

ARMY



NAVY

BOMB DISPOSAL MANUAL

THIS MANUAL ON ALLIED AND ENEMY EXPLOSIVE MATERIAL HAS BEEN COMPILED THROUGH THE JOINT EFFORTS OF THE UNITED STATES ARMY ORDNANCE BOMB DISPOSAL SCHOOL, ABERDEEN PROVING GROUND, MARYLAND, AND THE UNITED STATES NAVY BOMB DISPOSAL SCHOOL, POTOMAC RIVER NAVAL COMMAND, WASHINGTON, D. C. INQUIRIES AND INTELLIGENCE INFORMATION ON BOMB DISPOSAL SHOULD BE SENT DIRECTLY TO THE COMMANDANT OF THE ARMY SCHOOL, OR TO THE OFFICER-IN-CHARGE OF THE NAVY SCHOOL.

THE BOMB DISPOSAL MANUAL IS COMPRISED OF THE FOLLOWING INFORMATION ON EXPLOSIVE MATERIAL.

GERMAN BOMBS AND FUZES.
JAPANESE BOMBS AND FUZES.
ITALIAN BOMBS AND FUZES.
FRENCH BOMBS AND FUZES.
BRITISH BOMBS AND FUZES.
AMERICAN BOMBS AND FUZES.
AMERICAN ARMY PROJECTILES AND PROJECTILE FUZES.
AMERICAN NAVY PROJECTILES AND PROJECTILE FUZES.

THIS INFORMATION IS CONTAINED IN SEVERAL VOLUMES

CONFIDENTIAL

**INSTRUCTIONS
FOR THE
USE AND
MAINTENANCE
OF
BOMB DISPOSAL
EQUIPMENT**

CONFIDENTIAL

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USE OF EQUIPMENT		
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HYDRAULIC CLOCKSTOPPER T-3/M-1 (Continued)OPERATION:

8. Never attempt to withdraw a type 7 fuze. The bomb can be moved safely after the fuze has been made safe.

CARE AND MAINTENANCE:

1. The "Tite Flex" hose should be kept filled with S.A.E. 10 oil, or its equivalent, by means of plugs in both ends.

2. Never bend the hose or coil it on a smaller diameter than that of the reel.

3. Leaks may be repaired by running acid flux solder onto the wire sheath of the hose.

4. The large thread on the high pressure head which fits over the fuze should always be protected by the bronze cap when not in use.

5. Always use clean oil.

6. Clean the check valve under the gauge when necessary.

7. Gaskets can be made of a similar 1/16 inch material.

8. All equipment is tested at the Bomb Disposal School up to a pressure of 2200 lbs./sq. inch.

9. The end of the spring in the head which seats on the fuze should be expanded to a 1-5/16 inch inside diameter to prevent binding on the fuze boss.

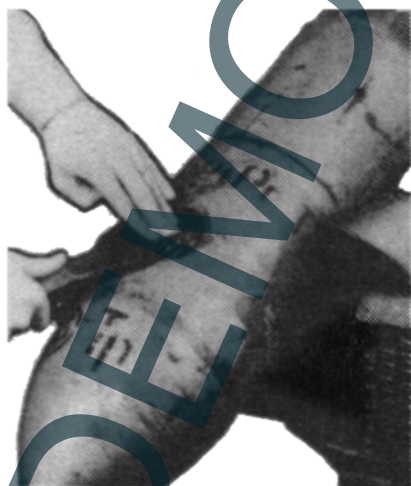


FIG. 1
Removing the locking ring.



FIG. 2
Applying the spring-loaded head after inserting fiber gasket and gasket defater.



FIG. 3
The head in place with hose attached.

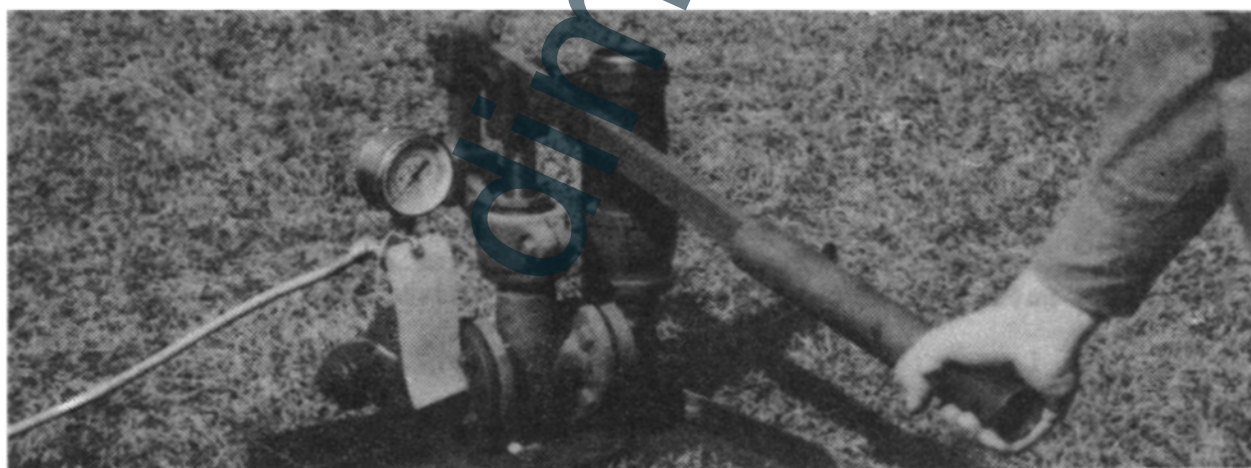


FIG. 4
Pumping the oil into the fuze.

MERRILEES EXTRACTOR FOR ELECTRIC FUZES T-4/M-2THEORY:

This equipment makes possible the extraction of German Electric Rheinmetall fuzes by remote control and a minimum of vibration. A reel is fastened to the fuze and is unwound by pulling on a rope from a position of safety. An additional device enables the "Y" fuze to be withdrawn by means of a rotary motion imparted to the fuze; this defeats the anti-withdrawal device.

DESCRIPTION:

The Merrilees Extractor Set consists of the following:-

1. A collet for gripping the fuze boss.
2. A threaded spindle for attaching the reel to the collet.
3. A tube for supporting the reel and guiding the fuze as it is withdrawn.
4. A reel containing 250 feet of cord for operation by remote control.
5. A bolt for securing the threaded spindle in the tube.
6. A plate and spring attachment which is used to impart to the fuze, a rotary motion as it is withdrawn.
7. A short bolt.

OPERATION: (After the fuze has been made safe.)

1. Attach the collet to the fuze boss, using one or two pieces of paper if the collet tends to slip on the boss.
2. Remove the locking and locating rings.
3. Screw the tube into the locking ring thread.
4. Attach the threaded spindle to the collet by means of a bolt which is passed through the slots in the side of the tube. Screw the nut on the bolt but do not tighten.
5. Screw the guide cap on to the top of the tube, tightening it to the tube by means of the wing bolt.
6. For all fuzes except the "Y" fuze, screw the reel on to the threaded spindle. For the "Y" fuze, first attach the plate spring assembly with the plate resting against the spring. Then apply the reel with the cord wound to rotate the reel in a clockwise direction.
7. Unwind sufficient cord from the reel to pass through all pulleys in the hole. Tie a second length of cord to the first. Lead it back to the safety position of operation, carrying the rope over logs or over smooth surfaces. Wherever possible, keep the rope free of underbrush.
8. From the safety position, pull the rope taut and then continue to pull slowly. Finally pull hard and seat the reel firmly against the guide cap when the fuze is entirely withdrawn.
9. Loosen the wing bolt in the guide cap.

(Continued on the following page.)

MERRILEES EXTRACTOR FOR ELECTRIC FUZES T-4/M-2 (Continued)OPERATION:

10. Grasp the protruding threaded spindle, unscrew the guide cap, and remove the reel, threaded spindle, guide cap, collet, and fuze, guiding the fuze with the other hand so as not to strike the side of the tube which is removed only after the fuze is withdrawn.

11. Remove the gaine from the fuze.

CARE AND MAINTENANCE:

1. Keep all parts well oiled.
2. The large threads on the ends of the tube should be protected at all times by the bronze caps when not in use.

MERRILEES EXTRACTOR FOR ELECTRIC FUZES T-4/M-2 (Modification)THEORY:

The present extractor allows only a straight pull which will not remove the German electric fuze designated as the 50 B. or "Y" fuze. This fuze has a spring which allows the fuze to be removed only by clockwise rotation. The attachment consists of a plate and spring which slide down over the spindle. A stop is fixed to the reel.

