

INSTRUMENTS

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PART 7

Pamphlet No. 12

GRENADES

By Command of the Army Council,

Eric B. B. B. B.

THE WAR OFFICE.
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REGULATIONS FOR ARMY ORDNANCE SERVICES

PART 7

Pamphlet No. 12

GRENADDES

INTRODUCTION

1. Most of the grenades now in the Service have been introduced since 1939 for use as hand-thrown weapons. Rifle grenades and the adaptation of hand grenades for use with rifles, have been to some extent superseded by the use of the 2-inch trench Mortar, but rifle grenades are still required in some theatres.

2. Grenades are classified according to their use, that is, Service, drill instructional, practice, as described below. This pamphlet deals mainly with "Service" grenades, but inspecting ordnance officers will be responsible, during inspection of unit or depot holdings, that grenades in all classes are in serviceable condition and correctly marked.

3. Service grenades are designed to produce a particular operational effect, on active service or during training. The various types may be classified as follows:—

ANTI-PERSONNEL	Nos. 36M, 69
ANTI-TANK	Nos. 68, 73, 74, 75, 76, 82
SMOKE, screening	Nos. 63, 77, 79, 80, 81
SMOKE, signalling	No. 83
FLARE, Signal and Illuminating	Nos. 57, 58, 59, 60, 61, 62

4. Drill grenades are for throwing drill or for drill firing from a rifle. They are similar in design and weight to their counterpart Service grenades, but are non-explosive. They are usually stamped "DRILL" and are painted white, with the exception of No. 75 which is painted dull red. Boxes in which they are packed are stencilled in white to give the following particulars: quantity, type (No.), Mark and the word "DRILL."

5. Instructional grenades are for instruction in mechanism, etc. They are non-explosive and unweighted. They are painted and varnished in the same manner as their counterpart Service grenades except that they bear no red filling ring. Stencilling on boxes includes quantity, type (No.), Mark and the word "INSTRUCTIONAL."

6. Practice or training grenades are of special design, containing a small charge of explosive substance. They are intended to simulate the action of Service H.E. grenades without causing undue damage to targets, property, etc.

7. The instructions contained in this pamphlet for the proof of grenades and their components, are for guidance in the event of suspicion being entertained as to their serviceability, due to, for example:—

- (a) Adverse reports on their functioning qualities during service or training.
- (b) The probable effects of exposure to bad storage conditions or storage in extremes of temperature.
- (c) Deterioration of certain explosives with age.

Routine proof will not be carried out unless detailed in this pamphlet, or specially ordered by the War Office.

8. The following principles will always be observed when carrying out proof of grenades:—

- (a) The precautions and instructions given in S.A.T., Volume I, Pamphlet No. 13, 1942, for preparing and throwing, will be complied with. If specific instructions for any particular type of grenade are not included in this publication, the instructions given for grenades of similar design, that is, the same means of actuation and the same or similar type of filling, etc., will be applied insofar as they are effective.
- (b) The ground chosen as the proof site should be firm and of uniform texture. Soft, boggy ground and long grass should be avoided as being likely to lead to blinds owing to their cushioning effect on grenades which are designed to function on impact. In addition, there is the possibility of blind grenades being difficult to locate if they penetrate below the surface or fall in long grass. Gravel or stony ground should also be avoided, especially during proof of H.E. grenades, as the risk of flying missiles will be unduly high.
- (c) The direction of the throw should be varied slightly for each grenade, to ensure that no two grenades fall in the same place, as otherwise confusion may arise when attempts are made to judge their individual performance.
- (d) When H.E. grenades are being proved, the area in which they fall will be carefully examined for evidence of complete detonation or otherwise. Complete detonation can be assumed by the blackening of the soil immediately around the point of detonation, together with the absence of large fragments of the grenades and of unconsumed explosive nearby. With experience, the size of crater or the impression made on the ground is a reliable factor, depending on the texture of the soil.

With experience, also, the volume of sound accompanying the functioning of the grenades may be taken as an indication of the degree of detonation, though this is not a reliable means of judging if the ground is undulating or is soft enough to allow the grenades to penetrate below the surface.

Defective detonators exert force in varying degrees, ranging from that sufficient merely to open the grenade without causing the filling either to explode or to detonate, to that which will cause all the filling to be mildly detonated or exploded, breaking the grenades into large fragments which, having low velocity, are not projected to any great distance.



Introduction

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- (e) When a blind occurs, except where instructions to the contrary appear in this pamphlet, proof will immediately be discontinued and will not be re-commenced at the same site until the blind has been located and destroyed.

No attempt will be made to investigate the cause of a blind, and a blind grenade will not in any circumstances be moved: the I.O.O. or senior A.E. i/c of the proof will proceed alone to destroy it, *in situ*, by the method laid down in S.A.T., Volume I, Pamphlet No. 13, 1942.

- (f) When the quantity of a particular grenade held on charge consists of small Lots of various Marks, fillers and dates of filling, economy in the numbers taken for proof may be effected by "grouping" together several of the lots. Unless otherwise stated the following rules will apply:—

(i) When stores are being grouped, it is of the utmost importance that all Lots should have the same "filler."

(ii) The dates of filling of the different Lots grouped together should not, as a rule, cover a period of more than six months.

(iii) Normally a group should include only stores of one particular Mark, but, where the Lots are all of the same filler and closely allied in dates of filling, more than one Mark of store may be included, *provided that there are no radical differences of design and that the proof requirements are the same throughout.*

(iv) Except where stated differently, the maximum number of grenades in one group will be about 300.

(v) The number selected for proof from a group will all be of one Lot number. If proof is successful, the whole of the group will be sentenced serviceable. If, however, the proof is a failure, *the Lot in which the failures actually occurred* will be sentenced unserviceable and discarded from the group.

(vi) The residual group will then be treated on its merits and proof taken as at (v) until one Lot is found serviceable, the remaining Lots in the group then being sentenced serviceable.

9. The instructions given in this pamphlet for the destruction of grenades and their components are intended to cover the local disposal of small quantities only. When large quantities are involved, application should be made to the C.I.O.O., or in the case of War Office depots, to the War Office (W.S.8.), for disposal instructions.

10. In addition to the methods of marking described in the various sections of the pamphlet, a system of stencilling was introduced in 1944 to facilitate rapid sorting at beach-heads, dumps, etc., in theatres of operations.

Based on the ammunition brevity code shown in Field Service Pocket Book, Part I, Pamphlet 3A, 1944, this takes the form of an abbreviated description of the ammunition in each package and is displayed in white, in large letters and numerals, over the existing

markings on one long side and the lid of the package ; alternatively, the normal markings may be omitted from the long side of the package on which the white stencilling is displayed.

All packages containing ammunition destined for operational use will be "over-stencilled" in this manner before being issued from depots, the present approved list of abbreviations for Grenades and their components being as follows :—

<i>Grenade</i>	<i>Abbreviation</i>
Grenades, No. 36M	36 GREN
Grenades, No. 36M Rifle	36 GREN RIFLE
Grenades, No. 69	69 GREN
Grenades, No. 74 Mk. 2	74 GREN
Grenades, No. 75	75 GREN
Grenades, No. 77 Mk. 1 (Phosphorus)	77 GREN WP
Grenades, No. 79	79 GREN
Grenades, No. 80 (Phosphorus)	80 GREN WP
Grenades, No. 82	82 GREN
Grenades, No. 83 Yellow	83 GREN YEL
Grenades, No. 83 Red	83 GREN RED
Grenades, No. 83 Blue	83 GREN BLU
Grenades, No. 83 Green	83 GREN GRN
Detonator Assemblies, No. 74 Grenade	DET ASS 74 GREN
P.E.2, 8 oz. charges	PE2 (8 oz.)



Sec. 1

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SECTION 1.—GRENADE HAND OR RIFLE No. 36M

DESCRIPTION

Mk. 1. (See Plate 1A).

1. This grenade is an anti-personnel H.E. grenade consisting of a cast iron body, a centre piece comprising a striker sleeve and a detonator chamber, a steel striker and spiral spring, a base closing plug, a safety lever and a safety pin carrying a solid or split ring.

The body is oval and segmented externally to facilitate its breaking up into large fragments. A hole in one side through which the H.E. is filled is screw-threaded to take a closing plug. A large diameter screw-threaded hole is formed in the base to take the centre piece, and a smaller hole diametrically opposite allows one end of the striker to protrude. A double bracket on the shoulder on the side opposite to the filling hole is grooved to provide a fulcrum for the striker lever and has holes to accommodate the safety pin.

The centre piece is made of aluminium, turned brass, steel or zinc alloy, and consists of a central sleeve to accommodate the striker assembly and the head of the igniter set, and an offset chamber for the detonator. It is screw-threaded to fit into the base of the grenade, its upper end resting against a lead washer set in a recess around the smaller hole in the top of the grenade body.

The base plug, made of zinc alloy or zinc-plated cast iron, screws into the base hole below the centre piece. It has a knurled rim to facilitate easy insertion and removal by hand and has also two key slots. A $\frac{1}{4}$ in. screw-threaded hole is formed on its underside to take the screwed projection of a steel gas check plate which is used when firing the grenade from a rifle.

The striker and spring are made of rustproofed steel. The spring is positioned round the stem of the striker and rests on a flange formed on the striker head. The striker head is slotted to allow escape of gas and on its face two ridges are formed which enable the rim-fire cap of the igniter, described below, to be struck correctly. When the spring is under compression the plan end of the striker protrudes through the hole in the top of the grenade body. This end has a slot on one side into which fits the end of the striker lever, thus holding the striker in the armed position.

The striker lever is made of rustproofed steel and is curved to allow it to fit closely to the grenade body. At the end which fits into the slot of the striker are two transoms which pivot on the grooves formed in the double bracket on the shoulder of the grenade. The lever is retained by a split pin passing through the holes in the bracket, this pin carrying either a solid or split ring to facilitate easy extraction.

Before being filled, the grenades are assembled with the striker in the armed position, the joint between the striker and the grenade body being sealed with a specified sealing mixture, and the base plug is screwed into the base.

The grenades are filled with Baratol 20/80. After filling, the filling hole is closed with a steel or alloy plug, the threads of which are coated with R.D. cement. This cement is also applied to the joint after the plug is screwed home.

The number of filled grenades constituting a "LOT" when issued from factory to depot, is 2,400.

Igniters

2. The following Marks of Igniters may be met:—

- (a) Mk. 2 and 3, which both give a delay of seven seconds, and are used when firing grenades from rifles.
- (b) Mk. 4, giving a delay of three seconds, is purely a Naval Store.
- (c) Mk. 5, 6 and 7, which give a delay of four seconds, are used when throwing grenades by hand. The Mk. 6 is produced in India only and has slight differences in construction.

3. All Igniters are made to the same general design, and consist of a .22-in. calibre Rimfire cartridge cap in a zinc alloy cap chamber, a length of safety fuze, and a detonator.

The .22-in. cap has a hole bored centrally in the base to allow escape of gas on firing. This hole is sealed with a varnished paper disc. It is attached by means of a metal sleeve to one end of the safety fuze, on the other end of which is crimped the detonator.

Igniters are normally bent ready for insertion into the grenades. The quantity constituting a "LOT" when issued from factory is approximately 2,000.

4. Particulars of the different Marks of Igniter sets are as follows:—

Mk. 2 (obsolescent).—Seven seconds delay. Is made up with No. 16 safety fuze coloured yellow, and a No. 6 detonator. See Plate 1B.

Mk. 3.—Seven seconds delay. Differs from the Mk. 2 in having a No. 27 type detonator (Aluminium tube with concave base, filled C.E. and A.S.A. composition) instead of the No. 6. See Plate 1C.

Mk. 4.—Three seconds delay. Used only in Naval Service. It is made up with No. 17 safety fuze and a No. 45 Mk. 1 detonator.

Mk. 5 (obsolescent).—Four seconds delay. Is made up with No. 17 safety fuze coloured white, and a No. 27 type detonator. A rubber, or in later production, paper, ring is fitted round the safety fuze as a means of identification in the dark. See Plate 1D.

Mk. 6.—Four seconds delay. It is similar to the Mk. 5, but has slight differences in construction.

Mk. 7.—Four seconds delay. Is made up with No. 20 safety fuze which is not subject to bituminous exudation, a fault which has occurred with the No. 17. In other respects it is the same as the Mk. 5. See Plate 1E.

Action

5. Before throwing or firing, the safety pin is withdrawn, the lever being held firmly by the hand or by the walls of the discharger cup. On release, the spring asserts itself, forcing the striker down on to the rimfire cap and throwing the lever clear. The cap ignites the safety fuze which fires the detonator after the appropriate length of delay, which in turn detonates the H.E. filling.

Marking and Packing

6. Grenades are varnished to prevent rusting. A ring of red crosses is painted round the shoulder and a green band is painted round the centre of the body.



Sec. 1

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Igniters are packed 12 in a tin cylinder, two containing Mk. 2 or 3 igniters bearing a yellow label and those containing Mk. 5, 6 or 7 igniters bearing a red label. The first production of Mk. 7 grenades were labelled Mk. 6. No action is necessary to amend the Marking. True Mk. 6 igniters are produced and used only in India.

Up to August, 1943, these cylinders contained a circular wooden packing piece, when it was found that, due to excessive moisture content of the wood, considerable quantities of igniters were rapidly becoming unserviceable. From this date, igniters were received from factories wrapped in greaseproof paper, shellacked paper or cellophane, the cylinders being marked "TP" (temporary packing). There is no restriction on "TP" igniters from either the user or the storage point of view.

Stocks of igniters already in service before August, 1943, were 100 per cent. examined and those found serviceable were repacked in grease-proof paper in cylinders marked "EMU" (emergency use). "EMU" igniters now remaining in the Service (1945) will be used mainly for practice at home; they may be used operationally at home in an emergency, but will not be issued overseas except with War Office approval.

Future production of igniters will be packed in cylinders which have two perforated metal diaphragms.

Cylinders are sealed with soldered tin bands, adhesive tape, or shellacked tape.

Igniters of Canadian production are packed 12 in metal cylinders having the lids secured by a soldered metal strip which can be removed by a special key attached to the base of the container. Underneath the lid is a metal spacing piece stamped "TOP SPACER. DISCARD BEFORE REPLACING LID", below this is a felt disc.

7. Old stocks of grenades were packed in boxes stencilled "HAND OR RIFLE," and only seven second igniter sets were used. The present method is for boxes to be stencilled "HAND" or "RIFLE," the grenades being packed with four seconds or seven seconds igniter sets respectively.

Hand grenades are packed 12 in Box G36 with 12 igniters, four seconds, and one base plug key. The box is stencilled on each side "12 GRENADES HAND 36M Mk. 1," the Lot Number of the filled grenades, details of the igniters and the letters "TP" if applicable, on each end, "NO 36M HAND," and "20/80" superimposed on three red crosses; on the lid "4 SECS" in two-inch lettering, and the letters "OD" if the box has been oil dressed. Package dimensions are 22 in. x 6½ in. x 6½ in. and the filled weight is approximately 28 lb.

Rifle grenades are packed 12 in Box G36 with 12 igniters, seven seconds, 12 gas-check plates, one base plug key and a tin box containing 14 ballistite cartridges (303-in. or 30-in.). Stencilings on the boxes are similar to those for Hand grenades except that the word "RIFLE" is substituted for "HAND" and the lid is stencilled "7 SECS" instead of "4 SECS." The tin containing the cartridges bears a descriptive label. If the cartridges are 30-in. this label has a red band across it and the Box G36 has a red band painted round it. Package dimensions are 22 in. x 6½ in. x 6½ in. and the filled weight is approximately 29 lb. See Plate 1F.

A new key, which will replace the original base plug key, is designed to remove or replace the base plug, re-cock the striker and gauge the detonator chamber.

8. A large number of boxes carry an additional 12 safety pin rings on one loop of the rope carrying handle. It is suspected that the rings fitted to the grenades are not hard enough to withstand the pull when withdrawing the safety pin, and the additional 12 are for replacement by the users if necessary.

9. The "jungle packs" for grenades No. 36M are as follows:—

Hand grenades.—Three grenades and a tin containing three igniter sets in a bituminized board tube rolled with waterproof adhesive and with the end cap sealed with waterproof tape; four of these tubes and an all-purpose key in Box G70.

Rifle grenades.—As for hand grenades, with the addition of four sealed tins packed in the Box G70, each tin containing three gas-check plates and four Cartridges S.A. Rifle Grenade, H., Mk. IZ.

Examination

10. Boxes will be examined as indicated in Appendix 3 to this pamphlet.

11. THE FIRST OPERATION IN THE EXAMINATION OF GRENADES WILL BE TO REMOVE THE BASE PLUGS TO ASCERTAIN WHETHER OR NOT THEY ARE FITTED WITH IGNITER SETS, AND TO REMOVE THEM IF PRESENT.

12. Mechanisms will be checked in the following manner:—

- (a) Remove excess luting from the striker head with a dry rag.
- (b) Place the grenade with the base plug removed, base downwards on a piece of soft wood, remove the safety pin and slowly release the striker lever. If the striker does not function properly the cause should be ascertained.

13. The following repairs may be carried out locally on defective grenades, or, where facilities do not exist, the grenades will be set aside pending disposal instructions:—

- (a) Grenades found rusty, except as in para. 16.(b) below, will be cleaned and coated with Varnish for the exterior and bases of shell. Corroded markings will be repainted.
- (b) Striker mechanism found sluggish in movement will be cleaned and re-tested, and, if still sluggish will be replaced. Paraffin or other inflammable liquids will not be used for cleaning strikers and springs.
- (c) Base plugs or striker levers found broken, cracked or distorted will be replaced.
- (d) Broken, loose or distorted safety pins, and soft rings, will be replaced. Rings must withstand a pull test of 30 lb. without distortion.
- (e) Grenades contaminated with explosive dust will be brushed clean.
- (f) If the wax sealing at the joint of the striker and grenade body is broken it will be replaced with the approved composition, or, in emergency, luting, thin, lead-free may be used.



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Sec. I

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14. Grenades showing any of the following defects will be sentenced unserviceable:—

- (a) Exudation of the H.E. filling.
- (b) Rust, corrosion or verdigris in the centre piece or filling hole.
- (c) Detonator chamber hard to gauge.
- (d) Distorted or displaced lead washer.
- (e) Broken or cracked shoulder bracket.
- (f) Damaged or eccentric centre pieces.
- (g) Screw-threads of the base hole burred.
- (h) Absence of filling hole plug; absence of H.E. filling.

15. Igniters will be subjected to minute inspection if the cylinders are rusty or dented, or if the sealing tape has become loose or is missing.

16. Igniters may be found with the following defects and, if so, will be sentenced unserviceable:—

- (a) Corrosion or rust on the cap assembly or on the detonator.
- (b) Absence or looseness of the varnished paper disc which seals the hole in the cap.
- (c) Safety fuze loose in the cap assembly or not properly crimped into the detonator.
- (d) Distorted or "soggy" safety fuze; safety fuze showing signs of discoloration, dampness, fungoid growth or bituminous exudation.

17. Instructions for the examination and proof of Cartridges, Rifle Grenade, are given in R.A.O.S., Part 7, Pamphlet No. 11.

Proof

18. Proof of Grenades No. 36M is not normally required. If, however, it is for any reason necessary to carry out a proof, the sentence will be based on the results in accordance with para. 21 below. Igniter sets used for proof of grenades will be of the latest date of manufacture available.

19. Before commencement of proof the grenade mechanisms should be checked as described in para. 12.

20. Proof of Igniter sets will be carried out as follows:—

- (a) One complete tin of Igniter sets will be selected.
- (b) They will be proved in conjunction with Service No. 36M Grenades, by throwing in the normal way.
- (c) The time elapsing from the moment the grenade leaves the thrower's hand until it functions on the ground, will be recorded by means of stop watches.

21. Grenades which detonate completely will be sentenced serviceable. Any which do not completely detonate when the Igniter sets used are of proved serviceability, will be the subject of a special report to the War Office (W.S. 9).

22. Igniter sets which cause complete detonation of the grenades will be sentenced serviceable, provided the times of burning are within the limits laid down in para. 24 below.

23. Igniter sets which do not cause complete detonation of the grenades when the grenades are of known serviceability, will be sentenced provisionally unserviceable.

24. The limits of the times of burning of safety fuze in the various Marks of Igniter sets are as follows:—

Mk. 2 } 8.2 ± 1.2 seconds.
Mk. 3 }
Mk. 5 } 4.5 ± 0.5 seconds.
Mk. 6 }
Mk. 7 }

25. If the time of burning of the safety fuze of any one igniter set is outside the appropriate limits, the Lot concerned will be sentenced provisionally unserviceable, regardless of whether the grenades were completely detonated.

26. The cause of a blind may be:—

- (a) The base plug not being screwed in properly, allowing the striker to expel the plug and the igniter set from the grenade during flight.
- (b) Failure of the striker to strike the cap properly due to malfunctioning of the spring, or the striker being jammed in the centre-channel.
- (c) The rimfire composition in the cap not reacting to the blow of the striker, or not giving a flash sufficiently strong to ignite the safety fuze.
- (d) The safety fuze not reacting to the flash from the cap, or failing to burn completely throughout its whole length.
- (e) The detonator composition being inert because of age or adverse storage conditions, thus failing to react to the flash from the safety fuze, or the flash being blocked by foreign matter contained in the detonator tube.

27. When a blind occurs, an interval of fifteen minutes will be allowed to elapse, after which the procedure laid down in para. 8 (e) of the introduction to this pamphlet will be followed.

Destruction

28. Boxes of grenades will be dealt with in the following manner:—

- (a) Dig a hole to a depth of 4 ft. with an undercut at the bottom.
- (b) Pack 16 grenades all in contact with each other in their own box, the wooden partitions being first removed. The four in the middle should be base upwards and have the plugs removed. If necessary, pack the sides and ends of the boxes with earth, paper or other suitable material to ensure proper contact between the grenades.
- (c) Place the box in the undercut hole: place two wet gun-cotton slabs over the inverted grenades and insert into one of the slabs a rectified dry gun-cotton primer; lay two filled sandbags over the prepared box, leaving a small space only sufficient to allow the insertion of a detonator into the primer.
- (d) Insert into the primer a No. 27 detonator with a suitable length of safety fuze attached, or a No. 33 electric detonator if the charge is to be fired electrically.
- (e) Fill in the hole to a height of about $1\frac{1}{2}$ ft. round the prepared box: ignite the safety fuze and retire to cover.



Sec. 1

11

29. Small quantities of grenades may be disposed of by either of the following methods:—

- (a) Strip them of all movable parts, that is, base plugs, striker and springs, and insert the end of a short length of F.I.D. or cordtex into the detonator chamber of each grenade. The other end of the F.I.D. or cordtex is inserted into a stick of gelignite, which, when all the grenades are in position and in contact with each other, is fitted with a detonator, electric or with safety fuze attached. Care must be taken to rectify the gelignite so that the detonator does not touch any piece of the F.I.D. or cordtex.
- (b) By the method described in S.A.T., Volume 1, Pamphlet No. 13, 1942, for blind grenades, after removal of serviceable components.

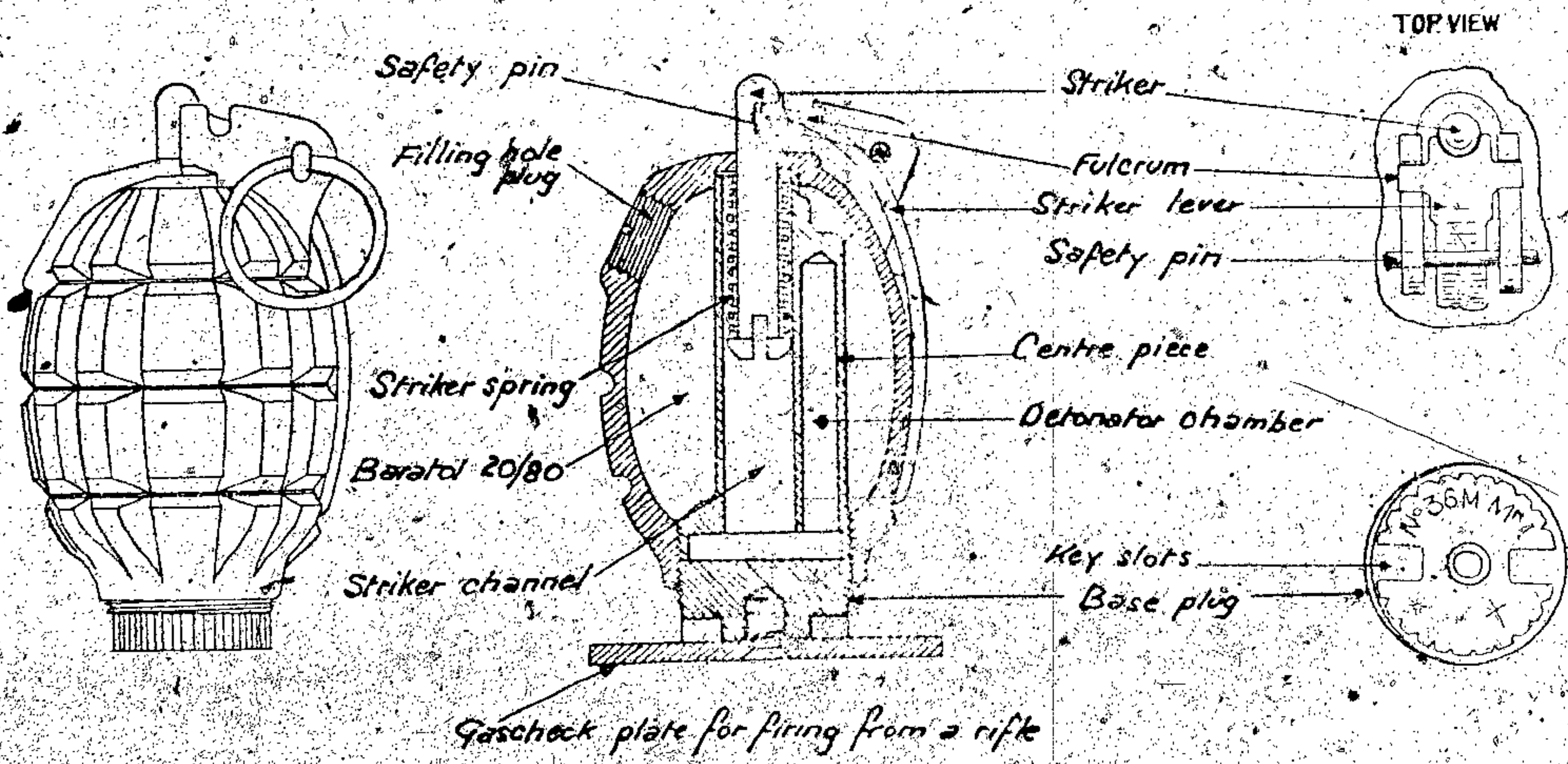
30. Disposal of defective grenades by throwing is a most unsatisfactory and unsuitable method owing to the probability of the defects causing them to be blind. This method of disposal will not normally be employed.

31. Unserviceable Igniter sets will be destroyed in the following manner:—

- (a) Cut the safety fuze at about $\frac{1}{4}$ in. from the detonator, using a sharp magazine knife. Moistening the blade with turpentine or white spirit at intervals will assist in keeping it clean.
- (b) Prepare a number of cardboard cartons (these can easily be made up of scraps of cardboard and adhesive tape) of suitable size to take about 100 detonators packed on their ends.
- (c) Pack not more than 100 detonators into each carton, and after packing, remove one detonator from the centre to provide a space for the detonator with which they will be destroyed.
- (d) Convey the cartons to the demolition ground and place them one each in shallow holes at least 3 yards apart on the ground.
- (e) Insert a No. 33 electric detonator or a No. 27 detonator with a length of safety fuze attached into the space provided in each carton by the removal of one of the detonator.
- (f) Ignite the safety fuzes and retire to cover.
- (g) Destroy the caps and safety fuzes remaining by dropping them a few at a time into an incinerator.

32. Instructions for disposing of unserviceable Cartridges S.A. Rifle Grenade are given in R.A.O.S., Part 7, Pamphlet No. 11.

GRENADE, No. 36M, MK. 1



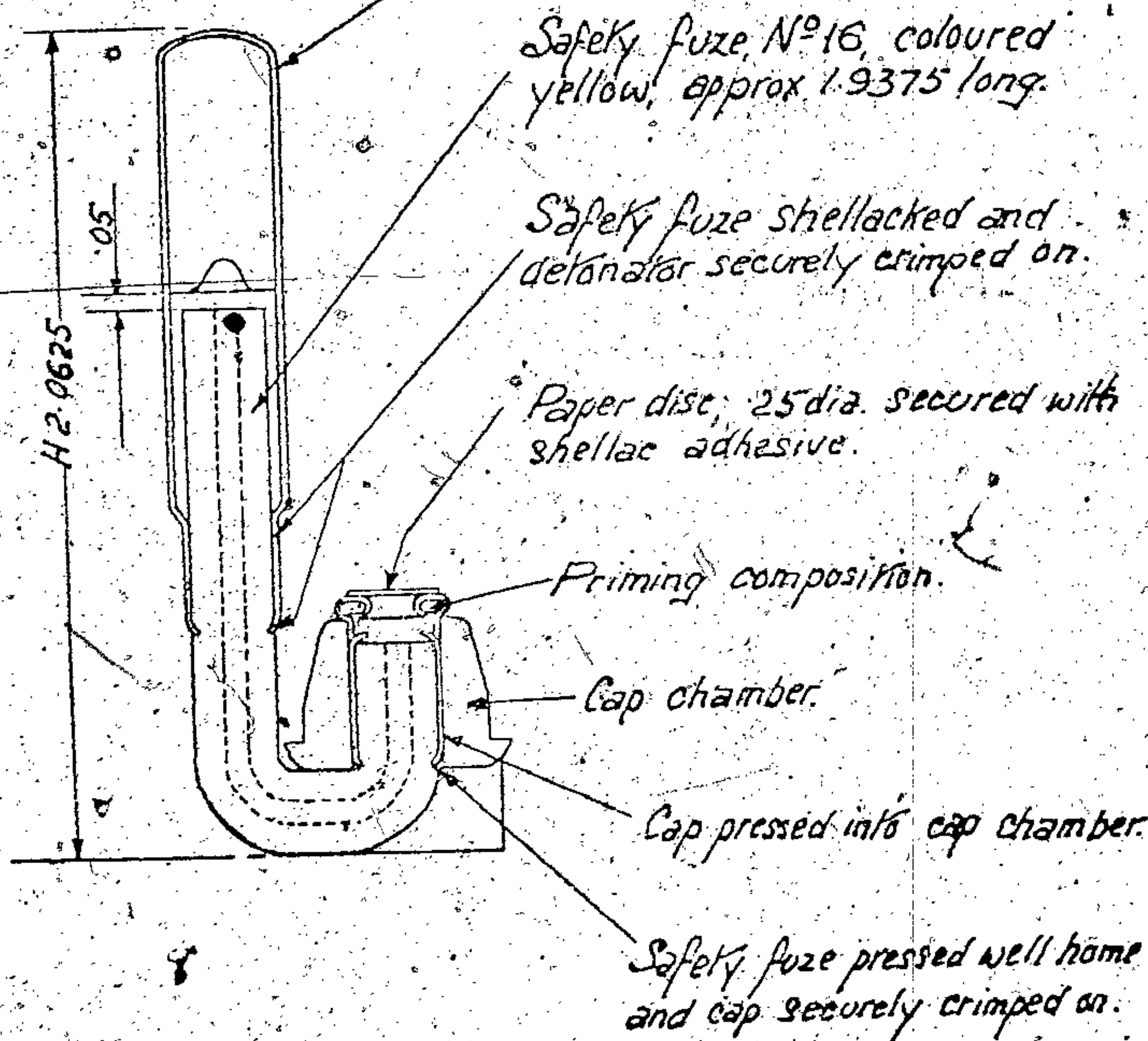
Sec. 1

Plate 1B

DETONATOR No. 36M. GRENADE, MK. 2

(Seven Seconds Delay)

Detonator No. 16



DETONATOR, No. 36M, GRENADE, MK. 3

(Seven Seconds Delay)

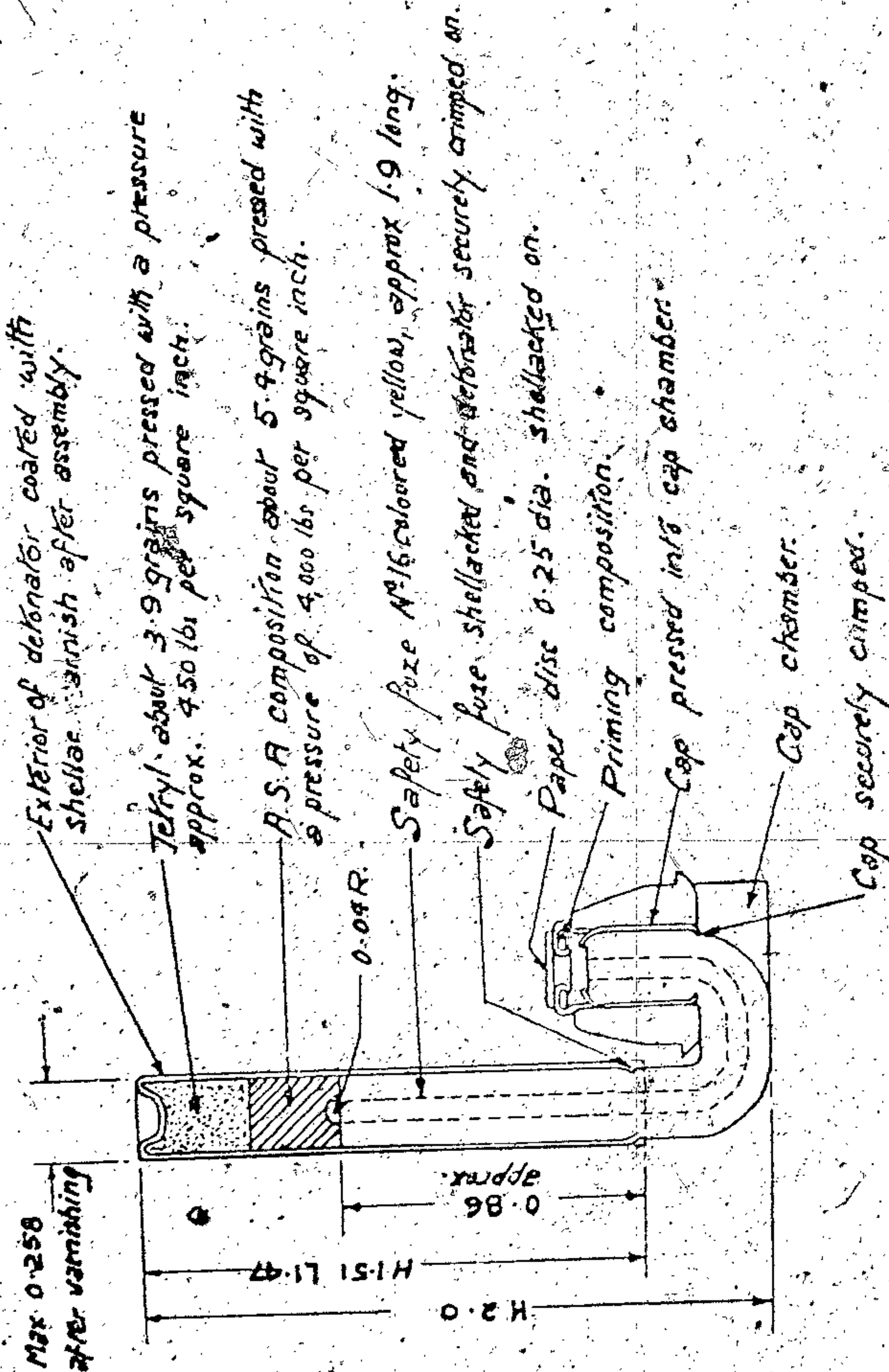
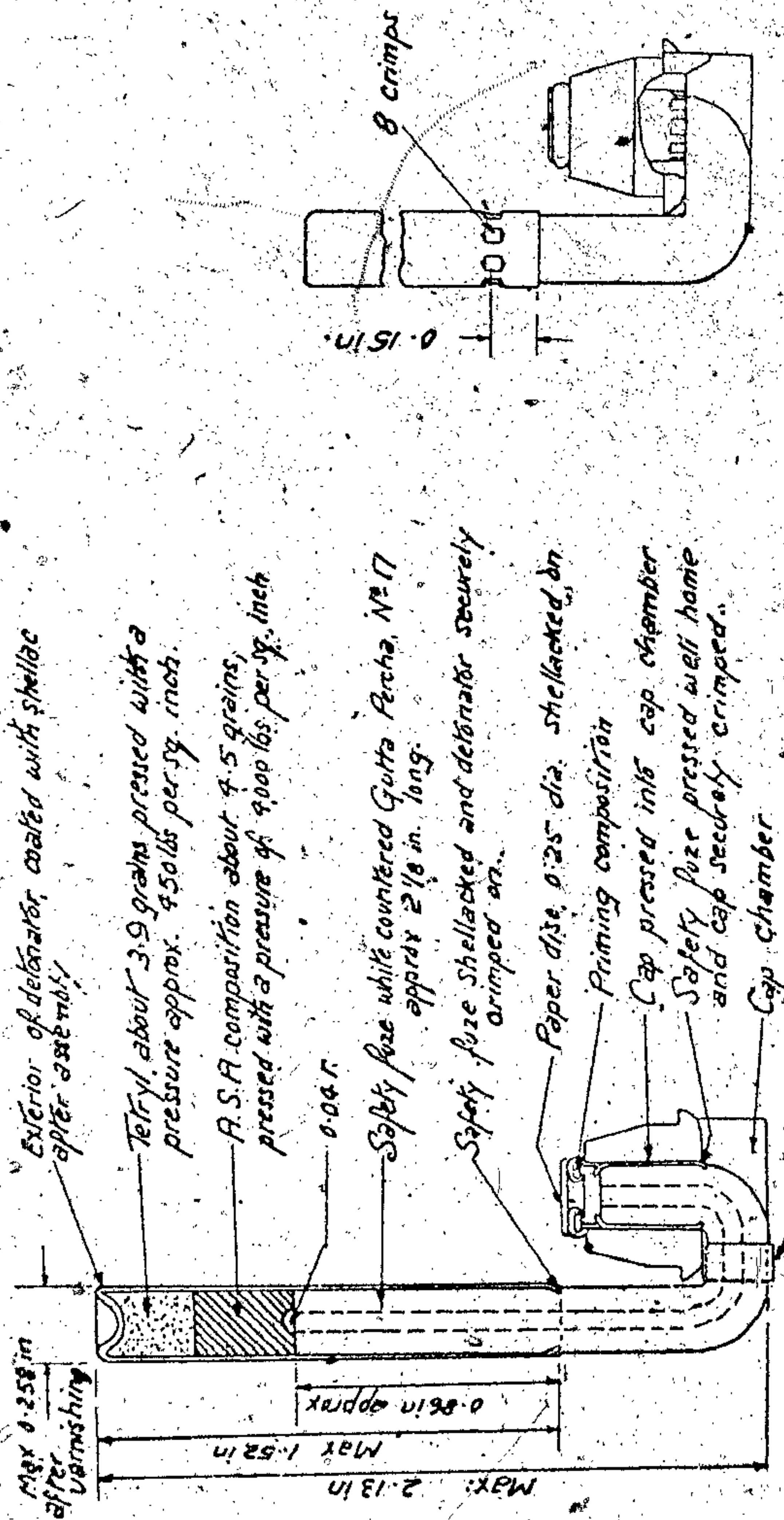


Plate ID

DETONATOR, No. 36M. GRENADE, MK. 5 (Four Seconds Delay)



Alternative method of securing detonator and cap.

