OP 1330:
MINE DISPOSAL HANDBOOK
*PART 3 OF 4**

In the collection of the
U.S. Naval Undersea Museum

NUM.2019.010.190

**Manual has been separated into four parts due to its large size*

E.C.HADERLIE

Museum volunteer crossed out "Declass in Full" on sticker below on accident. Please disregard cross out on sticker. Booklet is declassed in Full

[redacted]

per OPNAVINST 5513.16-02 by
COMNAVSEA DECLASS TEAM on
4/22/98

Other Agency Interest DECLASSIFIED
x YES ____NO

P.O.C. for CLASS/DECLASS
Commander Naval Sea Systems Command
Attn: Security Office, SEA 09T
2531 Jefferson Davis Hwy
Arlington, VA 22242-5160

MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

. . . . . .

JUNE 1, 1945

[redacted]

TABLE OF CONTENTS

PART V - ITALIAN UNDERWATER ORDNANCE

CHAPTER 1

ITALIAN CONTACT MINES	Page
Mine Chart (Table 1)	2
Introduction	3
Mine Type II	5
Mine Type IJ	7
Mine Type IK (IK Coloniale)	11
Mine Type IL	15
Mine Type IM	17
Mine Type IN	19
Mine Type IO	21
Mine Type IP	25

CHAPTER 2

ITALIAN TORPEDOES	
Introduction	3
Warheads Types A, B and C	3
SIC Warhead	3
Standard Exploder	7
SIC Activator	11
SIC Circuit - Operation	15
Circling Torpedo	17
Circling Torpedo Exploders	
Impact-Direct Action Type	21
Impact-Inertia Type	21
Self-Destroying Type	23

CHAPTER 3

ITALIAN DEPTH CHARGES	
Introduction	3
1927 Model Depth Charge	3
1936 Model Depth Charge	5
Pistols Type A and B	7
Boosters Type A and B	9
Booster Extender and Booster Release Mechanisms	9
Flooder Device	9
Tactical Depth Charge	11

CHAPTER 4

ITALIAN MISCELLANEOUS	
Controlled Mine Type O	3
160/C. S. Depth Bomb	5
Fuzes for 160/C. S. Depth Bomb	5
Explosive Paravane	11
Explosive Motorboat	13

[redacted]

MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

CHAPTER I

ITALIAN CONTACT MINES

JUNE 1, 1945

[redacted]

ITALIAN CONTACT MINES

Mine Type	Italian Designation	Laid By	Charge Wt. (lb.)	Firing Methods	Dimensions Dia. (in.)	Dimensions Length (in.)	Depth Taking	Maximum Depth (ft.)	Total Weight in Air (lb.)	Remarks
II	Torpedine aep 125/1933	S/C	275	Six chemical horns	33	40	Plummet	990	488	
IJ	Torpedine aep 145/1935	S/C	320	Seven chemical horns	38	38	Plummet	191	685	
IK	Torpedine aep 200/1936	S/C	440	Nine chemical horns	40 1/2	40 1/2	Plummet	330 case	851	Known to have been fitted with acoustic unit.
IL	Torpedine aep 150/1935	Sub	260	Seven chemical horns	36	54	Explosive pawl	1650 anchor 330 case	Unknown	
IM	Torpedine A.M. 70/1916 Harle	S/C	170	Hydrostat valve	30	30	Plummet	330	Unknown	
IN	Aircraft Mine 70/1918	A/C	154	Mechanical	Unknown		Suspended from buoy	5	Unknown	Drifter
IO	Torpedine Beta	S/C or A/C	425	Inertia-impact	18	104	Drifter		780	Fitted with PSE and scuttling clock.
IP	Torpedine Tipo V	A/C	739	Antenna (Galvanic action)	18	98	Ground		1101	Fitted with PSE.

ITALIAN CONTACT MINES

Introduction

1. Although more than sixty models and modifications of Italian mines are believed to exist, this chapter discusses only those which have been recovered or concerning which reasonably complete intelligence information is available. It is believed that the other types either are obsolete or never progressed beyond the design stage. It is not considered likely that types other than those treated herein will be encountered by field personnel.

2. Almost no generalizations can be drawn with respect to Italian mine design. Although some of the mine firing devices and accessories incorporate unique features in the field of mine design, it will be noted that the various mine types described herein (i.e., those believed to be in service) reflect British, French and German design techniques for the most part and present but few original features. The mines vary considerably both in appearance and in the depth-taking and firing methods employed.

3. Particular care should be exercised when dealing with the moored contact type of mine which carries horns on its lower hemisphere, provided that the horns are not fitted on brackets. The position of the horn relative to the vertical is such that gravity prevents the electrolyte from running down into a horn battery when the vial is crushed. For this reason, each such horn contains a gas-charged vial in addition to the electrolyte ampoule, the purpose of the vial being to force the electrolyte up into the horn battery. Should one of these horns be broken, danger to personnel exists in that acid may be sprayed in the surrounding area, even though the mine firing mechanism has been rendered safe.

4. P.S.E.'s will be found fitted to the tail cover plates of both the Mines Type IO and IP. These devices, however, provide little difficulty in RMS because, in each case, access to the mine case is readily obtained elsewhere.

5. The following precautions should generally be observed when dealing with Italian contact mines:

   (a) Be particularly careful not to bend or damage the horns in any way. This is of particular importance since some Italian mines contain mechanical horn firing systems which operate on horn movement.

   (b) Do not move or jar the mine except from a safe distance.

   (c) Do not allow metallic objects to contact antennae or electrodes.

   (d) Note that boosters and detonators are permanently married upon completion of arming.

   (e) Note that the self-disarming devices depend upon spring tension and cannot be relied upon to operate as designed.

[redacted]

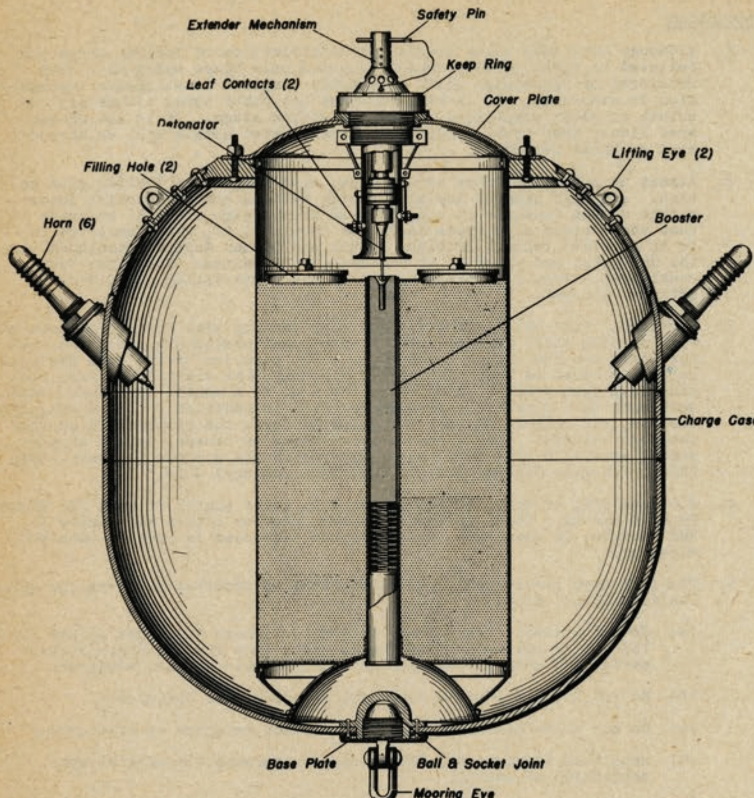


Fig. I - Mine Type II, Sectional View

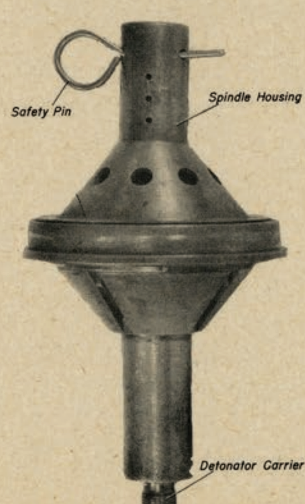


Fig. Ia - Mine Type II, Extender Mechanism

[redacted]

ITALIAN CONTACT MINES

Mine Type II

General

1. Moored, contact, chemical horn mine, laid by surface craft.

2. Italian designation, "Torpedine aep 125/1933 Bollo".

3. Defensive mine, for use in maximum depth of water of 990 ft. against surface craft.

Description

1. Case

Shape	Two hemispheres, joined by a 5" cylindrical mid-section.
Color	Black
Material	Steel
Diameter	33"
Length	40"
Charge	275 lb. cast TNT
Total weight in air	487 lb.

2. External fittings

Horns	Six, equally spaced around upper hemisphere, 24" from center.
Cover plate	19" diam., in center of upper hemisphere, lap-fitted, secured by 18 bolts.
Extender mechanism	5" diam., in center of cover plate, secured by keep ring.
Base plate	5" diam., welded to center of lower hemisphere, fitted with ball and socket joint for securing mooring eye.
Name plate	16" from center of upper hemisphere.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug allows the extender to operate upon application of the proper degree of hydrostatic pressure. When the extender operates, it moves the detonator carrier downward within its housing, performing the following arming functions:

   (a) It bridges two leaf contacts in the housing, thereby arming the firing circuit.

   (b) It separates two scissors arms, thereby freeing the spring-loaded booster to house over the detonator.

2. Standard chemical horn firing.

3. The only self-disarming device is the extender mechanism which is designed to disarm the mine by opening the firing circuit and separating the detonator and booster upon release of hydrostatic pressure.

Precautions

1. Check the extender spindle. Except in extreme emergency, do not attempt RMS if a safety pin cannot be inserted through the top of the spindle and spindle housing in the hole provided.

RMS

1. Remove the keep ring and extender mechanism.

2. Reach in the case, press back the spring clips and remove the booster.

3. Dispose of detonator, booster and charge.

[redacted]

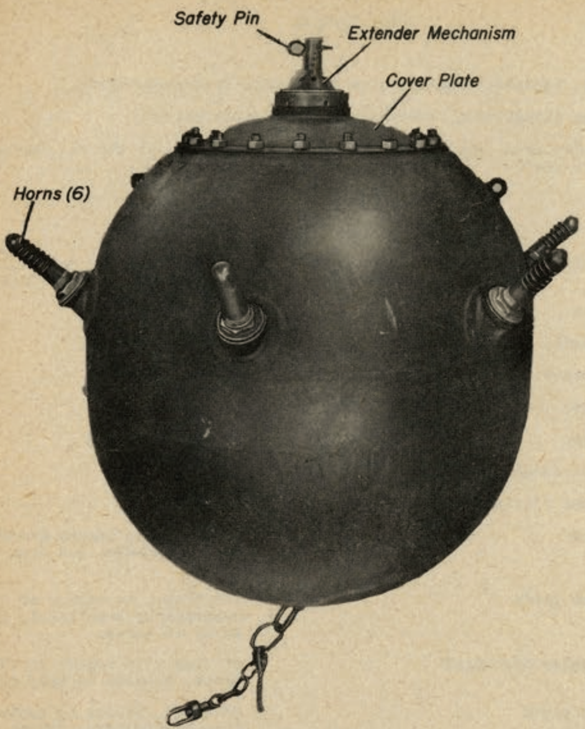


Fig. 2 - Mine Type II

Fig. 3 - Mine Type II, Floating

ITALIAN CONTACT MINES

Mine Type IJ

General

1. Moored, contact, chemical horn mine, laid by surface craft.
2. Italian designation, "Torpedine aep 145/1935."
3. Defensive mine, for use in maximum depth of water of 191 ft. against surface craft or submarines.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	38"
Charge	320 lb. cast TNT with TNT booster.
Total weight in air	685 lb.

2. External fittings

Horns	Seven; four equally spaced around upper hemisphere, 19" from center; one in center of upper hemisphere; two, 90° apart on lower hemisphere, 15" from center.
Base plate	16" diam., in center of lower hemisphere, lap-fitted, secured by 18 bolts. Fitted with straight shank mooring spindle, soluble plug fitting and detonator strongback and set screw.
Lifting eyes	Two, 90° apart on upper hemisphere, 8" and 26" respectively from center.
Anchor securing lugs	Three; two on lower hemisphere, 13" from center; one on upper hemisphere, 24" from center.
Name plate	On lower hemisphere, between horns, 23" from center.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug permits mooring tension to pull out the mooring spindle, closing the mooring safety switch, tripping the booster release lever and the mine is armed.
2. Standard chemical horn firing.
3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. Check the mooring spindle. Except in extreme emergency, do not attempt RMS if a safety pin cannot be inserted in the hole provided.

RMS

1. Unscrew the set screw in the center of the detonator strongback until the seal is broken and the detonator carrier starts to withdraw.
2. Remove the set screw and swing the strongback clear.
3. Remove the detonator carrier.
4. Remove the base plate; the booster will follow the base plate.
5. Dispose of detonator, booster and charge.

[redacted]

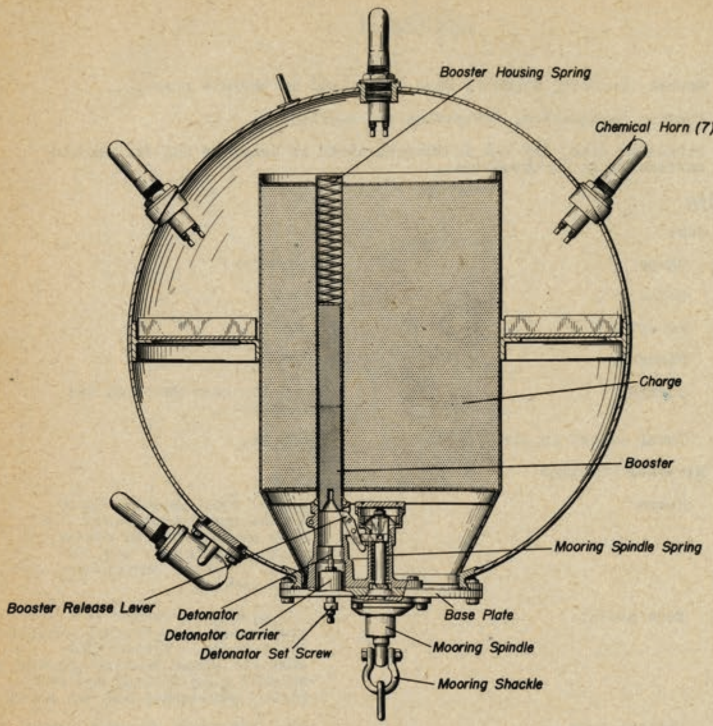


Fig.4- Mine Type IJ, Sectional View

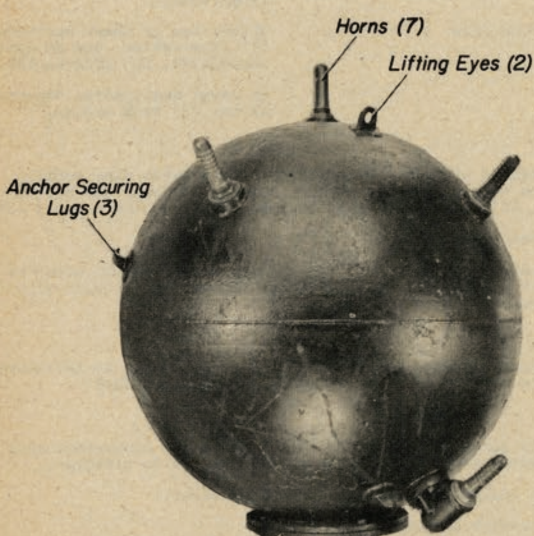


Fig.5- Mine Type IJ

[redacted]

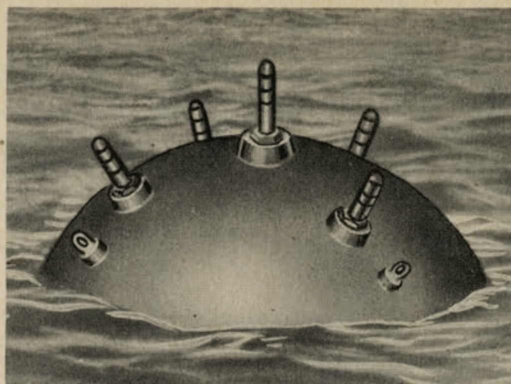
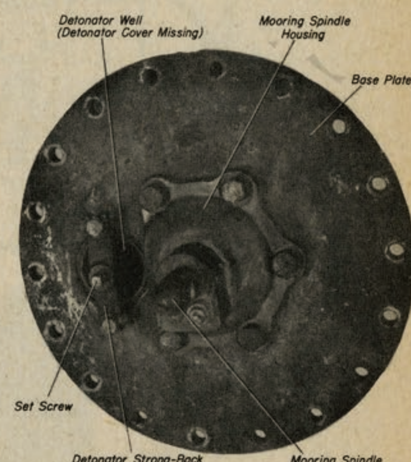


Fig. 6 - Mine Type IJ, Floating

Fig. 7 - Mine Type IJ, Base Plate, External View



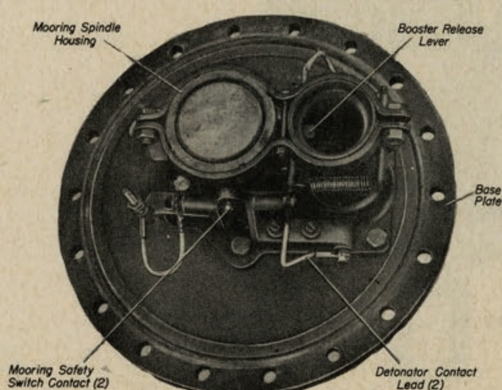


Fig. 8 - Mine Type IJ, Base Plate, Internal View

[redacted]

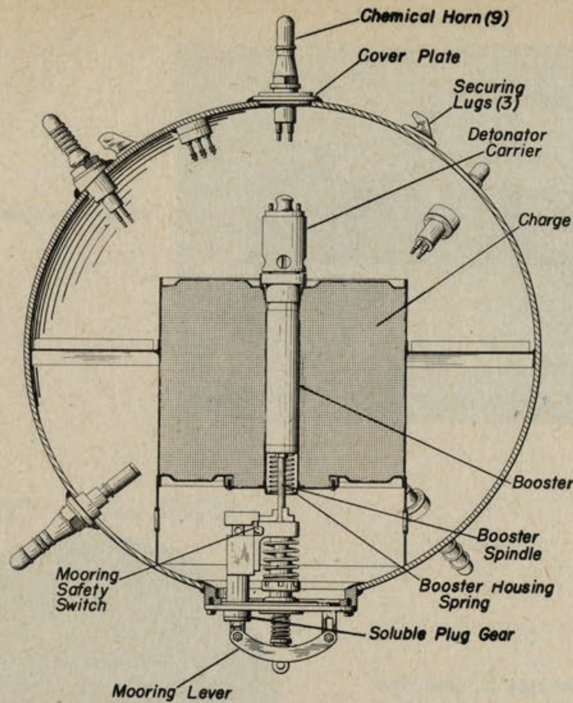


Fig. 9 - Mine Type IK, Sectional View

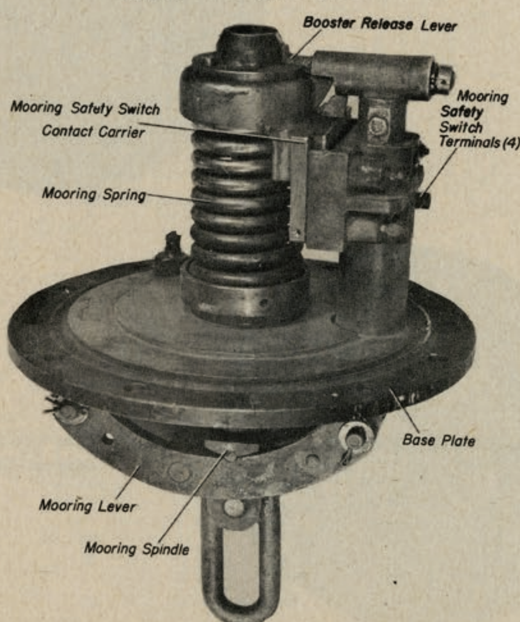


Fig. 10- Mine Type IK, Base Plate

[redacted]

ITALIAN CONTACT MINES

Mine Type IK (IK Colonial)

General

1. Moored, contact, chemical horn mine, laid by surface craft. May be fitted with upper antenna.

2. Italian designation, "Torpedine aep 200/1936."

3. Defensive mine, for use in maximum depth of water of 330 ft. against surface craft.

4. This mine has been recovered with an acoustic unit fitted in place of the horn on the top cover plate. However, no details of acoustic operation are known.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	40 1/2"
Charge	440 lb. cast TNT with pressed TNT booster.
Total weight in air	851 lb.

2. External fittings

Horns	Nine; four, equally spaced around upper hemisphere, 21" from center, bosses painted red; one in center of upper hemisphere, boss painted blue; four equally spaced around lower hemisphere, 19" from center, bosses painted green.
Cover plate	10" diam., in center of upper hemisphere, lap-fitted, secured by eight bolts. Fitted with horn in center.
Base plate	12" diam., in center of lower hemisphere, lap-fitted, secured by 12 bolts. Fitted with mooring lever, soluble plug gear and antenna stuffing box.
Lifting eyes	Four; two, 180° apart on upper hemisphere, 19" from center; two, 180° apart on lower hemisphere, 19" from center.
Securing lugs	Three; two on upper hemisphere, 120° apart, 19" and 38" respectively from center; one on lower hemisphere, 11" from center.
Support legs	Three, forming a triangle whose base is 15" and whose center is 35" from center of lower hemisphere.
Name plate	12" from center of lower hemisphere.

3. The Mine Type IK Colonial differs from Mine Type IK as follows:

   (a) Its Italian designation is "Torpedine Coloniale aep 125/1938."

   (b) Its charge is 275 lb.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug allows mooring tension to pull out the mooring lever, closing the mooring safety switch, tripping the booster release lever and the mine is armed.

2. Standard chemical horn firing.

[redacted]

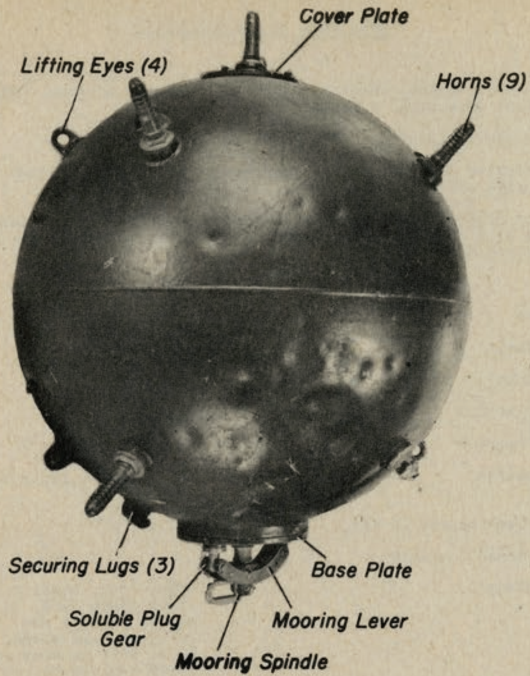


Fig. 11 - Mine Type IK

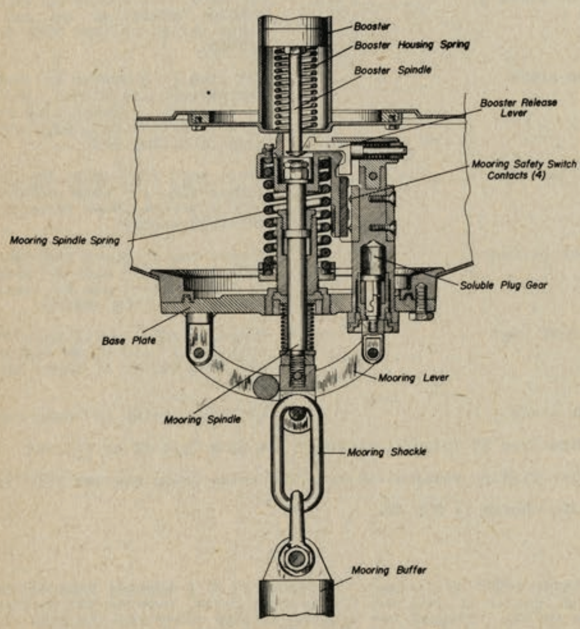


Fig. 12 - Mine Type IK, Base Plate,
Showing Booster Release Mechanism, Sectional View

[redacted]

(Mine Type IK (IK Colonial), (Cont'd.)

3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. Keep all necessary noise to a minimum. The mine is known to have been fitted with an acoustic unit.

2. Check the mooring spindle. Except in extreme emergency, do not attempt RMS unless the bellows around the lower portion of the mooring spindle has retracted completely. The condition of the bellows may be ascertained by cutting its rubber diaphragm housing.

RMS

1. Remove the cover plate.

2. Compress the spring clips and remove the detonator lead plug.

3. Break the bayonet joint and remove the detonator carrier. The spring-loaded booster will follow it out.

4. Dispose of detonator, booster and charge.

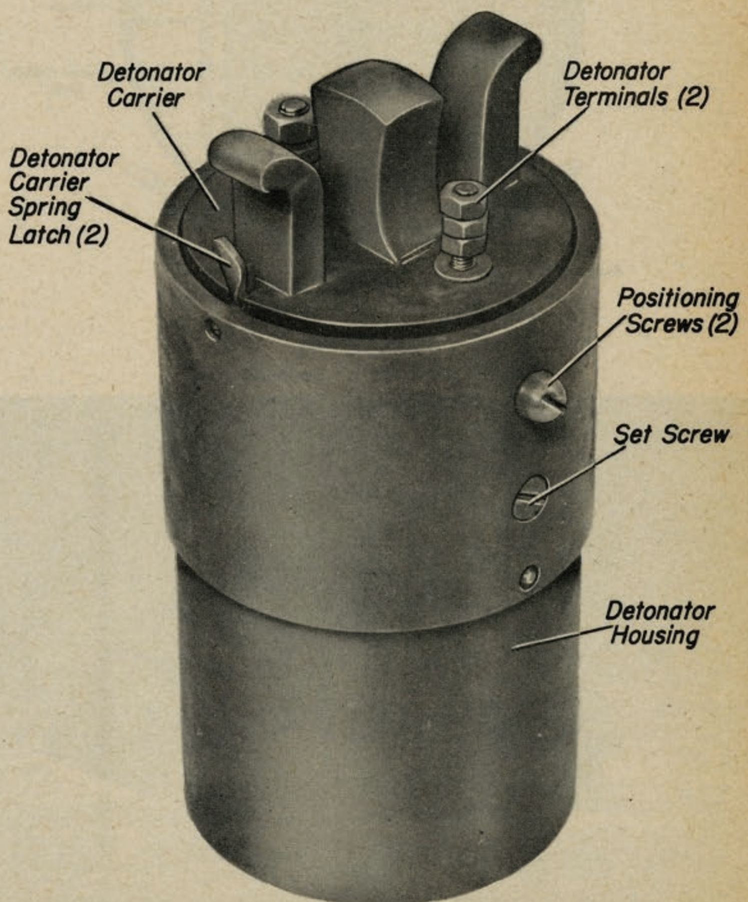


Fig. 13 - Mine Type IK, Detonator Carrier and Housing

[redacted]

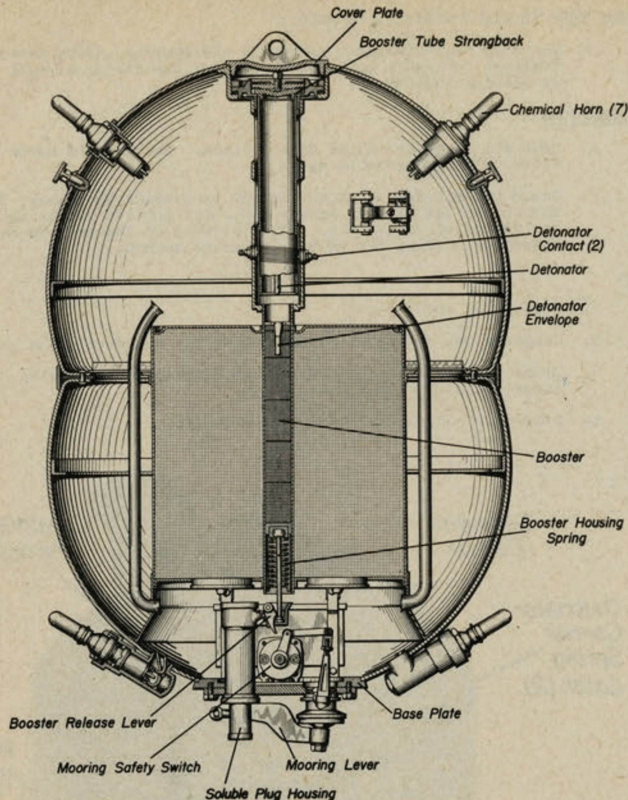


Fig. 14 - Mine Type IL, Sectional View

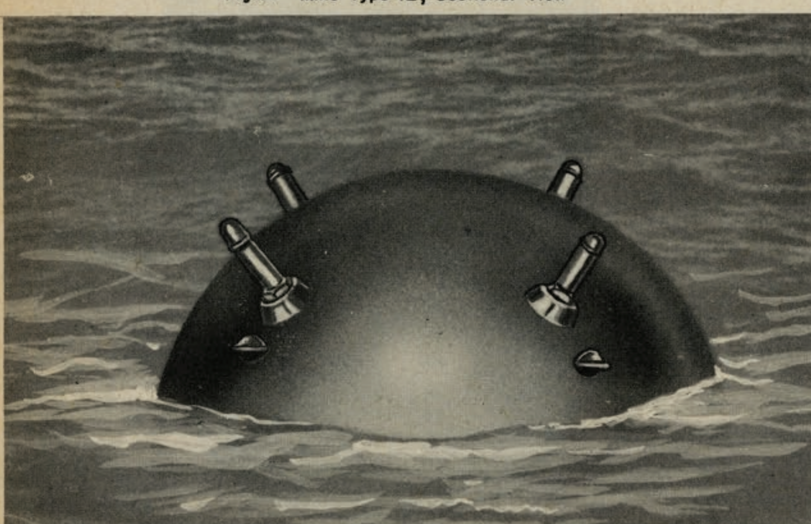


Fig. 15 - Mine Type IL, Floating

ITALIAN CONTACT MINES

Mine Type IL

General

1. Moored, contact, chemical horn mine, laid by submarine.
2. Italian designation, "Torpedine aep 150/1935."
3. Defensive mine, for use in maximum depth of water of 1650 ft. against submarines or surface craft. Maximum depth of case when moored is 330 ft.

Description

1. Case

Shape	Two truncated spheres, joined by a cylindrical band.
Color	Black
Material	Steel
Diameter	36"
Length	54"
Charge	260 lb. cast TNT.
Total weight in air	Unknown

2. External fittings

Horns	Seven; four equally spaced around upper hemisphere; three equally spaced around lower hemisphere.
Cover plate	In center of upper hemisphere, secured by keep ring.
Base plate	In center of lower hemisphere, fitted with mooring lever and soluble plug gear.
Mooring hydrostat	On lower hemisphere, adjacent to base plate.
Positioning lugs	Twelve; three sets of four each, two sets on upper sphere, one set on lower sphere.

Operation

1. Mine takes depth by a variation of the loose bight hydrostat system whereby a small charge detonates when the mine rises to its pre-set depth, permitting a pawl to engage the mooring cable drum. Dissolution of a soluble plug allows mooring tension to pull out the mooring lever, closing the mooring safety switch, tripping the booster release lever and the mine is armed.
2. Standard chemical horn firing.
3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. Except in extreme emergency, do not attempt RMS unless the mooring lever has retracted fully.

RMS

1. Remove the keep ring and cover plate.
2. Reach in the case and remove the strongback from over the booster tube. The detonator and booster assembly is spring-loaded and should come out upon release of the strongback.
3. Dispose of detonator, booster and charge.

[redacted]

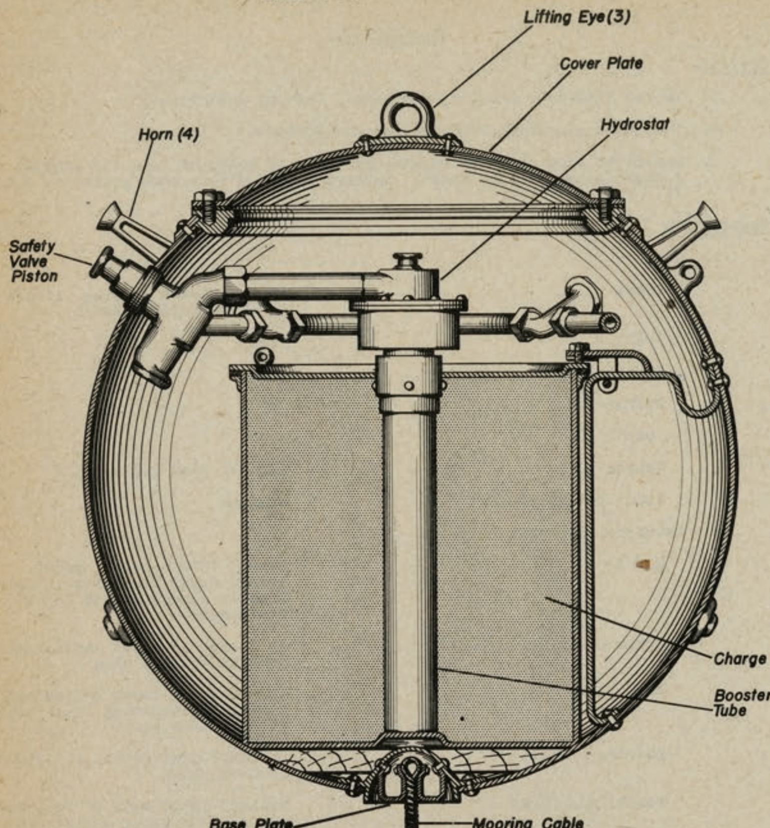


Fig. 16 - Mine Type IM, Sectional View

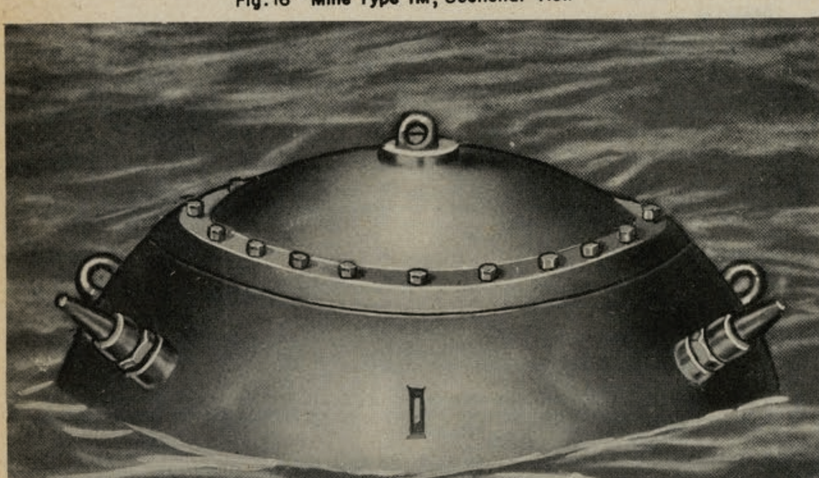


Fig. 17 - Mine Type IM, Floating

[redacted]

ITALIAN CONTACT MINES

Mine Type IM

General

1. Moored, contact, hydrostatic horn mine, laid by surface craft.

2. Italian designation, "Torpedine am 70/1916 Harle."

3. Defensive mine, for use in maximum depth of water of 330 ft.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	30"
Charge	170 lb.
Total weight in air	Unknown

2. External fittings

Horns	Four, equally spaced around upper hemisphere.
Cover plate	16" diam., in center of upper hemisphere.
Safety valve piston	On upper hemisphere, between two horns.
Lifting eyes	Three; one in center of upper hemisphere; two, 180° apart on upper hemisphere.
Base plate	In center of lower hemisphere, fitted with ball and socket joint for mooring eye.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug permits the safety valve piston to arm the hydrostatic firing device.

2. Mine fires when one of the horns is broken. This admits water to a hydrostat in the top center of the charge container. When the hydrostat is depressed, it frees a spring-loaded firing pin to impinge on the detonator.

Precautions

1. See Introduction.

RMS

1. Remove the cover plate.

2. Cut the hose leading to the hydrostat.

3. Unscrew and remove the hydrostat. The detonator and booster are attached thereto.

4. Dispose of detonator, booster and charge.

[redacted]

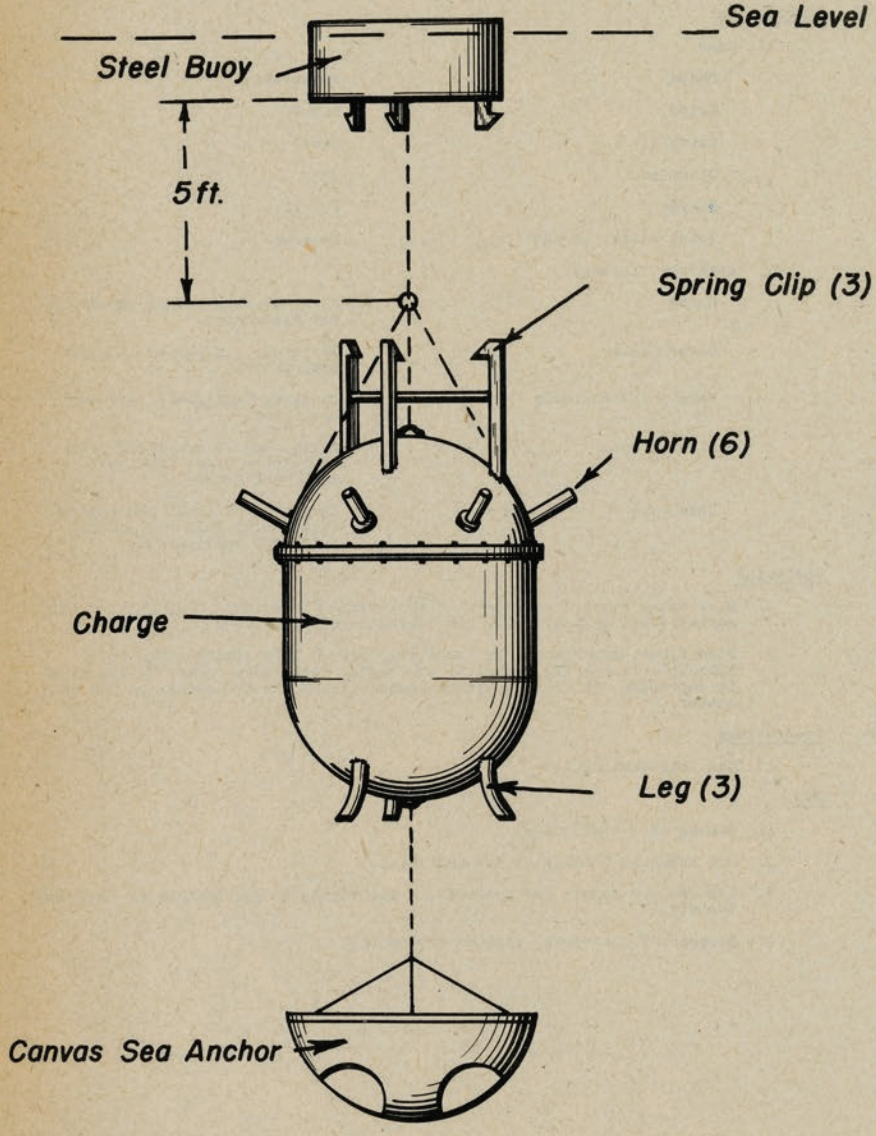


Fig. 18 - Mine Type IN, Armed Position

ITALIAN CONTACT MINES

Mine Type IN

General

1. Drifting, contact, mechanical horn mine, laid by aircraft.
2. Italian designation, "Aircraft Mine 70/1918."
3. Offensive mine,for use against surface craft. Depth of case when drifting is approximately five feet.

Description

1. The mine is reported as being cylindrical with hemispherical ends and carrying a charge of 154 lb. TNT.
2. External fittings

Horns	Six, equally spaced around upper end.
Hydrostat	In center of upper end.
Float	Secured to upper end by five ft. pendant.
Spring clips	Three, equally spaced around upper end.
Legs	Three, equally spaced around lower end.

3. A bucket-shaped sea anchor of unusual design is used with the mine.

Operation

1. When the mine is launched, the float separates from the case and the sea anchor fills with water and descends to the end of a suspension pendant. The mine then floats beneath the surface at a depth regulated by the length of the float pendant and the negative buoyancy of the sea anchor. Dissolution of a soluble plug allows the hydrostat to depress and arm the firing mechanism.
2. The mine fires when one of the horns is bent. The horn acts as a lever and, upon being bent, transfers the motion through a lever system to a wheel which rotates and releases a spring-loaded firing pin to impinge on the detonator.
3. The only self-disarming device is a galvanic cell which is designed to corrode a hole in the case and sink the mine after a period of nine hours.

Precautions

1. See Introduction.

RMS

1. None known.

[redacted]

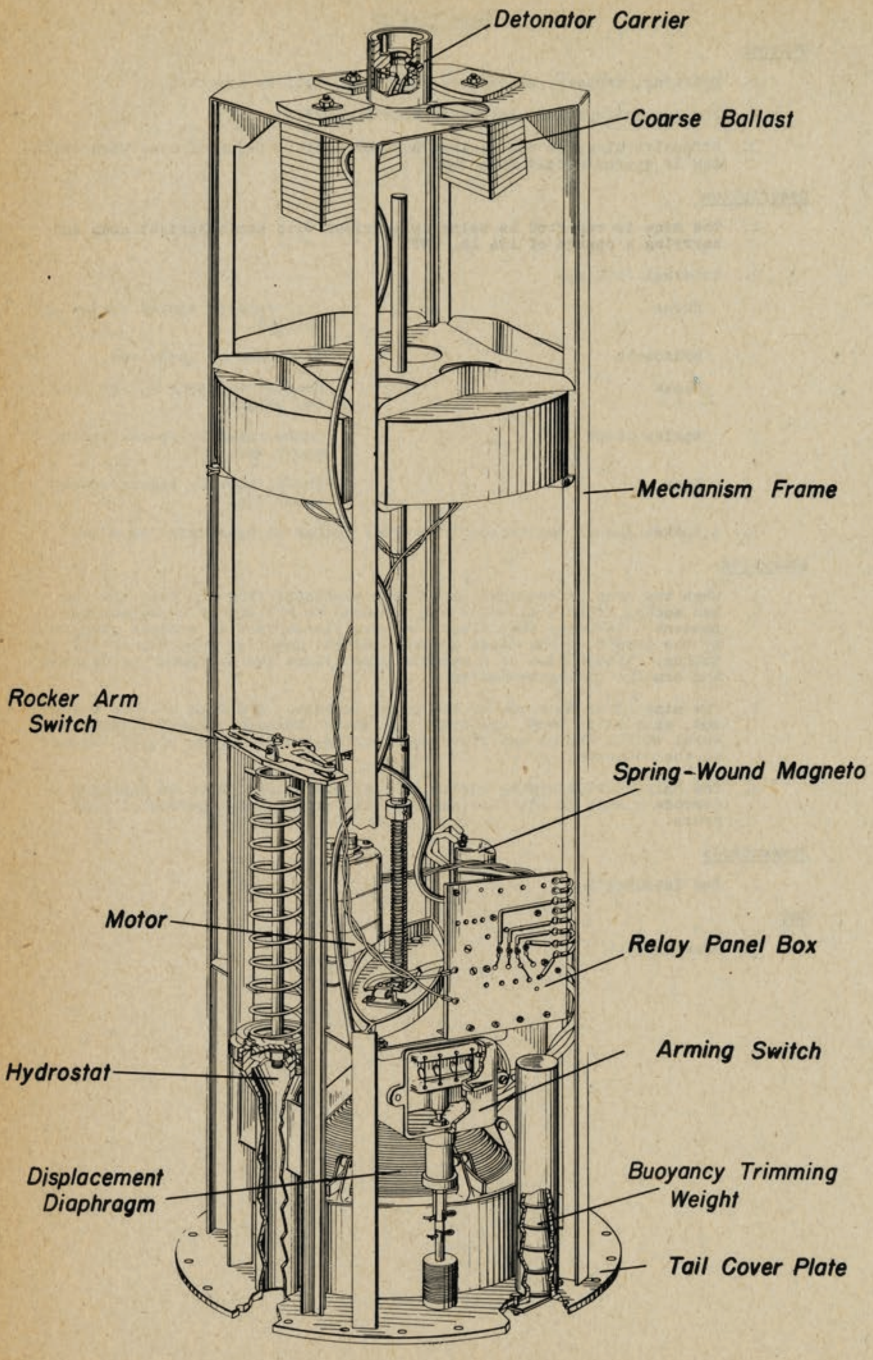


Fig. 19 - Mine Type 10, Depth Control and Firing Mechanism, Perspective View

ITALIAN CONTACT MINES

Mine Type IO

General

1. Oscillating, percussion-fired mine, laid by surface craft or by aircraft with parachute.

2. Italian designation, "Torpedine Beta."

3. Offensive mine, for use in rivers, harbors and anchorages against shipping, docks, dams, bridges, etc.

Description

1. Case

Shape	Cylindrical, with truncated conical nose. Fitted with 5" cylindrical skirt on after end.
Color	Gray
Material	Steel
Diameter	18"
Length	8' 1 1/2"
Charge	425 lb. Torpex.
Total weight in air	780 lb.

2. External fittings

Tail cover plate	17 1/2" diam., on after end of case, secured by 29 bolts.
Hydrostat tube	1 1/2" diam., on tail cover plate, 12" from center.
Clock cover plate	2 3/4" diam., on tail cover plate, 2" from center, secured by four screws.
Arming switch knob	1/2" diam., on tail cover plate, 1 1/2" from center.
Buoyancy tube	1" diam., on tail cover plate, 2" from center.
Booster release mechanism	4" diam., screwed into center of nose.
Suspension lug	On top center line, 37" abaft the nose.
Filling hole cover	4" diam., 180° from top center line, secured by six screws.
Parachute release mechanism	On top center line at after end of case.

3. The depth control mechanism consists essentially of a 9" conical displacement diaphragm, a small motor and a hydrostatic motor control. The hydrostatic motor control may cause the motor to operate in either of two directions, direct control being accomplished by a rocker arm switch and associated relays. The motor in turn expands or contracts the diaphragm, depending on motor direction. Since one surface of the diaphragm is presented to the water on the tail cover plate, expansion or contraction of the diaphragm increases or decreases the displacement of the mine case, and thus, by definition, controls the buoyancy of the case.

Operation

1. When the mine is launched, a safety sleeve is removed from a boss on the tail cover plate. This permits the arming switch to close and battery current then energizes the relays of the hydrostatic motor control. Upon impact with the water, the mine sinks to a considerable depth due both to momentum and to the fact that the displacement diaphragm is fully retracted, thus giving the mine its greatest possible negative buoyancy. The hydrostatic motor control starts the motor which expands the diaphragm. As the diaphragm expands for the first time, it starts the scuttling clock and withdraws a safety fork from the inertia firing mechanism. The mine then rises rapidly to its pre-set depth, at which point the hydrostatic motor control reverses the motor direction and

[redacted]

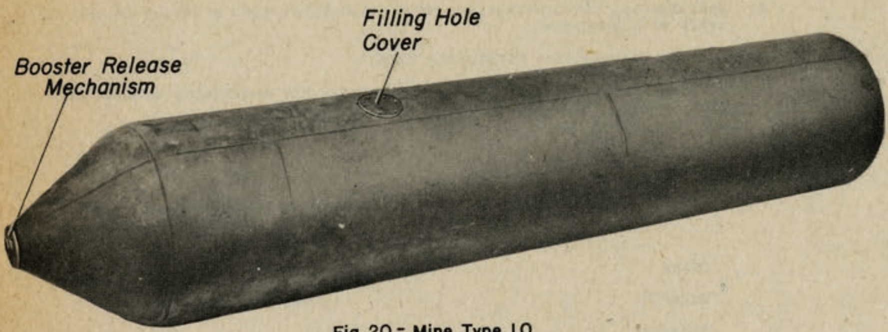


Fig. 20 - Mine Type 10

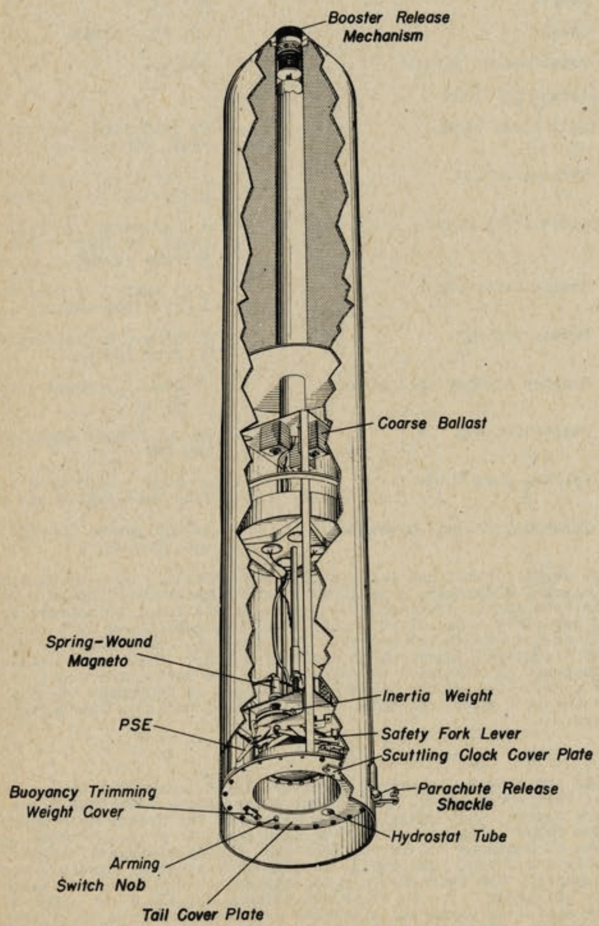


Fig. 21 - Mine Type 10, Perspective View

(Mine Type IO, Cont'd.)

the mine starts to sink. The mine then oscillates near its set depth. Dissolution of a soluble plug permits the booster release mechanism to house and lock the booster over the detonator and the mine is armed.

2. The mine fires upon receipt of a lateral blow sufficient to displace an inertia weight from its seat within the firing mechanism. Lateral displacement of the weight removes a stop from a small, spring-wound magneto which then turns, producing sufficient current to fire the detonator.

3. The only self-disarming device is the scuttling clock which, upon completion of its pre-set period (1-48 hours), is designed to retract the diaphragm permanently and thus sink the mine.

Precautions

1. Do not remove the tail cover plate of the mine until after the booster has been removed. A P.S.E., consisting of a lever system attached to both the inertia weight and the tail cover plate, is designed to trip the firing magneto if an attempt is made to remove the tail cover plate.

RMS

1. Remove the booster release mechanism and booster.

2. From a safe distance, remove the tail cover plate and attached fittings. Considerable force may be necessary to accomplish this and the detonator will probably fire during the process.

3. Dispose of booster and charge.

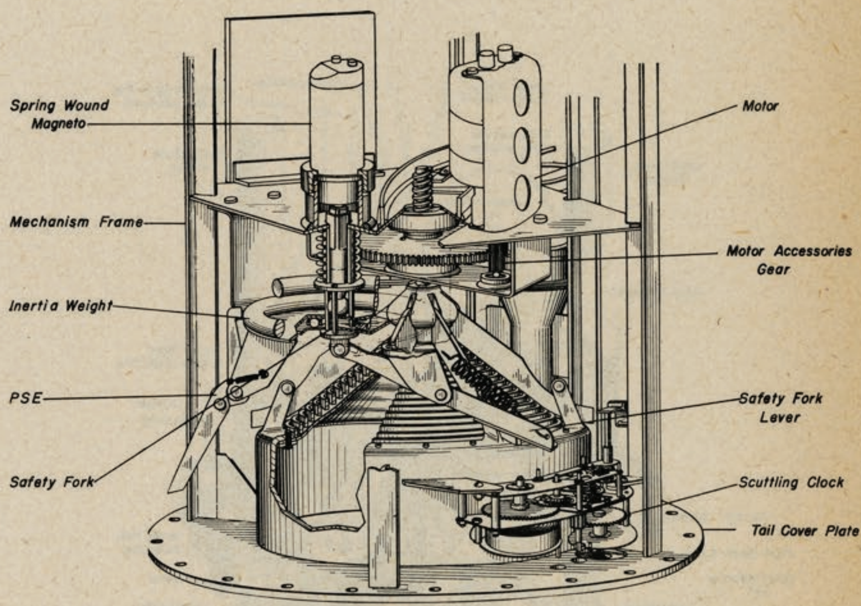


Fig. 22- Mine Type IO, Depth Control and Firing Mechanism, Perspective View

[redacted]

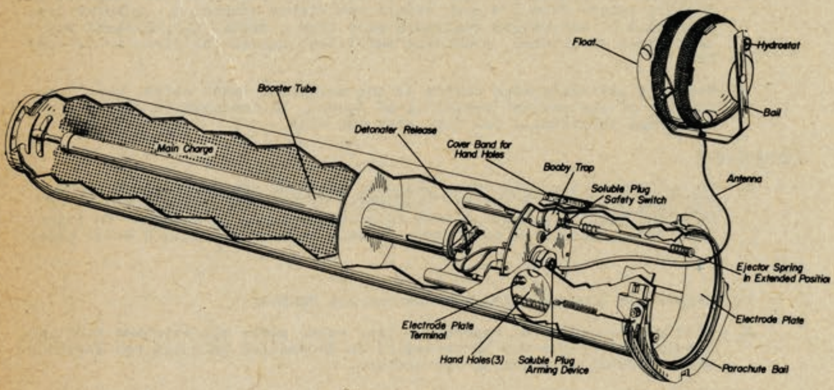


Fig. 23 - Mine Type IP, Perspective View

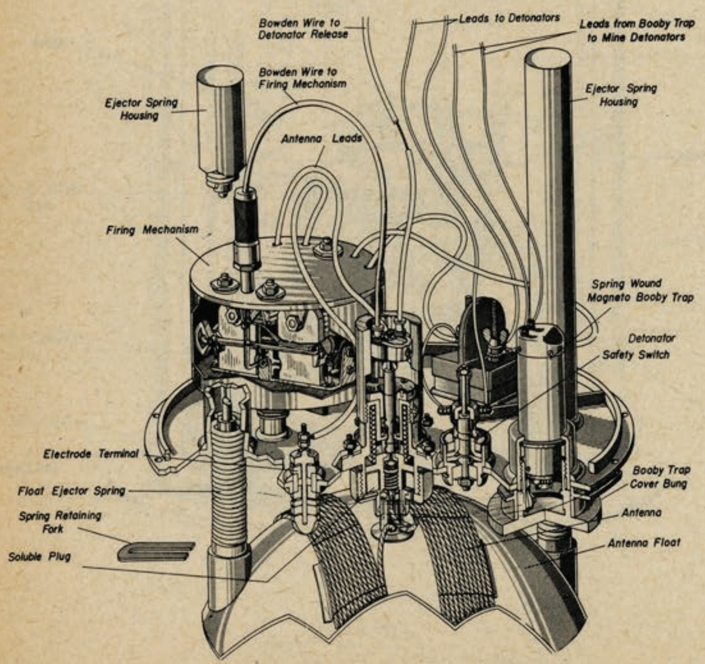


Fig. 24 - Mine Type IP, Base Plate, Perspective View

[redacted]

ITALIAN CONTACT MINES

Mine Type IP

General

1. Ground, contact, antenna mine, laid by aircraft with parachute.

2. Italian designation, "Torpedine Tipo V."

3. Offensive mine, for use in maximum depth of water of 110 ft. against surface craft.

Description

1. Case

Shape	Cylindrical, with rounded nose. Fitted with 19" cylindrical skirt on after end.
Color	Brown or gray-green.
Material	Steel
Diameter	18"
Length	8'2"
Charge	739 lb. (type of explosive unknown; believed similar to Minol)
Total weight in air	1101 lb.

2. External fittings

Nose cover plate	13" diam., in center of nose, lap-fitted, secured by eight bolts. Fitted with lifting eye in center.
Tail cover plate	17 1/2" diam., fitted to flange inside skirt 19" forward of after end, secured by 18 bolts.
P.S.E. cover bung	4" diam., on tail cover plate, 6 7/8" from center, screwed onto boss.
Soluble plug housing	In center of tail cover plate.
Detonator safety switch	1 1/4" diam., on tail cover plate, 4" from center, secured by keep ring from inside.
Antenna connector	On tail cover plate, 6" from center.
Float ejector springs	Two, 180° apart on tail cover plate, 6" from center.
Float release bail	Spring-loaded, swivelled on two lugs, 180° apart on after end of case, fitted with parachute release mechanism.
Steel band	6 1/4" wide, fitted around case 10 1/2" forward of after end; covers three equally spaced 5 1/2" diam. access holes.
Antenna float	Copper sphere, 17 1/2" diam., fitted with hydrostatic switch and mooring bail and forms drum for 80 ft. copper antenna. Fitted inside case between tail cover plate and float release bail prior to release.
Antenna electrode	Copper band, 16 1/2" diam., 4" wide, secured to and insulated from inside of skirt at after end.

Operation

1. When the mine is launched, release of parachute tension upon impact with water operates the parachute release mechanism. Dissolution of a solu-

[redacted]

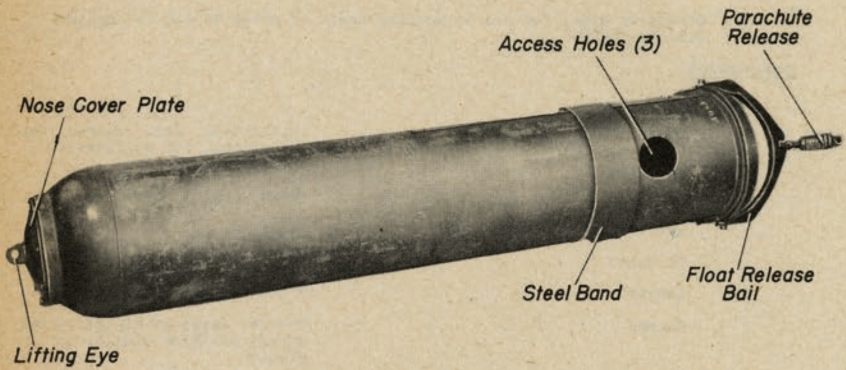


Fig. 25 - Mine Type IP

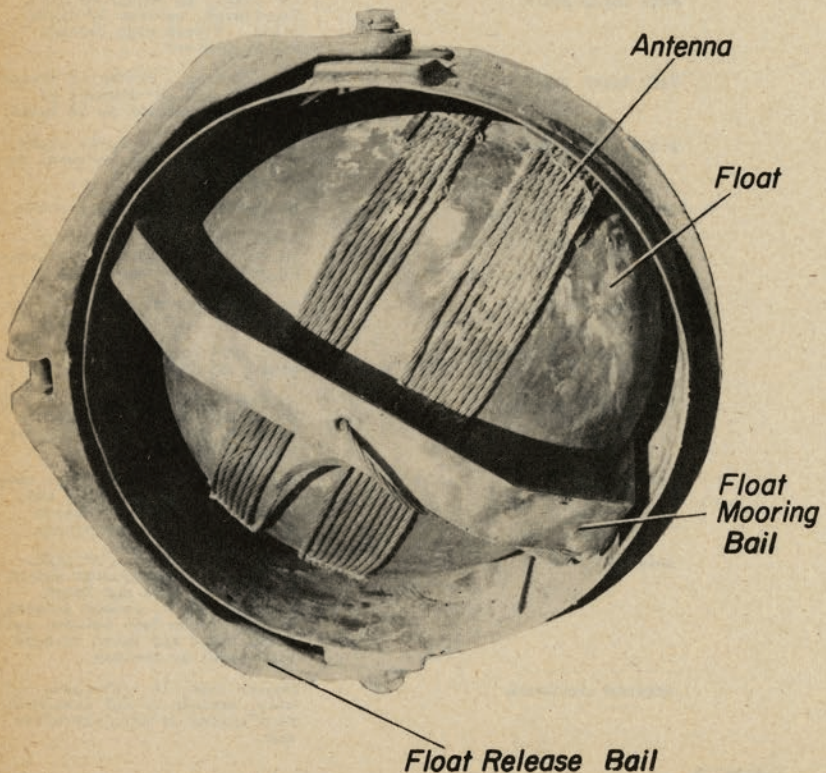


Fig. 26 - Mine Type IP, After End

[redacted]

(Mine Type IP, Cont'd.)

ble plug releases a spring-loaded spindle inside the tail cover plate. Release of the spindle performs the following arming functions:

(a) It frees the float release bail which swings clear, allowing the float ejector springs to force the float out of the case. The float then rises, unreeling the antenna. At the pre-set depth, its hydrostat allows a locking stud to engage the mooring bail, preventing further rotation of the float and mooring it in place.

(b) It operates a bowden wire which releases the detonator carrier and allows a coil spring to house the detonator in the booster.

(c) It operates a bowden wire which frees a small relay, thereby arming the spring-wound firing magneto.

(d) It completes a safety switch fitted in the circuit between the antenna and the magneto relay.

Dissolution of another soluble plug allows another spring-loaded switch to make, thereby completing the firing circuit and arming the mine.

2. The mine fires when the antenna or float contacts a metal of a type sufficiently dissimilar to set up a 10-15 milliampere current in the antenna circuit. This current operates a sensitive relay which in turn operates a lever system, releasing the magneto which fires the detonator.

3. No self-disarming devices are fitted.

Precautions

1. Never remove the P.S.E. cover plate until after the antenna has been disconnected and the detonator leads cut. Removal of this cover plate is designed to release the magneto and fire the mine as noted above.

2. Never attempt RMS underwater. If the mine is found on the bottom or in the surf, haul it ashore from a safe distance before beginning operations.

RMS

1. Slide back the steel band which covers the access holes and disconnect the antenna from its connector on the tail cover plate.

2. Retract the detonator safety switch and wedge it out.

3. Remove the tail cover plate.

4. Cut and tape each lead separately; disconnect bowden wires as necessary.

5. Remove the detonator and booster.

6. Dispose of detonator, booster and charge.

[redacted]

MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

. . . . . .

CHAPTER 2

ITALIAN TORPEDOES

JUNE 1, 1945

[redacted]

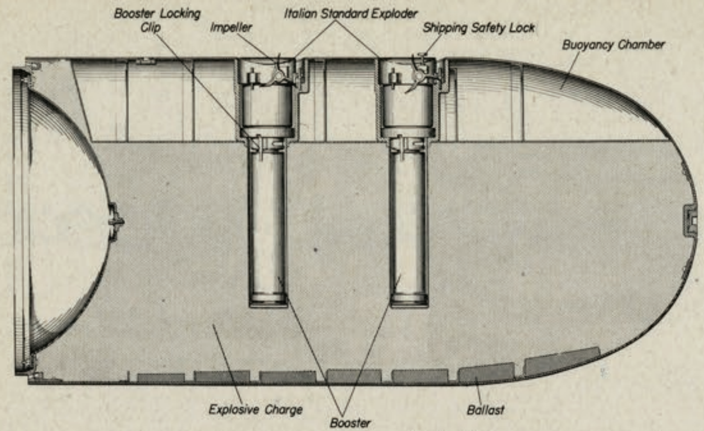


Fig. 1 - Warhead Type A, Sectional View

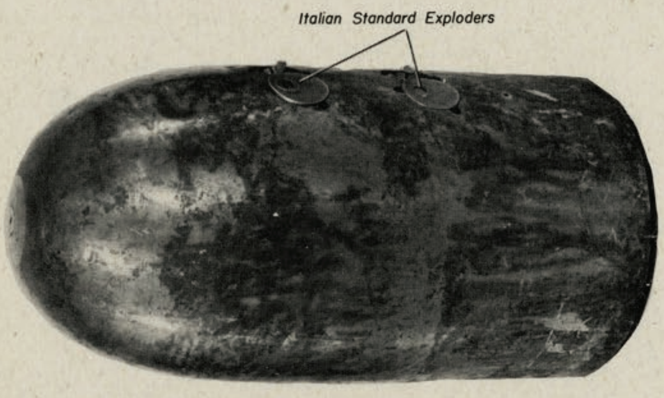


Fig. 2 - Warhead Type A

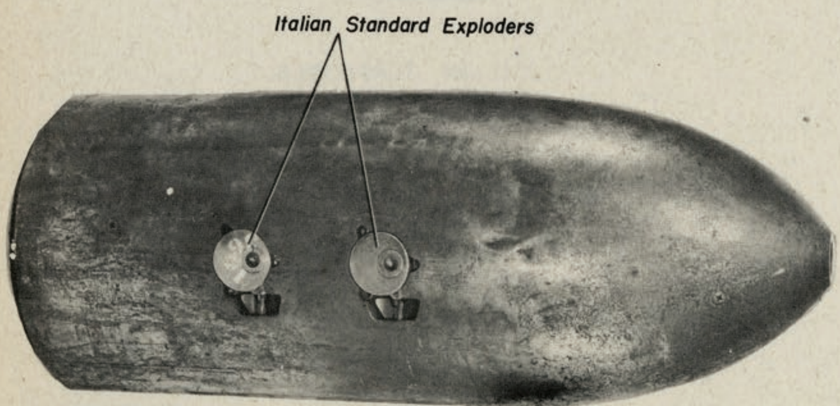


Fig. 3 - Warhead Type B

ITALIAN TORPEDOES

Introduction

1. The torpedoes of the Italian Navy are 21" and 18" in diameter and are all air-driven with the single exception of the 19 1/2", electrically-driven, aircraft-launched, circling torpedo. The Italians are known to have used some submarine-launched electric torpedoes also, but it is believed that these were obtained from the Germans. This chapter does not contain detailed information with respect to the entire torpedo assemblies, the single exception being the circling torpedo which is sufficiently unique to warrant full treatment. Data are included on representative examples of recovered warheads and the known types of exploders are covered in detail.

Italian Warheads

General

1. Although many types of Italian warheads have been examined, all types, excepting the SIC and circling torpedo warheads, are simply constructed and are quite similar in design. The warheads are either 18" or 21" in diameter, are constructed of steel, and contain no special features or fittings except the transverse exploder pocket on the top center line. Later models may contain two exploder pockets on the top center line, about 10" apart, either of which will receive the Standard Italian Exploder.

Description

1. Data on three standard 21" warhead types follow below:

(a) Type A (Round Nose)

Length	40"
Distances from centers of exploder pockets to after flange.	14" and 23"
Diameter of nose plug	1 3/4"
Marking on nose	GSE MARISUB LA SPEZIA

(b) Type B (Pointed Nose)

Length	52"
Distances from centers of exploder pockets to after flange	16" and 25"
Diameter of nose plug	3"
Marking on nose	GSE MARISUB TARANTO

(c) Type C (Round Nose)

Length	45"
Distances from centers of exploder pockets to after flange	16" and 26"
Diameter of nose plug	1 1/2"
Marking on nose	S.I. 270/553.4 x 7.2 C.P. GSE TARANTO

2. SIC Warhead

(a) This warhead is very similar externally to the standard types treated above. It is 46" long, 21" in diameter, and contains the two pockets on its top center line, the respective centers of which are 17" and 27" from the after warhead flange. The most obvious difference apparent to a casual inspection is the fact that the after pocket is fitted to receive the five securing screws for the SIC activator rather than the three screws which secure the Standard Exploder.

(b) The internal arrangement of the components of the magnetic firing device is as follows (all parts fitted just forward of the after bulkhead):

[redacted]

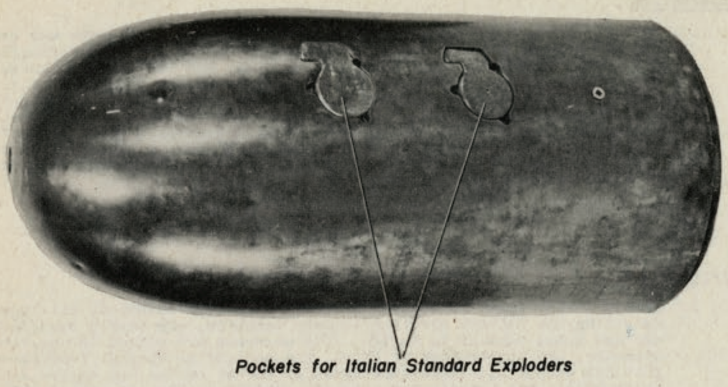


Fig. 4 - Warhead Type C

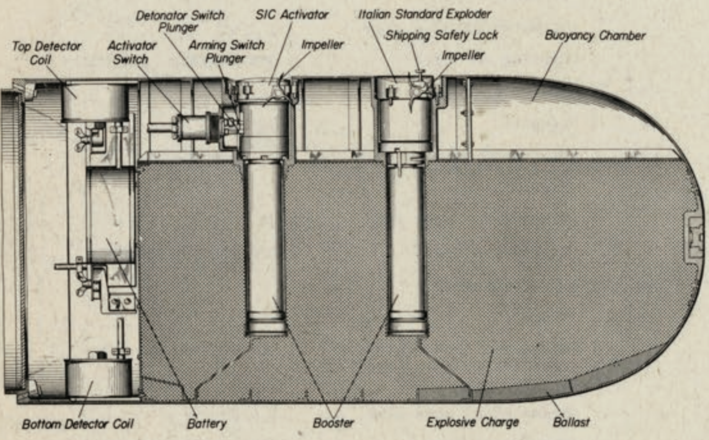


Fig. 5 - SIC Warhead, Sectional View

[redacted]

(Italian Warheads, Cont'd.)

(1) Two detector coils, one on the top center line and one on the bottom center line.

(2) An amplifier unit on the starboard side.

(3) A battery on the port side.

(4) A magnetic test switch on the lower starboard side.

(c) Light-colored, rubberized cables extend within the warhead as follows:

(1) From the battery to the amplifier.

(2) From the amplifier to the magnetic test switch.

(3) From the upper detector coil to the magnetic test switch.

(4) From the lower detector coil to the magnetic test switch.

(5) From the amplifier to a switch on the after edge of the activator pocket.

3. The circling torpedo warhead is treated elsewhere in this chapter.

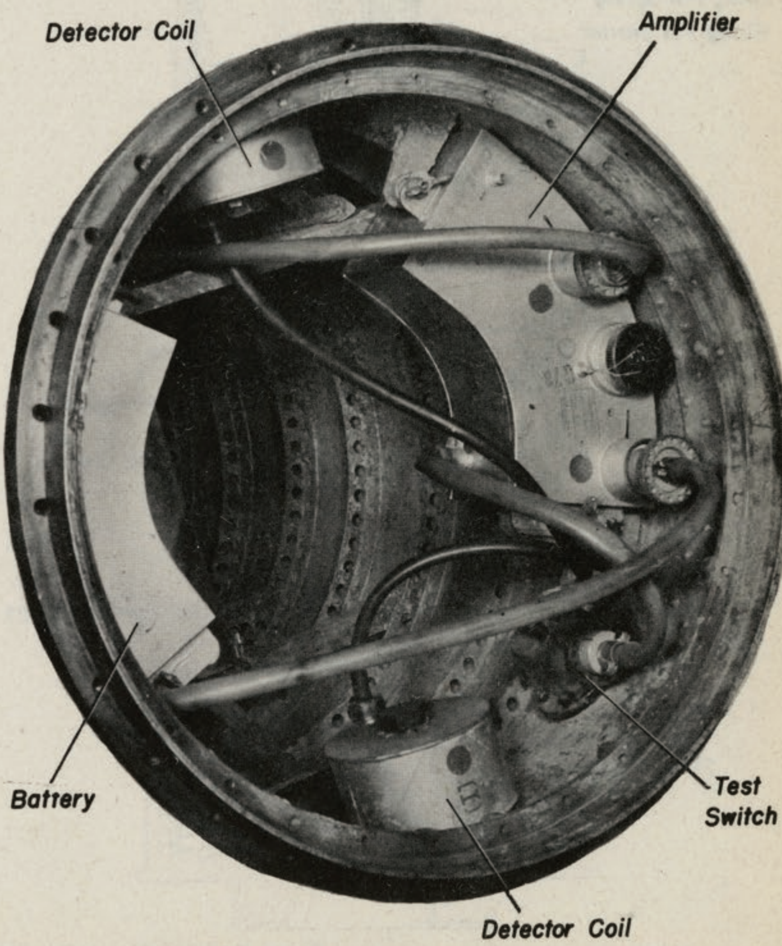


Fig 6- SIC Warhead

[redacted]

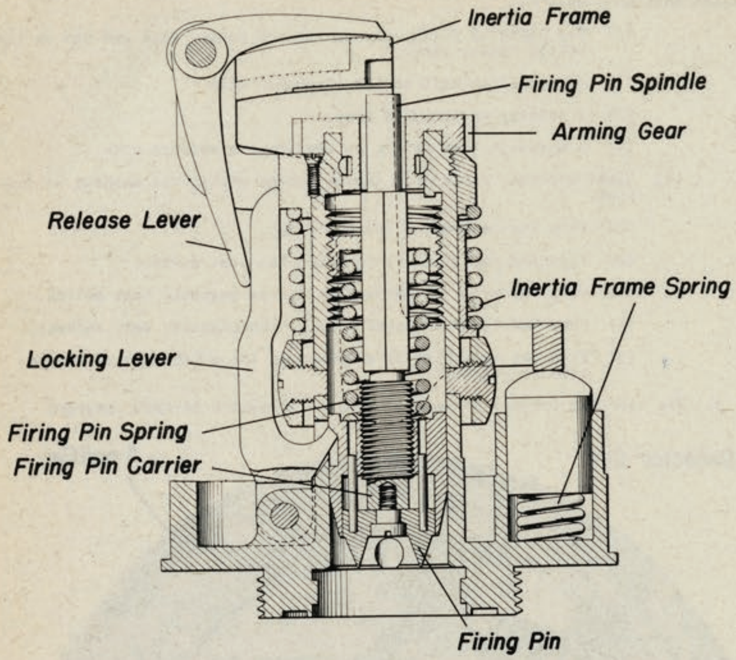


Fig. 7 - Italian Standard Exploder, Armed Position, Sectional View

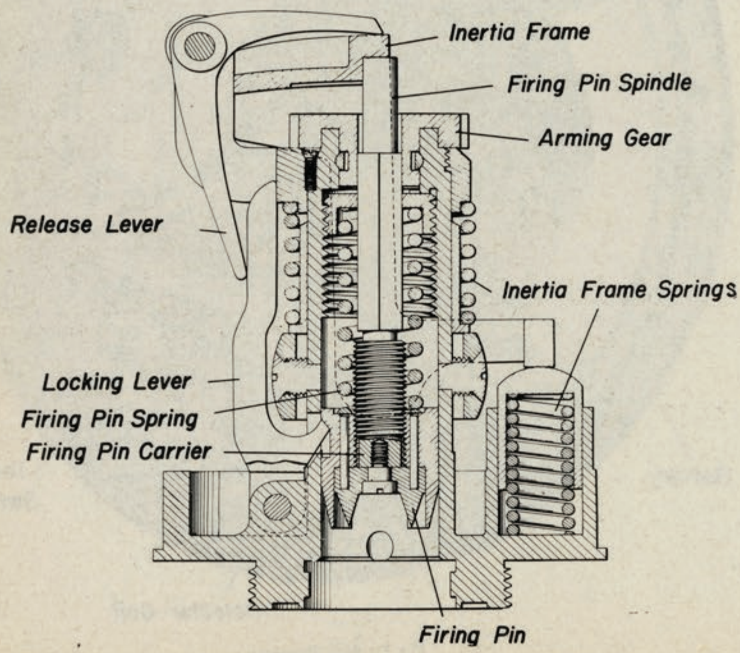


Fig. 8 - Italian Standard Exploder, Unarmed Position, Sectional View

[redacted]

ITALIAN TORPEDOES

Italian Standard Exploder

General

1. Impact-inertia type, fitted in transverse pocket on top center line of warhead. Used in surface craft, aircraft and submarine-launched torpedoes; two exploders usually fitted to each warhead.

Description

1. External

   (a) The exploder is 15 3/4" long, 3 3/4" in maximum diameter, and is composed of the following main parts:

   (1) An upper section, consisting of a cylindrical brass housing, 5" long, which encloses the main working parts of the exploder. A three-bladed impeller, mounted on the end of an impeller shaft which protrudes from the side of the housing, rotates in an impeller trough adjacent to the exploder pocket. An inspection port covered by a transparent plastic window is fitted in the top cover.

   (2) A lower section, consisting of a cylindrical brass housing, 10 3/4" long and 2 1/4" in diameter, which encloses the booster and detonators. The detonator carrier is secured to the base of the upper section by a keep ring (left hand threads). The booster screws to the lower end of the detonator carrier and is locked by an L-shaped clip.

   (b) Markings on the exploder body are as follows:

   (1) The words Graduazion Immobilizzazion in Geridi Elichetta stamped around the inspection port.

   (2) The exploder serial number stamped on the top face.

2. Internal

   (a) The primary working parts of the exploder are as follows:

   (1) A worm gear, driven by the impeller, which drives:

   (i) The arming indicator assembly, consisting of a gear train, a calibrated wheel, an indicator flap and a spring-loaded shaft. The shaft is fitted at its upper end with a small arm which is painted red and on which the word Smobilizz is stamped.

   (ii) The arming gear which is mounted on the vertical axis and which contains a square hole in its center.

   (2) A square-shafted, spring-loaded firing pin spindle. The spindle is rounded at the top and screws into a firing pin head containing two firing pins. The spindle and head are contained in a cylindrical housing which is threaded at the top. The square shaft of the spindle engages the square hole in the arming gear prior to arming.

   (3) An inertia frame, pivoted to the firing pin housing, and two springs which tend to hold the frame in the unfired position. The underside of the top of the frame contains a small recess into which the rounded top end of the firing pin spindle fits, thereby locking the frame prior to arming.

   (4) A firing spring compressing disc, threaded externally and fitted with a square hole in its center, screws into the top of the firing pin housing and fits over the firing pin spindle.

   (5) The firing pin release lever and the firing pin locking lever. The upper end of the firing pin release lever bears down upon the projection on top of the inertia frame and its lower end restrains the upper end of the firing pin locking lever. The lower end of the firing pin locking lever protrudes through the side of the firing pin housing and restrains the firing pin head.

3. Method of Mounting

   (a) The exploder is slipped into the warhead and secured by three square-headed bolts.

[redacted]

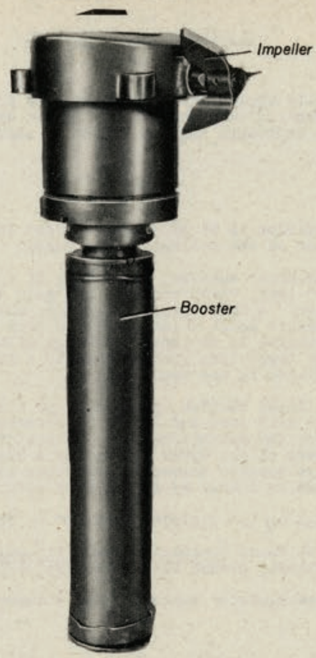
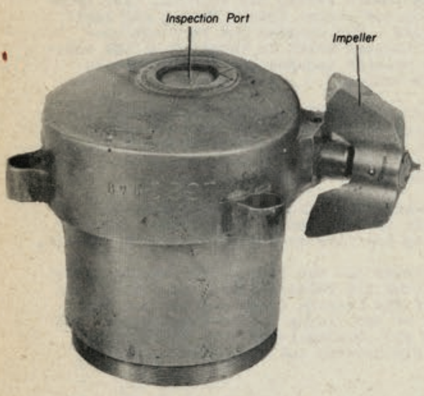


Fig. 9 - Italian Standard Exploder



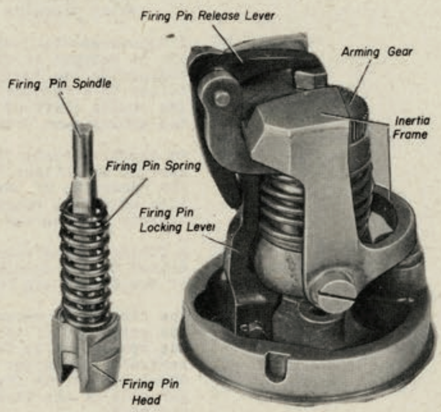


Fig. 10 - Italian Standard Exploder, Booster Removed

Fig. 11 - Italian Standard Exploder, Housing Removed

[redacted]

(Italian Standard Exploder, Cont'd.)

Operation

1. The arming range is set manually prior to launching by running off the desired number of turns on the impeller. The maximum arming range is represented by 500 impeller turns. When the torpedo is launched, impeller rotation drives the worm gear, thereby performing the following arming functions:

   (a) The calibrated wheel of the arming indicator assembly rotates and, when the required number of impeller turns has been run off, the spring-loaded shaft is released and the red-painted arm is interposed between the calibrated wheel and the window. This ordinarily occurs when the exploder lacks 65 impeller turns of being fully armed and indicates that the exploder is in a dangerous condition, but not necessarily fully armed.

   (b) The arming gear rotates, thereby rotating the firing pin spindle and the firing spring compressing disc. As the firing pin spindle rotates, it moves downward causing the firing pins to emerge from the housing. As the firing spring compressing disc rotates, it also moves downward, compressing the firing spring. When the complete arming distance is run off, the firing pin spindle moves downward sufficiently to permit its rounded top to disengage and unlock the inertia frame and its square shaft moves out of the hole in the center of the arming gear which idles for the remainder of the run.

2. The exploder fires upon receipt of a blow sufficient to displace the inertia frame. Displacement frees the firing pin release lever from the projection on the inertia frame, thereby releasing the firing pin locking lever. The tension of the firing spring then forces the locking lever outward and carries the firing pins downward to impinge on the detonators.

Precautions

1. Note that the exploder when armed is extremely sensitive to shock or motion.

2. Inspect the interior of the exploder by peering at a sharp angle through the port on the top cover. Except in extreme emergency, do not attempt rendering safe unless the rounded top of the firing pin spindle may be seen to be engaged in the recess atop the inertia frame.

Rendering Safe Procedure

1. Remove the exploder securing bolts.

2. From a safe distance, remove the exploder, making provisions for cushioning its fall. If the exploder is armed, destroy it in situ. If unarmed, proceed as directed below.

3. Remove the L-shaped clip.

4. Unscrew the booster can.

5. Unscrew the detonator carrier keep ring (left hand threads).

6. Dispose of all explosive elements.

[redacted]

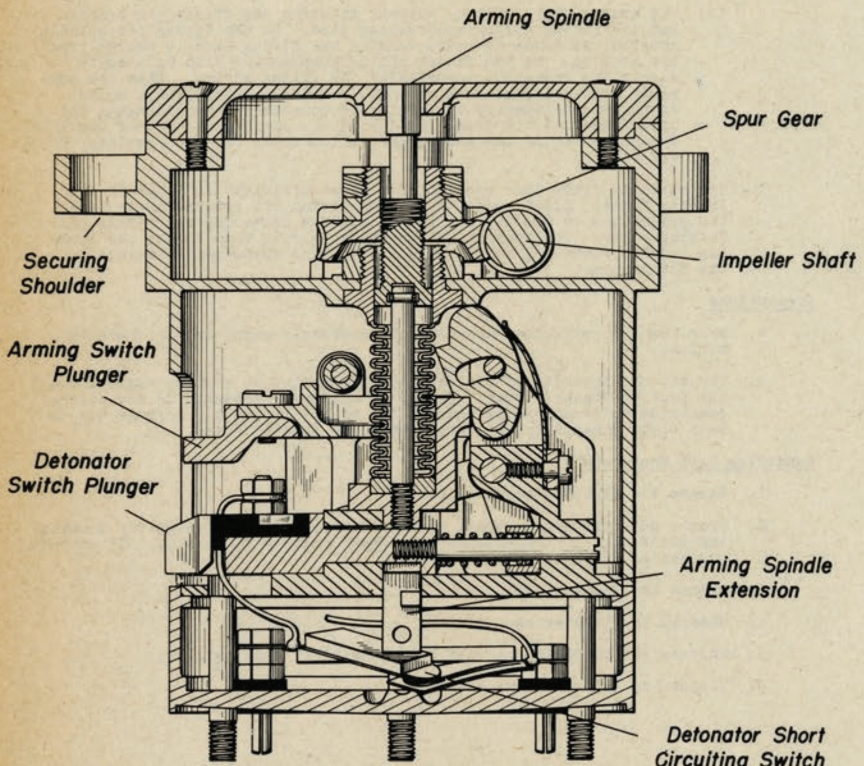


Fig. 12 - SIC Activator, Sectional View

[redacted]

SIC Activator

General

1. Impeller-driven arming device, fitted in transverse pocket on top center line of SIC warhead in SIC torpedoes. This device is very similar in design and operation to the German SIC activator, (Part IV, Chapter 3).

Description

1. External

   (a) The activator is 16" long, 3 7/8" in maximum diameter, and is composed of the following main parts:

   (1) An upper section, consisting of a cylindrical brass housing, 5" long, which encloses the main working parts of the device. A three-bladed impeller mounted on the end of an impeller shaft protrudes from the side of the housing and rotates in an impeller trough adjacent to the activator pocket. The top cover is made of steel, contains a square hole in its center (may be covered by a rubber diaphragm) and is secured to the housing by four screws.

   (2) A lower section, contained in a cylindrical brass housing, 11" long and 2 1/4" in diameter, which encloses the booster and detonators.

   (b) The upper and lower sections are joined by six bolts.

2. External

   (a) The main working parts of the activator are as follows:

   (1) The impeller and impeller shaft, the latter being fitted with a worm on its inner end which engages a spur gear.

   (2) A threaded arming spindle which engages internal threads of the spur gear. The top of the spindle is square and fits into the hole on the top cover. The lower end of the spindle is secured to a spindle extension. A bellows is fitted around the arming spindle to keep the interior of the device watertight.

   (3) Two lever systems, one of which controls an arming switch plunger while the other compresses the spring of the detonator switch plunger. The arming switch plunger, consisting of a brass pin mounted on a sliding frame, is held in the unarmed position by a spring clip which bears against the arming switch plunger lever system. The detonator switch plunger consists of two insulated, wedge-shaped contacts, each of which is fitted with an electrical lead on its upper edge. The leads go to a pair of contacts directly below the arming spindle extension and thence to the detonators. The lower end of the arming spindle extension consists of two brass prongs which, when made to the contacts mentioned above, short-circuit the detonators.

3. Method of Mounting

   (a) The activator is slipped into the warhead and secured by five lugs.

Operation

1. (a) When the torpedo is launched, impeller rotation then turns the worm and spur gears. The arming spindle, which is not free to rotate, rises up on the threads of the spur gear, carrying the spindle extension with it. As the spindle extension rises, it pivots a lever system against the tension of the spring clip, gradually forcing the arming switch plunger aft and closing the arming switch which energizes the magnetic firing device located elsewhere in the warhead.

   (b) Upward motion of the spindle extension also compresses the detonator switch plunger spring. After the arming switch plunger operates, further upward motion of the spindle extension aligns a slot in the spindle extension with detents on the detonator switch plunger, allowing the plunger to snap aft by spring pressure and make its double contact. Upward movement of the spindle extension causes the two prongs on its lower extremity to break their contacts, arming the detonator circuit.

   (c) Continued impeller rotation moves the square top of the arming spindle upward out of the square hole in the top cover, at which point upward motion of the spindle ceases since it may now rotate freely.

[redacted]

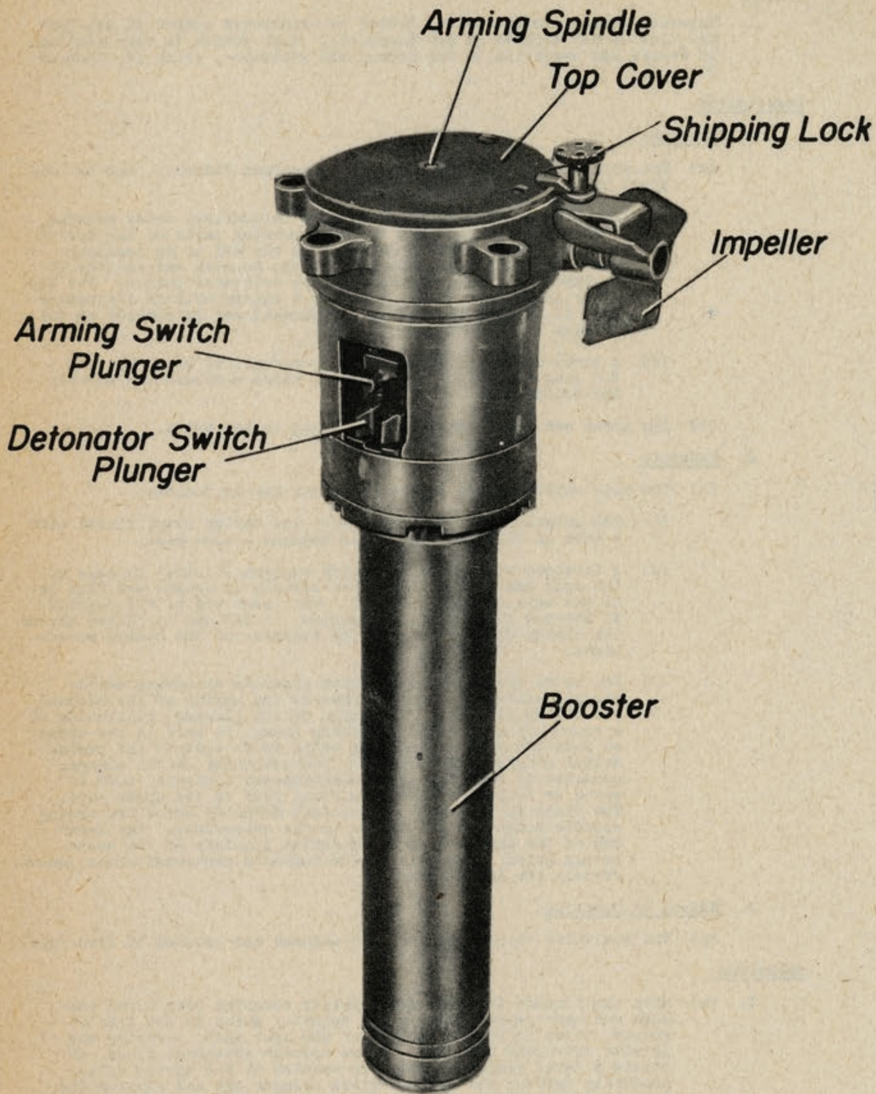


Fig. 13 - SIC Activator

[redacted]

(SIC Activator, Cont'd.)

2. The detonators fire when the detector coils in the magnetic firing device receive the proper signal and the amplifier completes the detonator circuit from the battery.

Precautions

1. Note that this activator is used in a warhead which also contains the standard inertia type exploder in the foremost of the two pockets on the top center line. Should it be necessary to render safe a torpedo fitted with both these devices, deal with the activator first if feasible.

2. Note that the activator cannot be withdrawn from the pocket when in an armed condition.

3. The magnetic firing device may incorporate a self-destroying feature. Except in extreme emergency, wait at least 24 hours before attempting to render safe.

4. Check the condition of the activator as follows:

   (a) If rubber diaphragm is present on top cover cut it away. Inspect the square hole in the center of the top cover. If the arming spindle projects 1/8" or more above the surface of the top cover, the magnetic firing device must be considered armed.

Rendering Safe Procedure

1. Unarmed

   (a) Tape the impeller to the warhead shell.

   (b) Remove the five securing bolts.

   (c) From a safe distance, remove the activator from the warhead.

   (d) Remove the six bolts and separate the upper and lower sections.

   (e) Dispose of detonators and booster.

2. Armed

   (a) Using the proper nitric acid solution (Part I, Chapter 7), cut a hole approximately 3" in diameter on the top center line of the warhead shell, 3" abaft the after end of the activator pocket.

   (b) Slit the buff colored, rubberized cable beneath the hole; cut and tape separately each of its four leads. The magnetic section is now inert.

Note: If the inertia-type exploder has not yet been removed, it should be dealt with at this point.

   (c) Enlarge the hole until easy hand access is obtained.

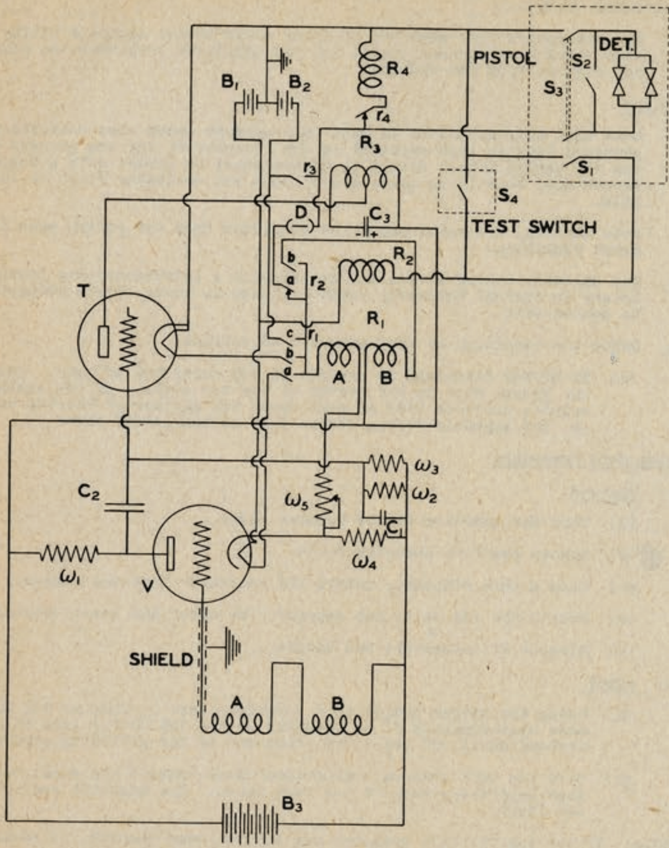
   (d) Remove the keep ring which secures the switch to the after side of the activator; remove the switch.

   (e) Remove the top cover securing screws and the top cover.

   (f) Reach in through the hole and push the detonator plunger switch forward while rotating the arming spindle clockwise. Continue until the switch plunger retracts to the unarmed position.

   (g) The activator is now disarmed; proceed as in Par. 1 above.

[redacted]



A,B - INDUCTION DETECTOR COILS
C_1 - 0.15 MFD. - 750 VOLT
C_2 - 0.20 MFD. - 750 VOLT
C_3 - 25.00 MFD. - 200 VOLT - ELECTROLYTIC
B_1 - 4.5 VOLTS
B_2 - 4.5 VOLTS
B_3 - 135.0 VOLTS
S_1 - ARMING SWITCH
S_2 - SHORTING SWITCH
S_3 - DETONATOR SWITCH
S_4 - TESTING SWITCH
D - PIN FOR SELF-DESTROYING FEATURE
T - THYRATRON
V - VACUUM TUBE (6Q7GT)
ω_1 - 0.5 MΩ
ω_2 - 2.0 MΩ
ω_3 - 2.0 MΩ
ω_4 - 100.0 Ω
ω_5 - 700.0 Ω
R_1 - RELAY (ARMING)
R_2 - RELAY (ARMING)
R_3 - RELAY (FIRING)
R_4 - BUZZER (TESTING)

Fig. 14 - SIC Circuit

SIC Circuit - Operation

Arming

1. As the torpedo runs off its arming range, S_1 closes, S_2 opens, removing the short from the detonators, and S_3 closes, putting the detonators in the firing circuit. Closing S_3 causes B_1 to energize R_2, causing it to operate r_2. Operation of r_2 breaks (a) and makes (b), putting current from B_3 through coils A and B of R_1 and through w_5, thereby biasing w_4. Operation of R_1 closes r_1, (a), (b), and (c), causing B_1 and B_2 in series to heat the cathode of V and B_2 to heat the cathode of the gas-discharge tube T.

Normal Firing

1. Coils A and B are wired in series opposition so that motion of the torpedo through the earth's magnetic field produces no effect on either one. When the torpedo passes near a magnetic mass, the field around A and B is distorted in such a manner and at a sufficient rate to produce a potential between the grid of V and the negative side of B_3. This varies the plate current of V in such a manner as to produce a DC pulse across w_1. If the pulse is of the proper direction, it appears, due to the capacitative coupling, on the grid of T, allowing T to fire and complete a circuit through B_3, R_3, the cathode of T, R_1A, w_4 and w_5.

2. When R_3 is energized, it makes r_3, putting B_2 across the detonators. The switch S_4 and buzzer R_4 are used for testing purposes only.

Self-Destroying Feature

1. Pin D is incorporated if a self-destroying feature is desired. When the circuit is armed, B_1 energizes R_2 constantly until the unit fires or comes to rest without firing. In the latter case, B_1 eventually runs down, allowing R_2 to recover gradually. When this occurs, the shorting contacts (a) and (b) are closed at the same time and B_2 fires the detonators.

[redacted]

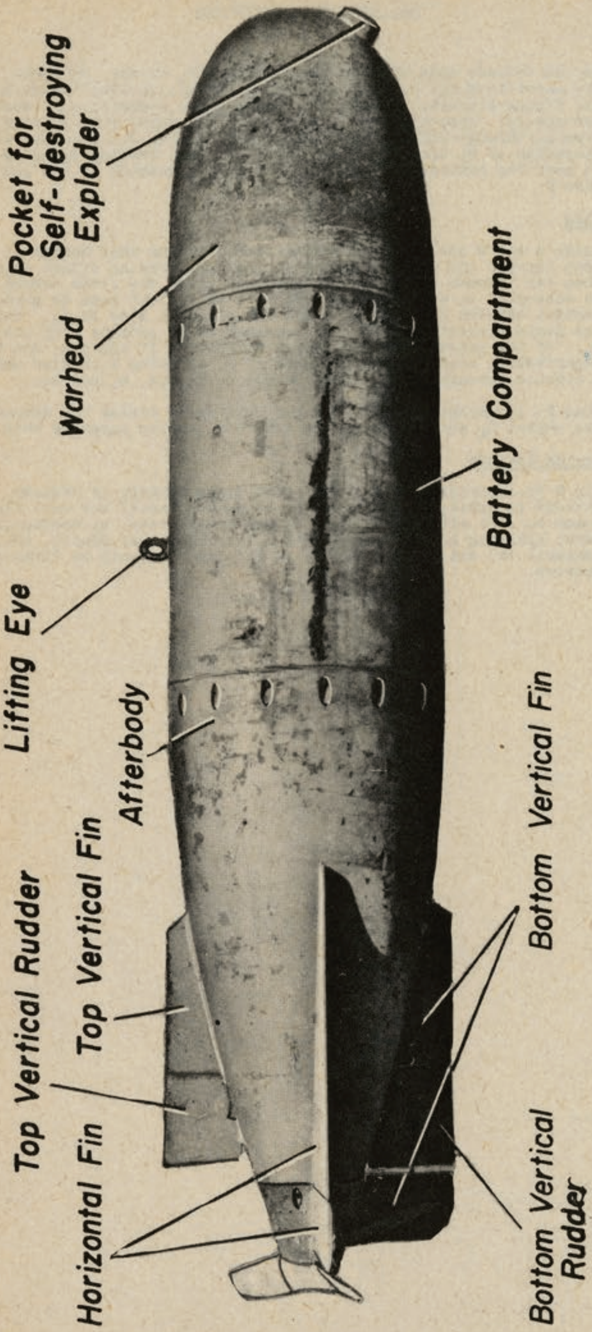


Fig. 15 - Circling Torpedo, Side View

[redacted]

Circling Torpedo

General

1. The circling torpedo is a small electrically-driven torpedo, laid with parachute from aircraft, designed to be used in harbors, anchorages and restricted waters. It is unique in the field of underwater ordnance. Although it is a self-propelled, dirigible underwater explosive weapon and is therefore a torpedo by definition, such standard torpedo components as gyro steering and depth mechanisms are omitted from its design. It is the only known torpedo to incorporate three separate exploders and, with a single exception, the only known service model to be driven by a single propeller. Aircraft launching with parachute is also unique in this field as is the torpedo's eight-foot length which is but slightly more than half that of the shortest U. S. service model.

