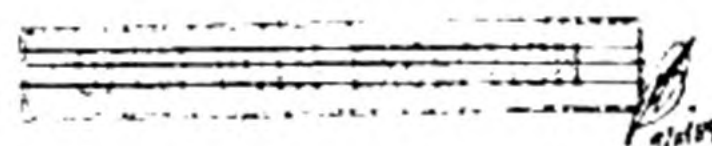


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SPECIAL OPERATIONS - AUSTRALIA

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VOL. 4

TRAINING SYLLABI

CONFIDENTIAL
PART 9

SRD STANDARD EQUIPMENT TABLES.
SRD TECHNICAL HANDBOOK.

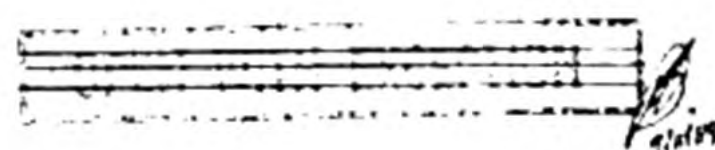
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VOL. 4

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PART 9

SRD STANDARD EQUIPMENT TABLES.
SRD TECHNICAL HANDBOOK.

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MELBOURNE,

8 Mar 46.

The Official History of the Operations and
Administration of 'Special Operations Aust-
ralia' (SOA) conducted under the cover-name
of 'Services Reconnaissance Department'.

VOLUME IV

TRAINING SYLLABI

PART IX

By Order of the C-in-C, Australian Military Forces,

C. J. Jones
Lt-Col.

Chief of Staff,

Services Reconnaissance Department.

DISTRIBUTION:

Copy No. 1: HQ AMF, Melbourne - for DMI.

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STANDARD EQUIPMENT TABLES

AMENDMENTS

Amendment No.	Reference	Date forwarded	Date Copies Amended
1.	T26/G1(c)/45	31 Jan 45	15 Feb 45
2.	T119/G1(c)/45	2 Mar 45	2 Mar 45
3.	T291/G1(c)/45.	24 Apr 45.	" May 45.
4.	T307/G1(c)/45.	30	
5.			
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TOP SECRET.

S.R.D. TECHNIC I
HANDBOOK.

Volume I, Sections I - V.

Prepared by
D/Tech (Aust).

February, 1955.

C O N T E N T S

VOLUME I.

- SECTION I - Initiating and Booby Trap Mechanisms.
- SECTION II - Delay Action Mechanisms.
- SECTION III - Prepared Charges.
- SECTION IV - Accessories for use with Prepared Charges.
- SECTION V - Incendiary Stores.

VOLUME II.

- SECTION VI - Arms and Equipment.
 - SECTION VII - Small Boats and Equipment.
 - SECTION VIII - Special Equipment.
 - SECTION IX - Tools and Sundries.
-

I N T R O D U C T I O N

1. This handbook contains descriptive literature on the majority of technical stores used by S.R.D. It has been produced mainly for use by technical officers at forward bases, but the information it contains will be of more general interest.
2. Where possible, the source and date of the information given has been quoted. Much of it has been abstracted from 'Descriptive Catalogue of Special Devices and Supplies' compiled and issued by M.O.2 (S.P.) The War Office. In some cases it has been augmented by additions from filed reports, Technical Reviews, etc., and additional information on items not dealt with in that catalogue has been included.
3. The drawings are only intended to illustrate the general functioning of the particular store and for purposes of recognition. They should not be regarded as accurate machine drawings.
4. Amendments and new matter will be issued, where necessary, on separate sheets of paper which can be fitted into the handbook in the correct position.
5. Suggestions for improvement, addition of further information, etc. should be submitted to D/Tech (Aust) at S.R.D. H.Q.

DEMOLITION EQUIPMENT.

SECTION 1.

INITIATING AND BOOBY TRAP MECHANISMS.

Matches, Fuze, Non-flaming (Fuze Matches).

Boards, Striker.

Igniters, Safety Fuze, Copper Tube.

Caps, Percussion (with Holders and Spring Snouts).

Switch No. 4 (Type 6 Pull Switch).

Switch No. 5 (Type 6 Pressure Switch).

Switch No. 6 (Type 6 Release Switch).

Switch No. 1 (M.D. 1 Pull Switch).

Switch No. 2 (M.D. 1 Pressure Switch).

Switch No. 3 (M.D. 1 Release Switch).

Wire, Trap . 014.

Wire, Trip . 032

Igniters, Fuze, Fog Signal. Mk. 1A.

Switch No. 8, Anti-Personnel Mk. I (Pistols, Ground Spike).

Note on Burning Fuze used by S.R.D.

Note on Detonating Fuze used by S.R.D.

Note on Detonators used by S.R.D.

MATCHES, FUZEE, NON-FLAMING (FUZEE MATCHES)

The fuzees is a slow-burning, non-flaming match which can be struck on a normal safety matchbox or on a striker board. It is intended for direct ignition of safety fuze. The only precaution to be taken is to ensure that the fuzees are kept dry.

Catalogue No. F. 29.

Dimensions: $2\frac{1}{4}" \times 1\frac{7}{16}" \times \frac{3}{4}"$ Weight. $\frac{3}{8}$ oz.

Shipping Classification:

Generic Title	Fuzees, Safety
Label	E
Storage and Stowage	Dangerous Goods.

Packing and Special Notes:

Each matchbox containing 20 Fuzees is wrapped in cellophane.

100 Boxes are packed and hermetically sealed in each of the two tin liners of Case H.30, Mk.IE., which therefore holds 200 boxes in all.

Packed Dimensions:Weight Packed

Case H.30, Mk.IE, $16" \times 10\frac{1}{4}" \times 8\frac{1}{2}"$	20 lbs. approx.
--	-----------------

BOARDS, STRIKER.

The striker board is a piece of cardboard coated on both sides with safety match composition. It is intended to be used for striking fuze matches, copper tube igniters and match heads attached to incendiary stores. The striker boards must be kept dry.

Catalogue No. F. 48.

Dimensions: $3\frac{1}{4}" \times 1\frac{1}{2}" \times \frac{1}{8}"$

Weight 3 ozs. per dozen.

Packing and Special Notes:

6 Striker Boards wrapped in cellophane.
144 Striker Boards packed in hermetically sealed tin with tear-off strip.

Packed Dimensions:Weight Packed:

Tin $5" \times 3" \times 4"$

1.6 lbs. approx.

IGNITERS, SAFETY FUZE, COPPER TUBE (COPPER TUBE IGNITERS)

This consists of a small copper tube, open at one end and with a match head at the other. The tube can be crimped on to a length of safety fuze and ignited by a striker board or a safety matchbox. The copper tube igniter must be kept dry and can be waterproofed when crimped on to the safety fuze by use of tape, balloons, etc.

Catalogue No. F. 49.

Dimensions: $5/8$ " x $1/4$ " dia. Weight: 3 ozs for 25 wrapped.

Shipping Classification:

Generic Title	Igniters, Fuze.
Explosive Group	VI.
Storage and Stowage	I. O.A.S.

<u>Packing and Special Notes:</u>	<u>Dimensions:</u>	<u>Weight:</u>
25 Igniters per tin.	$2\frac{1}{2}$ " x $3/4$ ".	$1\frac{1}{2}$ ozs.

New Packing for a Small per cent:

10 Igniters in Detonator Magazine Mk.II 1 " x $2\frac{1}{8}$ " 1 oz.
200 or more magazines in Case, Wood, Packing or as required.

CAPS, PERCUSSION (WITH HOLDERS AND SPRING SNOUTS).

This store consists of a threaded brass adaptor with a percussion cap securely held in one end and a spring snout attached to the other. Safety or instantaneous (orange) fuze, or a detonator can be inserted into the spring snout and are ignited or fired by the detonation of the percussion cap. The device can be used in conjunction with Switches Nos. 4, 5 and 6, etc.

The store may be found either loose (Fig. 1), or with a tubular rubber sleeve over the snout (Fig. 2), or in a waterproof sheath (Fig. 3). If necessary, it can be waterproofed by taping when in position on the Switch.

Catalogue No. F. 204.

Dimensions: $1\frac{3}{8}$ " long. Weight: 2 ozs. approx.

Shipping Classification:

Generic Title	Caps, Percussion with Spring Snouts.
Explosive Group	VI.
Storage and Stowage	I. O.A.S.

Packing and Special Notes:

For future deliveries each article will be sealed in a waterproof sheath.
70 articles so covered are packed in a tin box with taped lid.

<u>Packed Dimensions:</u>	<u>Weight Packed:</u>
$3\frac{5}{8}$ " x 4" x 2"	1 lb. 5 ozs.

CAPS, PERCUSSION

WITH HOLDERS AND
SPRING SNOUTS

Fig 1

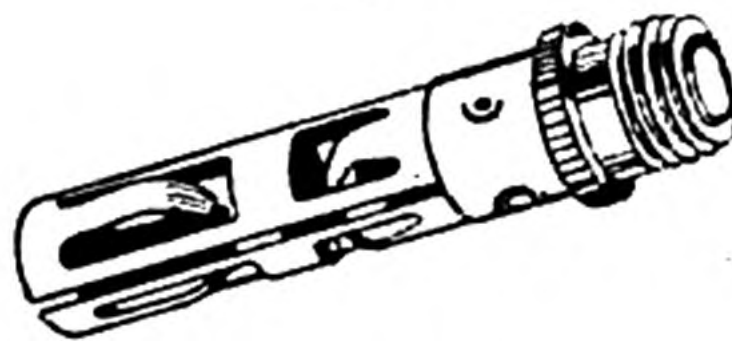
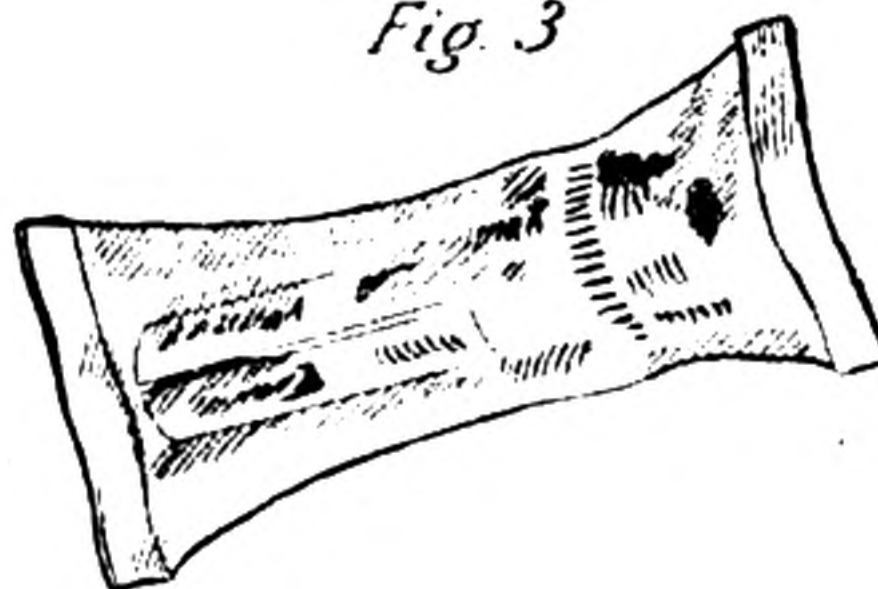


Fig. 2



Fig. 3



SWITCH NO. 4 (TYPE 6 PULL SWITCH)

I.3.

General Description:

This is a simple mechanism suitable for igniting safety fuze or instantaneous (orange) fuze, for firing a detonator, and also for use as a booby trap.

Detailed Description:

The switch consists of a cylindrical brass body threaded at one end to receive a percussion cap with spring snout attachment (A) into which the fuze or detonator may be fitted. At the other end there is a U-shaped clip (D) provided with jaws which embrace the ball-ended tail of a spring loaded striker (B) contained within the brass body. The jaws of the clip cannot open whilst positioned inside the tubular body.

In the safe position the striker is held in position with the spring only partially compressed by a safety pin (C). When this pin is withdrawn the striker is held only by the clip. A pull on the clip compresses the striker spring and when eventually the jaws emerge from the tubular body they open and release the striker. A pull of approximately 6 lbs or more is required, and can be applied manually or by means of a trip wire.

A mounting strip (E) is attached to the body of the switch so that the switch may be secured to some firm object.

Instructions for Re-Cocking:

If used without a detonator directly attached the switch may be used again after re-cocking. To do this unscrew the spring snout and with a pencil or rectifier, push back the striker as far as it will go. Using the safety pin as a tommy bar twist the striker rod until the safety pin hole is in line with the two slots in the body. Clip the shackle over the ball-end of the striker and allow the striker to come forward about $\frac{1}{4}$ ". Insert the safety pin and screw in a new percussion cap with spring snout.

Catalogue No. B.105.

Dimensions: $3\frac{7}{8}" \times \frac{7}{16}" \times \frac{1}{2}"$ dia. Weight: $1\frac{1}{4}$ ozs.

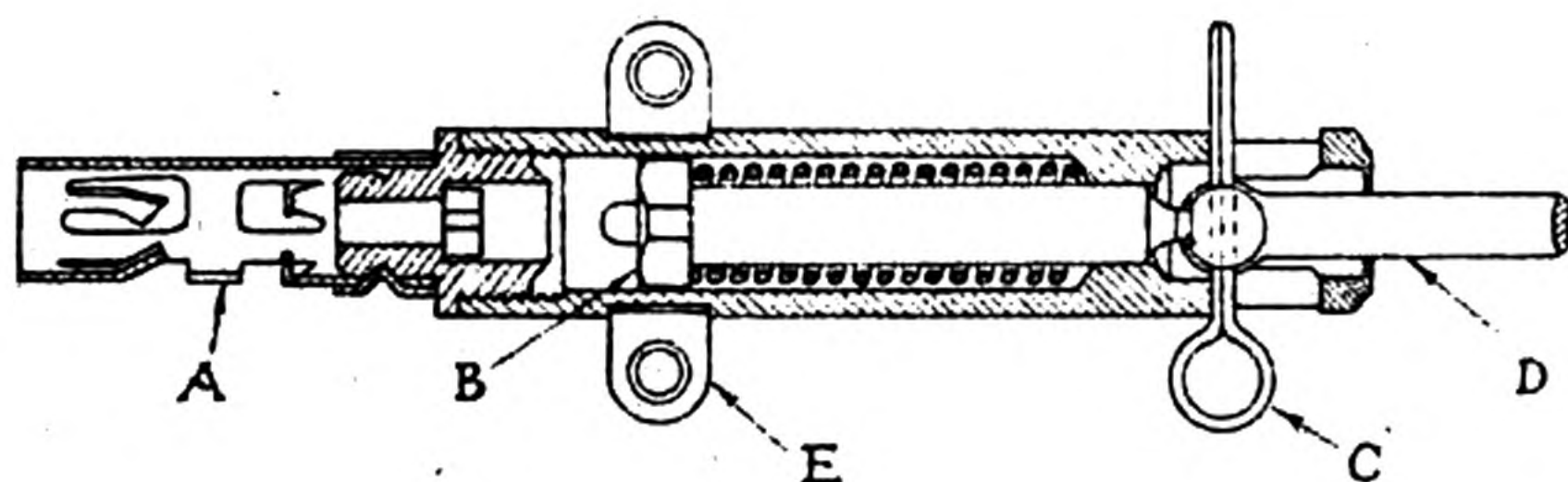
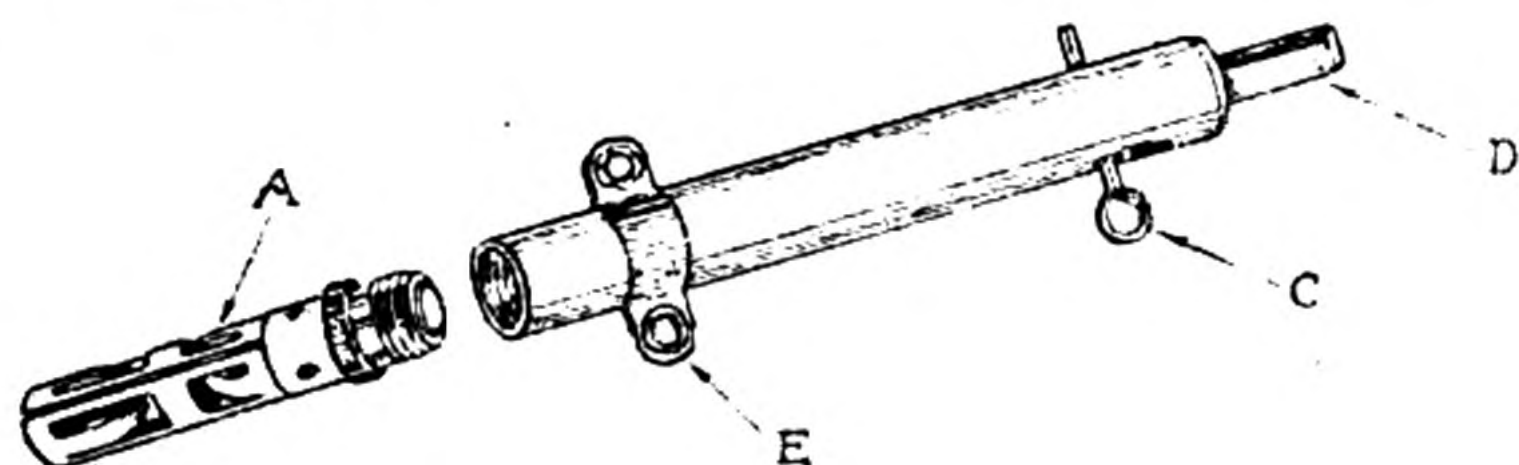
Shipping Classification:

Generic Title Igniters, Mechanism, Pull.
Explosive Group VI.
Storage and Stowage . I. O.A.S.

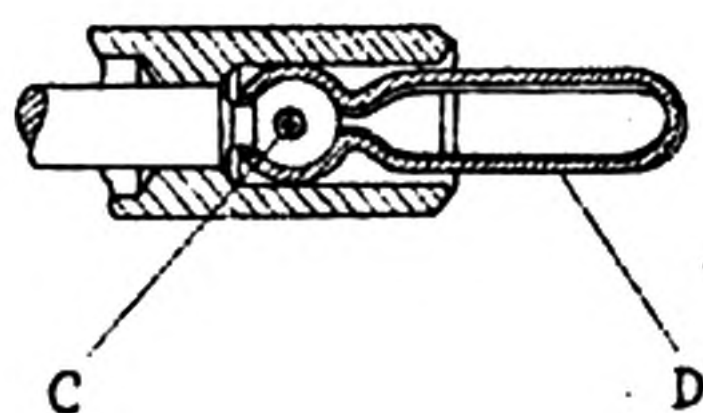
<u>Packing and Special Notes:</u>	<u>Dimensions:</u>	<u>Weight:</u>
2 Switches per carton	$3\frac{3}{4}" \times 2" \times \frac{5}{8}"$	3 ozs.
5 Cartons per tin	$3\frac{13}{16}" \times 3\frac{9}{16}" \times 2\frac{1}{16}"$	$1\frac{3}{4}$ lbs.
20 Tins per case	$20" \times 9\frac{1}{2}" \times 5\frac{3}{4}"$	33 lbs.

Source: E-in-C Tech. Instrn. No. 44 5th Nov. 1943
and filed reports.

Switch N° 4 Fig. 1



Switch N° 4 Fig. 2



General Description:

This is a simple mechanism in which application of pressure to the hinged lid of a flat oblong body releases a striker which fires a normal type percussion cap, hence igniting safety or instantaneous (orange) fuze or firing a detonator.

Detailed Description:

The switch consists of an oblong box shaped body (A) with a loosely fitting lid (B) hinged to it at one end. At the same end the body is holed and threaded to take a percussion cap with spring snout attachment (C). A tube passing down the centre of the box contains a spring loaded striker which is held in position with the spring under compression by a safety pin (D) and by a sear (E) which engages a detent (F) in the striker rod. When the safety pin is removed and the hinged lid depressed the sear is disengaged and the striker released.

The hinged lid is fitted centrally with an extension rod (G) in a socket (H). The length of this rod can be adjusted by screwing into or out of the socket.

The mechanism is designed to operate at a pressure of 45 lbs. applied to the extension rod, and a movement of about 20/1000 inch at this point; is necessary to disengage the sear. At the end of the lid, remote from the hinges, a pressure of about 21 lbs and a movement of about 40/1000 inch are necessary.

Notes on Use:

With or without the extension rod attachment, the switch can be used on many occasions as a booby trap. With the rod in position the switch can be placed beneath a railway line and will fire when a train passes over. In this case, since the rail deflection is quite small, the switch has to be set very carefully and best results are obtained if it is placed on a base-plate or firm ballast. The extension rod is screwed up until it is in firm contact with the underside of the rail.

Instructions for Re-Cocking:

Remove the spring snout and withdraw striker. Then re-insert the striker with the detent pointing downwards and push in the striker against the action of the spring until the sear engages with the detent. Insert the safety pin and screw in a new spring type adaptor.

Catalogue No. B.106.

Dimensions: $3\frac{7}{8}$ " long x $1\frac{5}{8}$ " x $\frac{3}{4}$ " diam. Weight: $5\frac{1}{2}$ ozs.
(with extension socket removed 2" across safety pin)

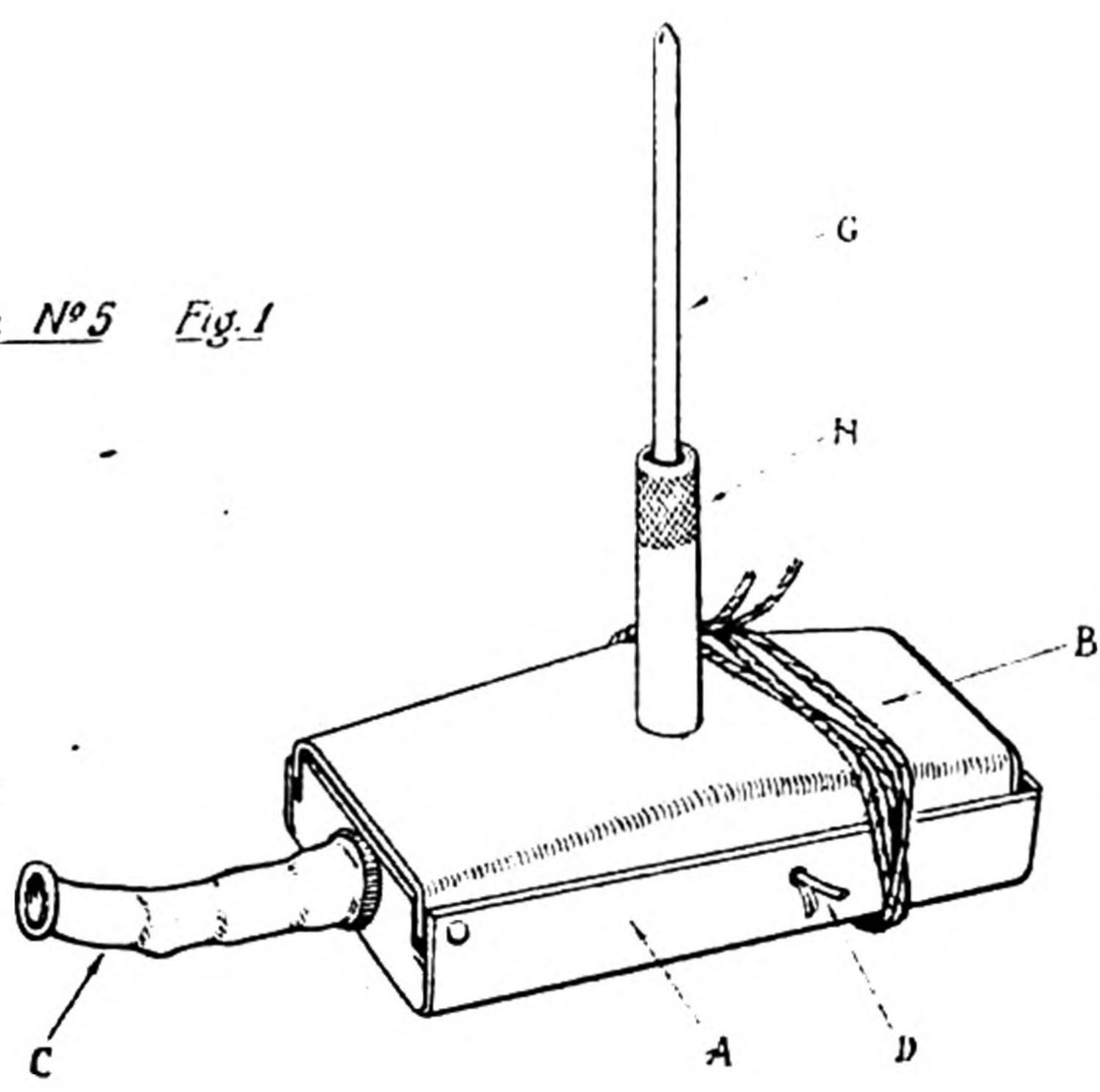
Shipping Classification:

Generic Title	Igniters, Mechanism, Pull.
Explosive Group	VI.
Storage and Stowage	I. O.A.S.

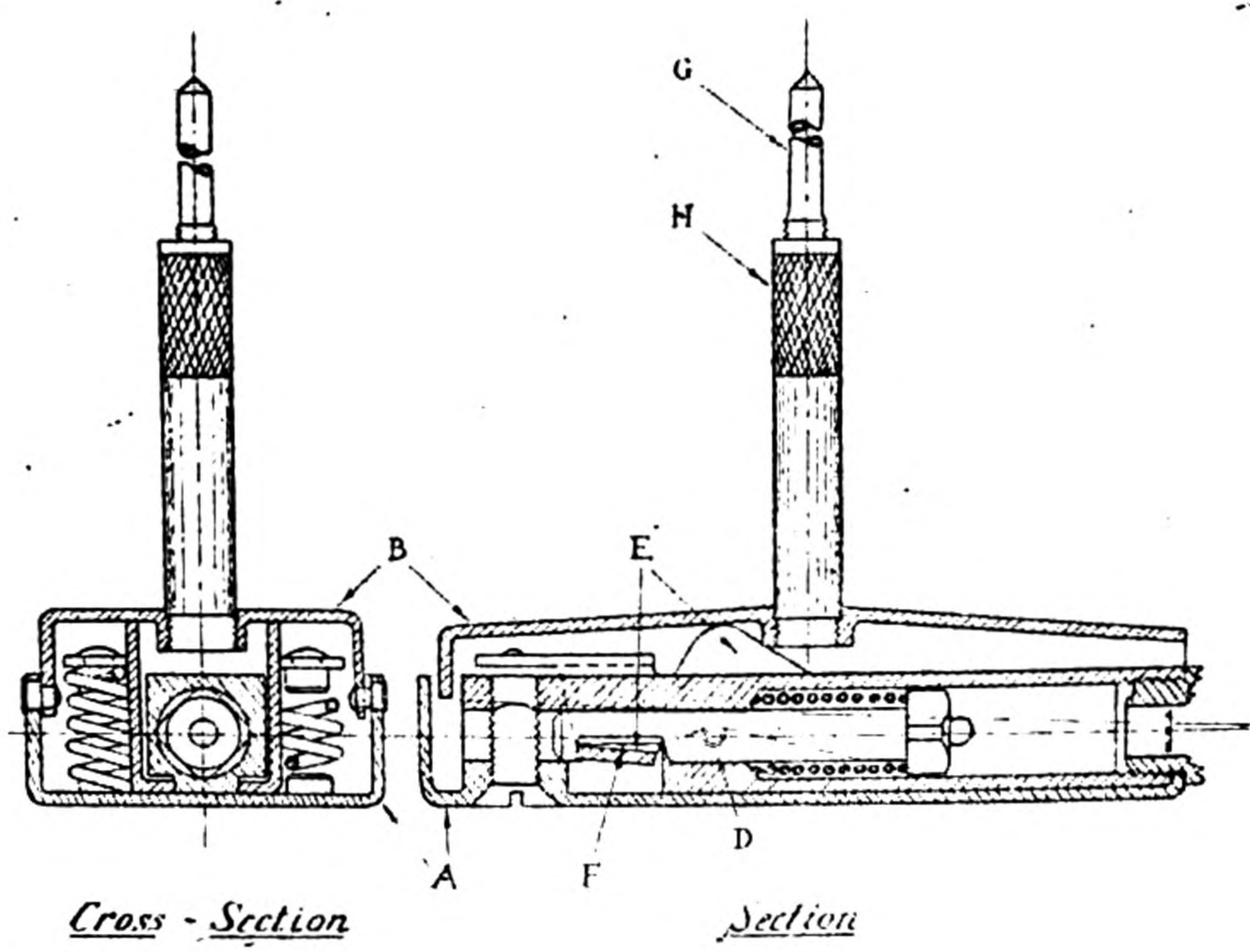
<u>Packing and Special Notes:</u>	<u>Dimensions:</u>	<u>Weight:</u>
2 Switches per carton	$3\frac{7}{8}$ " x $3\frac{3}{8}$ " x $1\frac{5}{8}$ "	12 ozs.
5 Cartons per tin	$5\frac{1}{8}$ " x $4\frac{1}{16}$ " x $3\frac{5}{8}$ "	4 lbs.
20 Tins per case	$22\frac{1}{2}$ " x $11\frac{1}{2}$ " x $8\frac{1}{4}$ "	84 lbs.

Source: E-in-C's Tech.Instrn.No.44 5th Nov.1943 and filed reports.

Switch N°5 Fig.1



Switch N°5 Fig.2



SWITCH NO. 6 (TYPE 6 RELEASE SWITCH).General Description:

This device is a small rectangular box with a lid formed into a flat tail at one end and hinged to the body of the box at the other. So long as the tail is held down the switch is safe but if the safety pin is removed and the tail released, the hinged cover rises and the switch fires. It is fitted with a percussion cap with spring snout and can hence be used to ignite safety or instantaneous (orange) fuze, or fire a detonator. It is intended for use in booby trap set-ups.

Detailed Description:

The case (A) of this switch has a lid (B) hinged at one end and, at the same end, it is holed and threaded to take a normal type percussion cap and holder (C). Inside the case there is a spring-loaded striker (D) held in position by a safety pin (E), and, when the lid is seated down on the case, by a sear (F) hinged at (G) and engaging a detent in the striker stem at (H).

With a weight of about 5 lbs. or more on the tail end of the lid the safety pin can be removed quite easily, and the striker is held back against the compressed spring only by the sear. If the load on the lid is removed the striker forces the sear upwards and goes forward on to the percussion cap.

Instructions for Re-Cocking:

Unscrew the adaptor and withdraw the striker and spring. Open the lid and throw the sear over until the striker channel is clear. Reinsert spring and striker, detent uppermost. With a pencil or rod force the striker back until the safety pin can be inserted. Throw the sear forward and close the lid of the switch. Screw in a new fuze adaptor with cap.

Catalogue No. B.107.

Weight: 3 ozs.

Dimensions: $4\frac{1}{2}$ " x $\frac{5}{8}$ " x $\frac{7}{16}$ " diam.

Shipping Classification:

Generic Title	Igniters, Mechanism, Release.
Explosive Group	VI.
Storage and Stowage	I. O.A.S.

Packing and Special Notes:

2 Switches per carton
5 Cartons per tin
10 Tins per case

Dimensions

$3\frac{3}{4}$ " x $2\frac{3}{8}$ " x $\frac{7}{8}$ "	6 ozs.
$4\frac{5}{16}$ " x $3\frac{15}{16}$ " x $2\frac{7}{16}$ "	$2\frac{1}{2}$ lbs
22" x $10\frac{1}{2}$ " x $6\frac{1}{4}$ "	60 lbs.

SWITCH NO. 6.

