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OP 1245

DEMOLITION CHARGES
MARK 24 MOD 0 AND MARK 25 MOD 0



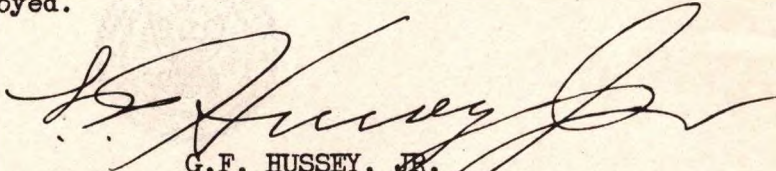
NAVY DEPARTMENT
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ORDNANCE PAMPHLET 1245

DEMOLITION CHARGES MARK 24 MOD 0 AND MARK 25 MOD 0

1. Ordnance Pamphlet 1245 contains a description of the almost identical Demolition Charges Mark 24 Mod 0 and Mark 25 Mod 0, which are created by combining certain depth charges with Mine Conversion Kits Mark 7 or Mark 8.
2. This publication includes instructions for making these conversions.
3. This publication supersedes OP 952, OD 4422, and OCL M12-42 which should be destroyed.



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Vice Admiral, U. S. Navy
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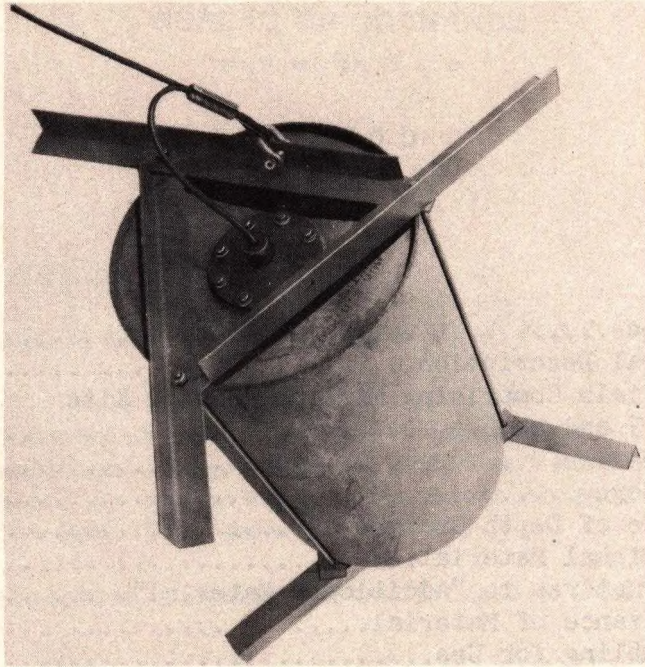


Figure 1 - Depth Charge Mk 6 with Mine Conversion Kit Mk 7 becomes Demolition Charge Mk 24.

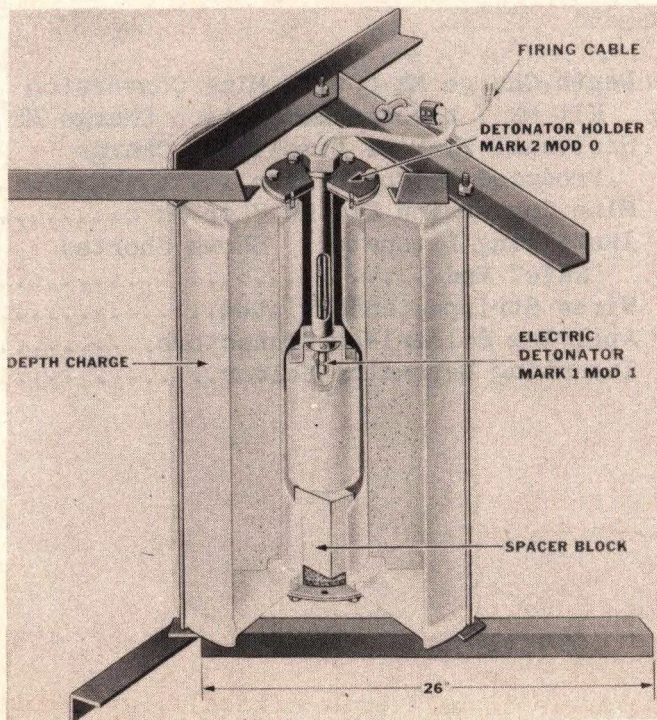


Figure 2 - Sectional View of Demolition Charge Mk 24 by Conversion.