Description

1. Case

Material	Steel
Color	Green
Diameter	19 1/2"
Length	
Overall	8'
Warhead	2'3"
Battery compartment	2'3"
Afterbody	2'10"
Tail	8"
Charge	200 lb. (approx.) cast Torpex
Total weight in air	927 lb.

2. External fittings

(a) Warhead

Direct action exploder	In pocket in center of nose.
Inertia exploder	In pocket on nose, 6 1/2" from center, 4" to port from bottom center line.
Self-destroying exploder	In pocket on nose, 6 1/2" from center, 4" to starboard from bottom center line.

(b) Battery Compartment

Suspension lug	On top center line, 10 1/2" forward of afterbody joint.

(c) Afterbody

Motor switch (optional)	7" to port of bottom center line, 16" abaft battery compartment joint.

(d) Tail

Propeller	Three-bladed, 10 1/2" span.
Fins	
Horizontal	Two, each 26" long, no rudders fitted.
Vertical	
Top	17 1/2" long, including rudder.
Bottom	26" long including rudder.
Parachute release	On apex of tail.

3. Internal arrangement of parts

(a) Warhead - no internal fittings are included.

(b) Battery Compartment - contains the propulsion battery, consisting of 1080 dry-cell batteries, wired so as to provide an EMF of about 270 volts.

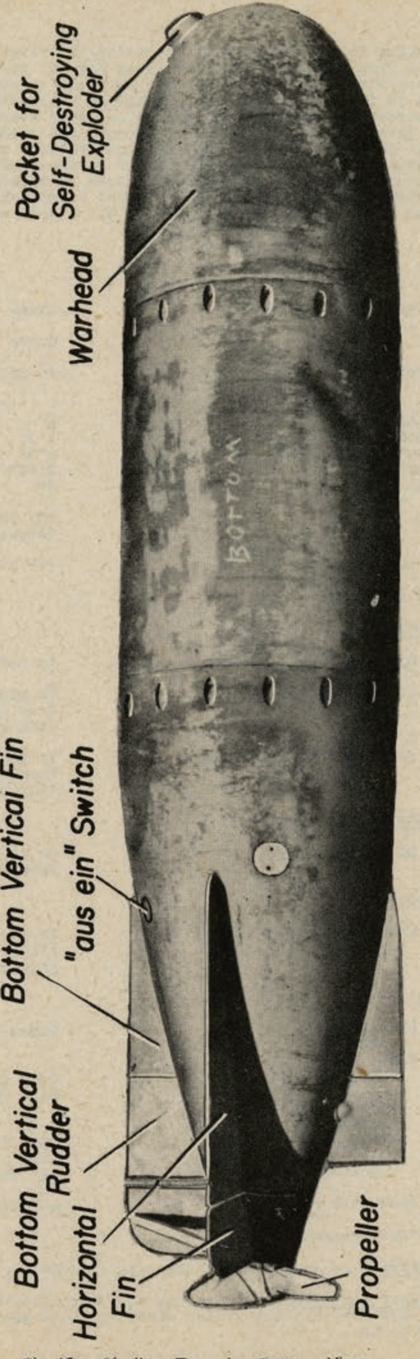


Fig. 16 - Circling Torpedo, Bottom View

[redacted]

(Circling Torpedo, Cont'd.)

(c) Afterbody - contains the following:

(1) A four-pole, D. C. motor which controls a drive shaft.

(2) A mercury switch which controls the motor circuit.

(3) Steering gear which controls the vertical rudders.

(d) Tail - contains the propeller shaft.

Operation

1. The motor switch on the afterbody (may not be fitted) is closed prior to launching. When the torpedo is launched, impact with the water releases tension on the parachute shrouds, thereby operating a standard German type parachute release. As the parachute ejecting plunger springs out, it permits a plunger beneath to rise and bridge two contacts in the motor circuit. The nose of the torpedo is slightly more buoyant than the after parts and tends to rise so that the torpedo body makes an acute angle with the surface of the water. When the nose has risen sufficiently, (about 20° above the horizontal), the mercury switch in the afterbody closes, completing the circuit from the battery to the motor which starts to run.

2. The torpedo then runs, broaching slightly, at a speed of five to six knots. Its course varies with the type of cam fitted to the steering gear but is almost always some derivative of a circle. The torpedo may then fire by means of the impact-inertia exploder, the impact-direct action exploder or the self-destroying exploder. In some cases, a second impact-inertia exploder may be fitted in place of the self-destroying exploder, in which instances the torpedo becomes a very sensitive impact-inertia floating mine at the end of its run. Details of each pistol are discussed below.

Precautions

1. Never attempt rendering safe by disassembly or removal of the exploders. The extreme sensitivity of the inertia exploder(s) when armed makes such a pro_edure suicidal. The armed or unarmed condition of an exploder cannot be determined from an exterior examination.

2. Countermine the torpedo in situ if at all feasible. If countermining is not compatible with the local military situation, it may be possible to shear the nose of the warhead, including exploders, from the after part using a curvelinear cavity charge (Part I, Chapter 5). It should be noted, however, that this procedure has not been field tested and a high order detonation must be anticipated.

Rendering Safe Procedure

1. None recommended.

Fig. 17 - Circling Torpedo Warhead

[redacted]

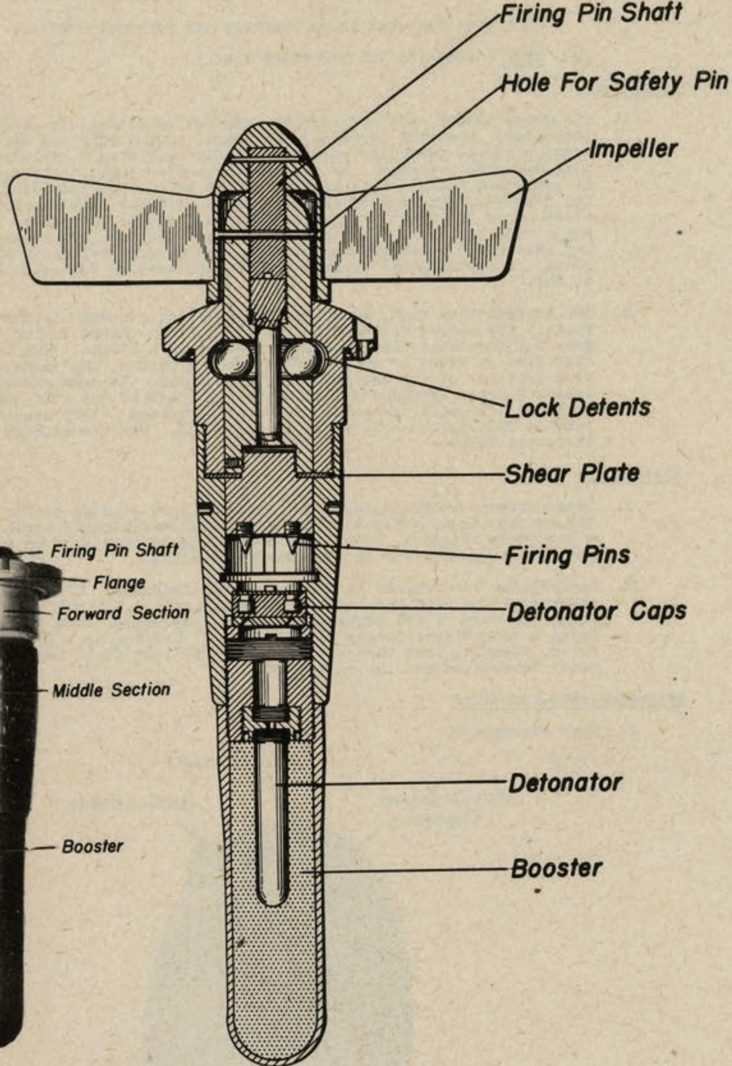


Fig. 18 - Impact Direct Action Exploder, for Use in Circling Torpedo

Fig. 19 - Impact Direct Action Exploder, for Use in Circling Torpedo, Sectional View

[redacted]

Impact-Direct Action Exploder

General

1. Used in circling torpedo.

Description

1. External

(a) The exploder is generally cylindrical in shape, approximately 12" long, 3" in maximum diameter, and is composed of the following main parts:

(1) A forward section, which protrudes from the warhead, consisting of a flanged sleeve and a firing pin shaft, rounded at its forward end, which slides into the center of the flange. The forward end of the firing pin shaft is enclosed by a cap fitted with a four-bladed impeller. This section contains the exploder arming and firing devices.

(2) A middle section which contains the firing pins and detonator caps.

(3) An after section which contains the detonator and booster.

(b) The various exploder sections are screwed together, a small adapter being used to join the middle and after sections.

2. Internal

(a) The primary working parts of the exploder are as follows:

(1) The impeller which is keyed to an arming spindle which in turn screws into the firing pin shaft.

(2) The firing pin shaft which contains the firing pins on its after end and which is held in the unarmed position by:

(i) Lock detents held by the lower end of the arming spindle.

(ii) A small shear plate at the joint between the forward and middle sections.

3. Method of Mounting

(a) The exploder may be either screwed into the warhead or secured by three bolts depending on the design.

Operation

1. A safety pin through the impeller cap and firing pin shaft is removed prior to launching. When the torpedo is launched, air and water travel rotate the impeller. Impeller rotation unscrews the arming spindle from the firing pin shaft, thereby freeing the locking detents. Impeller rotation continues until the impeller disengages the firing pin shaft and drops free. The exploder is now armed.

2. Impact with a hard surface forces the firing pin shaft inward, shearing the shear plate and forcing the firing pins onto the detonator caps, which in turn fire the detonator.

Impact-Inertia Exploder

General

1. Used in circling torpedo.

Description

1. External

(a) The exploder is generally cylindrical in shape, approximately 15" long, 3" in maximum diameter and is composed of the following main parts:

(1) A forward section, which protrudes from the warhead, consisting of a flanged sleeve and a cylindrical nose piece, rounded at its forward end, which screws into the center of the flange and is fitted with an impeller. This section contains the exploder safety arming devices and the inertia firing mechanism.

[redacted]

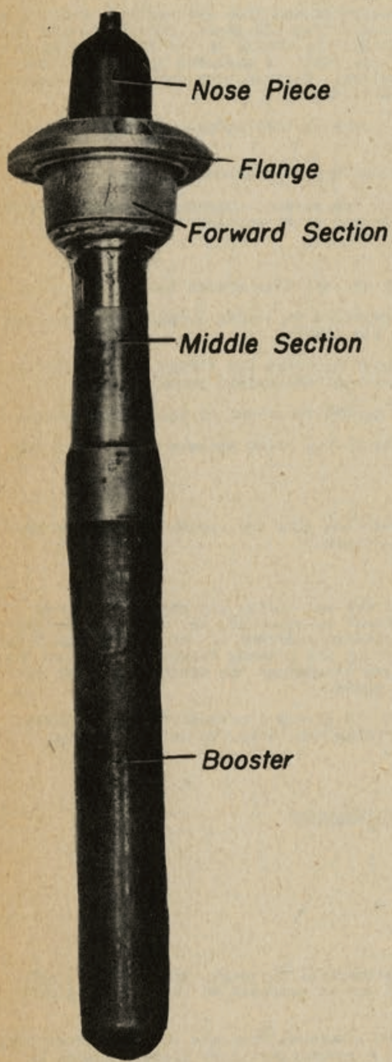


Fig. 20- Impact Inertia Exploder, for Use in Circling Torpedo

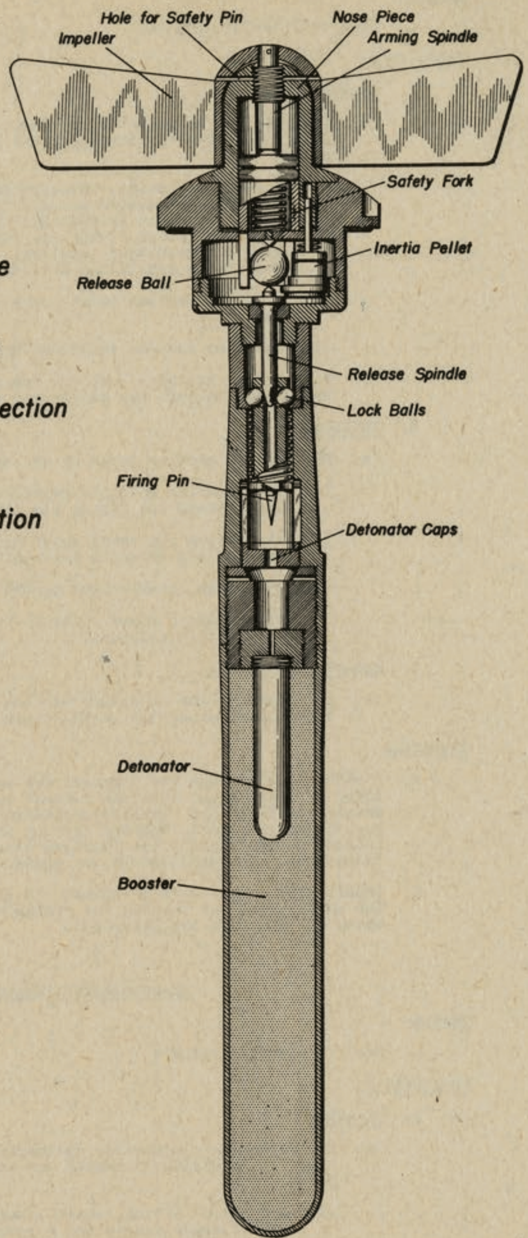


Fig. 21 - Impact Inertia Exploder for Use in Circling Torpedo, Sectional View

(Impact-Inertia Exploder, Cont'd.)

(2) A middle section, consisting of two sleeves screwed together, which contains the spring-loaded firing pin assembly, the firing pin release and the detonator caps.

(3) An after section which contains the detonator and booster.

(b) The various exploder sections are screwed together, a small adapter being used to join the middle and after sections.

2. Internal

(a) The primary working parts of the exploder are as follows:

(1) The impeller which is attached to an arming spindle which in turn screws into the nose piece.

(2) A spring-loaded safety fork which is restrained by the arming spindle.

(3) A steel release ball, held between two small support points, is restrained prior to arming by the safety fork prongs.

(4) A spring-loaded inertia pellet.

(5) The spring-loaded firing pin assembly, restrained by lock balls which are in turn held by the lower end of the release spindle. The upper end of the release spindle tapers to form the lower support point for the release ball.

3. Method of Mounting

(a) The exploder is screwed into the warhead.

Operation

1. When the torpedo is launched, water impact shears a safety pin in the impeller. Water travel rotates the impeller, thereby unscrewing the impeller from the nose piece, withdrawing the arming spindle and allowing the spring-loaded safety fork to move outward and disengage the release ball. The impeller and arming spindle drop free and the exploder is armed.

2. The exploder fires when subjected to a slight inertia force. This displaces the inertia pellet which pushes the release ball from between its two support points. Movement of the ball frees the release spindle which is forced forward by the pressure of the lock balls on its tapered lower end, releasing the lock balls and allowing the spring-loaded firing pins to impinge on the detonator caps which in turn fire the detonators.

Self-Destroying Exploder

General

1. Used in circling torpedo.

Description

1. External

(a) The exploder is generally cylindrical in shape, approximately 15" long, 3" in maximum diameter, and is composed of the following main parts:

(1) A forward section, which protrudes from the warhead, consisting of a flanged sleeve and a cylindrical nose piece, rounded at its forward end, which screws into the center of the flange and is fitted with an impeller. This section contains the exploder safety arming devices.

(2) A middle section, consisting of two sleeves joined by a threaded adapter, which contains the spring-loaded firing pin assembly, the firing pin release and the detonator caps.

(3) An after section which contains the detonator and booster.

(b) The various exploder sections are screwed together, a small adapter being used to join the middle and after sections.

2. Internal

(a) The primary working parts of the exploder are as follows:

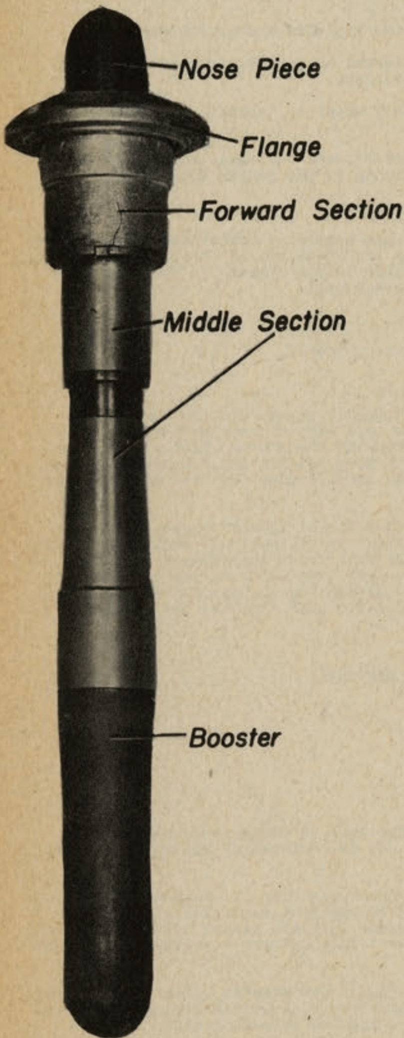


Fig. 22 - Self Destroying Exploder, for Use in Circling Torpedo

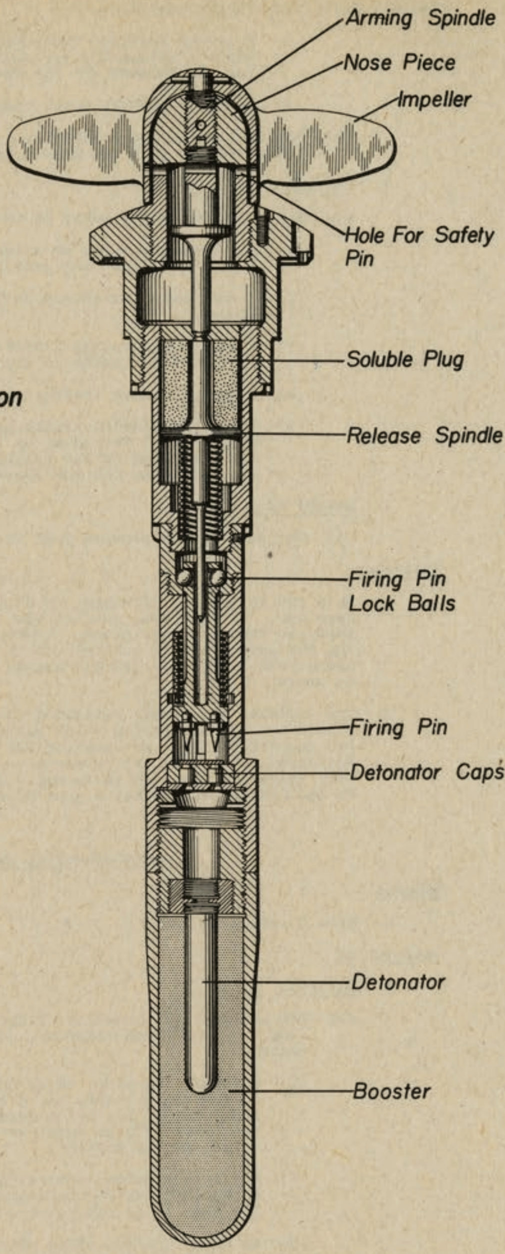


Fig. 23 - Self Destroying Exploder, for Use in Circling Torpedo, Sectional View

[redacted]

(Self-Destroying Exploder, Cont'd.)

(1) The impeller which is attached to an arming spindle which in turn screws into the nose piece.

(2) The spring-loaded firing pin assembly.

(3) The spring-loaded release spindle, the after end of which protrudes into the forward end of the firing pin and restrains the firing pin lock balls. Its forward end is held by the after end of the arming spindle and its forward movement is also restrained by a soluble plug.

3. Method of Mounting

(a) The exploder is screwed into the warhead.

Operation

1. A safety pin through the impeller and nose piece is removed prior to launching. When the torpedo is launched, air and water travel rotate the impeller, thereby unscrewing the impeller and arming spindle from the nose piece and leaving the release spindle restrained only by the soluble plug. The impeller and arming spindle drop free and the exploder is armed.

2. Gradual dissolution of the soluble plug permits the spring-loaded release spindle to move forward until it clears the firing pin lock balls, releasing the lock balls and allowing the spring-loaded firing pins to impinge on the detonator caps which in turn fire the detonator.

[redacted]

MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

. . . . .

CHAPTER 3

ITALIAN DEPTH CHARGES

JUNE 1, 1945

[redacted]

ITALIAN DEPTH CHARGES

Introduction

1. No Italian depth charges have ever been made available for examination by the U.S. Navy and the following information, being drawn almost entirely from captured documents, may not be entirely reliable and should be accepted with reserve. The Tactical Depth Charge, which has been recovered and examined, is not a depth charge in the usual sense but is included herein because of its similarity in appearance.

2. This chapter contains information on two standard depth charge cases, each of which is made in two sizes, and two depth charge pistols. Both the pistols operate on direct hydrostatic pressure in a manner similar to U.S. pistols. The depth charge cases incorporate a unique design feature wherein a small electrolytic cell may be used to flood the charge if it fails to detonate as designed during descent.

3. The following precautions should generally be observed when dealing with Italian depth charges:

   (a) Do not move or jar the charge except from a safe distance.

   (b) Do not change the depth setting while rendering safe.

   (c) If the charge is found underwater, raise it to the surface before rendering safe.

1927 Model Depth Charge

General

1. Launched by surface craft.

2. Italian designation, "Bombe Torpedine da Getto 50/1927 (or 100/1927) I. A.". (The numbers 50 and 100 above refer to the weight of charge in kilograms cast in the respective cases which differ only in diameter.)

Description

1. Case

Shape	Cylindrical, enclosed at each end by welded steel heads.
Color	Gray
Material	Steel
Diameter	11" (50 kg) or 15" (100 kg).
Length	20" approx.
Charge	110 lb. or 220 lb. cast TNT.
Total weight in air	Unknown

2. External fittings

Lifting eyes	Two, 90° apart, on pistol end.
Filling holes	Two, 90° apart, on pistol end, 90° from lifting eyes.

3. Standard Accessories for Case

   Pistol - Type B.

   Booster - Type A with booster extender.

   Standard flooder.

Rendering Safe Procedure

1. Using an adjustable wrench or other suitable tool, remove the pistol from the case.

2. Remove the booster extender.

3. Dispose of detonator, booster and charge.

[redacted]

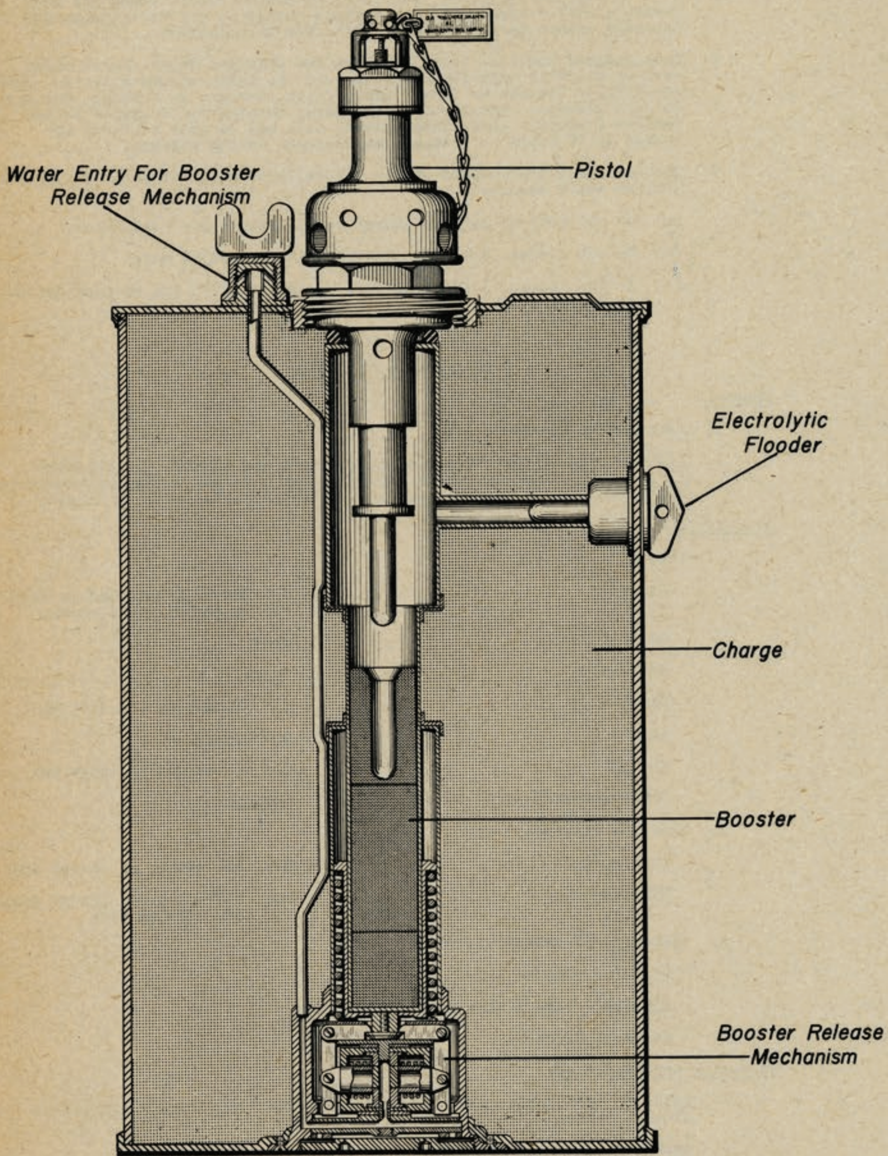


Fig. 1 - 1936 Model Depth Charge, Sectional View.

[redacted]

ITALIAN DEPTH CHARGES

1936 Model Depth Charge

General

1. Launched from surface craft.
2. Italian designation, "Bombe Torpedine da Getto 50/1936 (or 100/1936) I. A., I. B.". (The numbers 50 and 100 above refer to the weight of charge in kilograms cast in the respective cases which differ only in diameter.)

Description

1. Case

Shape	Cylindrical, enclosed at each end by welded steel heads.
Color	Gray
Material	Steel
Diameter	11" (50 kg) or 15" (100 kg).
Length	20" approx.
Charge	110 lb. or 220 lb.
Total weight in air	Unknown

2. External fittings

Lifting eyes	Two, 90° apart, on pistol end.
Filling holes	Two, 90° apart, on pistol end, 90° from lifting eyes.
Water inlet	Adjacent to pistol, covered by screw cap prior to launching.

3. Standard Accessories for Case

   Pistol - Type A.

   Booster - Type B with booster release mechanism.

   Standard flooder.

Rendering Safe Procedure

1. Same as 1927 Model.

[redacted]

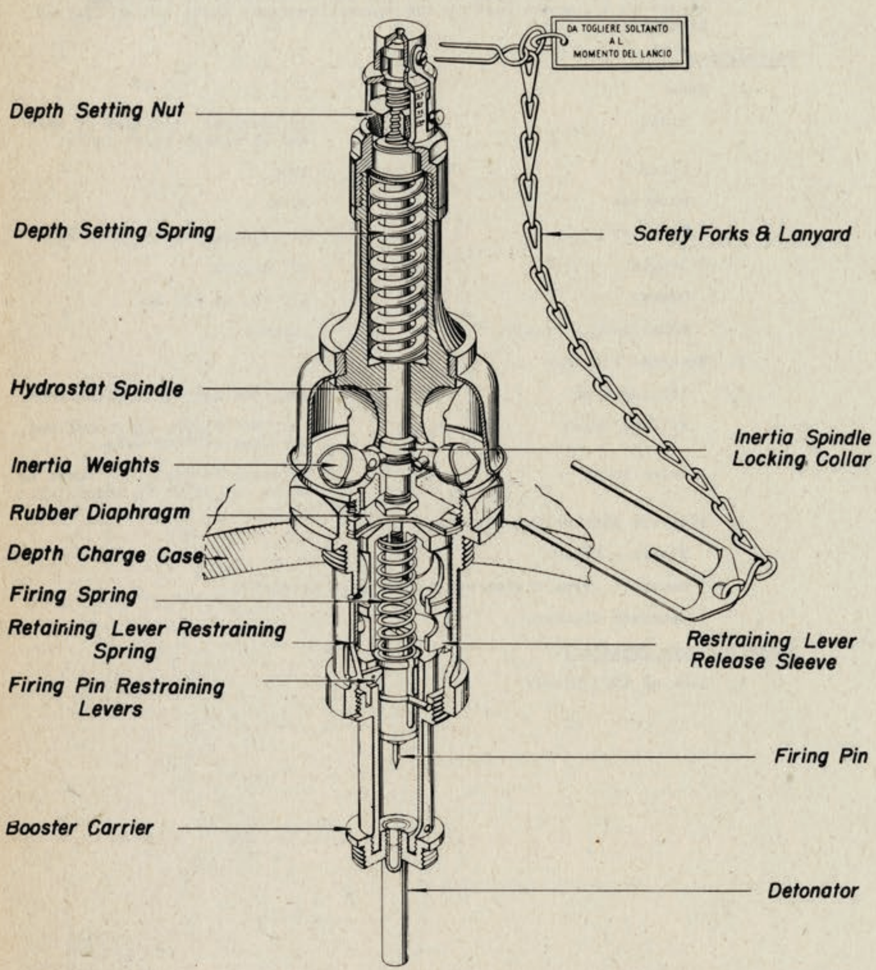


Fig. 2 - Depth Charge Pistol Type A", Sectional View.

[redacted]

ITALIAN DEPTH CHARGES

Type A Pistol

General

1. Hydrostatic, direct action type, used in depth charges launched from surface craft.

Description

1. External

   (a) The pistol is 12 3/4" long, 3 1/4" in diameter at its center flange, and is composed of the following main parts:

      (1) An upper section which protrudes about 7 1/2" from the depth charge case and which houses the pistol depth-setting gear. Depth settings of 25, 50, 75 and 100 (meters) are inscribed at the top. Two safety forks are fitted prior to launching, one at the top to lock the hydrostatic spindle and one at the base near the flange to lock the inertia weights.

      (2) A lower section which is housed in the depth charge and which contains the firing mechanism and the detonator.

   (b) The two sections are joined at a flange about midway on the pistol body.

2. Internal

   (a) The main working parts of the pistol are as follows:

      (1) A hydrostatic spindle, the lower end of which protrudes through and is controlled by a rubber diaphragm. The spindle contains an annular groove on its lower portion just above the diaphragm.

      (2) A depth-setting spring encloses the hydrostatic spindle and tends to force the spindle upward.

      (3) A depth-setting nut screwed to the upper end of the hydrostatic spindle adjusts tension on the depth-setting spring.

      (4) Three pivoted inertia weights are mounted around the inside of the pistol housing and are so arranged that their inner edges will engage the annular groove on the hydrostatic spindle upon actuation.

      (5) A firing pin housing, screwed into the lower pistol body, contains a spring-loaded firing pin assembly which is held in the unfired position by two triangular pivoted restraining levers. The levers are held against the spindle by two leaf springs on the outside of the pistol body and are so attached that they can pivot only in one direction.

      (6) A restraining lever release sleeve is attached to the hydrostatic spindle directly below the diaphragm.

3. Method of Mounting

   (a) The pistol is screwed into the central tube of the depth charge case.

Operation

1. The depth setting is made manually prior to launching by screwing down on the depth-setting nut until its top is flush with the mark at the desired setting. Removal of the safety forks unlocks the hydrostatic spindle and inertia weights. When the charge is launched, hydrostatic pressure depresses the diaphragm, thereby depressing the hydrostatic spindle against the tension of the depth-setting spring. This depresses the restraining lever release sleeve and compresses the firing spring and, when the depth charge reaches the firing depth, the lever release sleeve pivots the levers upward until they clear a small flange on the firing spindle and allow the spring-loaded firing pin to impinge on the detonator.

2. If the depth charge is subjected to a sudden shock of considerable magnitude at any time after launching, the ends of the inertia weight arms engage the annular groove on the hydrostatic spindle, locking the spindle.

Type B Pistol

1. This pistol differs from the Type A only in that no inertia weights are fitted.

[redacted]

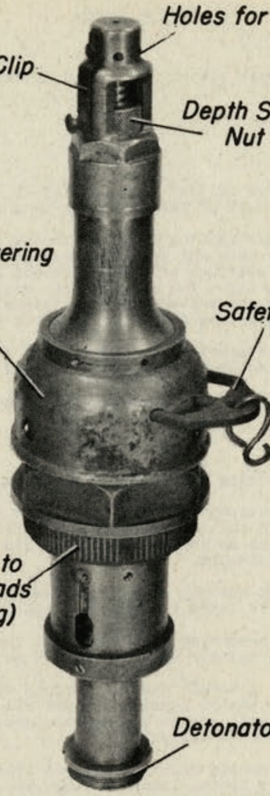


Fig. 3 - Depth Charge Pistol Type A

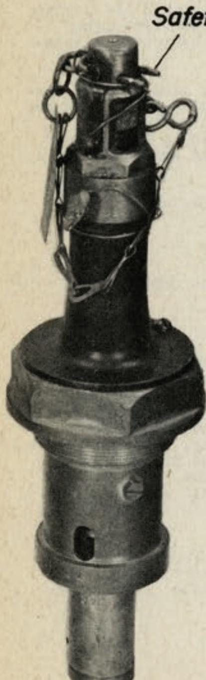


Fig. 5 - Depth Charge Pistol Type B.

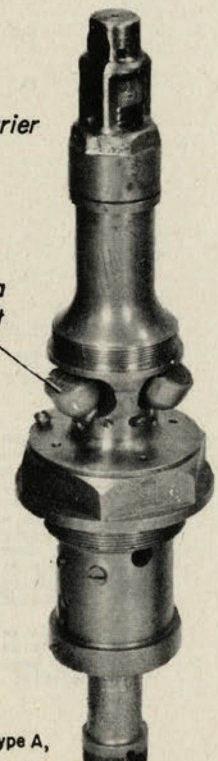


Fig. 4 - Depth Charge Pistol Type A, Shroud Covering Removed.

[redacted]

Boosters

Type A

1. This booster consists of three cylinders of pressed TNT enclosed in a metal case. The upper cylinder contains a detonator envelope. A threaded ring is welded to the lower end of the booster container and screws to the inner end of the booster extender spindle.

Type B

1. This booster consists of four cylinders of pressed TNT enclosed in a metal case. One of the upper cylinders contains a detonator envelope. The lower end of the booster container is fitted with a mushroom-headed disc which is engaged by pawls on the booster release mechanism.

Booster Extender Mechanism

1. This mechanism, housed in a cylindrical case, consists of a hydrostatically-operated diaphragm attached to a spring-loaded spindle. The spindle spring tension opposes hydrostatic pressure and tends to force the diaphragm outward.

2. When the depth charge is launched, hydrostatic pressure acting against the tension of the spindle spring forces the diaphragm, and thereby the spindle and booster, in toward the detonator until, at a depth of about 12 ft., the detonator is completely housed in the booster.

Booster Release Mechanism

1. This mechanism, housed in a cylindrical case, consists of two pistons held against two hydrostatically-operated diaphragms. The inner end of each piston is attached to the mid-point of an L-shaped lever, one end of which engages the mushroom head on the booster can.

2. When the depth charge is launched, water enters the mechanism through the water inlet on the top of the depth charge case and flows down to the booster end through a special channel. Hydrostatic pressure then forces the diaphragms apart, causing the pistons to pivot the L-shaped levers and release the spring-loaded booster to house over the detonator.

Flooder Device

1. This device, designed to flood the depth charge case if the charge fails to detonate as designed, consists of a zinc-copper electrolytic cell fitted at the outer end of a small channel which runs from the central tube to the side of the mine case. Use of the device is optional.

2. If the flooder is to be used, a plug is removed from the outer end of the channel on the side of the case and the tinfoil seal is punctured to admit water to the cell. If the depth charge fails to fire properly, the admission of water to the cell corrodes a watertight zinc plug within 48 hours after immersion, admitting water to the central tube of the depth charge. This equalizes the pressure inside and outside and thereby disarms the pistol and separates the booster and detonator if the booster extender is used.

[redacted]

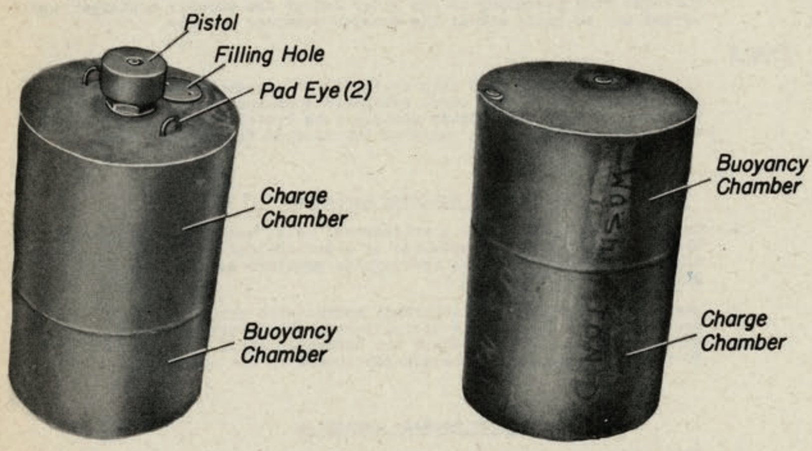


Fig. 6 - Tactical Depth Charge.

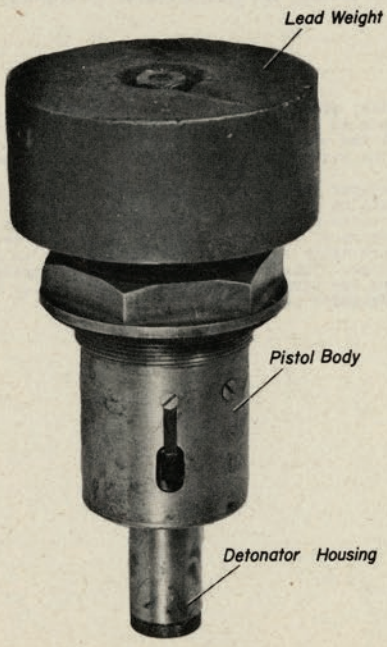


Fig. 7 - Pistol for Tactical Depth Charge.

[redacted]

ITALIAN DEPTH CHARGES

Italian Tactical Depth Charge

General

1. Buoyant, tactical explosive charge, launched from surface craft.

2. Italian designation unknown.

3. Used defensively by surface craft to harass pursuing surface units. Designed to force pursuing ships to keep at a safe distance from the charges and thus give the pursued ship a tactical advantage.

Description

1. Case

Shape	Cylindrical
Color	Brown
Material	Steel
Diameter	14"
Length	21 3/4"
Charge	120 lb. Hexanite (approx.)
Total weight in air	157 lb. approx.

2. External fittings

Lifting eyes	Two, 90° apart on pistol end, 3 3/4" from center.
Filling hole	2 1/4" diam., on pistol end, 90° from lifting eyes, 4" from center.

3. The pistol fitted is very similar to the Type A pistol, the main difference being that an 8 1/2 lb. lead weight and weight release mechanism are fitted to the outer end of the hydrostatic spindle of the pistol. It is assumed that a delay detonator is fitted in place of the standard instantaneous detonator.

Operation

1. When the charge is launched, its slight negative buoyancy causes it to sink slowly. At a set depth, believed to be about 18 ft., hydrostatic pressure depresses the spindle fully, performing the following functions:

   (a) It operates the weight release mechanism, releasing the weight and thereby giving the case a slight positive buoyancy.

   (b) It releases the firing pin, thereby firing the delay detonator.

2. The positive buoyancy then causes the case to rise and, at the end of its set delay period, the detonator fires the charge. It is believed that the charge case is 3-5 ft. below the surface when the charge fires.

Precautions

1. Check the condition of the pistol.

   (a) If the lead weight is still attached, the pistol may be assumed to be safe.

   (b) If the lead weight is not attached, the detonator must be assumed to have fired and the charge is in a dangerous condition.

Rendering Safe Procedure

1. Using an adjustable wrench or other suitable tool, remove the pistol from the case.

2. Unscrew the detonator from the pistol.

3. Remove the booster.

4. Dispose of detonator, booster and charge.

[redacted]

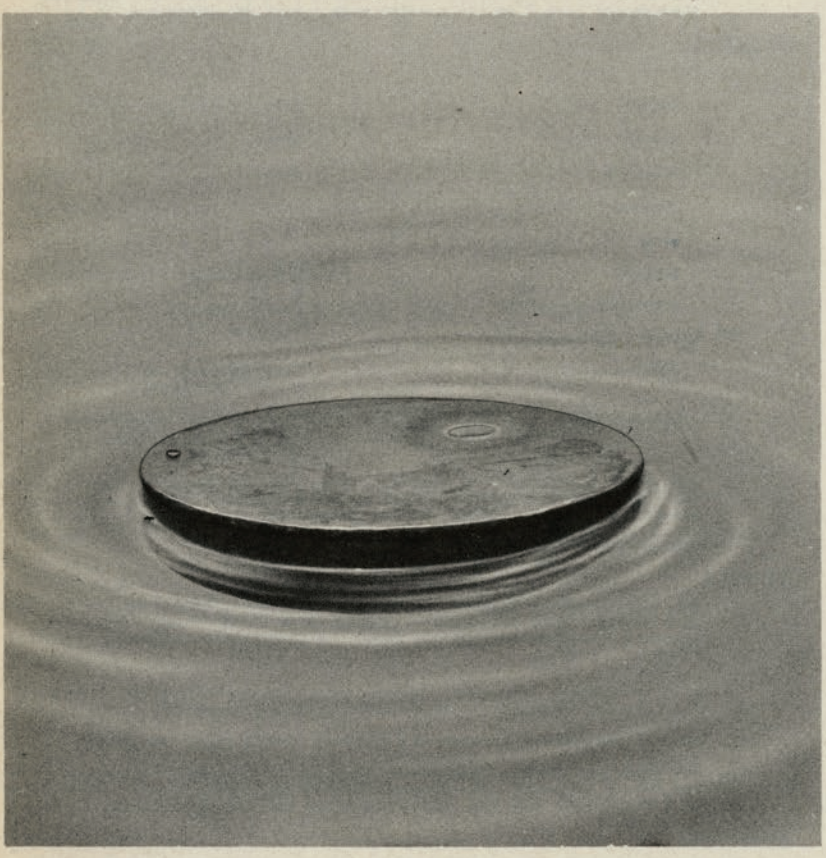


Fig.8 - Tactical Depth Charge Floating.

MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

. . . . .

CHAPTER 4

ITALIAN MISCELLANEOUS

JUNE 1 1945

[redacted]

Controlled Mine Type 0

General

1. Controlled ground mine, laid by surface craft.
2. Italian designation, "Controlled Mine Type 0".
3. Defensive mine, for use in maximum depth of water of 165 ft.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	33"
Charge	880 lb. cast Trotyl.
Total weight in air	3256 lb. (includes anchor)

2. External fittings

Cover plate	In center of upper hemisphere, fitted with arming hydrostat.
Firing cable stuffing box	On upper hemisphere.
Lifting lugs	Two on upper hemisphere, 180° apart.

Operation

1. When the mine is launched, dissolution of a soluble plug allows the arming hydrostat to depress the detonator carrier which then performs the following arming functions:

   (a) It completes the firing circuit.

   (b) It operates the booster release mechanism.

2. The mine is fired electrically by an observer.
3. The only self-disarming device is the arming hydrostat which is designed to disarm the mine by opening the firing circuit if the mine rises above a depth of 10 ft.

Precautions

1. See Introduction.

RMS

1. Slit the firing cable; cut and tape each lead separately.
2. Unscrew the keep ring and remove the arming hydrostat; the detonator is attached thereto.
3. Press back the booster latch and remove the booster.
4. Dispose of detonator, booster and charge.

[redacted]

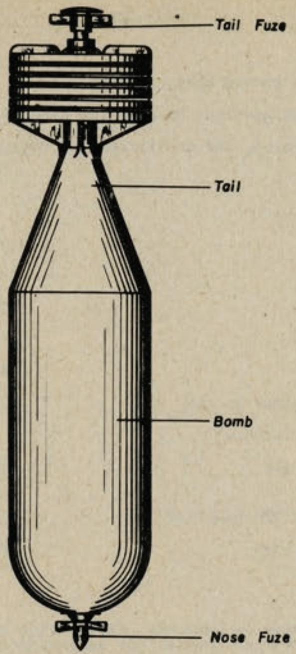


Fig. 1 - 160/C.S. Depth Bomb

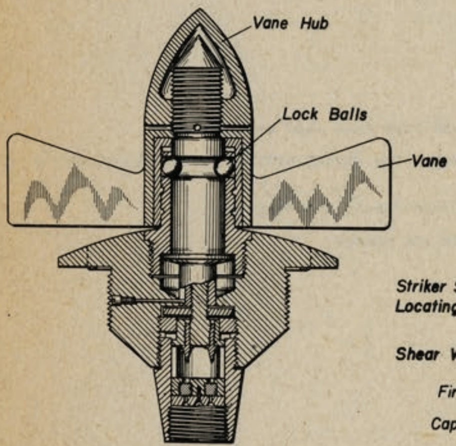


Fig. 2 - Type B Nose Fuze
Sectional View

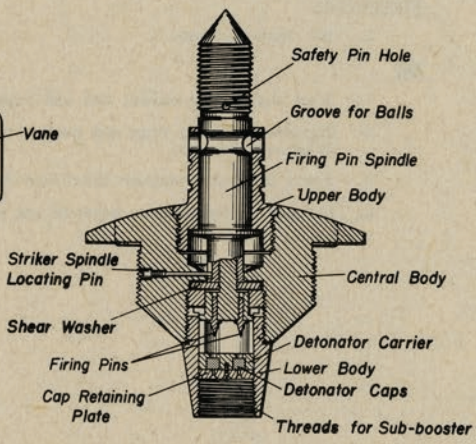


Fig. 3 - Type B Nose Fuze, Arming Vane
Removed, Sectional View

160/C. S. Depth Bomb

General

1. Anti-submarine bomb, fitted with nose and tail fuzes for impact of under-water firing.

2. Italian designation, "Bomba 160 C. S.".

Description

1. Case

Shape	Cylindrical with rounded nose and tapered tail. Tail is fitted with four fins enclosed by a shroud ring 15"3 in diameter.
Material	Steel
Diameter	13"3
Length	
Overall	69"8
Body	36"2
Tail	27"2
Charge	TNT (weight unknown)
Total weight in air	396 lb.

2. The bomb is fitted with nose and tail pockets to receive an impact, direct action nose fuze and an impact-armed, mechanically-fired tail fuze.

Type B Nose Fuze

Description

1. Instantaneous, impact fuze, mechanically armed.

2. The fuze is 7"8 long, 6"4 in maximum diameter and protrudes about 3"4 from the pocket. The span of the impeller is 6"4.

3. If the arming vane is missing from the nose, the fuze must be assumed to be armed.

Operation

1. Armed by the air vane which screws forward on its stem until it drops free, thereby releasing locking balls and freeing the firing pin. A blow of sufficient force on the firing pin spindle forces the firing pin down onto the detonator. The fuze is designed to fire upon land impact but not upon impact with water.

Rendering Safe Procedure

1. Tape the fuze vane securely to the fuze body. If the vane is not present, secure the firing pin spindle so as to prevent any movement.

2. Unscrew the fuze from the pocket.

3. Unscrew the sub-booster from the lower fuze body.

4. Dispose of all explosive elements without further disassembly.

Tail Fuze

Description

1. Mechanical fuze, armed by inertia on impact, fired by vane rotation.

2. The fuze is 33"6 long, protrudes 5 1/4" from the pocket, and is fitted with a three-bladed arming vane. A cap, fitted over the hub of the arming vane, contains a setting disc with graduations from 0-90 (meters). A metal pressure plate, held prior to impact by a safety pin, washer and shear wire, fits flush against the vane cap.

3. If the fuze is armed, the small pressure plate on the vane cap will not be present.

[redacted]

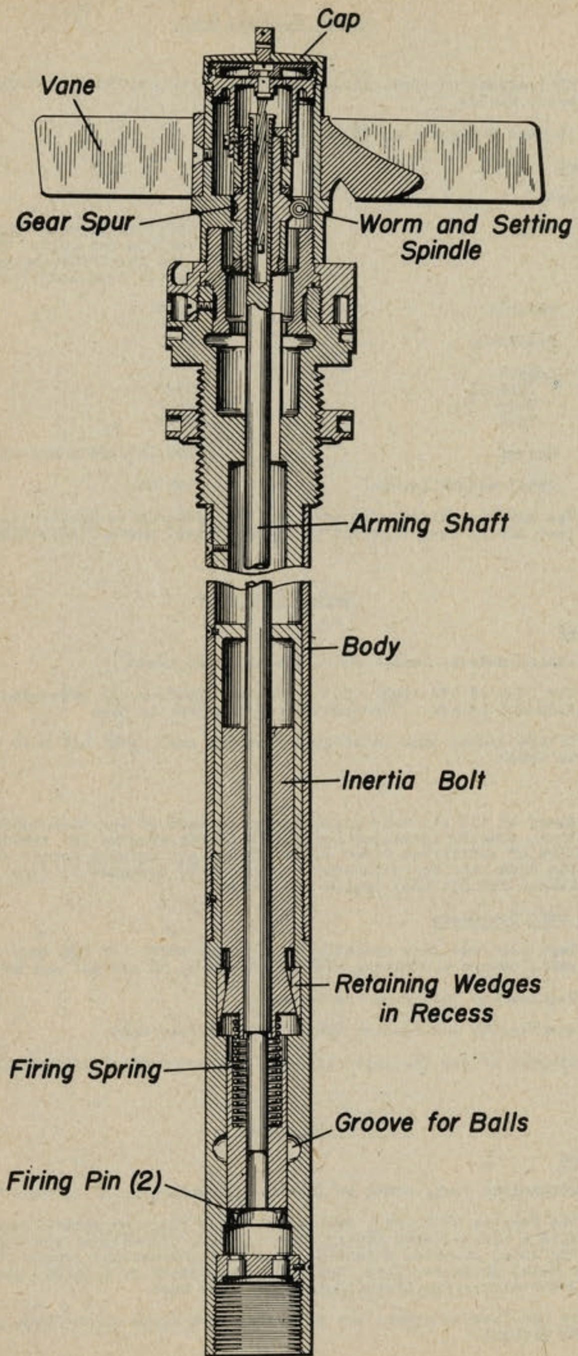


Fig. 4 - 160/C.S. Depth Bomb, Tail Fuze, Armed Position, Sectional View

[redacted]

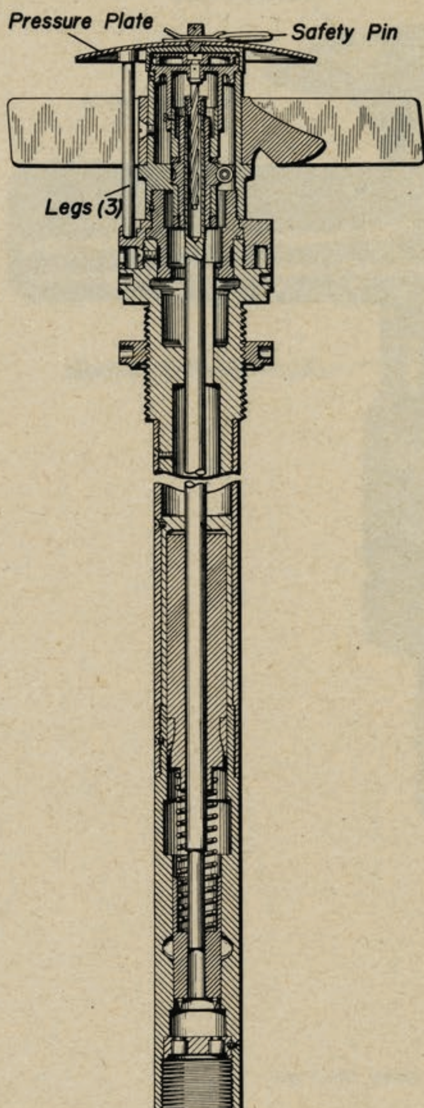


Fig. 5 - 160/C.S. Depth Bomb, Tail Fuze, Unarmed Position, Sectional View

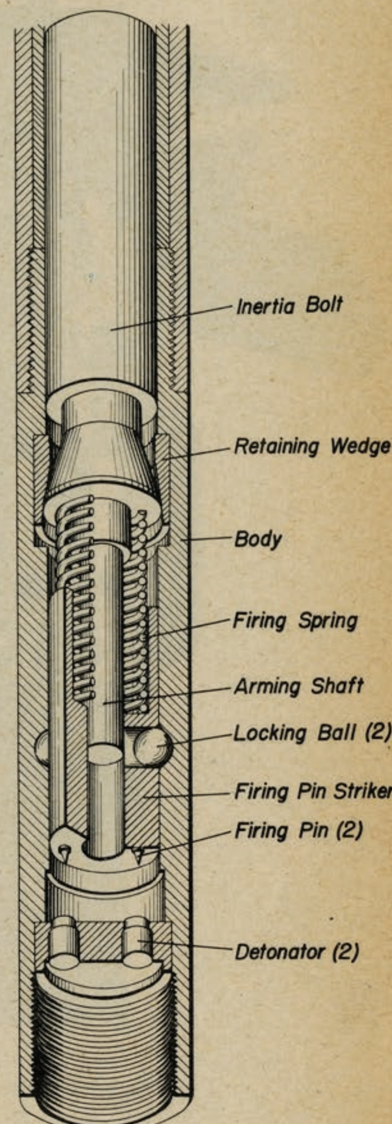


Fig. 5a - 160/C.S. Depth Bomb, Tail Fuze, Perspective View

[redacted]

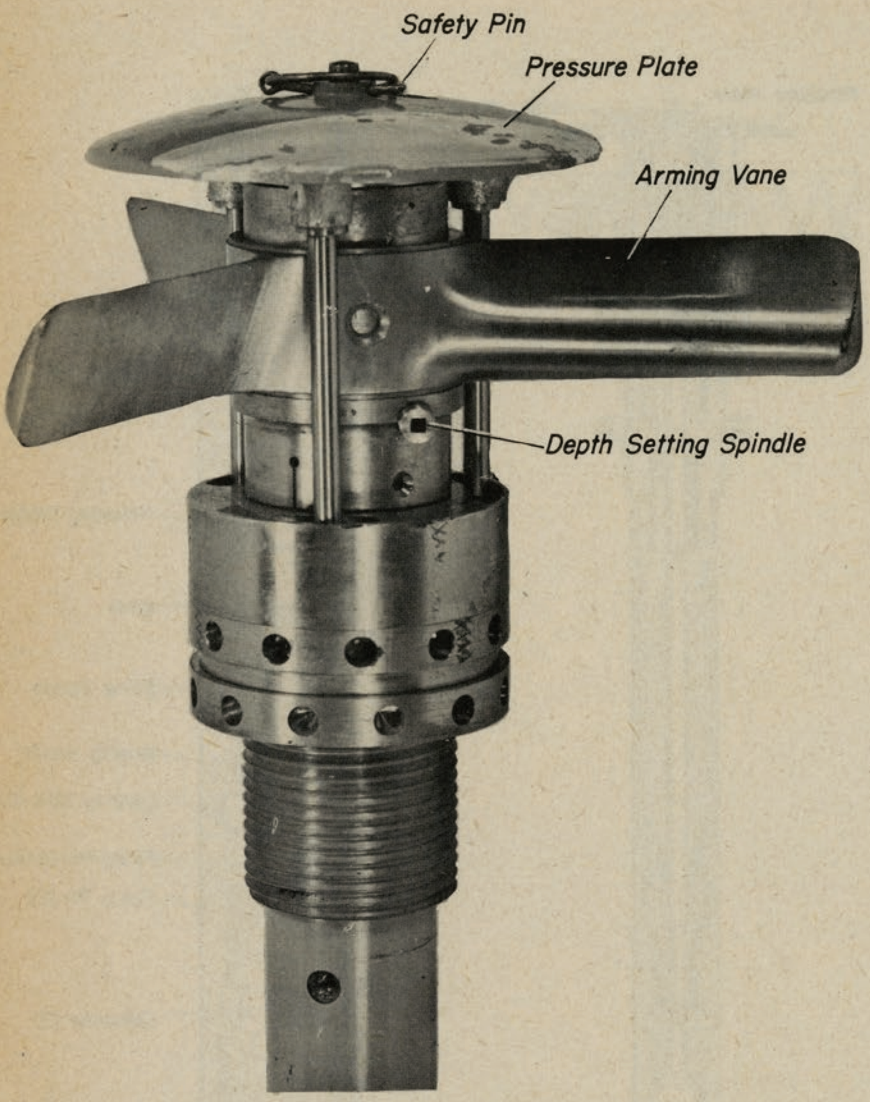


Fig.6 - 160/C.S. Depth Bomb, Tail Fuze

(Tail Fuze, Cont'd.)

Operation

1. The depth setting is made manually. Inertia upon impact with water moves an inertia bolt downward, thereby compressing the firing pin spring. As the bomb sinks, water travel rotates the vane, retracting an arming spindle until, at the set depth, two lock balls are freed to move into a recess, releasing the spring-loaded firing pin to impinge on the detonator.

Rendering Safe Procedure

1. Tape the fuze vane securely to the fuze body.
2. Unscrew the fuze from the pocket.
3. Unscrew the sub-booster from the lower fuze body.
4. Remove the set screw at the lower end of the fuze body. This screw secures the detonator carrier.
5. Dispose of all explosive elements.

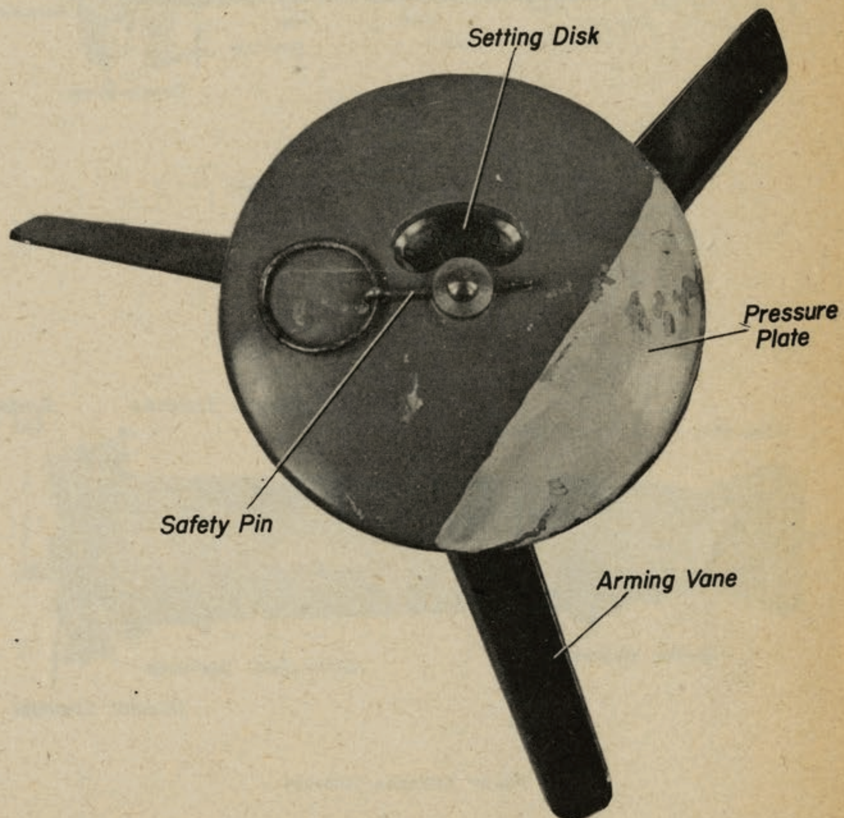


Fig. 7 - 160/C.S. Depth Bomb, Tail Fuze, End View Showing Pressure Plate

[redacted]

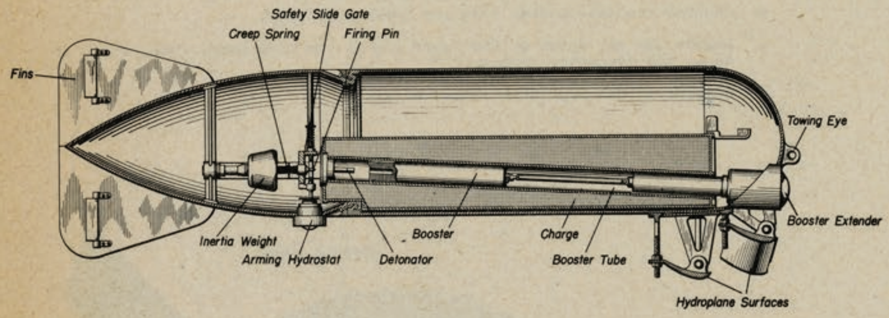


Fig. 8 - Explosive Paravane, Sectional View

("Torpedine da Rimorchio T.R. 30/1916 I.A.")

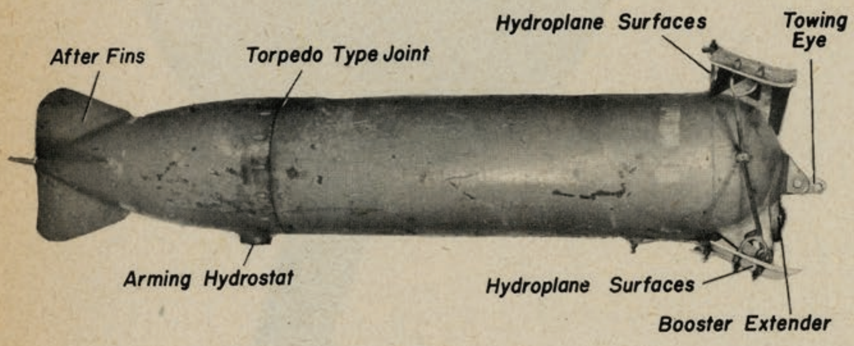


Fig. 9 - Explosive Paravane

("Torpedine da Rimorchio T.R. 30/1917 I.A.")

[redacted]

Explosive Paravane

General

1. Towed, inertia-fired, anti-submarine weapon, streamed from patrol craft.
2. Italian designation, "Torpedine da Rimorchio T. R. 30/1917 I. A.".
3. Designed to be streamed between 50 and 120 ft. below the surface at speeds from 4-20 knots at a maximum distance of 360 ft. from the towing vessel.

Description

1. Case

Shape	Cylindrical with rounded nose and faired tail. Fitted with two hydroplane surfaces forward, and horizontal and vertical fins aft.
Color	Gray
Material	Steel
Diameter	11"
Length	6'5"
Charge	66 lb. cast TNT
Total weight in air	170 lb. approx.

2. External fittings

Booster extender	3 1/2" diam., on nose, secured by keep ring.
Arming hydrostat	2 1/2" diam., on lower surface of tail.
Towing eye	In center of nose.

Operation

1. When the paravane is launched, water travel causes it to submerge due to the hydroplane surfaces forward. The arming hydrostat unlocks the firing mechanism at a depth of 20 ft. and the booster extender houses the booster over the detonator at a depth between 20 and 30 ft. The paravane is now armed.
2. The paravane fires upon striking an object with sufficient force to cause an inertia weight to overcome a creep spring and force a firing pin into a detonator cap.
3. The booster extender and arming hydrostat are designed to withdraw the booster from the detonator and lock the firing device, respectively, if the paravane rises to a depth less than 20 ft.

Precautions

1. Do not move or jar the paravane except from a safe distance.

Rendering Safe Procedure

1. Remove the keep ring and booster extender. The booster is attached thereto.
2. Remove the detonator from the tail (exact method of assembly unknown).
3. Dispose of detonator, booster and charge.

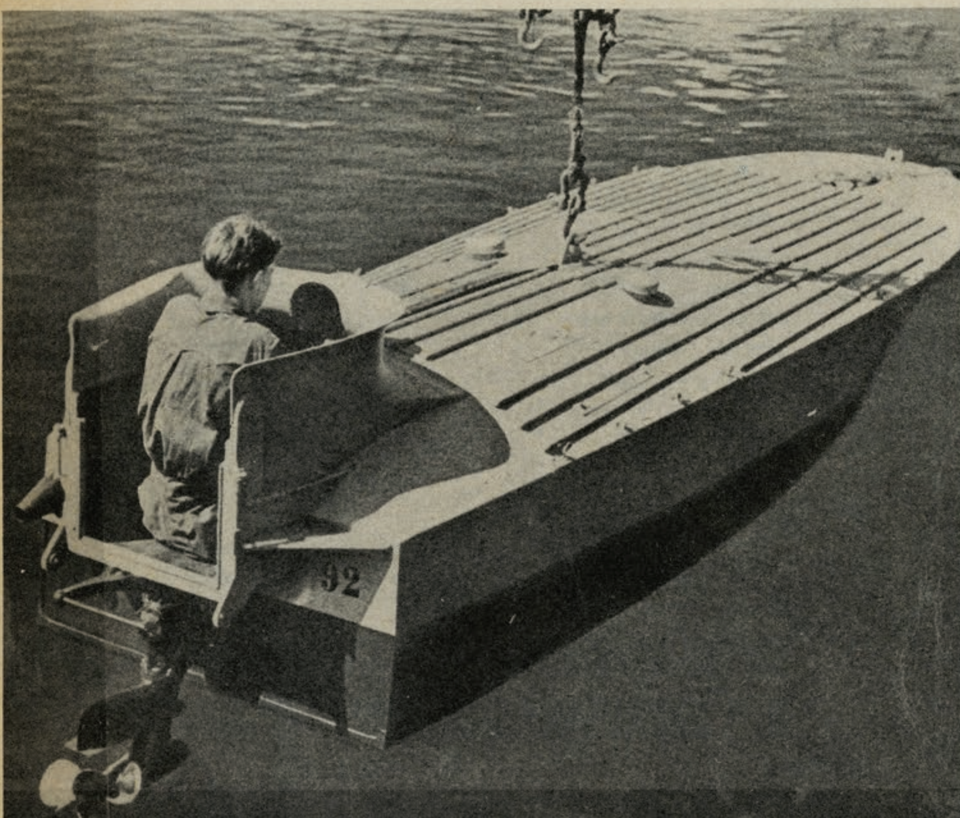


Fig. 10 - Explosive Motorboat

Explosive Motorboat

General

1. The explosive motorboat (Italian designation, "Motoscafo Turismo") is a light, wooden-hulled craft carrying a large explosive charge which may be fired either hydrostatically, by direct action on impact, or by a self-destroying delay fuze. The boat is powered by a gasoline engine and is piloted by a single operator who goes over the side having once set the boat on a collision course relative to its intended target. It was designed primarily as a weapon against merchant shipping although its sizable charge makes it effective against all but the largest and most heavily-armored capital ships.

Description

1. Hull

(a) The hull of the boat is rather similar to that of a commercial-type speedboat. Its bottom is V-shaped with a cutwater which extends aft to the beam, the remainder of the bottom being flat. The hull is constructed of five-ply, 5/8", mahogany-veneered plywood and is strengthened by 1" x 1" transverse ribbing at one-foot intervals. Significant figures and dimensions are as follows:

Length overall (including cockpit)	19' 8 1/2"
Length of hull proper	18'
Length at waterline	17' 9"
Beam	5'3"
Maximum height	3'2"
Cockpit freeboard	2'11"

(b) The decking, which encloses the entire boat except for the pilot's compartment, may logically be divided into five main parts, reading aft from forward, as follows:

(1) A fixed section, 3' 10" long, which forms the forecastle. A fender bar framework of welded steel pipe is fitted over the forecastle and overlaps the deck so that if the boat makes contact with a target, the framework tends to move aft. A bow fender bar attached to the framework may be swung down in front of the cutwater to increase the striking surface. The section contains a hole near the center of its after edge, through which a small shaft protrudes. The shaft is attached at its upper and lower ends, respectively, to the framework and to the firing switch on the underside of the deck.

(2) A removable section, 4' long, which covers the charge compartment and is secured by 12 drop bolts. This section contains an air vent on its port side.

(3) A fixed section, 3' long, which covers an empty compartment abaft the charge compartment and the forward end of the engine room.

(4) A removable section, 4' long, which covers the greater part of the engine room and is secured by 12 dogs. This section contains hatches to port and to starboard.

(5) A fixed section, 5 1/2' long, which extends to the stern of the boat and contains the pilot's cockpit.

(c) The pilot's cockpit is sunk into the after end of the engine room and is about 30" square. The seat protrudes over the stern and contains a back rest consisting of two hinged, plywood floats secured in the vertical position. The panel board contains the customary gauges and steering apparatus and, in addition, a button switch which controls a switch in the circuit to the main charge detonator controlled by the impact firing device. A toggle on the port side of the cockpit is used to release the floats and also to arm the various firing devices.

2. Engine

(a) The boat is powered by a six-cylinder Alfa-Romeo gasoline engine of about 200 h.p. Transmission is through a clutch controlled by a lever in the pilot's cockpit. Two counter-rotating propellers are fitted. The boat's maximum speed is 30 knots, its cruising speed, about 20 knots, and it is estimated to have a range of about 120 miles at cruising speed.

3. Explosive Charges

(a) Main charge

(1) This consists of 560 lb. of TNT cast in a cylindrical container

[redacted]

(Explosive Motorboat, Cont'd.)

34" long and 19 1/2" in diameter. It is mounted athwartships in two wooden cradles in the charge compartment and is secured by two metal bands. A central tube, 2 3/4" in diameter, runs the full length of the container and contains a brass booster can. Two filling holes, each 3 3/4" in diameter, are fitted to one end of the container. A hydrostatic pistol fits into the port end of the central tube and the starboard end contains the inner end of a casting which consists of (1) a delay fuze and (2) an electric detonator and leads.

(a) Scuttling charge

(1) This consists of a primacord charge fitted to the forward edge of the after bulkhead of the charge compartment and a metal tube of TNT located forward of the third rib under the forecastle. The primacord charge is designed to sever the charge compartment and forecastle from the rest of the boat whereas the TNT tube is designed to sever the forecastle and bow from the charge compartment. Six electric detonators are fitted to the charges which are designed to be fired simultaneously.

4. Firing Devices

(a) The boat incorporates three main types of firing devices as follows:

(1) A simple hydrostatic pistol consisting essentially of a housing, a hydrostatic diaphragm and spindle, and a spring-loaded firing pin assembly restrained by two lock balls. This pistol is armed by the toggle lever in the pilot's cockpit and fits into the port end of the charge container central tube.

(2) An impact-direct action firing mechanism which operates upon displacement of the fender-bar arrangement on the forecastle. The fenders are connected mechanically to a normally-open switch which is in the circuits of the respective electric detonators fitted to the main charge and scuttling charges.

(3) A delay action firing mechanism (self-destroying feature) which consists essentially of a black powder delay fuse, wound around an aluminum housing, and a detonator. A spring-loaded firing pin assembly is contained within the housing and is restrained by a safety pin which in turn is controlled by the toggle bar in the pilot's cockpit. Operation of this mechanism fires the main charge.

Operation

1. The pilot sets the boat's course and speed so that a collision with the desired target may be expected. The type of target ordinarily determines the type of firing that is employed. Delay action hydrostatic firing is ordinarily used against stationary targets whereas direct action impact firing is used against moving targets. Having set the target's course and speed, the pilot then determines the type of firing to be employed. If direct action impact firing is to be employed, the pilot closes the button switch on the dashboard, putting the electric detonator of the impact firing device in the battery circuit. If this is not done, delay action hydrostatic firing is obtained. Having determined the type of firing, the pilot pulls the toggle on the port side of the cockpit, resulting in the following:

(a) The hinged float is released and dropped in the water. The pilot goes over the side at this point and climbs on the float to protect himself from the explosion.

(b) Strain is taken on a heavy bowden wire which is attached to the toggle and which leads to a transmission box on the after port side of the charge compartment where it controls four other wires. Strain is put on these four wires, resulting in the following:

(1) A safety pin is withdrawn from a spring-loaded switch on the other side of the charge compartment, allowing a plunger to move forward and close a break in the circuits of the respective electric detonators fitted to the main charge and scuttling charges.

(2) A safety pin is withdrawn from the hydrostatic pistol, arming the pistol.

(3) A spring-loaded firing pin is released, igniting the delay fuze in the self-destroying feature.

(4) Two plungers are withdrawn from the impact firing switch under the forecastle, arming the switch.

(Explosive Motorboat, Cont'd.)

2. When the boat contacts a target, it may fire in one of two ways as follows:

   (a) If set for impact firing, contact with the target moves the fender framework on the forecastle aft, closing the firing switch and completing the circuit from the battery through the main charge detonator controlled by the impact firing device and through the scuttling charge detonators.

   (b) If set for hydrostatic firing, contact with the target moves the fender framework aft, closing the firing circuit and completing the circuit from the battery through the scuttling charge detonators. The portion of the boat forward of the after bulkhead of the charge compartment is then sheared by the primacord charge, and the TNT charge under the forecastle demolishes the bow. The charge compartment then sinks. When the hydrostatic pistol reaches a depth of 18 ft., the hydrostatic diaphragm moves inward, releasing the lock balls and allowing the spring-loaded firing pin to impinge on the detonator and fire the main charge.

3. If the boat makes no firing contact within six minutes after the toggle is pulled, the delay fuze of the self-destroying feature burns through its entire length and fires its detonator and the main charge.

Precautions

1. Stand clear of the forward end of the boat, being especially careful not to contact the fenders. Always board the boat over the side or stern.

2. Except in extreme emergency, do not approach the boat unless it can be positively ascertained that the self-destroying delay fuse has not been ignited. If it should be necessary to board the boat without knowing the condition of the delay fuse, wait a period of at least 12 hours before boarding if the military situation permits.

Rendering Safe Procedure

1. **Remove the portion of the deck covering the motor compartment and disconnect all battery leads.**

2. **Remove the portion of the deck covering the charge compartment and insert a safety pin in the hydrostatic pistol on port side of the charge.**

3. **Disconnect the mechanical lead to the delay fuse in the starboard end of the central tube of the charge container, using extreme care not to exert any tension on the lead. Such tension will ignite the delay fuse if it has not already started.**

4. **Loosen the metal bands and remove the charge container.**

5. **Unbolt the casting containing the delay fuse and detonators from the starboard end of the central tube.**

6. **Cut and tape the electrical leads running from the main juction box located on the upper frame of the after bulkhead of the charge compartment. This disconnects the scuttling charges.**

7. **Remove the frame containing the primacord scuttling charge.**

8. **Remove the TNT scuttling charge from under the forecastle.**

9. **Dispose of all explosive elements.**

[redacted]

MINE DISPOSAL HANDBOOK

E.C.HADERLIE

PART VI

JAPANESE UNDERWATER ORDNANCE

[redacted]

TABLE OF CONTENTS

PART VI - JAPANESE UNDERWATER ORDNANCE

CHAPTER I

JAPANESE CONTACT AND CONTROLLED MINES

	Page
Introduction	3
Mine Type JA	5
Mine Type JB	11
Mine Type JC	15
Mine Type JD	19
Mine Type JE	23
Mine Type JF	27
Mine Type JG	31
Mine Type JH	35
Mine Type JI	38a
Mine Type "Pear"	39
Mines Type "Apricot" and "Grapefruit"	39
Mine Type "Banana"	40
Mine Type "Quince"	41
Mine Type "Avocado"	41
Mine Type "Persimmon"	42
Mine Type "Grape"	42
Mine Type "Pomegranate"	43
Mines Type "Blueberry" and "Fig"	43
Mine Type 92 Model 1 (JK)	45

CHAPTER II

JAPANESE TORPEDOES

Introduction	3
Exploder Type 90, Model 2	3
Special Spanner for Ball Type Exploders	9
Exploder Type 91, Model 1 (Type 91, Model 2)	11
Type 3 Warhead	15
Hydroplane Firing Device	17
Exploder Type 2	31

CHAPTER III

JAPANESE DEPTH CHARGES

Introduction	3
Depth Charge Type 95 (Modification 1, Modification 2)	3
Depth Charge Type 2, Modification 1	9

CHAPTER IV

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

Introduction	3
Japanese Calendar	3
Numeral System	3
Type Number	5
Model and Modification Numbers	5
Mark Number	7
Miscellaneous Designations	7
Underwater Ordnance Indentification	7
Glossary	14

[redacted]

MINE DISPOSAL HANDBOOK

PART VI

JAPANESE UNDERWATER ORDNANCE

* * * * * *

CHAPTER I

JAPANESE CONTACT AND CONTROLLED MINES

NOVEMBER 1, 1944 CONFIDENTIAL

Moored and Drifting Contact Mines

Japanese Designation	U. S. Designation	Old Type No.	Source of Information	Nature	Laid By	Dimensions Dia. (in.)	Dimensions Length (in.)	Type & Wt. of Charge (lb.)	Total Wt. (lb.)	Depth Taking	Max. Case (ft.)	Depths Anchor (ft.)	Firing Methods	Safety Devices Arming	Safety Devices Disarming	Remarks
Type 88 Mod 1	JA	II	Recovered	Moored	Sub	33.9	45.8	396 block fitted Shimose	847	Hydrostat	66	1500	Four chemical horns (Type 88)	Spring-loaded switch with soluble plug delay	Come-along on mooring cable which withdraws detonator	Laid by subs of the I-121 Type. Most information taken from the I-1 document. An offensive mine.
Type 93 Model 1	JB	IV	Recovered	"	S/C or A/C	34	34	220 Type 88	484	Plummet	246	3281	Four chemical horns (Type 91 or 97)	Mooring safety switch with soluble plug delay. Detonation and booster separated prior to mooring	Mooring safety switch	Most commonly found moored chemical horn mine.
Type 93 Model 2	Blueberry	VIII	I-1 document	"	S/C	34	34	220 Type 88	484	Plummet	246	3281	Seven chemical horns Type 91 or 97	Same as Mine Type JB		Model of JB.
Type 93 Model 3	JB	VIII	"	"	"	34	34	220 Type 88	484	Plummet	246	3281	Eight or nine chemical horns (Type 91 or 97)	Same as Mine Type JB		Same as JB (Type 93-3-1) but does not incorporate lever type base plate.
Type 93 Model 3 Mod 1	JB	IV	Recovered	"	S/C or A/C	34	34	220 Type 88	484	Plummet	246	3281	8 or 9 chemical horns (Type 91 or 97)	Mooring safety switch with soluble plug delay. Detonation and booster separated prior to mooring	Mooring safety switch	Most commonly found moored chemical horn mine. Those mines with lower horn bosses are often found with the lower bosses blanked off.
Type 93 Model 4	JB	"	"	"	"	34	34	"	"	"	"	"	"	"	"	"
Mk 5 Mod 1	JC	V	"	"	S/C	32.9	33.7	182 block fitted Shimose	456		162	525	Four chemical horns (Type 91 or 97)	Spring-loaded switch with soluble plug delay; mooring safety switch	Mooring safety switch	Very similar to JH, mooring system being the only major difference.
Mk 6 Model 1	JH	XV	"	"	"	41.4	41.4	478 block fitted Shimose	944				Four chemical horns	Spring-loaded switch with soluble plug delay and dash-pot damped mooring safety switch	Mooring safety switch	

Added 1 July 1945
(Change No. 8)

Moored and Drifting Contact Mines (Cont'd.)

Japanese Designation	U. S. Designation	Old Type No.	Source of Information	Nature	Laid By	Dimensions Dia. (in.)	Dimensions Length (in.)	Type & Wt. of Charge (lb.)	Total Wt. (lb.)	Depth Taking	Max. Case (ft.)	Depths Anchor (ft.)	Firing Methods	Safety Devices Arming	Safety Devices Disarming	Remarks
Mk 6 Model 2	JL		Recovered	Moored	S/C	41.1	41.1	440 cast Shimose	800				Four chemical horns	Spring-loaded switch with soluble plug delay; mooring safety switch	Mooring safety switch	Tactical use and laying depths assumed to be same as Mk 5 Mod 1.
Mk 6 Model 2 Mod 1	Persimmon	VII	I-1 document	"	"	41.3		440 Type 88	903		150	3300	Four chemical horns (Type 87)	Spring-loaded arming switch with soluble plug delay and mooring safety switch	Mooring safety switch	Similar to JC and JH with same mooring safety switch as JC. Information from I-1 document.
Type 3 Mk 1 Aircraft Mine Model 1	JJ (Camote)		Recovered	"	A/C	23 1/2	52 3/4	240 Type 98	600	Loose bight hydrostat			Four chemical horns	Hydrostatic booster release mooring safety switch with soluble plug delay, and horn release mechanism	Mooring safety switch	Can be surface laid.
Type 3 Mk 2 Aircraft Mine Model 1	JI		Recovered	Drifting	"	14 1/2	22 1/2	123 Cast Type 98	300	Float pendant			Three switch horns	Hydrostatic switch, soluble plug delay in tail release mechanism, and horn release mechanism and safety switch	None	Offensive mine. Scuttles self after soluble plug delay.
Type 3 Mk 6	Pear	I	OP-16-FE Serial 45-43, April 21, 1943	Moored	Sub	35.5	45.3	440 Shimose	900		66	1221	Four chemical horns	Not known but believed similar to Mine Type JA		Believed to be a redesign of JA with same mooring and safety features.
Unknown	JM	IX	ONI Ltr. OP-16-A S76/EF (1-10) of 18 Jan. 1928	"	S/C	32.5		170 Type 88	450	Plummet			Inertia pendulum	Not known		Recently recovered, information incomplete.
Unknown	Pomegranite	X	Unknown	"	"	41				Plummet			Six chemical horns and upper and/or lower antenna	Antenna safety switch and mooring safety switch	Mooring safety switch	Reported to be very similar to the British Vickers antenna mine.
Unknown	Banana	III	Unknown	"	"	35.5		275 Type 88		Plummet			Four chemical horns	Mooring safety switch with soluble plug delay	Mooring safety switch	Believed to be similar to Dutch Vickers.

Added 1 July 1945
(Change No. 8)

[redacted]

JAPANESE CONTACT AND CONTROLLED MINES

[redacted]

Beach Contact Mines

Japanese Designation	U. S. Designation	Old Type No.	Source of Information	Nature	Laid By	Dimensions Dia. (in.)	Dimensions Length (in.)	Type & Wt. or Charge (lb.)	Total Wt. (lb.)	Depth Taking	Max. Case (ft.)	Depths Anchor (ft.)	Firing Methods	Safety Devices Arming	Safety Devices Disarming	
Small Type Mine, Model 1	JE	XIII	Recovered	Ground	Manually	20.5	10.5	45 Cast Type 98	110				Two chemical horns	Spring-loaded switch, manually operated	None	Has been found wired in parallel & series thus eliminating arming spindle switch as a means of visual determination of armed conditions
Small Type Mine, Model 2	JG	XVI	Recovered	Ground	Manually	14.3 (max.) 7 (min.)	14.6	22 Cast Type 98	52.5-62.5				One chemical horn	Same as Mine Type JE		As for Mine Type JE

Controlled Mines

Japanese Designation	U. S. Designation	Old Type No.	Source of Information	Nature	Laid By	Dimensions Dia. (in.)	Dimensions Length (in.)	Type & Wt. or Charge (lb.)	Total Wt. (lb.)	Depth Taking	Max. Case (ft.)	Depths Anchor (ft.)	Firing Methods	Safety Devices Arming	Safety Devices Disarming	
Type 92	JK	XII	JICPOA Translations (MEIU #4 Report 19) ONI Report-OP 16 F-Z Serial #113-42	Moored	S/C	41.5	55.0	1100 Type 88	1687	Preset soluble plug delay	198	396	Electrically controlled	Same as 92 Model 1		Laid in clusters of six. Acoustically monitored.
Type 92 Model 1	JK		Recovered	"	"	41.5	55.0	1100 Temp. Type 1	1687	"	198	396	Controlled or automatic	Soluble plug delays mooring	None	Laid in clusters of six. Magnetically monitored.
Type 94 Model 2	JF	XIV	Recovered	Ground	"	24.8	25.6	190 Type 88	580				Controlled	None	None	
Mk 2 explosive hook	Grape		I-1 document	Towed sweep device		11.5 (max.)	25	19 Type 88	39	Float pendant			550 lb. tension	None		Same as JD with substitution of tension firing device for electrical control.
Mk 2 explosive hook, Mod 1	JD	XI	Recovered	"		11.5 (max.)	25	19 Shimose or Type 88	39				Electrically controlled	None	None	May be used as a ground controlled mine either in water or on land.

Net Mines

Japanese Designation	U. S. Designation	Old Type No.	Source of Information	Nature	Laid By	Dimensions Dia. (in.)	Dimensions Length (in.)	Type & Wt. or Charge (lb.)	Total Wt. (lb.)	Depth Taking	Max. Case (ft.)	Depths Anchor (ft.)	Firing Methods	Safety Devices Arming	Safety Devices Disarming	
Type 96	Apricot	VI	I-1 document	Attached to nets		20.1	27.2	121 Type 97 or 88	238				Tension mechanism 300 lb. tension needed for firing	Hydrostatic plunger and shear pin	Not known	Attached to anti-sub nets.
Type 96 Mod 1	Grapefruit	VI	I-1 document	Attached to nets		20.1	27.2	132 Type 97 or 88	248					Similar to Apricot		Change of position of charge alters the center of gravity from that in the Type 96.

Influence Mines

Japanese Designation	U. S. Designation	Old Type No.	Source of Information	Nature	Laid By	Dimensions Dia. (in.)	Dimensions Length (in.)	Type & Wt. or Charge (lb.)	Total Wt. (lb.)	Depth Taking	Max. Case (ft.)	Depths Anchor (ft.)	Firing Methods	Safety Devices Arming	Safety Devices Disarming	
Type 3 Electric Mine	Lime		CinCPac CinCPOA Translation Item #10	Ground	A/C	21	11' 2"	1950 (Type unknown)	2398		100		Acoustic or magnetic unit	Not known		Model 1 is magnetic, model 2 is acoustic.

Added 1 July 1945
(Change No. 8)

JAPANESE CONTACT AND CONTROLLED MINES

Introduction

1. Although numerous different types of Japanese mines are believed to exist, only those hereinafter given a letter designation have been recovered and analyzed by American or Allied commands, information on all others being derived entirely from Intelligence sources.

2. In order to differentiate between mines which have been recovered and those which have been reported only by Intelligence sources, NAVORD OCL M21-44, dated 8 September 1944, abolishes the Roman numeral designations for Japanese mines, and directs that they be designated as follows:

   (a) Designation of each Japanese mine which has been recovered shall consist of two capital letters, the first of which shall be "J" in all cases, indicating nationality. The second letter will designate the specific mine, these letters being assigned in alphabetical order as the mines are found. These letter designations will be assigned by the Bureau of Ordnance only.

   (b) Field units finding what they believe to be a new mine may identify it by the name of a fruit. A short name not previously used should be selected. This name will be used until the Bureau of Ordnance has made the necessary investigation to insure that the mine is of a new type, at which time a letter designation will be assigned. After letter designations have been assigned, the fruit name of that particular type mine will no longer be used. Fruit names may also be assigned to Japanese mines of which there is Intelligence information only, and no specimen has been recovered.

   (c) Data on mines designated with fruit names may not be accurate and should be accepted with reserve.

3. Most of the safety devices of Japanese moored contact mines are operated by tension on the mooring spindle resulting from the positive buoyancy of the mine case. Because these safety devices may have weak springs, frequent malfunction may be expected. Therefore, proper operation of disarming safety devices cannot be assumed until examination of the mooring spindle indicates that full retraction has taken place.

4. A number of Japanese mines and depth charges are loaded with Type 88 explosive (Japanese designation). This explosive, a dark, crystalline powder, is composed approximately within the ranges noted below:

Ammonium perchlorate	77%	-	66%
Silicon (Metallic Powder)	16%	-	14%
Wood Powder	11%	-	6%
Crude Oil (Binder)	6%	-	1%

   This mixture is extremely sensitive to friction and heat; according to reports, it is equally unstable, and may become more sensitive with age. High order detonation must be expected if an attempt is made to burn it within a confined space. It burns violently and with an intense flame even when unconfined. Ordnance containing charges of this type of explosive should, whenever feasible, be countermined or else dumped in deep water rather than burned. If this ordnance is of a new type, however, it should be rendered safe as prescribed, and shipped, with main charge intact, to one of the investigation centers in accordance with instructions given in Part I, Chapter 1.

5. The following additional general precautions should be observed when dealing with all Japanese mines:

   (a) Take care not to damage horns in any way.

   (b) Bear in mind that safety disarming devices may fail to operate as designed.

   (c) Do not take a strain on any lines or cables which may be attached externally to the case.

   (d) Do not move or jar the mines except from a safe distance.

   (e) If necessary to move the mine before completing RMS, it may be advisable to remove the horns first. All Japanese horns recovered to date are fitted with left-hand threads. (No horns were recovered with Mine Type JH but its horn bosses were machined with right-hand threads.)

[redacted]

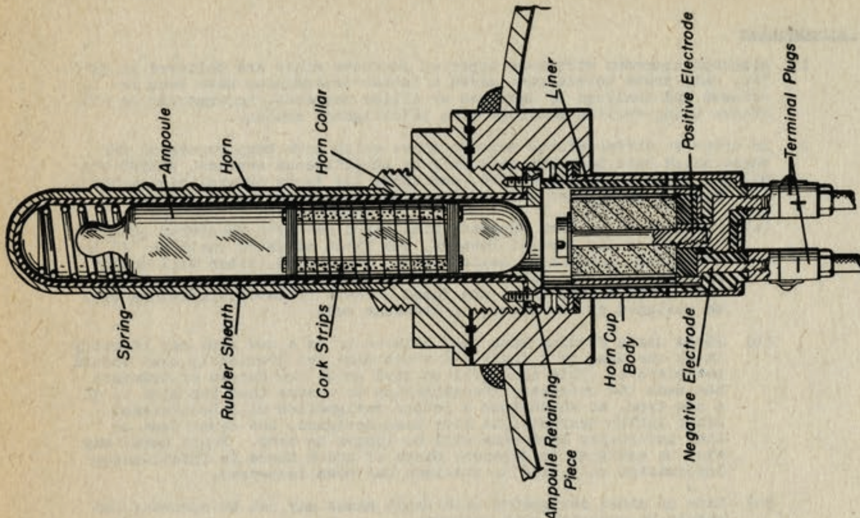


Fig. 1 - Chemical Horn, Sectional View

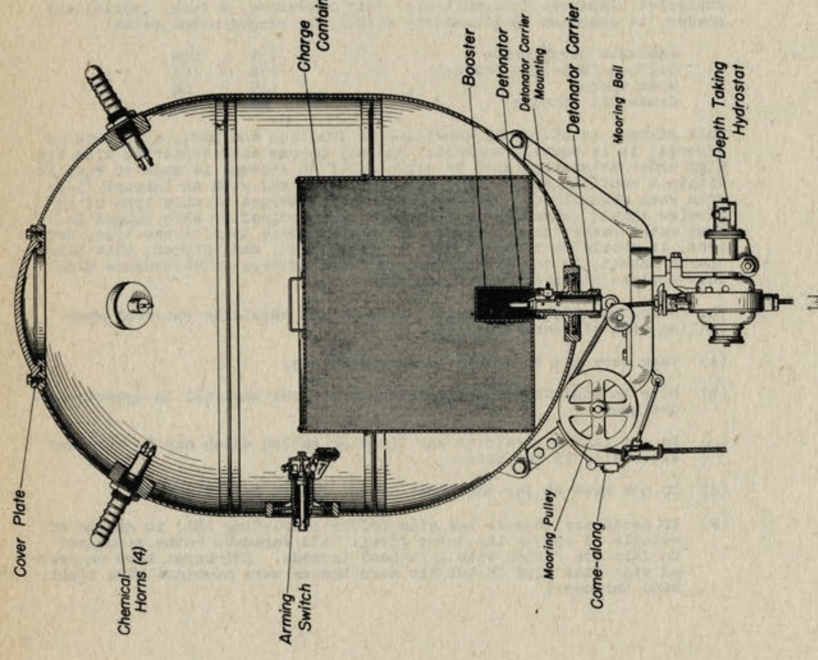


Fig. 2 - Mine Type JA, Sectional View

JAPANESE CONTACT AND CONTROLLED MINES

Mine Type JA

General

1. Moored, contact, chemical horn mine, laid by submarine.

2. Japanese designation, "Type 88, Modification 1".

3. Offensive mine for use in maximum depth of water of about 1500 ft. against surface craft. Maximum depth of case when moored is 66 ft.

Description

1. Case

Shape	Two hemispheres, joined by a 12" cylindrical mid-section.
Color	Black
Material	Steel
Diameter	33"9
Length	45"8
Charge	396 lbs. block-fitted Shimose with Shimose booster.
Total weight in air	847 lbs.

2. External fittings

Horns	Four, equally spaced around upper hemisphere, 16" from top center of mine.
Cover plate	12"75 diam., in center of upper hemisphere, lap fitted, secured by 16 bolts. A circular pan, 17" deep, may be fitted instead of the cover plate.
Arming switch	5" diam., on mid-section, 2"75 below upper hemisphere, secured by keep ring.
Detonator carrier mounting	5" diam., in center of lower hemisphere, secured by keep ring. Protrudes about 2" from case. Detonator carrier is fitted in center of mounting.
Lifting lugs	Two, on upper hemisphere, 180° apart, 7"75 from center.
Depth taking hydrostat	12" long, bolted to extension on mooring bail.
Mooring bail	27" span, bolted to two lugs on lower hemisphere.
Mooring pulley	6"25 diam., attached to mooring bail.
Come-Along	Fitted to mooring bail. Secured by a shear pin.

Operation

1. Detonator is manually housed in booster prior to laying. Mine moors on a bight of cable and takes depth by hydrostat. Spring operated arming switch arms the mine 15 to 20 min. after the mine and anchor separate, delay being caused by an oil dashpot on the arming switch.

2. Standard chemical horn firing.

[redacted]

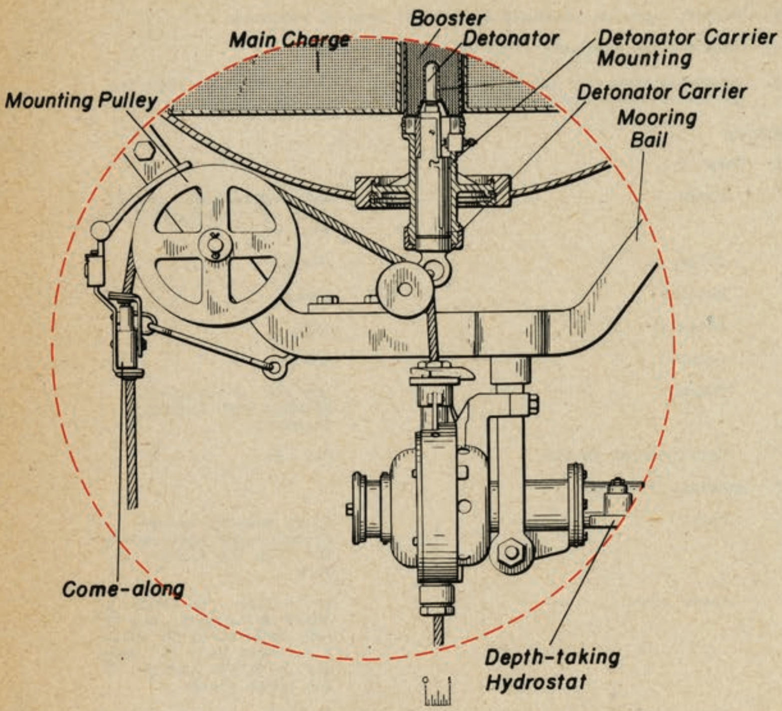


Fig. 3-- Detail of Base, Mine Type JA

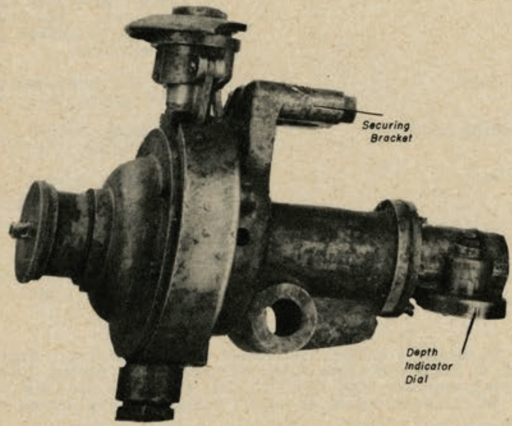


Fig. 4-- Depth Taking Hydrostat, Mine Type JA

[redacted]

3. The only self-disarming device is a chain, one end of which is made fast to the detonator carrier, and the other end of which is made fast to the come-along. When the mine breaks its mooring, the mooring cable runs back over the pulley as the mine rises. The come-along takes up on the mooring cable and is pulled out of its fitting on the bail, being secured thereto only by a small shear pin. Tension on the chain then withdraws the detonator carrier. This device is not operative if the mine is laid in depths greater than approximately 1000 ft. because, in such a case, the mooring cable will be completely unreeled from the cable drum on the anchor and the mine will be moored on a single length of cable rather than on a bight.

Precautions

1. Note that the spring-loaded arming switch does not disarm the mine when it breaks loose from its mooring.

RMS

1. Check the detonator carrier. If it has not withdrawn, unscrew the small keep ring which holds the packing around the detonator carrier, and remove the detonator from a safe distance.

