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From: Chief, Naval Technical Mission to Japan.
To : Chief of Naval Operations.

Subject: Target Report - Japanese Torpedoes and Tubes, Article 3 -
Above-Water Tubes.

Reference: (a) "Intelligence Targets Japan" (DNI) of 4 Sept. 1945.

1. Subject report, dealing with Target O-01 of Fascicle O-1
of reference (a), is submitted herewith.

2. The investigation of the target and the target report
were accomplished by Lieut. R. R. Morin, USNR.



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Captain, USN

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O-01-3

JAPANESE TORPEDOES AND TUBES
ARTICLE 3
ABOVE-WATER TUBES

"INTELLIGENCE TARGETS JAPAN" (DNI) OF 4 SEPT. 1945
FASCICLE O-1, TARGET O-01

MARCH 1946

U.S. NAVAL TECHNICAL MISSION TO JAPAN

SUMMARY

ORDNANCE TARGETS

JAPANESE TORPEDOES AND TUBES - ARTICLE 3 ABOVE - WATER TUBES

The latest types of torpedo tube mounts, which were used on Japanese destroyers and cruisers for the past ten years, are all modifications of the Type 92 mount. Some mounts are equipped with spray shields, depending upon their positions aboard ship. They are of ordinary construction having no special features except for the torpedo reloading facilities. The torpedoes are fired by compressed air and, in emergencies, by powder charges.

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REFERENCES

Location of Target:

MITSUKOSHIMA, Kure Bay, Japan

Japanese Personnel Interviewed:

lt. Comdr. T. NOBUHARA, Engineer, and other members of Navy Technical Department, Navy Ministry, TOKYO. NOBUHARA had 10 years of experience in design and construction of above-water torpedo tubes.

INTRODUCTION

The following report was prepared after an inspection of Japanese torpedo tubes and interviews with responsible personnel. The report describes the main items and outstanding features of the latest type of Japanese torpedo tube mount.

THE REPORT

A. GENERAL

Table I lists all the types of above-water torpedo tube mounts with some of the principal particulars and the type of ship on which they were used.

The Type 92 tube mount is the latest type and has been in use for ten years. For this reason, only the Type 92 and its modification are discussed in this report.

B. TYPE 92 TORPEDO TUBE MOUNT

1. General

This mount has quadruple tubes and is designed to fire 24" Type 93 oxygen torpedoes. (See Figures 1 to 15.) It is used on destroyers and on light and heavy cruisers. Spray shields are fitted on all destroyer mounts but are omitted on some of the cruisers, depending on the position of the tube mount aboard ship. Its construction is ordinary and there are no special features, with the exception of the reloading gear. (See Figures 14 and 15.)

The total weight of the mount minus torpedoes varies from 15 tons, without the shield, to 18 tons, with the shield.

Type 92 Modifications 1-4 are all practically the same with minor changes in each to suit the type of ship, as shown in Table I.

The tube mount is trained manually or by a 10-horsepower, 600 RPM air motor using compressed air at a pressure of 215 lbs/in². Two large hand-wheels, with an operator at each, are necessary to train the mount manually.

The torpedoes are usually fired by compressed air, but in an emergency it is possible to fire them by using a powder charge. Each tube has a separate air bottle with a volume of 5.65 cubic feet and a charged pressure of 285-355 lbs/in². The maximum tube pressure is 50-65 lbs/in², resulting in torpedo muzzle velocities of 36-40 feet per second. Approximately the same muzzle velocities are obtained when using an impulse consisting of 600 grams of black powder. This method of firing caused flashes, therefore, it was used only in emergencies.

2. Firing Procedure (See Figure 1.)

The charging valve (1) is opened and the air bottle (3) is charged with compressed air through a lead (2) from the main compressors. Compressed air fills two cylinders (8 and 14) and three releasing valves (7, 11, and 17). Pressure is indicated by a gauge (12).

When the firing button on the bridge is pushed, the first firing circuit is switched in and the electro-magnet (20) is actuated, opening the first relief valve (17) and discharging the compressed air from one cylinder (14). The piston (23) is moved to the left, the starting lever of the torpedo is tripped by a lever (24), and the torpedo gyro is started. A second firing circuit is automatically switched in and the electro-magnet (25) is actuated, opening the second relief valve (11) and discharging the compressed air from the cylinder (8). The piston (9) is moved to the left and the forward stop (27) is lifted, freeing the torpedo. Simultane-

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JAPANESE ABOVE - WATER
TORPEDO TUBES