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DEMOLITION CHARGES
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Certain depth charges, listed herein, when modified by means of Mine Conversion Kits Mk 7 or Mk 8, become Demolition Charges Mk 24 or Mk 25, respectively. They are for use in shallow water or as large charges suitable for certain demolition operations.

Purpose

Demolition Charges produced by these conversions will be useful where large concentrated charges are required, and where transportation and placing of unit loads weighing respectively 435 pounds and 780 pounds each is feasible.

General Description

A loaded depth charge and booster, but without the pistol or extender, is equipped with an electric detonator. An angle iron frame with projecting spurs is provided for use where water currents might cause rolling or dislocation of the charge. Wire of suitable length enters the charge through a watertight joint allowing submersion, and extends to a blasting machine located in a place of safety for the operator.

Other suitable sources of current, and required items not parts of the kits, are listed. Kits Mk 7 and Mk 8 are identical except that the angle irons in the Kit Mk 8 are longer, to accommodate the larger Depth Charge Mk 7.

Material Comprising Mine Conversion Kits
Mk 7 and Mk 8

Each kit contains:

- 6 - Angle iron bars (26 inches long in Kit Mk 7, and $32\frac{1}{4}$ inches long in Kit Mk 8).
- 3 - Threaded tie rods.
- 8 - Nuts to fit tie rods. (Two are spares).
- 8 - Lock washers. (Two are spares).

(The above parts are for use in water currents)

- 1 - Electric Detonator Holder Mk 2 Mod 0. (Includes set screw and jam nut for fastening the detonator).
- 1 - Electric Detonator Mk 1 Mod 1. Use no other. The electric detonator is shipped separately for safety.
- 1 - End cover plate. (Not used if depth charge shipping cover is available).
- 2 - Spare cover gaskets.
- 4 - Spare cover bolts.
- 4 - Spare lock washers.
- 1 - Wood spacer block.
- 3 - Cellulose spacer pads.
- 1 - Cable thimble.
- 1 - Cable clamp. (Two pieces, with screws).
- 1 - Shackle, with bolt.
- 3 - Insulated connectors for wires. (One is a spare).