2. Insert a screw in the threaded spindle of the arming switch. Retract the spindle, and insert a wedge to hold it out.

3. Remove the cover plate.

4. Cut and tape the leads between the arming switch and the detonator, and all leads to the horns.

5. Unscrew the arming switch keep ring, and remove the arming switch.

6. Unscrew the large keep ring, and remove the detonator carrier mounting. The booster can is attached thereto.

7. Dispose of detonator, booster and charge.

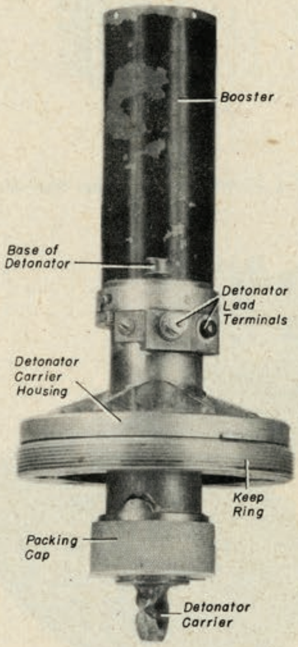


Fig. 5-- Detonator-Booster Assembly, Phantom View, Mine Type JA

[redacted]

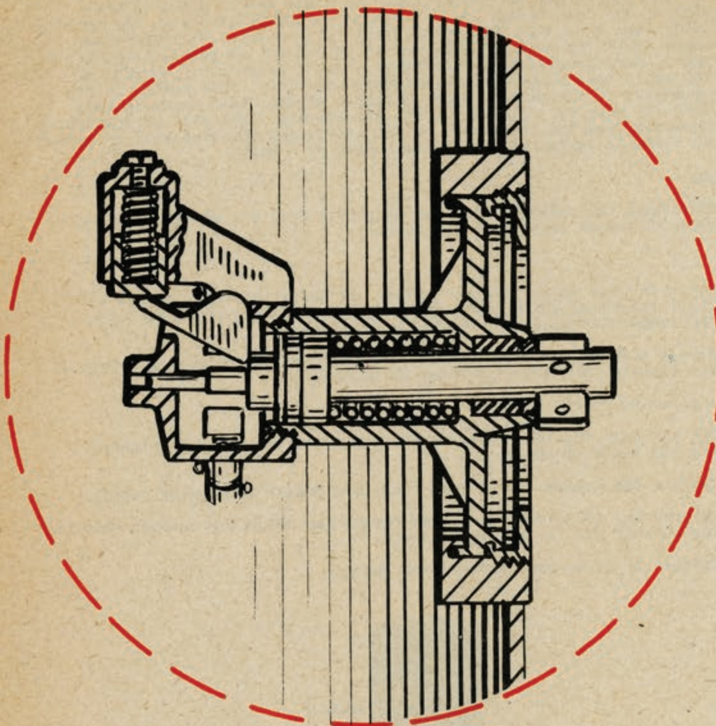


Fig. 6-- Arming Switch Detail, Mine Type JA

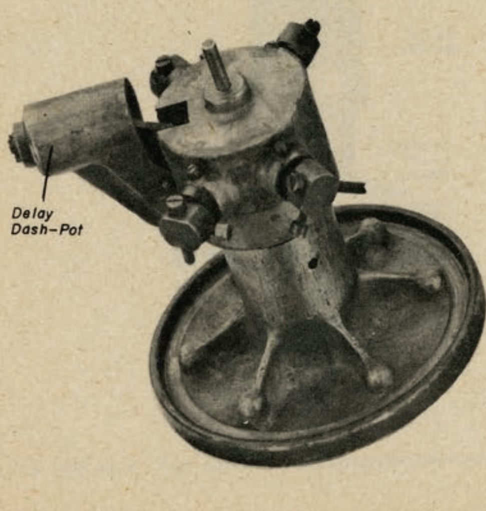


Fig. 7-- Arming Switch, Mine Type JA

[redacted]

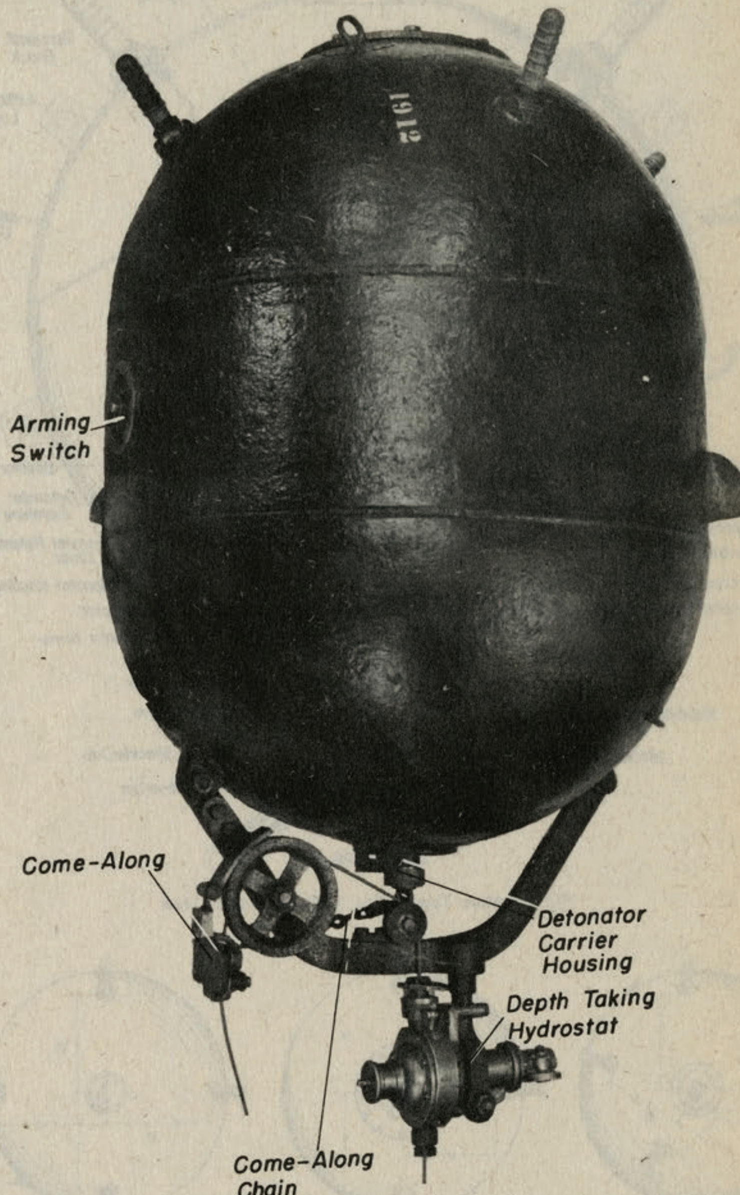


Fig. 3 - Mine Type JA

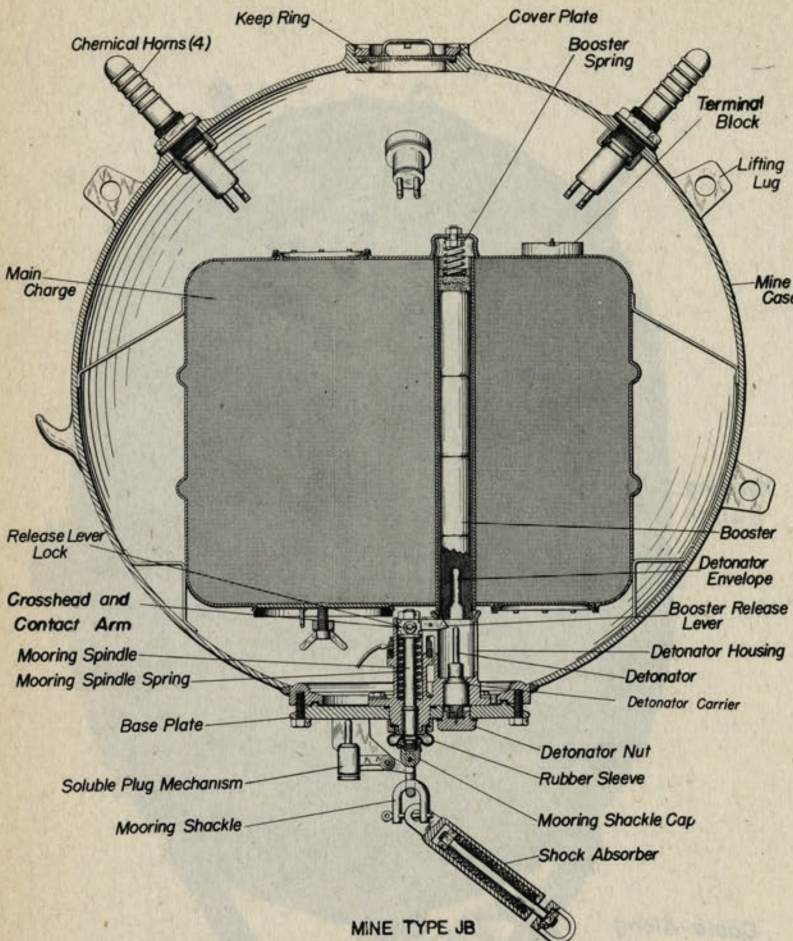
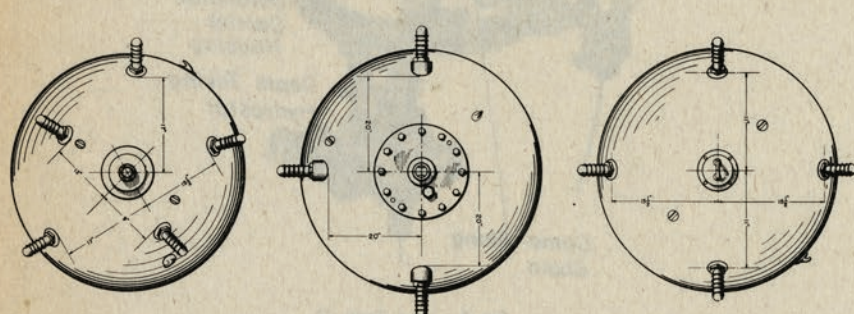


Fig. 9 - Mine Type 93-1 (JB), Sectional View



Types 93-3-1 and 93-4, Top View | Types 93-3-1 and 93-4, Bottom View | Type 93-1, Top View

Fig. 9a - Mine Type JB, Horn Arrangements

Mines Type JB

General

1. Moored, contact, chemical horn mines, laid by surface craft.

2. Japanese designations, "Type 93, Model 1, Type 93, Model 3, Modification 1 and Type 93, Model 4".

3. Defensive mines for use in maximum depth of water of 3527 ft. against surface craft or submarines. Maximum depth of case when moored is 246 ft.

Description

1. Case (Type 93, Model 1)

Shape	Spherical
Color	Black
Material	Steel
Diameter	34"
Charge	220 lb. granular Type 88 explosive with Shimose booster.
Total weight in air	484 lb.

2. External fittings (Type 93, Model 1)

Horns	Four, around upper hemisphere, 90° apart, alternately 16"2 and 11"6 from top center of case.
Cover plate	5"25 diam., in center of upper hemisphere, recessed, secured by keep ring.
Lifting lugs	Two on upper hemisphere, 180° apart, 13"6 from top center of case, and one on lower hemisphere, 18" from bottom center of case.
Base plate	11"75 diam., in center of lower hemisphere, lap-fitted and secured by 12 bolts. Fitted with straight-shank mooring spindle, detonator cover nut, and a soluble plug mechanism. The mooring spindle is fitted with a rubber sleeve which makes a watertight joint between the spindle and the base plate.
Anchor securing lugs	Two, on upper hemisphere, 19" and 28" respectively from center of upper hemisphere.

3. The Type 93, Model 3, Modification 1 differs from the Type 93, Model 1 as follows:

   (a) It is fitted with either eight or nine chemical horns positioned as follows:

      (1) One on the top cover plate.

      (2) Five irregularly spaced around the upper hemisphere. Fig.9a shows the position of the horns relative to the center of the upper hemisphere and to each other.

      (3) Two or three, 90° apart on the lower hemisphere, 23" from the center.

   (b) It may be fitted with a lever type base plate. Fittings thereon include a mooring shackle, detonator cover nut and soluble plug gear.

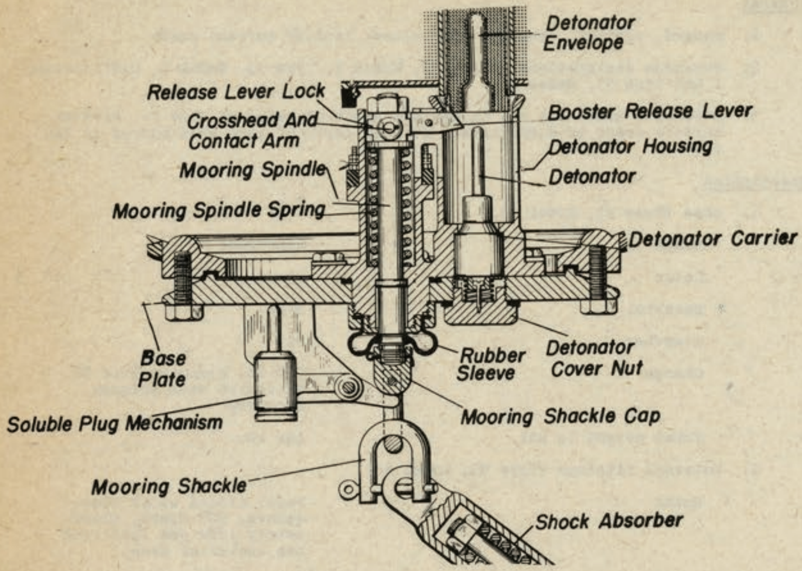


Fig. 10 - Mine Type JB, Straight - Shank Base Plate, Sectional View

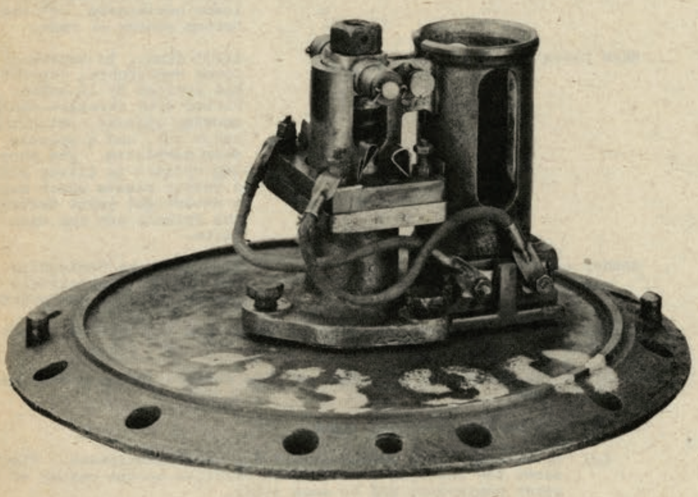


Fig. 11 - Mine Type JB, Straight-Shank Base Plate, Interior View

(Mines Type JB, Cont'd.)

4. The Type 93, Model 4 differs from the Type 93, Model 3, Modification 1 as follows:

   (a) It has never been found fitted with the lever type base plate.

   (b) It has always been found fitted with three horns on the lower hemisphere.

   (c) Its charge is of temporary Type 1 explosive.

Operation

1. Mine takes depth by plummet. Dissolution of the soluble plug permits mooring tension to pull out the mooring spindle or lever, closing the mooring safety switch, operating the booster release mechanism, and mine is armed.

2. Standard chemical horn firing.

3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. Check the mooring spindle or mooring lever.

   (a) If a spindle-type base plate is fitted, do not attempt RMS, except in extreme emergency, unless the groove in which the rubber sleeve is secured to the mooring spindle is flush with the outer end of the sleeve securing collar.

   (b) If a lever-type base plate is fitted, do not attempt RMS, except in extreme emergency, unless the rubber sleeve is collapsed and the outer end of the spindle is up inside the sleeve.

RMS

1. Remove the spring-loaded brass detonator cover nut, thereby exposing the detonator carrier and the two sets of contacts.

2. From a safe distance, remove the detonator carrier. Should corrosion make this impossible, open the two sets of spring contacts by inserting between them a non-conducting material such as cardboard or a sliver of wood.

3. From a safe distance remove the base plate.

4. If the detonator has not been removed, separate it from the booster.

5. Cut and tape each lead separately, starting with the detonator leads.

6. Dispose of detonator, booster and charge.

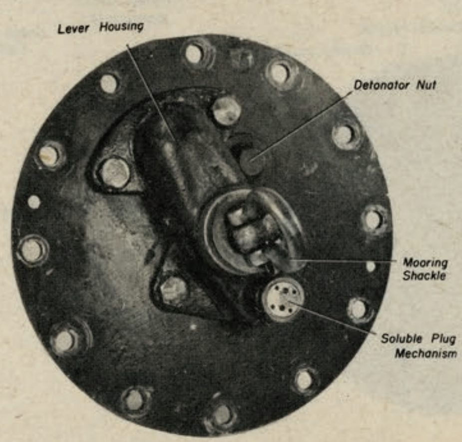


Fig. 11a - Mine Type JB, Lever-Type Base Plate

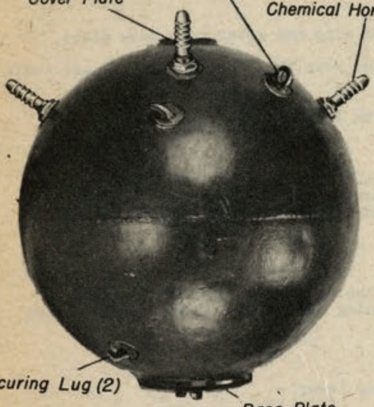


Fig. 12 - Mine Type 93-1 (JB)

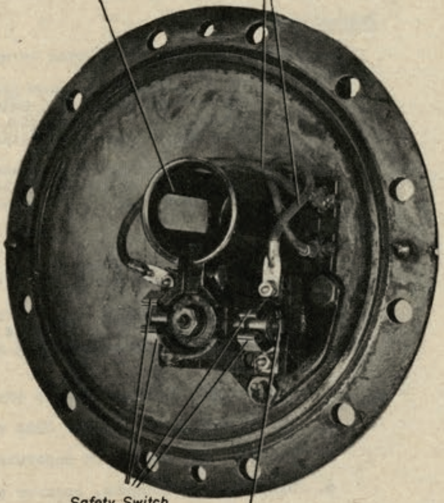


Fig. 12a - Mine Type JB, Lever-Type Base Plate, Interior View

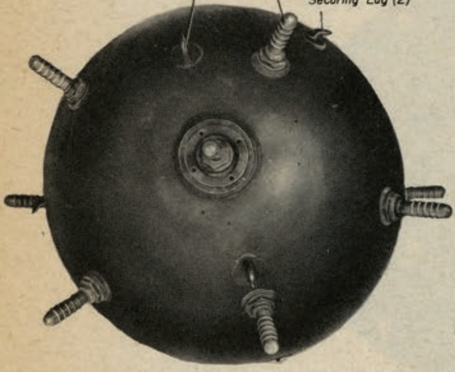


Fig. 12b - Mine Type 93-3-1 (JB) Top View

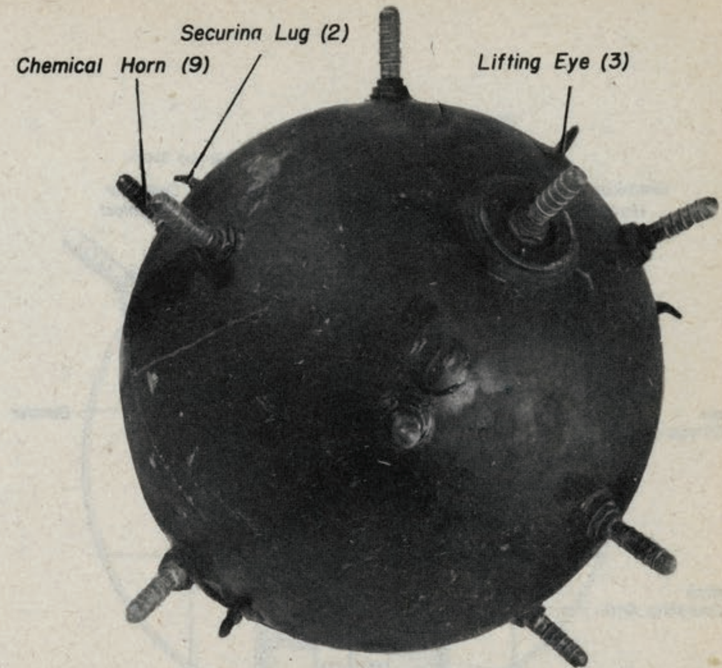


Fig. 12c - Mine Type 93-4 (JB) Top View

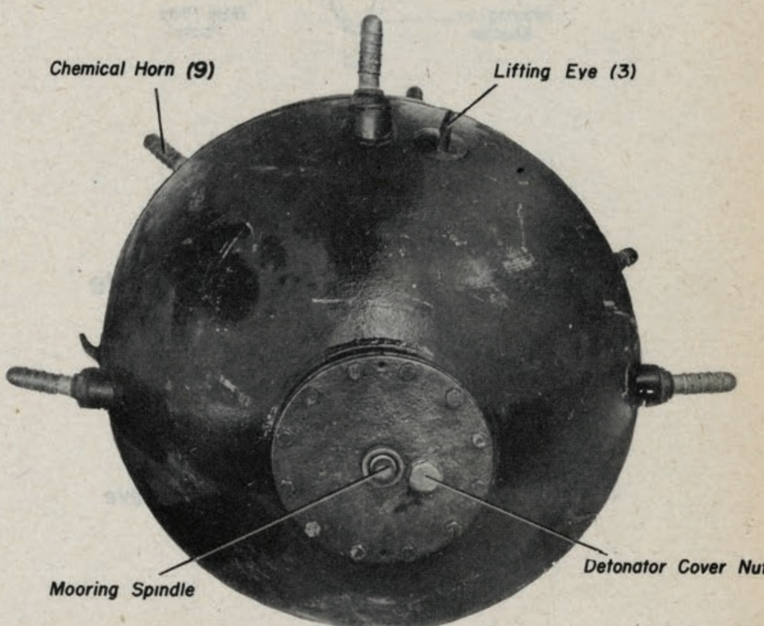


Fig. 12d - Mine Type 93-4 (JB) Fitted with Straight-Shank Base Plate, Bottom View

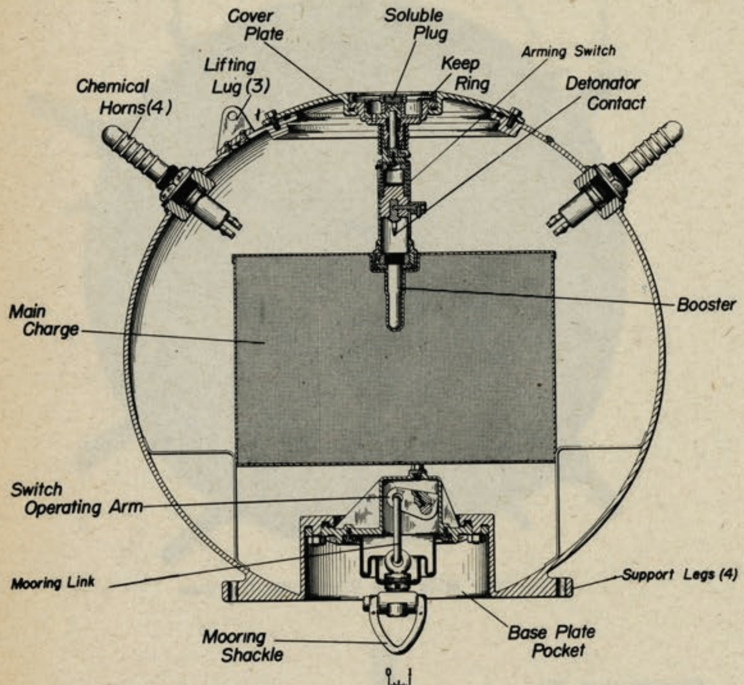
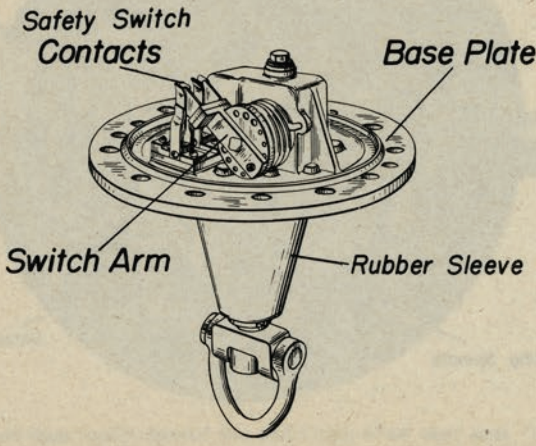


Fig. 13-- Mine Type JC, Sectional View



Mine Type JC

Note: Although this mine has been recovered, only the cover plate and base plate were returned for examination. Information on other parts of this mine has been derived from photographs and intelligence sources.

General

1. Moored, contact, chemical horn mine, laid by surface craft.
2. Japanese designation, "Mark 5, Modification 1".
3. Defensive mine for use in maximum depth of water of 689 ft. against surface craft or submarines. Maximum depth of case when moored is 164 ft.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	32".7
Charge	132 lbs. block-fitted Shimose with Shimose booster.
Total weight in air	456 lbs.

2. External fittings

Horns	Four, 90° apart around upper hemisphere.
Cover plate	15" diam., in center of upper hemisphere, lap fitted and secured by 18 bolts. Fitted with spring-loaded arming switch mechanism, 5".2 diam., secured by keep ring.
Lifting lugs	Three, equally spaced around upper hemisphere near edge of cover plate.
Base plate	10".5 diam., in pocket in center of lower hemisphere, recessed, fitted with rubber sleeve between mooring chain and base plate.
Support legs	Four, equally spaced around lower hemisphere near base plate pocket.

Operation

1. Anchor separates from mine case upon impact with the water. Mooring tension closes the mooring safety switch. Dissolution of a soluble plug permits the spring-operated arming switch to close and mine is armed.
2. Standard chemical horn firing.
3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. See Introduction.

[redacted]

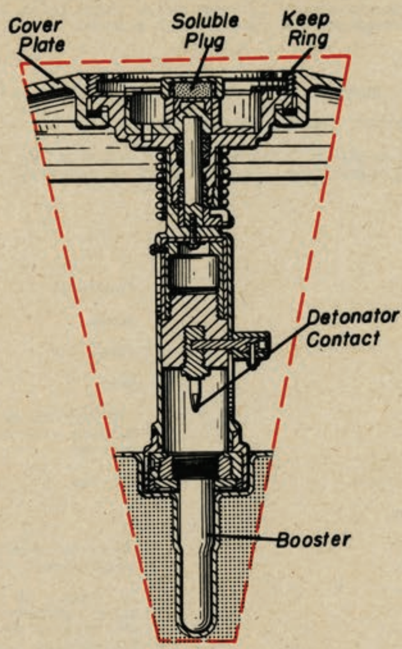


Fig. 15-- Arming Switch Detail, Mine Type JC

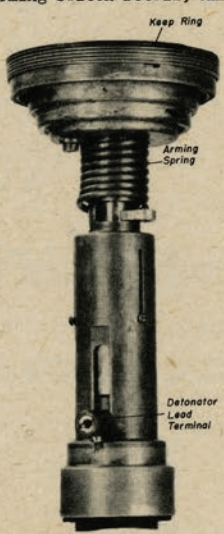


Fig. 16-- Arming Switch, Mine Type JC

<u>RMS</u>

1. Remove the arming switch mechanism keep ring.
2. From a safe distance remove the arming switch mechanism.
3. Cut and tape the detonator leads separately.
4. Unscrew the booster from the arming switch mechanism.
5. Unscrew the detonator from the booster.
6. Remove the base plate; cut and tape each lead to the mooring safety switch separately.
7. Dispose of detonator, booster and charge.

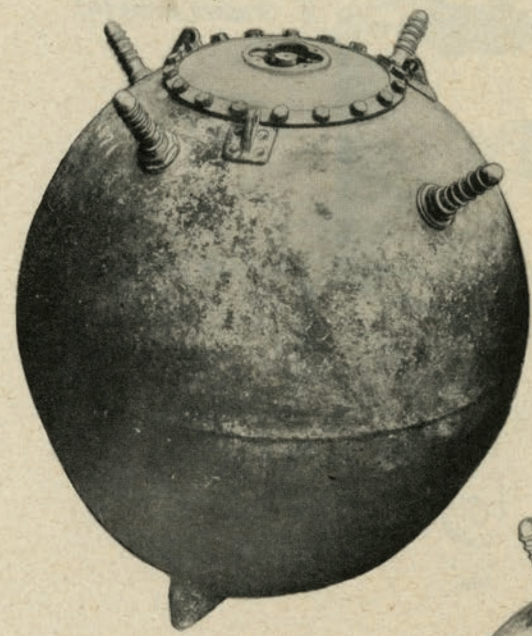


Fig. 17-- Mine Type JC

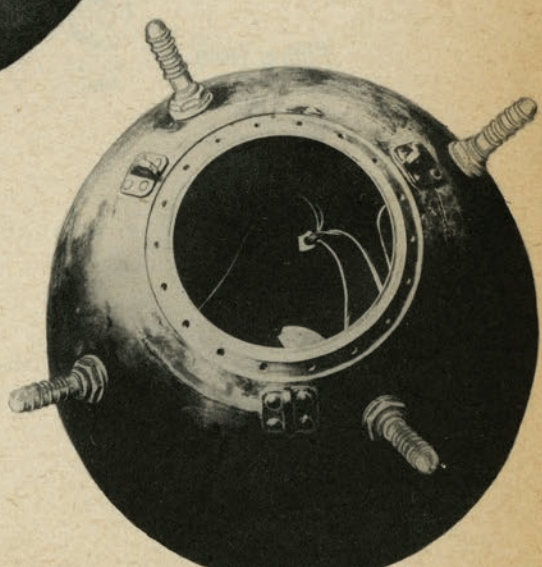


Fig. 18-- Mine Type JC, Top View

[redacted]

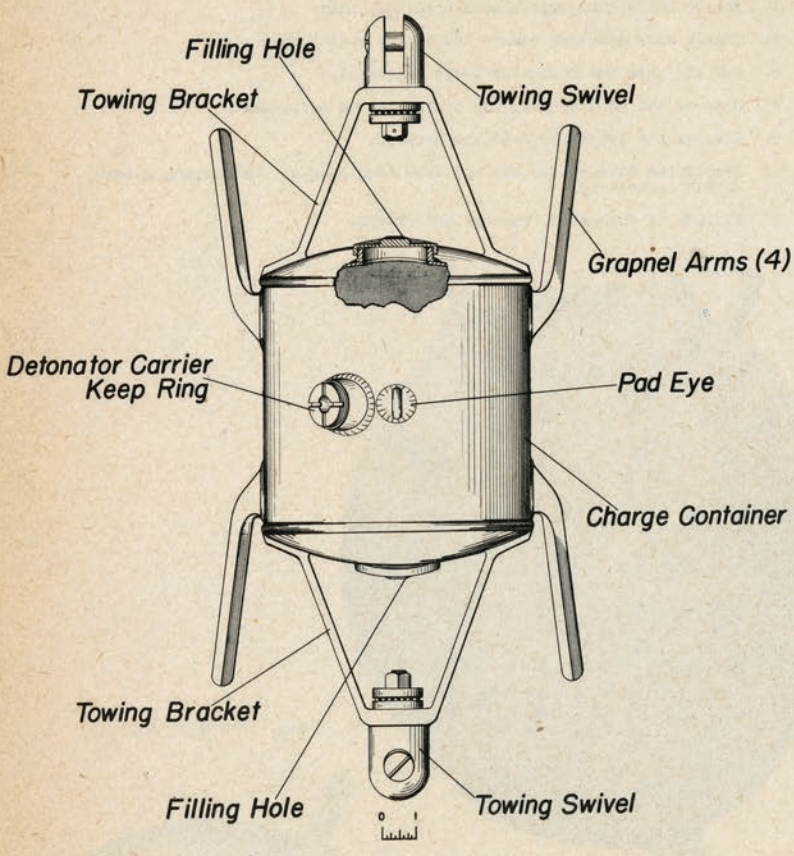


Fig. 19-- Mine Type JD, Elevation

Mine Type JD

General

1. Towed, electrically fired explosive grapnel.

2. Japanese designation, "Mark 2 Explosive Hook, Modification 1".

3. Used as an explosive grapnel against moored mines and underwater obstructions. Has also been used as a controlled land mine.

Description

1. Case

Shape	Cylindrical, with rounded ends. Fitted with two projecting grapnel arms and one towing bracket on each end.
Color	Gray
Material	Steel
Diameter	
Body	8"
Maximum span of arms	11".5
Length	
Body	10"
Overall	25"
Charge	Maximum of 19 lbs. cast Shimose or granular Type 88 explosive.
Total weight in air	39 lbs. maximum

2. External fittings

Detonator carrier keep ring	1".5 diam., in middle of body, 5".2 from either end of case. Firing cable enters thru center of keep ring.
Filling holes	One on each end, 2".5 diam., covered by threaded cap.
Pad eye	One, on top center line next to detonator carrier keep ring.
Towing swivels	Two, one attached to each towing bracket.

Operation

1. Mine is armed during assembly. When used as a grapnel, a sweep wire serves as a towing cable and proper depth is maintained by a float and pendant.

2. Mine is fired electrically by an observer.

3. Mine contains no self-disarming features.

Precautions

1. See Introduction.

RMS

1. If the mine appears to have been laid as a controlled mine, cut and tape all external electrical leads after making sure that these are power leads and not trip wires.

2. Remove the detonator carrier keep ring.

3. From a safe distance, withdraw the detonator carrier. Intelligence reports indicate that the mine is not fitted with separate booster.

4. Dispose of detonator and charge.

[redacted]

Fig. 20-- Mine Type JD

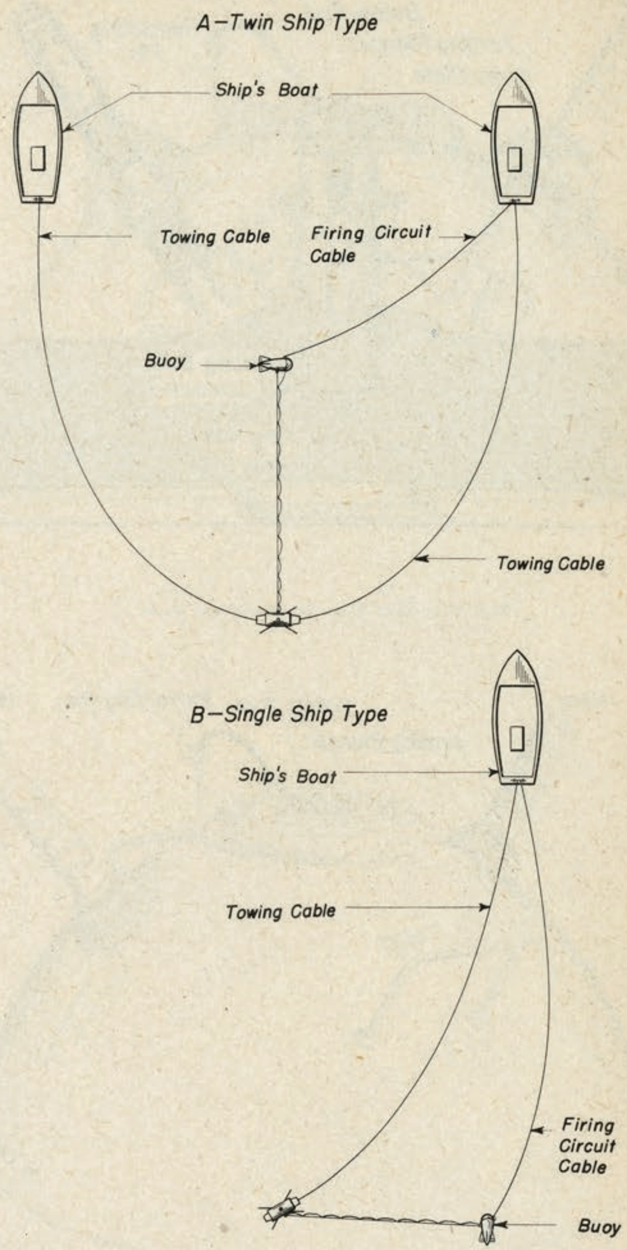


Fig. 21-- Method of Towing Mine Type JD

[redacted]

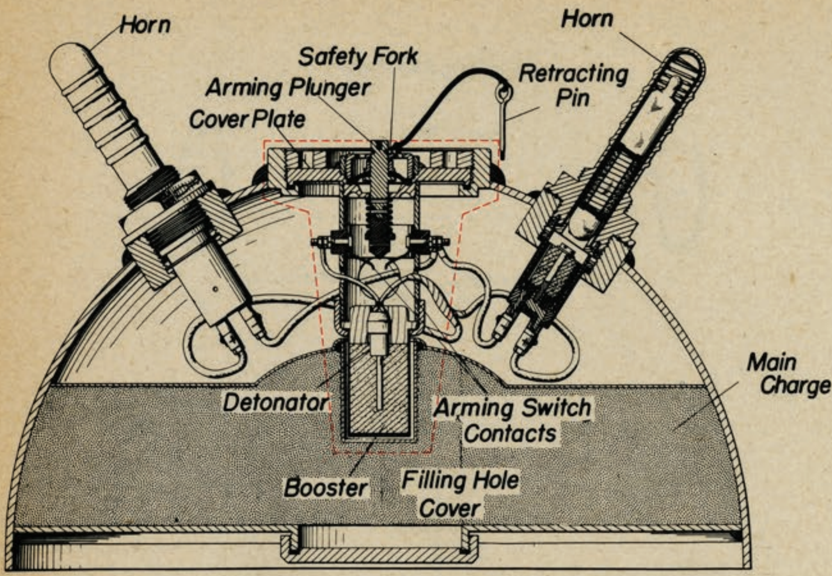


Fig. 22-- Mine Type JE, Sectional View

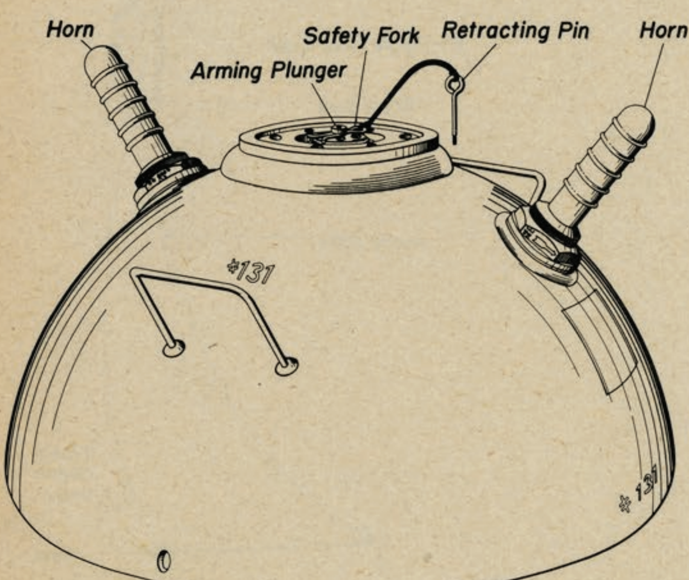


Fig. 23-- Mine Type JE, Elevation

[redacted]

JAPANESE CONTACT AND CONTROLLED MINES

Mine Type JE

General

1. Ground, contact, chemical horn mine, laid manually.

2. Japanese designation, "Small ~~Type~~ Mudle Mine, Model 1".

3. Anti-boat mine for use in shallow water approaches to beaches or on beaches above the high-water mark. May also be used as a land mine on air strips and roads. When planted between obstacles, snag lines and trip wires may be fitted to the horns.

Description

1. Case

Shape	Hemispherical
Color	Black
Material	Steel
Diameter	20"5
Height	10"5
Charge	44 lb. cast Type 98 explosive with Shimose booster.
Total weight in air	100 lb. (approx.)

2. External fittings

Horns	Two, 180° apart on upper hemisphere, 5"5 from top center of case.
Cover plate	5"2 diam., in top center of case, recessed, secured by keep ring.
Arming plunger	0"45 diam., spring-loaded, in center of cover plate. Fitted with groove for safety fork.
Carrying handles	Two, 180° apart, 90° from horns, 7"5 from center of case.
Filling hole cover	3"5 diam., screwed into pocket in center of base.

Operation

1. The detonator is housed in the booster during assembly. The plunger switch may be wired either in series or in parallel with the detonator. Arming may, therefore, take place in one of two ways as follows:

   (a) If the plunger switch is wired in series with the detonator (Fig. 25a), the mine becomes armed when the arming switch plunger is depressed, bridging the arming switch contacts and completing the horn circuit.

   (b) If the plunger switch is wired in parallel with the detonator (Fig. 25a), the mine becomes armed when the arming switch plunger is withdrawn, breaking the arming switch contacts and removing the shunt from the horn circuit.

2. Standard Chemical horn firing.

3. Mine contains no self-disarming devices.

Precautions

1. Note that it is impossible to determine the armed or unarmed condition of the mine by examining the arming switch plunger. The mine must always be considered armed.

2. Carefully examine the horns for snag lines and trip wires.

RMS

1. Cut all snag lines or trip wires secured to the horns.

2. Remove the keep ring from the cover plate.

Added 1 July 1945
(Change No. 8)

[redacted]

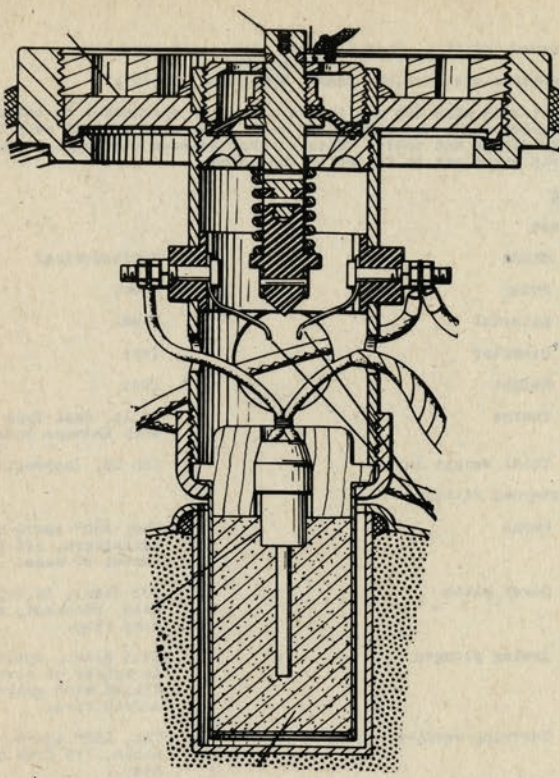


Fig. 24-- Arming Switch Detail, Mine Type JE

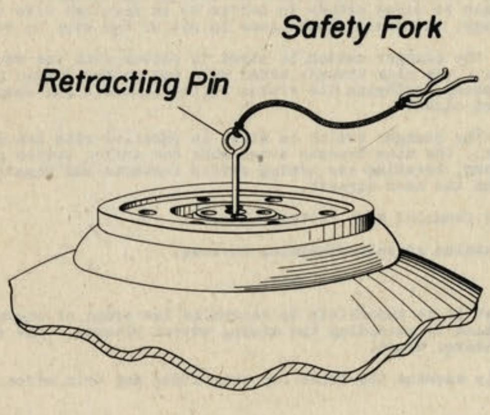


Fig. 25-- Retracting Pin Inserted in Spindle of Mine Type JE
(Armed Condition)

(Mine Type JE, Cont'd.)

3. Remove the arming switch assembly; detonator and booster are attached thereto.
4. Cut and tape each lead separately.
5. Remove the booster can from the arming switch assembly.
6. Separate the booster and detonator.
7. Dispose of detonator, booster and charge.

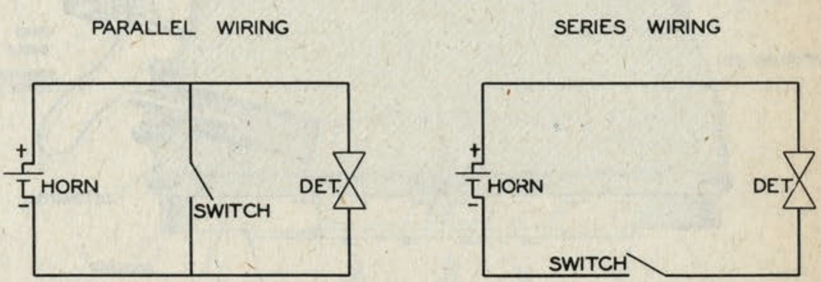


Fig.25a - Mine Type JE, Wiring Diagrams

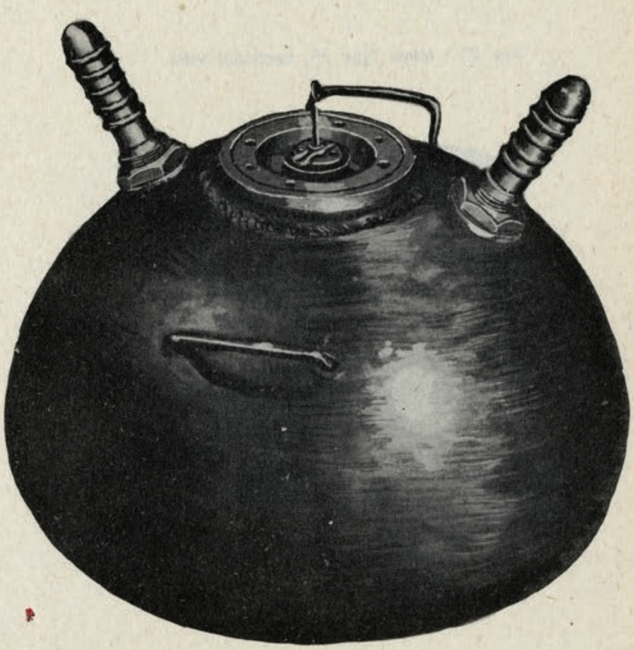


Fig. 26 - Mine Type JE

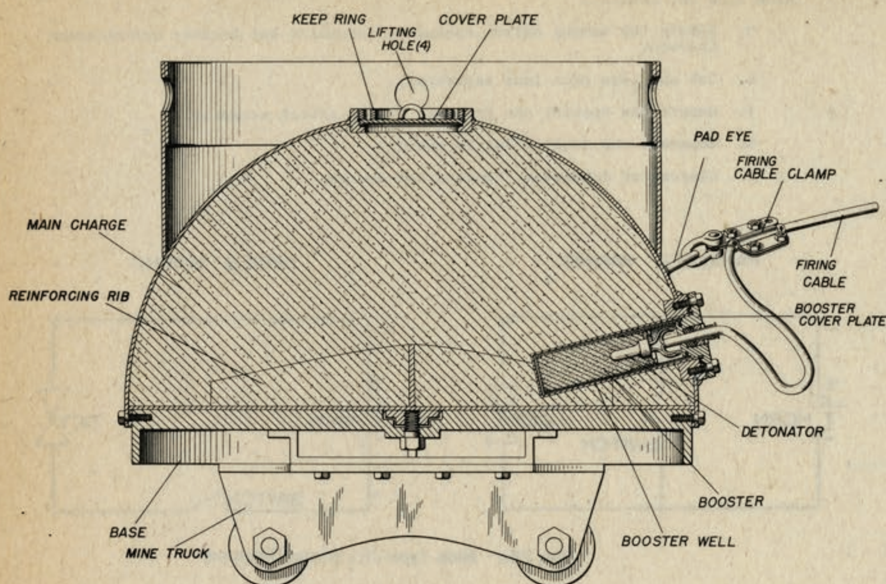


Fig. 27 - Mine Type JF, Sectional View

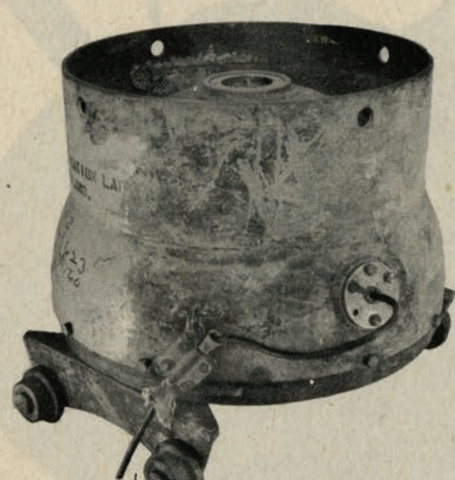


Fig. 28 - Mine Type JF

Mine Type JF

General

1. Ground, controlled mine, laid manually or by surface craft.
2. Japanese designation, "Type 94, Model 2".
3. Defensive mine, for use along beaches or in shallow water.

Description

1. Case

Shape	Hemispherical, with steel skirt 9" high and 24" diam. welded around top. Supported on four-wheeled cast iron truck.
Color	Black
Material	Steel
Diameter	28".4
Height	25".6
Charge	190 lbs. (approx.) granular Type 88 explosive with Shimose booster.
Total weight in air	580 lbs. (approx.)

2. External fittings

Booster cover plate	4" diam., on side of case, 3".5 below edge of skirt, secured by six bolts. Firing cable enters through stuffing box in center.
Lifting holes	Four, 1".2 diam. on skirt, 90° apart, 1" below top.
Cover plate	5".2 diam., in top center of case, recessed, secured by keep ring.
Pad eye	One, on case, 13" below upper edge of skirt.
Cable clamp	Shackled to pad eye; prevents strain on cable from being transmitted to detonator.
Mine truck	Rectangular, cast iron, fitted with four wheels 4".25 diam., on bottom of case.

Operation

1. Mine is armed manually before laying.
2. Mine is fired electrically by an observer.
3. Mine contains no self-disarming features.

Precautions

1. When found used as a land mine, look for other explosives to be buried with it.

RMS

1. Slit the firing cable; cut and tape each lead separately.
2. Unbolt the booster cover plate, and remove it from a safe distance. Booster and detonator are attached thereto.
3. Separate the booster and detonator by removing the four screws in the neck of the booster carrier.
4. Dispose of detonator, booster and charge.

[redacted]

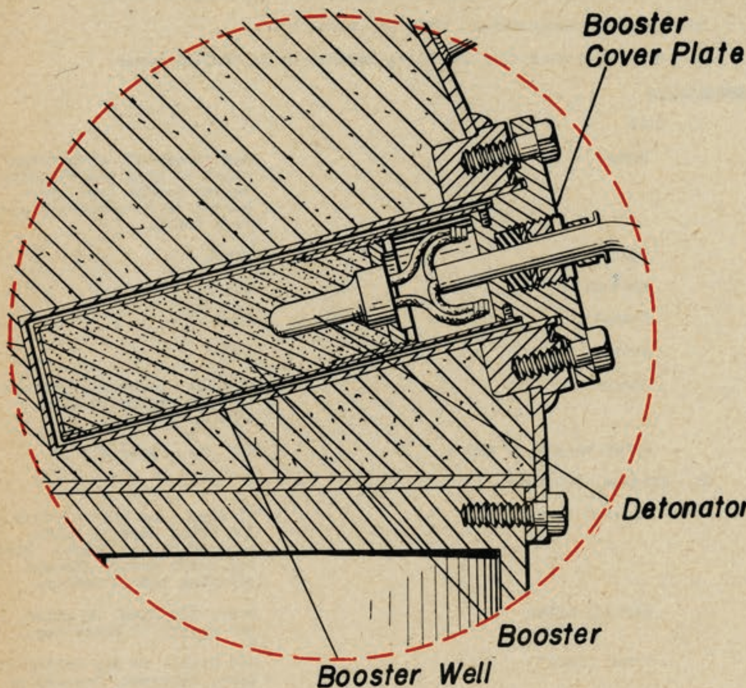


Fig. 29-- Booster Assembly Detail, Mine Type JF

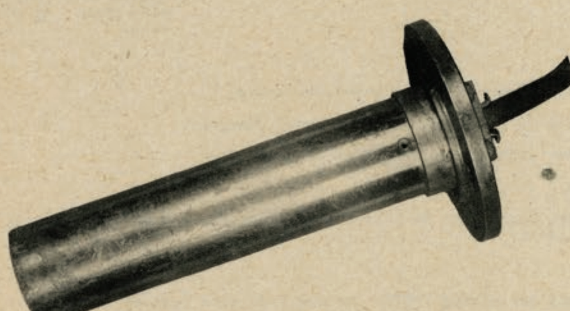


Fig. 30-- Booster Assembly, Mine Type JF

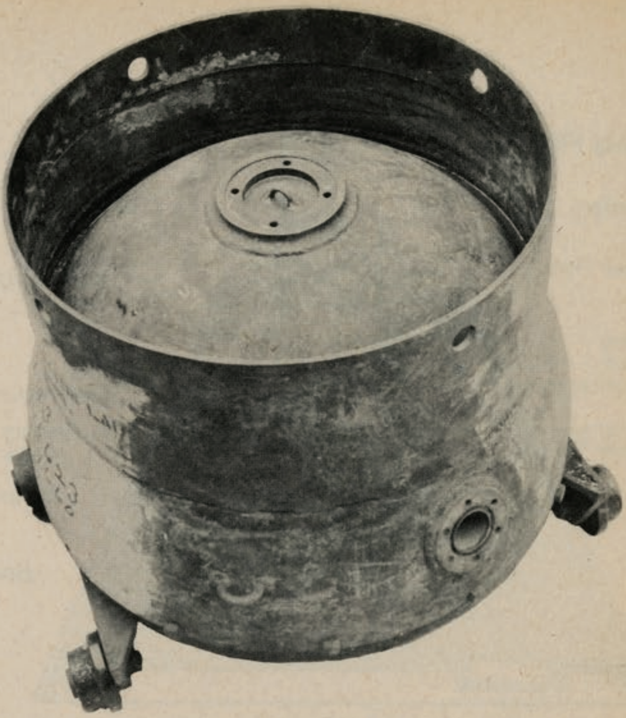


Fig. 31-- Mine Type JF (Booster Assembly Removed)

Fig. 32-- Mine Type JF as Controlled Land Mine

[redacted]

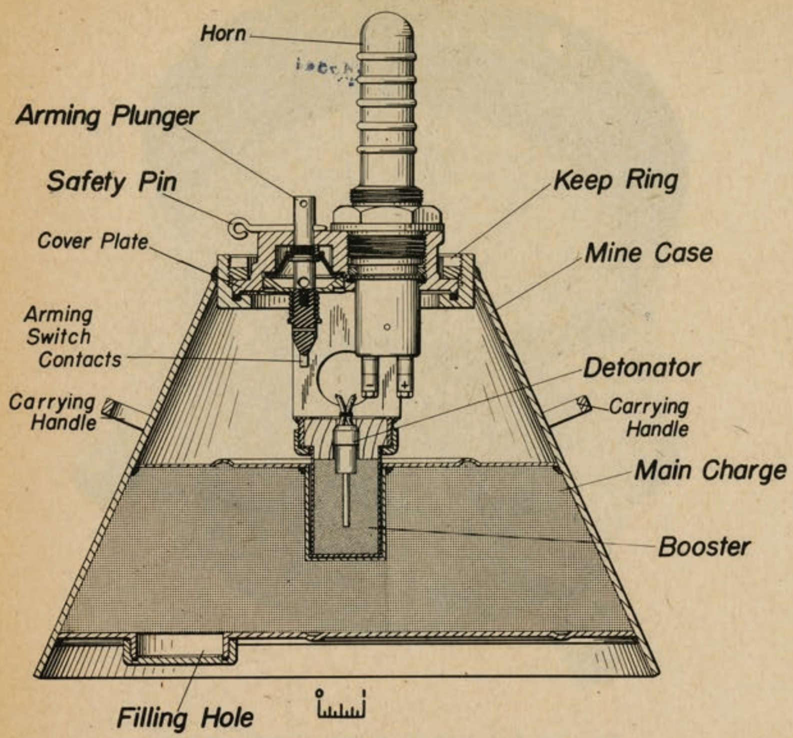


Fig. 33-- Mine Type JG, Sectional View

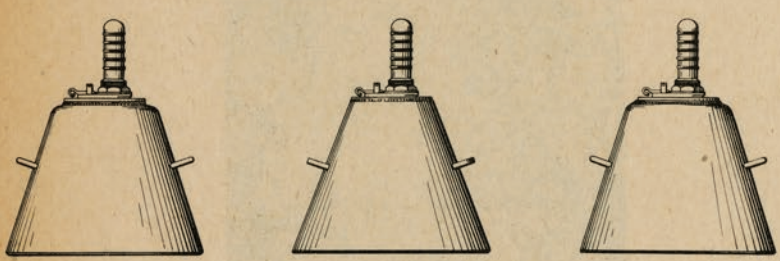


Fig. 34-- Mine Type JG Showing Variations in Case Construction

Mine Type JG

General

1. Ground, contact, chemical horn mine, laid manually.

2. Japanese designation, "Small ~~Type~~ Model Mine, Model 2".

3. Anti-boat mine for use in shallow water approaches to beaches or on beaches above the high water mark. May also be used as a land mine on air strips and roads. When planted between obstacles, snag lines and trip wires may be fitted to the horn.

Description

1. Case

Shape	Truncated cone
Color	Black
Material	Steel
Diameter	
Base	14"3 - 14"5
Top	7"
Height	
Case only	10"25 - 10"35
With horn	14"6 - 14"7
Charge	22 lb. (approx.) cast Type 98 explosive with Shimose booster.
Total weight in air	52.5 lb. - 62.5 lb.

2. External fittings

Horn	One, on cover plate, slightly off center of case.
Cover plate	5"2 diam., in top center of case, secured by keep ring.
Filling hole cover	3"25 diam., in base.
Arming plunger	0"5 diam., spring-loaded 180° from horn on cover plate. Contains two 0"2 diam. safety pin holes.
Carrying handles	Two, 180° apart, 4" below top of case.

Operation

1. The detonator is housed in the booster during assembly. The plunger switch may be wired either in series or in parallel with the detonator. Arming may, therefore, take place in one of two ways as follows:

   (a) If the plunger switch is wired in series with the detonator (Fig. 35a), the mine becomes armed when the arming switch plunger is depressed, bridging the arming switch contacts and completing the horn circuit.

   (b) If the plunger switch is wired in parallel with the detonator (Fig. 35a), the mine becomes armed when the arming switch plunger is withdrawn, breaking the arming switch contacts and removing the shunt from the horn circuit.

2. Standard chemical horn firing.

3. Mine contains no self-disarming devices.

Precautions

1. Note that it is impossible to determine the armed or unarmed condition of the mine by examining the arming switch plunger. The mine must always be considered armed.

2. Carefully examine the horns for snag lines and trip wires.

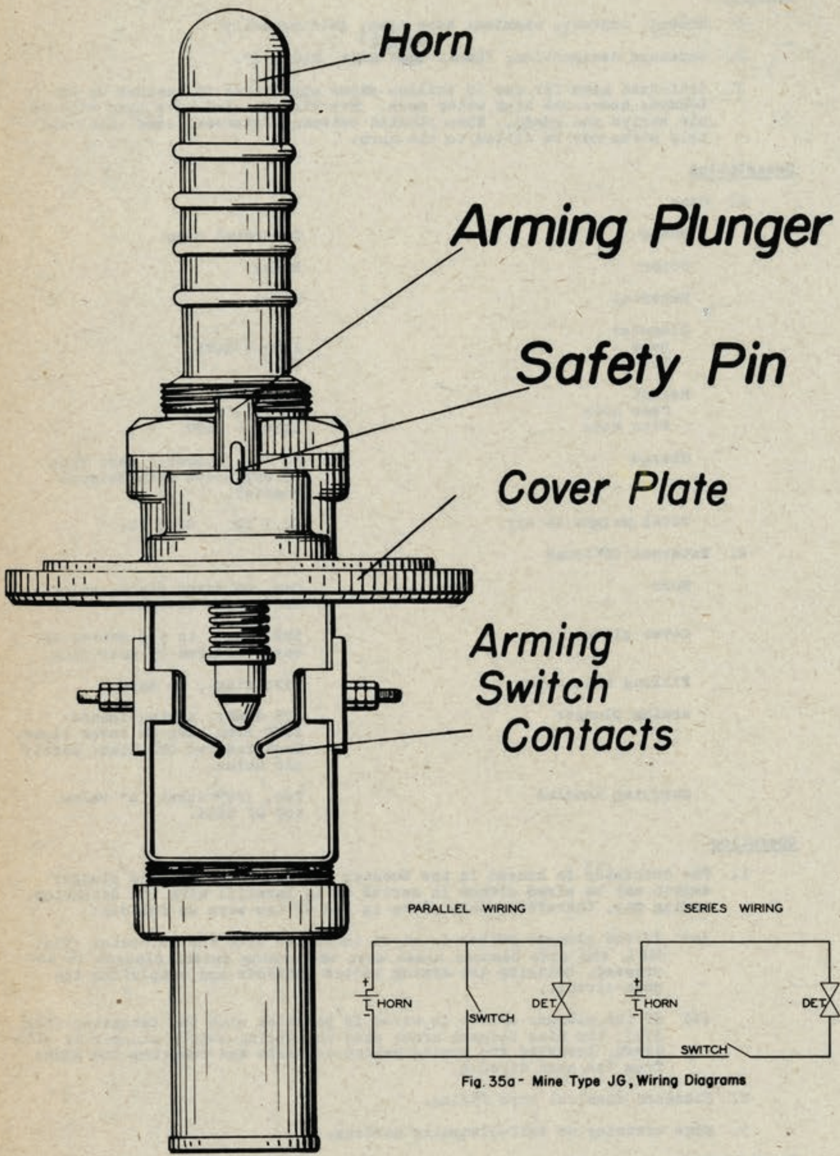


Fig. 35a - Mine Type JG, Wiring Diagrams

Fig. 35-- Arming Switch and Firing Assembly, Mine Type JG

Added 1 July 1945
(Change No. 8)

(Mine Type JG, Cont'd.)

RMS

1. Cut all snag lines or trip wires secured to the horns.
2. Remove the keep ring from the cover plate.
3. Remove the arming switch assembly; detonator and booster are attached thereto.
4. Cut and tape each lead separately.
5. Remove the booster can from the arming switch assembly.
6. Separate the booster and detonator.
7. Dispose of detonator, booster and charge.

Fig. 36-- Mine Type JG

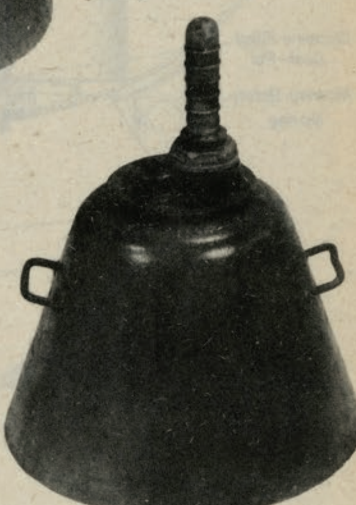


Fig. 37-- Mine Type JG

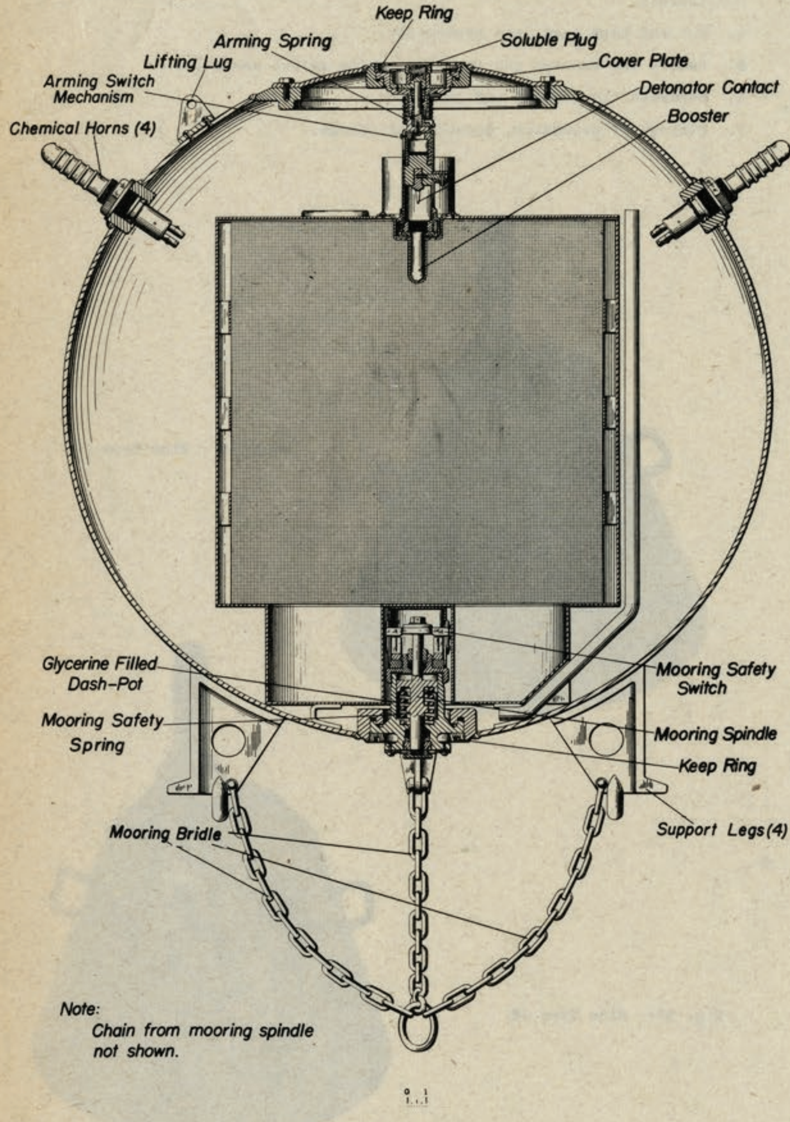


Fig. 38-- Mine Type JH, Sectional View

Mine Type JH

General

1. Moored, contact, chemical horn mine, laid by surface craft.
2. Japanese designation ~~unknown~~. Mark 6 Mod 1
3. Tactical use and expected laying depths not known.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	41".4
Charge	~~550~~ 428 lbs. (est.) block-fitted Shimose.
Total weight in air (less explosive)	466 lbs.

2. External fittings

Horns	Four, around upper hemisphere, 90° apart, alternately 18".2 and 17".2 from top center of case.
Cover plate	17".4 diam., in top center of case, lap-fitted, secured by 16 bolts..
Arming switch mechanism	5".2 diam., in center of cover plate, secured by keep ring.
Lifting lugs	Three, around upper hemisphere, 120° apart, 14" from top center of case.
Mooring bridle	On lower hemisphere; consists of five 15" lengths of chain, four of which are attached to the support legs, and one to the mooring spindle.
Mooring spindle housing	5".6 diam., in bottom center of case, secured by keep ring.
Support legs	Four, around lower hemisphere, 90° apart, 8" from bottom center of case.

3. The two horns which are 17".2 from the top center of the case are mounted on cylindrical horn bosses 3" long. These bosses make an angle of 60° with a tangent drawn to the surface of the case at that point.

Operation

1. When mine is launched, tension on the mooring chain closes the mooring safety switch after a delay given by glycerine-filled dashpot. Dissolution of a soluble plug permits the spring-operated arming switch to close the firing circuit and the mine is armed.
2. Standard chemical horn firing.
3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. The action of the mooring spindle is retarded by a gylcerine-filled dashpot, making it increasingly improbable that the disarming feature will operate as designed.

[redacted]

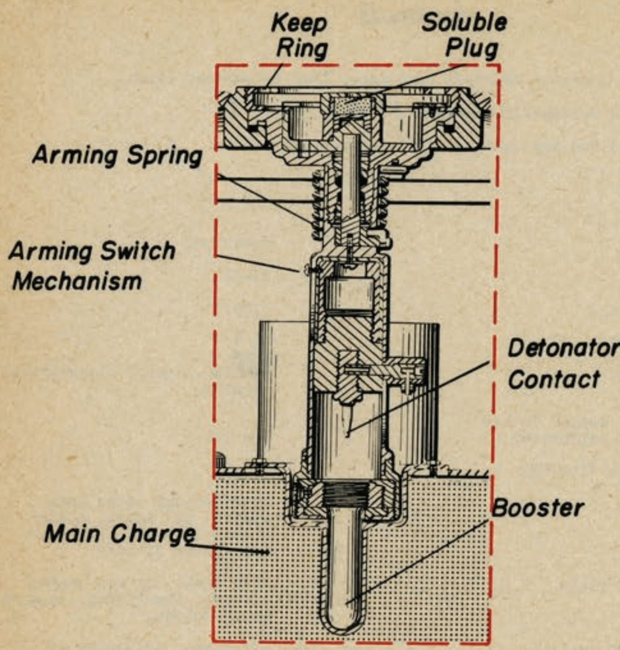


Fig. 39-- Arming Switch Detail, Mine Type JH

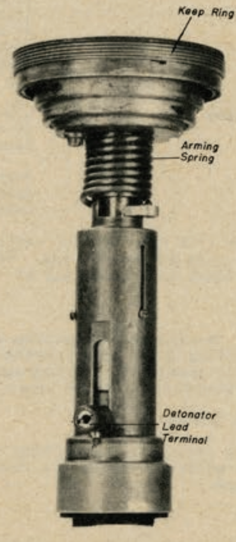


Fig. 40-- Arming Switch, Mine Type JH

RMS

1. Remove the keep ring from the arming switch mechanism.

2. From a safe distance, remove the arming switch mechanism; booster and detonator are attached thereto.

3. Cut and tape the detonator leads separately.

4. Remove the mooring spindle housing; cut and tape each lead to the mooring switch separately.

5. Dispose of detonator, booster and charge.

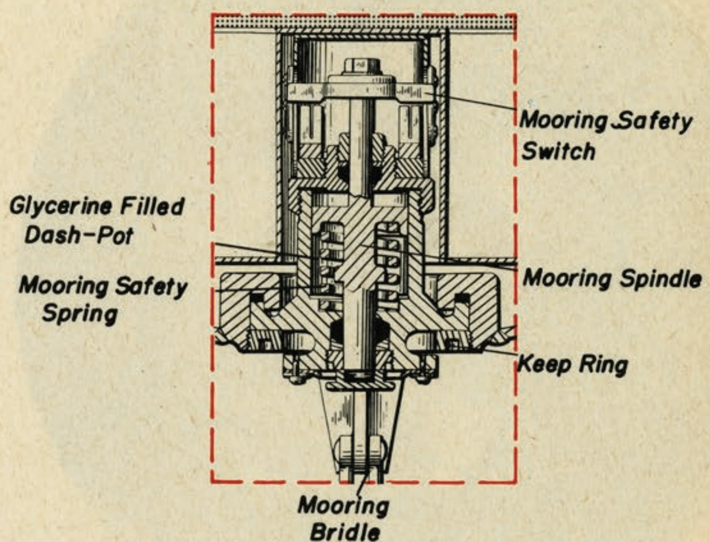


Fig. 41-- Mooring Safety Switch Detail, Mine Type JH

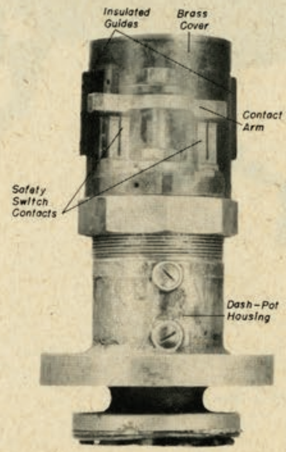


Fig. 42-- Mooring Safety Switch, Phantom View, Mine Type JH

Fig. 43-- Mine Type JH

Mine Type JI

General

1. Drifting, contact, switch horn mine, laid by aircraft.

2. Offensive mine, for use in restricted waters against surface craft. Designed laying depths not known although the mine must descend to a depth of at least 20 ft. during its initial plunge in order to arm. Depth of case when floating is about six ft.

Description

1. Case

Shape	
Forward section	Cylindrical with rounded ends. After end fitted with 5 1/4" cylindrical skirt with three horn recesses.
Tail section	Conical section, fitted with four radial fins, welded to 4" cylindrical belt.
Color	Black over red lead.
Material	Steel
Mine Diameter	14 1/4"
Length	
Overall	72 1/2"
Forward section	49"
Tail section	23 1/2"
Charge	123 lbs. cast Type 98 explosive.
Total weight in air	300 lbs.

2. External fittings

Horns	Three, spring-loaded, hinged type, equally spaced around after end of forward section, 5 1/2" from center, secured by keep rings.
Hydrostatic arming switch	2 1/2" diam., on top center line of forward section, 21" abaft forward end, secured by keep ring.
Detonator carrier mounting	4" diam., on forward section 180° from top center line, 9 1/2" abaft forward end, secured by keep ring.
Booster release mechanism	2 2/16" diam., on top center line on forward section, 9 1/2" abaft forward end, secured by keep ring.
Suspension lug	On top center line of forward section, 26" abaft forward end.
Filling hole cover	4" diam., screwed into center of nose.
Tail cover plate	6 1/4" diam., on after end of forward section, lap-fitted, secured by six screws. Fitted with horn release disc, horn safety switch and blank plug.
Tail release mechanism	On top center line of forward section, 2 1/2" forward of after end of skirt.
Tail securing lugs	Three; one on forward section, 180° from top center line, 1 1/2" forward of after end of skirt, fitted with eye bolt. One on cylindrical band of tail section, 180° from top center line, 1" from forward end; one on cylindrical band of tail section on top center line, 1" from forward end, fitted with eye bolt.

Added 1 May 1945
(Change No. 4)

[redacted]

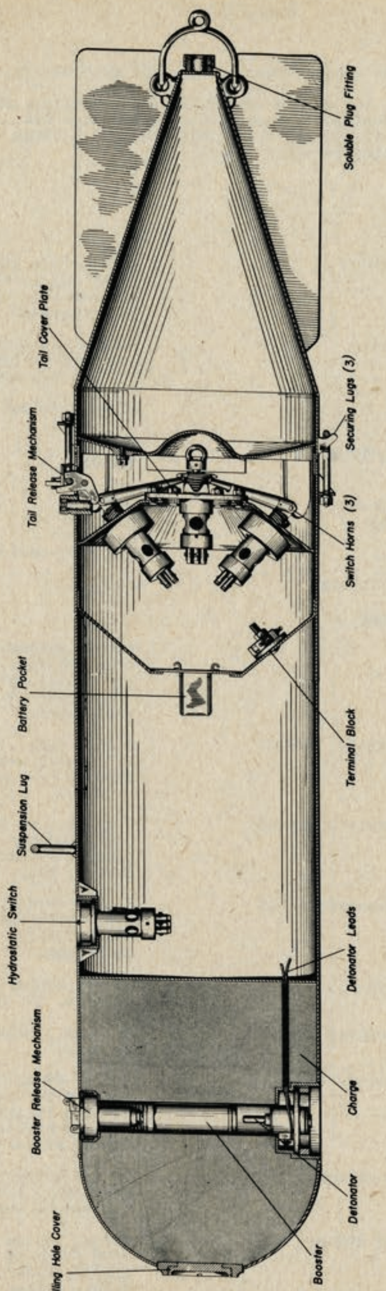


Fig. 44 - Mine Type JI, Sectional View

Added 1 May 1945
(Change No. 4)

(Mine Type JI, Cont'd.)

Bridle securing eyes	Two, 180° apart on tail section, adjacent to apex of tail section.
Soluble plug fitting	On tail section at apex of cone.
Air release valve	On forward end of cylindrical base of tail section, in line with top center line of case, 4 1/2" from center.

Operation

1. When the mine is dropped, wires are withdrawn from the safety keys on the tail release and booster release mechanisms, respectively. This unlocks the tail release mechanism and allows the booster to house over the detonator. If the mine descends to a depth of 20 ft. during its initial plunge, the hydrostatic arming switch closes and locks in the armed position. The buoyant tail section then causes the mine to return to the surface where it floats, tail section up. Dissolution of a soluble plug in the tail release mechanism allows the two sections of the mine to unmarry and, as the forward section sinks, the tail inverts and the forward section is suspended from the tail section by a six ft. pendant. Tension on the pendant rotates the horn release disc, allowing the horns to spring out into the extended position. This closes and locks the horn safety switch and the mine is now armed.

2. Standard switch horn firing.

3. After an as yet undetermined period, dissolution of the soluble plug on the apex of the tail allows the tail section to flood and sink the mine.

Precautions

1. Note that the switch horns are extremely sensitive, about five lbs. pressure being sufficient to make a firing contact.

2. If the mine is found floating, check its floating position:

   (a) If found floating in the unarmed condition the fins may be seen protruding from the water.

   (b) If found floating in the armed condition, the inverted tail section will resemble a floating oil drum. It should be noted that the tail may be sunk by gunfire with relatively little danger of detonating the main charge, although it is quite possible that the mine may fire upon impact with the bottom unless the case is crushed by water pressure as it sinks.

RMS

1. Unscrew and remove the cover plug from the detonator carrier mounting.

2. Insert a screw or pointed wedge in the tapped hole in the detonator carrier and remove the carrier.

3. Remove the detonator carrier mounting keep ring.

4. Remove the detonator carrier mounting; the booster will follow the detonator out.

5. Dispose of detonator, booster and charge.

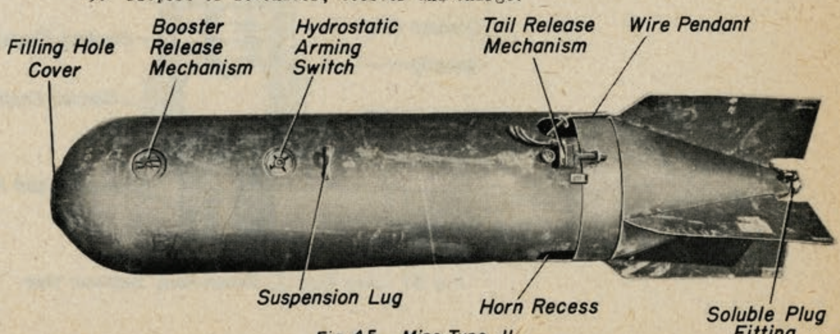


Fig. 45 - Mine Type JI

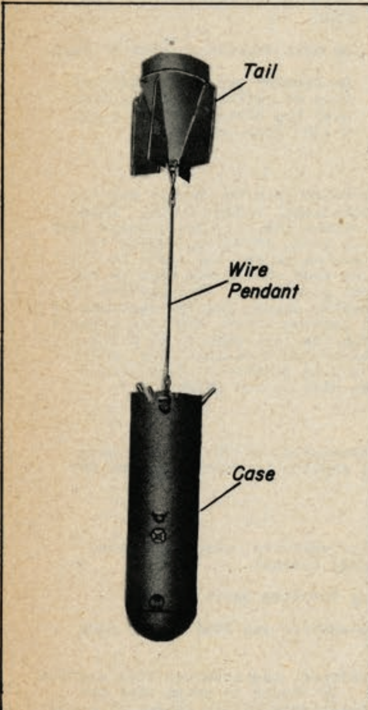


Fig. 46 - Mine Type JI, Armed Position

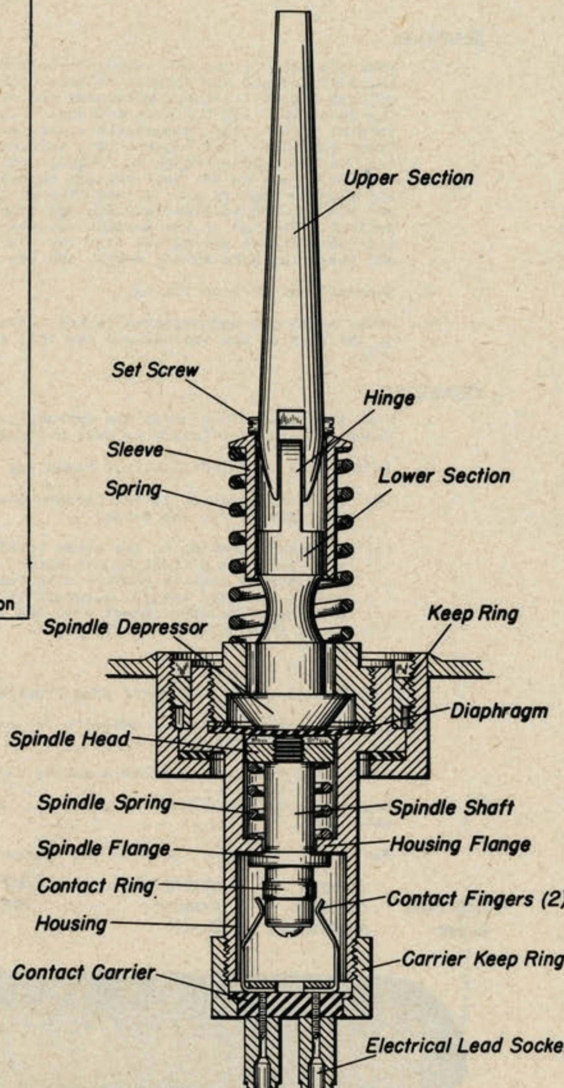


Fig. 47 - Mine Type JI, Switch Horn, Sectional View

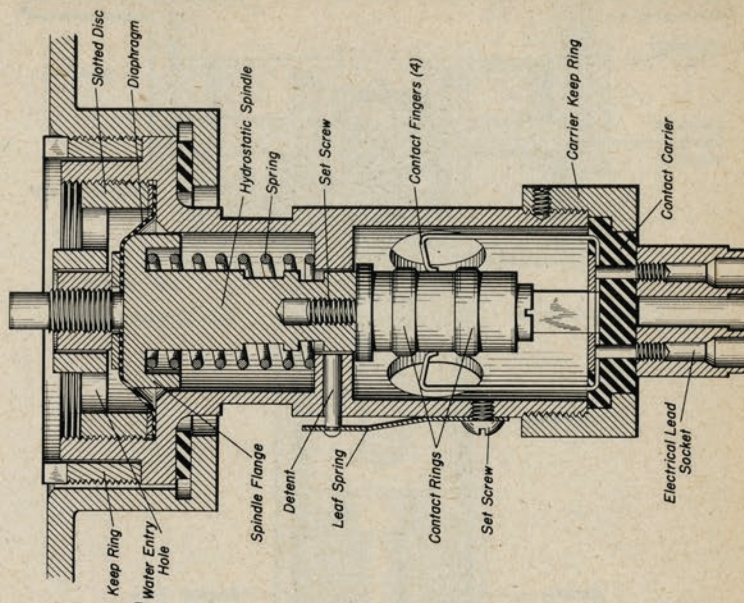


Fig. 48 - *Mine Type JI, Hydrostatic Arming Switch, Sectional View*

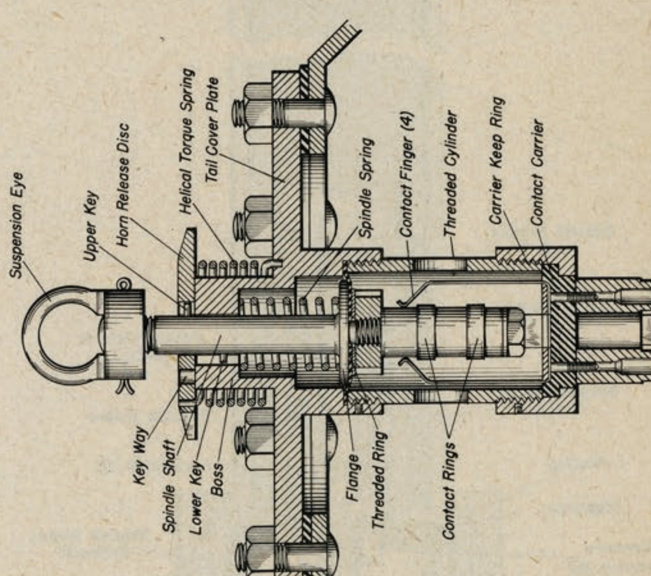


Fig. 49 - *Mine Type JI, Horn Release Mechanism and Safety Switch, Sectional View*

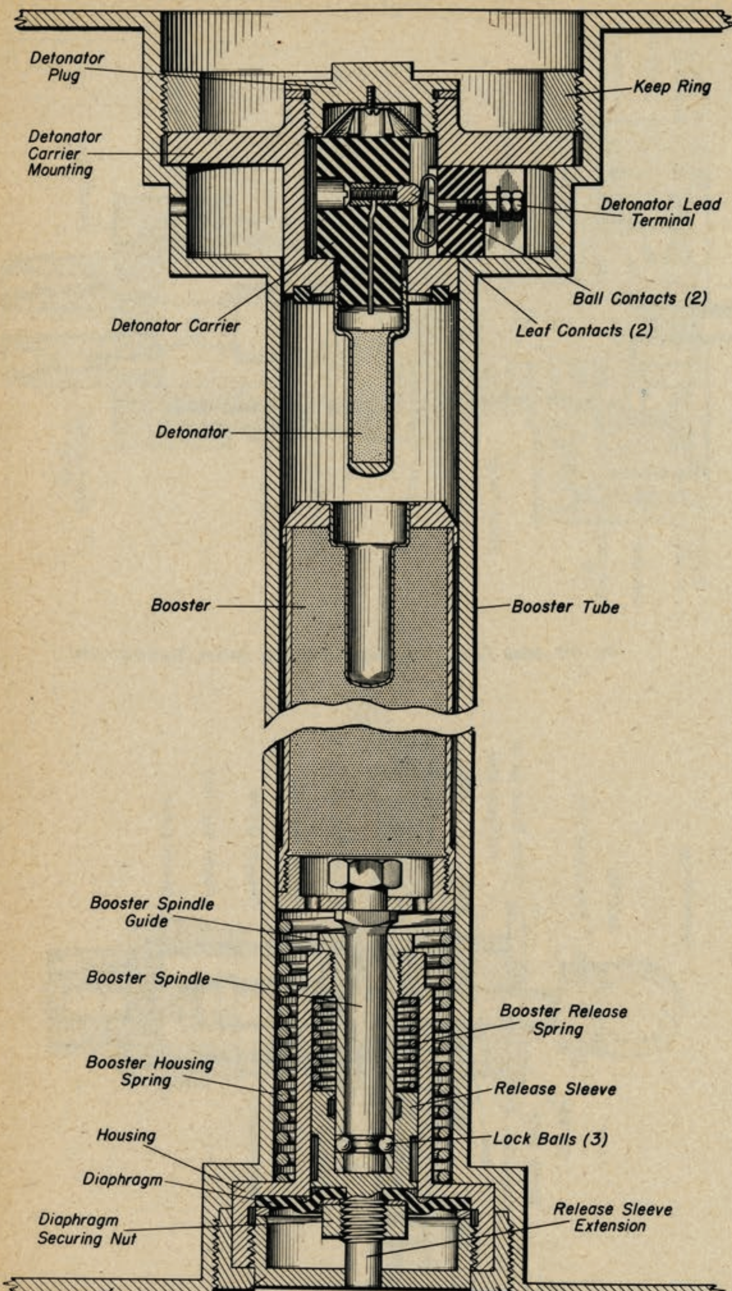


Fig. 50 - Mine Type JI, Booster and Detonator Assembly, Sectional View

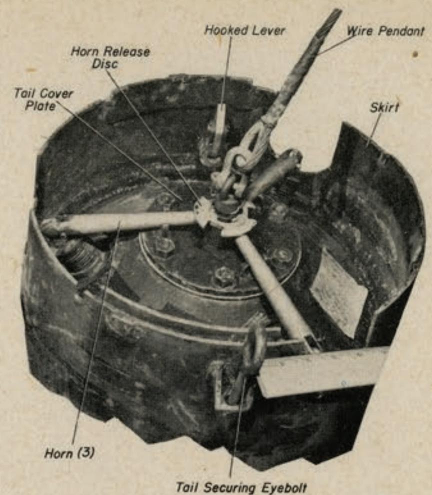


Fig. 51 - Mine Type JI, After End of Forward Section Showing Horns Prior to Release

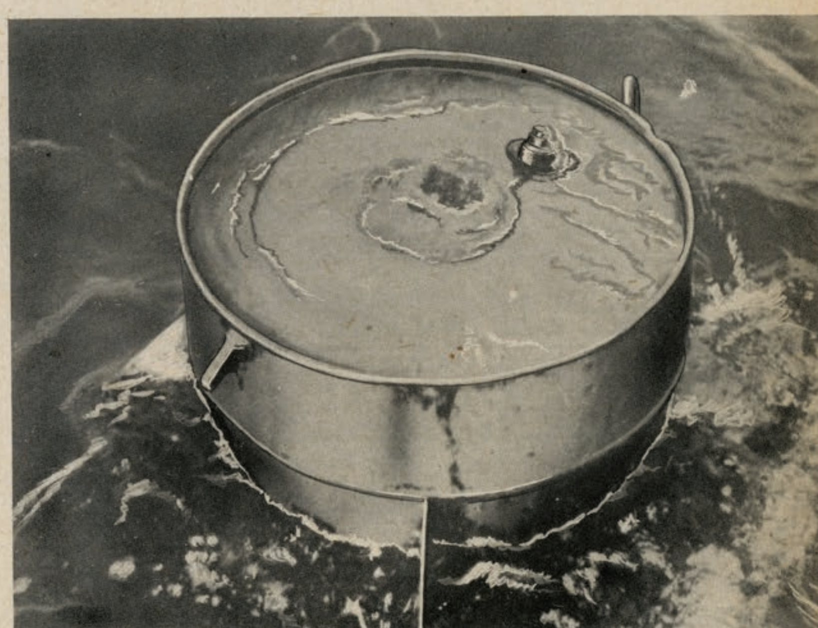


Fig. 52 - Mine Type JI, Floating

Additional Mine Types from Intelligence

Introduction

1. The following mines, as explained in the introduction, are those which are believed to exist, but concerning which only Intelligence information is available. All information in this section is taken from official Japanese documents, except that which concerns the Mines Type "Quince", "Banana", "Avocado" and "Pomegranate", which is drawn from Prisoner of War Interrogation and captured notebooks and is not considered to be as reliable as that taken from the official documents.

Mine Type "Pear"

General

1. Moored, contact, chemical horn mine, laid by submarine.
2. Japanese designation, "Type 3, Mark 6".
3. Offensive mine, for use in maximum depth of water of 1221 ft. Maximum case depth when moored is 66 ft.

Description

1. Case

Shape	Two hemispheres, joined by a cylindrical mid-section.
Color	Green over red lead
Material	Steel
Diameter	35".5
Length	45".3
Charge	440 lbs. Shimose
Total weight in air	900 lbs. (approx.)

2. External fittings

Horns	Four, around upper hemisphere.

Note: Nothing more is known about this mine.

Mines Type "Apricot" and "Grapefruit"

General

1. Contact, net mines, believed to be attached to nets before laying.
2. Japanese designation, "Type 96" ("Apricot") and "Type 96, Modification 1" ("Grapefruit").
3. Defensive mines, for use particularly on anti-submarine nets. These nets may be expected in water as deep as 700 ft., while case depths may be expected to vary between eight ft. and 300 ft.

Description

1. Case

Shape	Cylindrical, with rounded ends.
Color	Unknown
Material	Steel
Diameter	20".1
Length	27".2
Charge	121 lbs. ("Apricot") or 132 lbs. ("Grapefruit") Type 88 or Type 97 explosive.

Total weight in air	234 lbs. ("Apricot") or 249 lbs. ("Grapefruit").

2. External fittings

   It is believed that a drag line runs from the firing mechanism, a modified Type 95 depth charge pistol, to the head rope of the net panel. No other information is available.

Operation ("Apricot")

1. As the net is lowered into the water, a hydrostatically operated plunger restrains the drag spring until the mine reaches a minimum depth of eight ft. Dissolution of a soluble plug then allows tension from the drag line to be transmitted to a firing spindle.

2. Mine fires when tension of 300 lbs. or more is put on the drag line.

3. There are no known self-disarming devices.

4. The Mine Type "Grapefruit" differs from the Mine Type "Apricot" as follows:

   (a) Its hydrostatic plunger, in addition to restraining the drag spring, also prevents tension from being transferred to the firing spindle until the mine reaches a depth of eight ft. It is not known whether the plunger performs the second function in addition to the soluble plug or in place of it.

   (b) It is fitted with an additional shear pin inserted in the firing mechanism to keep it from arming on slight tension.

   (c) Its charge is fitted differently, thereby changing the center of gravity of the loaded case.

Precautions

1. Do not put a strain on any lines leading from the mine.

RMS

1. None known.

Mine Type "Banana"

General

1. Moored, contact, chemical horn mine, laid by surface craft.

2. Japanese designation unknown.

3. Believed to be a defensive mine.

Description

1. Case

Shape	Two hemispheres, joined by a cylindrical mid-section.
Color	Unknown
Material	Steel
Diameter	33"5
Height	Unknown
Charge	275 lbs. Type 88 explosive
Total weight in air	Unknown

2. External fittings

Horns	Four, equally spaced around upper hemisphere.
Base plate	In center of lower hemisphere: contains straight shank mooring spindle.
Cover plate	In center of upper hemisphere.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble washer permits the mooring spindle to be withdrawn, and mine is armed.

2. Standard chemical horn firing.

3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Note: Nothing more is known about this mine. However, it apparently is similar in design to the Dutch Vickers mine and the British T-Mk. 3 mine.

Mine Type "Quince"

General

1. Moored, controlled mine, acoustically monitored, laid by surface craft.

2. Japanese designation, "Type 92".

3. Defensive mine for use in maximum depth of water of 195 ft. against surface craft or submarines. May be laid maximum of 15 miles from shore.

Description

1. The mine is believed to be spherical, 58"2 in diameter, and to contain a charge of 1100 lbs. of Type 88 explosive. No further information on the case or fittings is available.

Operation

1. About 30 minutes after the mine has been laid, a marker buoy attached to the case releases a smoke signal, presumably to assist observers in plotting the exact position of the mine. One hour after laying, the mine case separates from the anchor. The mooring and firing cables are apparently unreeled from their respective drums within the anchor. The mine presumably takes depth by hydrostat. Reports indicate that the mines are laid in groups of four and six, connected through a common junction box to a control post ashore.

2. Hydrophones in the mine field transmit sound from enemy ships to the control post ashore, and it is assumed that the mines are fired individually or simultaneously at the discretion of the observer at the control post.

Note: Nothing further is known about this mine.

Mine Type "Avocado"

General

1. Moored, contact mine, having an inertia-impact pendulum type of firing mechanism, probably laid by surface craft.

2. Japanese designation unknown.

3. Believed to be a defensive mine.

Description

1. Case

Shape	Spherical
Color	Unknown
Material	Steel
Diameter	32"5
Charge	170 lbs. Type 88 explosive.
Total weight in air	450 lbs.

2. External fittings

No details are known.

[redacted]

Operation

1. Mine takes depth by plummet. No further details of the arming process are known.

2. Mine fires when it is tilted sharply enough to cause an inertia pendulum to make one of three electrical contacts, thereby closing the firing circuit.

3. Reports indicate that the mine has four safety devices, but they give no details.

Note: Nothing further is known about this mine.

Mine Type "Persimmon"

General

1. Moored, contact, chemical horn mine, probably laid by surface craft.

2. Japanese designation, "Mark 6, Model 2, Modification 1".

3. Offensive mine for use in maximum depth of water of 3363 ft. against surface craft. Maximum depth of case when laid is 82 ft.

Description

1. Case

Shape	Spherical
Color	Unknown
Material	Steel
Diameter	41".3
Charge	440 lbs. Type 88 explosive.
Total weight in air	903 lbs.

2. External fittings

Horns	Four, equally spaced around upper hemisphere.
Base plate	In center of lower hemisphere, contains mooring safety switch.
Cover plate	In top center of case; contains arming mechanism similar to that fitted in JC, secured by keep ring.

Note: Nothing more is known about this mine. However, attention is invited to the similarity between this mine and the Mine Type JH.

Mine Type "Grape"

General

1. Towed, electrically or tension fired explosive grapnel.

2. Japanese designation, "Mark 2 Explosive Hook".

3. Used as an explosive grapnel against moored mines and underwater obstacles.

Description

1. This mine is reported to be the same as the Mine Type JD except that it also incorporates automatic firing. It is believed that the mine will fire when a strain greater than 550 lbs. is applied to a line attached to the firing mechanism.

JAPANESE CONTACT AND CONTROLLED MINES

Mine Type "Pomegranate"

General

1. Moored, contact, chemical horn mine, laid from surface craft. May be fitted with upper or lower antenna.

2. Japanese designation unknown.

3. Defensive mine, modeled after the British Vickers antenna mine.

Description

1. The Japanese are reported to have purchased 100,000 mines identical with or very similar to the British Vickers antenna mine. No further information from any source is available. These mines may be expected to have the same external appearance and operational characteristics as the British Vickers, with necessary modifications to accommodate Japanese charges, accessories, and laying facilities.

Mines Type "Blueberry" and "Fig"

General

1. Moored, contact, chemical horn mines, laid by surface craft.

2. Japanese designations, "Type 93, Model 2 ("Blueberry") and, "Type 93, Model 3" ("Fig").

3. Defensive mines for use in maximum depth of water of 3527 ft. against surface craft or submarines. Maximum depth of cases when moored is 246 ft.

Description

1. These mines are believed to be models of Mine Type JB, differing as follows:

   (a) Mine Type "Blueberry" is fitted with seven chemical horns, one in the center of the upper hemisphere, four irregularly spaced around the upper hemisphere, and two 180° apart on the lower hemisphere.

   (b) Mine Type "Fig" is fitted with either eight or nine chemical horns, one on the top cover plate, five irregularly spaced around the upper hemisphere, and either two or three 90° apart on the lower hemisphere.

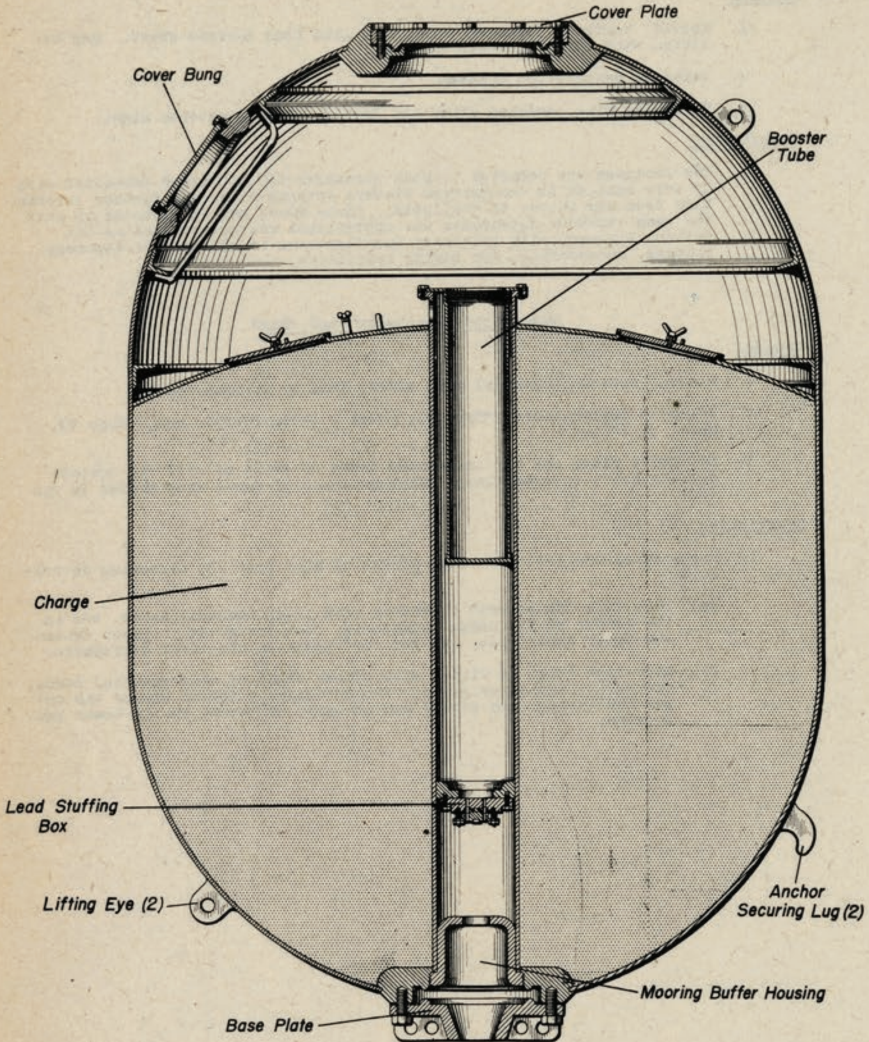


Fig. 53 - Mine Type 92 Model I, Sectional View

JAPANESE CONTACT AND CONTROLLED MINES

Mine Type 92 Model 1

General

1. Moored, magnetically monitored, controlled mine, laid by surface craft.
2. U.S. designation, "Mine Type JK".
3. Defensive mine, for use in maximum depth of water of 396 ft. against surface craft and submarines. Maximum depth of case when moored is 198 ft; maximum operating distance from control station is about 10 miles.