ALTERATION OF THE PRESENT EQUIPMENT:

1. Mill a $5/32$ inch slot (A) $1/8$ inch deep and $7-1/4$ inches long from the top of the threaded spindle. The sharp edges left on the thread should be removed by slight 45 degree mill cuts or with a file.
2. Mount a stop (B) $1-3/4$ inches from the center of the reel hub as shown.
3. Fabricate a steel plate (C) with a key (D) and protruding stop as shown in the diagram.
4. Wind a spring (E) as shown. The spring should be fastened to the plate.
5. Use a special short collet bolt and nut (F) to allow the collet-spindle assembly to rotate freely within the tube.

OPERATING INSTRUCTIONS:

1. Apply collet to fuze boss.
2. Remove locking and locating rings.
3. Carefully attach threaded spindle to collet with short bolt and nut.
4. Screw tube into locking ring thread, holding spindle to prevent movement.
5. Apply guide cap.
6. Apply plate - spring assembly as shown in diagram.
7. Apply the reel with the stub down and the cord wound to rotate the reel and fuze clockwise.
8. Thread the cord through the necessary pulleys and attach another length of cord to run back to a position of safety. The reel should be nearly full of cord.
9. The spring, plate, and stop system will work on a fuze which requires counter-clockwise turning, provided a left-hand spindle and reel are obtained.

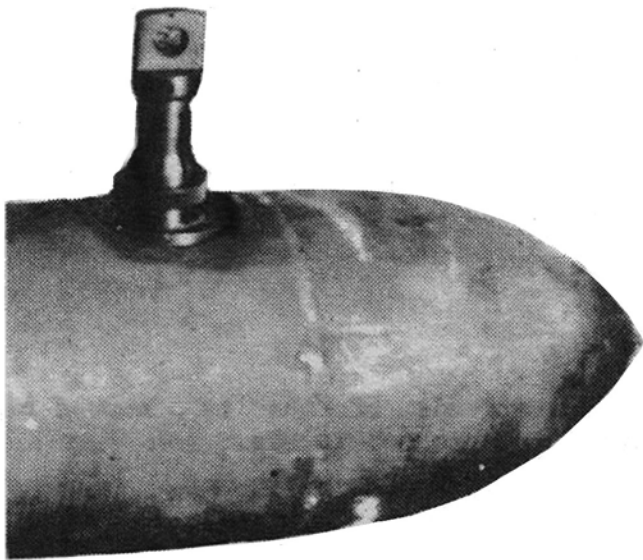
MERRILEES EXTRACTOR FOR ELECTRIC FUZES T-4/M-2

FIG. 1
Attaching collet.

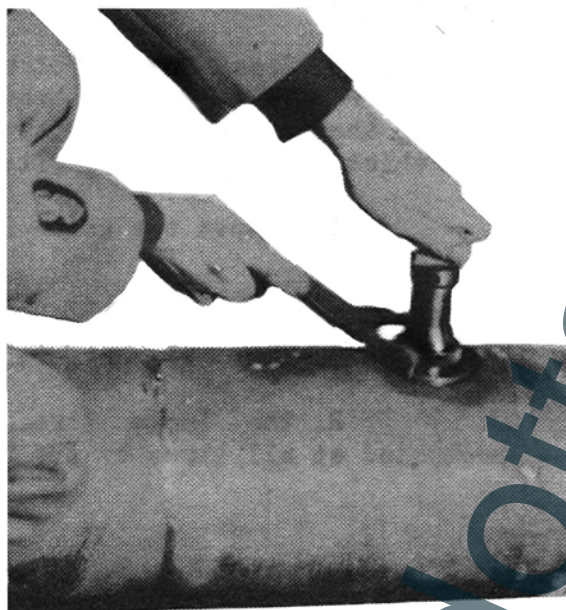


FIG. 2
Removing the locking ring.

FIG. 3
The threaded tube in place.

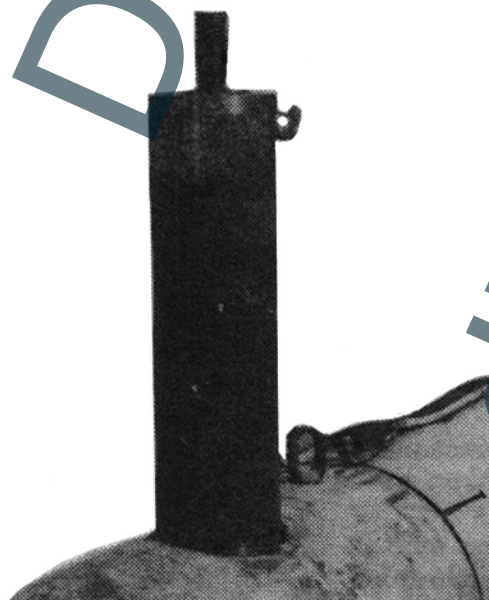


FIG. 4
The threaded spindle attached.

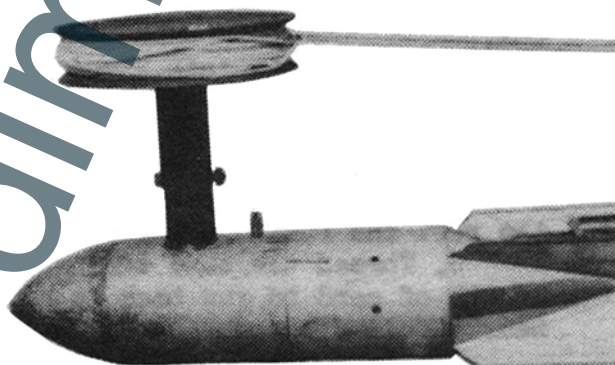


FIG. 5
The reel and tube in place. (Note the long bolt extending through the extractor tube.)

LOCKING RING WRENCH T-5/M-2DESCRIPTION:

This wrench is a simple spanner wrench which is designed to engage the slots in the locking rings which are used to secure the Electrical Rheinmetall fuzes in German bombs.

SPANNER WRENCH T-6/M-1 & SPANNER WRENCH T-7/M-1DESCRIPTION:

These spanner wrenches are built to engage the spanner holes of certain Japanese fuzes.

The T-6/M-1 can be used on fuzes of 2 inches in diameter.

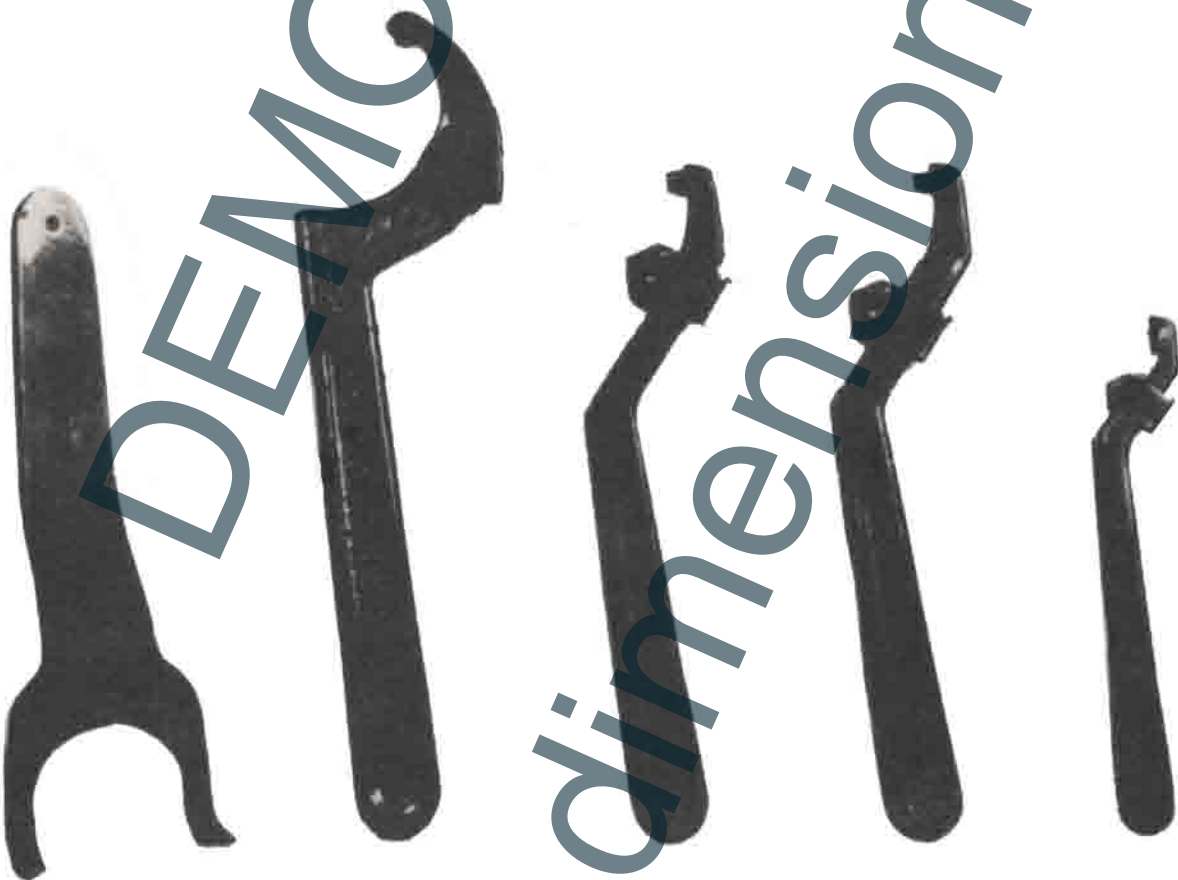
The T-7/M-1 can be used on fuzes of 2-1/8 inches.