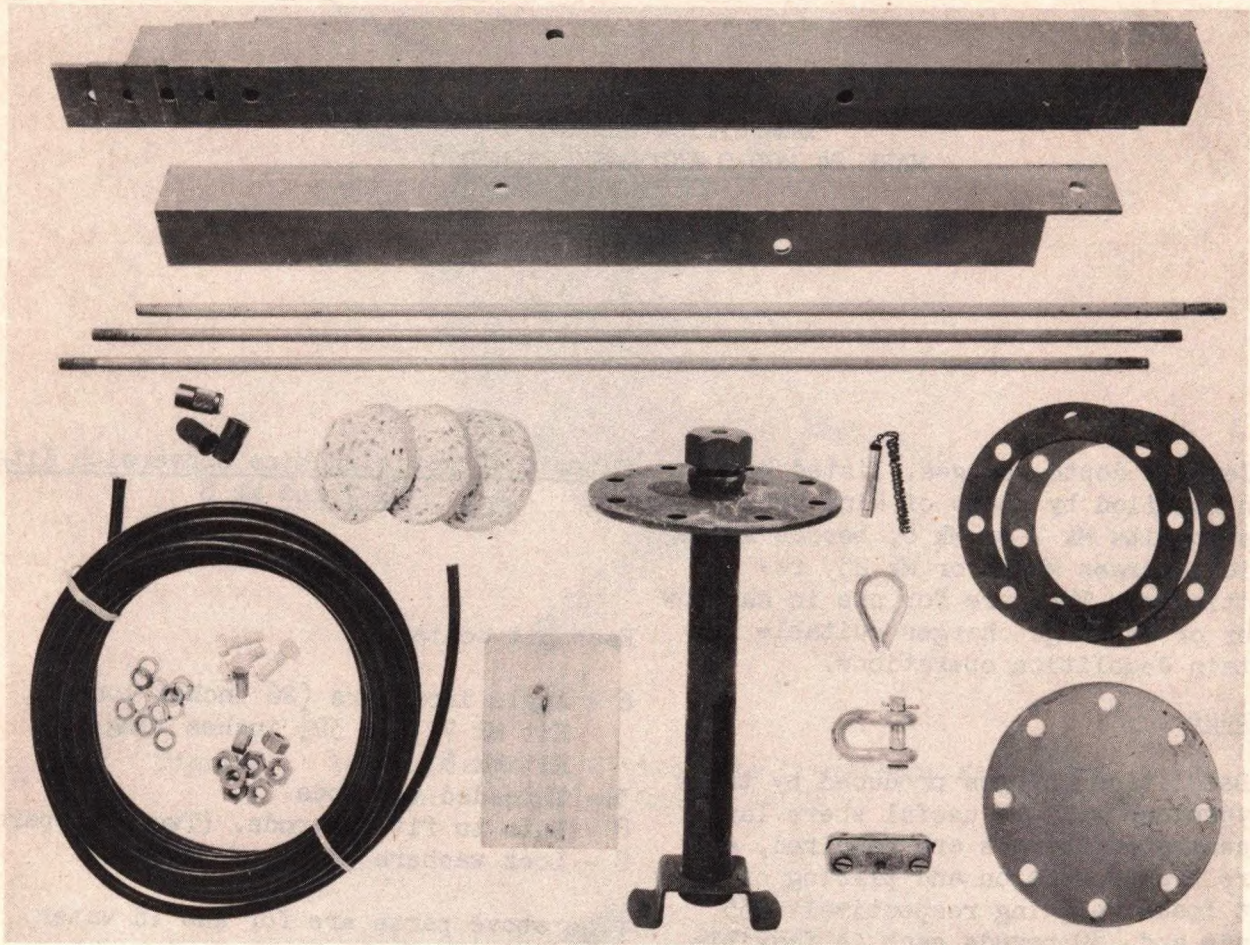


Figure 3 - Mine Conversion Kit Mk 7 or Mk 8.

Explosives

The following loaded depth charge cases can be used:

Depth Charge Case	With Kit	Notes
Mk 6	Mk 7	Kit has angle irons 26" long.
Mk 7	Mk 8	Kit has angle irons 32 $\frac{1}{4}$ " long.
Mk 8	Mk 7	Aluminum case; uses 26" angle irons.
Mk 9	Mk 7 or Mk 8	Tear drop shape; angle irons cannot be used.

Boosters

The following TNT loaded depth charge boosters may be used:

- Mk 6 Mod 2: BuOrd Dwg. 388788
or
- Mk 6 Mod 4: BuOrd Dwg. 434329

Choice of Depth Charges

These kits are offered primarily for use with Depth Charge Cases (loaded) Mk 6 and Mk 7. Depth Charge Mk 8 is an aluminum case of the same size as Depth Charge Mk 6. Mk 9 and Mods are tear drop shaped and will not ordinarily be

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considered. The non-rolling angle-iron frame cannot be used with this last type

When possible, procure the Mk 6 or Mk 7 loaded charge cases with shipping covers over the central tube. If assembled depth charges must be accepted the contents of the central tube must be removed and salvaged; except, the following will be reused:

- a. The booster.
- b. The cover bolts and washers.
- c. The gaskets if in good condition.

Additional Material

To complete a demolition charge, ready for firing, there will be required also:

- a. Box or other strong support for the charge during assembly.
- b. Wrenches, with openings $9/16$ inches, $5/8$ inches and $1\frac{1}{2}$ inches.
- c. Demolition charge cable, OS 718, long enough to reach to a place of safety.
- d. Blasting machine ("hell box"), 10 cap or larger capacity preferred.
- e. Blasting galvanometer, for testing circuit to assure firing when required.
- f. Electrician's cutting pliers.
- g. Medium sized screw driver.
- h. Knife to remove insulation.

