OP 1330: MINE DISPOSAL HANDBOOK
PART 3 OF 4*

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Arlington, VA 22242-5160
MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE
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ITALIAN UNDERWATER ORDNANCE

CHAPTER I

ITALIAN CONTACT MINES

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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-tacking 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. F.S.E.’s will be found fitted to the tail cover plates of both the Mines Type 10 and 1P. These devices, however, provide little difficulty in RMG 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.
ITALIAN CONTACT MINES

Extender Mechanism
Safety Pin
Leaf Contacts (2)
Keep Ring
Cover Plate
Lifting Eye (2)
Booster

Fig. 1 - Mine Type II, Sectional View

Fig. 1a - Mine Type II, Extender Mechanism
ITALIAN CONTACT MINES

Mine Type II

General
1. Moored, contact, chemical horn mine, laid by surface craft.
2. Italian designation, "Torpedia mep 125/1933 Bolico".
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: 43"
   Charge: 275 lb. cast TNT
   Total weight in air: 487 lb.
2. External fittings
   Horns: Six, equally spaced around upper hemisphere, 14" from center.
   Cover plate: 19" diam., in center of upper hemisphere, lap-fitted, secured by 10 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 BDS if a safety pin cannot be inserted through the top of the spindle and spindle housing in the hole provided.

BDS
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.
ITALIAN CONTACT MINES

Mine Type L4

General
1. Moored, contact, chemical horn mine, laid by surface craft.
2. Italian designation, "Torpedine asp 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: 200 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 25" respectively from center.
   - Anchor securing lugs: Three; two on lower hemisphere, 13" from center; one on upper hemisphere, 25" 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 RE5 if a safety pin cannot be inserted in the hole provided.

RE5
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.
Fig. 9 - Mine Type IK, Sectional View

Fig. 10 - Mine Type IK, Base Plate
ITALIAN CONTACT MINES

Mine Type IX (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: 120 lb. cast TNT with pressed TNT booster.
   Total weight in air: 351 lb.

2. External fittings
   Horns: Mine; 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, 13" from center, bosses painted green.
   Cover plate: 10" diam., in center of upper hemisphere, lag-fitted, secured by eight bolts. Fitted with horn in center.
   Base plate: 12" diam., in center of lower hemisphere, lag-fitted, secured by 12 bolts. Fitted with mooring lever, soluble plug gear and antenna mounting 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 13" from center of lower hemisphere.
   Base plate: 12" from center of lower hemisphere.

3. The Mine Type IX Colonial differs from Mine Type IX as follows:
   (a) Its Italian designation is "Torpedine Coloniale aep 125/1936."
   (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.
Fig. 11 - Mine Type IK

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

![Diagram of Mine Type IK Detonator Carrier and Housing]

Fig. 13 - Mine Type IK, Detonator Carrier and Housing
## General
1. Moored, contact, chemical horn mine, laid by submarine.
2. Italian designation, "Torpedine aep 150/1915."
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
### Case
1. **Shape**: Two truncated spheres, joined by a cylindrical band.
2. **Color**: Black
3. **Material**: Steel
4. **Diameter**: 36"
5. **Length**: 54"
6. **Charge**: 260 lb. cast TNT.
7. **Total weight in air**: Unknown

### External fittings
1. **Horns**: Seven; four equally spaced around upper hemisphere; three equally spaced around lower hemisphere.
2. **Cover plate**: In center of upper hemisphere, secured by keep ring.
3. **Base plate**: In center of lower hemisphere, fitted with mooring lever and soluble plug gear.
4. **Mooring hydrostat**: On lower hemisphere, adjacent to base plate.
5. **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 sight 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 EMD unless the mooring lever has retracted fully.

## EMD
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.
Fig. 16 - Mine Type IM, Sectional View

Fig. 17 - Mine Type IM, Floating
ITALIAN CONTACT MINES

Mine Type IV

General
1. Moored, contact, hydrostatic horn mine, laid by surface craft.
2. Italian designation, "Torpedo m70/191c 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.

Rem
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.
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 70/1915."
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.
   Lega 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.

EWS
1. None known.
Fig. 19 - Mine Type 10, Depth Control and Firing Mechanism, Perspective View
ITALIAN CONTACT MINES

Mine Type 10

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
   Hydrostat tube
   Clock cover plate
   Arming switch knob
   Buoyancy tube
   Booster release mechanism
   Suspension lug
   Filling hole cover
   Parachute release mechanism

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 locking mechanism. The mine then rises rapidly to its pre-set depth, at which point the hydrostatic motor control reverses the motor direction and
ITALIAN CONTACT MINES

(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 inertial 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 T.M.G., consisting of a lever system attached to both the inertial weight and the tail cover plate, is designed to trip the firing magneto if an attempt is made to remove the tail cover plate.

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. 23 - Mine Type IP, Perspective View

Fig. 24 - Mine Type IP, Base Plate, Perspective View
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 Mina)
   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, 1800° apart on tail cover plate, 6" from center.
   Float release ball: Spring-loaded, swivelled on two lugs, 1800° 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 ball and forms drum for 80 ft. copper antenna. Fitted inside case between tail cover plate and float release ball 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-
ITALIAN CONTACT MINES

(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 hydrotstat 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 magnet.

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

Dissolement 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 milliamper 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 F.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 R.S. underwater. If the mine is found on the bottom or in the surf, haul it ashore from a safe distance before beginning operations.

R.S.

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.
MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

CHAPTER 2

ITALIAN TORPEDOES

JUNE 1, 1945
ITALIAN TORPEDOES

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, except 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)

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>40&quot;</td>
</tr>
<tr>
<td>Distances from centers of exploder pockets to after flange</td>
<td>14&quot; and 23&quot;</td>
</tr>
<tr>
<td>Diameter of nose plug</td>
<td>1 3/4&quot;</td>
</tr>
<tr>
<td>Marking on nose</td>
<td>GSB MARISUB LA SPEZIA</td>
</tr>
</tbody>
</table>

(b) Type B (Pointed Nose)

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>52&quot;</td>
</tr>
<tr>
<td>Distances from centers of exploder pockets to after flange</td>
<td>16&quot; and 25&quot;</td>
</tr>
<tr>
<td>Diameter of nose plug</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Marking on nose</td>
<td>GSB MARISUB TARANTO</td>
</tr>
</tbody>
</table>

(c) Type C (Round Nose)

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>45&quot;</td>
</tr>
<tr>
<td>Distances from centers of exploder pockets to after flange</td>
<td>16&quot; and 26&quot;</td>
</tr>
<tr>
<td>Diameter of nose plug</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>Marking on nose</td>
<td>S.I. 270/553.4 X 7.2 C.F. GSE TARANTO</td>
</tr>
</tbody>
</table>

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 27" 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):
ITALIAN TORPEDOES

Fig. 4 - Warhead Type C

Fig. 5 - SIC Warhead, Sectional View
(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.
5. 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. 7 - Italian Standard Exploder, Armed Position, Sectional View

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

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 Grad耐ion Immobilization in Geredi Eliehetsa 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 immobilization 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 unprimed 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 disk, 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.
Fig. 9 - Italian Standard Exploder

Fig. 10 - Italian Standard Exploder, Booster Removed

Fig. 11 - Italian Standard Exploder, Housing Removed
ITALIAN TORPEDOES

[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 63 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.
Fig. 12 - SIG Activator, Sectional View
ITALIAN TORPEDOES

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 bellow 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 unarm ed 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 out 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 detente on the detonator switch plunger, allowing the plunger to snap off 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.
Fig. 13 - SIC Activator
ITALIAN TORPEDOS

(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 inertive-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.
A, B - INDUCTION DETECTOR COILS
C₁ - 0.15 MFD - 750 VOLT
C₂ - 0.20 MFD - 750 VOLT
C₃ - 2,500 MFD - 200 VOLT - ELECTROLYTIC
B₁ - 4.5 VOLTS
B₂ - 4.5 VOLTS
B₃ - 135.0 VOLTS
S₁ - ARMING SWITCH
S₂ - SHORTING SWITCH
S₃ - DETONATOR SWITCH
S₄ - TESTING SWITCH
D - PIN FOR SELF-DESTROYING FEATURE
T - VACUUM TUBE (6Q7GT)
V₁ - 0.5 MA^\(^-\)
V₂ - 2.0 MA^\(^-\)
V₃ - 2.0 MA^\(^-\)
V₄ - 100.0^\(^-\)
R₁ - RELAY (ARMING)
R₂ - RELAY (ARMING)
R₃ - RELAY (FIRING)
R₄ - BUZZER (TESTING)

Fig. 14 - SIC Circuit
ITALIAN TORPEDOES

BIG Circuit - Operation

Arming

1. As the torpedo runs off its arming range, S1 closes, S2 opens, removing the short from the detonators, and S3 closes, putting the detonators in the firing circuit. Closing S3 causes B1 to energize R2, causing it to operate P2. Operation of R2 breaks (a) and makes (b), putting current from B3 through coils A and B of R1 and through w5, thereby biasing w5. Operation of R1 closes R1, (a), (b), and (c), causing B2 and C2 in series to heat the cathode of V and B3 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 B3. This varies the plate current of V in such a manner as to produce a 50-100 pulse across w5. If the pulse is of the proper direction, it appears, due to the capacitative coupling, on the grid of T3, allowing T to fire and complete a circuit through B3, R3, the cathode of T, R4, w6, and w5.

2. When R3 is energized, it makes R3, putting B3 across the detonators. The switch B4 and buzzer B3 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, S1 energizes B2 constantly until the unit fires or comes to rest without firing. In the latter case, B2 eventually runs down, allowing R2 to recover gradually. When this occurs, the shorting contacts (a) and (b) are closed at the same time and B2 fires the detonators.
Fig. 15 - Circling Torpedo, Side View
ITALIAN TORPEDOES

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 V. 3. service model.

Description

1. Case

Material: Steel
Color: Green
Diameter: 19 1/2"

Length:
Overall: 8'
Warhead: 2 3/4'
Battery compartment: 2 1/2'
Afterbody: 2 1/2'
Tail: 8'

Charge: 200 lb. (approx.) cast Torpedo

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" aft of battery compartment joint.

(d) Tail
Prodeller
Three-bladed, 10 1/2" span.
Fins
Two, each 26" long, no rudders fitted.
Horizontal
Vertical
Top
Bottom
Parachute release
17 1/2" long, including rudder.
26" long including rudder.
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.

-17-
Fig. 16 - Circling Torpedo, Bottom View
(Circling Torpedo, Coat’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 procedure suicidal. The armed or unarmed condition of an exploder cannot be determined by 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. 18 - Impact Direct Action Exploder, for Use in Circling Torpedo

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

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

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

(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

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
ITALIAN TORPEDOES

(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.
MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

CHAPTER 3

ITALIAN DEPTH CHARGES

JUNE 1, 1945
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.

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.
Fig. 1 - 1936 Model Depth Charge, Sectional View.
ITALIAN DEPTH CHARGES

1936 Model Depth Charge

General
1. Launched from surface craft.

2. Italian designation, "Bomb Torpedo 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.
Fig. 2 - Depth Charge Pistol Type A', Sectional View.
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 another 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 lever 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.
Fig. 3 - Depth Charge Pistol Type A

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

Fig. 5 - Depth Charge Pistol Type B.
ITALIAN DEPTH CHARGES

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 paws 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 tin foil 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.
Fig. 6 - Tactical Depth Charge.

Fig. 7 - Pistol for Tactical Depth Charge.
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" dia., on pistol end, 7 3/4" from lifting eyes, 6" 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.
Fig. 8 - Tactical Depth Charge Floating.
MINE DISPOSAL HANDBOOK

PART V

ITALIAN UNDERWATER ORDNANCE

CHAPTER 4

ITALIAN MISCELLANEOUS

JUNE 1 1945
ITALIAN MISCELLANEOUS

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         660 lb. cast Tetryl.
   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.

PROCEDURE
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.
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
ITALIAN MISCELLANEOUS

160/C. S. Depth Bomb

General
1. Anti-submarine bomb, fitted with nose and tail fuses for impact of underwater 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 137 in diameter.
   Material: Steel
   Diameter: 137
   Length: Overall 6978, Body 3672, Tail 3272
   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 728 long, 674 in maximum diameter and protrudes about 374 from the pocket. The span of the impeller is 674.
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-boosters 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 3756 long, protrudes 5 1/8" 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 (metres). 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.
Fig. 4 - 160/G.S. Depth Bomb, Tail Fuze, Armed Position, Sectional View
Fig. 5 - 160/C.S. Depth Bomb, Tail Fuze, Unarmed Position, Sectional View

Fig. 5a - 160/C.S. Depth Bomb, Tail Fuze, Perspective View
Fig. 6 - 160/0.S. Depth Bomb, Tail Fuze
ITALIAN MISCELLANEOUS

(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 fuse vane securely to the fuze body.
2. Unscrew the fuse 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/G.S. Depth Bomb, Tail Fuze, End View Showing Pressure Plate
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.")
ITALIAN MISCELLANEOUS

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" (28 cm)
   - Length: 6'5" (1.96 m)
   - Charge: 66 lb. cast Tnt
   - Total weight in air: 170 lb. approx.

2. External fittings
   - Booster extender: 3 3/4" 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 raises 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 there-to.
2. Remove the detonator from the tail (exact method of assembly unknown).
3. Dispose of detonator, booster and charge.
Fig. 10 - Explosive Motorboat
ITALIAN MISCELLANEOUS

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-destructing delay fuse. 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-armed 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 bow, 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 1/2"
- Maximum height 3' 2 1/2"n
- Cockpit freeboard 2' 11"

(b) The decking, which envelopes 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, 4' 10" long, which forms the forecastle. A folding framework of welded steel pipe is fitted to 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, fixed 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 1/2 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 1/2 drop bolts. 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 deck 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 arm the various firing devices.

2. Engine

(a) The boat is powered by a six-cylinder Alfa-Romeo gasoline engine of about 300 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 129 miles at cruising speed.

3. Explosive Charges

(a) Main charge

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

(Explosive Motorboat, Cont'd.)

3/4" 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 brasslocator cap. 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 fuse 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 1/2" 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 1/2" 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 bowline 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 fuse in the self-destroying feature.