Description

1. Case

Shape	Two hemispheres, joined by a 14" cylindrical mid-section.
Color	Black
Material	Steel
Diameter	41.5"
Length	55"
Charge	1100 lb. Temporary Type 1 explosive with 5 lb. booster.
Total weight in air	1687 lb.

2. External fittings

Cover plate	12 1/2" diam., in center of upper hemisphere, recessed in 1 1/2" flange, secured by eight bolts.
Base plate	10 1/4" diam., in center of lower hemisphere, lap-fitted, secured by eight bolts. Cut away in center to receive firing cable.
Cover bung	7 3/4" diam., on upper hemisphere, 20" from center, lap-fitted, secured by 12 bolts.
Positioning lugs	Two, 150° apart on cylindrical mid-section, midway between upper and lower edges.
Anchor securing lugs	Two, on lower hemisphere, 60° apart, 19" from center.
Lifting eyes	Two, on upper hemisphere, 180° apart, 17" from center.

Operation (information from Intelligence sources)

1. When the mine is launched, the case and anchor sink to the bottom together. Dissolution of a soluble plug allows the case to rise and moor at a depth determined by the amount of mooring cable wound on the mooring cable drum on the anchor. At the same time the case is released, a marker buoy is released and carries the junction box cable to the surface. The buoy also gives off a smoke signal to aid in locating the mine. The mines are ordinarily laid in groups of six, forming two lines of three each. The prescribed distance between lines is 528 ft., and the distance between mines, 429 ft. As the various marker buoys rise to the surface, the junction box cables are collected and spliced into a junction box which is then laid.

2. Each group of mines is monitored by a magnetic detector loop of the type ordinarily used for harbor protection. The mines may be fired in one of two ways as follows:

   (a) If set for manual firing, the detector loop records the ship's position and an operator at the control post fires the appropriate mine or mines.

   (b) If set for automatic firing, the signal from the detector loop is relayed through a photo-electric system which actuates the mine-firing system.

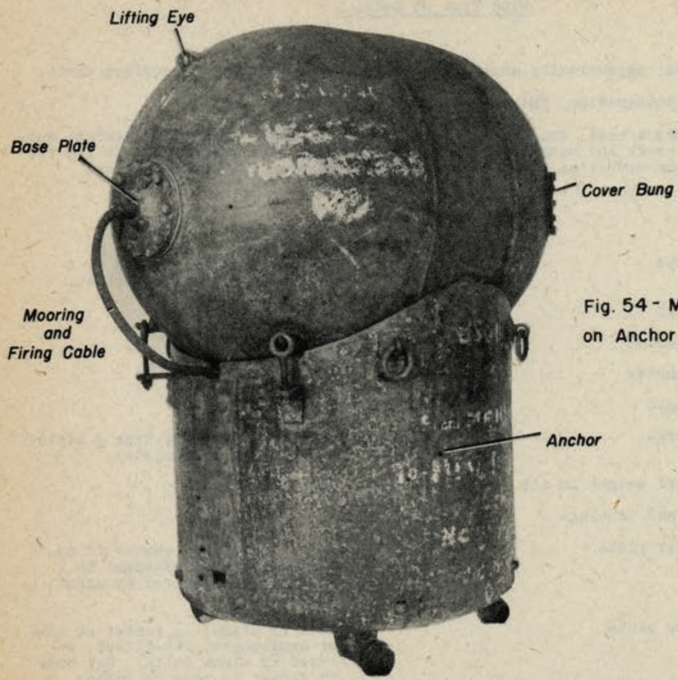


Fig. 54 - Mine Type 92 Model I, on Anchor

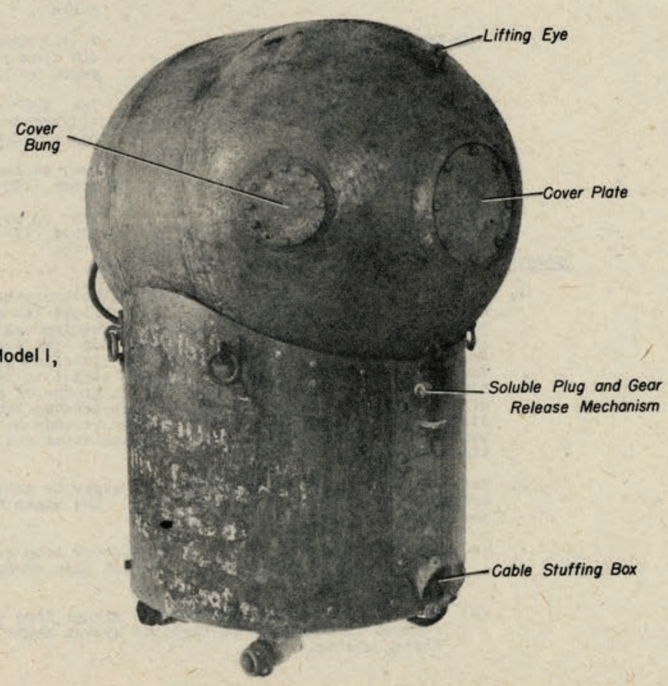


Fig. 55 - Mine Type 92 Model I, on Anchor

[redacted]

Added 15 June 1945
(Change No. 7)

(Mine Type 92, Model 1, Cont'd.)

3. No self-disarming devices are fitted.

Precautions

1. Note that the detonators and booster are permanently housed in the charge.

RMS

1. Locate and disconnect all cables leading from the control station to the mine field.

2. By any means available, cut the case loose from its anchor. It should be noted that only a single cable need be cut since the mooring and firing cables are contained in the same sheathing. The use of a minesweeper or a small underwater charge is recommended. Tow the mine ashore.

3. Remove the cover plate.

4. Reach in and remove the cover plate from the booster well; remove the detonator and booster assembly.

5. Separate the two detonators from the booster and dispose of all explosive elements.

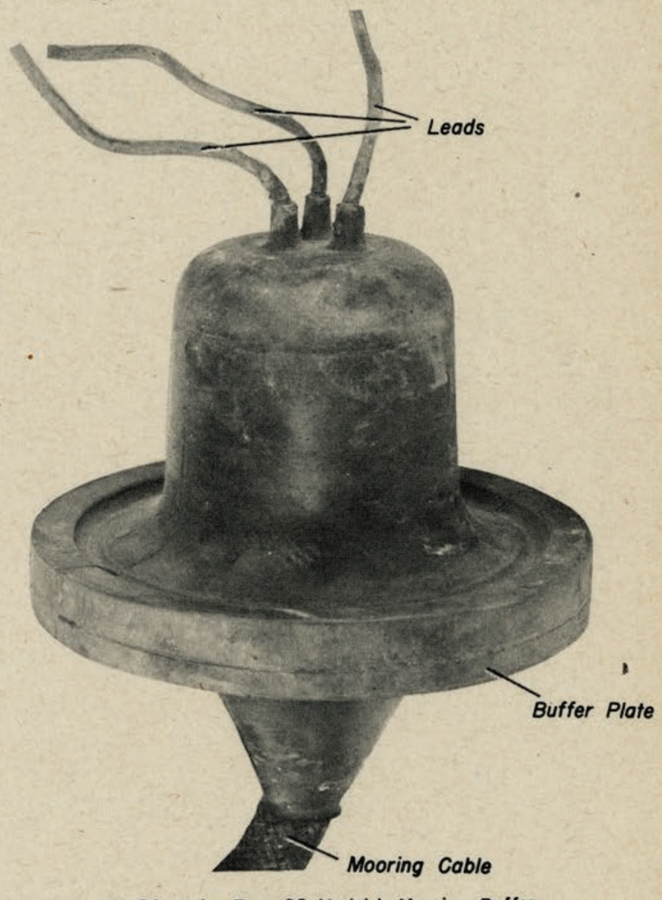


Fig. 56- Mine Type 92 Model I, Mooring Buffer

Mine Mark 6 Model 2

General

1. Moored, contact, chemical horn mine, laid by surface craft.
2. U.S. designation, "Mine Type JL".
3. Defensive mine. Its designed tactical use and laying depths are not known although it may be expected to be used in the same manner as the Mine Mark 5 Mod 1 (Mine Type JC).

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	41".1
Charge	440 lb. cast Shimose
Total weight in air	800 lb.

2. External fittings

Horns	Four, equally spaced around upper hemisphere, 18 3/4" from center.
Cover plate	25".2 diam., in center of upper hemisphere, lap-fitted, secured by 24 bolts. Fitted with spring-loaded arming switch, similar to that fitted to Mine Type JC.
Base plate	13".8 diam., in center of lower hemisphere, lap-fitted, secured by 16 bolts. Fitted with rubber sleeve between mooring chain and base plate.
Lifting eyes	Three, equally spaced around upper hemisphere, 22" from center.
Positioning lugs	Three; one on upper hemisphere, 26 3/4" from center; two on lower hemisphere, 15 3/8" from center.

Operation, Precautions and RMS

1. Same as Mine Mark 5 Mod 1 (Mine Type JC).

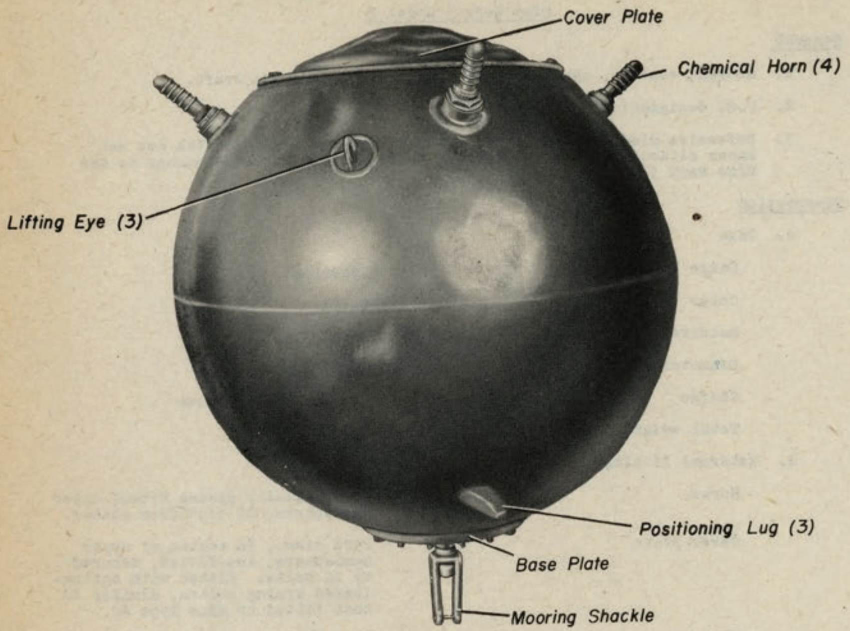


Fig. 57 - Mine Mk 6 Model 2

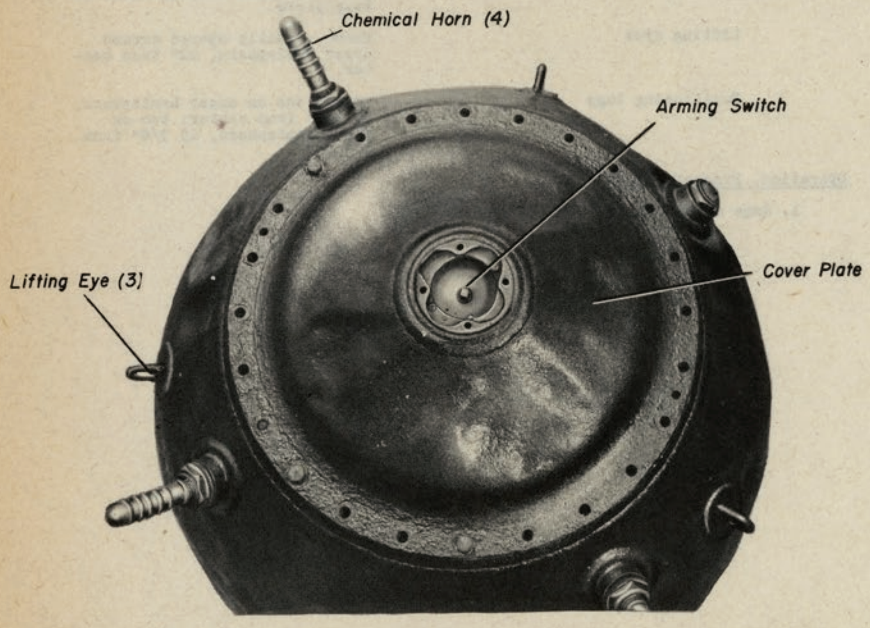


Fig. 58 - Mine Mk 6 Model 2, Top View

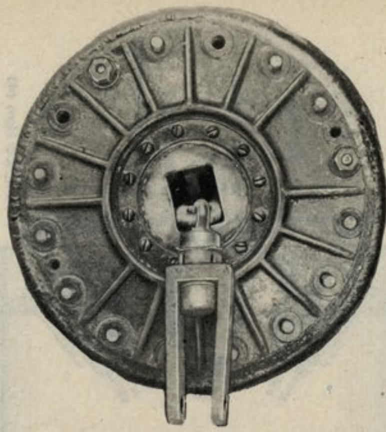


Fig. 59 - Mine Mk 6 Model 2, Base Plate, External View

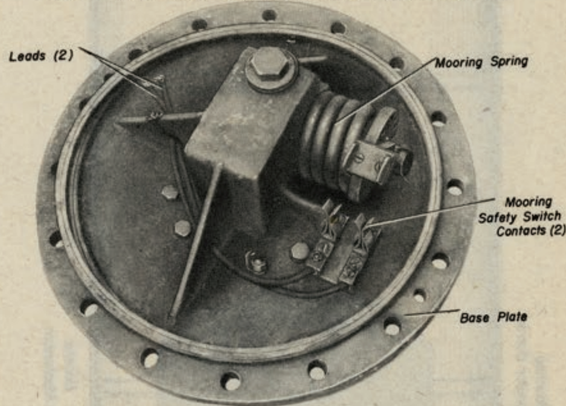


Fig. 60 - Mine Mk 6 Model 2, Base Plate and Mooring Safety Switch, External View

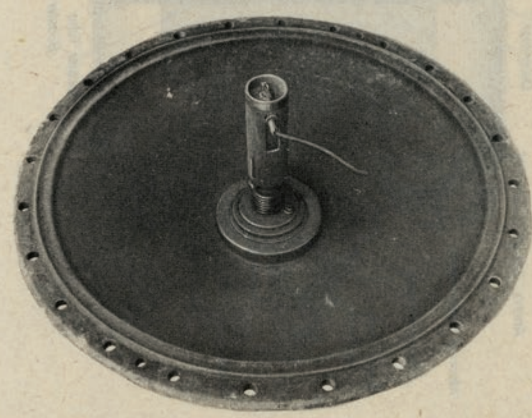


Fig. 61 - Mine Mk 6 Model 2, Cover Plate and Arming Switch, Internal View

Added 1 September 1945
(Change No. 11)

[redacted]

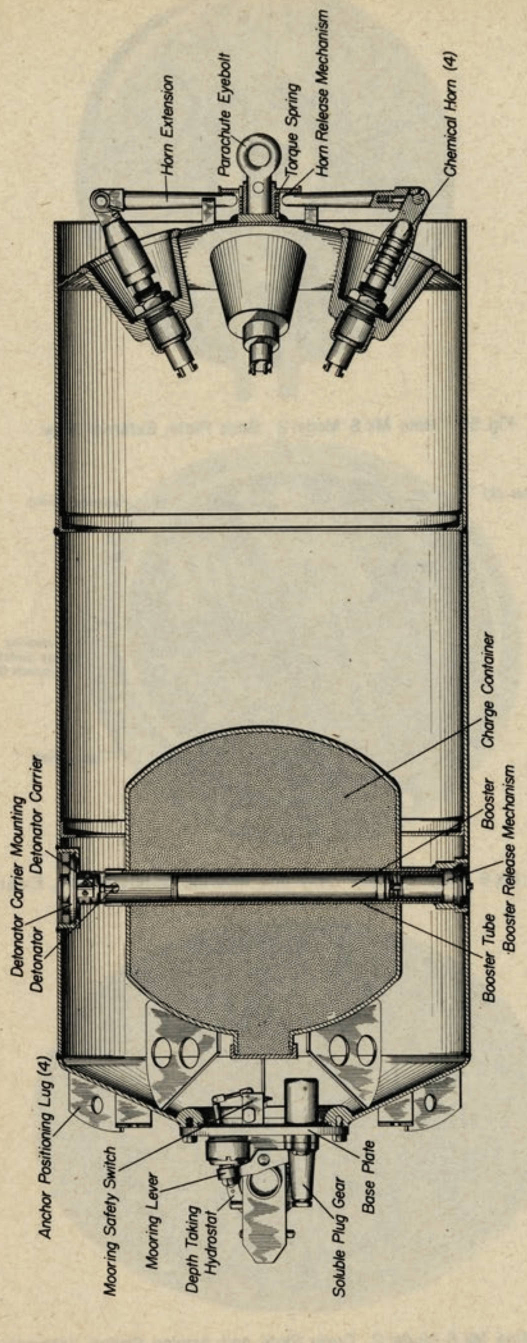


Fig. 62 - Mine Type JJ, Sectional View

Type 3 Mark 1 Aircraft Mine Model 1

General

1. Moored, contact, chemical horn mine, laid by aircraft with parachute, or by surface craft.
2. U. S. designation, "Mine Type JJ".
3. Offensive or defensive mine; expected laying depths and intended targets unknown.

Description

1. Case

Shape	Cylindrical with cambered ends. Upper end fitted with 3 3/4" cylindrical skirt; lower end fitted with depth-taking gear.
Color	Black
Material	Steel
Diameter	23 1/2"
Length	
Overall (including parachute housing)	70 3/4"
Case	52 3/4"
Charge	240 lb. cast Type 98 explosive with 1 lb. 4 oz. Shimose booster.
Total weight in air	600 lb.

2. External fittings

Horns	Four equally spaced around upper end, 9" from center; fitted with hinge-type extensions.
Horn release mechanism	On top center of case; consists of parachute eyebolt lug, eyebolt, horn release disc, torque spring, and release key bracket.
Base plate	10" diam., in bottom center of case, lap-fitted, secured by six bolts; fitted with depth-taking hydrostat, mooring lever, and soluble plug gear.
Guide stud	Flat type, 10" from lower edge of cylindrical section.
Booster release mechanism	2 3/8" diam., 10" from lower edge of cylindrical section, secured by keep ring.
Detonator carrier mounting	180° around case from booster release mechanism, 10" from lower edge of cylindrical section, secured by keep ring.
Access hole cover plate	5" diam., 11" from upper edge of cylindrical section, secured by keep ring.
Anchor positioning lugs	Four equally spaced around lower end of case, 10" from center.
Case release lugs	Two "U"-shaped straps, 180° apart on lower end of case, 8" from center.
Parachute housing securing lugs	Two, 180° apart on skirt at upper end of cylindrical section.

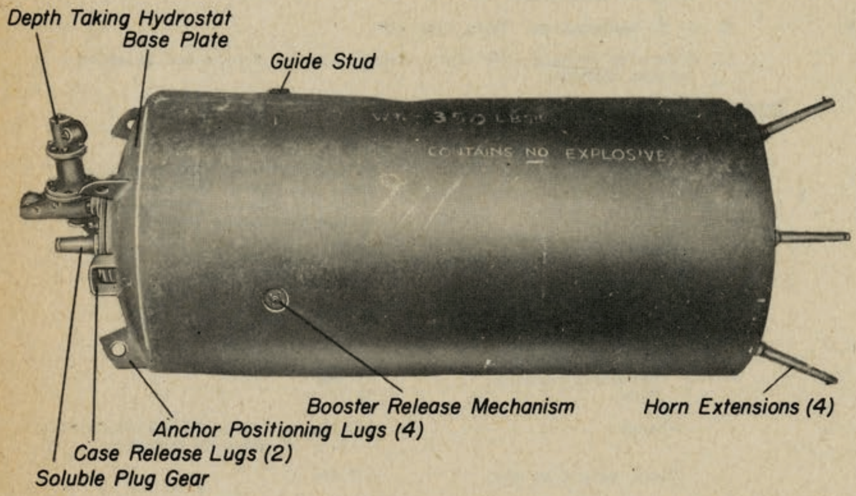


Fig. 63 - Mine Type JJ

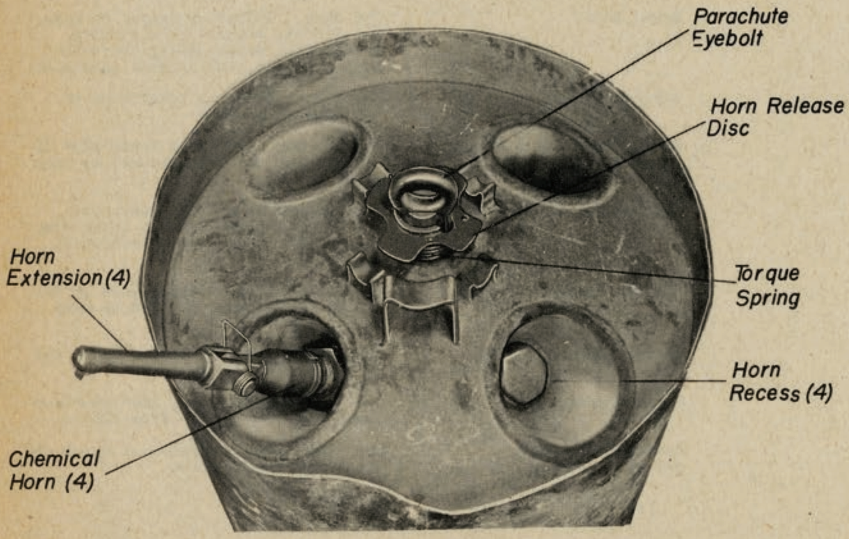


Fig. 64 - Mine Type JJ, Upper End

(Type 3 Mark 1 Aircraft Mine Model 1, Cont'd.)

Parachute housing securing slots	Two, 180° apart on skirt at upper end of cylindrical section, 90° around case from parachute housing securing lugs.

Operation

1. When the mine is dropped, impact with the water separates the anchor dome from the anchor. The mine and anchor sink and hydrostatic pressure performs the following:

   (a) It operates the parachute release mechanism, causing the parachute to separate from the mine and anchor. Release of the parachute exerts tension on two lanyards, performing the following:

      (1) One lanyard withdraws a safety pin from the horn release mechanism, allowing the horn release disc to rotate under the tension of the torque spring. Rotation of the disc allows the spring-loaded horns to spring out into the extended position where they are locked.

      (2) The other lanyard, a split type, trips two spring-loaded latches on the parachute housing, allowing the housing to drop free.

   (b) It operates the booster release mechanism, allowing the booster housing spring to force the booster over the detonator where it is locked by spring clips on the detonator carrier mounting.

2. After the mine and anchor have reached the bottom, dissolution of a soluble plug allows the case and anchor to separate, and the case takes depth by the loose-bight hydrostat system. Dissolution of another soluble plug allows mooring tension to pull out the mooring lever, closing the mooring safety switch and arming the mine.

3. Standard chemical horn firing.

4. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. Note that the detonator and booster are permanently married once arming has been completed.

RMS

1. Same as Type 3 Mark 2 Aircraft Mine Model 1 (Mine Type JI).

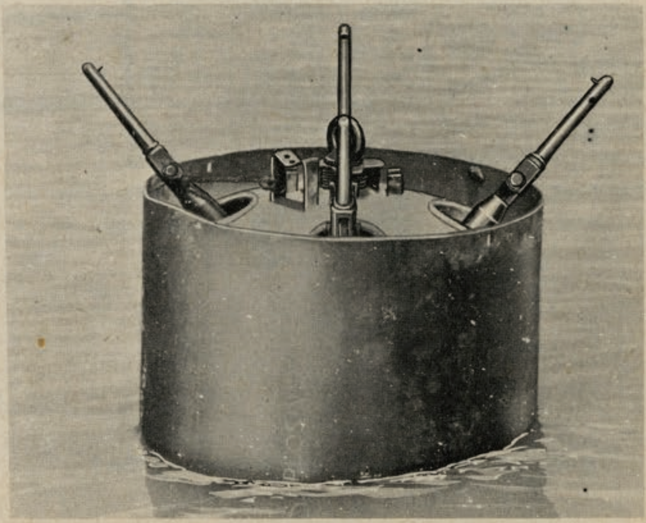


Fig. 65- Mine Type JJ, Floating

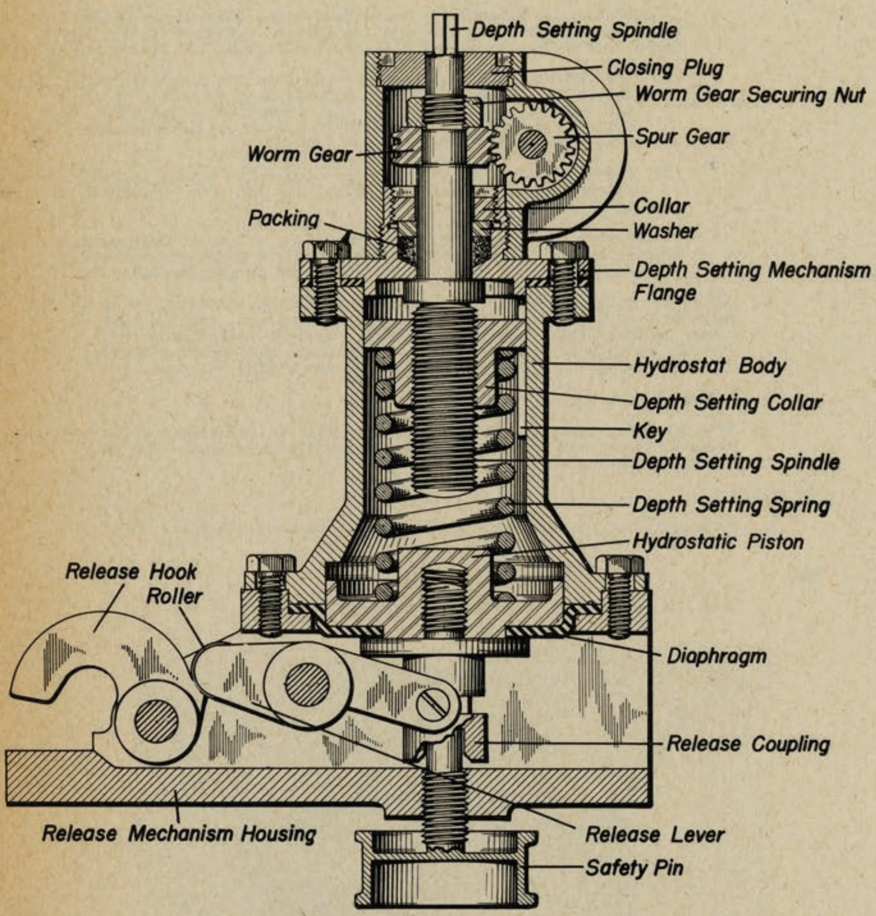


Fig. 66 - Mine Type JJ, Mooring Hydrostat, Sectional View

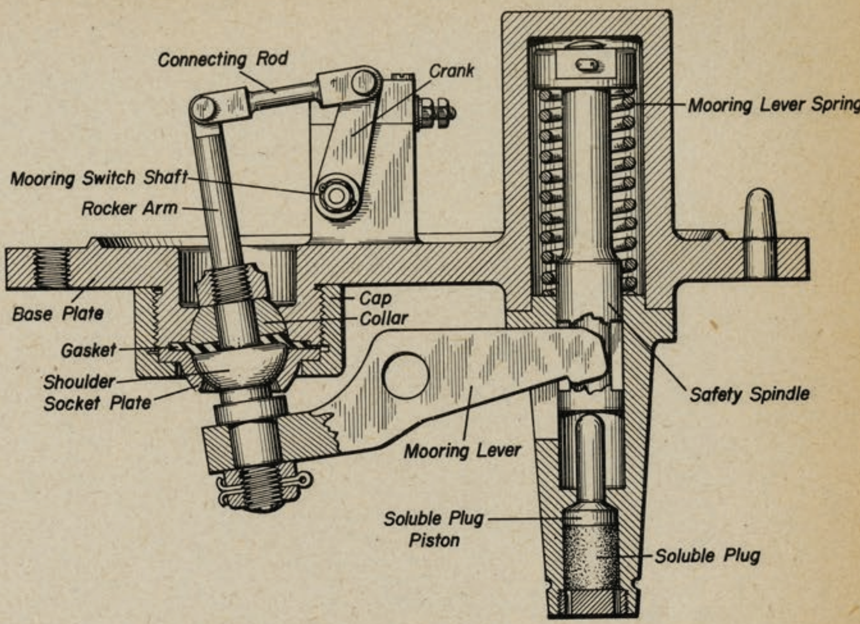


Fig. 67 - Mine Type JJ, Base Plate, Sectional View

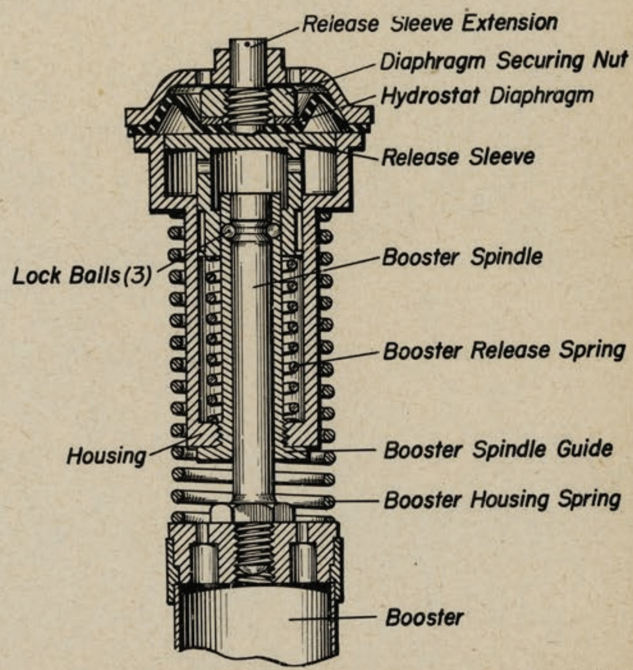


Fig. 68 - Mine Type JJ, Booster Release Mechanism, Sectional View

MINE DISPOSAL HANDBOOK

PART VI

JAPANESE UNDERWATER ORDNANCE

* * * * * *

CHAPTER II

JAPANESE TORPEDOES

NOVEMBER 1, 1944 [redacted]

JAPANESE TORPEDOES

Torpedo	Source of Info.	Used With	Diameter (in.)	Power Source	Speed/Range (Kts. & Yds.)	Total Wt. (lb.) (Approx.)	Overall Length	Warhead Length	Flask Section Length	Afterbody Length	Tail Length	No. of Fins	Designation of Warhead	Remarks
Type 44 Mk 2 Mod 1	Newport	PT	18	Four cylinder engine	36-4300* 26-8700	1830*	18'8"*	4'*	10'0"	3'3"	1'5"	4	Unknown	Obsolete
6th Year Type	"	SS Old Des.	21	"	37-7650* 32-10900 25-16400	3200	22'5"	3'1"	12'9"	5' 1/2"	1' 6 1/2"	4	6th Year Type	"
8th Year Type Mk 2 Mod 2	"	DD CL	24	"	41-10950* 32-16400 26-21900	5800*	27'5"	3'7"	16'9"	5'4"	1'9"	4	8th Year Type Mk 2	"
Type 89 Mod 1	"	SS Old Des.	21	Two cylinder engine	45-6000* 43-6550 35-10900	3660	23'6"	3'8"	13'5"	4'5"	2'	4	Type 89 Model 2	Obsolescent
Type 91 Mod 1	"	A/C PT	18	Eight cylinder engine	42-3300	1730	17'3"	3'1"	8'11"	3'10"	1'5"	4	Type 91 Mod 1	"
Type 91 Mod 2	"	A/C PT	18	"	42-3300*	1840	18'0"	3'10"	8'11"	3'10"	1'5"	8	Type 91 Mod 2	Service
Type 91 Mod 3 and Type 91 Mod 3 (Special)	"	"	"	"	42-3100	1800	17'5"	4'10"	7'4"	3'4"	1'11"	8 or 4	Type 91 Mod 3	"
	"				42-2500	2100	18'10"	6'3"					Type 91 Mod 6	"
	OIL				Unknown	1900	18'1"	5'6"					Type 3	"
	MEIU #4					2200	18'10"	6'3"					Type 91 Mod 7	"
Type 92 Mod 1	MEIU #4	SS	21	Six-pole DC motor	Unknown	Unknown	Unknown	Unknown	11'7"	6'5"	1'2"	4	Unknown	Service Electric Torpedo
Type 93 Model 1 Mod 2	OIL	DD CL	24	Two cylinder engine	50-22400* 40-33800	6000	29'6"	4'7"	18'1"	4'9"	2'1"	4	Model 2 for use with Type 93 Model 1 Mod 2	Service Oxygen Torpedo
Type 93 Model 3	"	CL DD	"	"	Unknown	Unknown	29'6"	7'4"	15'3"	4'10"	2'1"	6	Model 2 for use with Type 93 Model 3	"
Type 97	Newport	Midget SS	18	"	46-3500*	2205	18'5"	5'11"	7'11"	3'4"	1'3"	4	Type 97	"
Type 2 Special	MEIU #1	A/C PT	"	Eight cylinder engine	42-3000	1800	18'6"	6'0"	7'4"	3'3"	1'11"	4	Type 2 (Special)	Service

* Data from empirical calculations or from Intelligence sources.

Table I - Japanese Torpedos

[redacted]

Added 1 August 1945
(Change No. 10)

Warhead	Diam. (in.)	Length	Nose Shape	Type Charge	Block or Cast	Charge Wt. (lb.)	Exploder Used With	Location Exploder Pocket	Torpedo Used With
6th Year Type	21	3'1"	Hemi-spherical	Shimose	Block	451	Type 91 Model 2	Nose	6th Year Type
8th Year Type	24	3'7"	"	Type 98	Cast		Type 91 Model 1	"	8th Year Type Mk 2 Mod 2
Type 89 Model 2	21	3'8"	"	Type 94, 97, or Shimose		660	Type 91 or Type 2	TCL	Type 89 Mod 1
Type 91 Mod 1	18	3'1"	"	Type 97	Block	338	Type 90 Model 2 or Type 2	"	Type 91 Mod 1
Type 91 Mod 2	18	3'10"	"	"		420	"	"	Type 91 Mod 2
Type 91 Mod 3	18	4'10"	"	"	Block	522	"	"	Type 91 Mod 3
Type 91 Mod 4	18	"	"	"	Cast	678	"	"	
Type 91 Mod 6	18	6'3"	"	"	Block	812	"	"	Type 91 Mod 3
Type 91 Mod 7	18	"	"		Cast	924	"	"	"
Model 2 for use with Type 93 Model 1 Mod 2	24	4'9"	Ogival	Type 97	Block	1080	Type 90 or Type 2	"	Type 93 Model 1 Mod 2
Model 2 for use with Type 93 Model 3	24	7'4"	"	Type 98	Cast	1680	"	"	Type 93 Model 3
Type 97	18	5'11"	Hemi-spherical	Type 97	Block	790	"	"	Type 97
Type 2 Special	18	6'	"	Type 97	Cast	650	Type 90 Mod 2 or Type 2	"	Type 2 Special
Type 3	18	5'6"	"	Type 97 or 98	Cast	475	Type 90 Mod 2 or Type 2 plus Type 3	TCL and BCL	Type 91 Mod 3

Table 2 - Japanese Torpedo Warheads

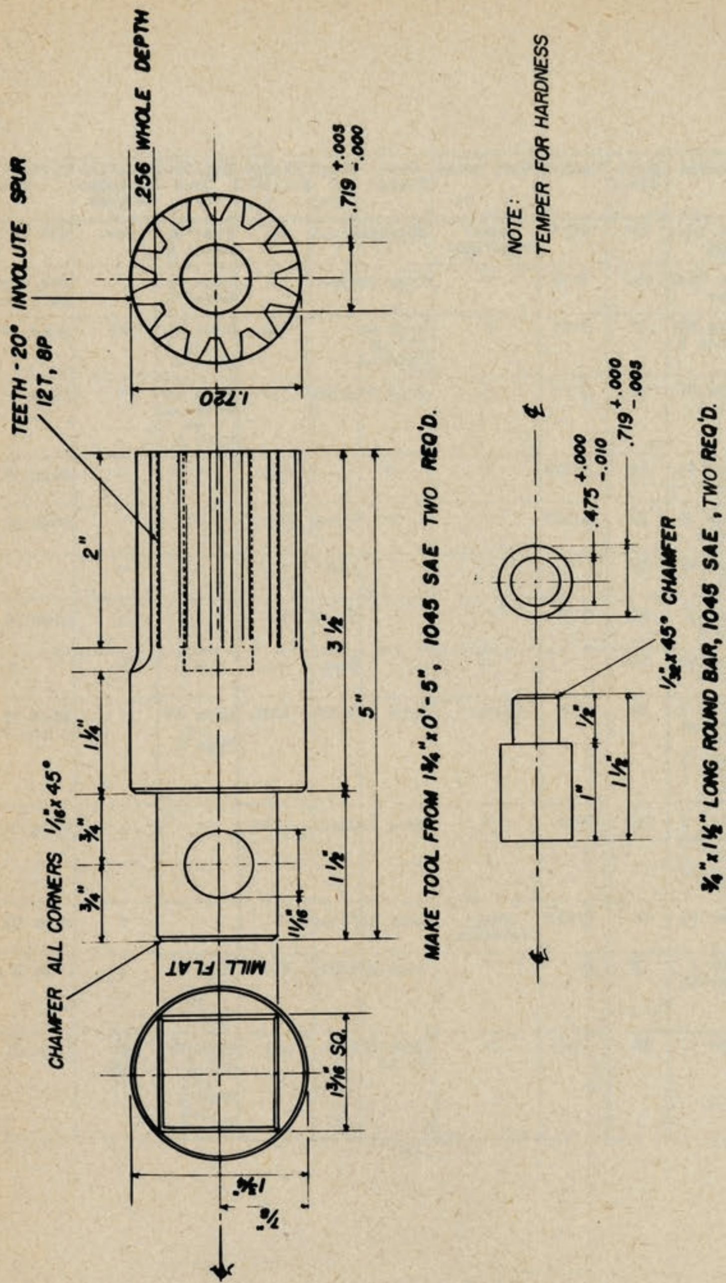


Fig. 1- Special Tool For Bayonet Type Locking Ring Used With Type 91 And Models And Type 97 Torpedoes

[redacted]

Added 1 August 1945
(Change No. 10)

JAPANESE TORPEDOES

Introduction

1. The Japanese are known to manufacture torpedoes in three sizes, measured at the diameter: 18", 21", and 24". The torpedoes vary in length from 18' to 30' and each is composed of the following main sections:

   (a) Warhead and exploder.

   (b) Flask section or battery compartment.

   (c) Afterbody.

   (d) Tail section.

2. The interest of disposal personnel is centered on the warheads and exploder mechanisms and each of these is treated in detail in this chapter. General descriptive material on the various torpedoes, including physical and operational characteristics, is also included to aid in identifying and understanding the complete torpedo assemblies.

3. All recovered torpedo types have been driven either by air, oxygen, or storage batteries. The air-driven and electric torpedoes are standard types and contain no particularly outstanding features. The oxygen torpedoes, however, are the only weapons of this type known to be in service and it should be noted that their speed/range characteristics are the best of any known torpedo of any kind now in use.

4. The warheads used are of the same diameter as the respective torpedoes. Each consists of a thin cylindrical steel shell with either a rounded or ogival nose. The earlier types are fitted with exploder pockets in the nose whereas later types contain an athwartships pocket. The only exception is the Warhead Type 3, a special type described in detail later in the chapter. The charges vary in weight from 300 to 1700 lb. and Type 97 is the explosive most often used, although Shimose or Type 98 may be encountered in some models.

5. All the known Japanese exploder mechanisms fire upon impact, either by inertia or by direct action. The Japanese are known to possess information, obtained both from the Germans and from captured specimens, on various types of influence exploders but none has ever been encountered nor has any information been received to indicate that an exploder of this type might be in service or in production. The design of the hydroplane-fired Type 3 exploder indicates that the answer to the problem of torpedo detonation without actual contact of the torpedo with the target may have been sought elsewhere than in the field of influence firing devices.

6. The component parts of the torpedo assembly are joined by one of two methods:

   (a) By means of joint screws (used mostly in earlier models).

   (b) By means of bayonet-type locking rings. Rotating the rings by means of special tools serves to lock or unlock the various sections.

7. Rendering these torpedoes safe involves disposing of the particular exploder which may be fitted. Consequently, the rendering safe procedures are given with the treatment of the individual exploders rather than with the torpedoes.

Identifying Features

1. Any Japanese torpedo may be readily identified by an examination of its markings. The Type, Model and Modification numbers along with the torpedo serial number are found forward on the top center line of the flask section, near the warhead joint. The serial numbers should always be carefully noted because of the Japanese practice of incorporating small but important design changes in their torpedoes without changing the designations. Mine disposal personnel will be notified periodically of the highest serial numbers of the various types of torpedoes available for study and research, and every effort should be made to return for examination torpedoes with higher serial numbers than those listed. Should this not be feasible, a thorough spot examination should be made to insure as far as possible that no basic design changes have been effected.

2. Due to Japanese manufacturing methods, the location of fittings on different specimens of the same torpedo may vary by several inches and this fact should be borne in mind when torpedo identification is attempted.

General Precautions

1. The following precautions should generally be observed when dealing with all Japanese torpedoes (special precautions to be observed with

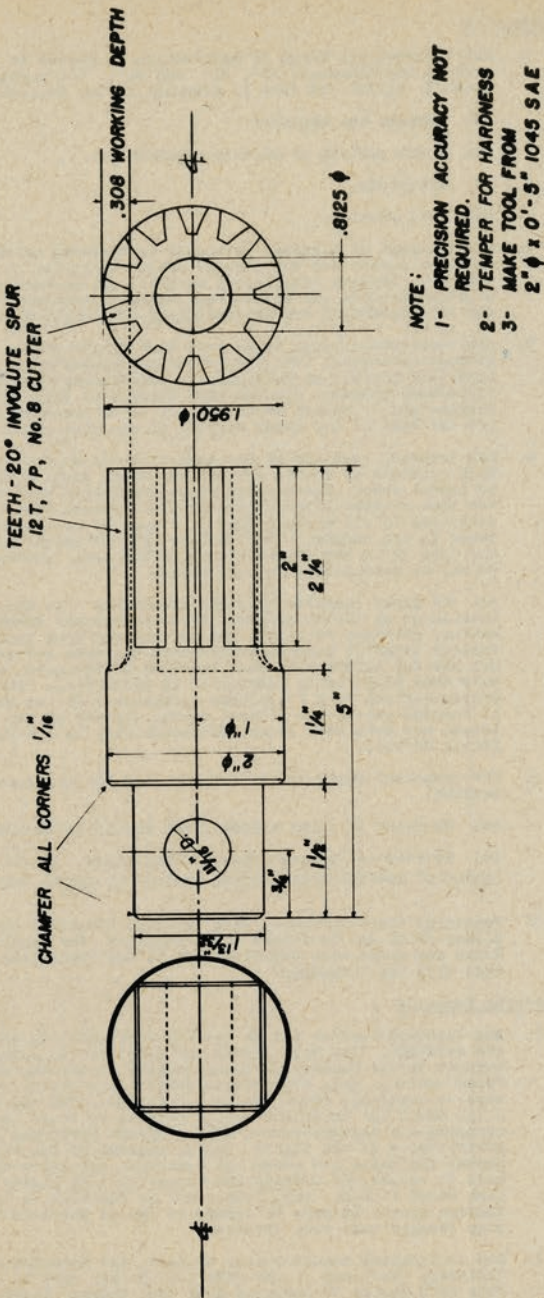


Fig. Ia- Special Tool For Bayonet Type Locking Ring Used With Type 93 Model I Modification 2 And Type 93 Model 3 Torpedoes

Added 1 August 1945
(Change No. 10)

(Introduction, Cont'd.)

the electric Torpedo Type 92 Mod 1 will be included with the treatment of that torpedo):

(a) Block the propellers before rendering safe. Specially-designed propeller locks, chain, or wire or manila rope may be used for this purpose. Since the propellers rotate in opposite directions, binding them securely together provides an effective lock.

(b) Avoid contact with the starting lever, water trip lever, or water flap.

(c) If possible, close the stop valve (three or four will be fitted to oxygen torpedoes) before rendering safe. To close a stop valve, rotate it clockwise as far as possible. It should be noted that the Japanese use two types of stop valves. The type shown in Fig. has been found fitted to each type of torpedo recovered to date whereas the type shown in Fig. has been encountered to date only in the Torpedo Type 97, although it may be used in various oxygen torpedoes as yet unrecovered.

(d) If the torpedo has not completed its full run, air pressures as high as 2500 lb./in^2 may be present. Due precautions should be taken.

(e) Prior to removal of the exploder, do not move or jar the torpedo except from a safe distance.

(f) Do not rotate the exploder arming impellers except as hereinafter prescribed. Avoid all contact with firing whiskers or bails.

(g) Note that the detonators and boosters are permanently married in all cases.

Discharging Oxygen Flasks

1. It is extremely desirable that any oxygen torpedo which is returned for examination be shipped with its charge of oxygen untouched in order that laboratory tests may be conducted thereon. Should this not be feasible, however, the following procedure is recommended for bleeding off the charge. In any event, the tremendous explosive potentialities of a high pressure oxygen charge of this type and the attendant risk should always be borne in mind.

(a) Separate the warhead from the flask section.

(b) Carefully wash the forward part of the flask section, including the forward bulkhead and all piping and connections thereon, with alcohol and allow it to dry thoroughly.

(c) Be sure that both the stop and charging valves on the forward part of the air flask are closed tightly.

(d) Disconnect the pipes on the forward bulkhead of the flask section which connect the stop and charging valves.

(e) Open the stop valve slowly and allow the oxygen to bleed off, observing all possible fire precautions.

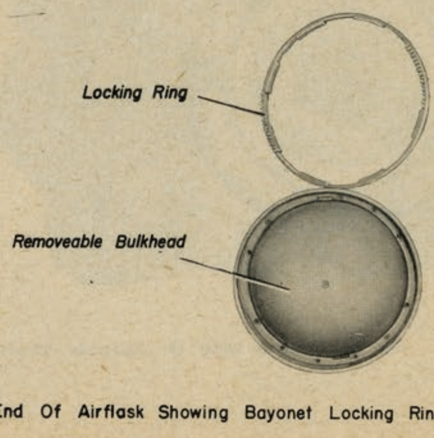


Fig. Ib – Forward End Of Airflask Showing Bayonet Locking Ring Removed

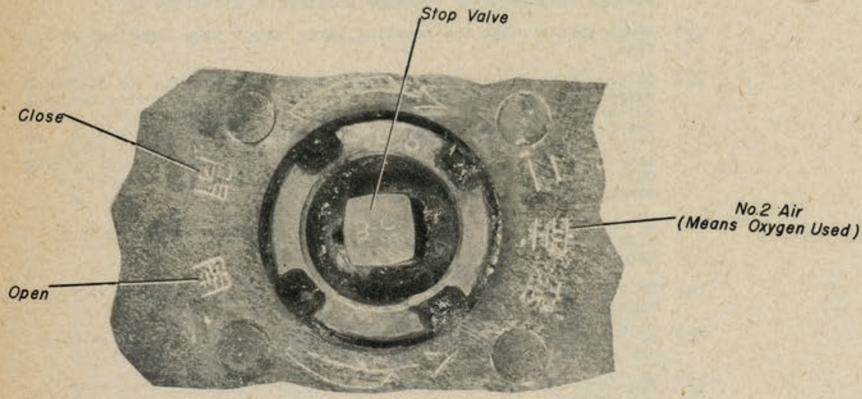


Fig. Ic – Stop Valve On Japanese Torpedoes

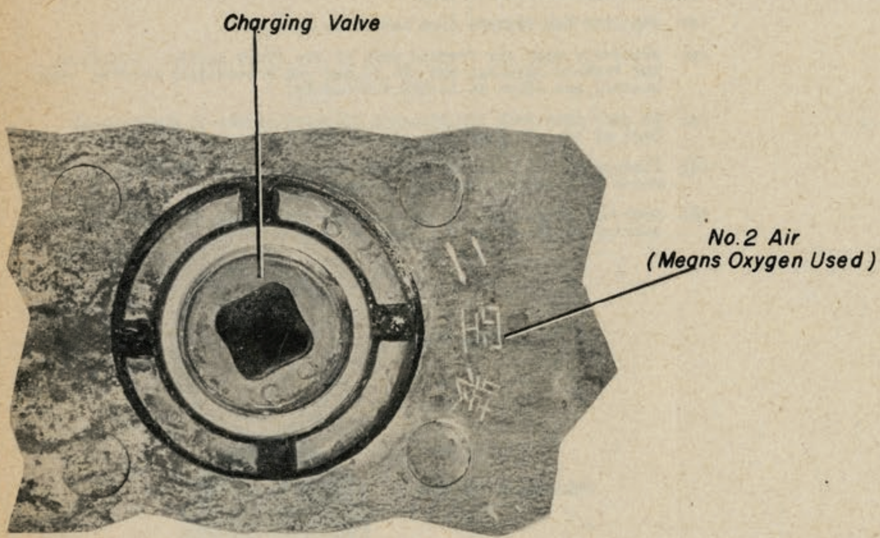


Fig. Id – Charging Valve On Japanese Torpedoes

Added 1 August 1945
(Change No. 10)

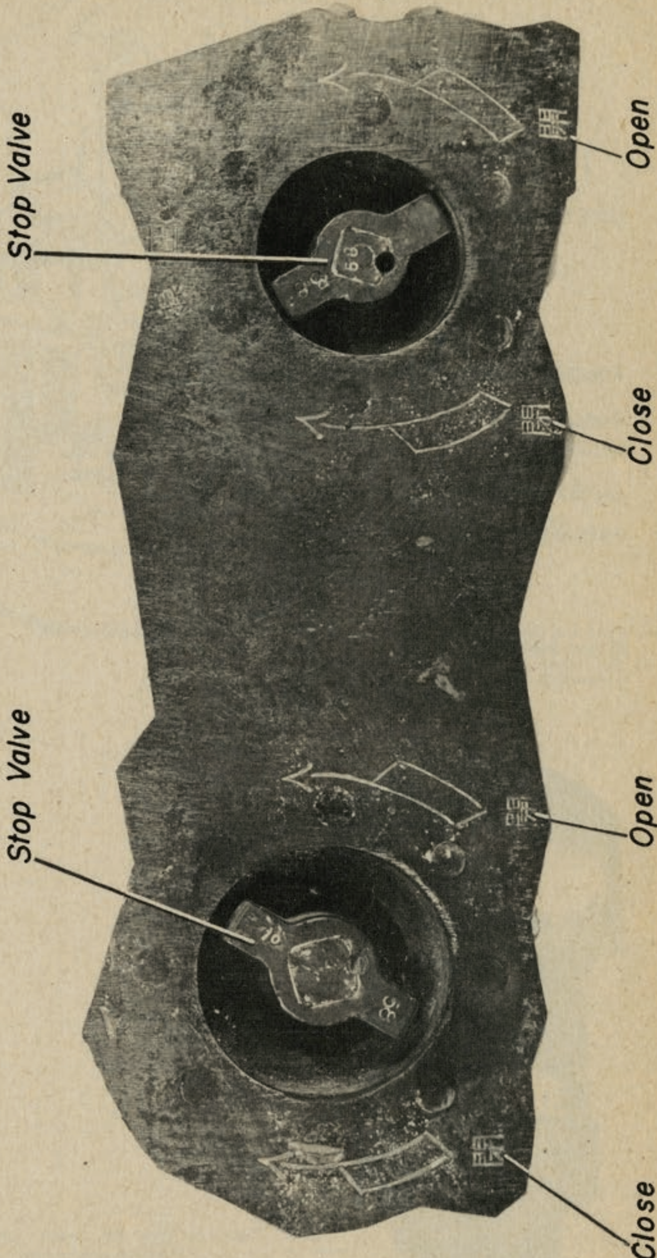


Fig. le – Stop Valve On Japanese Type 97 Torpedo

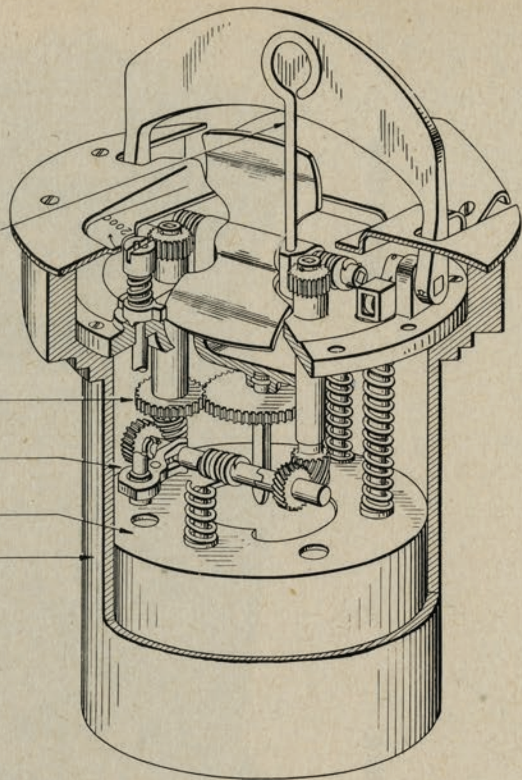


Fig. 1f-- Type 90, Arming and Firing Mechanism, Sectional View in Elevation

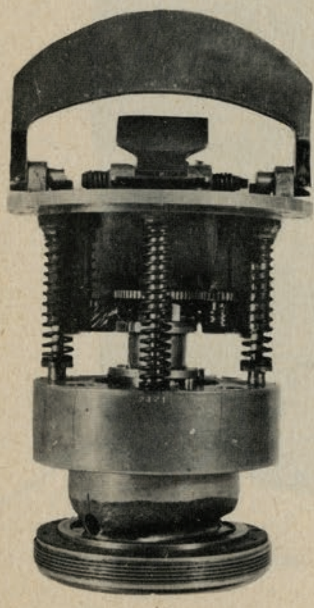


Fig. 2-- Type 90, Arming and Firing Mechanism

Exploder Type 90, Model 2

General

1. Bail, impact type, inertia-firing transverse exploder, fitted in pocket on top center line of warhead.

2. Used in aircraft torpedoes.

Description

1. External

The exploder is cylindrical in shape, 13"7 long, 4" in body diameter, 5"2 in diameter at the top flange, and 6"7 in diameter at the top cover. A three-bladed impeller, 2"5 in diameter, protrudes from the top center of the cover and carries a spring-loaded bail or flap arched over it. Fitted to the bail is a small stop pin which prevents rotation of the impeller until the bail is depressed. The top cover is secured to the exploder by nine screws.

2. Internal

The exploder consists of two main parts as follows:

(A) An upper section, 7"8 long, which houses,

(1) Arming assembly composed of,

(a) The impeller

(b) A reduction gear system

(2) Firing assembly composed of,

(a). An inertia trigger, essentially a brass cup with an elliptical base, shaped to insure displacement when subjected to proper shock. The trigger is locked before launching by a cylindrical mask which is lifted when the bail is depressed by water travel.

(b) A spring-loaded firing pin assembly, centrally located in the lower part of the section and held in the cocked position by two lock detents.

(B) A lower section, 5"3 long, housing the detonator, sub-booster and booster. The detonator and sub-booster are secured to a center ring which joins the two sections and are permanently housed in the booster.

3. Method of Mounting

The exploder is secured in the warhead pocket by a bayonet joint between lugs on the exploder flange and a corresponding set of lugs in the retaining ring which is screwed into the exploder pocket. Abaft and adjacent to the exploder pocket is a well that carries a rack-locking pinion. The teeth of this pinion engage corresponding teeth on the retaining ring so that any rotation of the locking pinion will lock or unlock the exploder by the rotation of the retaining ring. Travel of the retaining ring in either direction is limited by a "limit stop" coming to the end of a groove. The locking pinion is locked in position by a locking bolt after the bayonet joint has been closed.

4. A second exploder, believed to be the Type 90, differs from the Type 90, Model 2 as noted below:

(a) It does not have the stop pin protruding downward from the bail.

(b) Its top cover is secured by eight screws instead of nine.

(c) It has an arming range selector screw on its top cover with settings of 200 and 2000 meters.

(d) It is believed to be used only in torpedoes launched from submarines and surface craft.

Operation

1. Water travel depresses the bail, lifting the mask off the inertia trigger. As the impeller rotates, it drives the reduction gear system, performing the following arming functions:

(a) It screws the firing pin into the armed position.

(b) It unlocks the inertia trigger.

[redacted]

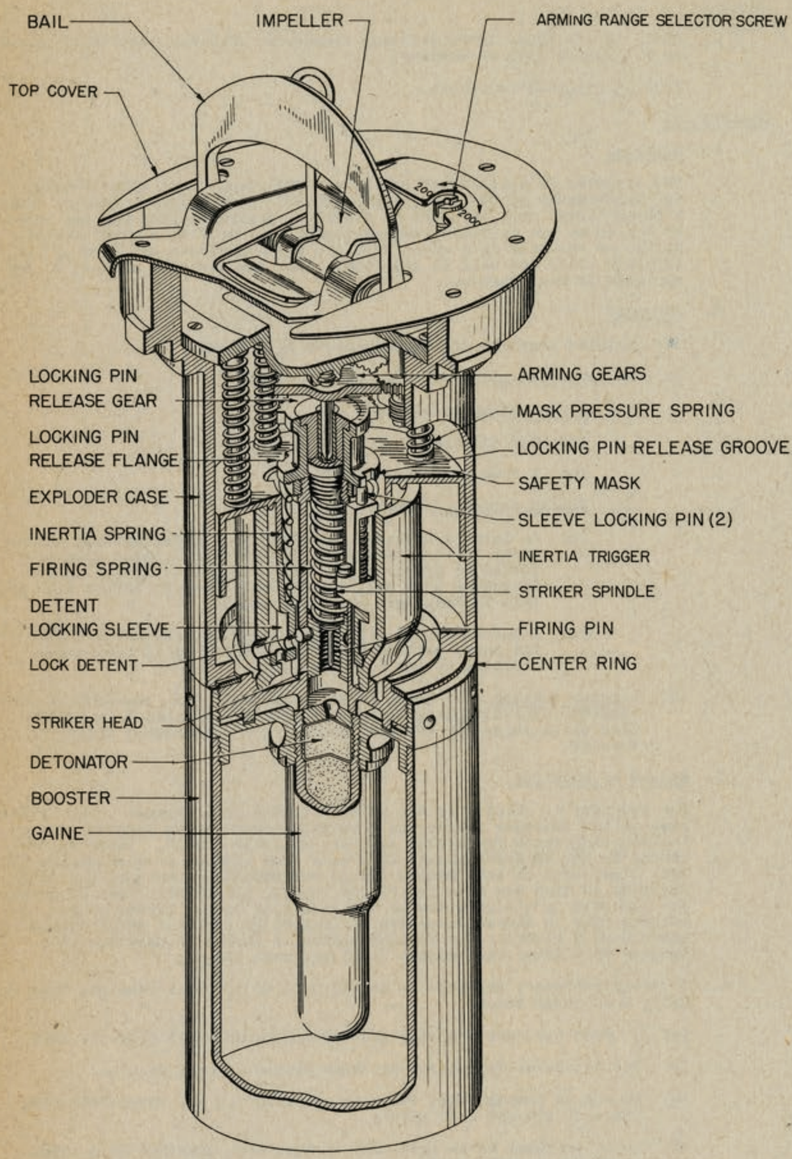


Fig. 3-- Type 90, Exploder, Sectional View in Elevation

(Exploder Type 90, Model 2, Cont'd.)

2. Impact displaces the inertia trigger, aligning an escape channel for the two locking detents which are forced outward by the firing pin as it flies downward to impinge on the detonator.

Precautions

1. There is no means of determining the armed or unarmed condition of the exploder by exterior examination.

Rendering Safe Procedure

1. If the bail is depressed, move it to the upright position from a safe distance. The exploder cannot normally fire with the bail upright.

2. Remove the locking bolt from the center of the rack-locking pinion.

3. Rotate the rack-locking pinion counterclockwise, thereby turning the retaining ring (left hand threads) clockwise until the lugs on the retaining ring line up with the grooves on the exploder flange. This condition should obtain when the ring has been turned until a stop has been reached and may be determined visually. If alignment cannot be achieved, it may be necessary to remove the top cover and clean the grooves.

4. From a safe distance, remove the exploder.

5. Using a special spanner (Fig. 13), unscrew the center ring from the upper section, thereby separating the firing pin, which is in the upper section, from the explosive train.

6. Unscrew the center ring from the lower section, the sub-booster from the center ring, and the detonator from the sub-booster.

7. Dispose of all explosive elements.

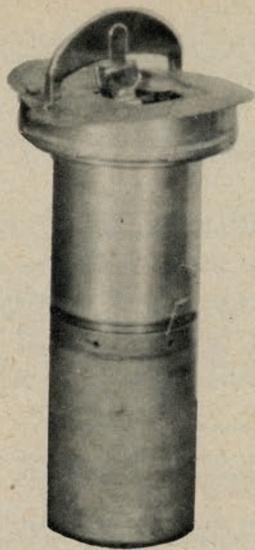


Fig. 4-- Type 90, Model 2 Exploder

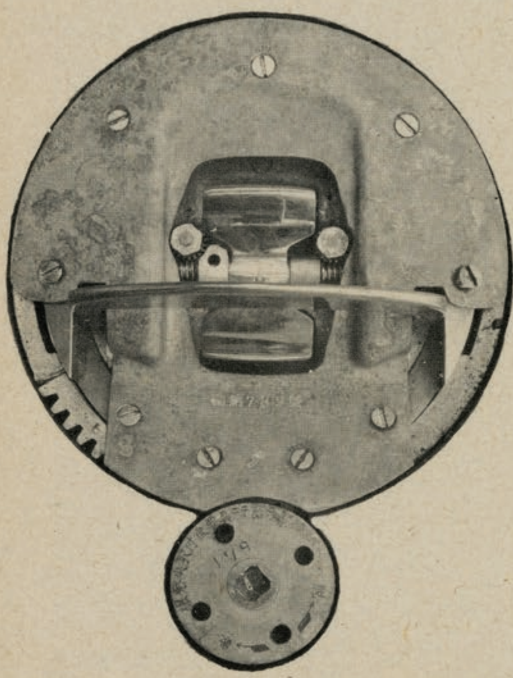


Fig. 5-- Type 90, Model 2 Exploder, Top View

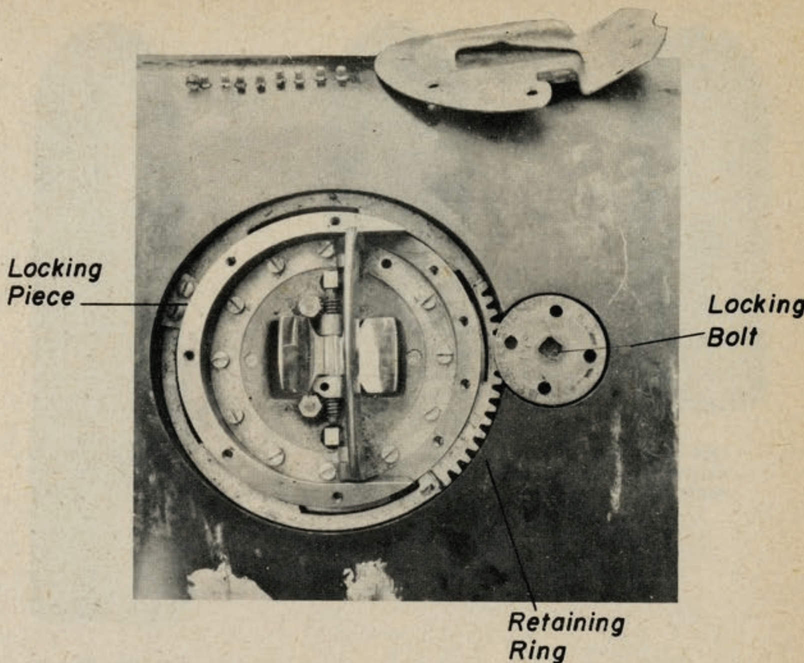


Fig. 6-- Type 90, Model 2 Exploder with Top Cover Removed

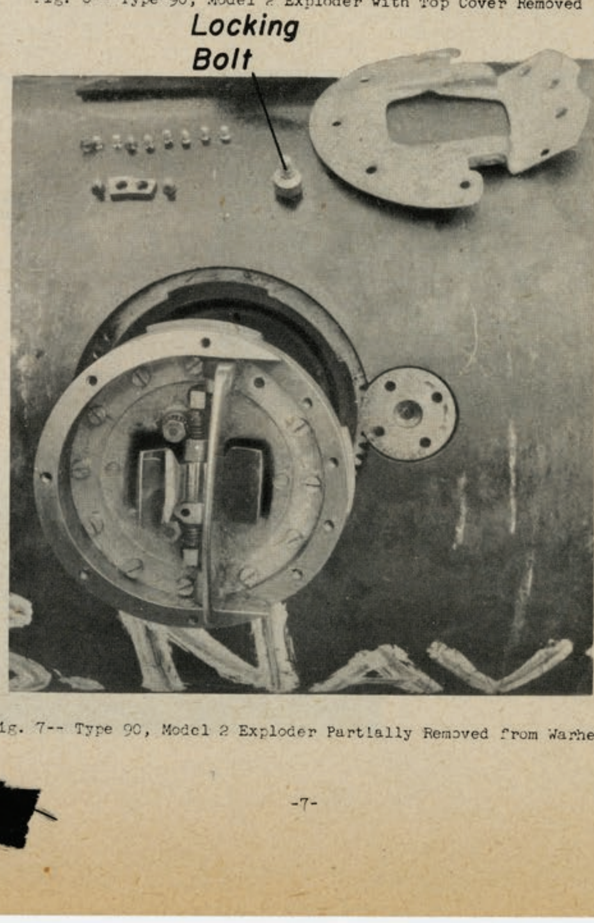


Fig. 7-- Type 90, Model 2 Exploder Partially Removed from Warhead

[redacted]

Fig. 8-- Type 91,
Modification 2
Warhead

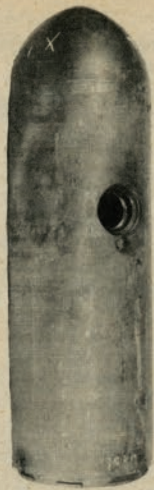


Fig. 9-- Type 91,
Modification 3
Warhead

Fig. 10-- Type 97
Warhead

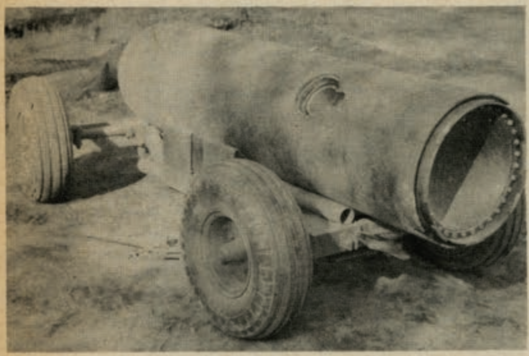


Fig. 11-- Type 91,
Modification 6
Warhead

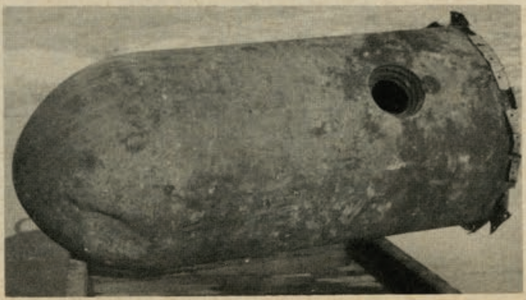


Fig. 12-- Warhead for
Type 93, Model 1,
Modification 2
Torpedo

[redacted]

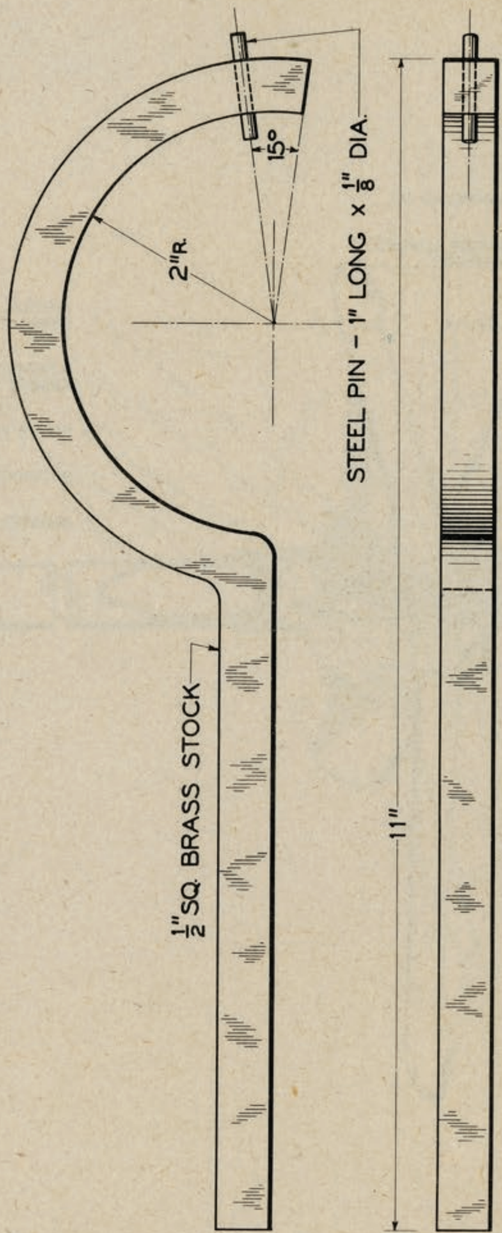


Fig. 13-- Special Spanner for Ball Type Exploders

[redacted]

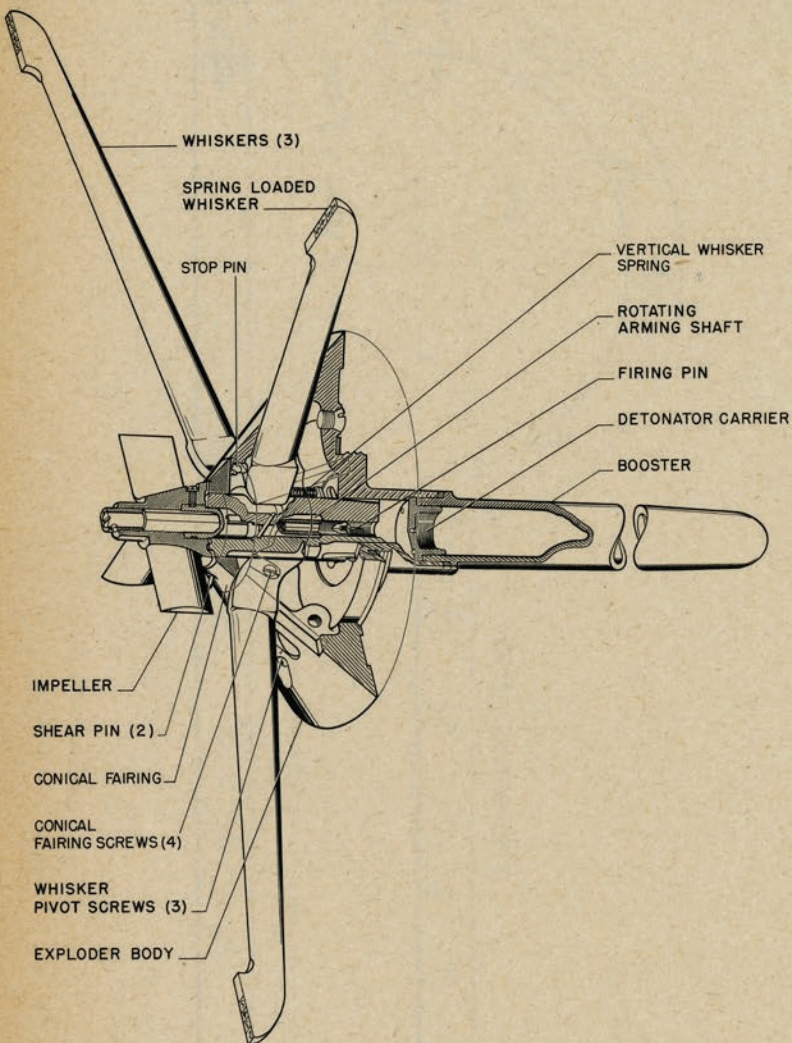


Fig. 14-- Type 91, Model 1 Exploder,
Sectional View in Elevation

[redacted]

Exploder Type 91, Model 1 (Type 91, Model 2)

General

1. Bent lever, impact type, direct action firing nose exploder.

2. Believed to be used in tube launched torpedoes only.

Description

1. External

The Type 91, Model 1 exploder has a shape similar to that of a truncated cone, being 17"3 long overall and 7"75 in maximum diameter. A four-bladed impeller, 4"25 in diameter, is fitted to the nose of the exploder. Three whiskers or firing levers protrude from the exploder, two of which are horizontal having a span of 23", and one of which extends vertically up from the exploder. The latter is spring-loaded and is fitted with a stop pin which, before the torpedo is launched, is interposed between the blades of the impeller, thus preventing rotation.

2. Internal

The exploder is composed of three main parts as follows:

(A) The exploder body, consisting of a hollow brass truncated cone having 3 slots through which the whiskers protrude and over which a small conical fairing is fitted.

(B) An arming and firing assembly composed of:

(1) A striker barrel, holding an arming shaft which is free to rotate inside the barrel and on opposite ends of which are mounted:

(a) The impeller

(b) The firing pin

(2) Three firing levers, pivoted at their inner ends, with lugs on the striker barrel serving as bearing points.

(C) The detonator-booster assembly, composed of a long booster tube screwed to the base of the exploder body. The detonator holder is secured to the open end of the booster tube.

3. Method of Mounting

The exploder body screws into the warhead and is secured by a single set screw.

4. The Type 91, Model 2 is identical with the Type 91, Model 1 except that most of its components are proportionally smaller. Significant dimensions are:

(a) Whisker span 20"

(b) Overall length 17"

(c) Maximum body diameter 7"

Operation

1. Water travel forces the spring-loaded vertical whisker aft, removing the stop pin from the path of the impeller blades. As the impeller rotates, it performs the following arming functions:

(a) It moves forward about 1" on its threads on the arming shaft, thereby unlocking the striker barrel which is then held in place by two shear pins.

(b) It screws the firing pin into the armed position after 34 to 39 complete revolutions.

2. Impact on any lever or on the impeller will sever the two shear pins and force the striker barrel to carry the firing pin forward onto the detonator.

Precautions

1. If the impeller is flush against the exploder body, and the arming spindle is protruding slightly through the hub of the impeller, the exploder is not armed.

[redacted]

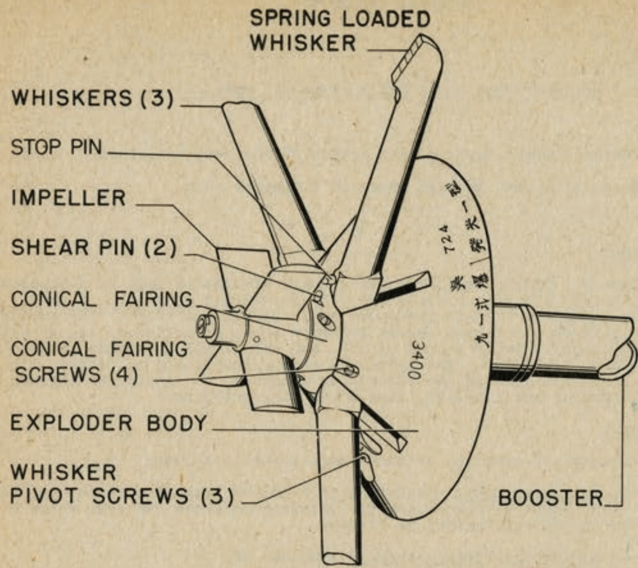


Fig. 15-- Type 91, Model 1 Exploder, Elevation

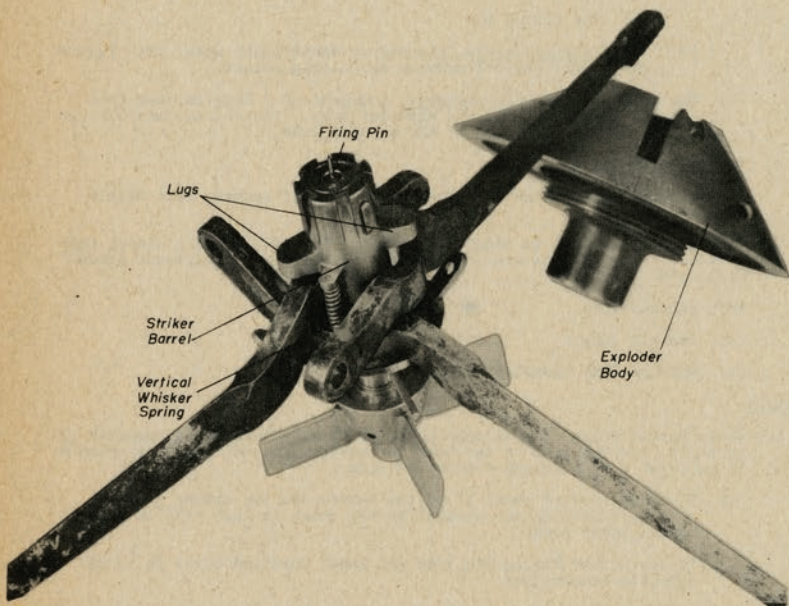


Fig. 16-- Type 91, Model 2 Exploder

2. If the impeller is flush against the exploder body, and the arming spindle is about 0"5 down inside the hub of the impeller, the exploder has probably fired.

3. If there is from 0"3 to 1" space between the exploder body and the impeller, the exploder is partly or fully armed.

Rendering Safe Procedure

1. Insert wooden wedges in the slots between the levers and the exploder body, in such a manner as to prevent the levers from moving aft.

2. Remove the three large lever pivot screws.

3. Remove the four small brass fairing securing screws near the top of the exploder body.

4. Secure a length of white line around and under the impeller.

5. From a safe distance, remove the arming and firing mechanism from the exploder body.

6. Remove the large set screw from the base of the exploder body.

7. Unscrew the exploder body from the warhead, the booster from the base of the exploder body, and the detonator from the top of the booster.

8. Dispose of detonator, booster and charge.

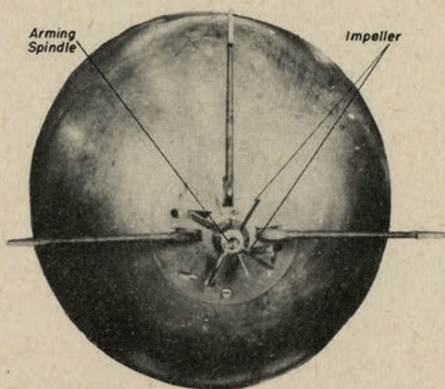


Fig. 17-- Sixth Year Model Warhead with Type 91, Model 2 Exploder

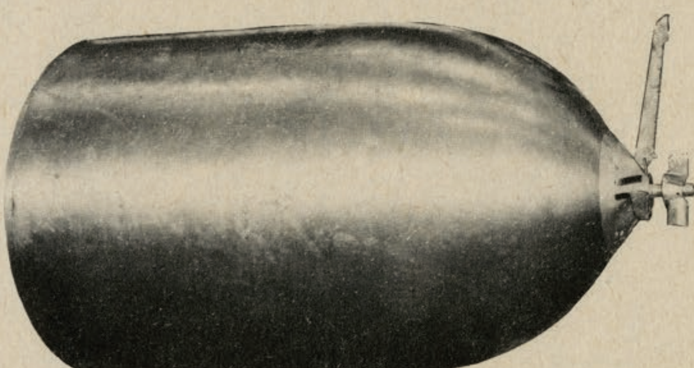


Fig. 18-- Sixth Year Model Warhead with Type 91, Model 2 Exploder

[redacted]

Type 3 Warhead Fitted With Hydroplane Firing Device

Introduction

1. The hydroplane firing device, one of two methods of firing the Type 3 warhead, is essentially a method of remote control impact firing which, although basically not new, has not heretofore been applied successfully.

2. Briefly, this remote control method fires the torpedo through the release of a hydroplane which it tows during its run. It launches the device after an undetermined amount of travel by the torpedo through the water which also arms the exploders. The hydroplane, when being towed, streams above and slightly abaft the warhead. The drag exerted by the hydroplane cocks a spring-loaded mechanism geared to the exploder. Impact of the hydroplane with the target causes the hydroplane to be released from the towing cable, thereby releasing tension on the tow line. This allows the cocked mechanism to operate, which in turn, fires the exploder.

3. The warhead also carries a standard inertia-type exploder which fires the torpedo upon direct impact with the target.

4. The hydroplane device apparently adds to the torpedo's effectiveness by giving it the ability to attack shallow-draft vessels and by acting as a substitute for an influence-firing exploder in that it will detonate the torpedo under a ship's vulnerable underside.

Type 3 Warhead

General

1. This warhead, designed especially for use with the hydroplane firing device, is similar in construction to other Japanese warheads except for the multiplicity of internal and external fittings necessary to accommodate the hydroplane and its accessories.

2. Its charge is cast rather than block-fitted, probably because of the internal irregularities of the warhead case; its loading factor is slightly lower than that of comparable 18" warheads owing, in part, to the presence of two large buoyancy chambers which extend nearly the full length of the warhead on each side.

3. The warhead's Japanese designation is, "Type 3 service head for use with Type 91 torpedo, Modifications 3 and 5."

Description

1. Shell

Shape	Cylindrical, with rounded nose.
Material	Steel
Diameter	17"7
Length	5' 5"7
Charge	500 lbs. Type 97 explosive.
Total weight in air	868 lbs.

2. External fittings

Nose cover plate	13" diam., in center of nose, secured by 20 screws.
Hydroplane pocket	15" long, 7"6 wide (max), on top center line 17"7 forward of after end, covered in part by a two-section cover plate, each section of which is secured by 11 screws. Left section cut away for safety flap.
Inertia exploder pocket	6"5 diam., on top center line, 9"9 forward of after end.

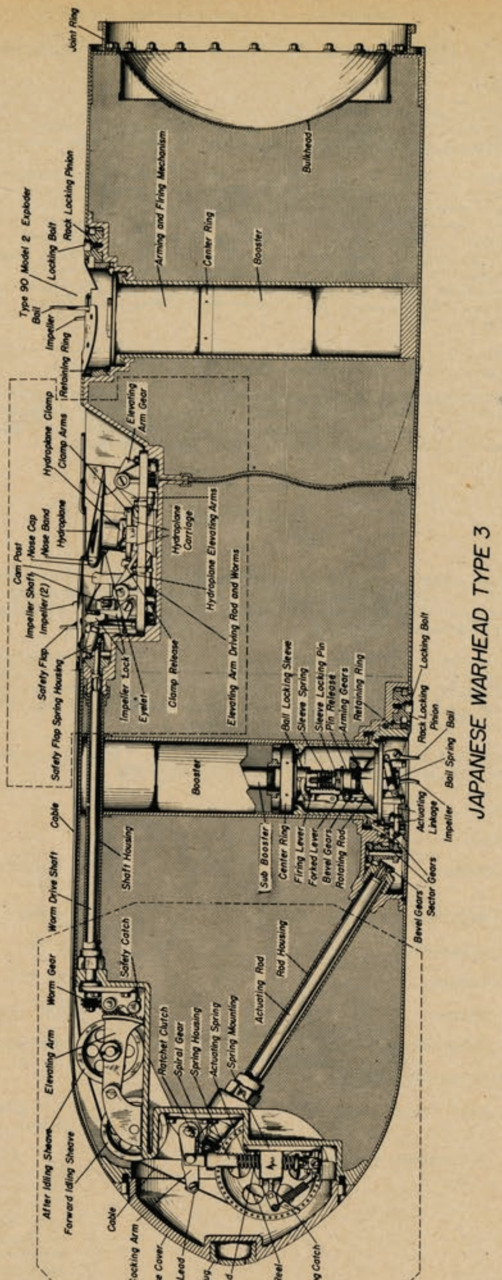


Fig. 19 - Type 3 Warhead, Sectional View

[redacted]

Type 3 Warhead, (Cont'd.)

Sheave pocket cover plate	10" long, 3"5 diam., on top center line, 50"5 forward of after end, secured by 20 screws.
Cable channel	18" long, on top center line, extends from sheave pocket to hydroplane pocket.
Type 3 exploder pocket	6"5 diam., 180° from top center line, 35"7 forward of after end.
Gear pocket cover plate	4"2 diam., 180° from top center line, adjacent to and ahead of the Type 3 exploder pocket.
Hydroplane impellers	Two, four-bladed, 3"5 span, in pockets on either side of the hydroplane pocket.

Hydroplane Firing Device

General

1. Remotely-operated, impact-type torpedo firing mechanism.

2. Used with Type 3 Warhead and Type 91, Modification 3 aircraft torpedoes. Believed also to be used with Type 91, Modification 5 torpedoes.

Description

1. The firing mechanism consists of six main assemblies as follows:

   (a) The Hydroplane - a delicately balanced, and finely machined brass object, similar in appearance to a model monoplane with tapered wings, a slender fuselage and a tail fitted with four fins. Small triangular pieces secured to the top of the trailing edge of each horizontal fin serve to depress the tail when the hydroplane is waterborne.

   A keel-like, streamlined extension is welded to the underside of the fuselage about midway between the nose and the leading edges of the fins and an elongated, teardrop-shaped piece is soldered to the bottom of the keel. A small, towing eyelet, fitted under the fuselage ahead of the keel, is fitted with a pivot arm which extends upward into the hollow nose of the hydroplane proper. The hydroplane is fitted with a small nose band and cap, secured by a threaded extension of the cap which screws into the upper end of the eyelet pivot arm.

   The hydroplane is 5"5 long, 4"7 in wing span and weighs about one pound. The horizontal and vertical fins have an overall span of 2".

   (b) The Hydroplane Elevating and Releasing Assembly - a complex system of gears and levers, which serve as a carriage and an elevating and releasing assembly for the hydroplane, mounted in the hydroplane pocket.

   A horizontal, transverse drive shaft fitted with an impeller at each end is mounted at the forward end of this assembly. The drive shaft, through a reduction gear system, controls an elevating arm driving rod; the driving rod, in turn, controls two elevating arms through worm gears which engage sector gears on the two elevating arms. The free end of each elevating arm is attached to the hydroplane carriage in such a manner as to cause the carriage to rise upward when the mechanism operates.

   The hydroplane is held firmly in its carriage by a spring-loaded clamp and two clamp arms. The forward ends of the clamp arms are held together by a U-shaped clamp release when the latter is in the aft position. Cam followers, secured to each side of the clamp release, slide on the after face of a double cam post shaped to cause the clamp release to pivot and release the clamp arm as it rises.

 [redacted]

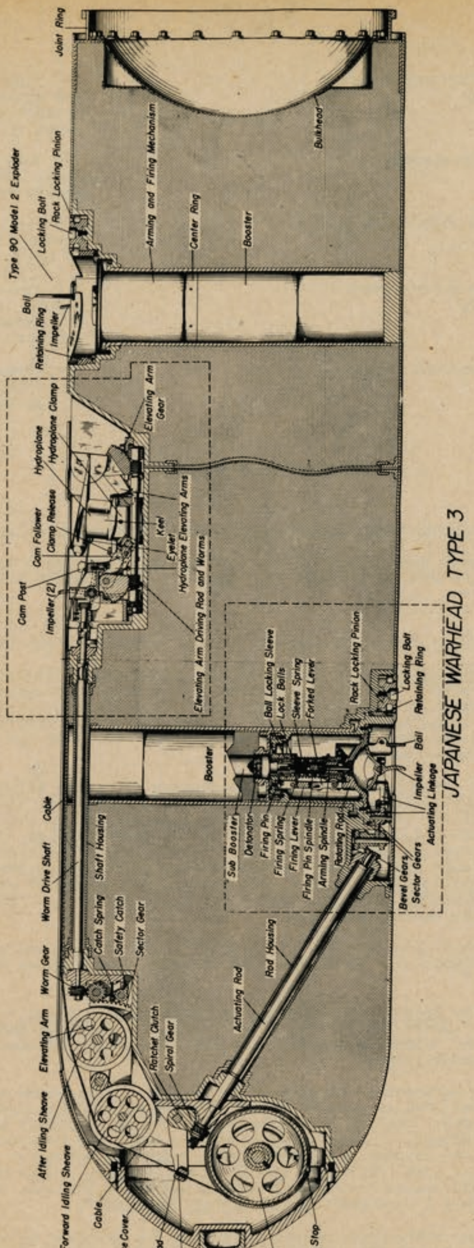


Fig. 20 - Type 3 Warhead, Sectional View

[redacted]

Hydroplane Firing Device, (Cont'd.)

After the hydroplane is released, a clutch disengages the drive shaft from the impellers. This is accomplished by means of a drum cam on the axle of the forward elevating arm, the cam being shaped to cause a follower to move to the right and disengage the clutch when the elevating arm has pivoted to its upper limit.

A spring-loaded, pivoted, impeller safety flap protrudes about one inch from the left side of the cover plate and, when in the vertical position, prevents impeller rotation. If depressed, it carries beyond a central pivot point and is thereafter depressed by its spring.

(c) Idling Sheaves - two in number, the forward sheave being mounted on an arm fixed to the warhead while the after sheave is mounted on a elevating arm which is pivoted on the fixed arm. The after end of the elevating arm is fitted with a sector gear connected to a spur gear driven by the worm shaft. The worm shaft in turn is driven by a gear system controlled by the impeller drive shaft. The after sheave is normally depressed but, after the torpedo's arming run, the sheave is elevated by the gear train until it protrudes about $\frac{1}{2}$" above the surface of the warhead.

(d) The Cable, Cable Reel and Braking Assembly - mounted directly under the nose cover plate. The cable is wound on the cable reel, its bitter end being secured thereto, and passes through the fair lead on the forward end of the cocking arm, over the idling sheaves and back along a channel in the warhead shell to the hydroplane, where it is secured to the towing eyelet by a link fitting. A metal cable stop, attached to the cable, $8\frac{1}{2}$" from the bitter end, is too large to pass through the fair lead and thereby prevents all of the cable from paying off the reel. The cable is 25'6" long overall. Twenty-four feet of cable extend between hydroplane and after sheave when hydroplane is streamed.

The axle of the cable reel extends through an oil dash-pot cylinder on the right side of the reel. Flanges on the cylinder are tapped to receive body screws which secure the reel and cylinder to the warhead pocket. A brass piston is screwed to threads on the reel axle inside the dash-pot and is keyed to the cylinder to prevent rotation. As the reel pays out cable, the piston moves from left to right on the reel axle, forcing the dash-pot oil through a small ball valve in the piston, thus limiting the speed of the reel.

An eccentric spring catch, secured to the actuating spring mounting, bears on a small pin at the left side of the reel and thereby maintains constant tension on the reel. The catch is pivoted and locked clear of the pin by the initial pull exerted by the hydroplane upon release.

(e) The Spring Cocking and Actuating Assembly - mounted directly above the cable reel. The cocking arm, which contains a fair lead for the cable on its forward end, is held down in the uncocked position by a heavy steel actuating spring mounted below and to the left. An upper extension of the actuating spring rod is pivoted to a short arm secured to the cocking arm axle. A spiral gear on the cocking arm engages a similar gear at the forward end of the actuating rod.

When the cable stop jams in the fair lead, tension on the cable due to the hydroplane lifts the cocking arm and the spring rod upward, thereby compressing the spring. As the arm rises, a ratchet clutch on the actuating rod disengages, preventing the arm from transmitting any clockwise motion to the actuating rod. However, subsequent downward motion of the arm will reengage the ratchet clutch and rotate the actuating rod counterclockwise and fire the hydroplane exploder, the after end of the actuating rod being connected to the exploder actuating linkage by two beveled gears and a pair of sector gears.

(f) The Type 3 Exploder - this exploder is essentially the same as the Type 90, Model 2 except for modifications necessary to adapt it for hydroplane actuation. The main differences are as follows:

(1) The shape of the upper section is slightly modified.

(2) The exploder bail serves only as an impeller safety device prior to launching and does not lock the firing mechanism when upright. The bail is slightly smaller than that fitted to the Type 90, Model 2, is so located that no impeller stop need be fitted, and operates against the tension of a single, dash-pot type spring.

[redacted]

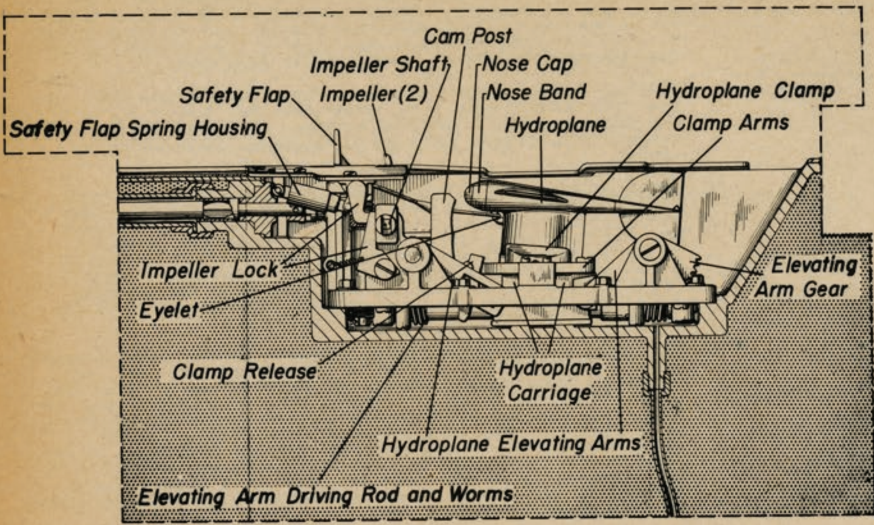


Fig. 21 - Hydroplane Assembly Detail

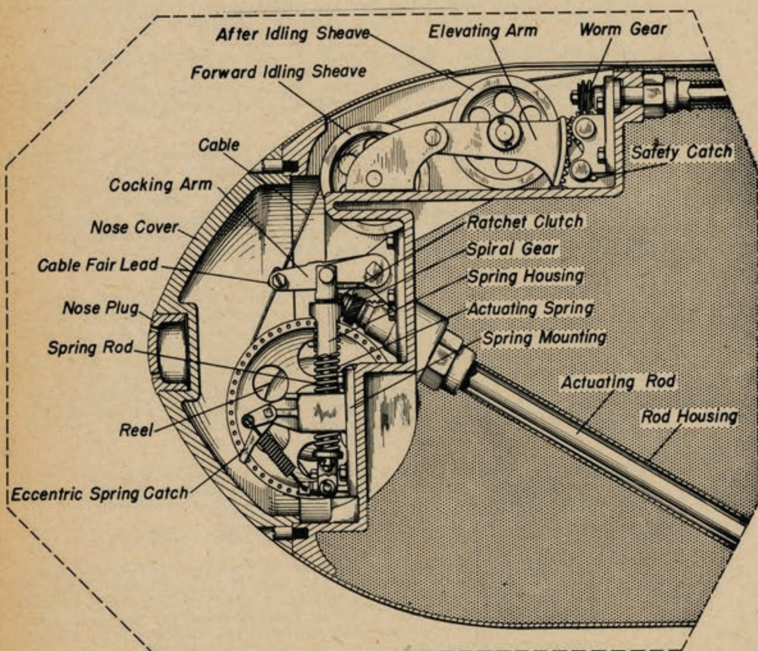


Fig. 22 - Type 3 Warhead, Nose Detail

Hydroplane Firing Device, (Cont'd.)

(3) A small opening in the upper flange accommodates the sector-type, firing gear which is connected to an actuating linkage under the top cover. The linkage revolves a rotating rod which extends down into the exploder and is attached at its lower end to a forked lever. The forked lever in turn engages the firing lever which lifts the ball-locking sleeve upon receipt of a firing actuation.

(4) The firing assembly is modified slightly in that three lock balls instead of two detents serve to retain the firing pin, no inertia cup is fitted, and the firing pin spindle is fitted with right hand threads.

Operation

1\. (a) When the torpedo is launched, water travel depresses the safety flap which protrudes from the hydroplane elevating and releasing mechanism and the flap is permanently locked down by its pivot spring. The impellers are then free to rotate and drive the elevating arm driving rod. Worms at the end of this rod cause the elevating arms to pivot upward carrying with them the hydroplane and its carriage. Simultaneously, the clamp release moves forward, clearing the forward ends of the clamp arms which then spring apart, being forced open by the spring-loaded hydroplane clamp which releases its grip on the hydroplane keel.

(b) Impeller rotation also turns the worm drive shaft causing the elevating arm on the after idling sheave to pivot upward through a distance equal to that travelled by the sector gear on the elevating arm, this movement being directly controlled by the gear system at the forward end of the worm drive shaft. At this point, the safety catch slips forward to prevent the moving arm from being depressed in case the gear teeth on the moving arm or worm wheel are stripped. As the after idling sheave moves upward, the cable follows the upward movement of the hydroplane.

(c) As soon as the hydroplane is released, water pressure forces it up and aft, its trajectory being similar to that of a kite. The exact position of the hydroplane is not known. With only 18" of cable paid out the hydroplane assumed an almost vertical position above the warhead in test runs. Its normal position is thought to be from 12 to 20 feet above the torpedo. The reel pays out cable with its initial turn pivoting the eccentric spring catch clear of the pin which had been maintaining constant tension on the reel. The dashpot brakes the reel, preventing possible cable breakage and keeping the hydroplane from erratic flight. When almost all the cable is paid out, the metal cable stop jams in the fair lead and the resultant cable strain pivots the cocking arm upward about 35° against the tension of the actuating spring which is compressed by the same action. As the cocking arm pivots upward, its spiral gear rotates a similar gear on the forward end of the actuating rod and the ratchet clutch disengages, preventing rotary motion from being transmitted to the actuating rod proper. A tension of about 70 lbs. is necessary to pivot the cocking arm.