Alternatives to "Additional Material"

- a. It is possible, but much less convenient, to make the assembly on the ground (without a supporting box) by digging clearance holes for the angle irons.
- b. Adjustable wrenches may be used but solid wrenches are quicker.
- c. For use in dry places, any wire may be used provided it is reasonably well insulated. In this case use the galvanometer, after all is in place, to

make sure there is no leak between wires and the ground.

d. In the absence of a blasting machine, provide: One, two, or three automobile batteries as required by distance; or, several good No. 6 dry cells in series. (See "Firing the Charge")

e. Demolition Reel Box Mk 2 will normally contain OS 718 cable, dry cells, and ohmmeter; Demolition Reel Mk 4 contains OS 718 Cable, but no device for firing. A standard blasting machine can be used.

Cognizance of Material

All materials for creation of demolition charges from depth charges will be supplied by the Bureau of Ordnance.

Assembling for use

A sturdy support several inches high is a convenient but not essential accessory. Procedure is as follows:

1. Remove cover plates from both ends of the central tube of the depth charge case.
 - a. Keep the bolts, washers and holes free from grit and dirt.
 - b. If using a bare (loaded) charge case, discard one cover, saving the gasket if possible.
 - c. If using an assembled depth charge, remove and retain the booster, gaskets, bolts and washers; and salvage the booster extender and the pistol.
2. Assemble the detonator holder, placing it on a surface where it cannot roll, fall, or be subjected to a shock. See Figure 4.
 - a. Remove the large nut, washer, and packing from the outer end of the holder, thread the end of the OS 718 firing cable through all, and draw out through the slot in the side of the