These two wrenches are outmoded by four new spanner wrenches.

NEW SPANNER WRENCHES

Spanner Wrenches T-6/M-1 and T-7/M-1 are now replaced by four spanner wrenches which are supplied with the set containing the Merrilees Fuze Extractor and the Impact Wrench.

The new wrenches do not have a "T" designation. The wrenches range from 1/2 inch to 4-3/4 inches in size.



LOCKING RING
WRENCH
(T-5/M-2.)

FIG. 1

Set of four Spanner Wrenches.

NEW IMPACT WRENCH T-10/M-2 (Continued)CARE AND MAINTENANCE:

k. Pull the wire and cable anchor up between the reel and the intermediate hub far enough to allow cable anchor to be attached by its screw.

l. The cable anchor is attached in such a manner that the cable lies against the flange on the hub through which the cable anchor screw passes. Release the cable and allow it to assume its normal position before tightening the cable anchor screw.

m. Turn the assembly over and place the cable on the bottom brass rollers and the spring on the upper rollers. Make certain that the spring and cable are riding smoothly over all brass rollers.

n. Oil all sliding surfaces.



FIG. 1

The impact wrench and vise assembled.

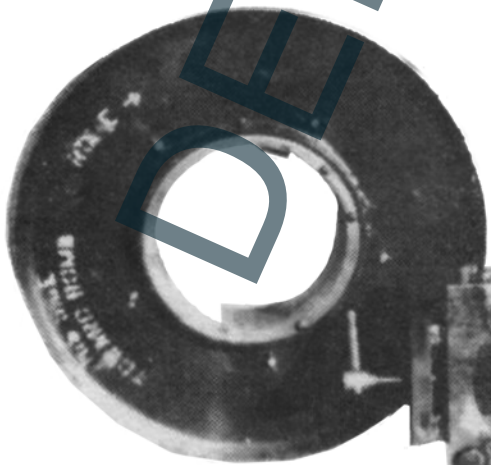


FIG. 2

The Vise separated from the reel.

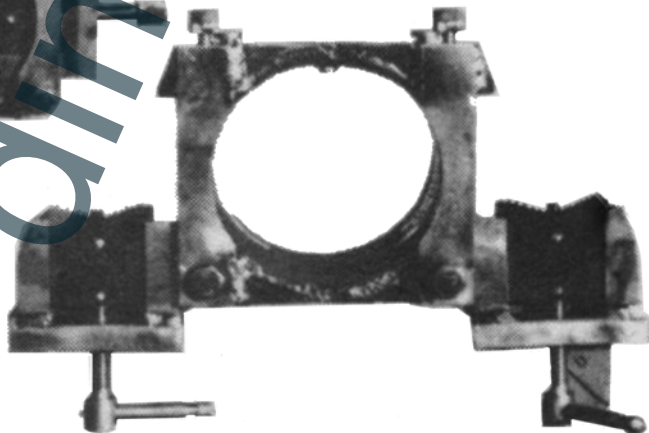


FIG. 3

The Vise jaws opened. (Note the locking pins in the retracted position.)

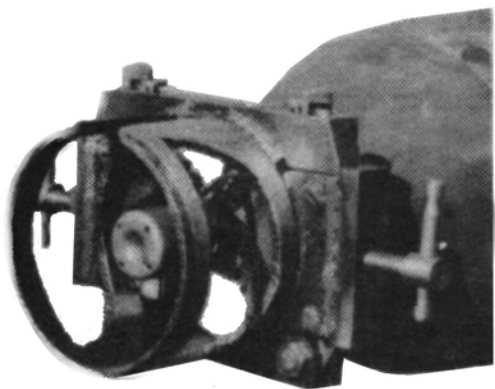


FIG. 4
The Vise tightened on the fuze body.
(Note the tightened screw handles are in a vertical position.)

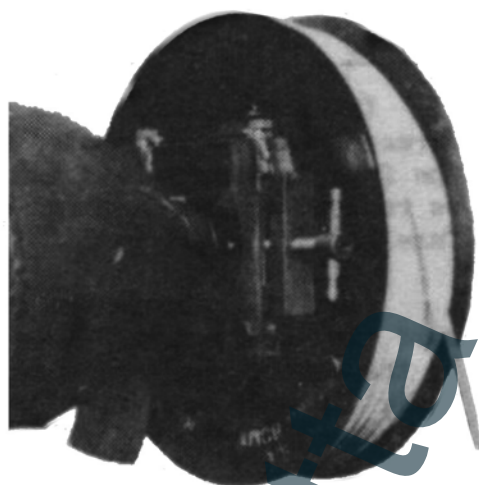


FIG. 5
The Reel attached.

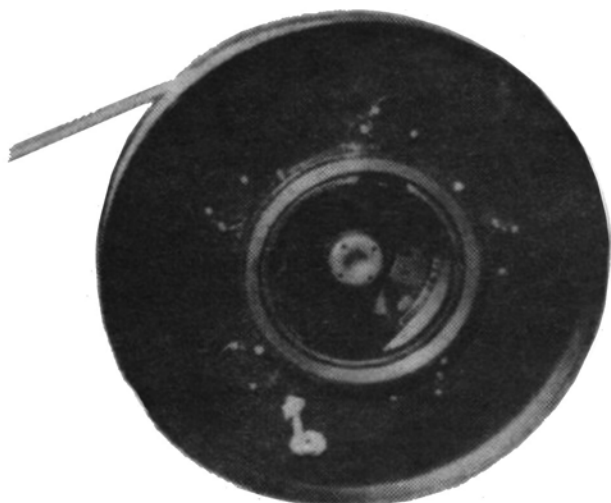


FIG. 6
Looking towards the bomb. (Note that the dust cap holes are on the side away from the bomb for right-hand threaded fuze.)

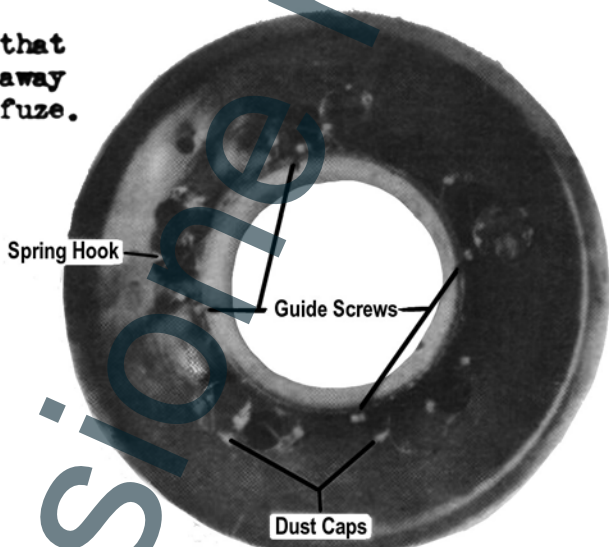


Fig. 7.
The Wrench with the Dust Caps opened.

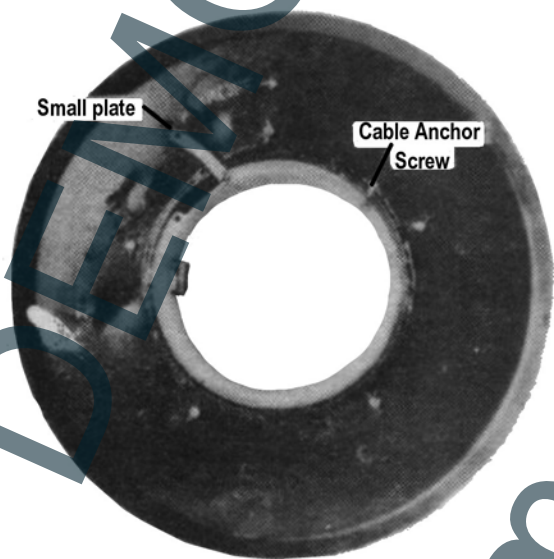


Fig. 8.
Removal of the Small Plate.