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

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(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 ait, 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 fuse of the self-destructing 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-destructing 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 14 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 junction 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.
MINE DISPOSAL HANDBOOK

E.C. HADERLIE

PART VI

JAPANESE UNDERWATER ORDNANCE
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**PART VI - JAPANESE UNDERWATER ORDNANCE**

## CHAPTER I

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## CHAPTER II

### JAPANESE TORPEDOS

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
<td>90, Model 2</td>
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<tr>
<td>91, Model 1 (Type 91, Model 2)</td>
<td>9</td>
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<tr>
<td>Warhead</td>
<td>11</td>
</tr>
<tr>
<td>Hydroplane Firing Device</td>
<td>15</td>
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<td>Type 2</td>
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## CHAPTER III

### JAPANESE DEPTH CHARGES

<table>
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<tbody>
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<td>95, Modification 1, Modification 2</td>
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<tr>
<td>2, Modification 1</td>
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## CHAPTER IV

### JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

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**Added 1 July 1944**

(Change No. 8)
MINE DISPOSAL HANDBOOK

PART VI

JAPANESE UNDERWATER ORDNANCE

CHAPTER I

JAPANESE CONTACT AND CONTROLLED MINES

NOVEMBER 1, 1944

CONFIDENTIAL
<table>
<thead>
<tr>
<th>Japanese Designation</th>
<th>Ch. 4. Designation</th>
<th>Old Type No. of Information</th>
<th>Nature</th>
<th>Laid By</th>
<th>Dimensions</th>
<th>Type &amp; Wt.</th>
<th>Total Wt.</th>
<th>Depth Taking</th>
<th>Max. Depth</th>
<th>Firing Methods</th>
<th>Safety Devices</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Type 99 Mod 1</td>
<td>JA II</td>
<td>Recovered</td>
<td>Sub</td>
<td>July 25.6</td>
<td>390 block fitted Shikose</td>
<td>847</td>
<td>Hydrostatic 55</td>
<td>1500</td>
<td>Spring-loaded mooring safety switch (Type 66)</td>
<td>Chemical horn mine</td>
<td>Cams along on laid by sub of the I-120 mines, mooring tab, Type III, marking and recovery of mines.</td>
<td></td>
</tr>
<tr>
<td>Type 93 Model 1</td>
<td>JB IV</td>
<td>Recovered</td>
<td>S/C or A/C</td>
<td>94</td>
<td>300 Type 88</td>
<td>454</td>
<td>Plummet</td>
<td>246</td>
<td>3281</td>
<td>Four chemical horn mine with delay, mooring safety switch (Type 91 or 97)</td>
<td>Chemical horn mine</td>
<td>Most commonly found moored chemical horn mines.</td>
</tr>
<tr>
<td>Type 93 Model 2</td>
<td>Blueberry</td>
<td>L-1 document</td>
<td>A/C</td>
<td>94</td>
<td>200 Type 88</td>
<td>454</td>
<td>Plummet</td>
<td>246</td>
<td>3281</td>
<td>Seven chemical horn with delay, mooring safety switch (Type 91 or 97)</td>
<td>Same as Mine Type JB</td>
<td>Model of JB.</td>
</tr>
<tr>
<td>Type 93 Model 3</td>
<td>JB</td>
<td>&quot;</td>
<td>A/C</td>
<td>94</td>
<td>200 Type 88</td>
<td>454</td>
<td>Plummet</td>
<td>246</td>
<td>3281</td>
<td>Eight or nine chemical horn mine with delay, mooring safety switch (Type 91 or 97)</td>
<td>Same as Mine Type JB</td>
<td>Same as JB (Type 93-1-1) but does not incorporate lever type base plate.</td>
</tr>
<tr>
<td>Type 93 Mod 1</td>
<td>JB</td>
<td>Recovered</td>
<td>A/C</td>
<td>94</td>
<td>200 Type 88</td>
<td>454</td>
<td>Plummet</td>
<td>246</td>
<td>3281</td>
<td>Eight or nine chemical horn with delay, mooring safety switch (Type 91 or 97)</td>
<td>Chemical horn mine</td>
<td>Most commonly found moored chemical horn mines. Those mines with lower horn bosses are often found with the lower bosses blunted off.</td>
</tr>
<tr>
<td>Type 95 Mod 1</td>
<td>JC IV</td>
<td>&quot;</td>
<td>S/C</td>
<td>12.9</td>
<td>182 block fitted Shikose</td>
<td>456</td>
<td>182</td>
<td>525</td>
<td>Four chemical horn with delay, mooring safety switch (Type 91 or 97)</td>
<td>Chemical horn mine</td>
<td>Very similar to JB, mooring safety switch system being the only major difference.</td>
<td></td>
</tr>
<tr>
<td>Mt. 6 Model 1</td>
<td>JA XV</td>
<td>&quot;</td>
<td>S/C</td>
<td>41.5</td>
<td>170 block fitted Shikose</td>
<td>944</td>
<td>41.5</td>
<td>41.5</td>
<td>Four chemical horn with delay, mooring safety switch (Type 91 or 97)</td>
<td>Chemical horn mine</td>
<td>Mooring safety switch.</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
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<tr>
<td>MK 5 Model 2</td>
<td>JL</td>
<td>Recovered</td>
<td>MOORED</td>
<td>SC</td>
<td>0.9</td>
<td>21.1</td>
<td>11.1</td>
<td>2048 KAT</td>
<td>Shimosa 800</td>
<td>Spring-loaded switch with soluble plug delay and mooring safety switch</td>
<td>Mooring safety switch</td>
<td>Tactical use and laying depths assumed to be the same as MK 1 Mod 1.</td>
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<tr>
<td>MK 6 Model 2 Mod 1</td>
<td>Pelican</td>
<td>VII 1-1 Document</td>
<td>Recovered</td>
<td>A/C 23 2/22 3/4</td>
<td>240 Type 98</td>
<td>903</td>
<td>150</td>
<td>3300</td>
<td>Four chemical horn switch with soluble plug delay and mooring safety switch</td>
<td>Mooring safety switch</td>
<td>Similar to JD and JP with same mooring safety switch as JD. Information from 1-l document.</td>
<td></td>
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<tr>
<td>Type 3 MK 1 Aircraft Mine Model 1</td>
<td>JJ (Cancel)</td>
<td>Recovered</td>
<td>Drifting</td>
<td>11 2/22 1/2</td>
<td>123 East Type 98</td>
<td>300</td>
<td>Float pendant</td>
<td>Three switch horns</td>
<td>Hydrostatic switch, soluble plug delay in Hall release mechanism, and horn release mechanism and safety switch</td>
<td>No</td>
<td>Offensive mine. Scuttles self after soluble plug delay.</td>
<td></td>
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<tr>
<td>Type 3 MK 2 Aircraft Mine Model 1</td>
<td>JJ</td>
<td>Recovered</td>
<td>MOORED</td>
<td>Sub</td>
<td>35.5</td>
<td>45.3</td>
<td>440</td>
<td>Shimosa</td>
<td>900</td>
<td>66</td>
<td>1221</td>
<td>Four chemical horn switch and released similar to Mine Type JA</td>
</tr>
<tr>
<td>Type 3 MK 6</td>
<td>Pear</td>
<td>OP-10-FZ Serial L-2-A, April 1, 1943</td>
<td>MOORED</td>
<td>800</td>
<td>32.5</td>
<td>270 Type 98</td>
<td>450</td>
<td>Flusmat</td>
<td>Inertia pendulum</td>
<td>Not known</td>
<td>Recently recovered information incomplete.</td>
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<td>Unknown</td>
<td>KX</td>
<td>OP-10-A</td>
<td>OP-10-A (P-10-A)</td>
<td>1-100 of 12 Jan. 1928</td>
<td>440</td>
<td>900</td>
<td>66</td>
<td>1221</td>
<td>Four chemical horn switch and released similar to Mine Type KA</td>
<td>Believed to be similar to British Vickers antiaircraft mines.</td>
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<tr>
<td>Unknown</td>
<td>Pom-</td>
<td>Unknown</td>
<td>*</td>
<td>44</td>
<td>300</td>
<td>Type 99</td>
<td>450</td>
<td>Flusmat</td>
<td>Six chemical horn switches and upper and lower antennas</td>
<td>Mooring safety switch</td>
<td>Reported to be very similar to British Vickers antiaircraft mines.</td>
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<td>Unknown</td>
<td>Banana</td>
<td>III Unknown</td>
<td>*</td>
<td>35.5</td>
<td>275 Type 98</td>
<td>450</td>
<td>Flusmat</td>
<td>Four chemical horn switch with soluble plug delay</td>
<td>Mooring safety switch</td>
<td>Believed to be similar to Dutch Vickers.</td>
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### Beach Contact Mines

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<tbody>
<tr>
<td>Small Type Mine, Model 1</td>
<td>JK</td>
<td>XII</td>
<td>Recovered</td>
<td>Ground</td>
<td>Manually</td>
<td>20.5 x 10.5</td>
<td>45 Cast Type 98</td>
<td>110</td>
<td>Two chemical horns</td>
<td>Spring-loaded switch, manually operated</td>
<td>None</td>
</tr>
<tr>
<td>Small Type Mine, Model 2</td>
<td>J5</td>
<td>XVI</td>
<td>Recovered</td>
<td>Ground</td>
<td>Manually</td>
<td>14.6 x 7 x 7</td>
<td>22 Cast Type 98</td>
<td>52.5-60.5</td>
<td>One chemical horn</td>
<td>Same as Mine Type J6</td>
<td>As for Mine Type J6</td>
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### Controlled Mines

<table>
<thead>
<tr>
<th>Type 92</th>
<th>JK</th>
<th>XII</th>
<th>MECOPA Translations [RMI] Report 19/ONI Report OT 16 4-2 Serial No 132-32</th>
<th>Moored</th>
<th>0/C</th>
<th>41.5 x 55.0</th>
<th>1100 Type 85</th>
<th>1687</th>
<th>Pre-set explosive plug delay</th>
<th>198</th>
<th>396 Electrically controlled</th>
<th>Same as 92 Model 1</th>
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<tbody>
<tr>
<td>Type 92</td>
<td>JK</td>
<td>Model 1</td>
<td>Recovered</td>
<td>Ground</td>
<td>21.8 x 25.6</td>
<td>100 Type 85</td>
<td>580</td>
<td>Controlled</td>
<td>Soluble plug automatic delays mooring</td>
<td>Controlled</td>
<td>None</td>
<td></td>
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<tr>
<td>Type 92</td>
<td>JF</td>
<td>XIV</td>
<td>Recovered</td>
<td>Ground</td>
<td>1.1 x 25</td>
<td>19 Type 85</td>
<td>39</td>
<td>Float pendulum</td>
<td>550 lb. tension</td>
<td>None</td>
<td></td>
<td></td>
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<tr>
<td>Type 92</td>
<td>JF</td>
<td>Model 2</td>
<td>Exploded hook</td>
<td>1.1 x 25</td>
<td>19 Shimose Type 85</td>
<td>39</td>
<td>Electrically controlled</td>
<td>None</td>
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</table>

### Net Mines

| Type 96 | April | VI | T-documented | Attached to nets | 20.1 | 27.2 | 121 Type 97 or 86 | 238 | Tension mechanism 100 lb. tension needed for 231ME Hydrostatic plunger and shear pin | Not known |
|---------|-------|----|--------------|-----------------|------|-----|----------------|-------|----------------|--------------|--------------------|
| Type 96 | Japenese | VI | T-documented | Attached to nets | 40.1 | 27.2 | 112 Type 97 or 86 | 248 | Similar to April | Change of position of charge alters the center of gravity from that in the Type 96. |

### Influence Mines

<table>
<thead>
<tr>
<th>Type 3 Electric Mine</th>
<th>Line</th>
<th>CINDEPO-CISDEPO Transl. Item #10</th>
<th>Ground</th>
<th>A/C</th>
<th>21</th>
<th>12&quot;</th>
<th>1919 (Type unknown)</th>
<th>2398</th>
<th>100 Acoustic or magnetic unit</th>
<th>Not known</th>
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</thead>
<tbody>
<tr>
<td>Model 1 is magnetic, model 2 is acoustic.</td>
<td></td>
<td></td>
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</table>
Introduction

1. Although numerous different types of Japanese mines are believed to exist, only those hereafter 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, MAYFORD OCL WP1-44, 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 83 explosive (Japanese designation). This explosive, a dark, crystalline powder, is composed approximately within the ranges noted below:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Ammonium perchlorate</td>
<td>77%</td>
</tr>
<tr>
<td>Silicon (Metallic Powder)</td>
<td>10%</td>
</tr>
<tr>
<td>Wood Powder</td>
<td>11%</td>
</tr>
<tr>
<td>Crude Oil (Binder)</td>
<td>6%</td>
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</table>

   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 neutralized or else dumped in deep water rather than burned. If this ordinance is of a new type, however, it should be rendered safe as prescribed, and shipped, with main ordnance, subject, 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 1H but its horn bosses were machined with right-hand threads.)
Fig. 1 - Chemical Horn, Sectional View

Fig. 2 - Mine Type JA, Sectional View

Added 1 July 1945
(Change No. 6)
JAPANESE CONTACT AND CONTROLLED MINES

Mine Type JA

General
1. Moored, contact, chemical horn mine, laid by submarine.
2. Japanese designation, "Type 38, 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
   35.9
   Length
   45.8
   Charge
   396 lbs. block-fitted Shimose with Shimose booster.
   Total weight in air
   647 lbs.

2. External fittings
   Horns
   Four, equally spaced around upper hemisphere, 16" from top center of mine.
   Cover plate
   127.75 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, 2775 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, 150' apart, 7775 from center.
   Depth taking hydrostat
   12" long, bolted to extension on mooring ball.
   Mooring ball
   27" span, bolted to two lugs on lower hemisphere.
   Mooring pulley
   6725 diam., attached to mooring ball.
   Come-Along
   Fitted to mooring ball. Secured by a shear pin.

Operation
1. Detonator is manually housed in booster prior to laying. Mine moors on a hight 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.
Fig. 3--Detail of Base, Mine Type JA

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

Precautions

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

FAQ

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

Fig. 7-- Arming Switch, Mine Type JA
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
JAPANESE CONTACT AND CONTROLLED MINES

Miners Type J8

General
1. Moored, contact, chemical horn mines, laid by surface craft.
2. Japanese designations, "Type 93, Model I, Type 93, Model 3, Modification 1 and Type 93, Model 4".
3. Defensive mines for use in maximum depth of water of 1352 ft. against surface craft or submarines. Maximum depth of case when moored is 216 ft.

Description
1. Case (Type 93, Model 1)
   - Shape: Spherical
   - Color: Black
   - Material: Steel
   - Diameter: 34"
   - Charge: 220 lb. granular Type 88 explosive with Shimos booster.
   - Total weight in air: 484 lb.