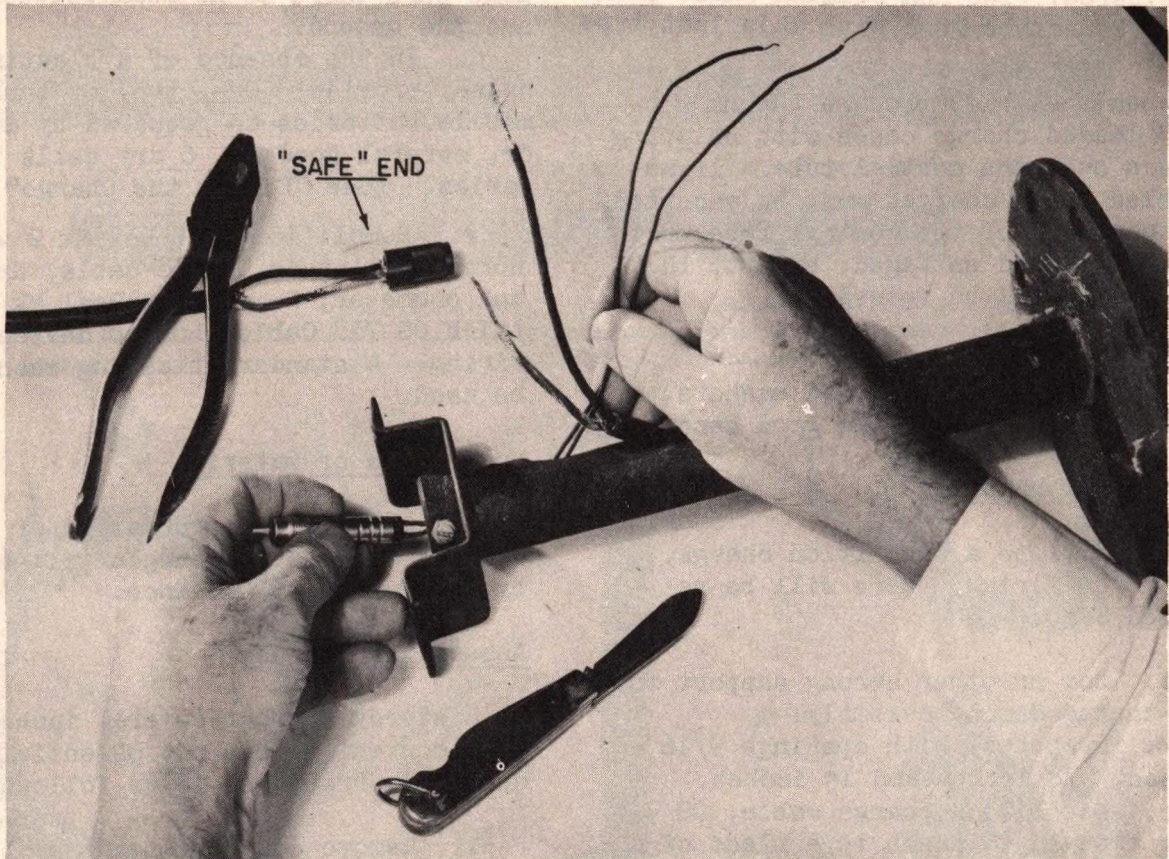


Figure 4 - Installing Detonator. Shows Shorted "Safe" End.

tube; replace the packing parts but leave them loose. About two feet of wire should be drawn through for easy working.

b. Remove from the cable about six inches of the outer rubber sheath, also the cotton braiding, and fillers, leaving the two rubber insulated conductors.

(b-1) Cut one of these about two inches shorter than the other.

(b-2) Strip the insulation and cotton threads from about 1 inch of each conductor. (A total of four ends)

(b-3) Short circuit the conductors at the "safe" *end of the cable, using

one of the three connectors provided.

c. Test the Detonator Mk 1 Mod 1. Only the blasting galvanometer should be used to make sure the detonator will carry electric current. Touch the two ends of the leg wires attached to the detonator to the terminals of the blasting galvanometer. The pointer should swing nearly as far as when the terminals are shorted.

d. Install the Detonator Mk 1 Mod 1. IT IS VERY SENSITIVE TO SHOCK. BE CAREFUL.

* "The two ends of an electric firing line will here be designated the "charge" end and the "safe" end.

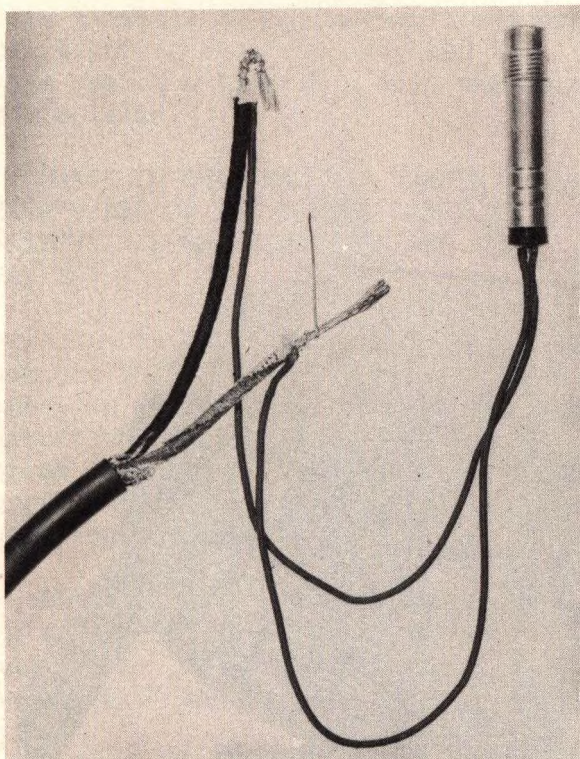


Figure 5 - Wires Stripped and Twisted.