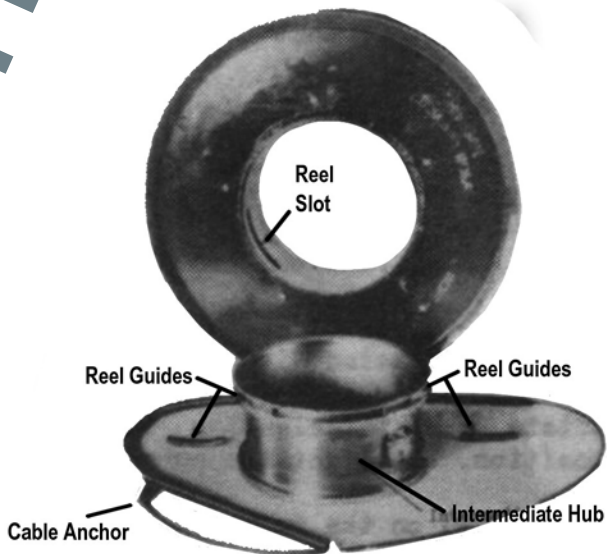


Fig. 9.
Disassembly, showing Reel Guides, Spring and Cable, and Intermediate Hub.

THE THERMAL FUZE DISCHARGER T-11/M-1THEORY:

This equipment makes possible the discharging of the condensers in German Rheinmetall Fuzes while the fuzes are still in the bomb. Once the fuze is made safe, there is no need to remove it, and the bomb can be removed to the disposal area without any undue danger, although the fuze still remains in it.

Heat will change the dielectric constant of the insulating material used in condensers, thus enabling the electrical charge to leak away. In the case of German Fuzes, hot water or steam can be used to heat the fuze; in this way, most of the electrical charge is dissipated, and the charge which remains is much too small to fire the quick-match pellet which surrounds the ignitor bridge.

If high pressure steam is used, the polystyrene molding may melt, thereby allowing the tremblers to contact the trumbler cups before the condensers are discharged, thereby firing the fuze.

The following Electric Rheinmetall Fuzes cannot be discharged by this method:-

(17), (17)A, (17)B, (49) series, 50b or "Y" fuze, (59), (59)A, (79), (79)A, (89), (89)B.

The apparatus should not be used near a "George" Mine.

DESCRIPTION:

The Thermal Fuze Discharger consists of the following parts and attachments:-

1. Small fire-tube boiler.
2. Small gasoline burner.
3. Discharging head equipped with two magnets.
4. A piece of rubber hose.

The boiler is placed over the burner and the hose connects the boiler to the discharging head. The latter is held over the fuze head by two magnets.

OPERATION:

1. Fill the boiler to within one inch of the top with clean water.
2. Connect the boiler and the discharging head by means of the hose.
3. Fill the stove with white (non-leaded) gasoline if available. (The use of leaded gasoline requires adequate ventilation and frequent cleaning of the stove.) Replace and tighten the filling cap.
4. Pull out the folding feet from the base of the stove.
5. To light the burner, turn the pump handle two turns in a counter-clockwise direction. Holding the thumb over the vent hole, pump 25 to 30 strokes. Turn the pump handle clockwise to tighten the valve. Rotate the tip-cleaning lever several times and leave in the down position. To light the burner, turn the main gasoline valve 1/4 turn in

(Continued on the following page.)

DISPOSAL INSTRUCTIONS	FILE NO.: 111.10
USE OF EQUIPMENT	

THE THERMAL FUZE DISCHARGER T-11/M-1 (Continued)

OPERATION:

a counter-clockwise direction. Light the burner. After the burning flame becomes blue, (3 to 5 minutes), open the gasoline valve and pump 10 more strokes in order to build up a good pressure in the fuel tank.

6. Place the boiler over the burner, securing it in place by means of the wing nuts.

7. Remove the steel shims from the head magnets and place the head directly over the fuze in such a manner that the head fits the curvature of the bomb and the magnets are seated firmly on the bomb body. A tight fit is not necessary.

8. Mark down the time and withdraw to the safety position for 40 minutes. In this period the temperature in the fuze reaches at least 80 degrees C. and the condensers lose their electrical charge.

9. Return to the bomb, turn off the burner by closing the fuel control valve, and replace the equipment after cooling.

CARE AND MAINTENANCE:

1. Keep the boiler filled within one inch of the top with clean water. Change occasionally.

2. Always keep the steel shims over the magnets in the discharging head when not in use.

3. Coil the rubber hose in the box without kinks in the line.

4. The gasoline orifice can be cleaned while the burner is in operation by rotating the tip-cleaning lever which should always be turned once before starting the burner. The orifice can be removed for additional cleaning by unscrewing the jam-nut. The cleaning needle may be unscrewed and replaced also. The wire gauze can be unrolled and cleaned also.

5. The fuel capacity is sufficient for 50 minutes of operation. If it rests on a flat surface, it cannot be over filled.

6. The pump leather is kept soft by an occasional drop of oil into the pump barrel.

7. For long storage, remove the burner and valve and pour the contents thru the valve opening.

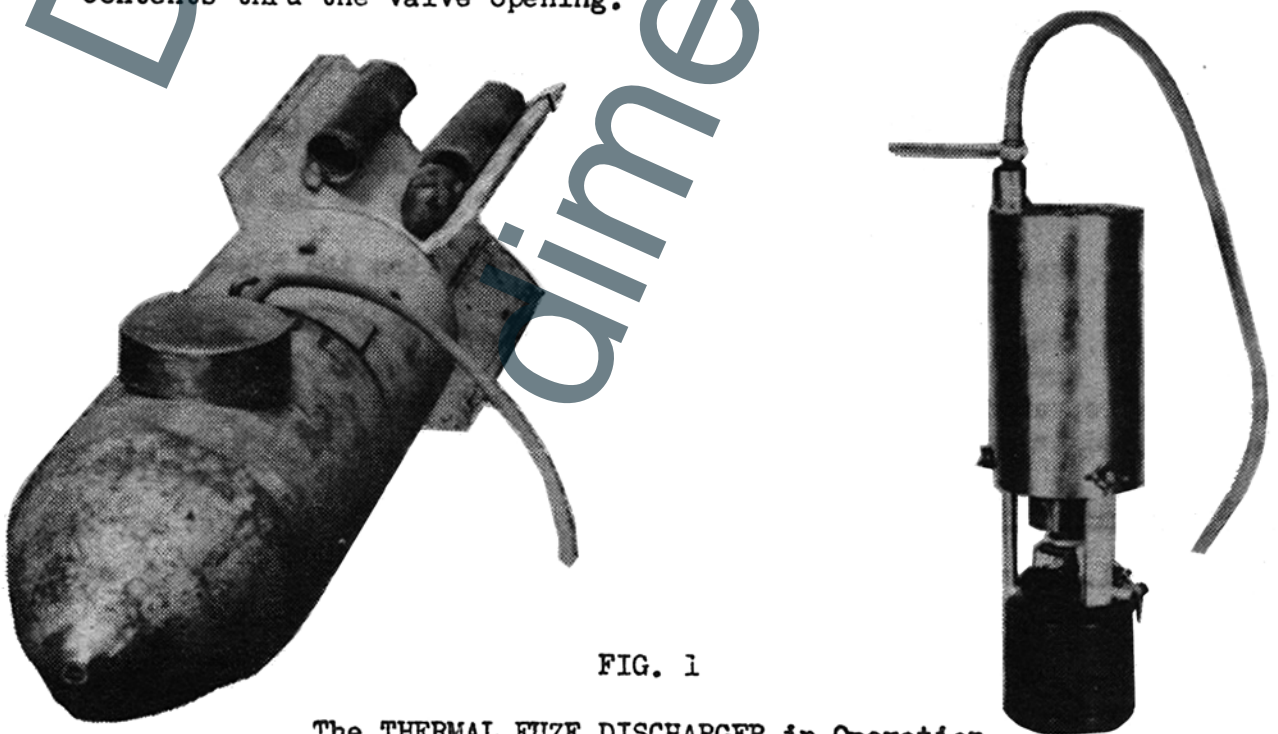


FIG. 1

The THERMAL FUZE DISCHARGER in Operation.

DISPOSAL INSTRUCTIONS	FILE NO.: 112.10
USE OF EQUIPMENT	

T-12/M-1 DE-ARMER FOR THE JAPANESE FUZE C-3(a)

THEORY:

If the brass arming spindle on the Japanese C-3(a) fuze is pushed into the fuze after it has been armed, and started to function, the two spring-loaded plungers holding the inertia weight and the two detents holding the arming assembly are sheared, and both the inertia weight and the arming assembly are pushed toward the base of the fuze. This action moves the firing pin out of line with the primer.