2. External fittings (Type 93, Model 1)
   - Horns: Four, around upper hemisphere, 90° apart, alternately 1172 and 1176 from top center of case.
   - Cover plate: 5725 diam., in center of upper hemisphere, recessed, secured by keep ring.
   - Lifting lugs: Two on upper hemisphere, 180° apart, 1376 from top center of case, and one on lower hemisphere, 18" from bottom center of case.
   - Base plate: 11772 diam., in center of lower hemisphere, lag-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.

Added 1 July 1945
(Change No. 8)
Fig. 10 - Mine Type JB, Straight-Shank Base Plate, Sectional View

Fig. 11 - Mine Type JB, Straight-Shank Base Plate, Interior View
4. The Type 93, Model 1 differs from the Type 92, 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 slice 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. 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

Cover Plate
Lifting Eye (3)
Chemical Horn (4)
Securing Lug (2)
Base Plate

Booster Housing
Defener Leads

Safety Switch Contacts (4)
Cross Head and Contact Arm

Lifting Eye (3)
Chemical Horn (8)
Securing Lug (2)

Added 1 July 1945
(Change No. 8)
Securing Lug (2)
Chemical Horn (9)
Lifting Eye (3)

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

Chemical Horn (9)
Lifting Eye (3)
Mooring Spindle
Detonator Cover Nut

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

Added 1 July 1945
(Change No. 8)
Fig. 13--Mine Type JC, Sectional View
JAPANESE CONTACT AND CONTROLLED MINES

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 15sf ft.

Description
1. Case
   - Shape: Spherical
   - Color: Black
   - Material: Steel
   - Diameter: 327"
   - Charge: 122 lbs. block-fitted Shionese with Shioese 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 12 bolts. Fitted with spring-loaded arming switch mechanism, 3½ diam., secured by keep ring.
   - Lifting lugs: Three, equally spaced around upper hemisphere near edge of cover plate.
   - Base plate: 16½ 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 releases 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.
Fig. 15 -- Arming Switch Detail, Mine Type JC

Fig. 16 -- Arming Switch, Mine Type JC
JAPANESE CONTACT AND CONTROLLED MINES

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
Fig. 19--Mine Type JD, Elevation
JAPANESE CONTACT AND CONTROLLED MINES

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: Grey
   Material: Steel
   Diameter: 3" 11/16
   Maximum span of arms: 11 1/2" 11/16
   Length: Body: 10 1/2" 1/16
            Overall: 25" 11/16
   Charge: Maximum of 19 lbs. cast Shimose or granular Type 89 explosive.
   Total weight in air: 39 lbs. maximum

2. External fittings
   Detonator carrier keep ring: 1 1/2" dia., in middle of body, 5 1/2" from either end of case. Firing cable enters thru center of keep ring.
   Filling holes: One on each end, 2 3/8" dia., 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.

Precautions
1. See Introduction.

EWS
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.
Fig. 20-- Mine Type JD
Fig. 21-- Method of Towing Mine Type JD
Fig. 22-- Mine Type JE, Sectional View

Fig. 23-- Mine Type JE, Elevation
**Japanese Contact and Controlled Mines**

**Mine Type JR**

**General**

1. Ground, contact, chemical horn mine, laid manually.
2. Japanese designation, "Small 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: 2075
   - Height: 1075
   - Charge: 44 lb. cast Type 98 explosive with Shimoce booster.
   - Total weight in air: 100 lb. (approx.)

2. **External fittings**
   - Horns: Two, 180° apart on upper hemisphere, 575 from top center of case.
   - Cover plate: 572 diam., in top center of case, recessed, secured by keep ring.
   - Arming plunger: 0245 diam., spring-loaded, in center of cover plate, fitted with groove for safety fork.
   - Carrying handles: Two, 180° apart, 90° from horns, 745 from center of case.
   - Filling hole cover: 375 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. **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. 3)*
Fig. 24-- Arming Switch Detail, Mine Type JE

Safety Fork

Retracting Pin

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

Added 1 July 1945
(Change No. 8)
JAPANESE CONTACT AND CONTROLLED MINES

(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.

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Fig. 25a - Mine Type JE, Wiring Diagrams

Fig. 26 - Mine Type JE
Fig. 27 - Mine Type JF, Sectional View

Fig. 28 - Mine Type JF

Added 1 July 1943 (Change No. 8)
JAPANESE CONTACT AND CONTROLLED MINES

Mine Type JP

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: 28.54
   Height: 25.5
   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 2/3 diam. on skirt, 
   90° apart, 1" below top.
   Cover plate: 5 2/3 diam., in top center of case, recessed, secured by 
   keeper ring.
   Pad eye: One, on case, 13" below upper 
   edge of skirt.
   Cable clamp: Shackle to pad eye; prevents strain on cable from 
   being transmitted to detonator.
   Mine truck: Rectangular, cast iron, 
   fitted with four wheels 
   4 1/25 diam., on bottom of 
   case.

Operation
1. Mine is armed manually before laying.
2. Mine is fired electrically by an observer.

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

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

Fig. 30 -- Booster Assembly, Mine Type JF
Fig. 31-- Mine Type JP (Booster Assembly Removed)

Fig. 32-- Mine Type JP as Controlled Land Mine
Fig. 33 -- Mine Type JG, Sectional View

Fig. 34 -- Mine Type JG Showing Variations in Case Construction
JAPANESE CONTACT AND CONTROLLED MINES

Mine Type JD

General
1. Ground, contact, chemical horn mine, laid manually.
2. Japanese designation, "Small 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: 1473 - 1475
   Base: 7"
   Top: 1025 - 1035
   Height: 1476 - 1477
   Case only: 22 lb. (approx.) cast Type 98 explosive with Shimose booster.
   With horn: 52.5 lb. - 62.5 lb.

2. External fittings
   Horn: One, on cover plate, slightly off center of case.
   Cover plate: 592 diam., in top center of case, secured by keep ring.
   Filling hole cover: 3825 diam., in base.
   Arming plunger: 075 diam., spring-loaded 1800 from horn on cover plate. Contains two 072 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 the 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.

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.

Added 1 July 1945
(Change No. 8)
Fig. 35 - Arming Switch and Firing Assembly, Mine Type JG

Added 1 July 1945

(Change No. 6)
(Mine Type JG, Cont'd.)

**Procedure:**

1. Cut all snap lines or trip wires secured to the horn.
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

Note:
Chain from mooring spindle not shown.
JAPANESE CONTACT AND CONTROLLED MINES

Mine Type: MH

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

Description
1. Case
   - Shape: Spherical
   - Color: Black
   - Material: Steel
   - Diameter: 4174
   - Charge: 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 1872 and 1772 from top center of case.
   - Cover plate: 1772 diam., in top center of case, lap-fitted, secured by 16 bolts.
   - Arming switch mechanism: 532 diam., in center of cover plate, secured by keep ring.
   - Lifting lugs: Three, around upper hemisphere, 120° apart, 1/2" 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: 535 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 1772 from the top center of the case are mounted on cylindrical horn bosses 3" long. These bosses make an angle of 50° 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 glycerine-filled dashpot, making it increasingly improbable that the disarming feature will operate as designed.
Fig. 39-- Arming Switch Detail, Mine Type JH

Fig. 40-- Arming Switch, Mine Type JH
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**

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**Fig. 42-- Mooring Safety Switch, Phantom View, Mine Type JH**
Fig. 43-- Mine Type JH
JAPANESE CONTACT MINES

Mine Type JJ

General
1. Drifting, contact, switch horn mine, laid by aircraft.
2. Offensive mine, for use in restricted waters against surface craft. Designed to sink at 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
   Tail section
   Color
   Material
   Mine Diameter
   Length
   Overall
   Forward section
   Tail section
   Charge
   Total weight in air
2. External fittings
   Horns
   Hydrostatic arming switch
   Detonator carrier mounting
   Booster release mechanism
   Suspension lug
   Filling hole cover
   Tail cover plate
   Tail release mechanism
   Tail securing lugs

Cylindrical with rounded ends. After end fitted with 5 1/4" cylindrical skirt with three horn recesses.
Conical section, fitted with four radial fins, welded to 4" cylindrical belt.
Black over red lead.
Steel
14 3/4"
72 1/2"
49"
23 1/2"
123 lbs. cast Type 98 explosive.
300 lbs.

Three, spring-loaded, hinged type, equally spaced around after end of forward section, 5 1/2" from center, secured by keep rings.
2 1/2" diam., on top center line of forward section, 21" abaft forward end, secured by keep ring.
4" diam., on forward section 180° from top center line, 9 1/2" abaft forward end, secured by keep ring.
2 2/16" diam., on top center line on forward section, 9 1/2" abaft forward end, secured by keep ring.
On top center line of forward section, 26" abaft forward end.
6 1/4" diam., screwed into center of nose.
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.
On top center line of forward section, 2 1/2" forward of after end of skirt.
Three; one on forward section, 1200 from top center line; 1 1/2" forward of after end of skirt, fitted with eye bolt.
One on cylindrical band of tail section, 150° from top center line, 1" from forward end; one on cylindrical head of tail section on top center line, 1" from forward end, fitted with eye bolt.

Added 1 May 1945 (Change No. 4)
Fig. 44 - Mine Type J1, Sectional View
**JAPANESE CONTACT MINES**

*(Mine Type J1, 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 unarm 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.

**NMT**

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 J1**

*Added 1 May 1945*

*Change No. 4*
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 J1, Booster and Detonator Assembly, Sectional View

Added 1 May 1945
(Change No. 6)
Fig. 51 - Mine Type JL, After End of Forward Section
Showing Horns Prior to Release

Fig. 52 - Mine Type JL, Floating
JAPANESE CONTACT AND CONTROLLED MINES

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: 4575
   Length: 4573
   Charge: 440 lbs. Shinsan
   Total weight in air: 500 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, not mines, believed to be attached to nets before laying.
2. Japanese designation, "Type 95 ("Apricot") and "Type 95, 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 900 ft.

Description

1. Case
   Shape: Cylindrical, with rounded ends.
   Color: Unknown
   Material: Steel
   Diameter: 2011
   Length: 2772
   Charge: 62 lbs. ("Apricot") or 132 lbs. ("Grapefruit") Type 56 or Type 97 explosive.
JAPANESE CONTACT AND CONTROLLED MINES

Total weight in air: 240 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 the 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.

PMs

1. None known.

Mine Type "Banana"

General

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


3. Believed to be a defensive mine.

Description

1. Case

Shape: Two hemispheres, joined by a cylindrical mid-section.

Color: Unknown

Material: Steel

Diameter: 3375

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.
JAPANESE CONTACT AND CONTROLLED MINES

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 "Guineo"

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% 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.
3. Believed to be a defensive mine.

Description

1. Case
   Shape: Spherical
   Color: Unknown
   Material: Steel
   Diameter: 35"
   Charge: 170 lbs. Type 88 explosive.
   Total weight in air: 850 lbs.
2. External fittings
   No details are known.
JAPANESE CONTACT AND CONTROLLED MINES

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 mines, 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 335 ft. against surface craft. Maximum depth of case when laid is 82 ft.

Description
1. Case
   - Shape: Spherical
   - Color: Unknown
   - Material: Steel
   - Diameter: 41 3/8 in.
   - 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 JD, secured by key ring.

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

Mine Type "Grane"

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 350 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.
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.

Mine 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 127 ft. against surface craft or submarines. Maximum depth of cases when moored is 245 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 90° 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 196 ft, against surface craft and submarines. Maximum depth of ease when moored is 198 ft; maximum operating distance from control station is about 10 miles.

Description
1. Case
   - Shape: Two hemispheres, joined by a 1¾" cylindrical mid-section.
   - Color: Black
   - Material: Steel
   - Diameter: 4½ ft
   - Length: 55"
   - Charge: 1100 lb. Temporary Type 1 explosive with 3 lb. booster.
   - Total weight in air: 1667 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, 15° from center.
   - Lifting eyes: Two, on upper hemisphere, 180° apart, 15" 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 538 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 photoelectric system which actuates the mine-firing system.

Added 15 June 1945
(Change No. 7)
JAPANESE CONTACT AND CONTROLLED MINES

(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.

PROCEDURE

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

2. By any means available, cut the fuse 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 1, Mooring Buffer

Added 15 June 1945
(Change No. 7)
JAPANESE CONTACT AND CONTROLLED MINES

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: 4171
   - 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: 2572 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: 1358 diam., in center of lower hemisphere, lap-fitted, secured by 46 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 3/8" from center; two on lower hemisphere, 15 3/8" from center.

Operation, Precautions and RWS

1. Same as Mine Mark 5 Mod 1 (Mine Type JC).
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
Fig. 62 - Mine Type JJ, Sectional View

Added 1 September 1945
(Change No. 11)
**General**

1. Moored, contact, chemical horn mine, laid by aircraft with parachute, or by surface craft.
2. U.S. designation, "Mine Type J3".
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" at midsection, tapers to 19 3/4" at upper end and 19 1/2" at lower end.
   - **Length**:
     - Overall (including parachute and case): 72 3/4"
     - Case length: 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 hydrostatic, 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, 5" from center.
   - **Parachute housing securing lugs**: Two, 180° apart on skirt at upper end of cylindrical section.
**Fig. 63 - Mine Type JJ**

- Depth Taking Hydrostat
- Base Plate
- Guide Stud
- Booster Release Mechanism
- Anchor Positioning Lugs (4)
- Case Release Lugs (2)
- Soluble Plug Gear
- Horn Extensions (4)

**Fig. 64 - Mine Type JJ, Upper End**

- Parachute Eyebolt
- Horn Release Disc
- Torque Spring
- Horn Recess (4)
- Chemical Horn (4)
JAPANESE CONTACT AND CONTROLLED MINES

(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-blight hydrotact system. Dissolution of another soluble plug allows mooring tension to pull out the mooring lever, closing the mooring safety switch and arming the mine.


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.

Fig. 65 - Mine Type JJ, Floating

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

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Added 1 September 1945
(Change No. 11)

-55-
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
PART VI

JAPANESE UNDERWATER ORDNANCE

CHAPTER II
JAPANESE TORPEDOES

NOVEMBER 1, 1944
<table>
<thead>
<tr>
<th>Torpedo Source of Info</th>
<th>Used With (In.)</th>
<th>Power Source</th>
<th>Speed/Range (Kts. &amp; Yds.)</th>
<th>Total Mt. (lb.) (Approx.)</th>
<th>Overall Length</th>
<th>Warhead Length</th>
<th>Fins Section Length</th>
<th>Afterbody Length</th>
<th>Tail Length</th>
<th>No. of Fins</th>
<th>Designation or Warhead</th>
<th>Remarks</th>
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* Data from empirical calculations or from Intelligence sources.
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<th>Type Charge</th>
<th>Block or Cast</th>
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<th>Location Exploder Pocket</th>
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Table 2 - Japanese Torpedo Warheads

Added 1 August 1945
(Change No. 10)
Fig. 1—Special Tool For Bayonet Type Locking Ring Used With Type 91 And Models And Type 97 Torpedoes

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

Introduction

1. The Japanese are known to manufacture torpedoes in three sizes, measured by the diameter 10", 21", and 26". 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 pointed 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 this chapter. The charges vary in weight from 300 to 1700 lb., and Type 97 is the explosive most often used, although Shimoese or Type 98 may be encountered in some models.