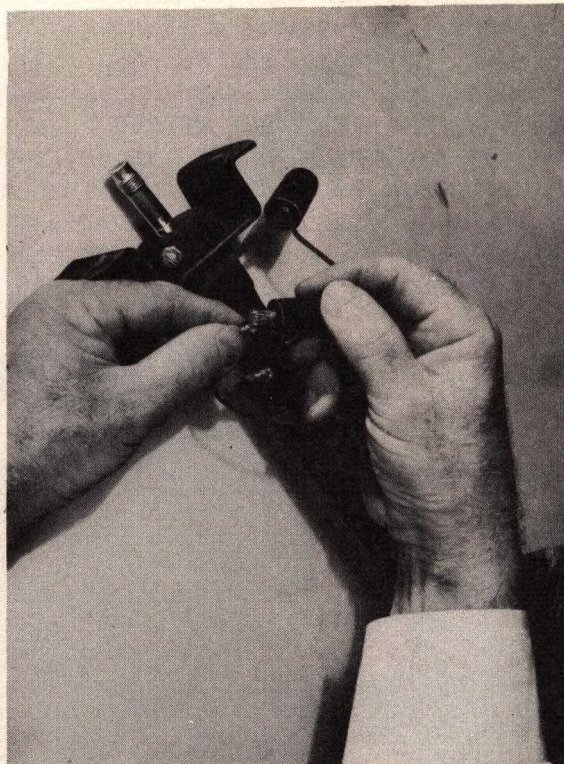


Figure 6 - Applying Solderless Connectors

(d-1) Thread the wires into the detonator socket, out through the slot in the tube, and cut off all but about a foot. See Figure 4.

(d-2) Tighten the set screw solidly on the detonator. The socket is so constructed that the base of the Detonator Mk 1 Mod 1 fully entered into the socket will expose only its inert base to the set screw. However, excessive tightening beyond that necessary to hold the detonator firmly should be avoided, as this might bend or break the detonator.

(d-3) Tighten the lock nut.

e. Separate the detonator wires if they are fastened together and connect to the firing wire:

(e-1) Scrape both firing wire ends to assure 1 inch of clean metal,

and the two wires from the detonator to assure $1\frac{1}{2}$ inches of clean metal. Be sure the exposed portions of these conductors are no longer than stated above, for the insulating connectors must cover all bare metal of the finished joint. A short circuit will, or ground may, cause a failure to fire or possibly a premature explosion.

(e-2) Hold one firing cable conductor and one detonator wire side by side, ends of the insulation (rather than the ends of the conductors) together. Wind the $1\frac{1}{2}$ inch length of a solid detonator wire around the stranded end of a firing wire, leaving some space between turns. Use the pliers to wind the end down neatly, as in Figure 5.

(e-3) Now bend the twist at the middle and pinch tight.

(e-4) Repeat with the other pair of wires.