DETONATOR, No. 36M. GRENADE, MK. 7 (Four Seconds Delay)

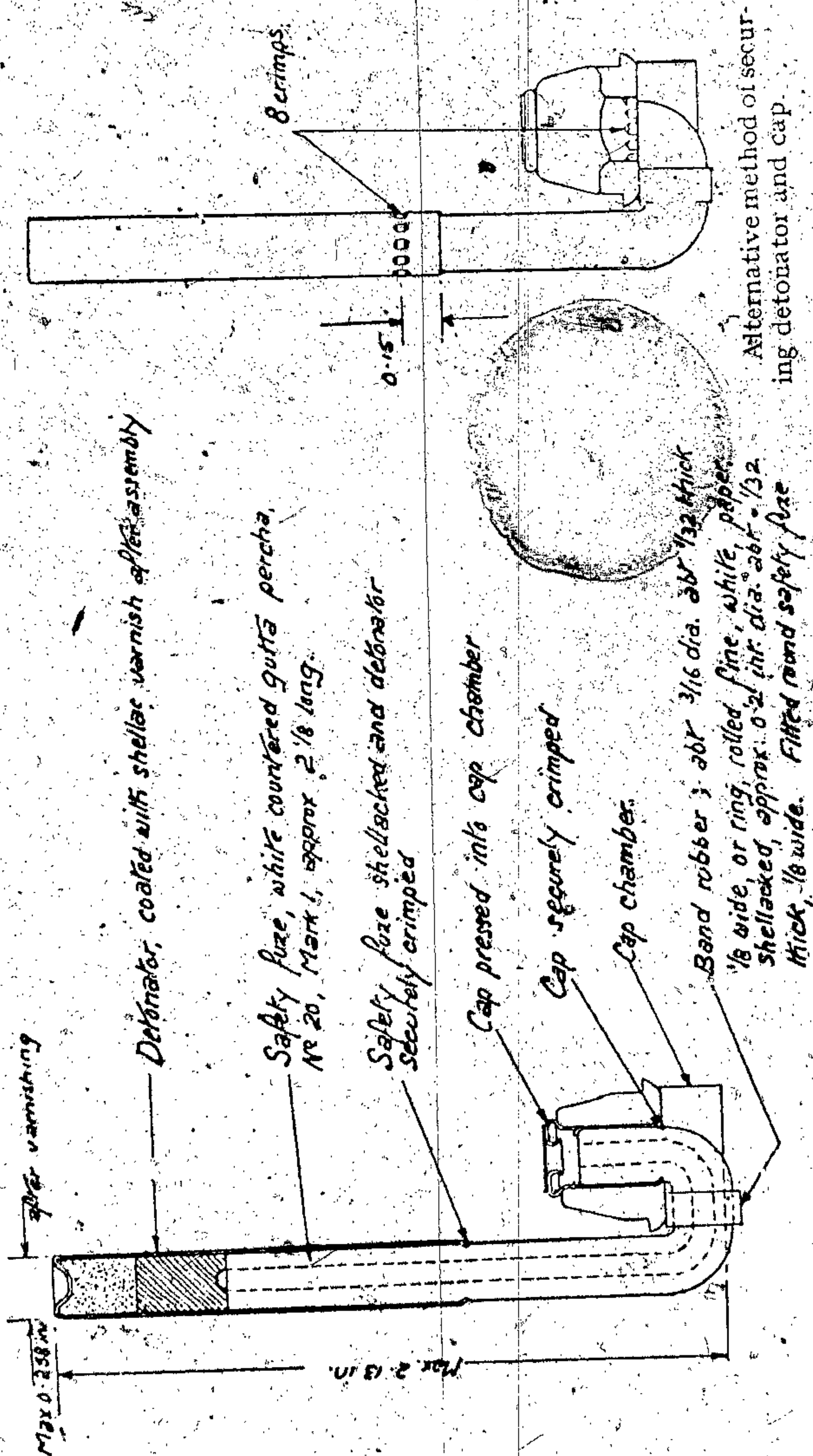


Plate 1F

TYPICAL FOR BOXES CONTAINING GRENADES No. 36M

Stencil for Box G36

General Notes

The number or letter in circle denotes item in column.

Box to be stained vandyke brown.

Stencilling to be in yellow $\frac{1}{4}$ inch and $\frac{3}{8}$ inch lettering except where

otherwise stated.

Stencilling to be as shown on both sides, lid and both ends.

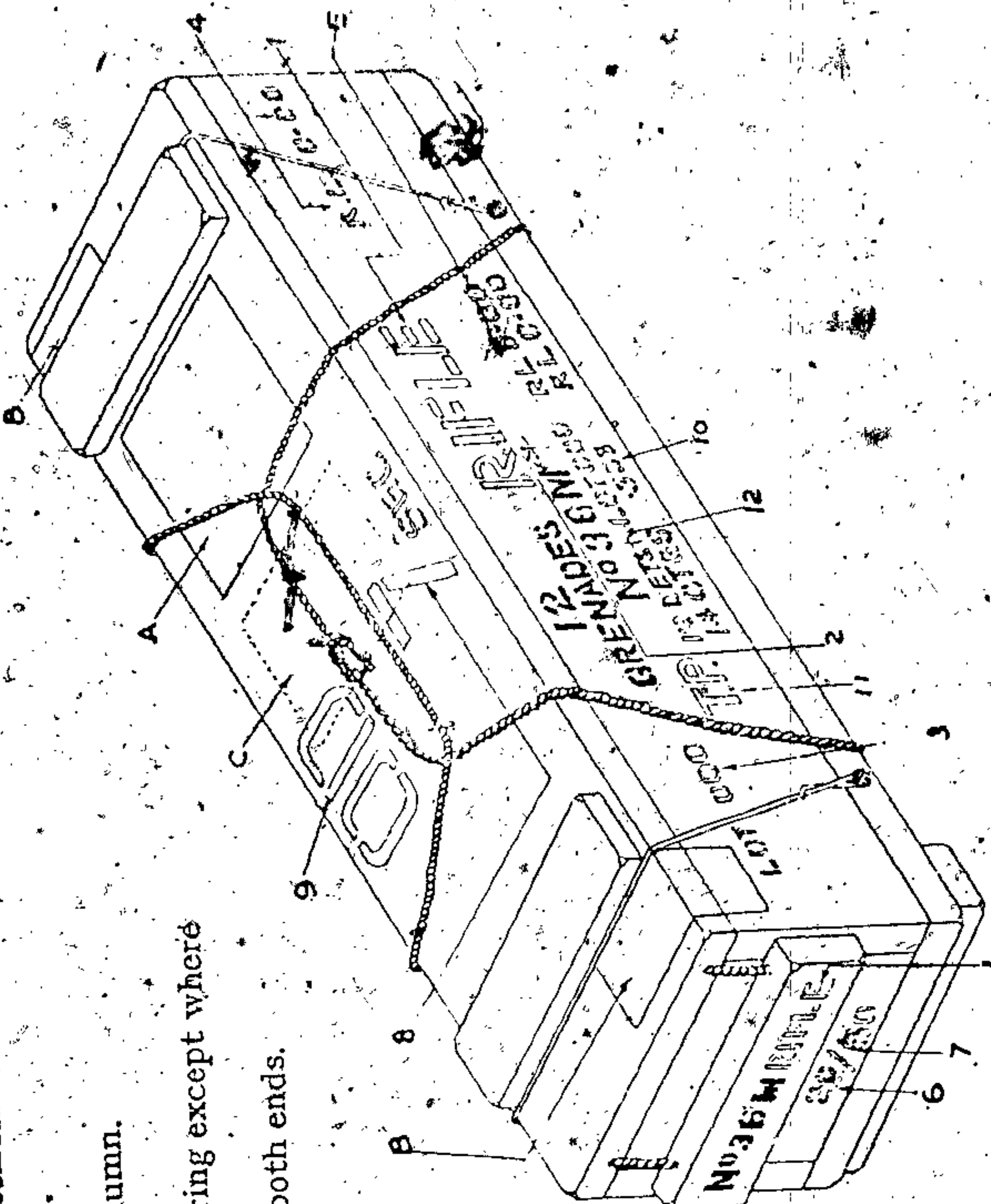
Item

1. "Rifle" or "Hard." (1 inch letters)
2. Mark.
3. Grenade Lot number.
4. Filler and date.
5. Lot No., manufacturer and date of detonators.
6. Composition of filling.
7. Suitability for use in hot climates.
8. "4 sec." or "7 sec." as applicable (2 inch fig.)
9. 2 inch letters as applicable.
10. Calibre of cartridge.
11. 2 inch Red type, to denote temporary package of detonators.
12. Mark of detonator.
- A. Explosive Group 8.
- B. Two station labels on opposite sides.
- C. Packers label, No. L566A.

Care must be taken to ensure that a Key, Base Plug, is inserted in each box in straps on underside of lid.

Grenades intended for use in Rifles must have gaschecks packed with them.

IMPORTANT.—The position of all stencilling must be exactly as shown.



SECTION 2. - GRENADES, RIFLE

Nos. 57 to 62, SIGNAL AND ILLUMINATING DESCRIPTION

1. These grenades are generally out of use, having been superseded by the 2-inch mortar bombs, though they may still be met in depots. They are designed to be fired from the 2½-in. discharger cup by a .303-in. H. Mk. 1Z rifle Grenade cartridge.

All the grenades are similar in construction, each grenade consisting of a steel cylindrical container carrying the stars and delay, bursting and ignition compositions.

2. The following are brief details of each of the grenades in this series:—

No. 57, *Illuminating*.

Time of burning 5½ sec., giving 500,000 c.p. Weight without cap 1-lb. ½-oz.; length 2-in.

Ignition composition: 23-gr. of S.F.G. 2 and 46-gr. of S.R. 252.

Illuminating composition: 1,930 gr. of S.R. 577.

Marking: Red Star in a white circle.

No. 58, *Illuminating (with parachute)*.

Time of burning 28 sec. Weight 1-lb. 7-oz. Length 5-in. 30-in. parachute.

Ignition composition: 23-gr. of S.F.G. and 50-gr. of S.R. 252.

Illuminating composition: 6½-oz. of S.R. 565.

Marking: Red Star in a white circle.

No. 59, *Day Signal*.

Contains 12 red or 12 green or 12 mixed red and green stars. Time of burning: 7 sec. Weight 1½-lb. Length 3½-in.

Ignition composition: 1,290-gr. G. 12.

Star Composition: 138-gr. of S.R. 232 (red) or S.R. 477 (Green).

Marking: "M" on coloured triangle. Base of triangle green; upper part of triangle red.

No. 60, *Night Signal*.

Similar to No. 59, except that it is designed for night use. Time of burning: 11½-sec. red; 8½-sec. green.

Star composition: 148-gr. of S.R. 287 (red), or 148-gr. S.R. 475 (green).

Marking: "M" on a coloured disc, parti-red and green.

No. 61, *Day Signal (with parachute)*.

Contains 3 stars, red or green or a combination. Time of burning: 20-sec. Weight: 1-lb. 4½-oz. Length: 5½-in.

Ignition composition: as for No. 58 grenade.

Star composition: Red, S.R. 232; green S.R. 477.

Marking: 3 triangles red or green, or red and green, according to the colours of the stars.

No. 62, *Night Signal*.

Similar to No. 61, except that it is designed for night use.

Ignition composition: Red, S.R. 287; Green, S.R. 475.

Marking: 3 discs red or green, or red and green, according to the colours of the stars.

Examination and Proof

4. No repairs or proof will be carried out on these grenades; any found defective will be sentenced unserviceable and destroyed as described below.

Destruction

5. Grenades will be destroyed as follows:—

- (a) By firing from a discharger cup. This method will normally only be employed when grenades are to be destroyed owing to redundancy or similar reasons. Grenades showing defects which might prevent their satisfactory functioning if fired, will be destroyed in the manner described at (b) below.
- (b) By burning in an incinerator. The incinerator should be provided with a narrow-mesh steel netting cover, and be substantially constructed so as to provide adequate protection for the operator. Not more than three grenades will be destroyed at one time.

GRENAD, RIFLE, 2.5-IN., No. 63, SMOKE, MKS. 1 AND 1Z

6. The Mk. 1Z differs from the Mk. 1 only in being filled with a different smoke composition. Both Marks are obsolescent and stocks in the United Kingdom have been sentenced for training purposes only.

The grenade is for firing from a rifle, and consists of a thin drawn steel cylindrical container, closed at one end. In the middle of the priming composition is a delay pellet, the object being to delay the emission of smoke for some five seconds while the grenade is in flight. The top (closed) end of the grenade is marked "TOP" and has a circular corrugation. The base is sealed with tinned-plate sealing discs and closed with a cap fitted with a loop for easy removal.

The body is painted green and bears a red filling ring. The time of smoke emission is about one minute.

Action

7. The grenade is prepared for firing by pulling off the protective cap. It is inserted into the discharger cap base first. When the cartridge is fired, the flash from the propellant penetrates the tinned-plate closing discs and ignites quickmatch leading to the delay pellet, which in turn ignites the priming composition and then the smoke composition.

Examination and Proof

8. No repairs or proof will be carried out on these grenades; any found defective will be sentenced unserviceable and destroyed as described below.

Destruction

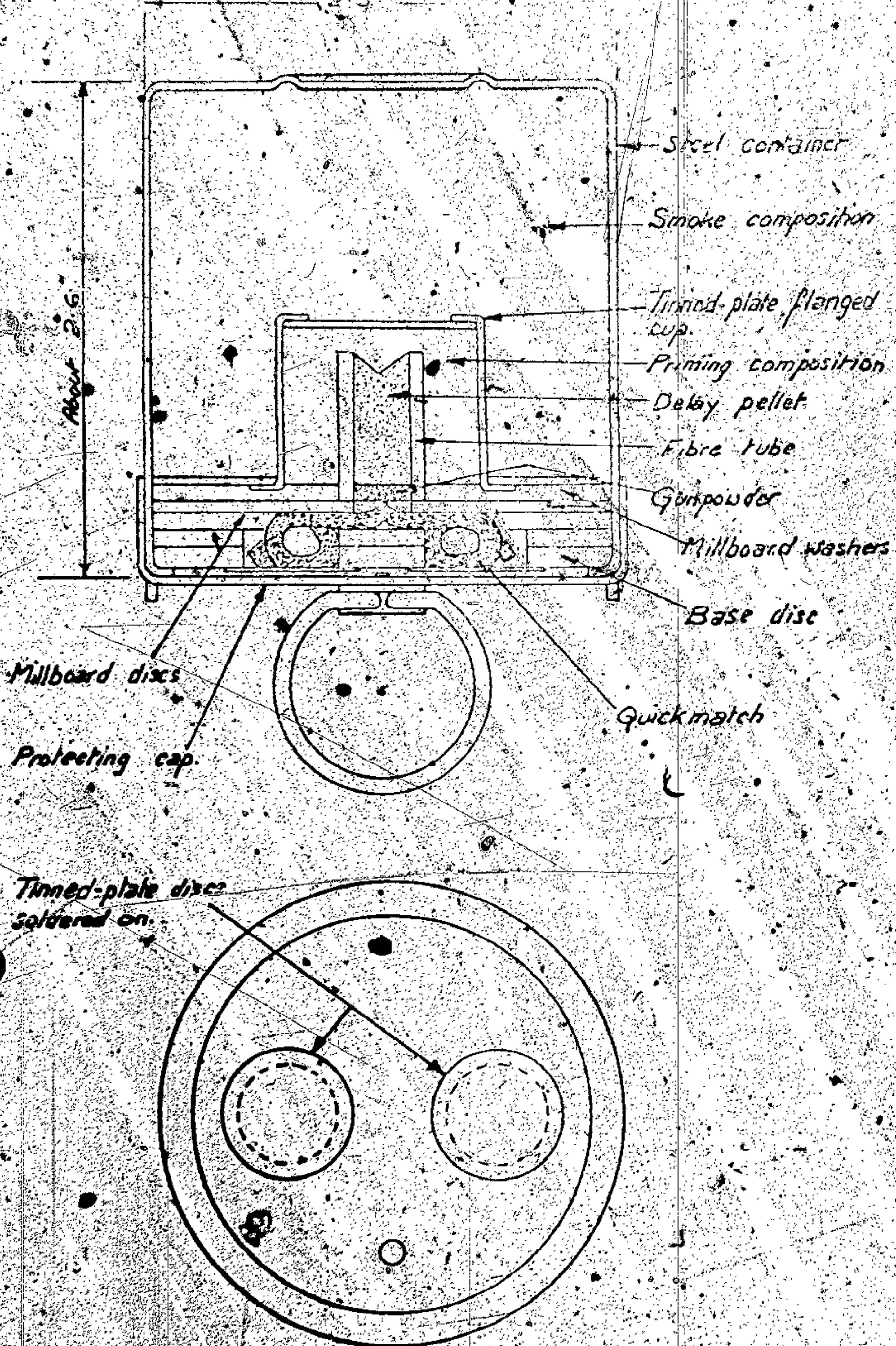
9. Grenades will be destroyed by the appropriate method laid down for the destruction of Grenades Nos. 57 to 62.

GRENAD, HAND, LACHRYMATORY, No. 67, MK. 1

10. For details of this grenade, see R.A.O.S., Part 7, Pamphlet No. 7.



Sec. 2



Verfikt für dienstliche Zwecke der Reichsteilnahme-
gung. Weitergabe an Dritte nur mit Zustimmung des M M

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**SECTION 3.—GRENADE, RIFLE, No. 68, ANTI-TANK****DESCRIPTION**

1. This grenade is intended for use at ranges between 60 and 100 yards.

The grenade body is made of steel, in the shape of a bell with cylindrical walls. The dome of the body is bored and screw-threaded to accommodate the tail unit. The tail has four straight vanes and a central recess to carry the striker and spring. The recess is screw-threaded at the outer end to receive the detonator holder. The striker is made either of rustproofed steel in one piece, or consists of a steel needle set in a mazak holder. The open end of the body is fitted with a metal disc made of brass, tinned plate or steel, secured by a screwed metal cap. The rear end of the tail carries a gas-check plate which may be integral with the unit, or secured by a screw or a rivet.

The detonator holder carries a 5-gr. lead azide detonator and a C.E. pellet which constitutes the magazine. There is a helical creep spring between the detonator and the striker, and the striker is held in the safe position by a copper shearing wire and a safety pin passing through holes bored through the stem of the tail coincidental with holes in the striker. Attached to the safety pin is a metal tag bearing the words "TO BE WITHDRAWN FROM GRENADE BEFORE FIRING."

The filling is about 5½-oz. H.E., the weight of the filled grenade being 1-lb. 15½-oz. The number of grenades in a Lot when issued from factory to depot is 1,938.

Mk. 1 (obsolescent).

2. This Mark can be recognized by the small vanes on the body in addition to those on the tail, giving the appearance of interrupted vanes. In earlier production the gas-check plate was secured by a bakelite screw which was designed to break when the grenade was fired and allow the gas-check plate to fall away. Considerable trouble was caused, however, by the screws breaking during handling and transport and pieces of bakelite falling into the barrel of the rifle on firing. Trials proved that the presence of the gas-check during flight did not appreciably affect the range or trajectory of the grenade and so the bakelite screw was replaced by a brass screw in order to ensure that the gas-check remained fixed to the grenade during flight.

This Mark of grenade is filled R.D. X/B.W.X. 91/9 or P.E. The detonator holder and C.E. pellet container are in one unit, the container being closed with a bakelite cap. The cavity in the filling is hemispherical with a cylindrical extension. The cap liner is brass.

All stocks have been relegated for practice at short ranges (up to 50 yards) owing to the unsatisfactory performance of the interrupted vanes.

Mk. 2 (obsolescent).

3. This Mark differs from the Mk. 1 in that there are no small vanes on the body: the vanes of the tail unit being lengthened to increase the vane area. The gas-check plate is secured to the tail either by a brass screw or a metal rivet. The filling is the same as for the Mk. 1.

Mk. 3 (obsolescent). (See Plate 3A.)

4. The filling is either Lyddite or Pentolite, the cavity being cylindro-conoidal. The magazine is fitted with a larger C.E. pellet than the Mk. 1. The gas-check is either of steel, secured by a metal rivet or of Mazak integral with the tail unit. Integral Mazak gas-checks become brittle at temperatures -20° F. and may break on firing. The detonator is held in place by spinning the edge of the detonator holder on to it, a method which has proved most unsatisfactory and has given rise to prematures. In consequence, all grenades of this Mark have been modified by replacing the existing tail unit with a Mk. 4 grenade tail unit, in which the detonator is secured in its holder by a screwed metal plug. Grenades so modified are distinguished by the letter "R" after the Lot number and are re-designated Mk. 4 to conform with the later production incorporating the new method of securing the detonator.

Mk. 4 (obsolescent). (See Plate 3A.)

5. This differs from the Mk. 3 in that the method of securing the detonator by means of a metal plug is incorporated during manufacture; the filling is about 5½ oz. of Lyddite, Pentolite or C.E./T.N.T., the two latter having a topping of T.N.T.; the gas-check plate is of Mazak, cast integrally with the tail unit.

Mk. 5 (obsolescent). (See Plate 3A.)

6. This differs from the Mk. 4 in that the gas-check plate is made of steel, secured by riveting.

Action

7. The grenade is inserted into the discharger cup *vanes* first, the safety pin is withdrawn before firing. On firing, the striker sets back under inertia, breaking the shear wire. On deceleration during flight the striker is held off the detonator by the creep spring. When the grenade strikes the target, the forward movement of the striker overcomes the creep spring, impinging on the detonator, the ensuing detonating wave being passed through the C.E. pellet to the H.E. filling.

Marking and Packing. (See Plates 3A, 3B and 3C.)

8. Grenades are painted buff with a red filling ring round the body below the cap, and are stencilled with particulars of the Lot number, filler's initials and date of filling. The Serial number (No. 68 A.Tk.), Mark, contractor's initials and year of manufacture are embossed on the tail. Markings to indicate the various fillings are:—

LYDDITE	..	"LYD" stencilled in white.
R.D.X./B.W.X. 91/9	..	Green ring with "RDX/BWX 91/9" stencilled on it in black.
P.E.	..	Green ring with "P.E." stencilled on it in black.
C.E./T.M.T. 30/70	..	Green ring with "C.E./T.N.T. 30/70" stencilled on it in black.

9. Cartridges for use with the No. 68 grenade are either .303-in. H. Mk. 1Z, or .30-in. Early supplies of .30-in. cartridges were packed in cartons marked with 2-in. red band and bearing two labels, one on the side and one on the top, marked "20 Cartridges, Rifle Grenade, .30-in. (American) Ballistite." Later supplies are in cartons or sealed tins marked "20 Cartridges, Rifle Grenade, .30-in. for Grenade use only, 5-gr. F.F.F.G. Black and 51-gr. N.C.", and bearing two ½-in. vertical blue bands. .303-in. Ballistite cartridges are in sealed tin boxes of 20.



Sec. 3

26

10. Grenades and cartridges are packed in Box P 59 Mk. 2: each grenade is contained in a paper cylinder. The following three methods of packing have been used:—

- (a) 17 Grenades with 20 cartridges. (This is the normal method.)
- (b) 18 Grenades with no cartridges (for use with Northover Projector).
- (c) 18 Grenades with 20 cartridges.

Dimensions of Box P 59 Mk. 2 are $19\frac{1}{4}$ -in. $\times$ $8\frac{1}{2}$ -in. $\times$ 8-in. and when containing 17 grenades and 20 cartridges the filled weight is approximately 49 $\frac{1}{2}$ -lb.

11. Boxes are stencilled to indicate the quantity, mark, Lot number, filler, date of filling and nature of filling of the grenades, and details of the cartridges. When containing 30 cartridges they have a two inch red band vertically on the sides and across the lid, and are stencilled in red in one inch letters "Cartridges 30-in." on both sides. Some boxes containing Mk. 5 grenades were stencilled with the words, "STEEL GASCHECKS" but as all Mk. 5 grenades are fitted with steel gas-check plates, this marking is not necessary, and has been discontinued.

Examination

12. Boxes will be examined as indicated in Appendix 3 to this pamphlet.

13. THE FIRST OPERATION IN CONNECTION WITH THE EXAMINATION OF THE GRENADES WILL BE TO ENSURE THAT THE SAFETY PIN AND SHEAR WIRE ARE CORRECTLY FITTED.

14. The shear wires are generally loose, being of much smaller diameter than the hole. They are prevented from falling out of position by a slight flattening or turning over of the ends. As long as the wire is present the fact of its being loose can be accepted. Units should be instructed to check the presence of the wire before firing. NO ATTEMPT WILL BE MADE TO REMOVE LOOSE SHEAR WIRES. Grenades without shear wires should not be fired.

15. Examination of grenades will be as follows: Repairs may be carried out locally when facilities exist, or if components are not available, the grenades will be sentenced provisionally unserviceable and segregated pending disposal instructions:—

- (a) Grenades found incompletely painted or with illegible markings will be repainted and re-stencilled.
- (b) Grenades with slight rust or corrosion except as in (c) may be cleaned and repainted.
- (c) Grenades badly rusted or corroded, or with any signs of rust or corrosion at the joints between:
 - (i) the cap and the body; or
 - (ii) the tail unit and the body,will be sentenced unserviceable.
- (d) Loose caps will be removed, and, if the metal cup and disc over the filling are in good condition, will be replaced, the threads being coated with R.D. cement.
- (e) Grenades with loose tail units will be sentenced unserviceable.

- (f) Broken, loose or distorted safety pins will be replaced. Where safety pins are missing it will be ensured that the shear wire is in correct position and undistorted; if the shear wire appears to have been subjected to any strain the grenade will be sentenced unserviceable. If new safety pins are not available to replace those which are missing, a nail or a piece of steel wire will be inserted in the safety pin hole.
- (g) If grenades are found without shear wires they will be segregated and arrangements made to obtain a fresh supply of shear wires, or, if the number of grenades is small they may be sentenced unserviceable.
- (h) Grenades with cracked or broken tail units will be sentenced unserviceable.
- (j) Any grenades found with over-poured lyddite set on the exterior will be sentenced unserviceable. The explosive may or may not be found to be painted over, but the defect can easily be detected as it gives the otherwise smooth surface an uneven appearance.

16. Examination and proof of Cartridges, Rifle Grenade, will be as laid down in R.A.O.S., Part 7, Pamphlet No. 11.

Proof

17. Proof of Grenades No. 68 will not be carried out unless specially ordered.

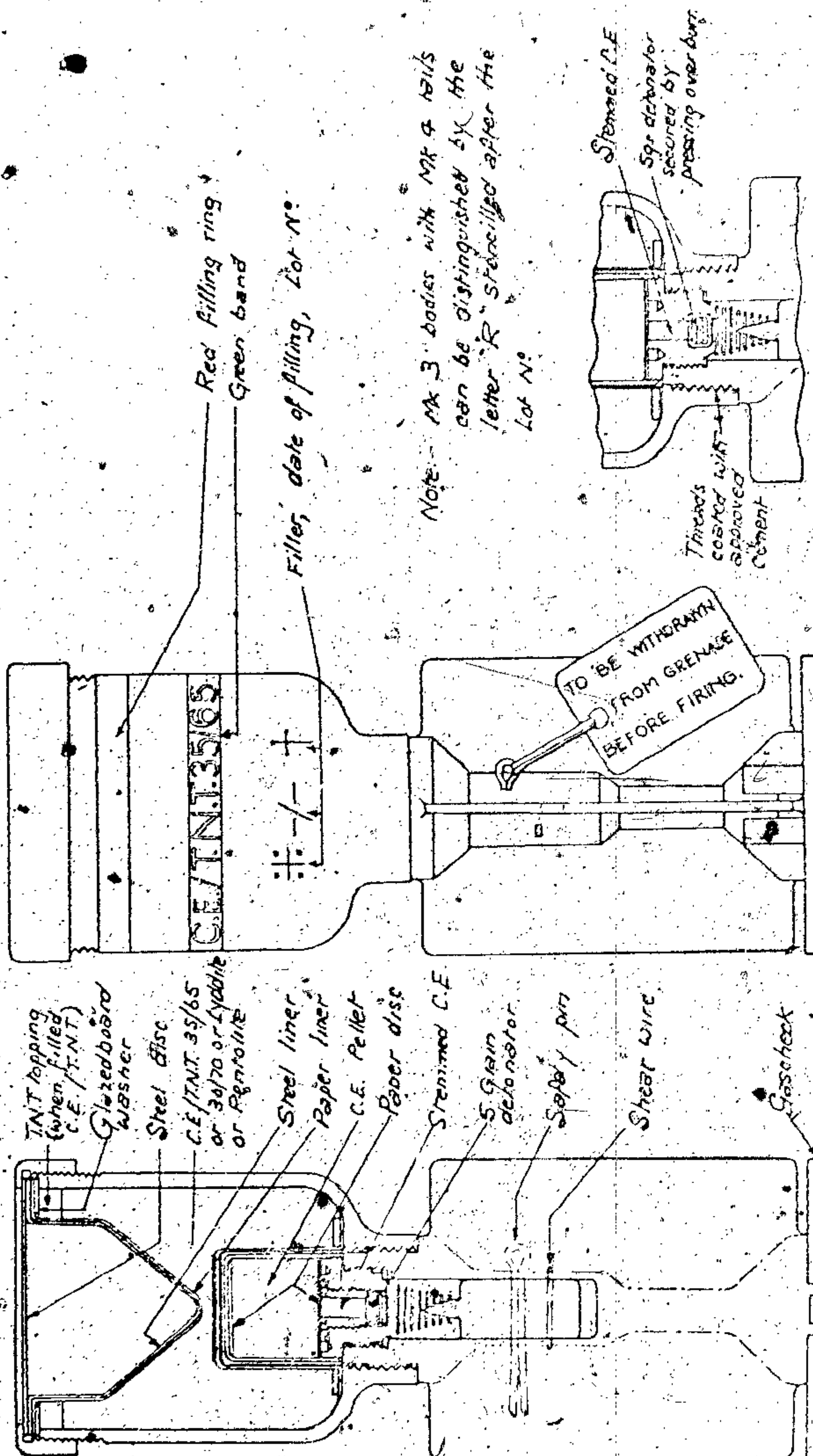
Destruction

18. Two suitable methods are as follows:—

- (a) (i) Dig a hole about 4-ft. deep with an undercut, and in the undercut arrange twelve grenades in three layers, five in the bottom layer, with the tails all in the same direction, and pack the space between the arcs of the bodies with plastic explosive.
- (ii) Place on the top a wet guncotton slab with a rectified dry guncotton primer.
- (iii) Initiate by means of a No. 33 electric detonator or a No. 27 detonator with a length of safety fuze attached.
- (b) (i) The grenades will be dealt with singly.
- (ii) Secure a dry guncotton primer to the body of the grenade, near the tail, with adhesive tape.
- (iii) Place the grenade so prepared in a hole at least 2-ft. deep: insert a No. 27 detonator with a length of safety fuze attached into the primer: fill in the hole with earth or sand free from stones, leaving the safety fuze protruding.
- (iv) Ignite the safety fuze and retire to cover.

19. Cartridges, Rifle Grenade, will be disposed of as indicated in R.A.O.S., Part 7, Pamphlet No. 11.

GRENADE, RIFLE, No. 68, ANTI-TANK



Mks. 4 and 5

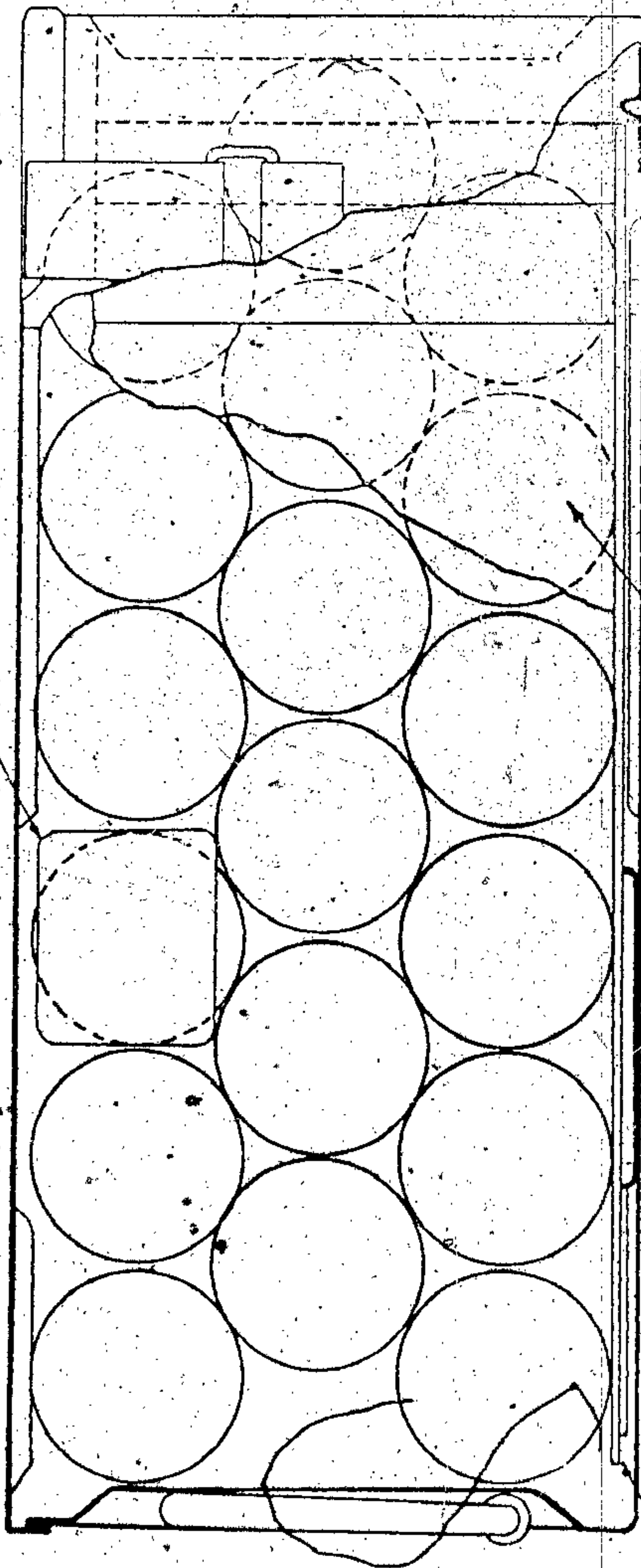
Detonator Assembly for 3



Bestätigung der Unterschrift mit dem Original.
Ausgestellt, am 14.12.83 Unterschrift: U. Weber

TYPICAL FOR BOX, P59 MK. 2, CONTAINING GRENADES, RIFLE, No. 68,
ANTI-TANK

Box containing 20 Cartridges.



Millboard packing piece on bottom
with supports down, position as shown

Millboard packing piece to be placed on both
sides, supports outward as shown

C.I.A. 627

Method of Packing

Part side and packing piece removed.

Note:—Grenades to be packed in paper tubes and placed alternately head and tail in box.



SECTION 4.—GRENADE, HAND, No. 69

DESCRIPTION

Mk. 1. (See Plate 5A.)

1. This is an anti-personnel H.E. grenade which produces mainly a blast effect.

The design can be seen in the plate. The body, upper and lower parts, the base plug and the filling hole plug, originally made of bakelite are now made from an approved moulded composition. The body is assembled before filling, the screw-threads being coated with approved cement.

The central channel connecting the base hole and the fuze-hole is to accommodate the detonator and is formed by a tube made of laminated plastic, paper based. A fillet of cement is placed at either end of the tube where it is in contact with the body. In grenades of early manufacture, some trouble was caused by the tubes delaminating, or in some cases partially collapsing, making it impossible to insert the detonators correctly. This defect was overcome at about the end of 1942, when the manufacturing specification was amended.

The base plug has a small rubber plug secured to its inner end with cement to cushion the detonator after insertion, at the same time exerting sufficient pressure to hold it firmly in position. The detonator is the No. 46, containing A.S.A. and C.F. The base plug and filling hole plug are seated (See Plate 4B) on rubber washers, and a vulcanized rubber washer is positioned in the fuze recess above the screw-threads in the top of the grenade body.

The fuze is the No. 247, details of which are given in Appendix 1 of this pamphlet. When the fuze is screwed into the grenade, a strip of adhesive tape 2-in. $\times$ $\frac{1}{2}$ -in. is placed across its cap and the grenade body as an additional means of securing.

The filling is approximately 3 $\frac{1}{2}$ -oz. of Amatol 80/20, Lyddite or Baratol 20/80. The number of grenades in a Lot when issued from factory to depot is 3,400.

Action

2. The base plug is removed and the detonator is inserted with its open end towards the fuze. The base plug is then replaced and screwed home. Before throwing, the safety cap of the fuze is removed. When thrown, the fuze functions as described in Appendix 1, the flash from the cap firing the detonator which in turn detonates the H.E. filling.

Marking and Packing. (See Plates 4C and 4D.)

3. The grenades are unpainted, and bear a filling ring of red crosses. If the filling is Amatol 80/20, a green band is painted on the body, if the filling is Lyddite the abbreviation "LYD" is stencilled in $\frac{1}{4}$ -in. white letters; if the filling is Baratol 20/80 a green band is painted on the body bearing the abbreviation "BAR 20/80". The grenade body will be stamped either on the side or the base, No. 69 Mk. 1, the contractor's initials or recognized trade mark and the year of manufacture.

4. The detonators are packed in circular wooden blocks drilled with circular holes to accommodate 17 detonators. The top of the block is closed with a tinned plate lid which bears a descriptive label.

5. Box B 167 contains 34 grenades and two detonator containers, in nine paper tubes. Eight of the tubes contain four grenades, the ninth holding two grenades and the two detonator containers. A mill-board disc is placed between each two grenades, and the ends of the tubes are closed with wooden plugs. The tube containing the detonators is stencilled "DETONATORS" in two places diametrically opposite and is packed in the centre of the top layer.

Dimensions of the box B 167 are 21 $\frac{1}{2}$ -in. $\times$ 9 $\frac{1}{2}$ -in. $\times$ 9 $\frac{1}{2}$ -in., and the filled weight is approximately 46-lb.

6. The "jungle pack" for Grenades No. 69 is four Grenades and a tin containing four detonators No. 46, in a bituminized board tube; 6 tubes in Box C 238. Dimensions of Box C 238 are 26.1-in. $\times$ 10.1-in. $\times$ 9.6-in., and the filled weight is approximately 35-lb.

Examination

7. The boxes will be examined as indicated in Appendix 3 to this pamphlet.

8. Paper tubes containing the grenades and detonators should be examined for signs of dampness, swelling and delamination. Any found in an unsatisfactory condition will be replaced.

9. The wooden detonator blocks, if found to be damp, swollen, shrunken, cracked or otherwise defective, will be immediately replaced. Where it is not possible to remove detonators from defective blocks, the whole will be removed for destruction, under precautions.

10. Detonators showing any signs of damp, corrosion or verdigris or in any other way visually in bad condition, will be sentenced unserviceable. Fuzes will be dealt with as detailed in Appendix 1.

11. Grenades with any of the following defects will be sentenced unserviceable:—

- (a) Cracked or chipped bodies.
- (b) Delaminated, cracked or collapsed central tubes.
- (c) Exudation of the H.E. filling; crystalline deposit near the filling hole.

12. It will be ensured that the fuze cap is retained by a strip of adhesive tape across it and the body of the grenade.

13. Grenades with base plugs of which the rubber plugs are missing will be fitted with new base plugs, or alternatively sentenced unserviceable. In no circumstances must grenades without the rubber plugs be put to operational use.

Proof

14. Grenades will be proved in conjunction with their own fuzes and the detonators with which they are packed, except as provided in para. 18B below.

15. The proof will be carried out as follows:—

- (a) Select 10 grenades from the Lot concerned.
- (b) Throw the grenades "overhand" from behind cover, on to a firm surface. A slight spin should be imparted to the grenade as it leaves the hand.

16. In the event of all the grenades detonating completely, on impact, the Lot concerned will be sentenced serviceable.

17. A failure will be —

- (a) A blind.
- (b) The grenade not detonating completely.
- (c) Failure to detonate on impact.

18. If a failure occurs, the serviceability of the detonators and the fuzes will be tested separately as follows —

(a) *Detonators.*

- (i) Select a further 10 grenades, and detonators.
- (ii) Fit a length of safety fuze to each detonator.
- (iii) Lay a grenade on the ground with its safety cap on but with the base plug removed.
- (iv) Insert a prepared detonator into the grenade: ignite the safety fuze and retire to cover.
- (v) Repeat for the remaining grenades.
- (vi) If a failure occurs the detonators will be sentenced unserviceable and destroyed. If no failure occurs a second proof will be carried out as in para. 15. Any failure at this second proof will entail a sentence provisionally unserviceable on the Lot concerned.

(b) *Fuzes.*

- (i) Select a further 10 grenades.
- (ii) Insert detonators of proved serviceability and of the latest date of manufacture available.
- (iii) Proceed as in para. 15 (b) above.
- (iv) If a failure occurs the fuzes and the grenades to which they are fitted will be sentenced provisionally unserviceable. If no failure occurs a second proof will be carried out as in para. 15. Any failure at this second proof will entail a sentence provisionally unserviceable on the Lot concerned.

19. When a blind occurs, the procedure laid down in the introduction to this pamphlet, para. 8 (e), will be followed.

Destruction

20. The principles of the methods of destruction given for Grenades No. 36M may be applied to the destruction of Grenades No. 69, with the following modifications:—

- (a) When destroying boxes of grenades by detonation, 40 grenades may be destroyed in a box at one time.
- (b) When destroying single grenades by the F.I.D./Gelignite method, the base plugs only of the grenades will be removed. Caps of fuzes will be left in position and the fuzes destroyed with the grenades.

21. Detonators may be destroyed by the method given for the destruction of detonators of No. 36M Grenade Igniter sets, in Section 1, para. 32 (b) to (f) or as follows:—

- (a) Tie a bundle of not more than 30 detonators as closely as possible round a No. 27 detonator fitted with a suitable length of safety fuze.
- (b) Place the bundle into a hole in the ground about 18-in. deep by 12-in. diameter.
- (c) Fill in the hole with earth or sand free from stones, leaving the safety fuze protruding: ignite the safety fuze and retire to cover.