5. All the known Japanese exploder mechanisms fire upon impact, either by indirect action 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 or 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

Added 1 August 1945
(Change No. 10) -10-
Fig.1a-Special Tool For Bayonet Type Locking Ring Used With Type 93 Model 1 Modification 2 And Type 93 Model 3 Torpedoes

Added 1 August 1945
(Change No. 10)
the electric Torpedo Type 92 Mod 1 will be included with the treatment of that torpedo:

(s) Block the propellers before rendering safe. Specially-designed propeller locks, chain, or wire or manila rope may be used for this purpose. Once 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 valves (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./in² 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 cranking impellers except as hereinafter prescribed. Avoid all contact with firing whiskers or balls.

(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.

(s) 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.

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Fig.1b - Forward End Of Airflask Showing Bayonet Locking Ring Removed.

Added 1 August 1945
(Change No. 10)
Fig. 1c - Stop Valve On Japanese Torpedoes

No. 2 Air (Means Oxygen Used)

Fig. 1d - Charging Valve On Japanese Torpedoes

No. 2 Air (Means Oxygen Used)
Fig. 1e - Stop Valve on Japanese Type 97 Torpedo
Fig. 1f—Type 90, Arming and Firing Mechanism, Sectional View in Elevation

SAFETY PIN
ARMING GEARS
ARMING RANGE SELECTOR ARM
SAFETY MASK
EXPLODER CASE

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

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

Exploder Type 90, Model 2

General
1. Belt, 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, 130 long, 4" in body diameter, 522 in diameter at the top flange, and 467 in diameter at the top cover. A three-bladed impeller, 275 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, 728 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 ball 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, 513 long, housing the detonator, sub-locator and booster. The detonator and sub-locator 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. Abert and adjacent to the exploder pocket is a well that carries a rock-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 ball.
   (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.

Added 1 August 1945
(Change No. 10)
Fig. 3--Type 90, Exploder, Sectional View In Elevation

Added 1 August 1945
(Change No. 10)
(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 ball is depressed, move it to the upright position from a safe distance. The exploder cannot normally fire with the ball 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. 12), 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.

Added 1 August 1945
(Change No. 10)
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
Fig. 6-- 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 99, Model 1, Modification 2 Torpedo
Fig. 14—Type 91, Model 1 Exploder,
Sectional View in Elevation
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 17½ long overall and 7½ in maximum diameter. A four-bladed impeller, 4½ 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 4½", 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 26"

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

Fig. 16-- Type 91, Model 2 Exploder
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2. If the impeller is flush against the exploder body, and the arming spindle is about 0.05 inch below the hub of the impeller, the exploder has probably fired.

3. If there is from 0.05 to 1.00 inch 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
JAPANESE TORPEDOES
Change No. 1 Mine Disposal Handbook
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, the 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: 1777
   - Length: 57 5/7
   - Charge: 500 lbs. Type 97 explosive.
   - Total weight in air: 868 lbs.

2. External fittings
   - Nose cover plate
   - Hydroplane pocket: 13" diam., in center of nose, secured by 20 screws.
   - 15" long, 776 vide (max), on top center line 1 7/47 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.

   - Inertial exploder pocket: 675 diam., on top center line, 979 forward of after end.
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Type 3 Warhead, (Cont'd.)

Sheave pocket cover plate

10" long, 375 diam., on top center line, 50.5 forward of after end, secured by 10 screws.

Cable channel

18" long, on top center line, extends from sheave pocket to hydroplane pocket.

Type 3 exploder pocket

675 diam., 180° from top center line, 35.77 forward of after end.

Gear pocket cover plate

472 diam., 180° from top center line, adjacent to and ahead of the Type 3 exploder pocket.

Hydroplane impellers

Two, four-bladed, 375 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, 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 bend and cap, secured by a threaded extension of the cap which screws into the upper end of the eyelet pivot arm.

The hydroplane is 575 long, 477 in wing span and weighs about one pound. The horizontal and vertical fins have an overall span of 5".

(b) The Hydroplane Elevating and Releasing Assembly - a complex system of gears and levers, which serves 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.
After the hydroplane is released, a clutch disengages the drive shaft from the impellers. This is accomplished by means of a drum 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 an 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 \( \frac{3}{4} \) inch 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 cooking 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, \( \frac{3}{4} \) inch from the bitter end, is too long to pass through the fair lead and thereby prevents the entire length of the cable from paying off the reel. The cable is \( 25\times \frac{5}{8} \) inches long overall. Forty-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 rear 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 Cooking and Actuating Assembly - mounted directly above the cable reel. The cooking arm, which contains a fair lead for the cable on its forward end, is held down in the uncooked 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 cooking arm axle. A spiral gear on the cooking 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 cooking 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 release the ratchet clutch and rotate the actuating rod counterclockwise and drive 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 50, 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 bell serves only as an impeller safety device prior to launching and does not lock the firing mechanism when upright. The bell is slightly smaller than that fitted to the Type 50, Model 2, is so located that no impeller stop need be fitted, and operates against the tension of a single, dash-pot type spring.
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 are used 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 pressure 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 bellcranks are forced 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 mid-plane is not known. The cable paid out by 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 30° against the tension of the actuating spring which is compressed by the same motion. 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 cone to go into 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.
Fig. 21 - Hydroplane Assembly Detail

Fig. 24 - Type 3 Exploder, Detail
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 ball 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 undershield, 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.
Fig. 25 - Type 3 Warhead

Fig. 26 - Type 3 Warhead, Covers Removed
Fig. 27 - Hydroplane Elevating and Releasing Assembly, Before Safety Run

Fig. 28 - Hydroplane Elevating and Releasing Assembly, Just Prior to Release of Hydroplane
Fig. 29 - Hydroplane Elevating and Releasing Assembly, Top View

Fig. 30 - Type 3 Warhead, Sheave Pocket
Fig. 31 - Type 3 Warhead (Nose) - Mechanism Cocked

Fig. 32 - Type 3 Warhead (Nose) - Mechanism Uncocked
Fig. 33 - Type 3 Exploder

Fig. 34 - Type 3 Exploder, Booster and Center Ring Removed
Fig. 35 - Type 3 Exploder, Arming and Firing Assembly
Fig. 36 - Type 3 Exploder, Showing HMS Precautions
Exploder Type 2

General

1. Impact, inertia type, fitted in a transverse pocket on the top center-line 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, 576 in diameter at the top flange and 675 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 ball 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-countermine 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, 555 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-countermine 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 depressed 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 ball 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
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(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 unseats 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 counternumbing shock will cause the piston of the anti-counternuming 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 ball type exploders, the Type 2 will normally be found in an armed condition at the end of the run.

Rendering Safe Procedure

1. Detach ball spring from ball by removing screw "A" as shown in Fig. 38.

2. From a safe distance, move the ball to an upright position.

3. Insert pin as shown in Fig. 38.

4. Remove the locking bolt from the center of the rock-locking pinion.

5. Rotate the rock-locking pinion counterclockwise, thereby turning the retaining ring (left hand threads) counterclockwise 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. 1), 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.

March 1, 1945
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
JAPANESE TORPEDOES

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 ever been recovered.
3. The torpedo is driven by a four-cylinder radial reciprocating steam engine and is capable of running 4,000 yards at a speed of 16 knots or 8,700 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' 2"
   - Tail 1' 5"
2. Total weight in air 1830 lb. approx.
3. External fittings
   (a) Flask section
      - Guide studs
      - Depth setting spindle and dial
      - Stop valve
      - Charging valve
      - Depth mechanism cover plate
      - Strengthening plates
   (b) Afterbody
      - Distance and starting gear cover plate
      - Water flap
      - Gyro angling setting spindle and dial
      - Gyro cover plate
   (c) Tail
      - Propellers
        - Forward
        - After
      - Pins
        - Vertical
        - Horizontal

On top and bottom center lines, respectively, 4' 3" forward of afterbody joint. Stud on bottom may not be fitted.

On top center line, 6" forward of afterbody joint.

4" to starboard of top center line, 18 3/4" forward of afterbody joint.

4" to starboard of top center line, 13 3/4" forward of afterbody joint.

7 1/2" diam., on bottom center line, 6" forward of afterbody joint.

Two, rectangular, 2 1/2" x 4 1/2", fitted over joint between afterbody and flask section, 20" to starboard and to port, respectively, from top center line.

Rectangular, 6" x 7", on top center line, 5" abaft flask section joint.

On bottom center line, 7 1/2" abaft flask section joint.

6" to port from top center line, 15 1/2" abaft flask section joint.

Oval-shaped, 7" x 8", on bottom center line, 14" abaft flask section joint.

Four-bladed, 14 1/2" span.
Four-bladed, 13 3/4" span.

Two; length, including rudders, 10 3/4".
Two; length, including rudders 10 3/4".

Added 1 August 1945
(Change No. 10) -37-
Fig. 43 – Torpedo Type 44 Mark 2 Mod 1, Warhead Removed

JAPANESE TORPEDOES

Gyro Angle Setting Device

Starting Lever

Guide Stud

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

(Torpedo Type 44 Mark 2 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 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) 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, 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) The 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) 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. Generally similar to that of the Torpedo Sixth Year Type.

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Fig. 44 - Torpedo Type 44 Mark 2 Mod 1, Depth Mechanism

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

Fig. 45 - Torpedo Type 44 Mark 2 Mod 1, Flask Section, Top View

Fig. 46 - Torpedo Type 44 Mark 2 Mod 1, Flask Section, Bottom View

Added 1 August 1945
(Change No. 10)
Fig. 47 - Torpedo Type 44 Mark 2 Mod 1, Afterbody, Top View

Fig. 48 - Torpedo Type 44 Mark 2 Mod 1, Tail Section, Top View
Fig. 49 - Torpedo Sixth Year Type, Warhead Removed

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOS

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 39 knots, 10,900 yards at 32 knots, or 16,400 yards at 29 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

<table>
<thead>
<tr>
<th>Overall</th>
<th>22' 5&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warhead</td>
<td>3' 1&quot;</td>
</tr>
<tr>
<td>Flesh section</td>
<td>12' 5&quot;</td>
</tr>
<tr>
<td>Afterbody</td>
<td>7' 1/2&quot;</td>
</tr>
<tr>
<td>Tail</td>
<td>1' 6 1/2&quot;</td>
</tr>
</tbody>
</table>

2. Total weight in air 3200 lb, approx.

3. External fittings

(a) Flesh section
- Guide stud
- Stop valve
- Charging valve
- Strengthening plates
- On top center line, 5' 1/2" forward of afterbody joint.
- 4" to starboard from top center line, 9 3/4" forward of afterbody joint.
- 1" to starboard from top center line, 4 1/2" forward of afterbody joint.
- Two, rectangular, 9 1/2" x 3", fitted over joint between afterbody and flesh section, 90° to starboard and to port, respectively, from top center line.

(b) Afterbody
- Distance and starting gear cover plate
- Water trip lever
- Water flap
- Depth setting spindle and dial
- Gyro angling setting spindle and dial
- Gyro cover plate
- Depth mechanism cover plate
- Access holes to main engine
- Rectangular, 8 3/4" x 7 1/4", on top center line, 8 1/2" abaft flesh section joint.
- 1" to starboard from top center line, 2' 4" abaft flesh section joint.
- On bottom center line, 1" abaft flesh section joint.
- 4 1/2" to starboard from top center line, 21" abaft flesh section joint.
- 7" to port from top center line, 2' 8 1/2" abaft flesh section joint.
- Oval-shaped, 7" x 9", on bottom center line, 2' 7" abaft flesh section joint.
- Oval-shaped, 9 3/4" x 10", 5" to port from bottom center line.
- Four, equally spaced around shell, 6 1/2" abaft flesh section joint.

(c) Tail
- Fins
  - Vertical
  - Horizontal
- Two; length, including rudders, 13 3/4".
- Two; length, including rudders, 13 1/4".

Added 1 August 1945
(Change No. 10)
Fig. 50 - Torpedo Sixth Year Type, Flask Section, Top View

Fig. 51 - Torpedo Sixth Year Type, Flask Section, Bottom View

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOS

(Sixth Year Type Torpedo, Cont'd.)

Propellers
Forward
After
Four-bladed, 16" span.
Four-bladed, 17" span.

4. Internal arrangement of parts

(a) Flank 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, above 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:

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

(ii) The main engine, a four-cylinder radial type.

(iii) The combustion pot and igniters.

(iv) A reciprocating oil and water pump.

(v) A main air reducing valve of the double poppet type.

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

(vii) Four bottles of lubricating oil.

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

(ix) 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

(e) The various sections of the torpedo are joined by joint screws, with special plates being added to strengthen the joint between the flank 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:

Added 1 August 1945
(Change No. 10)
Fig. 52 - Torpedo Sixth Year Type, Afterbody, Top View

Fig. 53 - Torpedo Sixth Year Type, Tail Section
(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

Added 1 August 1945
(Change No. 10)
Fig. 55 - Torpedo Eighth Year Type Mark 2 Mod 2, Warhead Removed
JAPANESE TORPEDOS

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 44 knots, 10,400 yards at 32 knots, or 21,900 yards at 26 knots. The depth control gear may be set for depths from 2-18 meters and the gyro steering device may be set for angles up to 90°, either to starboard or to port, in 10° steps.