The operation as described above is done remotely by shooting a steel plug into the nose of the fuze. This action is so rapid that even though the fuze is in a sensitive condition, the striker will not release quickly enough to pierce the primer before it is out of line.

DESCRIPTION:

The de-armer consists of a barrel, a large cap which acts as a breech block, and a steel slug. The chamber of the barrel will receive a .30 caliber cartridge, M-2, without the slug. The cap screws over the end of the barrel, holding the cartridge in the chamber. A hole is drilled in the side of the cap to receive a No. 8 non-electric cap, or a No. 8 Engineer special cap. A larger hole will take the No. 8 standard blasting cap. Two sizes of plugs are furnished. The ends are different: One is almost equal in diameter to the arming spindle, and the other size is smaller - for use in the event that the opening in the nose of the fuze was damaged on impact. A steel rod is provided to push out the expended cartridge. (M-1 or M-2 cartridge can be used.)

OPERATION:

1. Remove the slug from a cartridge, ball, caliber .30, and plug the open end of the case with a piece of paper or cardboard. (Several may be prepared in advance by using paraffin or wax to keep out the moisture.) Cartridge, blank, caliber .30 cannot be used. A rifle grenade cartridge is a second choice.
2. Insert the blank in the chamber and screw on the cap.
3. Insert one of the slugs in the barrel with the smaller end out.
4. Insert a No. 8 blasting cap in the proper hole and tape or bind it in position. Do not block the open end of the cap, or a misfire will occur.
5. Remove the protecting cap from the fuze if one is present. (The presence of a cover cap does not indicate an unarmed fuze since the cap is easily replaced after the fuze is set in the bomb.)
6. Place the de-armer against the fuze with the end of the slug against the brass arming spindle. Use dirt and mud to hold the de-armer in place. Do not attempt to fasten securely to the bomb.
7. Withdraw to a position of safety and fire the blasting cap.
8. The fuze is safe if the brass arming spindle has been pushed in for at least 0.5 inches. If it is not safe, the operation should be repeated. The slug can be removed and used again. The bomb can be moved in safety by exercising reasonable care in moving.

CARE AND MAINTENANCE:

1. Keep the assembly well oiled.

(Continued on the following page.)

T-12/M-1 DE-ARMER FOR THE JAPANESE FUZE C-3(a) (Continued)CARE AND MAINTENANCE:

2. Repeated firings will cause the open end of the cap to become disfigured and pitted. This does not affect its operation.

3. Additional plugs can be made in the field. Those furnished are of hardened steel (Rockwell (C 60)).

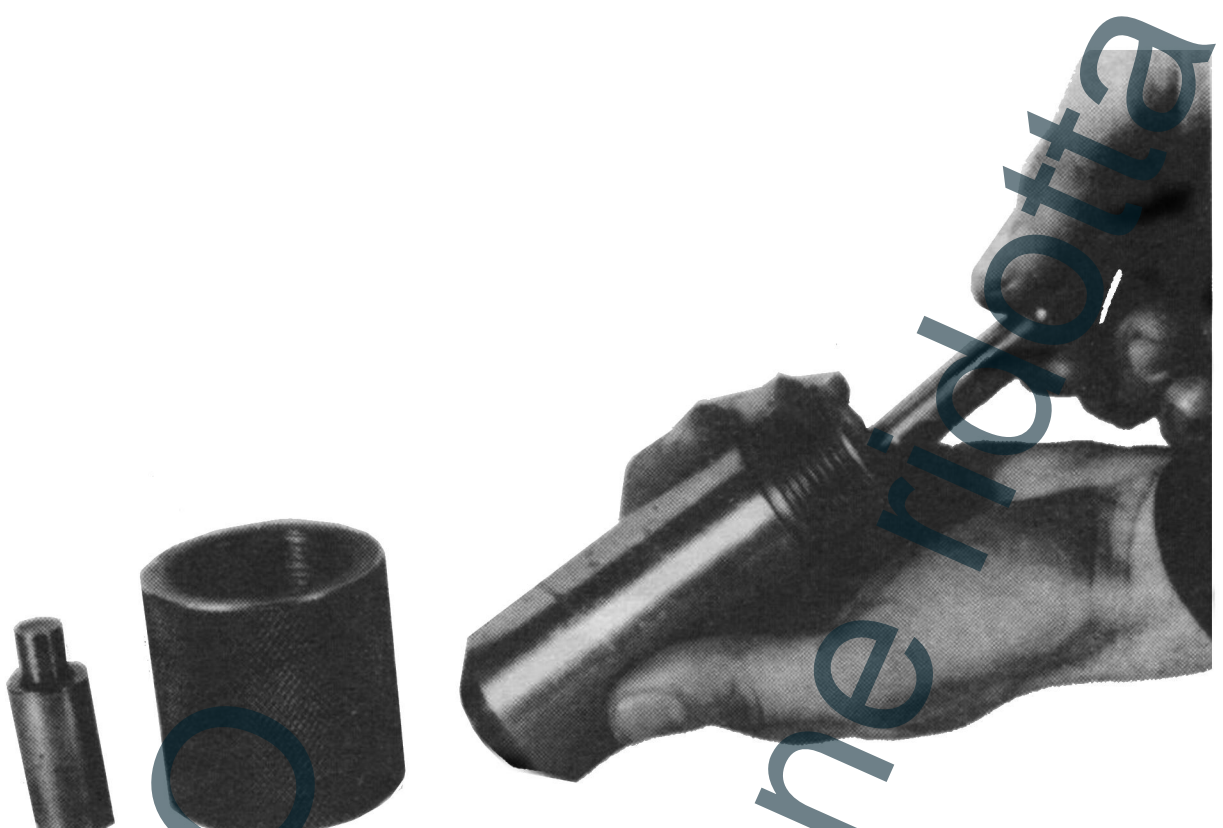


FIG. 1
Inserting the blank in the chamber.



FIG. 2
Screwing on the cap.

T-12/M-1 DE-ARMER FOR THE JAPANESE FUZE C-3(a)

FIG. 3

Inserting the slug in the barrel.

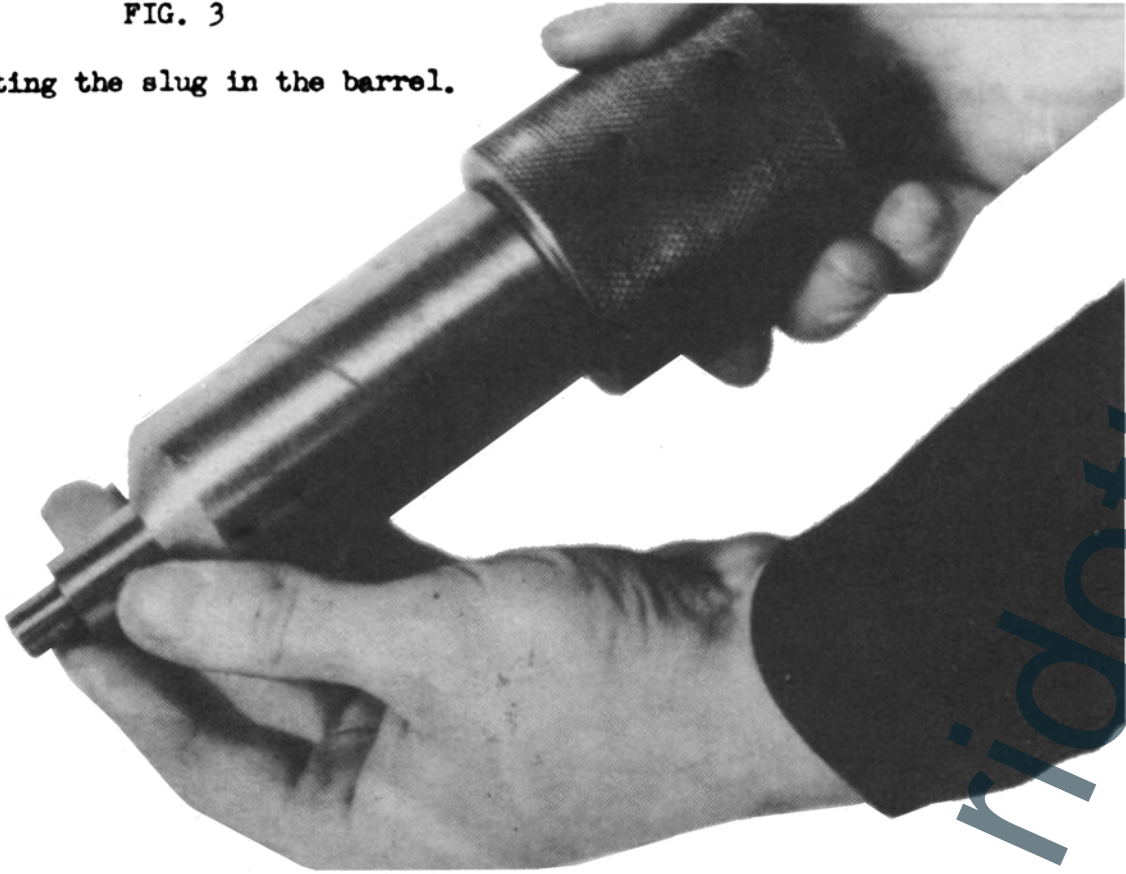


FIG. 4

Tying the No. 8 Blasting Cap in the hole.