(d) The Type 3 exploder arms in essentially the same manner as the Type 90, Model 2.

2\. (a) The Type 3 exploder fires upon release of tension from the cocking arm. This is normally accomplished when the hydroplane strikes a surface with sufficient force to cause its nose cap to crush its nose band, forcing open the eyelet pivot arm and releasing the cable. This removes tension from the cocking arm which then pivots downward under the tension of the actuating spring. The spiral gear on the cocking arm rotates the actuating rod counterclockwise looking forward, with the gears on the end of the actuating rod transmitting the motion to the small sector gear which protrudes from the forward side of the exploder. The rotating rod revolves, and the forked lever is pivoted toward the nose of the warhead, causing the L-shaped firing lever to pivot, lift the ball-locking sleeve upward, and free the spring loaded striker to impinge on the detonator.

(b) In addition to the Type 3 exploder, the warhead carries a standard inertia-type Type 90, Model 2 exploder. This exploder will fire normally if the torpedo contacts a target. If this exploder should fail, it is probable that the hydroplane exploder would operate, due to the release of tension from the cocking arm when the torpedo's forward motion has ceased.

[redacted]

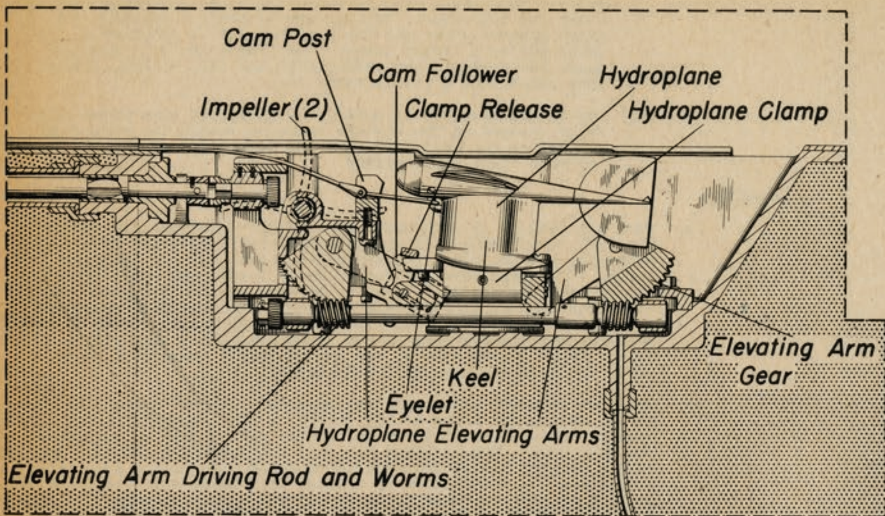


Fig. 23 - Hydroplane Assembly Detail

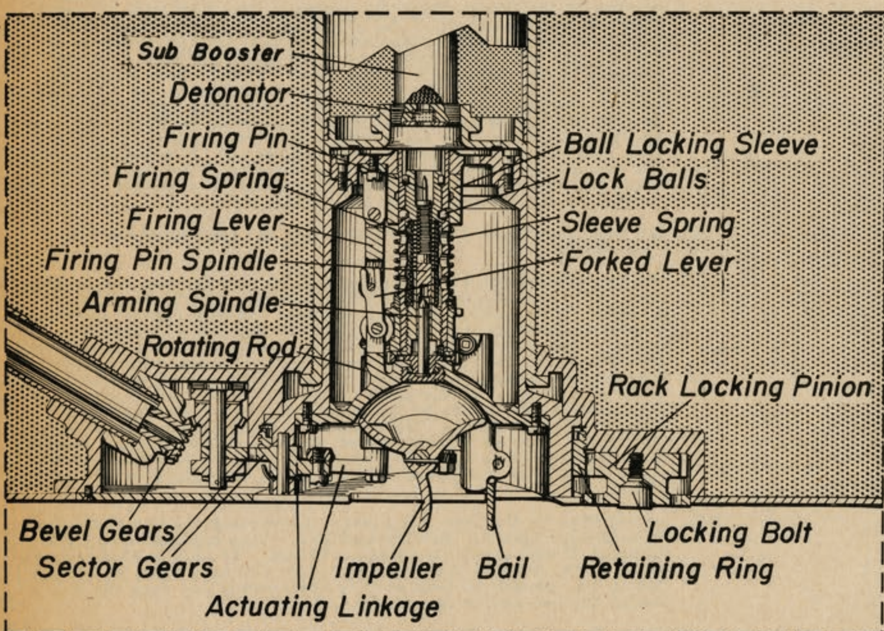


Fig. 24 - Type 3 Exploder, Detail

[redacted]

Hydroplane Firing Device, (Cont'd.)

Precautions

1. Carefully examine the vicinity of the torpedo for a cable.

   (a) If the cable is slack, cut it off close to the warhead.

   (b) If the cable is taut, do not disturb it; proceed with rendering safe only in extreme emergency. Although it is unlikely that the exploder would be rigged as a booby trap with the mechanism cocked (cable taut), it must be emphasized that rendering safe under these conditions is extremely hazardous.

2. Always deal with the hydroplane firing device before rendering safe the inertia-type exploder, since the bail of the latter makes it relatively safe.

Rendering Safe Procedure

1. If the cable is slack or if no cable is found:

   (a) Remove the top cover of the Type 3 exploder.

   (b) Remove the gear pocket cover plate.

   (c) Insert a screwdriver or other suitable tool between the teeth of the two sector gears as shown in Fig. 36

   (d) Loosen the screw labelled "A" (Fig. 36 three full turns.

   (e) Screw one of the top cover screws into the hole as shown by screw "B" (Fig. 36 .

   (f) Using a strong piece of wire or twine, bind screw "A" to the screw in hole "B" in such a manner as to cause the two links "C" to be held securely, tending counterclockwise. This procedure makes it impossible for the exploder to fire normally.

   (g) Remove the Type 3 exploder and render safe as prescribed on page 5 of this chapter.

2. If the cable is taut:

   (a) If the Type 3 exploder is readily accessible, the procedure given in Par. 1 above may be followed. However, since the torpedo will ordinarily be found upright with the Type 3 exploder on the underside, it will usually be necessary to roll the torpedo over from a safe distance before rendering safe can be undertaken. In order to accomplish this without firing the charge, the actuating mechanism must first be jammed.

   (b) Remove the nose cover plate.

   (c) Examine the actuating mechanism. If cocked, the cocking arm will be elevated as in Fig. 31 and the actuating spring will be compressed as in Fig. 31 . If the mechanism is not cocked, proceed as in Par. 1 above. If cocked, proceed as below.

   (d) Fashion a wedge or prop which will fit firmly around the actuating spring rod between the top of the spring housing and the coupling at the upper extremity of the rod.

   (e) Insert the wedge as shown in Fig. 31 .

   (f) From a safe distance cut the cable using primacord or similar suitable means.

   (g) From a safe distance, roll the torpedo over until the Type 3 exploder becomes accessible and proceed as in Par. 1 above.

3. Disarm the inertia-type exploder as prescribed on page 5 of this chapter.

4. Dispose of all explosive elements.

[redacted]

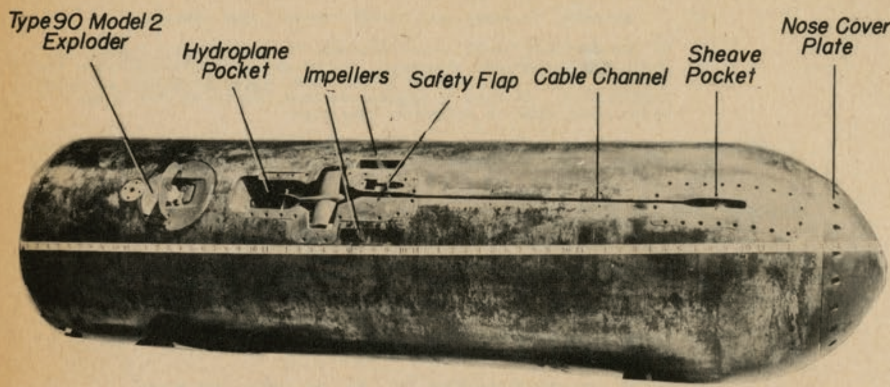


Fig. 25 - Type 3 Warhead

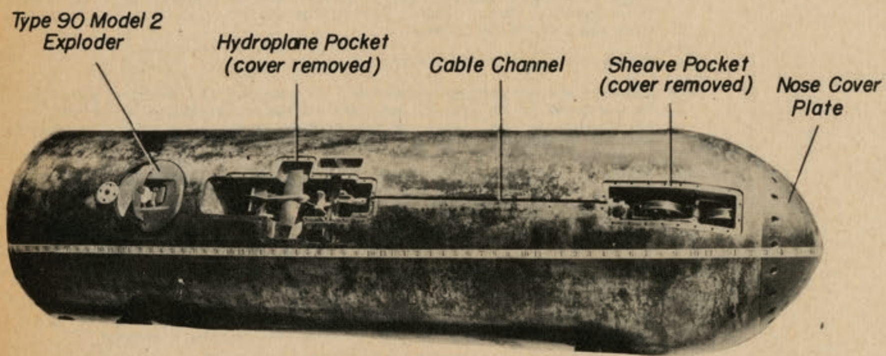


Fig. 26 - Type 3 Warhead, Covers Removed

[redacted]

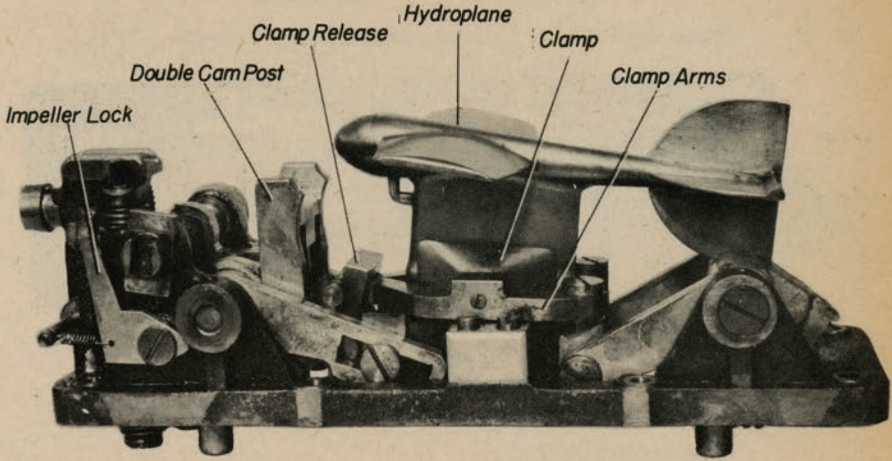


Fig. 27 - Hydroplane Elevating and Releasing Assembly, Before Safety Run

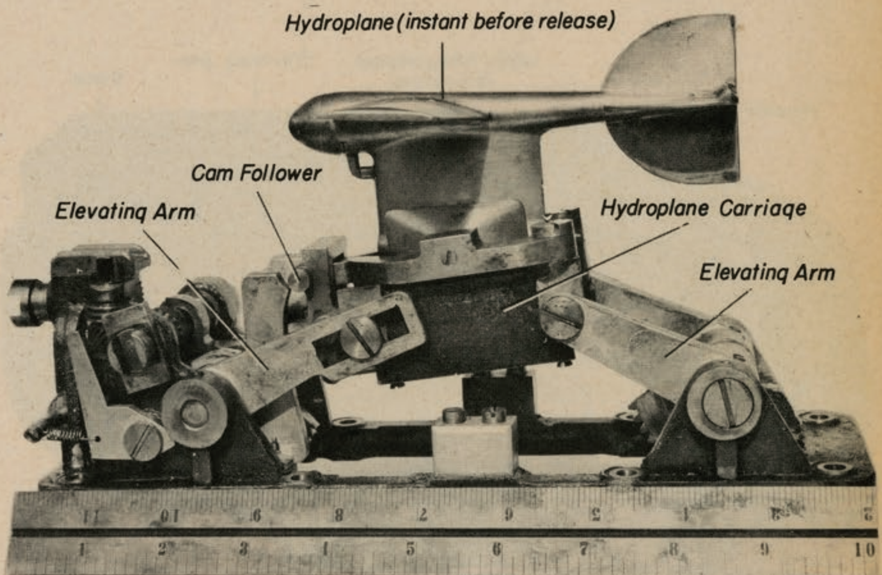


Fig. 28 - Hydroplane Elevating and Releasing Assembly, Just Prior to Release of Hydroplane

 [redacted]

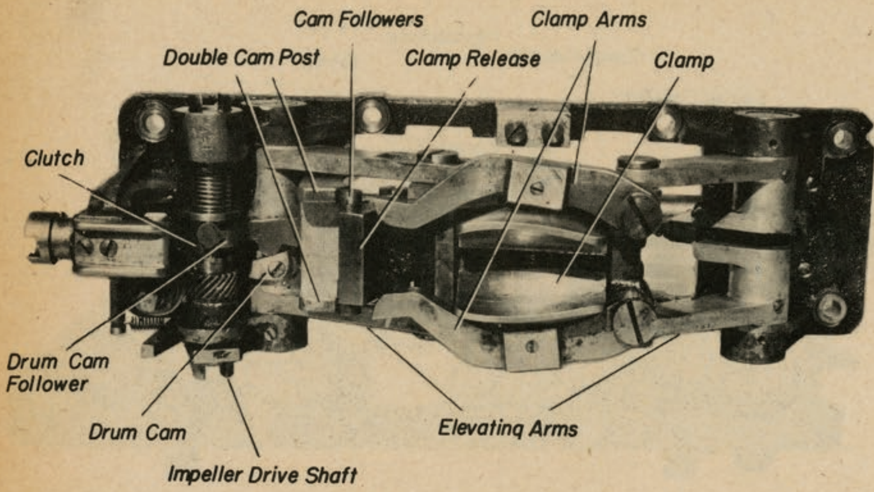


Fig. 29 - Hydroplane Elevating and Releasing Assembly, Top View

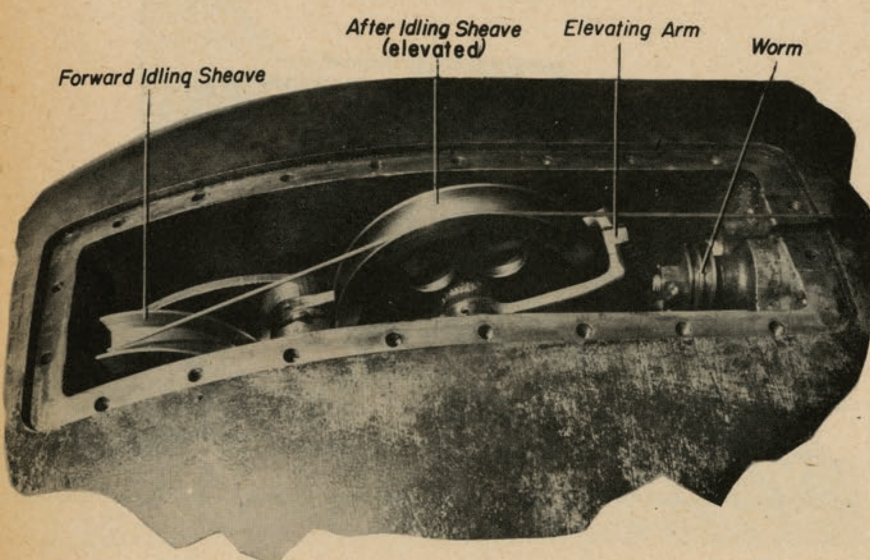


Fig. 30 - Type 3 Warhead, Sheave Pocket

[redacted]

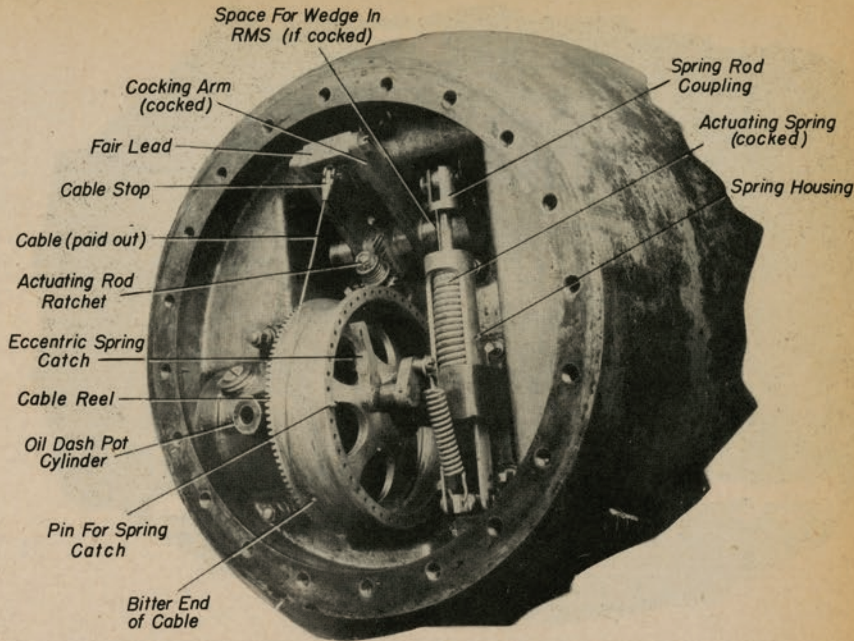


Fig. 31 - Type 3 Warhead (Nose) - Mechanism Cocked

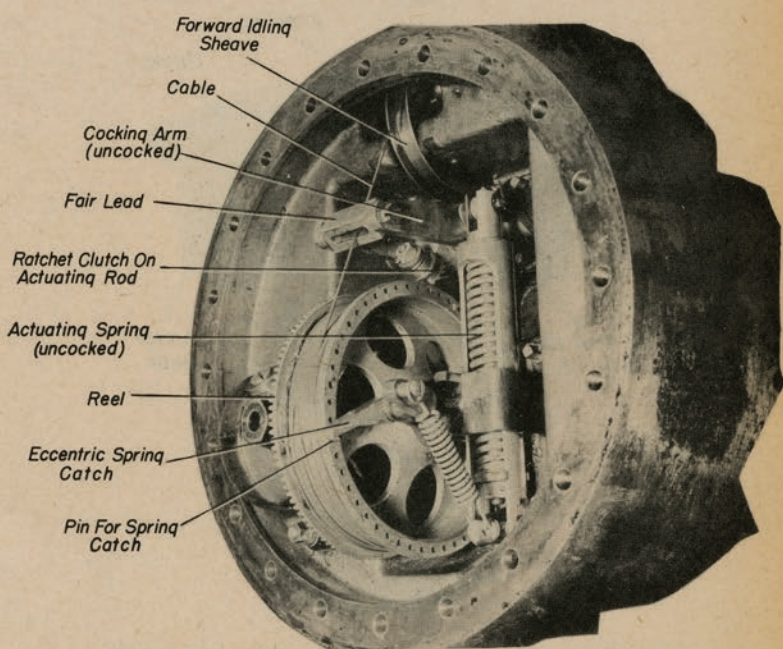


Fig. 32 - Type 3 Warhead (Nose) - Mechanism Uncocked

[redacted]

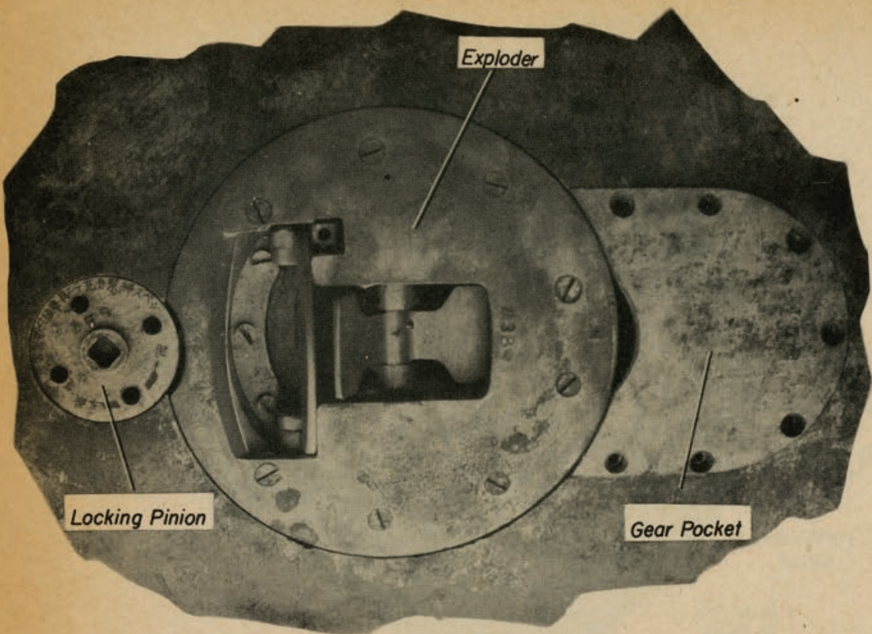


Fig. 33 - Type 3 Exploder

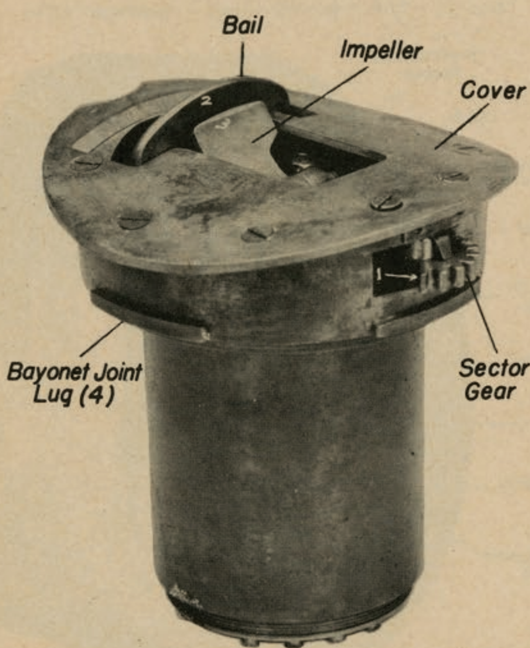


Fig. 34 - Type 3 Exploder, Booster and Center Ring Removed

[redacted]

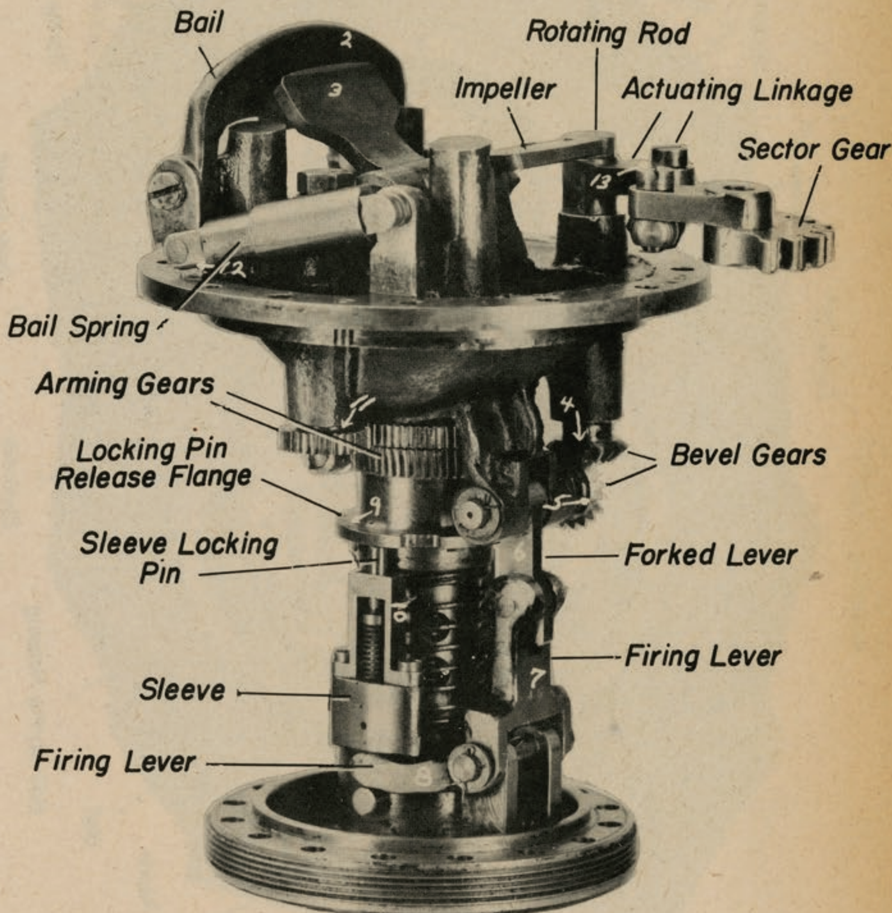


Fig. 35 - Type 3 Exploder, Arming and Firing Assembly

 [redacted]

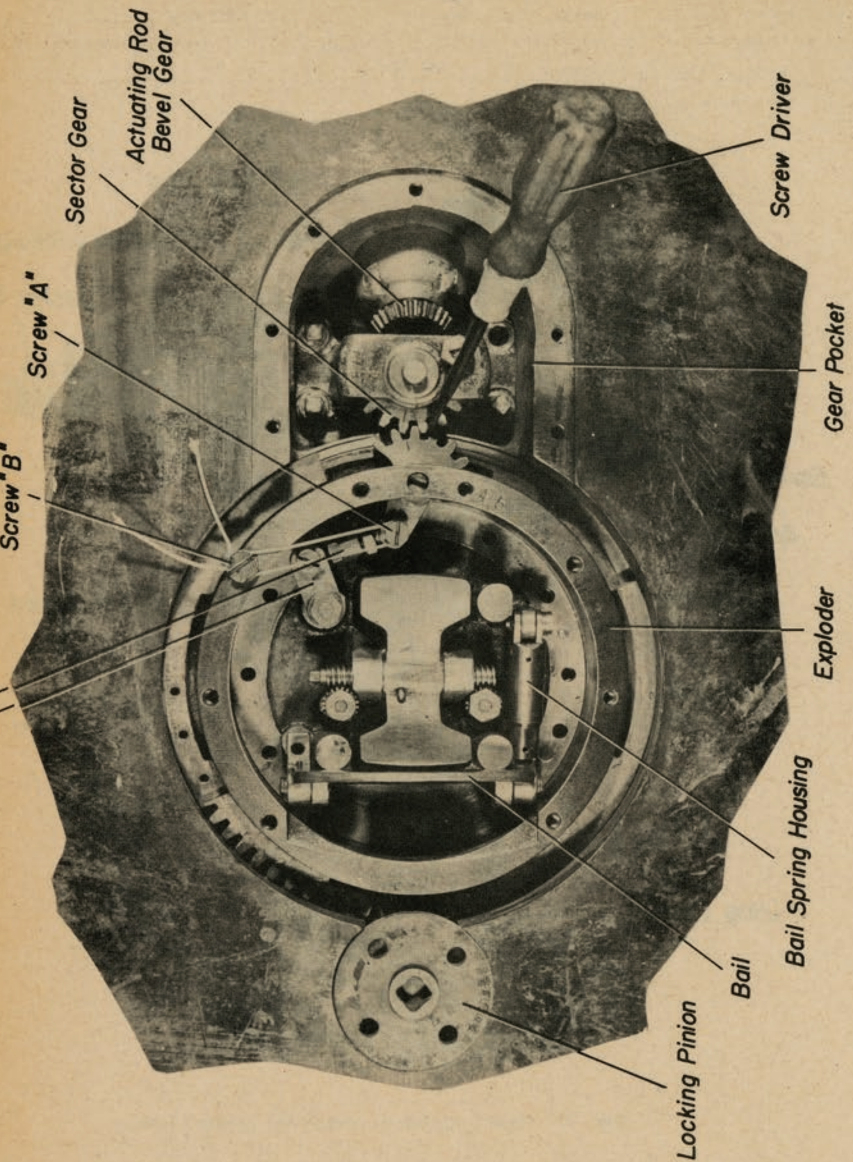


Fig. 36 - Type 3 Exploder, Showing RMS Precautions

[redacted]

Exploder Type 2

Change No. 2 - Mine Disposal Handbook

General

1. Impact, inertia type, fitted in a transverse pocket on the top centerline of the warhead.

2. It is interchangeable with the Type 90 or Type 90 Model 2 Exploders.

Description

1. External

The exploder is similar in appearance to the Type 90 Model 2 exploder. It is 12" long, 4" in body diameter, 5"6 in diameter at the top flange and 6"75 in diameter at the top cover. A small bail, normally held down by a spring, is held up in a "safe" position by a pin. When the bail is in the safe position, the firing device is locked and the impeller is prevented from rotating by a removable detent attached to the bail. The bail, being spring-loaded down, does not serve to prevent premature firing when the torpedo broaches as does the bail in the Type 90 or Type 90 Model 2 Exploders. A round disk, 2" in diameter and secured by four screws, is adjacent to the impeller. A brass ring, clamping the rubber diaphragm of the anti-countermining device and secured by eight screws, surrounds the disk. On the opposite side of the impeller is the arming-range selector screw, bearing two settings labeled with Japanese characters meaning "long" and "short". The short range represents about 500 impeller revolutions and the long range about 3000. Actually, the selector screw can be set at any position between a point slightly less than 500 revolutions to a position beyond the "long" setting up to about 5000 revolutions. It is possible that this adjustment is made remotely by an accurate setting device.

2. Internal

The exploder consists of two main parts as follows:

(A) An upper section, 6"75 long which houses:

(1) An arming assembly secured to the top of the upper section by 13 screws and which is composed of:

(a) The impeller

(b) The anti-countermining device

(c) The arming-range selector mechanism

(d) Gear trains used in arming

(2) A firing assembly, secured to the bottom of the housing by 16 screws and very similar to that of the Type 90 Model 2 Exploder. The firing assembly is composed of:

(a) A steel inertia trigger similar to that in the Type 90 Model 2 Exploder, but flat on the bottom.

(b) A spring-loaded firing pin assembly held in the cocked position by four (4) locking balls.

(c) A spring-loaded ball-release sleeve which is lifted upward to release the balls when the trigger is displaced in firing.

(B) A lower section identical with that of the Type 90, Model 2.

3. Method of Mounting

Same as Type 90 Model 2 Exploder.

Operation

1. (A) Prior to launching, the safety range is set by adjusting the arming range screw. The bail-retaining safety pin is removed, allowing the spring-loaded bail to depress itself. Movement of the bail unlocks the safety wedge in the firing mechanism, allowing it to be pivoted clear by rotation of the impeller which is now free to revolve.

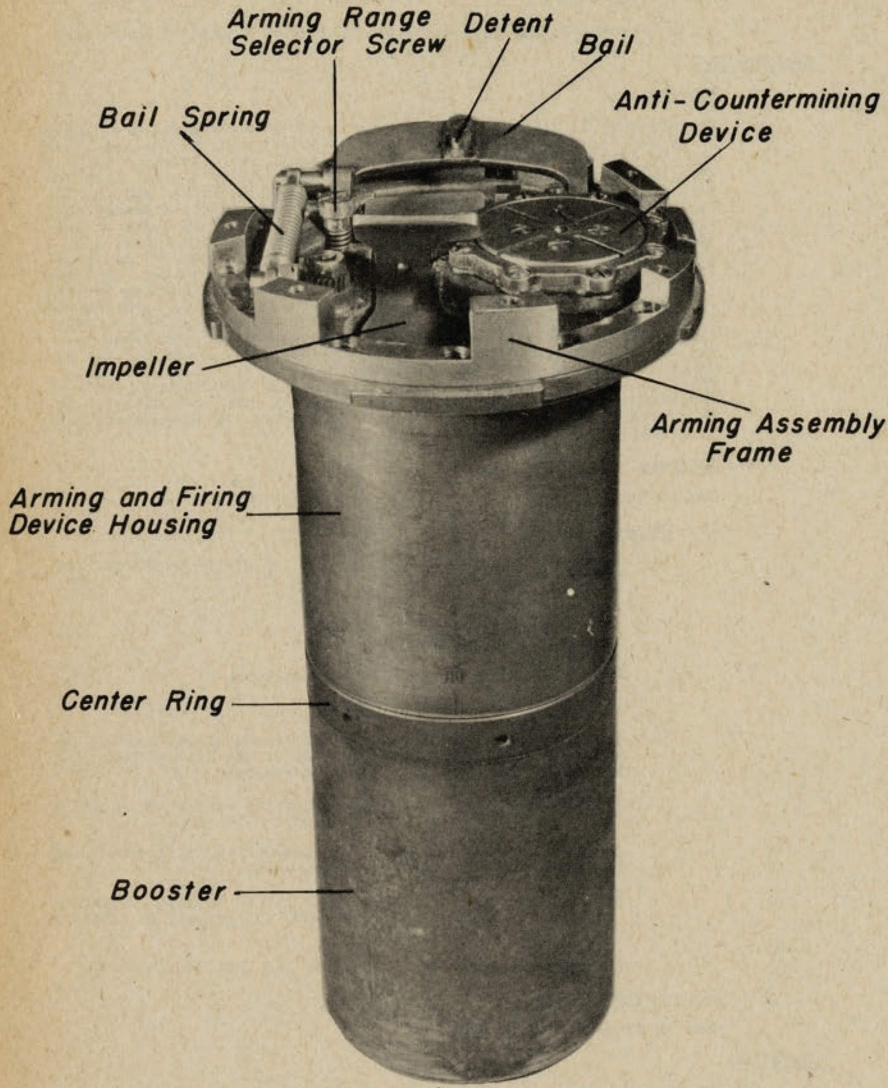


Fig. 37 - Exploder Type 2

(Exploder Type 2, Cont'd.)

(B) Water travel rotates the impeller, turning the arming spindle through a reduction gear train. As the square end of the arming spindle fits into a square hole in the firing pin spindle, rotation of the arming spindle turns the firing pin spindle. This unmasks the firing pin (right hand thread) and compresses the firing spring. Rotation of the impeller also turns a cam on the lower end of the variable arming-range screw until a spring-loaded follower drops into the cam. This causes gears connected with the safety wedge to be revolved by the impeller, moving the safety wedge outward and clear of the ball release sleeve. The pistol is now armed.

2. (A) Any countermining shock will cause the piston of the anti-countermining device to move downward against strong spring pressure. This movement revolves the safety wedge inward through a system of levers and locks the ball release slide to prevent firing of the exploder. The impeller then runs the wedge outward again during the next 21 revolutions.

(B) The exploder fires when the torpedo strikes an object with sufficient force to rock the inertia cup, thereby lifting the firing sleeve, releasing the locking balls, and allowing the spring-loaded firing pin to impinge on the detonator.

Precautions

1. **There is no means of determining the armed or unarmed condition of the exploder by exterior examination.**
2. **Unlike other Japanese bail type exploders, the Type 2 will normally be found in an armed condition at the end of the run.**

Rendering Safe Procedure

1. Detach bail spring from bail by removing screw "A" as shown in Fig. 38.
2. From a safe distance, move the bail to an upright position.
3. Insert pin as shown in Fig. 38.
4. Remove the locking bolt from the center of the rack-locking pinion.
5. Rotate the rack-locking pinion counterclockwise, thereby turning the retaining ring (left hand threads) clockwise until the lugs on the retaining ring line up with the grooves on the exploder flange. This condition should obtain when the ring has been turned until a stop has been reached and may be determined visually. If alignment cannot be achieved, it may be necessary to remove the cover plate and clean the grooves.
6. From a safe distance, remove the exploder.
7. Using a special spanner, (Fig. 13, page 9) unscrew the center ring from the upper section, thereby separating the firing pin, which is in the upper section, from the explosive train.
8. Unscrew the center ring from the lower section, the sub-booster from the center ring, and the detonator from the sub-booster.
9. Dispose of detonator, sub-booster, booster and charge.

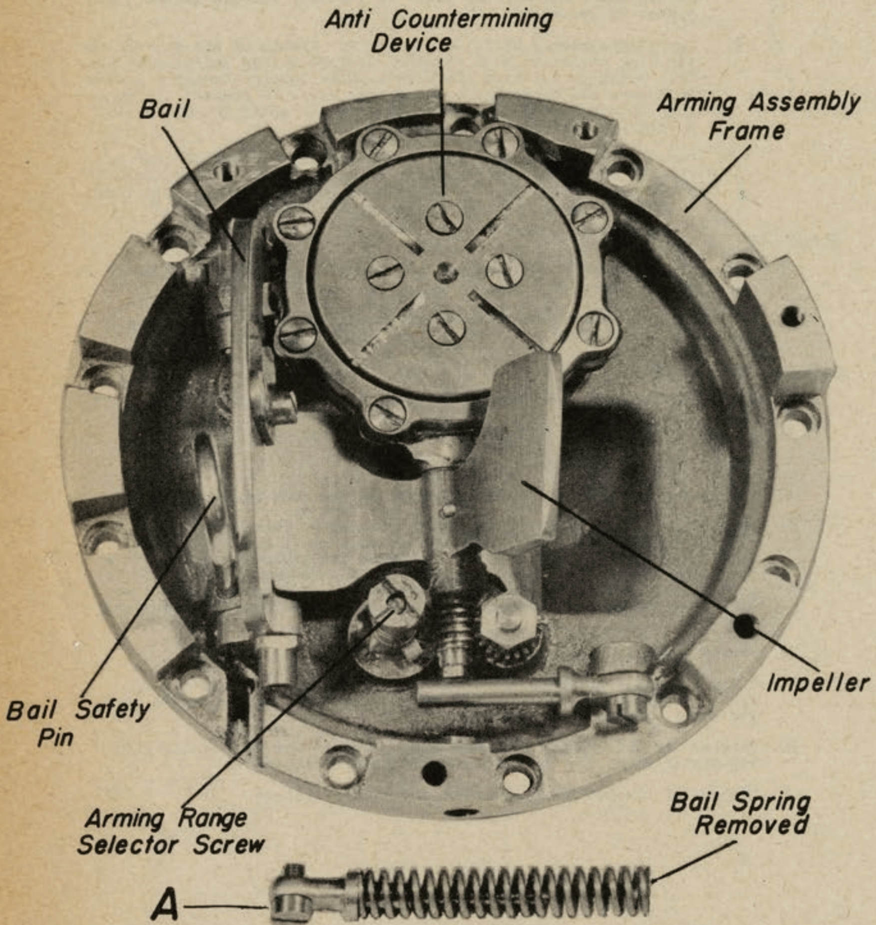


Fig. 38 - Exploder Type 2, Top View

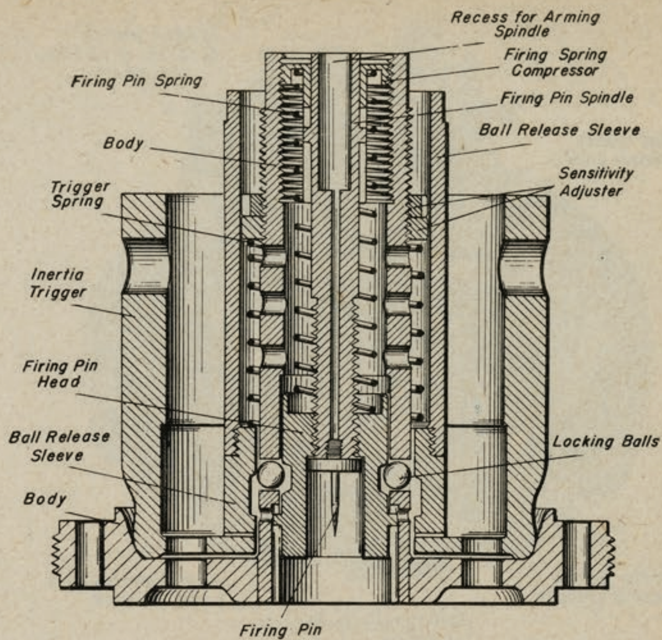


Fig. 39 - Exploder Type 2 Firing Assembly, Sectional View

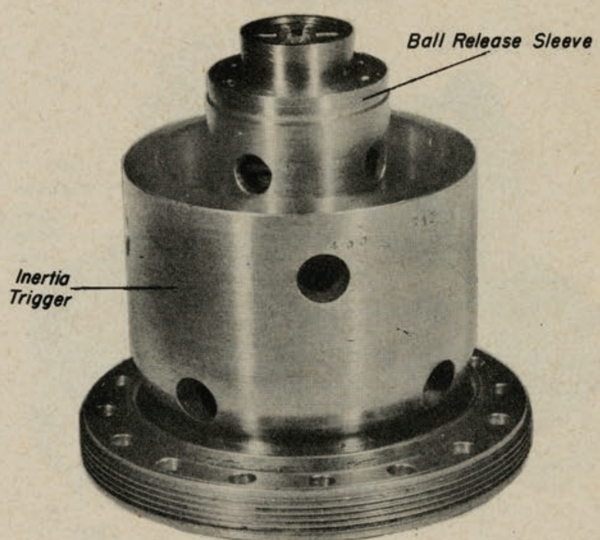


Fig. 40 - Exploder Type 2 Firing Assembly

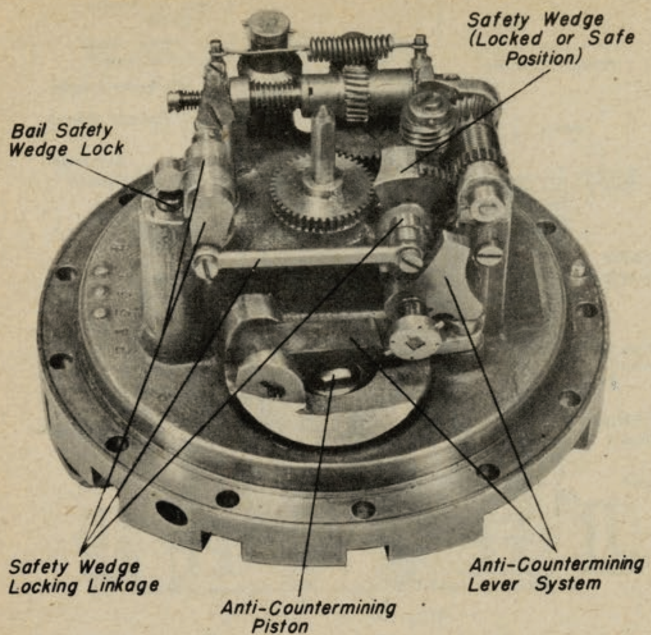


Fig. 41 - Exploder Type 2 Arming Assembly, Left Side

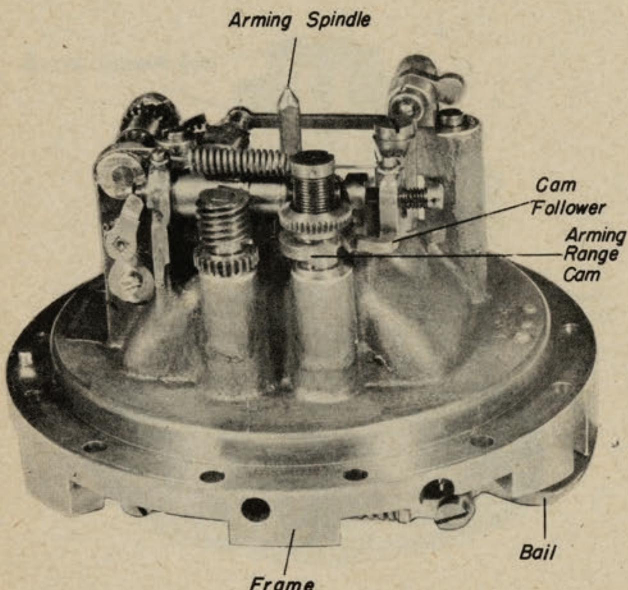


Fig. 42 - Exploder Type 2 Arming Assembly, Right Side

Torpedo Type 44 Mark 2 Mod 1

General

1. 18" air-driven torpedo, designed to be launched from motor torpedo boats; believed to be obsolete.

2. No warhead for this torpedo has never been recovered.

3. The torpedo is driven by a four-cylinder radial reciprocating steam engine and is capable of running 4300 yards at a speed of 36 knots or 8700 yards at 26 knots. No data are available with respect to the possible settings of the depth control gear and gyro angling device.

Description

1. Lengths

Overall	18' 8"
Warhead	4'
Flask section	10'
Afterbody	3' 3"
Tail	1' 5"

2. Total weight in air — 1830 lb. approx.

3. External fittings

(a) Flask section

Guide studs	On top and bottom center lines, respectively, 4' 3" forward of afterbody joint. Stud on bottom may not be fitted.
Depth setting spindle and dial	On top center line, 6" forward of afterbody joint.
Stop valve	4" to starboard of top center line, 18 3/4" forward of afterbody joint.
Charging valve	4" to starboard of top center line, 13 3/4" forward of afterbody joint.
Depth mechanism cover plate	7 1/2" diam., on bottom center line, 6" forward of afterbody joint.
Strengthening plates	Two, rectangular, 2 1/2" x 4 1/2", fitted over joint between afterbody and flask section, 90° to starboard and to port, respectively, from top center line.

(b) Afterbody

Distance and starting gear cover plate	Rectangular, 6" x 7", on top center line, 5" abaft flask section joint.
Water flap	On bottom center line, 7 1/2" abaft flask section joint.
Gyro angling setting spindle and dial	6" to port from top center line, 15 1/2" abaft flask section joint.
Gyro cover plate	Oval-shaped, 7" x 8", on bottom center line, 14" abaft flask section joint.

(c) Tail

Propellers	
Forward	Four-bladed, 14 1/2" span.
After	Four-bladed, 13 3/4" span.
Fins	
Vertical	Two; length, including rudders, 10 3/4".
Horizontal	Two; length, including rudders 10 3/4".

Added 1 August 1945
(Change No. 10)

[redacted]

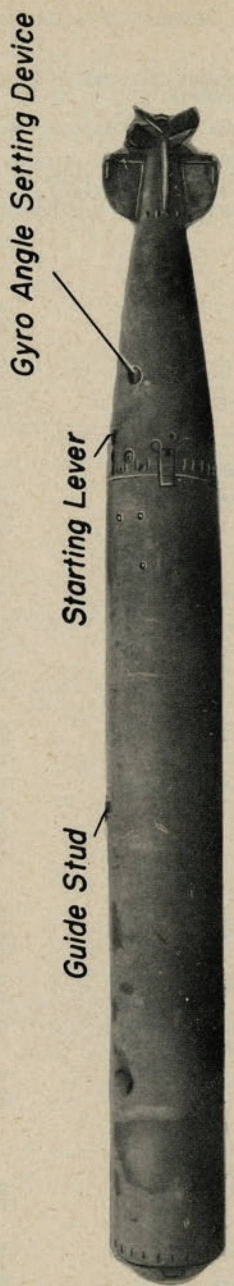


Fig. 43 – Torpedo Type 44 Mark 2 Mod I, Warhead Removed

Added 1 August 1945
(Change No. 10)

(Torpedo Type 44 Mark 2 Mod 1, Cont'd.)

4. Internal arrangement of parts

(a) <u>Flask section</u> - consists of the following:

(1) The air flask, a hollow steel cylinder with a removable forward bulkhead. The cylinder is built to withstand high internal pressures.

(2) The balance chamber, secured to the after end of the air flask, contains the following:

(i) The fuel and water bottles.

(ii) A hydrostatic valve-pendulum type depth mechanism.

(iii) The stop valve and the charging valve.

(b) <u>Afterbody</u> - consists of the following:

(1) The forward compartment or engine room which is open to sea water and contains the following:

(i) The main engine, similar to that fitted to the Torpedo Sixth Year Type.

(ii) The combustion pot and igniters.

(iii) A speed change mechanism attached to the combustion pot.

(iv) The main air reducing valve.

(v) The depth engine.

(vi) The starting gear which consists of the starting lever, the water trip lever, the distance gear, and the starting valve.

(2) The after compartment which contains the following:

(i) A steering mechanism similar to that fitted to the Torpedo Type 89 Mod 1.

(ii) The propeller shafts and sleeves on which the propellers are mounted.

(c) <u>Tail</u>

(1) The internal arrangement of parts is similar to that in the Torpedo Type 89 Mod 1.

5. Method of assembly

(a) The various sections of the torpedo are joined by joint screws with special plates being added to strengthen the joint between the flask section and afterbody.

<u>Operation</u>

1. Generally similar to that of the Torpedo Sixth Year Type.

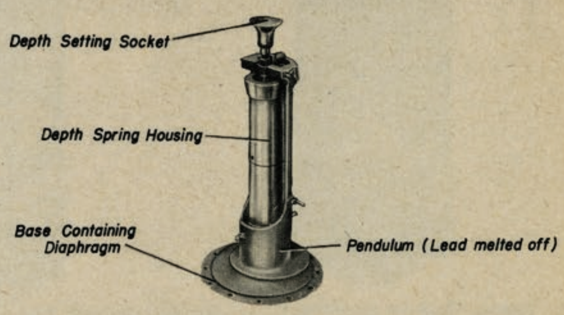


Fig. 44 - Torpedo Type 44 Mark 2 Mod I, Depth Mechanism

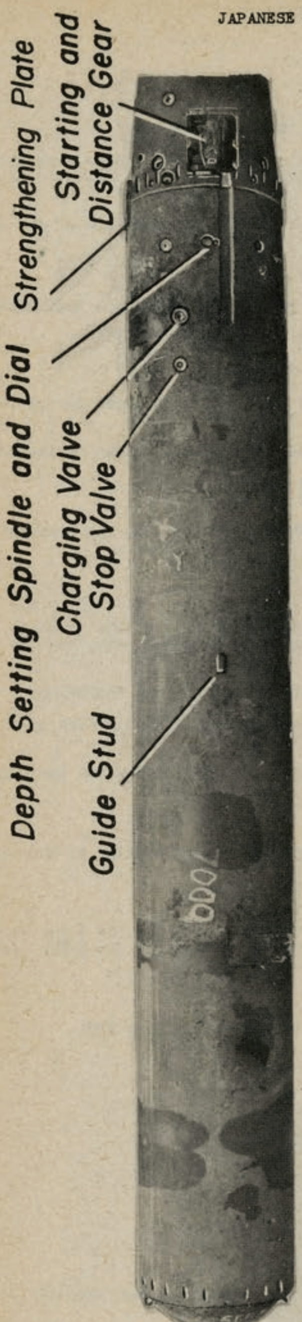


Fig. 45 - Torpedo Type 44 Mark 2 Mod I, Flask Section, Top View

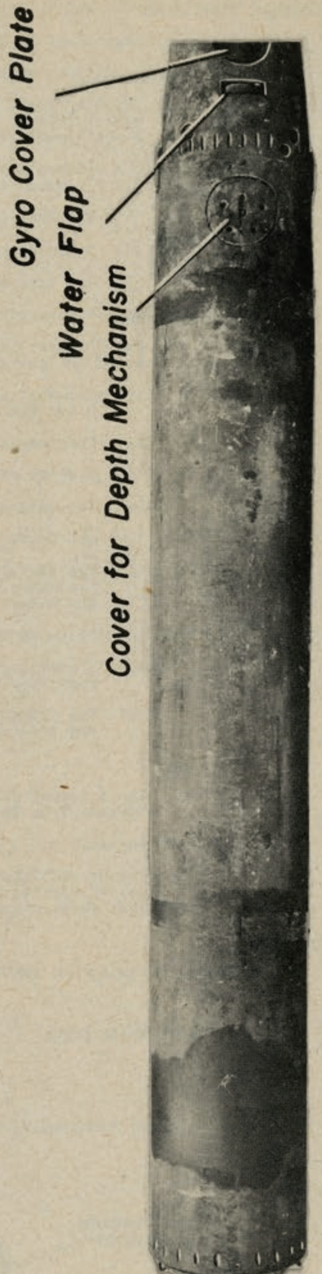


Fig. 46 - Torpedo Type 44 Mark 2 Mod I, Flask Section, Bottom View

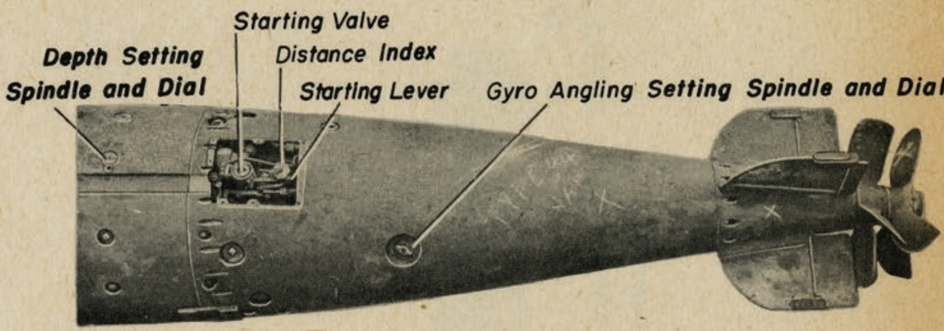


Fig. 47 - Torpedo Type 44 Mark 2 Mod I, Afterbody, Top View

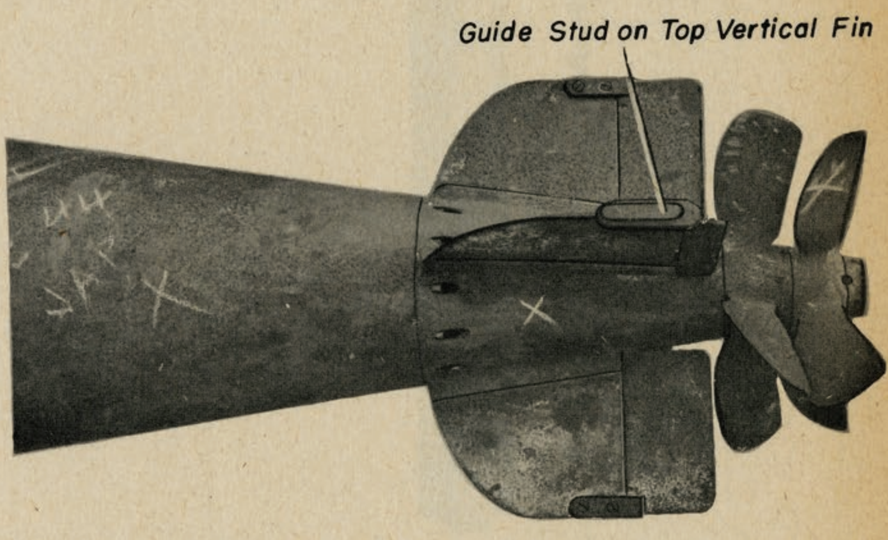


Fig. 48 - Torpedo Type 44 Mark 2 Mod I, Tail Section, Top View

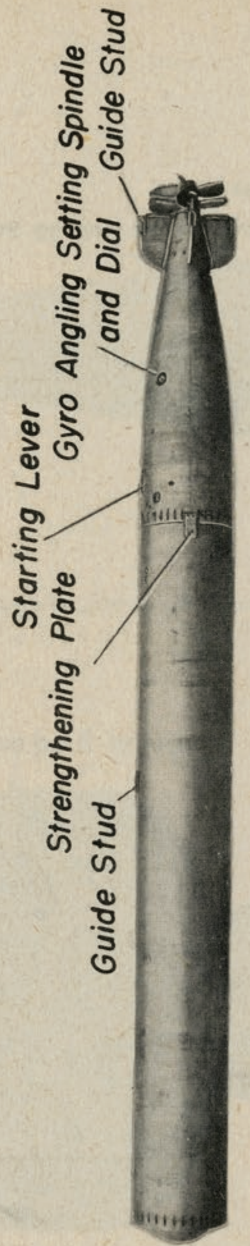


Fig. 49 - Torpedo Sixth Year Type, Warhead Removed

Torpedo Sixth Year Type

General

1. 21" air-driven torpedo, designed to be launched from submarines or older-type destroyers; believed to be obsolete although it is reported as being in use by shore-based torpedo batteries.

2. Fitted with Warhead Sixth Year Type.

3. The torpedo is driven by a four-cylinder radial reciprocating steam engine and is capable of running 7650 yards at a speed of 37 knots, 10,900 yards at 32 knots, or 16,400 yards at 25 knots. The depth control gear may be set for depths from 2-16 meters and the gyro angling device may be set for angles up to 90°, either to starboard or to port, in 1° steps.

Description

1. Lengths

Overall	22' 5"
Warhead	3' 1"
Flask section	12' 9"
Afterbody	5' 1/2"
Tail	1' 6 1/2"

2. Total weight in air — 3200 lb. approx.

3. External fittings

(a) Flask section

Guide stud	On top center line, 5' 1/2" forward of afterbody joint.
Stop valve	4" to starboard from top center line, 9 3/4" forward of afterbody joint.
Charging valve	4" to starboard from top center line, 4 1/2" forward of afterbody joint.
Strengthening plates	Two, rectangular, 5 1/2" x 3", fitted over joint between afterbody and flask section, 90° to starboard and to port, respectively, from top center line.

(b) Afterbody

Distance and starting gear cover plate	Rectangular, 8 3/4" x 7 1/4", on top center line, 8 1/2" abaft flask section joint.
Water trip lever	1" to starboard from top center line, 2' 4" abaft flask section joint.
Water flap	On bottom center line, 1' abaft flask section joint.
Depth setting spindle and dial	4 1/2" to starboard from top center line, 21" abaft flask section joint.
Gyro angling setting spindle and dial	7" to port from top center line, 2' 8 1/2" abaft flask section joint.
Gyro cover plate	Oval-shaped, 7" x 9", on bottom center line, 2' 7" abaft flask section joint.
Depth mechanism cover plate	Oval-shaped, 9 3/4" x 10", 5" to port from bottom center line.
Access holes to main engine	Four, equally spaced around shell, 6 1/2" abaft flask section joint.

(c) Tail

Fins	
Vertical	Two; length, including rudders, 12 3/4";
Horizontal	Two; length, including rudders, 13 1/4".

Added 1 August 1945
(Change No. 10)

[redacted]

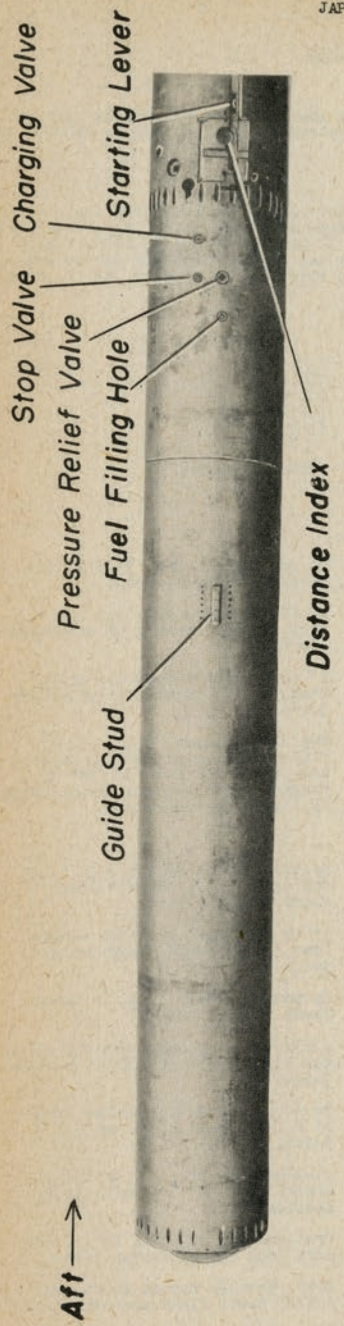


Fig. 50 - Torpedo Sixth Year Type,
Flask Section, Top View

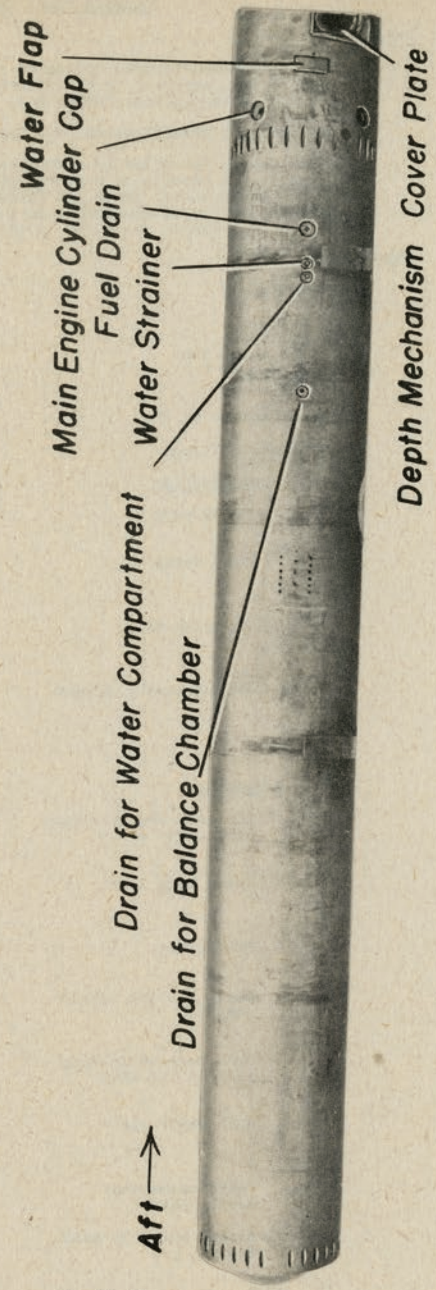


Fig. 51 - Torpedo Sixth Year Type,
Flask Section, Bottom View

(Sixth Year Type Torpedo, Cont'd.)

Propellers	
Forward	Four-bladed, 18" span.
After	Four-bladed, 17" span.

4. Internal arrangement of parts

(a) Flask section - consists of the following:

(1) The air flask, a hollow steel cylinder with a removable forward bulkhead. The cylinder is built to withstand high internal pressures.

(2) A small buoyancy chamber secured to the after end of the air flask.

(3) The water compartment, abaft the buoyancy chamber, is formed by the buoyancy chamber shell and a bulkhead and contains the following:

(i) The fuel bottle, a large copper sphere.

(ii) The stop and charging valves.

(b) Afterbody - consists of the following:

(1) The forward compartment or engine room which is open to sea water and contains the following:

(i) The main engine, a four-cylinder radial type.

(ii) The combustion pot and igniters.

(iii) A reciprocating oil and water pump.

(iv) A main air reducing valve of the double poppet type.

(v) The starting gear consisting of the starting lever, the water trip lever, the water flap, the distance gear and the starting valve.

(vi) Four bottles of lubricating oil.

(vii) A speed change mechanism attached to the combustion pot.

(viii) A small sea water pump on the forward bulkhead of the main engine.

(2) The after compartment which contains the following:

(i) A sinking valve which floods the torpedo at the end of its run.

(ii) Depth control and steering mechanisms similar to those fitted to the Torpedo Type 89 Mod 1 except that no rudder locking device is fitted.

(iii) A bottle of lubricating oil.

(iv) The propeller shafts.

(c) Tail

(1) The internal arrangement of parts is similar to that in the Torpedo Type 89 Mod 1.

5. Method of Assembly

(a) The various sections of the torpedo are joined by joint screws, with special plates being added to strengthen the joint between the flask section and afterbody.

Operation

1. When the torpedo is launched, the starting lever is forced aft by a latch in the tube. This cocks the main starting gear and also allows high pressure air to flow to the gyro which is unlocked and spun by a single short blast of air. The air is shut off after approximately 1/2 second.

2. When the torpedo hits the water, the water trip lever is forced aft and/or the water flap is forced in, allowing high pressure air to flow through the starting valve to the main air reducing valve. Reduced air then flows as follows:

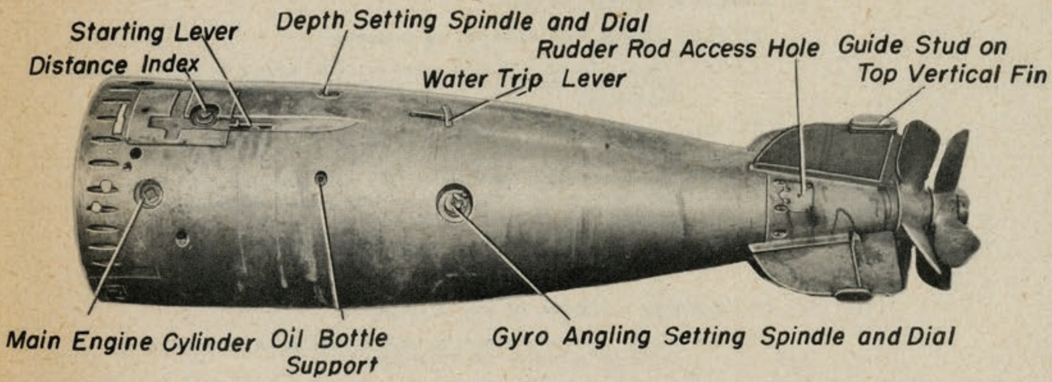


Fig. 52 - Torpedo Sixth Year Type, Afterbody, Top View

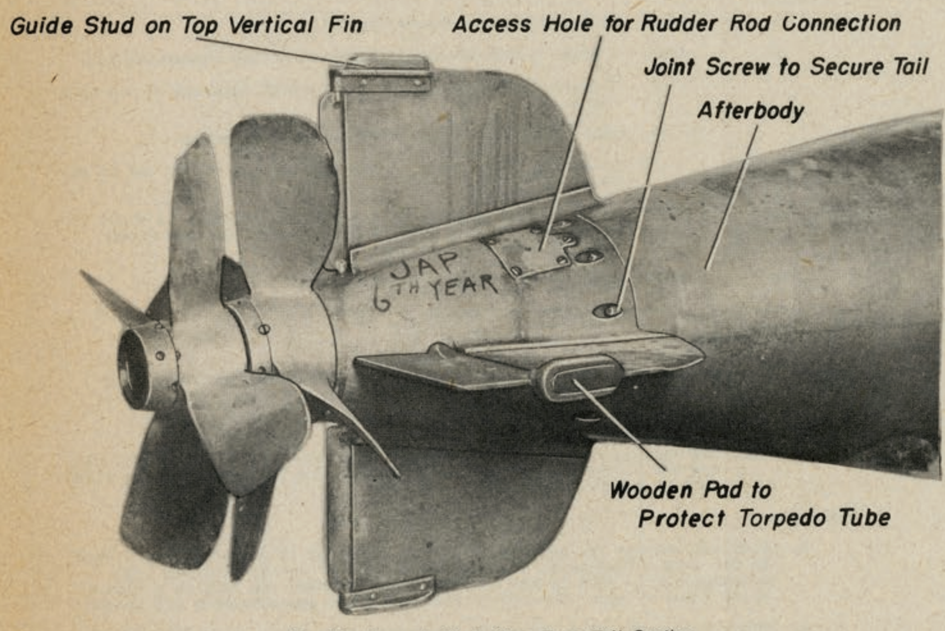


Fig. 53 - Torpedo Sixth Year Type, Tail Section

[redacted]

Added 1 August 1945
(Change No. 10)

(Sixth Year Type Torpedo, Cont'd.)

(a) To the depth engine where it operates the horizontal rudders.

(b) To the gyro where it maintains gyro speed.

(c) To the steering engine where it operates the vertical rudders.

(d) To the combustion pot and thence to the main engine where it turns over the main engine and runs it until the igniters fire the fuel/air mixture which is subsequently pumped into the combustion pot.

3. When the main engine turns over, it performs the following:

(a) It operates the reciprocating oil and water pump which functions as follows:

(1) It forces water from the water compartment to the combustion pot and also to the bottom of the fuel bottle, thereby forcing fuel into the combustion pot.

(2) It forces lubricating oil from the bottles into the main engine,

(b) It revolves a cam which trips two spring-loaded hammers which in turn fire the igniters. The fuel/air mixture in the combustion pot is thereby ignited to form high pressure gases which are cooled by the water in the combustion pot. During the cooling process, the water is turned into steam.

4. The high pressure gas and steam flows from the combustion pot to the main engine, causing it to operate at high speed. The engine rotates the drive shafts and sleeves which in turn rotate the propellers.

5. The depth control gear and steering mechanism are similar to those fitted to the Torpedo Type 89 Mod 1.

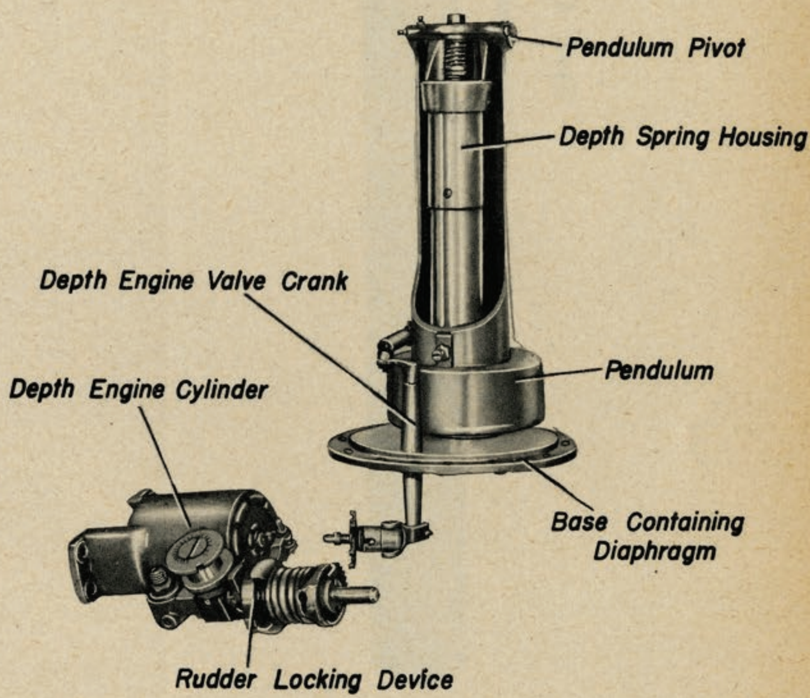


Fig. 54 - Torpedo Sixth Year Type, Depth Mechanism

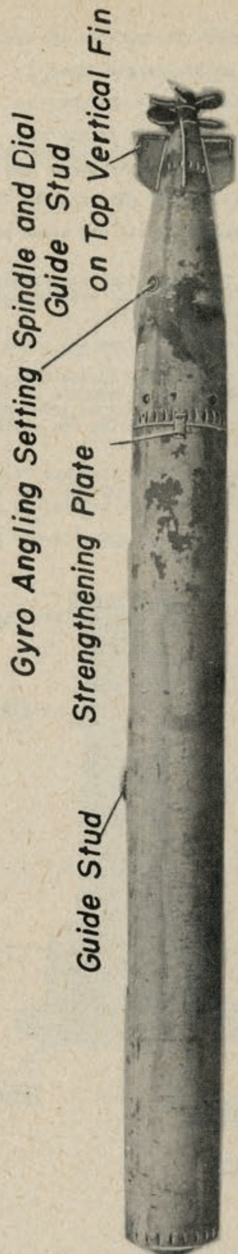


Fig. 55 - Torpedo Eighth Year Type Mark 2 Mod 2, Warhead Removed

Torpedo Eighth Year Type Mark 2 Mod 2

General

1. 24" air-driven torpedo, designed to be launched from destroyers or light cruisers; believed to be obsolete.

2. Fitted with Eighth Year Type warhead.

3. The torpedo is driven by a four-cylinder radial reciprocating steam engine and is capable of running 10,950 yards at a speed of 41 knots, 16,400 yards at 32 knots, or 21,900 yards at 26 knots. The depth control gear may be set for depths from 2-16 meters and the gyro angling device may be set for angles up to 90°, either to starboard or to port, in 1° steps.

Description

1. Lengths

Overall	27'5"
Warhead	3'7"
Flask section	16'9"
Afterbody	5'4"
Tail	1'9"

2. Total weight in air — 5800 lb.

3. External fittings

(a) Flask section

Guide stud	On top center line, 7'5" forward of afterbody joint.
Charging valve	On top center line, 10 1/2" forward of afterbody joint.
Stop valve	Location not determined.

(b) Afterbody

Distance and starting gear cover plate	Rectangular, 7" x 10", on top center line, 8 3/4" abaft flask section joint.
Water trip lever	1" to starboard from top center line, 20" abaft flask section joint.
Water flap	Rectangular, 2" x 5", on bottom center line, 13 1/2" abaft flask section joint.
Depth setting spindle and dial	4" to port from top center line, 23" abaft flask section joint.
Gyro angling setting spindle and dial	7 1/2" to port from top center line, 3' 11 1/2" abaft flask section joint.
Gyro cover plate	Oval-shaped, 7" x 9", on bottom center line, 2' 10" abaft flask section joint.
Depth mechanism cover plate	Rectangular-shaped, 9 1/2" x 11", 6" to port from top center line, 18 1/2" abaft flask section joint.
Strengthening plates	Two, rectangular, fitted over joint between afterbody and flask section, 90° to starboard and to port, respectively, from top center line.

(c) Tail

Propellers	
Forward	Four-bladed, 21" span.
After	Four-bladed, 20" span.
Fins	
Vertical	Two; length, including rudders, 15 1/2".
Horizontal	Two; length, including rudders, 16 3/4".

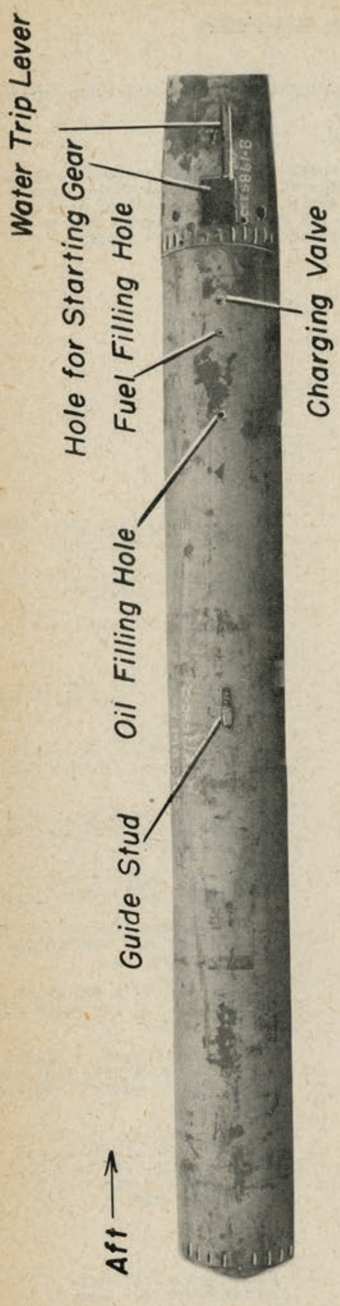


Fig. 56 - Torpedo Eighth Year Type Mark 2 Mod 2, Flask Section, Top View

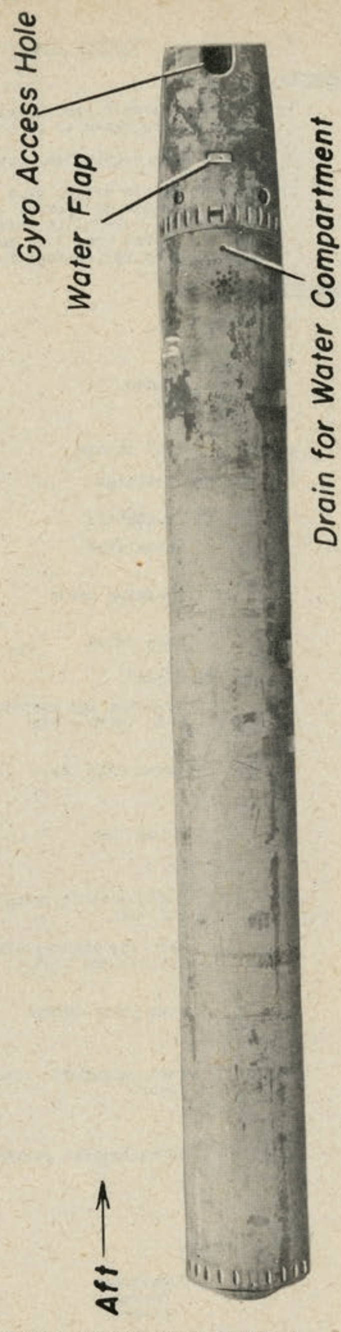


Fig. 57 - Torpedo Eighth Year Type Mark 2 Mod 2, Flask Section, Bottom View

[redacted]

Added 1 August 1945
(Change No. 10)

(Torpedo Eighth Year Type Mark 2 Mod 2, Cont'd.)

4. Internal arrangement of parts

(a) Flask section - consists of the following:

(1) The air flask, a hollow steel cylinder with a removable forward bulkhead. The cylinder is built to withstand high internal pressures.

(2) The oil compartment, secured to the after end of the air flask. This compartment is probably not completely filled and therefore acts in part as a buoyancy chamber.

(3) The water compartment, abaft the oil compartment, is formed by the oil compartment shell and a bulkhead and contains the following:

(i) The fuel bottle, a large copper sphere.

(ii) The stop and charging valves.

(4) It should be noted that the fuel and water compartment were reversed on one specimen examined.

(b) The internal arrangement of parts in the afterbody and tail is similar to that in the Torpedo Sixth Year Type.

5. Method of Assembly

(a) The various sections of the torpedo are joined by joint screws, with special plates being added to strengthen the joint between the flask section and afterbody.

Operation

1. Similar to that of the Torpedo Sixth Year Type.

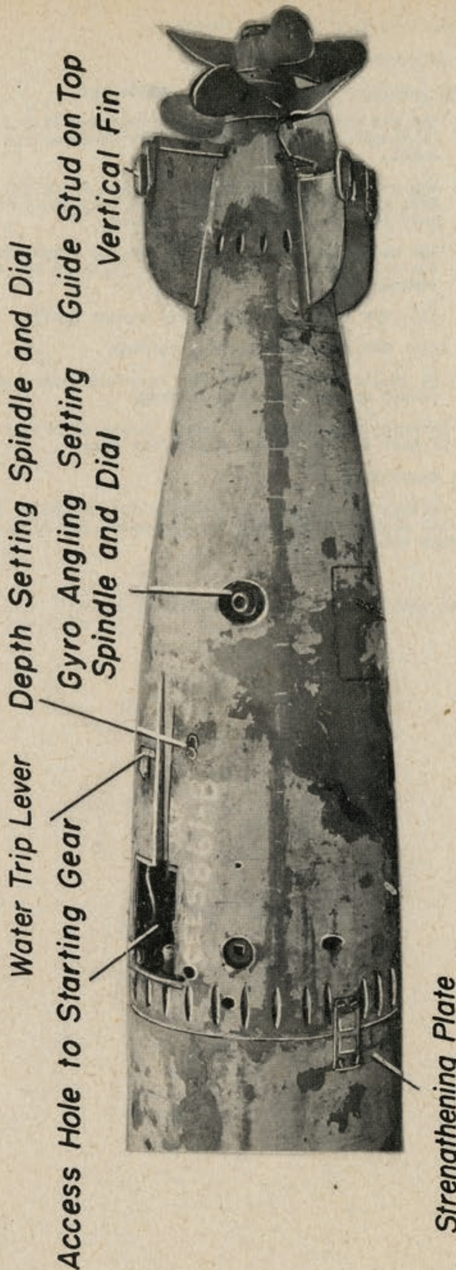


Fig. 58 - Torpedo Eighth Year Type Mark 2 Mod 2, Afterbody

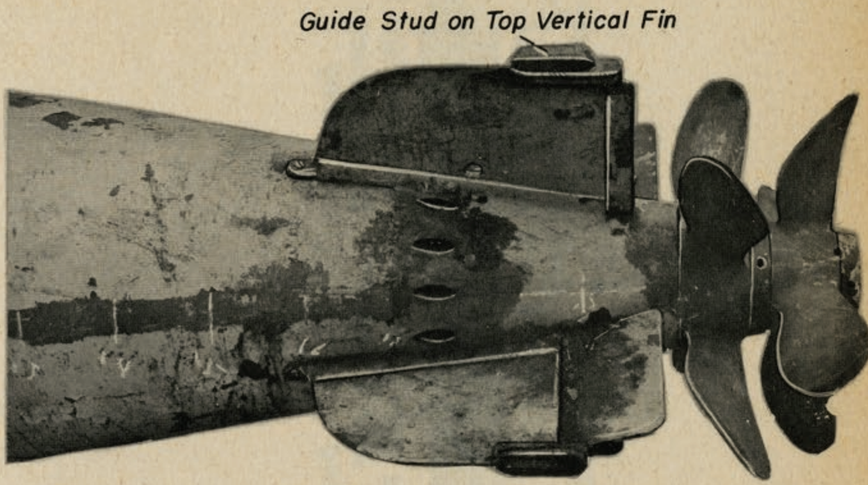


Fig. 59 - Torpedo Eighth Year Type Mark 2 Mod 2, Tail Section

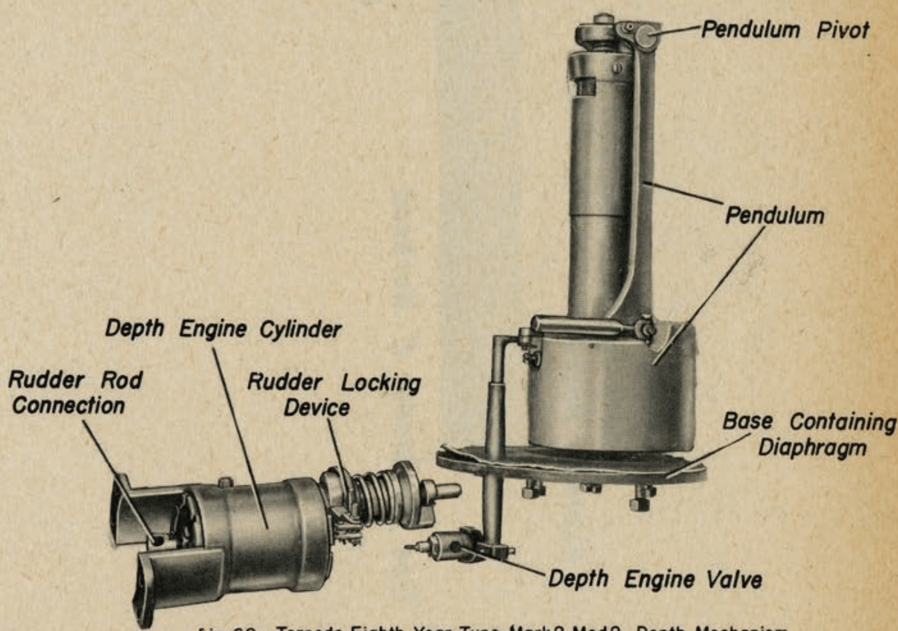


Fig. 60 - Torpedo Eighth Year Type Mark 2 Mod 2, Depth Mechanism

Added 1 August 1945
(Change No. 10)

[redacted]

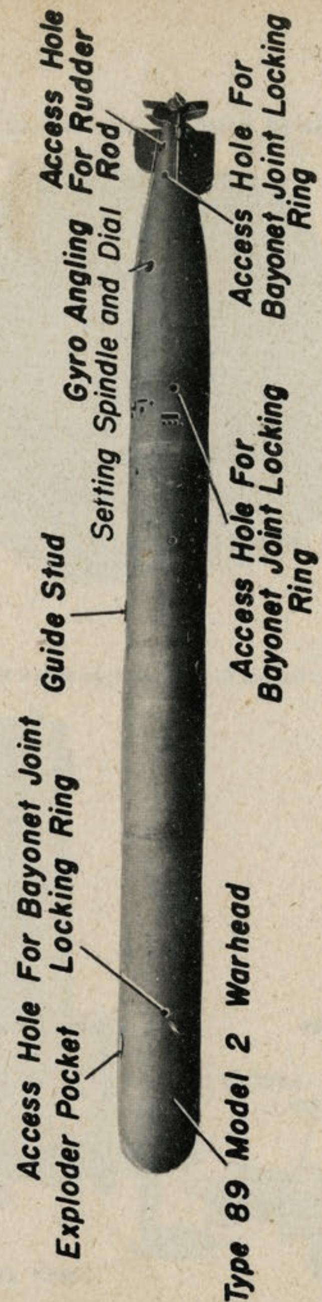


Fig. 61 - Torpedo Type 89 Mod I

Torpedo Type 89 Mod 1

General

1. 21" air-driven torpedo, launched from submarines and old type destroyers; believed to be in general service although intelligence reports indicate that it is being replaced by the Torpedo Type 95.

2. Fitted with Warhead Type 89 Model 2.

3. The torpedo is driven by a two-cylinder, longitudinal, reciprocating, steam engine, and is capable of running 6000 yards at a speed of 45 knots, 6550 yards at 43 knots, or 10,900 yards at 35 knots. The depth control gear may be set for depths from 2-16 meters and the gyro angling device may be set for angles up to 90°, either to starboard or to port, in 1° steps.

Description

1. Lengths

Overall	23' 6"
Warhead	3' 8"
Flask section	13' 5"
Afterbody	4' 5"
Tail	2'

2. Total weight in air — 3660 lb.

3. External fittings

(a) Flask section

Guide studs	Two, on top and bottom center lines, respectively, 5' forward of afterbody joint.
Stop valve	On top center line, 21" forward of afterbody joint.
Depth setting spindle and dial	On top center line, 17" forward of afterbody joint.
Depth mechanism cover plate	7 1/2" diam., on bottom center line, 16" forward of afterbody joint.
Water flap	On bottom center line, 4" forward of afterbody joint.
Access holes to locking ring	90° to port and to starboard, respectively, from top center line, 2 1/2" forward of afterbody joint.

(b) Afterbody

Starting lever	1" to port from top center line, 12 1/4" abaft flask section joint.
Water trip lever	1" to starboard from top center line, 2' 5" abaft flask section joint.
Gyro angling setting spindle and dial	8" to port from top center line, 2' 6 1/2" abaft flask section joint.
Gyro cover plate	9" diam., on bottom center line, 2' 6" abaft flask section joint.

(c) Tail

Access holes to locking ring	Two; one 2" abaft afterbody joint, between top and port fins; one 2" abaft afterbody joint, between bottom and starboard fins.
Propellers	
Forward	Four-bladed, 19 1/2" span.
After	Four-bladed, 17 1/2" span.
Fins	
Upper vertical	Length, including rudder, 12".
Lower vertical	Length, including rudder, 17".
Horizontal	Two, length, including rudders, 18 1/2".

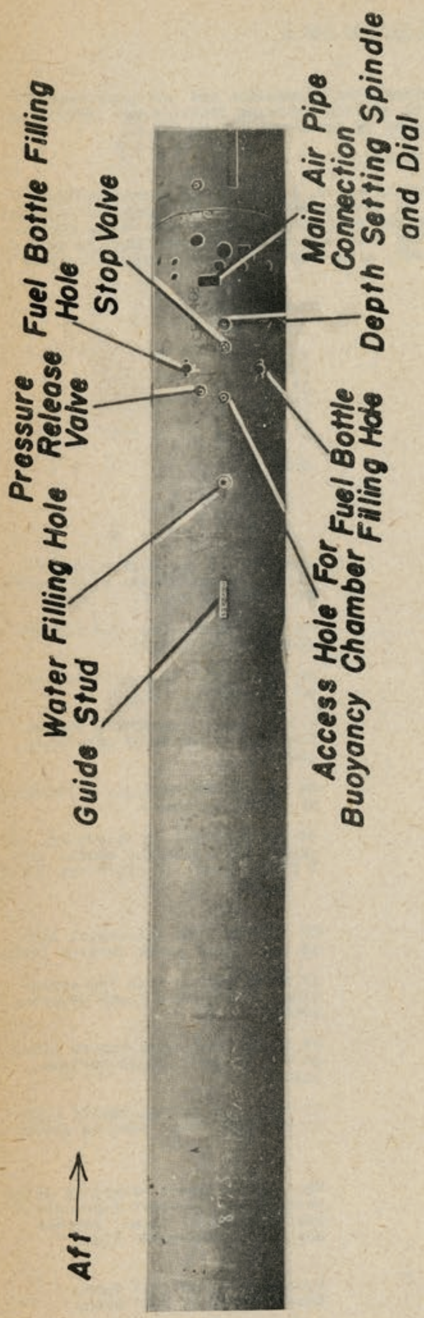


Fig. 62 - Torpedo Type 89 Mod I, Flask Section, Top View

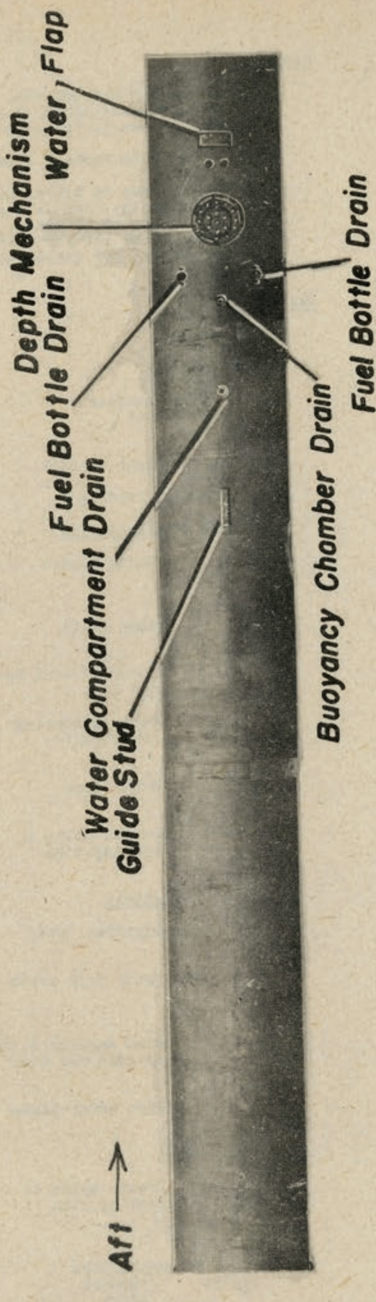


Fig. 63 - Torpedo Type 89 Mod I, Flask Section, Bottom View

[redacted]

Added 1 August 1945
(Change No. 10)

(Torpedo Type 89 Mod 1, Cont'd.)

4. Internal arrangement of parts

(a) Flask section - consists of the following:

(1) The air flask, a hollow steel cylinder with a removable forward bulkhead. The cylinder is built to withstand high internal pressures.

(2) The water compartment, secured to the after end of the air flask.

(3) The buoyancy chamber, secured to the after end of the water compartment, contains the following:

(i) The fuel and oil bottles.

(ii) The stop and charging valves.

(4) The depth mechanism chamber, abaft the buoyancy chamber, is formed by the buoyancy chamber shell and two bulkheads. It contains a hydrostatic valve-pendulum type depth mechanism.

(5) The engine room, abaft the depth mechanism chamber, is formed by the buoyancy chamber shell and a removable bulkhead. The engine room is open to sea water and contains the following:

(i) The main engine cylinders.

(ii) The combustion pot and igniters.

(iii) The water flap (remainder of starting gear in afterbody).

(iv) The main air reducing valve, a two-stag poppet type which incorporates a three-speed, speed change mechanism.

(v) A sea water pump which cools the main engine.

(vi) A depth engine of the follow-up type. The engine incorporates a rudder-locking device which locks the horizontal rudders from the time the torpedo is launched until it has completed its initial dive and steadied on its course.

(b) Afterbody - contains the following:

(1) The main engine, a two-cylinder, double-acting reciprocating type. The forward part projects into the engine room of the flask section where it is cooled by the sea water. A crankcase, located abaft the main engine cylinders, is fitted with an oil distributor on its upper surface which feeds oil to the various moving bearing parts.

(2) The steering mechanism consisting of the gyro, a small air valve, a relay valve, and the steering engine.

(3) The starting lever, the water trip lever, the starting valve, and the distance gear.

(4) A bottle of lubricating oil.

(c) Tail - contains the following:

(1) Linkages which connect the horizontal and vertical rudders to the depth and steering mechanisms, respectively.

(2) The propeller drive shafts and sleeves on which the propellers are mounted.

5. Method of Assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings.

Operation

1. When the torpedo is launched, the starting lever is forced aft by a latch in the tube. This cocks the main starting gear and also allows high pressure air to flow to the gyro which is unlocked and spun by a single short blast of air. The air is shut off after approximately 1/2 second.

2. When the torpedo hits the water, the water trip lever is forced aft and/or the water flap is forced in, allowing high pressure air to flow through the starting valve to the main air reducing valve. Reduced air then flows as follows:

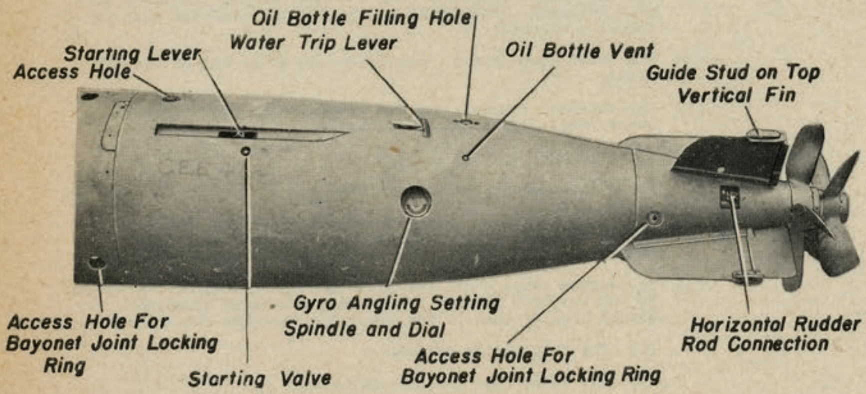


Fig. 64 - Torpedo Type 89 Mod I, Afterbody, Portside

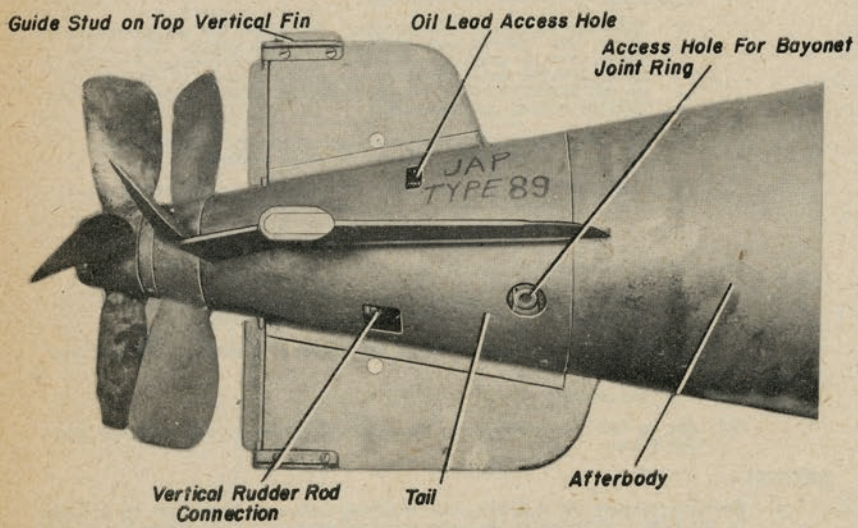


Fig. 65 - Torpedo Type 89 Mod I, Tail Section

Added 1 August 1945
(Change No. 10)

(Torpedo Type 89 Mod 1, Cont'd.)

(a) To the depth engine where it operates the horizontal rudders.

(b) To the gyro where it maintains gyro speed.

(c) To the steering engine where it operates the vertical rudders.

(d) To the top of the oil bottle where it forces oil into the engine.

(e) To the water compartment and fuel bottle where it forces water and fuel into the combustion pot.

(f) To the combustion pot where it mixes with the fuel and water and thence to the main engine. The air turns over the main engine and runs it until the igniters fire the fuel/air mixture in the combustion pot.

3. When the main engine turns over, it performs the following:

   (a) It revolves a cam which trips two spring-loaded hammers which in turn fire the igniters. The fuel/air mixture in the combustion pot is thereby ignited to form hot high pressure gases which are cooled by the water in the combustion pot. During the cooling process, the water is turned into steam.

   (b) It operates the sea water pump.

   (c) It unlocks the horizontal rudders after a predetermined delay period.

4. The high pressure gas and steam flows from the combustion pot to the main engine, causing it to operate at high speed. The engine rotates the drive shafts and sleeves which in turn rotate the propellers.

5. The steering mechanism keeps the torpedo on its set course. If at any time the torpedo deviates from its set course, the small air valve linked to the outer gyro gimbal is moved, thereby operating the larger relay valve. This directs air to one side of the steering engine which then gives the torpedo either full right or full left rudder until the preset course is regained.

6. The depth mechanism maintains the torpedo at its set depth. If at any time the torpedo is not at the set depth, a hydrostat detects the error. If the torpedo starts to broach or dive, a pendulum detects the deviation from the horizontal. The hydrostat and pendulum are connected and operate the depth engine which controls the horizontal rudders.

7. The distance gear stops the torpedo after the torpedo has run its preset distance.

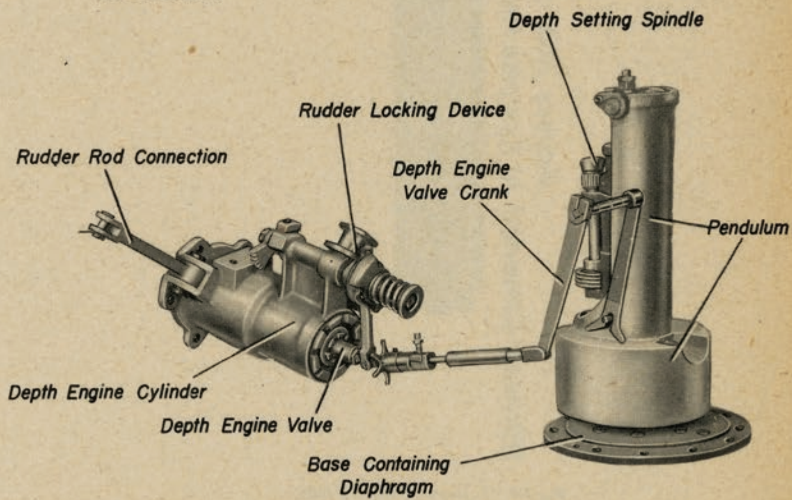


Fig. 66 - Torpedo Type 89 Mod I, Depth Mechanism

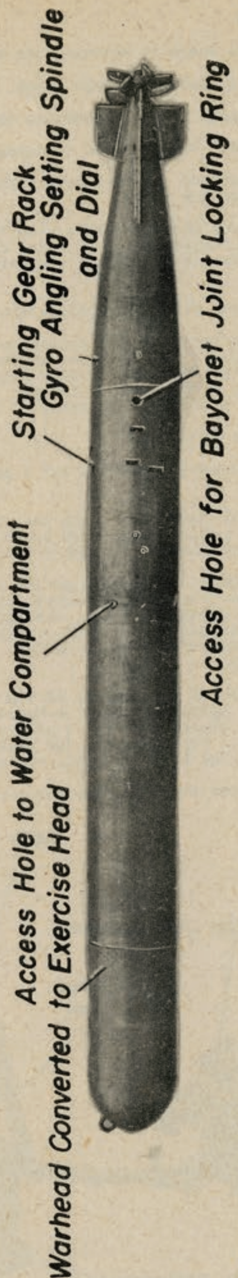


Fig. 67 - Torpedo Type 91 Mod I

[redacted]

Added 1 August 1945
(Change No. 10)

Torpedo Type 91 Mod 1

General

1. 18" air-driven torpedo, launched from aircraft; believed to be obsolescent, being replaced by later models of the Type 91 and also by the Type 2.