Description
1. Lengths
   - Overall
   - Wrecked
   - Flank section
   - Afterbody
   - Tail
   27'5"
   3'7"
   16'9"
   5'1"
   1'9"
2. Total weight in air
   5800 lb.
3. External fittings
   (a) Flank section
      - Guided stud
      - Charging valve
      - Stop valve
      On top center line, 7'4" forward of afterbody joint.
      On top center line, 10'1/2" forward of afterbody joint.
      Location not determined.
   (b) Afterbody
      - Distance and starting gear cover plate
      - Water trip lever
      - Water flap
      - Depth setting spindle and dial
      - Gyro steering setting spindle and dial
      - Gyro cover plate
      - Depth mechanism cover plate
      Rectangular, 7" x 10", on top center line, 8' 3/4" abaft flank section joint.
      1'2" to starboard from top center line, 20" abaft flank section joint.
      Rectangular, 2" x 5", on bottom center line, 13' 1/2" abaft flank section joint.
      4" to port from top center line, 23" abaft flank section joint.
      7' 1/2" to port from top center line, 3' 11 1/2" abaft flank section joint.
      Oval-shaped, 7" x 9", on bottom center line, 2' 10" abaft flank section joint.
      Rectangular-shaped, 9' 1/2" x 11", 6' to port from top center line, 18' 1/2" abaft flank section joint.
      Two, rectangular, fitted over joint between afterbody and flank section, 90° to starboard and to port, respectively, from top center line.
   (c) Tail
      - Propellers
      - Forward
      - After
      - Fins
      - Vertical
      - Horizontal
      Four-bladed, 21" span.
      Four-bladed, 20" span.
      Two; length, including rudders, 15' 1/2".
      Two; length, including rudders, 10' 3/4".

Added 1 August 1945 (Change No. 10)
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

Water Trip Lever
Hole for Starting Gear
Fuel Filling Hole
Oil Filling Hole
Guide Stud
Charging Valve

Gyro Access Hole
Water Flap
Drain for Water Compartment

Aft

-50-

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

(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 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

Guide Stud on Top Vertical Fin

Fig. 60 - Torpedo Eighth Year Type Mark 2 Mod 2, Depth Mechanism

Depth Engine Cylinder
Rudder Rod Connection
Rudder Locking Device
Depth Engine Valve
Pendulum Pivot
Pendulum
Base Containing Diaphragm
Access Hole For Rudder Rod
Access Hole For Gyro Angling
Setting Spindle and Dial
Access Hole For Bayonet Joint Locking Ring
Access Hole For Bayonet Joint Locking Ring
Exploder Pocket
Guide Stud
Type 89 Model 2 Warhead
Fig. 61 - Torpedo Type 89 Mod 1

Added 1 August 1945
(Change No. 10)
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 99.

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, 4550 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 10° steps.

**Description**

1. **Lengths**
   - Overall 23' 6"
   - Warhead 3' 8"
   - Flank section 13' 5"
   - Afterbody 4' 5"
   - Tail 2'
   - Total weight in air 3600 lb.

2. **External fittings**
   - (a) **Flank 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" dia., 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 flank section joint.
     - Water trip lever 1" to starboard from top center line, 2' 5" abaft flank section joint.
     - Gyro angling setting spindle and dial 8" to port from top center line, 2' 6 1/2" abaft flank section joint.
     - Gyro cover plate 9" dia., on bottom center line, 2' 6" abaft flank 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 Four-bladed, 19 1/2" span.
     - Forward, 27 1/2" span.
     - Fins Length, including rudder, 12 1/2".
     - Upper vertical length, including rudder, 17 1/2".
     - Lower vertical length, including rudder, 18 1/2".

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Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOS

(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:

(11) The fuel and oil bottles.

(12) The stop and charging valves.

(4) The depth mechanism chamber, shaft 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, shaft 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:

(1) The main engine cylinders.

(11) The combustion pot and igniters.

(111) The water flaps (remainder of starting gear in afterbody).

(IV) The main air reducing valve, a two-stage 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 shaft 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 flaps 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:

Added 1 August 1945
(Change No. 11)
Fig. 64 - Torpedo Type 89 Mod 1, Afterbody, Portside

Fig. 65 - Torpedo Type 89 Mod 1, Tail Section
(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 plunger 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 gases 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 signal 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. 67 - Torpedo Type 91 Mod 1

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

Torpado Type 91 Mod 1

General
1. 18" air-driven torpedo, launched from aircraft; believed to be obsolete, 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 5300 yards at a speed of 12 knots. The depth control gear may be set for depths from 2 to 16 meters and the gyro steering 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' 14"
   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
      Depth setting spindle and dial
      Depth mechanism cover plate
      Starting gear
      Stop valve
      Charging valve
      Distance setting spindle and dial
      Rudder locking spindle and dial
      Access holes for locking ring
   (b) Afterbody
      Gyro steering setting spindle and dial
      Gyro cover plate
   (c) Tail
      Propellers
      Forward
      After
      Fins

Added 1 August 1945
(Change No. 10)
Fig. 68 - Torpedo Type 91 Mod 1,
Flask Section, Top View

Fig. 69 - Torpedo Type 91 Mod 1,
Flask Section, Starboard View
JAPANESE TORPEDOS

(Torpedo Type 91 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 contain internal pressures of 2000 lb/in².

(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 99 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 see 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 aft of the cylinders.

   (ii) A small shutter-type water pump attached to the forward bulkhead.

   (iii) The combustion pot and ignitors.

   (iv) The main air reducing valve.

   (v) Starting gear of the conventional type. The starting lever is replaced by a rack and sprocket which is attached prior to the torpedo's launching.

   (vi) A depth gauge 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) Afterbody - 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) Tail - 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.

Operation

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:

Added 1 August 1945
(Change No. 10)
Fig. 70 - Torpedo Type 91 Mod 1, Flask Section, Bottom View

Fig. 71 - Torpedo Type 91 Mod 1, Afterbody, Top View
JAPANESE TORPEDOES

(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.

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Pilot Valve Housing
Angle Setting Dial
Outer Gimbal
Gyro Wheel
Unlocking Crank
Centering Pin

Leads to Steering Engine

Fig. 72 - Torpedo Type 91 Mod 1, Gyro Mechanism

Added 1 August 1945
(Change No. 10)
Fig. 73 - Torpedo Type 91 Mod 1, Afterbody, Bottom View

Fig. 74 - Torpedo Type 91 Mod 1, Tail Section, Port View

Added 1 August 1945
(Change No. 10)
Fig. 75 - Torpedo Type 91 Mod 1, Depth Mechanism

Fig. 76 - Torpedo Type 91 Mod 1, Depth Mechanism

Added 1 August 1945
(Change No. 10)
Fig. 77 - Torpedo Type 91 Mod 2, Warhead Removed

- Access Hole for Water Compartment
- Gyro Angling Setting Spindle and Dial
- Fuel Bottle Filling Hole
- Pivot of Anti-roll Flipper
- Access Hole for Bayonet Joint Locking Ring
- Access Hole for Balance Chamber
- Water Strainer
- Guide Stud
JAPANESE TORPEDOES

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
   Warhead
   Flask section
   Afterbody
   Tail
   [Lengths provided]
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
          Steering gyro cover plate
          Anti-roll gyro cover plate
          Gyro angling setting spindle and dial.
   (c) Tail
       Propellers
       Forward
       After
       Fins
       Vertical
       Horizontal
       Intermediate
       [Details provided]
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.

Added 1 August 1945
(Change No. 10)

-69-
(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.

![Torpedo Type 91 Mod 2, Tail Section](image)

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

Added 1 August 1945
(Change No. 10) -73-
Fig. B4 - Torpedo Type 91 Mod 3
JAPANESE TORPEDOS

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 1100–3300 yards (when fitted with Mod 3 warhead) or 2500 yards (when fitted with Mod 6 warhead) at a speed of 6.2 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' 1"
   with Type 3 warhead 7' 11"
   Flask section 1' 11"
   Afterbody 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
      Depth setting spindle and dial
      Depth mechanism cover plate
      Starting gear
      Distance setting spindle and dial
      Stop and charging valves
      Access holes to locking ring
      On top center line, 3' 8" aft shaft warhead joint.
      On top center line, 22 3/4" forward of afterbody joint.
      8" diam., on bottom center line, 21" forward of afterbody joint.
      On top center line, 15" forward of afterbody joint.
      3 1/2" to port from top center line, 15" forward of afterbody joint.
      90° to starboard from top center line, 2' 3" forward of afterbody joint (location may vary as much as 5" in any direction).
      90° to starboard and to port, respectively, from top center line, 2' 1/2" forward of afterbody joint.
   (b) Afterbody
      Anti-roll flippers (optional)
      Steering gyro cover plate
      Anti-roll gyro cover plate
      8 1/4" long overall, 90° to port and to starboard, respectively, from top center line, 1 3/4" aft shaft flank section joint (measured from forward edge of flippers).
      7" max. diam., 4" to port from top center line, 7" aft shaft flank section joint.
      7" max. diam., 4" to starboard from top center line, 19 1/2" aft shaft flank section joint.
   (c) Tail
      Pigs
      Vertical
      Intermediate
      Horizontal

Added 1 August 1945
(Change No. 10)
Fig. 85 - Torpedo Type 91 Mod 3, Flask Section, Top View

Fig. 86 - Torpedo Type 91 Mod 3, Flask Section, Bottom View

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOS

(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" aft of 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 2900 lb/ft².
(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, aft of 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
Similar to that of the Torpedo Type 91 Mod 2, the main differences being as follows:
(1) A single oil bottle is fitted instead of the two fuel bottles.
(2) 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 then to the main engine. The air turns over the main engine and runs it until the igniters fire the fuel/aer 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)
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
JAPANESE TORPEDOS

Torchado 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: 3' 2"
2. Total weight in air: Unknown
3. External fittings
   (a) Battery compartment
      - Guide studs
      - Pressure relief valve
      - Access hole
      - Power switch
      - Depth setting spindle and dial
      - Battery positioning studs
   (b) Afterbody
      - Access hole
      - Depth setting spindle and dial
      - Distance setting and resistance cut-out spindles and dials
      - Gyro angling setting spindle and dial
      - Starting lever
      - Gyro angling setting spindle and dial
      - Battery charging socket
      - Charging valve
      - Stop valve

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOS

(Type 92 Mod 1 Torpedo, Cont'd.)

Depth mechanism cover plate
Square, 2' 9" x 2', 3' 3" to port from bottom center line, 3' 5"
shaft battery compartment joint.

Gyro access hole
8' diam., on bottom center line, 4' 1" shaft battery compartment joint.

(c) Tail
Fins
Four; each 23' in length and 7'
in maximum width.

Propellers
Not recovered.

4. Internal arrangement of parts

(a) Battery compartment - A hollow steel cylinder with removable for-
ward 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 start-
   ing 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 fol-
   lows:

(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.

Addendum 1 August 1945
(Change No. 10)
Fig. 97 - Torpedo Type 92-1, Afterbody, Top View
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. 96 - Torpedo Type 92-1, Tail Section, Starboard View
JAPANESE TORPEDOES

Type 91 Model 1 Mod 2

General
1. 21" 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 91 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 10 steps.

Description
1. Lengths
   - Overall: 22' 6"
   - Warhead: 1' 7"
   - Flask section: 18' 1"
   - Afterbody: 1' 9"
   - Tail: 2' 1"

2. Total weight in air: 6000 lb. approx.

3. External fittings
   (a) Flask section
      - Guide stud
      - Stop valves
      - Charging valves
      - Depth setting spindle and dial
      - Dial (purpose unknown)
      - Depth mechanism cover plate
      - Water flap
      - Access holes to locking ring

   (b) Afterbody
      - Starting lever
      - Water trip lever
      - Gyro setting spindle and dial

Added 1 August 1945
(Change No. 10)
Fig. 100 - Torpedo Type 93 Model 1 Mod 2, Flask Section, Bottom View

JAPANESE TORPEDOES
(Type 93 Model 1 Mod 2, Cont'd.)

Gyro cover plate

9 1/2" diam., on bottom center line; 2' 6 1/2" after flange section joint.

c) Tail

Access hole to locking ring

Between top and port fins, 2 1/4" aftbody joint.

Fins

Upper vertical

Length, including rudder, 9 1/2".

Lower vertical

Length, including rudder, 9' 11".

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) Flank 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, aft 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 aft the balance chamber, is formed by the oil compartment shell and a bulkhead. The engine room is open to see water and contains the following:

(i) The main starting gear consisting of the water trip lever, the water trip, 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.

(vi) The main engine cylinders.

(vii) 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
JAPANESE TORPEDOES

(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 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 gases 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 aseas 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 99 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 flange 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.

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

Combustion Pot
Main Air Reducing Valve
Speed Change Device
Main Engine Cylinder
Starting Valve
Distance Gear Dial
Igniter Hammer
Sea Water and Oil Pump
Starting Lever

Fig. 103 - Torpedo Type 93 Model 1 Mod 2, Engine, Top View

Depth Setting Socket

Pendulum Pivot
Pendulum

Base Containing Diaphragm Rudder Locking Device
Depth Engine Cylinder
Rudder Rod Connection

Depth Engine Valve Crank
Air Intake

Fig. 104 - Torpedo Type 93 Model 1 Mod 2, Depth Mechanism

_Added 1 August 1945_ (Change No. 10)
Fig. 105 - Torpedo Type 93 Model 1 Mod 2, Gyro, Side View

Fig. 106 - Torpedo Type 93 Model 1 Mod 2, Gyro
Fig. 107 - Torpedo Type 93 Model 3, Bottom View
JAPANESE TORPEDOES

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: 7'11"
   - Flank section: 15'3"
   - Afterbody: 4'11"
   - Tail: 2'1"
   - Total weight in air: Unknown

2. External fittings
   (a) Flank section
      - Guide stud
      - Stop valves
      - Depth mechanism cover plate
      - Depth setting spindles and dials
      - Access holes for locking ring
      - On top center line, 7'7" forward of afterbody joint.
      - 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" astern warhead joint.
      - On bottom center line, 25" forward of afterbody joint.
      - Three, near afterbody joint.
      - 90° to port and to starboard respectively from top center line, 3° forward of afterbody joint.
   (b) Afterbody
      - Starting lever
      - Water trip lever
      - Gyro angling setting spindle and dial
      - Gyro cover plate
      - 1" to port from top center line, 9" astern flank section joint.
      - On top center line, 16" astern flank section joint.
      - 8" to port from top center line, 33" astern flank section joint.
      - 9 1/2" diam., on bottom center line, 33" astern flank section joint.
   (c) Tail
      - Propellers
      - Fins
        - Upper vertical
        - Lower vertical
        - Horizontal
        - Intermediate (between horizontal and lower vertical fins)
      - None recovered
      - Length, including rudder, 9".
      - Length, including rudder, 25".
      - Two, length including rudders, 24".
      - Two, each 25" long (no rudders).