(TYPE 6 RELEASE SWITCH)

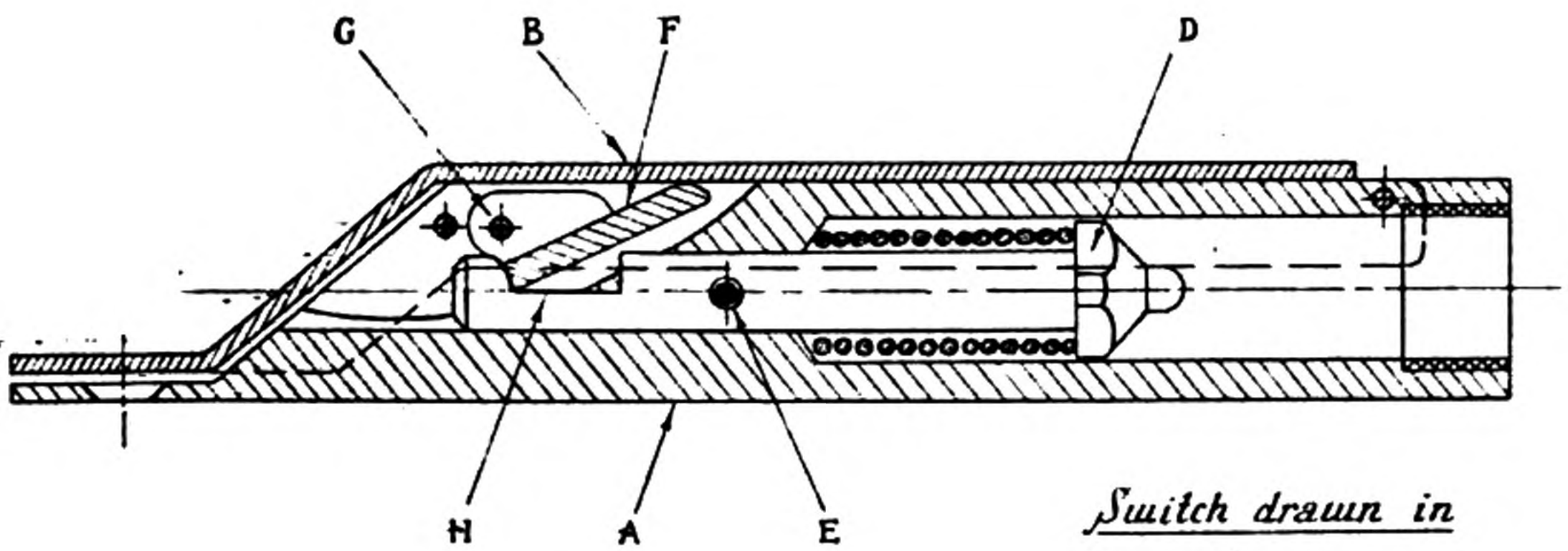
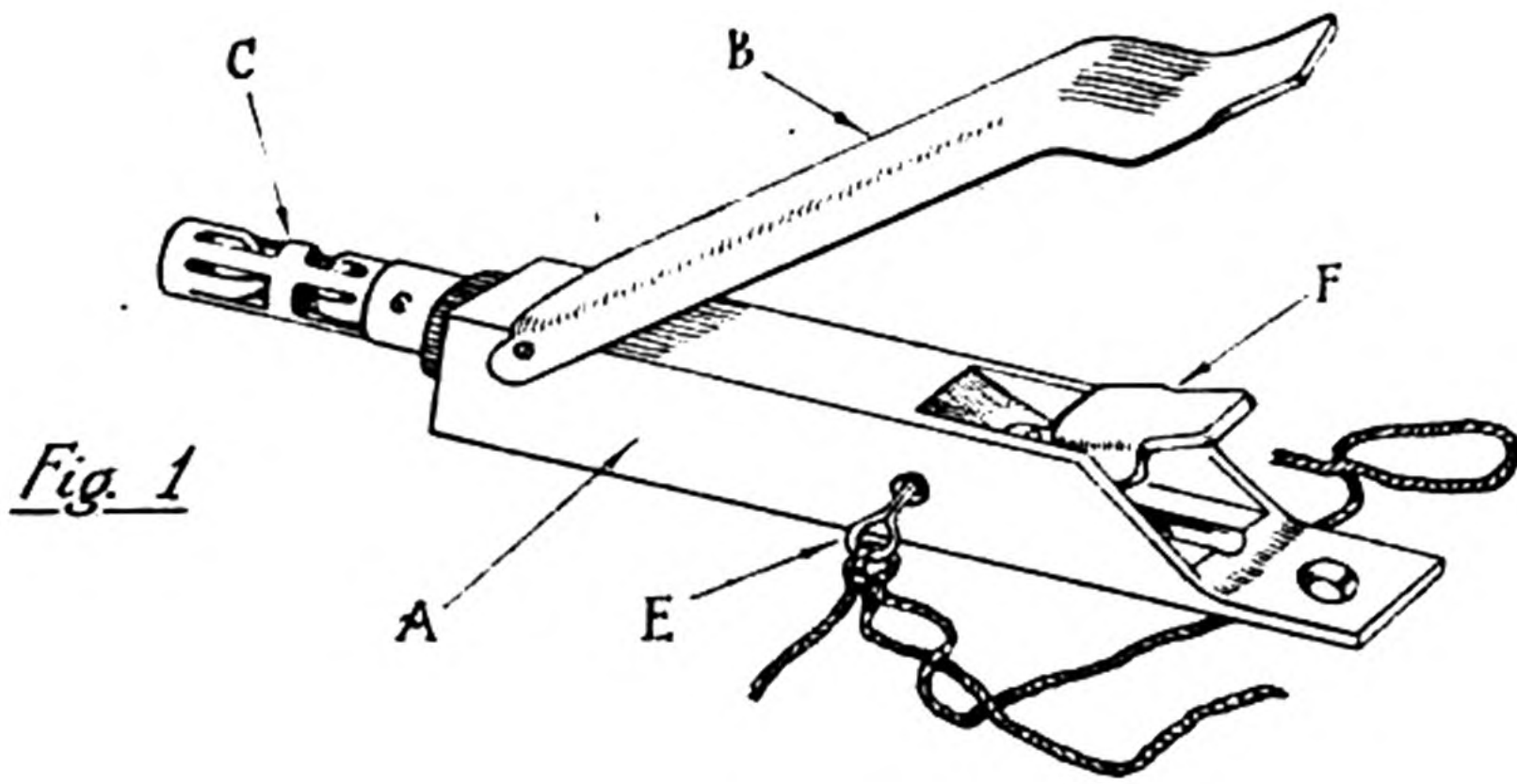
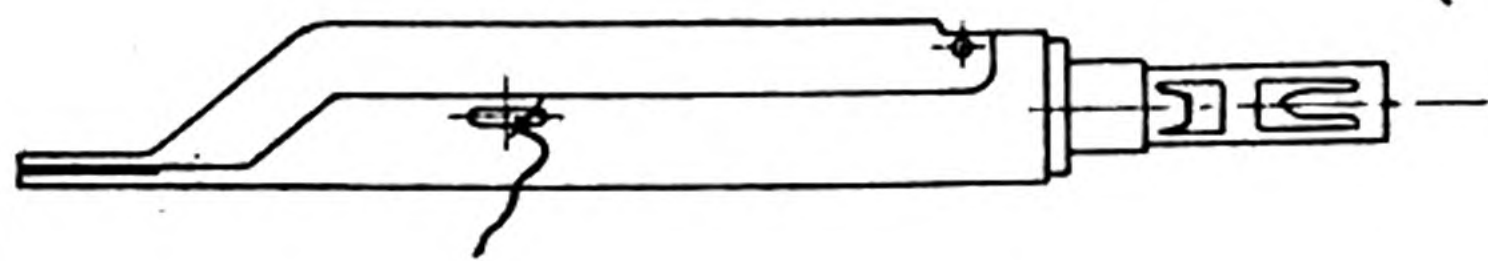


Fig. 2



Full Size View

SWITCH NO. 1, PULL Mk. I (F.D. 1 Pull Switch).General Description:

This is a pull switch very similar to the Switch No. 4 (Type 6 Pull Switch). No further orders are to be made for the Switch for S.R.D. work, but available stocks will be used up.

Detailed Description:

This switch is operated by a pull in the same direction as the axis of the mechanism.

It consists of a barrel (1), in which moves a striker block, with a tubular tail (2) split into four quadrants, on the end of each of which is a small lip. In the set position these quadrants are splayed outwards by the point of the firing pin (3), which is pressed forward by the retaining spring (4) in the top collar (5). The striker is then held up against the firing spring (6) by the lips on the tail engaging with a platform (7) in the head of the barrel. Screwed on to the bottom of the barrel by means of another collar is an adaptor with a percussion cap. The firing pin is provided with an oblong ring (8), and also with a safety pin (9) to prevent its moving. At the fuze adaptor end is an anchor plate (10) which enables the switch to be mounted in any convenient manner, thereby taking all strain off the fuze, etc., inserted in the adaptor.

When the firing pin is pulled outwards with a force of about 2 lb., the split tail of the striker contracts to normal, enabling the lips to pass through the platform in the head and the striker to be driven down to the cap by the firing spring. If the trap is properly set, the safety pin should be so loose that it can be pulled out very easily. It must not be removed if it is tight.

Dimensions: 4³/₄" x 5⁵/₈" diam.

Weight: 2³/₄ ozs.

Shipping Classification:

Explosive Group	VI.
Storage and Stowage	I. O.A.S.

Packing Details:

	<u>Dimensions</u>	<u>Weight</u>
10 per tin		
20 tins per wooden box (200 switches)	14" x 9" x 9"	52 lbs

Source: Field Engineering Pamphlet No. 9. 1943.

SWITCH NO. 2 PRESSURE, MK. I (M.D.I PRESSURE SWITCH).General Description:

This is a pressure switch very similar to the Switch No. 5 (type 6 Pressure Switch). No further orders are to be made for this switch for S.R.D. work but available stocks will be used up.

Detailed Description:

The press switch consists of the following parts:-

- The main casing and base plate (1).
- The striker rod, block and spring (2)
- The shear stud (3).
- Adaptor and collar (4).

The main casing and base plate are made of brass, and in the base there are small holes to facilitate attachment to any suitable surface and a larger one to take the shear stud during transit.

The striker rod is of hardened steel $1/3$ " in diameter, reduced to $1/16$ " under the shear stud, which will break it under a point load of 30 to 40 lb.

The metal shear stud is provided with a V-shaped cutting edge and shoulders to keep it in position on the striker rod.

The adaptor and collar are fitted with a service cap and designed to take either safety or instantaneous fuze.

As a safety precaution, the shear stud should always be carried in the base plate to avoid damage to the striker during transport, and should only be inserted over the striker when the mechanism is set.

When a load of 30 to 40 lb is applied to the top of the shear stud, the striker rod will be sheared, allowing the striker to be driven forward by the spring, and firing the cap and charge.

Dimensions: $4\frac{1}{8}$ " x $1\frac{1}{2}$ "

Weight: 5 ozs.

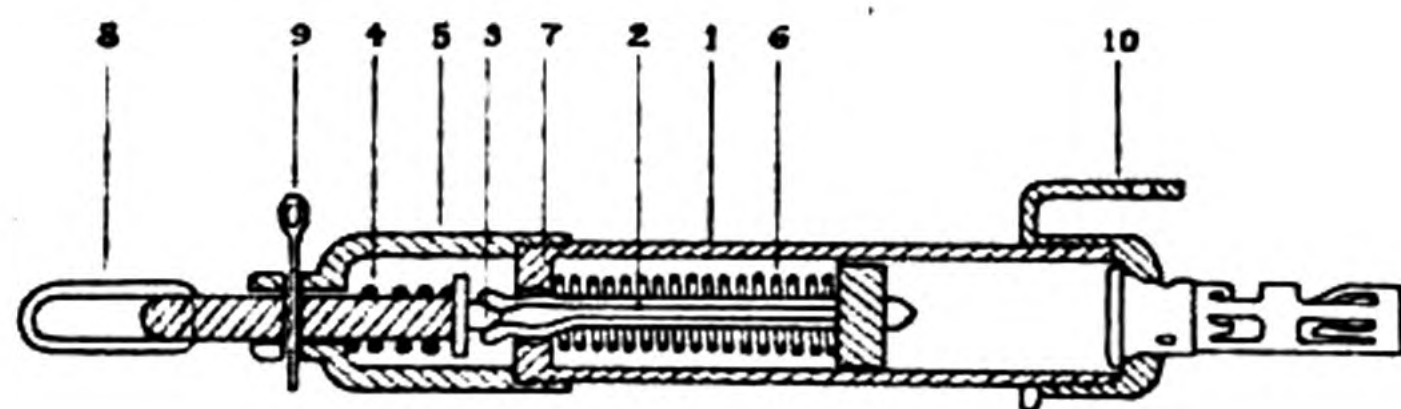
Shipping Classification:

Explosive Group VI.
Storage and Stowage ..I. O.A.S.

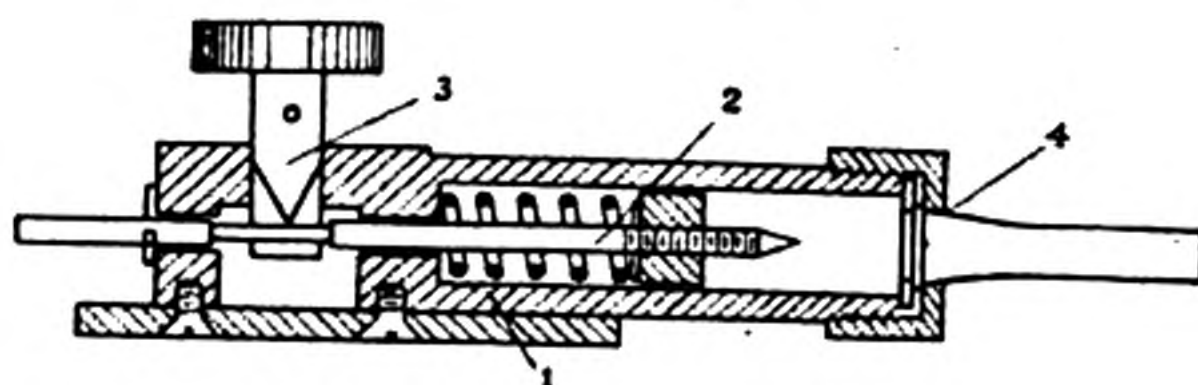
Packing Details:Dimensions:Weight:

10 per tin		
20 tins per wooden box (200 switches)	26" x $9\frac{1}{2}$ " x $8\frac{1}{2}$ "	92 lb.

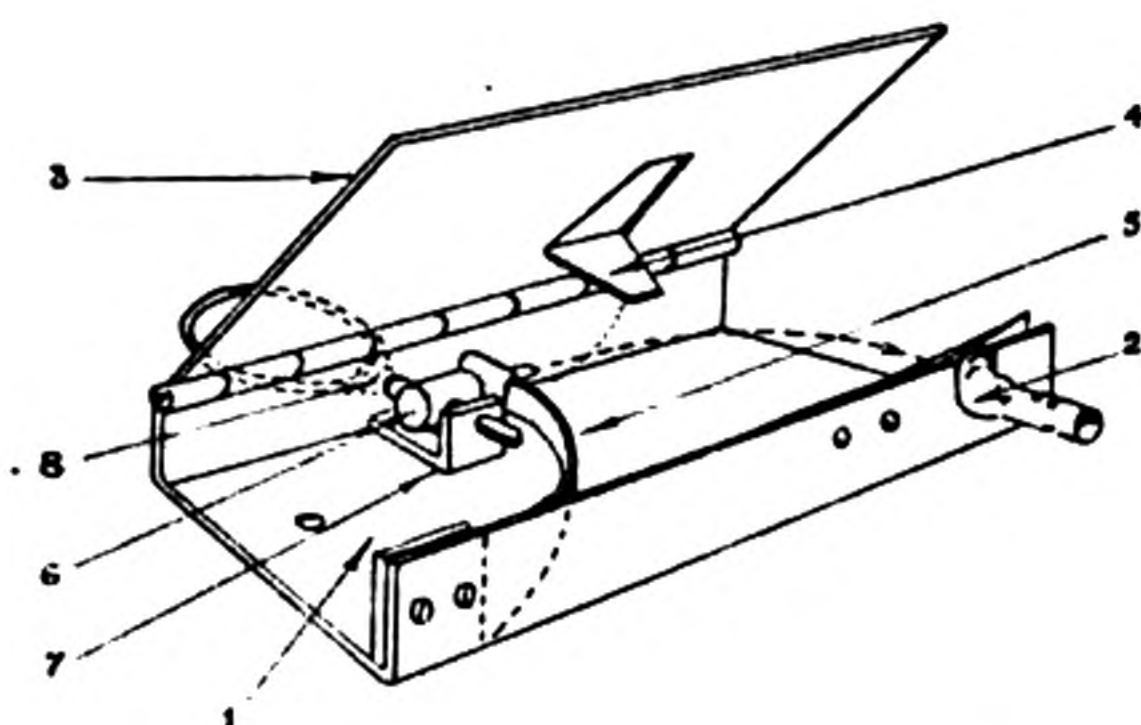
Source: Field Engineering Pamphlet No. 9. 1943.



Switch N°1 Pull Mk.1



Switch N°2 Pressure Mk.1



Switch N°3 Release Mk.1

SWITCH NO. 3, RELEASE, Mk. I. (M.D.I RELEASE SWITCH).General Description:

This switch is designed to fire on release of pressure. It is similar to the Switch No. 6 (Type 6, Release Switch) and will in future be replaced by that switch. Existing stocks of Switch No. 3 may, however, still be found.

Detailed Description:

The body (1) of the switch comprises a shallow channel section with open ends and a hinged cover (3) provided with an inclined tongue (4). Into one side of the body is clipped the fuze adaptor (2) complete with percussion cap, by means of a metal leaf. A two leaf steel spring (5) has one end fixed to the same upright side as the fuze adaptor, whilst at its other end it carries a striker (6). The fuze adaptor is identical with that in the percussion igniter, pressure and pull switches.

Setting the Switch:

Turn the metal leaf clear of the hole in the side of the body and insert the adaptor. Pull back the striker and leaf spring until the safety pin (8) can be put through the hole in the body, the striker head and the brass block (7). Close the cover, making sure the metal tongue is in contact with the spring. The fuze can now be inserted in the adaptor and the switch placed in its final position. If there is sufficient weight on the cover the safety pin will be loose so that it can easily be pulled out with a piece of cotton. On no account must this pin be withdrawn after the charge has been connected if it is at all tight.

On removal of pressure the force of the spring on the inclined tongue will raise the cover. The striker will then fly round to fire the cap and the charge.

Dimensions: 3" x 2¹/₈".

Weight: 4³/₄ ozs.

Shipping Classification:

Explosive Group	VI.
Storage and Stowage	I. O.A.S.

Packing Details:Dimensions:Weight:

10 per tin		
20 3 per box (200 switches)	x 9 ¹ / ₂ " x 8 ¹ / ₂ "	77 lb.

Source: Field Engineering Pamphlet No. 9. 1943.

WIRE TRAP .014"

This is .014" diameter black tempered steel wire, which, provided it has not been kinked, will withstand a steady pull of 30 lbs. If well placed it is almost invisible to anyone who does not know of its presence. It is wound on flat wooden spools in nominal 50 yard lengths. It has been found, however, that some spools have only 30 to 40 yards.

Catalogue No. B. 35.

Dimensions: 50 yds. spool.
25/8" diam. x 1/2" thick.

Weight: 2 1/2 ozs.

Packing and Special Notes:

800 spools per case. Each spool marked .014" x 50 yds.

Package Dimensions:

30" x 22" x 13"

Weight Packed:

164 lbs.

WIRE TRIP .032"

This is .032 diameter black, tempered steel wire, which is almost invisible and provided it has not been kinked, will withstand a steady pull of 150 lbs. It is wound on flat wooden spools in nominal 25 yard lengths. It has been found, however, that some spools have only 20 to 22 yards.

The wire is intended for use as a trip wire by stretching it between two firm supports about 4" above the ground. The wire should be placed where it cannot easily be seen.

It can also be used in place of booby trap wire.

Catalogue No. B 36.

Dimensions: 25 yds. spool.
3 1/2" diam. x 1/2" thick.

Weight: 4 3/4 ozs.

Packing and Special Notes:

400 spools per case. Each spool marked .032" x 25 yds.

Package Dimensions:

30" x 22" x 13"

Weight Packed:

160 lbs.

IGNITERS, FUZE, FOG SIGNAL, Mk. IA.General Description:

This igniter is designed for placing on a railway line in such a way that it is fired by the passage of the train along the line, and over the igniter. The igniter is connected to a 'e-railing chain' by cordtex leads.

Detailed Description:

The igniter consists of a small disc-shaped body (A) mounted on a spring clip (B) so that it can quickly be slipped on to a rail where it is held firmly in position. Inside the igniter there are three percussion caps, some quick match, and a little gunpowder. Projecting from the body of the igniter there is a spring snout (C) into which a detonator can be fitted.

When a train passes over this igniter, the percussion caps are fired, and the flash from the quick match and powder, fires the detonator.

Notes on Use:

1. The igniter should always be used in pairs.
2. The spring snout must point outwards from the track or else it will be cut off by the flange of the locomotive wheels.
3. Outside the sealed tin, the igniter is not water or moisture proof, and if the powder becomes damp the detonator may not be fired.
4. The charges attached to the fog signals should be placed at least one metre ahead of the signals (in the direction of the train's approach). This is to allow for any delay in the pick-up of the igniter, and to ensure that the rail is cut ahead of the leading bogey of the locomotive.

Catalogue No. B 8.

Dimensions: 4" x 3 $\frac{1}{2}$ " x 9/16"
including clip which folds flat.

Weight: 1 $\frac{1}{2}$ ozs.

Shipping Classification:

Generic Title	Igniters, Fuze, Fog Signal.
Explosive Group	VI.
Storage and Stowage	O.A.S. (C).

Packing and Special Notes:Dimensions:Weight:

4 Igniters in 1 Vacuum Tin	4 $\frac{5}{8}$ " x 3 $\frac{7}{8}$ " x 1 $\frac{1}{2}$ "	9 $\frac{1}{2}$ ozs.
588 Igniters (147) tins per case.	31" x 18" x 14"	112 lbs.

IGNITERS, FUZE, FOG SIGNAL, Mk. IA. E., DUMM.

These are intended for training purposes. They resemble the IGNITERS, FUZE, FOG SIGNAL Mk. IA, but do not contain any percussion caps, powder, etc., and cannot be fired.

Catalogue No. B 8d.

Dimensions as for B. 8.

SWITCH No. 3. ANTI-PERSONNEL, Mk. I.
(PISTOLS, GROUND, SPIKE)

General Description:

This device is intended to be sunk in paths, roads, etc. When pressure is put upon it, e.g., it is trodden on, the switch fires and projects a bullet upwards.

Detailed Description:

The switch consists of a hollow metal spike (A) with a flange at the open end, which can be pressed into the ground or hammered with care into a road surface. Inside the spike is placed the firing assembly, consisting of a metal spindle (B) with a flange at the base and a wire umbrella catch towards the top. A spring (C) and spring retaining sleeve (D) are threaded over the spindle and hold in compression by the umbrella catch. Over the top of the spindle is placed a striker with hollow shaft (E), and resting on this is a rimless cartridge with a bullet (F) which just projects out of the spike.

When a man's foot or a pneumatic tyre depresses the bullet the striker moves down and releases the umbrella catch. The striker then drives up under the influence of the spring, striking the cartridge cap and firing the bullet, which will go through the man's foot or the pneumatic tyre.

Notes on Use:

1. Never use singly, except for a specific purpose. Scatter about the scene of a demolition, etc.
2. Stand as far to one side as possible when inserting the cartridge, in case of premature firing.
3. If, in setting, difficulty is experienced in getting the catch to hold, prise it further open with a small screwdriver.
4. Never use the cartridge when testing. Use a pencil, etc.
5. After placing, conceal as well as possible. Remember that the switch is not waterproof and will rust if left in the open for long.

Dimensions:Weight: 5 ozs.

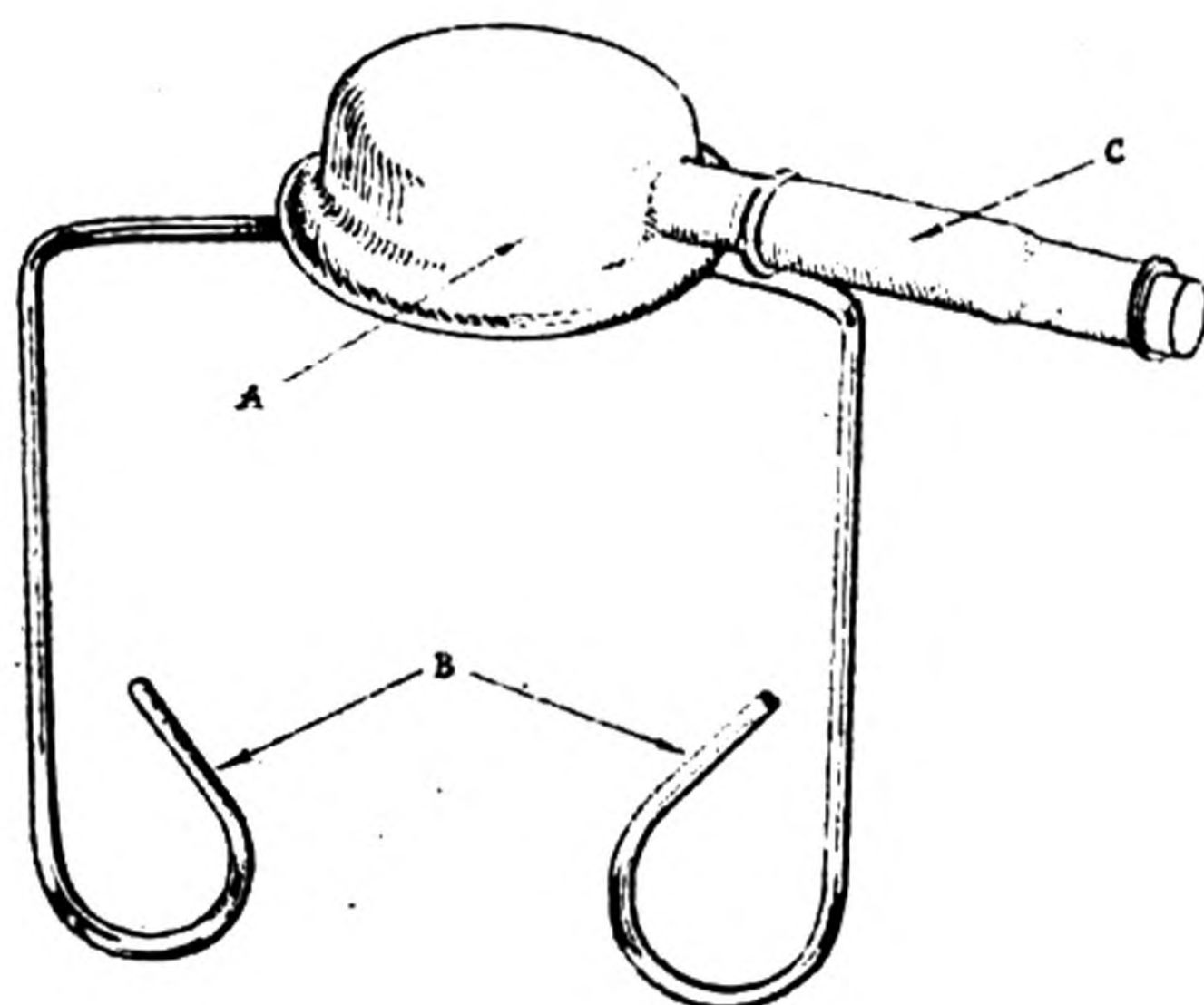
Body, $5\frac{3}{4}$ " long x $\frac{1}{2}$ " diam.
 Flange, $1\frac{1}{2}$ " diam. x $\frac{1}{16}$ ".

Packing Details:Dimensions:Weight:

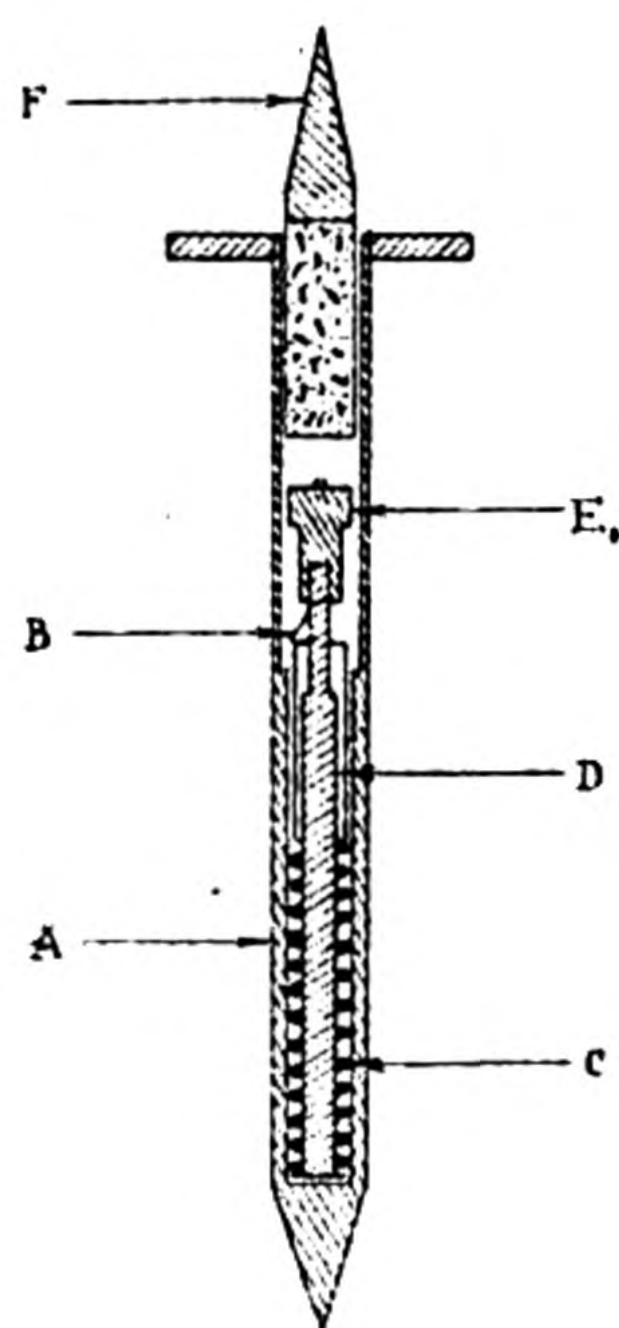
10 switches in tin box.
 20 boxes (200 switches)
 in wooden box

$6\frac{3}{4}$ " x $6\frac{1}{2}$ " x $1\frac{3}{4}$ " 4 lbs.
 28" x 11" x $3\frac{1}{4}$ " 94 lbs.

Source: Field Engineering Pamphlet No. 9. 1943.



Igniter, Fuze, Fog Signal, Mk. 1A



Switch N°8, Anti-Personnel, Mk. 1

NOTES ON BURNING FUZES USED BY S.R.D.

Burning fuzes, both safety and instantaneous, as used by S.R.D., are the same as those used in the Services generally. These notes are given as a summary of the types of fuze which may be found.

1. Fuze, Safety (Inst. Commercial).

Consists of a central core of cotton coated with 25 grains of gunpowder per foot run, the core being enclosed in two layers of yarn, each layer being impregnated with bitumen. Commercial fuzes are of three different colours, blue, white and red, all identical, the various colours being intended to facilitate identification against different backgrounds. The blue colour is normally used by S.R.D.

The rate of burning is 2 feet per min. and the fuze will burn under water provided it is NOT immersed for more than one hour before lighting.

It is packed 48 ft. to a cylindrical tin $2\frac{3}{8}$ " x 5" diam., the tin being sealed by a strip of adhesive tape. 100 tins are packed in a case $27\frac{1}{2}$ " x 22" x $13\frac{1}{2}$ " weighing 137 lbs.

2. Fuze, Safety, No. 11, Mk. I.

This is the standard British safety fuze (commonly called Bickford). It is similar to the Inst. commercial fuze but is black in colour.

3. Safety Fuze, Blue Sump.

This is another commercial safety fuze similar in all respects to Fuze, Safety No. 11, Mk. I, except for the outer covering which is coloured blue.

4. Fuze Instantaneous (Orange Fuze).

This fuze is primarily intended for use in booby traps. It burns at 90 feet per second and should be ignited only by a mechanical igniter.

The fuze composition is encased in an orange covered fabric.

NOTE: This is NOT a detonating fuze and must have a detonator attached to it in normal manner as for safety fuze.

In all four cases the end of the fuze will probably be sealed by sealing compound or by a dummy detonator crimped on to the end. In all cases a length of the fuze (6" is standard R.E. training) should be cut off the end before using and thrown away and it is also advisable to test the rate of burning of each batch of fuze.

(Extracted from E - in-C's Tech. Instrn. 5th November, 1943, and Military Engineering, Vol. IV, Part I - Demolition 1942).

NOTE ON DETONATING FUZES USED BY S.R.D.

Detonating fuzes as used by S.R.D. are the same as those used in the Services generally. Brief notes on each type are given below. As with safety fuzes the end of the fuze will probably be sealed with sealing compound or a dummy detonator.

1. Primacord.

A flexible, waterproof fabric cord $13/64$ inches in diameter, with an explosive core of PETN (Pentaerythritetetrinitrate) which has a velocity of detonation of about 19,700 ft. per second. It is quite insensitive to shock, flame or friction, and requires a cap to detonate it. It is greenish-yellow in colour and has a relatively rough, waxy surface.

2. Fuze, Instantaneous, Detonating (F.I.D.).

This is an obsolete store but may still be found. It contains a PETN train inside a lead tube.

3. Cordtex.

This is the British equivalent of Primacord. It is a grey fabric tube 0.12" in diameter, filled with PETN and detonating at 19,700 ft. per second.

4. Plastic Cordtex.

This consists of a PETN core wrapped in a shiny white plastic tubular cover. It has the same properties as cordtex and primacord, but is easier to handle and more reliable at all temperatures.

This is the detonating fuze normally used by S.R.D.

(Extracted from 'E-in-C's Tech. Instrn.' 5th November, 1943, and Military Engineering, Vol. IV, Part I - Demolitions 1942).

NOTES ON DETONATORS USED BY S.R.D.

1. Detonator No. 27. Detonator No. 8.

The detonator No. 27 is the standard British or Australian Service detonator. It is identical with the British or Australian commercial detonator No. 8.

The detonator consists of a solid drawn aluminium tube $1\frac{3}{4}$ " long x 0.26" in diameter, containing 0.35 grms. of ASA (a mixture of Lead Azide, Lead Styphnate and Aluminium powder) and 0.55 grams of tetryl (C.E.).

2 Detonator No. 6.

This is a commercial detonator used in the Services. It consists of an aluminium tube 1.378" long x 0.25" diameter, containing 0.35 grams of ASA and 0.25 grams of tetryl.

The No. 6 detonator can normally be used to replace a No. 27 or No. 8 detonator.

3. Detonator, Electric, No. 33.

This is the normal British Service electric detonator and consists of a No. 27 detonator with an electric firing head crimped in position. safe figure for firing resistance is 1.6 ohms.

4. Detonator, Electric (Aust. Commercial).

These are almost identical with the Service No. 33 detonator except that the case is copper instead of Aluminium. safe figure for firing resistance is 1.6 ohms.

(Extracted from E-in-C's Tech. Instrn. No. 44, 5th Nov. 1943, and Military Engineering Vol. IV, Part I - Demolitions 1942).

DEMOLITION EQUIPMENT.

SECTION II.

DELAY ACTION MECHANISMS.

Switch No. 10 (Time Pencil).

Fuze, Delay Action, A.C. Mk. IA (A.C. Delay).

Fuze, Delay Action, A.C. Mk. II (A.C. Delay).

Bursters for use with A.C. Delays.

SWITCH NO. 10. (Time Pencil)General Description:

This is a simple delay action mechanism which can be used to ignite safety or instantaneous (orange) fuze or fire a detonator at a predetermined time after setting the switch. Nominal timings, varying between 10 minutes and 24 hours are given by six different coloured switches. In each of the six cases the actual timing is different from the stated time which is a mean timing, and the actual timing also varies with change in temperature.

Detailed Description:

The time pencil consists essentially of the following parts:-

- (a) A thin copper sleeve (A) containing a glass phial of corrosive liquid (B).
- (b) A thin aluminium sleeve (C)
- (c) A striker (D) with spring (E) and retaining wire (F).
- (d) A safety strip (G) and inspection hole (H).
- (e) A percussion cap with spring snout (J).

The striker is held back with the spring under compression by a thin steel retaining wire anchored by a screw at the top of the copper sleeve. If the copper sleeve is crimped or flattened the glass phial which it contains is broken and the corrosive liquid begins to attack the striker retaining wire. When the steel wire is eaten through the striker is released and fires the percussion cap. The safety strip is provided so as to prevent the switch firing if the retaining wire breaks accidentally or is corroded through by rust, etc. As an added precaution inspection holes are provided. If it is possible to see through these holes it is an indication that the retaining wire is intact and the spring fully compressed.

Notes on Use:

1. The copper sleeve must not be bent or broken off. It must be crimped or squeezed flat.
2. Take care not to fracture the copper sleeve.
3. Withdraw the safety strip just before connecting the charge and re-insert it in the inspection hole as an added precaution when crushing the copper sleeve. Finally, remove the strip and take it away, since if left lying about the colour of the strip may enable the enemy to discover the time of the delay.
4. Always use two (2) time pencils together.
5. The time pencil can be waterproofed by covering it with a balloon.

Delay Timings:

The timings of the six switches are shown by the colour of the safety strip, as follows:-

BLACK	10 minutes	GREEN	5 hours
RED	1 hour	YELLOW ...	10 hours
WHITE ...	1½ hours	BLUE	20 hours

The timings are the mean timings given by a number of switches at 65°F. Actual timings may deviate either way. The following table shows the variation of the time delay with the temperature:-

Temperature	Black (Mins)	Red (Mins)	White (Mins)	Green (Hrs)	Yellow (Hrs)	Blue (hrs)
0°F (-18°C)	-	86	1240	50	122	-
20°F (-7°C)	-	54	480	21	46	159
40°F (+4°C)	18	34	200	9.5	20	58
60°F (+16°C)	12	23	100	4.5	8.9	24
70°F (21°C)	9	19	80	3.3	6.1	16.7
80°F (27°C)	8	15.5	64	2.4	4.3	11.5
90°F (32°C)	6.5	13.0	53	1.8	3.2	8.1
100°F (38°C)	5.5	11.0	43	1.3	2.3	5.9
110°F (43°C)	4.5	9.5	37	1.0	1.7	4.7

- NOTES:
- (a) The times are subject to plus or minus 25% deviations.
 - (b) It is assumed that pencils are used in pairs - to obtain mean timings add 10%.
 - (c) Switches marked blue must not be used if the temperature is likely to be or to fall below 0°C., i.e., freezing point.