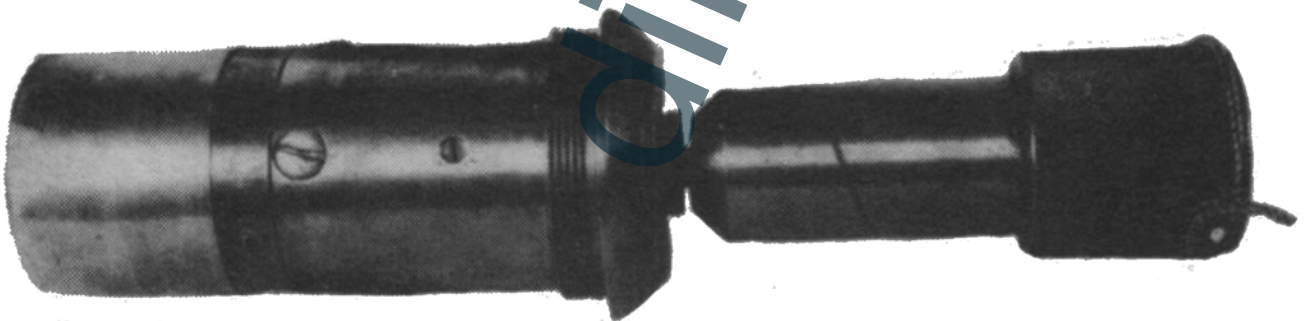


FIG. 5

Placing the De-Armer against the fuze.

USE OF EQUIPMENT

PALNUT LOCK NUT BREAKER T-19/M-1THEORY:

A new lock nut of the "Palnut" type is being used on the M123, 4, 5 fuzes and on the M132, 3, 4 fuzes. In the drilling procedure for the M123, 4, 5 fuzes it is necessary to back off the lock nut and remove it by breaking. In the drilling procedure for the M132, 3, 4 fuzes the lock nut is not removed. It should be left tight.

DESCRIPTION:

The Palnut Lock Nut Breaker is a combination of the "Palnut" type wrench issued with each box of fuzes and the breaker which is welded to the wrench handle. A drawing of the breaker and the complete tool are shown on next page.

OPERATION:

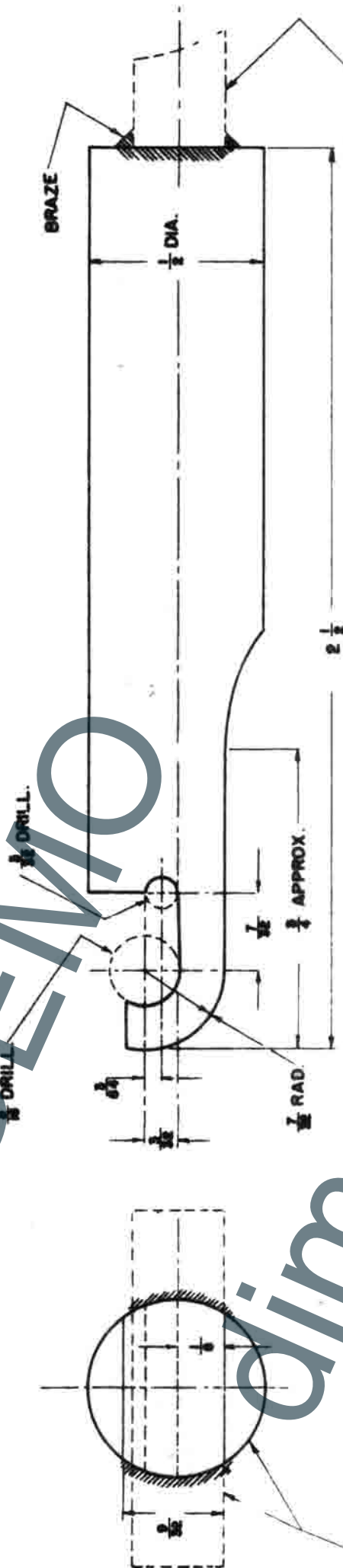
1. The use of the "Palnut" type wrench is obvious. The lock nut of an M123, 4, 5 type fuze is loosened by using the "Palnut" wrench in conjunction with a large crescent wrench which engages the two (2) flats of the adapter at the rear of the fuze. A Stillson wrench may be substituted for the crescent wrench. Apply the force by squeezing together the handles of the two (2) wrenches. Do not allow the fuze itself to be unscrewed at all by this procedure.
2. Back off the lock nut as far as possible.
3. Apply the breaker to the lock nut between two (2) studs then slip it around until it is located over one of the studs. Break the lock nut by bending out away from the fuze. The breaker is then applied on the castle at 180° and the lock nut will come off.

NOTE: If the fuze is in a recessed base plate the breaker is applied as usual. Pull out until the base plate is hit then use a back and forth motion in a plane tangent to the lock nut.



Fig. 1 PALNUT LOCK NUT BREAKER T-19/M-1

PALNUT LOCK NUT BREAKER T-19/M-1



PAL-NUT WRENCH
USED ON LOCKING RING
FOR 123 AND 132 SERIES
TAIL FUZES.

MAT'L: DRILL ROD.
ONE RECD.

NOTE:
HEAT TO BRIGHT CHERRY.
QUENCH IN OIL.
BRIGHTEN SURFACE.
DRAW TO FULL BLUE.

WRENCH AND BREAKER
ORIENTED AS SHOWN.

LOCKING RING BREAKER T-19/M-1

DEMO

dimensione ridotta

CLAMP ASSEMBLY T-22/M-1REVERSE ELECTROPLATING PROCESS TO REMOVE METALTHEORY:

The common type of electroplating used as a protective coating on plated silverware and the cadmium plate on many fuze parts is accomplished by dipping the part in a special solution while passing a direct current from a battery through the part, through the solution, to another plate usually of the metal being plated on the part, and then back to the battery. If the battery connections are reversed then the plate is removed from the part. It is this reverse effect which is to be used.

Usually in electroplating the composition of the solution is very important. However, in the reverse process this is not true. The solution is most easily made by adding table salt to water until a layer of salt remains in the container and will not dissolve after a minute of stirring. Pour off and use the liquid, leaving the crystals of salt behind.

Etching with nitric acid is not considered practical for a depth of .040 inches.

DESCRIPTION:

The equipment necessary for the job consists of a transfer cylinder, a hypo needle, a storage battery, and wire, preferably the size of the Engineer's Demolition Reel. The salt water can be mixed in a canteen cup. A small clamp to hold the etching electrode can be made from the drawing below. This will minimize fatigue.

OPERATION:

1. Mix a strong solution of salt water. (About 2 canteen cups.)
2. Attach the Hypo Needle to the transfer cylinder.
3. Using 6 ft. wire leads attach the negative pole of the battery to the transfer cylinder.
4. Attach the positive pole of the battery to the bomb or to the fuze. Good contacts are necessary. Do not allow transfer cylinder to touch bomb at this point or battery will be short circuited.
5. Pour salt water into transfer cylinder and direct the stream on the spot where the hole is to be cut. No pressure is applied. The top end cap and locking of transfer cylinder are not needed. Hold the Hypo Needle about 1/64 inch away from the fuze. Add salt water as needed. Do not re-use it. The etched crater should be formed in 10-15 minutes.

NOTE: If the needle touches the fuze a short circuit will result, this does no harm. It will be noted that the bubbles stop. Move the transfer cylinder back slightly until strong bubbling occurs.

NOTE: If the clamp is used make all electric connections, then fill transfer cylinder. Adjust electrode so it is about 1/32 inch from touching the fuze.