Added 1 August 1944
(Change No. 10)
Fig. 108 - Torpedo Type 93 Model 3, Flask Section, Starboard Inverted View

Fig. 109 - Torpedo Type 93 Model 3, Afterbody and Tail, Bottom View
JAPANESE TORPEDOES

(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.
Exploder Packet

Oxygen Flask

Warhead

Access Hole to Locking Ring

Fuel Tank Drain Hole

Access Hole to Locking Ring

Charging Valve-Stop

Guide Stud

Afterbody

Afterbody Access Hole

Fig. 110 - Torpedo Type 97

Added 1 August 1945
(Change No. 10)
JAPANESE TORPEDOES

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 1500 yards at a speed of approximately 16 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 15 steps.

Description

1. Lengths

| Overall | 16' 5" |
| Warhead | 5' 11" |
| Flask section | 3' 4" |
| Tail | 1' 3" |

2. Total weight in air

2205 lb. (approx)

3. External fittings

(a) Flask section

- Guide studs
- Stop valves
- Charging valves

Two, on top and bottom center lines, respectively, 7' 6 1/2" forward of afterbody joint.

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' 1 1/2" forward of afterbody joint.

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).

On top center line, 2' 3 1/2" forward of afterbody joint.

8" diam., on bottom center line, 2" forward of afterbody joint.

On top center line, 2' 11 1/2" forward of afterbody joint.

9" diam., on bottom center line, 3' 2" forward of afterbody joint.

On top center line, 3 3/4" forward of afterbody joint.

On top center line, 6 1/2" forward of afterbody joint.

8" to starboard from bottom center line, 13 3/4" forward of afterbody joint.

90° to port and starboard, respectively from top center line, 2 1/2" forward of afterbody joint.

Added 1 August 1945
(Change No. 10)
Fig. III - Torpedo Type 97, Flask Section, Top View
JAPANESE TORPEDOES

(Torpedo Type 97, Cont'd.)

(a) Starting valve
   Starting cover plate 6 1/2" to starboard from top cen-
   ter 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
   Fin
      Upper vertical
      Lower vertical
      Horizontal
   Length, including rudder, 14 1/2".
   Length, including rudder, 19 1/2".
   Length, including rudders, 19 1/2".

   Propellers
      Forward
      After
      Four-bladed, 16" span.
      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 for-
   ward 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 com-
   partment, 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 steer-
      ing mechanisms.
      (ii) A hydrostatic valve-pendulum type depth mechanism.
      (iii) The ramming 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 lock-
   ing rings.

Operation

1. Similar to that of the Torpedo Type 93 Model 1 Mod 2.

Added 1 August 1945
(Change No. 10) -10-'
Fig. 112 - Torpedo Type 97, Flask Section, Port View

Fig. 113 - Torpedo Type 97, Flask Section, Bottom View

10 August 1945
(Change No. 10)
Fig. 114 - Torpedo Type 97, Afterbody, Port View
Guide Stud on Top Vertical Fin

Access Hole For Rudder Rod Connection

Fig. 116 - Torpedo Type 97, Tail Section

Depth Setting Dial and Spindle
Gyro Angling Setting Spindle and Dial
Air Pressure Relief Valve
Stop Valve
Charging Valve

Fig. 117 - Torpedo Type 97, Flask Section
Air Reducing Valve for Relay Valve
Angle Setting Dial
Inner Gimbal
Gyro Wheel
Outer Gimbal
Unlocking Crank
Air Lead to Steering Engine

Fig. 119 Torpedo Type 97, Gyro Mechanism

Pendulum
Depth Engine Cylinder
Depth Engine Valve
Rudder Rod Connection
Rudder Locking Device
Base Containing Diaphragm
Depth Engine Valve Crank

Fig. 120 - Torpedo Type 97, Depth Mechanism
Fig. 121 - Torpedo Type 2 (Special), Warhead Removed

Added 1 August 1945
(Change No. 10)
**JAPANESE TORPEDOES**

**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 12 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: 7'11"
   - Afterbody: 3'7"
   - 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: 1 1/2" to port from bottom center line, 7 1/2" above 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.

**Added 1 August 1945**

[Change No. 10]
Fig. 122 - Torpedo Type 2 (Special), Flask Section, Top Starboard View
**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
MINE DISPOSAL HANDBOOK

PART VI

JAPANESE UNDERWATER ORDNANCE

CHAPTER III

JAPANESE DEPTH CHARGES

NOVEMBER 1, 1944
Fig. 1-- Type 95 Depth Charge, Pistol End

Fig. 2-- Type 95 Depth Charge, Booster End
JAPANESE DEPTH CHARGES

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 hydraulic 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: 17/16
     - Overall: 17/16
   - Length: 30½
   - Charge: 210 lbs. Type 85 explosive with Shimaza booster.
   - Total weight in air: 353 lbs.

2. External fittings
   - End plate: 17/16 diam., secured by 16 nuts. Forms one end of case.
   - Piston cover: 17/16 diam., screwed into central tube in center of end plate. Contains two holes for piston safety fork.
   - Depth control valve: Screwed into opposite end of central tube from piston cover.
   - Red eyes: Two on each end of case.

3. The pistol is a tubular piece, 10½ long and 1½ 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.
Fig. 3-- Type 95 Depth Charge Pistol, Sectional View
JAPANESE DEPTH CHARGES

4. The booster is a tubular piece, 10¾ long and 1½ 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 valve 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:

<table>
<thead>
<tr>
<th>Type Charge</th>
<th>Modification 1</th>
<th>Modification 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 95</td>
<td>Type 95 Temporary</td>
<td></td>
</tr>
<tr>
<td>Weight of charge</td>
<td>305 lbs.</td>
<td>242 lbs.</td>
</tr>
<tr>
<td>Total weight in air</td>
<td>457 lbs.</td>
<td>374 lbs.</td>
</tr>
</tbody>
</table>

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 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 pivot 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 be 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.

Removing Safe Procedure

1. Unscrew the pistol cover.

2. Remove the pistol by looping a short bit 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.
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

DEPTH CHARGE CASE

Dial Pointer
Depth Control Valve
Booster Locking Lugs
Rolling Gasket
Limit Stop
Detonator
Pistol Case
Central Tube
Rolling Gasket

Depth Control Valve
Booster
Pistol
Fig. 8--Type 2, Modification 1 Depth Charge, Pistol End

Fig. 9--Type 2, Modification 1 Depth Charge, Booster End
JAPANESE DEPTH CHARGES

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: 3.462"
      Overall: 17.56"
   Length: 30.75"
   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.
   End 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 14.75" long, 3.756" 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 "SAPE", 30, 60, 90, 120 and 150 meters. The depth valve plate has five different sized asseage 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 impact 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 3.756" 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 hydrosstatically. 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
Fig. 10—Type 2, Modification 1 Depth Charge Pistol, Sectional View
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.

Rendoring 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 bevel 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

Added 15 June 1945
(Change No. 7)
MINE DISPOSAL HANDBOOK

PART VI

JAPANESE UNDERWATER ORDNANCE

CHAPTER 4

JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

JULY 1, 1945
### JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

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<th>TAISHO</th>
<th>SHOWA</th>
<th>Jap Calendar</th>
<th>Our Calendar</th>
<th>Era</th>
<th>MEIJI</th>
<th>TAISHO</th>
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<th>Our Calendar</th>
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<td>14</td>
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<td>1943</td>
<td>12</td>
<td>2581</td>
<td>1921</td>
<td>14</td>
<td>2604</td>
<td>1944</td>
</tr>
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<td>11</td>
<td>2582</td>
<td>1922</td>
<td>14</td>
<td>2605</td>
<td>1945</td>
<td>11</td>
<td>2583</td>
<td>1923</td>
<td>14</td>
<td>2606</td>
<td></td>
</tr>
</tbody>
</table>

**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 a label in the English language, certain letters or combinations thereof often embody several different meanings also adds to the problem since it does not represent the different method of writing. This chapter attempts 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 2606 in the empire calendar. Three wars 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 Shōwa Era (昭和) 26 December 1926 to date.

The Christian year 1945 is therefore the year 20 of the Shōwa 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 arithmetical 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:

\[
\begin{align*}
(1) & \quad \text{五 (five) ten (plus) five} \\
(2) & \quad \text{五 (five) seven (times) ten} \\
(3) & \quad \text{五 (five) ten (plus) six (times) thousand (plus) two} \\
(4) & \quad \text{五 (five) ten (plus) one}
\end{align*}
\]

Added 1 July 1945
(Change No. 8)
### 93 Type Mine 4 Model

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosive Type</td>
<td>Provisional Designation 1 Type Explosive</td>
</tr>
<tr>
<td>Lot No.</td>
<td>No. &quot;Kan&quot; C7</td>
</tr>
<tr>
<td>Manufactured</td>
<td>Showa Era 18 Year 4 Month (April 1943)</td>
</tr>
<tr>
<td>Cast</td>
<td>(No Date - Powder Type Explosive)</td>
</tr>
<tr>
<td>Explosive Weight</td>
<td>100 kg. 000 gms.</td>
</tr>
<tr>
<td>M Date</td>
<td>Showa Era 18 Year 5 Month (May 1943) Mine Case</td>
</tr>
<tr>
<td>d.</td>
<td>Refers to Mine &quot;9&quot; Plant No.</td>
</tr>
<tr>
<td>Total Weight</td>
<td>223 kg. 300 gms.</td>
</tr>
</tbody>
</table>

Fig. 1 - Mine Type 93 Model 4, Label Pasted Either on Charge Container or Under Base Pigta.
JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

(Numerical System, Cont'd.)

(b) A method, closely corresponding to the English decimal system, whereby digits 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) 25
    -
    -
    -
    -
    -
    -
    -
    one five

(2) 50
    -
    -
    -
    -
    -
    -
    -
    five zero

(3) 57
    -
    -
    -
    -
    -
    -
    -
    five seven

(4) 6231
    -
    -
    -
    -
    -
    -
    -
    six two three one

1. A situation somewhat analogous 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 fourteen." In conclusion, it must be emphasized 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 emperor 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 era, the era year was generally used while during the present (Showa) era, the year of the era 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 1942-1945 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 definitively 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 mine layer 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 assigning these numbers is not definitively 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

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#### Fig. 2 - Mine Type 94 Model 2, Label Pasted Under Cover Plate.

#### Table: Mine Type 94 Model 2

<table>
<thead>
<tr>
<th>Powder</th>
<th>Kind of powder</th>
<th>84 Type Explosive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot No.</td>
<td>No. 276</td>
<td></td>
</tr>
<tr>
<td>Manufacture date</td>
<td>Show Era 17 years one month (June 1942)</td>
<td></td>
</tr>
<tr>
<td>Empty weight</td>
<td>Kilogramme</td>
<td></td>
</tr>
<tr>
<td>Charge loaded weight</td>
<td>Kilogramme</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Show Era 17 year six month (June 1942)</td>
<td></td>
</tr>
<tr>
<td>Name and number of place</td>
<td>17 &quot;Yokos&quot; 36 No.</td>
<td></td>
</tr>
</tbody>
</table>

#### Fig. 3 - Mine Type 88 Mod 1, Label Pasted on Blocks of Explosive.

#### Table: Mine Type 88 Mod 1

<table>
<thead>
<tr>
<th>Name of Article</th>
<th>Bursting Charge 88 Type Mine Mod 1 Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kind of powder</td>
<td>Shimose Explosive</td>
</tr>
<tr>
<td>Lot No.</td>
<td>&quot;Kam&quot; No. 30</td>
</tr>
<tr>
<td>Manufacture date</td>
<td>Show Era 14 Year 3 Month (March 1939)</td>
</tr>
<tr>
<td>Casting date</td>
<td>Show Era 14 Year 3 Month (March 1939)</td>
</tr>
</tbody>
</table>

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be 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 before the Model number) has ever been encountered, coupled with the facts 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.

Mark Number

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 1940.

Miscellaneous Designations

1. The terms "Experimental" and "Temporarily (Provitionally) Designated" 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", 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.

Underwater Ordnance Identification

1. Mines

(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. 1A & 2) were taken respectively from the bottom of the charge container of a Type 26, Model 2 and from the inside of the cover plate of a Type 9A, 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. Torpedoes

(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 some 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.
Fig. 4 - Type 91 Mod 6 Warhead, Label on Nose.

Fig. 5 - Type 3 Warhead, Markings on Nose.

Fig. 6 - Type 91 Mod 2 Warhead, Label on Nose.

Fig. 7 - Type 91 Mod 3 Warhead, Label on Nose.
JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

(Underwater Ordnance Identification, Cont'd.)

3. Depth Charges

(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.

Fig. 8 - Type 95 Depth Charge, Markings on Edge of Case.

Fig. 9 - Type 3 Warhead, Label on Bulkhead.

Fig. 10 - Type 91 Mod 2 Torpedo, Label on Airflask Bulkhead.

Fig. 11 - Type 90 Model 2 Exploder Storage Box, Label on Cover.

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**Fig. 12** - **Type 91 Model I Exploder, Label on Body.**

**Fig. 13** - **Type 89 Mod I Torpedo, Label on Forward End of Airflask, Top Centerline.**

**Fig. 14** - **Type 93 Model I Mod 2 Torpedo, Label on Forward End of Airflask, Top Centerline.**

**Fig. 15** - **Type 91 Mod 3 Special Torpedo, Label on Forward End of Airflask.**

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<table>
<thead>
<tr>
<th>品名</th>
<th>九七式實用頭部炸薬 假稱九一式魚雷改六用</th>
</tr>
</thead>
<tbody>
<tr>
<td>藥種</td>
<td>九七式爆薬</td>
</tr>
<tr>
<td>種目</td>
<td>第 207号</td>
</tr>
<tr>
<td>製造年月</td>
<td>昭和17年5月</td>
</tr>
<tr>
<td>鑄造年月</td>
<td>昭和17年5月</td>
</tr>
</tbody>
</table>

第三海軍火薬廠

<table>
<thead>
<tr>
<th>Name of Article</th>
<th>97 Type Service Use Warhead Bursting Charge For Provisional Type 91 Mod 6 Torpedo Use.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kind of Powder</td>
<td>97 Type Powder</td>
</tr>
<tr>
<td>Lot</td>
<td>Number 207</td>
</tr>
<tr>
<td>Date of Manufacture</td>
<td>Shōwa Era 17 Year 5 Month (May 1942)</td>
</tr>
<tr>
<td>Date of Casting</td>
<td>Shōwa Era 17 Year 5 Month (May 1942)</td>
</tr>
</tbody>
</table>

No. 3 Naval Powder Factory

Fig. 16 - Type 91 Mod 3 Torpedo, Label on Forward End of Airflask.