The variety of timings is brought about by different corrosive solutions in the glass ampoules. The solutions contained in each ampoule are as follows:-

Colour of Ampoule.	Grams of Copper Chloride.	Grams of Water.	Grams of Glycerine.
Black	13.8	86.2	-
Red	37.7	62.3	-
White	10.3	37.7	52.0
Green	35.0	20.0	39.0
Yellow	33.2	19.8	47.0
Blue	10.2	16.3	73.5

Catalogue No. A. I.

Dimensions: 5 1/8" x 3/8" diam.

Weight: 0.65 ozs.

Shipping Classification:

Generic Title
Explosive Group
Storage and Stowage

Igniter, Fuze.
VI
I. O.A.S.

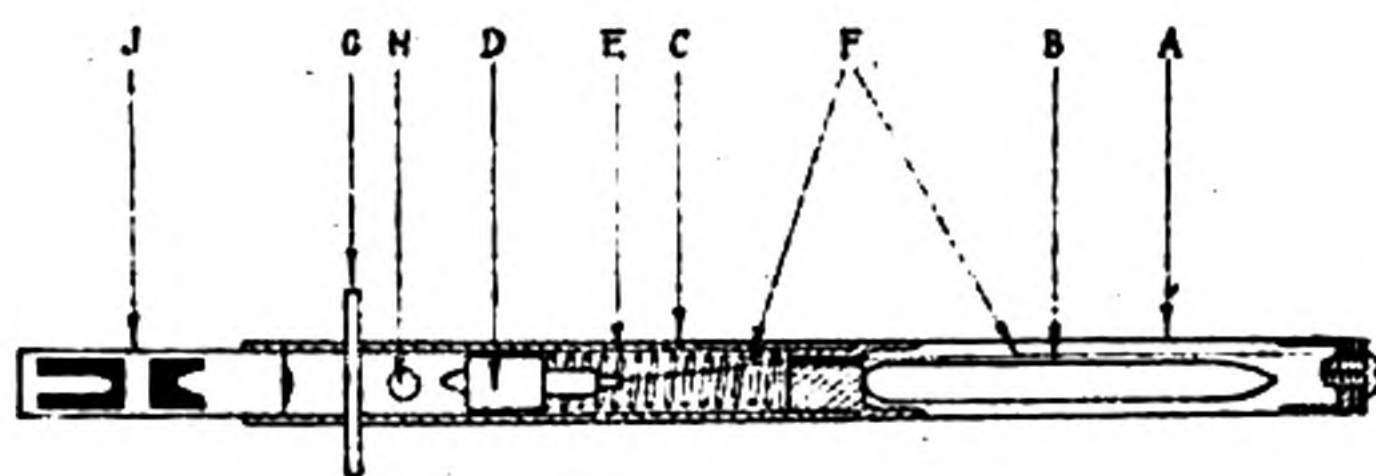
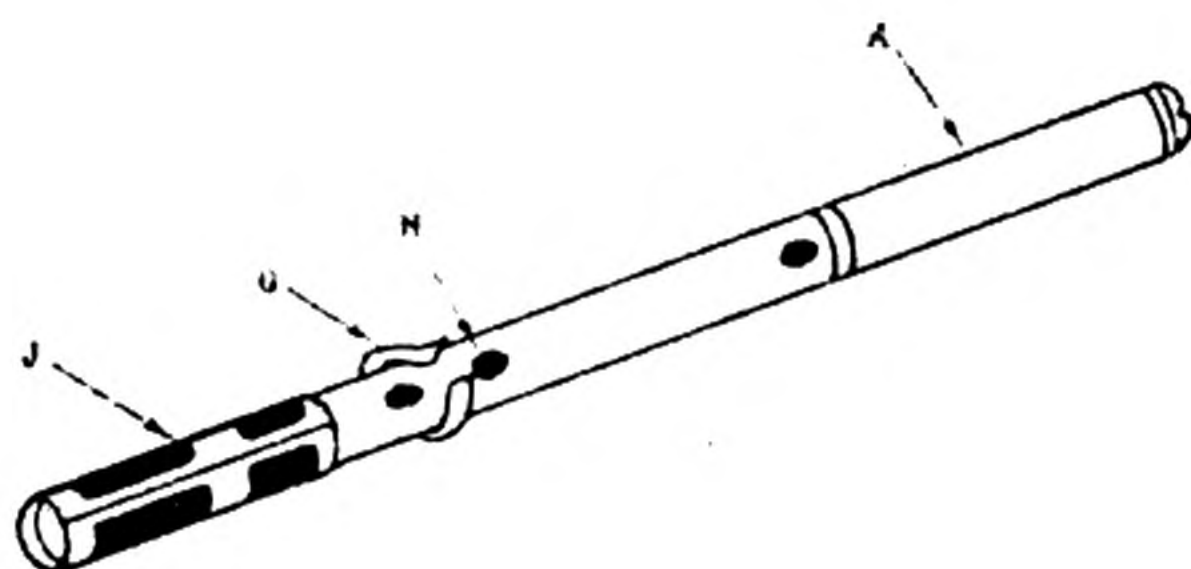
Packing and Special Notes:

5 Switches per tin ...
150 Tins per case

Dimensions: 5 5/16" x 1 7/8" x 7/16"
16 1/2" x 13" x 7 3/4" Weight:
5 ozs.
62 lbs.

Source: Filed reports.

Switch N° 10. Time Pencil, Mark I



FUZES, DELAY ACTION, A.C., Mk. IA (A.C. DELAY).General Description:

This is a delay action fuze designed for use with limpets. When attached to a limpet it is quite waterproof and will give time delays of between $4\frac{1}{2}$ hours and $5\frac{1}{2}$ days. As with the time pencil the actual timing deviates from the mean and also varies with temperature.

Detailed Description:

The A.C. Delay consists of a tubular metal body (A) containing a spring loaded strike mechanism (B). The striker is held in position with the spring under compression by a celluloid disc (C) and above this disc the tube is empty forming a chamber which can receive a liquid-containing glass ampoule (D). Above this chamber the body is threaded externally and a cap with a central thumb screw (E) may be fitted. The fitting of this cap is made waterproof by a rubber washer (F). The thumb screw is held in the safe position by a safety pin (G) and at the bottom of the ampoule chamber some layers of lint are provided (H).

At the striker end the body is threaded to take a Type 6 Burster or a transit cap (J) and to enable the delay to be fitted into a limpet.

In operation one of six different coloured ampoules is placed in the ampoule chamber and, with the top cap lightly in position and the safety pin removed, the thumb screw is depressed. This crushes the ampoule and the liquid which it contained comes into contact with the celluloid disc and slowly dissolves it. After a certain time the disc is so thin that it cannot hold back the striker which goes forward and fires the Type 6 Burster.

Notes on Use:

1. Always place the ampoule in the delay with the pointed end into the lint.
2. The A.C. delay may be used to fire a percussion cap as used with Switch No. 4, etc., and hence may be used to ignite safety fuze, etc. The percussion cap, plus holder and spring snout, is attached to the A.C. Delay using an adaptor as used with Switch No. 1. The A.C. Delay striker is not designed to fire a percussion cap and to ensure correct initiation A.C. Delays should be used in pairs when being used with percussion cap attachment.
3. For correct use of Type 6 Burster see the article and notes on that store.
4. Screw down the thumb screw as far as it will go. Do not stop when the ampoule is heard to crack.

Delay Timing:

Different timings are obtained by the use of six different coloured ampoules as follows:-

RED	$4\frac{1}{2}$ hours	GREEN	26 hours
ORANGE ..	$7\frac{1}{2}$ hours	BLUE	42 hours
YELLOW ...	15 hours	VIOLET ...	$5\frac{1}{2}$ days.

These timings are the mean timings given at 60°F. The

actual timings are subject to 15% deviation either way, except in the case of Red on which the deviation may be 2 hours either way. The following table shows the variation of the time delay with the temperature:-

Temp.	Red Hours.	Orange Hours.	Yellow Hours.	Green Hours	Blue Hours	Violet Days	Temp.
40°F.	6½	9½	20	34	67	8½	5°C.
50°F.	5	8½	17½	30	53	7	10°C.
60°F.	4½	7½	15	26	42	5½	15°C.
68°F.	4	7	14	22½	36	4½	20°C.
77°F.	3½	6½	12	20	30	3½	25°C.
88°F.	3	6	10	17½	25	2½	30°C.

The different timings are brought about by different solutions in the ampoules, as follows:-

Colour of Ampoule.	Filling.	Dye.
Red	Acetone	Fuchsene
Orange	Ethyl Acetate	Waxoline Orange 2627
Yellow	n - Propyl Acetate	Waxoline Yellow I.D.S.
Green	Butyl Acetate	Waxoline Green 2451
Blue	Amyl Acetate	Waxoline Victoria Blue B.I.
Violet	Ethyl Lactate	Wasoline Violet 2 B.I.

Catalogue No. A. 100

Dimensions: 4 ³/₄" long x 1" diameter. Weight: 6½ oz.

Shipping Classification:

Generic Title	Detonator, Burster, ..C.
Explosive Group ...	X.
Label	B.
Storage and Stowage .	III. M.S.D.

Packing and Special Notes:

Dimensions: Weight:

Operational. One Fuze (each containing a red ampoule) per tin complete with carton of five ampoules and one Burster in wooden holder. 5 ³/₈" x 3 ³/₄" x 1 ⁵/₁₆" 1½ lbs

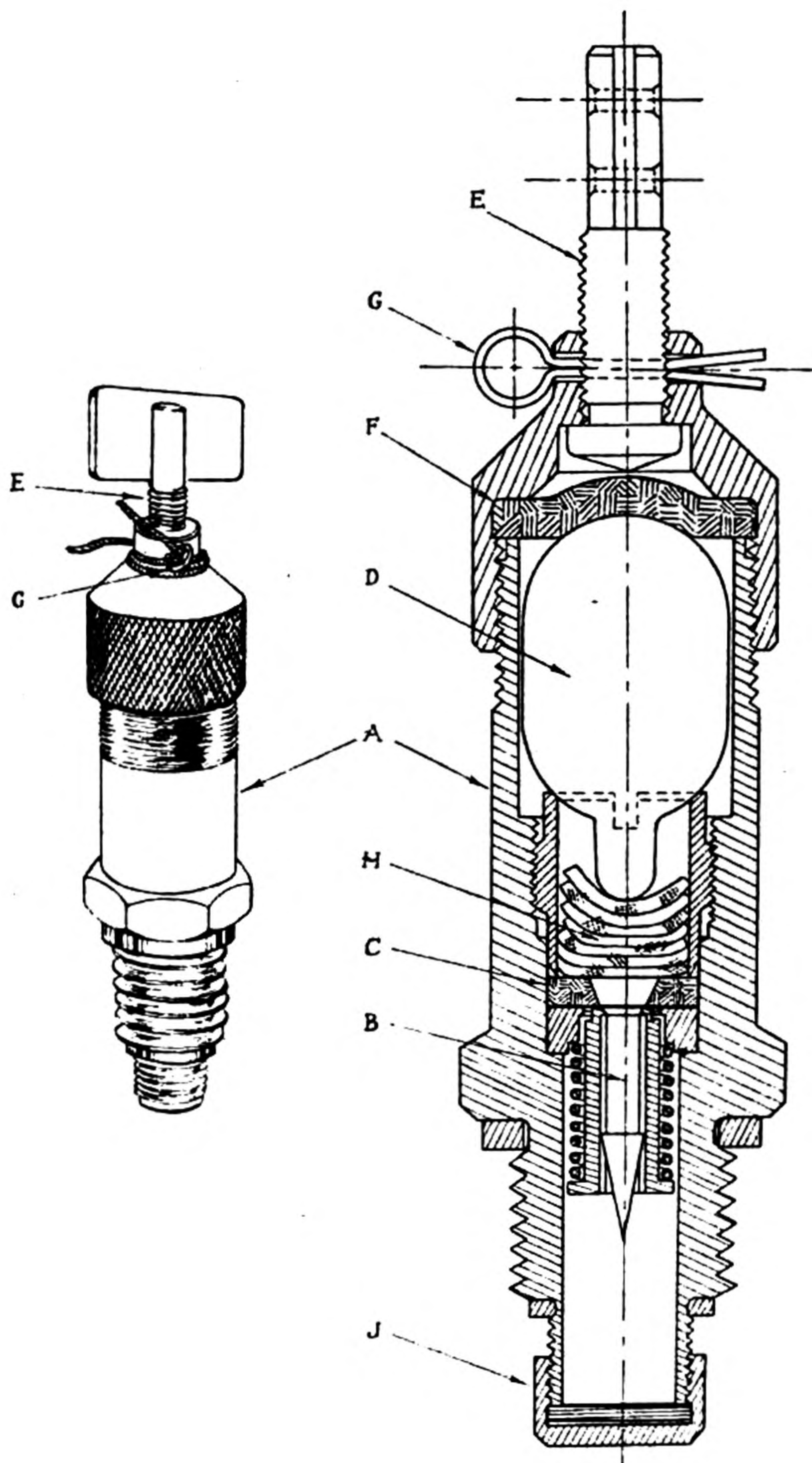
Shipping and Storage. Two Fuzes and two Bursters per tin without ampoules, 250 Fuzes per case. 37" x 18" x 12" 216 lbs

In future three types of pack will be issued as follows:-

- Air Pack. As operational pack above.
- Mission Pack. As described under Shipping and Storage.
- Ampoule Pack. Two cartons each containing six ampoules all of the same colour. Cartons in a tin with a coloured disc on the lid indicating colour of ampoules.

Source: Filed Reports

FUZE, DELAY ACTION, A.C., MK. 1A



FUZE, DELAY ACTION, A.C. Mk. II.General Description:

This is a watertight time delay intended for use with limpets. It works on the same principle as the A.C. Delay Mk. IA, but it is lighter and smaller and gives a different range of timings - $\frac{1}{2}$ hr. to 40 hrs. at 15°C.

Detailed Description:

The Mk. IIA.C. Delay differs from the Mk. IA mainly in that the striker (G) is held back by a celluloid rod (I) instead of by a disc. Two pieces of lint pass round the rod and up into the ampoule chamber. As in the Mk. IA there is a top cap (B) with a central thumb screw (C) above the ampoule chamber and at the other end the body (D) of the delay is threaded to take a transit cap (E) or a Type 6 Burster.

In operation an ampoule in the ampoule chamber is crushed by screwing down the thumb screw (after removal of the safety pin (F)) and the liquid from the ampoule dissolves away the celluloid rod until it breaks and allows the striker to go forward and fire the Burster.

Notes on Use:

1. Different ampoules are used in the Mk. I and Mk. II delays.
2. In the case of the Mk. II delay the ampoule is placed with the point towards the thumb screw, i.e. insert the ampoule rounded end first.

Delay Timings:

Different timings are obtained by the use of six different coloured ampoules, as follows:-

RED (Acetone)	40 min.	GREEN	
ORANGE		(Methyl Acetate)	4 hrs
(Methyl Ethyl Ketone)	1 hour	BLUE (Ethyl Lactate)	14 hrs
YELLOW	2 hours	VIOLET	
(n-Propyl Acetate)		(Methyl Salicylate)	40 hrs.

These are the mean timings at temperature of 60°F. Actual timings will deviate either way. The chemicals in brackets after the colour of the ampoule are the main filling in the ampoule. A small quantity of dye-stuff is added to each to give the necessary colour. The variation of the delay timing with change in temperature is given as follows:-

Temp.	Red Mins.	Orange Hrs. Mins.	Yellow Hrs. Mins.	Green Hrs.	Blue Hrs.	Violet Hrs.	Temp.
40°F.	60	1 30	3 15	8	30	80	5°C.
50°F	51	1 20	2 30	6	20	55	10°C
60°F	42	1 5	2 5	4	15	40	15°C
68°F	37	55	1 45	3 $\frac{1}{2}$	12	30	20°C
77°F	32	50	1 30	2 $\frac{1}{2}$	9	20	25°C
88°F	27	40	1 15	2	7	16	30°C

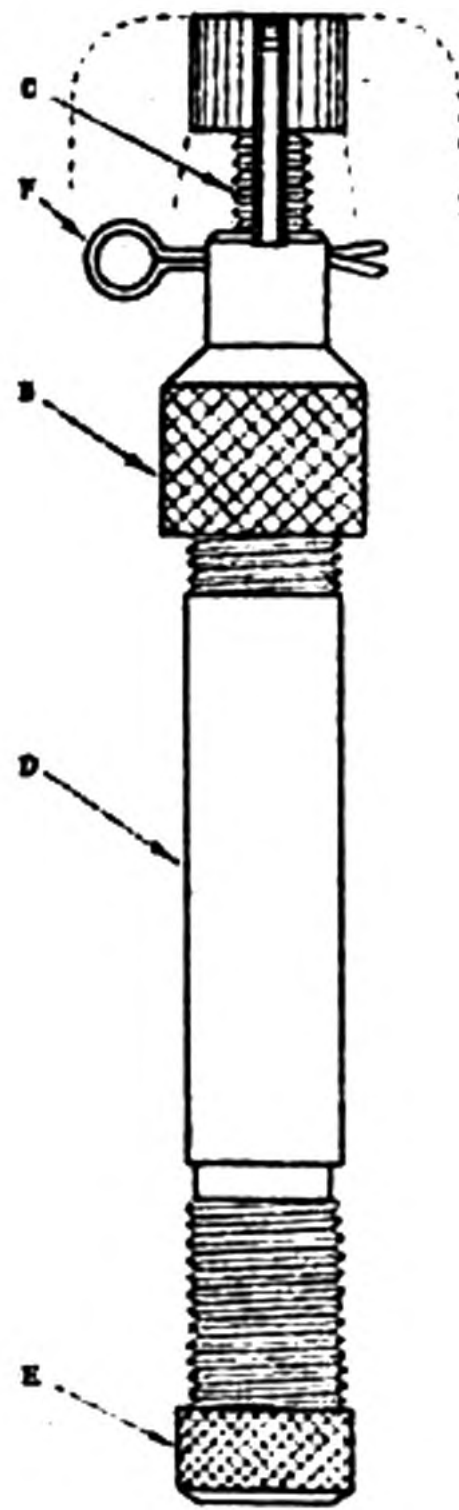
Cat. Logue No. Not allotted as the store is not available yet.

Dimensions: 4 $\frac{1}{2}$ " x $\frac{1}{2}$ "

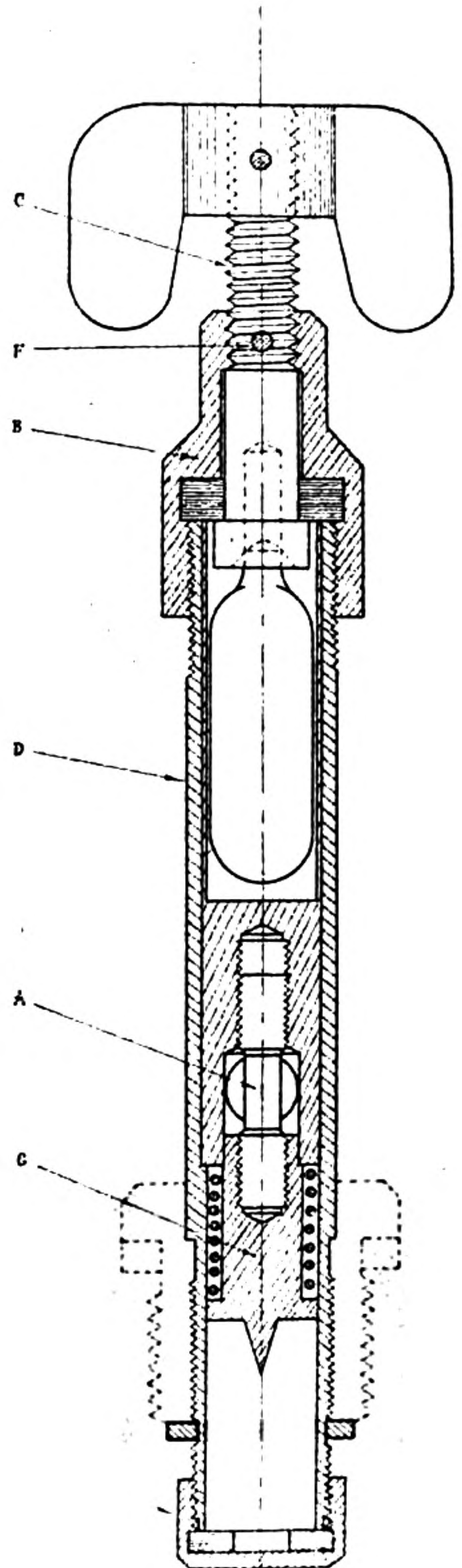
Weight: 3 $\frac{3}{4}$ ozs.

Source: Filed reports.

Fuze, Delay Action, A.C. Mk. II



Full Size View



BURSTERS FOR USE WITH A.C. DELAYS.BURSTERS, DETONATOR, Type 28A.

This was the original type burster for use with A.C. Delays. It has become obsolete because:-

- (a) There was a danger of the burster being damaged whilst being screwed into a limpet, with the result that the waterproof qualities of the burster were impaired.
- (b) The Burster, as set out, was not in itself resistant to damp, and there is a chance that bursters may fail if stored for long in damp conditions.
- (c) The Burster would not initiate 808.

This Burster will probably not be found with S.R.D. stores, but if it is it must be used only with limpets filled with P.E. and only if Type 6 Bursters are not available. After screwing this burster lightly on to the delay the joint must be waterproofed by luting all the exposed threads.

BURSTERS, DETONATOR, Type 6 Mk. I.

This burster is designed to be waterproof both in storage and when screwed on to a delay. It is more robust and powerful than the 28A burster and should initiate 808, unless the latter is very old. It will initiate P.E. reliably. It consists of a 5 grain percussion detonator with a crystalline C.E. lead (stemmed to density of 1.2) to a C.E. pellet.

The burster is sent out with a transit plug and washer which must be removed before it can be attached to a delay. The joint between the burster and the delay is waterproofed with luting as in the case of the 28A burster. Care must be taken to see that no luting gets into the burster or the striker channel of the delay.

BURSTERS, DETONATOR, Type 6 Mk. II.

The Mk. II may readily be distinguished from the Mk. I as the Mk. II has not the three dimples or crimping marks in the middle of the body, and it is slightly longer.

The length has been increased so that a watertight joint between the burster and the delay can be made with a synthetic rubber washer; and not with luting. The Mk. II burster, like the Mk. I, is sent out with a transit plug and washer which must both be removed and discarded before fitting the burster on to a delay. The washer which waterproofs the joint between the burster and the delay is already provided on the A.C. Delay Mk. IA. If the delay is not a Mk. IA and not fitted with washers the Mk. II burster must be waterproofed with luting as in the case of the Mk. I.

WHENEVER RUBBER WASHERS ARE SUPPLIED LUTING MUST NOT BE USED. This is because the luting would lubricate the washers and prevent a reliable waterproof joint being made. This applies to both the joint between burster and delay and that between delay and limpet.

Catalogue No. E.207.

Dimensions: 5/8" diameter x 2" long. Weight: 1 1/4 ozs,

Shipping Classification: Generic Title Detonator,
Explosive Group X (Burster)
Storage and Stowage III.M.S.D.
Packing and Special Notes. Not packed separately. Two included in each mission pack and one each air pack.
See A.C. Delay.

Source: Technical Bulletin No. 13, July 1944.

28A BURSTER



BURSTER TYPE 6 MK. I.

Dimple or Crimping Marks



Rubber Washer

Transit Cap

BURSTER TYPE 6 MK. II.



Rubber Washer

Transit Cap

FUZE DELAY ACTION A.C. MK. IA.

Rubber Washers



Designed by _____
 Drawn by _____
 Traced by B. Inglis, Pte.
 Traced from Tech. Review, No 2 Feb. 1944.
 Checked by _____

DATE

17-6-44

DWG NO

D 10

DEMOLITION EQUIPMENT.

SECTION III.

PREPARED CHARGES.

Standard Charges, $1\frac{1}{2}$ lb and 3 lb.

Standard Split Charges, $1\frac{1}{2}$ lbs and 3 lbs.

Grenade G.P.

The Clam.

Limpets Rigid, Type 6.

Connector Cordtex, Limpet.

Notes on Design, Use and Treatment of Magnetic Devices.

M.D. 1 Altimeter Switch.

Wing Charge.

Wreath Charge.

Charge, Beehive 6" (Aust.)

Cavity Link Charges.

Note on the Cavity Effect.

STANDARD CHARGES, 1½ lb and 3 lb.General Description:

These charges have been made up as standard units mainly with a view to facilitating the training of non-technical personnel and doing away with the necessity for making up charges in the field. Two types are available, the 1½ lb and the 3 lb.

Detailed Description:

The charges contain 1½ lb or 3 lbs of P.E. wrapped in rubberised fabric. At either end there is a C.E. primer and twin cordtex leads which pass right through the charge and extend at either end. Each lead goes through the hole in one of the primers (and is knotted or taped in position there) and round the outside of the other (See Diagram I). These two leads are taped together and extend on either side of the charge. The general arrangement is shown in Diagram II.

The charges are initiated by attaching a detonator to the cordtex leads or the leads may be attached by a triple roll to a cordtex main.

In cases where the weight of explosive is excessive the charges may be cut into two portions and each portion used separately. This, of course, breaks down the protective covering of fabric and renders the charge portion less waterproof, etc.

Two separate halves of a 1½ lb standard charge can be used as a rail cutting charge,

Notes on Use:

1. If the charges have to be placed on hot surfaces the explosive may become very plastic and the charge may lose its shape. To avoid this line the charge with cardboard, etc., and tape in position.
2. Both charges will hole up to approximately 1" mild steel plate and will shatter or crack cast iron sections.

Catalogue No. 1½ lb - D.244: 3 lb - D.245.

Dimensions:Weight:

1½ lb charge 6½" x 1⁷/₈" x 2¼"

1½ lb

3 lb charge 10½" x 2¼" x 2¼"

3 lbs.

(Actual charges exclusive of cordtex)

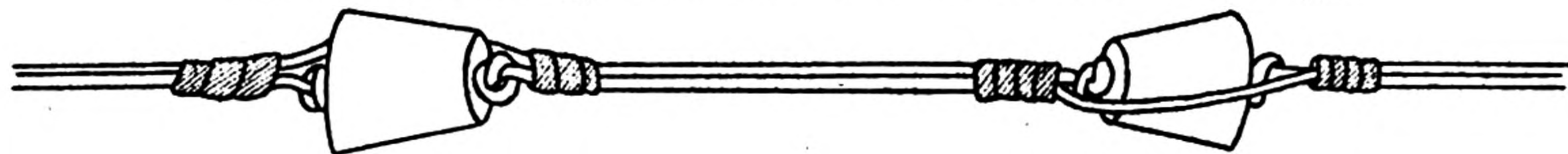
Shipping Classification:

Generic Title	Charges, Demolition.
Explosive Group	VII
Storage and Stowage ..	III. O.A.S.

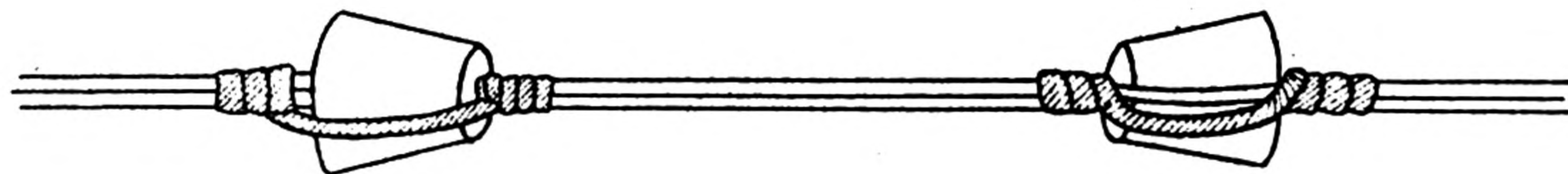
Packing and Special Notes: As required.

DIAGRAM I

Method of Attaching Primer to Cordtex in the Standard Charge.



Method I (Knot and Tape)



Method II (Tape Only)

*Note that one piece of tape is used
and brought round the primer.*

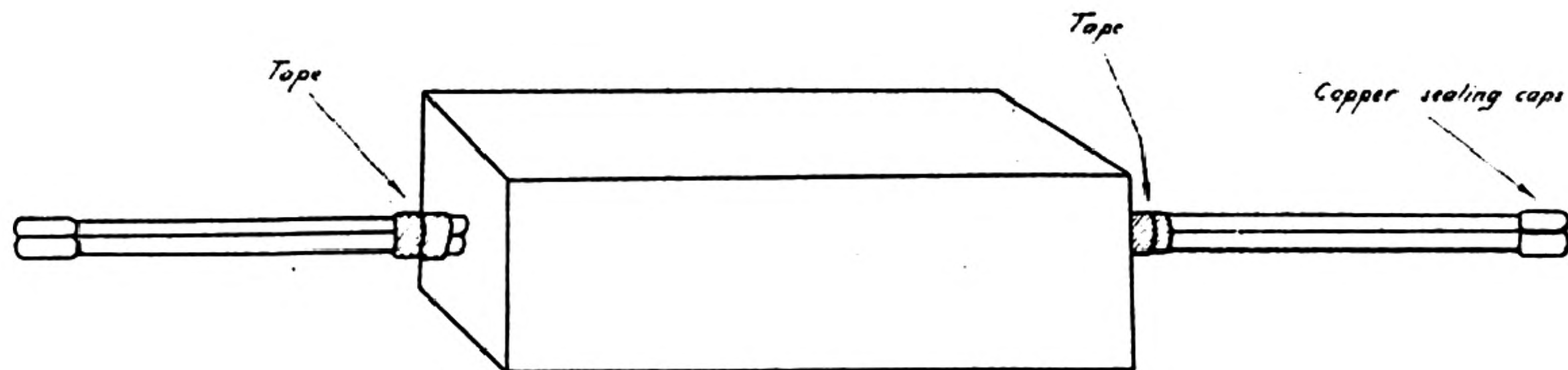
STANDARD CHARGE

Designed by-----
Drawn by-----
Traced by *R. Inglis Plc*
Traced from *Amendment N°5* to
Checked by *Remediation Syllabus*

DATE
11.8.44

DWG. NO.
D19

DIAGRAM II



- (1) If there is plenty of Cordtex make double tail at each end 3."
 (2) If Cordtex is in short supply make the tail at one end '3" and at the other 3."

STANDARD CHARGE

Designed by
 Drawn by
 Traced by *A. Inglis Pte.*
 Traced from *Amendment N°3 to*
 Checked by *Demolition Syllabus.*

DATE
 12.8.44

DWG NO
 D20

STANDARD SPLIT CHARGES - 1½ lb and 3 lb.General Description:

These charges which are made up as 1½ lb or 3 lb types are similar to the normal standard charges but are designed so that they may be split up into two connected halves to meet cases where the exact size of the target is not known.

Detailed Description:

The split standards charges have the same dimensions as the normal standard charges, but they are made up from the start in two separate halves arranged to slide along the cordtex leads for a limited distance only.

Two cordtex loads pass through each half of the charge and each lead goes through one primer and round the outside of the other. At each end one of the cordtex leads is longer than the other by about 6" - 8".

Where the cordtex lead passes through the primer it is kept in position either by knotting on either side of the primer or by tape, but the tape must not pass round both leads of cordtex as this would prevent the two halves of the charges sliding apart (see Diagram III).

When the charge is assembled the two halves are in contact and are held together by tape. In this state the charge can be used as a normal standard charge. The longer of the two leads at each end is looped and taped to the shorter. The general arrangements is shown in Diagram IV.

If it is desired to split the charge the tape around the centre of the charge is removed and the two halves pulled apart to the required distance.

Catalogue No. - 1½ lb. N.251; 3 lb. - N.252

Dimensions, Weight, etc. As for Standard Charges

Special Note:

As at present it is found there is a tendency for standard charges to lose their shape in hot climates due to increase in the plasticity of the explosive filling with increase in temperature. To overcome this, it is intended to develop a more rigid type of container for the charge. This container will also be such as to allow for the easy placing of non-removal fuzes (air-armed) in the standard charge.

Full details of this development will be circulated as soon as possible

DIAGRAM III

Arrangement of Primer

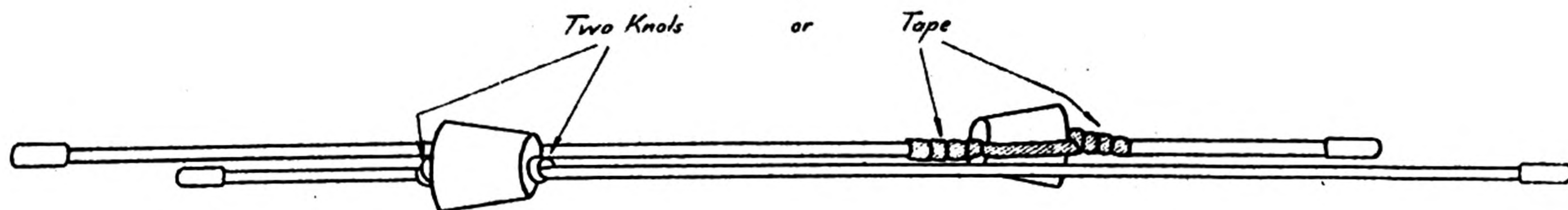
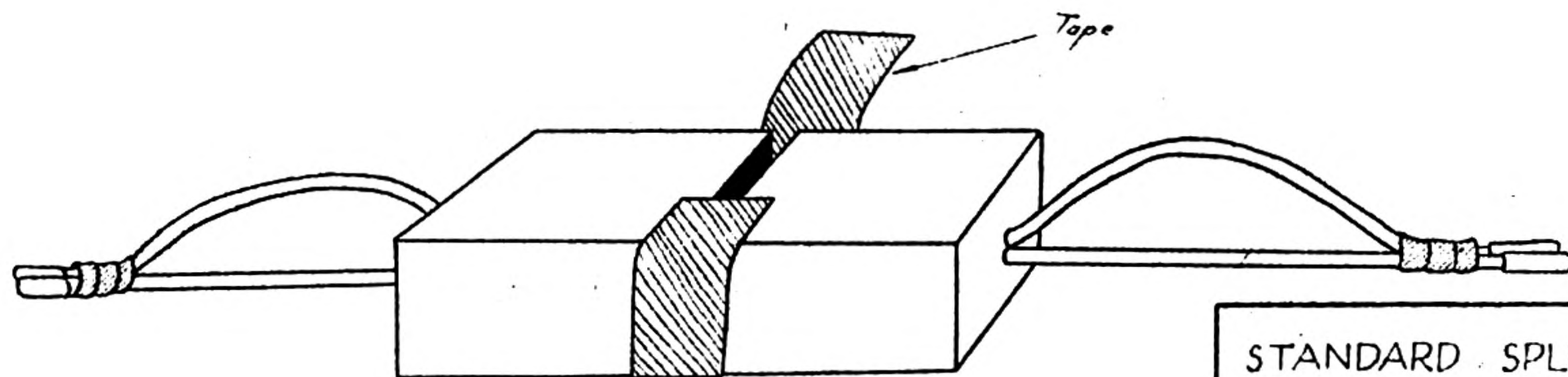


DIAGRAM IV



STANDARD SPLIT CHARGE

Designed by
Drawn by
Traced by *R. Inglis Pte.*
Traced from *Amendment IV's to*
Checked by *Demolition Syllabus*

DATE

12 · 8 · 44

DWG NO

D 21

GRENADE G.P.General Description:

A small explosive store which can be used either as a demolition charge or as a hand grenade.