TUBE MOUNT			Inside Tube Diam. (in)	SHIPS FITTED		No. of Mounts	ADDITIONAL ITEMS			
Type	Model & Mod.	No. of Tubes		Type	Class		Spray Shield	Firing**	Operation Training*	Max. Train Angle
6 Nen		2	21	DD	NOKAZE, NUMAKAZE, KAMIKAZE, NAMIKAZE, HOKAZE, SHIOKAZE	3	No	CA	H	360°
94		3	21	PT	HATO, KAMO, KIZI, SAGI	1	Yes	CA & PC	H & AM	360°
12 Nen		3	24	DD	IKAZUCHI, INAZUMA, HIBIKI, AKATSUKI, USHIO, OBOBO, AKEBONO, SAZANAMI	3	Yes	CA	H & AM	360°
90		3	24	CA	TONE, CHIKUMA, SUZUYA, MIKUMA	4	No	CA & PC	H & OM	180°
8 Nen		2	24	CL	YUBARI	2	Yes	CA	H & EM	360°
92	1	4	24	CA	NACHI, MYOKO, ASHIGARA, HAGURO	4	No	CA & PC	H	105°
92	1 - 1	4	24	CA	TAKAO, ATAGO, MAYA, CHOKAI	4	No	CA & PC	H & AM	105°
92	2 - 1	4	24	DD	ASAGURO, MURASAME, ASAZIO	2	Yes	CA & PC	H & AM	360°
92	3	4	24	CL	IZUZU	8	No	CA & PC	H	105°
92	4	4	24	DD	OI, KITAGAMI	2	Yes	CA & PC	H & AM	360°
	5	5	24	DD	SHIRANUHI, TAKANAMI, KIOSHIMO, MATSU, NIIZUKI	2	No	CA & PC	H	105°
				CL	AGANO, NAKA, ZINTSU	1	Yes	CA & PC	H & AM	360°
				DD	SHIMAKAZE	2	Yes	CA & PC	H & AM	360°