GRENAD, HAND, No. 69, MK. 1

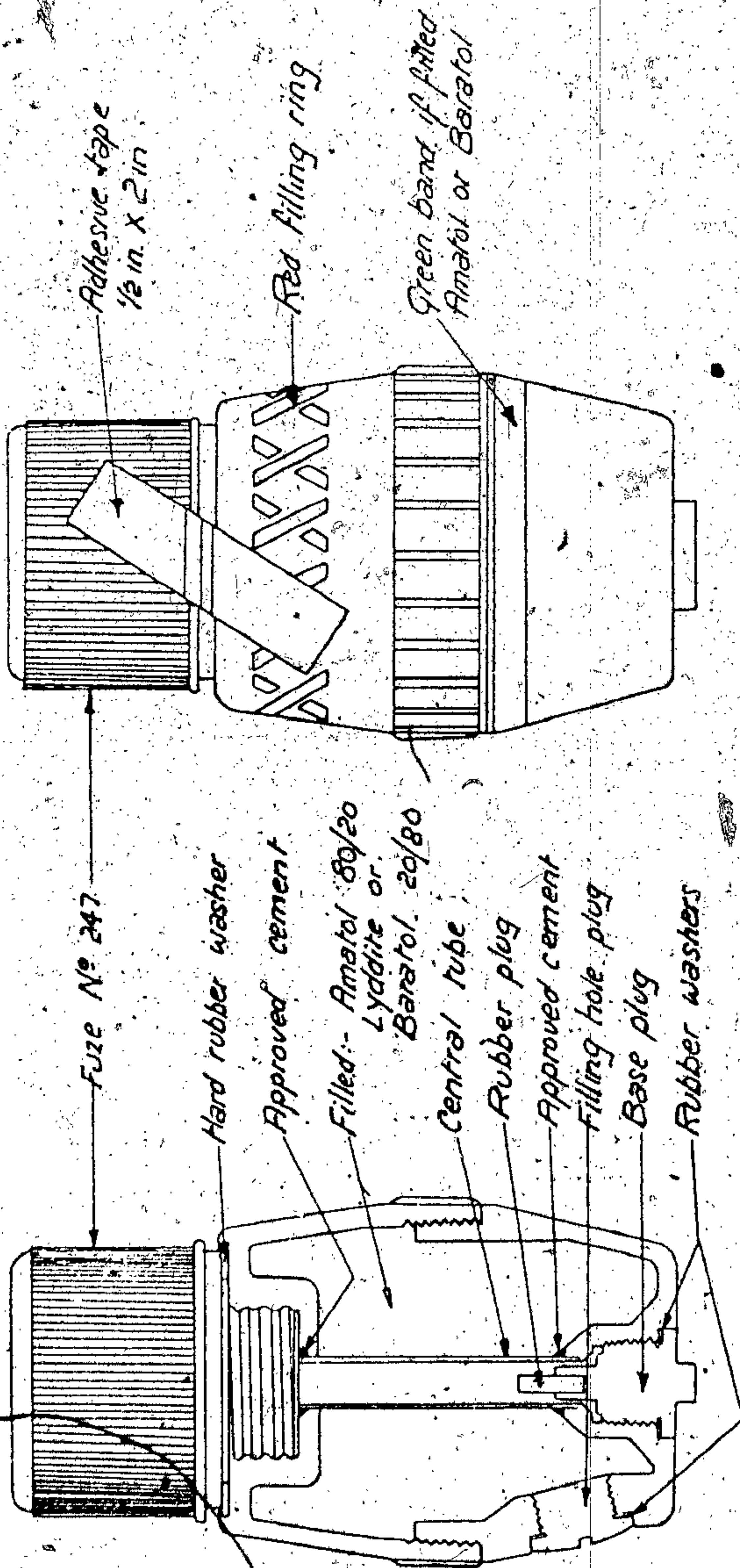
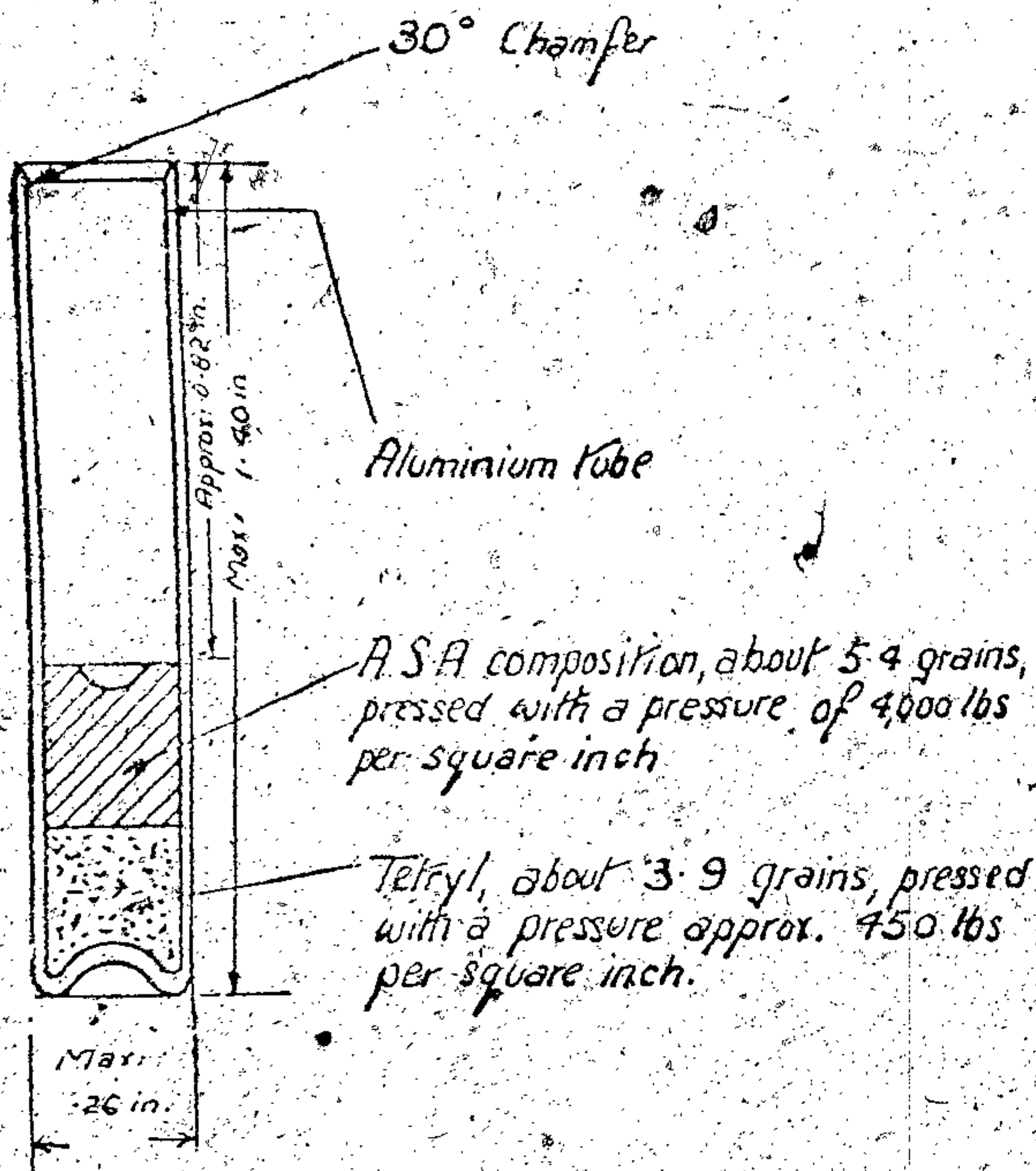


Plate 4B

DETONATOR, No. 46, MK. 1



Notes:—This is identical with the commercial No. 6 detonator.

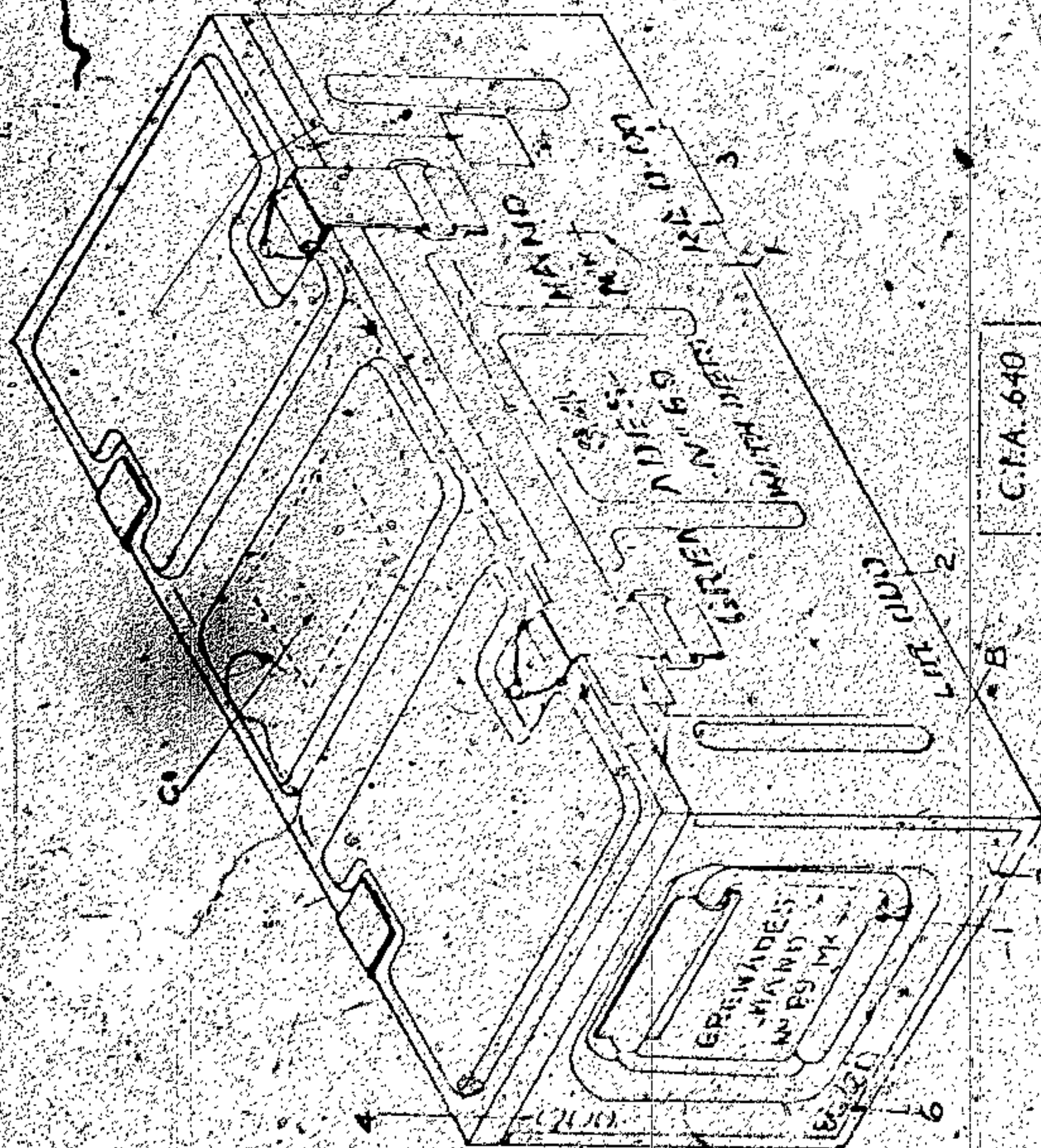
Use.—Grenade, Hand No. 69.

BOX B167, CONTAINING GRENADES, HAND, No. 69, MARKINGS

General Notes

Box to be painted service colour.

Stencilling to be in yellow $\frac{1}{2}$ inch on sides $\frac{1}{2}$ inch on ends except where stated.



Item

1. Mark of grenade.
2. Lot number of filled grenade ($\frac{1}{2}$ inch).
3. Monogram of filler and date of filling ($\frac{1}{2}$ inch).
4. Serial number of box in white.
6. L.Y.D. when box contains grenade filled Lyddite, ^{80/20} of other fraction denoting composition, if grenade filled amatol or baratol.
7. Red cross only on boxes containing grenades which bear a similar marking around body indicating suitability for use in hot climates.

A. Government explosive and classification label No. L1608A (Group VIII).

B. One station label affixed over junction of lid and body and under spring clip as shown.

C. Packers label No. L506A affixed to underside of lid in the position shown.

Plate 4C

C.I.A. 640

Plate 4D

BOX B167, CONTAINING GRENADES, HAND, No. 69

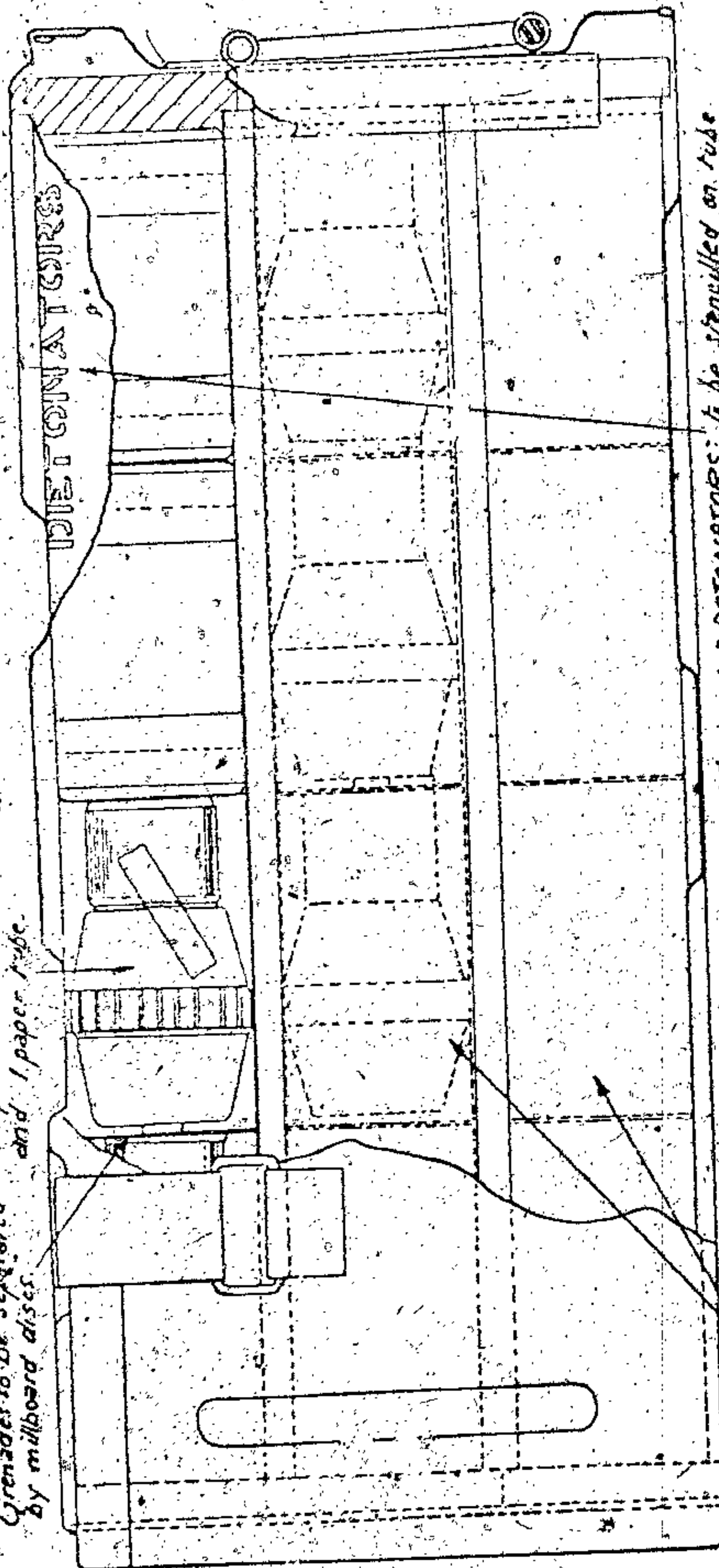
Method of Packing

IMPORTANT

The tube containing detonators must be placed in centre of top row.

32 Grenades to be packed in 8 containers and one container packed as follows:-
2 grenades and 2 cylinders No 393
containing detonators of 2 grenades and
1 cylinder No 393 containing detonators
and 1 paper tube.

Grenades to be separated
by millboard discs.



The word "DETONATORS" to be stencilled on tube containing detonators, in two places diametrically opposite.

Container, packing No 31

C.I.A. 640

SECTION 5.—GRENADE, HAND, No. 73, ANTI-TANK

DESCRIPTION

Mk. 1 (obsolescent). (See Plate 5A.)

1. This was originally intended for use against A.F.Vs., and has also been used most effectively for demolition work.

It consists of a cylindrical tinplate container, approximately 3½-in. diameter and 9½-in. in length. It has a tin lid which screws on to the container, interrupted threads being used to allow the removal of the lid speedily. In the middle of the lid is a recess, roll threaded with coarse threads, to accommodate the fuze No. 247. See Appendix 1 of this pamphlet. The threads of the fuze are coated with cement before insertion. When fitted with the fuze, the grenade has the external appearance of a thermos flask.

A detonator tube is screwed on to the underside of the fuze recess, which take a No. 6 Commercial or, in later production, a Service No. 8 detonator. Both may be met with.

The filling is approximately 3½-lb. of Polar Ammon Gelatine Dynamite (P.A.G.D.) wrapped in two layers of Kraft paper. A thin grey board disc is positioned in the bottom of the container, and a ½-in. thick felt pad is placed between the filling and the lid in order to absorb any nitro-glycerine exudation.

A strip of adhesive tape round the junction of the lid and the body serves as a seal against the ingress of moisture, and also indicates by its presence that the grenade is not fitted with a detonator. When the detonator has been fitted the tape should be discarded.

Action

2. The grenade is prepared for use by removing the adhesive tape and the lid. The detonator tube is unscrewed, the detonator inserted into its closed end first, and the tube replaced. The lid is then screwed on to the body, but the adhesive tape is not replaced; its absence indicates that the detonator is fitted. (The only exception to this is that some grenades of early manufacture had badly fitting lids, and it was necessary to re-apply the tape to the screw-threads of the body, before replacing the lid. This defect was remedied in later production.)

The action of the Fuze 247 is described in Appendix 1 of this pamphlet. The flash from the cap of the fuze ignites the detonator which in turn detonates the P.A.G.D. filling.

Marking and Packing

3. Grenades are painted buff, have a red filling ring round the top and bear the stencilled letters "P.A.G.D." in black. The body is also stencilled "No. 73-1," the filled Lot number, filler's initials, and date of filling.

4. The detonators are packed ten in a tinned plate cylinder.

5. Ten grenades and ten detonators are packed in Box B 166 Mk. 2 which is marked: on both sides, "10 Grenades Hand H.E. No. 73 Mk. 1, w/dets"; on both ends: "Grenades Hand H.E. No. 73." Dimensions of the box are 19.8-in. x 9.1-in. x 13.2-in. and the filled weight is approximately 62-lb.

Examination and Proof

6. Packages will be examined as indicated in Appendix 3 of this pamphlet.

7. No repairs of any nature will be carried out on No. 73 grenades; any found defective will be destroyed.

8. Proof of Grenades No. 73 will not be carried out unless specially ordered.

Destruction

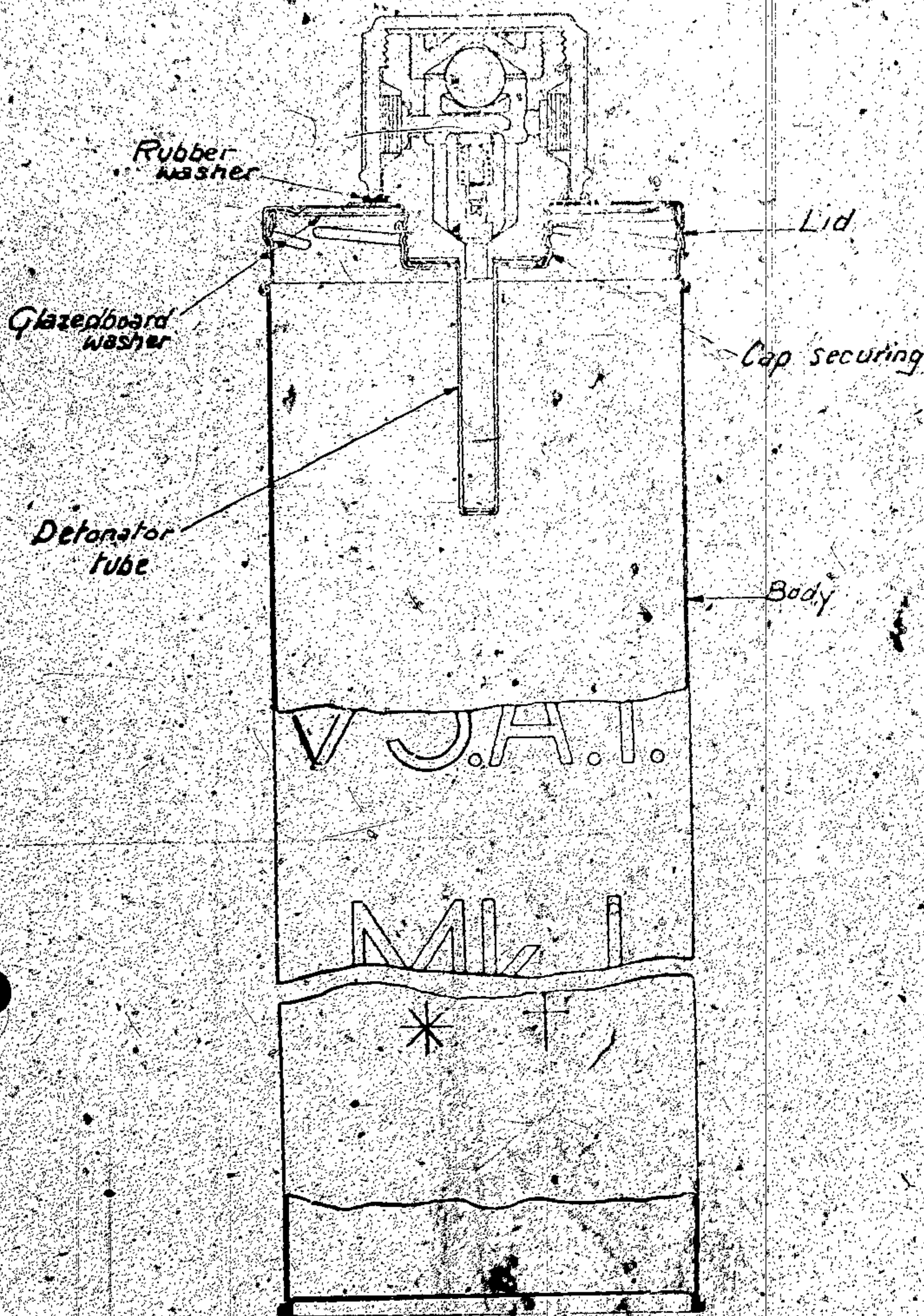
9. Grenades showing exterior corrosion or rust which appears to have penetrated the container, or grenades showing signs of nitroglycerine exudation will be destroyed by a demolition charge. A maximum of six grenades will be dealt with at one time. The grenades should be placed in a trench 4-ft. deep, without an undercut, the demolition charge being placed on top. It is essential that the fuze and all components are destroyed as well as the filling.

10. Grenades which show no signs of exudation and in which the detonator cavity is clean may be destroyed with a detonator in the gelignite filling instead of by means of a demolition charge. Again it is essential that the associated fuzes and components are destroyed as well as the charge.

11. Damaged or broken charges which cannot be destroyed locally by detonation as described in paras. 9 and 10, will be burned in the following manner:

- (a) Prepare a hole in the ground about 2-ft. square and 12-in. deep. The bottom of the hole should be well stamped down to give a firm surface.
- (b) Place a quantity of wood shavings in the centre of the hole: remove the wrapper from the charge and lay them both on the shavings.
- (c) Cover the charge, wrapper and shavings with thick lubricating oil and sprinkle with sufficient kerosene to enable the oil to be ignited.
- (d) Lay a train of waste paper, shavings or cordite sticks, if available, from the charge, etc., in the direction of the wind.
- (e) Ignite the train and retire to cover. Owing to the liability of detonation even by this method, a safety distance of at least 100 yards should be observed.
- (f) After burning, ascertain that no unburnt explosive or shavings remain, and fill in the hole.
- (g) Charges will only be destroyed one at a time by this method and a fresh hole must be made for each charge.

GRENADE, HAND, No. 73, ANTI-TANK, MK. 1



SECTION 6.—GRENADE, HAND, No. 74, ANTI-TANK

DESCRIPTION

1. This grenade was originally known as the "sticky bomb" or "Grenade Type S.T." It is an H.E. grenade designed to stick to the target until it detonates. There are two Marks of this grenade, Mk. 1 and Mk. 2, both described below.

Mk. 1 (obsolescent). (See Plates 6A and 6B.)

2. The body consists of a spherical glass flask about 4½-in. diameter, having a short neck which is screw-threaded externally, and enclosed in a bag of woollen material which is coated with an adhesive mixture (bird-lime or—in later manufacture—Adhesive B 17). The filling is about 1½-lb. of Nobels S23, a viscous mixture containing primarily nitro-glycerine and nitro-cellulose.

Fitting inside the neck and projecting some way into the filling, is an aluminium tube, closed at the bottom, which accommodates the detonator assembly, when the grenade is prepared for use. In storage and transit the mouth of the grenade is closed either by a flat wooden disc resting on top of the aluminium tube, secured by screw-threaded plastic ring, or a hollow plastic plug shaped to fit the tube, held in position by a cork or cork substitute disc, the whole being secured by a metal, trade-pattern screwed cap. To prevent accidental removal or loosening of the screwed cap, a 5-in. strip of adhesive tape is placed across it and the body.

To protect the flask until the grenade is required for use, it is contained within a hinged metal container. Actual contact of the adhesive covering on the flask and the container is prevented by a number, usually four, of rubber plugs, spaced equidistant, secured to the inside of the container. The two halves of the container are held together by a "casing release pin" or a tear-off metal tape, and is so designed that when the pin is removed the container opens and drops away.

The moulded plastic handle contains the striker assembly. The striker has a spring acting between a perforated diaphragm near the top of the handle and the flange of the striker head. The top end of the striker passes through the diaphragm and carries a screw nut, under which the two prongs of the striker lever are positioned. The shank of the striker lever lies against the handle and is held in position by a safety pin which also prevents any downward movement. The safety pin carries a label with the legend "Danger. Do not remove this pin until the grenade is to be thrown". The handle carries a moulded plastic ring with which it is secured to the flask when preparing for use. In later production, this has a ½-in. groove cut on the underface to allow escape of gas.

The Mk. 1 detonator assembly (see Plate 6B), consists of a 410 cartridge head housed in a plastic holder, a brass sleeve fitted to the cartridge head, to which is crimped a length of safety fuze, an A.S.A./C.E. detonator crimped to the other end of the fuze, and a double C.E. pellet which fits over the detonator and is secured to the plastic holder by a strip of adhesive tape. Two rubber bands are placed round the plastic holder for the purpose of centring the assembly within the aluminium tube.

The safety fuze gives a delay of $5 \frac{2}{1}$ seconds.

The grenade is prepared for use as follows. Remove the screwed ring and wooden disc, or screwed cap, cork disc and plug, whichever is fitted. Before the detonator assembly is inserted, ensure that the rubber rings are spaced well apart on the plastic holder, not on the C.E. pellet or the adhesive tape. After the assembly is pushed gently home the rings will provide sufficient grip to keep it in position. It is essential for the assembly to be properly centred in the aluminium tube, otherwise blunts may result. See also that the cap does not project above the rim of the holder. Attach the handle by means of its screwed ring and allow the metal casing to fall away by removing the "casing release pin" on the metal tape round its neck.

The number of grenades constituting a "Lot" when issued from factory to depot is 1,600.

Mk. 2. (See Plate 6C.)

3. The Mk. 2 grenade is designed to improve certain features of the Mk. 1 which have caused unsatisfactory performance. Its operational use remains the same. The following describes how it differs from the Mk. 1:—

The flask is made of a moulded plastic material in two halves, secured by flanges coated with an approved adhesive. A boss formed on one half is threaded internally to take the handle and a moulded plastic sealing plug, while two radial recesses receive projections on the metal container. The container, in two halves, is necked and shaped to fit round and in the base of the flask, where it is retained by a spring clip.

The filling is about 1½ lb. of Nobels 823, the slight reduction in content being to provide an air space to allow expansion of the filling during storage in high temperatures.

The aluminium tube contains a perforated C.E. pellet, a sponge rubber washer and a "grip" washer. It is a fixture in the neck of the flask, being firmly sealed in position by a moulded sealing plug which is screwed in above it on to a rubber sealing ring. The moulded sealing plug is bored centrally to take the detonator, and at the top, the recess into which the cap fits is splined internally to allow escape of gases. It is also tapered slightly externally. For transit a cardboard dust cover with loop fits over the plug.

The handle carrying the striker screws into and not over the neck of the flask, thus giving a more rigid connection. The possibility of prematures due to the striker nut unscrewing has been overcome by spinning over the end of the striker, and accidental removal of the trigger with the safety pin in position is prevented by a projection between the arms of the fork at the top of the trigger.

The Mk. 2 detonator assembly consists of a cap, containing 1.5-gr. of "B" composition, held in a metal cap holder secured to a brass sleeve wrapped round with paper, and a length of safety fuze with detonator attached. A delay of about five seconds is provided.

The Mk. 3 detonator assembly, see Plate 6D, differs from the Mk. 2 in that a special cartridge head, similar in appearance but of slightly increased diameter to the .410 cartridge head used in the Mk. 1 detonator, is employed. Early production of Mk. 3 detonators were unsuitable for use, and current production is of slightly modified design. Only modified Mk. 3 detonators are to be used with the Mk. 2 grenades. They can be identified as described below.

The grenade is prepared for use as follows. Remove the cardboard cover from the plug and insert the detonator assembly into the hole in the sealing plug. When in position, the assembly is prevented from

falling out by the "grip" washer holding the detonator. Screw the handle into the boss of the flask and remove the adhesive tape and spring clip of the container, allowing the container to fall away.

The number of grenades constituting a filled "lot" when issued from factory to depot, is 1,600.

Action

4. The grenade is prepared as described above. Before throwing, ensure that the screwed nut on the top of the striker is correct and remove the safety pin. When throwing the Mk. 1, any tendency of the striker mechanism to be sluggish is overcome by releasing the handle quickly. On release, the striker can be forced down under pressure of the compressed spring, throwing the striker lever (trigger) clear. The striker fires the cap of the cartridge head, igniting the safety fuze, which, after about five seconds delay, fires the detonator. This in turn initiates the C.E. pellet which detonates the main filling.

Marking and Packing

5. Grenade containers are generally painted light brown. Some have been issued painted buff, in packages bearing a two inch yellow disc, but there is no significance in the use of the different colour paint. A red filling ring is painted just below the neck of the container, and the following stencillings also appear on the container, in black:

- (a) Number, type and Mark of grenade (No. 75 A. Tk. Mk. " ").
- (b) Explosive filling number (823).
- (c) Filler's initials and date of filling.

6. Mk. 1 grenades are packed five grenades in a khaki-coloured metal carrying case, together with five handles wrapped in corrugated paper, and five detonator assemblies carried in a cardboard tube attached to the lid of the case by spring clips. Detonator assemblies were originally issued in separate packages, five assemblies in a cardboard tube, five tubes in a box weighing 42 lb., and measuring 19-in. X 16-in. X 9-in. It is possible that some of these may still be met.

A piece of felt 26-in. X 6½-in. X ½-in. is placed over the grenades and between them and the hinges of the case, in order to absorb nitro-glycerine exuding from faulty grenades. The case weighs about 22 lb. and measures 18-in. X 11-in. X 6-in. The ends of the case are stencilled "5 ST. GRENADES", and the date of filling.

For protection during transport, three cases are packed in a wooden crate. A full crate containing 15 grenades weighs about 84 lb. and measures 21½-in. X 20½-in. X 13½-in. overall. See Plate 6E.

7. Mk. 2 grenades were originally packed four grenades in a wooden box G 112 Mk. 1. Sponge rubber packing pieces are provided for the grenade bodies while a centre compartment holds four grenade handles. A special wood block prepared to hold four detonator assemblies is positioned in the centre compartment on top of the handles. Dimensions of the box are 17.26-in. X 15.35-in. X 8.15-in. Only a limited number of boxes G 112 have been used.

Boxes G 110 Mk. 1 and Mk. 2, both made of steel, are the current packages. The Mk. 1 box is divided into four compartments to accommodate the grenade bodies which are secured in position by spring clips. A centre compartment contains four grenade handles and a special wooden block prepared to hold four detonator assemblies.

The lid of the box is secured with a toggle catch. Dimensions are 13.9-in. x 13.1-in. x 7.1-in. The Mk. 2 box is fitted with a diaphragm to accommodate the grenade bodies and is provided with felt packing pieces. Four brackets are secured to the sides of the box to hold the grenade handles, and a special wood block to hold four detonator assemblies is positioned in a centre compartment in the diaphragm. The lid of the box is secured by a toggle catch. Dimensions are 13.2-in. x 13.05-in. x 7.15-in. See Plates 6F and 6G.

8. Mk. 2 assemblies were packed in red blocks and the early Mk. 3 assemblies were packed in red blocks and with a 1-in. black stripe painted diagonally across the top. The Modified Mk. 3 assemblies which are the only type suitable for use, are packed in blocks painted blue, and can be further identified by the base of the cartridge head being stamped "74-73", instead of the normal trade markings.

Storage and Handling

9. The viscous explosive filling tends to flow at moderate temperatures, and, as the temperature rises, Mk. 1 grenades are particularly liable to leakage of the explosive through the neck as no allowance is made for its expansion, except that the aluminium tube is free to move; it is rich in nitro-glycerine and is therefore somewhat more sensitive than most Service H.M. fillings.

For this reason the storage and transport of the grenades calls for more than the usual care if accidents are to be avoided. The grenades are definitely liable to sympathetic detonation.

10. Storage temperatures should be kept as low as possible in order not to increase the sensitivity of the filling, but freezing must be avoided. Special care is necessary to protect the grenades, whether packed or not, from the direct rays of the sun. High temperatures cause the explosive to run, and in general the grenade is only suitable for storage in temperate climates.

11. The flasks, especially the glass flasks of the Mk. 1 grenades, are sensitive to shock; care must be taken when handling the packages to avoid jars, as if breakage occurs the danger risk is considerably increased. If a package is dropped it should be set aside for immediate examination of its contents.

12. The grenades should be stacked by dates of filling in small well-separated units, and for preference apart from other ammunition of the same group.

Examination

13. Packages will be examined as indicated in Appendix 3 to this pamphlet.

14. Grenades showing any of the following defects will be sentenced unserviceable:—

- (a) Broken or cracked flasks: severe leakage, that is, more than about one tablespoonful from a single grenade.
- (b) Badly rusted or corroded metal containers.
- (c) Deterioration or absence of the positioning studs on the inside of containers, resulting in the adherence of the flask to the container.
- (d) Serious loss of the adhesive properties of the stockinet flask cover.
- (e) Corroded aluminium tubes.

15. The following repairs will be carried out on defective grenades, or, if facilities are not available, they will be sentenced unserviceable:—

- (a) Slight rust on metal containers may be removed with emery cloth "O". Containers will be repainted when necessary.
- (b) Light exudation from the filling may be cleaned off with rags. See para. 17 below.
- (c) Fungoid growth may be removed from the sticky exterior of the flask by scraping with a spatula, when, if the fungus is not heavy, the adhesive should be only slightly affected.
- (d) Broken sealing plugs or caps, or damp wooden plugs, will be replaced.
- (e) If the plastic ring of the Mk. 1 grenade is loose, it should be screwed up again finger tight, over-tightening, however, may strain and crack the neck of the flask.
- (f) Broken handles, rusted or corroded strikers and springs, distorted levers and broken or badly fitting plastic rings, will be replaced.
- (g) Renewal of the adhesive tape at the container joints will be done if necessary.
- (h) Missing or distorted "casing release pins" or metal clips will be replaced.
- (j) Contaminated felt pads will be replaced. If new felt is not available, strips of unserviceable blankets or similar material may be used.

Note.—The adhesive exteriors of flasks should only be exposed to light for the minimum length of time required to carry out the examination, as the adhesive begins immediately to harden.

16. Leaking explosive is an almost colourless semi-liquid. Care must be taken to avoid skin contamination, or to wash very thoroughly immediately if it does occur. Skin contamination may produce severe headaches, and if food is contaminated by traces on the hands nitro-glycerine poisoning may result.

17. Rags used for cleaning leaking grenades will be destroyed at once by burning in the open. The explosive in the rags will burn fiercely; they will therefore be ignited with caution. Contaminated felt pads will also be destroyed by burning in a similar manner.

18. Detonator assemblies will be examined very carefully for signs of deterioration, and sentenced unserviceable if showing any of the following defects:—

- (a) Rust or corrosion on the cartridge head or on the detonator.
- (b) Absence or looseness of the paper wrapping on the cartridge head.
- (c) Safety fuze loose either at the joint with the cartridge head or the detonator, distorted or "saggy" safety fuze showing signs of discoloration, dampness, fungoid growth or bituminous exudation.
- (d) Cracked or flaked C.E. pellets.
- (e) Broken or chipped plastic holders.

19. Wooden detonator assembly blocks which appear to have been subjected to moisture will be replaced.

Proof and Heat Test

20. The purpose of carrying out proof of Grenades No. 74 is to determine whether they retain their destructive power: the purpose of heat test is to determine whether the explosive filling remains stable after long periods of storage.

It is known as a result of experiments that the filling will remain stable in storage for three years in temperate climates and for two years in tropical climates, but it is not yet known how long detonative efficiency is retained or whether this is inter-related with stability. Heat tests will therefore commence after three years storage in temperate climates and after two years storage in tropical climates. Proof will be carried out annually at home and abroad.

21. When grenades are received at a tropical station the date of life expiry will be taken as two years from the date of filling. For the purpose of these instructions a tropical station is defined in accordance with Magazine Regulations (Land Service), Part I, 1941, that is, any station where the mean annual temperature of storage exceeds 75° F.

22. The following procedure for proof, testing and sentencing will be adopted during war time:—

(a) *Proof, testing and sentencing before expiry of life.*—One per cent. of every Lot of grenades will be subjected to a comparative cratering test annually. Selection will be in accordance with sub-para. (b) below and the test and sentencing in accordance with sub-paras. (c) and (e).

(b) *Proof, testing and sentencing after expiry of life.*—Within one month after the date of expiry of life of a Lot, ten grenades will be selected. Two extra grenades will be selected when heat test is to be carried out. Where appropriate, grenades will be grouped as laid down in Section 1, para. 8 (f) of this pamphlet. Where the number of grenades in a Lot exceeds 500, the Lot will be dealt with separately: where quantities of less than 500 of any one Lot are held, Lots will be grouped with a maximum of 1,000 in one group: where very small quantities of Lots are held, Lots should be made up to groups of 250.

(c) *Heat test.*

(i) Samples of the fillings from two of the grenades selected from each Lot or group will be heat tested in accordance with R.A.O.S. Part 3, Pamphlet No. 10, para. 72 (a) (iv). The test will be carried out in duplicate.

(ii) A Lot which gives a heat test result of ten minutes or less will be sentenced unserviceable.

(iii) A Lot which gives a heat test of over ten minutes will be subjected to a comparative cratering test as laid down in sub-para. (d) below.

(d) *Comparative cratering test.*

(i) A firing ground will be selected which is level and of uniform texture and moisture content.

(ii) Two grenades from a Lot of which the life has not expired and preferably from the newest Lot available at the station will be placed on the ground in the vertical position and detonated in the normal manner. The average diameter and depth of crater will be noted.

(iii) The grenades selected in accordance with sub-para. (b) will be similarly detonated. The average diameter and depth of crater will be noted.

(iv) The following will count as failures at the comparative cratering test:—

- (a) Igniter set functions but fails to detonate the filling.
- (b) Average depth of crater formed by grenades under test less than 75 per cent. of average depth of crater of new grenades.
- (c) Average diameter of crater formed by grenades under test less than 75 per cent. of average diameter of crater of new grenades.

Note.—Failure of the igniter set to function will not count as a failure, and any instances in which this occurs will be excluded from consideration in sentencing under sub-para. (e) below. Such failures will be reported as special defects. See also para. 25 below.

(e) *Sentencing.*

- (i) If, at first proof, no failures occur, the Lot or group represented will be sentenced serviceable for one year.
- (ii) If, at first proof, two or more failures occur, the Lot represented will be sentenced "FOR PRACTICE ONLY."
- (iii) If, at first proof, less than two failures occur, a second proof will be carried out.
- (iv) If, at second proof, any failure occurs, the Lot represented will be sentenced "FOR PRACTICE ONLY."

23. When a blind occurs, an interval of 5 minutes will be allowed to elapse, after which the procedure laid down in the introduction to this pamphlet, para. 8 (e) will be followed.

24. In order to avoid the introduction of history sheets in connection with No. 74 Grenades, the proof, etc., is based on periods of one year. When the grenades are issued within one month after the anniversary of the date of filling, a statement will be sent to the consignee showing whether the requisite tests have been carried out. When the date of issue is more than one month after the anniversary of the date of filling, the consignee will be entitled to assume that the tests have been carried out unless a categorical statement to the contrary is received. If the consignee is not known, it is necessary to send a statement, the dates of filling of the grenades in the consignment will be reported to the War Office (W.S.2) for information of the consignee, under reference of this paragraph.

25. Para. 22 (d) (i) is not to be interpreted strictly. It is intended merely that all grenades should be fired on the same type of ground in order to obtain a reliable comparison of the results.