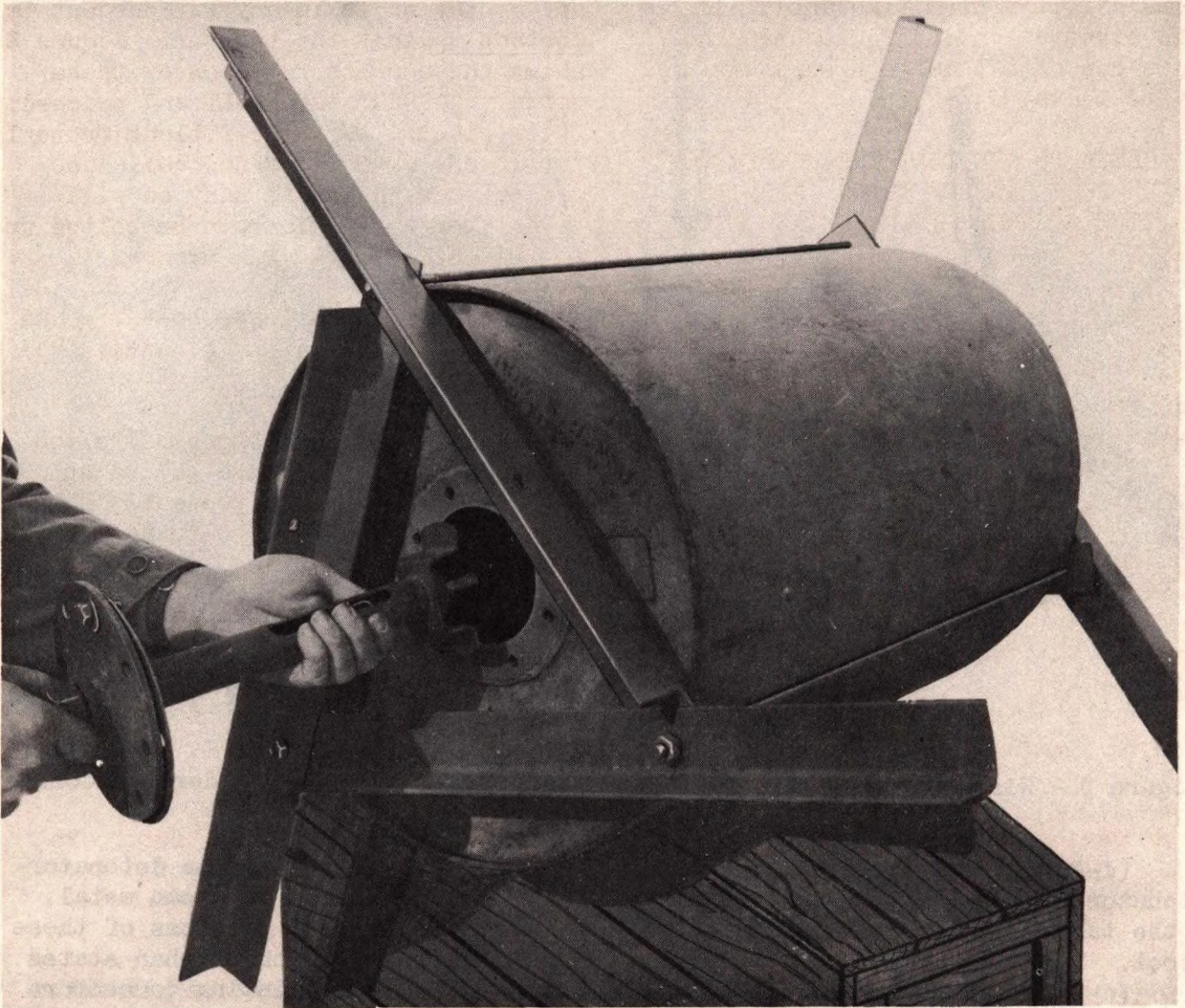


Figure.7 - Inserting Detonator Holder.

(e-5) Screw over each bend one of the insulating connector sleeves. See Figure 6. Be very sure no bare metal is exposed.

(f) After both leads are thus connected the joints should be laid against the tube while the firing cable is pulled back through the packing and tightened so there will be two to four inches of slack inside the tube. See Figure 2.

g. If the charge is to be subjected to rough water or much handling, the connectors may be bound firmly to the tube with about a foot of tape.

3 - Insert the detonator holder into the central tube of the depth charge (see Figure 7), first making sure the gasket is good, and put all eight bolts and washers in place. Run all the bolts up finger tight before using a wrench,

then use the wrench round and round all bolts a little at a time until all become tight at once. To tighten the bolts one at a time is a sure way to invite leaks.

4 - CHECK TO SEE THAT THE REMOTE (OR "SAFE") END OF THE FIRING CABLE IS POSITIVELY SHORT-CIRCUITED AND WILL STAY SO.

5 - Assemble the set of angle irons (if they are to be used) to produce the cage-like arrangement shown in the illustrations. The method to use will depend on local surroundings but a careful study of the pictures will be sufficient explanation.

6 - Attach the thimble to one of the angle iron bars by means of the shackle, running the firing cable through the shackle with the thimble.

a. Bend the cable around the thimble leaving about nine inches of slack so no possible pull on the cable can cause this slack portion to tighten.

b. Apply and tighten the cable clamp.

c. Again pull the cable to check whether there is sufficient slack in all directions. See Figure 1.