*H - By Hand
AM - By Air Motor

**CA - Compressed Air
PC - Powder Charge

*H - By Hand

AM - By Air Motor

OM - By Oil Motor

EM - By Electric Motor

**CA - Compressed Air

PC - Powder Charge

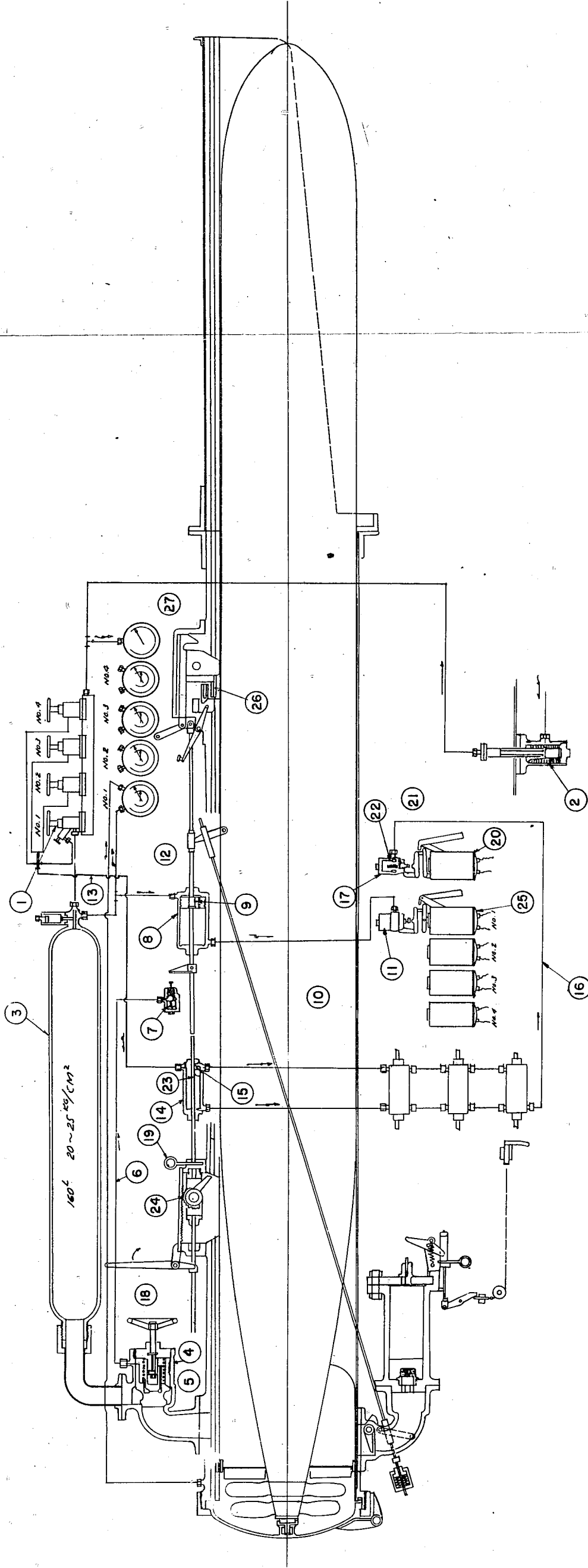


Figure 1
DIAGRAM OF TYPE 92 TORPEDO TUBE MOUNT

ously, the lug (7') pushes against the third relief valve (7) and releases the compressed air holding the firing valve on its seat. The firing valve opens and compressed air is forced into the tube, firing the torpedo. The tube firing pressure is indicated by a gauge (12).

3. Depth Setting

The depth is set in the torpedo by means of a spring-loaded plunger similar to the speed-change mechanism used on U.S. torpedo tubes.

4. Gyro-Angle Setting

Gyro-angle is set in the torpedo by a handwheel, using a system of matching pointers on the gyro-angle indicator (See Figure 6.) The gyro setting spindle is inserted by hand but it is automatically withdrawn as the torpedo is fired, by an air piston arrangement.

Spread angle is set by hand at the gyro setting spindle of each tube with a special spread-angle indicator. A $\frac{1}{2}^{\circ}$ unit of spread was used most often.

5. Stop Mechanism

The torpedo is secured in the tube by a forward and after stop at each end of the T-guide on top of the torpedo. The after stop is spring-loaded and has a beveled rear edge so that the T-guide forces it up when loading a torpedo in the tube. The forward stop is automatically lifted by an air piston upon firing, as shown in Figure 1.

6. Changing Torpedo Speed

There is no speed-changing device fitted on the tubes. The only method for changing torpedo speed is with a small hand wrench inserted through an access hole in the tube. Whenever the speed is changed it is necessary to remove and replace the access hole cover. The Japanese seldom changed torpedo speeds as most attacks were made using the high-speed setting.

7. Firing System

Torpedoes can be fired automatically from the bridge or by hand at the tube mount. The latter method was used only for emergency firing. Figure 5 shows the firing mechanism. An indicator panel is located above the firing mechanism which indicates the order of firing.

As the torpedo leaves the tube, it trips a lever, completing an electrical circuit which indicates at the bridge and at the tube mount that the torpedo has been fired.

The Type 14 torpedo sight is mounted on top of the tubes behind the large observation port in the shield. It is similar to the U.S. Mark 5 torpedo sight and is used for visual firing from the tube mount.

The torpedo cannot be fired when the tube door is open. If the door is not lined up correctly, the piston rods for the tripping mechanism and firing valve release mechanism cannot operate.

The crew on the tube mount normally consists of nine men.

8. Construction

The torpedo tube is made of mild steel plate, 0.197" thick, with steel guides, 2" wide, running inside the whole length of the tube on each side and along the bottom.