Detailed Description:

The grenade consists externally of a black painted rectangular tin (A) with a central tube (B) throughout, a threaded cup (C) at one end and a sealed lid (D) at the other. Around the central tube there are two C.E. pellets and these are embedded in the cast explosive filling of the grenade (25% C.E.: 75% T.N.T.). The weight of the filling is approximately 14 ozs.

As a demolition charge the grenade may be initiated by a detonator inserted in the central tube or by a single lead of cordtex passed through the tube. This latter method enables several grenades to be initiated simultaneously by stringing them necklace-wise on a single cordtex lead. Several grenades can also be initiated simultaneously by stacking them together when the detonation of one will explode the others. In this case it is best to initiate either the central grenade or the one furthest away from the target. Sympathetic detonation will occur so long as the gap between two grenades is not greater than $\frac{1}{2}$ ".

When used as a demolition charge the grenade will hole M.S. plate up to approximately $\frac{3}{4}$ " thickness. It will shatter or seriously crack the majority of cast iron sections. It can be used in emergency as a rail cutting charge, but it is not reliable against heavy rail.

As a grenade a No. 247 (Allways) Fuze (E) must be screwed into the threaded cup of the container. The central tube is plugged at the lid end by a wooden plug and short spring (G). A No. 8 detonator (H) is inserted, closed end first, into the tube from the open end and the Allways Fuze is then screwed into position above the open end of the detonator. The grenade is effective against unarmoured vehicles and personnel.

Instruction for Throwing:

1. Unscrew the bakelite cup from the Allways fuze, taking care the safety tape does not unwind.
2. Hold the grenade in the palm of the hand, gripping the fuze with first finger and thumb in order to hold the tape in place.
3. Throw the grenade with an action similar to throwing a ball.
4. Do not hold on to the tape.

Dimensions: $4\frac{3}{8}$ " x $2\frac{1}{4}$ " x $1\frac{7}{8}$ "
(without Allways Fuze)

Weight: 1 lb (without
Allways Fuze)

Shipping Instructions: Generic Title Grenades, Filled H.E.
Explosive Group VII
Storage and Stowage . II. O.S.S.

Packing and Special Notes:

50 grenades per box each containing in addition five Fuze No. 247 in metal cylinders and five No. 27 or No. 8 Detonators in Magazine Mk. II.

Packing Dimensions: 22" x 17" x 8" Weight Packed 71 lbs.

THE CLAMGeneral Description:

This is a small explosive store intended to serve as a general purpose demolition charge. It has small built-in magnets so that it can be attached instantly to any flat iron or steel surface. It is initiated by a detonator which can be attached to a length of safety fuze, or directly to a time delay mechanism such as the time pencil.

Detailed Description:

The case of the clam (A) is made of Bakelite moulded into an oblong box with rounded corners. At each end there is a compartment containing two magnets (B) which are loosely mounted so that they can grip a slightly uneven surface. The centre compartment of the box is filled with about 8 ozs. of either cast high explosive or of P.E. and closed with a flat lid (C) held in place by four screws. At the top of the body there is a central channel (D) running into the explosive.

In the case of Clams filled with P.E. they will in future be issued with a C.E. primer embedded in the explosive and with double cordtex leads coming from the primer through this central channel. The leads will extend about 2 ft. from the clam body. A detonator plus safety fuze or time pencil can be taped to the leads for initiation, or the leads can be attached to a cordtex main.

If the clam body is issued empty, the clam should be filled with P.E. The explosive should be kneaded well into the cavity, and a primer with twin cordtex leads approximately 2'6" long should be embedded in the explosive. The cordtex leads should then be lead out from the clam body through the central channel. The hole available through which to pass the cordtex leads is not large enough to take twin leads and it should be enlarged with a knife, etc. so that the leads can pass through.

In the case of clams filled with cast explosive, there will be no cordtex leads, and to initiate, a detonator plus safety fuze or time pencil, is fitted in to this central channel where it is held in position by a small clip (E). In transit, a wooden former plug is positioned in the channel. If it is necessary to link a number of cast filled clams together, or to a cordtex main, the best method to adopt is as follows -

Attach a detonator to a length of cordtex and insert into the central channel. Push down the brass clip as far as possible and push the free end of the cordtex up into the socket as far as the detonator hole. If the cordtex is not gripped lightly by the brass clip it can be wedged in by a piece of wood, etc. The cordtex loop obtained by this method can be attached to a cordtex main by a triple roll or can be taped to a parallel cordtex lead.

The explosive charge is such that the clam will hole M.S. plate up to about $\frac{3}{4}$ " thick, and will shatter or crack the majority of cast iron sections.

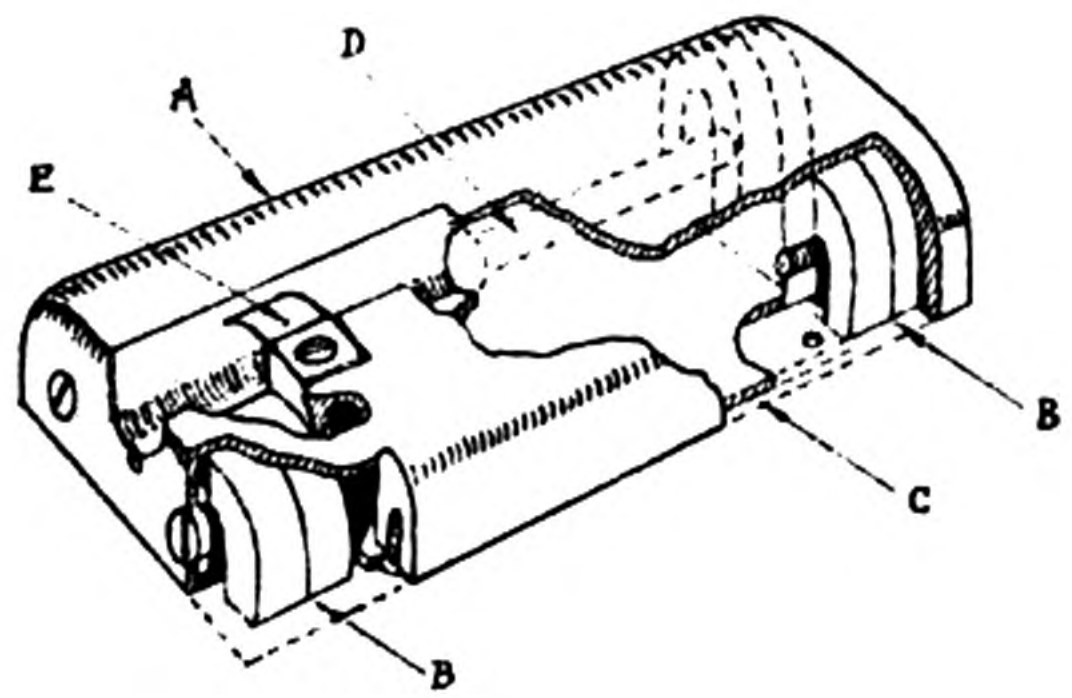
Dimensions: $5\frac{3}{4}$ " x $2\frac{3}{4}$ " x $1\frac{1}{2}$ " Weight: (filled) 1 lb. 7 oz.

THE CLAM (Contd.)Packing and Special Notes:

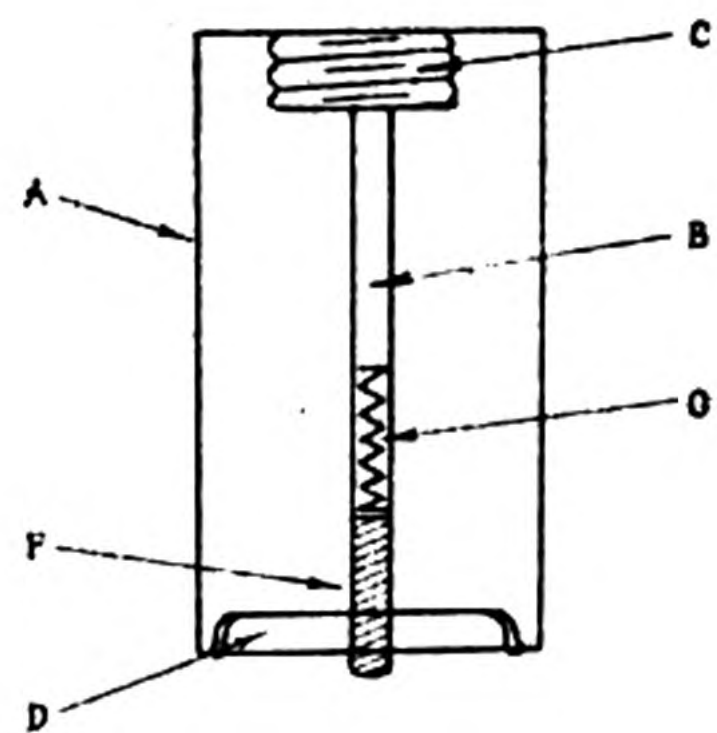
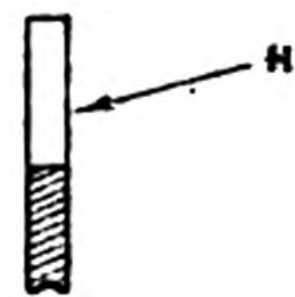
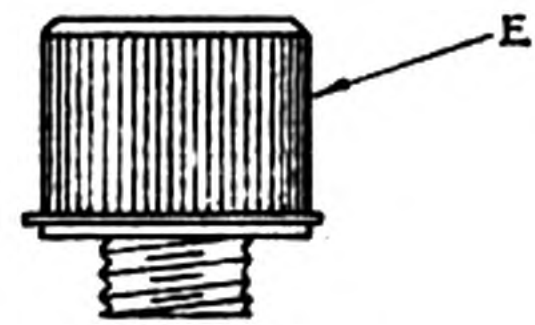
	<u>Dimensions:</u>	<u>Weight</u>
50 filled clams in wooden box	22"x15½"x9"	102½ lb.

Some clams made in U.S. are also available. They are very similar to the clam described above, but the bakelite case is not quite so rounded and of a slightly different size.

The Clam



G.P. Grenade



LIMPETS, RIGID, Type 6.General Description:

This store consists of an explosive charge contained in a metal case to which six magnets are fitted. It is intended for placing on the hulls of metal ships below the waterline.

Detailed Description:

The limpet consists of a rectangular brass container (A) which has a set of three magnets (B) fitted along each side. The magnets are each mounted on a rubber bush (C) to give a little flexibility so that the limpet will hold on a slightly uneven surface. At one end of the container there is a large metal screw cap (D) and each end has a port (E), threaded to take an A.C. Delay. In transit these two ports are fitted with wooden rectifiers. On the side of the container remote from the poles of the magnets there is a bracket (F) into which the lug of a limpet placing rod can be fitted.

Notes on Use:

1. The limpets may be issued filled with P.E. or filled with Pentolite (25/75 PETN/TNT). If issued empty they should be filled with P.E. through the filling hole covered by the large metal screw cap.
2. In practice three limpets are issued connected together by 50 ft. leads of cordtex wound round a small piece of wood. In the case of limpets filled with P.E. this connection is made through the A.C. Delay ports. The end of the cordtex is threaded through and knotted on to a C.E. primer placed inside the P.E. and the cordtex is passed through a small wooden plug which fits into the A.C. Delay port. In the case of limpets filled with cast explosive a special connecting device has to be used. (See Connectors, Cordtex, Limpet).
3. Limpets are normally issued with a keeper plate or with 2 limpets on opposite sides of the same plate. The presence of the plate protects the magnets and cuts down the external magnetic field and hence the effect of the limpets on a compass is minimised. Keep the limpets on the plate till the last possible moment. (See Notes on Magnetic Devices).
4. Tests have shown that a limpet will stay in position on a normal steel ship up to speeds of 10-15 knots. If the ship is very dirty and barnacled the limpet will not adhere so well.
5. The explosive effect of the limpet is not known precisely as it depends on the nature of the ship, the depth at which the limpet is placed, etc. Tests in U.S. on a Liberty Ship with steel plates $\frac{1}{2}$ " - $\frac{5}{8}$ " thick and with welded seams showed that one limpet blew a hole about 6' x 2'6", and another a hole of 4' x 2'6".
Against a double-walled hardwood barge - outer wall 4" thick, inner wall two diagonally laid planks each 2 $\frac{1}{2}$ " thick - a limpet placed at a depth of 4' blew a hole 3'6" x 4'6".

Nomenclature of Limpets.

There are now various different types of Limpets being issued or in production. The correct names, together with their distinguishing features, are set out below:-

(a) Limpet, Rigid, Type 6, Mk. I.

Original Limpet with 6 or 10 magnets, without rubber washer under filling cap. Limpet not water-tight, generally issued empty; 2 Limpets to 1 keeper plate.

(b) Limpet, Rigid, Type 6, Mk. IA.

As above but with rubber washer under filling cap, only 6 magnets.

(c) Limpet, Rigid, Type 6, Mk. II.

Is the Mk. IA modified to take the Fuze. Anti-disturbance (Water-Armed), Mk. II. This Limpet is likely to be filled with P.E. or with cast explosive.

(d) U.S. Plastic Limpet.

This Limpet has a plastic body instead of the normal brass one. In other respects it is similar to the Limpets described. It is normally filled with cast explosive and has no pocket for the Fuze, Anti-disturbance (Water-armed). Mk. IA.

Dimensions: $9\frac{1}{2}" \times 2\frac{3}{4}" \times 1\frac{1}{2}"$. Weight: Empty $7\frac{1}{2}$ lbs.
Full 10 lbs.

Shipping Classification:

Generic Title When filled - Charges, Demolition, Limpet "R".
Explosive Group VII
Storage and Stowage III (To be stowed away from compasses).

Packing and Special Notes: Per pair on Carrier.

Packing Dimensions: $9\frac{1}{2}" \times 5\frac{1}{2}" \times 9"$ Weight Packed:
Empty $15\frac{1}{2}$ lbs. Full 20 lbs.

CONNECTOR, CORDTEX, LIMPET.

Introduction:

Operationally three limpets are normally issued linked together by 50 ft. lengths of cordtex wound round wooden forms. In the case of limpets filled with P.E. this connection is made by attaching a C.E. primer to one end of the cordtex and embedding the primer in the P.E. The cordtex lead is then passed out through a small wooden former inserted in the A.C. Delay port. To facilitate the linking together of P.E. filled limpets and to provide a method of linking cast filled limpets two types of special adaptor have been designed.

The first one, made up from an A.C. Delay body, is intended for use until the second one, which is a specially designed and manufactured adaptor, is available in this theatre.

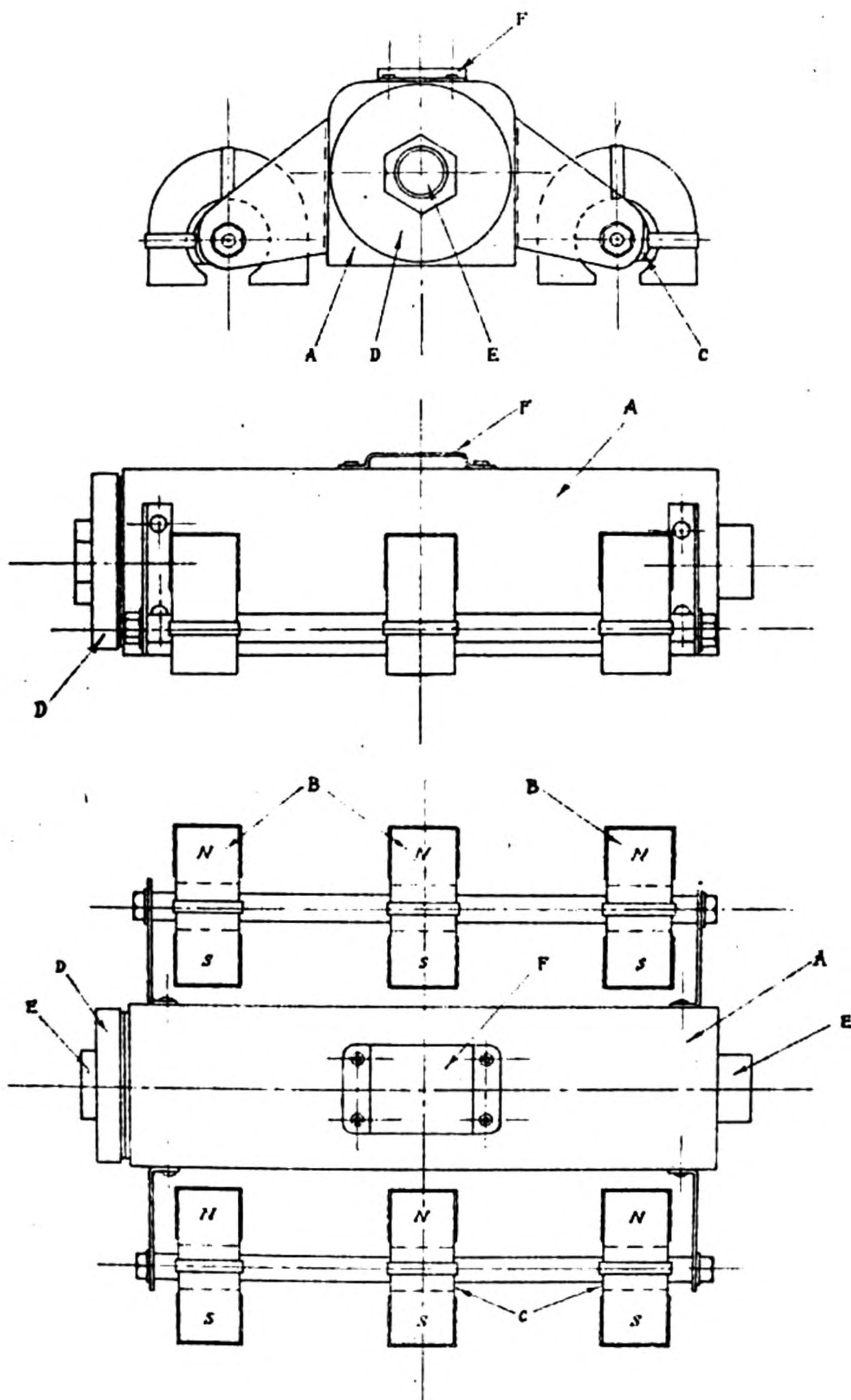
1. CONNECTOR MADE UP FROM A.C. DELAY BODY.

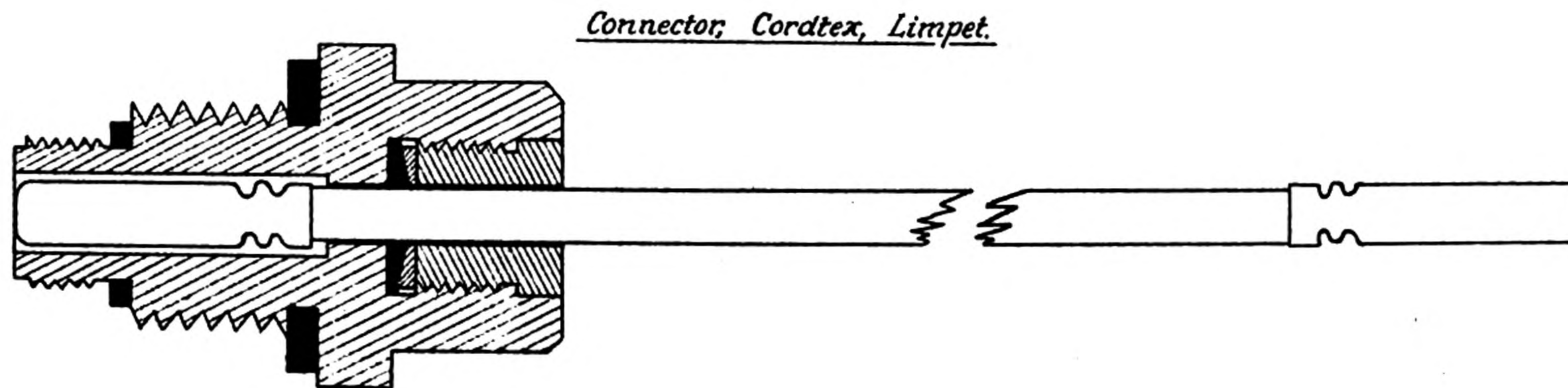
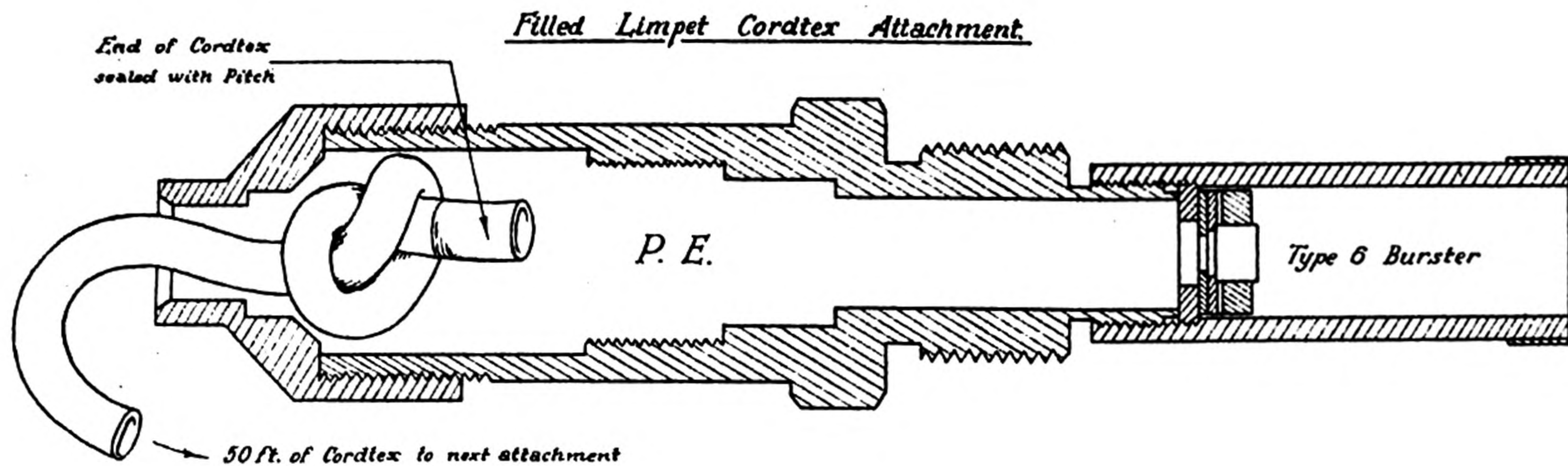
This is made up by filling an A.C. Delay body with P.E. and inserting a knotted cordtex lead at the open end. A type 6 Burster is attached in the normal way and the whole is inserted into the limpet as for a normal A.C. Delay.

2. CONNECTOR, CORDTEX, LIMPET.

This device has been specially manufactured and will replace the modified A.C. Delay Body as soon as it becomes available. Details will be circulated later when available.

Limpet, Rigid, Type 6.





NOTES ON THE DESIGN, USE AND TREATMENT OF MAGNETIC DEVICES.1. Types of Magnet

Three types of magnet are normally used by S.R.D. and details are summarised as follows :-

<u>Magnet</u>	<u>Dimensions</u>	<u>Weight</u>
Plain Horseshoe	2 $\frac{1}{4}$ " x 1 $\frac{3}{4}$ " x 1"	8 ozs.
Horseshoe with toes	2 $\frac{1}{2}$ " x 2" x 1"	10 ozs.
M.C. 571 type	4 $\frac{1}{2}$ " x 2 $\frac{5}{8}$ " x 1 $\frac{1}{2}$ "	45 ozs.

The type 6 Limpet is fitted with the plain horseshoe type. The $\frac{1}{2}$ lb magnets are issued 120 in a case, 20" x 12" x 6" and weighing 69 lb.

2. Magnetic Pull.

The pull of typical magnets of the above type on a $\frac{7}{8}$ " steel plate are summarised below:-

<u>MAGNET</u>	<u>TREATMENT AFTER MAGNETISATION.</u>	<u>PULL IN LBS. WGT. AT A GAP OF:-</u>			
		<u>1/32"</u>	<u>1/16"</u>	<u>1/8"</u>	<u>1/4"</u>
Plain Horseshoe	Stabilised (by pulling off MS plate 5 times)	15	9	4 $\frac{1}{2}$	2
" "	Opposed (by a similar magnet in contact)	9	5 $\frac{1}{2}$	3	1
Horseshoe with toes	Stabilised	17	10	5 $\frac{1}{2}$	2 $\frac{1}{2}$
" "	Opposed	10	6	3 $\frac{1}{2}$	1 $\frac{1}{2}$
MC 571 type	Stabilised	45	25	14	7
	Opposed	30	18	10	4

The pull will not vary with the thickness of the mild steel plate down to $\frac{1}{4}$ " thick, and most targets, e.g. ships' sides, are quite thick enough for these pulls to be obtained. Below $\frac{1}{4}$ " thickness the pull falls rapidly for the large type magnets. The pull will vary considerably with the type of steel pulled, and some steels will not be attracted to any appreciable extent, e.g., manganese steels used in German tank tracks are almost non-magnetic.

3. Care of Magnets.

The following notes have been prepared as a guide for the avoidance of damage:-

- (1) If possible, keep magnetic devices together in pairs until required for use, or, if they are supplied singly, e.g., limpets, leave them on their keeper plates. (This procedure will also help to reduce the disturbing effects which the magnets have on compasses).

- (ii) DO NOT on any account oppose the magnets, i.e. do not place them so that they can be felt to repel each other. For magnets marked with an "N" this means never put the Ns. together.
- (iii) When you stick a magnet on to a metal plate, always put it on squarely. NEVER put one on SIDEWAYS.
- (iv) DO NOT heat magnets to high temperatures, such, for example, as would be required for soldering. Magnets are not appreciably affected by ordinary climatic variations of temperature, but should not be exposed unnecessarily to heat or cold.
- (v) Store pairs of magnets at least $\frac{1}{2}$ " apart whenever possible. If they must be piled, put pieces of wood between. Use wooden trays of $\frac{1}{2}$ " wood with wood spacers. Paper wrapping also aids in prevention of loss of magnetisation by too close proximity of pairs and by attraction of iron dust or filings. Do not tip magnets out of case into a heap and then stack them carefully in correct manner.
- (vi) The strength of a single magnet is not affected by immersion in fresh or salt water. In composite magnetic devices, however, there is a possibility of rust forming by the prolonged action of moisture on surfaces between parts of the device and this may have an adverse effect on the magnetic strength. Magnetic devices should, therefore, not be exposed unnecessarily to moisture.
- (vii) DO NOT PLAY with magnets.

4. Storage of Magnetic Devices.

If it is necessary to store limpets for some time under indifferent conditions, the magnets should be carefully greased with vaseline, or preferably lanolin, to prevent the attack of moisture. Care should be taken that the grease is not allowed to come into contact unnecessarily with the rubber bushes on which the magnets are mounted. The limpets should be left on their keeper plates.

A film of rust on the magnets will not appreciably lower their performance, but it is desirable to keep them free from rust as far as possible.

5. Testing of Magnetic Devices.

As magnets are very liable to lose their magnetism on storage and during transit they should be tested before issue to the field. In testing the general rule to adopt is that a single magnet should lift thirty times its own weight. Thus a standard Type 6 Limpet should be able to lift 90 lbs. weight (i.e., 6 $\frac{1}{2}$ lb. magnets each lifting 15 lbs.)

Limpets and other composite magnetic devices can be tested by a simple method involving little equipment. A mild steel plate 1" thick and about 1 ft. square has a hook screwed centrally into one side. The other (top) side of the plate should be completely free from rust and pitting and should be flat to within at least .010", preferably .001". The plate should be weighed and weights should be available for attaching to the hook so that the total weight may be varied in 10-lb steps up to a total of about 150 lbs.

A limpet can now be readily tested by seeing whether if placed centrally on the top of the plate it can, with a steady upward pull, lift a total weight of 90 lbs. In carrying out the test do not jerk the limpet upwards with a sudden pull.

For testing single magnets a similar method can be adopted. In this case, however, better results are obtained by measuring the magnetic pull at a gap of $\frac{1}{16}$ ". This is done by having a circular piece of M.S. plate with two $\frac{1}{16}$ " thick brass discs on one face in such a position as to take the poles of the magnet. In the case of the plain horseshoe the plate plus disc should weigh 8.82 lbs. For the horseshoe magnet with toes it should weigh 9.92 lbs. If the magnet can lift the plate with a steady pull upward it is satisfactorily magnetised.

6. Method of re-Magnetisation.

If the magnets do not pass the tests described in 5, they can be remagnetised by a simple method outlined as follows:-

The apparatus needed is a car battery, 12 volt, fully charged (or any other source of 12 volt D.C.); some pieces of clean iron, or mild steel at least $\frac{1}{2}$ " thick (a vice with 3" jaws does very well), and a pound or more of 14 S.W.G. (2 mm. diameter) well insulated copper wire. The wire is wound into a thin coil about 3" x 2" x 1" bound together with tape. One lead from the coil is soldered to a copper rod, the other being left free.

The first step in the process of remagnetisation is to find the N. pole of the magnet. This may be marked - (a) by an "N" etched on the pole face (b) by a dimple on the side of the pole face (c) by a grinding mark on the side of the pole face, or (d) by a spot of red paint. The magnet is then placed inside the coil with its poles on the blocks of iron and the free lead from the coil is attached securely to the negative terminal of the battery. Grasping firmly the copper rod which is soldered to the other lead from the coil, press it hard on the positive battery terminal (which should be thoroughly clean) for approximately one second. (To estimate one second count "one, two, three, four" as quickly as possible). Keep your face away in case molten lead spurts from the terminal. Repeat the operation three times. The magnet will now be magnetised to full strength.

It is possible by the above method to get the magnet remagnetised the wrong way round so that the North Pole has now become a South Pole and vice versa. To avoid this, do one magnet and test it against a magnet which has not been remagnetised. If the poles of the two magnets marked "N" repel each other, then the magnet has been placed in the coil the right way round. The coil should now be marked with a splash of red paint or an "N" on the side on which the N. pole of the magnet was placed. The copper rod should also be marked with a red band to denote that it is to be used on the positive terminal of the battery. If the arrangement is always used in this order, it will give correct results.

If the marked "N" poles of the two magnets compared above attract each other, the magnet under test has been remagnetised the wrong way round. It should, therefore, be replaced in the coil in the opposite position and the procedures repeated.

The following precautions must be taken:-

- (a) The blocks of steel must be clean and flat to make good magnetic contact. Do not use rusty pieces.
- (b) After doing about twenty magnets, recharge the battery.
- (c) Remove the magnet by levering it with a bar of brass or wood, if you cannot pull it off easily.
- (d) In dealing with composite magnetic devices, mark the position of the North Pole of each magnet before taking the device apart. Remagnetise each magnet separately and replace each in its original position. THIS IS IMPORTANT.
- (e) Mild steel only may be used. Armour plate or other hard steels are quite unsuitable.

Source: London Laboratory Contribution No. 60, October, 1943.

M.D.I. ALTIMETER SWITCH.General Description:

The switch consists of a bakelite head (1) containing the firing mechanism which operates when atmospheric pressure drops to a pressure corresponding to a height of between 5000 and 7000 ft. above mean sea level, and a flexible rubber sleeve containing the charge (2).

Detailed Description:

The bakelite head (Fig. 2) is in two parts (3 & 4) which are screwed together.

The lower part (4) contains a battery coil spring (6) from which a contact strip (7) leads to an external terminal (8) for an electric lead.

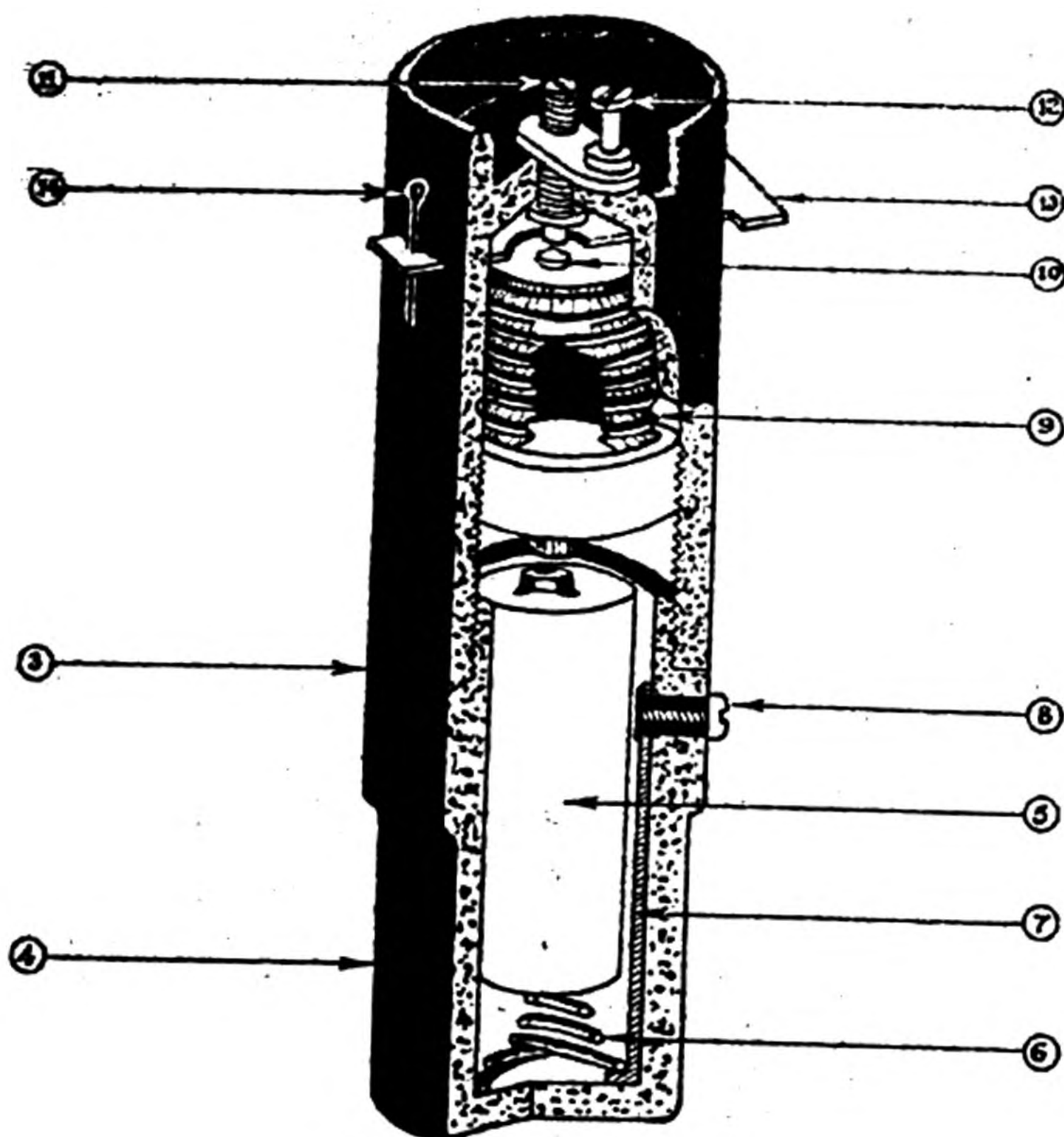
The upper part (3) contains a copper bellows (9) which is filled with air at atmospheric pressure and is therefore capable of expansion when the external pressure drops with increase of altitude. The lower end of the bellows (9) is in contact with the top end of the battery (5) and the top end of the bellows carries a stud (10) which makes contact with the lower end of the adjusting screw (11), when the bellows expand sufficiently. The adjusting screw (11) passes through a plate carrying a terminal (12).