26. In reference to the "note" to para. 22 (d), there is a possibility of failure of the igniter set from two causes:—

- (a) Failure of the striker to hit the cap fairly due to faulty location of the handle or to bad centring of the igniter assembly.
- (b) Failure of the igniter set itself due to some fault in the initiating system.

IN CASE OF FAILURE OF THE IGNITER SET, NO ATTEMPT WILL BE MADE TO DISMANTLE IT TO ASCERTAIN THE REASON FOR THE FAILURE.

27. When no heat test facilities exist at home, application will be made to the C.I.O.O.

Destruction

28. Destruction of grenades may be carried out by either of the following methods:—

- (a) (i) By burning. The grenades will be destroyed in shallow trenches or furrows 6 to 8-in. deep and 9 to 12-in. wide. Not more than 25 grenades will be destroyed at once in one trench, and a train of paper or shavings sprinkled with paraffin will be laid along the trench.
- (ii) The metal covers will be removed from the grenades, the plastic rings or sealing plugs unscrewed and, lastly, the aluminium containers will be removed; it will be found that they come out easily. The C.E. pellets will be set aside for destruction separately. See para. 30 below.
- (iii) Grenades will be spaced at least one foot apart in the trench; contaminated covers, rings, plugs and aluminium containers being placed alongside them.
- (iv) Grenades which are not broken will have a portion of the filling removed with a suitable piece of wood which will be burned with the grenades. The object of this is partly to reduce the amount of explosive in the flask, thereby reducing pressure and liability to detonate after ignition, and partly to provide a train of explosive to the flask to ensure ignition. The explosive so removed will be placed on the paper or shavings, care being taken that there is a definite train of explosive in the neck of the flask.
- (v) The contents of the trench will be ignited by a further train of paper or shavings, or a thin line of cordite sticks, if available. The train will be arranged and lighted down wind from the trench.
- (vi) The explosive will burn out fiercely and quickly and there is a liability to detonation. A safety distance of 250 yards will be observed.
- (vii) The adhesive stockinet covers may smoulder for an hour or so, but nobody will be allowed to approach the trench until all signs of burning are over. The trench will then be filled in with earth; it will not be used for a second burn.
- (viii) Anti-gas gloves or other suitable protection for the skin should be used when handling the grenades, and personnel should remain up-wind during the burning as the fumes from the explosive will give severe headaches.
- (ix) Units are authorized to destroy leaking or broken grenades by this method, but the number to be destroyed at one time is limited to five grenades.

- (b) (i) By detonation. The C.E. pellet is left in position and a No. 33 electric detonator or a No. 27 detonator with a length of safety fuze attached, is inserted. A maximum of four grenades are grouped round this one and the group destroyed at once by detonation.
- (ii) The hole made by the group of five is sufficient to accommodate destruction of a further ten grenades at once by the same method.
- (iii) Subsequent groups of 20 grenades can be destroyed in the crater, but this figure will be the maximum to be destroyed locally at one time.
- (iv) A safety distance of 250 yards is essential.

29. Detonator assemblies will be destroyed in the manner described in Section 1, para. 33 of this pamphlet.

30. The C.E. pellets removed from grenades which are destroyed by burning as in para. 28 (a) above, will be destroyed in the following manner:—

- (a) Quantities not exceeding a total weight of 10-lb. may be destroyed at one time.
- (b) Steep the pellets in lubricating oil for 4 hours and then mix thoroughly in approximately twice the volume of sawdust or wood shavings, using an improvised wooden tool.
- (c) Spread the mixture on shavings in a shallow iron tray lined with firebrick, if possible. Sprinkle with kerosene and lay a train of cordite sticks down-wind.
- (d) Ignite and retire until all traces of burning are over.
- (e) After each burn the tray and the ground in the vicinity will be well watered and carefully examined to see that no unburnt explosive remains.

Plate 6A

GRENADE, HAND, No. 74, ANTI-TANK, MK. 1

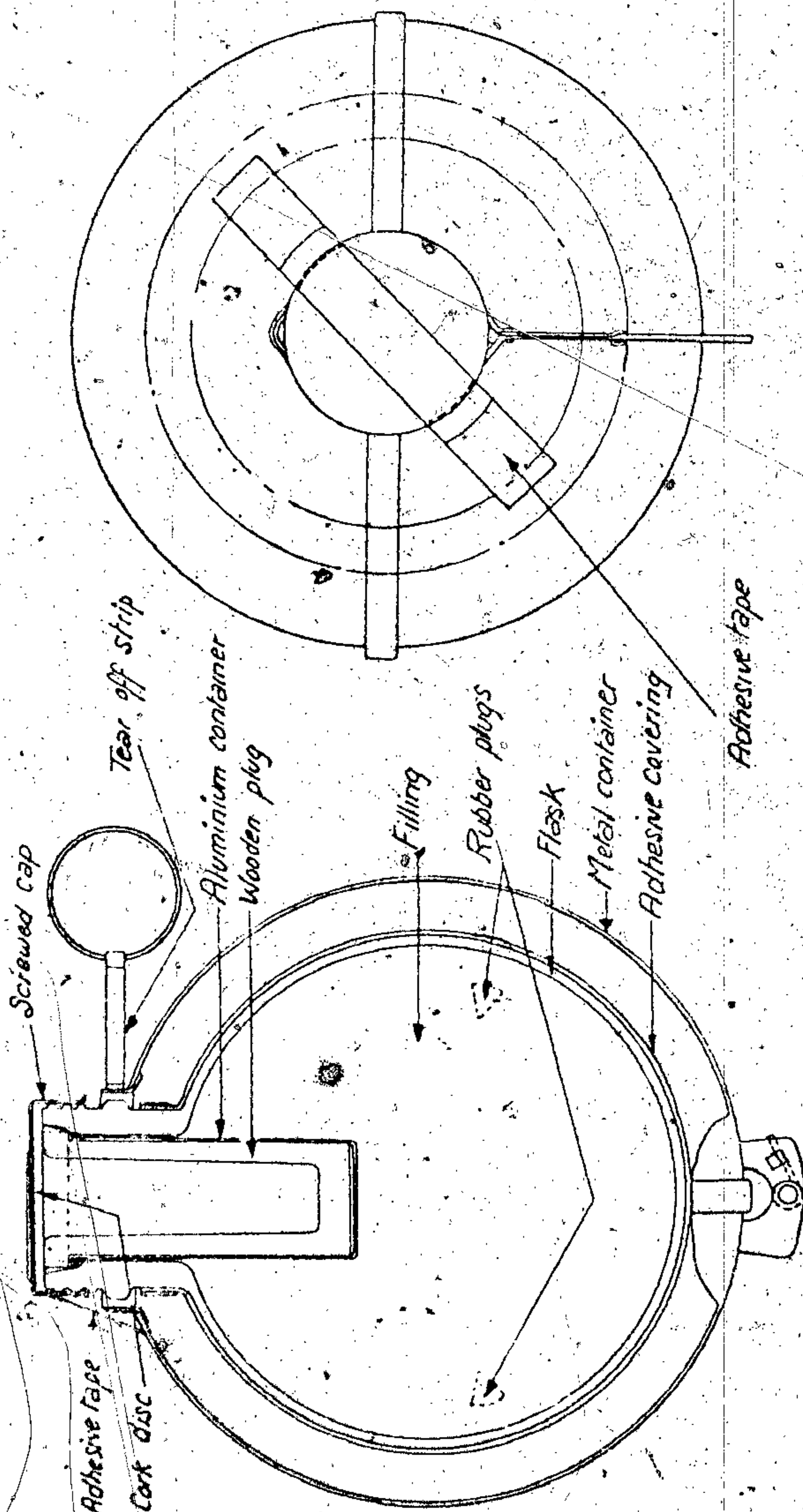


Plate 6B

DETONATOR, No. 74, GRENADE, MK. I

Paper protector coated with approved cement

Cap holder

Adhesive tape, 1/2" wide, approx. 1'0" long, wrapped round detonator to make good fit in cap holder and afterwards coated with approved cement

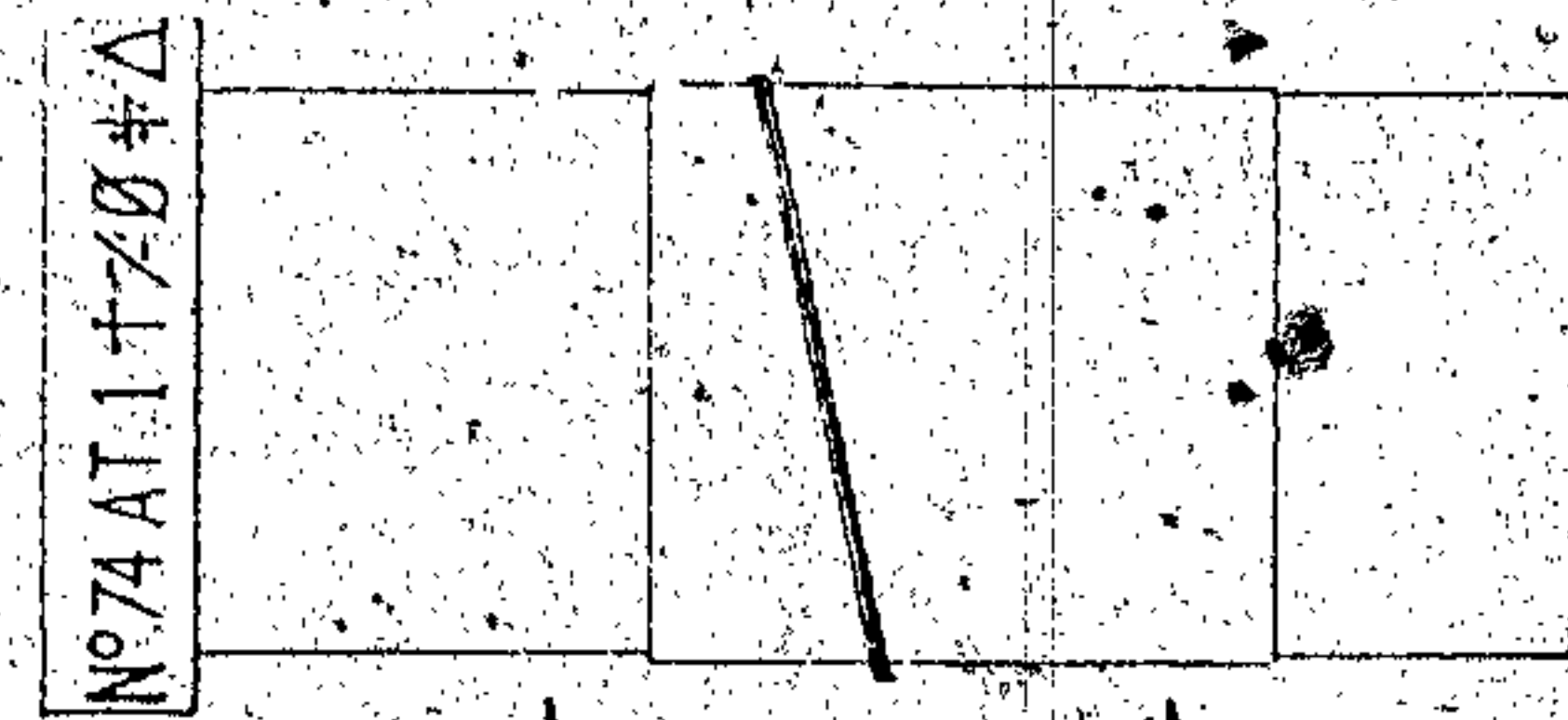
Detonator

C.E. pellet and cap holder

Secured together by wrapping band with adhesive tape, 1/2" wide, approx. 3/4" long, a space being left between cap holder and pellet to give dimension *

2 N°8 rubber bands

C.E. Pellet



N°74 AT 1 + 7/8 # Δ

Markings on Empty Cap Holder

N° 74 A.T. and Mark

+ Contractors Initials or recognised trade mark

-/- Month & Year of manufacture

Markings on Assembled Detonator

Ø Initials or recognised trade mark of Unit Filling Contractor

* Month & Year of Unit Filling

Δ Unit Filling lot N°

Plate 6C

GRENAD, HAND, No. 74, ANTI-TANK, MK. 2

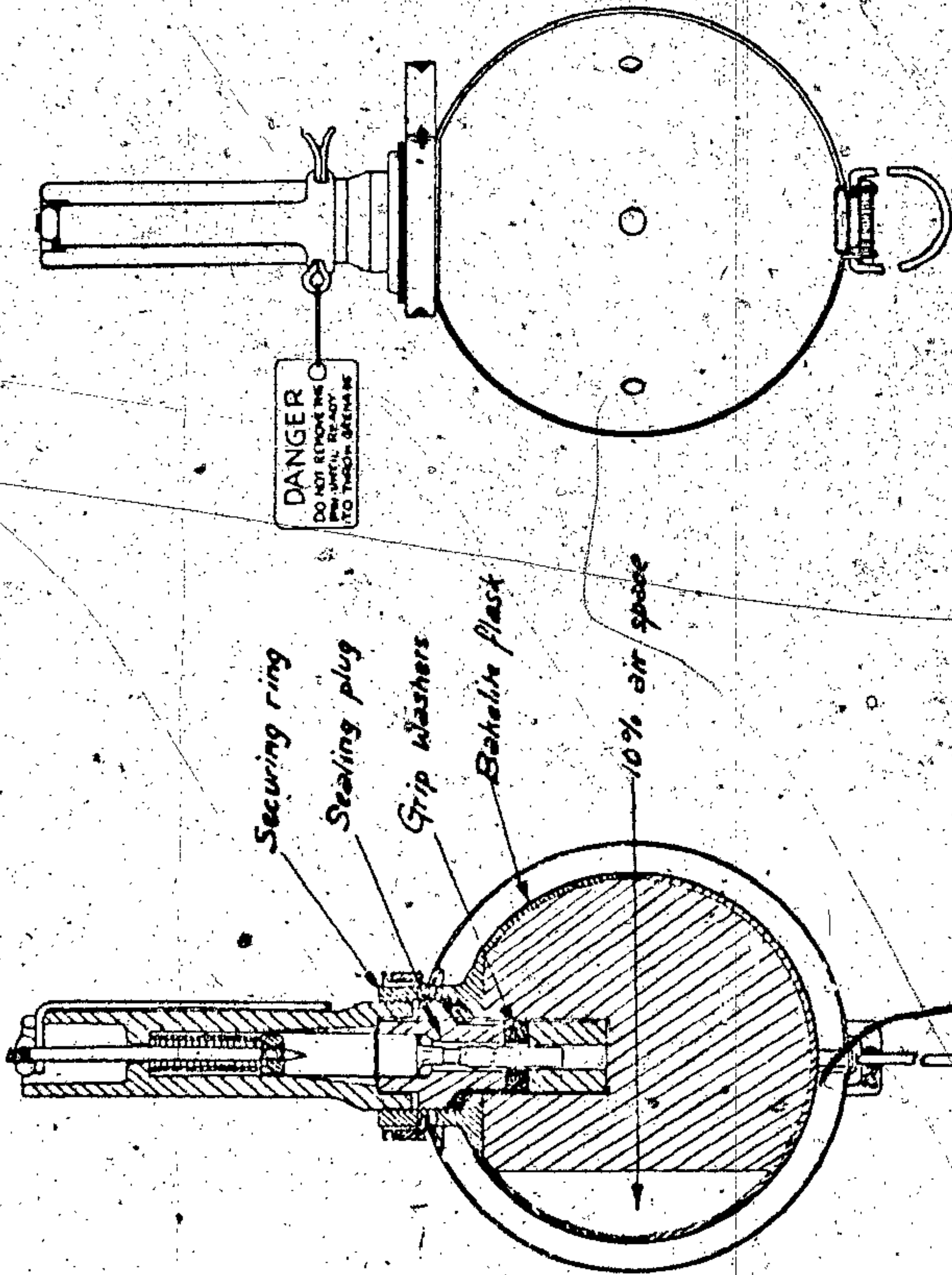
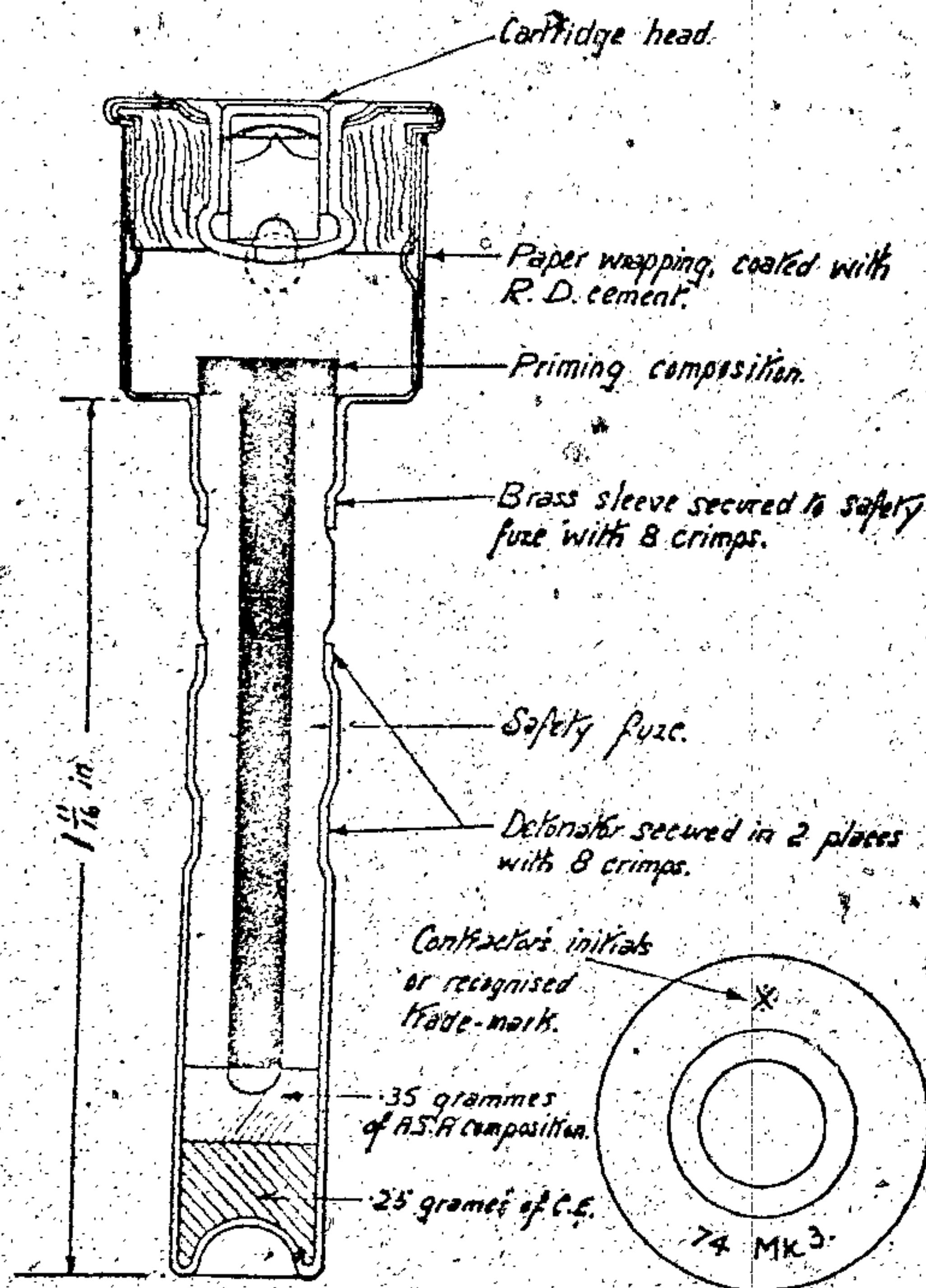


Plate 6D

DETONATOR, No. 74, GRENADE, MK. 3
(Seven Seconds Delay)

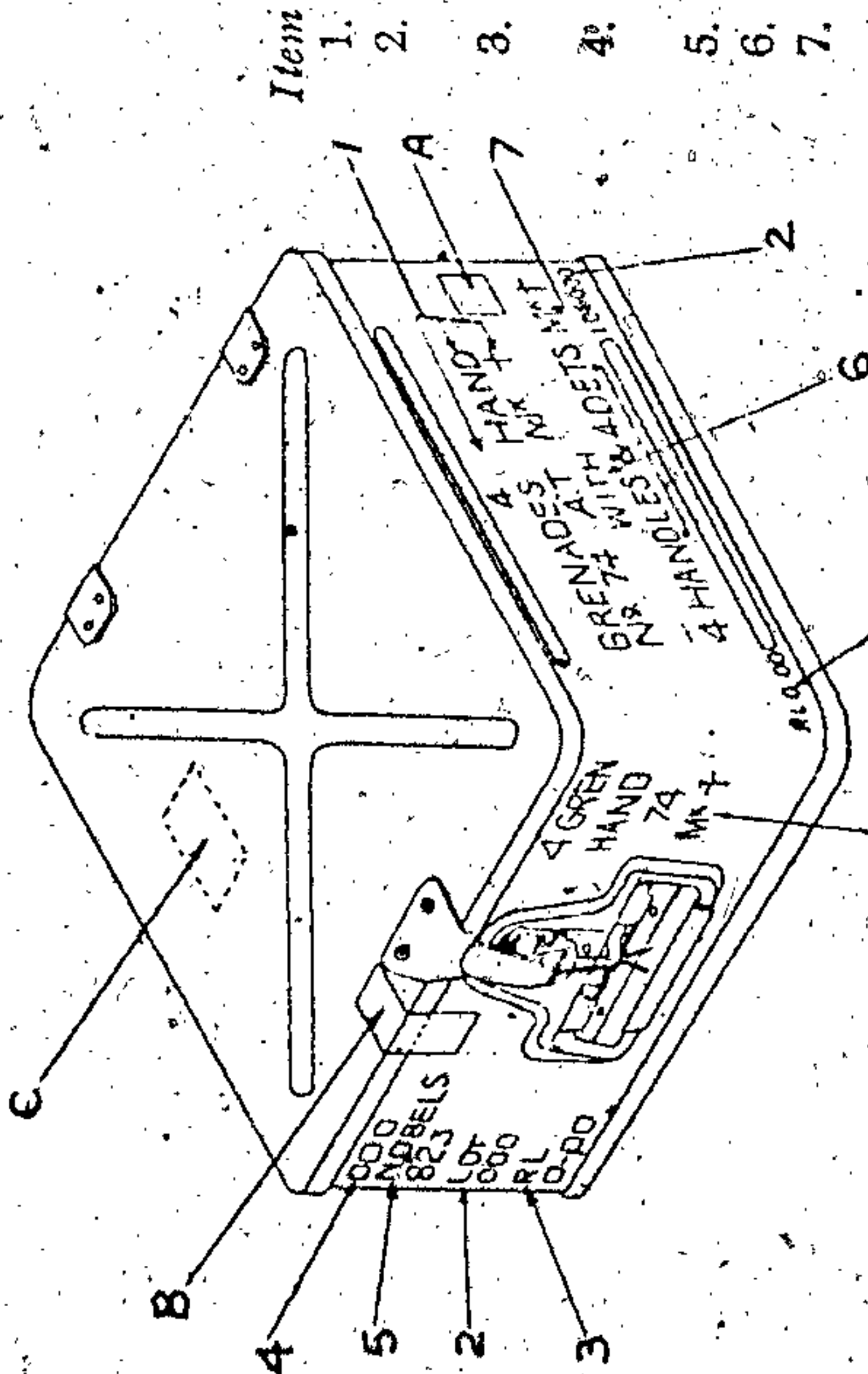


Note:—The detonators are packed 4 each in specially shaped wooden blocks painted blue.

TYPICAL FOR BOX, STEEL, No. G110, CONTAINING 4 GRENADES, HAND, No. 74, MK. 2

General Notes

- The number or letter denotes item in column.
- Box to be painted service colour if not already so finished.
- Stencilling to be in $\frac{1}{4}$ inch yellow lettering unless otherwise stated.
- Stencilling to be as shown on both sides and both ends.



Item

1. Mark of grenade, as applicable.
2. Lot number of filled grenades, as applicable ($\frac{1}{2}$ inch lettering).
3. Monogram or initials of filling station and date of filling (month and year $\frac{1}{4}$ inch lettering).
4. Packing serial number to be stencilled in white ($\frac{1}{2}$ inch lettering).
5. Nature of filling, as applicable ($\frac{1}{2}$ inch lettering).
6. $\frac{1}{2}$ inch lettering.
7. Mark of detonator, as applicable.

- A. Government explosive and classification label No. L1608A (Group VIII).
- B. One station label affixed over junction of lid and body in position shown.
- C. Packers label No. L566A affixed to underside of lid in position shown.

Sec. 5

Plate 6F

TYPICAL FOR BOX, No. G112, CONTAINING 4 GRENADES, HAND, No. 74, MK. 2

General Notes

- The number or letter denotes item in column.
- Box to be stained vandyke brown if not already so

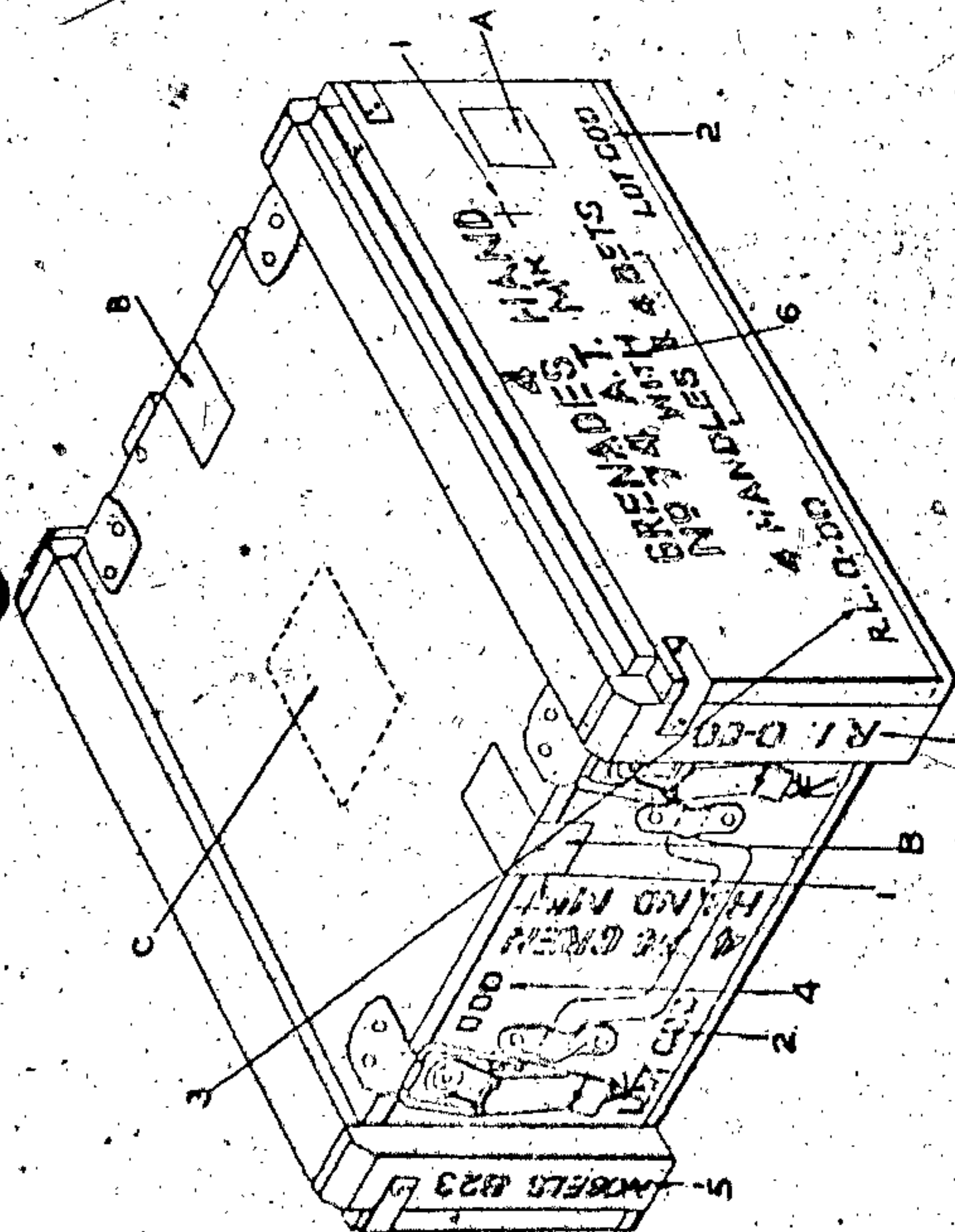
Sec. 6

TYPICAL FOR BOX No. G112, CONTAINING 4 GRENADES, HA No. 74, MK. 2

General Notes

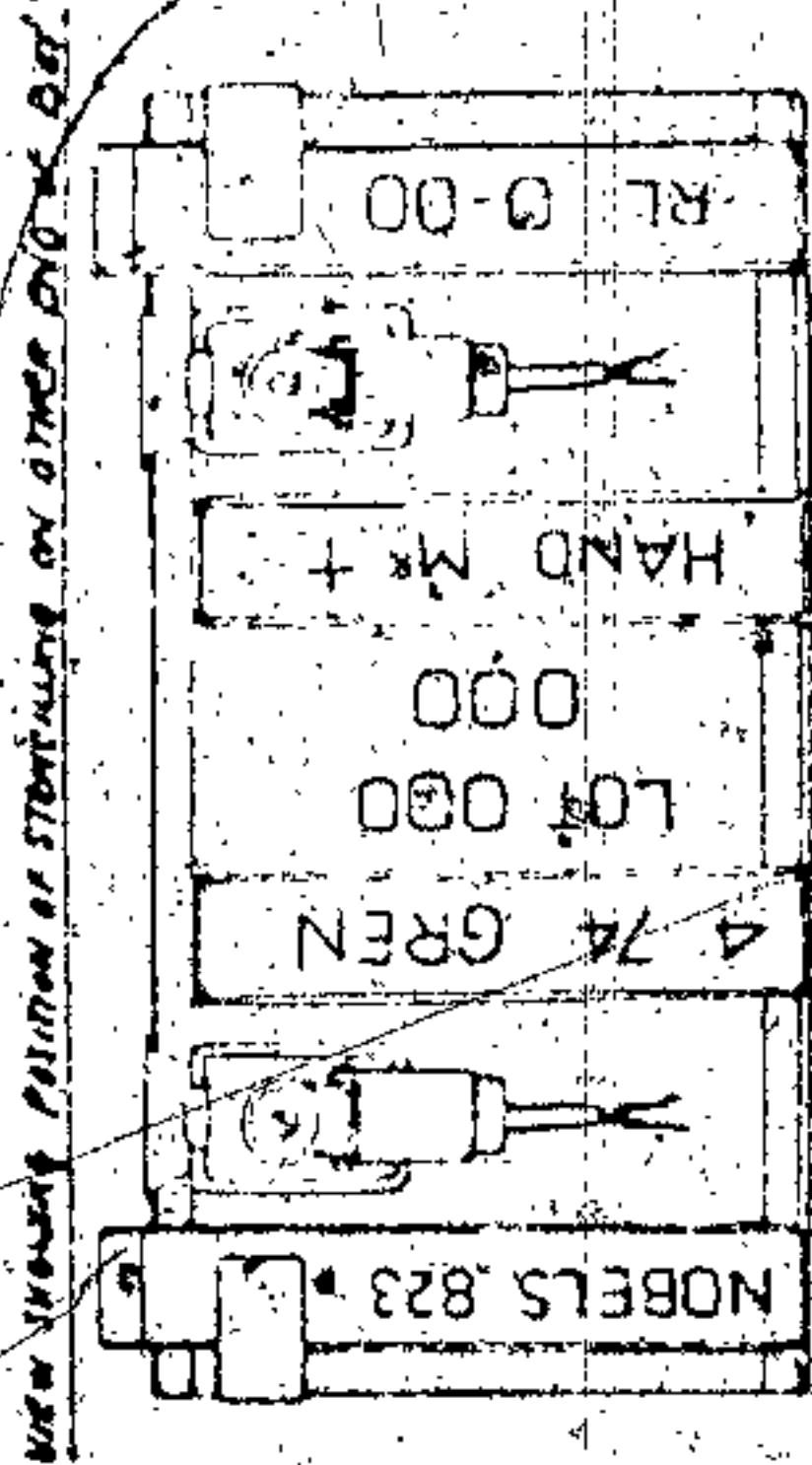
The number or letter denotes item in column.
Box to be stained vandyke brown if not already so finished.
Stencilling to be in $\frac{1}{4}$ inch lettering unless otherwise stated.
Stencilling to be shown on both sides and both ends.

- Item
1. Mark of grenade, as applicable.
 2. Lot number of filled grenades, as applicable ($\frac{1}{4}$ inch lettering).
 3. Monogram or initials of filling station and date of filling (month and year $\frac{1}{4}$ inch lettering).
 4. Packing serial number to be stencilled in white ($\frac{1}{4}$ inch lettering).
 5. Nature of filling, as applicable ($\frac{1}{4}$ inch lettering).
 6. $\frac{1}{4}$ inch lettering.



- A. Government explosive and classification label No. L1608A (Group VIII).
- B. Two Station labels affixed over junction of lid and body in positions shown.
- C. Packers label No. L366A affixed to underside of lid in the position shown.

C.I.A. 941





SECTION 7.—GRENADE, HAND, No. 75, ANTI-TANK

DESCRIPTION

1. This is an H.E. Grenade, designed to be used in the capacity of an Anti-Tank Mine, or can be thrown under the track of a tank. The Mk. 2 is of stronger design than the Mk. 1, and provides a safer and more reliable method of initiation. Neither of these Marks is suitable for use in tropical climates owing to the nature of the fillings, and the light-steel casing of the grenade bodies.

Mk. 1 (obsolescent). (See Plates 7A, 7B, 7C)

2. The body of the grenade is of tinned plate with a short neck of approximately 1-in. diameter, which is closed by a screwed cap. It has a capacity of about 1 pint.

On one of the flat sides is soldered the detonator holder consisting of a tinned plate sheet shaped to form two pockets. Both pockets are slotted, the open ends being provided with tabs which are bent over after insertion of the detonator, to hold them in position.

The striker plate, which is shaped to form the striker on its underside, is secured to a bracket at each end of the body by means of metal tabs bent over. The brackets are soldered to the body and the striker is coincidental with the slots in the detonator holder.

The filling may be one of the following —

- (a) Nobels explosive No. 704B with 4 exploders.
- (b) Burrowite with 4 exploders.
- (c) Burrowite and $\frac{2}{3}$ Nobels explosive No. 704B. In addition, some grenades of earlier manufacture may be found filled with Nobels Explosive No. 704B (without exploders), or Military Ammonal with 4 exploders. When filled with the latter, the grenades were designated No. 75A.

The exploders are Polar Dynamite (25 per cent. Nitro-Glycerine). Nobels Explosive No. 673 has been used in earlier manufacture. Nobels Victor Powder was also approved as an alternative but not taken into use. The exploders are cylindrical sticks wrapped in waxed paper and are positioned inside the body of the grenade at the end opposite the neck filling hole.

The detonator assembly consists of an Igniter No. 75 Grenade Mk. 2 and a No. 27 detonator. The Igniter comprises a small tin tube flattened at one end, having a rubber tube rolled on to the open end. It contains a glass capsule of sulphuric and nitric acids, adjacent to a mixture of potassium chlorate and charcoal. The capsule is protected by a small cotton wool pad. See Plates 7B and 7C.

The number of grenades in a filled Lot issued from factory to depot, formerly, 2,000, is now 2,400.

Action

3. The detonator assembly is prepared by inserting the open end of the No. 27 detonator into the igniter and unrolling the rubber tube to hold it in position.

A detonator assembly is inserted into each pocket of the detonator holder with the flattened end towards the neck of the grenade, the tabs on the holder being turned down after insertion. The glass capsules are then positioned directly below the formed striker portion of the striker plate.

Pressure on the grenade causes the striker plate to collapse, breaking the capsules. Interaction of the acids and the ignition composition in each assembly produces a flash to initiate the detonator which through the medium of the exploders detonates the grenade filling.

Mk. 2. (See Plate 7D.)

4. The Mk. 2 grenade combines a safer method of initiation and a more strongly constructed striker plate. Its body is the same as the Mk. 1.

The detonator holders, instead of being parallel to each other, are arranged to form a "V", with a bridge piece separating the outer ends. A small slot to take a securing pin is also cut near the top of the outer side of each detonator holder.

The striker plate is secured over the detonator holders with stronger brackets. It has a central longitudinal corrugation and is assembled with the convex side away from the grenade body. The brackets have tongues punched out for the insertion of cordtex or safety fuze for initiation of the grenades when used as a demolition charge. Punched out holes can also be used for linking the grenades into a chain.

The H.E. fillings are the same as in the Mk. 1, and a waxed felt washer is inserted in the neck of the grenade to seal the filling.

Initiation is by means of the Detonator No. 83 (Plate 7E), formerly known as the "Igniter Special No. 1" which comprises a No. 27 Detonator, a plastic igniter body containing a glass capsule filled with approved composition, and a steel striker pin. One end of the body is sealed with approved cement. To the other end of the body the open end of the No. 27 detonator is secured with cement. The striker pin protrudes at right-angles from the igniter body to which it is secured with cement.

The number of grenades in a filled Lot issued from factory to depot is 2,400.

Action

5. Two igniters are inserted into the detonator holders on the grenade body, with the striker pins adjacent to the striker plate, and retained in position by the securing pin. Movement of the securing pin is prevented by passing the end of a short length of twine provided, through an eye-hole in the pin and thence through the bridge piece, the ends then being tied together. The grenade functions in a similar manner to the Mk. 1.

Marking and Packing

6. Mk. 1 Grenades are painted buff colour. Mk. 2 are painted service brown. Empty marking stamped or embossed on the side of the grenades are:—

"No. 75 Mk. 1" (or Mk. 2).

Contractors initials or recognized trade mark.

Month and year of manufacture.

7. The type of exploders contained are indicated by: a red filling ring round the neck below the screw cap for Nobels Explosive No. 673; a ring of red crosses or two red crosses on opposite sides of the neck for Polar Dynamite.

8. Military Ammonal filling is indicated by the letter "A" stencilled on the side of the body remote from the striker plate and the top of the screwed cap being painted pink; the top of the screwed cap is also painted pink when the filling is Burrowite and 4 exploders.



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Filled markings stencilled on the base are:—

- "704B & 4 EXPRS "
 - "BUR & 4 EXPRS "
 - " $\frac{1}{2}$ BUR $\frac{1}{2}$ 704B "
- } as applicable.

Monogram of firm or filling station.

Month and year of filling.

Lot Number (this may alternatively be found on the side).

9. The flattened end of the detonator assembly used with the Mk. 1 grenade is painted red. The following markings are moulded on the end face of the body of the Detonator No. 83 used with the Mk. 2 grenade:—

"Igniter No. 1 Mk. 1" or "No. 83 Mk. 1."

Contractors initials or recognized trade mark.

Year of manufacture.

10. Mk. 1 Grenades are packed 12 grenades in Box G 70, together with 24 detonators and 24 igniters in separate containers marked "DETONATORS" and "IGNITERS" respectively. See Plate 7D.

Mk. 2 grenades are packed 12 grenades in Box G 70, together with 24 detonators No. 83 in a lined plate box No. 376. The box No. 376 is marked "IGNITERS".

Dimensions of the box G 70 are 19½ in. x 8½ in. x 8 in. approximately, and the approximate weight filled with either Mk. 1 or Mk. 2 grenades and components is 40-lb.

The "Jungle Pack" is 4 grenades in Box G 111, Mk. 3.

11. Markings on boxes are as shown in Plates 7E and 7G. A number of grenades were issued with the letters "SP" stencilled on both the grenades and the boxes. This marking has no significance and should be ignored.

Examination

12. Packages will be examined as indicated in Appendix 3 to this pamphlet.

13. THE FIRST OPERATION IN CONNECTION WITH THE EXAMINATION OF GRENADES WILL BE TO INSURE THAT THE DETONATOR ASSEMBLIES OR IGNITERS ARE NOT FITTED TO THE GRENADES. IF FOUND IN THE DETONATOR HOLDERS THEY WILL BE IMMEDIATELY REMOVED.

14.—(a) One of the most serious defects which have arisen with these grenades is corrosion around the neck filling hole. This was caused either by inefficient sealing of the filling hole, allowing moisture to be absorbed by the Ammonium Nitrate in the filling, or by a film of explosive being allowed to remain on the exterior of the neck and the top of the body after filling.

Another defect which may also have been caused by moisture absorbed in the filling, was the bursting of the grenade bodies due to swelling of the explosive. In some instances the swelling was sufficient to have burst the glass capsules had they been in position.

The later production of Mk. 2 grenades incorporates a waxed felt washer on top of the filling, and the neck is coated with R.D. cement before screwing on the cap. After filling, the grenades are carefully cleaned to remove any loose explosive from the exterior.

Sec. 7

(b) Grenades manufactured from March, 1943 are fully serviceable and unrestricted. The following action will be taken to dispose of grenades manufactured before March, 1943:—

- (i) Grenades manufactured up to the 30th June, 1942, are unserviceable and will be destroyed under War Office arrangements.
- (ii) Grenades manufactured between July, 1942 and February, 1943, inclusive are for use in temperate climates only, to be used before 1st January, 1945. Any remaining in service after this date will be sentenced provisionally unserviceable and reported specially to the War Office (W.S.9) or C.I.O.O.