7 - Insert the booster from the other end of the central tube. DO THIS VERY CAUTIOUSLY. Put the booster in with the detonator cavity entering first, and VERY GENTLY push it into place. When it stops put the wooden spacer block in behind it.

If the wooden block does not enter its entire length, and a little more, DO NOT FORCE IT. Remember that the end of the booster may touch the very sensitive detonator and a slight shock or pressure can easily blow up the whole works. Withdraw the block and booster

and determine whether the detonator is off center or is in any way subject to contact against the booster. Figure 2 shows the correct relation of these parts. CORRECT THE FAULT and proceed. After placing the spacer block properly, put in one or more of the cellulose spacer pads, using as many as will permit the cover plate to be bolted up to the gasket without a wrench.

Finally, tighten these bolts, round and round, using a wrench, until the cover is watertight.

WARNING - Screwing these bolts too tight, even when all are pulled up alike, will relax the pressure on the gasket midway between bolts and almost certainly cause leaking.

CAUTION - From the moment the booster is in place THIS CHARGE IS ARMED and should be handled with utmost care. The internal parts are not immovably held, and a severe blow or drop might cause an explosion.

8 - Testing the circuit. Before removing the charge from the place of assembly the blasting galvanometer should be used to make sure all connections (except source of current) are secure. Touch the two separated ("safe") ends of the conductors to the two terminals of the instrument; the pointer should swing nearly as far as when the instrument terminals are shorted. Short circuit the wires again immediately.

9 - It is well to make a final check of the wire circuit with the blasting galvanometer AFTER placing the charge, just before firing.

The blasting machine may be tested by operating it first with no wires connected, and again with its terminals connected by a short piece of wire. If there is a marked difference in the

"feel" when so operated it may be considered good; i.e., a good machine when shorted will stop very abruptly, but with NO connection will run a few revolutions.

The blasting machine ends (the "safe" ends) of the cable conductors should be short circuited by means of one of the connectors and this should be maintained at all times until ready to test and fire.

Firing the Charge

At the chosen place of safety, anchor the firing cable somehow to prevent its being moved at the critical moment. Leave several feet free to allow for necessary freedom of movement.

Note the directions attached to any blasting machine and proceed accordingly.

When no blasting machine is available ANY adequate source of current may be used. The MINIMUM current is ONE AMPERE. This means that the voltage of the battery or other power source must be NOT LESS THAN the total resistance of the circuit. For example: With 1000 feet of OS 718 cable the total voltage would be (10 ohms cable +1 ohm cap) 11 volts; or two automobile batteries or eight large dry cells.

If a battery is used for firing, the ends of the cable may be TOUCHED to the battery terminals without any risk of shock. DO NOT try this with any kind of blasting machine, and DO NOT DO IT UNTIL YOU WANT AN EXPLOSION.

SAFETY PRECAUTIONS

a. If a completely assembled depth charge is to be used be extremely cautious when removing the extender and pistol. The detonator built into these parts is very sensitive to shock, and accidentally striking it will certainly cause a disastrous accident whether the detonator is within the charge or has been removed.

b. Paragraph 2 (c) says that only the Blasting galvanometer should be used when testing the detonator. This is very important. There are two forms of testers for this purpose, the GALVANOMETER and the OHMMETER. They look almost exactly alike, but the ohmmeter has been known to cause explosions while making the test and is no longer standard Navy equipment. IF IN DOUBT ABOUT WHICH INSTRUMENT YOU ARE USING INSERT ENOUGH EXTRA WIRE BETWEEN THE

DETONATOR AND THE METER TO ALLOW PUTTING THE DETONATOR IN A PLACE WHERE IT CAN DO NO DAMAGE IF IT EXPLODES.

c. Do not neglect the simple act of keeping the wires leading to the detonator short circuited at all times except while actually making connections. Even then the other end of the cable should be short circuited. Explosions or violent air blasts have been known to cause premature firing of circuits not so protected.

d. Removing too much insulation from wires to be connected is a very common source of trouble. Be SURE that no metal shows after the insulated connectors are screwed over the joint. The stiff wires in the OS 718 cable make this precaution especially important.