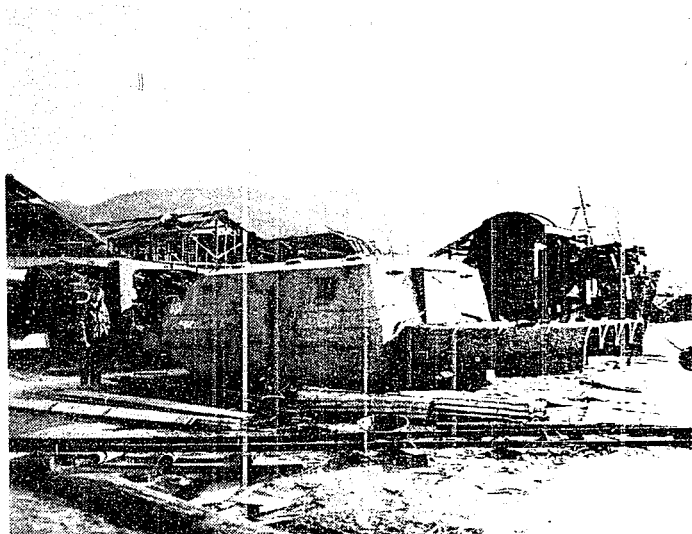


Figure 2
TORPEDO TUBE MOUNT
TYPE 92 MODIFICATION 4

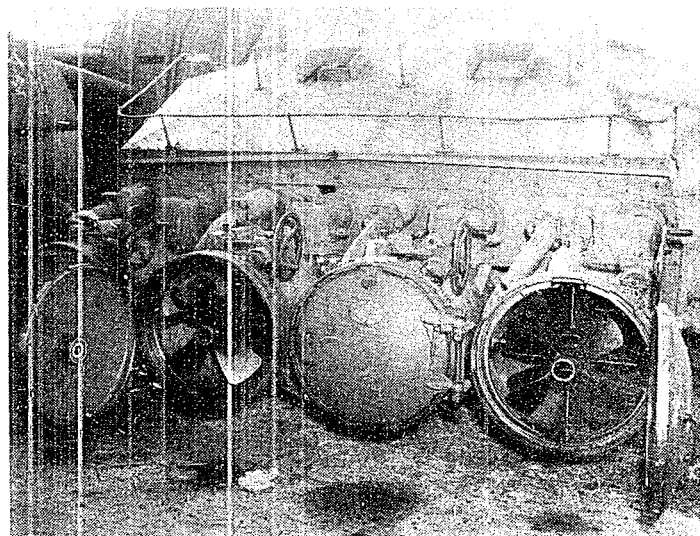


Figure 3
REAR VIEW OF TORPEDO TUBE MOUNT
TYPE 92 MODIFICATION 4

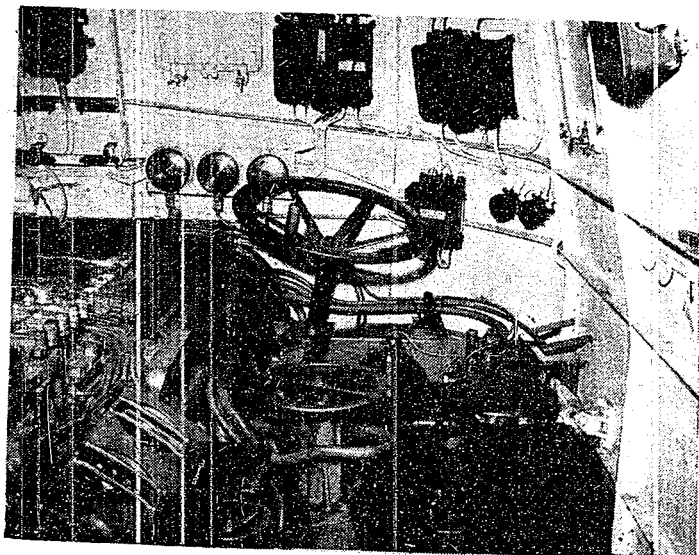


Figure 4
LARGE HAND WHEEL FOR TRAINING
TORPEDO TUBE MOUNT
TYPE 92 MODIFICATION 4

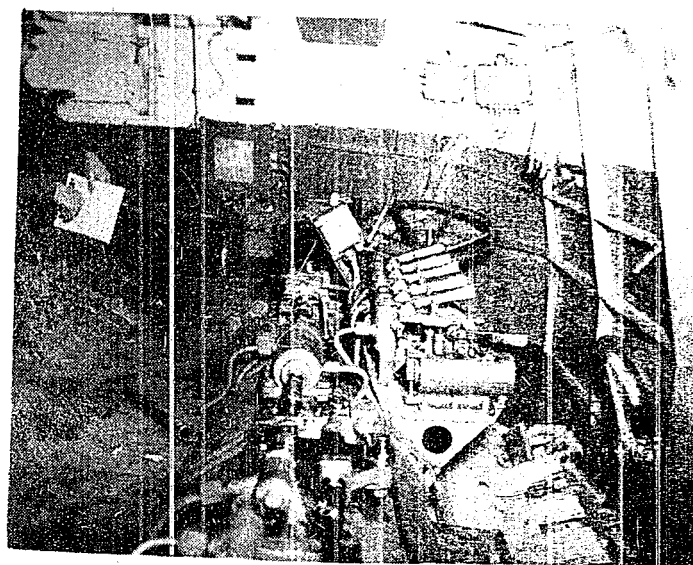


Figure 5
FIRING MECHANISM FOR
TORPEDO TUBE MOUNT
TYPE 92 MODIFICATION 4

Figure 8
GYRO-ANGLE INDICATOR ON
TORPEDO TUBE MOUNT
TYPE 92 MODIFICATION 4

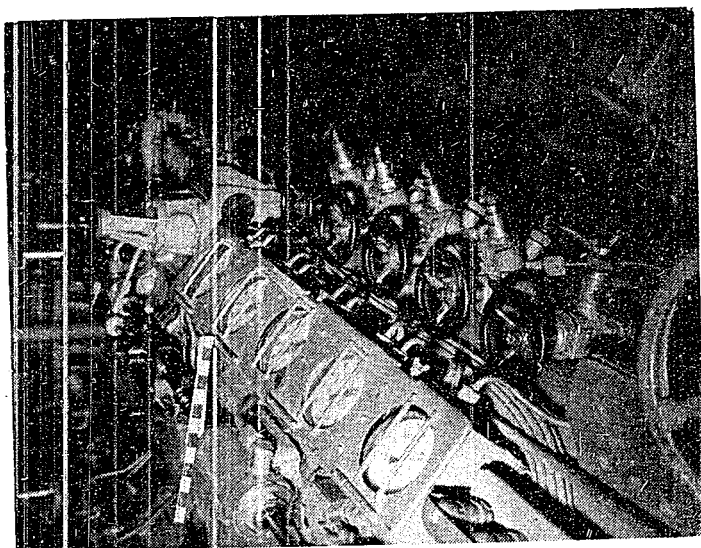
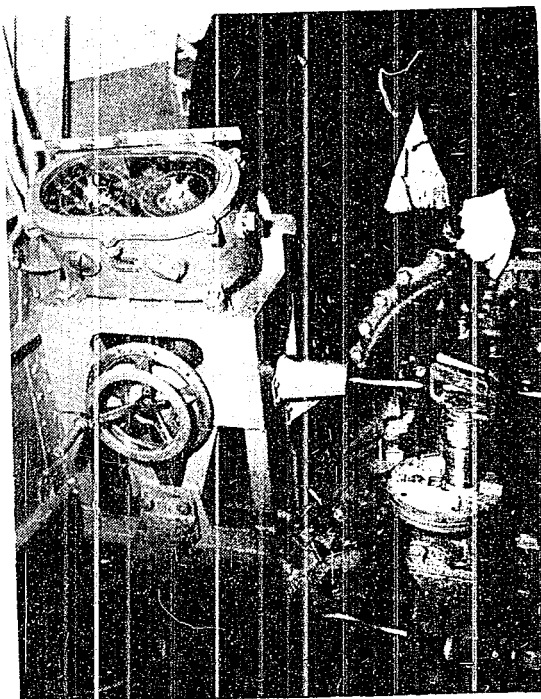