15. Grenades showing the following defects will be sentenced unserviceable:—

- (a) Severe corrosion, or rust, especially at the neck and closing cap. See para. 18 below.
- (b) Dented, split, swollen or burst bodies.
- (c) Distorted or insecure detonator holders and brackets.
- (d) Distorted striker plates.

16. The following repairs may be carried out on grenades not exhibiting any of the defects listed in paras. 15 and 17:—

- (a) Slight corrosion or rust may be removed with cloth, emery, size O (HA 0042).
- (b) Repainting as necessary.
- (c) The two metal tabs on the detonator holders of Mk. 1 grenades may be adjusted to be in the "straight" position; the four metal tabs on the brackets may be adjusted so that they hold the striker plate firmly in position.
- (d) Loose closing caps will, if the grenades are otherwise in a serviceable condition, be removed and the interior examined. If in good condition the threads of the neck will be coated with R.D. cement and the cap well screwed down.
- (e) Replacement of missing or unsuitable bezels on Mk. 2 grenades.

17. Any grenades manufactured after February, 1943, which show corrosion or rust at the neck or on the screwed cap will be sentenced provisionally unserviceable and reported to the War Office (W.S.9) and the C.I.O.O. The report will give full details of the extent of the corrosion or rust, filling particulars of the Lot or Lots of grenades concerned and the number of grenades of each Lot.

18. Detonator assemblies for the Mk. 1 grenade will be examined to ensure that they are free from rust or corrosion and that the sleeve portion which receives the detonator is not bent or distorted. The rubber tubes should be correctly positioned on the igniter and in good condition.

19. Detonators No. 83 will be examined for the correct positioning of the striker and to ensure that the striker and detonator are firmly cemented to the body. The joints between the striker pin and the body, and between the detonator tube and the body, and the cavity above the capsule, must be sealed with cement. Detonators No. 83 with any visual defects will be sentenced unserviceable.

**Proof**

20. When the number of grenades in a Lot exceeds 300, they will be dealt with separately. For grouping of Lots of smaller quantities, the provisions of para. 8 (f) of the introduction to this pamphlet will apply, with the additional rule that all grenades in one group will contain the same type of filling.

21. Ten grenades of each Lot or group will be selected. Each grenade will be prepared by inserting a detonator taken from the same box into one of the pockets. Into the other pocket will be inserted a No. 27 detonator with a length of safety fuze attached.

22. A further ten grenades of the same type of filling as the Lot under proof, and of the latest date of filling available, will be selected, prepared as described in para. 21, and fired separately as a standard. The average depth and diameter of crater will be recorded.

23. The ten grenades of each Lot or group under proof will be fired separately, the average depth and diameter of crater being recorded.

24. Failures will be as follows—

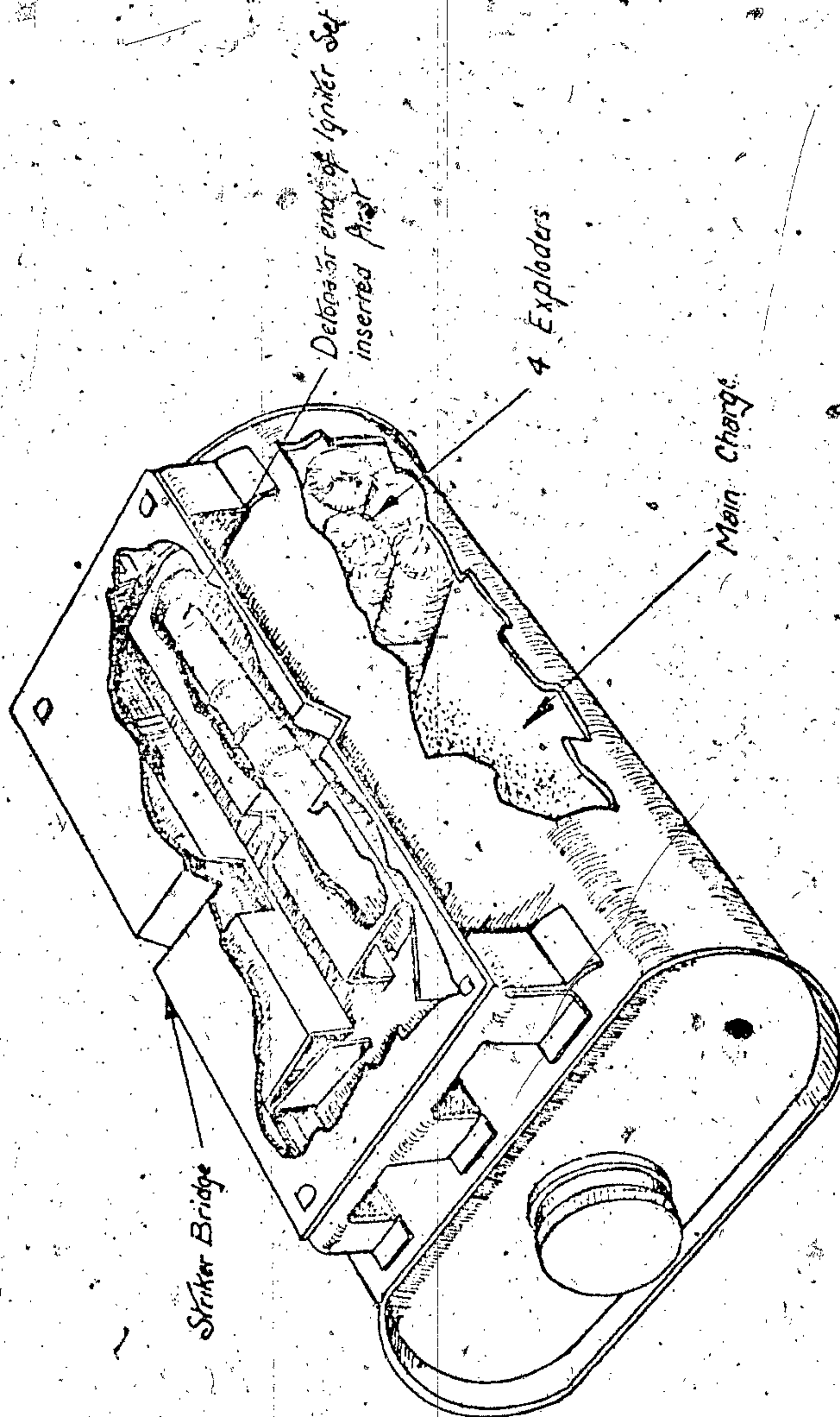
(a) Detonator fires but fails to detonate the grenade.

(b) Average depth of crater less than 75 per cent. of the average depth of crater of new grenades.

(c) Average diameter of crater less than 75 per cent. of the average diameter of crater of new grenades.

25. If, at first proof, two or more failures occur, the Lot represented will be sentenced provisionally unserviceable. If less than two failures occur, a second proof of ten grenades will be carried out. If, at second proof any failure occurs, the Lot represented will be sentenced provisionally unserviceable.

GRENADE, HAND, No. 75, ANTI-TANK, M1. 1



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Plate 7B

GRENAD, HAND, No. 75, ANTI-TANK, MK. 1

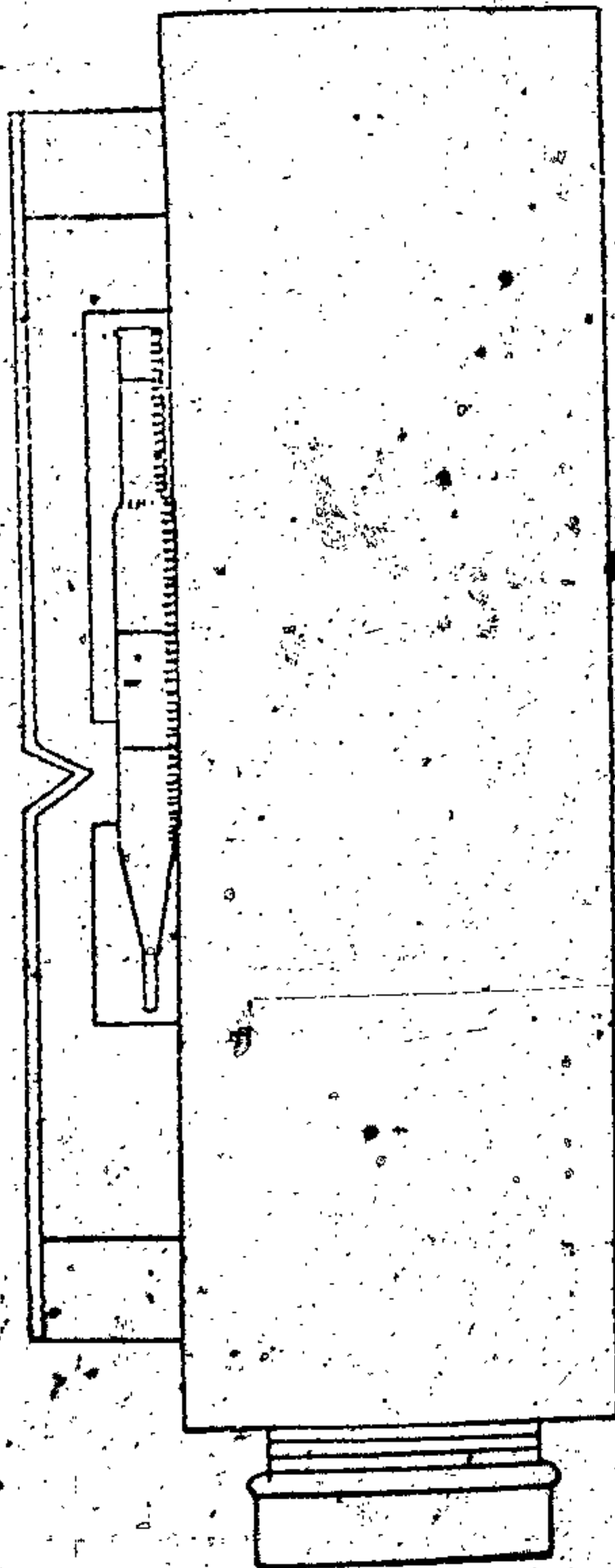
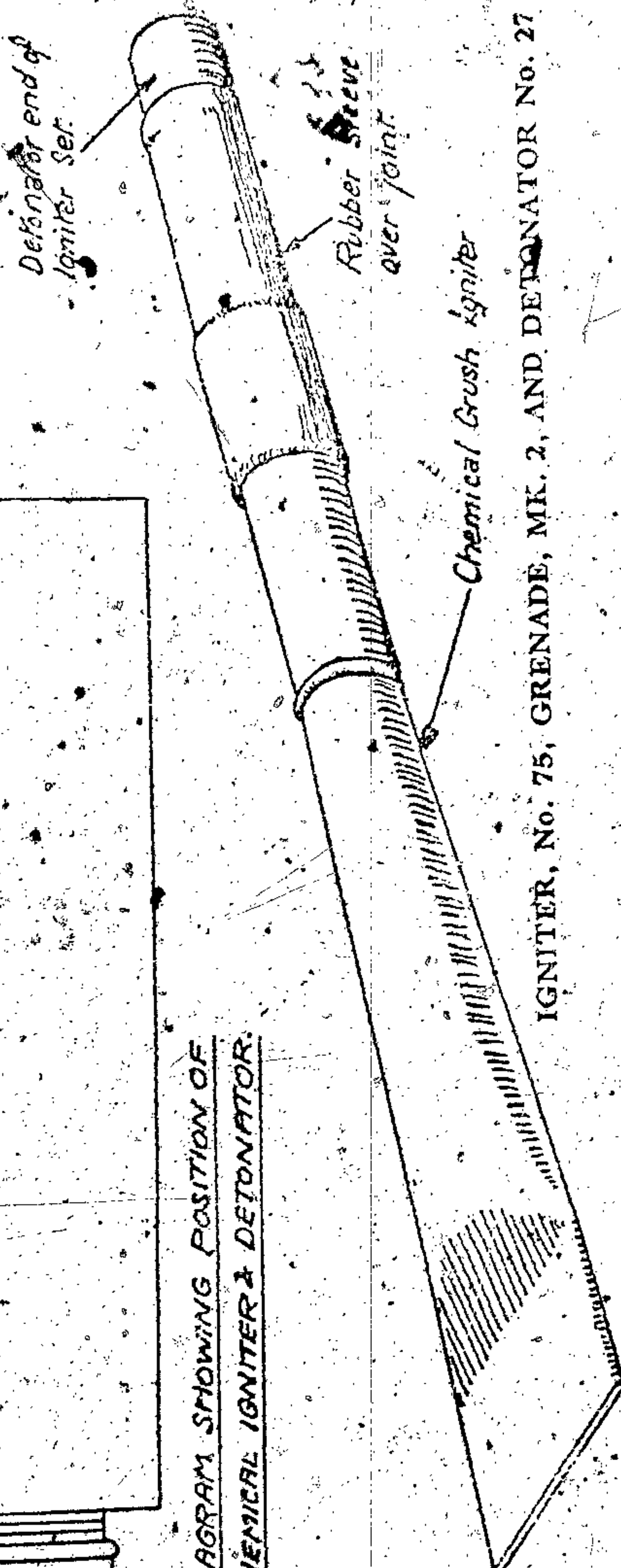


DIAGRAM SHOWING POSITION OF
CHEMICAL IGNITER & DETONATOR.



IGNITER, No. 75, GRENADE, MK. 2, AND DETONATOR No. 27

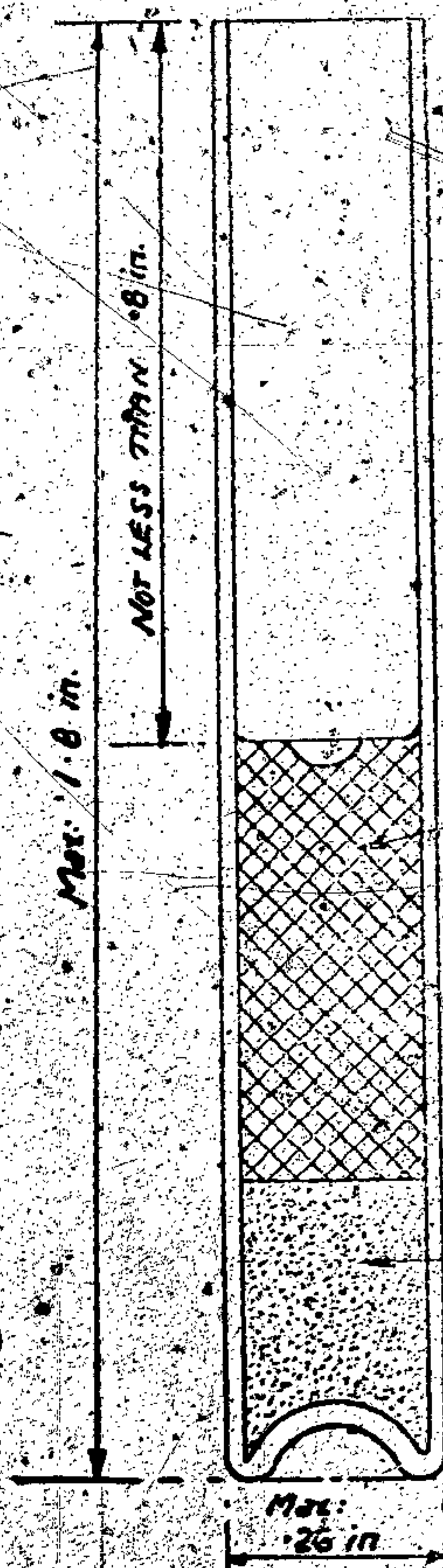


Sec. 7

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Plate 7C

DETONATOR, No. 27, MK. 1



Aluminium tube, lacquered externally.

About 0.35 gramme R.S.A. composition pressed with a pressure of approx. 4000 lbs per sq. inch.

About 0.55 gramme C.E. pressed with a pressure of approx. 450 lbs per sq. inch.

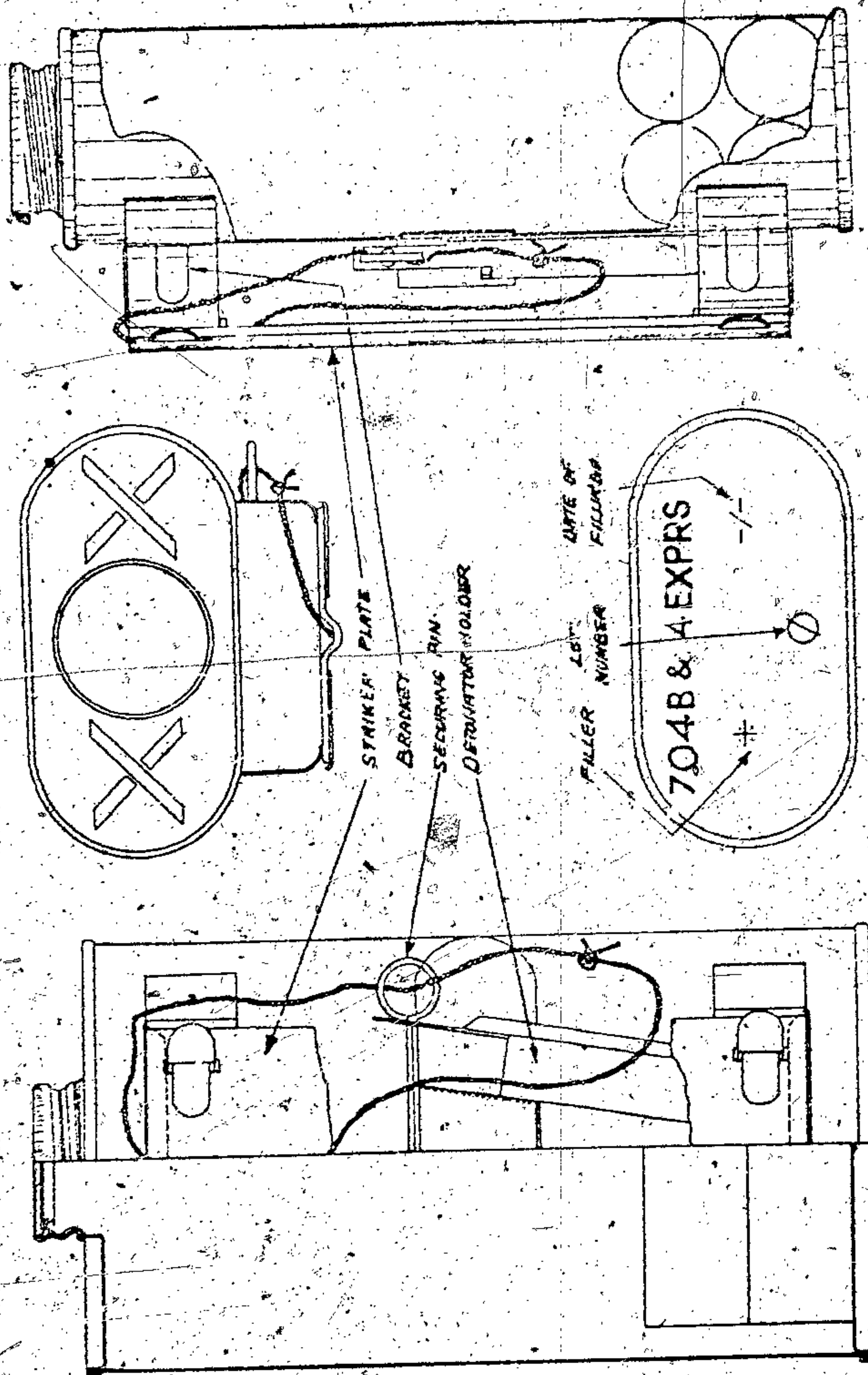
Notes:—This is identical with the detonator No. 8 commercial.

Use:—Standard non-electric detonator for use with demolition sets.

In conjunction with an igniter for the No. 75 Grenade Mk. 1.

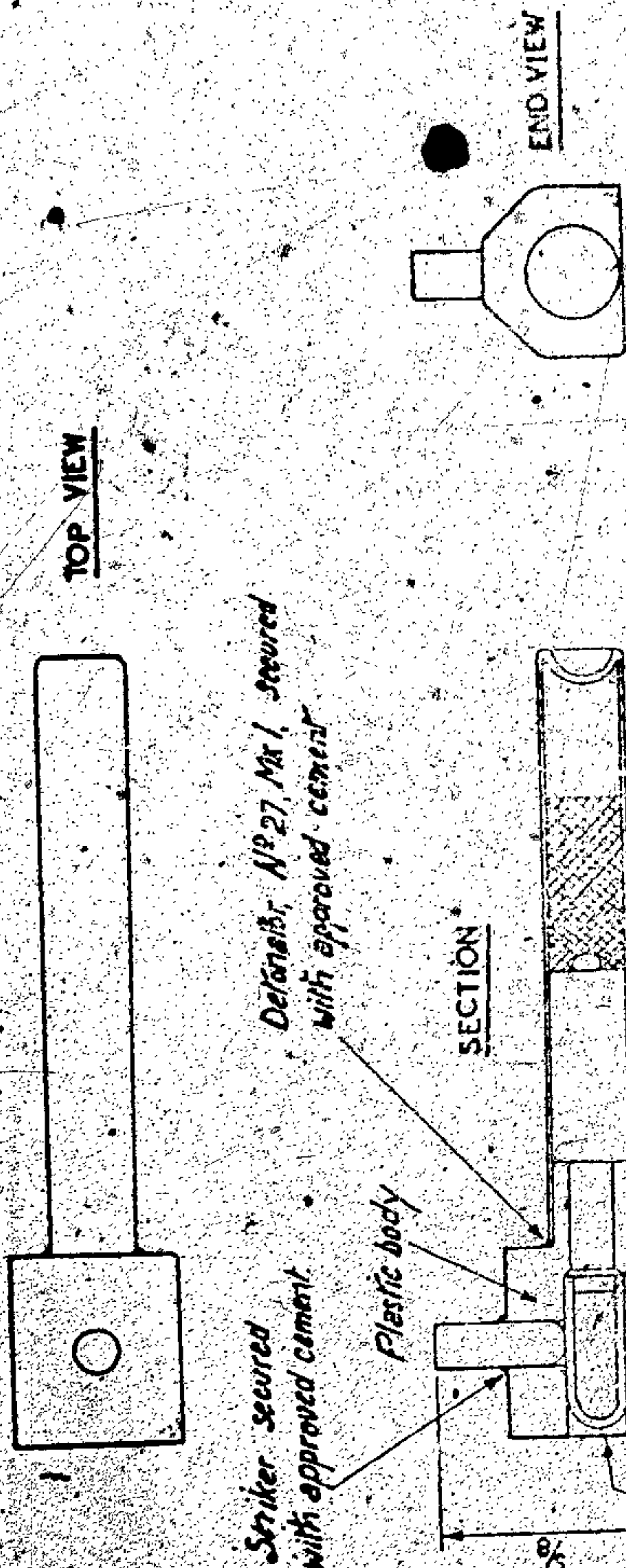
Plate 7D

GRENADE, HAND, No. 75, ANTI-TANK, MK. 2



DETONATOR, No. 83, MK. 1

For use with No. 75, Mk. 2, Grenade



* Contractor's initials or recognised trade mark
+ Year of manufacture

TYPICAL BOX, G70, CONTAINING GRENADES, No. 75, ANTI-TANK

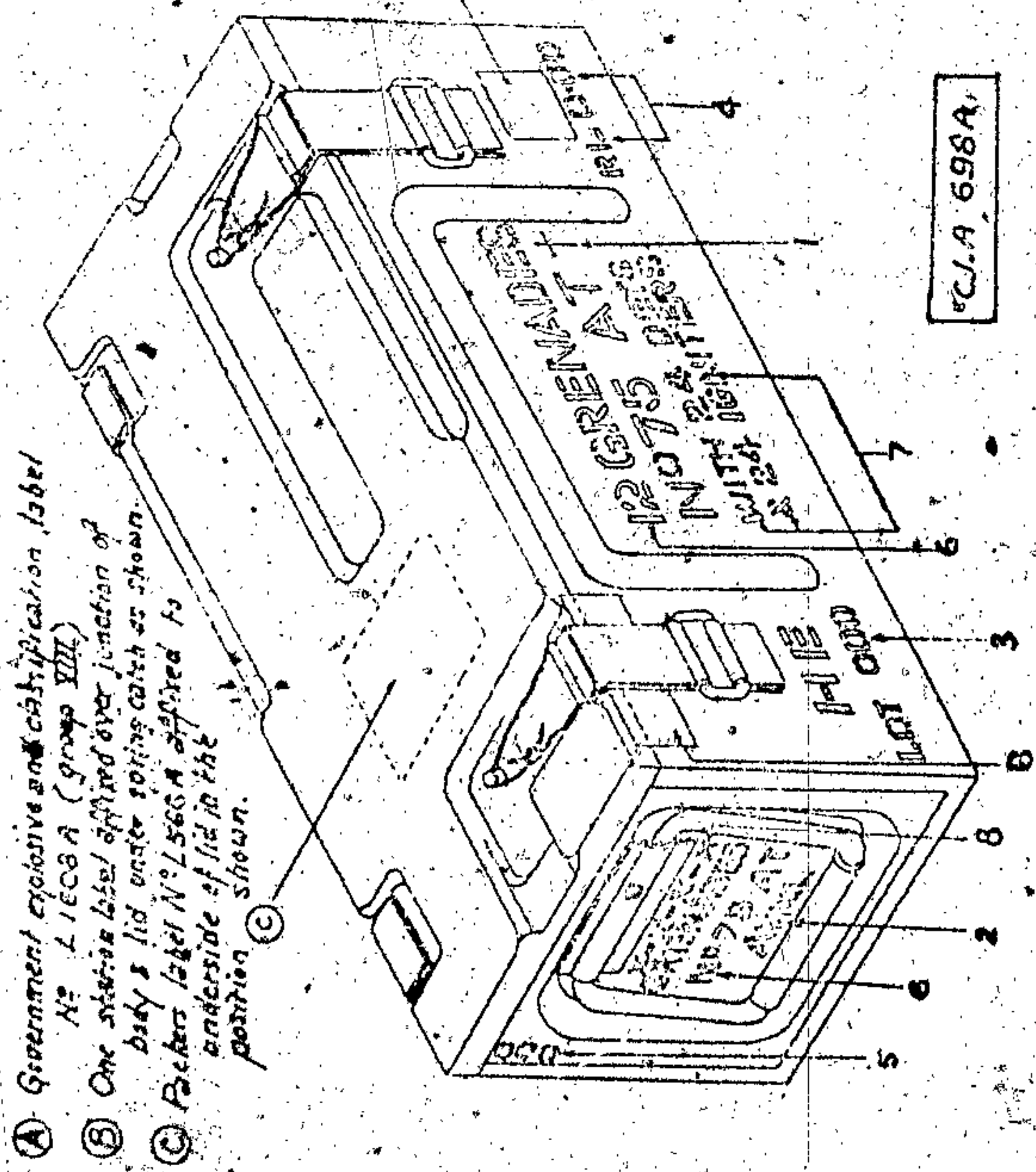
Plate 7F

General Notes

The number or letter in circle denotes item in column.
Box to be painted service colour if not already so finished.
Stencilling to be in yellow $\frac{1}{4}$ inch lettering on sides and $\frac{1}{4}$ inch on ends except where otherwise stated.
Stencilling to be as shown on both sides and both ends.

Item

1. Mark of grenade as applicable.
2. Nature of filling as applicable.
3. Lot number as applicable ($\frac{1}{4}$ inch lettering).
4. Monogram or initials of filling station and date of filling (month and year) $\frac{1}{4}$ inch lettering.
5. Packing serial number to be stencilled in white.
6. No. 75 or 75A as applicable.
7. To be stencilled in $\frac{1}{4}$ inch lettering, or "with 24 Dets. No. 83" when Mk. 2 grenades are packed.
8. Red XXX or X-X-X as on grenades packed.



- A Government explosive identification label No. 11003 A (group VIII)
- B One station label affixed over junction of body & lid under locking catch as shown.
- C Packing label No. 1500 A affixed to underside of lid in the position shown.

C.I.A. 1407

076

C. Packers label No. L566A affixed to underside of lid in the position shown.

C.I.A. 1407

C. Packers label No. L566A affixed to underside of lid in the position shown.



C. Packers label No. L566A affixed to underside of lid in the position shown.

- C. Packers label No. L566A affixed to underside of lid in the position shown.

C. Packers label No. L566A affixed to underside of lid in the position shown.

C. Packers label No. L566A affixed to underside of lid in the position shown.

C. Packers label No. L566A affixed to underside of lid in the position shown.

SECTION 8.—GRENADE, HAND, No. 76

DESCRIPTION. (See Plate 8A)

1. This grenade was originally known as the A.W. (Allbright and Wilson) Bomb and later as the "Grenade S.I.P." (Self-Igniting Phosphorus). It was designed for throwing against A.F.Vs. to produce an incendiary and smoke effect, and a later adaptation enables it to be fired by a small charge from the Northover Projector.

2. The grenade consists of a short-necked half-pint bottle charged with a mixture of yellow phosphorus, water, benzine and rubber, with a 10 per cent. air space to allow expansion. The bottles are sealed with brown corks coloured either red or green. The filled weight is approximately 1½-lb.

There are two classes of grenades in the Service:—

(a) Those sealed with red-coloured crown corks were produced between August and October, 1940, and bottles of varying dimensions were used. These are suitable for hand throwing only.

(b) Those sealed with green-coloured crown corks have bottles of standard diameter (2.5-in.), and are suitable for firing from the Northover Projector.

The Northover charges consist of a small charge of gunpowder in a disc-shaped cellophane container, protected by millboard discs. A sorbo-rubber pad or a rubber ring ½-in. thick and 1½-in. external diameter is fitted to one end of the container to form a buffer between the charge and the bottle when firing, to prevent the bottle being fractured. A percussion cap is employed to fire the gunpowder charge.

Action

3. When the bottle is shattered, instantaneous ignition takes place with the production of a masking cloud of smoke containing phosphorus pentoxide and sulphur dioxide. The Service respirator is proof against these fumes which are of a noxious nature. Sharp impact is essential to ensure breaking of the grenade, and throwing alongarmac is not a main method of operation. A few seconds delay in ignition can be obtained by shaking the bottle before throwing.

Marking and Packing

4.—(a) Red capped grenades, if undated, were filled between August and October, 1940.

(b) Green capped grenades, if undated, were filled between November, 1940 and May, 1941.

(c) All grenades filled since the 1st June, 1941, are packed in boxes marked with the month and year of filling.

Twenty-four grenades are packed in one wire-bound wooden partitioned case, which has two rope handles and is fastened with two wires sealed with lead seals. The fastening can be easily broken with a jack-knife or similar instrument. Dimensions of the case are 25½-in. × 13½-in. × 9½-in. and the gross weight is approximately 53-lb.

5. An enamelled plate, screwed to the inside of the lid, gives full instructions for storage and fire precautions, and the top of the case is stencilled or branded:—

HANDLE
WITH CARE

A W BOMBS

FRAGILE GLASS

HIGHLY INFLAMMABLE

DO NOT
DROP

Cases issued since the 1st June, 1941, are marked with the month and year of filling, and cases containing grenades with green crown corks, suitable for firing from the Northover Projector, are marked at one end with a vertical green band.

6. Northover charges are packed three in a cylinder, ten cylinders being in a trade pattern cardboard box. The caps are in circular tins each holding 250. Four tins are packed in a cylinder.

Storage

7. Special precautions for the storage of Grenades No. 76, the method of stacking and the safety distances appropriate to the numbers involved, are given in R.A.O.S., Part 6.

Fire Risks

8. The firing of one grenade in a box or of several grenades in a stack of boxes is not likely to produce a fire which cannot be fought by normal methods, providing it is tackled promptly. If, however, the fire has taken a good hold before fire-fighting commences, no attempt should be made to control it. The adjacent stacks should be soaked with water, to prevent the fire spreading.

Burning material will not be projected very far but adjacent grenades may be burst. A grenade igniting in an open isolated box is not likely to project burning material more than 40 yards.

9. The best method of fire-fighting is by water from a hose. The phosphorous will ignite again when dry, so cover with wet sand and remove.

10. Personnel must wear rubber boots, rubber gauntlets and eye-shields. Service respirators are advised. Gloves, hedging, are also authorized as under for use by personnel where Grenades No. 76 are held:—

Units holding small quantities	2 pairs.
Depots holdings stocks up to 2,000	6 pairs.
A.S.Ds. holding stocks over 2,000	12 pairs.

11. It is advisable to use the principle of "burning over" to make safe any residues left by a fire that has been extinguished by the use of sand. The residues should be destroyed by igniting some readily inflammable material, such as oil or wood over the contaminated area, the surface being well raked over to bring every vestige of phosphorus into contact with the air. Where the fire risk makes it inadvisable to cleanse the site by "burning over," the residues and top soil should be removed to a suitable site for treatment by burning.



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12. When phosphorus liquid has been spilt on wood there is little likelihood of a re-ignition if all phosphorus has been removed from the surface, but the possibility must be borne in mind that some phosphorus may penetrate cracks in floorboards. Where it is suspected that phosphorus residues are present on wooden or metal surfaces, such as vehicles or railway trucks, an inspection should be carried out in the dark when the presence of phosphorus may be detected by the glow.

Transport

13. The following procedure, which has been agreed with the railway companies, will be adopted when despatching Grenades No 76 by rail:—

- (a) Advance notice of not less than six hours must be given of the intention to forward a consignment.
- (b) Grenades must be packed in strong partitioned wooden cases with lids. They must be loaded as far as possible in open steel wagons and sheeted. If steel wagons are not available, ordinary open wagons, sheeted, must be used. Vehicles fitted with grease lubricated axles must not be used. Each wagon must bear the Railways' "Highly Inflammable Liquids" label on each side.
- (c) The traffic will only be conveyed by special train when quantity warrants this procedure.
- (d) Vehicles containing grenades must not be coupled direct to engine or brake van. They must be marshalled in the rear of the train and two empty vehicles, preferably steel, or two vehicles not loaded with inflammable liquids or other dangerous goods, must be placed between the vehicles containing the grenades and the engine, brake van or loaded vehicles containing inflammable liquids or other dangerous goods. Vehicles containing grenades must not be marshalled on trains conveying explosives.
- (e) A conductor provided by the military authorities must travel on the train. He will be equipped with a Service respirator and will carry Copper Sulphate Solution for treating phosphorus burns. He will also be provided with protective gauntlets, rubber boots and non inflammable clothing. This equipment must not be carried in the same truck as the grenades but in the guard's brake van. The conductor will be in charge of and responsible for the use of the equipment in an emergency and will help to uncouple wagons, remove unaffected packages from burning vehicles if possible, and generally assist in preventing extension.
- (f) The vehicles must not be loose shunted, and a special label to this effect must be fixed on each side of the vehicle in addition to the Railways' "Highly Inflammable Liquids" label.
- (g) Vehicles conveying grenades must not be allowed to stand alongside vehicles containing explosives.
- (h) Fire should be extinguished, if possible, with water and vehicle isolated and kept under observation.
- (i) Defective vehicles, detached en route, must be isolated.
- (k) Loading and unloading and all handling must be by senders and consignees and not by railway servants. All packages must be securely stowed to prevent movement in transit.

14. The use of the term "Conductor" by the railway companies (see para. 13 (e)), will not be taken literally to indicate an escort of one man. The issuing depot will in all cases ensure that an escort of one N.C.O. and two men accompany each consignment of Grenades No. 76 despatched by rail or road.

15. Magazine clothing may be used in lieu of non-inflammable clothing and gloves, hedging may be used in lieu of protective gauntlets, if the latter are not available.

16. In addition to the equipment detailed above, the escort will be provided with four 2-gallon fire extinguishers.

17. If the consignment is by road, a proportionate quantity of the equipment should be carried, if possible, in the vehicle cab.

18. It will be necessary to ensure that the personnel forming the escort are fully instructed as to what action is to be taken if fire should occur. The escort will remain with the consignment until, in the case of despatch to a port, the off-loading from the trucks on to the ship has been completed.

19. Escorts arriving with Grenades No. 76 at an ammunition depot should be released for return to their unit without delay, as the consignee can supervise the unloading, but the escort will remain until the consignee's representatives have taken over the loaded vehicles.

Examination, Tests and Proof

20. Grenades will be examined by dates of filling. The percentage to be examined is left to the discretion of the I.O.O. and should normally be from 1 per cent. to 5 per cent. of the quantity in the date or group. For undated grenades, I.O.Os. must use their discretion in grouping stocks according to their past history and conditions of storage.

21. Grenades are liable to the following defects:—

- (a) Red deposit on walls of bottle.
- (b) Red particles on top layer of filling.
- (c) Solidification of the phosphorus layer.
- (d) Contents mixed.
- (e) No water layer.
- (f) Greyish deposit in bottle.
- (g) Cracked bottles and bad flaws.
- (h) Rusty caps.
- (j) Less than 10 per cent. air space.
- (k) Loose crown corks.
- (l) No benzine in bottles.
- (m) No rubber in bottles.

Defects (a) to (f) do not render the grenades unserviceable, but performance will be inferior, and they should be used quickly.

Defects (g) to (m) render the grenade unserviceable and grenades with any of these defects will be destroyed immediately.

In cases of doubt a small firing trial should be carried out.

22. In addition to inspection as in para. 21 a proportion of the grenades examined will be tested to ascertain the liability of the crown corks to looseness, and the liability of the bottles to crack when handled, and, if they pass these tests satisfactorily, will be subjected to proof. Quantities and the methods of carrying out the tests and proof are detailed below.



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23. "Dates" of 1,200 or more will be tested and proved separately: smaller dates may be grouped into quantities not exceeding 2,400, provided that all dates so grouped fall within a period of not more than three months.

24. For testing and proving, red capped and green capped grenades must not be grouped together.

Provided that grenades are stored under similar conditions, results of tests and proof may be taken to govern other quantities of the same date held in the area.

25. Twelve grenades will be selected during the examination for tests and proof, and will consist if possible of any bottles showing flaws or incipient cracks. A check of the 10 per cent. air space is an indication of freedom from flaws of the bottle, or of looseness of the crown cork.

26.—(a) The 12 grenades will be "crown cork tested" as follows:—

"Immerse the grenades in water for two hours. The temperature of the water should be maintained between temperature limits of 90° to 110° F. in temperate climates, or at 20° above the average summer temperature at the station, if in warmer climates. The corks should not become loosened or show any signs of leakage."

(b) If facilities are not available for carrying out the test described in para. 26 (a), the following may be substituted:—

"Press hard on the cork with the thumb, the cork should not "crack" or become "loose."

27. If any grenade fails the "crown cork test," the date concerned will be sentenced provisionally unserviceable; in the case of a group of mixed dates a failure will entail a separate proof of each date concerned, in which any failure will condemn the date concerned.

28. Grenades which pass the "crown cork test" will be subjected to the "dropping test." This test will be carried out by dropping the grenades BASE-DOWNWARDS on to a wooden sleeper, or similar firm wood surface, from a height of four feet. If any grenade breaks or cracks, the date will be sentenced unserviceable: for groups of mixed dates, any failure entails a separate proof of each date.

Before carrying out this test, grenades which have been immersed in warm water will be allowed to thoroughly cool.

29. If the grenades pass the dropping test, they will be sentenced on firing proof results as follows:—

"The grenades will be thrown separately against a wet brick or concrete wall from a distance of 10 yards. Care will be taken that the contents have been allowed to settle down, and are NOT shaken up before throwing. All grenades should break, all should ignite without a delay of more than 3 seconds, and a proportion of the burning contents of each grenade should adhere to the wall."

30. If on first proof there are more than two of any particular type of failure, or if the total number of failures exceed three, a second proof will be taken separately of each date in the group. The second proof will consist of 12 grenades and should be carried out as for the first proof. At second proof, if there are more than two of the same type of failure, or if the total failures exceed three, the sentence will be provisionally unserviceable.

Destruction

31. When grenades are to be destroyed the following method will be adopted providing a suitable site with a minimum fire is available. If the soil contains much humus or if peat is present, there is a danger of seepage for considerable distances, and the grenades will be dealt with as described in para. 32 below.

- (a) A trench will be dug about 18-in. deep with sloping sides, sufficiently wide at the bottom to take two rows of grenades disposed as in sub-para. (b) below. The spoil from the trench will be spread evenly along the sides to make a fire break. The trench should lie in the direction of the wind and may extend indefinitely, although local conditions may necessitate a series of small trenches all in one line.
- (b) The grenades for destruction will be placed in the trench in two rows, bases outwards and sides touching, with the necks of each row projecting into the spaces between the necks of the other row. As the grenades are being placed in position a length of primacord will be woven under and over the necks so that it lies under all the necks of one row and over the necks of the other row.
- (c) The primacord will be initiated by a primer and a detonator and not less than 3-ft. of safety fuse, the primer being placed clear of the trench.
- (d) When the flames begin to die down, the trench will be raked over to expose new surfaces, and raking will be continued after the last evidence of smoke or flame has disappeared.
- (e) Two hours after the last flame and smoke have disappeared, the trench will be burned with oil or wood, raking being carried out as described in sub-para. (d).
- (f) If it is necessary to use the same trench repeatedly, an interval of 4 hours will be allowed to elapse between burns.
- (g) After completion of the operations, the trench will be allowed to weather for 24 hours and then filled in.
- (h) If the soil contains much humus, or if peat is present, particular attention will be given to the prevention of ground fires.
- (j) If the wind is fitful, or if more than 50 grenades are being destroyed at one time, respirators will be worn at the alert during the burning operations.
- (k) The maximum number of grenades which may be destroyed locally at one time by this method is 300. The number may be increased to 2,000 providing a suitable site is available, that is, a beach, etc., and that rigid safety precautions are adopted.