When not in use the stud on the bellows (10) is kept apart from the lower end of the adjusting screw (11) by a bakelite safety key (13) which is kept in position by a split pin (14).

Fig. 1 shows the complete device. The rubber sleeve (2) contains $11\frac{1}{2}$ ozs. P.E. and has, at the closed end (15), a 1-oz. C.E. primer with a hole to take the detonator. Electric leads (16) run from the terminals (8 and 12) and are taped to the head and rubber sleeve; the leads terminate in an electric fuse igniter or "puffer" (17) to which a No. 8 detonator can be crimped.

Method of Use:

1. Remove safety pin (14) from bakelite strip (13) and remove strip. Ensure that the strip can be removed easily.
If any force is necessary the mechanism is defective and the device must not be used.
Replace strip (13) and safety pin (14).
2. Remove clip (12a) from terminal (12) and unscrew top half of bakelite head (1). Test battery with spare puffer and insert (plain end first) into lower half of bakelite body.
3. Screw on top half of bakelite head (1). Reconnect clip (12a) to terminal (12).
4. Inspect electric fuse igniter (17). The colour of the firing head inside the small cardboard tube should be white. If it is black, discard the whole mechanism, as the igniter will already have fired.
5. Crimp a No. 8 detonator on to the electric fuse igniter (17). Ensure that the leads are loose enough for this detonator to be inserted into hole at the base of the rubber sleeve.
6. When the charge is ready to be placed in position, withdraw the safety pin (14) and bakelite safety strip (13) and insert detonator into hole at base of charge.



3. Bakelite Head (Upper Part)
4. Bakelite Head (Lower Part)
5. Battery
6. Battery Coil Spring
7. Contact Strip
8. External Terminal
9. Copper Bellows
10. Stud on Bellows
11. Adjusting Screw
12. Terminal
13. Bakelite Safety Key
14. Split Pin

Fig. 2

M.D.1. ALTIMETER SWITCH

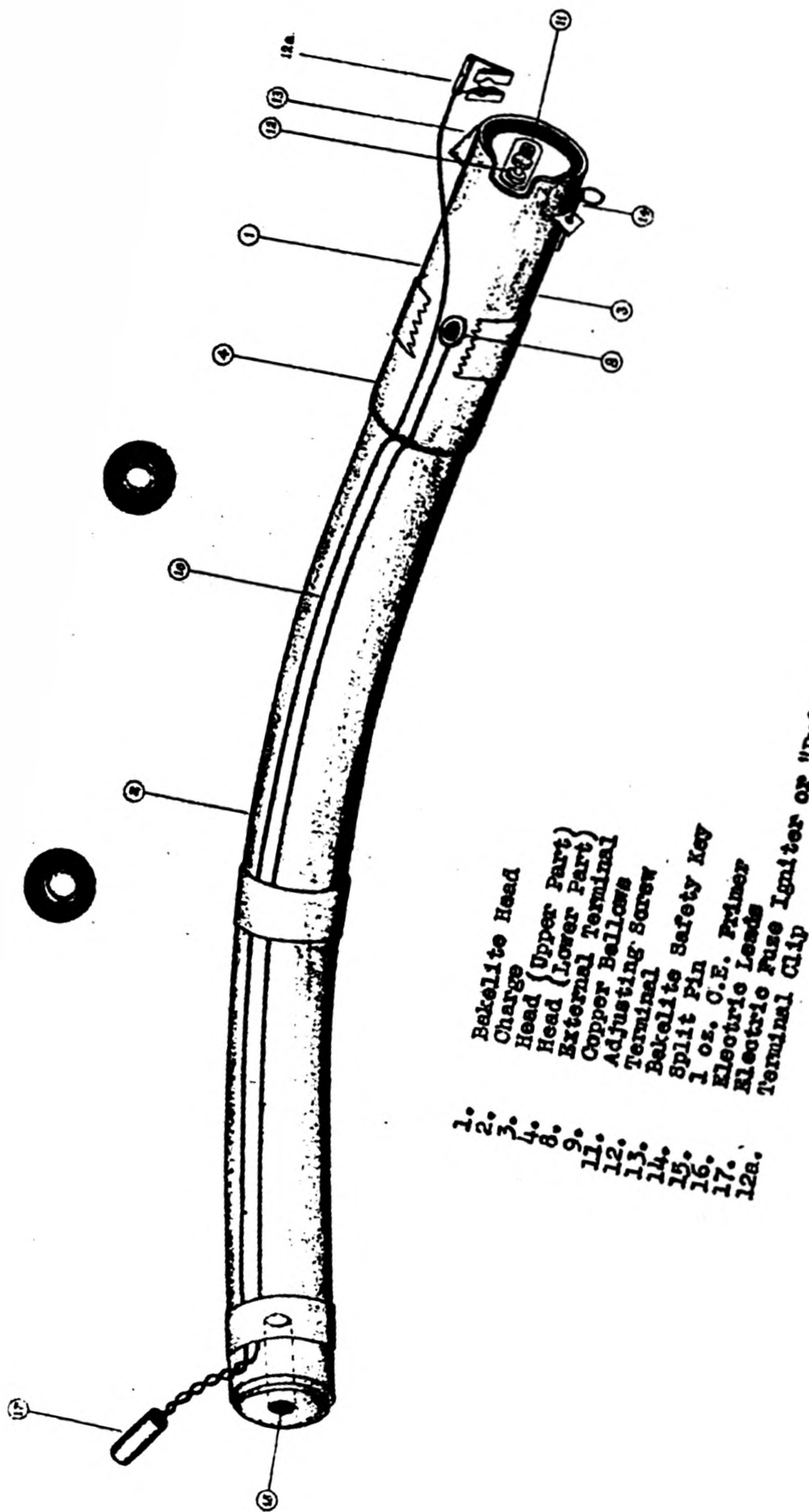
Designed by
 Drawn by
 Traced by *R. Inglis Pte.*
 Traced from *London Report.*
 Checked by

DATE

29.11.44

DWO NO

D36

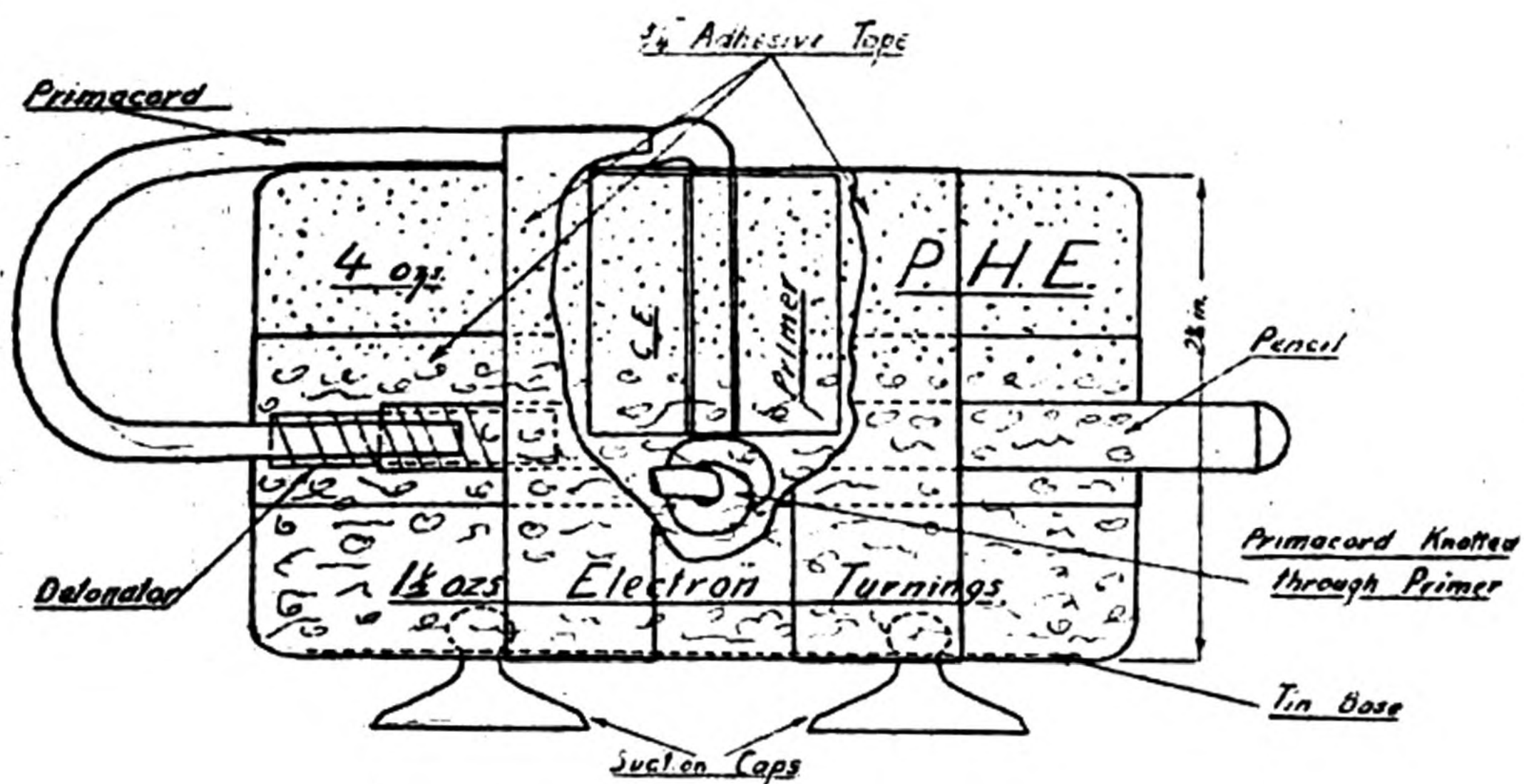


Bakelite Head
 Charge
 Head (Upper Part)
 Head (Lower Part)
 External Terminal
 Copper Bellows
 Adjusting Screw
 Terminal
 Bakelite Safety Key
 Split Pin
 1 oz. C.E. Primer
 Electric Leads
 Electric Fuse Igniter or "Puffer"
 Terminal Clip

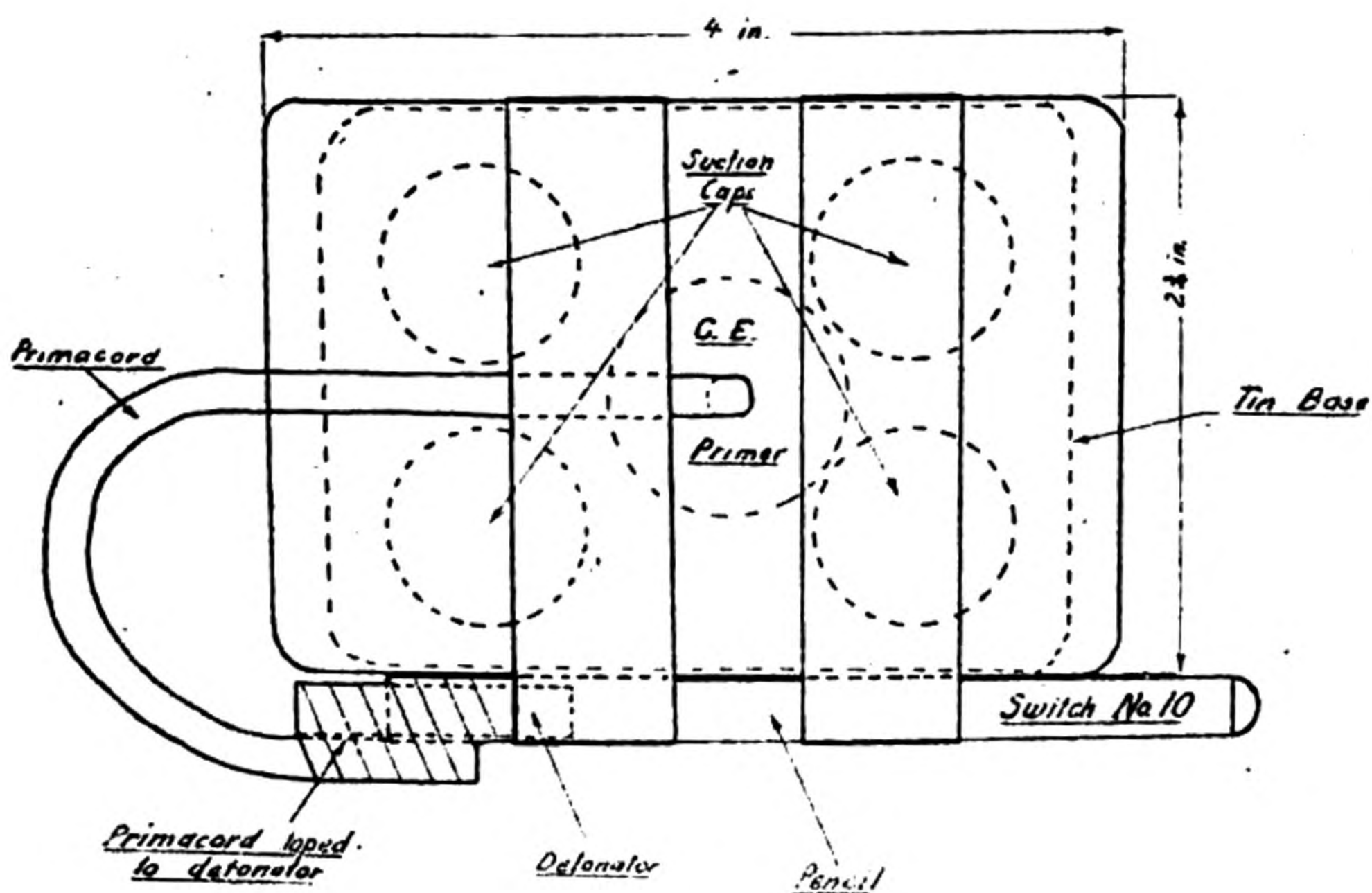
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Fig. 1.

M.D.1. ALTIMETER SWITCH	
Designed by	DATE
Drawn by	4.12.44
Traced by R. Inglis Pte.	
Traced from London Report	
Checked by	
DWG NO D35	



WING CHARGE



General Description:

A charge designed for cutting a hole out of the side of an oil storage tank, or generally for attacking liquid backed targets. When attacking oil storage tanks the charge is used in conjunction with a tar baby.

Detailed Description:

The charge utilises a strip cavity charge in which the cavity is ridged-shaped and metal lined, i.e., the cross-section of the strip is W-shaped. Four lengths of the strip cavity are welded together to form a square framework. Two sizes are used - 8" x 8" and 16" x 16". The strip is filled with P.E. and a C.E. primer is placed centrally in the explosive on two opposite sides of the frame. Twin cordtex leads are attached to each primer, the cordtex being passed through the central hole in the primer and then doubled back on itself.

Four magnets are attached to the framework so that the charge may be readily applied to the target, and the P.E. is kept in position by taping or wrapping in rubberised fabric.

The charge is initiated by a detonator attached to the cordtex leads and it will cut a square hole out of 3/4" - 1" liquid backed steel plate. It will be noticed that the resulting hole will be much larger than the actual surface covered by the explosive.

Notes on Use:

1. In filling press the P.E. well home and fill until the explosive is just level with the top of the strip. Build up the explosive around the C.E. primers.
2. It is essential that the V-shaped cavity on the underside of the charge should be left completely clear; the charge should not be used under water unless the cavity is sealed.
3. A method of fitting the standard Anti-Removal Fuze (ir-armed) to the wreath charge is being developed and details will be circulated when the method is finalised.

Dimensions: 8" x 8"

Weight: (full) 7 lb. 4 1/2 oz.

Packing: 2 are provided in Demolition Unit F packed in sealed container or webbing pack.

Source: Filed reports.

CHARGE, BEEHIVE, 6" (AUST.)

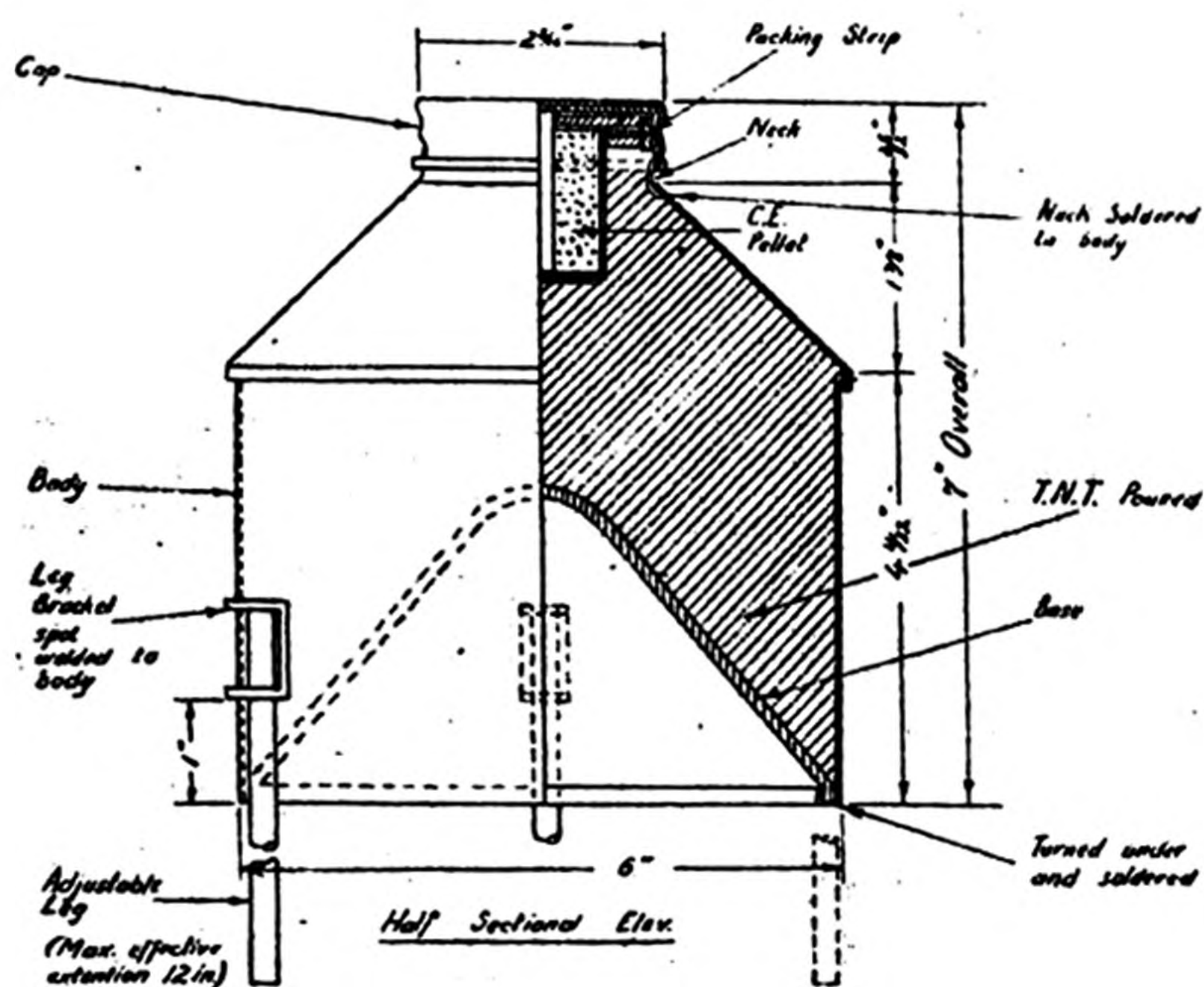
This is a standard army store and will probably not be much used by S.R.D. parties owing to its size, weight, etc. The explosive charge, 6 3/4 lbs. of 75/25 TNT/PETN, is cast so that at one end there is a hollow cone cavity. The explosive is contained in a case provided with adjustable logs. At the top of the charge, i.e. remote from the cavity a small lid and piece of fabric beneath it cover a primer into which a normal detonator can be inserted.

When placed at the optimum distance from the target, i.e., 4 1/2" away, the charge will penetrate 8" mild steel, 5" armour plate, 33" reinforced concrete. It will also fragment an 8' diameter boulder.

The total weight of one beehive charge is 10 lbs. and four are normally packed in a strong cardboard cylinder with a total weight of 50 lbs.

Source: M.E. Vol. IV. Pt. I 1942. Trended 1 June, 1943.

— 6" BEEHIVE CHARGE —



CAVITY LINK CHARGES.General Description.

Separate cavity links are provided which can easily be fitted together to form a square or rectangle or can be used separately. In the form of a square the charge is analogous to a wreath charge, but the wreath need not be made up until the last moment and hence carriage in transit is made easier.

Detailed Description:

Two shapes of link are provided, one straight and 6" long (A), the other right-angled, with its outer sides 3" long (B). In cross-section both types are W-shaped, the long sides being parallel, $1\frac{1}{2}$ " long and $1\frac{1}{2}$ " apart and the cavity formed by the central links of the W is right-angled and about $\frac{3}{4}$ " deep. The links have at each end fittings (C) consisting of a metal strip made to slide under two $\frac{1}{2}$ " brackets (D); by means of these the links can be easily and securely fixed together.

They are filled with explosive before being joined together and can then be fitted into square or rectangular shapes as desired; they could also, using straight links only, be used to make a single straight cut across a plate.

Each link will penetrate a $\frac{3}{4}$ " - 1" M.S. liquid backed plate.

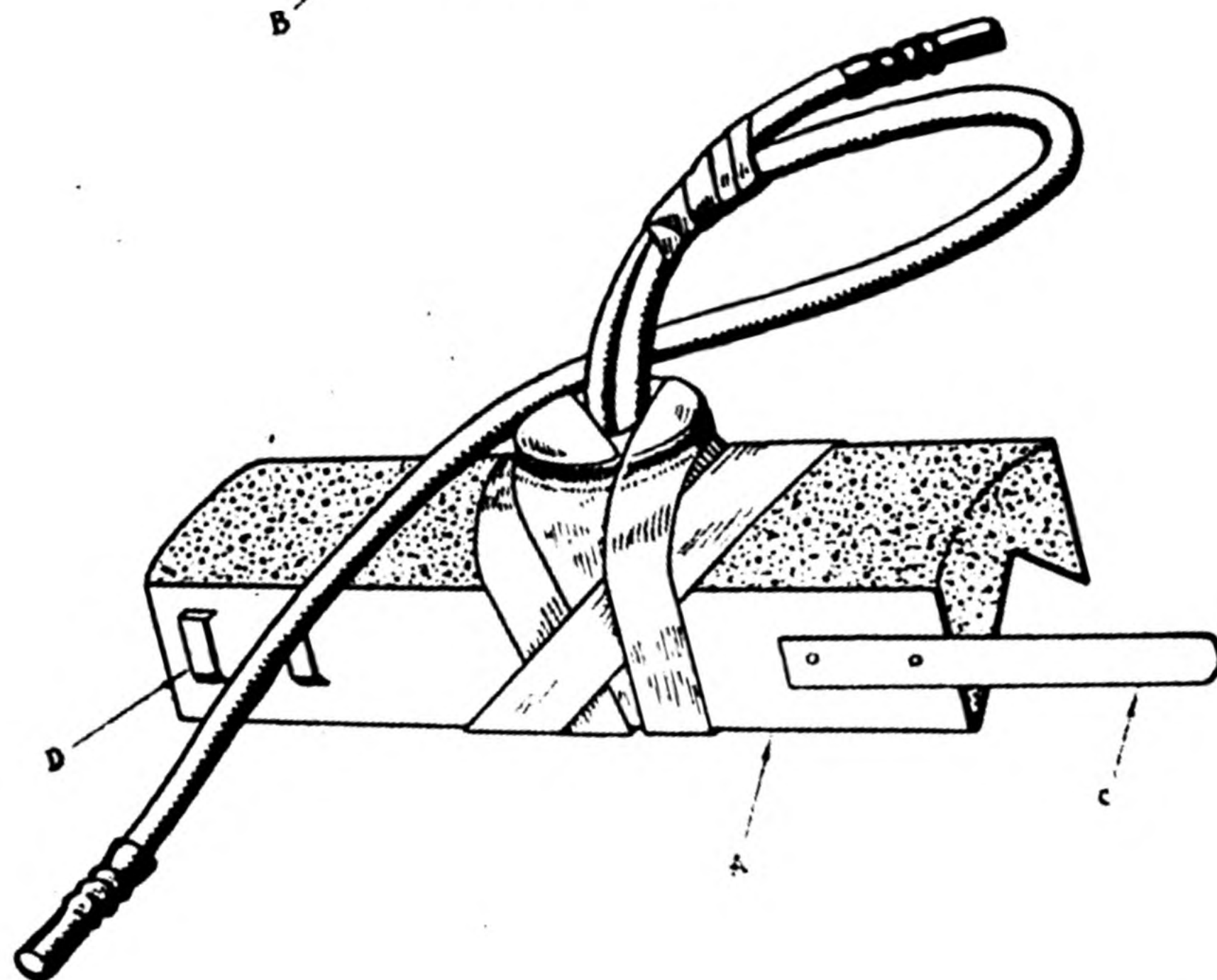
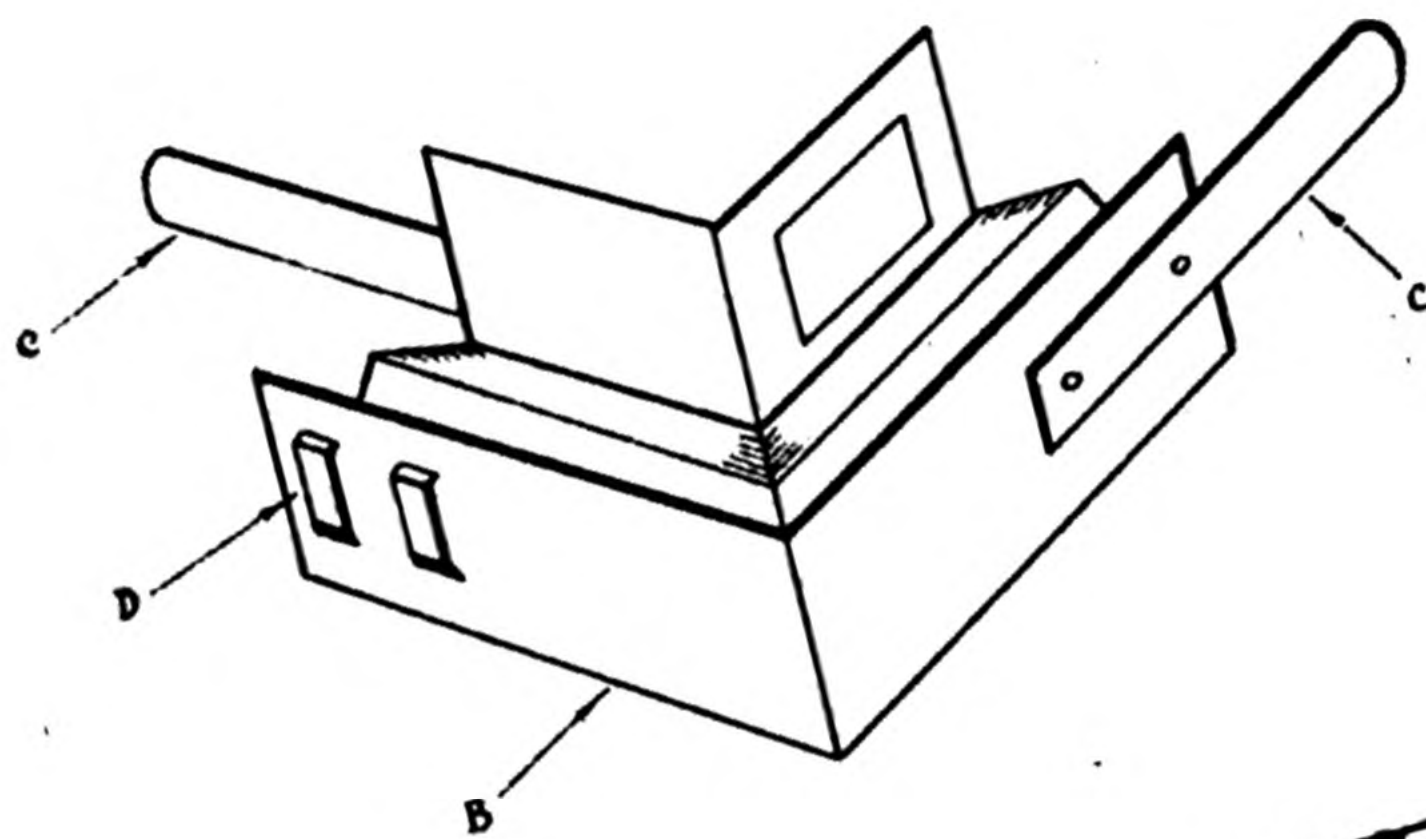
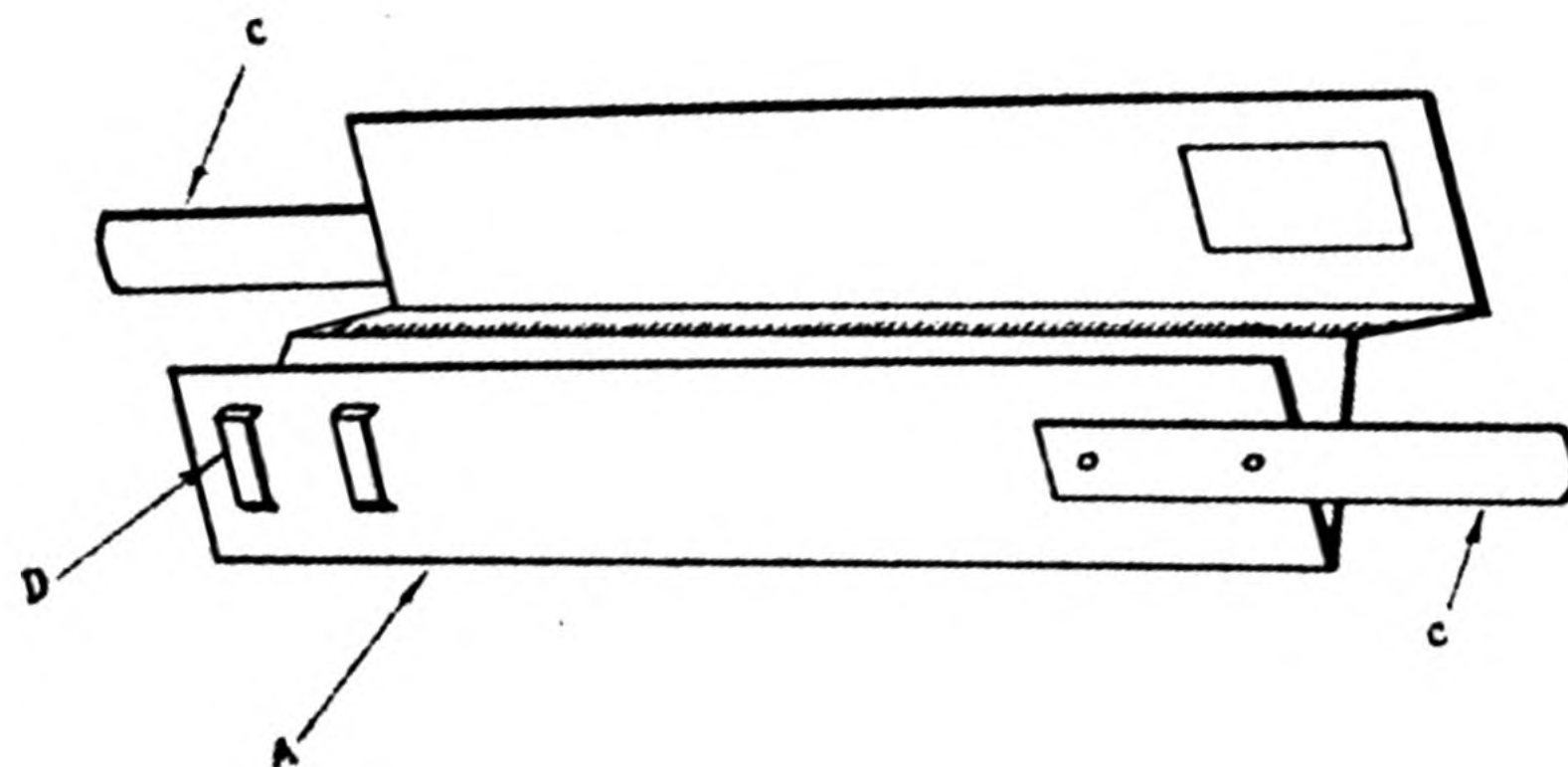
Notes on Use:

1. To fill the links coat the inside with a thin layer of vaseline. Then carefully fill with P.E. making sure that the explosive is pressed well down into the cavity and that there are no air holes. Each link will take about 8 ozs. of P.E.
2. Make sure that the P.E. extends to the ends of each link so as to give ^{good} contact between the explosive in adjacent links.
3. If the links are to be used under tropical conditions the explosive should be covered over to prevent it running. The cavity should be left clear and the charges should not be used under water unless the cavity is sealed.
4. The charge is initiated by two C.E. primers placed on opposite sides of the framework. Place the primer in the P.E. and mould a little extra explosive round it. Cordtex is led through the central hole of the primer and doubled back to give twin leads. The primer may be taped in position.
5. Attach the charge to the targets by magnets, etc.

Packing Details, etc. Not yet available.

Source: London Descriptive Literature, 31.10. 44.

Cavity Link Charge



The cavity effect was first observed in 1889 by Monro, and independently in 1914 by Neumann. They noticed that a groove cut into a block of explosive gave a corresponding groove in the target. This effect has been extensively investigated in recent years and considerable progress has been made in the design of charges and devices which utilise the effect.

General Description of Cavity Effect:

When a block of explosive is fired against a steel plate the result depends mainly on the thickness of the plate and the weight of the charge. If the charge is large enough in relation to the plate thickness a hole roughly corresponding to the size of the charge will be made in the plate (Fig. A). If too small, a scab will be blown off the back of the plate and a shallow dent made in the top surface of the plate (Fig. B).

When a cavity charge, made by forming a small cavity or hollow in the base of an equal weight of explosive, is used the results are different. A deep crater is produced in the plate whatever its thickness, the depth of penetration depending mainly on the weight of the charge (Fig. C). Unlike a block charge too, a cavity charge gives deeper penetration when fired at a distance away from the plate.

Mechanism of the Effect:

The full mechanism of the effect is not known but some progress has been made in the investigation being carried out, especially by the study of X Ray photographs.

In the simplest case the cavity or hollow in the charge is conical and lined with metal. On detonation the liner tends to collapse and the walls coalesce (Fig. D.1, 2 & 3) beginning at the apex. Simultaneously, the pressure of the explosion forms the collapsing liner into a jet of hot metallic particles, and the action may be compared with the squirting of toothpaste from a tube which is suddenly pressed (Fig. D.4, 5 and 6).

The jet of hot metallic particles coupled with the detonation wave is the cause of the cavity effect and it is apparent that an air space between the charge and the target is necessary to allow for proper development of the jet.

In the action of a normal block charge there is no such jet of material and the effect of the explosion is caused by the passage of a shock wave (in the form of a compression wave) through the target, which may either hole the target or drive off a scab (Fig. E). The effect may be compared to a line of railway trucks being hit by a shunting engine. The shock or compression wave is transmitted along the line of trucks to the last truck which is projected forward.