Figure 7
PRESSURE GAUGES FOR AIR BOTTLES
AND MAIN AIR SUPPLY ON
TORPEDO TUBE MOUNT
TYPE 92 MODIFICATION 4

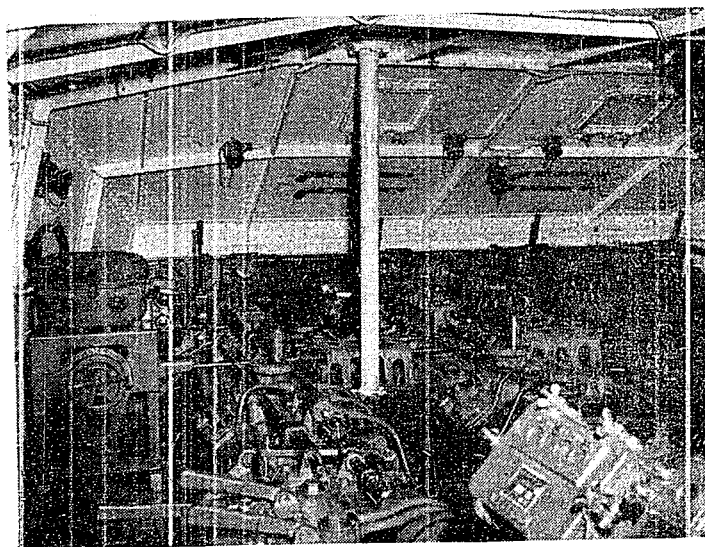


Figure 8
INSIDE OF TUBE MOUNT LOOKING AFT

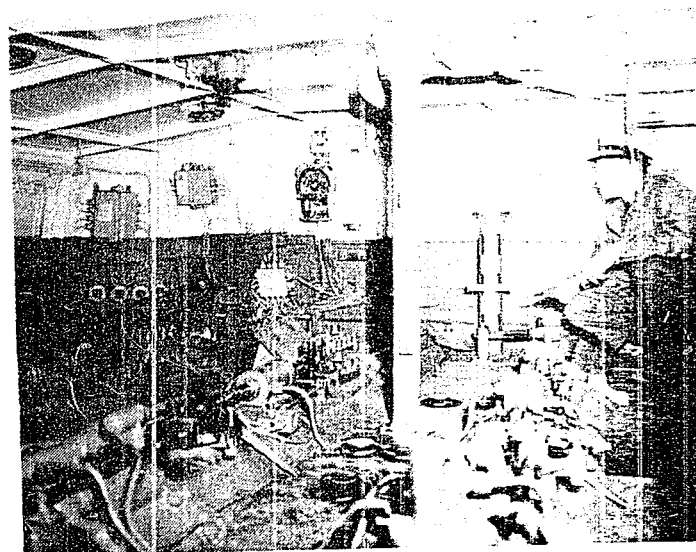


Figure 9
INSIDE OF TUBE MOUNT LOOKING FORWARD

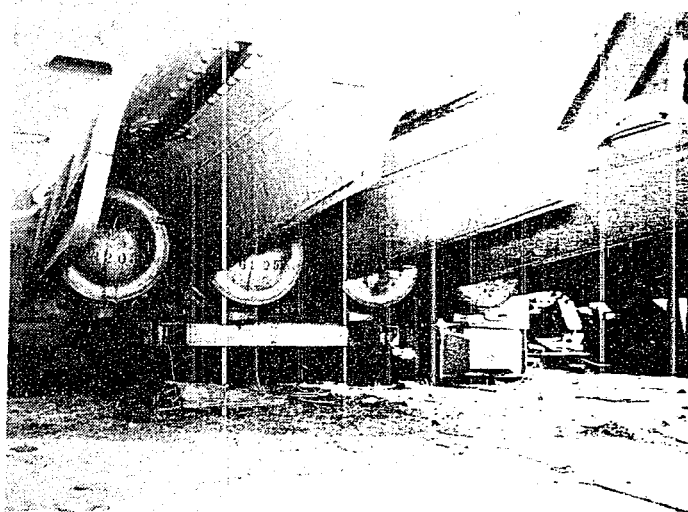


Figure 10
FORWARD END OF TORPEDO TUBE MOUNT

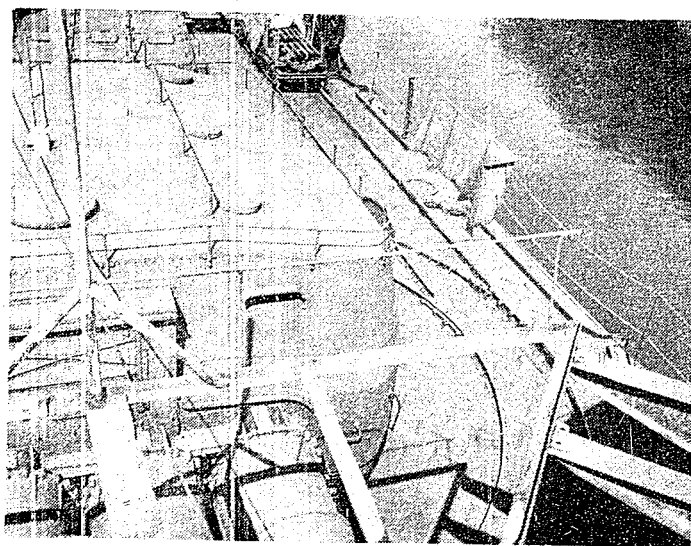


Figure 11
SHIPBOARD ARRANGEMENT OF TUBE MOUNT.
LOADING DOLLY AND TRACKS

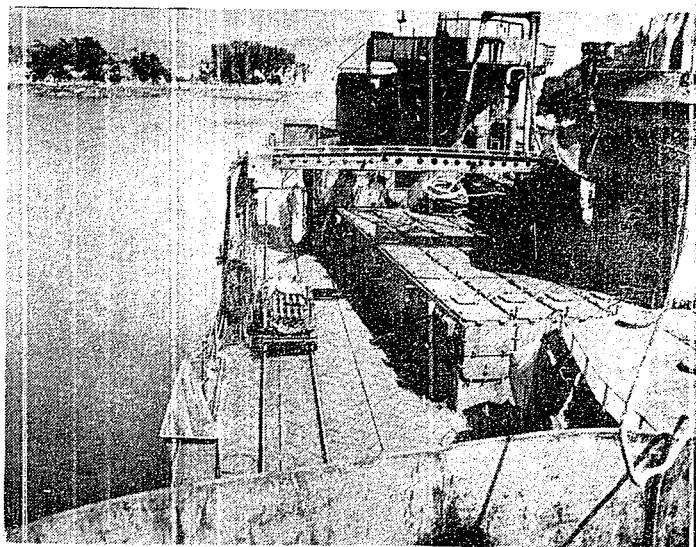


Figure 12
SHIPBOARD ARRANGEMENT OF TUBE MOUNT
TORPEDO STORAGE BOXES

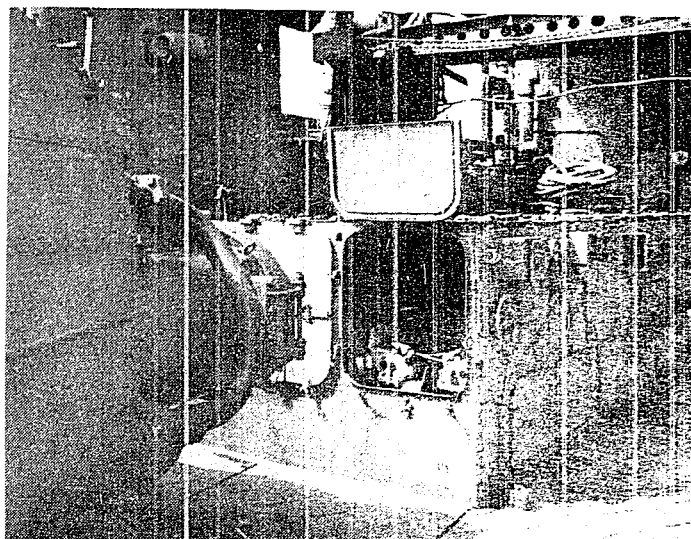


Figure 13
CLOSE-UP OF TORPEDO STORAGE BOXES

The tube door is of cast steel and is hinged to the tube itself. When the door is closed, a steel ring is rotated by a hand-wheel and gear rack, locking the door in position, as shown in Figure 3.