USE OF EQUIPMENT

CLAMP ASSEMBLY T-22/M-1



Fig. 1 POURING SOLUTION INTO TRANSFER CYLINDER



Fig. 2 REVERSE PLATING ON A Mk 237 FUZE

CLAMP ASSEMBLY T-22/M-1

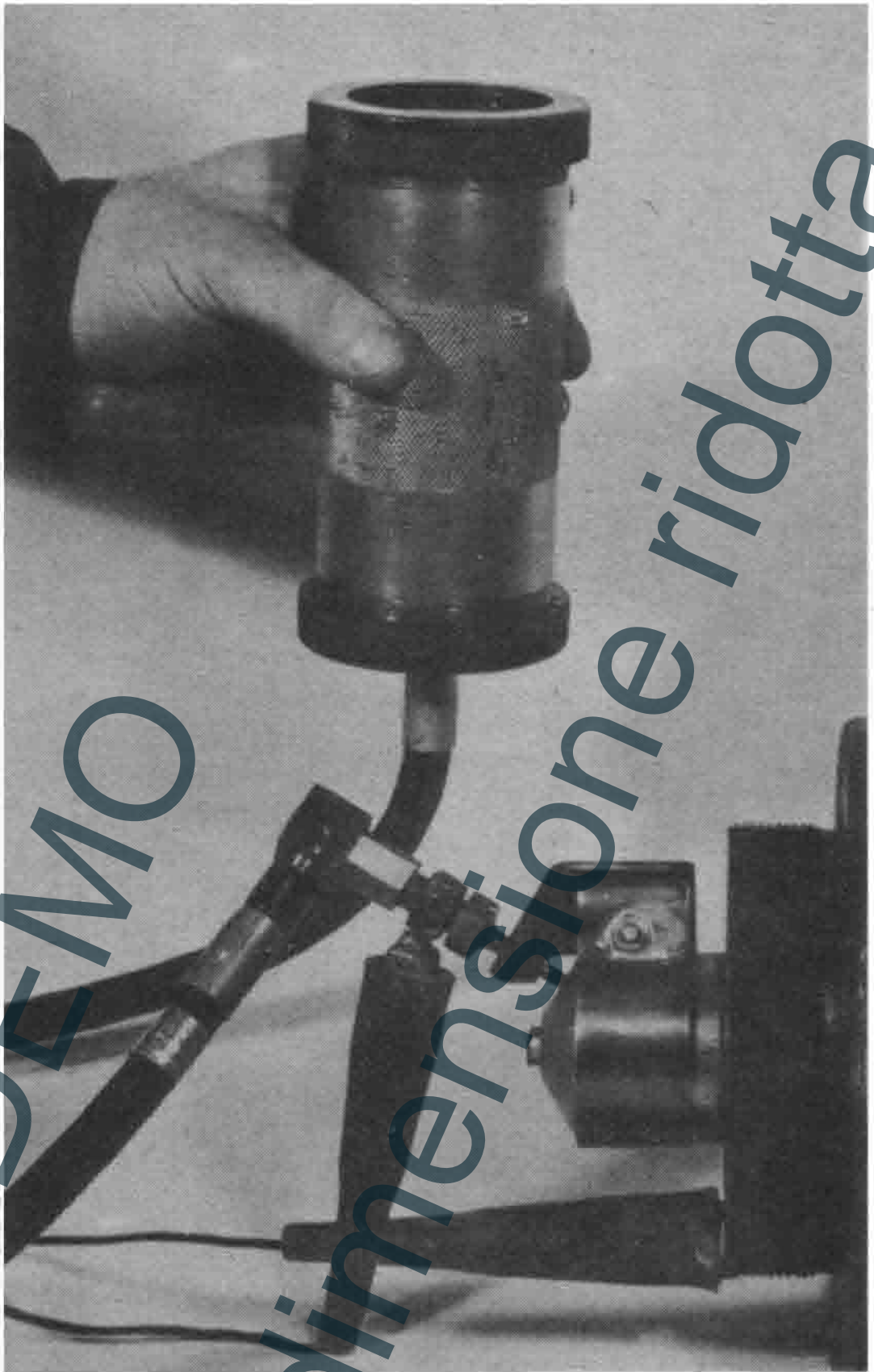


Fig. 3 REVERSE PLATING WITH CLAMP AND ELECTRODE

USE OF EQUIPMENT

DRILL JIG A-28/M-1



Fig. 1 DRILL JIG A-28/M-1 WITH DRILLS A-31/M-1 AND PINS

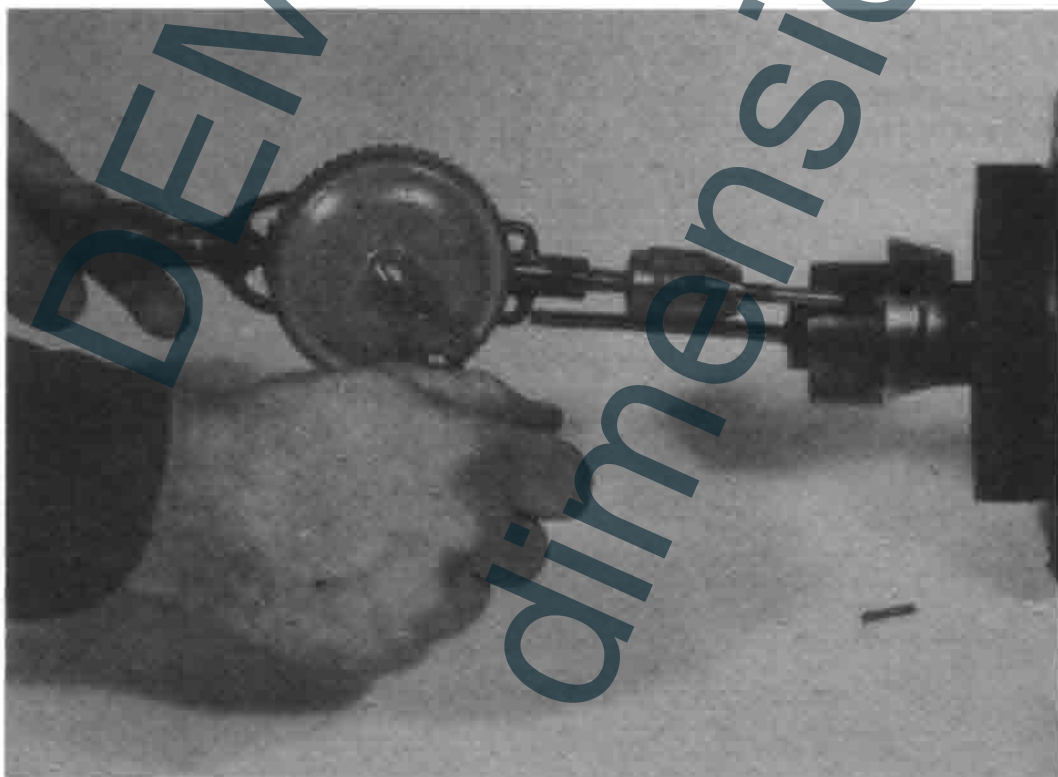


Fig. 2 DRILLING M123 SERIES FUZE

USE OF EQUIPMENT

DRILL JIG A-29/M-1THEORY:

The M132, 133, 134 fuzes can be handled more conveniently by drilling and pinning than any other known method. In the pin method four (4) accurate holes are drilled into the fuze to enter the thread which holds the fuze head to the fuze body. 1/8 inch diameter pins 1-1/4 inches long are pushed in the drilled holes. With the pins in position the fuze can then be removed with the Impact Wrench (T-10/M-2 or T-14/M-1) causing the ball to machine away the eccentric groove.

DESCRIPTION:

Drill Jig A-29/M1 locates on the shoulder of the head of the fuze. A case hardened screw is turned in to tighten the jig on to the fuze. The 3/16 inch milled slots are simply for chip clearance. The A-31/M1 Drill penetrates the fuze to the proper depth when the drill shank hits the bottom of the 3/8 inch milled slot.



FIG. 1 DRILL JIG A-29/M1 WITH DRILLS A-31/M1

OPERATION:

1. The lock nut is left in position throughout this procedure. Position the jig on the fuze and tighten the case hardened screw.
 2. Drill into the fuze through first one hole then the other until the drill shank contacts the jig.
- NOTE: During the entire drilling operation the drill must frequently be removed to clear the chips to prevent drill breakage.
3. Remove all chips from the holes. Remove the jig.
 4. Push a 1-1/4 inch pin in each of the two (2) holes as far as possible.
 5. Re-apply the jig at 90° to the first position. Drill two (2) more holes.
 6. Remove the jig and push 1-1/4 inch pins into these holes as far as possible.
 7. Leaving the lock nut in position apply the Impact Wrench (T-10/M-2 or T-14/M1) as indicated in File No. 110.20 or (114.10) and remove the fuze by remote control. It will probably require 20 - 50 impacts to remove the fuze.