Details of Cavity Effect:

Although the general principle of the cavity effect is simple the actual results obtained depend on various factors, as follows:-

- (a) Shape of Cavity. The best results are normally obtained with an 80° hollow cone, or a strip of 80° 'V' shaped section. The efficiency of the latter is less than the former, but both are far superior to a plain charge. If the charge is used several diameters away from the target a hemispherical hollow or strip of semi-circular cross-section gives good results.

(b) Nature and Thickness of Lining: Different metals and different thicknesses of metal give varied results when used as the cavity lining. With the optimum thickness the order of penetrating power in steel targets is lead, zinc, tin, copper, steel. In practice, however, the differences are not very great. The optimum thickness of lining diminishes from lead to steel. For steel it is about $1/30$ to $1/50$ th of the charge diameter and in general, the thickness can be estimated since best results are obtained if the total weight of the lining is just less than the weight of the explosive.

(c) Position of Charge with respect to Target. The optimum distance of the charge from the target in the case of cones and hemispheres is about 1 to 2 charges diameter. In the case of strip charges good results may be obtained with the charge in contact with the target.

(d) Material between Charge and Target. It is essential that the cavity be left quite free from obstruction. If used under water the cavity must be sealed.

Examples of Service Application:

The following list gives some examples of the use of cavity charges:-

Beehives - Cast explosive with hollowed out cone.
 P.I.T.. Bomb - Hollow charge anti-tank bomb.
 Bazooka Bomb - " " " " "
 Wreath Charge - Example of strip cavity charge.
 General Wade Charge - Hemi-spherical hollow charge intended for breaking sea walls, etc.

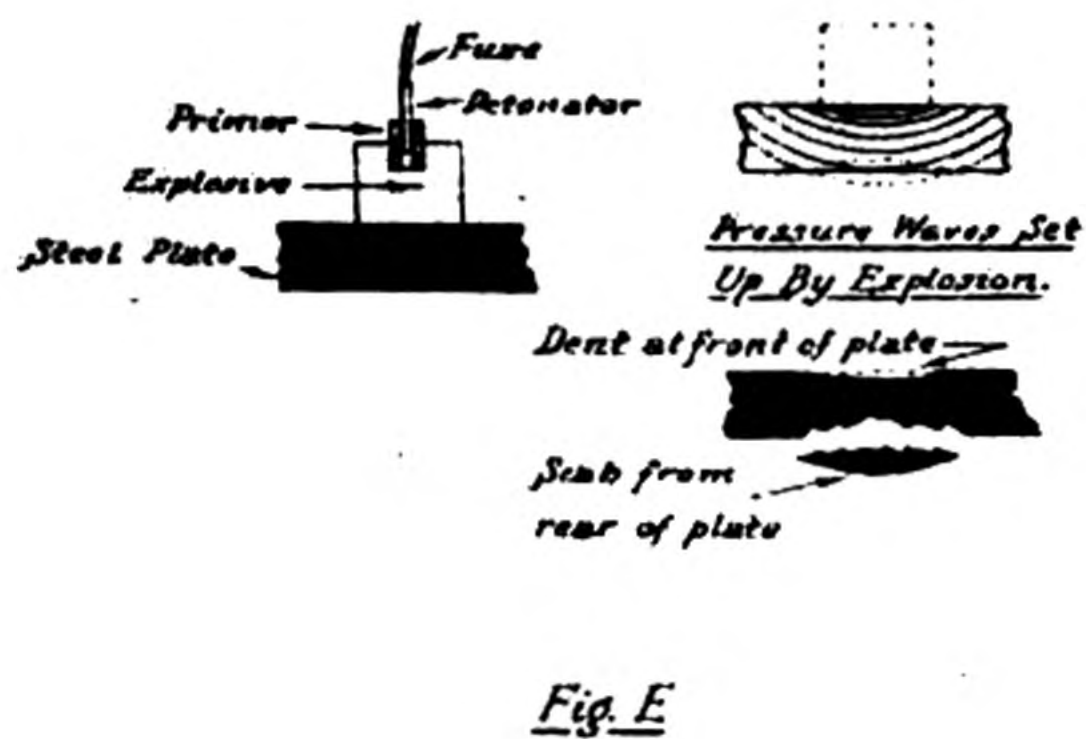
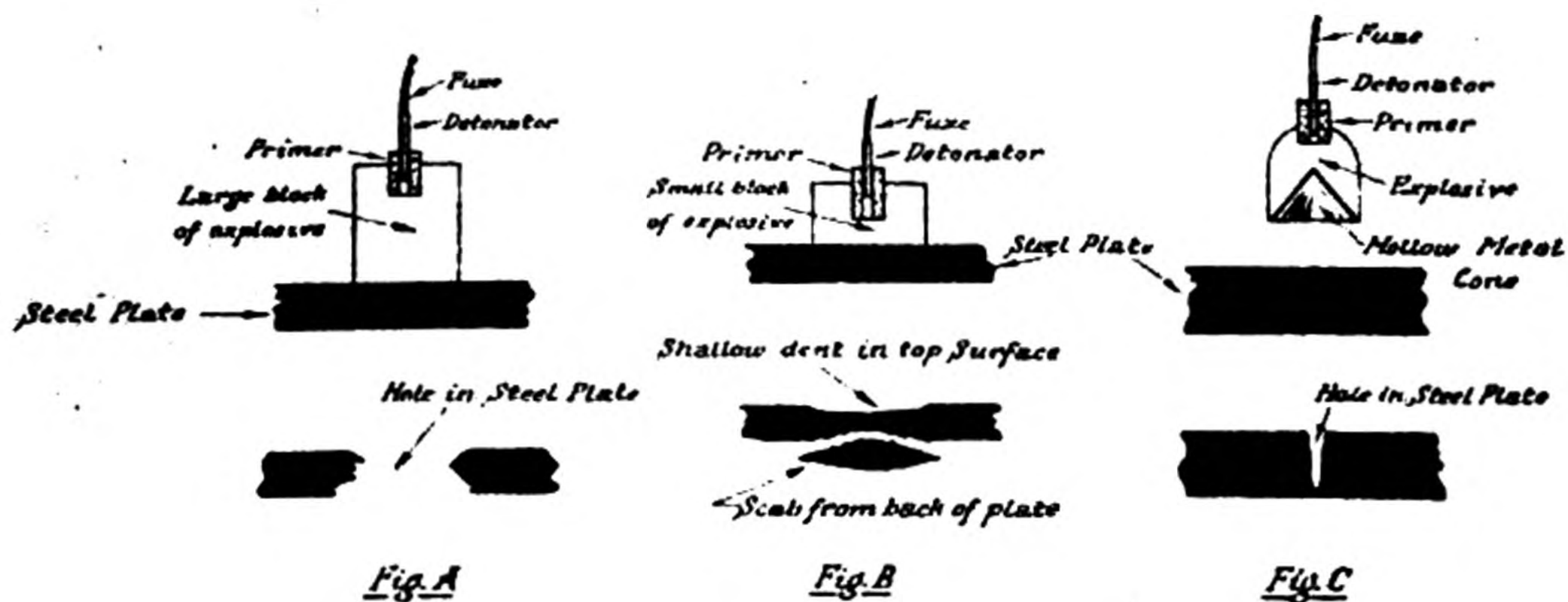
Choice of Target for Cavity Charge:

Cavity charges are intended for use against special targets, such as :-

- (1) Very resistant targets, such as reinforced concrete.
- (2) Pipe lines, oil tanks, transformers, etc., where steel plate is backed by water or other liquid.
- (3) Multiple air-spaced targets, such as spaced tank armour.
- (4) Targets where perforation of a small part will ruin the whole.
- (5) Targets where direct contact with vulnerable points is impossible.

In deciding whether the use of cavity charge is advisable or not it must be remembered that the extra weight of the cavity lining and the inflexibility of the charge may render the carrying and placing of the charges more difficult than for a straightforward charge. The use of a specialised charge is also a hindrance if any unforeseen alteration in the method of attack is necessary.

The Cavity Effect



DEMOLITION EQUIPMENT.

SECTION IV.

ACCESSORIES FOR USE WITH PREPARED CHARGES.

Detonator Magazines.

Holdfast Magnetic Mk. I.

Holdfast Magnetic Mk. II.

Rods, Collapsible, Placing, Limpet.

Rigid Placing Rod.

Spike Attachment.

Fuze, Anti-Removal (Air-Armed), Type III.

Fuze, Anti-Disturbance (Water-Armed), Mk. I. L.

DETONATOR MAGAZINES.

Three types of detonator magazines are liable to be found with S.R.D. stores as follows:-

1. Detonator Magazine Mk. I.

This consists of a cylindrical bakelite body with holes drilled in an outer and inner circle. The outer circle has 11 holes and the inner 5, each hole being the right size to take one No. 8, No. 27 or No. 6 detonator. At either end there is a transparent plastic cover pivoted centrally to the bakelite body; at one end the cover is holed to enable detonators from the outer ring to be inserted and extracted and the other cover is holed opposite the inner ring.

The detonators are normally protected by the addition of sawdust, but they are not protected against dampness as the magazine is not waterproof.

Catalogue No. H.21.

Dimensions: $2\frac{3}{16}$ " long x $1\frac{7}{8}$ " diam. Weight: (empty) $3\frac{1}{2}$ oz.

2. Detonator Magazine U.S.

This is very similar to the Mk. I magazine described above but it is somewhat longer in the body.

3. Detonator Magazine Mk. II.

This is a waterproof magazine which consists of a cylindrical plastic container with a screw cap which screws down on to a plastic washer. It holds five No. 27, No. 8, or No. 6 detonators which are inserted on to a felt pad in the bottom of the magazine. The magazine may also be used for carrying copper tube igniters, Fuzees, etc.

Catalogue No. H. 26 (replacing the Mk. I magazine).

Dimensions: $2\frac{1}{8}$ " long x 1" diam. Weight: $\frac{1}{2}$ oz. empty.

Shipping Classification:

Generic Title	Magazines, Detonators.
Explosive Group	X
Storage and Stowage	III. M.S.D.

Packing and Special Notes.

The above Shipping Classification only applies when Magazines are sent out with Detonators.
130 filled magazines are packed in a stout wooden box. All spaces being filled with sawdust.

Packing Dimensions:

Various sized boxes may be used.
Usual case for detonators is Box W.3
Mk. IV, 16.3" x 6.125" x 7.4.

Weight Packed:

Box W. 3 Mk. IV
holding 130
Magazines loaded
with detonators
weighs 11 lbs.

HOLDFASTS, MAGNETIC, Mk. I.

This is the present standard type of Holdfast. It consists of eight $\frac{1}{2}$ lb. plain horseshoe magnets mounted in two rows of four each on a brass frame to which a handling line is attached centrally. It is intended to provide a hold for folboat parties whilst placing limpets.

The pull/weight ratio is 8.3 and the pulls on contact and at a gap of $\frac{1}{16}$ " are 120-150 lbs. and 60 lbs. respectively.

Notes on Use:

1. The instructions and precautions described in Notes on Magnets apply fully to magnetic holdfasts.
2. In placing in position apply one edge first and slowly tilt the holdfast on to the side of the ship. This minimises the noise made when the magnets come up against the ship.

Catalogue No. K.177.

Dimensions: Single Length $9\frac{1}{2}$ ". Width $6\frac{3}{8}$ ". Weight: $7\frac{1}{2}$ lbs.
Depth $1\frac{3}{4}$ ".

<u>Packing and Special Notes:</u>	<u>Dimensions:</u>	<u>Weight:</u>
In pairs on carrier Stow away from compasses.	$9\frac{1}{2}$ " x 8" x $3\frac{1}{2}$ "	17 lbs.

HOLDFAST, MAGNETIC, Mk. II.

This consists of a single M.C. Type magnet with a central handling line and a brass gate-handle pivoted to the magnet at either end. This holdfast is smaller and lighter than the Mk. I.

The pull/weight ratio is 13.5 and the pulls on contact and at a gap of $\frac{1}{16}$ " are 130-150 lbs. and 40 lbs. respectively.

The method of use, upkeep, etc., is the same as for the Mk. I Holdfast.

Dimensions: 3.9" x 2.7" x 1.5" Weight: 3 lbs.

RODS, COLLAPSIBLE, PLACING LIMPET (PLACING RODS).

This device consists of a rod which folds into four sections and is provided with a hooked handle at one end and a two way bracket at the other. The bracket fits into a slot provided on the body of the Type 6 Limpet and the rod is intended for use when placing the limpet beneath the waterline on the side of a ship.

The rod opens up to the full length (about 5 ft) when it is extended and it is locked in this position by spring bracket tubes which slide over each of the three joints. To fold the rod these tubes have to be pressed back against their springs until the joints will fold.

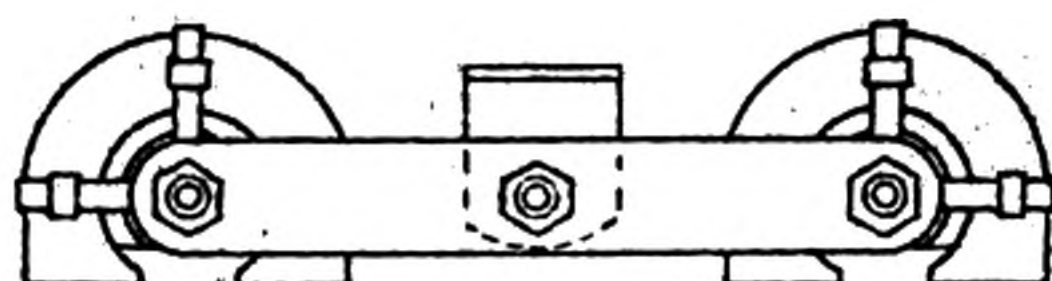
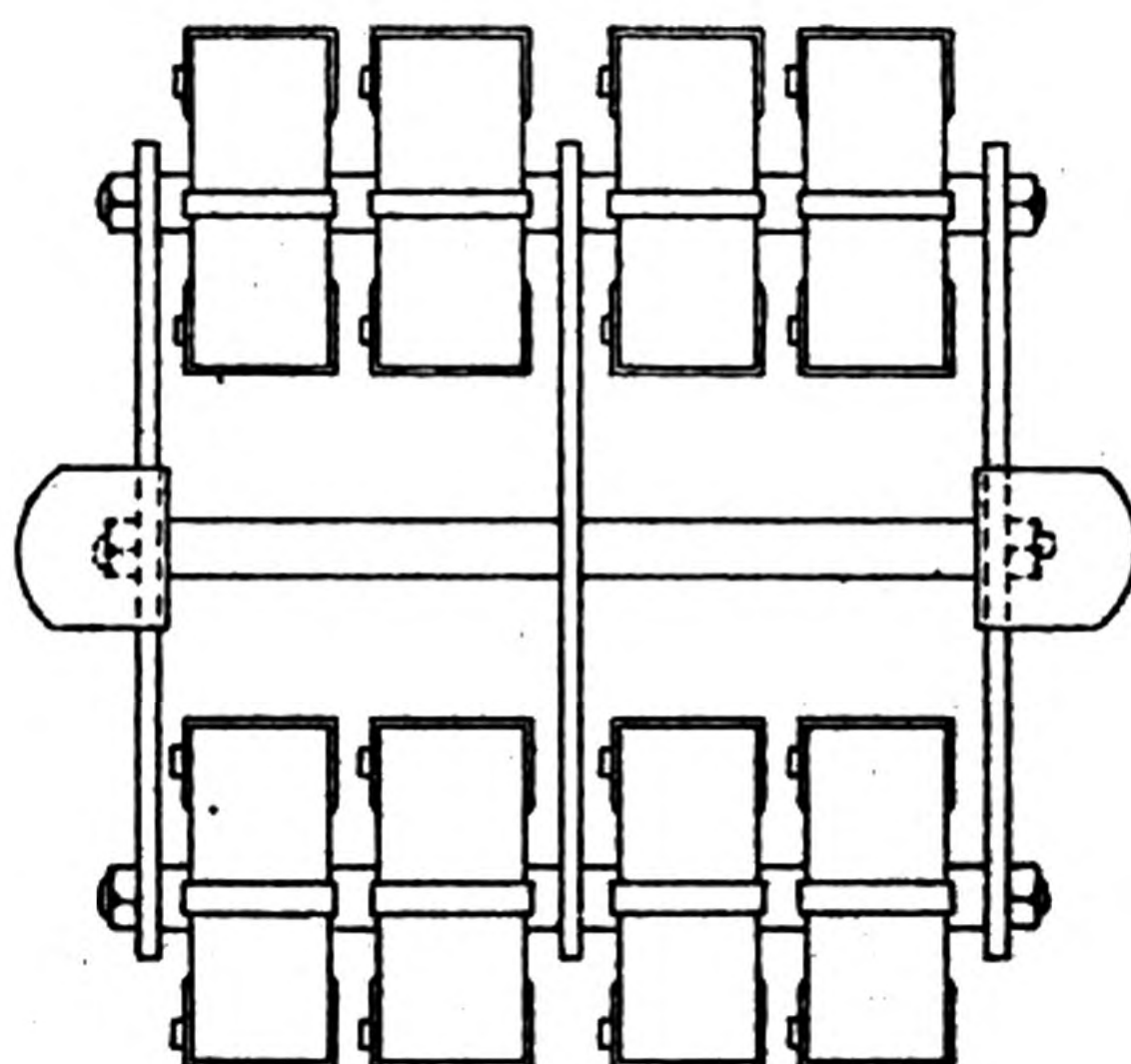
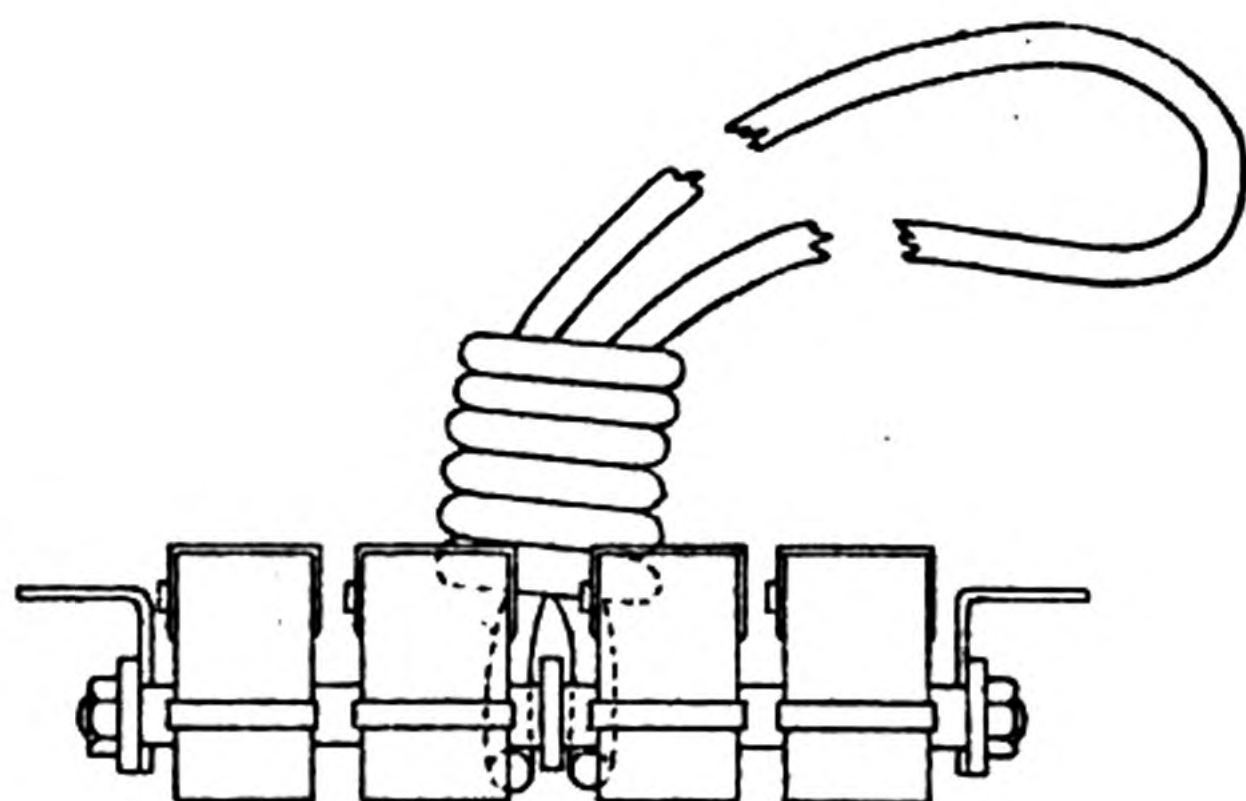
Catalogue No. P. 100.

Dimensions: Width $4\frac{3}{4}$ ". Length folded $15\frac{1}{2}$ ". Weight: 2 lbs.

Packing and Special Notes: - As required.

RIGID PLACING ROD

It is intended to finalise the design of a lug for attachment to a single folboat paddle which will enable the paddle to be used as a rigid limpet placing rod. Details will be circulated later.



Holdfast, Magnetic, Mk. I

SPIKE ATTACHMENT.General Description:

The device enables a sharp spike to be driven into wooden targets in order to leave a hook, suspended from the target, upon which a charge may be hung with cord; it is suitable for use when attacking wooden ships, lock gates, wharves, etc.

Detailed Description:

The device consists of two main parts :-

- (a) Fig. A - The spike attachment with swivelling hook.
- (b) Fig. B - The placing handle.

The spike attachment consists of a cylindrical body (A1) 2-1/8" x 3/8" diameter from the narrowed end of which protrudes a sharp steel spike 1" long x 1/8" diameter. From the spike end of the body (A1) a hook (A3) is suspended and is free to swing round the body so that it will assume a vertical hanging position; this hook has a spring catch on it, such that any loop of cord hung upon it cannot be removed unless the spring catch is opened by pressing.

The placing handle consists of a bar, bound at one end with cord to act as a hand grip together with a cord thong for wrist attachment, having a hole (B1) at the other end, into which the spike attachment body (A1) fits. At (B2) a flat spring controls a catch in the hole (B1) which engages in the groove (A4) of the spike attachment when it is pushed home in the handle, thus lightly preventing the spike attachment from falling out of the handle.

The attachment may either be stuck into the target followed by the hanging of the charge by cord from the hook, or else; if the charge has a total weight of not more than 30 lbs., the spike may be stuck into the target with the charge already hanging from the hook, provided that some thin copper wire (20 S.W.G. or 0.036" diameter) is available for use to prevent the spike attachment falling from the handle, by threading through the holes A5 and B3.

The handle and spike attachment have been treated against rusting, and so there is no need to grease them.

Method of Operation:

(a) For attachment of the spike to the target followed by hanging the charge from the hook to the target.

- (i) Before operating, press the spike attachment body (A1) into the handle hole (B1) until the catch (B2) catches in the groove (A4).
- (ii) Grasp the handle by the cord binding and strike firmly at the target, spike end foremost and at an angle of 45 degrees to the horizontal.
- (iii) Pull the handle off the spike attachment.
- (iv) Hang the charge by a cord from the hook (A3).

(b) For the attachment of the spike to the target with the charge hanging from the hook (A3) during the attachment to the target. (The charge should not be greater than 30 lbs.).

(i) Before approach to the target, enter the spike attachment body (A1) into the hole (B1) in the handle until the hole in the spike attachment (A5) is opposite the hole in the handle (B3). Pass a length of copper wire right through the holes in the attachment and body, bend down the ends of the wire, and twist round as (C1) in Fig. C.

(ii) Stick the spike into the target as in (a)(ii) above.

(iii) Push hard on the handle in the direction in which the handle and spike are pointing until the wire (C1) is felt to break.

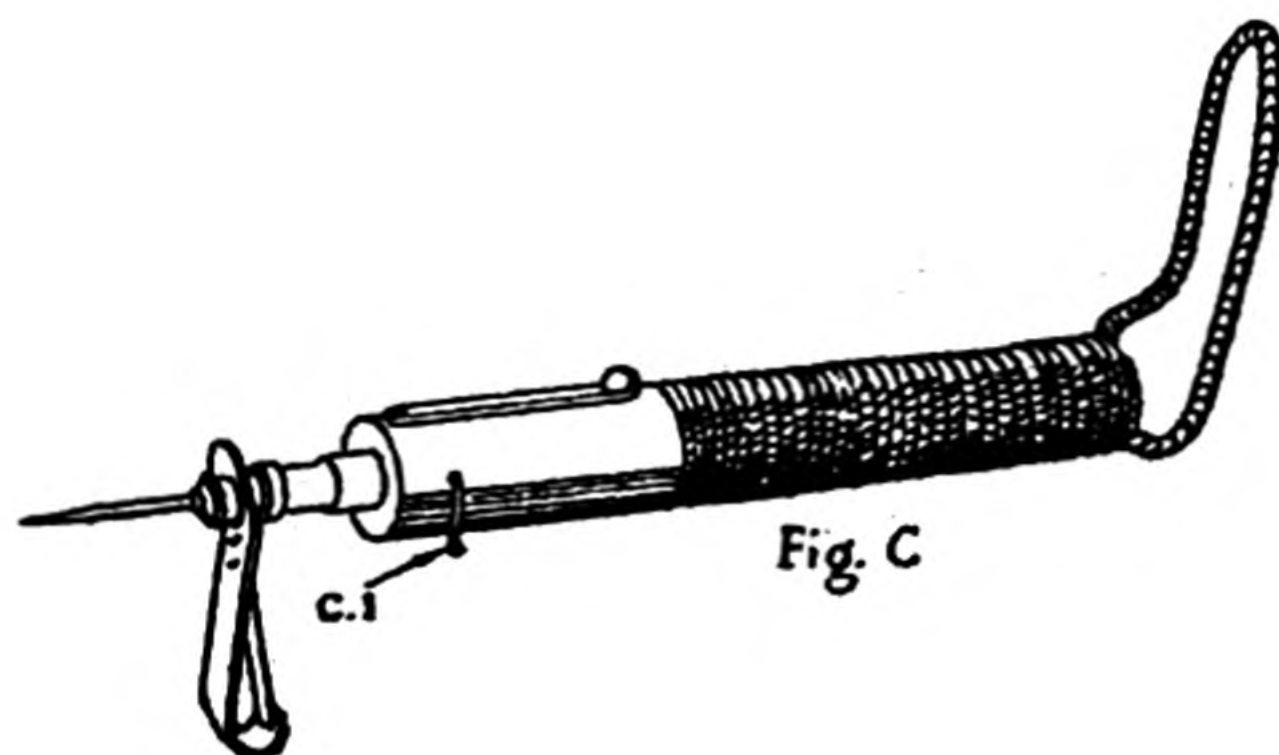
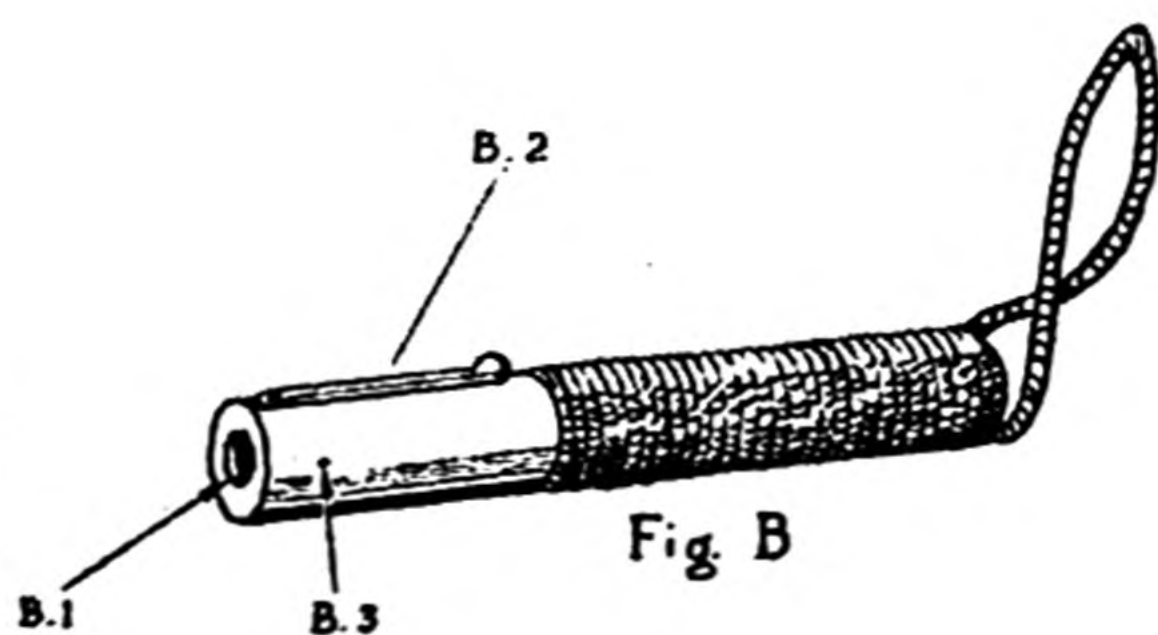
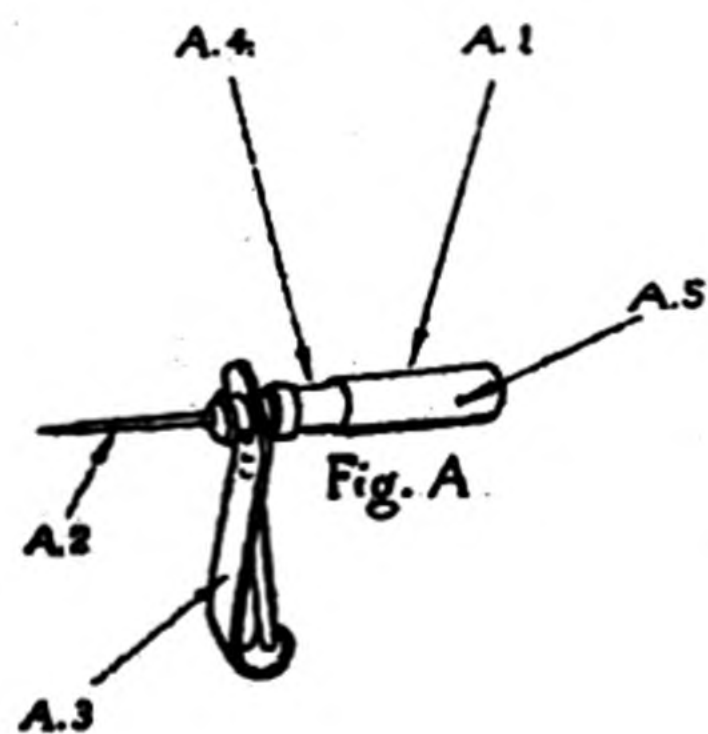
(iv) Remove the handle.

In method (b) it has been found to be advantageous when a canoe or boat is being used for the charge placing, to use a length of cord upon the end of the charge which is kept on the edge of the boat until the spike is placed and then it is lowered into the water, using the length of cord.

Catalogue No. D. 234.

Dimensions: Spike & handle together, $7\frac{1}{2}$ " x 1" diam. Weight: 1 lb. 2 oz.

Source: Technical Bulletin No. 21. 12 Oct. 1944.



SPIKE ATTACHMENT

Designed by
 Drawn by
 Traced by *R. Inglis, Pte.*
 Traced from *Attack on Blooden Ships Report*
 Checked by

DATE

10-10-44

DWG NO.

D28

FUZE, ANTI-REMOVAL (AIR-ARMED), TYPE III.Introductory Description:

This fuze is intended to provide a means of preventing the removal of demolition charges before the normal time delay fuzes (e.g. Switch No. 10, A.C. Delay, etc.) have functioned. It is designed so that after the arming period has elapsed it will fire if the charge in which it is embedded is withdrawn slightly from the target. It may be fitted in a rectified cavity in standard $1\frac{1}{2}$ lb. or 3 lb. charges or used with made up charges.

Technical Description:

The fuze (see attached drawing) incorporates a "Switch 10" corrosion chamber normally containing a "Black" (10 minute) ampoule which is crushed by a simple lever built in the underside of the fuze. When the arming delay has elapsed the striker moves forward until it is stopped by a ball interfering in the striker channel. The striker exerts a downward thrust upon the ball, tending to push it out of the striker channel, and this thrust is taken upon a feeler lever hinged on the underside of the fuze and bearing upon the target. If the charge containing the fuze is lifted, the feeler lever will drop, permitting the ball to clear the striker channel, and the striker will go forward to fire a Type 6 Burster which can be screwed on to the threaded end of the fuze. After arming a movement of $\frac{1}{4}$ " or more away from the target will allow the feeler lever to move sufficiently for the striker to be released.

Safety, positive and visual, is provided by a perforated strip safety pin passing in front of the striker. Should the fuze arm prematurely when the feeler lever is not retained by the target, the striker point will pass through a hole in the strip and prevent its withdrawal. The striker thus locked presents its full diameter to the ball, and prevents the feeler lever from being returned to its original position.

Arming Time:

As the arming delay time for the fuze depends upon the corrosive action on a retaining wire it varies with temperature as follows:-

Temperature (°C)	10	0	10	20	30	40
Arming Time (mins)	120	29	16	10	7.8	6.2

The times given are mean times when the fuze is used in the normal position on a horizontal surface with the feeler lever down. If the fuze is used with the feeler lever up the timings will in general be longer by about 10%.

Notes on Use:

1. After the fuze has been placed in the rectified cavity with the safety pin projecting from the side of the charge, it is important to make sure that the feeler lever is still perfectly free.

2. The arming delay is initiated by pulling up the ampoule crushing lever and turning it back as far as it will go, then replacing it to lie flush with the underside of the fuze. The charge is then placed with the fuze in contact with the flat surface of the target and attached by tape or magnets. (Charges of $1\frac{1}{2}$ lbs. or more may be placed on top of horizontal targets without securing).

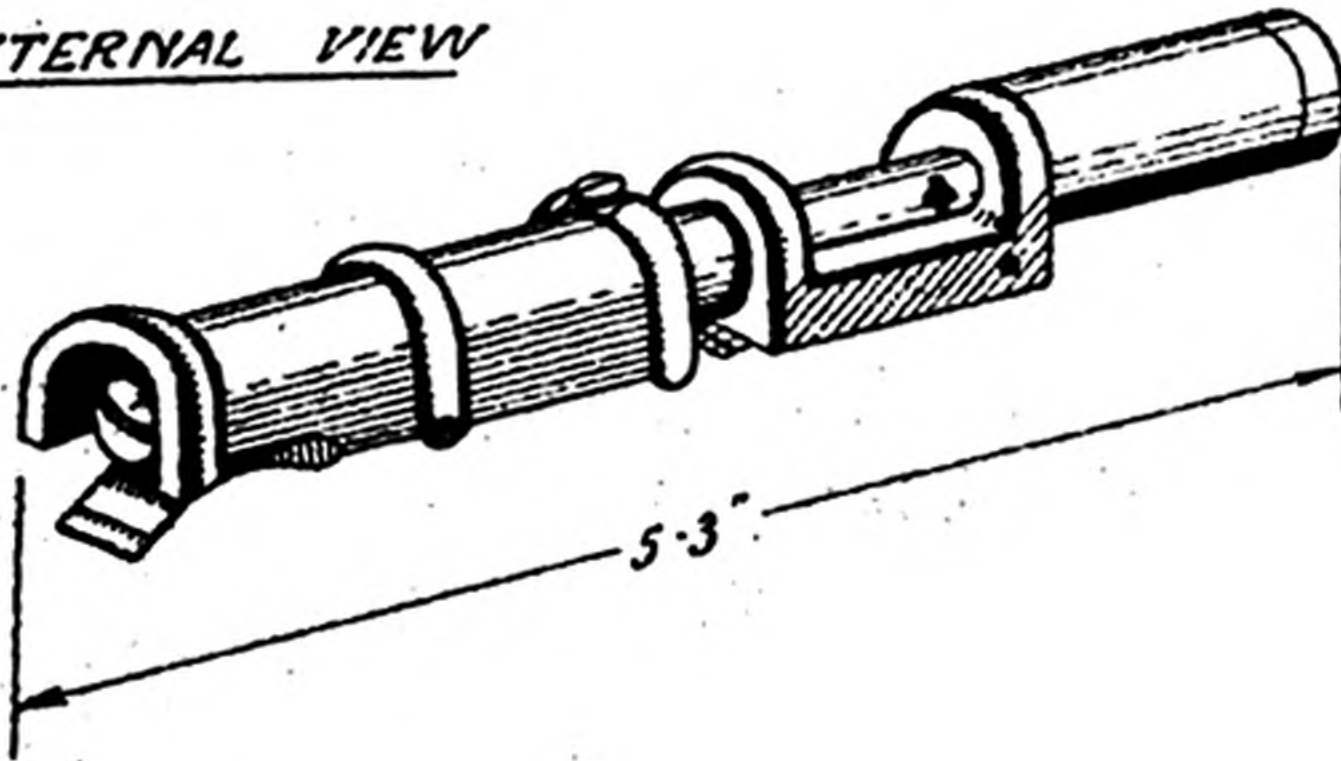
3. If it is found that the feeler lever of one of these fuzes is projecting and cannot be pushed in again, then the fuze has probably armed prematurely. The fuze should be removed from the charge (if it has already been placed in one), the burster unscrewed, and the two parts carried away separately. The burster may be used again. The fuze should be disposed of unless it is found that the feeler is jamming from some reason other than premature arming.