The air bottles are made of special high-strength steel and the firing valves and pistons are made of nickel-bronze.

The spray shield is made of sheet steel having a thickness of 0.118".

9. Torpedo Loading Gear

Four reload torpedoes are carried in water-tight steel boxes aft of the tube mount. The torpedoes are mounted on rollers as shown in Figure 13. The loading mechanism is illustrated in Figures 14 and 15. Power is supplied by a 10-horsepower, compressed air motor operating at a pressure of 215 lbs/in². The RPM of the motor are controlled by a valve (10), shown in Figure 14. The loading speed is about 0.65 feet per second and it is possible to load all four torpedoes together or separately. The revolution of the air motor shaft is transmitted to a pulley (4) through 1:45 reduction gears. Special attachments (1) which are connected to the loading cables are provided for rolling the torpedoes forward. An idling pulley (13) is employed to maintain positive transmission between the pulley and the cables. Just before the torpedoes are all the way in or out of the tubes, a small piece of metal on the cables (14) automatically releases the idling pulleys (13) and prevents further movement.

Torpedoes can also be loaded by hand using a rope wound to a drum (12) instead of the air motor. About ten men are required to pull the rope when this method is used.

It is possible to completely reload the tubes and be ready to fire in a total time of three minutes. This is under ideal conditions however, and usually the reloading gear does not function properly and the time is extended to 20 or 30 minutes. The fastest time for hand-loading was 5 minutes.

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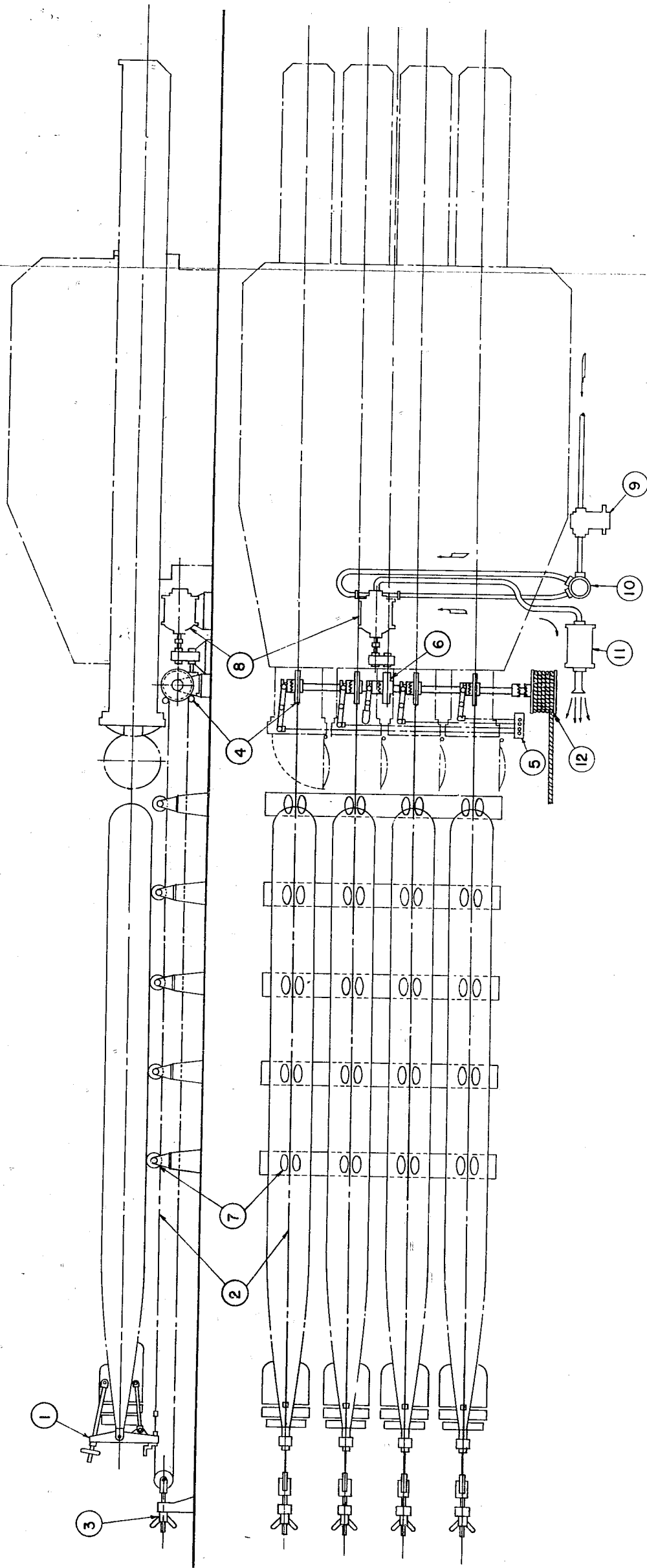