2. Fitted with Warhead Type 91 Mod 1.

3. The torpedo is driven by an eight-cylinder, radial, double-bank steam engine and is capable of running 3300 yards at a speed of 42 knots. The depth control gear may be set for depths from 2-16 meters and the gyro angling device may be set for angles up to 90°, either to starboard or to port, in 5° steps.

Description

1. Lengths

Overall	17' 3"
Warhead	3' 1"
Flask section	8' 11"
Afterbody	3' 10"
Tail	1' 5"

2. Total weight in air — 1730 lb.

3. External fittings

(a) Flask section

Guide stud	On top center line, 3'7 3/4" forward of afterbody joint.
Depth setting spindle and dial	On top center line, 23" forward of afterbody joint.
Depth mechanism cover plate	9" diam., on bottom center line, 21" forward of afterbody joint.
Starting gear	On top center line, 15" forward of afterbody joint.
Stop valve	90° to starboard from top center line, 2' 2 3/4" forward of afterbody joint.
Charging valve	90° to starboard from top center line, 2' 8" forward of afterbody joint.
Distance setting spindle and dial	3" to port from top center line, 15" forward of afterbody joint.
Rudder locking spindle and dial	2" to starboard from bottom center line, 1" forward of afterbody joint.
Access holes for locking ring	90° to starboard and to port, respectively, from top center line, 2 1/2" forward of afterbody joint.

(b) Afterbody

Gyro angling setting spindle and dial	3" to port from top center line, 5 1/2" abaft flask section joint.
Gyro cover plate	7 1/2" maximum diam., 5 1/2" to port from bottom center line, 7" abaft flask section joint.

(c) Tail

Propellers	
Forward	Four-bladed, 15" span.
After	Four-bladed, 13 1/4" span.
Fins	Two vertical, 10 3/4" long, and two horizontal, 25" long (lengths include rudders).

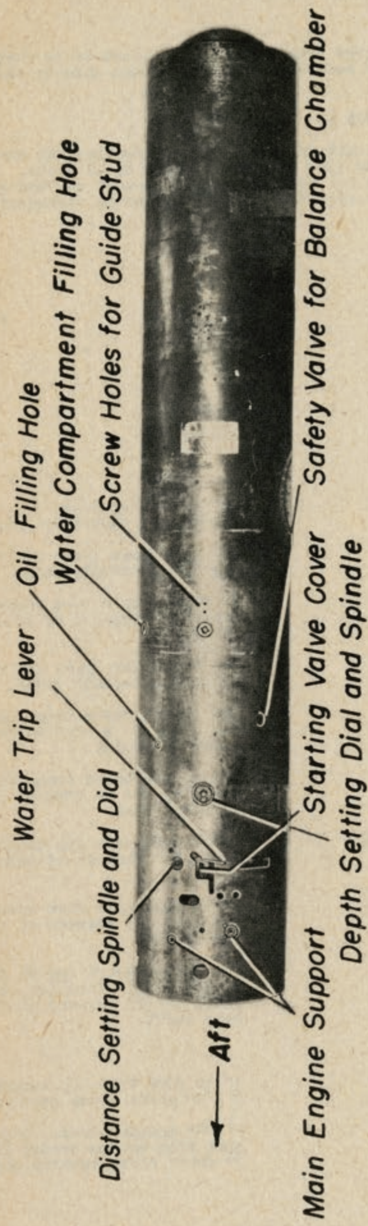


Fig. 68 - Torpedo Type 91 Mod I, Flask Section, Top View

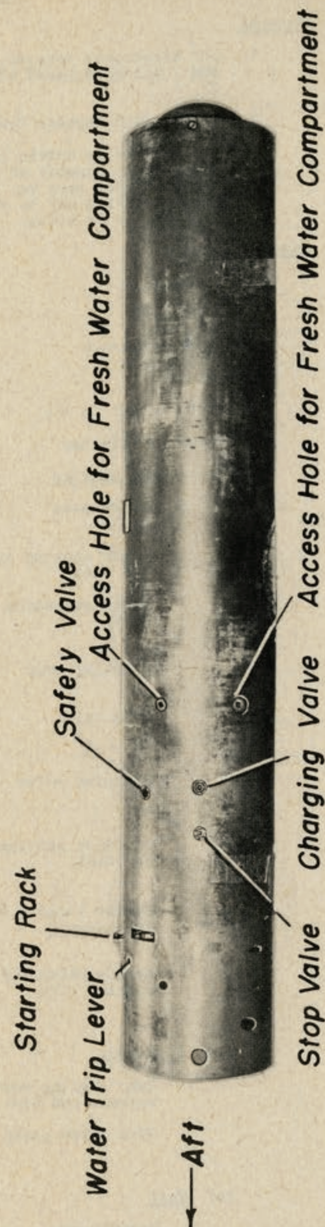


Fig. 69 - Torpedo Type 91 Mod I, Flask Section, Starboard View

Added 1 August 1945
(Change No. 10)

(Torpedo Type 91 Mod 1, Cont'd.)

4. Internal arrangement of parts

(a) <u>Flask section</u> - consists of the following:

(1) The air flask, a hollow steel cylinder with a removable forward bulkhead. The cylinder is built to contain internal pressures of 2000 lb/in^2

(2) The water compartment, secured to the after end of the air flask.

(3) The balance chamber, secured to the after end of the water compartment, contains the following:

(i) An oil bottle.

(ii) The stop valve and the charging valve.

(iii) A depth mechanism similar to that fitted to the Torpedo Type 89 Mod 1, the main difference being that two buffer springs are added to absorb the shock of water impact.

(4) The engine room, formed by the balance chamber shell and a bulkhead, is open to sea water and contains the following:

(i) The main engine, composed of two staggered rows of four cylinders each. The crankcase is made of sheet metal welded in the form of an octagon with a cylinder, cylinder cap and intake valve assembly bolted to each side of the octagon. The intake valves are alternately forward and abaft the cylinders.

(ii) A small shutter-type water pump attached to the forward bulkhead.

(iii) The combustion pot and igniters.

(iv) The main air reducing valve.

(v) Starting gear of the conventional type. The starting lever is replaced by a rack and eye to which a lanyard is attached prior to the torpedo's launching.

(vi) A depth engine of the follow-up type. The engine incorporates a rudder locking device which locks the rudders from the time the torpedo is launched until it has completed its initial dive and steadied on its course.

(b) <u>Afterbody</u> - contains the following:

(1) Two fuel bottles.

(2) The steering mechanism, consisting of the gyro, a small air valve, a relay valve and the steering engine.

(3) The main drive shaft.

(c) <u>Tail</u> - contains the following:

(1) Connections for the vertical and horizontal rudders.

(2) The after end of the drive shaft and the propeller shafts.

(3) Reversing gears which transform the unidirectional motion of the main drive shaft into the bi-directional motion of the propeller shafts.

5. Method of assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings with the exception of the tail section which is secured to the afterbody by joint screws.

<u>Operation</u>

1. When the torpedo is launched, the starting rack is pulled out. This cocks the starting gear and allows high pressure air to flow to the gyro which is unlocked and spun by a single short blast of air. The air is shut off after approximately 1/2 second.

2. When the torpedo hits the water, the water trip lever is forced aft, allowing high pressure air to flow through the starting valve to the main air reducing valve. Reduced air then flows as follows:

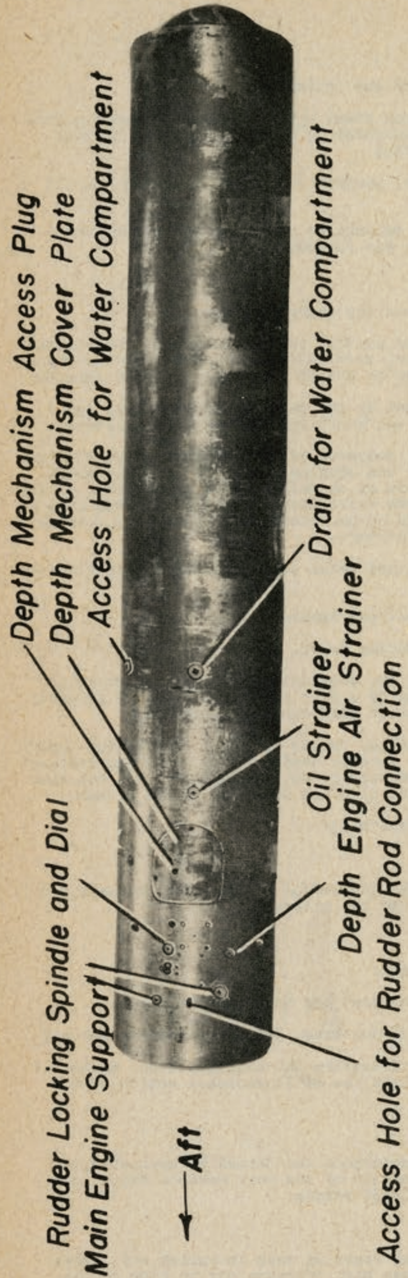


Fig. 70 - Torpedo Type 91 Mod I,
Flask Section, Bottom View

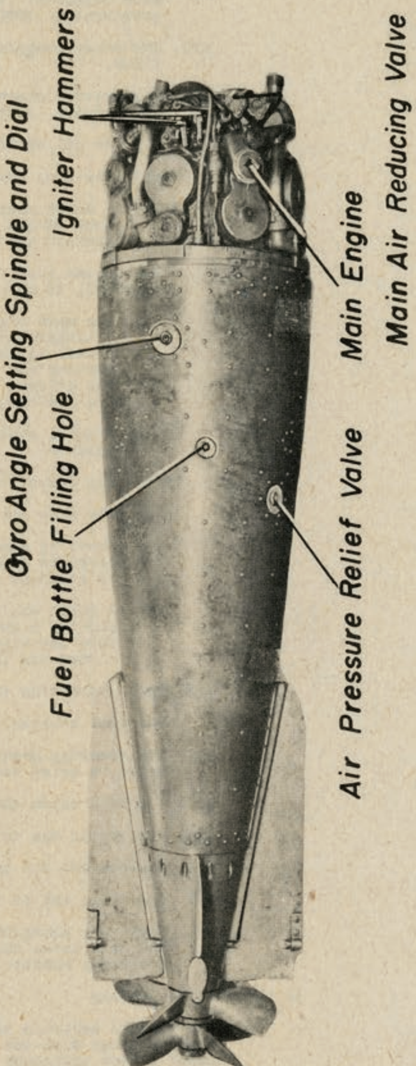


Fig. 71 - Torpedo Type 91 Mod I,
Afterbody, Top View

(Torpedo Type 91 Mod 1, Cont'd.)

(a) To the depth engine where it operates the horizontal rudders.

(b) To the gyro where it maintains gyro speed.

(c) To the steering engine where it operates the vertical rudders.

(d) To the top of the oil bottle where it forces oil into the engine.

(e) To the water chamber where it forces water from the chamber:

(1) To the bottom of the fuel bottles where it forces fuel into the combustion pot.

(2) To the combustion pot where it mixes with air and fuel.

(f) To the combustion pot where it mixes with the fuel and water and thence to the main engine. The air turns over the main engine and runs it until the igniters fire the fuel/air mixture in the combustion pot.

3. When the main engine turns over, it performs the following:

(a) It revolves a cam which trips two spring-loaded hammers which in turn fire the igniters. The fuel/air mixture in the combustion pot is thereby ignited to form hot high pressure gases which are cooled by the water in the combustion pot. During the cooling process the water is turned into steam.

(b) It operates the shutter-type water pump which forces water into the main engine.

(c) It unlocks the horizontal rudders after a predetermined delay period.

4. The high pressure gas and steam flow from the combustion pot to the main engine, causing it to operate at high speed. The engine rotates the drive shafts and sleeves which in turn rotate the propellers.

5. The steering and depth mechanisms operate in a manner similar to those fitted to the Torpedo Type 89 Mod 1.

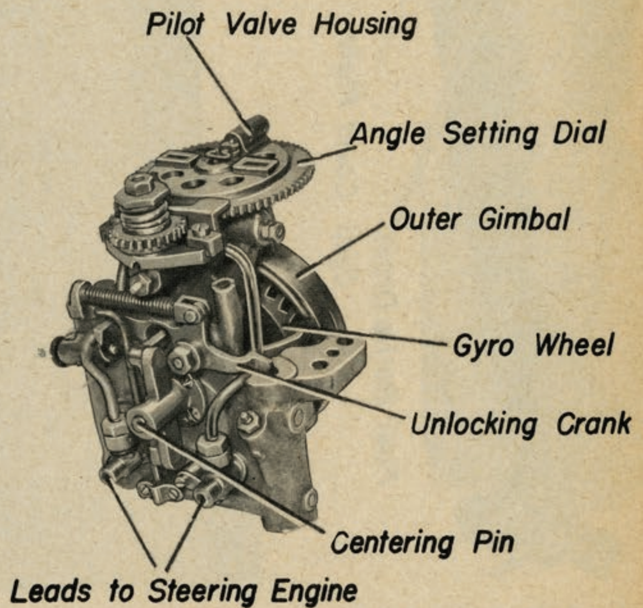


Fig. 72 - Torpedo Type 91 Mod I, Gyro Mechanism

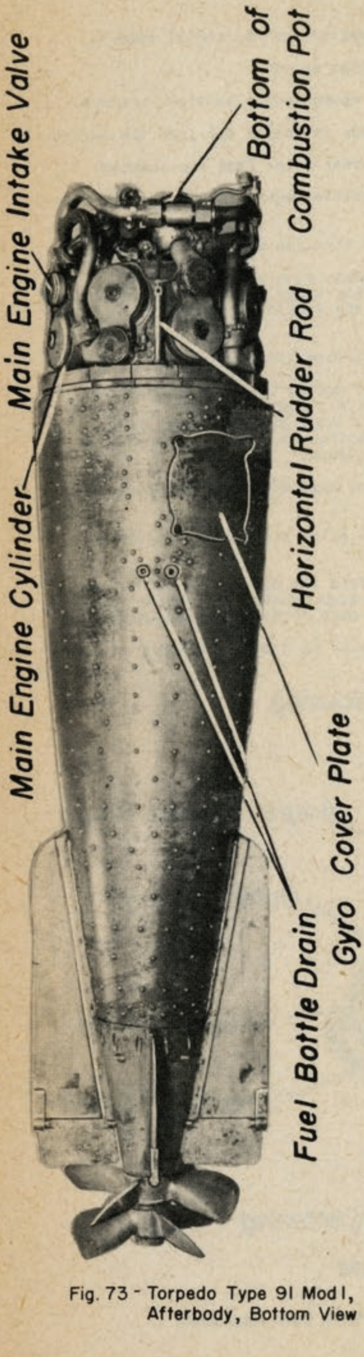


Fig. 73 - Torpedo Type 91 Mod I,
Afterbody, Bottom View

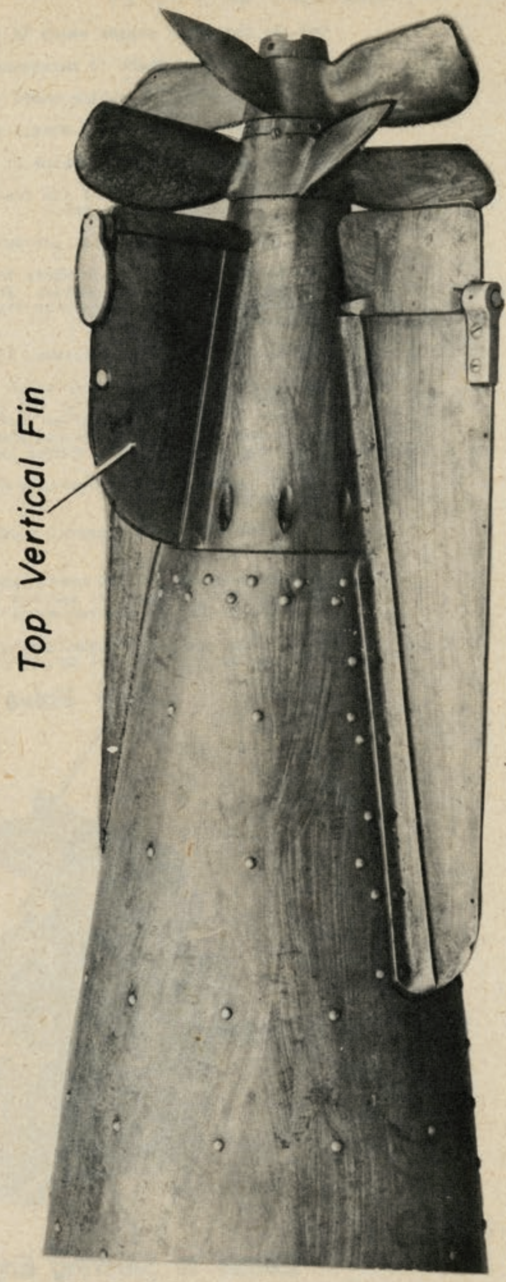


Fig. 74 - Torpedo Type 91 Mod I,
Tail Section, Port View

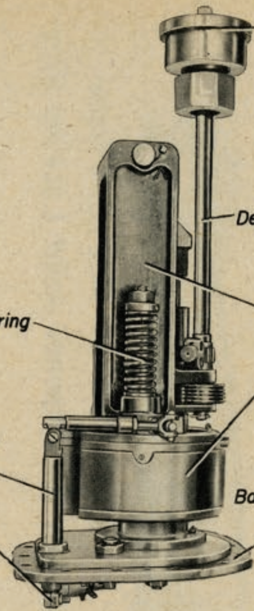


Fig. 75 - Torpedo Type 91 Mod I, Depth Mechanism

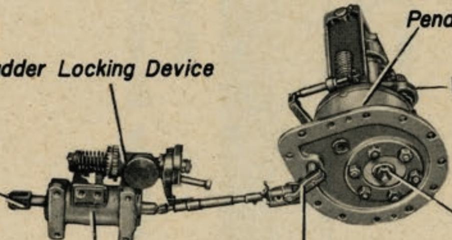


Fig. 76 - Torpedo Type 91 Mod I, Depth Mechanism

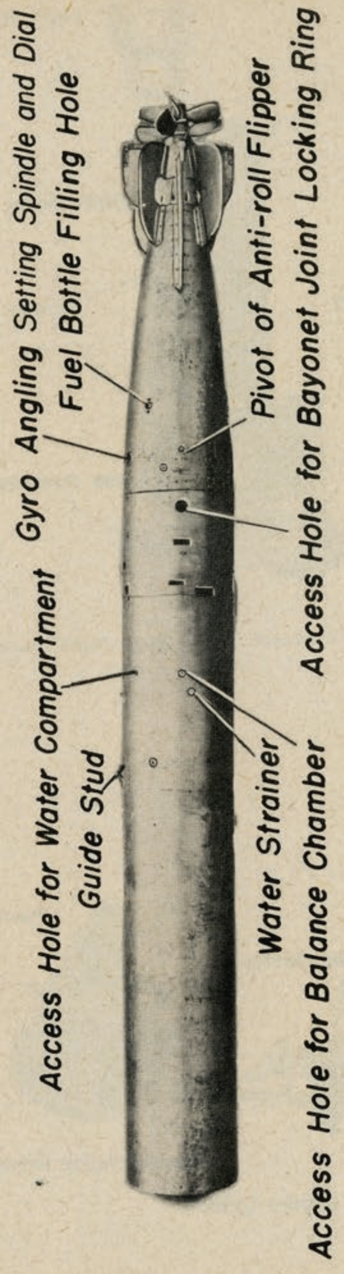


Fig. 77 - Torpedo Type 91 Mod 2, Warhead Removed

Torpedo Type 91 Mod 2

General

1. Same as Torpedo Type 91 Mod 1.
2. Fitted with Warhead Type 91 Mod 2.
3. Same as Torpedo Type 91 Mod 1.

Description

1. Lengths

Overall	18' 0"
Warhead	3' 10"
Flask section	8' 11"
Afterbody	3' 10"
Tail	1' 5"

2. Total weight in air — 1840 lb.

3. External fittings

(a) Flask section

(1) Same as the Torpedo Type 91 Mod 1.

(b) Afterbody

Anti-roll flippers (optional)	Two, 3 1/2" long, 90° to port and starboard, respectively, from top center line, 7 3/4" abaft flask section joint.
Steering gyro cover plate	7" diam., 4 1/2" to port from bottom center line, 7" abaft flask section joint.
Anti-roll gyro cover plate	6 1/4" diam., 4 1/2" to starboard from top center line, 19 1/2" abaft flask section joint.
Gyro angling setting spindle and dial.	3" to port from top center line, 5 1/2" abaft flask section joint.

(c) Tail

Propellers	
Forward	Four-bladed, 14 1/2" span.
After	Four-bladed, 13" span.
Fins	
Vertical	Two; length, including rudders, 10 1/2".
Horizontal	Two; length, including rudders, 2'1".
Intermediate	Four, cut away type, no rudders fitted; length 16 1/2".

4. Internal arrangement of parts

(a) Flask section

(1) Similar to the Torpedo Type 91 Mod 1.

(b) Afterbody - contains the following main parts:

(1) Two fuel bottles.

(2) A steering mechanism similar to that fitted to the Torpedo Type 91 Mod 1.

(3) An anti-roll device consisting of a gyro, a relay valve and two small, cross-connected, follow-up, air-driven engines which control the anti-roll flippers on the afterbody shell.

(4) A "free-wheeling" device fitted between the main drive shaft and the propeller shafts which permits the propellers to rotate at high speed without correspondingly rapid motor speeds when the torpedo hits the water.

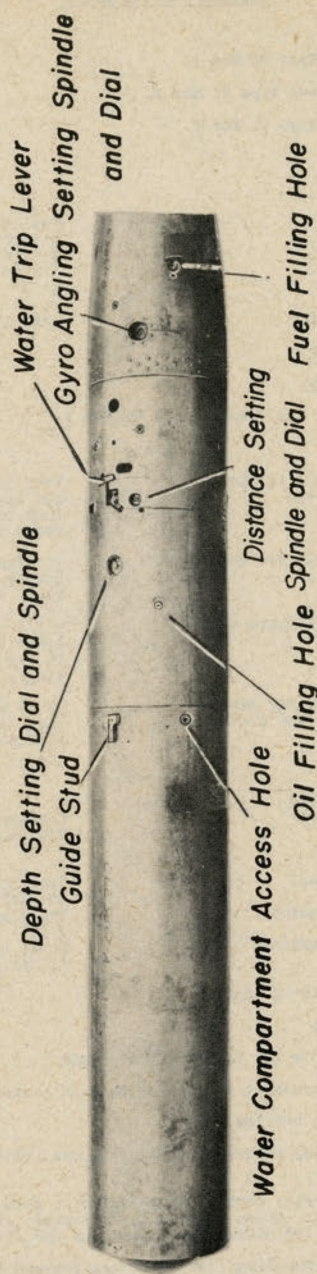


Fig. 78 - Torpedo Typr 91 Mod 2, Flask Section, Port Side

(Torpedo Type 91 Mod 2, Cont'd.)

(c) Tail

(1) Similar to the Torpedo Type 91 Mod 1.

5. Method of Assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings with the exception of the tail section which is secured to the afterbody by joint screws.

Operation

1. Similar to that of the Torpedo Type 91 Mod 1. It differs mainly in that high pressure air goes to the anti-roll gyro when the starting rack is pulled out, the anti-roll motors being powered during subsequent torpedo operation by the low pressure air from the main air reducing valve.

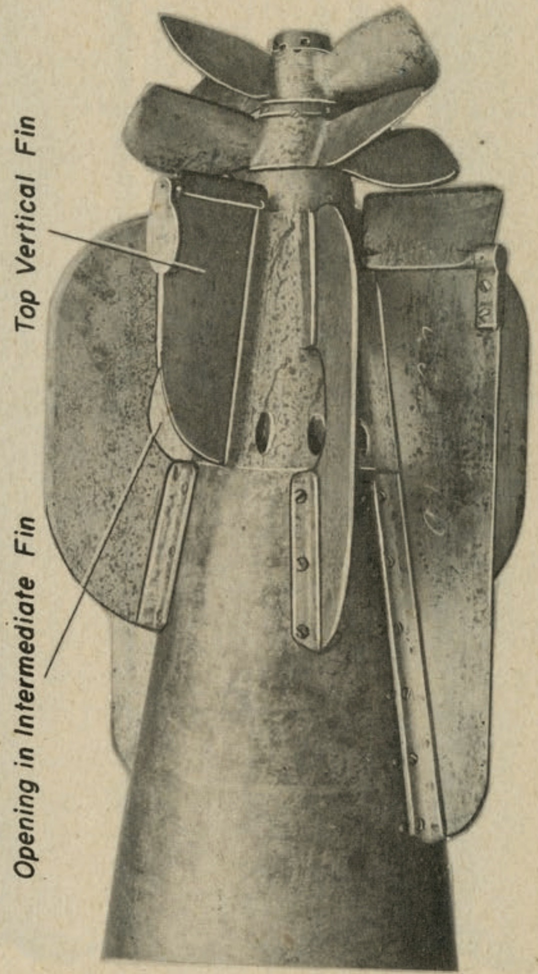


Fig. 79 - Torpedo Type 91 Mod 2, Tail Section

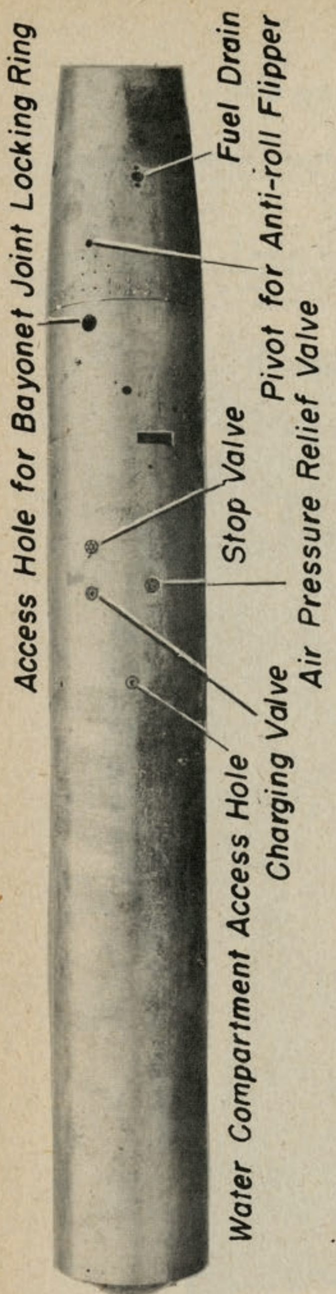


Fig. 80 - Torpedo Type 91 Mod 2,
Flask Section, Starboard Side

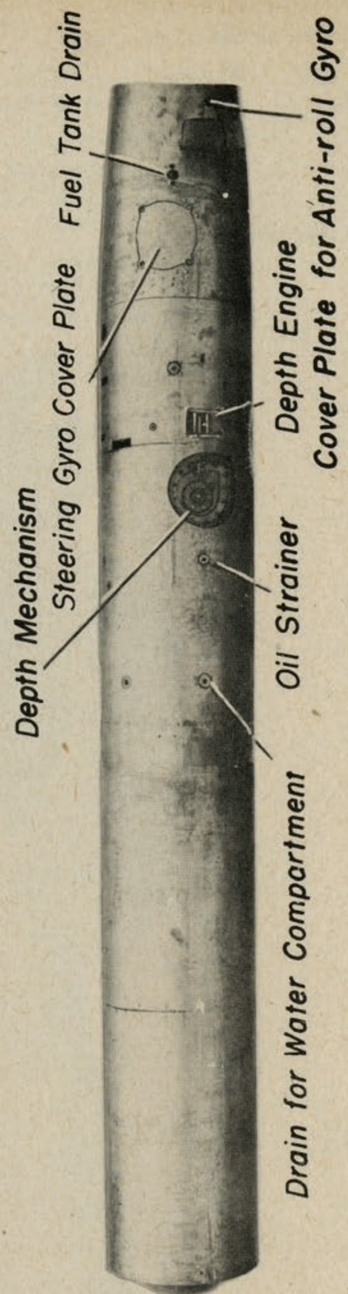


Fig. 81 - Torpedo Type 91 Mod 2,
Flask Section, Bottom View

Added 1 August 1945
(Change No. 10)

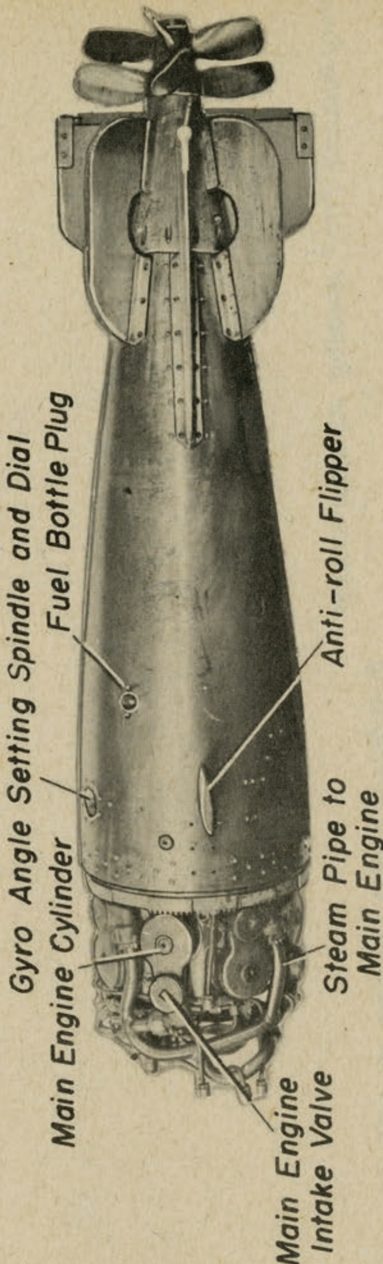


Fig. 82 - Torpedo Type 91 Mod 2, Afterbody, Port Side

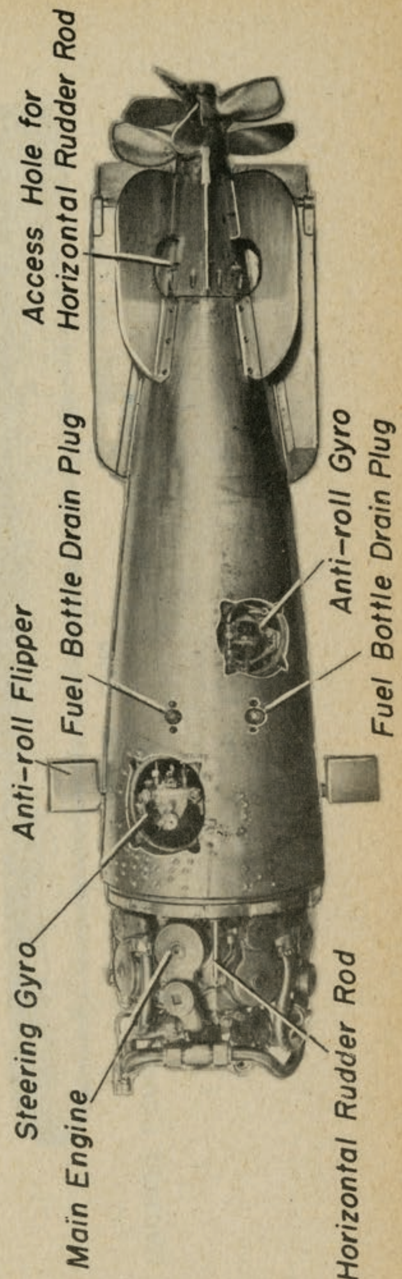


Fig. 83 - Torpedo Type 91 Mod 2, Afterbody, Bottom View

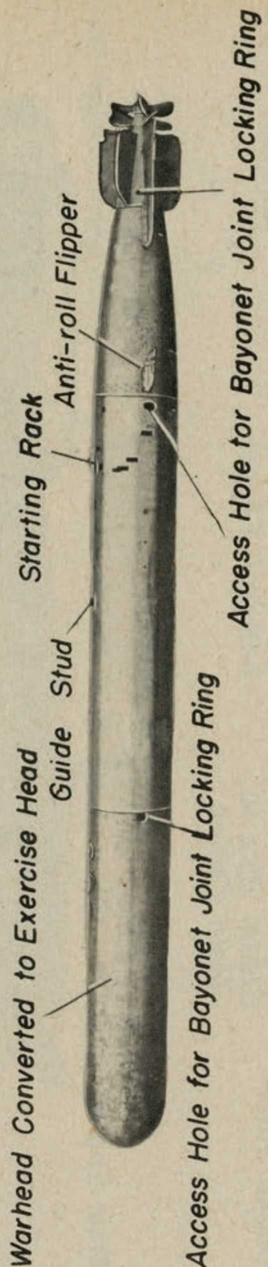


Fig. 84 - Torpedo Type 91 Mod 3

Torpedo Type 91 Mod 3 (Type 91 Mod 3 Special)

General

1. 18" air-driven torpedo, launched from aircraft; believed to be in general service.

2. Fitted with Warhead Type 91 Mod 3, Type 91 Mod 6, Type 91 Mod 7 or Type 3.

3. The torpedo is driven by an eight-cylinder, radial, double-bank steam engine and is capable of running 3100-3300 yards (when fitted with Mod 3 warhead) or 2500 yards (when fitted with Mod 6 warhead) at a speed of 42 knots. No further speed/range data are available. The depth control gear may be set for depths from 2-16 meters. No gyro angling device is fitted.

Description

1. Lengths

Overall	
with 91-3 warhead	17' 5"
with 91-6 warhead	18' 10"
with 91-7 warhead	18' 10"
with Type 3 warhead	18' 1"
Flask section	7' 4"
Afterbody	3' 4"
Tail	1' 11"

2. Total weight in air

with 91-3 warhead	1800 lb.
with 91-6 warhead	2100 lb.
with 91-7 warhead	2200 lb.
with Type 3 warhead	1900 lb.

3. External fittings

(a) Flask section

Guide stud	On top center line, 3' 8" abaft warhead joint.
Depth setting spindle and dial	On top center line, 22 3/4" forward of afterbody joint.
Depth mechanism cover plate	8" diam., on bottom center line, 21" forward of afterbody joint.
Starting gear	On top center line, 15" forward of afterbody joint.
Distance setting spindle and dial	3 1/2" to port from top center line, 15" forward of afterbody joint.
Stop and charging valves	90° to starboard from top center line, 2' 3" forward of afterbody joint (location may vary as much as 5" in any direction).
Access holes to locking ring	90° to starboard and to port, respectively, from top center line, 2 1/2" forward of afterbody joint.

(b) Afterbody

Anti-roll flippers (optional)	8 1/4" long overall, 90° to port and to starboard, respectively, from top center line, 1 3/4" abaft flask section joint (measured from forward edge of flippers).
Steering gyro cover plate	7" max. diam., 4" to port from top center line, 7" abaft flask section joint.
Anti-roll gyro cover plate	7" max. diam., 4" to starboard from top center line, 19 1/2" abaft flask section joint.

(c) Tail

Fins	
Vertical	Two; length, including rudders, 2' 2".
Intermediate	Four, 15 1/2" long.
Horizontal	Two; length, including rudders, 16".

Added 1 August 1945
(Change No. 10)

[redacted]

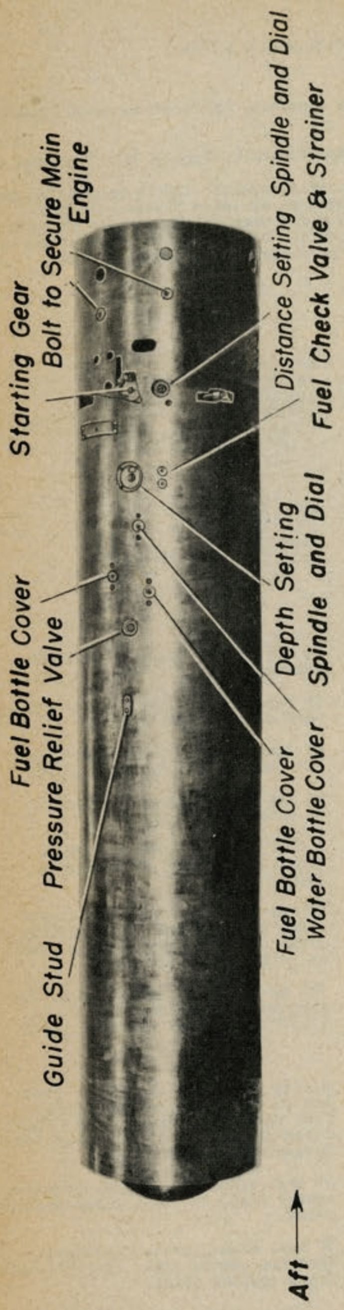


Fig. 85 - Torpedo Type 91 Mod 3, Flask Section, Top View

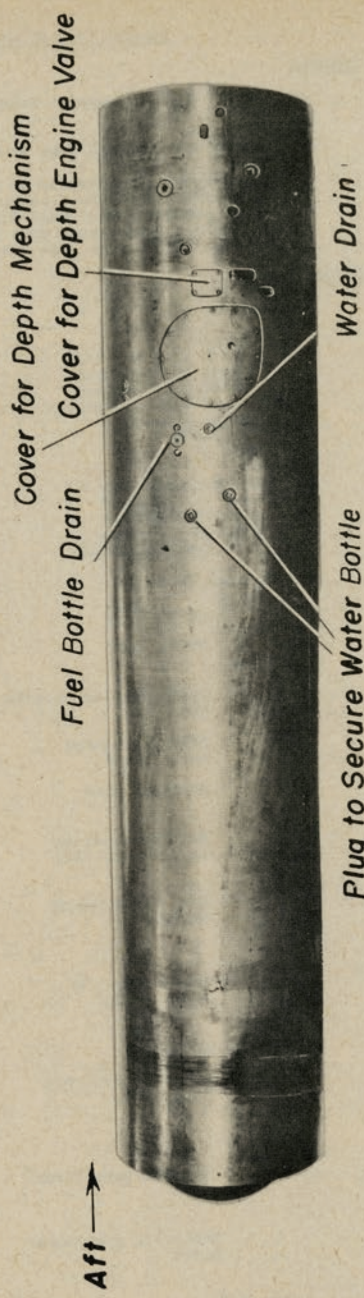


Fig. 86 - Torpedo Type 91 Mod 3, Flask Section, Bottom View

(Torpedo Type 91 Mod 3 (Type 91 Mod 3 Special, Cont'd.)

Propellers	
Forward	Four-bladed, 15" span.
After	Four-bladed, 13 1/4" span.
Access hole to locking ring	Midway between port horizontal fin and upper port intermediate fin, 3" abaft afterbody joint.

4. Internal arrangement of parts

(a) Flask section - consists of the following:

(1) The air flask, a hollow steel cylinder with a removable forward bulkhead. The cylinder is built to contain internal pressures of 2500 lb/in^2.

(2) The balance chamber, secured to the after end of the air flask, contains the following:

(i) Two water bottles and a fuel bottle.

(ii) A depth mechanism similar to that fitted to the Type 91 Mod 1.

(3) The engine room, abaft the balance chamber, is formed by the balance chamber shell and a bulkhead. The component parts are similar to those fitted to the engine room of the Torpedo Type 91 Mod 1, the main difference being that a larger depth engine is fitted.

(b) Afterbody

(1) Similar to that of the Torpedo Type 91 Mod 2, the main differences being as follows:

(i) A single oil bottle is fitted instead of the two fuel bottles.

(ii) No gyro angling device is fitted.

(c) Tail

(1) The internal arrangement of parts is similar to that in the Torpedo Type 91 Mod 2.

5. Method of Assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings.

Operation

1. When the torpedo is launched, the starting rack is pulled out. This allows high pressure air to cock the starting gear and flow to the gyro which is unlocked and spun by a single short blast of air. The air to the gyro is shut off after approximately 1/2 second.

2. When the torpedo hits the water, the water trip lever is forced aft and/or the water flap is forced in, allowing high pressure air to flow through the starting valve to the main air reducing valve. Reduced air then flows as follows:

(a) To the depth engine where it operates the horizontal rudders.

(b) To the gyro where it maintains gyro speed.

(c) To the steering engine where it controls the vertical rudders.

(d) To the top of the oil bottle where it forces lubricating oil into the engine.

(e) To the top of the water bottles where it forces water into the combustion pot.

(f) To the top of the fuel bottle where it forces fuel into the combustion pot.

(g) To the combustion pot where it mixes with fuel and water and thence to the main engine. The air turns over the main engine and runs it until the igniters fire the fuel/air mixture in the combustion pot.

(h) To the two anti-roll engines.

3. Subsequent details of operation are similar to those of the Torpedo Type 91 Mod 1.

Added 1 August 1945
(Change No. 10)

[redacted]

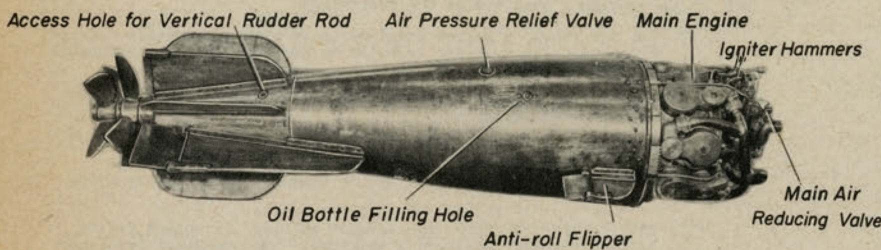


Fig. 87 - Torpedo Type 91 Mod 3, Afterbody, Starboard Side

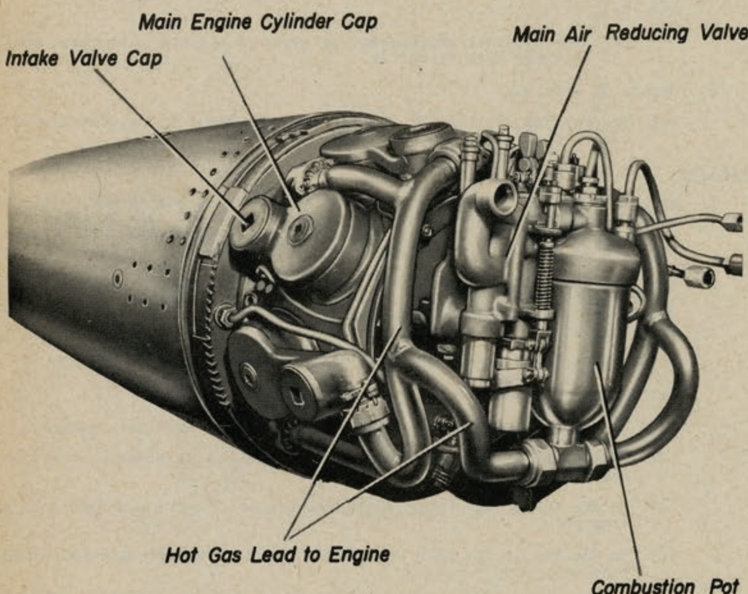


Fig. 88 - Torpedo Type 91 Mod 3, Engine

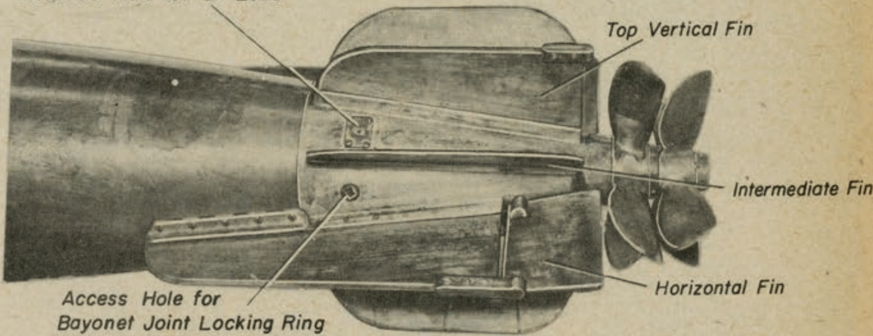


Fig. 89 - Torpedo Type 91 Mod 3, Tail Section

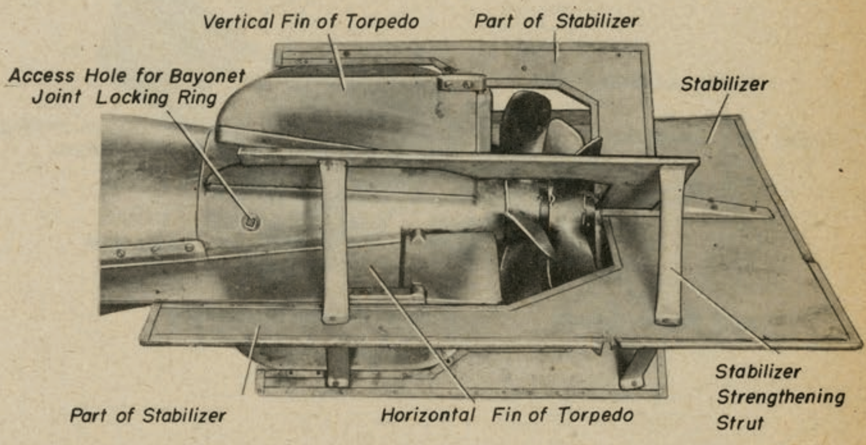


Fig. 90 - Torpedo Type 91 Mod 3, Tail Fitted with Stabilizer

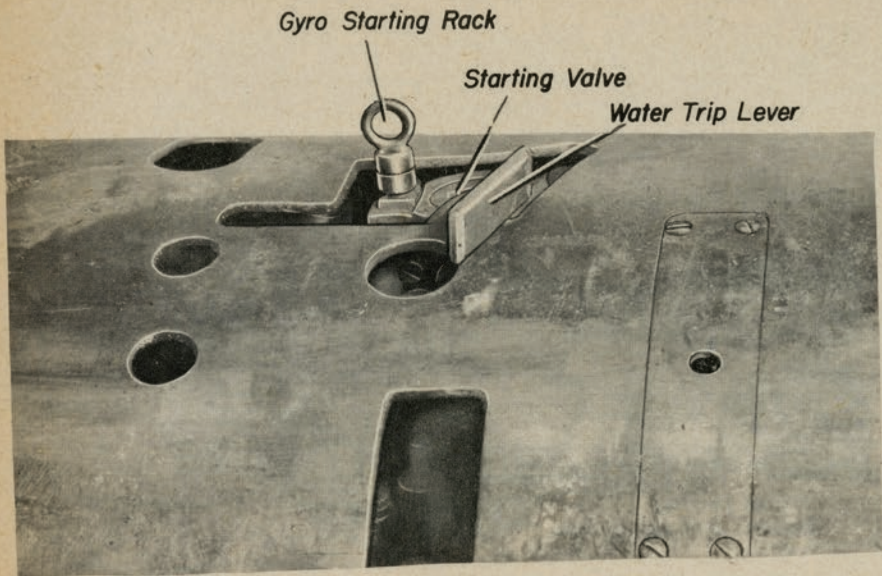


Fig.91 - Torpedo Type 91 Mod 3, Starting Gear

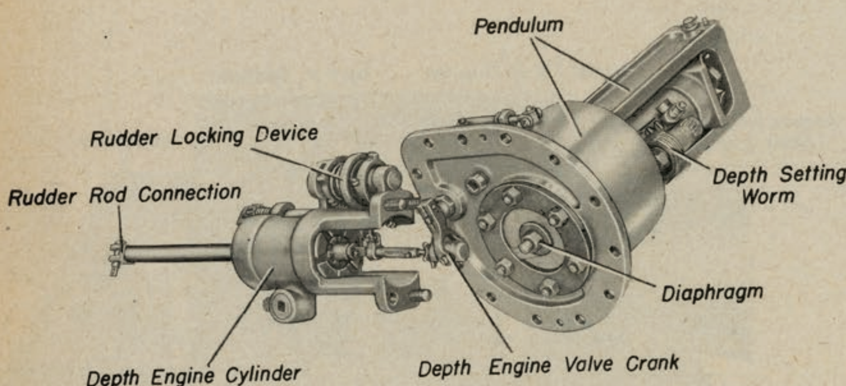


Fig. 92 - Torpedo Type 91 Mod 3, Depth Mechanism

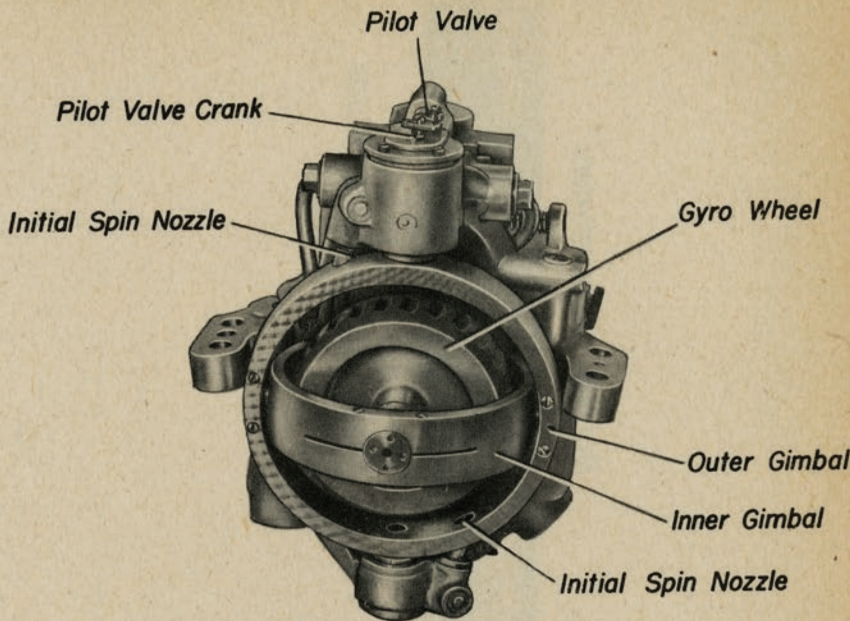


Fig. 93 - Torpedo Type 91 Mod 3, Gyro

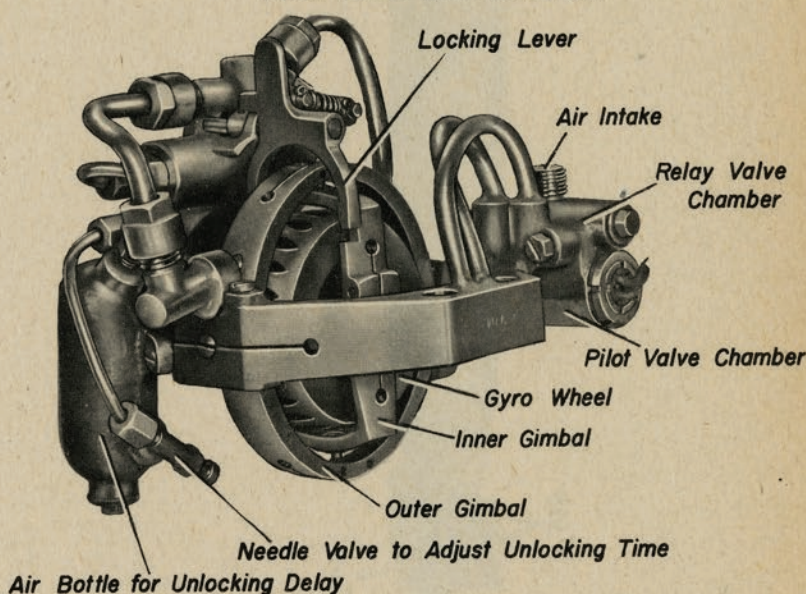


Fig. 94 - Torpedo Type 91 Mod 3, Anti-Roll Gyro

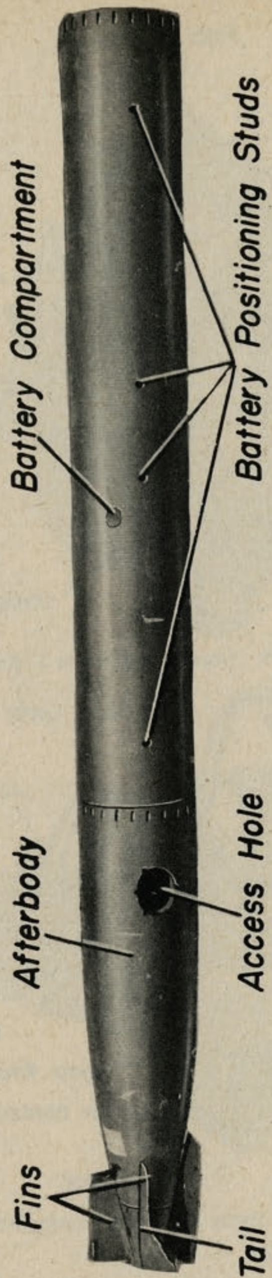


Fig. 95 - Torpedo Type 92-1, Warhead Removed

Torpedo Type 92 Mod 1

General

1. 21" electric torpedo, launched from submarines; believed to be in general service.

2. Warhead not recovered.

3. The torpedo is driven by a six-pole, compound-wound, direct current motor. The speed and range are unknown, as are the operational characteristics of the depth control gear and the gyro-angling device.

Description

1. Lengths

Overall	Unknown
Warhead	Unknown
Battery compartment	11' 7"
Afterbody	6' 5"
Tail	1' 2"

2. Total weight in air — Unknown

3. External fittings

(a) Battery compartment

Guide studs	Two, on top and bottom center lines, respectively, 2' 11" forward of afterbody joint.
Pressure relief valve	On top center line, 5" abaft warhead joint.
Access hole	4" diam., on top center line, 14" abaft warhead joint.
Power switch	On top center line, 19 1/2" forward of afterbody joint.
Depth setting spindle and dial	On top center line, 7" forward of afterbody joint.
Battery positioning studs	Eight; in four groups of two each, 90° to starboard and to port, respectively, from top center line, 11", 4' 9", 5' 8", and 10' 2" forward of afterbody joint.

(b) Afterbody

Access hole	Elliptical, 8 1/2" x 6", 90° to starboard from top center line, 19" abaft battery compartment joint.
Depth setting spindle and dial	On top center line, 6" abaft battery compartment joint.
Distance setting and resistance cut-out spindles and dials	On top center line, 15" abaft battery compartment joint.
Gyro angling setting spindle and dial	7" to port from top center line, 4' 8" abaft battery compartment joint.
Starting lever	On top center line, 3' 7" abaft battery compartment joint.
Gyro angling setting spindle and dial	7" to port from top center line, 4' 8" abaft battery compartment joint.
Battery charging socket	To port from top vertical fin, 3" forward of tail joint.
Charging valve	To starboard from top vertical fin, 3" forward of the tail joint.
Stop valve	Between top vertical and port horizontal fins, 4" forward of tail joint.

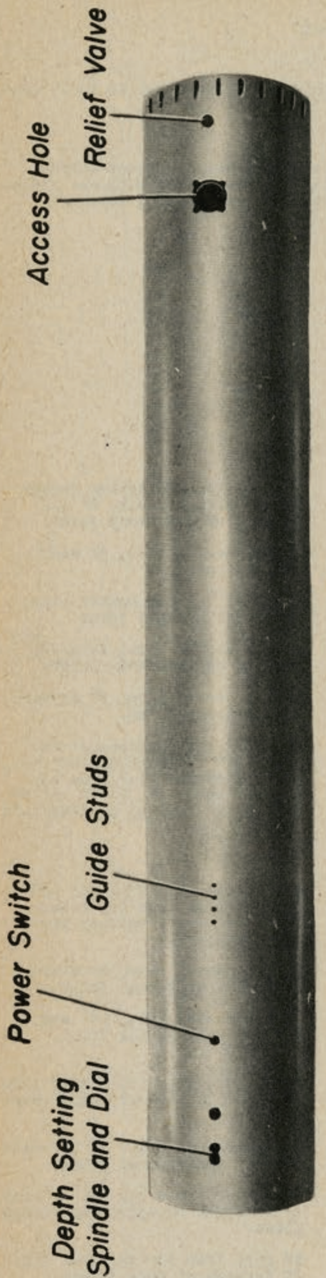


Fig. 96 - Torpedo Type 92-1, Battery Compartment, Top View

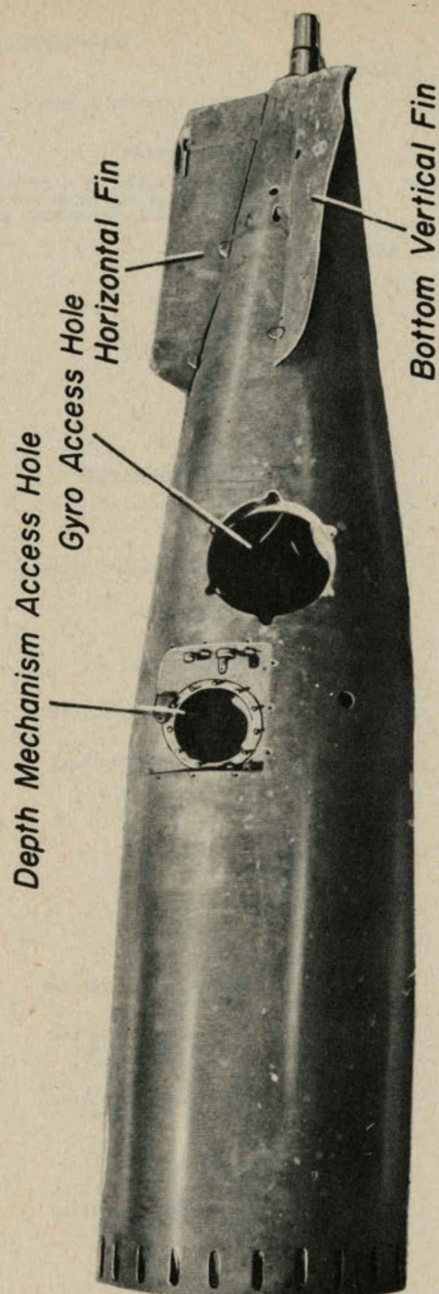


Fig. 96a - Torpedo Type 92-1, Afterbody, Bottom View

Added 1 August 1945
(Change No. 10)

(Type 92 Mod 1 Torpedo, Cont'd.)

Depth mechanism cover plate	Square, 9" x 9", 3" to port from bottom center line, 3' 5" abaft battery compartment joint.
Gyro access hole	8" diam., on bottom center line, 4' 5" abaft battery compartment joint.

(c) Tail

Fins	Four; each 25" in length and 7" in maximum width.
Propellers	Not recovered.

4. Internal arrangement of parts

(a) Battery compartment - a hollow steel cylinder with removable forward and after bulkheads and containing the following:

(1) Two storage batteries, each consisting of 52 cells connected in series.

(2) A power switch which controls the leads from the batteries to the motor.

(b) Afterbody - consists of the following:

(1) The motor compartment, a hollow steel cylinder containing the following:

(i) The electric propulsion motor, a six-pole, compound-wound, DC type.

(ii) A motor panel containing the associated switches and resistances.

(iii) Drive shaft.

(2) The control compartment, a tapered cylinder abaft the motor compartment, contains the following:

(i) Two air bottles.

(ii) Depth control and steering mechanisms believed to be similar to those fitted to the Torpedo Type 89 Mod 1.

(iii) Two air reducing valves.

(iv) The stop valve and the charging valve.

(v) The drive shaft.

(c) Tail - contains the following:

(1) Reversing and reduction gears which transform the unidirectional motion of the drive shaft into the bi-directional motion of the propeller shafts.

(2) Linkages for connecting the horizontal and vertical rudders to the depth and steering mechanisms, respectively.

(3) The propeller drive shafts and sleeves.

5. Method of assembly

(a) The various sections of the torpedo are joined by joint screws.

Operation

1. When the torpedo is launched, the starting lever is forced aft by a latch in the tube. This closes the motor switch and opens the starting valve, allowing high pressure air to flow to the gyro which is presumed to be started in the same manner as that fitted to the Torpedo Type 89 Mod 1. Opening the starting valve also allows high pressure air to flow to the air reducers, from which reduced air flows as follows:

(a) To the depth engine where it operates the horizontal rudders.

(b) To the steering engine where it operates the vertical rudders.

(c) Probably to the gyro where it maintains gyro speed.

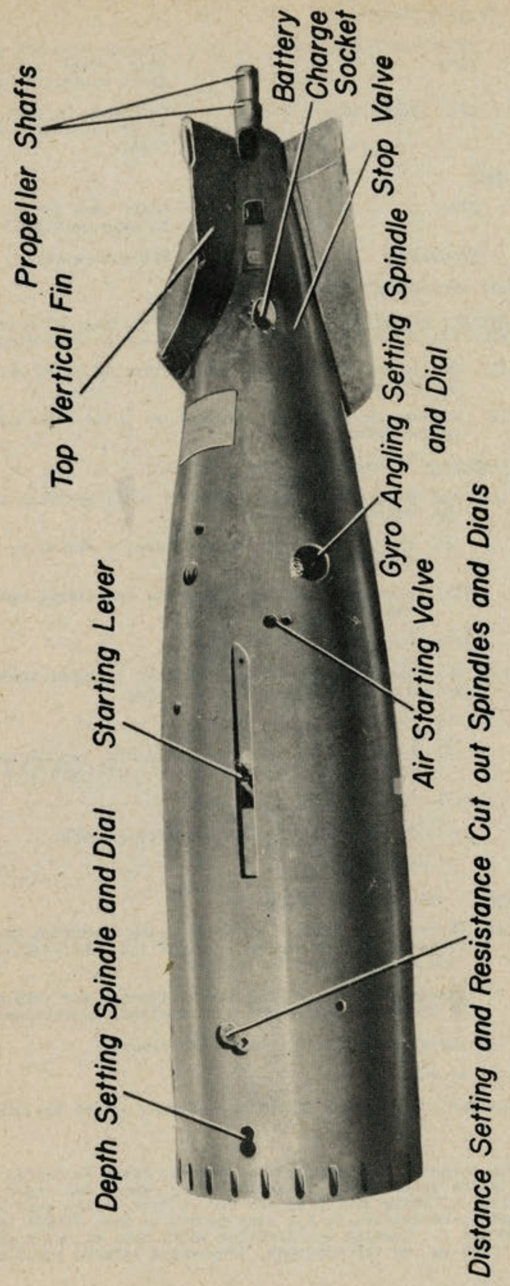


Fig. 97 - Torpedo Type 92-1, Afterbody, Top View

(Type 92 Mod 1 Torpedo, Cont'd.)

2. Closure of the motor switch starts the motor under a heavy resistance load. As the motor turns over, a mechanical linkage turns a shaft on the motor panel which successively removes various resistances from the motor circuit after a predetermined number of motor revolutions, thereby allowing the motor to increase its speed and rotate the propellers through the drive shaft and propeller shafts. After the torpedo has run its preset distance, a switch in the motor circuit opens, stopping the torpedo.

3. The depth control and steering mechanisms are believed to operate in a manner similar to those fitted to the Torpedo Type 89 Mod 1.

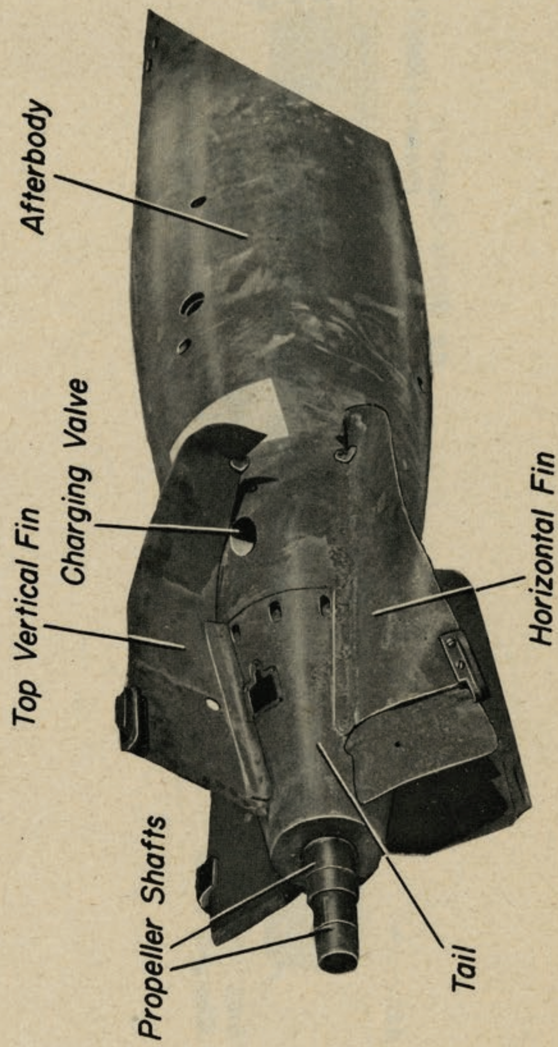


Fig. 98 - Torpedo Type 92-1, Tail Section, Starboard View

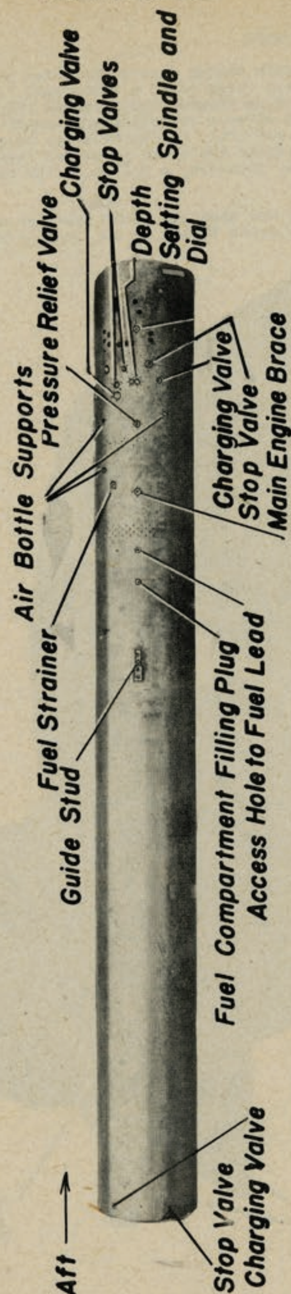


Fig. 99 - Torpedo Type 93 Model I Mod 2, Flask Section, Top View

Type 93 Model 1 Mod 2

General

1. 24" oxygen-driven torpedo, launched from destroyers or cruisers; believed to be in general service.

2. Fitted with a special warhead designated, "Model 2 for use with Type 93 Model 1 Mod 2 Torpedo".

3. The torpedo is driven by a two-cylinder, double-acting, reciprocating steam engine and is capable of running 22,400 yards at a speed of 50 knots or 33,800 yards at 40 knots. The depth control gear may be set for depths from 2.5-15 meters and the gyro angling device may be set for angles up to 90°, either to starboard or to port, in 1° steps.

Description

1. Lengths

Overall	29' 6"
Warhead	4' 7"
Flask section	18' 1"
Afterbody	4' 9"
Tail	2' 1"

2. Total weight in air — 6000 lb. approx.

3. External fittings

(a) Flask section

Guide stud	On top center line, 7' 7 1/2" forward of afterbody joint.
Stop valves	Four; one 7" to port from top center line, 2 1/4" abaft warhead joint; one 2 3/4" to port from top center line, 23" forward of afterbody joint; one 3 1/2" to starboard from top center line, 23 1/2" forward of afterbody joint; one 5 1/2" to starboard from top center line, 2' 3" forward of afterbody joint.
Charging valves	Four; one 7" to starboard from top center line, 2 1/4" abaft warhead joint; one 5 1/2" to starboard from top center line, 2' 5 1/2" forward of afterbody joint; one 8" to starboard from top center line, 23" forward of afterbody joint; one 16" to starboard from bottom center line, 13 3/4" forward of afterbody joint.
Depth setting spindle and dial	On top center line, 2' 2 3/4" forward of afterbody joint.
Dial (purpose unknown)	9 1/2" to starboard from top center line, 2' 3 3/4" forward of afterbody joint.
Depth mechanism cover plate	10" diam., on bottom center line, 2' 1" forward of afterbody joint.
Water flap	Rectangular, 2 3/4" x 5", on bottom center line, 5 1/4" forward of afterbody joint.
Access holes to locking ring	90° to starboard and to port, respectively, from top center line, 3 1/4" forward of afterbody joint.

(b) Afterbody

Starting lever	1" to port from top center line, 8 1/2" abaft flask section joint.
Water trip lever	1" to starboard from top center line, 15 1/4" abaft flask section joint.
Gyro setting spindle and dial	8" to port from top center line, 2' 9" abaft flask section joint.

Added 1 August 1945
(Change No. 10)

[redacted]

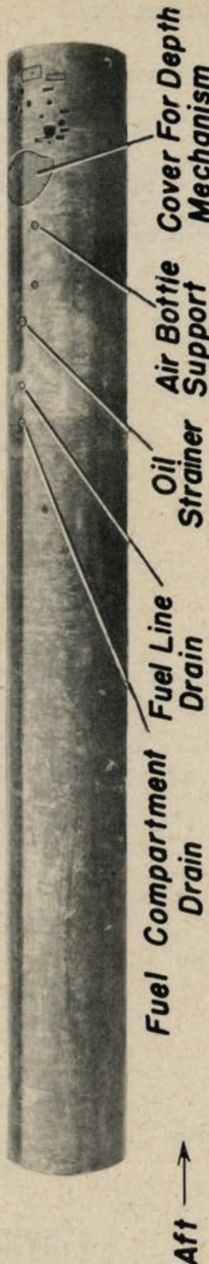


Fig.100 - Torpedo Type 93 Model I Mod 2, Flask Section, Bottom View

(Type 93 Model 1 Mod 2, Cont'd.)

Gyro cover plate	9 1/2" diam., on bottom center line, 2' 6 1/2" abaft flask section joint.

(c) Tail

Access hole to locking ring	Between top and port fins, 2 1/4" abaft afterbody joint.
Fins	
Upper vertical	Length, including rudder, 9 1/2".
Lower vertical	Length, including rudder, 2' 1".
Horizontal	Two; length, including rudders, 20 1/2".
Propellers	
Forward	Four-bladed, 23 1/2" span.
After	Four-bladed, 20 1/2" span.

4. Internal arrangement of parts

(a) Flask section - contains the following:

(1) The oxygen flask, a hollow steel cylinder with a removable forward bulkhead. A stop valve and a charging valve are fitted to the shell forward of the bulkhead. The cylinder is built to withstand high internal pressures.

(2) The fuel compartment, secured to the after end of the oxygen flask.

(3) The oil compartment, secured to the after end of the fuel compartment, contains the lubricating oil for the main engine and also two control air bottles for the steering and depth mechanisms.

(4) The balance chamber, abaft the oil compartment, is formed by the oil compartment shell and a bulkhead and contains the following:

(i) A hydrostatic valve-pendulum type depth mechanism.

(ii) An air bottle which provides air to run the main engine at the start of the run. This bottle is connected directly in series with the oxygen flask.

(iii) A third control air bottle for the steering and depth mechanisms.

(iv) The remaining stop and charging valves.

(5) The engine room, fitted abaft the balance chamber, is formed by the oil compartment shell and a bulkhead. The engine room is open to sea water and contains the following:

(i) The main starting gear consisting of the water trip lever, the water flap, the starting valve and the distance gear.

(ii) The auxiliary starting gear consisting of the starting lever and a small valve.

(iii) The combustion pot and igniters.

(iv) A depth engine of the follow-up type. The engine incorporates a rudder-locking device which locks the rudders from the time the torpedo is launched until it has completed its initial dive and steadied on its course.

(v) A reciprocating oil and water pump.

(vi) A gear-type water pump.

(vii) The main engine cylinders.

(viii) A small surge tank.

(b) Afterbody - contains the following:

(1) The main engine and steering engine, each of a type similar to that fitted to the Torpedo Type 89 Mod 1.

(c) Tail

(1) The internal arrangement of parts is similar to that in the Torpedo Type 89 Mod 1.

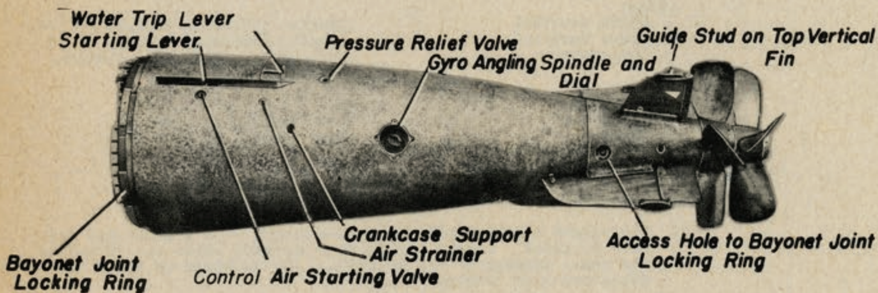


Fig. 101 - Torpedo Type 93 Model I Mod 2, Afterbody

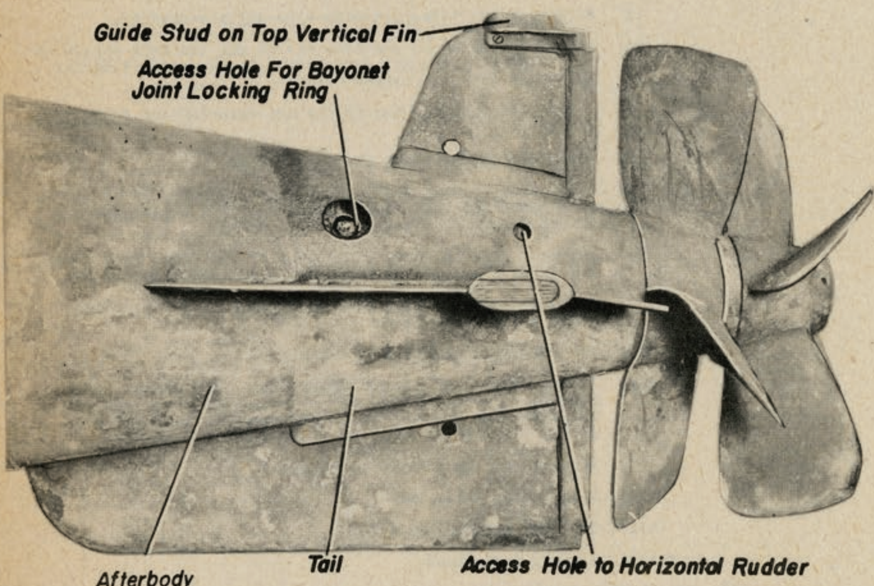


Fig. 102 - Torpedo Type 93 Model I Mod 2, Tail Section, Port View

(Type 93 Model 1 Mod 2, Cont'd.)

5. Method of assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings.

Operation

1. When the torpedo is launched, the starting lever is forced aft by a latch in the tube, allowing high pressure air from the control air bottles to flow as follows:

(a) To the gyro which is unlocked and spun by a single short blast of air. The air is shut off after approximately 1/2 second.

(b) To two reducers whence it passes to the steering and depth engines.

2. When the torpedo hits the water, the water trip lever is forced aft and/or the water flap is forced in, opening the main starting valve and allowing high pressure air from the remaining bottle to flow to the main oxygen reducing valve whence it flows to the main engine via the combustion pot. Opening the main starting valve also allows oxygen to flow to the combustion pot. The air turns over the main engine and runs it until the igniters fire the fuel/oxygen mixture which is subsequently pumped into the combustion pot.

3. When the main engine turns over, it performs the following:

(a) It operates the sea water pump which forces water through a pressure regulator and surge tank to:

(1) The fuel compartment where it forces fuel into the combustion pot.

(2) The combustion pot via a smaller surge tank.

(b) It operates the oil pump which forces lubricating oil from the bottles to the main engine.

(c) It operates the gear-type sea water pump which forces water into the main engine.

(d) It unlocks the horizontal rudders through the rudder locking device.

(e) It revolves a cam which trips two spring-loaded hammers which in turn fire the igniters. The fuel/oxygen mixture in the combustion pot is thereby ignited to form high pressure gases which are cooled by the water in the combustion pot. During the cooling process, the water is turned into steam.

4. The high pressure gas and steam flows from the combustion pot to the main engine, causing it to operate at high speed. The engine rotates the drive shafts and sleeves which in turn rotate the propellers.

5. The depth control and steering mechanisms operate in a manner similar to those fitted to the Torpedo Type 89 Mod 1.

6. A recently recovered model of this torpedo differs as follows from the one described above:

(a) It incorporates three speed settings instead of two, the added speed being lower than the original two.

(b) It is fitted with a new type of steering mechanism wherein the outer gimbal of the gyro is not directly connected to the small air valve but instead controls a displacement diaphragm linkage which in turn controls the small air valve. This change makes the steering mechanism considerably more effective.

(c) Its depth mechanism incorporates a depth change linkage which enables the torpedo to run a set distance at one depth and then rise and complete its run at a shallower depth. The exterior of the flask section is fitted with three spindles and dials which control the following:

(1) The initial depth setting.

(2) The length of run at the initial set depth.

(3) The final depth setting.

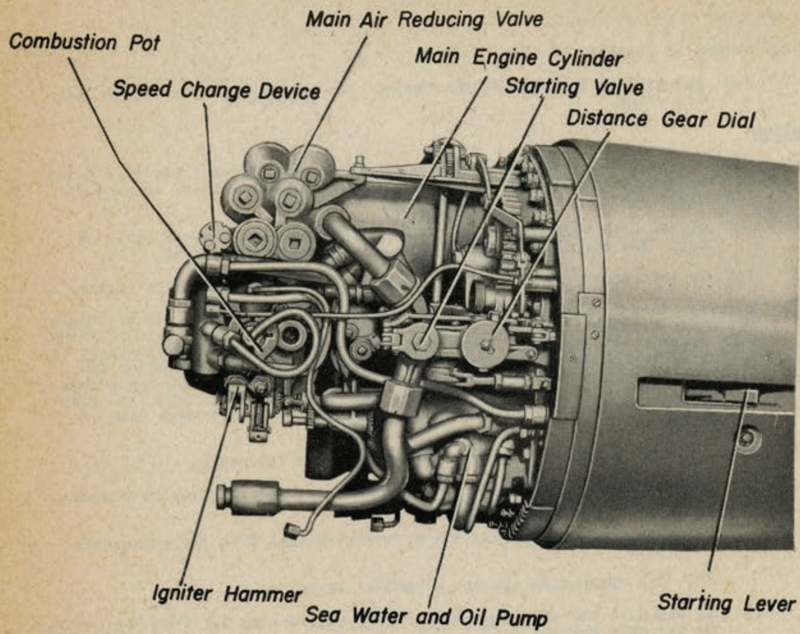


Fig. 103 - Torpedo Type 93 Model I Mod 2, Engine, Top View

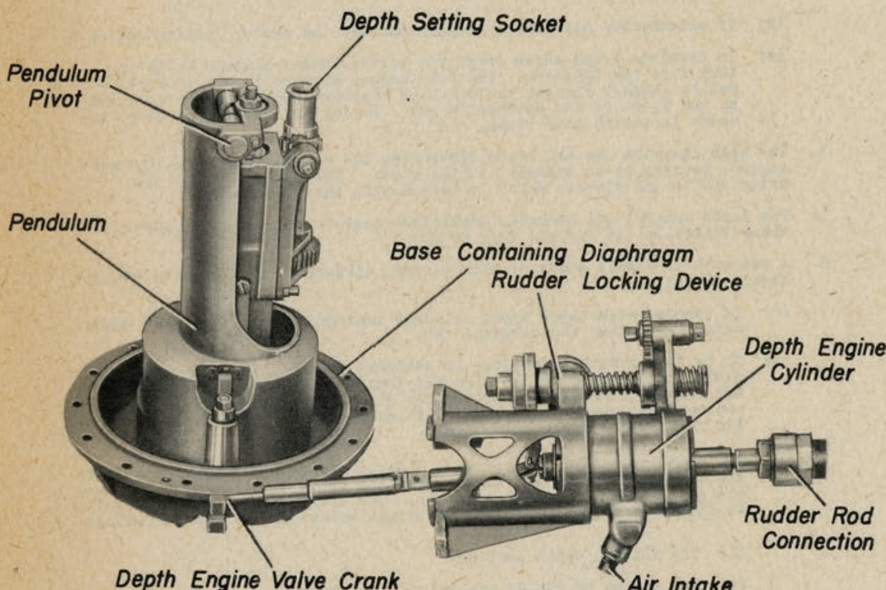


Fig. 104 - Torpedo Type 93 Model I Mod 2, Depth Mechanism

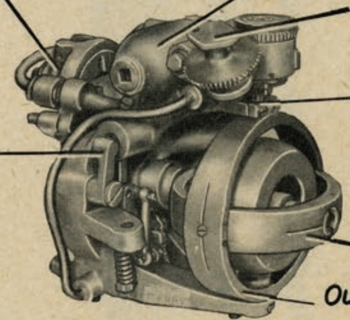


Fig. 105 - Torpedo Type 93 Model I Mod 2, Gyro, Side View

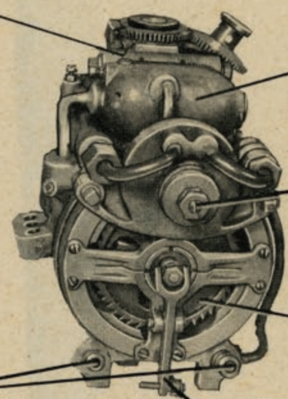


Fig. 106 - Torpedo Type 93 Model I Mod 2, Gyro

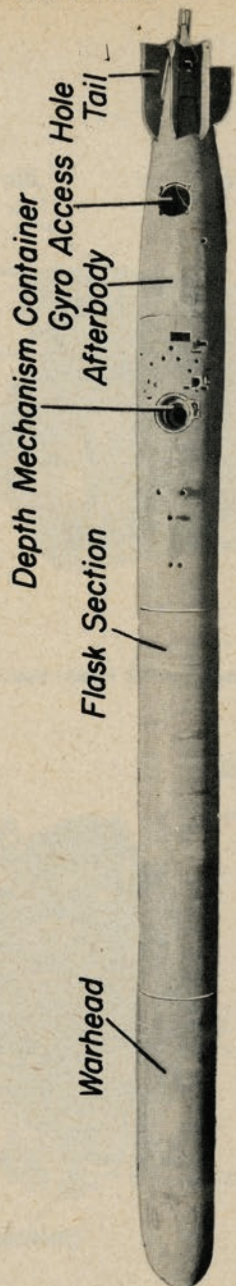


Fig. 107 - Torpedo Type 93 Model 3, Bottom View

Torpedo Type 93 Model 3

General

1. 24" oxygen-driven torpedo, designed to be launched from destroyers or cruisers; believed to be in general service.

2. Fitted with warhead designated, "Model 2 for use with Type 93 Model 3".

3. The torpedo is driven by a two-cylinder, longitudinal double-acting reciprocating steam engine. It is believed to have three speed/range settings and also gyro angling and depth control gear, but no performance data are available.

Description

1. Lengths

Overall	29'6"
Warhead	7'4"
Flask section	15'3"
Afterbody	4'10"
Tail	2'1"

2. Total weight in air — Unknown

3. External fittings

(a) Flask section

Guide stud	On top center line, 7'7" forward of afterbody joint.
Stop valves	Three; one 8" to starboard from top center line, 27" forward of afterbody joint; one 5" to starboard from top center line, 24" forward of afterbody joint; one 7" to port from top center line, 2" abaft warhead joint.
Depth mechanism cover plate	On bottom center line, 25" forward of afterbody joint.
Depth setting spindles and dials	Three, near afterbody joint.
Access holes for locking ring	90° to port and to starboard respectively from top center line, 3" forward of afterbody joint.

(b) Afterbody

Starting lever	1" to port from top center line, 9" abaft flask section joint.
Water trip lever	On top center line, 16" abaft flask section joint.
Gyro angling setting spindle and dial	8" to port from top center line, 33" abaft flask section joint.
Gyro cover plate	9 1/2" diam., on bottom center line, 33" abaft flask section joint.

(c) Tail

Propellers	None recovered
Fins	
Upper vertical	Length, including rudder, 9".
Lower vertical	Length, including rudder, 25".
Horizontal	Two, length including rudders, 20".
Intermediate (between horizontal and lower vertical fins)	Two, each 25" long (no rudders).

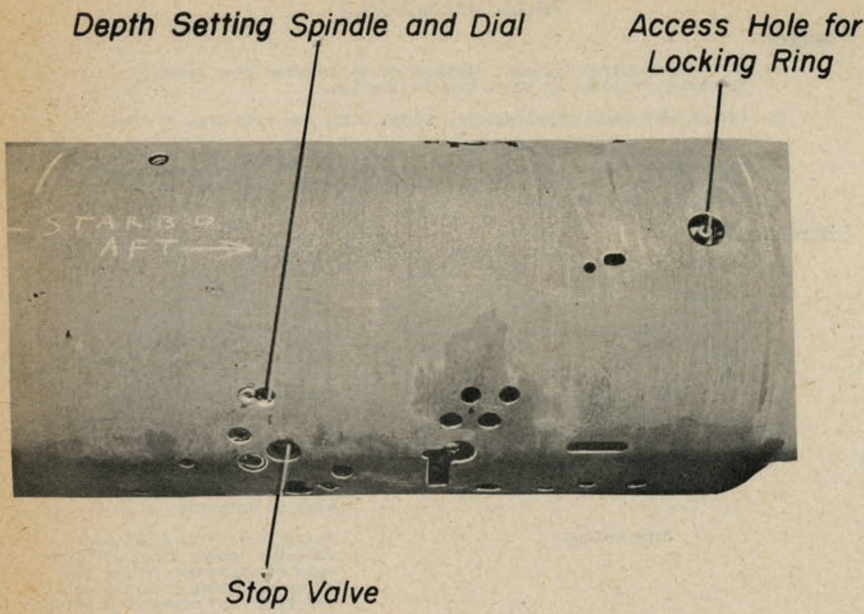


Fig. 108 - Torpedo Type 93 Model 3, Flask Section, Starboard Inverted View

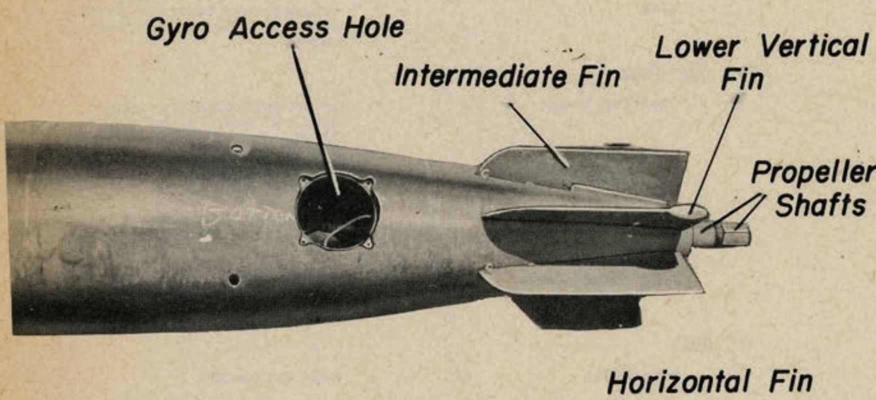


Fig. 109 - Torpedo Type 93 Model 3, Afterbody and Tail, Bottom View

(Torpedo Type 93 Model 3, Cont'd.)

4. Internal arrangement of parts

(a) Not known but believed similar to that of the Torpedo Type 93 Model 1 Mod 2.

5. Method of assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings.

Operation

1. Not known but believed similar to that of the Torpedo Type 93 Model 1 Mod 2.

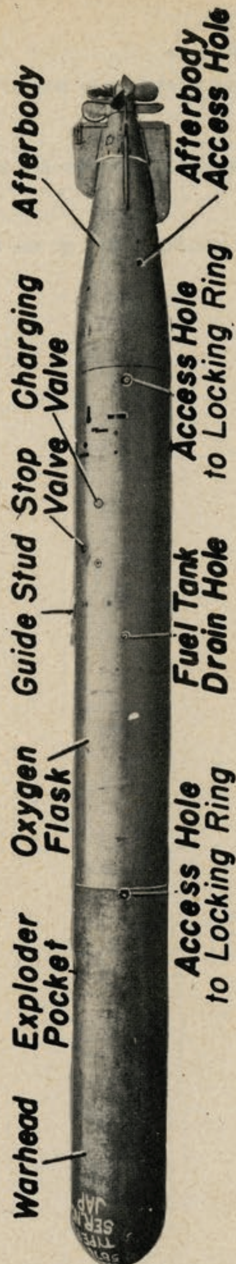


Fig. 110 - Torpedo Type 97

Added 1 August 1945
(Change No. 10)

Torpedo Type 97

General

1. 18" oxygen-driven torpedo, launched from midget submarines; believed to be in general service.

2. Fitted with Warhead Type 97.

3. The torpedo is driven by a two-cylinder, longitudinal, double-acting reciprocating steam engine and is capable of running approximately 3500 yards at a speed of approximately 46 knots depending on the relative purity of the oxygen. The depth control gear may be set for depths from 2.5-15 meters and the gyro angling device may be set for angles up to 90°, either to starboard or to port, in 1° steps.

Description

1. Lengths

Overall	18' 5"
Warhead	5' 11"
Flask section	7' 11"
Afterbody	3' 4"
Tail	1' 3"

2. Total weight in air — 2205 lb. (approx)

3. External fittings

(a) Flask section

Guide studs	Two, on top and bottom center lines, respectively, 3' 8 1/2" forward of afterbody joint.
Stop valves	Three, one 4 1/4" to starboard from top center line, 2" abaft warhead joint; one 5" to port from top center line, 2' 8 3/4" forward of afterbody joint; one 5" to port from top center line, 2' 3 1/2" forward of afterbody joint.
Charging valves	Four; one 4 1/2" to port from top center line, 2" abaft warhead joint; one 8 1/2" to port of top center line, 2' 11 1/2" forward of afterbody joint; one 1" to starboard from top center line, 2' 7" forward of afterbody joint (may not be used); one 1 1/2" to starboard from top center line, 2 1/2" forward of afterbody joint (blanked off on most torpedoes).
Depth setting spindle and dial	On top center line, 2' 3 1/2" forward of afterbody joint.
Depth mechanism cover plate	8" diam., on bottom center line, 2' 2" forward of afterbody joint.
Gyro angling setting spindle and dial	On top center line, 2' 11 1/2" forward of afterbody joint.
Gyro cover plate	9" diam., on bottom center line, 3' 2" forward of afterbody joint.
Distance setting spindle and dial	On top center line, 3 3/4" forward of afterbody joint.
Starting valve	On top center line, 6 1/2" forward of afterbody joint.
Rudder locking adjusting dial	8" to starboard from bottom center line, 13 3/4" forward of afterbody joint.
Access holes to locking ring	90° to port and starboard, respectively from top center line, 2 1/2" forward of afterbody joint.

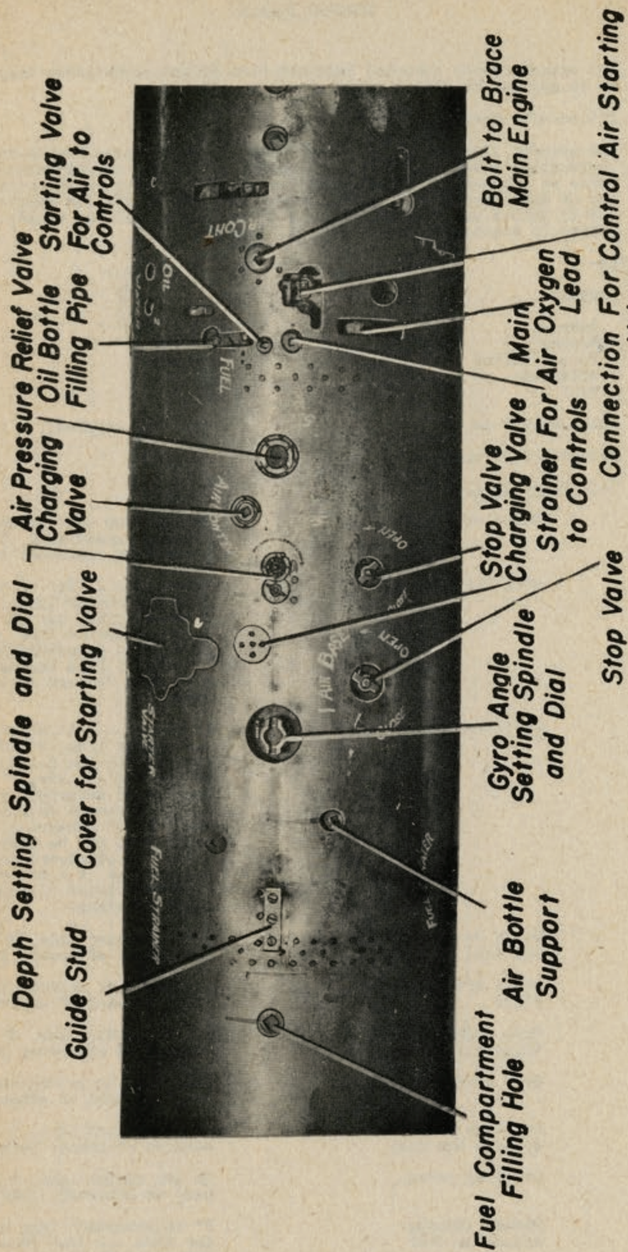


Fig. III - Torpedo Type 97, Flask Section, Top View

(Torpedo Type 97, Cont'd.)

Starting valve cover plate	6 1/2" to starboard from top center line, 2' 7 1/2" forward of afterbody joint.

(b) Afterbody

Starting lever	1 1/2" to port from top center line, 6" abaft flask section joint.
Water trip lever	1 1/2" to starboard from top center line, 13" abaft flask section joint.

(c) Tail

Fins	
Upper vertical	Length, including rudder, 14 1/2".
Lower vertical	Length, including rudder, 19 1/2".
Horizontal	Two, length, including rudders, 19 1/2".
Propellers	
Forward	Four-bladed, 16" span.
After	Four-bladed, 13 1/2" span.

4. Internal arrangement of parts

(a) Flask section - consists of the following:

(1) The oxygen flask, a hollow steel cylinder with a removable forward bulkhead. A stop valve and a charging valve are fitted to the shell forward of the bulkhead. The cylinder is built to withstand high internal pressures.

(2) The fuel compartment, secured to the after end of the oxygen flask.

(3) The balance chamber, secured to the after end of the fuel compartment, contains the following:

(i) Four bottles of high pressure air, two of which start the motor and two of which operate the depth control and steering mechanisms.

(ii) A hydrostatic valve-pendulum type depth mechanism.

(iii) The remaining stop and charging valves.

(iv) A bottle of lubricating oil.

(v) A gyro.

(4) The engine room, abaft the balance chamber, is formed by the balance chamber shell and a removable bulkhead. The engine room is open to sea water and the arrangement of parts therein is similar to that in the Torpedo Type 93 Model 1 Mod 2. The main difference is that the water flap is omitted.

(b) Afterbody - contains the following:

(1) The main engine and the steering engine.

(c) Tail

(1) The internal arrangement of parts is similar to that in the Torpedo Type 89 Mod 1.