Dimensions:

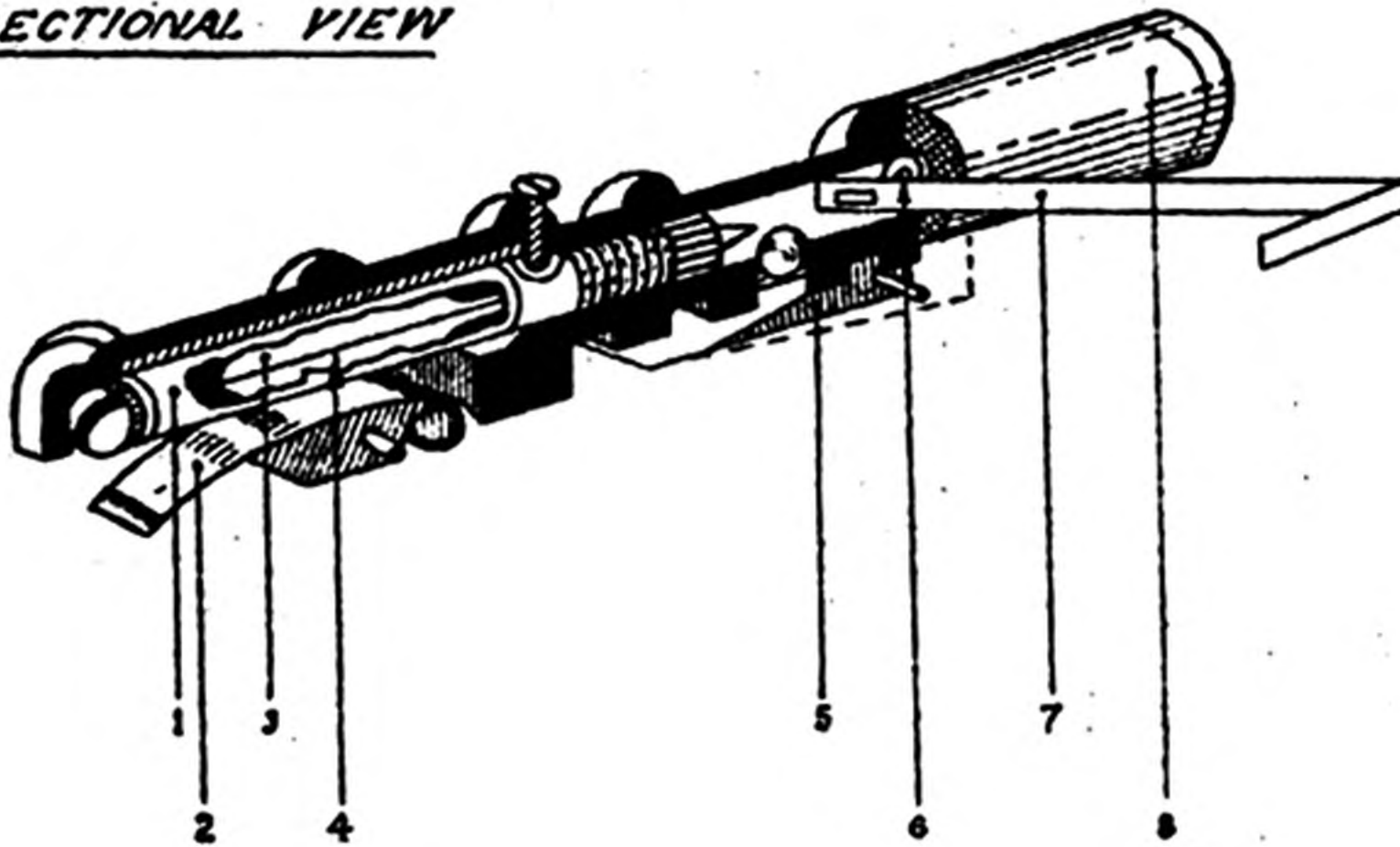
Length (without Type 6 Burster)	$3\frac{7}{8}"$	<u>Weight:</u> (without Burster)	$2\frac{1}{2}$ oz
" (with Burster)	$5\frac{1}{4}"$		
Height	$\frac{5}{8}"$		
Width	$\frac{5}{8}"$		

Source: Technical Bulletin No. 23. November, 1944.

EXTERNAL VIEW



SECTIONAL VIEW



- 1 Time Pencil corrosion chamber
- 2 Ampoule crushing lever
- 3 Ampoule
- 4 Tension wire
- 5 Feeler lever
- 6 Detonator
- 7 Safety strip
- 8 Type 6 Bursting

Fig. 9

*FUZE, ANTI-REMOVAL,
AIR-ARMED TYPE III*

Designed by _____
 Drawn by _____
 Traced by *R. Inglis Pte.*
 Traced from *Report on Anti-removal Fuze*
 Checked by _____

DATE
 23 10 44
 L.W.G. NO.
 D30

FUZE, ANTI-DISTURBANCE (WATER-ARMED) Mk. I.L.General Description:

The fuze is so designed that when screwed into a suitably threaded limpet or similar underwater mine, after a specified arming delay, it will be impossible to remove the limpet or mine from the target without the limpet or mine firing.

Detailed Description:

The fuze is designed to screw into a threaded opening in the face of a limpet which, when attached to a target, is nearest to the target.

It consists (Figs. I and II) of a body (B) containing a spring loaded striker mechanism (D) held in position by a striker release mechanism which is itself held by storage plugs (C), soluble plug (E) and a hinged feeler lever (F) held down by a safety cap (G). At the striker end the fuze is threaded to take a special type burster consisting of the main body (H) and with the percussion cap normally protected by a safety cap (I) which must be removed before the burster is attached to the fuze. The threaded port in this fuze is also protected in storage by a transit cap which must be removed before the burster can be screwed in.

Fuze Mechanism:

The details of the fuze mechanism are shown in Figs. III and IV.

The striker (a) is held in the cocked position against the striker spring (b) by three steel balls (c) which, when freed, move outwards to release the striker. These three balls are prevented from outward movement by a sleeve (d) surrounding the balls. The sleeve is loaded by a spring (e) and acts as a plunger pushing outwards, from the limpet or mine, along the axis of the fuze.

Before the balls, and, therefore, the striker, are released, the sleeve can move approximately $\frac{1}{4}$ ". The distance which the limpet or mine may be moved away from the target before the striker is released is, however, magnified to a distance of $\frac{11}{16}$ " by a hinge feeler lever (F) which prevents the fuze from firing whilst it is in contact with the target (M) under pressure of the sleeve spring.

The fuze striker, when released, fires a 5-grain sensitive cap and C.E. primer 1.1" diameter X.75" long contained in a burster, which screws into the bottom of the fuze body. The burster has a screw on safety cap for storage purposes.

In transit both the safety cap (G) and the storage plugs (C) act as safety pins.

The safety cap has a left hand thread and screws into the fuze body (B) by use of the detachable Finger Grip (L) by turning in an anti-clockwise direction. The safety cap protects the soluble plug (E), when in position, from contact with water until the operational point is approached.

If in the case of a faulty fuze, or omission of the soluble plug, the plunger is released prematurely, the feeler lever will be raised until it strikes the inside of the safety

cap. Subsequently, if efforts are made to unscrew the safety cap, the raised lever catches in two projections on the underside of the cap and prevents it from being unscrewed.

The safety cap is such that, even if its removal has been prevented or omitted, provided the detachable finger grip (L) has been removed, a limpet or mine fitted with the fuze can still be secured to the target in the normal manner.

The storage plugs retain the mechanism in the cocked position during transit and extend beyond the body of the fuze so that it cannot be inserted in a limpet until they have been removed.

The soluble plug (E) prevents the sleeve (d) from pressing outwards against the lever (F). When the fuze is immersed in water with the safety cap removed, the plug dissolves, leaving the sleeve (d) bearing on the lever (F), the fuze being then fully armed. If the limpet is removed from the target the sleeve presses the hinged lever still further outwards and the fuze will fire.

To allow for varying water temperatures in different parts of the world three types of soluble plug are being issued as follows:-

Yellow. The standard plug for temperate waters with an average arming time at 20°C of 32 minutes and at 10°C of 70 minutes.

Blue. A special plug for tropical waters, with an average arming time at 30°C of 29 minutes and at 20°C of 83 minutes.

Red. A special plug for cold water with an average arming time at 10°C of 40 minutes and at 1°C of 52 minutes.

The red plug will only be issued for use in specially cold water and care should be taken to see that the plug is not used in tropical or temperate waters. The fuzes will be issued fitted with soluble plugs, the colour of the plug being indicated by a large colour spot on the packing tin.

Instructions on Use:

(a) To insert Fuze into Limpet.

- (i) Remove transit caps from threaded port of fuze and from percussion cap of burster. Remove storage plugs (C) and screw burster into fuze.
- (ii) Remove transit plug (A) from face of Limpet by means of spanner (K).
- (iii) Unscrew (clockwise) safety cap (G) from fuze, using detachable finger grip (L). Check that soluble plug (E) is of correct colour for required delay.
- (iv) Screw fuze into limpet port by spanner (K) after lightly smearing rubber washer in port with the glycerine pad provided.
- (v) Replace safety cap in fuze after lightly smearing rubber washer with glycerine. Make sure that screwing in safety cap has not loosened the fuze in the limpet.

(b) To operate Fuze at Target.

Immediately before placing the limpet on its target, unscrew the safety cap (clockwise) using the detachable finger grip. If the fuze has "sprung", the safety cap will be locked solid and refuse to unscrew. In this case the limpet can be used without the benefit of the anti-disturbance fuze by detaching the finger grip.

Notes on Use:

1. The charge to which the fuze is fitted should not be placed in such a position that the fuze opening and feeler lever are on top as this position hinders the solution of the soluble plug. In the case of a limpet this means that the limpet should not be placed in a horizontal position with magnet poles uppermost.
2. The soluble plug should not be touched by parties in the field and no tools for the purpose will be issued to them. The necessary tools and spare plugs will be issued to base store depots in case it is necessary to change the plugs before the fuze is issued.
3. A small envelope containing a gauze pad impregnated with glycerine is packed in the top of each fuze tin for use on the rubber washers as described. The glycerine prevents any possibility of the transit caps binding on the washers.

Catalogue No. B. 230.

Dimensions: Length $2\frac{1}{2}$ " Weight: $9\frac{3}{8}$ ozs.
 Diam. of Head $1\frac{7}{8}$ "
 Diam. of Base $1\frac{3}{16}$ "

Shipping Classification:

Generic Title	Fuzes with Bursters.
Explosive Group	VI.
Storage and Stowage	III. O.S.

Packing: Fuzes will be issued complete with soluble plug, burster unit, glycerine gauze pad, etc., packed in a sealed tin.

Source: London Descriptive Literature, 24.11.44 and 3.6.44.

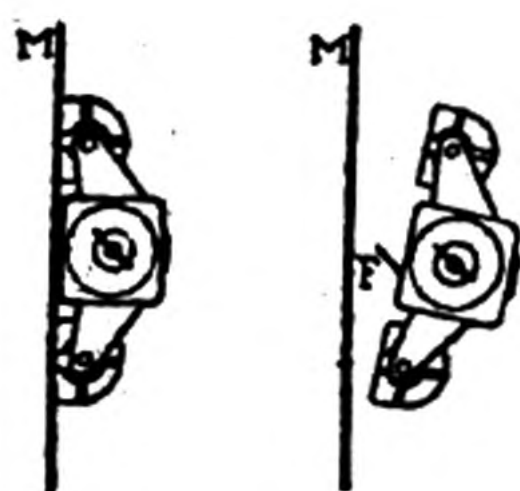
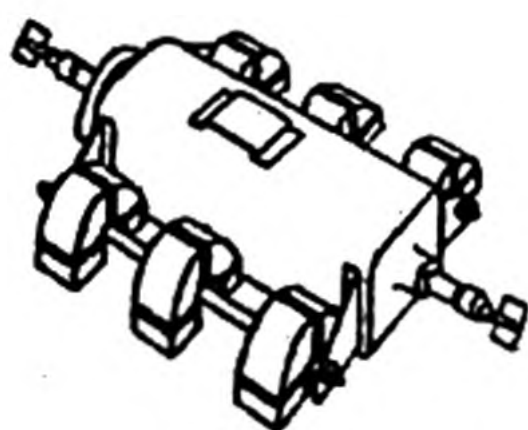
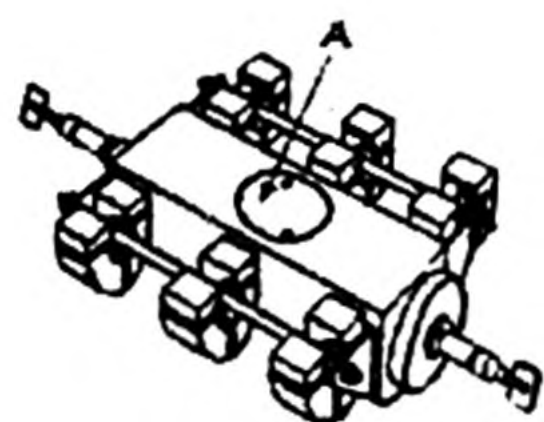


Fig. I

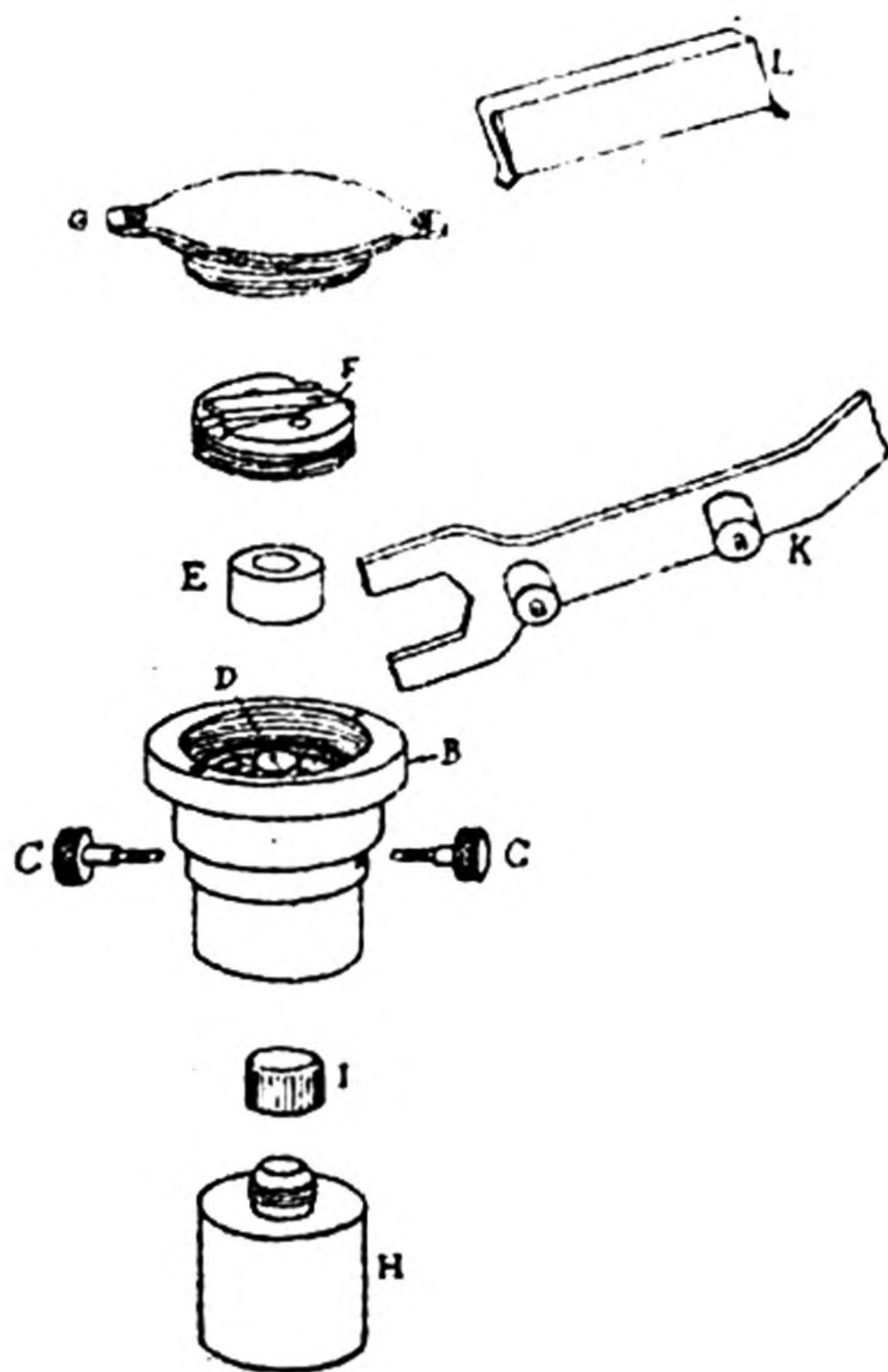


Fig. II

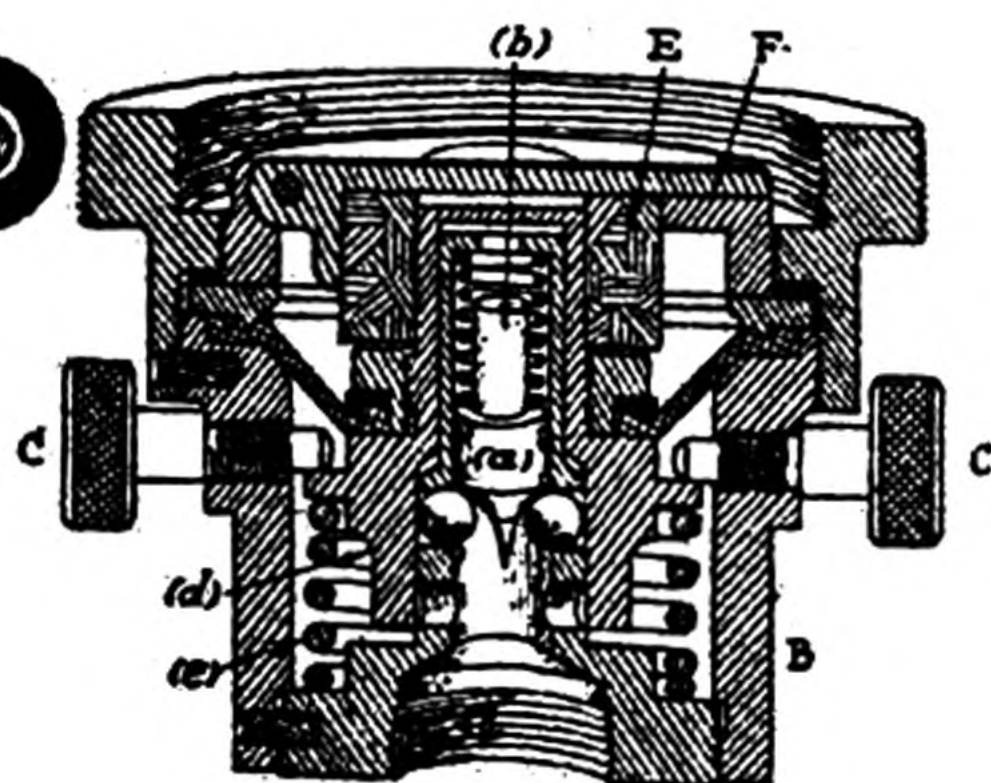


Fig. III

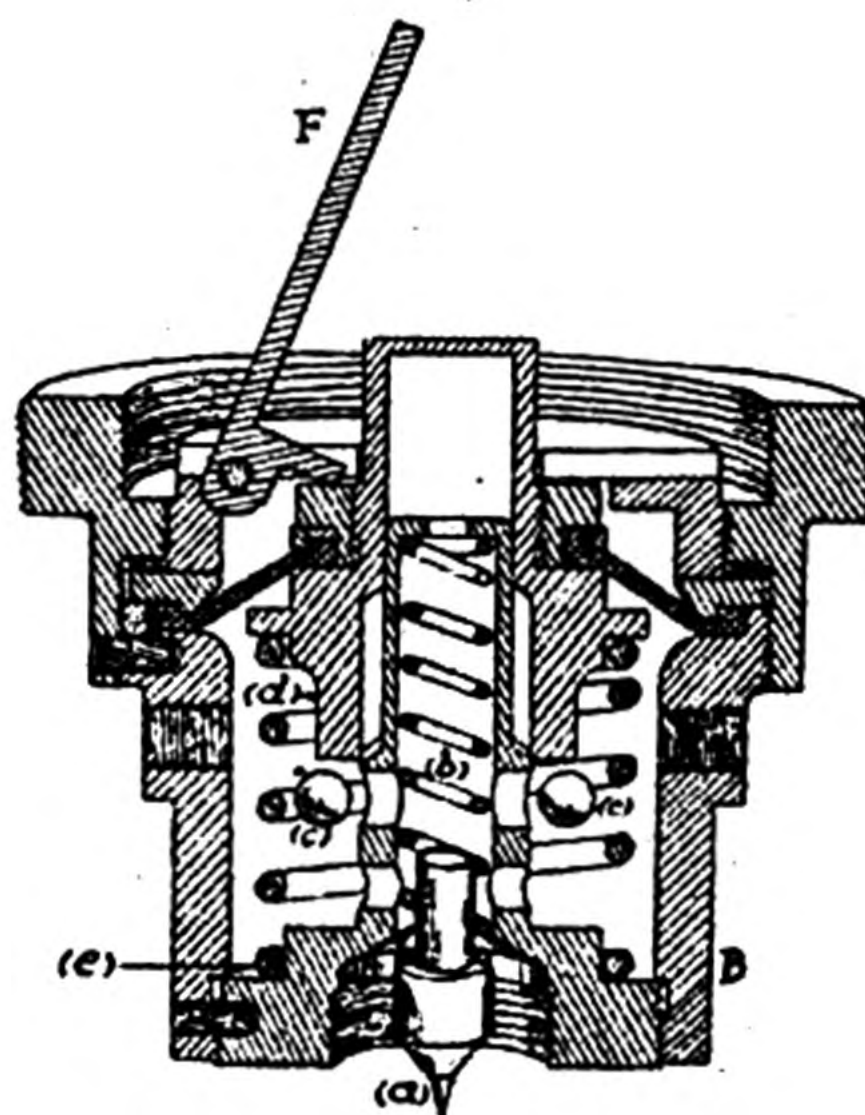


Fig. IV

ANTI-DISTURBANCE FUSE WATER-ARMED

Designed by
 Drawn by
 Traced by *R. Inglis & Co.*
 Traced from *London Report*
 Checked by

DATE
 7.12.44
 DWG NO
 D37

DEMOLITION EQUIPMENT.

SECTION V.

INCENDIARY STORES.

Incendiaries, Pocket, Time, Mk. IIB (P.R. 5's).

Incendiary Block, Mk. I.

Incendiary Block, Mk. II.

Incendiary, Thermit, $2\frac{1}{2}$ lb. (Thermit Bomb).

Incendiary, $1\frac{3}{4}$ lb., Mk. II (Firepot).

Incendiary Cigarette.

Incendiary, 1 lb. (M.L. Flame).

Flares, Ground, 15-minute.

General Description:

This is a small incendiary incorporating its own delay action mechanism. Delays of from 15 mins. to 24 hours can be obtained and when initiated the incendiary burns with a hot flame. It is intended for placing amongst kindling material, etc.

Detailed Description:

The outer casing, which is made of combustible material, consists of three tubular sections. The outer tubes contain an incendiary composition whilst the delay action mechanism is situated in the central tube. The mechanism is similar to that used in the time pencil, a spring loaded striker with an abrasive head being held back opposite a match head by a retaining wire passing through a corrosion chamber. When the chamber is crushed a corrosive liquid is released from a glass ampoule and eventually the retaining wire breaks and releases the striker. This goes forward, strikes the match head and two quick match leads transmit the flame through a priming composition to the incendiary composition in the outer tubes of the case.

The delay timings vary with the colour of the switch used and with temperature. The details are the same as for the Switch No. 10 (Time Pencil). The colour is indicated by the tape round the incendiary.

Once initiated the incendiary burns with a hot flame for about 50 seconds and then with a smaller flame for a further $2\frac{1}{2}$ minutes.

Notes on Use:

1. A metal strip attached to the tin containing the incendiary passes between the striker and the match head and serves as a safety pin. If the striker goes forward during storage it will impinge against this strip and consequently it will be difficult to get the incendiary out of the tin. If this is the case do not prise it out, but reject that incendiary.
2. There is also a wooden safety splint which lies along the top of the ampoule chamber. If the striker has gone forward it will be difficult to get the splint out and once again it should not be prised out, but the incendiary should be rejected.

Catalogue No.: C. 2.

Dimensions: $4\frac{1}{2}" \times 1\frac{3}{8}" \times \frac{5}{8}"$. Weight: $3\frac{1}{2}$ ozs.

Shipping Classification: Generic Title Bombs Incendiary,
D.A.P.

Explosive Group XI
Storage and Stowage. IV. O...S.

Packing and Special Notes: Dimensions: Weight:

2 Incendiaries are carried in $4\frac{1}{16}" \times 5\frac{3}{16}" \times \frac{7}{8}"$ 10 $\frac{1}{2}$ oz.
one tin box which is hermetically
sealed in a transparent water-
proof plastic envelope.

100 Tins packed in a case. 26" x 12" x 12" 84 lbs.

Source: Filed reports.

INCENDIARY BLOCK Mk. I.General Description:

A small incendiary store designed to give a longer burning time than the pocket time incendiary and for use especially against wooden targets, e.g., packing cases.

Detailed Description:

The incendiary consists of two types of incendiary composition enclosed in a waterproof cellulose acetate case. In one half there is a fused Sodium and Potassium nitrate block and above this there is a wax block consisting of 100 parts paraffin wax and 15 parts Aluminium Stearate. The whole is ignited through a priming composition by two safety fuze leads which are protected by a tear-off strip.

The incendiary is designed so that the nitrate block is ignited first and the incendiary must be placed so that this block is in contact with the target. To facilitate this the wax side has a raised longitudinal rib which is off-centre for packing purposes. The burning nitrate is especially effective against wooden targets and it will burn a hole through $\frac{3}{4}$ " pine wood in about 90 seconds. The wax adds greatly to the general conflagration and affords fuel to pour through the hole burnt by the nitrate in the wood.

Notes on Use:

1. The block burns vigorously for about 5 minutes and slowly for a further 3 minutes.
2. The block will not burn very well if placed upside down, i.e., nitrate block uppermost, or if placed on concrete.
3. If the block has to be placed on a concrete floor, e.g., in a warehouse, it should be placed on a small piece of wood.
4. The block can be used taped to a pocket time incendiary in which case it greatly increases the total time of burning.

Catalogue No. C.243a.

Dimensions: 5 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ ".

Weight: 12 ozs.

Shipping Classification:

Generic Title	Bomb Incendiary Cast Block.
Explosive Group	XI.
Storage and Stowage	IV. O.A.S.

Packing and Special Notes:

36 Incendiary Blocks and 36 Striker Boards packed in tin lined service case H. 13 Mk. IVE.

Packing Dimensions: 16" x 11" x 8". Weight Packed: 40 lbs.

Source: Filed reports.

INCENDIARY BLOCK Mk. II.

F.3.

This is very similar to the Mk. I and is intended to serve the same purpose.

It is fitted with a delay action mechanism similar to that used in the pocket time incendiary, and this is incorporated in the fuel block which in the case of the Mk. II consists of a mixture of 100 parts Paraffin Wax, 15 parts Aluminium Stearate, 15 parts Magnesium powder and 15 parts Carbon.

The delay mechanism gives time delays dependent on the colour of the tape covering as in the pocket time incendiary. Once again the time delay varies with the temperature. If it is desired to ignite the incendiary without a delay two safety fuze leads are provided, protected by a tear-off strip as in the Mk. I.

The change in the fuel composition means that the Mk. II will burn quite well if placed upside down but as with the Mk. I it is best placed with the nitrate block in contact with a wooden target.

It is probable that eventually the Mk. II Incendiary Block will replace both the Mk. I and the Pocket Time Incendiary.

Dimensions: $5\frac{3}{8}" \times 2\frac{1}{2}" \times 1\frac{1}{2}"$. Weight: 15 ozs.

Source: Filed reports.

INCENDIARIES, THERMIT, $2\frac{1}{2}$ lb. (THERMIT BOMBS).

This store consists of a metal container filled with just over 2 lbs. of commercial thermit which is ignited by two short lengths of safety fuze through a priming composition. The safety fuze leads are provided with Copper Tube Igniters and are covered in transit by a watertight lid which screws on to the top of the container.

The bomb burns fiercely generating intense local heat. The molten metal which pours from the bomb will penetrate 3 in. thick mild steel plate and this makes the incendiary useful for attacking petrol or oil in metal containers, electric motors, telecommunication cables, etc. It can also be used as a general purpose incendiary.

Catalogue No. Height 5". Diameter 3". Weight: $2\frac{1}{2}$ lbs.

Shipping Classification:

Generic Title	Bombs, Incendiary, Thermit.
Explosive Group	XI.
Storage and Stowage	IV. O.S.

Packing and Special Notes:

36 Incendiaries are packed in Box C. 179.

Packing Dimensions: 36" x 12" x 11". Weight Packed: 116 lbs.

Source: Filed reports.

F. 4.

INCENDIARIES, 1³/₄ lb. Mk. II (FIREPOT)

General Description:

This consists of a short cylindrical case of magnesium containing an incendiary mixture comprised mainly of thermit. It is intended for use as a general purpose incendiary and burns with a very hot flame.

Detailed Description:

The magnesium case of the incendiary contains a thermit filling which is ignited by two quick match tails leading down from a small willboard container of S.R.252 which is placed centrally at the top of the container.

S.R. 252 consists of 40% Potassium Nitrate, 40% Silicon and 20% S.F.G. Meal; S.F.G. Meal is 70% Potassium Nitrate and 29¹/₂% Carbon.

The S.R. 252 is ignited either by a match head immediately above or by two safety fuze leads. Ignition by the matchhead ignites the incendiary almost immediately; the safety fuze leads give a delay of about 10 seconds.

The matchhead, safety fuze leads, etc., are protected by a lid which fits over the container and is taped in position. Taped to the bottom of the container is a striker board which can be used to ignite the matchhead.

The incendiary burns violently with much sparking for a few seconds, and then burns more quietly for up to 15 minutes.

Notes on Use:

1. The Mk. I firepot did not have a tin lid or a match head and they should be destroyed if found. The Mk. II has a tin lid but batches 1-67 are unsatisfactory, with about 10% failures. Any batch after No. 67 is satisfactory but all firepots should be carefully batch tested before issue.
2. Firepots can be linked together by orange fuze. This is done by cutting a notch in the orange fuze and in the safety fuze leads of the incendiary to expose the filling of both fuzes. The two fuzes are then taped together so that the exposed fillings are in contact. The exposed filling of the orange fuze may also be taped down over the matchhead of the firepot.

Catalogue No. C.179

Dimensions: Height 2¹/₄". Diameter 3³/₄". Weight: 1³/₄ lbs.

Shipping Classification:

Generic Title	Bombs, Incendiary, 1 ³ / ₄ lbs.
Explosive Group	XI.
Storage and Stowage	IV. O.A.S.

<u>Packing and Special Notes:</u>	<u>Dimensions:</u>	<u>Weight:</u>
36 per C.207 Container.	18" x 13" x 11".	96 lbs.
18 per New Pack in Box H.31 Mk. I.E. have hermetically sealed tin liner.	20.5" x 9" x 10"	46 lbs.

Source: Filed reports.

INCENDIARY CIGARETTES.General Description:

This device consists of a small incendiary pellet placed inside any type of cigarette. The incendiary pellet is nearer one end of the cigarette than the other and can easily be located by touch. When ignited the pellet gives a hot flame for about 5 seconds.

If the cigarette is lit at the end near the pellet the delay will be about 2 minutes. If lit at the other end the delay will be about 3 or 4 minutes.

Notes on Use:

1. Light the cigarette from a match, lighter or other cigarette. Make sure that it is burning well. 'Drawing' will cause fast burning and so shorten the delay.
2. Place the cigarette in a suitable position on kindling material, and, if possible, cover it lightly with kindling.
3. Although the cigarette can be dropped or thrown some feet on to a soft surface it should not be dropped on a hard surface.
4. The cigarette should not be allowed to get damp nor should it be placed on damp material as it will then fail.

Catalogue No. . NS. 302.

Shipping Classification:

Explosive Group	XI.
Storage and Stowage..	IV. O.S.S.

Packing: As required.

INCENDIARY 1 Lb. (M.L. FLARE).

This consists of a damp proofed cardboard cylinder containing an incendiary composition and fitted with two safety fuze leads, each with match heads, for ignition purposes. The main filling consists of 55 parts Barium Nitrate, 20 parts Sulphur, 20 parts Aluminium powder, 4 parts Potassium Nitrate, 1 part Shellac. At either end a finer powder Aluminium is used in the same mixture.

The ends of the incendiary are coupled by a quickmatch lead, which can be felt as a small ridge running down the side of the container, so that both ends ignite simultaneously. This gives a total burning time of about 1 minute. If a longer time is required the quickmatch lead can be cut by a knife in which case ignition occurs only at one end and the burning time is about 2 minutes.

The incendiary produces an intense flare-like flame and a white-hot slag.

Notes on Use:

1. The flames initially shoot out of the end of the container and the incendiary should therefore be placed with the end pointing to the target.
2. A container has recently been produced which enables the M.L. flare to be placed in and fired from a normal rifle grenade discharger cup. The incendiary is ignited before firing and can then be thrown distances of about 100 yards with reasonable accuracy. The container can be made up at M.M.R.S.

Catalogue No: J. 12.

Dimensions: 8" long x 1³/₄" diam. Weight: 1 lb.