Fig. 17 - Type 91 Mod 6 Warhead, Label Posted on Blocks of Explosive.
JAPANESE DESIGNATION OF UNDERWATER ORDNANCE

Japanese Markings on the Type Z Torpedo

Below is a list of the characters found around the external fittings of the Type Z 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 afterbody.

4. 装載弁
   Air Charging Valve.

5. 潤滑油
   Lubricating Oil. By the oil filling hole.

6. 潤滑油排
   Lubricating Oil Drain.

7. 濁水
   Fresh Water. By the water filling hole.

8. 清水
   Fresh Water Drain.

9. 燃料
   Fuel. By fuel filling holes.

10. 空気
    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
    Around the two access holes to the reducer adjusting stud.

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13. 挤
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. 浅
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.

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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.
<table>
<thead>
<tr>
<th>English</th>
<th>Romaji</th>
<th>Kanji</th>
</tr>
</thead>
<tbody>
<tr>
<td>acoustic mine</td>
<td>onkyokirai</td>
<td>音響機</td>
</tr>
<tr>
<td>air</td>
<td>kūki</td>
<td>空気</td>
</tr>
<tr>
<td>air charging valve</td>
<td>aōkiben</td>
<td>装気弁</td>
</tr>
<tr>
<td>air service</td>
<td>kōkūnai</td>
<td>航空兵</td>
</tr>
<tr>
<td>air service(abbr.)</td>
<td>kō</td>
<td>航</td>
</tr>
<tr>
<td>air stop valve</td>
<td>saiben</td>
<td>塞弁</td>
</tr>
<tr>
<td>amatol</td>
<td>shōto yoku</td>
<td>硝斗薬</td>
</tr>
<tr>
<td>ammonal</td>
<td>amonāru kayak</td>
<td>「アンモナル」 火薬</td>
</tr>
<tr>
<td>anchored type</td>
<td>kenshīei</td>
<td>納硝式</td>
</tr>
<tr>
<td>Army</td>
<td>rikugun</td>
<td>陸軍</td>
</tr>
<tr>
<td>arsenal</td>
<td>kōshō; zoneisho</td>
<td>工廠造兵廠</td>
</tr>
<tr>
<td>ballistite</td>
<td>baramutsutoko</td>
<td>「バリスタイト」</td>
</tr>
<tr>
<td>black</td>
<td>kuro</td>
<td>黒</td>
</tr>
<tr>
<td>blasting gelatine</td>
<td>baiçu hasei serachin</td>
<td>爆発性「セラチン</td>
</tr>
<tr>
<td>bogb</td>
<td>bakusan</td>
<td>爆弾</td>
</tr>
<tr>
<td>booby trap</td>
<td>yūgakiteki jirai</td>
<td>遊撃的地雷</td>
</tr>
<tr>
<td>English</td>
<td>Romaji</td>
<td>Kanji</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>controlled naval mine</td>
<td>shihatsukirai</td>
<td>視發機雷</td>
</tr>
<tr>
<td>controlled naval mine</td>
<td>kanseikirai</td>
<td>管制機</td>
</tr>
<tr>
<td>cordite</td>
<td>chūjō kayaku</td>
<td>紐状火薬</td>
</tr>
<tr>
<td>day</td>
<td>nichi</td>
<td>火药</td>
</tr>
<tr>
<td>deep</td>
<td>fuka</td>
<td>深</td>
</tr>
<tr>
<td>delay</td>
<td>nobasu</td>
<td>延</td>
</tr>
<tr>
<td>demolition</td>
<td>hakai</td>
<td>破壊</td>
</tr>
<tr>
<td>demolition clock</td>
<td>jigen hakkaki</td>
<td>時限発火器</td>
</tr>
<tr>
<td>depth charge</td>
<td>bakurai</td>
<td>爆雷</td>
</tr>
<tr>
<td>depth charge pistol</td>
<td>bakurai hakkasochi</td>
<td>爆雷発火装置</td>
</tr>
<tr>
<td>depth setting</td>
<td>shinsō chōsei</td>
<td>深度指定</td>
</tr>
<tr>
<td>detonator</td>
<td>baku tō</td>
<td>爆管</td>
</tr>
<tr>
<td>drain</td>
<td>hai</td>
<td>川</td>
</tr>
<tr>
<td>dynamite</td>
<td>dainamito</td>
<td>ダイナマイト</td>
</tr>
<tr>
<td>electric cap</td>
<td>denkiraikan</td>
<td>電気雷管</td>
</tr>
<tr>
<td>experimental</td>
<td>shi</td>
<td>試</td>
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<thead>
<tr>
<th>English</th>
<th>Romaji</th>
<th>Kenji</th>
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<tbody>
<tr>
<td>explosives</td>
<td>baku yaku</td>
<td>爆薬</td>
</tr>
<tr>
<td>explosive grapnel (hook)</td>
<td>bakuhanō</td>
<td>爆破鉤</td>
</tr>
<tr>
<td>filled</td>
<td>sa (abb. for sekuten)</td>
<td>破壊</td>
</tr>
<tr>
<td>fine grain powder</td>
<td>shōryūyasu</td>
<td>小粒薬</td>
</tr>
<tr>
<td>fresh water</td>
<td>seisui</td>
<td>清水</td>
</tr>
<tr>
<td>fuel</td>
<td>muryū</td>
<td>燃料</td>
</tr>
<tr>
<td>fuze, electric (igniter bridge)</td>
<td>kaiichen</td>
<td>可熔片</td>
</tr>
<tr>
<td>fuze, detonator</td>
<td>shūkan no kibakuzu</td>
<td>信管 / 起爆劑</td>
</tr>
<tr>
<td>fuze, delay action</td>
<td>tanenki shūkan</td>
<td>短延期信管</td>
</tr>
<tr>
<td>fuze, projectile</td>
<td>shūkan</td>
<td>信管</td>
</tr>
<tr>
<td>fuze, percussion</td>
<td>chakuhatsu shūkan</td>
<td>着発信管</td>
</tr>
<tr>
<td>fuze, instantaneous</td>
<td>shuponshō shūkan</td>
<td>瞬発信管</td>
</tr>
<tr>
<td>fuze, sensitive</td>
<td>shuponsō shūkan</td>
<td>触発信管</td>
</tr>
<tr>
<td>fuze, time</td>
<td>aika shūkan</td>
<td>発火信管</td>
</tr>
<tr>
<td>grade</td>
<td>kōbetsu</td>
<td>別</td>
</tr>
<tr>
<td>gram</td>
<td>shūmetsu</td>
<td>瓦</td>
</tr>
</tbody>
</table>

-18-
<table>
<thead>
<tr>
<th>English</th>
<th>Romaji</th>
<th>Kanji</th>
</tr>
</thead>
<tbody>
<tr>
<td>green</td>
<td>midori</td>
<td>緑</td>
</tr>
<tr>
<td>ground type (naval mine)</td>
<td>chintei shiki</td>
<td>沈底式</td>
</tr>
<tr>
<td>gun</td>
<td>hō</td>
<td>砲</td>
</tr>
<tr>
<td>gun cotton</td>
<td>menkayaku</td>
<td>綿火藥</td>
</tr>
<tr>
<td>gun powder</td>
<td>kayaku</td>
<td>火藥</td>
</tr>
<tr>
<td>horn (naval mine)</td>
<td>shokkaku</td>
<td>触火藥</td>
</tr>
<tr>
<td>igniter charge</td>
<td>tenkayaku</td>
<td>點火藥</td>
</tr>
<tr>
<td>Initiator (detonator)</td>
<td>kibekuyaku</td>
<td>起爆薬</td>
</tr>
<tr>
<td>induction type mine</td>
<td>yudōgata pki kirai</td>
<td>誘導型磁気水雷</td>
</tr>
<tr>
<td>incendiary symbol</td>
<td>ōs</td>
<td>照明</td>
</tr>
<tr>
<td>illuminating</td>
<td>shomesi</td>
<td>検</td>
</tr>
<tr>
<td>inspect</td>
<td>ken</td>
<td>可 Nile</td>
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<td>inspector's stamp</td>
<td>yoshi</td>
<td>大左</td>
</tr>
<tr>
<td>instantaneous</td>
<td>shun</td>
<td>大左</td>
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<tr>
<td>large</td>
<td>dai</td>
<td>大左</td>
</tr>
<tr>
<td>left</td>
<td>hidari</td>
<td>大左</td>
</tr>
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</table>
loaded  สาเตำ
lot  ข้อมลก
lubricating oil  จุนกัศดูยุ
lydite  ริเดิตอ
magnesium  มังซึเนชิยุะ
magnetic mine (marine)  จิเกะดึง
magnetic needle type (magnetic mine)  จิชิ่น เกเต ดีกิ เดีย
manufacture  ซีซึ
mark  ซู
mercury fulminate  ไรซัน ซึลซิ
meter  โมตอรุ
middle  น้ำา (ชู)
millimeter  มิลลิ-โมตอรุ
mine  คิไร
mine, sea  ซึริ
mine, land  คิไร

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<table>
<thead>
<tr>
<th>Romanji</th>
<th>Kanji</th>
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</thead>
<tbody>
<tr>
<td>mine field</td>
<td>kirai fusetsu chitai</td>
</tr>
<tr>
<td>mine land</td>
<td>fuetsu suirai</td>
</tr>
<tr>
<td>mine, contact, land</td>
<td>shokubatsu jirai</td>
</tr>
<tr>
<td>mine, anti-tank</td>
<td>bogyo jirai</td>
</tr>
<tr>
<td>mine, floating</td>
<td>fuyu suirai</td>
</tr>
<tr>
<td>model</td>
<td>kata</td>
</tr>
<tr>
<td>modification</td>
<td>kai</td>
</tr>
<tr>
<td>mouth</td>
<td>gatsu</td>
</tr>
<tr>
<td>mountain</td>
<td>yama (san)</td>
</tr>
<tr>
<td>naval mine field</td>
<td>raigen</td>
</tr>
<tr>
<td>naval mine barrier</td>
<td>kireien</td>
</tr>
<tr>
<td>Navy</td>
<td>Kaigan</td>
</tr>
<tr>
<td>nitro glycerine</td>
<td>nitrogurisen</td>
</tr>
<tr>
<td>number</td>
<td>ban</td>
</tr>
<tr>
<td>place</td>
<td>tokoro (sho)</td>
</tr>
<tr>
<td>powder</td>
<td>kayaku</td>
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<thead>
<tr>
<th>English</th>
<th>Romanji</th>
<th>Kanji</th>
</tr>
</thead>
<tbody>
<tr>
<td>powder charge</td>
<td>sōyaku</td>
<td>裝薬</td>
</tr>
<tr>
<td>powder factory</td>
<td>kayaku seizeho</td>
<td>火薬製造所</td>
</tr>
<tr>
<td>powder, yellow</td>
<td>ōhoku yaku</td>
<td>黄色薬</td>
</tr>
<tr>
<td>picric acid</td>
<td></td>
<td>練習</td>
</tr>
<tr>
<td>practice</td>
<td>renshū</td>
<td>爆習</td>
</tr>
<tr>
<td>prefix to numerals</td>
<td>dai</td>
<td>爆習假称</td>
</tr>
<tr>
<td>primer</td>
<td>bakkan</td>
<td>爆習稱</td>
</tr>
<tr>
<td>provisional designation</td>
<td>keshō</td>
<td>回数起爆装置</td>
</tr>
<tr>
<td>(1) period delay mechanism</td>
<td>kaisūkibakusōchi</td>
<td>回数起爆装置</td>
</tr>
<tr>
<td>(2) shiitsu coounter (naval mines)</td>
<td></td>
<td>回数起爆装置</td>
</tr>
<tr>
<td>repair</td>
<td>sōuri</td>
<td>修理</td>
</tr>
<tr>
<td>recondition, reconstruct</td>
<td>kaisō</td>
<td>改修</td>
</tr>
<tr>
<td>red</td>
<td>aka</td>
<td>改造</td>
</tr>
<tr>
<td>rocket</td>
<td>funshidōn</td>
<td>改造</td>
</tr>
<tr>
<td>right</td>
<td>migi</td>
<td>改造</td>
</tr>
<tr>
<td>safe</td>
<td>enzen</td>
<td>改造</td>
</tr>
<tr>
<td>safety valve</td>
<td>enzenben</td>
<td>改造</td>
</tr>
<tr>
<td>service use</td>
<td>jitsu yō</td>
<td>改造</td>
</tr>
<tr>
<td>English</td>
<td>Japanese</td>
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Added 1 July 1945
(Change No. 8)
### Japanese Designation of Underwater Ordnance

**Romaji** | **Kanji**
---|---
tri nitro toluene | トールオール
sanseki toruoru | 三硝基

**Type**

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*Added 1 July 1945 (Change No. 8)*
DISTRIBUTION

Mine Disposal School -- 500 copies
MINE DISPOSAL HANDBOOK

E.C. HADERLIE

PART VII

RUSSIAN UNDERWATER ORDNANCE

APRIL 15, 1945
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PART VII

RUSSIAN UNDERWATER ORDNANCE

CHAPTER 1

RUSSIAN INFLUENCE MINES

APRIL 15, 1945
RUSSIAN INFLUENCE MINES

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 Tetrayl booster.
   Total weight in air 616 lbs.

2. External Fittings
   Brass band 5" wide, riveted around base.
   Mechanism cover plate Rectangular, 24" long, 15 1/2" wide, on top of case, 6" 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, 6 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, 6" 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 losing 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 EMS 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.

EMS

1. Remove the securing screw and open the detonator cover plate.
2. Cut and tape separately the two leads to the detonator housing.
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
PART VII

RUSSIAN UNDERWATER ORDNANCE

CHAPTER 2

RUSSIAN CONTACT MINES

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<th>Ground or Moored</th>
<th>How Laid</th>
<th>Firing Mechanism</th>
<th>Depth Taking</th>
<th>Charge Weight (lbs)</th>
<th>Total Weight (lbs)</th>
<th>Max. Case (ft)</th>
<th>Depth Anchor (ft)</th>
<th>Diameter (in)</th>
<th>Length (in)</th>
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<td>M</td>
<td>A/C</td>
<td>Chemical horn</td>
<td>Hydrostat</td>
<td>572</td>
<td>1060</td>
<td>30</td>
<td>330</td>
<td>34 1/2</td>
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<td>M</td>
<td>S/C</td>
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<td>Plummets</td>
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<td>984</td>
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<td>420</td>
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*Russian Standard Service Mine*

*Same as KB with antenna added*

*Laid from horizontal tube by sub*
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 motion 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 strong backed 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 shortens 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 horn 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 antennas 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 mines:
   (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.
Fig. 1 - Mine Mark M-08, Sectional View
RUSSIAN CONTACT MINES

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: 34.75
Charge: 253 lbs. TNT with Tetryl booster.
Total weight in air: 500 lbs.