Figure 14
DIAGRAM NO. 1 OF LOADING GEAR
FOR JAPANESE ABOVE-WATER TORPEDO TUBES

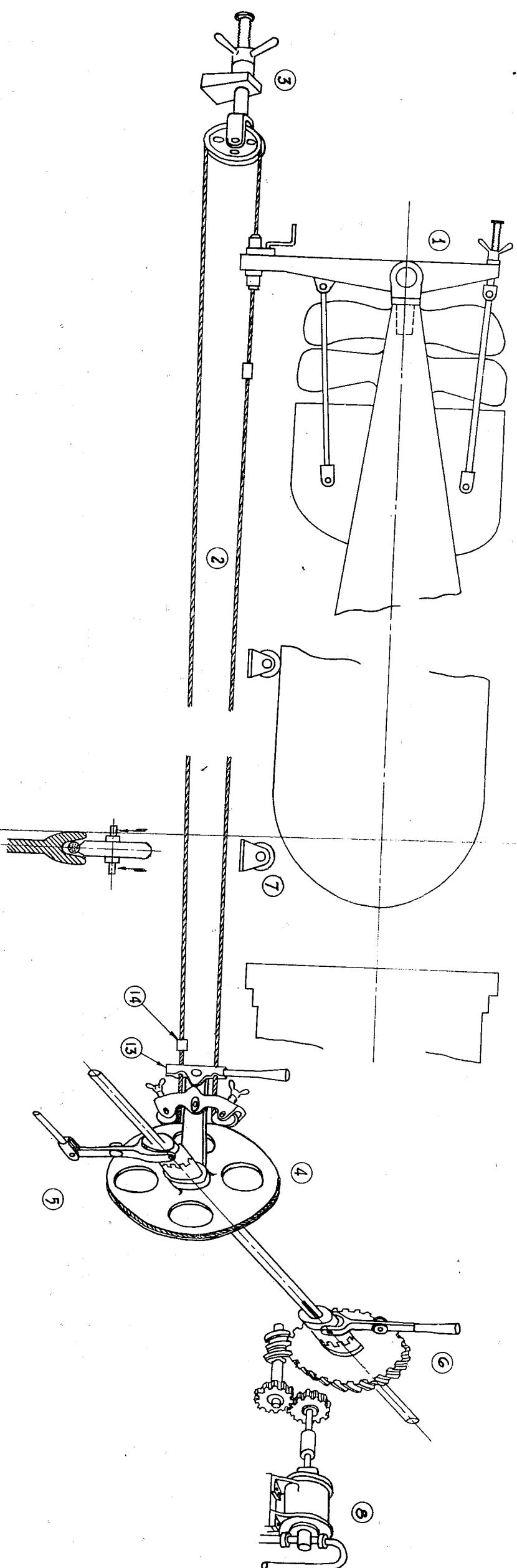


Figure 15
 DIAGRAM NO. 2 OF LOADING GEAR
 FOR JAPANESE ABOVE-WATER TORPEDO TUBES

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