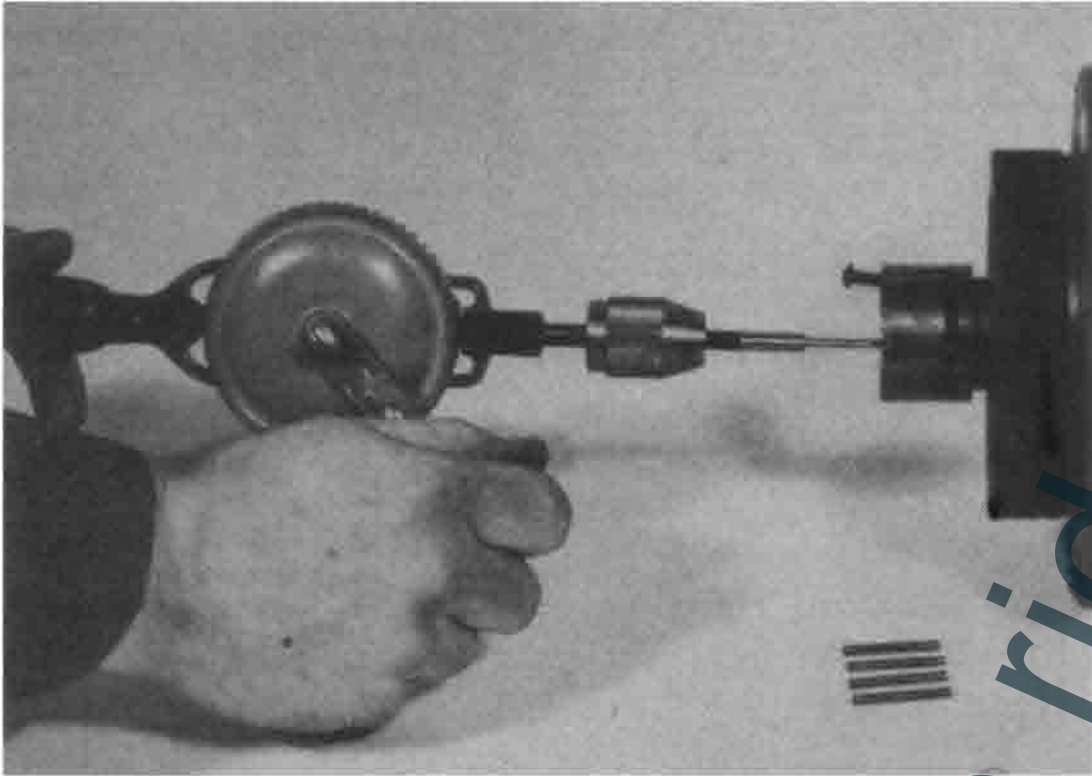
DRILL JIG A-29/M-1 (Continued)

FIG. 2 DRILLING M132 SERIES FUZES

CARE AND MAINTENANCE:

I. Drill, Jig, A-29/M1

1. Keep parts clean and well oiled.
2. Jig must not be distorted, store in a proper place.

II. Drill, A-31/M1

1. Drills must be kept sharp and ready for use.
2. If drill is resharpened the shank must be filed or turned back an equal amount to maintain the 2-1/2 inches dimension.
3. Keep drills well oiled.
4. If new drills are made up the silver soldered joint must be allowed to cool very slowly in air.

DISPOSAL INSTRUCTIONS	FILE NO.: 301.20
USE OF EQUIPMENT	

LIQUID TESTER I-1/M-2

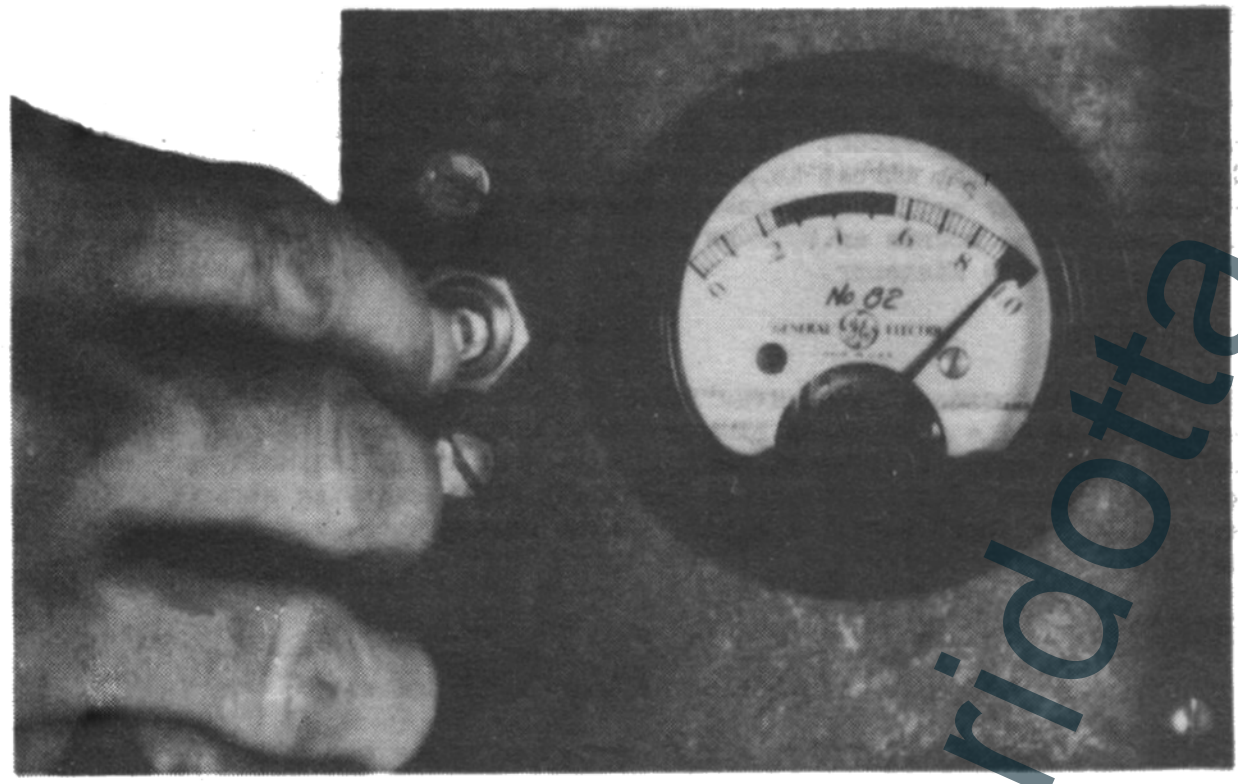


FIG. 1

Testing the equipment.



FIG. 2

Testing the liquid.

ELECTRICAL STETHESCOPE I-2/M-2THEORY:

A means of listening for a ticking clock in a German 17 type fuze from a safe distance is provided by the Electrical Stethoscope. It will detect the ticking clock; in addition, it can be held in front of the lips or against the throat in a one-way conversation between the Bomb Disposal Officer and the listener. The amplifier is designed to receive low amplitude sounds as well as high amplitude sounds without shock or confusion to the listener.

DESCRIPTION:

The stethoscope apparatus is contained in a single carrying case and consists of a microphone pick-up with a built-in magnet for attachment to the bomb, a 500 foot reel of wire, an amplifier unit, and earphones. Among the accessories are included a carrying strap for the amplifier, a short cord, a crank, extra radio tube, and an extra "B" battery.

OPERATION:

1. Attach the microphone to the end of the wire.
2. Attach the other end of the wire to the amplifier.
3. Plug in the head phones. When using the short cable, remove the amplifier unit from the case and sling it from the carrying straps.
4. Place the microphone to the bomb body as close as possible to the fuze. The magnet should make good contact with the bomb body in order to pick up the ticking of the clock. (The microphone can also be attached to a probe which is in good contact with the bomb.) Listen for the ticking of the clock.

CARE AND MAINTENANCE:

1. The stethoscope is a delicate instrument and should be handled with care.
2. To replace the batteries, remove the two screws in the bottom of the amplifier unit. The amplifier chassis is attached to the cover of the box. Then remove the box cover. Remove the copper plate to release the flashlight cells and the "B" battery. Always replace the "A" flashlight cells in groups of four.
3. A qualified radio man or electrician can make minor repairs to the unit, if necessary, with the aid of the diagram in the top of the carrying case.
4. When the earphone jack is pulled out, and the volume control is "OFF", the batteries are cut off from the amplifier. However, since the tube filament circuit goes through both switches, the stethoscope is temporarily turned off by either pulling the phone jack or turning the volume control switch off. The contact on the end of the reel should be kept clean.
5. In packing, place the earphones between the reel and amplifier with the ear phones toward the amplifier.

ELECTRICAL STETHESCOPE I-2/M-2

FIG. 1

- (a) Microphone attached to the Reel of wire.
- (b) The other end of the wire attached to the Amplifier.
- (c) Headphones plugged in.