5. Method of assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings.

Operation

1. Similar to that of the Torpedo Type 93 Model 1 Mod 2.

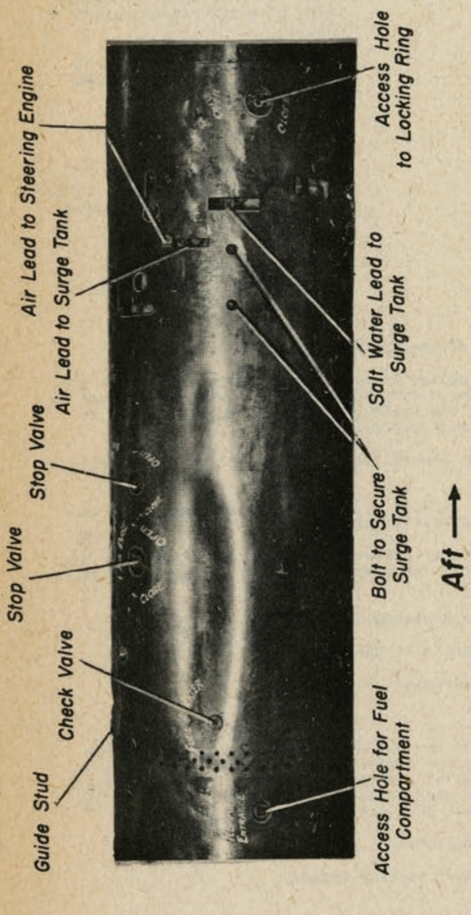


Fig. 112 - Torpedo Type 97, Flask Section, Port View

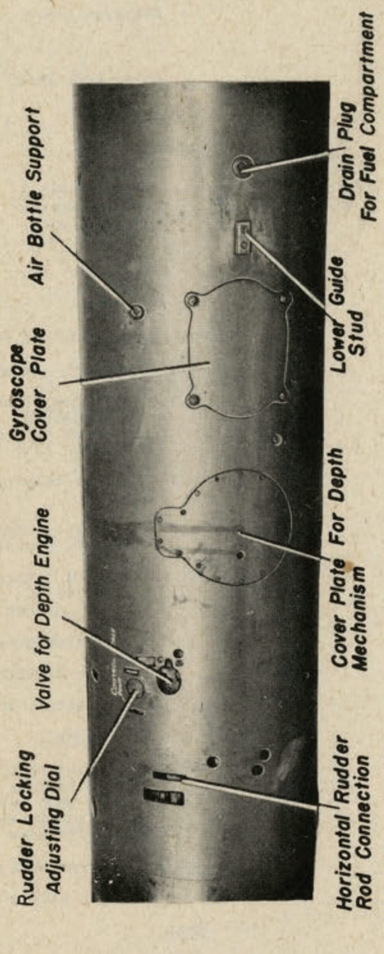


Fig. 113 - Torpedo Type 97, Flask Section, Bottom View

[redacted]

Added 1 August 1945
(Change No. 10)

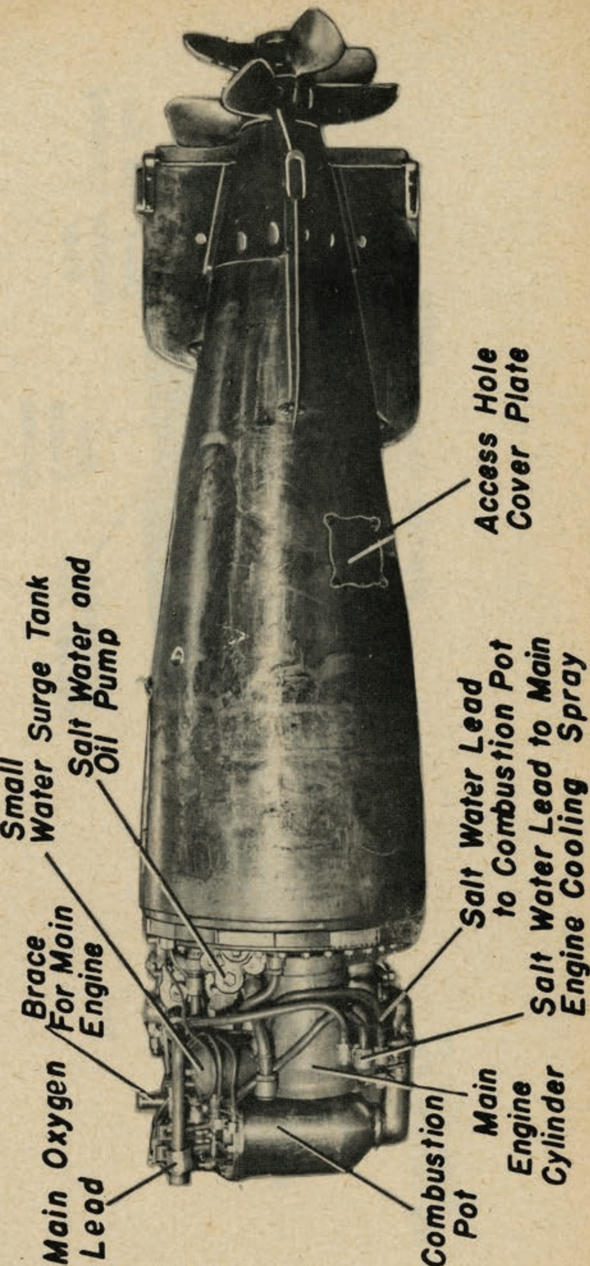


Fig. 114 - Torpedo Type 97, Afterbody, Port View

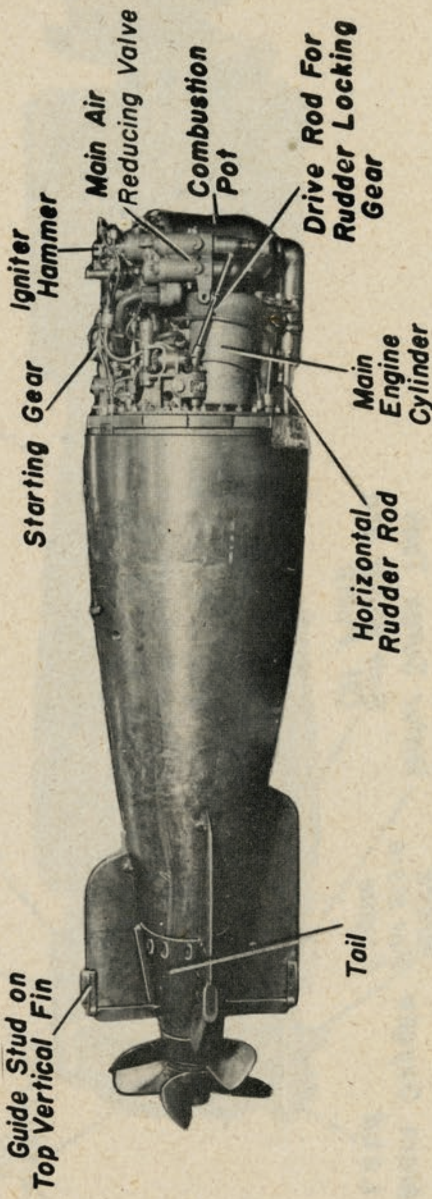


Fig. 115 - Torpedo Type 97, Afterbody, Starboard View

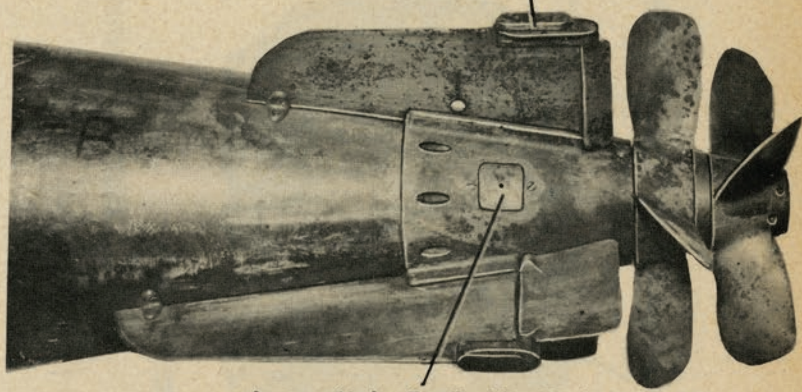


Fig. 116 - Torpedo Type 97, Tail Section

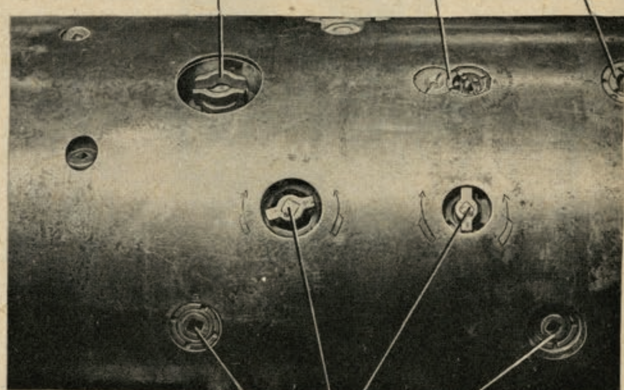


Fig. 117 - Torpedo Type 97, Flask Section

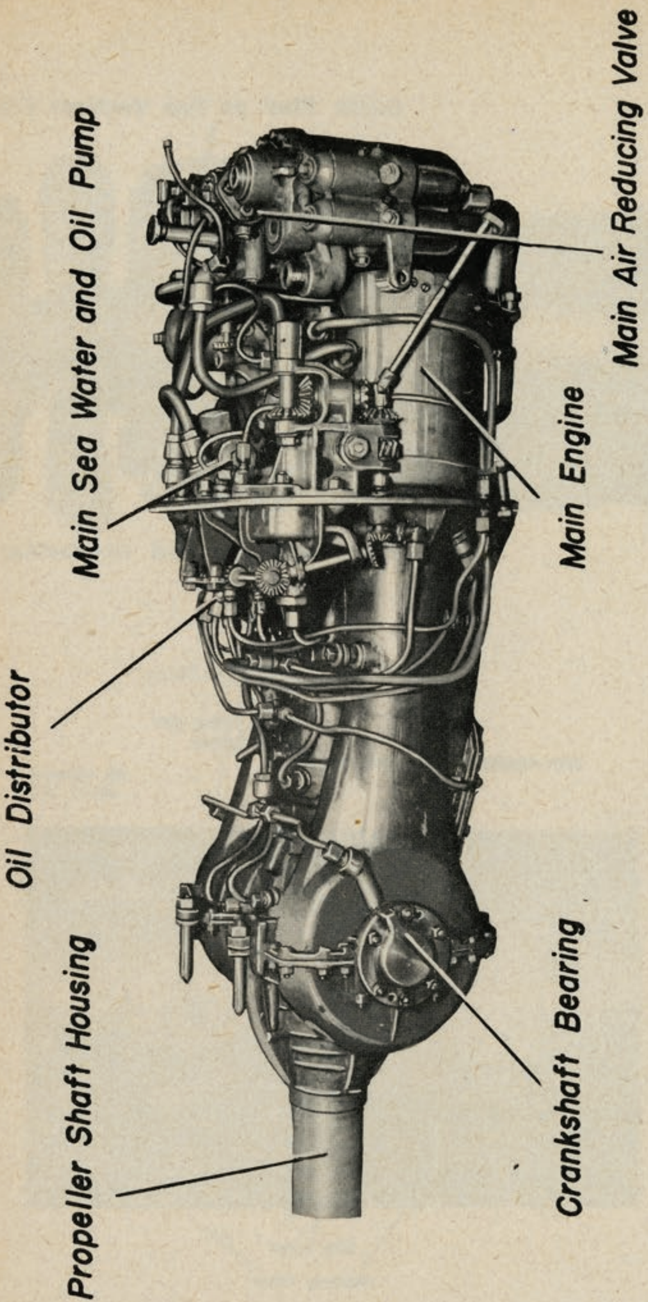


Fig. 118 - Torpedo Type 97, Engine

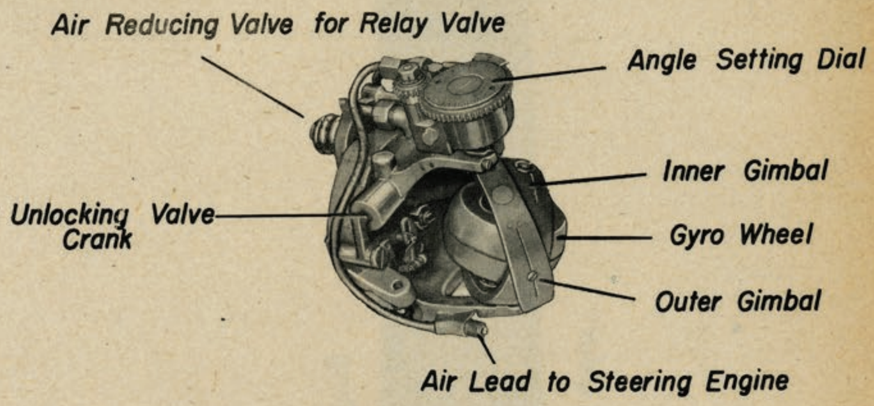


Fig. 119 Torpedo Type 97, Gyro Mechanism

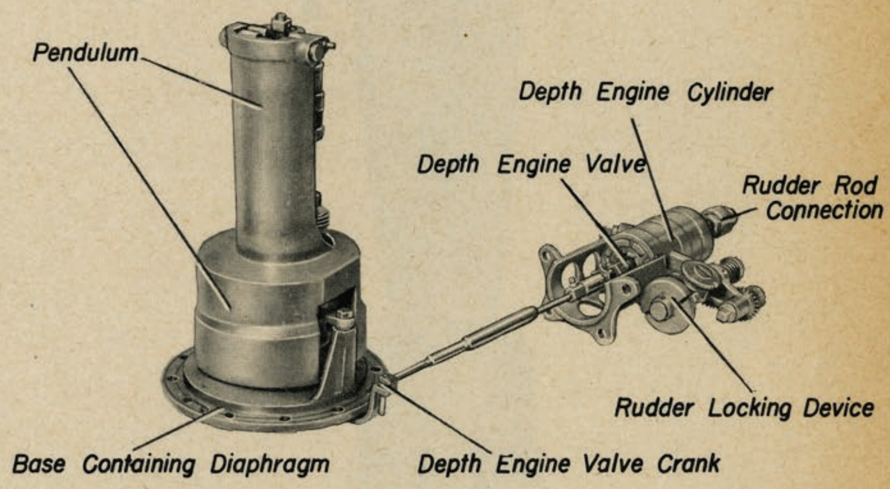


Fig. 120 - Torpedo Type 97, Depth Mechanism

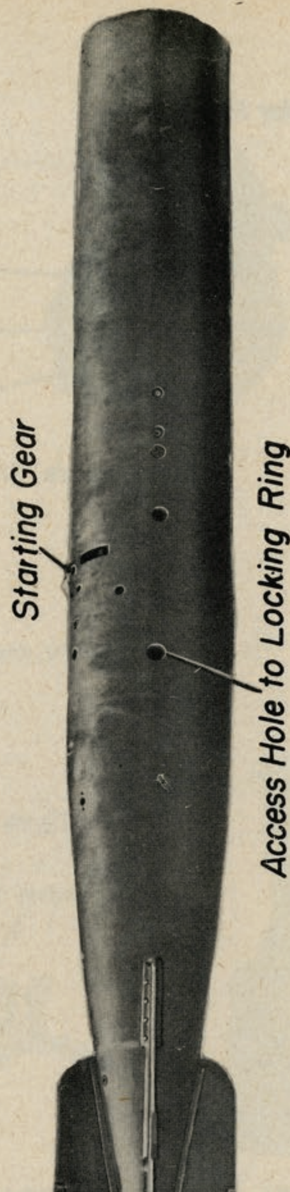


Fig. 121 - Torpedo Type 2 (Special), Warhead Removed

Torpedo Type 2 (Special)

General

1. 18" air-driven torpedo, launched from aircraft or motor torpedo boats; believed to be in general service.

2. Fitted with Warhead Type 2 Special.

3. The torpedo is driven by an eight-cylinder, radial, double-bank, steam engine and is capable of running approximately 3000 yards at a speed of 42 knots. The depth control gear may be set for depths from 2-16 meters. No gyro angling device is fitted.

Description

1. Lengths

Overall	18'6"
Warhead	6'0"
Flask section	7'4"
Afterbody	3'3"
Tail	1'11"

2. Total weight in air — 1800 lb. approx.

3. External fittings

(a) Flask section

Guide stud	On top center line, 3' 7 1/2" forward of afterbody joint.
Depth setting spindle and dial	On top center line, 23" forward of afterbody joint.
Depth mechanism cover plate	8" diam., on bottom center line, 21" forward of afterbody joint.
Starting gear	On top center line, 15 1/2" forward of afterbody joint.
Distance setting spindle and dial	3" to port from top center line, 15" forward of afterbody joint.
Stop valve	90° to starboard from top center line, 2'3" forward of afterbody joint.
Charging valve	90° to starboard from top center line, 19" forward of afterbody joint.
Access holes for locking ring	Two, 90° to starboard and to port, respectively, from top center line, 2 1/2" forward of afterbody joint.

(b) Afterbody

Steering gyro cover plate	4 1/2" to port from bottom center line, 7 1/2" abaft flask section joint.

(c) Tail

Propellers	
Forward	Four-bladed, 15" span.
After	Four-bladed, 13 1/2" span.
Fins	Two, vertical, 16 1/2" long; two, horizontal, 2'2" long (lengths include rudders).

4. Internal arrangement of parts

(a) Similar to Type 91 Mod 3, the main difference being that the anti-roll gyro and engines are omitted.

5. Method of assembly

(a) The various sections of the torpedo are joined by bayonet-type locking rings.

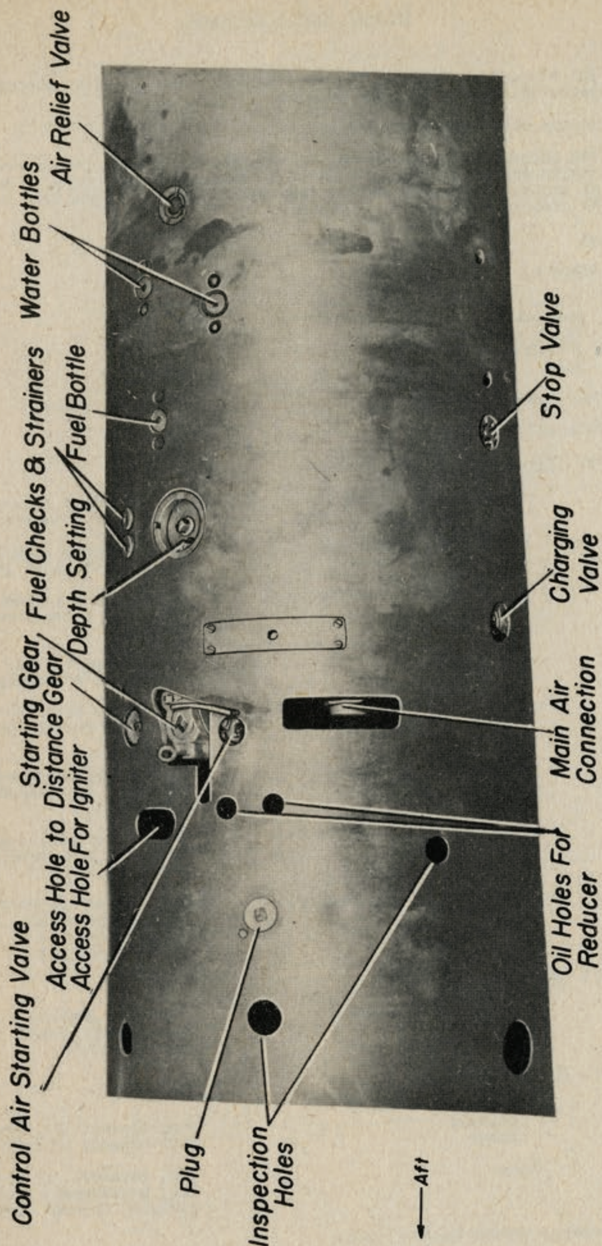


Fig. 122 - Torpedo Type 2 (Special), Flask Section, Top Starboard View

(Torpedo Type 2 (Special), Cont'd.)

Operation

1. Similar to that of the Torpedo Type 91 Mod 3 the main difference being that the anti-roll mechanism is omitted.

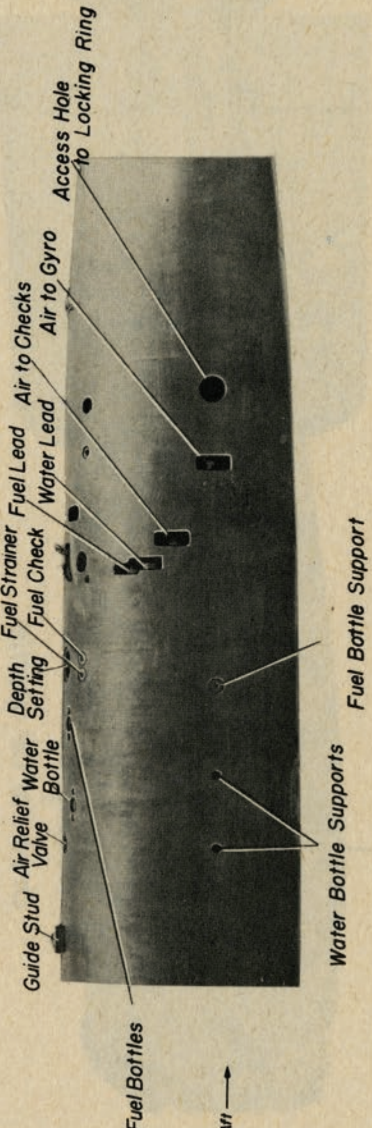


Fig. 123 - Torpedo Type 2 (Special), Flask Section, Port View

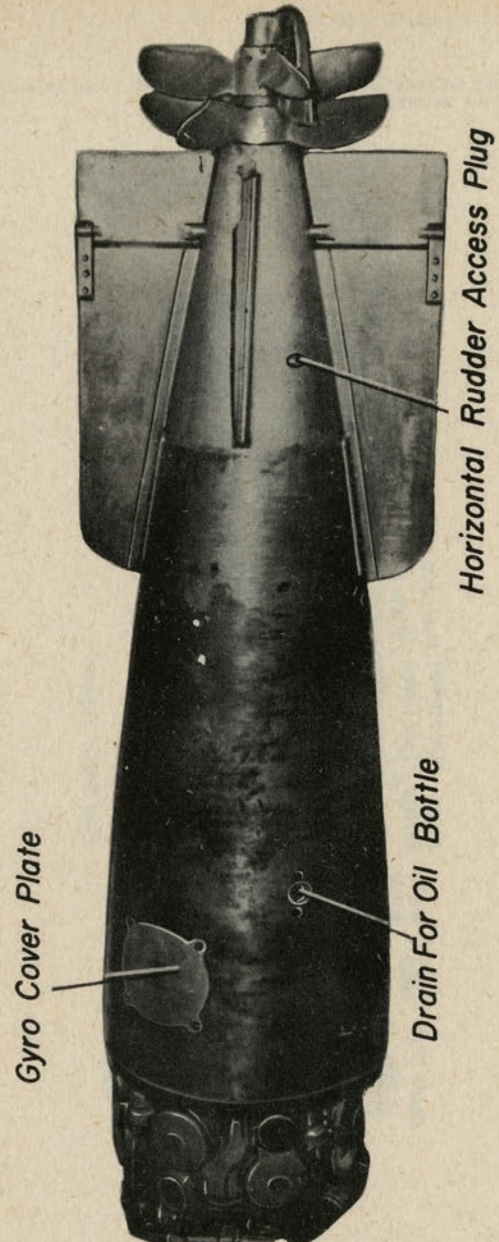


Fig. 124 - Torpedo Type 2 (Special), Afterbody, Bottom View

Added 1 August 1945
(Change No. 10)

MINE DISPOSAL HANDBOOK

PART VI

JAPANESE UNDERWATER ORDNANCE

* * * * * *

CHAPTER III

JAPANESE DEPTH CHARGES

NOVEMBER 1, 1944 [redacted]

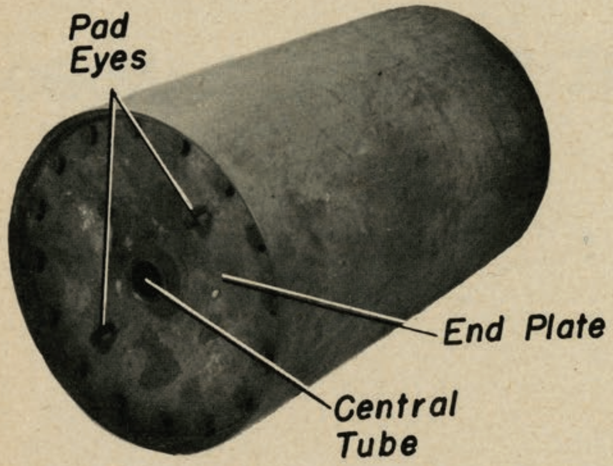


Fig. 1-- Type 95 Depth Charge, Pistol End

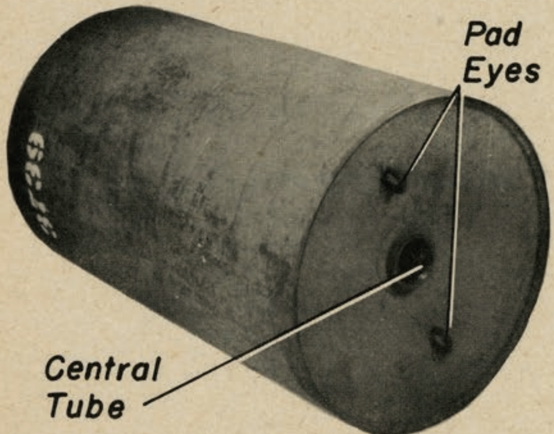


Fig. 2-- Type 95 Depth Charge, Booster End

Introduction

1. Although several types of Japanese depth charges are reported to exist, only those described below have been recovered and analyzed by American or Allied commands. All the charges recovered operate on the seepage-hole principle, and there is reason to believe that this principle is employed in most other Japanese depth charges.

2. It is doubtful that one of these charges will ever be found in a critically dangerous condition because of the fact that they will fire, if launched operationally, even at depths much shallower than the minimum possible depth setting. Time and the rate of speed at which the depth charge sinks are the main factors governing operation rather than hydrostatic pressure. If set on "SAFE", the charge will not fire except at crushing depths.

3. The following general precautions should be observed when dealing with depth charges of this type:

   (a) Do not move or jar the charge except from a safe distance.

   (b) If the charge is found underwater, raise it before attempting to render it safe.

   (c) Never move or change the depth setting while rendering safe.

Depth Charge Type 95 (Modification 1, Modification 2)

General

1. Hydrostatically operated anti-submarine weapon.

2. Japanese designation, "Type 95".

3. Launched from surface craft.

Description

1. Case

Shape	Cylindrical
Color	Grey
Material	Steel
Diameter Central tube Overall	 1"95 17"75
Length	30"5
Charge	219 lbs. Type 88 explosive with Shimose booster.
Total weight in air	353 lbs.

2. External fittings

End plate	16"5 diam., secured by 16 nuts. Forms one end of case.
Pistol cover	2"9 diam., screwed into central tube in center of end plate. Contains two holes for pistol safety fork.
Depth control valve	Screwed into opposite end of central tube from pistol cover.
Pad eyes	Two on each end of case.

3. The pistol is a tubular piece, 10"3 long and 1"9 in diameter. A small air-pressure test valve is located on a boss on the outer end of the pistol. The firing mechanism, consisting of a lock-ball type of spring-loaded firing pin assembly, is screwed into the inner end of the tubular case, along with the detonator. The pistol is inserted in the central tube under the pistol cover and is secured thereto before launching by the safety fork. Removal of the latter leaves the pistol free to move to the armed position.

[redacted]

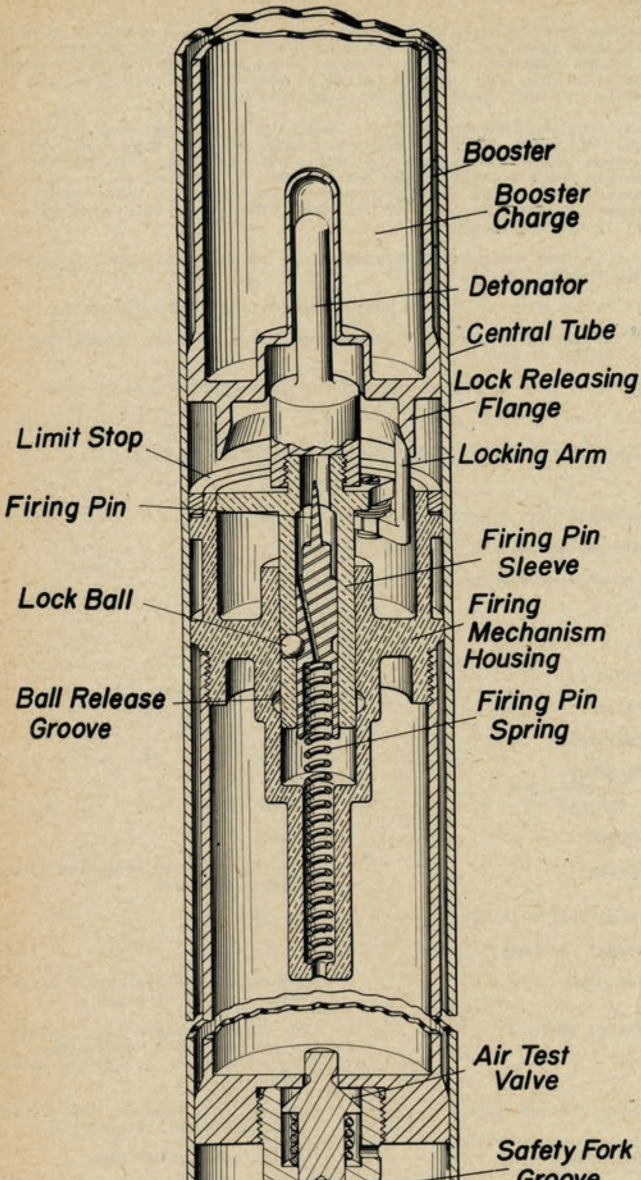


Fig. 3-- Type 95 Depth Charge Pistol, Sectional View

[redacted]

4. The booster is a tubular piece, 10"4 long and 1"9 in diameter, with an envelope on its inner end to receive a detonator, and a bayonet locking joint on its outer end. It is secured to the depth control valve in the central tube when the depth setting dial is set on "SAFE", being free to move to the armed position only after a depth setting has been made. It contains a 0.7 lb. charge.

5. The depth control volve is locked to the booster by the bayonet joint when the dial is set on "SAFE". Japanese settings on the depth setting dial are "SAFE", 30, 60, and 30 (with parachute attached), the settings being in meters. The parachute is believed to be used when the charge is launched from light, slow craft.

6. The Type 95, Modifications 1 and 2, which were recovered without pistols, differ from the Type 95 as noted below:

Type Charge	Modification 1 Type 98	Modification 2 Type 1 temporary
Weight of charge	325 lbs.	242 lbs.
Total weight in air	457 lbs.	374 lbs.

Operation

1. Before launching, the depth-setting dial on the depth control valve is moved from "SAFE" to the desired setting, thereby unlocking the booster can and aligning one of the three seepage holes with the water inlet hole. The safety fork is also removed at this time, unlocking the pistol. The charge is then launched, and, as it sinks, the increasing hydrostatic pressure forces the pistol and booster toward one another, with rolling rubber gaskets around each serving to keep the interior of the charge watertight.

2. The pistol moves inward about two inches to a limit stop almost immediately, while the booster moves more slowly, its rate of movement being controlled by the size of the seepage hole. When the booster contacts the pistol, the detonator houses in the booster, and the lock-releasing flange on the inner end of the booster can pivots the locking arm on the inner end of the pistol, thereby unlocking the firing pin sleeve. Further increase in pressure causes the booster to depress the firing pin sleeve and, when the lock balls move into the ball-release groove, the firing pin is free to impinge on the detonator. The firing depth, then, is dependent on the rate of flow of water through the seepage hole and the rate of speed at which the depth charge sinks.

3. When the charge is set on "SAFE", the booster can is locked to the depth-control valve, the pistol is secured to the pistol cover, and none of the water entry holes is uncovered.

Precautions

1. See Introduction.

Rendering Safe Procedure

1. Unscrew the pistol cover.

2. Remove the pistol by looping a short bight of twine about the safety fork groove and withdrawing it gently.

3. Remove the detonator from the inner end of the pistol.

4. Remove the depth control valve.

5. Insert a wooden probe through the pistol end of the central tube, and push the booster out the other end.

6. Dispose of detonator, booster and charge.

[redacted]

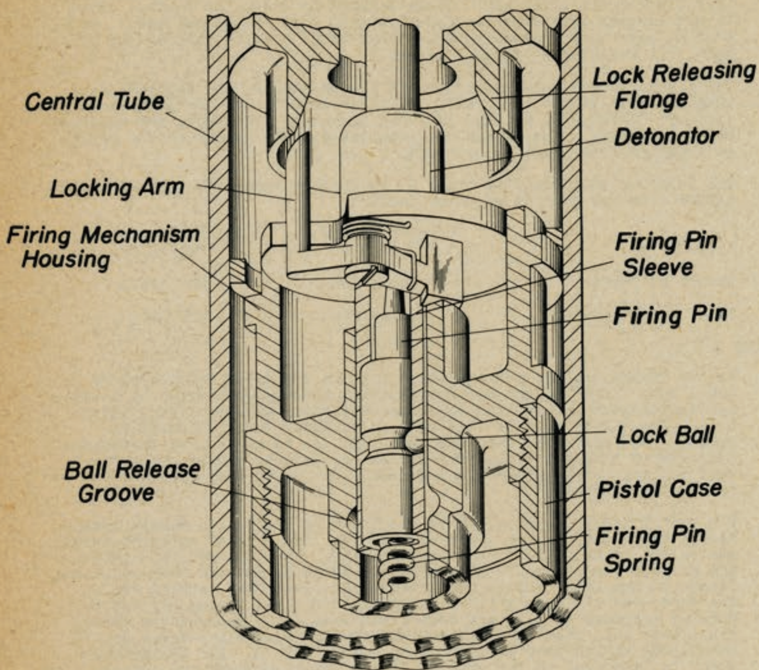


Fig. 4-- Firing Assembly, Type 95 Depth Charge, Sectional View in Elevation

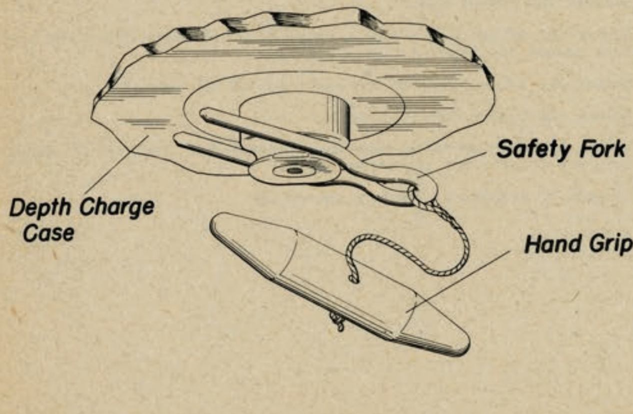
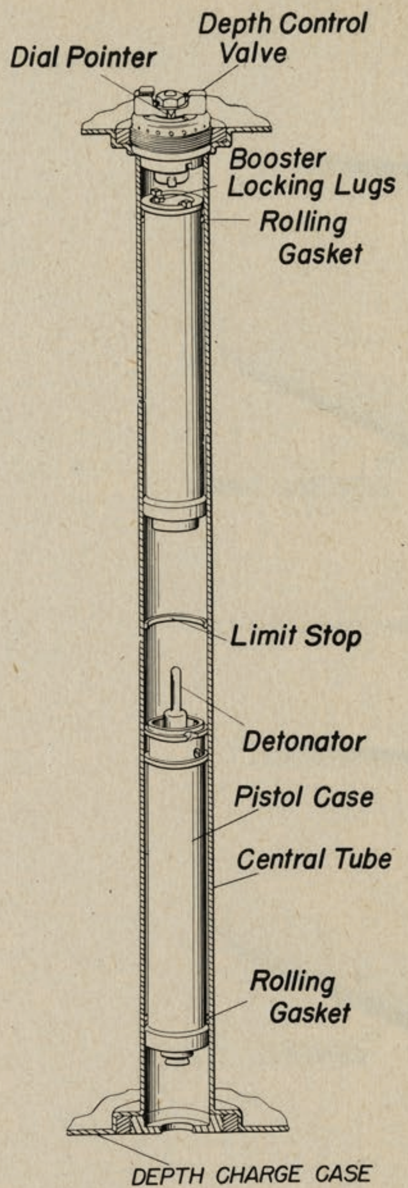


Fig. 5-- Pistol-Safety Fork Assembly, Type 95 Depth Charge



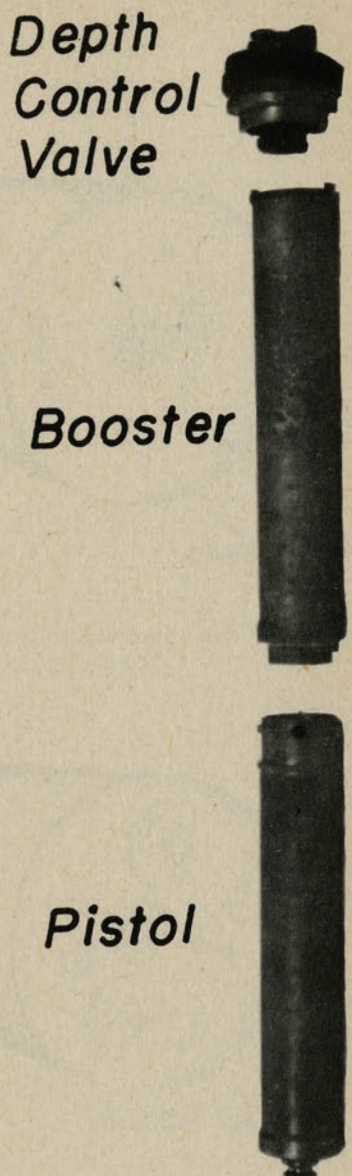


Fig. 6- Central Tube, Type 95 Depth Charge, Sectional View (Accessories shown in elevation)

Fig. 7-- Type 95 Depth Charge Accessories

[redacted]

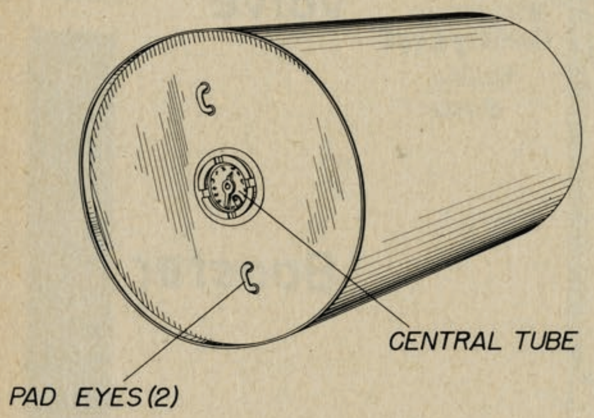


Fig. 8-- Type 2, Modification 1 Depth Charge, Pistol End

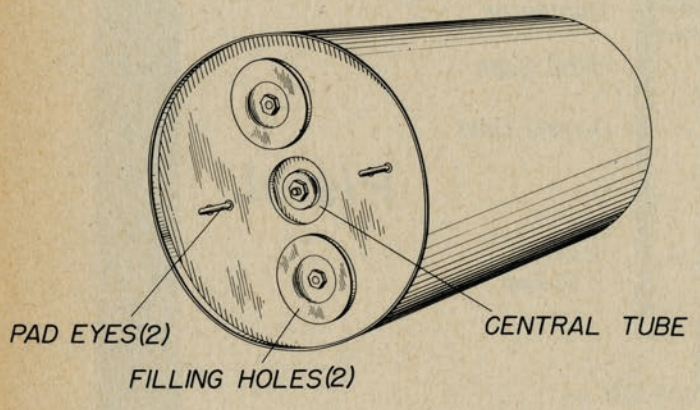


Fig. 9-- Type 2, Modification 1 Depth Charge, Booster End

Depth Charge Type 2, Modification 1

General

1. Hydrostatically operated anti-submarine weapon.
2. Japanese designation, "Type 2, Modification 1".
3. Launched from surface craft.

Description

1. Case

Shape	Cylindrical
Color	Black
Material	Steel
Diameter	
Central tube	3".625
Overall	17".56
Length	30".5
Charge	357 lbs. Type 98 explosive
Total weight in air	491 lbs. approx.

2. External fittings

Pistol	In end of central tube, locked by bayonet joint.
Filling holes	Two, 180° apart, on opposite end of case from pistol.
Pad eyes	Two on each end.
Booster can	In opposite end of central tube from pistol.

A broken white stripe, 1" wide, is painted around the end of the charge containing the filling holes.

3. The pistol is 14".5 long, 3".56 in maximum diameter, 1" in diameter at the safety sleeve, and is composed of the following main parts:

   (a) The depth-control mechanism. This is mounted in a housing on the outer end of the pistol. The depth settings on its dial are "SAFE", 30, 60, 90, 120 and 150 meters. The depth valve plate has five different sized seepage holes for the five different depth settings. A screen, spring and locking plate are fitted between the valve seat and the dial plate.

   (b) The diaphragm and firing device assembly. These are mounted in the diaphragm body on the inner portion of the pistol. The diaphragm consists of two rubber washers joined at the center and mounted in a circular, brass body. When the diaphragm operates, it separates two pistons, releasing lock balls, and allowing the spring-loaded firing pin to impinge on the detonator. The depth-control valve and firing device are connected by a safety sleeve which houses a safety spindle. The detonator is screwed to the inboard end of the pistol, and has the booster adapter screwed over it.

4. The booster can is a steel cylinder 7".5 long and 3".56 in diameter with an envelope on its inner end to receive a detonator and booster-adapter. A threaded spindle protrudes 2".75 from the outer end of the can.

Operation

1. The charge is armed when the dial is turned to any one of the five depth settings, and when the booster-adapter and detonator are housed in the booster. It is not known whether the booster is armed manually or hydrostatically. The booster is held in place by the friction fit of a gasket between the closing plate and the gland at the outer end of the booster.

2. When the charge is submerged, water enters the pistol through the holes in the setting dial, and passes through the locking plate, screen and

[redacted]

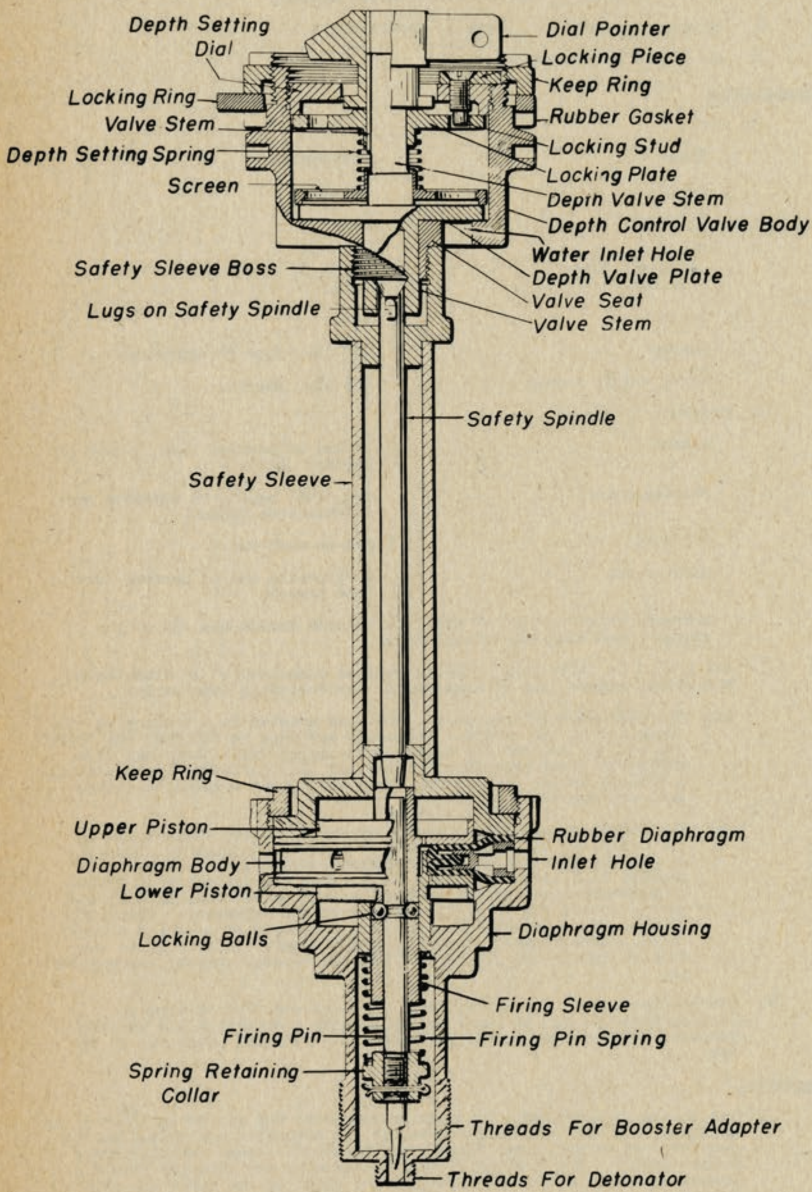


Fig. 10-- Type 2, Modification 1 Depth Charge Pistol, Sectional View

[redacted]

one of the five holes in the valve plate. The water then flows, at a rate controlled by the size of the hole in the valve plate, through the inlet hole in the valve seat, whence it passes out of the pistol and into the central tube. It is then forced back into the pistol through the inlet holes in the diaphragm body. As the water passes into the space between the two surfaces of the diaphragm, pressure spreads the diaphragm, forcing the pistons apart, and releasing the locking balls and firing pin.

3. When the charge is set on "SAFE", the depth-setting valve positions the depth valve stem in such a manner as to hold the safety spindle against the diaphragm so that it cannot operate.

Precautions

1. See Introduction.

Rendering Safe Procedure

1. Loosen the booster handle (turn counterclockwise) and remove the booster.
2. Remove the pistol by unscrewing the keep ring on the face of the depth control valve and turning the locking ring free of the bayonet joint. Fig. 12
3. Remove the detonator from the inner end of the pistol.
4. Dispose of detonator, booster and charge.

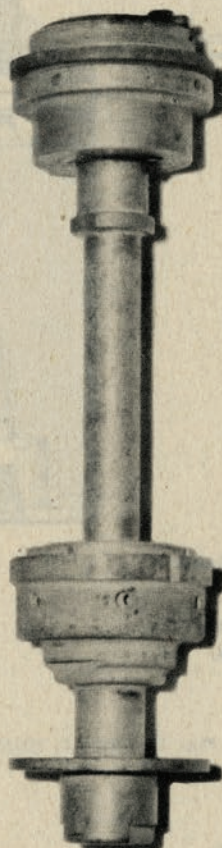


Fig. 11-- Type 2, Modification 1 Depth Charge Pistol

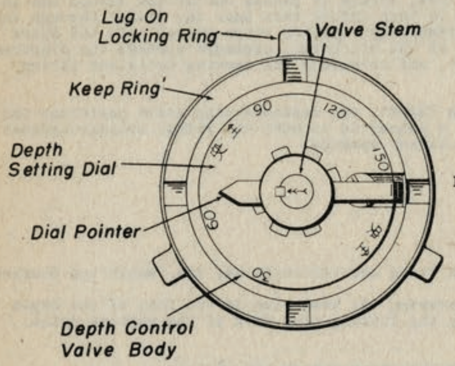
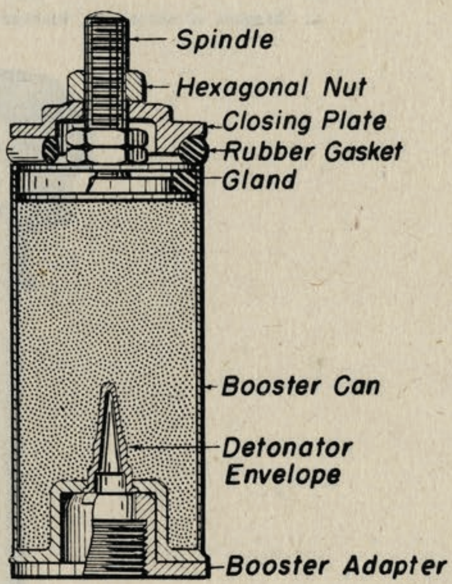


Fig. 12-- Dial Indicator, Type 2, Modification 1 Depth Charge Pistol

Fig. 13-- Type 2, Modification 1 Booster Assembly, Sectional View



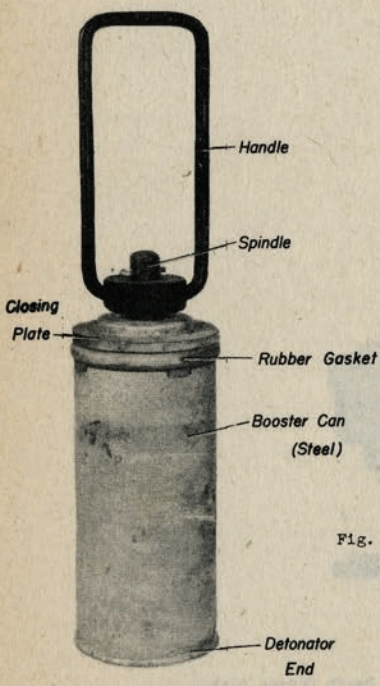


Fig. 14-- Type 2, Modification 1 Booster

[redacted]

MINE DISPOSAL HANDBOOK

PART VI

JAPANESE UNDERWATER ORDNANCE

CHAPTER 4

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

JULY 1, 1945

[redacted]

E r a s			Jap Calendar	Our Calendar	E r a s			Jap Calendar	Our Calendar
MEIJI	TAISHO	SHOWA			MEIJI	TAISHO	SHOWA		
33			2560	1900		12		2583	1923
34			2561	1901		13		2584	1924
35			2562	1902		14		2585	1925
36			2563	1903		15	1	2586	1926
37			2564	1904			2	2587	1927
38			2565	1905			3	2588	1928
39			2566	1906			4	2589	1929
40			2567	1907			5	2590	1930
41			2568	1908			6	2591	1931
42			2569	1909			7	2592	1932
43			2570	1910			8	2593	1933
44			2571	1911			9	2594	1934
45	1		2572	1912			10	2595	1935
	2		2573	1913			11	2596	1936
	3		2574	1914			12	2597	1937
	4		2575	1915			13	2598	1938
	5		2576	1916			14	2599	1939
	6		2577	1917			15	2600	1940
	7		2578	1918			16	2601	1941
	8		2579	1919			17	2602	1942
	9		2580	1920			18	2603	1943
	10		2581	1921			19	2604	1944
	11		2582	1922			20	2605	1945

Fig. A - Comparison of Calendars

Added 1 July 1945
(Change No. 8)

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

Introduction

1. The identification of captured or recovered Japanese underwater ordnance by means of markings and labels presents a difficult problem to personnel unfamiliar with oriental languages for many obvious reasons, not the least of which is the different alphabet employed. The fact that, as in the English language, certain letters or combinations thereof often embody several different meanings also adds to the problem as does the different method of writing. This chapter purports to present background information giving insight into the Japanese designation systems as well as representative examples of labels found on or in captured or recovered specimens of underwater ordnance.

2. It should be noted that the information contained herein is intended merely as a guide, and the fact that it may serve to permit reasonably accurate identification of some specimens should not be construed as relieving disposal personnel of the responsibility for making accurate tracings or clear photographs of all labels and markings encountered in the line of disposal duties. The data presented herein, while believed to be accurate, are not complete and therefore not suitable as a basis for a final decision as to a specimen's Japanese designation.

3. Understanding the Japanese ordnance designation system is contingent upon an understanding of the Japanese calendar system whereas proper reading and interpretation of markings and labels require that the translator be familiar with the many vagaries and inconsistencies of the Japanese numeral system. Brief discussions of the calendar and numeral systems follow immediately below.

Japanese Calendar

1. The Japanese employ two distinct calendar systems, one in which the current year is recorded with respect to the founding of the Japanese empire, and the other in which the current year is recorded with respect to the date on which the reign of the incumbent emperor began. The empire was founded in 740 B.C. hence the Christian year 1945 is 2605 in the empire calendar. Three eras based on an emperor's reigning years are pertinent to this discussion:

   (a) The Meiji Era (明 治) 1868 to 30 July 1912.

   (b) The Taisho Era(大 正) 31 July 1912 to 25 December 1926.

   (c) The Showa Era (昭 和) 26 December 1926 to date.

   The Christian year 1945 is therefore the year 20 of the Showa Era.

Numeral System

1. Although the Japanese characters representing the cardinal numbers are well standardized, several systems are used for writing multiples and number combinations with resultant confusion in translation. The number combinations are usually set down, in Japanese characters, either from left to right or from top to bottom, but in some cases may be found written from right to left in the traditional oriental manner. It will be noted, however, that long series of numbers such as serial numbers are almost always written in arabic numerals in the conventional manner.

2. Two different systems employed for writing number combinations follow below:

   (a) The arithmetic method whereby the actual addition and multiplication involved in achieving the sum or multiple is depicted in the characters representing said sum or multiple. This method has rarely been encountered and is not believed to be in general use. Typical examples are given below:

   (1) 15 - - - - - - - - - - - - - 十 五
   ten (plus) five

   (2) 50 - - - - - - - - - - - - - 五 十
   five (times) ten

   (3) 57 - - - - - - - - - - - - - 五 十 七
   five (times) ten (plus) seven

   (4) 6231 - - - - - - - - - - - - - 六 千 二 百 三 十 一
   six (times) thousand (plus) two (times) hundred (plus) three (times) ten (plus) one

Added 1 July 1945
(Change No. 8)

[redacted]

九三式機雷四型		
藥種		假稱一式爆藥
種目		第 關 C7 號
製造		昭和 18 年 4 月
鑄造		昭和 年 月
藥量		100 瓩 000 瓦
裝	年月	昭和 18 年 5 月
填	所名番號	吳 イ 號
總重量		223 瓩 300 瓦

93 Type Mine 4 Model		
Explosive Type		Provisional Designation 1 Type Explosive
Lot No.		No. "Kan" C7
Manufactured		Showa Era 18 Year 4 Month (April 1943)
Cast		(No Date - Powder Type Explosive)
Explosive Weight		100 kg. 000 gms.
M f d.	Date	Showa Era 18 Year 5 Month (May 1943) Refers to Mine Case
	Name and Number of Place	Kure "I" Plant No.
Total Weight		223 kg. 300 gms.

Fig. I - Mine Type 93 Model 4, Label Pasted Either on Charge Container or Under Base Plate.

(Numeral System, Cont'd.)

(b) A method, closely corresponding to the English decimal system, whereby digit by digit representation by Japanese equivalents of arabic numerals is used to depict sums and multiples. Under this system, the characters representing the numbers ten, hundred, thousand, etc. are omitted as in the arabic system. Typical examples follow:

(1) 15 - - - - - - - - - - - - - 一五
one five

(2) 50 - - - - - - - - - - - - - 五〇
five zero

(3) 57 - - - - - - - - - - - - - 五七
five seven

(4) 6231 - - - - - - - - - - - - 六二三一
six two three one

3. A situation somewhat analagous to the two different systems of writing numerals may be found in the English system whereby the number, "214," might be read either as "two fourteen" or "two hundred and fourteen." In conclusion, it must be reemphasized that any of the numbers listed in Par. (a) or (b) above may be written from left to right, from top to bottom or from right to left and, in cases where several numerals are written close together, care and logic must be exercised continually in order to effect proper translations.

Type Number

1. The primary or basic designation of Japanese underwater ordnance is generally the type number. This ordinarily consists of the last two numbers of the empire calendar year, or year of the era of the reigning emperor, during which the ordnance was officially accepted for service. During the Meiji and Taisho eras, the era year was generally used while during the present (Showa) era, the empire year has been most often used. In the accompanying calendar (Fig. A), the numbers used for ordnance designation for each year since 1900 are underlined. It will be noted that the year designations used in the years 1912-1916 and 1941-1945 are identical. The actual designations used, however, are easily differentiated because, while the type numbers used are identical, different systems are used to record the actual designations. For example, the designation 三年式 (Third Year Type) indicates that the ordnance was adopted in 1914 whereas the designation 三式 (Type 3) indicates adoption in 1943.

Model and Modification Numbers

1. These numbers are used to designate various degrees of change in basic types (see Para. 1 above) although their exact significance is not definitely known. All ordnance designation systems contain inconsistencies and the Japanese system is no exception. The following conclusions, drawn from examination of various specimens, have been generally borne out and are believed to be reasonably accurate.

(a) If a model number is assigned to an ordnance item, it indicates that changes of an adaptive nature have been made. In the case of a mine, slight alterations in its size or shape for the purpose of adapting it for laying from an unusual type of minelayer would probably warrant assigning a model number.

(b) If a modification number is assigned to an ordnance item, it indicates that changes of a corrective or improving nature have been made. In the case of a mine, correction of a fault in the mine firing mechanism by a design change would probably warrant assigning a modification number.

2. Model and Modification numbers may be assigned in combination to a single ordnance item. Although the Japanese system for so assigning these numbers is not definitely known, examination of captured specimens indicates the following to be generally applicable:

(a) Modifications of earlier Models are ordinarily indicated in an item's complete designation. The hypothetical example of a mine designated, "Type 26, Model 3, Modification 1" indicates that a Modification has

九四式機雷二型		
火藥	藥種	八八式爆藥
	種目	第 276 號
	製造年月	昭和 17 年 1 月
空体量		瓩
炸塡量		瓩
裝塡	年月	昭和 17 年 6 月
	所名番號	17 横 34 號

94 Type Mine 2 Model		
Powder	Kind of powder	88 Type Explosive
	Lot No.	No. 276
	Manufacture date	Showa Era 17 years one month (Jan. 1942)
Empty weight		Kilograms
Charge loaded weight		Kilograms
Loaded	Date	Showa Era 17 year six month (June 1942)
	Name and number of place	17 "Yoko" 34 No.

Fig. 2 - Mine Type 94 Model 2. Label Pasted Under Cover Plate.

品名	炸藥八八式機雷改一用
藥種	下瀬爆藥
種目	第 混 30 號
製造年月	昭和 14 年 3 月
鑄造年月	昭和 14 年 3 月
海軍火藥廠	

Name of Article	Bursting Charge 88 Type Mine Mod 1 Use
Kind of powder	Shimose Explosive
Lot No.	"Kon" No. 30
Manufacture date	Showa Era 14 Year 3 Month (March 1939)
Casting date	Showa Era 14 Year 3 Month (March 1939)
Naval Powder Factory	

Fig. 3 - Mine Type 88 Mod I, Label Pasted on Blocks of Explosive.

(Model and Modification Numbers, Cont'd.)

been made in the basic design of the Type 26, Model 3.

(b) Models of previous Modifications are not indicated in an item's designation. Continuing with the example drawn above, a mine designated, "Type 26, Model 4", might well be a new Model of the Type 26, Model 3, Modification 1 and include all the modified features of the Type 26, Model 3, Modification 1, although that fact is not obvious from its designation. The fact that no such designation as "Type 26, Modification 1, Model 3 (i.e., a designation with the Modification number written <u>before</u> the Model number) has ever been encountered, coupled with <u>the facts</u> previously noted in this paragraph, tends to substantiate the belief that when a new Model is made incorporating the features of a previous Modification, the Modification number is dropped from the actual designation.

<u>Mark Number</u>

1. The significance of Mark numbers is not clear. When assigned to a Navy bomb, a Mark number indicates the use to which the bomb is to be put, e.g., Mark 1 group - chemical bombs, Mark 2 group - depth bombs, etc. However, as applied to underwater ordnance and, in particular, to mines, the significance of these numbers is not apparent. It has never been found used in torpedo or depth charge designations except in two obsolete torpedo models which were developed prior to 1926.

<u>Miscellaneous Designations</u>

1. The terms "Experimental" 試 and "Temporarily (Provisionally) Designated" 假稱 are used to designate items which, although they may be found in trial service in forward areas, have not been finally accepted for general service. The term "Number", 番 followed by actual digits, is often found in bomb designations and, when so used, indicates the weight of the bomb. The actual number used represents the weight of the bomb in kilograms divided by ten.

<u>Underwater Ordnance Indentification</u>

1. <u>Mines</u>

(a) Mines may often be identified, upon disassembly, by examination of the printed labels which are ordinarily pasted to one or all of the following:

(1) The charge container

(2) The charge proper

(3) The inside of the cover plate.

(b) Labels of the type noted above give such information as the mine's designation, type and weight of charge, date and place of manufacture or assembly, total weight, etc. The accompanying samples (Fig. 1 & 2) were taken respectively from the bottom of the charge container of a Type 93, Model 4 and from the inside of the cover plate of a Type 94, Model 2.

(c) In rare cases, a mine's designation may be found stamped on the cover plate, base plate or in various positions on the case.

2. <u>Torpedoes</u>

(a) Each torpedo specimen recovered to date has contained its designation stamped on the top center line of the air flask section, adjacent to the warhead joint. Warhead designations may be found in any one of the following locations:

(1) Stamped on the nose, near the center.

(2) Stamped on the top center line, just forward of the warhead joint.

(3) On a printed label, pasted to the charge inside the warhead or on the warhead bulkhead.

(b) The accompanying samples show typical warhead and torpedo designation labels.

実用假稱九一式改六
愛二七號

Service Use Provisional Designation 91 Type Mod 6
"AI" 27

Service Use Temporarily Designated Type 91 Mod 6
Serial No. 27

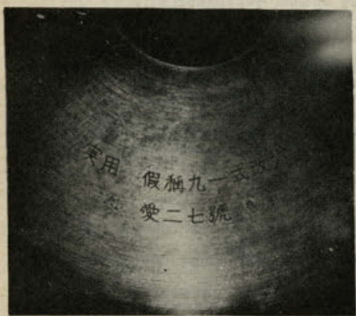


Fig. 4 - Type 91 Mod 6 Warhead, Label on Nose.

三式実用
九一式改三改五
愛一三五号

3 Type Service Use
91 Type Mod 3 Mod 5
"AI" 135

Type 3 Service Head for Use With
Type 91 Mod 3 or Mod 5
Serial No. 135

Fig. 5 - Type 3 Warhead, Markings on Nose.

九一式魚雷長333改二

91 Type Torpedo "Naga" 333 Mod 2

Type 91 Mod 2 Torpedo, Serial No. 333

Fig. 6 - Type 91 Mod 2 Warhead, Label on Nose.

實用九一式改三
長一八五號

Service Use 91 Type Mod 3
"Naga" 1850 Number

Service Use Type 91 Mod 3
Serial No. 1850

Fig. 7 - Type 91 Mod 3 Warhead, Label on Nose.

[redacted]

Added 1 July 1945
(Change No. 8)

(Underwater Ordnance Identification, Cont'd.)

3. <u>Depth Charges</u>

(a) The marking system for depth charges is not definitely known nor is any consistent marking procedure indicated by examination of recovered specimens. The accompanying sample (Fig. 8) was taken from around the pistol end of the case of a Type 95 Depth Charge. Labels have also been found on the explosive charge.

九五式火雷渡 4526
昭和 13 年 12 月造

95 Type Depth Charge 4526
Showa Era 13 Year 12 Month Manufacture

Type 95 Depth Charge 4526
Manufactured Dec. 1938

Fig. 8 - Type 95 Depth Charge, Markings on Edge of Case.

内部錫鍍ノ上ニ漆塗

Lacquer Painting on Interior Tin Plate

Fig. 9 - Type 3 Warhead, Label on Bulkhead.

長 6365
改二改

"Naga"
6365
Mod 2 Mod

Serial No.
6365
Mod 2 Modified

Fig. 10 - Type 91 Mod 2 Torpedo, Label on Airflask Bulkhead.

九〇式爆發尖二型格納筐

90 Type Pistol 2 Model Storage Box
Type 90 Model 2 Pistol Storage Box

Fig. 11 - Type 90 Model 2 Exploder Storage Box, Label on Cover

呉 72
九一式爆発尖一型

"Kure" 72
91 Type Exploder 1 Model

Serial No. 72
Type 91 Exploder Model 1

Fig. 12 - Type 91 Model I Exploder, Label on Body.

八九式改一長 109
昭和十三年造

89 Type Mod 1 "Naga" 109
Showa Era 13 Manufactured

Type 89 Mod 1 Serial No. 109
Manufactured 1938

Fig. 13 - Type 89 Mod I Torpedo, Label on Forward End of Airflask, Top Centerline.

九三式一型改二呉 631
昭和十五年造

93 Type 1 Model Mod 2 "Kure" 631
Showa Era 15 Manufactured

Type 93 Model 1 Mod 2, Serial No. 631
Manufactured 1940

Fig. 14 - Type 93 Model I Mod 2 Torpedo, Label on Forward End of Airflask, Top Centerline.

九一式魚雷改三特
呉 1022
昭和十七年造

91 Type Torpedo Mod 3 Special
"Kure" 1022
Showa Era 17 Manufactured

Type 91 Mod 3 Special Torpedo
Serial No. 1022
Manufactured 1942

Fig. 15 - Type 91 Mod 3 Special Torpedo, Label on Forward End of Airflask.

[redacted]

Added 1 July 1945
(Change No. 8)

九一式魚雷改三特
長6018

91 Type Torpedo Mod 3 Special
"Naga" 6081

Type 91 Torpedo Mod 3 (Special)
Serial No. 6081

Fig. 16 - Type 91 Mod 3 Torpedo, Label on Forward End of Airflask.

品名	九七式實用頭部炸薬 假稱九一式魚雷改六用
薬種	九七式爆薬
種目	第 207 号
製造年月	昭和 17 年 5 月
鋳造年月	昭和 17 年 5 月
第三海軍火薬廠	

Name of Article	97 Type Service Use Warhead Bursting Charge For Provisional Type 91 Mod 6 Torpedo Use.
Kind of Powder	97 Type Powder
Lot	Number 207
Date of Manufacture	Showa Era 17 Year 5 Month (May 1942)
Date of Casting	Showa Era 17 Year 5 Month (May 1942)
No. 3 Naval Powder Factory	

Fig. 17 - Type 91 Mod 6 Warhead, Label Pasted on Blocks of Explosive.

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

Japanese Markings on the Type 2 Torpedo

Below is a list of the characters found around the external fittings of the Type 2 Special Torpedo.

1. 開 塞弁	Open. Air Stop Valve.
2. 閉	Close. Characters 1 and 2 are found around the air stop valve.
3. 安全弁	Safety Valve. Around the relief valves on the midships section and the after-body.
4. 装氣弁	Air Charging Valve.
5. 潤滑油	Lubricating Oil. By the oil filling hole.
6. 潤滑油排	Lubricating Oil Drain.
7. 清水	Fresh Water. By the water filling hole.
8. 清水排	Fresh Water Drain.
9. 燃料	Fuel. By fuel filling holes.
10. 空氣	Air. The characters for "air", "fuel", and "water" are found beside the open access slots or on the plates covering these slots to the different leads.
11. 燃料排	Fuel Drain.
12. 一調油 二調油	Around the two access holes to the reducer adjusting studs.

(Japanese Markings on the Type 2 Torpedo, Cont'd.)

13. 接	Join
14. 離	Separate. Characters 14 and 15 are located around the access holes to the locking ring rack. These openings are found on the warhead, the midship section, and the afterbody.
15. 深度調定	Depth Setting. Found with several rows of characters around the depth setting dial. Characters 16 and 17 are also found here.
16. 深	Deep.
17. 淺	Shallow.
18. 漉網	Strainer. Used with "air", "fuel", and "water" by their respective strainer holes.
19. 歸弁	Check Valve. Used with "air", "fuel", and "water" by their respective check valve holes.

GLOSSARY

The following glossary is presented with a view toward familiarizing mine disposal personnel with the Japanese characters most likely to be encountered in ordnance items and installations. Primary emphasis is placed upon characters and terms used in connection with underwater ordnance although some general ordnance terms are also included, as are data on the Japanese numeral systems and other related non-technical subjects.

	Romaji	Kanji
acoustic mine	onkyokirai	音響機
air	kūki	空氣
air charging valve	sōkiben	装氣弁
air service	kōkūhei	航空兵
air service(abbr.)	kō	航
air stop valve	saiben	塞弁
amatol	shōto yaku	硝斗藥
ammonal	ammonāru kayak	「アンモナール」火藥
anchored type	kenshiki	繋維式
Army	rikugun	陸軍
arsenal	kōshō; zoheisho	工廠造兵廠
ballistite	barisutaito	「バリスタイト」
black	kuro	黒
blasting gelatine	baku hassei serachin	爆發性「セラチン
bomb	bakudan	爆彈
booby trap	yūgekiteki jirai	遊擊的地雷

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

	Romaji	Kanji
booster	shidō hatsudenki	傳 爆 藥
booster charge	denka yoku	傳火藥
bottom	shita (ge)	下
bursting charge	saku yaku	炸藥
burst	haretsu	破 裂
calibre	kei	徑
cast	chū	鑄
centimeter	senchi-mētoru	糎
check valve	kiben	歸 弁
cheddite	ennayaku	鹽那藥
chloropicric	kurōrupikurun	「クロールピクリン」
classification "A"	ko	甲
classification "B"	otsu	乙
classification "C"	hei	丙
close	tojiru	閉
color	iro	色

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

	Romaji	Kanji
controlled naval mine	shihatsukirai	視發機雷
controlled naval mine	kanseikirai	管制機
cordite	chūjō kayaku	紐狀火藥
day	nichi	日
deep	fuka	深
delay	nobasu	延
demolition	hakai	破壞
demolition clock	jigen hakkaki	時限發火器
depth charge	bakurai	爆雷
depth charge pistol	bakurai hakkasochi	爆雷發火裝置
depth setting	stindō chōtei	深度調定
detonator	baku bō	爆帽 雷管
drain	hai	排
dynamite	dainamaito	「ダイナマイト」
electric cap	denkiraikan	電氣雷管
experimental	shi	試

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

	Romaji	Kanji
explosives	baku yaku	爆薬
explosive grapnel (hook)	bakuhakō	爆破鉤
filled	sa (abb. for sakuten)	サ
fine grain powder	shōryūyaku	小粒薬
fresh water	seisui	清水
fuel	menryō	燃料
fuze, electric (igniter bridge)	kayōhen	可熔片
fuze, detonator	shinkan no kibakuzai	信管ノ起爆剤
fuze, delay action	tanenki shinkan	短延期信管
fuze, projectile	shinkan	信管
fuze, percussion	chakuhatsu shinkan	着發信管
fuze, instantaneous	shumpatsu shinkan	瞬發信管
fuze, sensitive	shumpatsu shinkan	觸發信管
fuze, time	eika shinkan	曳火信管
grade	kōbetsu	口別
gram	guramu	瓦

	Romaji	Kanji
green	midori	綠
ground type (naval mine)	chinteishiki	沈底式
gun	hō	砲
guncotton	menkayaku	綿火藥
gunpowder	kayaku	火藥
horn (naval mine)	shokkaku	觸角
igniter charge	tenkayaku	點火藥
initiator (detonator)	kibakuyaku	起爆藥
induction type mine	yudōgata pki kirai	誘導型磁氣機雷
incendiary symbol	ya	ヤ
illuminating	shomei	照明
inspect	ken	檢
inspector's stamp	yoshi	可
instantaneous	shun	瞬
large	dai	大
left	hidari	左

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

	Romaji	Kanji
loaded	sōten	装填
lot	shmoku	種目
lubricating oil	junkatsuyū	潤滑油
lyddite	ridaito	「リダイト」
magnesium	maguneshiyūm	「マグネシューム」
magnetic mine (marine)	jiki kirai	磁氣機雷
magnetic needle type (magnetic mine)	jishin gata pki kirai	磁針型磁氣機雷
manufacture	seizō	製造
mark	go	號
mercury fulminate	raisan suigin	雷酸水銀
meter	mētoru	米
middle	naka (chū)	中
millimeter	miri-mētoru	粍
mine	kirai	機雷
mine, sea	suirai	水雷
mine, land	firai	地雷

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

	Romaji	Kanji
mine field	kirai fusetsu chitai	機雷原
mine land	fuetsu suirai	敷設水雷
mine, contact, land	shokuhatsu jirai	觸發地雷
mine, anti-tank	bogyo jirai	防禦地雷
mine, floating	fuyu suirai	浮游水雷
model	kata	型
modification	kai	改
month	getsu	月
mountain	yama (san)	山
naval mine field	raigen	雷原
naval mine barrier	kiraien	機雷堰
Navy	Kaigun	海軍
nitro glycerine	nitrogurisen	「ニトロ グリセリン」
number	ban	番
place	tokoro (sho)	所
powder	kayaku	火藥

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

	Romaji	Kanji
powder charge	sōyaku	裝藥
powder factory	kayaku seizōsho	火藥製造所
powder, yellow picric acid	ōshoku yaku	黄色藥
practice	renshū	練習
prefix to numerals	dai	第
primer	bakkan	爆管
provisional designation	kashō	假稱
(1) period delay mechanism (2) ships counter (naval mines)	kaisūkibakusōchi	回數起爆裝置
repair	shūri	修理
recondition, reconstruct	kaizō	改造
red	aka	赤
rocket	funshindan	噴進彈
right	migi	右
safe	anzen	安全
safety valve	anzenben	安全弁
service use	jitsu yō	實用

[redacted]

Added 1 July 1945
(Change No. 8)

	Romaji	Kanji
shallow	asa	浅
shaped charge, hollow charge	ta (dan)	タ 彈
showa era	shōwa	昭和
small	shō	小
smoke symbol	ke	ケ
special	toku	特 殊
strainer	rokumō	濾 網
tetryl	meiayaku	茗亞藥
thermite	shakunetsuzai	灼 熱 劑
time	eika	曳 火
Tokyo	tōkyō	東 京
torpedo exploder	bakuhatsusen	爆 發 尖
torpedo	gyskei suirai (or gyorai)	魚 雷
top	ue (jō)	上
tri-nitro-phenyl-methyl-nitramine	sanshōki (fueniru) mechirunitoroanin	「メチール.ニトロ.アミン」 三硝基

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

	Romaji	Kanji
tri nitro toluene	sanshōki toruōru	「トルオール」三硝基
type	shiki	式
use	yō	用
weight	ryō	量
white	shiro (haku)	白

NUMERALS

Arabic	Japanese Simplified	Japanese Alternate Form
0	〇	
1	一	壹
2	二	貳
3	三	參
4	四	
5	五	
6	六	
7	七	
8	八	
9	九	
10	十	拾
100		百
1000		千

DISTRIBUTION

Mine Disposal School -- 500 copies

[redacted]

MINE DISPOSAL HANDBOOK

E.C.HADERLIE

PART VII

RUSSIAN UNDERWATER ORDNANCE

. . . . . .

APRIL 15, 1945

[redacted]

TABLE OF CONTENTS

PART VII - RUSSIAN UNDERWATER ORDNANCE

CHAPTER 1

RUSSIAN INFLUENCE MINES	Page
Mine Type Mirab	3

CHAPTER 2

RUSSIAN CONTACT MINES	
Table 1 - Russian Contact Mines	2
Introduction	3
Mine Mark M-08	5
Mine Mark M KB (Mark M AG)	7
Mine Mark M AMG-1	13
Mine Mark M PLT	17
Mark MZ-26 Sweep Obstructor	21

[redacted]

MINE DISPOSAL HANDBOOK

PART VII

RUSSIAN UNDERWATER ORDNANCE

. . . . . .

CHAPTER I

RUSSIAN INFLUENCE MINES

APRIL 15, 1945

[redacted]

Mine Type Mirab

General

1. Ground, magnetic induction mine, laid by surface craft.

2. Offensive mine, for use in maximum depth of water of 23 ft. against small surface craft.

Description

1. Case

Shape	Flat-bottomed ovoid.
Color	Green
Material	Steel
Length	40 1/2"
Width	27 1/2"
Height	27 1/2"
Charge	140 lbs. cast TNT with Tetryl booster.
Total weight in air	616 lbs.

2. External Fittings

Brass band	5" wide, riveted around base.
Mechanism cover plate	Rectangular, 24" long, 16 1/2" wide, on top of case, 8" from top edge of brass band, secured by 16 screws.
Detonator cover plate	6" square, on top of case, 18" from brass band, secured by hinge and screw.
Hydrostatic switch cover plate	3 1/2" diam., adjacent to brass band, 4 1/2" from lower edge of mechanism cover plate, secured by three screws.
Arming wire fair lead	3/4" diam., 1 1/4" from brass band, 3 1/2" forward of hydrostatic switch.
Filling hole cover	4 1/4" diam., screwed into bottom of case, 8" from wide end.
Wheels	Four, steel, 4 1/4" diam., welded to bottom of case.

Operation

1. When the mine is launched, an arming wire is withdrawn, unlocking the hydrostatic arming switch. Since the mine case is not watertight, an air pocket is trapped in the upper part of the case, thereby lessening its negative buoyancy and slowing its descent. Due to its shape, the mine orients itself so as to offer minimum resistance to current. Dissolution of a soluble plug permits the hydrostatic arming switch to close in 5-6 ft. of water and the firing unit begins its arming cycle.

2. The mine fires when subjected to a sufficient rate of change in the surrounding magnetic field.

3. The only self-disarming device is the hydrostatic switch which is designed to disarm the mine by opening the firing circuit upon release of hydrostatic pressure.

Precautions

1. Do not attempt RMS unless absolutely necessary.

2. Do not move or jar the mine except from a safe distance.

3. Allow no movement of magnetic material near the mine.

4. Note that the hydrostatic arming switch may fail to open upon release of hydrostatic pressure.

RMS

1. Remove the securing screw and open the detonator cover plate.

2. Cut and tape separately the two leads to the detonator housing.

 [redacted]

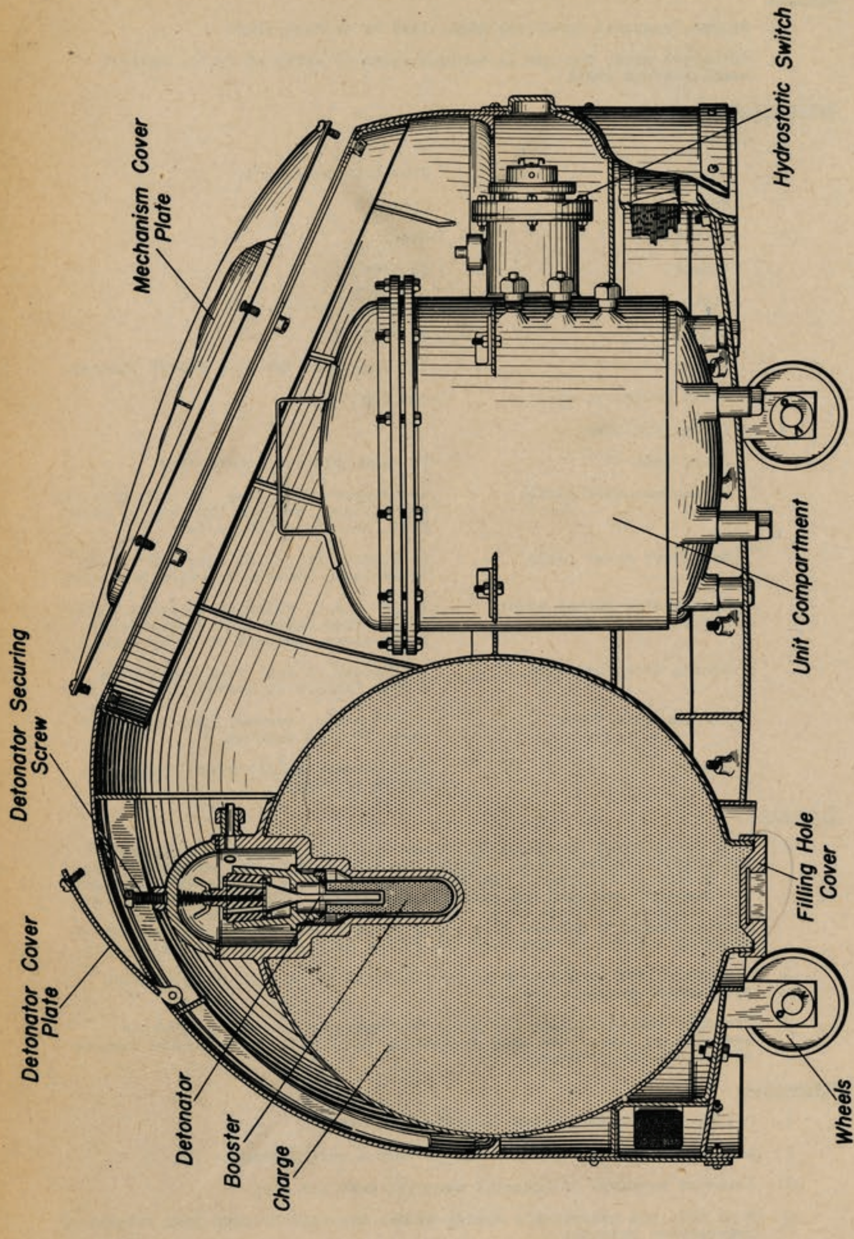


Fig. 1-Mine Type Mirab, Sectional View

Mine Type Mirab, (Cont'd.)

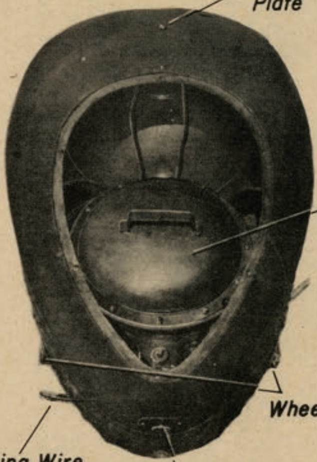
3. Loosen the set screw and remove the detonator strongback and cap.

4. Cut and tape each detonator lead separately.

5. Remove the detonator and booster.

6. Remove the keep ring and separate the detonator and booster.

7. Dispose of detonator, booster and charge.



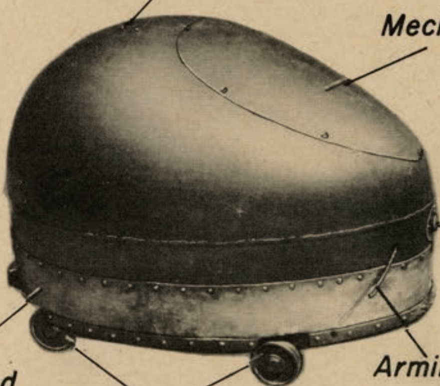


Fig. 3-Mine Type Mirab

[redacted]

MINE DISPOSAL HANDBOOK

PART VII

RUSSIAN UNDERWATER ORDNANCE

. . . . . .

CHAPTER 2

RUSSIAN CONTACT MINES

APRIL 15, 1945

[redacted]

RUSSIAN CONTACT MINES

Mine	Ground or Moored	How Laid	Firing Mechanism	Depth Taking	Charge Weight (lbs)	Total Weight (lbs)	Max. Case (ft)	Depth Anchor (ft)	Diameter (in)	Length (in)	
AMG-1	M	A/C	Chemical horn	Hydrostat	572	1060	30	330	34 1/2	52	
KB	M	S/C	Chemical horn	Plummet	506	984	30	897	34 1/2	52	Russian Standard Service Mine
AG	M	S/C	Chemical horn	Plummet	506	984	302	1603	34 1/2	52	Same as KB with antenna added
PLT	M	Sub	Inertia Percussion	Hydrostat	506	1220	30	456	31.5	50 1/2	Laid from horizontal tube by sub
M-08	M	S/C	Chemical horn	Plummet	253	500	20	360	34 1/2		
MZ-26	M	S/C	Percussion Cutter	Plummet	Eight 1 lb. charges	908	60 for chamber. 20 for float	420	---	---	Anti-sweep device

Table I - Russian Contact Mines

[redacted]

Introduction

1. Russian contact mines give the impression of being massive and heavy due to the fact that their cases are unusually thick and strong. Cases are generally painted green and the anchors, gray. Chemical horn and inertia pendulum firing devices are used, either alone or in combination with galvanic action antenna firing. Heavy cast iron horn guards are used with all mines which employ chemical horn firing.

2. Detonators and boosters are permanently married and housed in the charge, being secured either by a strongback and screw or by a threaded cover.

3. No mooring spindles or levers are used since none of the switches or other arming devices operate by tension on the mooring cable. Hydrostatic switches are ordinarily used for arming and disarming and are found on top of the mine case, secured by a bayonet joint type locking ring and various set screws. The switches used are a double-pole type. In the absence of adequate hydrostatic pressure, the switch shunts the horn leads and isolates the detonator from the firing circuit. Upon application of the proper degree of hydrostatic pressure, the switch changes over, removes the shunt from the horns and puts the detonator in the firing circuit.

4. The following precautions should be generally observed when dealing with Russian contact mines:

   (a) Do not bend or damage the horns in any way.

   (b) Do not move or jar the mine except from a safe distance.

   (c) Do not allow metallic objects to contact antennae or electrodes.

   (d) Note that detonators and boosters are permanently married.

   (e) Note that the self-disarming devices are all operated by spring tension and therefore cannot be relied upon to operate as designed.

5. The following procedure should be carried out when removing hydrostatic arming switches during RMS:

   (a) Remove the securing screws in the locking ring.

   (b) Rotate the keep ring either clockwise or counterclockwise until the bayonet joint is broken.

   (c) Remove the locking ring.

   (d) From a safe distance, remove the arming switch.

 [redacted]

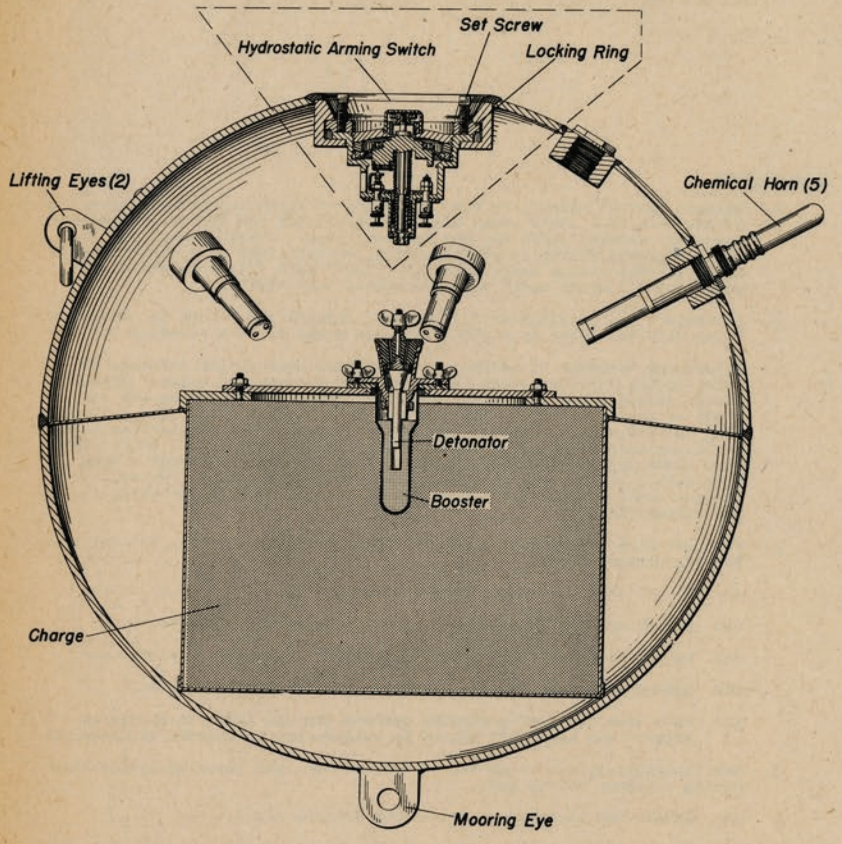


Fig. 1 - Mine Mark M-08, Sectional View

[redacted]

Mark M-08

General

1. Moored, contact, chemical horn mine, laid by surface craft.

2. Defensive mine, for use in maximum depth of water of 360 ft. against surface craft. Maximum depth of case when moored is 20 ft.

Description

1. Case

Shape	Spherical
Color	Green
Material	Steel
Diameter	34"5
Charge	253 lbs. TNT with Tetryl booster.
Total weight in air	500 lbs.

2. External fittings

Horns	Five, equally spaced around upper hemisphere, 16" from center.
Hydrostatic arming switch	7" diam., recessed, in center of upper hemisphere, secured by locking ring and four set screws.
Mooring eye	In center of lower hemisphere.
Blind plug	1 1/4" diam., on upper hemisphere, 10" from center.
Lifting eyes	Two, 180° apart on upper hemisphere, 16" from center

3. This mine is very similar in design to Mine Type GW (Part IV, Chapter 2).

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug unlocks the hydrostatic arming switch which operates in 2-8 ft. of water, arming the mine (see Introduction for details).

2. Standard chemical horn firing.

3. The only self-disarming device is the hydrostatic safety switch which is designed to disarm the mine by opening the firing circuit upon release of hydrostatic pressure.

Precautions

1. See Introduction.

RMS

1. Remove the hydrostatic arming switch (see Introduction). Cut and tape each lead separately.

2. Reach in and remove the wing nuts and clamp which secure the detonator in the booster; remove the detonator carrier.

3. Remove the booster securing bolts and remove the booster.

4. Dispose of detonator, booster and charge.

 [redacted]

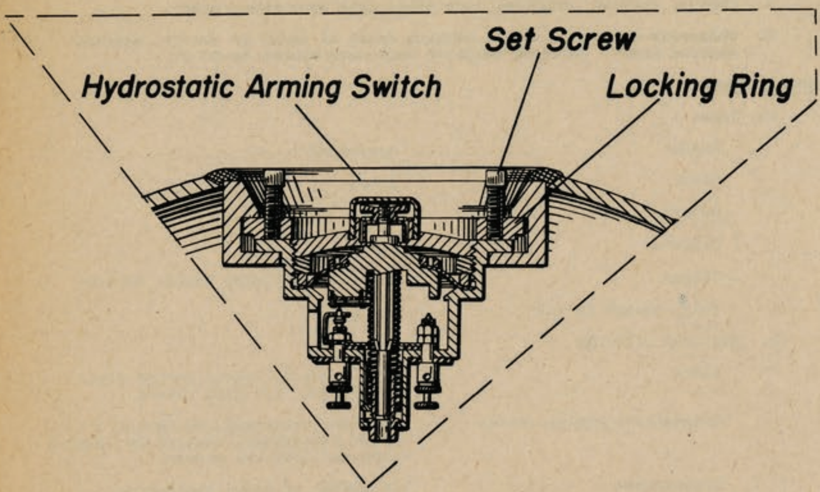


Fig. 2 - Mine Mark M-08, Hydrostatic Arming Switch, Sectional View

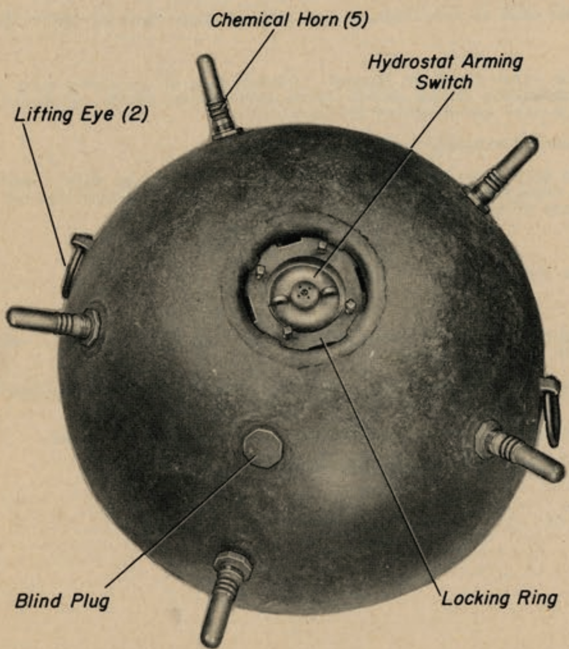


Fig. 3 - Mine Mark M-08

RUSSIAN CONTACT MINES

Mark M KB(Mark M AG)

General

1. Moored, contact, chemical horn mine, laid by surface craft.

2. Defensive mine, for use in maximum depth of water of 897 ft. against surface craft. Maximum depth of case when moored is 30 ft.

Description

1. Case

Shape	Two hemispheres, joined by an 18" cylindrical mid-section.
Color	Green
Material	Steel
Diameter	34 1/2"
Length	52"
Charge	506 lbs. cast TNT with Tetryl booster.
Total weight in air	984 lbs.

2. External fittings

Horns	Five, with spring-loaded horn guards equally spaced around upper hemisphere, 14" from center.
Hydrostatic arming switch	7" diam., recessed in center of upper hemisphere, secured by locking ring and four set screws.
Booster cover plate	4 1/8" diam., screwed into lower hemisphere, 21" from center.
Antenna stuffing boxes	Three, 2 1/4" diam., one on cylindrical mid-section, 33" from center of upper hemisphere; one on upper hemisphere, 8 1/2" from center; one on lower hemisphere, 8 1/2" from center.
Blank plug	4" diam., screwed into upper hemisphere, 24" from center.
Lifting eyes	Five; two 180° apart on upper hemisphere, 19" from center, fitted with lifting rings; two 90° apart on mid-section, 36" from center of lower hemisphere; one on lower hemisphere, 22" from center.
Anchor securing lugs	Two, 180° apart on mid-section, 28" from center of lower hemisphere.
Positioning lugs	Two, 90° apart on mid-section, 31" from center of lower hemisphere.

3. The Mark M AG differs from the Mark M KB in that it may be fitted with upper and/or lower antennae. If a single antenna is fitted, a coil of copper wire is wound around the mid-section of the case to serve as an electrode. If two antennae are fitted, the respective antennae serve as electrodes for one another.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug releases the horn guards, exposing the horns. Dissolution of another soluble plug unlocks the hydrostatic arming switch which operates in 2-8 ft. of water (see Introduction for details). Vertical orientation of the case permits a mercury switch to close a break in the firing circuit and the mine is armed.

 [redacted]

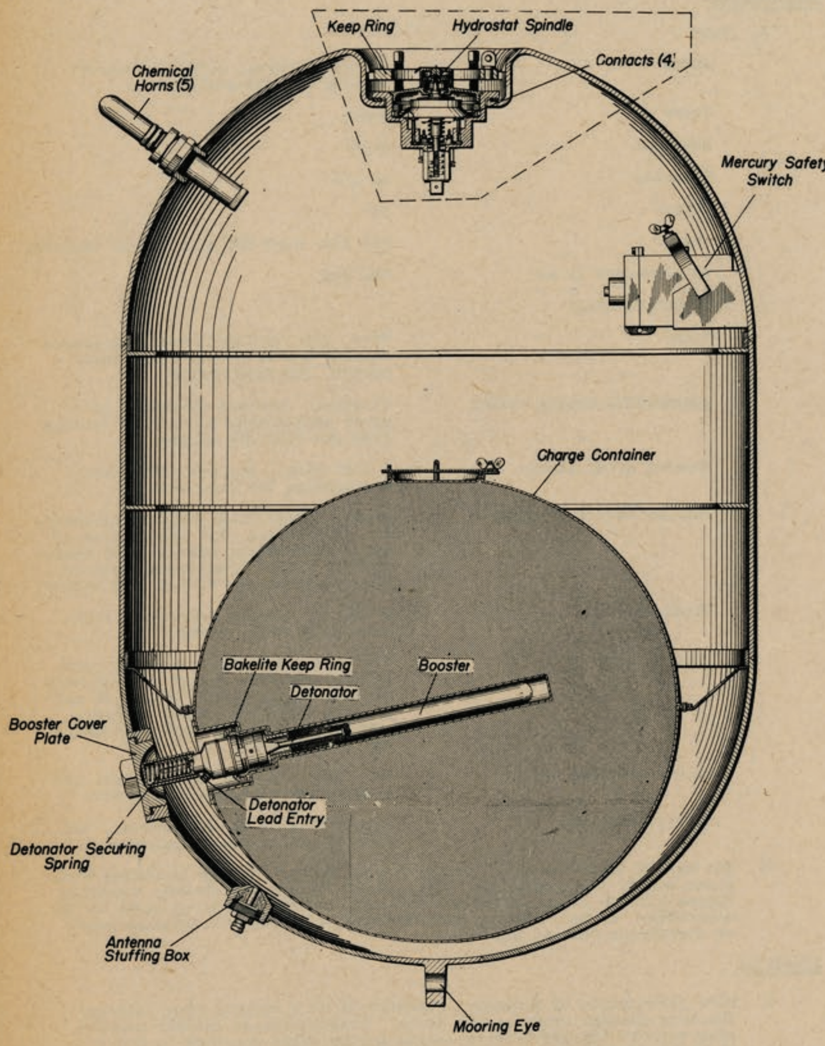


Fig. 4-Mine Mark M KB, Sectional View

[redacted]

Mark M KB (Mark M AG), (Cont'd.)

2. Standard chemical horn firing.

3. The only self-disarming device is the hydrostatic arming switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. See Introduction.

RMS

1. Remove the booster cover plate.

2. Unscrew the plastic keep ring and remove the detonator and booster.

3. Cut and tape each detonator lead separately.

4. Remove the hydrostatic safety switch (see Introduction).

5. Dispose of detonator, booster and charge.

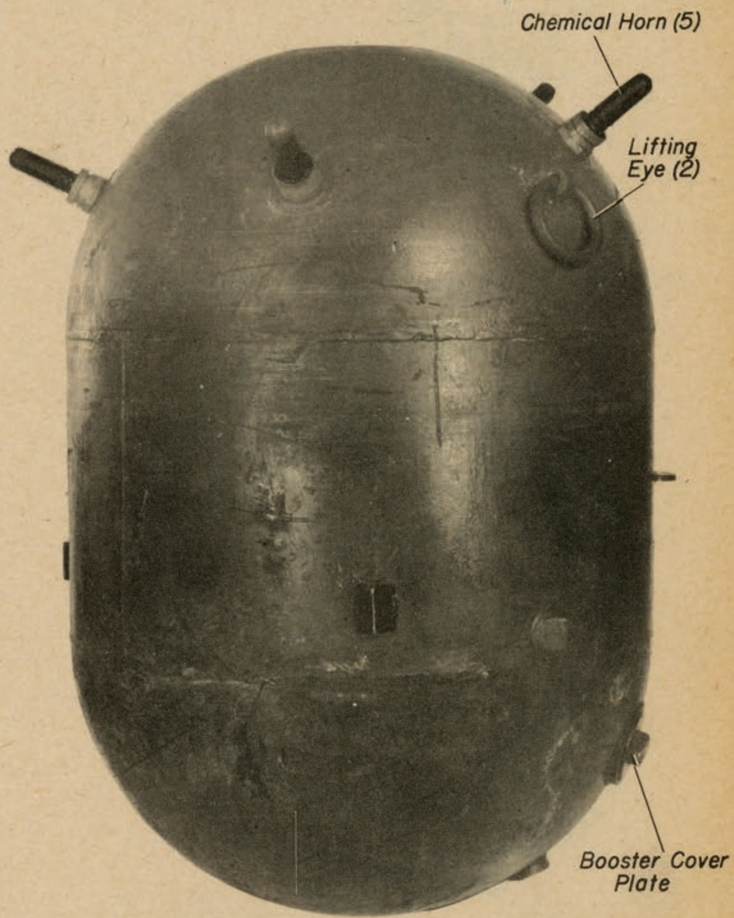


Fig.5-Mine Mark M KB

[redacted]

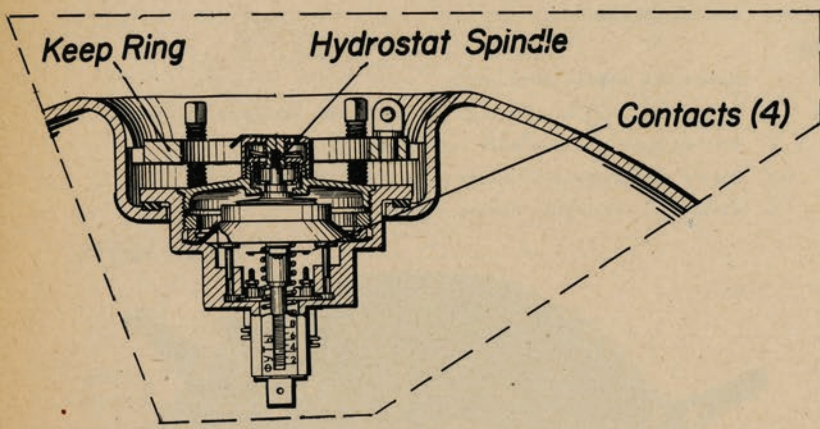


Fig. 6 - Mine Mark M KB, Hydrostatic Arming Switch, Sectional View

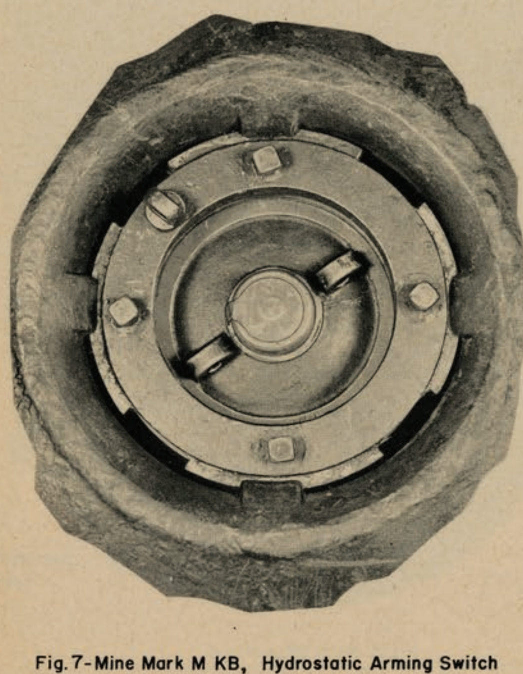


Fig. 7 - Mine Mark M KB, Hydrostatic Arming Switch

[redacted]

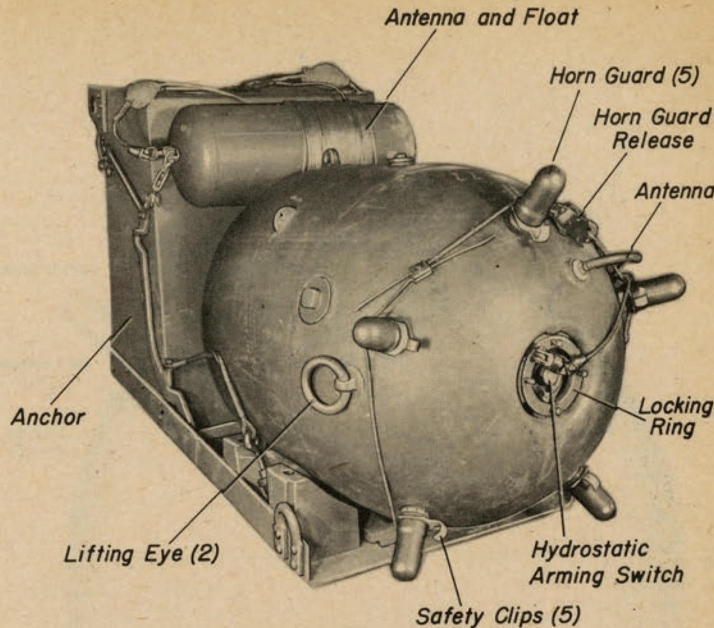


Fig.8-Mine Mark M AG, with Anchor

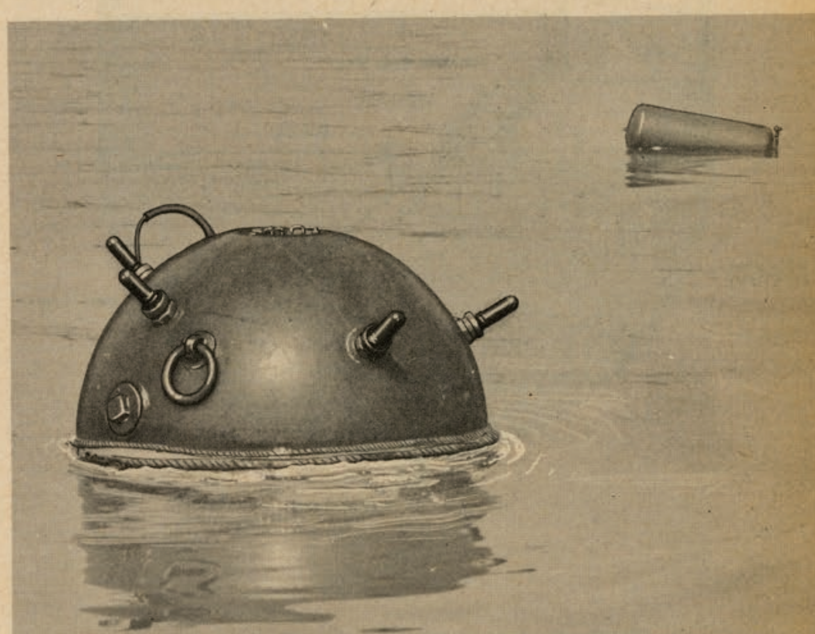


Fig.9-Mine Mark M AG, Floating

[redacted]

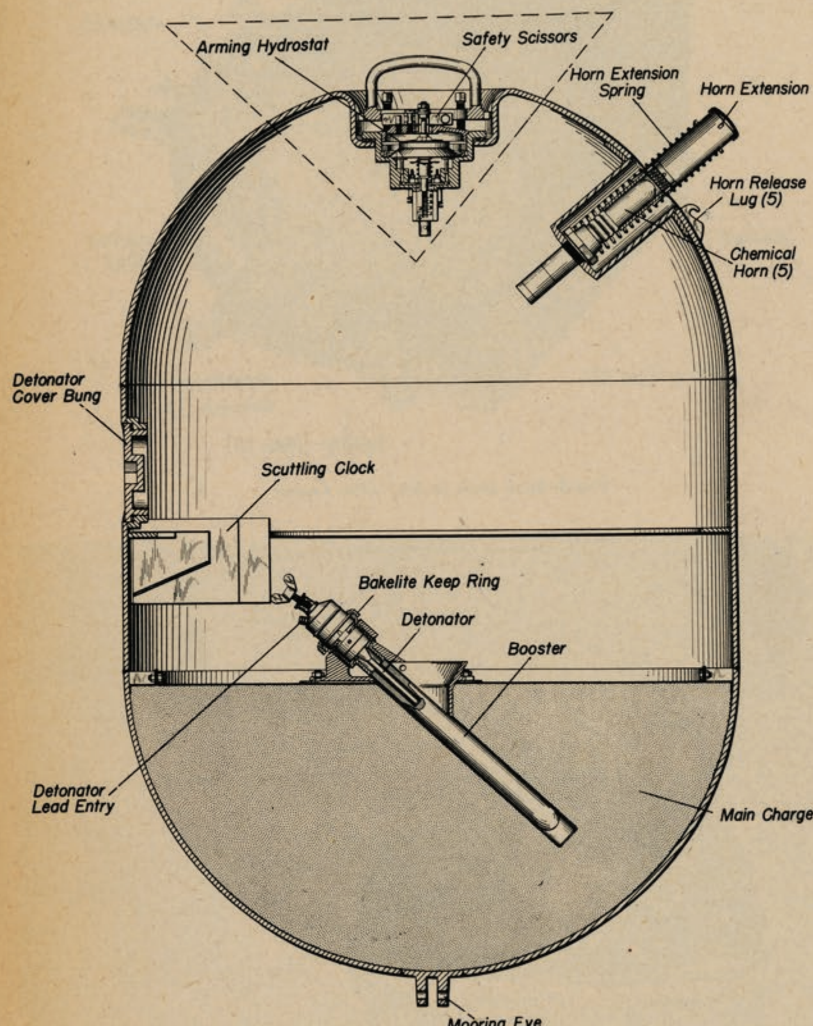


Fig. 10 - Mine Mark M AMG-1, Sectional View

RUSSIAN CONTACT MINES

Mark M AMG-1

General

1. Moored, contact, chemical horn mine, laid by aircraft.

2. Offensive mine, for use in maximum depth of water of 330 ft. against surface craft. Maximum depth of case when moored is 30 ft.