2. External Fittings
Horns: Five, equally spaced around upper hemisphere, 15" 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 CW (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.

PMR
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.

-5-
Fig. 2 - Mine Mark M-08, Hydrostatic Arming Switch, Sectional View

Chemical Horn (5)

Lifting Eye (2)

Blind Plug

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
   A 1/8" diam., screwed into lower hemisphere, 21" from center.

   Antenna stuffing boxes
   Three, 2 1/4" diam., one on cylindrical mid-section, 31" 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 antennas. If a single antenna is fitted, a turn of copper wire is wound around the mid-section of the case to serve as an electrode. If two antennas are fitted, the respective antennas 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 2-3 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.
Fig. 4 - Mine Mark M KB, Sectional View
RUSSIAN CONTACT MINES

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.

RMB

1. Remove the booster cover plate.
2. Unscrew the plastic keep ring and remove the detonator and booster.
3. Cut and tap 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
Fig. 6 - Mine Mark M KB, Hydrostatic Arming Switch, Sectional View

Fig. 7 - Mine Mark M KB, Hydrostatic Arming Switch
RUSSIAN CONTACT MINES

Fig. 8 - Mine Mark M AG, with Anchor

Fig. 9 - Mine Mark M AG, Floating
Fig. 10 - Mine Mark M AMG-1, Sectional View
RUSSIAN CONTACT MINES

Mark M AMO-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**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Two hemispheres, joined by an 18° cylindrical mid-section. Fitted with break-off nose and tail fairings.</th>
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<tr>
<td>Color</td>
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<td>Material</td>
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<tr>
<td>Diameter</td>
<td>34 1/2&quot;</td>
</tr>
<tr>
<td>Length</td>
<td>52&quot;</td>
</tr>
<tr>
<td>Charge</td>
<td>572 lbs. T.N.T. with Tetryl booster. 1050 lbs.</td>
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2. **External fittings**

<table>
<thead>
<tr>
<th>Horns</th>
<th>Five, spring-loaded, telescopic type, equally spaced around upper hemisphere, 15&quot; from center.</th>
</tr>
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<tbody>
<tr>
<td>Hydrostatic arming switch</td>
<td>7&quot; diam., recessed into center of upper hemisphere, secured by locking ring and four set screws.</td>
</tr>
<tr>
<td>Detonator cover bung</td>
<td>5 1/2&quot; diam., on cylindrical mid-section, 33&quot; from center of upper hemisphere, threaded to case.</td>
</tr>
<tr>
<td>Horn release lugs</td>
<td>Five, one adjacent to each horn recess.</td>
</tr>
<tr>
<td>Lifting eyes</td>
<td>Three; two on upper hemisphere, 180° apart, 19&quot; from center; one on lower hemisphere, 26&quot; from center.</td>
</tr>
<tr>
<td>Hoisting eye</td>
<td>In center of lower hemisphere.</td>
</tr>
</tbody>
</table>

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.
Fig. 11—Mine Mark M AMG-1, Hydrostatic Arming Switch, Sectional View

Fig. 12—Mine Mark M AMG-1, Hydrostatic Arming Switch
RUSSIAN CONTACT MINEs

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.

PROCEDURE

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
Fig.15-Mine Mark M PLT, Sectional View
RUSSIAN CONTACT MINES

Mark M FLT

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 deep 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 hydroystat 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 impact 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.

2. Remove the hydrostat and firing device (see Introduction).
   Reach in the case, release the locking clips and remove the detonator.
Fig. 16 - Mine Mark M PLT

Fig. 17 - Mine Mark M PLT, Floating
RUSSIAN CONTACT MINES

Mark M PLT (Cont'd.)

and booster.

3. UnscREW the slocder 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
Fig. 20 - Mark MZ-26 Explosive Cutter, Sectional View
RUSSIAN CONTACT MINES

Mark M26-26 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 cutter 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:

(1) A hydrostatic diaphragm and plunger enclosed in a cup-shaped housing. One end of the plunger projects from the housing.

(1) 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).

(1) 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 upper surface of the crosshead, preventing the charge container from moving upward. Its lower end is hooked to engage a firing ball (see next paragraph).

(3) A triangular, pivoted firing ball, 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 ball.

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. Disengagement of a solenoid plug releases one of the floats which rises to the limit of its mooring cable.

2. Movement of a sweep wire against the firing ball unseats the ball 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.

-21-
Fig. 21 - Mark MZ-26 Sweep Obstructor

Fig. 22 - Mark MZ-26 Sweep Obstructor
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 ball of any cutter.
3. Check the firing ball of each available cutter.
   (a) If the ball 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 ball 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 cutter pin from the cable channel slide.
3. Remove the cutter from the cable and dispose of the complete assembly.

Fig. 23 - Mark MZ-26 Explosive Cutter

Fig. 24 - Mark MZ-26 Explosive Cutter

Added 1 September 1945
(Change No. 11)
PLT Firing Mechanism  Keep Ring  Booster Cover Plate  Lifting Ring (2)
Scuttling Device  Cover Plate  Firing Pin (2)  Detonator (2)
Booster  Charge  Anchor Securing Lug (4)
Mooring Cable  Mooring Hydrotat

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 16" cylindrical mid-section.
   Color: Green
   Material: Steel
   Diameter: 34 1/2"
   Length: 29 1/2"
   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, 1 7/8" 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, 1 7/8" 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 F.1.

Precautions
1. Stand clear of the flooder bung during RMG. Attention is invited to the similarity between the detonator assembly cover bung and the flooder cover bung.

RMG
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)
Fig. 26 - Mine Mark M-26, Side View

Fig. 27 - Mine Mark M-26, Floating

Added 1 September 1945 (Change No. 11)
3. Remove the booster.
4. Dispose of the detonators, booster, and charge.

---

**Fig. 28 - Mine Mark M-26, Top View**

Added 1 September 1945
(Change No. 1)

---

PLT Type Arming Hydrostat
And Firing Device

Lifting Eyes (2)

Keep Ring

Detonator Assembly
Cover Bung

Anchor Securing Lugs (4)

Mooring Cable Drum
MINE DISPOSAL HANDBOOK

PART VIII

DUTCH UNDERWATER ORDNANCE

CHAPTER I

DUTCH CONTACT MINES

SEPTEMBER 1, 1945
Fig. 1 - Vickers Mine, Floating

Cover Plate

Chemical Horn (6)

Base Plate

Mooring Shackle

Soluble Plug Gear

Mooring Spindle

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: 30"
   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; fitted with straight shank mooring spindle, detonator strongback, and soluble plug gear.
   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.
DUTCH CONTACT MINES

Fig. 3 - Seven Horn Mine, Sectional View

Chemical Horn (7)
Cover Plate
Booster
Charge Case
Mooring Safety Switch
Mooring Lever
Mooring Shackle
Base Plate
Soluble Plug Gear
Defonator

Fig. 4 - Seven Horn Mine
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: 19" 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.
Fig. 5 - Percussion Mine, Sectional View

Fig. 6 - Percussion Mine
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 strapback. 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.
   Mounning 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.

DMS
1. Uncrew and remove the hydrostat strapback.
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.
MINE DISPOSAL HANDBOOK

PART VIII

DUTCH UNDERWATER ORDNANCE

CHAPTER 2

DUTCH DEPTH CHARGES

SEPTEMBER 1, 1945
Fig. 1 - Depth Charge, Booster End

Fig. 2 - Depth Charge, Pistol End
DUTCH DEPTH CHARGE

**General**
1. Hydrostatically operated.
2. Dutch designation unknown.
3. Launched from surface craft.

**Description**

<table>
<thead>
<tr>
<th>Case</th>
<th>Cylindrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Grey</td>
</tr>
<tr>
<td>Material</td>
<td>Steel</td>
</tr>
<tr>
<td>Diameter Overall</td>
<td>17 1/2&quot;</td>
</tr>
<tr>
<td>Central tube</td>
<td>4 1/8&quot;</td>
</tr>
<tr>
<td>Length</td>
<td>28 3/4&quot;</td>
</tr>
<tr>
<td>Charge</td>
<td>300 lb; TNE approx.</td>
</tr>
<tr>
<td>Total weight in air</td>
<td>400 lb. approx.</td>
</tr>
</tbody>
</table>

**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 forces 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.
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
MINE DISPOSAL HANDBOOK

PART IX

FRENCH UNDERWATER ORDNANCE

CHAPTER I

FRENCH CONTACT MINES

SEPTEMBER 1, 1945
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" or 150 lb. or 220 lb. TNT
   Charge: Unknown
   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 up-
   per and lower ends, respectively.
   Booster cover plate: In center of upper hemisphere;
   fitted with lifting eye.
   Base plate: In center of lower hemisphere, se-
   cured by bolts, fitted with moor-
   ing 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 ro-
   tation 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.

Rem
1. Unscrew the booster cover plate.
2. Remove the booster and detonator.
3. Dispose of detonator, booster, and charge.
Fig. 3 - Breguet Mine (Bridle Type), Base Plate and Firing Mechanism Before Firing

Fig. 4 - Breguet Mine (Bridle Type), Base Plate and Firing Mechanism Firing

Fig. 5 - Breguet Mine (Bridle Type), Base Plate and Firing Mechanism, Interior View After Firing
Fig. 6 - Breguet Mine (Shear Horn Type), Top View

Fig. 7 - Breguet Mine (Shear Horn Type), Bottom View
Fig. 8 - Breguet Mine (Shear Horn Type), Sectional View
French Contact Mines

French Breguet (Shear Horn Type)

General
1. Moored, contact, hydrostatically-fired mine, laid by surface craft.
2. French designation, "BAM".
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
   Booster cover plate
   Filling hole cover plate
   Mooring shackle securing eyes
   Anchor securing lugs
   Lifting eyes

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.

RMG
1. Unscrew the booster cover plate.
2. Remove the booster and detonator.
3. Dispose of detonator, booster, and charge.
Fig. 9 - Sautter Harle Mine, Sectional View
# FRENCH CONTACT MINES

## French Sautter Harle

### General
1. Moored, contact, hydrostatically fired mine, laid by submarine.
2. French designation, "SHL".
3. Offensive mine for use in maximum depth of water of 560 ft.

### Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case</strong></td>
<td>Spherical</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>Black</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Steel</td>
</tr>
<tr>
<td><strong>Diameter</strong></td>
<td>40 1/2&quot;</td>
</tr>
<tr>
<td><strong>Charge</strong></td>
<td>480 lb. Torita</td>
</tr>
<tr>
<td><strong>Total weight in air</strong></td>
<td>433 lb.</td>
</tr>
<tr>
<td><strong>External fittings</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Horns</strong></td>
<td>Four, spring-loaded, hinged type, 19&quot; long, equally spaced about upper hemisphere, 17&quot; from center.</td>
</tr>
<tr>
<td><strong>Cover plate</strong></td>
<td>12 1/2&quot; 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.</td>
</tr>
<tr>
<td><strong>Mooring shackle</strong></td>
<td>In center of lower hemisphere, secured over the booster well; fitted with mooring bolt and attachments for two bowden wires.</td>
</tr>
<tr>
<td><strong>Bowden windlass</strong></td>
<td>On lower hemisphere, 12&quot; from center, contained in a housing secured to case by 8 bolts.</td>
</tr>
<tr>
<td><strong>Anchor securing device</strong></td>
<td>Elliptical, 15&quot; x 4&quot;, on lower hemisphere, 24&quot; from center.</td>
</tr>
<tr>
<td><strong>Anchor positioning bosses</strong></td>
<td>Two, 1 1/2&quot; diam., adjacent to anchor securing device.</td>
</tr>
<tr>
<td><strong>Lifting eyes</strong></td>
<td>Four; two on upper hemisphere, 17&quot; from center; two on lower hemisphere, 29&quot; from center.</td>
</tr>
<tr>
<td><strong>Booster cover plate</strong></td>
<td>3 1/2&quot; diam., perforated, in center of lower hemisphere; fitted with hexagonal nut.</td>
</tr>
<tr>
<td><strong>Anchor securing lugs</strong></td>
<td>Four; two on upper hemisphere, 22&quot; from center; two on lower hemisphere, 17&quot; from center.</td>
</tr>
<tr>
<td><strong>Filling hole cover plate</strong></td>
<td>5&quot; diam., on lower hemisphere, 16&quot; from center.</td>
</tr>
</tbody>
</table>

### Operation
1. Mine takes depth by the loose-bright 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.
FRANCE CONTACT MINES

(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.
PART IX

FRENCH UNDERWATER ORDNANCE

CHAPTER 2

FRENCH TORPEDOES

SEPTEMBER 1, 1945
Fig. 1 - Impact Exploder, Sectional View

Fig. 2 - Impact Exploder
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 inches long and 5 inches 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 inches from the center of the cone. The impeller vane is 2 inches long and is prevented from rotating prior to launching by a safety pin. Four curved whiskers project 4 3/4 inches 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 long brass shear pin. Its mid-section is flattened to provide a pivot point for one 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 150 degrees 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 unsealing 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.
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
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.

<table>
<thead>
<tr>
<th></th>
<th>200 Kg. Size</th>
<th>100 Kg. Size</th>
<th>35 Kg. Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shape</strong></td>
<td>Cylindrical</td>
<td>Cylindrical</td>
<td>Cylindrical</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>31 1/2&quot;</td>
<td>31&quot;</td>
<td>23 3/4&quot;</td>
</tr>
<tr>
<td><strong>Diameter</strong></td>
<td>19 1/2&quot;</td>
<td>14&quot;</td>
<td>9 3/4&quot;</td>
</tr>
<tr>
<td><strong>Dia. filling hole</strong></td>
<td>5 3/8&quot;</td>
<td>5 3/8&quot;</td>
<td>5 3/8&quot;</td>
</tr>
<tr>
<td><strong>No. of radial ribs on filling hole and case</strong></td>
<td>8</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>No. of openings on and opposite filling hole</strong></td>
<td>2 holes - 2 3/4&quot;</td>
<td>2 holes 2 1/4&quot;</td>
<td>4 holes 2 3/4&quot;</td>
</tr>
<tr>
<td><strong>Case weight</strong></td>
<td>110 lb.</td>
<td>53 lb.</td>
<td></td>
</tr>
<tr>
<td><strong>Charge weight</strong></td>
<td>440 lb. TNT</td>
<td>220 lb. TNT</td>
<td>77 lb. TNT</td>
</tr>
</tbody>
</table>

*Table 1 - French Depth Charge Cases*