Consideration for an increase over and above 2,000 will be given provided details of the proposed site, quantities involved, etc. are approved by the War Office (W.S.9).

32. If, owing to the nature of the ground, grenades cannot be dealt with by the method given in para. 31, they may be destroyed by throwing on to a concrete or rocky surface, or into a shallow pit suitably prepared. The grenades should be thrown singly from behind cover.

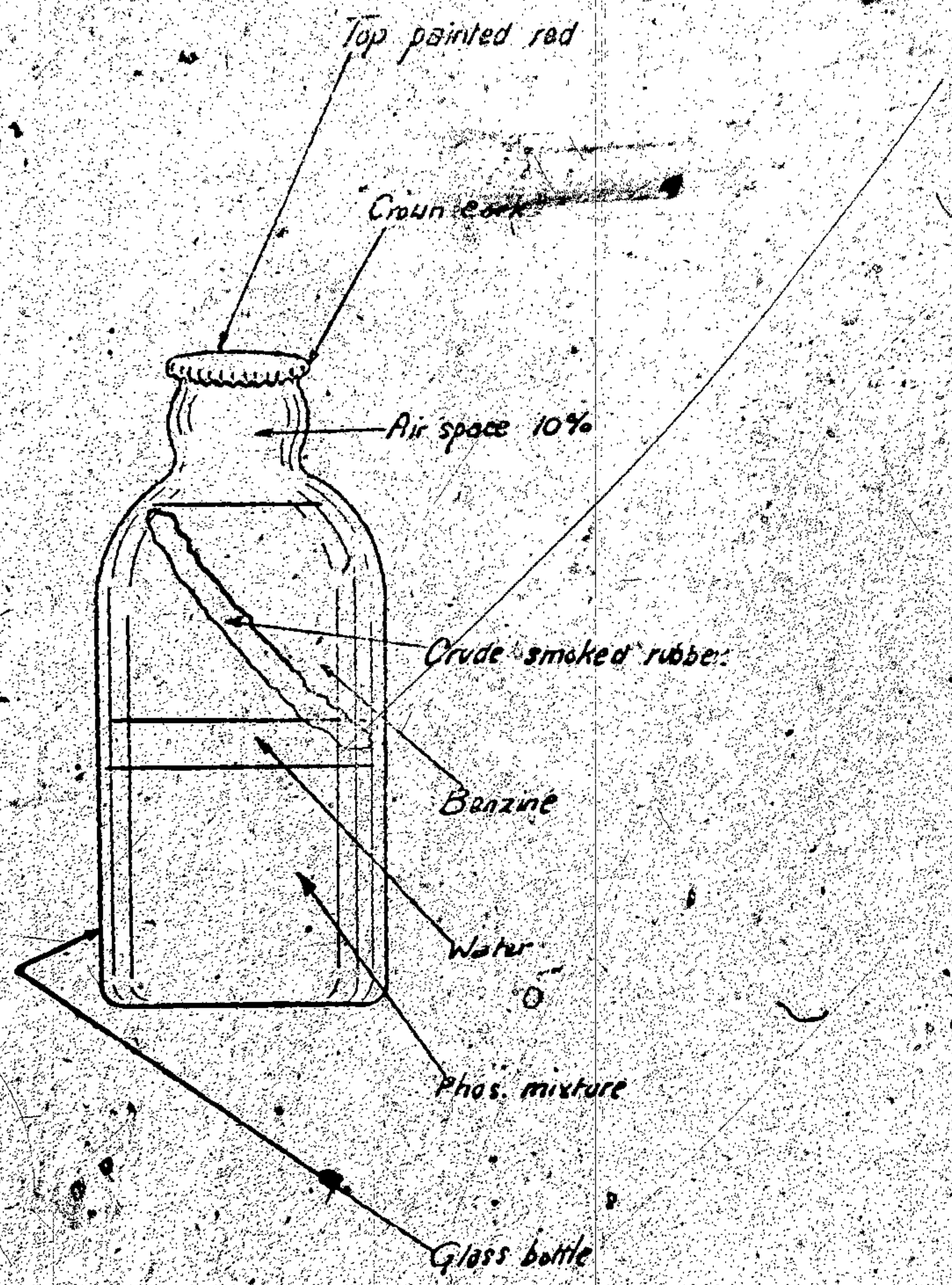
33. The attention of all concerned with the handling of Grenades No. 76 will be drawn to Appendix 4 to this pamphlet, which deals with the treatment of phosphorus burns.

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Plate 8A

GRENADÉ, HAND, No. 76 (S.I.P.)



5. The grenades are painted green and are stencilled in white with the particulars of filling, that is, "No. 77" (Mk.), filler's initials, date of filling and filled Lot number. The Mk. 1 grenade bears also the abbreviation "PHOS", or has a white band, and the Mk. 2 has a white band, with a red band immediately below it, round the centre.

6. The grenades and detonators are packed as follows :—

- (a) 34 in Box B 167 in nine cylindrical containers No. 56 : eight cylinders containing four grenades, the ninth cylinder containing two grenades and metal cylinders with wooden blocks holding the detonators. See Plates 9F and 9G.
- (b) 34 in Box B 166, each grenade wrapped in waxed paper, tissue or parchment, arranged in two layers and held in position with packing pieces. The detonators, formerly contained in wood blocks in metal cylinders and later in all metal cylinders, are packed as shown in Plates 9D and 9E.

7. The "jungle pack" for Grenades No. 477, is the same as for Grenades No. 69, i.e., 4 grenades and detonators in a bituminized board tube six tubes in Box C 238.

Storage

8. Mk. 1 grenades must be stacked in such a manner as to ensure any one box being accessible in the event of a leakage, and to facilitate inspection in accordance with Magazine Regulations, Part I, para. 272.

Examination and Test

9. Boxes will be examined as indicated in Appendix 3 to this pamphlet.

10. Before commencing the examination of grenades, the fuze holders carrying the fuzes should first be removed to ascertain whether detonators are fitted. If so, they will be removed.

11. Fuzes removed from grenades will be examined in the manner described in Appendix 1 to this pamphlet. Detonators showing any signs of damp, corrosion or verdigris, or in any other way visually in bad condition, will be sentenced unserviceable.

Mk. 1 W.P. Grenades.

12. Special care will be taken in the detection of leaking Mk. 1 grenades. Leaks can normally be detected by the smoke formed when the phosphorous comes into contact with the air but small leakages may occur which are not apparent until the grenade comes within a draught of air. The paint used at one time on the grenades gave a chemical reaction with phosphorus which turned the paint blue. This colour change can be taken as a positive indication of a leakage but, as all paints do not give this reaction, the absence of discoloration does not indicate freedom from leaks.

13. Grenades found with any of the following defects will be sentenced unserviceable :—

- (a) Any evidence of rust or corrosion at the seams and joints : heavy rusting or corrosion on any part of the body.
- (b) Corrosion or verdigris in the detonator pocket which is sufficiently bad to prevent insertion of the detonator.
- (c) Dented bodies : distorted fuze holders or seams.

14. Grenades may be repaired as follows, providing they do not show any of the defects listed in para. 13 :—

- (a) Slight rust or corrosion may be cleaned off with Cloth, Emery, size O (HA 0042) and the exposed parts repainted as necessary.



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- (b) Slight verdigris or deposit in the detonator pocket, not sufficiently bad to prevent insertion of the detonator, may be cleaned off with a dry cloth.
- (c) Repainting and renewal of markings as necessary.

15. If, after examination and repair as described above, there is any doubt as to the full serviceability of Mk. 1 grenades, they should be subjected to an "Immersion Test" in the following manner:—

- (a) A proportion of each Lot involved, that is 1 per cent. to 5 per cent. at the discretion of the I.O.O., will be selected.
- (b) The grenades, without their fuzes and fuze-holders, will be immersed in water, the temperature of which will be 70° C. Leaking grenades can be detected by turbidity of the water at the point of leakage, or by small air bubbles.
- (c) The grenades will be observed for 15 minutes and will then be removed from the bath and placed on their sides until cool.

16. Grenades which pass the Immersion Test will be carefully dried with a clean cloth before the fuze-holder and fuze are re-assembled and will be sentenced serviceable.

17. If any grenades are found to be leaking either at the Immersion Test or during examination, those affected will be immediately placed into a bucket of water and removed to a suitable site for destruction. If considered necessary by the I.O.O., the Lot or Lots concerned will be segregated in the open and reported as a special defect to the War Office (W.S.9) and the C.I.O.O.

18. The attention of all concerned with the handling of phosphorus grenades will be drawn to Appendix 4 to this pamphlet, which deals with the treatment of phosphorus burns.

Mk. 2 Grenades.

19. Mk. 2 grenades will be examined in accordance with paras. 13 and 14 above.

20. Leaking Mk. 2 grenades do not constitute any great source of danger, but any found to be leaking or showing signs of imminent leakage will be sentenced unserviceable, and destroyed.

21. No repairs of any nature will be carried out to the grenades. They are not suitable for operational use and are relegated to training only: therefore, any found defective will be destroyed.

Proof

22. No proof of Mk. 2 grenades will be carried out. They will be sentenced on the results of examination as described above.

23. Mk. 1 grenades will be proved in conjunction with their own fuzes and the detonators with which they are packed, except as provided in para. 26 (b) below.

24. The proof will be carried out as follows:—

- (a) Select 10 grenades from each Lot concerned, and insert detonators.
- (b) Throw the grenades in the normal way on to a firm surface. A slight spin should be imparted to the grenades when thrown.

25. A failure will be :—

- (a) A blind.
- (b) Failure of the grenade to burst on impact.

26. If a failure occurs, the serviceability of the detonators and the fuzes will be tested separately as follows :—

(a) Detonators.

- (i) Select a further ten grenades and detonators.
- (ii) Fit a length of safety fuze to each detonator.
- (iii) Lay the grenades on the ground at intervals with the fuzes removed.
- (iv) Insert a prepared detonator into each grenade: ignite the safety fuzes and retire to cover.
- (v) If a failure occurs the detonators will be sentenced unserviceable. If no failures occur a second proof will be carried out as in para. 24. Any failure at this second proof will entail a sentence of provisionally unserviceable.

(b) Fuzes.

- (i) Select a further ten grenades.
- (ii) Insert into the grenades detonators of known serviceability and of the latest date available.
- (iii) Proceed as in para. 24 (b) above.
- (iv) If a failure occurs the fuzes will be sentenced unserviceable. If no failures occur a second proof will be carried out as at para. 24. Any failure at this second proof will entail a sentence of provisionally unserviceable.

Destruction

27. Mk. 1 grenades which are found to be leaking will be destroyed as follows :—

- (a) Convey the grenades to a suitable site in a bucket of water. The ground chosen should be hard and firm so as to prevent as far as possible the absorption of phosphorous.
- (b) At the selected site a shallow hole should be dug and the destruction carried out by two operators. One operator will empty the grenades and the water from the bucket into the hole and the other operator will immediately place a prepared demolition set, consisting of a C.E. primer or similar burster, and a detonator with a suitable length of safety fuze, in contact with one of the grenades.
- (c) Ignite the safety fuze immediately and retire to cover.
- (d) When all signs of burning are over, the bottom of the hole will be raked over to ensure that no unburnt phosphorous remains, after which the hole will be filled with earth.

Note.—Protective gloves should be worn by both operators and a spare bucket of water should be at hand during the operation. The action of placing the demolition set and igniting the safety fuze should be done as speedily as possible owing to the probability of the grenades igniting spontaneously after the water has seeped into the ground.

28. Mk. 1 grenades which are not leaking, and Mk. 2 grenades, may be disposed of by throwing or alternatively as for blinds. See para. 8 (e) of the introduction to this pamphlet.

29. Detonators will be destroyed as indicated in Section 4, para. 22 of this pamphlet.

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Plate 97

GRENADÉ, HAND, No. 77, W.P. MK. I

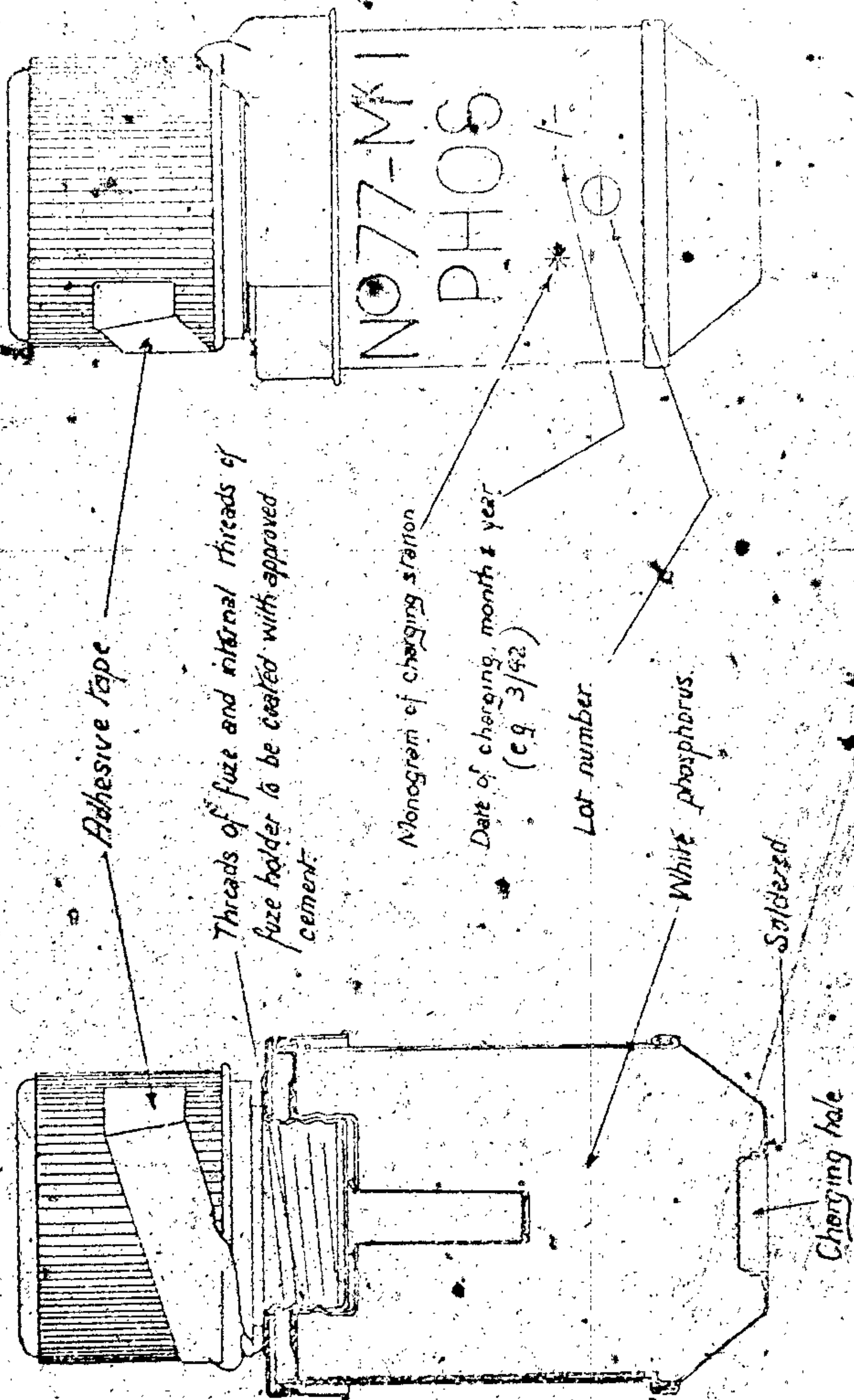


Plate 9B

GRENAD, HAND, NO. 77, P.M., MK. 2



Threads of fuse and internal threads of fuse holder to be coated with approved cement.



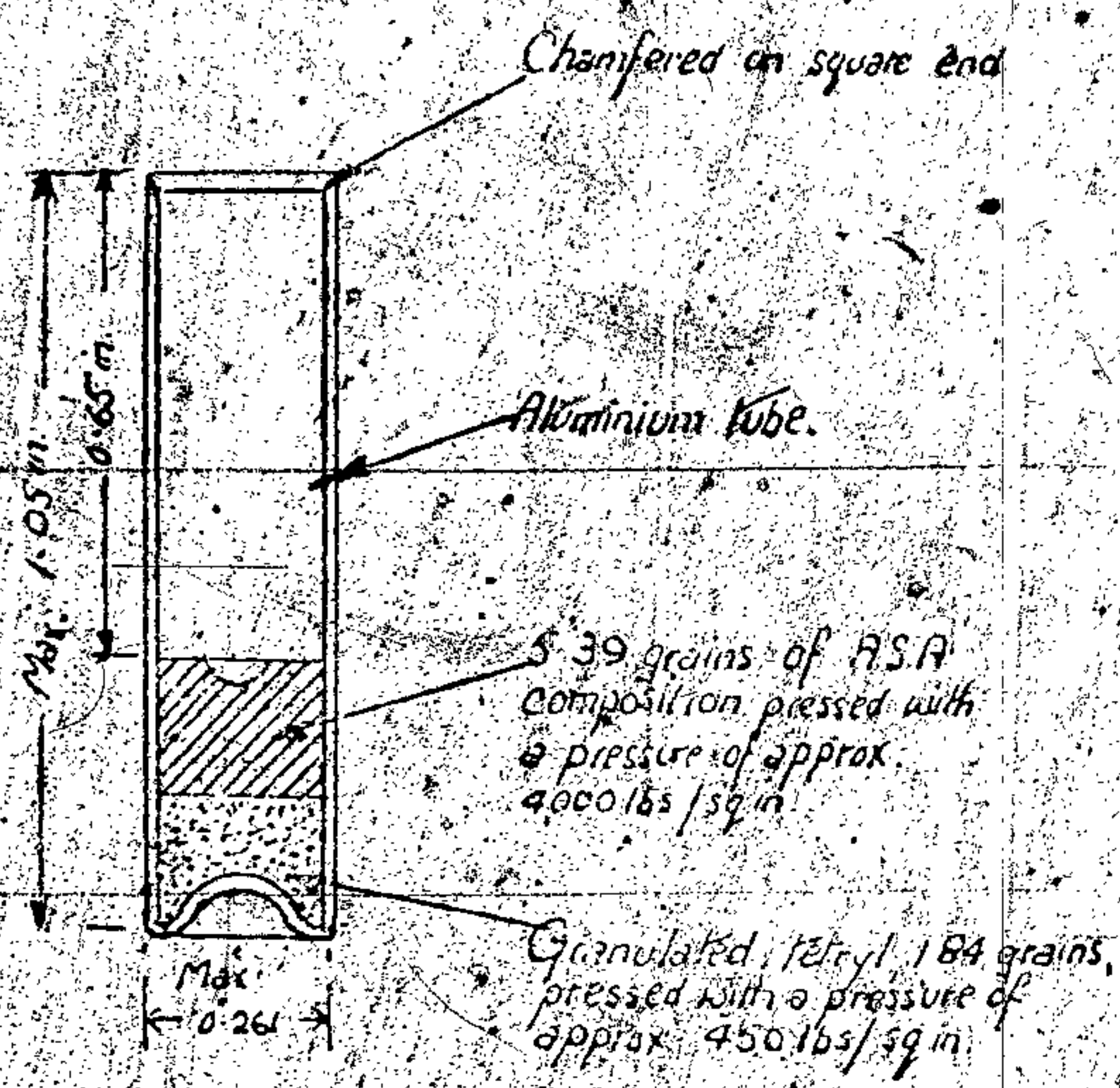
Reproduction der Urzeichnung mit dem Original.

Datum: 14.12.83 Unterschrift: W. Schreier

Sec. 9

Plate 9C.

DETONATOR No. 63, MK. 2



Notes.—The tube is of the same dimensions as the No. 3 commercial.

Use.—Grenade, Hand, No. 77, Smoke.

Component of Detonator No. 75, Mk. 1 for Grenades, Hand, Smoke Nos. 80 and 81.

Plate 9D

TYPICAL FOR BOX, B166 CONTAINING GRENADES, HAND, NO. 77, SMOKE

General Notes

- Box to be painted light green if not already so finished.
- Stencilling to be in yellow $\frac{3}{4}$ inch lettering on sides, $\frac{1}{2}$ inch on ends except where otherwise stated.
- Stencilling to be as shown on both sides and both ends.

Item

1. Mark of grenade as applicable.
2. Lot number of filled grenade as applicable ($\frac{1}{2}$ inch lettering).
3. Monogram or initials of filling station and date of filling (month and year) ($\frac{1}{2}$ inch lettering).
4. Packing/serial number of box to be stencilled in white.
5. To be stencilled in $\frac{1}{2}$ inch lettering.
6. Distinguishing colour band as applicable.

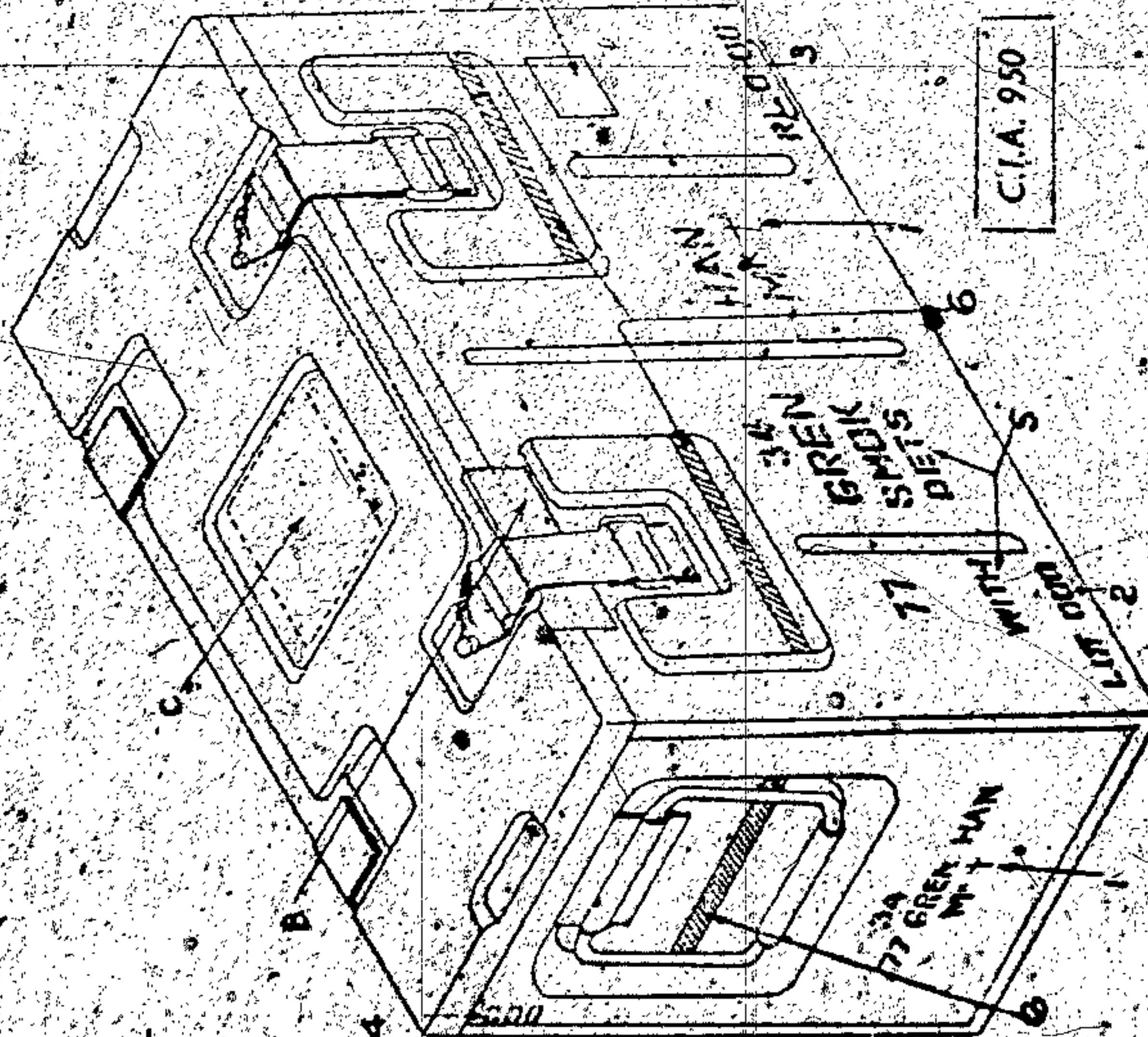
$\frac{1}{2}$ inch White for White Phos.

$\frac{1}{2}$ inch White } for F.M.
 $\frac{1}{2}$ inch Red }

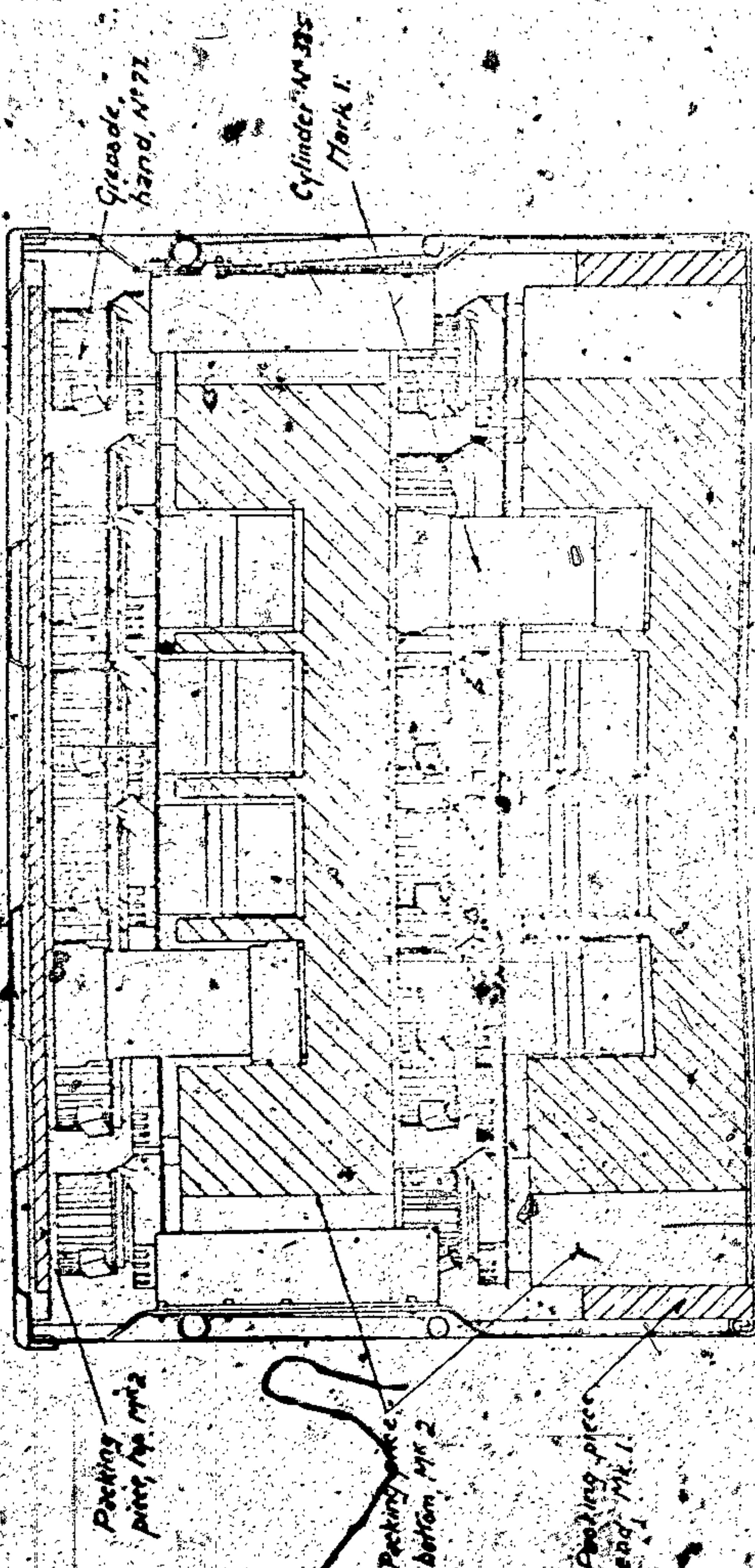
A. Government explosive and classification label as applicable, label No. 1611A (Group XI) when grenades filled F.M. are packed, label No. 1612B (Group XII) when grenades filled W.P. are packed.

B. One station label affixed over junction of body and lid as shown.

C. Packers label No. L566A affixed to underside of lid in position shown.



TYPICAL FOR BOX, B166, CONTAINING GRENADES, HAND, NO. 77, SMOKE



IMPORTANT

Section through centre of box.

34 grenades and 2 cylinders, packed in two layers. Cylinders, No. 385, one per layer, to be packed in the recess at end of centre row, marked with a red band.

METHOD OF PACKING

All grenades to be wrapped in waxed paper, tissue or parchment, prior to packing.

C.I.A. 950

TYPICAL FOR BOX, BI67, CONTAINING GRENADES, HAND, NO. 77, SMOKE

Plate 9F

General Notes

Box to be painted light green.

Stencilling to be in yellow $\frac{1}{4}$ inch on sides and $\frac{1}{2}$ inch on ends except where stated.

Item

1. Mark of grenade.
2. Lot number of filled grenade ($\frac{1}{4}$ inch).
3. Monogram of filler and date of filling ($\frac{1}{2}$ inch).
4. Serial number of box in white. The word "DETONA-

TORS" stencilled on tube containing detonators, in two places diametrically opposite.

5. To be in $\frac{1}{2}$ inch lettering.

6. PHOS. or F.M. as applicable.

7. Colour band, as applicable.

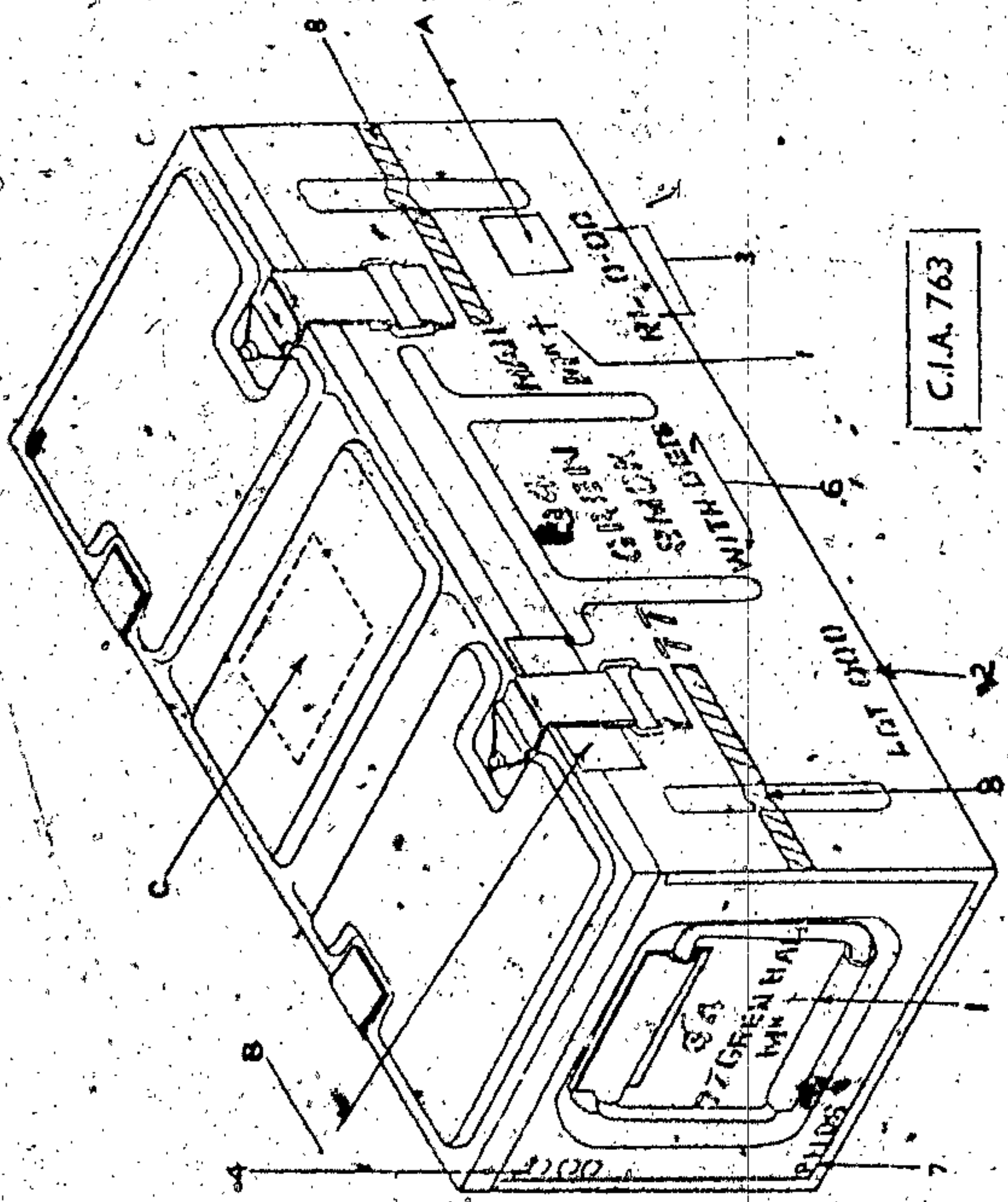
White for PHOS.

White } for F.M.
Red }

- A. Government explosive label.

- B. Label No. 1611A (Group XI) for grenades filled F.M.
Label No. 1612B (Group XII) for grenades filled W.P.

- C. Packers label No. 566A affixed to underside of lid as shown.



C.I.A. 763

TYPICAL FOR BOX B167, CONTAINING GRENADES, HAND, NO. 77, SMOKE

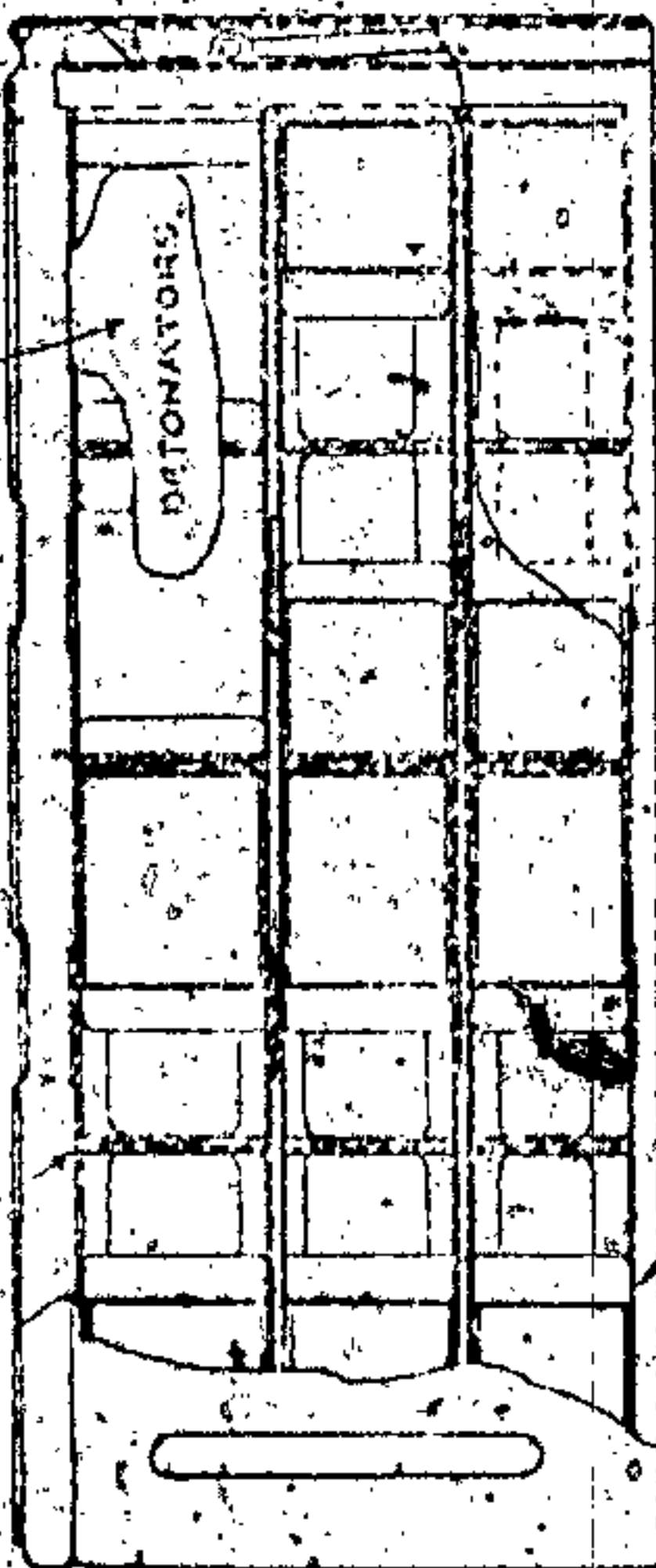
32 grenades to be packed in 8 containers and one container to be packed with 2 grenades and 2 cylinders No. 385 containing detonators.

IMPORTANT

The tube containing detonators must be placed in centre of top J.

Space between H1 and tube to be filled with multi-layer corrugated board.

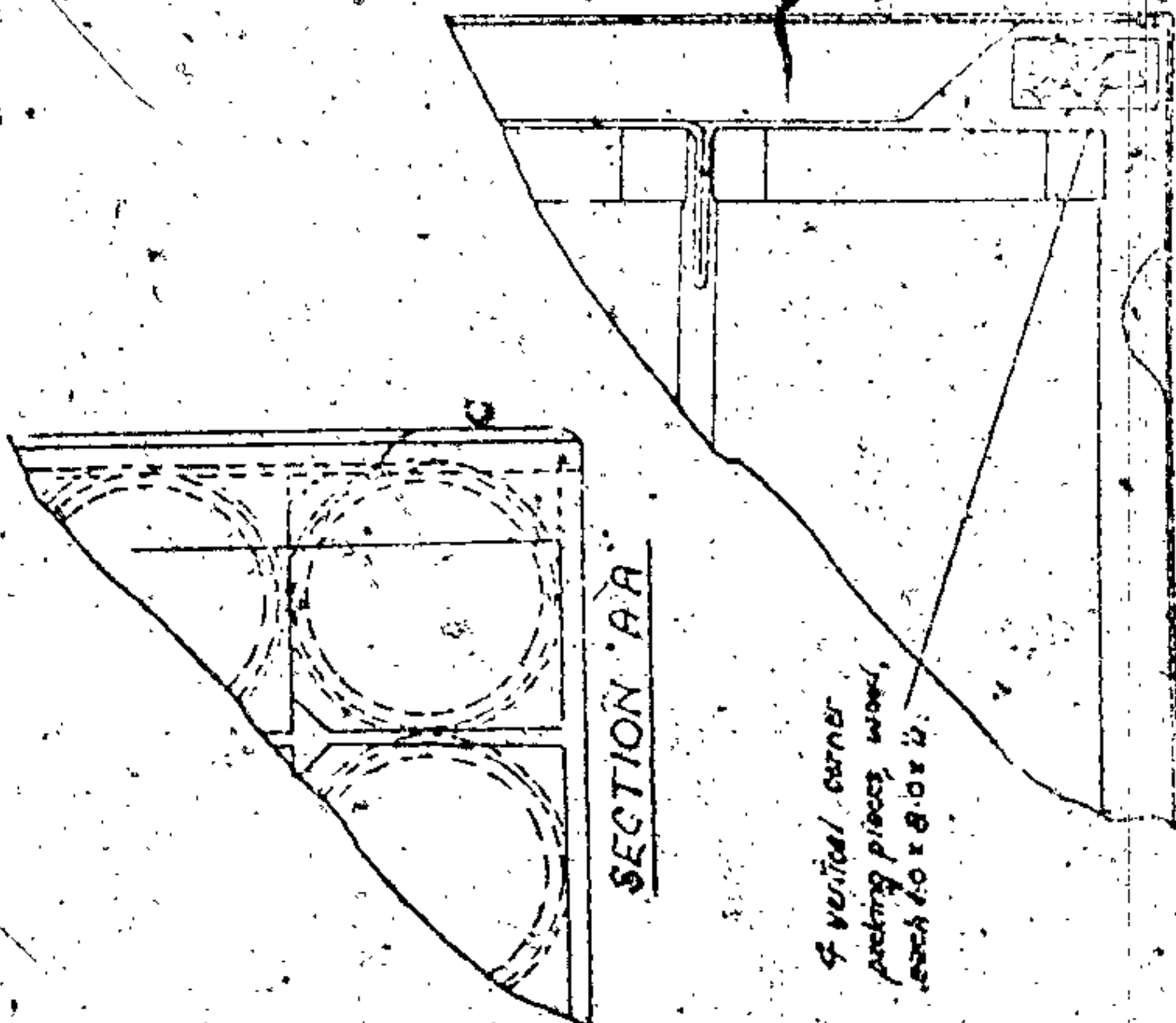
Grenades to be separated by felt packing.
The word "DETONATORS" stamped on tube containing detonators, in two parts diametrically opposite.