Shipping Classification:

Generic Title	Bomb, Incendiary, 1 lb.
Explosive Group	XI
Storage and Stowage	VI O...S.

Packing:Dimensions:Weight:

6 Incendiaries per paper bag.	9" x 6" x 4"	6 lbs.
20 bags per case	38" x 17" x 12"	140 lbs.

Special Note:

Production ceased in 1943, but small available stocks are being used up.

FLARES, GROUND, 15 MINUTE.General Description:

These flares have been produced to act as illumination flares or for ground-to-air signalling. They can be supplied in three different colours - red, green and white.

Detailed Description:

The store consists of a damp proofed cardboard cylinder containing a flaring composition. The bottom of the cylinder fits into a socket in a holder fitted with a spike which can be stuck into the ground. At the top end a cap is taped in position and covers two safety fuze leads with matchheads. Inside the cap there is a small striker board.

The composition in the red flare consists of S.R. 452 which is 40 parts Potassium Perchlorate, 20 parts Ammonium Perchlorate, 24 parts Strontium Nitrate, 12 parts Shellac and 4 parts Resin.

The colour of the flare is shown by a band of tape round the container. The average burning time is 15 minutes.

Notes on Use:

1. When used for ground-to-air signalling place the flares in such a position that the smoke from one flare is not likely to be blown so as to obliterate the colour of the others.
2. The flares are visible to aircraft at ranges of from 5-10 miles depending on altitude, atmospheric conditions, etc.
3. As illumination flares the white flare provides a good light over a fairly large area and could be used during night operations to assist demolition parties, etc.
4. In the past there has been some trouble over the waterproofing of the flares. Whilst it is believed that the store is now waterproof batches should be carefully tested before issue.

Catalogue No. C. 206.

Dimensions: Length 27". Diam. 2". Weight: 2³/₄ lbs.
Length in holder plus spike, 33".

Shipping Classification:

Generic Title	Flares, Ground.
Explosive Group	IX.
Storage and Stowage	IV. A.S.F.

Packing:

	Quantity	Weight:
12 flares in sealed tin-lined case. Colour required must be stated.	31 lbs.	1bs.

TOP SECRET.

S.R.D. TECHNICAL
HANDBOOK.

Volume 2, Sections VI to IX.

Prepared by
D/Tech (Aust).

February, 1945.

C O N T E N T S

VOLUME I.

- SECTION I - Initiating and Booby Trap Mechanisms.
- SECTION II - Delay Action Mechanisms.
- SECTION III - Prepared Charges.
- SECTION IV - Accessories for use with Prepared Charges.
- SECTION V - Incendiary Stores.

VOLUME II.

- SECTION VI - Arms and Equipment.
 - SECTION VII - Small Boats and Equipment.
 - SECTION VIII - Special Equipment.
 - SECTION IX - Tools and Sundries.
-

SECTION VI.

ARMS AND EQUIPMENT.

Gun, Sten, Silenced Mk. I.

Gun, Sten, Silenced Mk. II.

Silenced Austen Gun.

Welrod, Mk. IIA (.32).

~~S. m.~~ Welrod, Mk. I.

Note on Silent Weapons.

Rifle Fire Simulator.

GUN, STEN, SILENCED, Mk. I.General Description:

A silencer unit is fitted to a standard Sten Gun, reducing the noise of firing and removing the muzzle flash. This gives an automatic weapon which can be used without attracting much attention.

Detailed Description:

The silencer unit consists of a cylindrical metal case containing a bursting chamber, a series of metal baffle plates and two rubber baffles. A modified Sten barrel is incorporated and the whole is screwed on to a normal Mk. II Sten Gun from which the normal barrel and locking unit has been removed. The silencers are issued fitted to individual Sten Guns and although they are detachable it is not recommended that they be changed from one gun to another unless this is done by a qualified armourer. This is especially so if the gun is fitted with a foresight on the silencer unit casing.

The addition of the silencer unit makes no significant difference to the handling, loading, cocking, firing, etc., of the Sten Gun.

When used single-shot it is extremely difficult to recognise the sound as a shot from a firearm at a range of 150-200 yards. Used as an automatic the firing is more audible as a rhythmic sound peculiar to a machine carbine.

Details of the gun and its performance are summarised as follows:-

(a) Dimensions:

Length	-	Silencer Unit plus barrel	.....	14"
Diameter	-	Silencer Unit plus barrel	.....	2"

(b) <u>Weight:</u>	-	Silencer Unit plus barrel	.....	3 lbs.
		Complete silenced gun	.....	8 lb. 9 oz.

(c) Muzzle Velocity: 980 ft. per sec. using W.R.1. ammunition.

(d) Accuracy: At 30 yards range from a fixed rest a 5" group is an average performance.

(e) Penetration: At 30 yards range bullet penetration is six $\frac{3}{4}$ " pine boards spaced 1" apart.

(f) Range: Maximum recommended range for accuracy is 50 yards.

(g) Life: The silencing becomes less effective the more the silencer is used due to wearing of the rubber baffles, etc. After about 6,000 rounds the silencer should be returned for stripping.

Source: London Descriptive Literature. November, 1943.

GUN, STEN, SILENCED, Mk. IIGeneral Description:

The Mk. II silenced Sten Gun has been designed to meet the same requirements as the Mk. I Sten, but to be lighter, smaller, and easier to manufacture, and to require no rubber baffles.

Detailed Description:

As with the Mk. I the silencer unit consists of an outer cylindrical case containing a bursting chamber and a series of metal baffles. The rubber baffles in the Mk. I are replaced by two baffles each made up from fifteen wire gauze washers. The Mk. II Silencer Unit is fitted with a modified Sten Gun barrel and the whole silencer unit is screwed on to a normal Mk. II Sten Gun from which the barrel and locking unit have been removed. As with the Mk. I the Mk. II Silencer unit should not be changed from gun to gun unless this is done by a qualified armourer.

The dimensions and weight of the Mk. II Silencer Unit are compared with those of the Mk. I, as follows:-

	<u>Mk. I</u>	<u>Mk. II</u>
Length of Silencer Unit	14"	12 $\frac{3}{4}$ "
Length of Silenced Gun	37 $\frac{1}{2}$ "	36"
Diameter of Silenced Unit	2"	1 $\frac{1}{2}$ "
Weight of Silencer Unit	3 lbs.	1 lb. 14 oz.
Weight of Silenced Gun	8 lbs. 9 oz.	7 lb. 7 oz.

The silencing effect, muzzle velocity, accuracy and penetration of the Mk. I and Mk. II are not significantly different, but the life of the Mk. II is probably longer than that of the Mk. I. The smaller diameter and weight of the Mk. II silencer gives a better balance to the complete gun.

In both cases when a number of shots have been fired the silencer unit becomes appreciably hot. In the case of the Mk. II an asbestos lined hand grip is provided

Catalogue No. M. 211.

SILENCED AUSTEN GUN

Since the Austen Gun is used mainly by S.R.D. parties a simple method of fitting a Sten Silencer Unit, Mk. I or II, to it is being developed. Full details of the method adopted will be circulated when available.

One method of silencing the Austen Gun, by addition of a Sten silencer unit has already been tried and some guns have been issued, but failures have been reported and it is intended not to issue any further guns until a reliable silencing method is available.

General Description:

This weapon is a specially constructed, silent, single shot pistol which is easy to conceal. It is most effective when fired in contact with the target but can be used accurately at ranges of up to about 30 yards. It is intended for use by specially trained operators for specific purposes.

Detailed Description: It is a compact weapon used in a two-handed grip, one hand gripping the magazine which acts as a pistol grip and the other hand holding the barrel of the silencer unit in a convenient forward position.

The trigger action is similar to that of a colt automatic. The breech mechanism is a bolt in which is mounted a direct spring-controlled firing pin, and a spring operated extractor is positioned in the bolt head. A safety catch is situated at the rear of the magazine housing and is hand controlled. Fixed luminized sights are provided enabling 3" groups to be fired with ease at a range of about 15 yards. The nose cap of the weapon is hollowed out to enable the operator to place it lightly against the body of a person so that the noise is still further reduced.

The magazine may be charged with up to five cartridges. When the magazine is inserted in the housing the action is cocked by turning the breech operating handle in an anti-clockwise direction and drawing the bolt to the rear. The breech is then closed by driving the bolt forward and turning the breech operating handle in a clockwise direction as far as it will go. The gun will not fire if the safety catch and trigger are depressed.

To eject the empty case and reload, the above actions must be repeated smartly.

Features of the Velrod:

The main features are summarised as follows:-

Calibre .32". Any .32" ammunition should be used.
Muzzle Velocity - 900 ft per second.
Weight - 32 oz.
Overall Length - 12 $\frac{1}{2}$ ".
Length of Magazine - 4", projecting 5 $\frac{1}{8}$ " when in housing.
Overall Height - 5".
Penetration - 2 $\frac{3}{8}$ " into 2" cube of pine and loosely with two layers of glass, even 1" felt and one strip of standard webbing.

The baffled silencer unit is such that a shot fired at a range of about 50 yards is not recognisable as a shot from a firearm. If the gun is fired in contact the silencing effect is still better.

Stripping and Cleaning:

Details of the stripping and cleaning of the weapons are as follows:-

The magazine should be removed first by depressing the magazine catch. If then, the stop screw on the right hand side of the breech is removed the breech block can be withdrawn. With the silencer components also removed the barrel can be pulled through and the bolt and friction points should be wiped over with an oily rag.

The weapon should not be stripped any further than this.

For successful silent operation it is essential that the silencing elements are fitted to the silencer in the correct order, and that the special hook tool (Fig. 2) issued for the removal of the silencing elements is used.

Figure 1 shows, in section, the order in which the elements are fitted inside the silencer, these being as follows:-

Parts marked (A) are 14 metal washers with $\frac{3}{8}$ " hole in centre.

" " (B) " 14 metal washers with $\frac{1}{2}$ " hole in centre.

" " (C) " 12 metal spacers in the form of plain metal rings.

" " (D) " 3 rubber baffles.

The part marked (E) is a metal nose cap which screws on to the end of the silencer and retains all of the elements in place.

To remove the elements proceed as follows:-

- (a) Unscrew the nose cap (E).
- (b) Insert the removal tool pushing it through the first rubber washer (D).
- (c) Remove six $\frac{3}{8}$ " hole washers (A), $\frac{1}{2}$ " hole washer (B) and 6 spacers (C).
- (d) Insert removing tool and withdraw 1 rubber baffle (D).
- (e) Remove four $\frac{3}{8}$ " hole washers (A), one $\frac{1}{2}$ " washer (B) and 2 spacers (C).
- (f) Insert extracting tool and remove 1 rubber baffle (D).
- (g) Remove four $\frac{3}{8}$ " hole washers (A) and 2 spacers (C).

Next, clean all spacers (D) and metal washers (A & B) using a wire brush, clean the inside of the silencer casing using a clean rag or cotton waste and examine the rubber baffles (D). If badly worn replace.

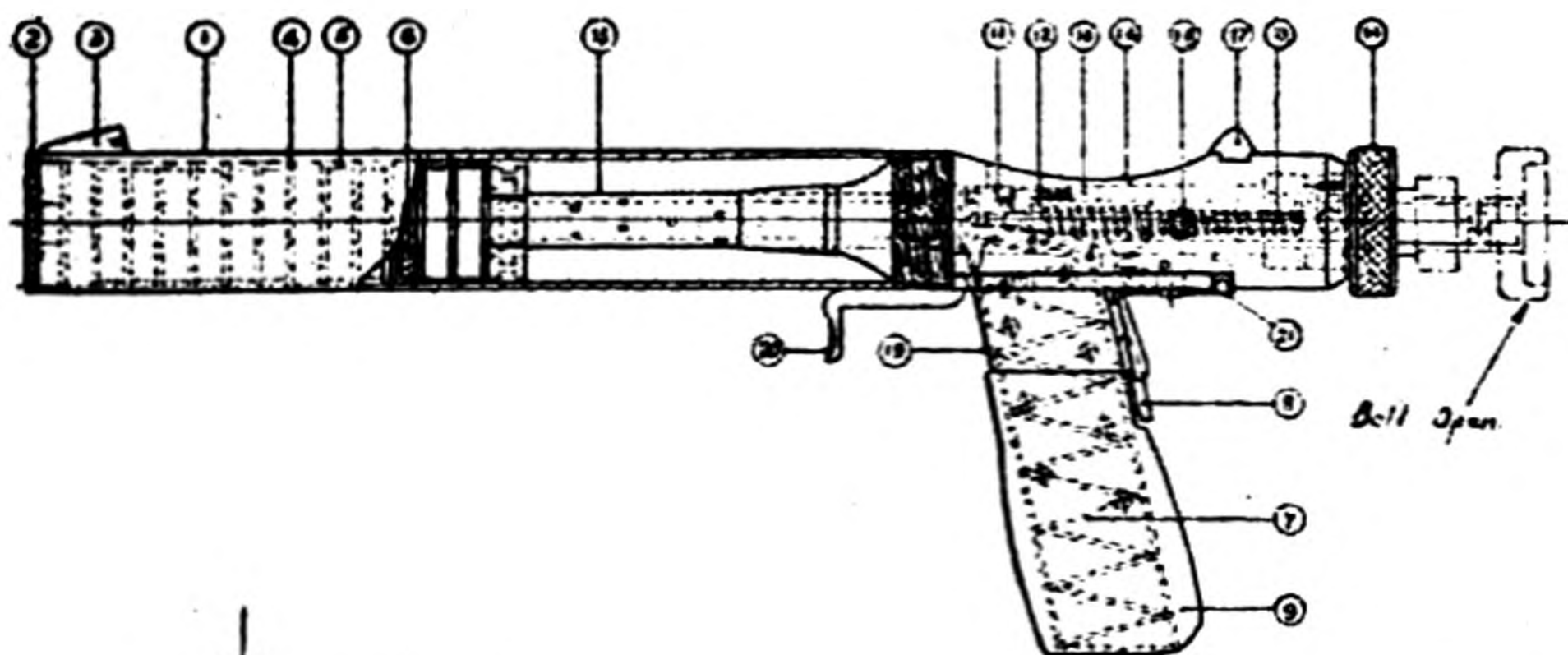
DO NOT put any oil upon any parts of the silencer.

Re-assemble by inserting each of the washers, spacers and rubber baffles in the reverse order to that in which they were removed.

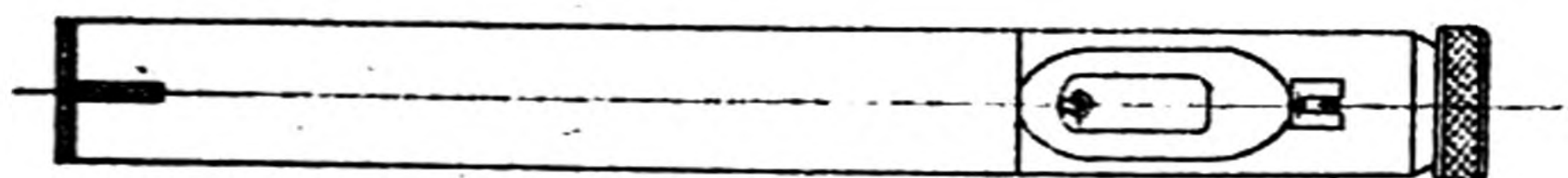
When all the elements have been inserted and pushed down the silencer tube in the correct order, screw the nose cap (E) firmly by hand.

Catalogue No. M.213.

Source: London Technical Review No. 1. November, 1943.



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Silencer Tube	13	Striker Pin Spring
2	Silencer Tube End Cap	14	Breech Operating Handle
3	Fore Sight	15	Barrel
4	Baffle Plate	16	Breech Block Housing
5	Spacer	17	Back Sight
6	Buffer	18	Stop Screw
7	Mods. to "Colt" .32 Magazine	19	Magazine Housing and Ejector
8	Magazine Catch	20	Trigger
9	Ebonite Handle	21	Safety Catch
10	Breech Block		
11	Extractor		
12	Striker Pin		



WELROD Mk II

Designed by _____

Drawn by _____

Traced by *R. J. L. 17*

Traced from *Welrod*

Checked by _____

DATE

8 - 8 - 44

DWG NO

W 2

SILENCER UNIT FOR WELROD MK. II (.32")

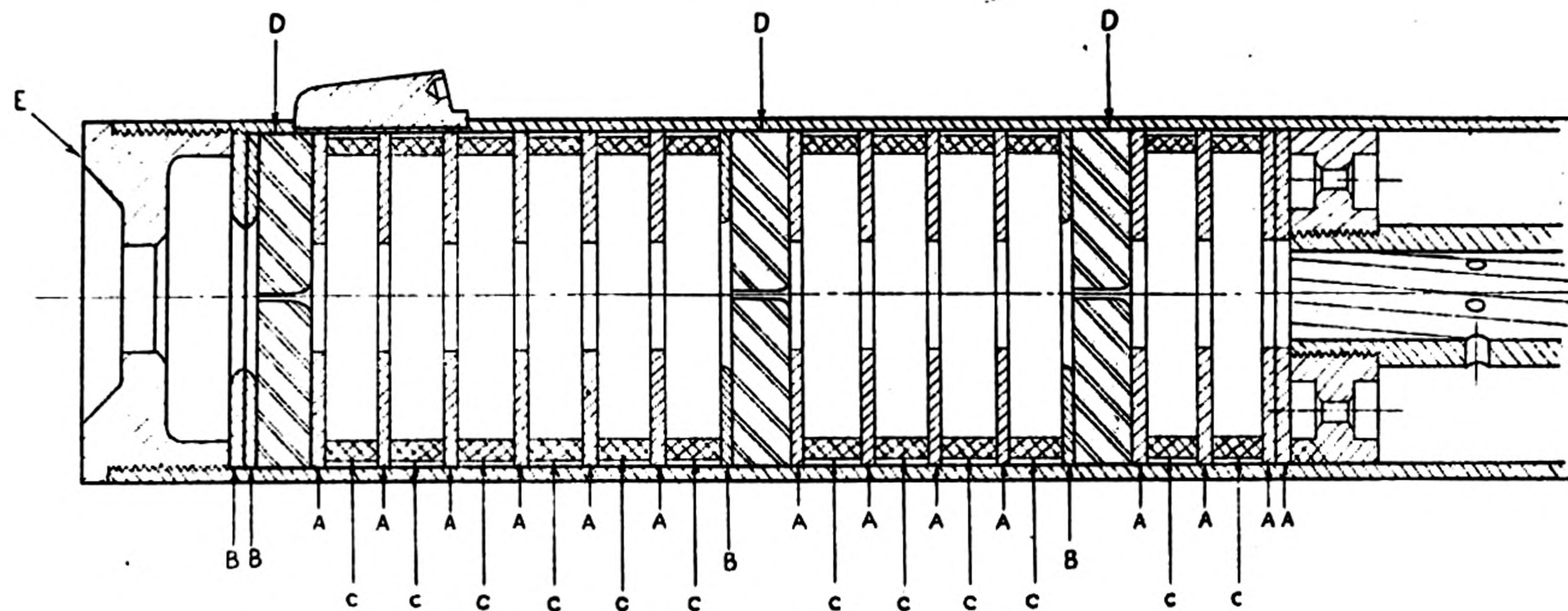


FIG. II

Inked in by R. Inglis No.

9 mm. WELROD, Mk. I.General Description:

The 9 mm. Welrod provides a silent single shot weapon with a much greater hitting power than the Welrod Mk. II^a (.32"). In general design it is similar to the Mk. II^a weapon but it is larger and heavier.

Detailed Description:

As with the .32" Welrod the 9 mm. weapon is intended for use by trained operators for specific tasks. The gun is used in a two handed grip, one hand holding the detachable magazine and the other the forward part of the barrel. This part of the barrel contains the silencer unit which, in the case of the 9 mm. weapon, can be unscrewed, when the gun can be used as a normal unsilenced bolt-action pistol.

The breech mechanism is a bolt in which a direct spring-controlled firing pin is mounted, and on the bolt head there is a spring-operated extractor. Two safety catches are provided - one being hand controlled when pressure is applied to the pistol grip, and the other, situated at the rear of the magazine housing, acting as a direct 'safe'/'fire' control. The trigger action is similar to that of a colt automatic and luminized sights are provided.

The magazine may be charged with up to six cartridges and is held in its housing by a retaining catch inside the trigger guard. Most types of 9 mm. parabolium ammunition may be used. With the magazine in position the action is cocked by turning the breech operating handle in an anti-clockwise direction and drawing the bolt to the rear. The breech is then closed by driving the bolt forward and turning the breech operating handle in a clockwise direction as far as it will go. The gun will now fire if the safety catches are in the "fire" position and if the trigger is squeezed. To eject the empty case and reload, the above actions must be repeated shortly.

The gun can be used accurately at ranges of up to 50 yards but ranges of from 15 to 30 yards are recommended. As in the case of the .32" weapon, the 9 mm. Welrod has a hollowed nose cap so that the gun can be used in close contact with the target, if this is possible.

When used with the silencer in position the noise of firing is midway between that of a .32" Welrod and that of a Silenced Sten Gun. In general a single shot will not be recognised as from a fire-arm at ranges greater than about 60 yards. If the gun is fired in contact with the target the silencing effect is improved.

Features of the 9 mm. Weibrod.

The main features are summarised as follows:-

Calibre	9 mm. parabellum ammunition should be used.
Muzzle Velocity ...	1000 ft. per second.
Weight	3 lbs. 6½ oz.
Overall Height ...	14 ³ / ₈ ".
Depth with Magazine	5½".
Length of Detachable Silencer	5"
Diam. of Silencer Unit	1 ³ / ₈ ".
Penetration	At point blank range bullet penetrates ten ½" pine boards spaced 1" apart.

Stripping and Cleaning:

First remove the magazine by depressing the retaining catch. Then unscrew the stop screw on the right hand side of the breech block and withdraw the bolt. Unscrew the silencer unit and the weapon is stripped for cleaning.

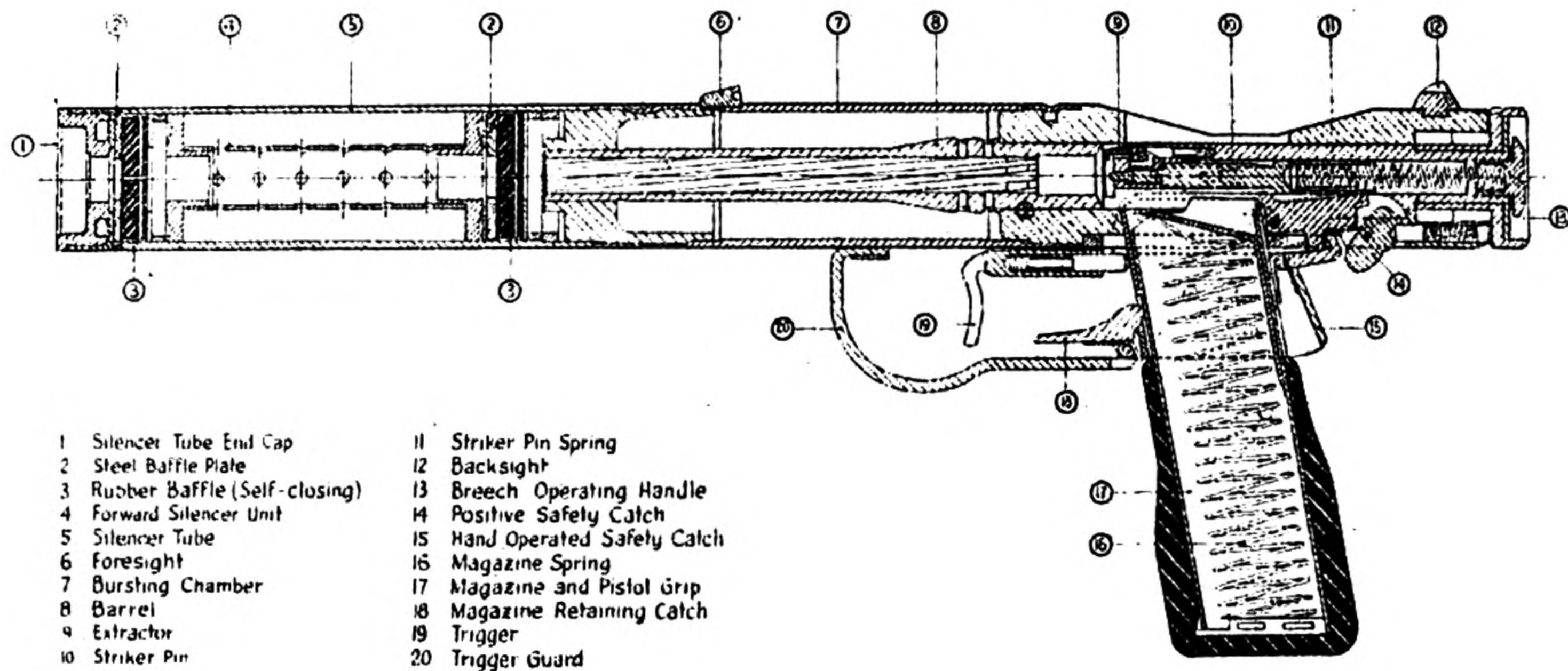
Clean the barrel unit in the normal manner and slightly oil all movable parts and friction points with thin machine oil. Before firing the mechanical parts should be dried and freed from oil.

The silencer unit should not be stripped or oiled. Should the unit show excess signs of wear a silencer unit from another gun can be used as all the units are interchangeable.

To re-assemble the weapon proceed in the reverse order.

Source: London Technician Review, No. 1. November, 1944, and London Descriptive Literature. August, 1944.

WELROD 9 M.M. MK. I



NOTES ON SILENCED WEAPONS.

Certain principles and considerations apply equally to all types of silenced weapons, and a general summary is given below so that the best type of weapon can be chosen for a particular job and the best use made of the weapon chosen.

Requirements for a Silenced Weapon.

A silenced small arms weapon may satisfy many requirements, the most important being -

- (a) To enable the weapon to be used in a crowded locality without anyone being aware that a shot has been fired.
- (b) To conceal the location of the firer by elimination of the sound and flash from the gun.
- (c) To avoid alarming the target in the event of a miss with the first shot.
- (d) To restrict the amount of noise as much as possible and to alter its characteristics so that although a noise may be heard it will not be recognisable as that of a firearm.

It must be remembered that in all cases although a gun may be referred to as a silenced it still makes some noise on firing, so that none of the above requirements can be met fully. The noise may also vary considerably with position of firing. Thus a gun fired in a leafless wood appears to be very noisy. Statements that the noise of firing cannot be heard or recognised as a shot at a certain range are estimates to give some general idea of the noise made.

The Principles of Silencing:

When a gun is fired the noise heard is derived from :-

- (a) The sound waves produced by the explosion in the breech and transmitted by the gaseous products of combustion of the explosive as they emerge from the barrel at high velocity.
- (b) Sound waves produced by the degradation of the ballistic or shock wave off the nose of the bullet.
- (c) Various secondary sound waves produced by moving parts of the firing mechanism.
- (d) The sound of the projectile striking the target.

To achieve the optimum degree of silence these separate sounds must be reduced to a minimum without materially altering the accuracy and penetration of the bullet.

The silencer reduces the intensity of sound originating from the causes mentioned under (a) and (b)

by expanding and cooling the gases resulting from the explosion before they emerge into the air. It also reduces the velocity of the bullet until it is about 100 ft. per second less than the velocity of sound in air (i.e. the muzzle velocity is about 1,000 ft. per second).

It is almost impossible to silence the noise produced by the moving parts of the firing mechanism in any standard automatic pistol. The best method, however, of eliminating these sounds is for the weapon to be fitted with a fixed bolt-action breech block. In the case of the Silenced Austen Gun most of the audible noise is made by the movement of the bolt.

Types and Uses of Silenced Weapons.

The types of weapon mainly used by S.R.D. are the Silenced Austen Gun, the .32 Welrod and the 9 mm. Welrod. Details of each gun have already been given and suggested uses are as follows:-

(a) Silenced Austen Gun.

A weapon for the patrol leader who requires high fire power and where the concealment of the weapon is not essential. By its silence it is possible to produce a lag in time before the enemy is warned that a raid is in progress. The weapon is also useful for shooting game, etc., within range of the enemy.

(b) Welrod Mk. III. (.32).

This weapon is very silent and also easy to conceal. It is suitable for an operator working alone against sentries or civilian personnel, and can be used for close-range shooting of game, etc.

(c) 9 mm. Welrod.

This weapon is very similar to the .32 Welrod. The fact that it can be broken down into 3 parts makes it relatively easy to conceal and yet it has sufficient hitting power to be used against fully equipped troops at ranges of from 10-20 yards. It is only slightly more noisy than the .32 weapon and hence can replace that for use against sentries, civilians and game. It can also replace to some extent the silenced Austen where the latter is too heavy and cumbersome.

RIFLE FIRE SIMULATOR.General Description:

The device consists of a set of detonators fired at predetermined intervals by a train of safety fuze. The last detonator operates a self destruction charge. The device is initiated by a Switch No. 10, Time Pencil, Mark I, which can give predetermined delays of fifteen minutes upwards.

The models made up contain 12 detonators, but the number used is limited only by the limits of size imposed on the device by operational requirements.

Detailed Description:

The device is shown in the half-scale drawing attached.

It consists of a top and base board made of either four or seven ply wood; $5/8$ " thick and 10" by 10", separated by four blocks of wood, $1\frac{3}{4}$ " by $1\frac{1}{2}$ " by $3/4$ " which are nailed at the corners of the base plate, and on to which the top plate is screwed after the mechanism is completed.

On the base board is mounted a Switch No. 10, Time Pencil, wired on to the base. The safety pin of the pencil is horizontal so that the sight hole lies over a hole bored in the base (not shown in the drawing) through which the pencil leads to a length of safety fuze and is moisture proofed by a rubber cover.

At intervals along this train of safety fuze, cross lengths are spliced on, leading to No. 6 detonators. Each detonator is surrounded by a piece of steel, copper, or brass tube screwed on to the base. Wooden buttons are screwed on to the base across the cross lengths of safety fuze to hold them securely in position.

The end of the main chain of safety fuze has a detonator on it which is inserted in 3 C.E. primers, held in spring clips in the middle of the base. This is the self destruction charge.

Uses of the Device:

The device was originally designed for dropping tied on to a dummy parachutist, but it can be used for the creation of a diversion either in an attack by night or in thick jungle country, etc.

Source: Technical Bulletin, No. 19. August, 1941.

NOTES ON PRESENT STOCK POSITION

The majority of the stores described in this handbook are readily available on indent through D/Stores, but in certain cases summarised below stores are either not available or only available in limited quantities.

(a) Stores not yet available, but likely to be available in the future:-

Fuze, Delay Action, A.C. Mk. II
Bursting, Sonar, Type 6, Mk. II
Holdfast, Magnetic, Mk. II
Fuze, Anti-Disturbance (Water-Armed)
Incendiary Block, Mk. I
" " Mk. II
Flares, Ground, 15 minutes
9 mm Welrod, Mk. I
Gun, Sten, Silenced, Mk. II

(b) Stores available in limited quantities; future deliveries expected:-

Fuze, Anti-Removal (Air-Armed), Type III
Incendiary, Thermit 2½ lb. (Thermit Bomb)

(c) Stores available in limited quantities; no future deliveries expected.

Switch No. 1 (M.D. 1 Pull Switch)
Switch No. 2 (M.D. 1 Pressure Switch)
Switch No. 3 (M.D. 1 Release Switch)
Incendiary, 1 lb (M.L. Flare)

S T A N D A R D E Q U I P M E N T T A B L E S

1. GENERAL:

All units have been prepared in suitable containers for insertion by sea or by air.

2. AIR SUPPLY:

All units mentioned in these Standard Equipment Tables can be supplied by air on demand. There are standard Storpado and package loads for Arms, Demolitions, Food and Clothing. Details of the contents of these standard loads are shown at the beginning of the appropriate sections. When ordering Standard Storpedces or packages, it is merely necessary to quote the name "symbols" appearing in these tables. If any unit is required which is not a standard storpedc or package content, it is merely necessary to order the requisite number of units using the code name.

ADDENDUM TO STANDARD EQUIPMENT TABLES

CONTAINER DIMENSIONS

<u>Container</u>	<u>Dimensions</u>	<u>Weight</u>
Mk. I	13-7/8" x 9 1/2" x 9 1/2"	3 lb.
Mk. II	16 3/4" x 12" x 10"	5 lb.
Mk. III	38" x 5" diameter	5 lb.
Mk. IV	36 1/2" x 9" x 5 1/2"	5 lb.
Mk. V	6-7/8" x 9 1/2" x 9 1/2"	2 lb. 10 oz.
2 gall.	13" x 10" x 6 1/4"	3 lb. 5 oz.
1 gall.	10" x 6" x 5"	2 lb. 3 oz.
Mk. VI	4' x 14 3/4" diameter	3 lb. 8 oz.
Mk. VII	3'5" x 14 3/4" "	11 lb.
Mk. VIII	1'5" x 14 3/4" " (semi-cylindrical)	5 lb.
Mk. IX	3 1/2" x 14 3/4" "	3 lb. 8 oz.

STANDARD EQUIPMENT TABLES

ARMS STOREPEDO UNITS

<u>Name</u>	<u>Dimensions</u>	<u>Weight Overall</u>	<u>Canopy</u>	<u>Contents</u>
SW1	7' 4"	230 lbs	24'	One of Arms Unit G
SW2	6' 6"	260 lbs	24'	{Four of Arms Unit I One of Arms Unit M
SW3	6' 6"	260 lbs	24'	{Four of Arms Unit H One of Arms Unit M
SW4	6' 6"	264 lbs	24'	Eight of Arm Unit K
SW5	6' 6"	254 lbs	24'	One of Arms Unit J

STANDARD EQUIPMENT TABLES

ARMS . PACKAGES

<u>Name</u>	<u>Dimensions</u>	<u>Weight Overall</u>	<u>Canopy</u>	<u>Contents</u>
P/1	12 $\frac{1}{2}$ "x 12 $\frac{1}{2}$ "x3'4 $\frac{1}{2}$ "	150 lbs	12'	One of Arms Unit L
P/2	15' x 11"x 2'10"	142 lbs	12'	One of Arms Unit N
P/3	11 $\frac{1}{2}$ "x 10 $\frac{1}{2}$ "x4'2 $\frac{1}{2}$ "	132 lbs	12'	Two of Arms Unit I
P/4	11 $\frac{1}{2}$ "x 10 $\frac{1}{2}$ "x4'2 $\frac{1}{2}$ "	132 lbs.	12'	Two of Arms Unit H
P/5	12 $\frac{1}{2}$ "x 12 $\frac{1}{2}$ "x3'4 $\frac{1}{2}$ "	147 lbs.	12'	Four of Arms Unit O

S T A N D A R D E Q U I P M E N T T A B L E S

I N D E X

A R M S

1.	Unit A	.....	Individual Issue
2.	Unit B	.....	Bren
3.	Unit C	.....	Bren Amm.
4.	Unit D	.....	Pistol and Grenade
5.	Unit E	.....	Welrod and Grenade
6.	Unit F	.....	.30 Carbine
7.	Unit G	.....	.303 Rifle
8.	Unit H	.....	Austen S.F.G.
9.	Unit I	.....	Owen S.F.G.
10.	Unit J	.....	Bren L.M.G.
11.	Unit K	.....	36 M. Grenade
12.	Unit L	.....	.303 Ammunition
13.	Unit M	.....	9 mm Ammunition
14.	Unit N	.....	9 mm Ammunition
15.	Unit O	.....	36 M. Grenade