Description

1. Case

Shape	Two hemispheres, joined by an 18" cylindrical mid-section. Fitted with break-off nose and tail fairings.
Color	Green
Material	Steel
Diameter	34 1/2"
Length	52"
Charge	572 lbs. TNT with Tetryl booster.
Total weight in air	1050 lbs.

2. External fittings

Horns	Five, spring-loaded, telescopic type, equally spaced around upper hemisphere, 15" from center.
Hydrostatic arming switch	7" diam., recessed into center of upper hemisphere, secured by locking ring and four set screws.
Detonator cover bung	5 1/2" diam., on cylindrical mid-section, 33" from center of upper hemisphere, threaded to case.
Horn release lugs	Five, one adjacent to each horn recess.
Lifting eyes	Three; two on upper hemisphere, 180° apart, 19" from center; one on lower hemisphere, 26" from center.
Mooring eye	In center of lower hemisphere.

3. The complete mine as assembled for laying consists of the anchor, case and nose and tail fairings. It resembles a large armor-piercing bomb.

Operation

1. Upon impact with the water, the nose and tail fairings are sheared and the scuttling clock starts. A lanyard attached to the tail fairing pulls a lock ball from the jaws of the safety scissors on the hydrostatic arming switch, unlocking the switch. The switch operates in 2-8 ft. of water (see Introduction for details). Dissolution of a soluble plug allows the case and anchor to separate and the case takes depth by loose bight hydrostat system. As the case rises, tension on a short lanyard attached to both anchor and case operates a mechanical cutter which severs the horn securing cable, allowing the horns to spring out into the extended position.

2. Standard chemical horn firing. The scuttling clock may fire the mine at any time between 10 hours and 10 days after laying.

3. No self-disarming devices are fitted.

Precautions

1. Note that the hydrostatic arming switch locks in the armed position.

2. Check the hydrostatic arming switch.

 [redacted]

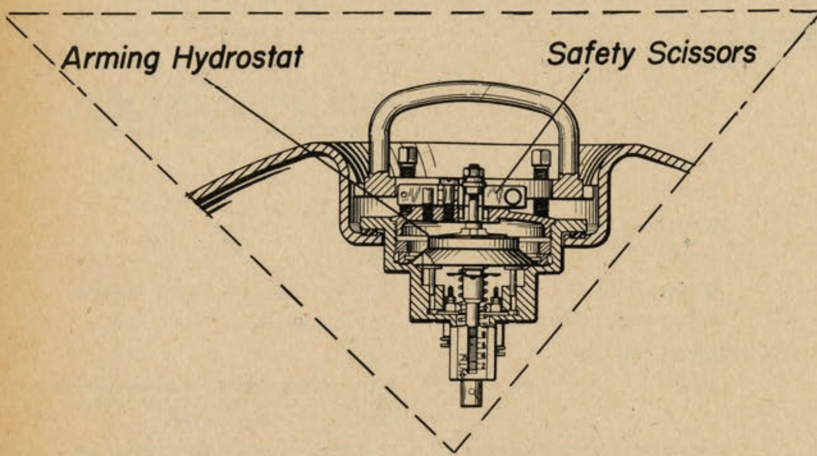


Fig.11-Mine Mark M AMG-1, Hydrostatic Arming Switch, Sectional View

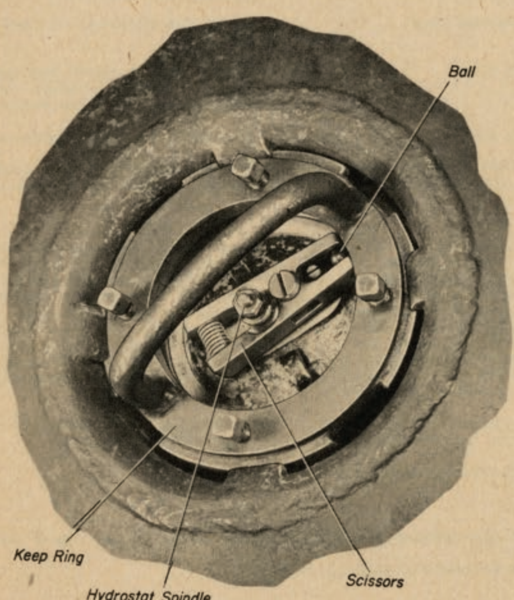


Fig.12-Mine Mark M AMG-1, Hydrostatic Arming Switch

[redacted]

Mark M AMG-1, (Cont'd.)

(a) If the lock ball is between the jaws of the scissors, the switch has not operated and the mine is safe.

(b) If the lock ball is not present, the switch must be assumed to have operated.

RMS

1. Remove the detonator cover bung; cut and tape separately each of the four leads beneath.
2. Remove the wing nut and the detonator and booster assembly.
3. Remove the hydrostatic arming switch (see Introduction).
4. Dispose of detonator, booster and charge.

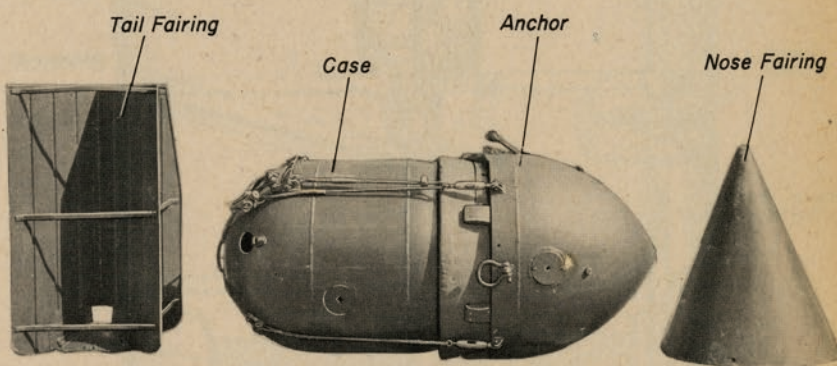


Fig.13-Mine Mark M AMG-1, Showing Nose and Tail

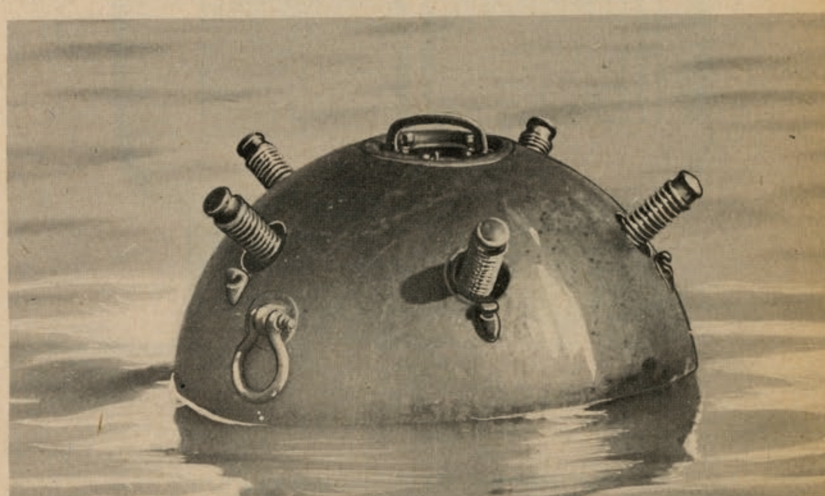


Fig.14-Mine Mark M AMG-1, Floating

[redacted]

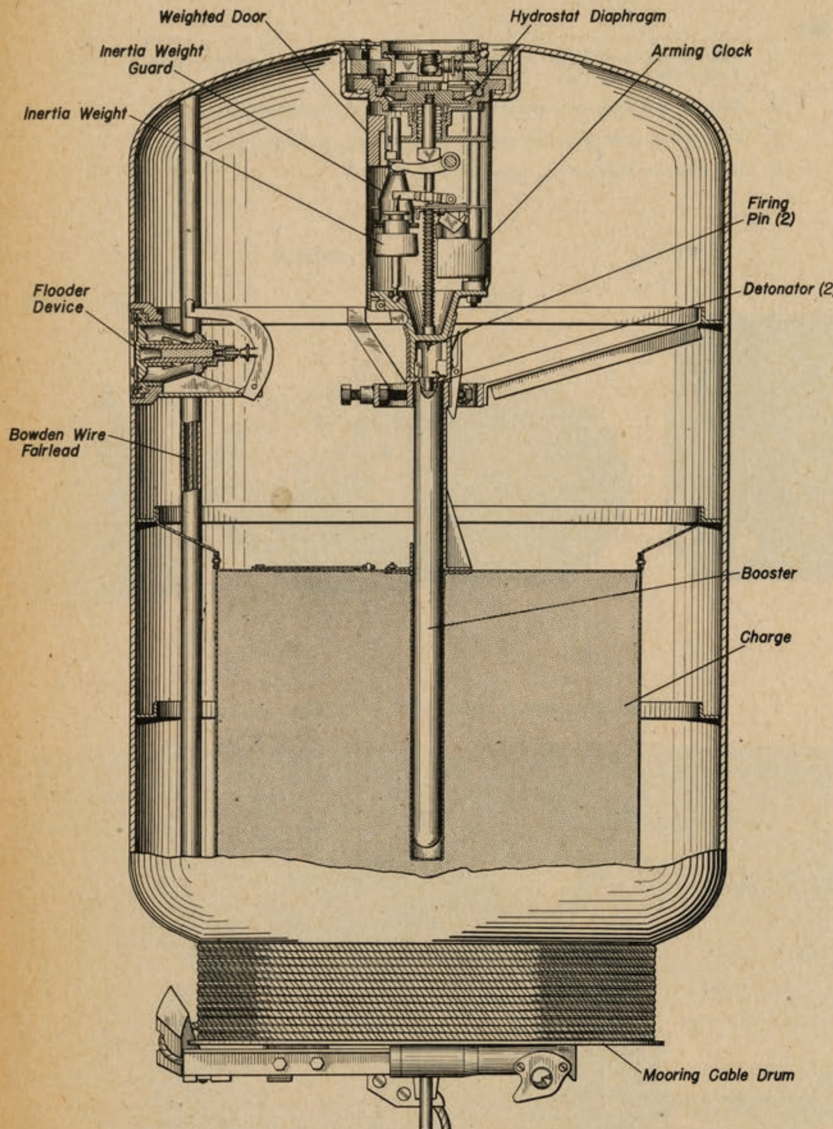


Fig. 15-Mine Mark M PLT, Sectional View

[redacted]

RUSSIAN CONTACT MINES

Mark M PLT

General

1. Moored, contact, percussion-firing mine, laid by submarines fitted with special stern tubes.

2. Offensive or defensive mine, for use in maximum depth of water of 456 ft. against surface craft. Maximum depth of case when moored is 30 ft.

Description

1. Case

Shape	Cylindrical, with rounded ends. Cylindrical mooring drum welded to bottom.
Color	Green
Material	Steel
Diameter	
Case	31.5"
Mooring drum	26"
Length	
Overall	55 3/4"
Case	50 1/2"
Mooring drum	5 1/4"
Charge	506 lbs. cast TNT.
Total weight in air	1220 lbs. approx.

2. External fittings

Arming hydrostat and firing device	8 3/4" diam., in top center of case, secured by keep ring and six set screws.
Flooder cover plate	4" diam., 29" from top of case, secured by 16 rivets.
Lifting eyes	Three, equally spaced around top of case, 13" from center.
Positioning lugs	Three, equally spaced around bottom of case, 14" from center.
Bowden wire fair lead	13" from top center of case.

Operation

1. When the mine is launched, the case and anchor orient themselves vertically during descent, starting an arming clock. The mine separates from the anchor by plummet and takes depth by a hydrostat in the anchor. Separation of the anchor and case exerts tension on the bowden wire which runs from the anchor to the arming hydrostat. This tension displaces a safety lever, partially unlocking the hydrostat. When the clock runs off, a retaining slide is removed from the arming hydrostat which is then completely unlocked. When the case rises to its preset depth, release of hydrostatic pressure allows a spring-loaded guard to rise and free the inertia firing mechanism and the mine is armed.

2. Shock on impact with a target unseats the inertia weight, operating a mechanical linkage which frees the spring-loaded firing pins to impinge on the detonators. If the mine breaks its mooring, complete retraction of the arming hydrostat operates a mechanical linkage which fires a small caliber shell, puncturing the flooder cover plate and sinking the mine.

3. The only self-disarming device is the arming hydrostat which is designed to disarm the mine by locking the inertia firing mechanism if the mine sinks below its preset depth or rises to the surface.

Precautions

1. See Introduction.

RMS

1. Remove the hydrostat and firing device (see Introduction).

2. Reach in the case, release the locking clips and remove the detonator

 [redacted]

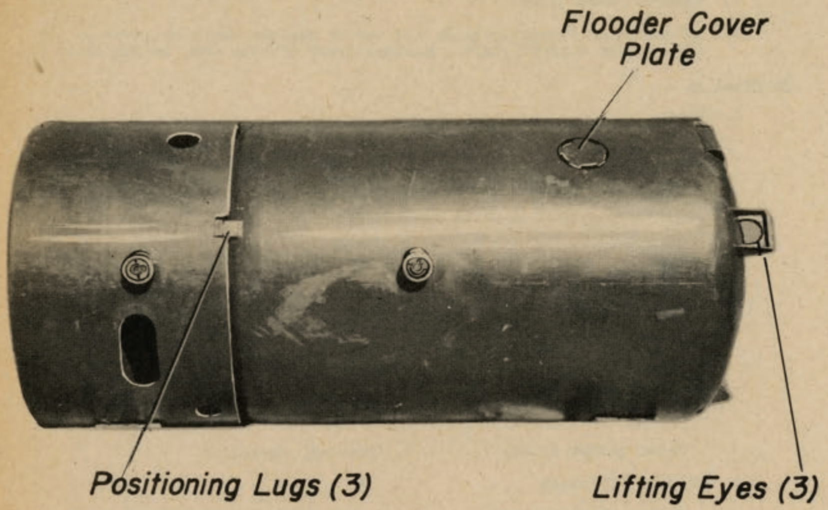


Fig.16-Mine Mark M PLT

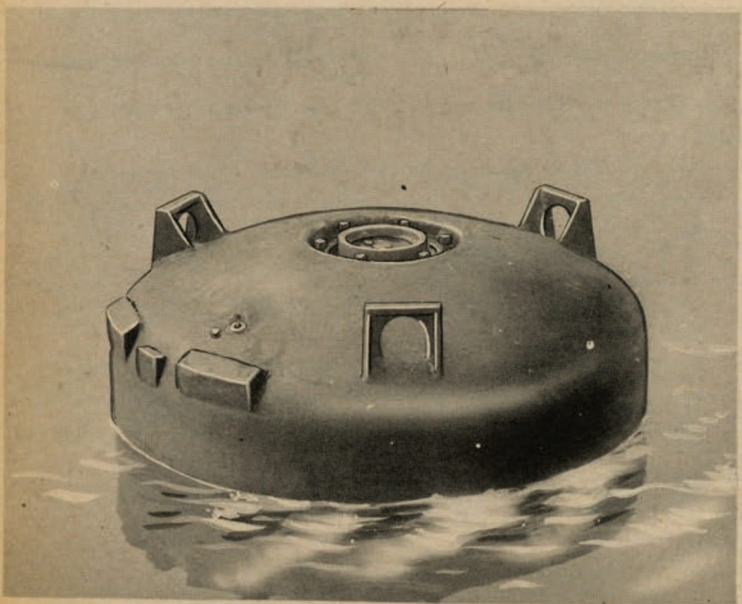


Fig.17-Mine Mark M PLT, Floating

[redacted]

Mark M PLT (Cont'd.)

and booster.

3. Unscrew the flooder plate and remove the scuttling charge.

4. Dispose of detonator, booster and charge.

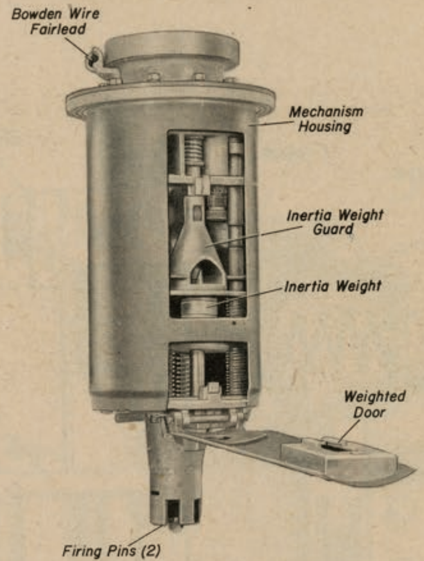


Fig.18- Mine Mark M PLT, Firing Mechanism

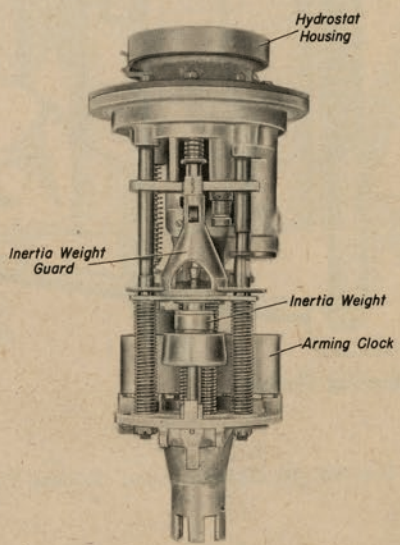


Fig.19- Mine Mark M PLT, Firing Mechanism

 [redacted]

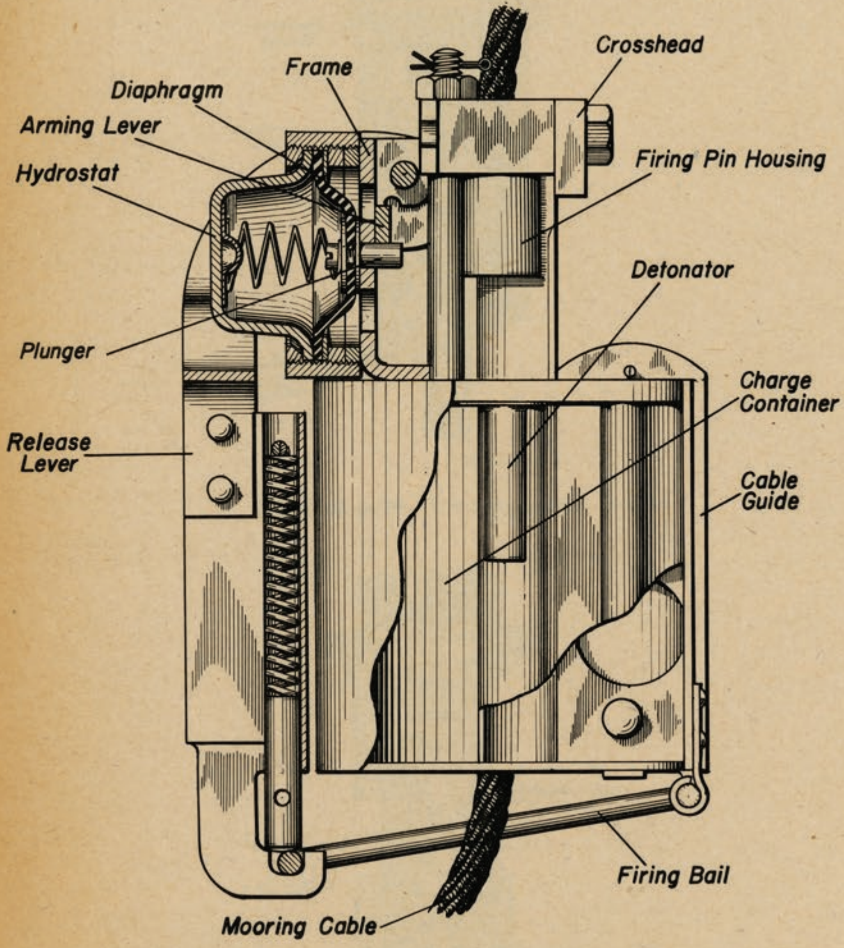


Fig.20-Mark MZ-26 Explosive Cutter, Sectional View

[redacted]

RUSSIAN CONTACT MINES

Mark MZ-26 Sweep Obstructor

General

1. Moored, explosive sweep obstructor, laid by surface craft.

2. Defensive weapon, for use in and around moored minefields in maximum depth of water of 420 ft. Maximum depth of buoyancy chamber when moored is 60 ft.; maximum depth of floats, 20 ft.

Description

1. The complete assembly is painted green, weighs 908 lbs., and is composed of the following main parts:

   (a) An L-shaped anchor.

   (b) A buoyancy chamber consisting of three hollow cylinders, each 12" in diameter and 26" long. The three cylinders are held together in pyramid fashion by a steel band.

   (c) Four cylindrical float housings, each 12 1/4" in diameter and 10" long, are surmounted on the buoyancy chamber. Each housing is open at one end to receive a float.

   (d) Four cylindrical floats, each 11 1/2" in diameter and 15 1/2" long, fit into the float housings.

   (e) Two hydrostatically-armed, percussion-fired cutters are secured to the mooring cable of each float. Each cutter consists of the following main parts:

      (1) A charge container which carries a one-pound TNT charge and two detonators, permanently housed in the charge. The float mooring cable passes through a cable channel in the center of the charge container, the side of which is cut away to facilitate attaching the cutter to the cable. A cable channel guide is inserted in the cutaway portion after the cutter is attached to the cable and is secured by a cotter pin. The upper end of the cable channel is a separate piece and extends above the charge container, terminating in a crosshead which contains the two firing pins.

      (2) A metal frame, mounted on the upper end of the charge container, which contains the following:

         (i) A hydrostatic diaphragm and plunger enclosed in a cup-shaped housing. One end of the plunger projects from the housing.

         (ii) A spring-loaded arming lever which is restrained by the hydrostatic plunger prior to arming. The arming lever serves to hold the release lever (see next paragraph).

         (iii) A release lever which extends the full length of the charge container. Its upper end contains a cam with two flat bearing surfaces. One surface is held prior to arming by the arming lever and the other holds the under surface of the crosshead, preventing the charge container from moving upward. Its lower end is hooked to engage a firing bail (see next paragraph).

      (3) A triangular, pivoted firing bail, secured to the bottom of the charge container, which engages the lower end of the release lever. A spring-loaded pin in the release lever housing insures proper seating of the bail.

Operation

1. When the assembly is launched, the buoyancy chamber with its associated float housing and floats takes depth by plummet. Hydrostatic pressure on the cutters depresses the hydrostatic spindle of each, releasing the arming lever which in turn unlocks the release lever. Dissolution of a soluble plug releases one of the floats which rises to the limit of its mooring cable.

2. Movement of a sweep wire against the firing bail unseats the bail from its position in the hook of the release lever. This permits further pressure from the sweep wire to move the charge container up against the crosshead, causing the firing pins to impinge on the detonators and fire the charge. When the charge fires, the float mooring wire is severed and the subsequent release of float mooring tension causes the next float to move up out of its housing and take the position of the swept float. This operation is repeated until all four floats have been swept.

 [redacted]

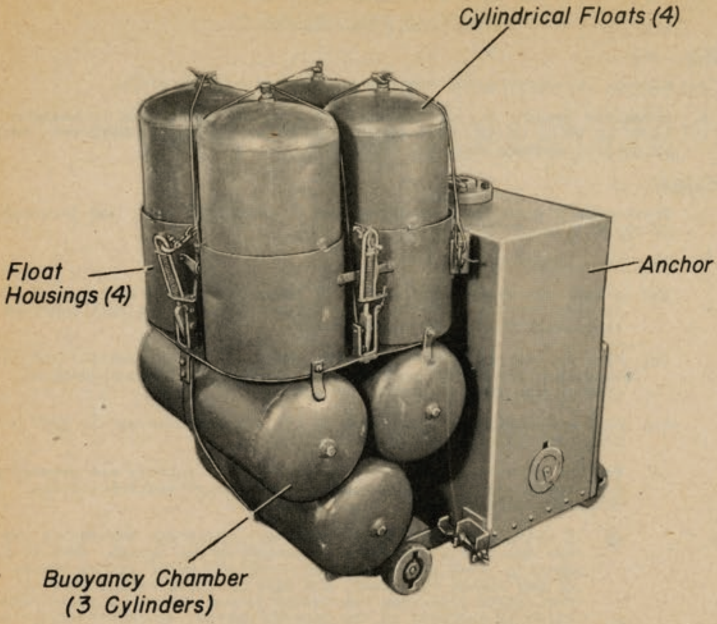


Fig.21-Mark MZ-26 Sweep Obstructor

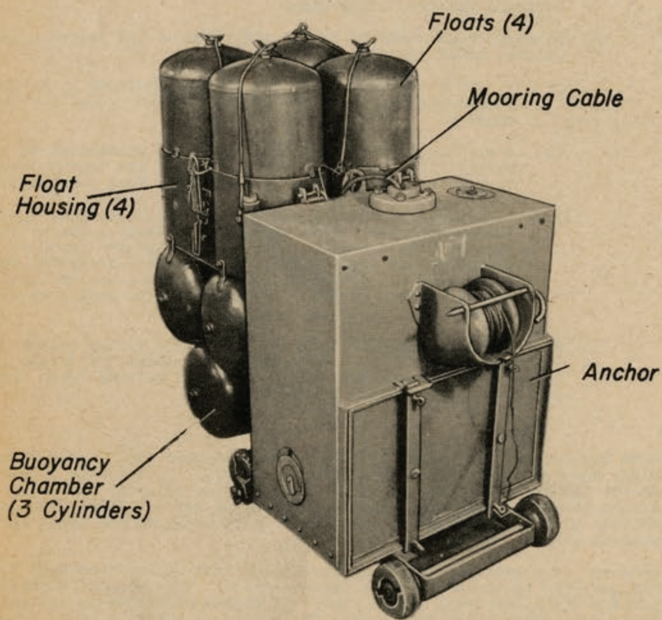


Fig.22-Mark MZ-26 Sweep Obstructor

[redacted]

Mark MZ-26 Sweep Obstructor, (Cont'd.)

3. No self-disarming devices are fitted to the cutters.

Precautions

1. Note that the cutters are extremely sensitive when fully armed.
2. Take care not to exert pressure on the firing bail of any cutter.
3. Check the firing bail of each available cutter.
   (a) If the bail is still engaged by the hooked end of the release lever, the cutter is not more than partly armed and may be safe.
   (b) If the bail is free of the release lever, the cutter is fully armed.

Rendering Safe Procedure

1. Wedge the space between the crosshead and charge container to prevent movement.
2. Remove the two bolts from the crosshead and the cotter pin from the cable channel slide.
3. Remove the cutter from the cable and dispose of the complete assembly.

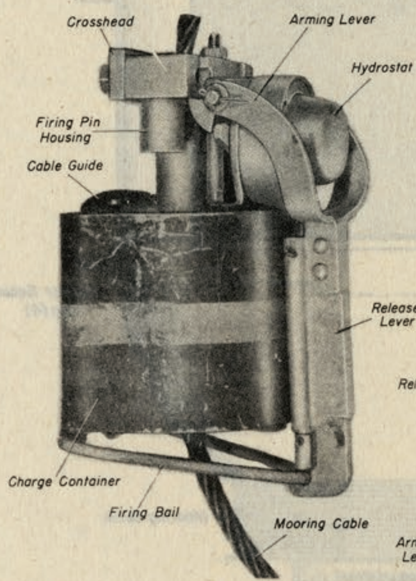
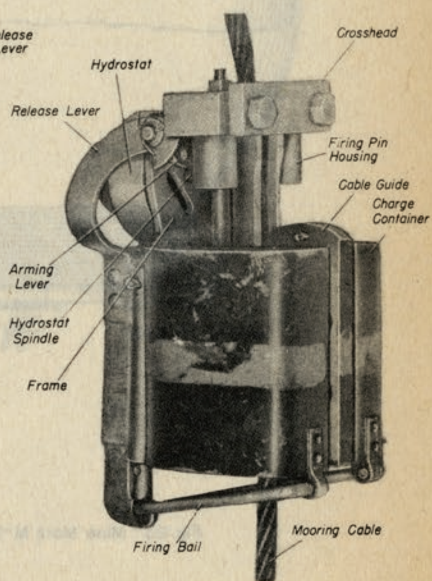


Fig.24-Mark MZ-26 Explosive Cutter

Fig.23-Mark MZ-26 Explosive Cutter



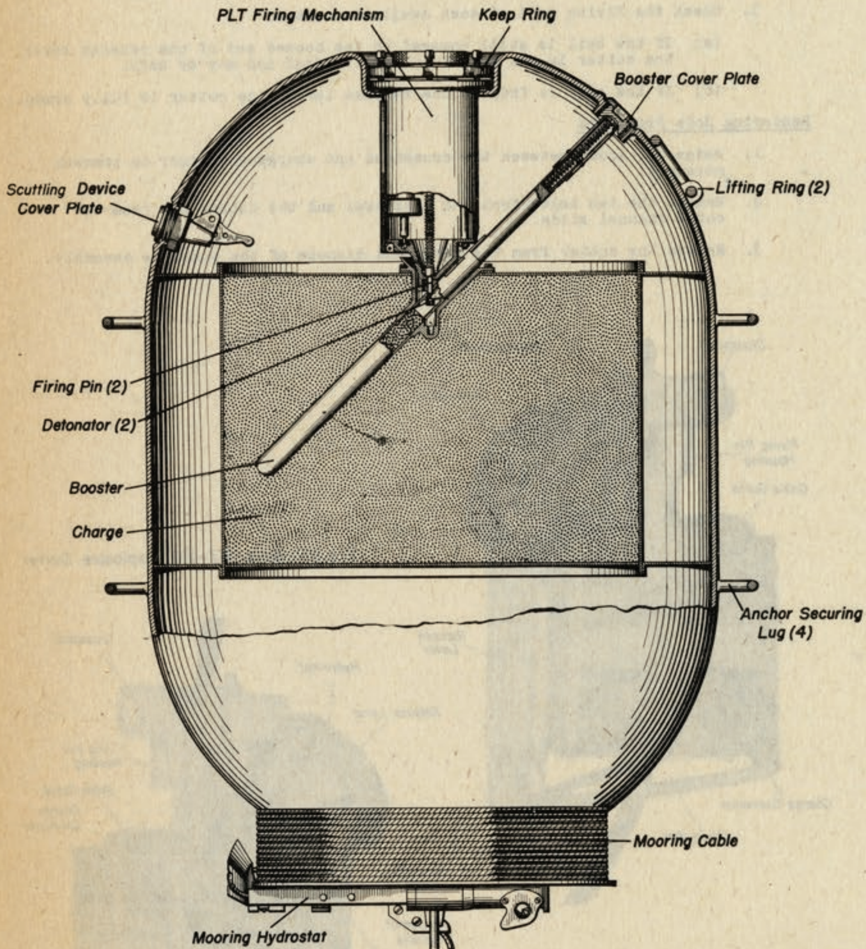


Fig. 25 - Mine Mark M-26, Sectional View

RUSSIAN CONTACT MINES

Mine Mark M-26

General

1. Moored, contact, percussion-firing mine, laid by surface craft.

2. Defensive mine, for use in maximum depth of water of 456' against surface craft. Maximum depth of case when moored is 30'.

Description

1. Case

Shape	Two hemispheres, joined by an 18" cylindrical mid-section.
Color	Green
Material	Steel
Diameter	34 1/2"
Length	
Case	52"
Overall	53 1/2"
Mooring drum	5 1/4"
Charge	528 lb TNT with tetryl booster.
Total weight in air	1950 lb.

2. External fittings

Arming hydrostat and firing device	8 3/4" diam., in center of upper hemisphere, secured by keep ring and 6 set screws.
Detonator assembly cover bung	2 1/2" diam., on upper hemisphere, 17" from center.
Flooder cover bung	2 1/2" diam., on upper hemisphere, 24" from center, 180° around case from detonator assembly cover bung.
Lifting eyes	Two, 180° apart on upper hemisphere, 17" from center.
Anchor securing eyes	Four; two 90° apart on lower hemisphere, 3" below weld; two 90° apart on upper hemisphere, 3" above weld.
Mooring cable drum	Riveted to bottom of lower hemisphere, fitted with depth-taking hydrostat.

Operation

1. When the mine is launched, the case and anchor separate by plummet action. The case takes depth by means of a hydrostat in the mooring cable drum. Dissolution of soluble plug in the arming hydrostat and firing device allows the hydrostat to displace a bell shaped guard from around the inertia pendulum. The mine is now armed.

2. The firing device and self-disarming devices are identical to and operate in the same manner as those fitted the Mine Mark M PLT.

Precautions

1. Stand clear of the flooder bung during RMS. Attention is invited to the similarity between the detonator assembly cover bung and the flooder cover bung.

RMS

1. Remove the hydrostat and firing device (see Introduction).

2. Unscrew and remove the detonator assembly cover bung and remove the detonator. Tight spring pressure will tend to force the cover bung off as it is unscrewed.

Added 1 September 1945
(Change No. 11)

[redacted]

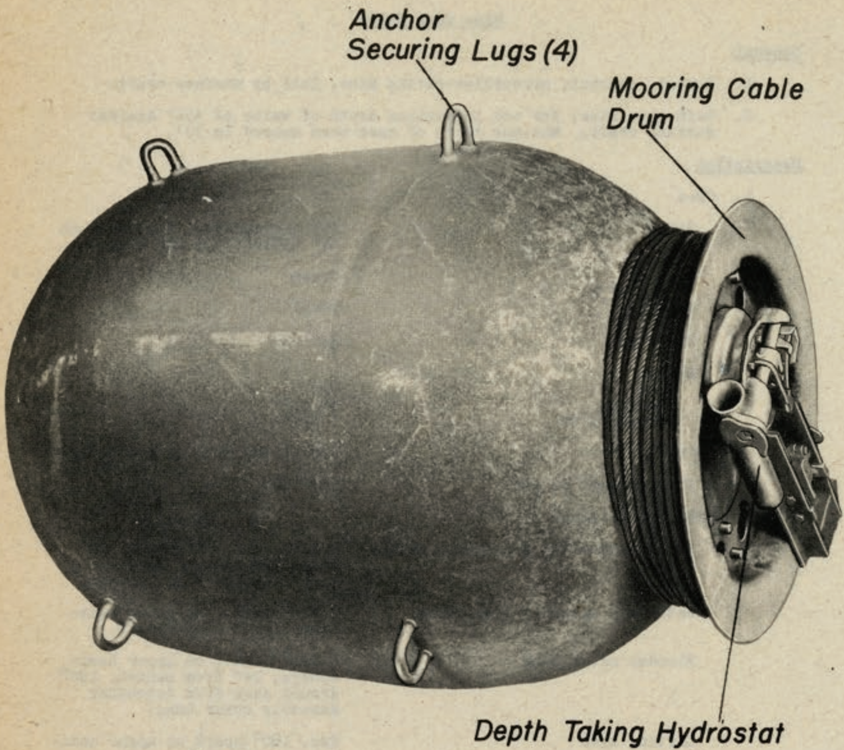


Fig. 26 - Mine Mark M-26, Side View

Fig. 27 - Mine Mark M-26, Floating

(Mine Mark M-26, Cont'd.)

3. Remove the booster.

4. Dispose of the detonators, booster, and charge.

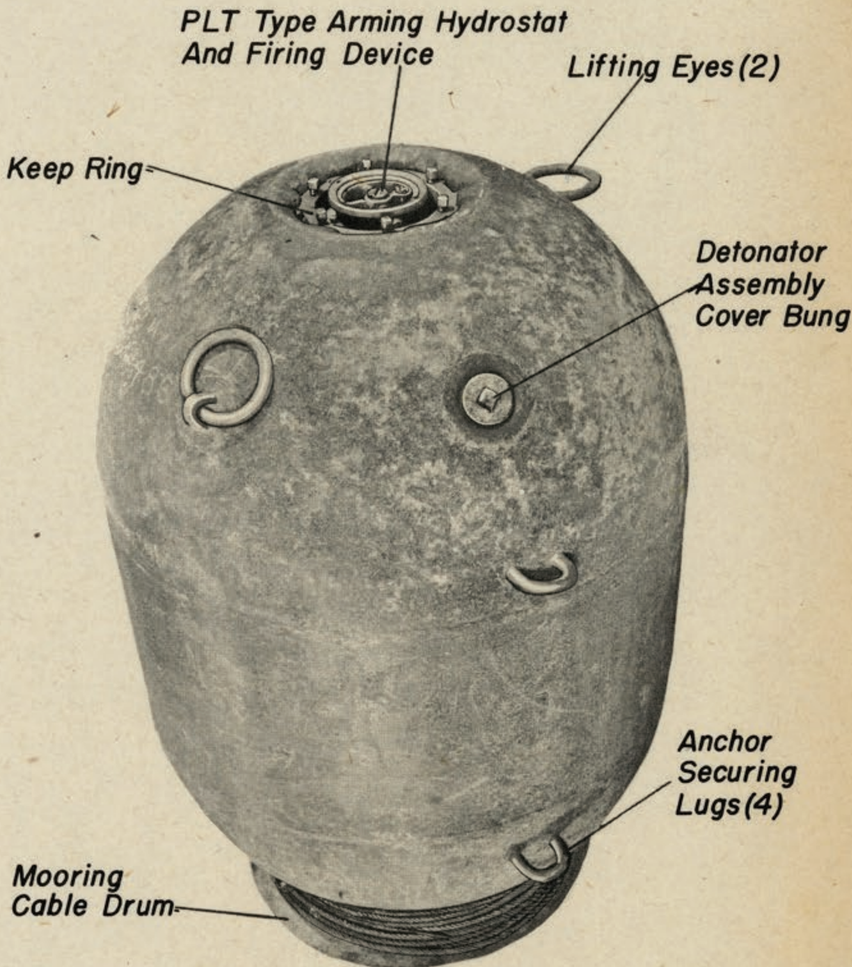


Fig. 28 - Mine Mark M-26, Top View

MINE DISPOSAL HANDBOOK

PART VIII

DUTCH UNDERWATER ORDNANCE

SEPTEMBER 1, 1945

[redacted]

MINE DISPOSAL HANDBOOK

PART VIII

DUTCH UNDERWATER ORDNANCE

CHAPTER I

DUTCH CONTACT MINES

SEPTEMBER 1, 1945

[redacted]

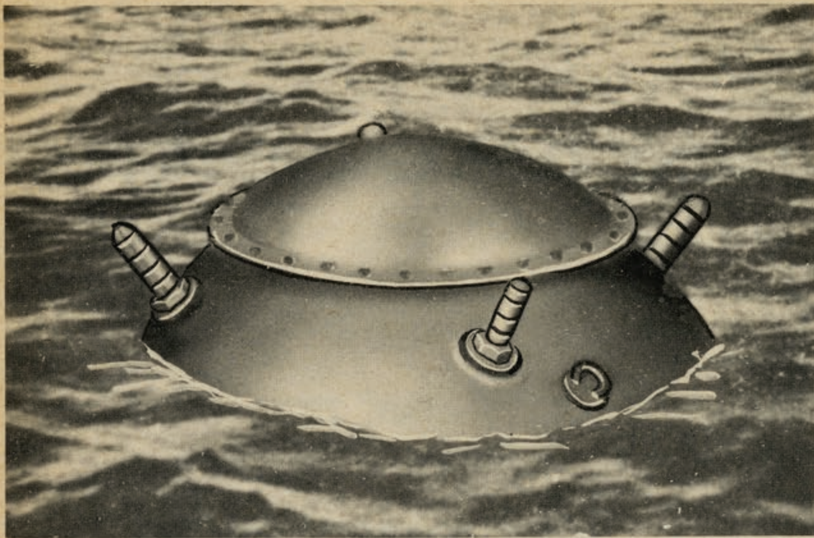


Fig. 1 - Vickers Mine, Floating

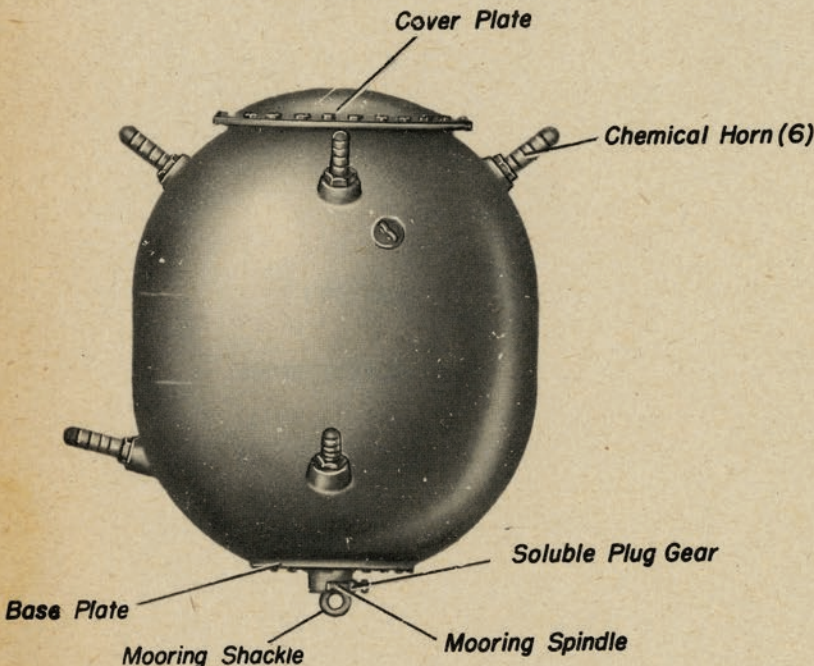


Fig. 2 - Vickers Mine

DUTCH CONTACT MINES

Dutch Vickers

General

1. Moored, contact, chemical horn mine, laid by surface craft.
2. Dutch designation unknown.
3. Defensive mine. Expected laying depths and intended targets unknown.

Description

1. Case

Shape	Two hemispheres joined by a cylindrical mid-section.
Color	Black
Material	Steel
Diameter	36"
Length	Unknown
Charge	Unknown
Total weight in air	Unknown

2. External fittings

Horns	Six; four equally spaced around upper hemisphere; two 90° apart on lower hemisphere, mounted on brackets.
Cover plate	In center of upper hemisphere, secured by bolts.
Base plate	In center of lower hemisphere, secured by bolts; fitted with straight shank mooring spindle, detonator strongback, and soluble plug gear.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug allows mooring tension to pull out the mooring spindle, operating the booster release, closing the mooring safety switch, and arming the mine.
2. Standard chemical horn firing.
3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. Check the mooring spindle. Except in extreme emergency, do not attempt RMS unless it has retracted fully.

RMS

1. Loosen the detonator strongback and swing it clear.
2. Remove the detonator and booster.
3. Dispose of detonator, booster, and charge.

[redacted]

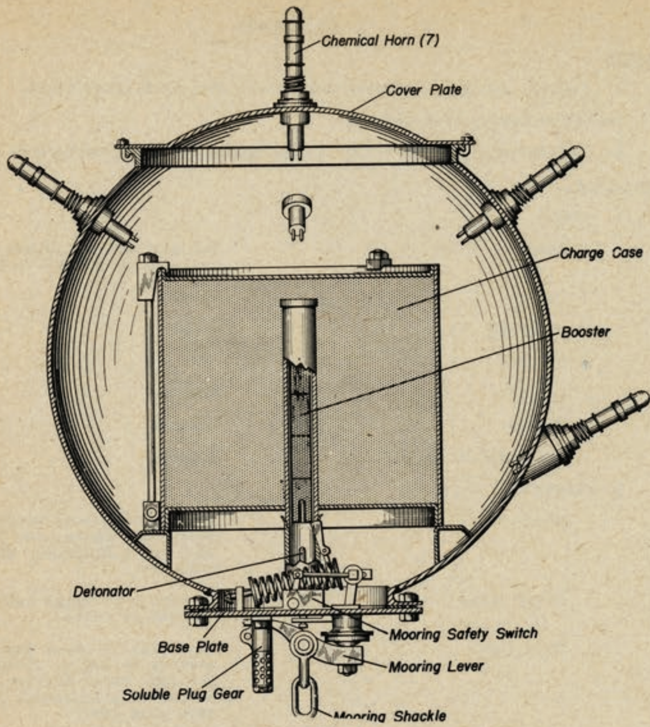


Fig. 3 - Seven Horn Mine, Sectional View

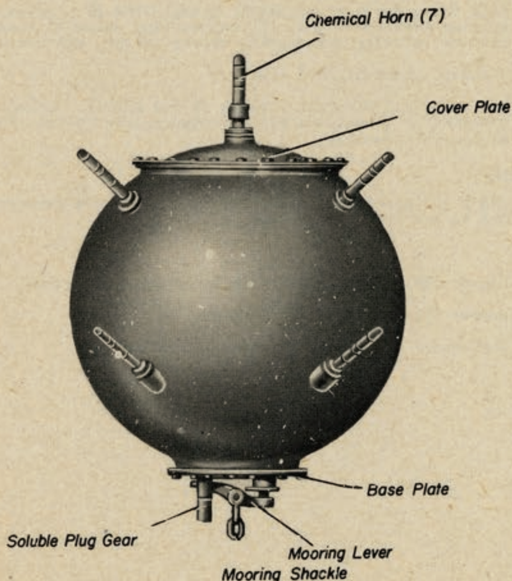


Fig. 4 - Seven Horn Mine

[redacted]

DUTCH CONTACT MINES

Dutch Seven Horn

General

1. Moored, contact, chemical horn mine, laid by surface craft.
2. Dutch designation unknown.
3. Defensive mine. Expected laying depths and intended targets unknown.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	39" approx.
Charge	300 lb.
Total weight in air	Unknown

2. External fittings

Horns	Seven; one in center of cover plate; four equally spaced around upper hemisphere; two 90° apart on bosses on lower hemisphere.
Cover plate	In center of upper hemisphere, lap-fitted, secured by bolts.
Base plate	In center of lower hemisphere, lap-fitted, secured by 18 bolts, fitted with mooring lever, detonator strongback, and soluble plug gear.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug allows mooring tension to pull out the mooring spindle, operating the booster release mechanism, closing the mooring safety switch, and arming the mine.
2. Standard chemical horn firing.
3. The only self-disarming device is the mooring safety switch which is designed to disarm the mine by opening the firing circuit upon release of mooring tension.

Precautions

1. Check the mooring lever. Do not attempt RMS unless the head of the bolt mounted on the free end of the mooring lever bears against the base plate.

RMS

1. Unscrew the detonator strongback and swing it clear.
2. Remove the detonator carrier; the booster is spring-loaded and should follow the detonator out.
3. Dispose of detonator, booster, and charge.

[redacted]

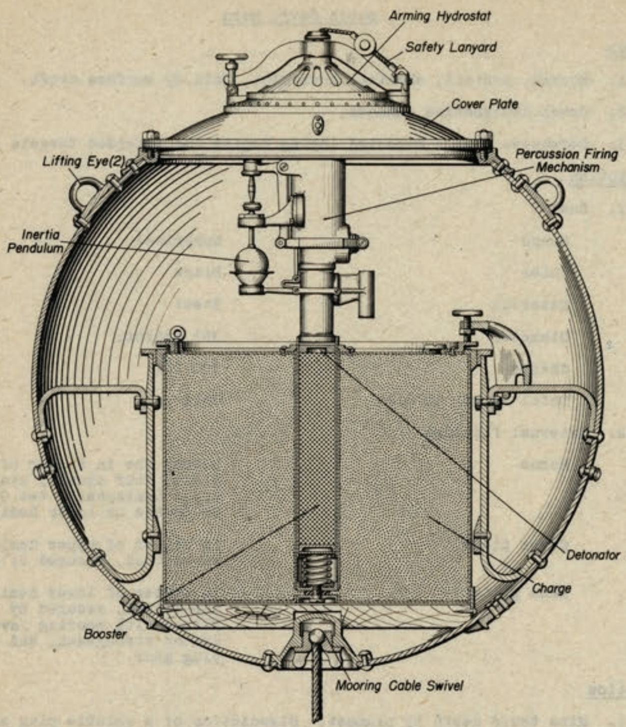


Fig. 5 - Percussion Mine, Sectional View

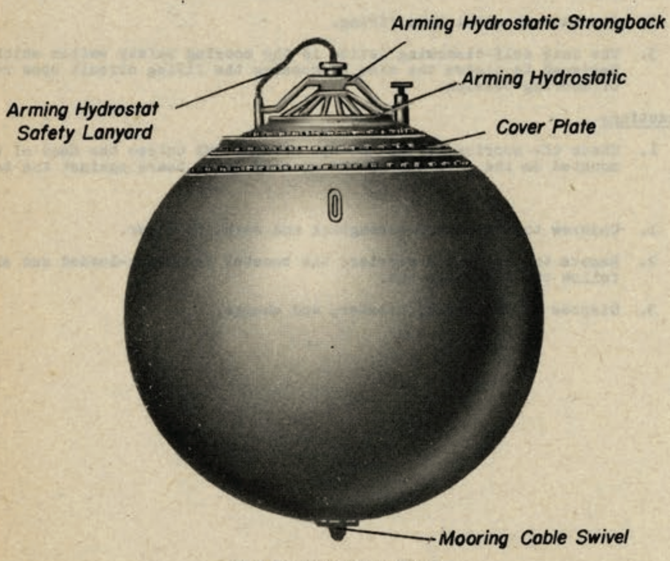


Fig. 6 - Percussion Mine

[redacted]

DUTCH CONTACT MINES

Dutch Percussion

General

1. Moored, contact, percussion-firing mine, laid by surface craft.
2. Dutch designation unknown.
3. Defensive mine for use against surface craft. Maximum depth of case when moored is 40 ft.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	35"
Charge	200 lb.
Total weight in air	Unknown

2. External fittings

Cover plate	20 1/4" diam., in center of upper hemisphere, secured by bolts.
Arming hydrostat	11 1/4" diam., in center of cover plate, secured by strongback. Lanyard leads from center of hydrostat to fitting on side of cover plate.
Lifting eyes	Two, 180° apart, on upper hemisphere, adjacent to cover plate.
Mooring cable swivel	In center of lower hemisphere.

Operation

1. Mine takes depth by plummet. Hydrostatic pressure lifts a guard from the inertia pendulum of the firing mechanism and compresses the firing spring, arming the mine.
2. Mine fires upon receipt of a blow sufficient to displace the pendulum. Pendulum movement operates a firing pin release, allowing the spring-loaded firing pin to impinge on the detonator.
3. The only self-disarming device is the arming hydrostat which is designed to replace the guard and lock the firing pendulum upon release of hydrostatic pressure.

Precautions

1. Check the hydrostat lanyard. If the bitter end thereof can be easily secured to the bracket on the cover plate, the mine is unarmed. If, however, the length of lanyard exposed is too short to reach the bracket, the mine is armed and extraordinary care should be taken not to move or jar the mine except from a safe distance.

RMS

1. Unscrew and remove the hydrostat strongback.
2. Attach a line to the safety lanyard. From a safe distance, exert tension on the lanyard until the hydrostat, firing pin, and detonator come free of the case. It is likely that this procedure will fire the detonator.
3. Remove the cover plate.
4. Remove the booster.
5. Dispose of detonator, booster, and charge.

[redacted]

MINE DISPOSAL HANDBOOK

PART VIII

DUTCH UNDERWATER ORDNANCE

CHAPTER 2

DUTCH DEPTH CHARGES

SEPTEMBER 1, 1945

[redacted]

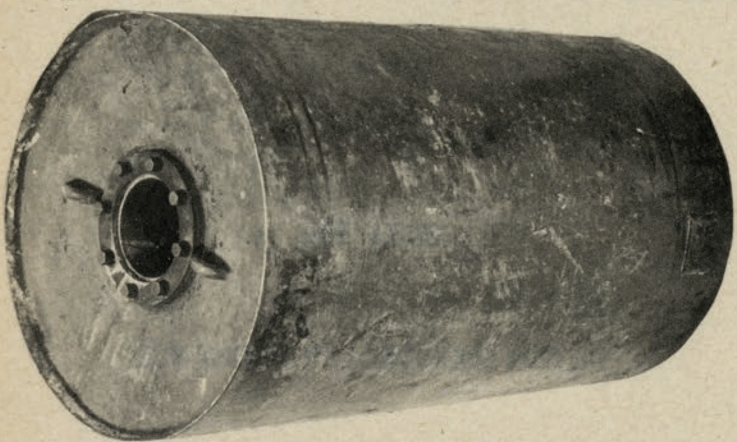


Fig. 1 - Depth Charge, Booster End

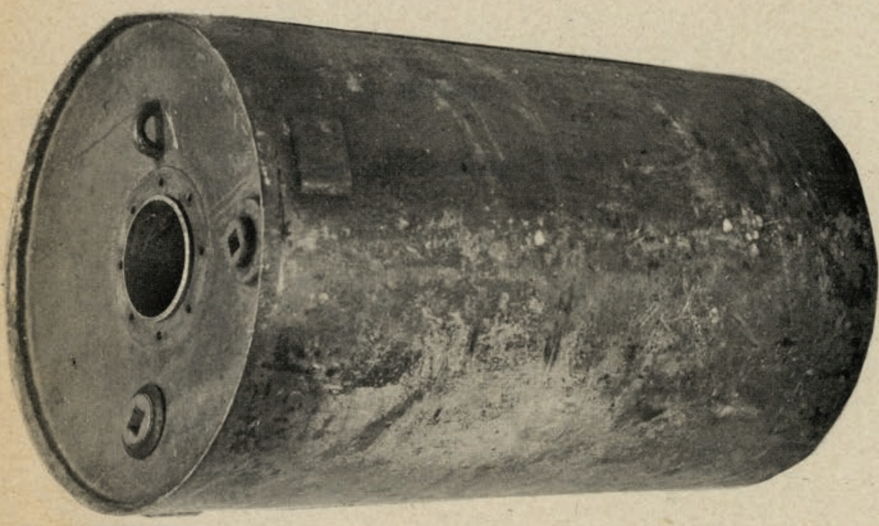


Fig. 2 - Depth Charge, Pistol End

[redacted]

DUTCH DEPTH CHARGE

General

1. Hydrostatically operated.
2. Dutch designation unknown.
3. Launched from surface craft.

Description

1. Case

Shape	Cylindrical
Color	Grey
Material	Steel
Diameter Overall Central tube	 17 1/2" 4 1/8"
Length	28 3/4"
Charge	300 lb. TNT approx.
Total weight in air	400 lb. approx.

2. External fittings

Pad eyes	Two on pistol end, one on booster end.
Filling holes	Two on pistol.

3. The pistol is made of brass, 10 1/4" long, 3 3/8" diameter. Its depth settings are Safe, 90, 70, 50, 30, and 15 meters. This pistol is similar to the U.S. Mk 3 pistol. Its firing action is similar to that of the U.S. Mk 6 pistol.

4. The booster is a cylindrical brass can 10 1/4" long and 4" in diameter. A booster extender, consisting of metal bellows and spindle, is soldered to the booster can. A safety fork can be placed on the spindle.

Operation

1. Before launching, the depth-setting dial is moved from "Safe" to the desired setting. As the charge sinks, hydrostatic pressure houses the booster over the detonator. Increasing pressure expands a corrugated metal bellows on the pistol, thereby compressing a firing spring and moving a collar around the firing pin. When the depth charge reaches the pre-set depth, lock balls release the firing pin and fire the charge.

Precautions

1. Do not attempt RSP unless absolutely necessary.
2. Do not move or jar.
3. Allow at least one passage of high tide if feasible.
4. Countermine where possible. Do not attempt RSP underwater.
5. Booster extender may fail to retract upon release of hydrostatic pressure.

Rendering Safe Procedure

1. Place a safety fork on the booster extender if possible.
2. Remove the booster extender.
3. Remove the pistol.
4. Remove detonator by unscrewing the detonator holder from the pistol.
5. Dispose of booster and charge.

[redacted]

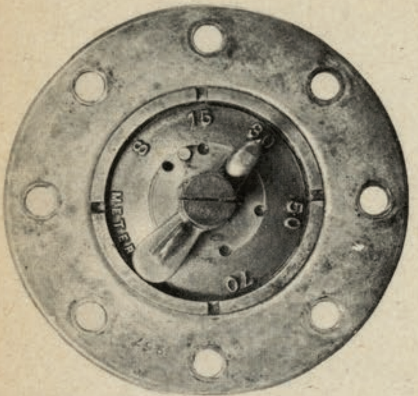


Fig. 3 - Depth Charge Pistol, Dial Setting Face

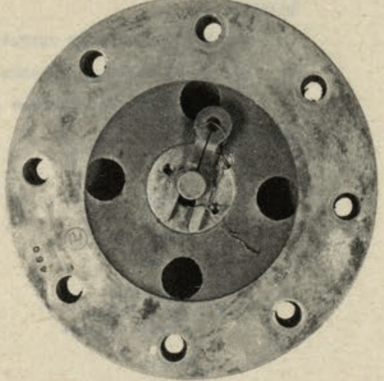


Fig. 4 - Depth Charge Booster Extender, End Plate

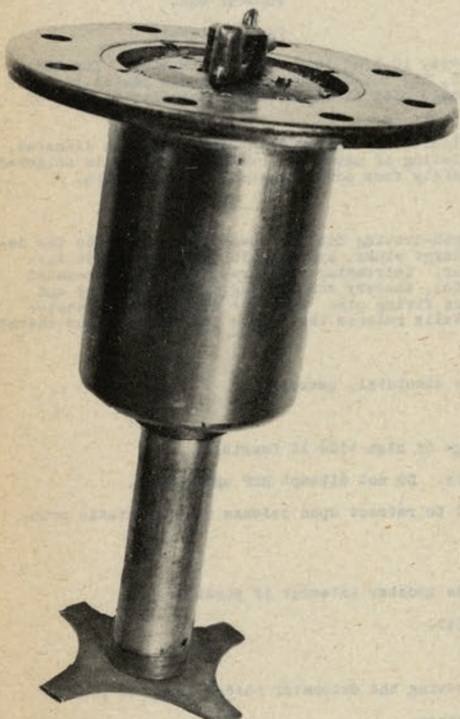


Fig. 5 - Depth Charge Pistol, Side View

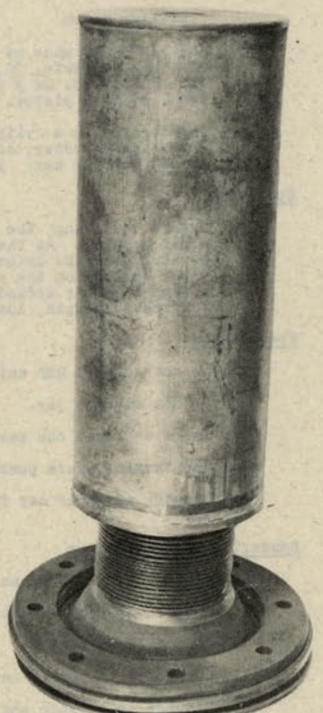


Fig. 6 - Depth Charge Booster Extender and Booster

MINE DISPOSAL HANDBOOK

PART IX

FRENCH UNDERWATER ORDNANCE

SEPTEMBER 1, 1945 [redacted]

MINE DISPOSAL HANDBOOK

PART IX

FRENCH UNDERWATER ORDNANCE

CHAPTER I

FRENCH CONTACT MINES

SEPTEMBER 1, 1945

[redacted]

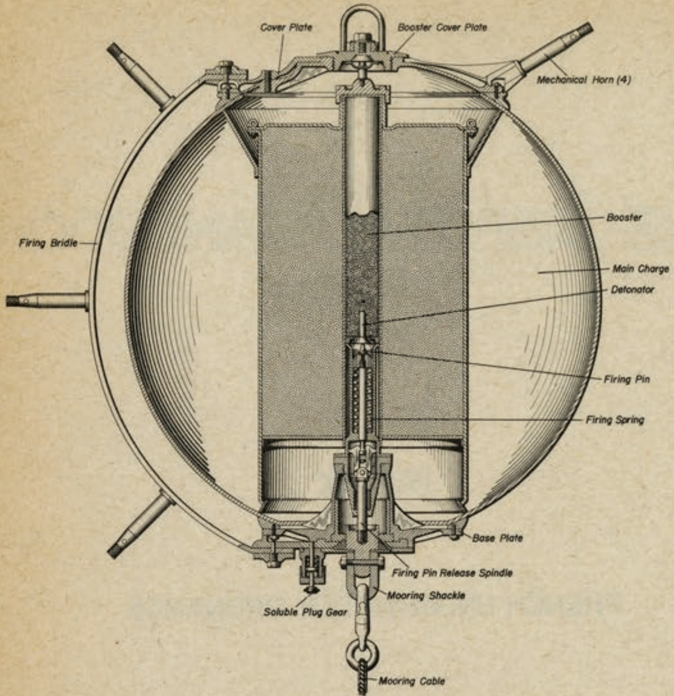


Fig. 1 - Breguet Mine (Bridle Type), Sectional View

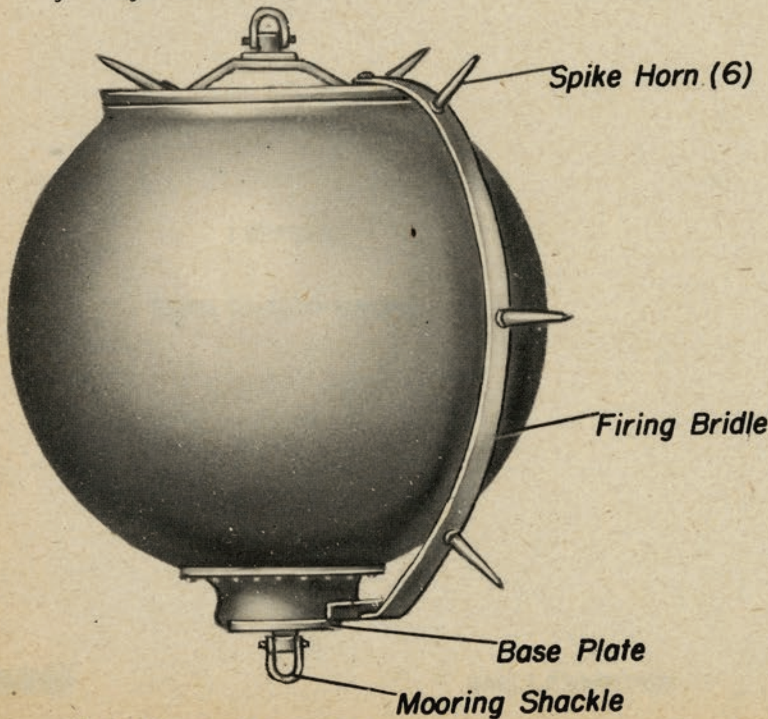


Fig. 2 - Breguet Mine (Bridle Type)

FRENCH CONTACT MINES

French Breguet (Bridle Type)

General

1. Moored, contact, mechanically-fired mine, laid by surface craft.

2. French designation, "B-1".

3. Defensive mine for use in maximum depth of water of 328 ft. against surface craft.

Description

1. Case

Shape	Spherical
Color	Black or galvanized metal
Material	Steel
Diameter	30"
Charge	130 lb. or 220 lb. TNT
Total weight in air	Unknown

2. External fittings

Firing bridle	Semi-circular, pivoted at centers of upper and lower hemispheres, respectively, fitted with six spike horns; restrained by a shear pin and a soluble plug, at the upper and lower ends, respectively.
Booster cover plate	In center of upper hemisphere; fitted with lifting eye.
Base plate	In center of lower hemisphere, secured by bolts, fitted with mooring and firing spindle.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug leaves the firing bridle restrained only by the shear pin and the mine is armed.

2. Mine fires when the bridle is struck with sufficient force to cause rotation thereof. This aligns small arms on the mooring spindle with slots in the bridle and allows mooring tension to retract the spindle. Spindle retraction compresses a firing spring and releases a spring-loaded firing pin to impinge on the detonator.

3. No self-disarming devices are fitted.

Precautions

1. Take care not to rotate the bridle nor take any strain on the mooring and firing spindle.

2. Note that the detonator and booster are permanently married in the charge.

RMS

1. Unscrew the booster cover plate.

2. Remove the booster and detonator.

3. Dispose of detonator, booster, and charge.

[redacted]

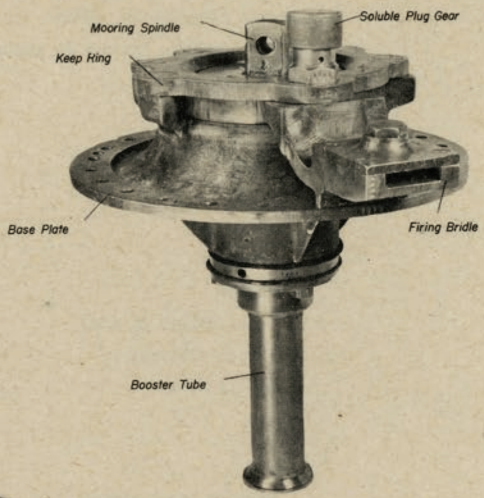


Fig. 3 - Breguet Mine (Bridle Type), Base Plate and Firing Mechanism Before Firing

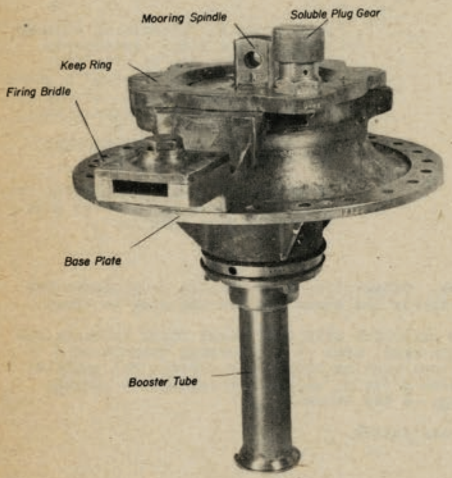


Fig. 4 - Breguet Mine (Bridle Type), Base Plate and Firing Mechanism Fired

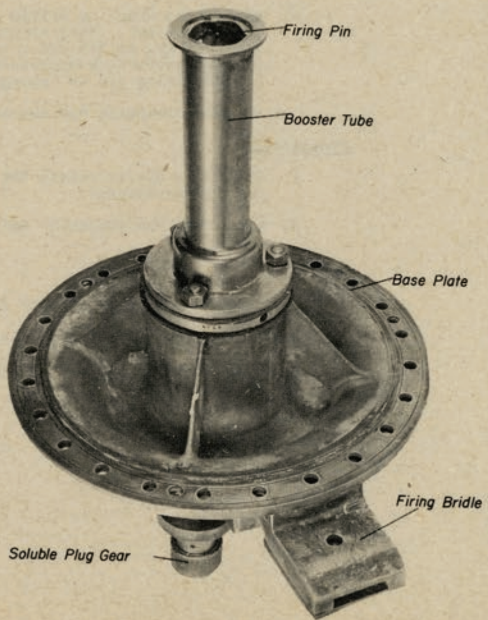


Fig. 5 - Breguet Mine (Bridle Type), Base Plate and Firing Mechanism, Interior View After Firing

[redacted]

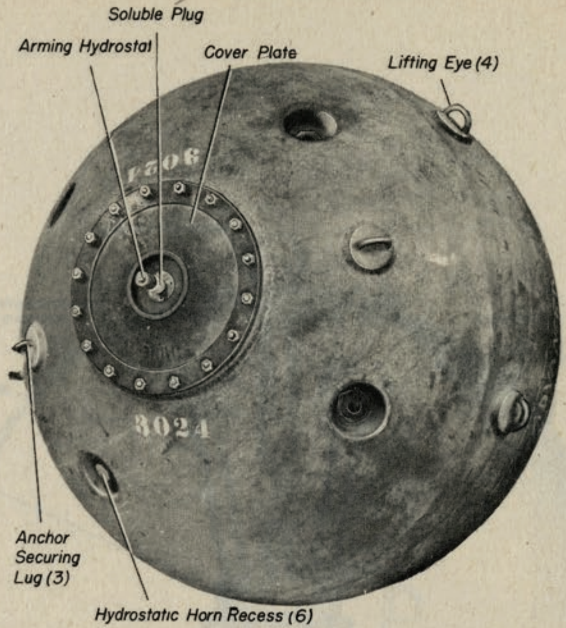


Fig. 6 - Breguet Mine (Shear Horn Type), Top View

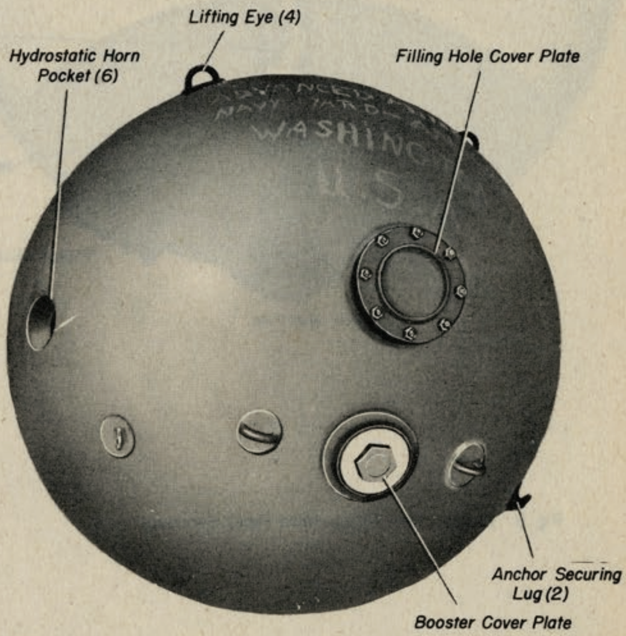


Fig. 7 - Breguet Mine (Shear Horn Type), Bottom View

[redacted]

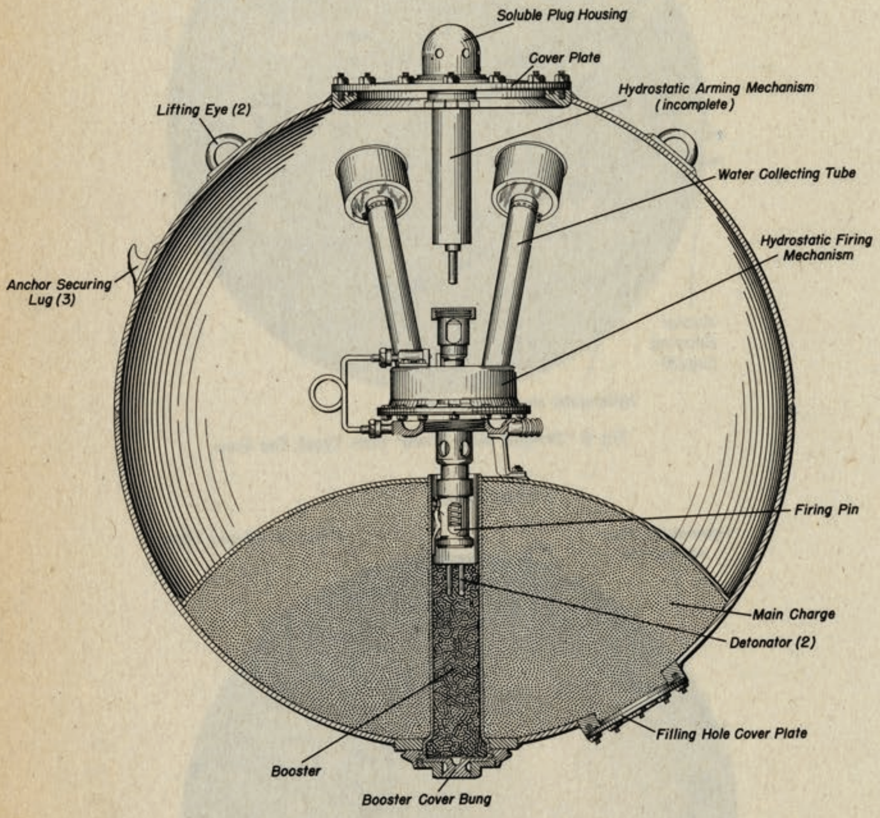


Fig. 8 - Breguet Mine (Shear Horn Type), Sectional View

[redacted]

French Breguet (Shear Horn Type)

General

1. Moored, contact, hydrostatically-fired mine, laid by surface craft.
2. French designation, "B4M".
3. Defensive mine for use in maximum depth of water of 990 feet against surface craft or submarines. Maximum depth of case when moored is 292 feet.

Description

1. Case

Shape	Spherical
Color	Black or galvanized
Material	Steel
Diameter	40"
Charge	176 lb. cast TNT
Total weight in air	451 lb.

2. External fittings

Horns	Six, spring-loaded, hinged type; four equally spaced about upper hemisphere, 12" from center; two on lower hemisphere, 21" from center.
Cover plate	10 3/4" diam., in center of upper hemisphere, secured by 16 bolts; fitted with an arming hydrostat.
Booster cover plate	3 1/2" diam., screwed into boss welded to center of lower hemisphere; fitted with hexagonal nut.
Filling hole cover plate	6" diam., on lower hemisphere, 9 1/2" from center, secured by 8 bolts welded to boss.
Mooring shackle securing eyes	Two, 180° apart, 6" from center of lower hemisphere.
Anchor securing lugs	Three; one on upper hemisphere, 17" from center; two on lower hemisphere, 14" from center.
Lifting eyes	Four on upper hemisphere, two 12" and two 21" from center.

Operation

1. Mine takes depth by plummet. Dissolution of a soluble plug allows the hydrostat to operate, arming the firing mechanism. Dissolution of another soluble plug causes the horn restraining ring to part, allowing the horns to spring out and lock in the extended position.
2. Mine fires when a horn is broken or sheared sufficiently to permit water to enter the firing ring. This operates the firing hydrostat which releases the spring-loaded firing pin to impinge on the detonator.
3. No self-disarming devices are fitted.

Precautions

1. Note that the detonator and booster are permanently married in the charge.

RMS

1. Unscrew the booster cover plate.
2. Remove the booster and detonator.
3. Dispose of detonator, booster, and charge.

[redacted]

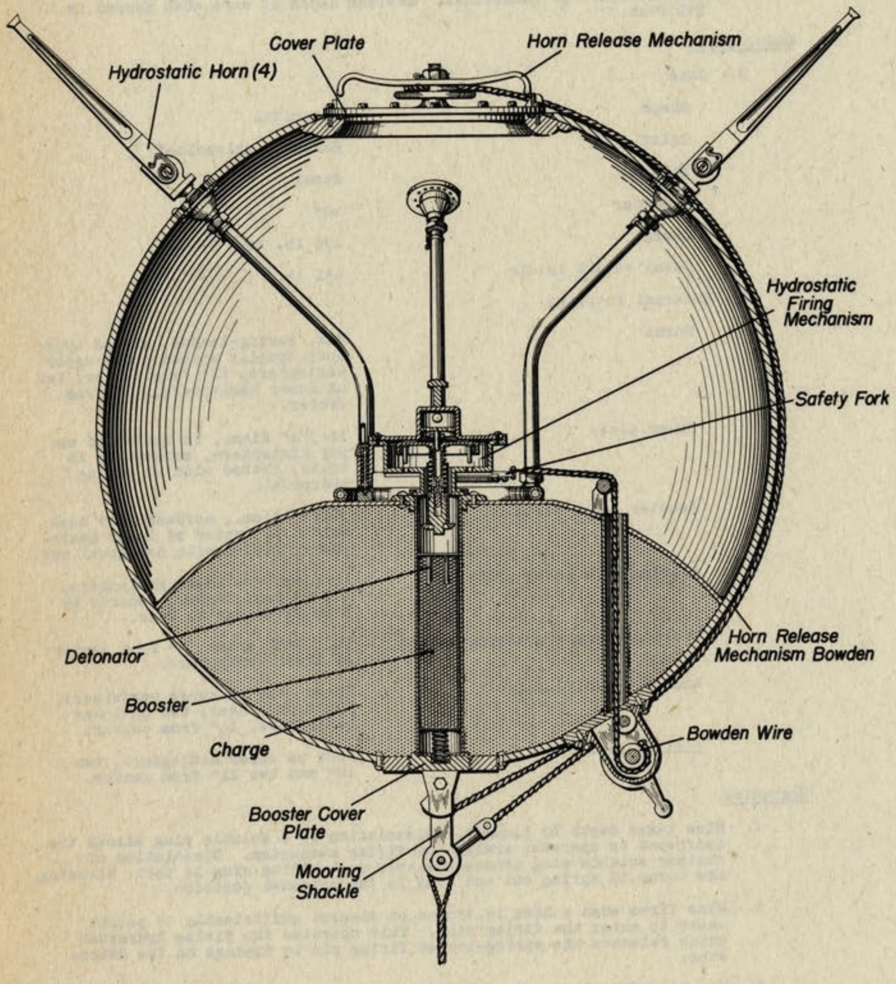


Fig. 9 - Sautter Harle Mine, Sectional View

[redacted]

French Sautter Harle

General

1. Moored, contact, hydrostatically fired mine, laid by submarine.

2. French designation, "HS4".

3. Offensive mine for use in maximum depth of water of 660 ft.

Description

1. Case

Shape	Spherical
Color	Black
Material	Steel
Diameter	40 1/2"
Charge	480 lb. Tolite
Total weight in air	433 lb.

2. External fittings

Horns	Four, spring-loaded, hinged type, 19" long, equally spaced about upper hemisphere, 17" from center.
Cover plate	12 1/2" diam., in center of upper hemisphere, secured by 12 bolts; fitted with cross-shaped horn release mechanism to which is attached a bowden wire leading from the mooring shackle.
Mooring shackle	In center of lower hemisphere, secured over the booster well; fitted with mooring bolt and attachments for two bowden wires.
Bowden windlass	On lower hemisphere, 12" from center, contained in a housing secured to case by 8 bolts.
Anchor securing device	Eliptical, 15" x 4", on lower hemisphere, 24" from center.
Anchor positioning bosses	Two, 1 1/2" diam., adjacent to anchor securing device.
Lifting eyes	Four; two on upper hemisphere, 17" from center; two on lower hemisphere, 29" from center.
Booster cover plate	3 1/2" diam., perforated, in center of lower hemisphere; fitted with hexagonal nut.
Anchor securing lugs	Four; two on upper hemisphere, 22" from center; two on lower hemisphere, 17" from center.
Filling hole cover plate	5" diam., on lower hemisphere, 16" from center.

Operation

1. Mine takes depth by the loose-bight hydrostat system. Mooring tension causes the mooring shackle to assume a position perpendicular to the axis of the case. This exerts tension on two bowden wires, performing the following:

   (a) The bowden wire leading from the shackle to the horn release mechanism rotates the mechanism, freeing the horns which spring out and lock in the extended position.

   (b) The bowden wire leading from the shackle to the windlass rotates the windlass, exerting tension on an interior bowden wire which removes a safety fork from and arms the firing mechanism.

 [redacted]

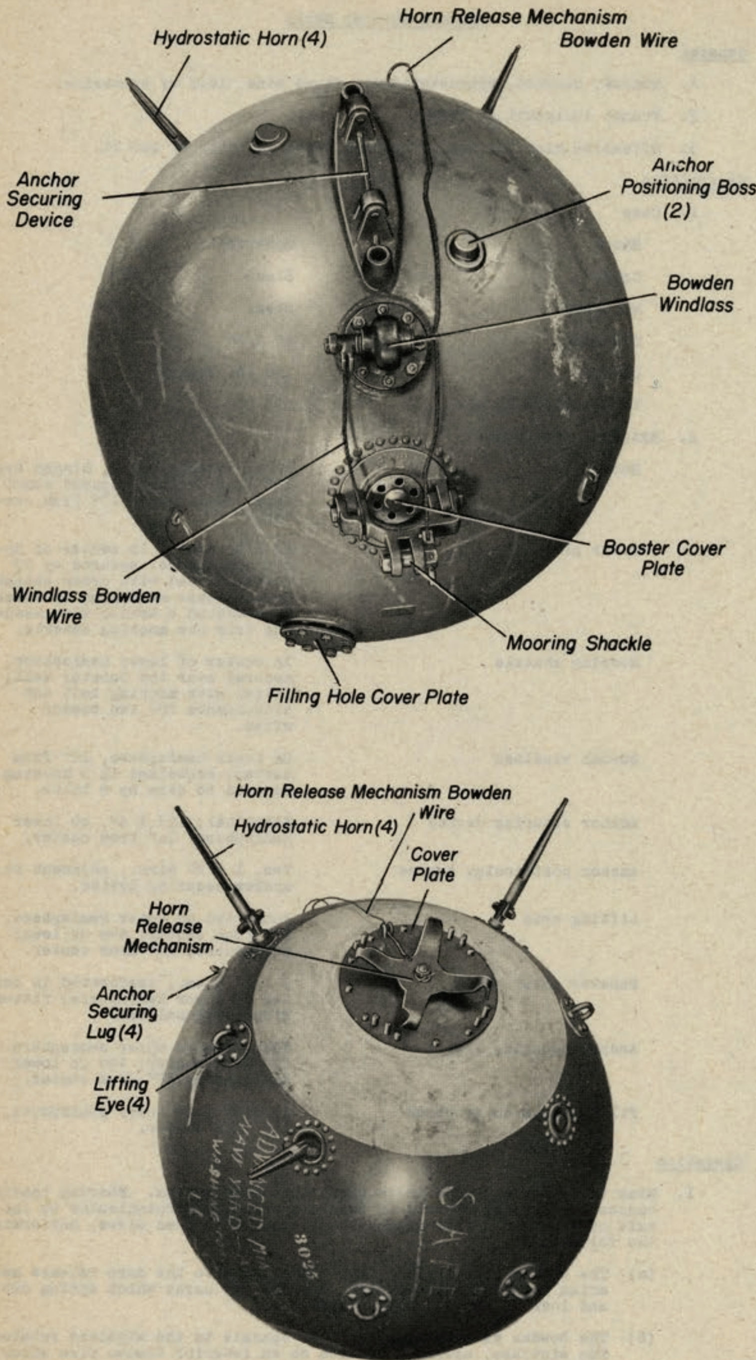


Fig. 11 - Sautter Harle Mine, Top View

[redacted]

(French Sautter Harle, Cont'd.)

2. Mine fires when a horn is broken or sheared sufficiently to permit water to enter the firing ring. This operates the firing hydrostat which releases the spring-loaded firing pin to impinge on the detonator.

3. The only self-disarming device is the safety fork which is designed to re-engage and lock the firing hydrostat upon release of mooring tension.

Precautions

1. Check the mooring shackle. Except in extreme emergency, do not attempt RMS unless the shackle is parallel to the bottom of the case.

2. Note that the detonator and booster are permanently married in the charge.

RMS

1. Unscrew the booster cover plate.

2. Remove the booster and detonator.

3. Dispose of detonator, booster, and charge.

[redacted]

MINE DISPOSAL HANDBOOK

PART IX

FRENCH UNDERWATER ORDNANCE

CHAPTER 2

FRENCH TORPEDOES

SEPTEMBER 1, 1945 [redacted]

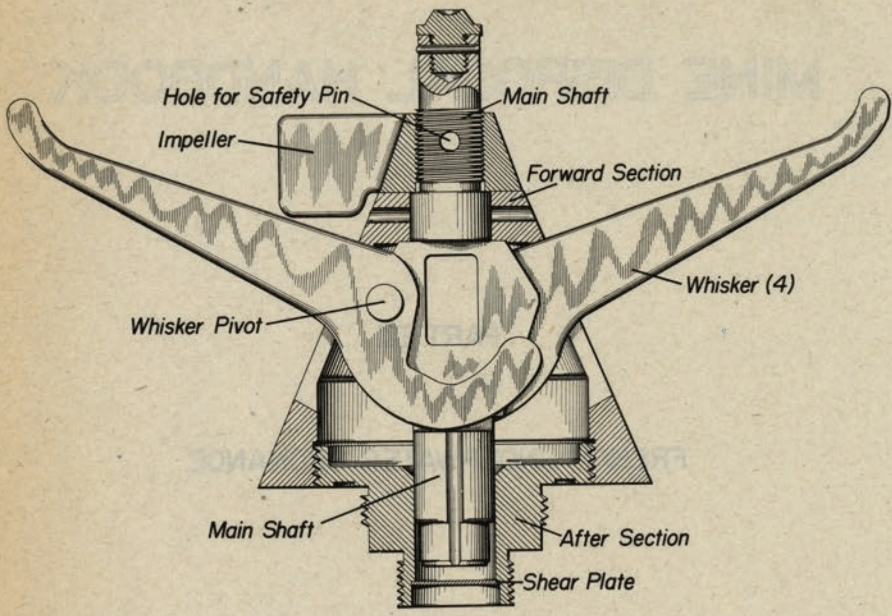


Fig. 1 - Impact Exploder, Sectional View

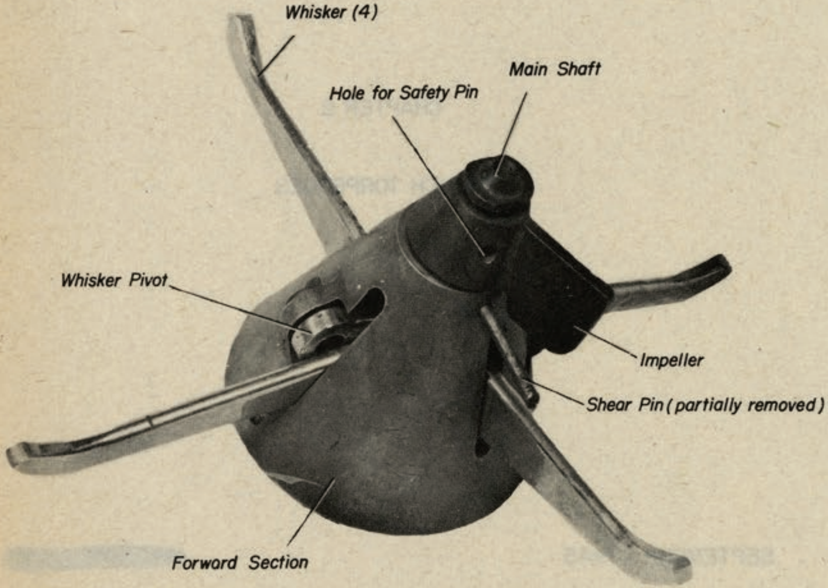


Fig. 2 - Impact Exploder

[redacted]

FRENCH TORPEDOES

Impact Exploder

General

1. Impact-direct action type, fitted in nose pocket of warhead.

Description

1. External

(a) The exploder is composed of the following main parts:

(1) A forward section, 7 1/2" long and 5" in maximum diameter, which is shaped like a truncated cone and contains the arming and firing mechanisms. A single-bladed impeller is fitted to the end of a threaded shaft which protrudes 2 1/4" from the center of the nose. The impeller vane is 2" long and is prevented from rotating prior to launching by a safety pin. Four curved whiskers project 4 3/4" from slots in the side of the exploder body.

(2) An after section which contains the detonator and booster. This section has not been recovered and no data are available as to its exact size and shape.

(b) The two sections of the exploder are screwed together.

2. Internal

(a) The main working parts of the exploder are as follows:

(1) The main shaft which extends the length of the forward section. Its upper end is threaded to receive the arming impeller and is keyed to the exploder body by a large brass shear pin. Its mid-section is flattened to provide a pivot point for two of the whiskers. Its lower end forms a blunt firing pin with a shear plate serving both to restrain the shaft and separate it from the detonator.

(2) The four whiskers, two of which are pivoted at the flattened mid-section of the main shaft. The other two are pivoted on the inside of the exploder body 180° around from their respective slots, and bear against the two whiskers which are pivoted on the main shafts.

3. Method of Mounting

(a) The exploder is screwed into the warhead.

Operation

1. The safety pin is removed manually prior to launching the torpedo. When the torpedo is launched, water travel rotates the impeller, thereby unscrewing the impeller from the main shaft and arming the exploder.

2. The exploder fires when subjected to a blow of sufficient force, either on the main shaft or whiskers, to force the blunt end of the main shaft through the shear plate onto the detonator.

Precautions

1. Avoid all unnecessary contact with the whiskers or main shaft.

Rendering Safe Procedure

1. Wedge the whiskers so as to prevent any movement aft.

2. Unscrew the exploder from the warhead.

3. Unscrew the detonator and booster.

4. Dispose of detonator, booster, and charge.

[redacted]

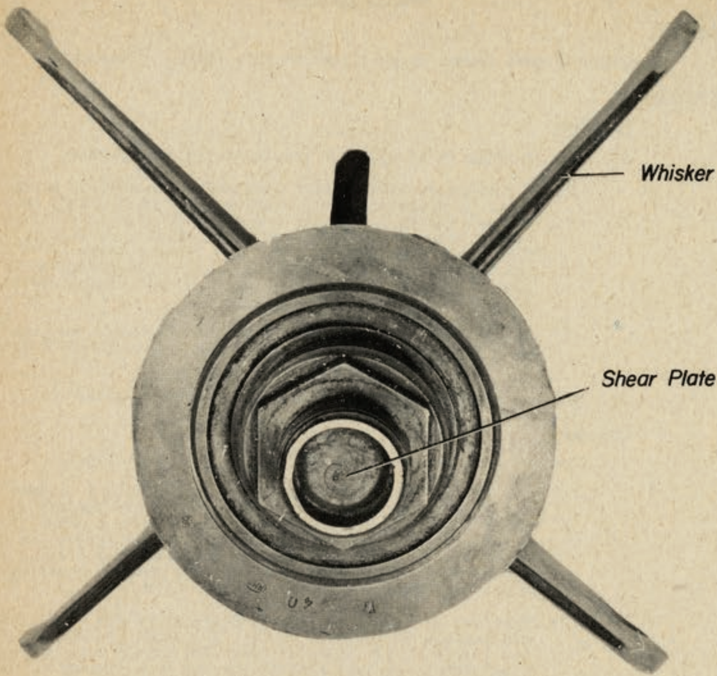


Fig. 3 - Impact Exploder, After End

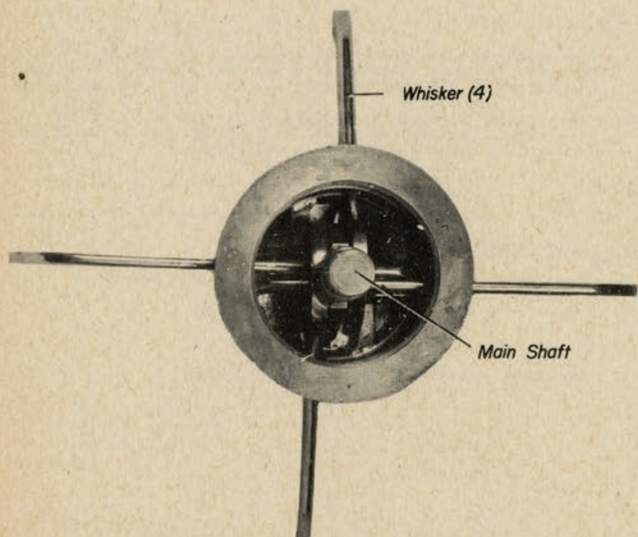


Fig. 4 - Impact Exploder, After Section Removed

MINE DISPOSAL HANDBOOK

PART IX

FRENCH UNDERWATER ORDNANCE

CHAPTER 3

FRENCH DEPTH CHARGES

SEPTEMBER 1, 1945

[redacted]

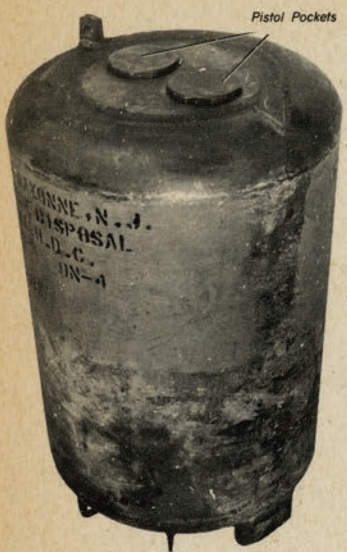


Fig. 1 - 100 Kg. Depth Charge, Top View

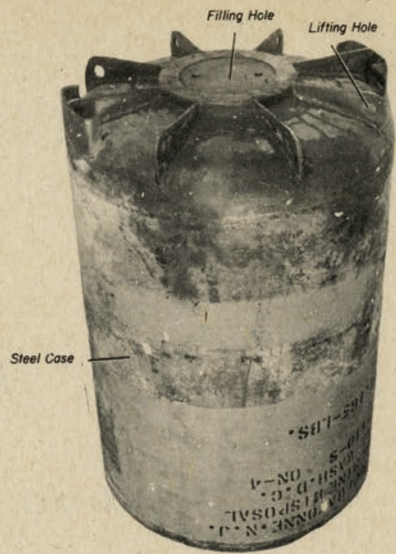


Fig. 2 - 100 Kg. Depth Charge, Bottom View

Fig. 3 - 200 Kg. Depth Charge, Top View

Fig. 4 - 200 Kg. Depth Charge, Bottom View

[redacted]

FRENCH DEPTH CHARGES

General

1. The French employ depth charges of three sizes, 200 kg., 100 kg., and 35 kg. All are made of steel with welded seams and are fitted with TNT charges. Surface launching is used.

2. Two standard-type hydrostatic pistols are employed, a 1923 model and a 1929 model. Depth settings are for 10, 25, or 50 meters. Nothing is known about either the boosters or booster extender mechanisms and no rendering safe procedures are known.

3. Table 1 incorporates all available information on the depth charge cases.

	200 Kg. Size	100 Kg. Size	35 Kg. Size
Shape	Cylindrical	Cylindrical	Cylindrical
Length	31 1/2"	31"	23 3/4"
Diameter	19 1/2"	14"	9 3/4"
Diam. filling hole	5 3/8"	5 3/8"	5 3/8"
No. of radial ribs on filling hole end case	8	6	6
No. of openings on end opposite filling hole	2 holes - 2 3/4"	2 holes 2 3/4"	4 holes 2 3/4"
Case weight	110 lb.	53 lb.	
Charge weight	440 lb. TNT	220 lb. TNT	77 lb. TNT

Table 1 - French Depth Charge Cases

[redacted]