Container No 56

NEW SIZE OF BOX
REQUIRED

C.I.A. 763



4 vertical corner
padding pieces wood,
each 10 x 8.0 x 1/2

SECTION 10.—GRENADE, HAND, No. 79, SMOKE

DESCRIPTION

1. This grenade is of the smoke emission type, and is actuated by a fuze No. 247 Mk. 1 or 2. See Appendix 1 of this pamphlet.

It has mainly been used for training and carriage by airborne units.

Mk. 1 (obsolescent). (See Plate 10A.)

2. The body is made of tin-plate, cylindrical in shape. It is closed at the bottom by a seamed on disc, and at the top by a disc fitted with an igniter cup. A lid which carries a socket for the No. 247 fuze is spot soldered at four points, the joint being covered with a strip of adhesive tape painted green. A strip of adhesive tape, unpainted, secures the safety cap of the fuze to the body of the grenade, and prevents the cap from unscrewing in transit.

The filling may be one of the following compositions:

P.N. 83 (M), (H.C.T.)	14½ oz. (early production only)
P.N. 898 (G.T.C.)	1 lb. 3 oz.

The igniter cup is filled with P.N. 227 and a gunpowder primed cambric disc is fitted under the fuze to pick up the flash and ignite the composition. As an additional means of ensuring satisfactory ignition, when the fuze No. 247 Mk. 1 is fitted, the ignition system is actuated by the insertion, into the flash hole of the fuze, of a 1-in. length of quickmatch. The quickmatch is folded into four and fixed in position with a paper disc perforated in the centre, which is shellacked to the base of the fuze.

The overall dimensions of the grenade are 5.4-in. × 2.8-in. diameter.

Action

3. The adhesive tape and the cap of the fuze are removed and the grenade thrown. The fuze functions on impact, igniting the quickmatch, if fitted, and the cambric disc, which ignites the P.N. 227 and so the grenade filling. The time taken to full smoke emission is about 5 seconds, and effective smoke continues to be emitted for about 40 to 50 seconds.

Marking and Packing

4. The grenades are painted green and bear the full designation of the store, the filling station monogram, filled lot number and date of filling, and the number of the P.N. composition.

5. 24 grenades are packed in Box B 166 which is painted green. They are in two tiers in two cardboard packing pieces each holding 12 grenades. Dimensions of the box are 19.8-in. × 9.1-in. × 13.0 in., and its filled weight is 57½ to 59½ lb.

6. The box bears the normal stencilled details of the grenades including the P.N. number of the filling. In addition, some boxes may bear the additional stencilling "FOR EARLY USE" in white, on the sides and ends. This signifies that the grenade bodies are rusty internally and must be considered to have a limited storage life.

Examination and Proof

7. Boxes will be examined as indicated in Appendix 3 to this pamphlet.

8. A fault which occurs with Mk. 1 grenades is bulging of the grenade bodies, which may thrust away the fuze holders, caused by development of internal pressure. The development of pressure is probably due to traces of moisture in the composition and the effect is accelerated in hot weather. Grenades which are bulging to any degree will be sentenced unserviceable. It is not necessary, however, to make special examinations to discover bulging grenades, as they do not constitute any risk in store.

9. Grenades will not be subjected to any repairs; any found to be defective will be sentenced unserviceable and destroyed.

10. Proof will not be carried out unless specially ordered.

Destruction

11. Grenades may be destroyed by either of the following methods:—

(a) By throwing in the normal way.

(b) If the fuzes have been separated from the bodies, stand the grenades in a row on the ground and ignite each in turn by means of a portfire.

Sec. 10

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Plate 10A

GRENAD, HAND, NO. 79, SMOKE, MK. I

Fuze percussion No 247

Strip approved adhesive tape, 1/2 inch wide, 6-8 inch, secured to fuze cover.



Washer, hard rubber, graphited, 17/32 inch dia x 1/8 inch thick.

Distance piece smeared with cement R.D. No. 1.

1/16 inch hole sealed with adhesive tape painted over with cement R.D. No. 1.

Approx. 1 inch quickmatch folded 3 times and inserted into the hole of Mark I fuze.

Throat of fuze to be coated with cement R.D.

1/2 lb. of cement, primed with S.M.P. cemented to distance piece with shellac cement.

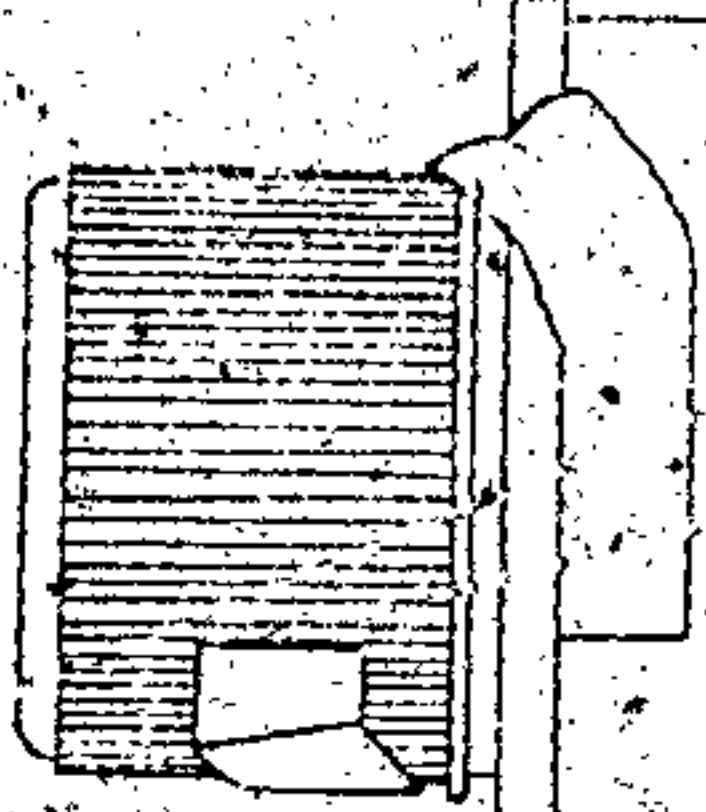
1/2 lb. of cement primed with composition R.D. No. 1.

Disc of paper cemented to the fuze with shellac cement.

Power fu. fitted back to form a non-leaky tab.

Approx. 1/5 of same composition.

Base smeared on after filling.



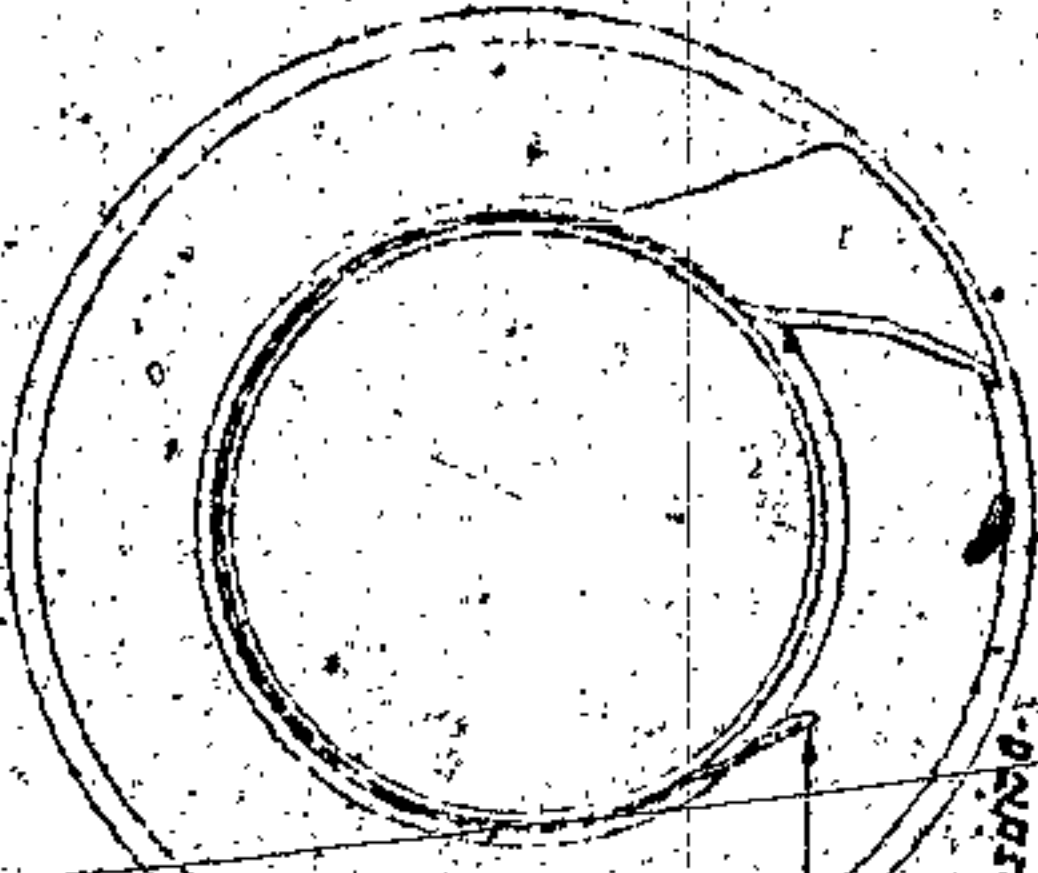
GRENAD, HAND, NO. 79, SMOKE, I

FILLED

LOT

DATE

COMPOSITION





SECTION 11.—GRENADE, HAND, No. 80, SMOKE

DESCRIPTION

1. This grenade is similar in construction to the No. 77 Grenade, but is actuated by the Striker Mechanism, No. 2 instead of Fuze No. 247. Its primary use is for throwing from A.F.Vs. to give an immediate smoke screen. Details of Striker Mechanisms are given in Appendix 2 to this pamphlet.

Mk. 1 (W.P.). (See Plate 11A.)

2. The cylindrical body, the top and the bottom are all constructed of tin-plate. In the bottom is a charging hole closed by a tin-plate plug. In the top is a screw-threaded recess, soldered to which is a tinned brass detonator tube. Screwed into the recess is the Striker Mechanism, No. 2, Mk. 1.

The top and bottom are secured to the body by seamed and soldered joints. The charging hole plug is soldered after the grenade has been charged with about 13-oz. of white phosphorus.

The detonator assembly, which is not assembled into the grenade until the grenade is prepared for use, is the No. 75, Mk. 1 or Mk. 2, details of which are as follows:—

Detonator No. 75 Mk. 1 (Plate 11B).—Consists of a zinc alloy cap, a length of No. 17 Mk. 1 safety fuze and a No. 63 Mk. 2 detonator. This Mark was used only in early production of No. 80 Grenades. It can be recognized by a $\frac{1}{2}$ -in. brown ring round the white safety fuze and the top of the detonator tube.

Detonator No. 75 Mk. 2 (Plate 11C).—Differs from the Mk. 1 in being fitted with a No. 78 detonator which has a more powerful effect. It can be recognized by its all-brown safety fuze. The safety fuze is the No. 17 Mk. 4 or No. 20 Mk. 2.

Dimensions of the grenade are 5.5-in. $\times$ 2.4-in. in diameter. The number of grenades constituting a Lot when issued from factory to depot, is 4,800.

Action

3. The grenade is prepared for use by unscrewing the striker mechanism and inserting the detonator assembly in the tube, cap uppermost, the striker mechanism then being reinserted into its housing. After throwing, the striker fires the cap which ignites the safety fuze. A delay of 2 $\frac{1}{2}$ to 4 seconds ensues before the detonator bursts the grenade, causing an instantaneous cloud of smoke and scattering burning lumps of white phosphorus.

Marking and Packing

4. Grenades are painted green and stencilled in black. Stencilling shows the number and Mark of the grenades, the abbreviation "PHOS", the monogram of the charging station, contractor's initials or recognized trade mark, the month and year of charging and the Lot number.

24 detonator assemblies, contained in a tin box No. 376 Mk. 1, together with 24 grenades with striker mechanisms assembled, are packed in box P 59 Mk. 2.

Stowage dimensions of the box P 59, Mk. 2 are 19.5-in. X 8.35-in. X 7.85-in. and the filled weight is approximately 43½-lb. See Plates 11D and 11E.

Examination

5. Boxes will be examined as indicated in Appendix 3 to this pamphlet.

6. Grenades will be examined and tested as laid down for the examination and testing of Grenades No. 77, in Section 9 of this pamphlet.

7. Detonators will be examined as laid down for detonators No. 36M grenade, in Section 1 of this pamphlet.

8. Striker mechanisms will be examined as described in Appendix 2 to this pamphlet.

Proof

9. Ten grenades of each Lot will be selected for proof.

10. The grenades and striker mechanisms will be proved in conjunction with detonators taken from the same box, by throwing in the normal way, and the fall of the grenades will be observed.

11. The following will count as failures:—

(a) Blinds.

(b) Time of burning of the safety fuze above 4.5 seconds.

(c) Time of burning of the safety fuze below 2.5 seconds.

12. If more than 10 per cent. of failures as at (a) and (b) occur, the grenades and their associated detonators will be sentenced provisionally unserviceable.

13. If any failure occurs as at (c), the detonators will be sentenced unserviceable and replaced.

14. If not more than 10 per cent. of failures occur as at (a) and (b) a second proof of a similar quantity will be carried out. In the event of any failures occurring at second proof the grenades and their associated detonators will be sentenced provisionally unserviceable.

15. When a blind occurs, an interval of five minutes will elapse before the grenade is approached, after which the procedure laid down in the introduction to this pamphlet, para. 8 (e) will be followed.

Destruction

16. Destruction of grenades will be carried out by the methods described for the destruction of Grenades No. 77 Mk. 1, in Section 9 of this pamphlet.

17. Detonators will be destroyed in the manner laid down for Igniters, No. 36M in Section 1 of this pamphlet.



Sec. 11

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Plate 11A

GRENADE, HAND, No. 30, MK. 1, W.P.

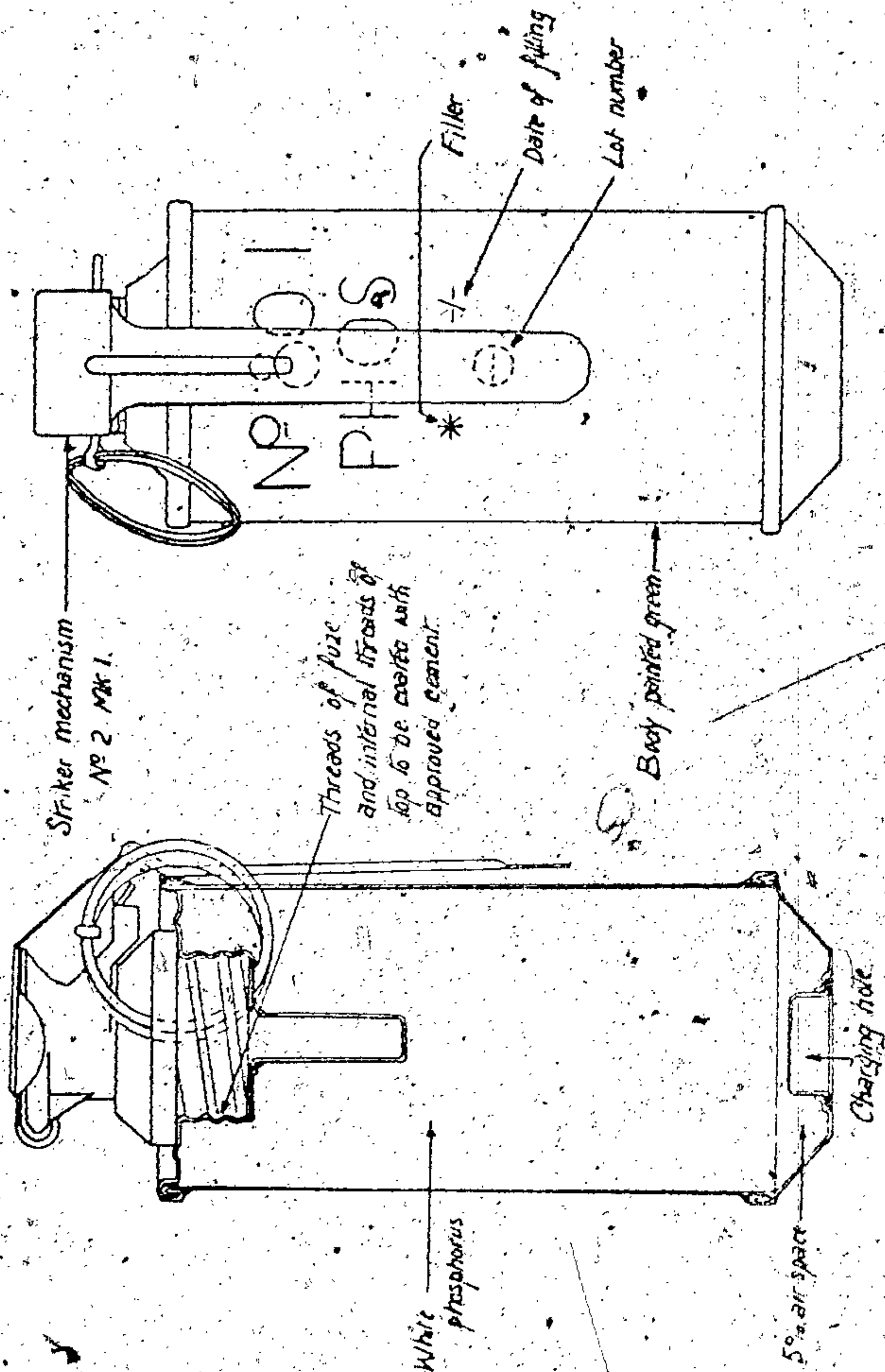
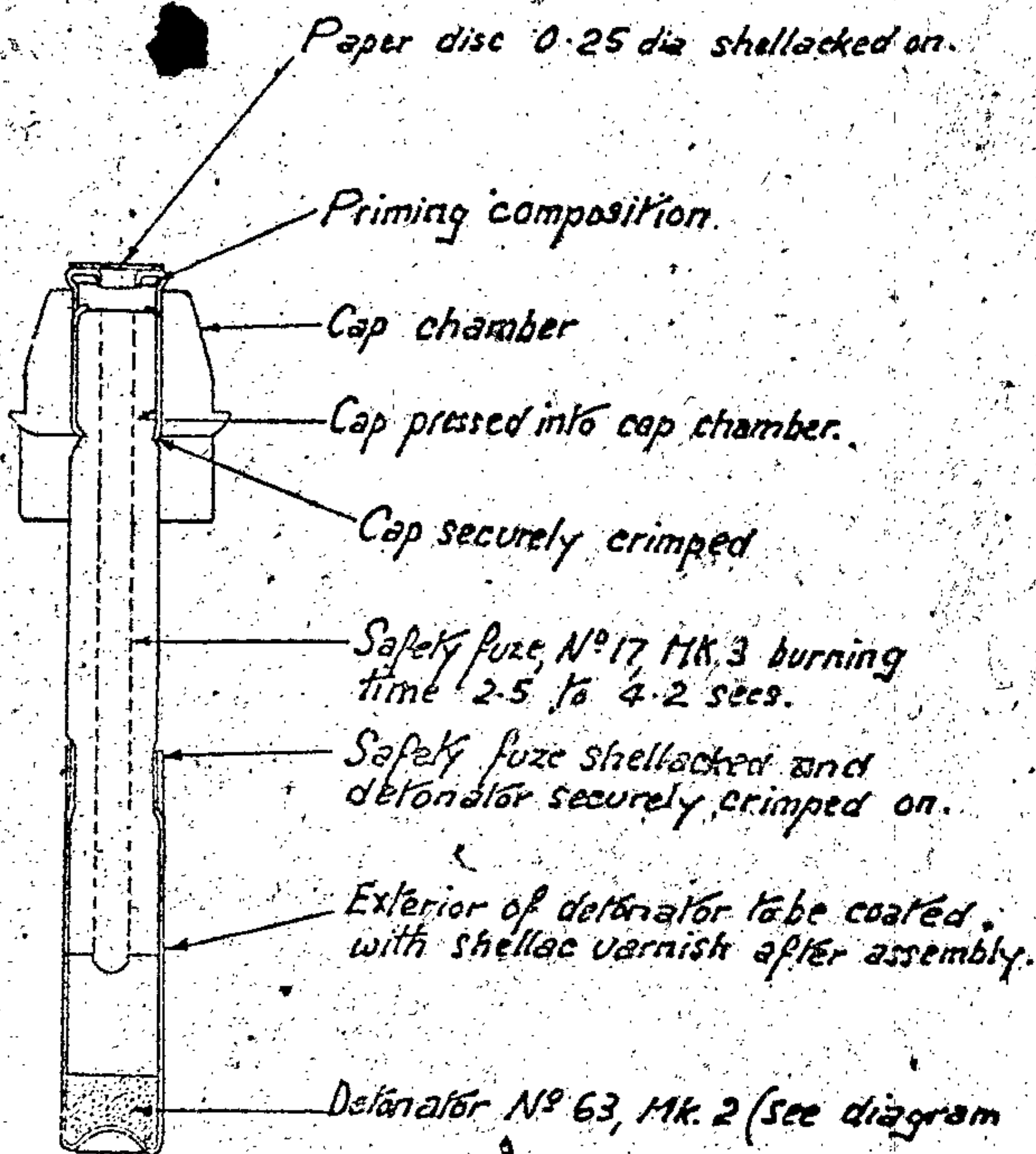


Plate 11B

DETONATOR, No. 75, MK. 1



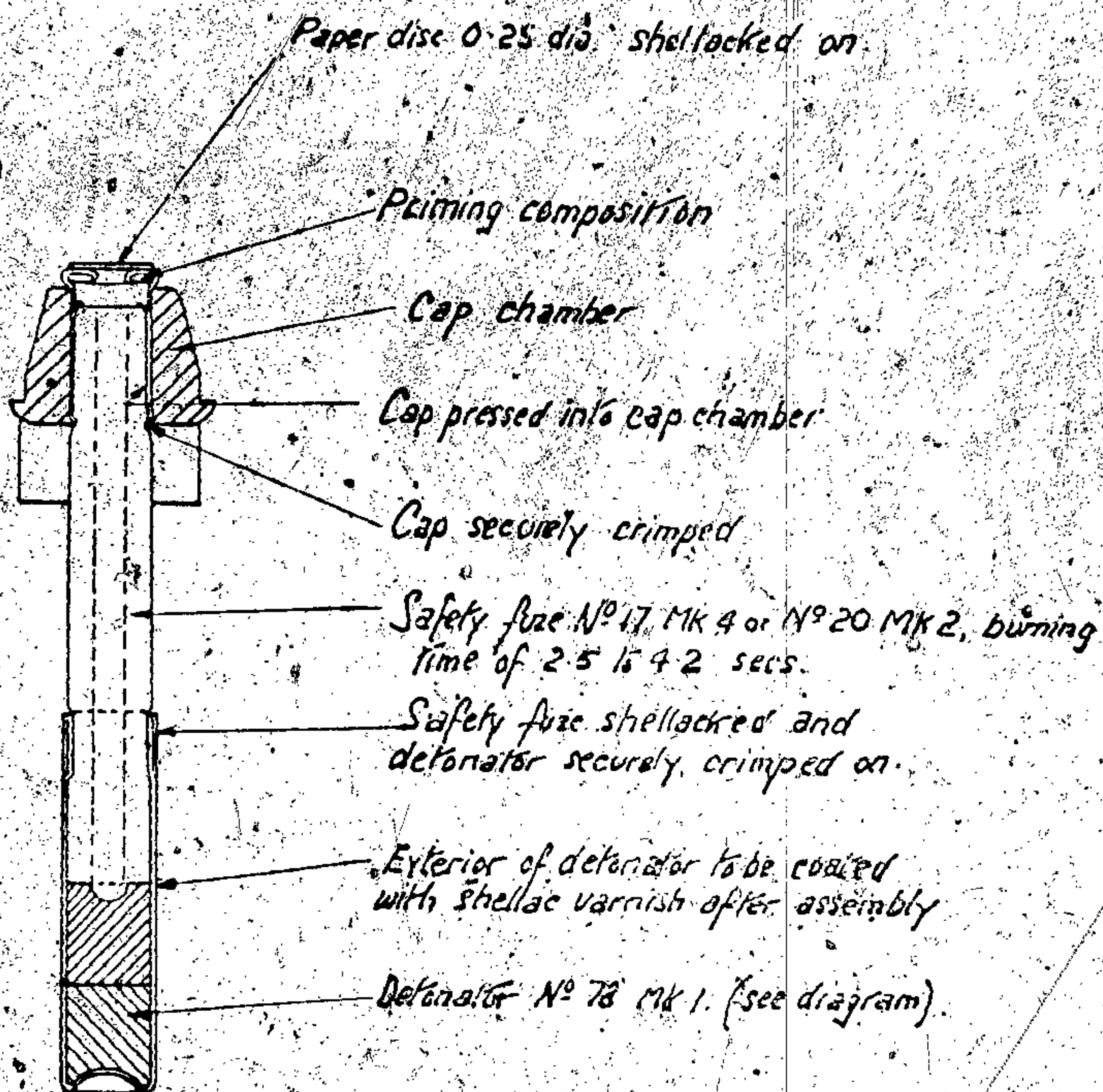
Note:—Safety fuze white with $\frac{1}{4}$ in. brown ring in centre.

Use.—Grenade, Hand, No. 80.

Grenade, Hand, No. 81 (experimental) Mk. 1.

Plate 112

DETONATOR, No. 75, MK. 2



Note:—Safety fuze is coloured brown all over.

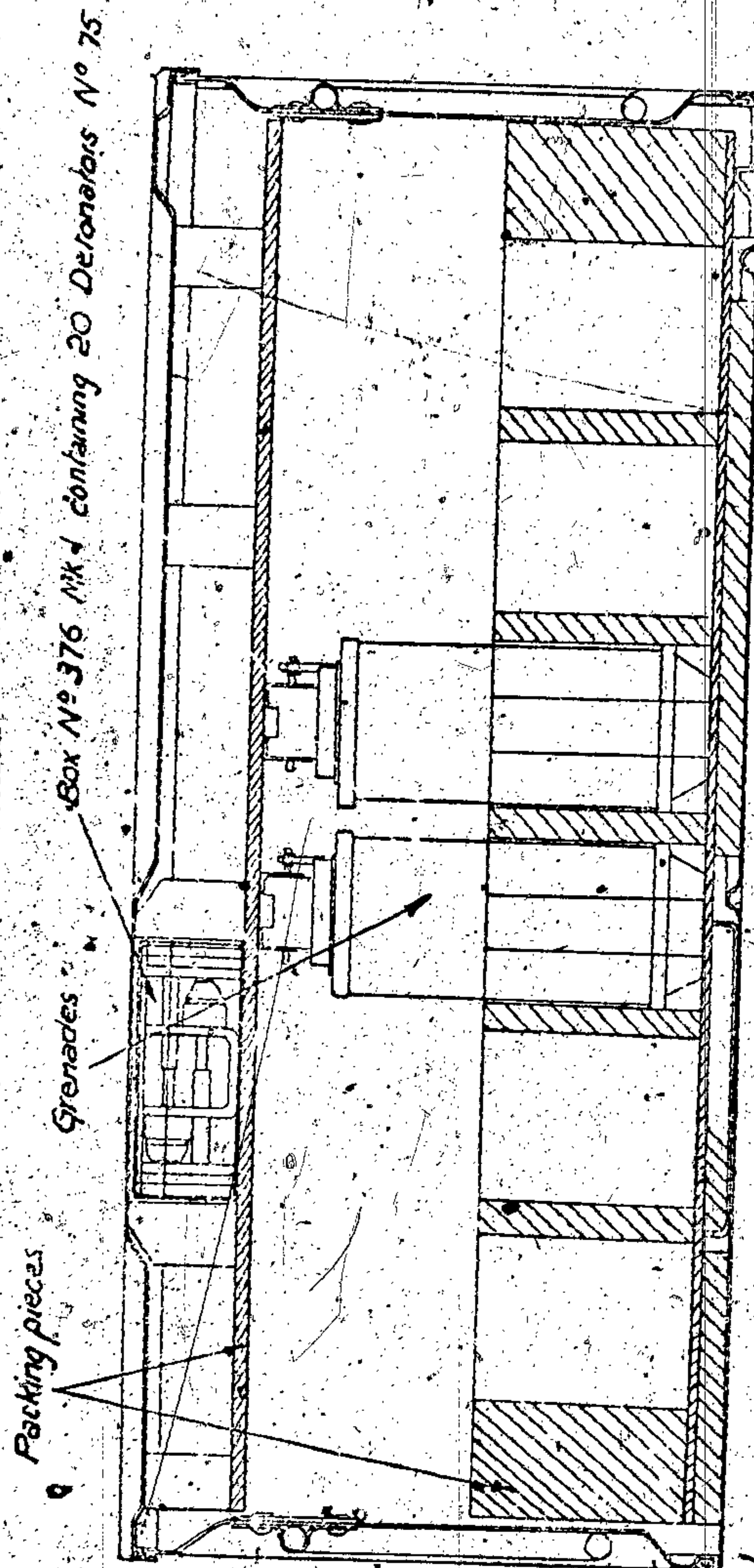
Use:—Grenade, Hand, Smoke No. 80.

Grenade, Hand, Smoke No. 81.

Plate 1 FD

BOX P59 MK. 2, MODIFIED TO HOLD 20 GRENADES, No. 80, MK. 1
AND 20 DETONATORS IN TIN BOX No. 376, MK. 1

Section



BOX P59 MK. 2, MODIFIED TO HOLD 20 GRENADES, No. 80, MK. 1
AND 20 DETONATORS IN TIN BOX, No. 376, MK. 1

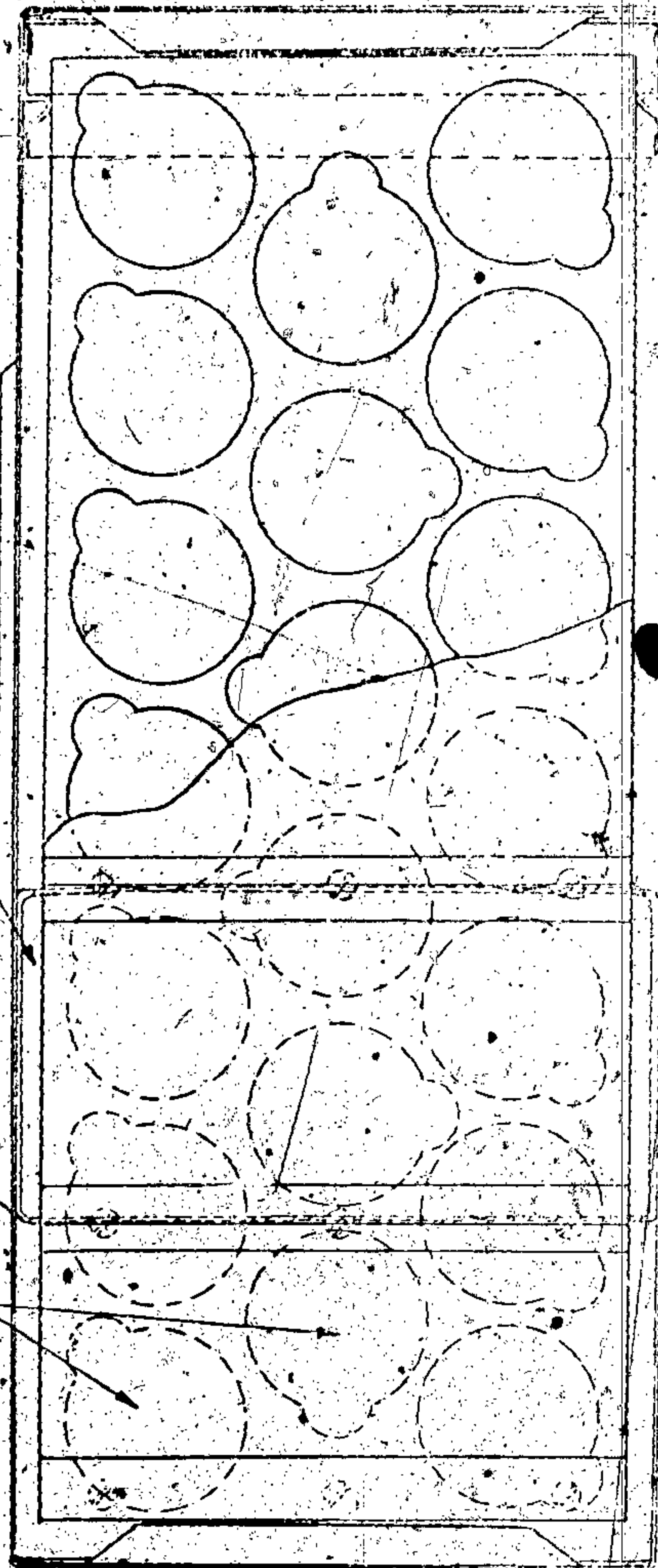
Plate 11E

BOX P59 NO. 2. MODIFIED TO HOLD 20 GRENADES, NO. 80, MK. 1
AND 20 DETONATORS IN TIN BOX, NO. 376, MK. 1

Plan

Grenades

Box No. 376 MK. 1 containing 20 Detonators No. 73



D.D./L/16188A

SECTION 12.—GRENADE, HAND, No. 81, SMOKE

DESCRIPTION

1. This grenade supersedes the No. 80 for throwing from A.P.Vs. It is built up of two parts; a bursting white phosphorus composition. The incendiary effect is comparable with the No. 77 grenade but the smoke effect is greater. The grenade is actuated by the Striker Mechanism, No. 3 Mk. 1, details of which are given in Appendix 2 to this pamphlet.

Mk. 1. (See Plate 12A.)

The two components are made of tin-plate or blackplate and are screwed together after filling. The white phosphorus component forms the top part of the grenade, and is similar in construction to the No. 80 grenade, though shorter, and contains about 6-oz. of white phosphorus. The generating component is filled with an H.C.E. composition topped with a disc of primed cambric and is screwed and cemented to the bottom of the white phosphorus component.

The detonator assembly, issued with current production of Mk. 1 grenades, is the Detonator No. 75 Mk. 2. See Plate 11C. The Detonator No. 75 Mk. 1 was issued with early production while the grenades were still in the experimental stage. Details of detonator assemblies are given in Section 11, para. 2 of this pamphlet.

Dimensions of the grenades are 5.25-in. x 2.4-in. diameter, and its weight is approximately 1½-lb.

Action

3. The grenade is prepared by unscrewing the striker mechanism and inserting the detonator into the tube, cap uppermost, the striker mechanism then being reinserted into its housing. After throwing, the striker fires the cap, which ignites the safety fuze. A delay of 2½ to 4 seconds elapses before the detonator bursts the white phosphorus component, causing an instantaneous cloud of smoke at the point of impact and scattering burning lumps of phosphorus. The flesh from the detonator also ignites the generator component, which attains full ignition before the phosphorus smoke is dissipated; rapid smoke emission then follows for about 45 seconds.

Marking and Packing

4. The body of the grenade is painted green and each component is stencilled in black. Stencilling on each component shows the number and Mark of the grenade, the abbreviation "PMOS" or the smoke composition number, as applicable, the empty maker's monogram, the filler's monogram, date of filling and the Lot number.

5. Initial production, that is, those for which the detonators No. 75 Mk. 1 were issued, were packed in Box B 166, marked "GRENADES, HAND, NO. 81, DUPLEX, EXPERIMENTAL". Detonators were packed separately.

Later production is packed 24 in Box B 173, in eight cylinders each holding 3 grenades and 3 detonators No. 75 Mk. 2.

Examination

6. Boxes will be examined as indicated in Appendix 3 to this pamphlet; striker mechanisms as indicated in Appendix 2 to this pamphlet.

7. Grenades will be examined according to the method described for the examination of Grenades No. 77 in Section 9 to this pamphlet, except that the "immersion test" will not be carried out. Any grenades about which the I.O.O. has doubts as to their serviceability will be specially reported to the War Office (W.S.9), a full description of the reasons being given.

Proof

8. Ten grenades of each Lot will be selected for proof.

9. The grenades and striker mechanisms will be proved in conjunction with detonators taken from the same box, by throwing in the normal way, and the fall of the grenade will be observed.

10. The following will count as failures:—

- (a) Blinds.
- (b) Failure of the generator portion to ignite.
- (c) Emission of smoke from the generator portion less than 35 seconds.
- (d) Time of burning of the safety fuze above 4.5 seconds.
- (e) Time of burning of the safety fuze below 2.5 seconds.

11. If two or more failures as at (a), (b), (c) and (d) occur, the grenades and their associated detonators will be sentenced provisionally unserviceable.

12. If any failure occurs as at (e), the detonators will be sentenced unserviceable and replaced.

13. If less than two failures occur as at (a), (b), (c) and (d), a second proof of a similar quantity will be carried out. In the event of any failures occurring at second proof, the grenades and their associated detonators will be sentenced provisionally unserviceable.

14. When a blind occurs, an interval of five minutes will elapse before the grenade is approached. After this interval, the I.O.O. or senior A.E. in charge of the proof will proceed *alone* to destroy it.

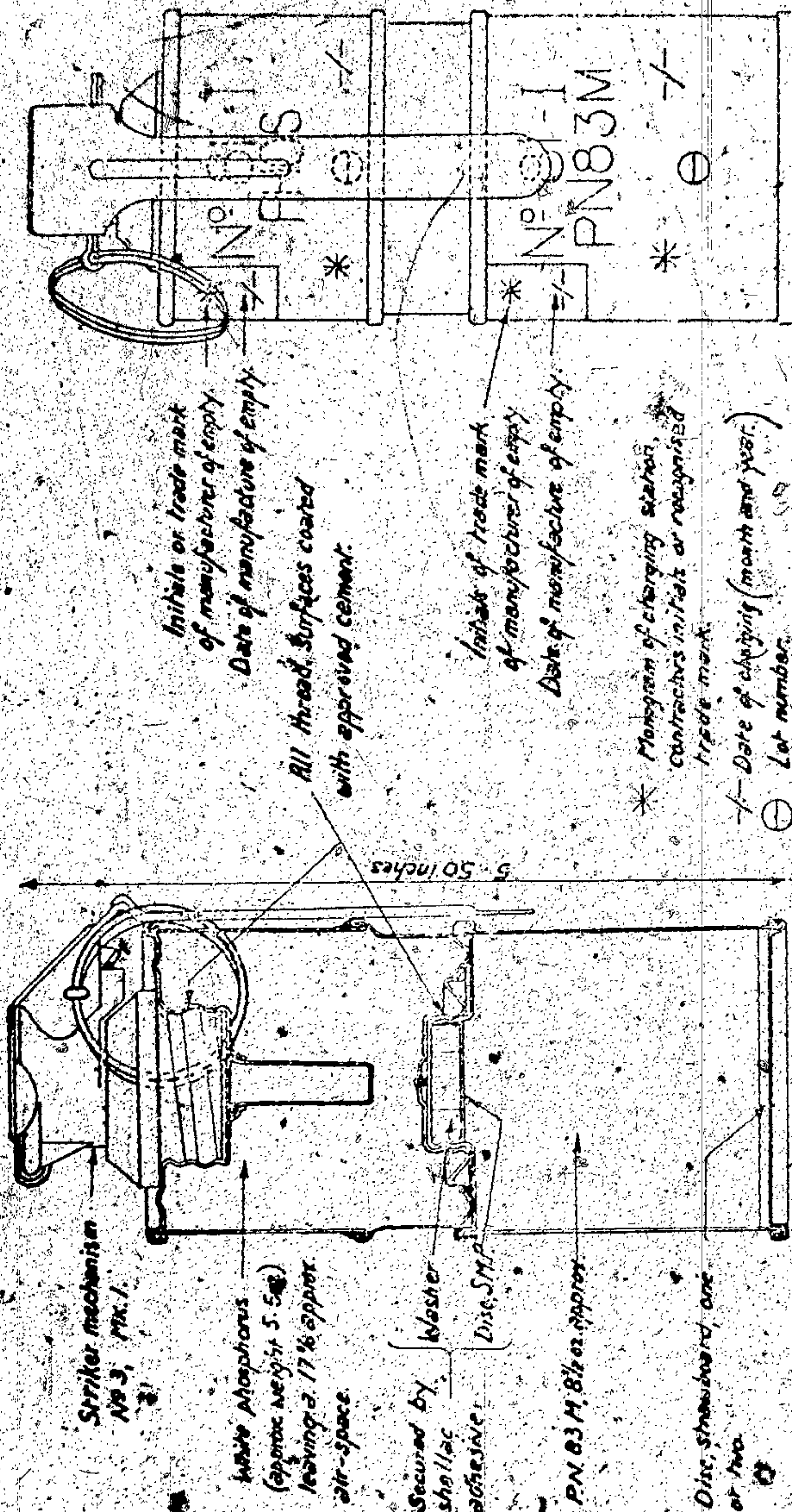
Destruction

15. Destruction of grenades will be carried out by the methods described for the destruction of Grenades No. 77, Mk. 1, in Section 9 of this pamphlet.

16. Detonators will be destroyed in the manner laid down for Igniters No. 46M, in Section 1 of this pamphlet.

Plate 12A

GRENADE, HAND, No: 81, SMOKE, MK. 1





SECTION 13.—GRENADE, HAND, No. 82, ANTI-TANK DESCRIPTION

1. This design is a departure from normal practice, comprising a fuze No. 247, detonator, primer, and a stockinet bag which can be filled with Plastic Explosive or similar material. It is intended for close range use against A.F.Vs.

Mk. 1. (See Plate 13A.)

2. The body consists of a stockinet bag open at each end. The lower end is gathered in by an elastic band, and the upper end fits under a steep cup, the edge being clamped between the cup and flange of a tinned plate housing for the fuze by four equally spaced rivets. A primer tube is secured to a screwed cap which screws on to the underside of the fuze housing.

The primer tube contains a C.E. pellet with a central perforation to accommodate a detonator No. 78, Mk. 1. See Plate 13B. A felt disc is placed at the bottom of the perforation and a felt washer is placed on top of the C.E. pellet.

The No. 247 fuze was originally modified to allow rapid arming after throwing, by having a tape $4\frac{1}{2}$ in. long instead of the normal $11\frac{1}{2}$ in. Some grenades have, however, been issued with fuzes fitted with $11\frac{1}{2}$ in. tapes, owing to a shortage of $4\frac{1}{2}$ in. tapes in the factories. Boxes containing these bear a special marking. See para. 6 below. A 2-in. strip of adhesive tape secures the fuze cap to the steel cup of the body.

The number of grenades constituting a Lot when issued from factory to depot is 2,000.

Mk. 1/1.

This differs from the Mk. 1 grenade in that the stockinet, elastic braid and sewing cotton are rot-proofed.

Action

3. The grenade is prepared for use by inserting the detonator into the C.E. pellet open end uppermost and screwing the tube on to the underside of the fuze housing. The P.E. charge is then placed into the bag, being retained by the elastic band. After throwing, the fuze is rapidly armed, when fitted with $4\frac{1}{2}$ in. tape. On impact, the flash from the fuze fires the detonator which detonates the C.E. pellet and so the P.E. charge.

Marking and Packing

4. The steel cup of the grenade is painted buff and the cap of the fuze is painted red. The cup is stencilled to show the number and Mark of the grenade, contractor's initials or trade mark, and the fuze Lot number.

5. The following components are packed in Box G 70 fitted with Shields, packing, No. 2, Mk. 1, and No. 3, Mk. 1:—

40 empty grenade bodies fuzed	In four tin boxes No. 413 Mk. 1, each containing 10.
40 filled primer tubes	In four tin boxes No. 414 Mk. 1, each containing 10.
40 detonators	In four tin boxes No. 415 Mk. 1, each containing 10.

6. Boxes G 70 and boxes, tin, No. 413 containing fuzes fitted with tapes of a length other than $4\frac{1}{2}$ in. are stencilled accordingly, that is:

" 11½-in. tape," in ½-in. yellow letters. The dimensions of the box G 70 are 19.15-in. × 8.34-in. × 7.85-in. See Plates 13C and 13D.

7. The P.E. charges are not included as components of the grenades, and are packed separately.

Examination

8. Boxes will be examined as indicated in Appendix 3 to this pamphlet.

9. Components of grenades showing any of the following defects will be sentenced unserviceable and destroyed:—

- (a) Stockinet bag torn, damp or affected by rot; elastic bands which have lost their elasticity.
- (b) Metal parts rusted, corroded, dented or otherwise distorted, except that slightly dented steel cups may be re-shaped by hand.
- (c) Detonators which are found to be rusty, corroded or otherwise in visually bad condition.
- (d) Powdered or cracked C.E. pellets; damp or otherwise defective felt discs and washers.

10. Fuzes will be examined as indicated in Appendix 1 to this pamphlet.

Proof

11. Ten grenades of each Lot will be selected for proof.

12. The grenades will be assembled with their associated components, and about 1½-lb. of P.E., and proved by throwing in the normal manner, the fall of the grenades being observed.

13. The following will count as failures:—

- (a) Blinds.
- (b) Failure to detonate on impact.
- (c) Failure to detonate completely.

14. In the event of all 10 grenades detonating completely on impact, the Lot or Lots concerned will be sentenced serviceable.

15. If a failure occurs, the detonators and fuzes will be tested in the following manner:—

- (a) *Detonators.*
 - (i) Select a further 10 grenades.
 - (ii) Remove the fuzes, assemble the tubes containing the C.E. primers, and the P.E. charges.
 - (iii) Initiate the grenades separately, on the ground, by the medium of the associated detonators fitted with a suitable length of safety fuze.
 - (iv) If any failure occurs the detonators will be sentenced unserviceable and destroyed.

If no failure occurs a second proof will be carried out as in para.

12. Any failure at this second proof will entail a sentence of unserviceable.

(b) *Fuzes.*

- (i) As described in Section 4 for the proof of Grenades No. 69.
- (ii) If any failure occurs the fuzes will be sentenced provisionally unserviceable.

If no failure occurs a second proof will be carried out as at para.

12. Any failure at this second proof will entail a sentence of unserviceable.

GRENADE, HAND, NO. 82, MK. I AND MK. I/1



+ Contractor's initials or recognized trade mark
 - Date of manufacture (month & year)
 Q Grenade forced lot number

entresert-
des IN NW



Werkstatt für angepasste Arbeit GmbH
Bestätigung der Übereinstimmung mit dem Original.
Düsseldorf, den 26.12.83 Unterschrift: *V. [illegible]*

RECEIVED
The following is a copy of the
original document as it appears in the
original file of the [illegible] [illegible]
[illegible] [illegible] [illegible]

Regulations for [illegible]

Ordinance No. 12

1945

Pamphlet No. 12

GREENADIS

The War Office
21st November, 1945.

Sec. 13

Plate 13B

DETONATOR No. 78, MK. 1

Chamfered on square end.



No. 3 Aluminum Tube
(trade pattern)

A.S.A. composition about 5.4 grains
pressed with a pressure of 4,000 lbs
per square inch.

Tetryl, about 3.9 grains, pressed
with a pressure of approximately
450 lbs per square inch.

Notes:—The tube is of the same dimensions as the No. 3 Commercial.

Use.—Grenade, Hand No. 82.

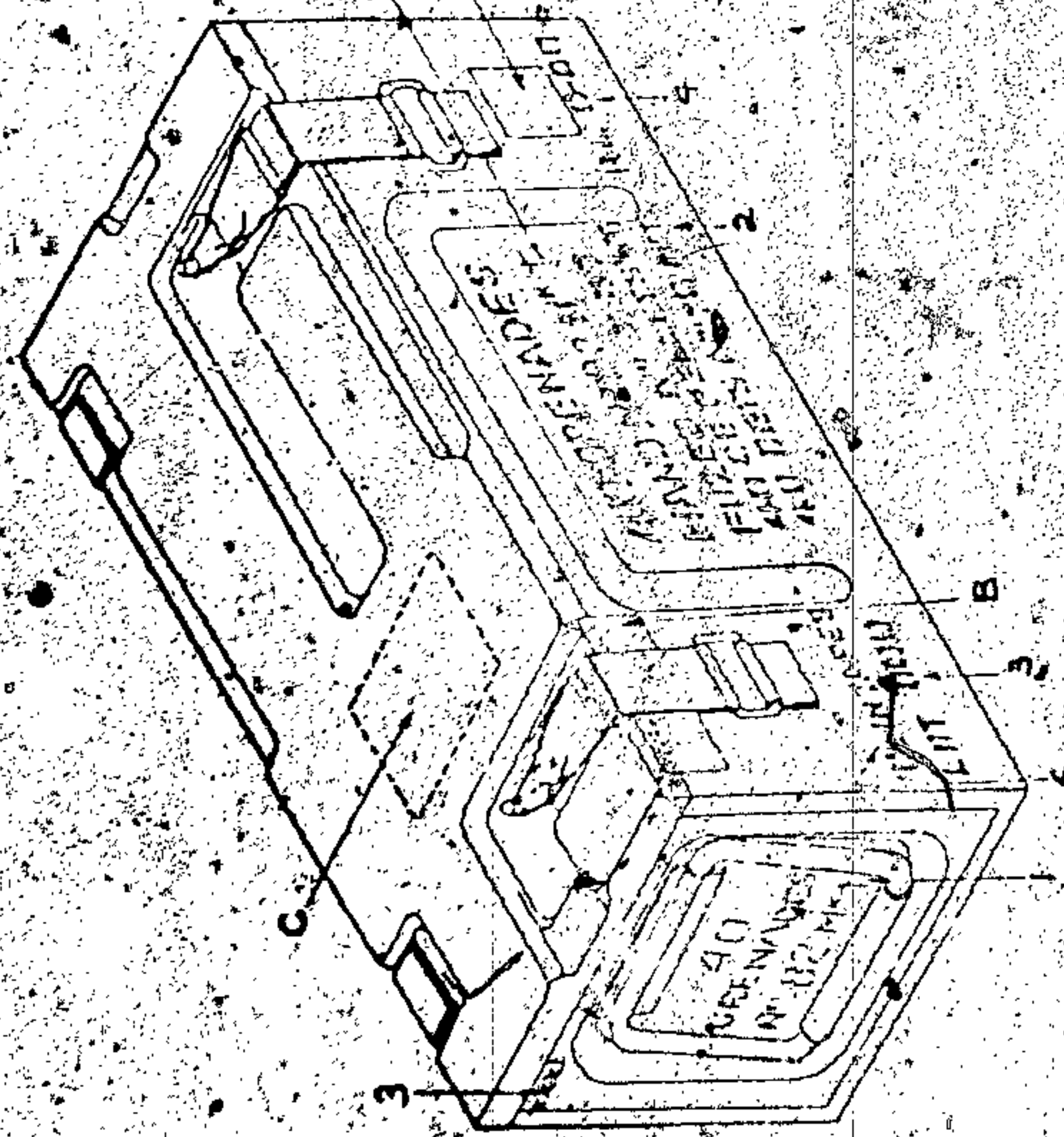
Component of the Detonator No. 75, Mk. 2 for Grenades, Hand, Smoke, Nos. 80 and 81.

TYPICAL FOR BOX, G70, CONTAINING GRENADES

General Notes

Box to be painted service color if not already so finished.
Stencilling to be in yellow $\frac{1}{4}$ inch lettering except where otherwise stated.

Stencilling to be as shown on both sides and both ends.



Item

1. Mark of grenade as applicable.
2. Mark of detonator as applicable.
3. Lot number of grenades in $\frac{1}{4}$ inch type.
4. Monogram or initials of firm or station filling grenades and date of filling (month and year).
5. Packing serial number on box to be stencilled in white.
6. To be stencilled on $\frac{1}{4}$ inch type when fuzes so fitted are packed.

- A. Government explosive and classification label No. L160SD (Group VIII).
- B. One station label affixed over junction of body and lid as shown.
- C. Packers label No. L566A affixed to underside of lid in the position shown.

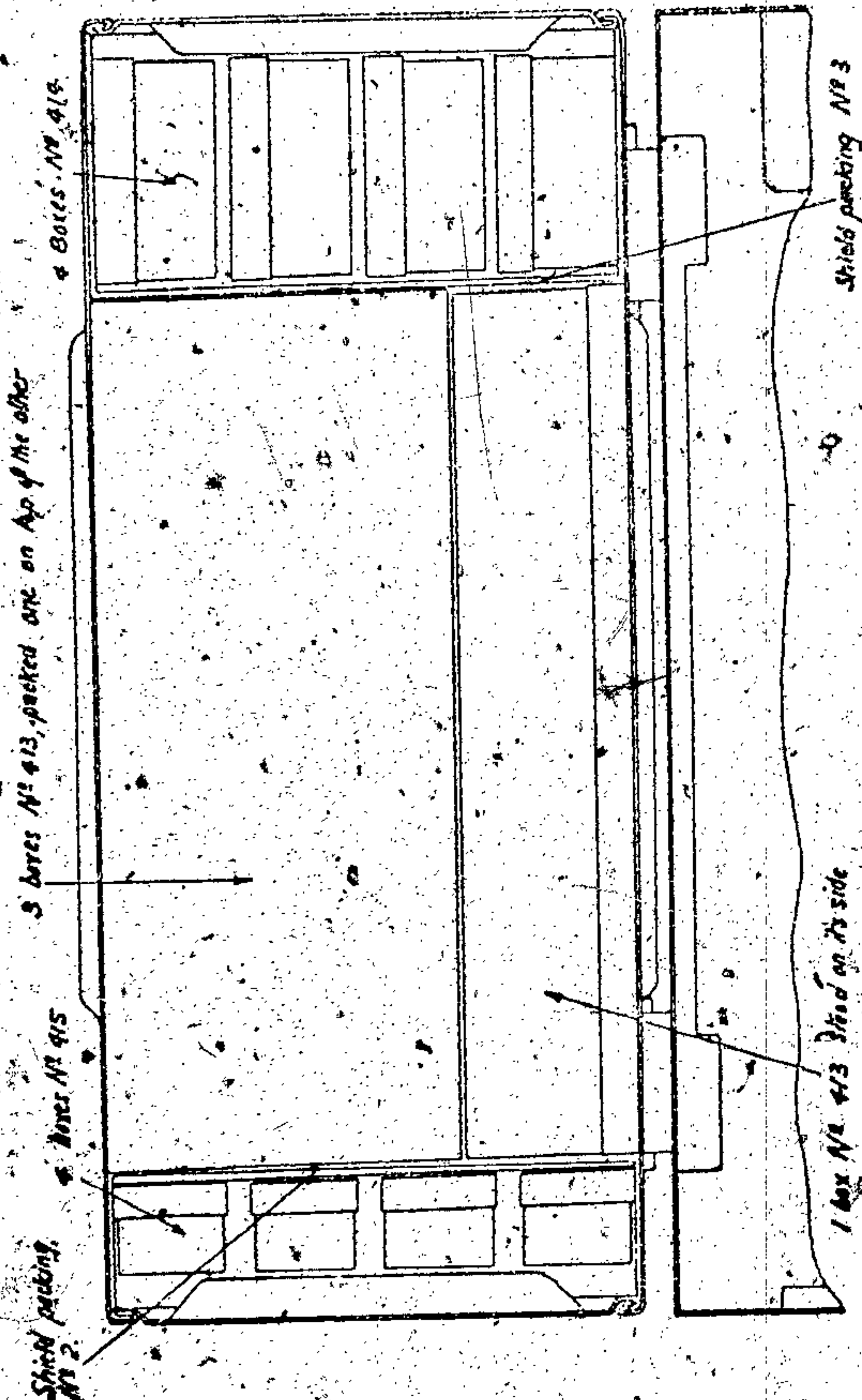
C.I.A. 926

Plate 13C

Sec. 13

Plate 13D

BOX G70, CONTAINING GRENADES No. 82



C.I.A. 926



Sec. 14

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SECTION 14.—GRENADE, HAND, No. 83, COLOURED SMOKE

DESCRIPTION

1. This grenade is designed to give a signalling smoke. The Mk. 1 design, intended for emergency use, is cancelled. Mk. 2 is actuated by a striker mechanism. See Appendix 2 to this pamphlet.

Mk. 2. (See Plates 14A and 14B.)

2. The cylindrical body of the grenade is of thin plate and encloses a backplate perforated canister charged with red, yellow, green or blue smoke composition, which is covered with a wrapping of paper coated with glue or other adhesive.

The bottom cover is flanged and is secured to the grenade body by a folded joint. The top cover is secured to the grenade body in a similar way and has a roll-threaded recess to accommodate the striker mechanism. In the centre of the recess is a small flash hole.

The inner perforated canister is closed at the top by a dished cover, having a recess in the centre which accommodates the lower half of the mechanism housing. In the centre of the recess is a small flash hole, across which, on the underside, a 1-in. square disc of primed cambric or muslin is fixed with shellac. The primed surface of the cambric or muslin is adjacent to a layer (about 3 drs.) of priming composition stemmed into the top of the canister. The rest of the canister is charged with one of the following smoke compositions:—

Colour of smoke	Composition	Weight
Red	P.N. 443 or 469A	6-oz. 0-dr.
Yellow	P.N. 431A or 473A	6-oz. 12-dr.
Green	P.N. 435 or 468A	6-oz. 0-dr.
Blue	P.N. 429 or 471A	7-oz. 8-dr.

The bottom of the canister is closed by a screwed-on cap. The canister rests on the bottom of the grenade body, any space being filled with cardboard discs, the number of discs varying according to the space.

3. The striker mechanism used is either the No. 3 Mk. 1 or No. 4 Mk. 1. The adaptor is coated on the threads and the flange with approved cement before being inserted into the housing. The igniter (see Plate 14B), consisting of a 22-in. priming cap in a cap chamber, and a length of Fuze, Instantaneous Mk. 4, is assembled into the mechanism and sealed with approved cement.

4. The overall dimensions of the grenade are 5.5-in. × 2.4-in. diameter and the weight, filled and complete with mechanism, is approximately 1-lb.

Action

5. The Mk. 2 requires no preparation as the igniter is permanently assembled into the striker mechanism. Time taken to full emission is 4 seconds and the emission of smoke continues for 25 to 45 seconds.

Marking and Packing

6. Grenade bodies are painted green and are printed in white with the word RED, YELLOW, GREEN or BLUE, as applicable, denoting

the colour of the smoke composition. Other markings, in black, are the number and mark of the grenade, the maker and date of the empty body, the filler and date of filling, the Lot number and the number of the composition.

Examination

7. Boxes will be examined as indicated in Appendix 3 to this pamphlet.

8. Grenades found with any of the following defects will be sentenced unserviceable:—

- (a) Any evidence of rust or corrosion at the seams and the joints: heavy rusting on any part of the body.
- (b) Badly dented bodies: distorted seams.

9. The following repairs may be carried out, providing the grenades do not exhibit any of the defects listed in para. 8 above:—

- (a) Slight rust or corrosion may be cleaned off with Cloth, Emery, size O (HA 9942), and the exposed parts repainted as necessary.
- (b) Renewal of markings where necessary.

10. Striker mechanism will be examined as indicated in Appendix 2 to this pamphlet.

Proof

11. Proof of grenades will be carried out by throwing in the usual way. Ten grenades of each Lot will be selected. The time taken to full emission of smoke and the length of time full emission continues will be recorded by means of stop-watches.

12. The following will count as failures:—

- (a) Blinds.
- (b) Time taken to full emission of smoke, longer than 4 seconds.
- (c) Emission of smoke for less than 15 seconds.

13. If two or more failures occur, the Lot concerned will be sentenced provisionally unserviceable.

14. If not more than one failure occurs, a second proof will be carried out of a similar quantity. In the event of any failure occurring at second proof, the Lot concerned will be sentenced provisionally unserviceable.

Destruction

15. Grenades may be destroyed by the following methods:—

- (a) Ignite and throw in the normal way.
- (b) Unscrew the striker mechanisms and adaptors from the Mk. 2 grenades (first apply naphthalene to the joint to soften the cement), stand the grenades in a row on the ground and ignite with a portfire.

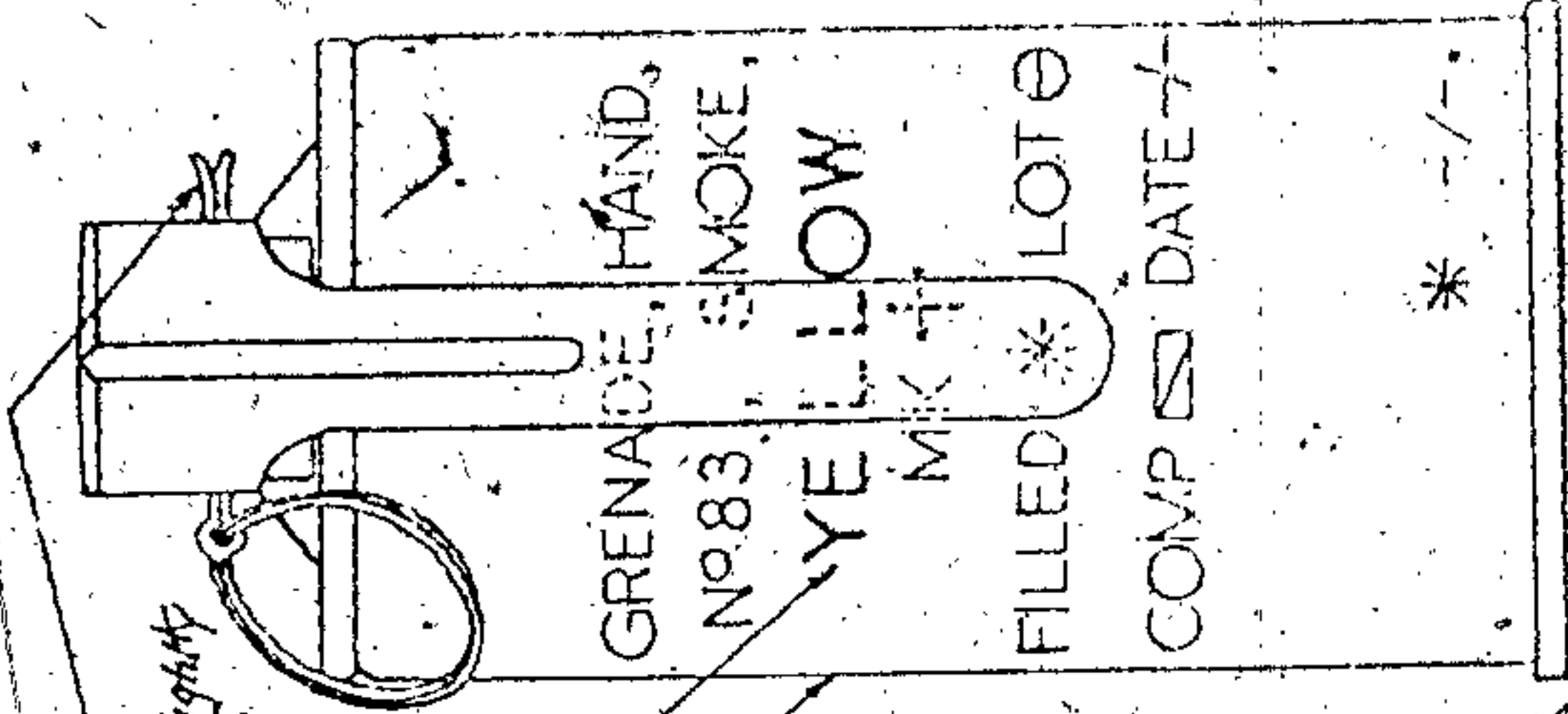
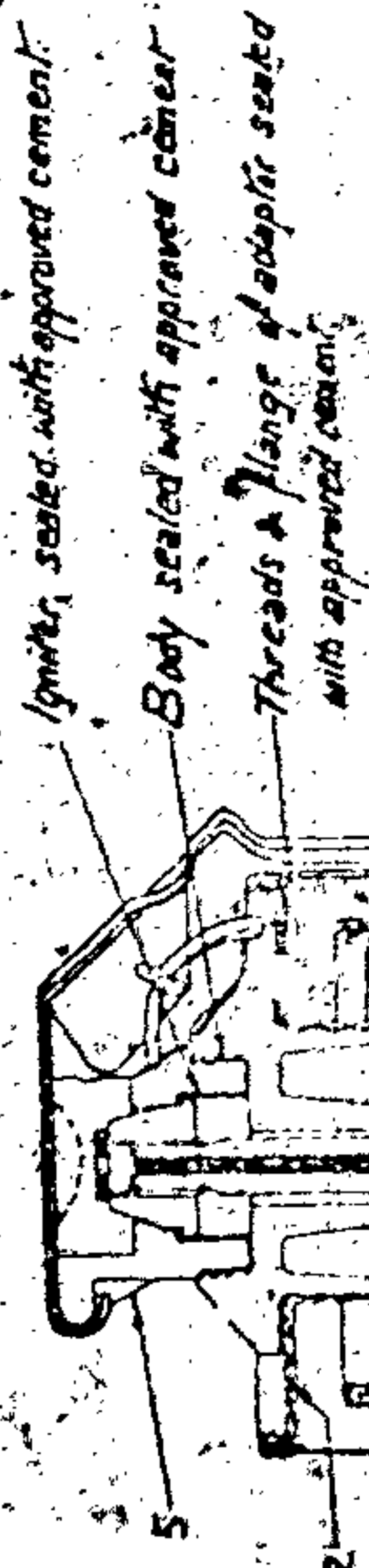
Sec. 14

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Plate 14A

GRENAD, HAND, NO. 83 SMOKE

Blue, Mk. 2. Red, Mk. 2. Green, Mk. 2. Yellow, Mk. 2.



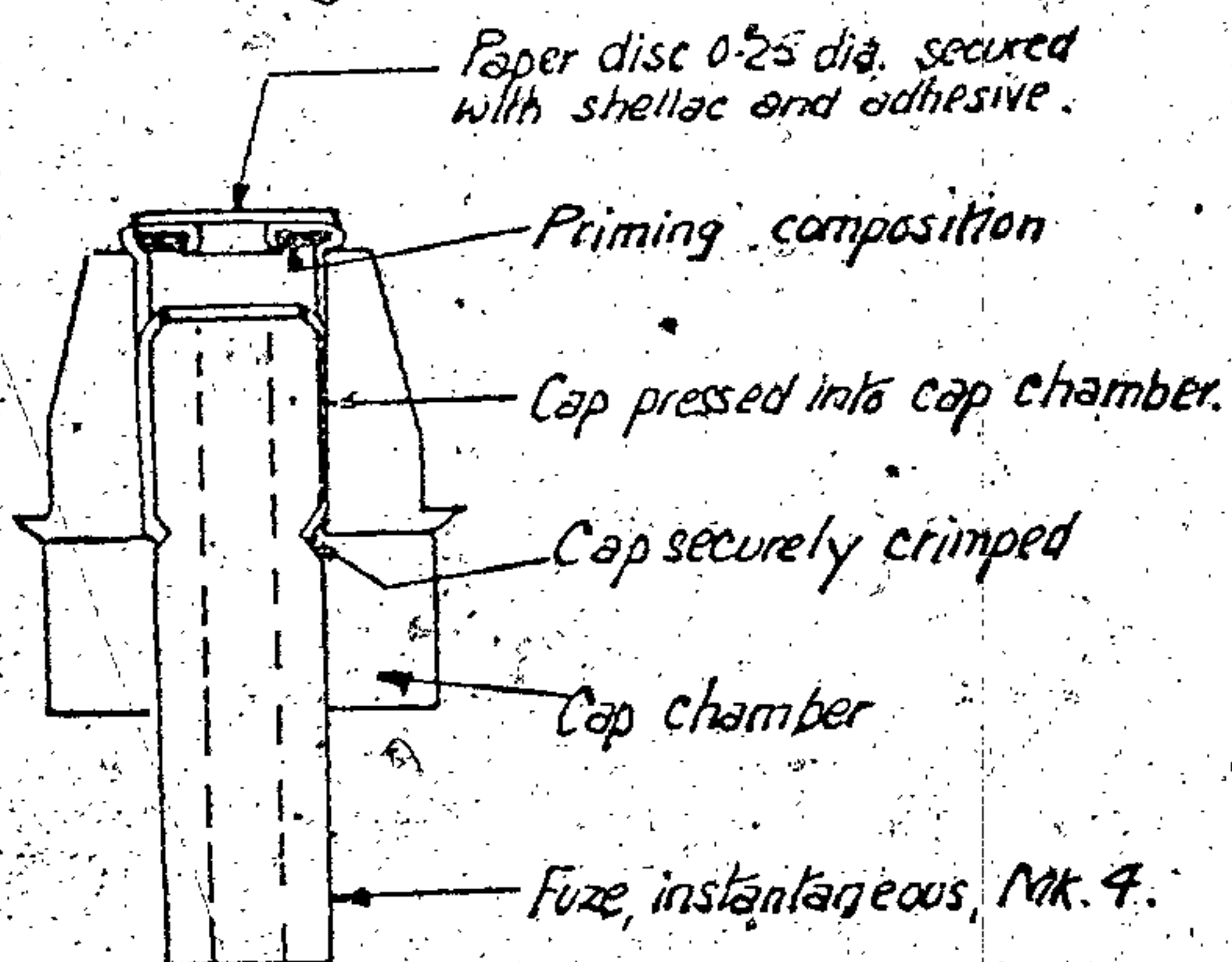
ITEM NO.	DESCRIPTION
1.	Composition (colour as ordered)
2.	Adaptor cap
3.	Primer composite or metal
4.	Primer 3.75 dia x 0.15 wide
5.	Striker mechanism
6.	Disc, cardboard, 1.95 dia x 0.2 thick

Marking to be completed and pencilled in 0.187 black type.
 + Mark to be added in 2.
 * Diagram of filling station
 - Lot number
 - Number of composition
 - Date of filling (month & year)

* Contractor's initials or recognised trade mark.
 - Date of manufacture (month and year)

Plate 14B

IGNITER FOR GRENADE, HAND, No. 83, SMOKE,
MK. 2



Note:—The igniter is cemented into the striker mechanism which is in turn cemented into the grenade.

SECTION 15.—GRENADE, HAND, CLAY

DESCRIPTION

1. This grenade is similar in shape to the Grenade No. 36M. It is purely for training purposes, to simulate the action of a Service hand grenade.

Mk. 1. (See Plate 15A.)

2. The grenade consists of a clay body and a gunpowder burster unit.

The body is oval, and has a hole bored from the top to within $\frac{1}{2}$ -in. of the bottom. Externally it has a parallel portion in the centre, with sixteen longitudinal serrations spaced equidistant round the body. The serrations are about $\frac{1}{8}$ -in. deep and $\frac{1}{8}$ -in. wide.

The burster unit consists of a brown paper sleeve filled with gunpowder, closed at the bottom with a cork disc and at the top with a cork washer carrying a length of Fuse, safety, No. 11 Mk. 2.

The outer end of the safety fuze is cut obliquely across, the bared portion being covered with striker composition, and is protected by a steel or copper ferrule. The safety fuze is about 2-in. long and gives a delay of approximately 5 seconds.

After insertion of the disc and the washer, the burster is waxed and the exterior of the fuze is shellac varnished.

After assembly of the burster into the clay body, the top of the central hole is sealed with bitumen.

Action

3. The striker composition on the safety fuze is ignited by a striker stick on a brassard, and the grenade is thrown. After a delay of about 5 seconds the flash from the safety fuze ignites the gunpowder filling which explodes, giving a sharp bang and a puff of smoke. A reasonable safety distance must be observed owing to the danger of lumps of hard clay being projected.

Marking and Packing

4. The body of the grenade is painted white and has a $\frac{1}{4}$ -in. red filling ring at the top. Markings, stencilled in black, are as shown in the diagram.

The grenades, with burster units assembled, are packed 40 in Box B 166, in wood shavings. Boxes are stencilled "TRENCH CLAY GRENADES" and the figure "40".

Examination

5. The following points should be observed during the examination of clay grenades:—

- (a) They must be thoroughly dry.
- (b) They must not be cracked or flaking.
- (c) The sealing of the burster into the body must be firm so that there is no tendency for the sleeve or the safety fuze, or both, to work loose.
- (d) The safety fuze must be inserted properly into the burster.
- (e) The igniter must be attached firmly to the safety fuze.

6. A proportion of the grenades examined will be tested by dropping on to concrete or similar material, from a height of 2½-ft., from behind cover. The number of grenades selected for this test will be at the discretion of the I.O.O. The grenades should not break, or crack to such an extent that they can be broken by hand.

7. Grenades showing any of the defects listed in para. 5 or which fail the test described in para. 6, will be sentenced unserviceable, and a further proportion, similar to the quantity originally selected, will be examined and tested. If any defects or failures occur the Lot concerned will be sentenced unserviceable.

8. When the defects found in grenades are such that a Lot is sentenced unserviceable see para. 7, the examination and testing should invariably be extended to all grenades held under the same conditions of storage.

Proof

9. Grenades in visually serviceable condition and which pass the test described in para. 6 above will be proved as follows:—

- (a) Ten grenades of the Lot concerned will be selected.
- (b) The grenades will be ignited by a striker stick on a brassard and thrown in the normal way.
- (c) The time from the moment the grenade is ignited, until it explodes will be recorded by means of a stop watch.

10. Failures will be:—

- (a) Blinds.
- (b) Delay of less than 4 seconds.
- (c) Delay of more than 7 seconds.

11. If any failure occurs as at para. 10 (b) above, the Lot concerned will be sentenced unserviceable.

If not more than two failures as at (a) and (c) occur, a second proof will be carried out on a further ten grenades, any failure at which the grenades will be sentenced unserviceable.

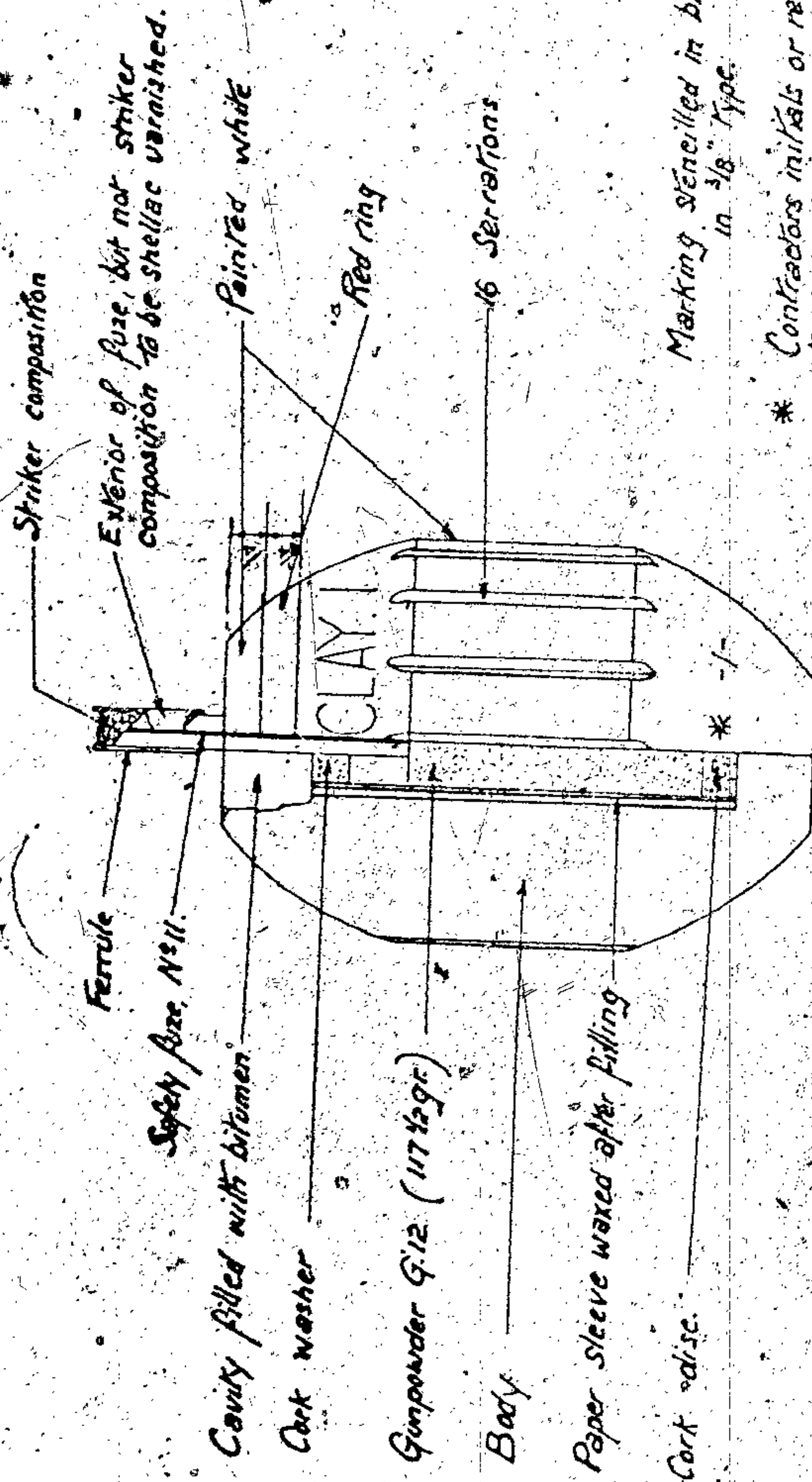
If more than two failures occur the grenades will be sentenced unserviceable.

Destruction

12. Grenades may be destroyed as follows:—

- (a) By throwing, providing there are no defects which would prevent satisfactory destruction by this manner.
- (b) By burning. The following method will be employed.
 - (i) Remove the bitumen seal at the joint between the burster and the body.
 - (ii) Extract the burster.
 - (iii) Remove the cork disc at the bottom of the burster and empty the gunpowder into a bucket of water.
 - (iv) Destroy the wetted gunpowder by burning in the open, and the residual burster components by burning in an incinerator.

GRENADe, HAND, CLAY, MK. 1



Plat 5A

Marking stencilled in black in $\frac{3}{8}$ " type.

* Contractors initials or recognised trademark.

-/- Date of manufacture month & year.

APPENDIX I.—FUZES USED WITH GRENADES

FUZE No. 247.

DESCRIPTION

1. This fuze has an "Allways" mechanism, that is, it is designed to function on impact at any striking angle. It was originally designed as a firing mechanism for the Grenade No. 69 but, as similar actuators became a requirement for later types of grenades, its use was extended, minor modifications being carried out as necessary, to suit the needs of each weapon.

Mk. 1A } (See Diagram 1A.)
Mk. 1Z }

2. The body of the fuze is made of bakelite. It is recessed internally to accommodate the detonator pellet, striker, ball and screwed cup, and has a flash hole in the base.

The detonator pellet is made of brass or a zinc base alloy. The normal detonator, 1.2 gr. of "A" composition in a copper shell, is secured by burring over a lip formed on the bottom of the pellet. The steel striker, surrounded by a steel wire creep spring positioned between a shoulder formed in the pellet and a shoulder on the striker, has a sheared point and a lateral hole for the safety bolt. The lead alloy ball is held between the concave head of the striker and the underside of the screwed cup.

Externally the body has a roll thread at the bottom to enable it to be screwed into its housing in the grenade. It is reduced diametrically in the centre, to provide a seating for the arming tape and lead sleeve attached to the safety bolt, and has a four start thread at the top, to receive the safety cap. The holes are bored diametrically opposite at the reduced portion, one of which takes the safety bolt.

The safety bolt is attached to one end of an 11 in. length of white coloured tape, to the other end of which a lead sleeve is secured by indenting. When the fuze is "Safe", the safety bolt is positioned through one of the holes in the body and the hole in the striker, the tape being wrapped round the reduced portion of the body. When viewed from the top, the tape is wound in a clockwise direction.

A bakelite safety cap screws over the body, holding the tape and lead sleeve in position and, in transit, this is secured by a piece of adhesive tape as shown in the diagram.

In the original design of this fuze, the base of the fuze and the flash channel were extended to form a small spigot. As described below, fuzes with this extension are not suitable for all types of grenades and later production of fuzes are flat-based.

3. Mk. 1A. The letter "A" is added to the Mark of the fuze when the detonator pellet is made of brass.

4. Mk. 1Z. The letter "Z" is added to the Mark of the fuze when the detonator pellet is made of a zinc base alloy.

5. Modifications. Modifications to the original design of this fuze are indicated by the top and upper part of the circumference of the safety cap having a distinguishing colour, in order to ensure correct assembly into the particular weapons.

The modifications and distinguishing colours are as follows:—

- | | Colour of Cap |
|--|----------------|
| (a) Original design, used in Grenades, Nos. 69 and 76. | Black |
| (b) For use with the Grenade, No. 77, the extension of the base and flash-hole are removed, leaving a flat base. | Black |
| (c) For use in the Grenade, No. 79, the fuze has a detonator filled with "B" composition, instead of the standard "A" composition, and a 1-in. length of quickmatch is inserted into the flash-hole. | Green |
| (d) For use with the Grenade, No. 82, the fuze has a 4½-in. arming tape instead of the standard 11½-in. | Red |
| (e) For use with drill grenades, the fuze has an empty detonator shell. | White all over |

Mk. 2. (See Diagram 1B.)

6. This Mark differs from the Mk. 1 in the following particulars:—

- (a) A different design of striker. The point is somewhat shorter; is not sheared and has a slightly different form.
- (b) A new design of detonator pellet; made of lead/antimony and having a different form of chamber for the detonator.
- (c) It has a 1.7 gr. "A" composition detonator, instead of 1.2 gr.

Mk. 3. (See Diagram 1C.)

Some trouble was experienced in factories when assembling Mk. 1 and 2 Fuzes, owing to the safety bolt not being able to obtain a satisfactory seating in the hole in the striker.

The Mk. 3 design was introduced to facilitate ease of assembly and differs from the Mk. 2 only in that the cup seating for the ball is integral with the body, and the base is closed with a screwed plug which is inserted after the detonator pellet, safety bolt and tape and the safety cap are in position.

Marking. (See Diagram 1D.)

8. First production of this fuze, before its use was extended and it received a fuze number, was not marked with any particulars of its manufacture other than the manufacturer's initials or trade mark.

Markings subsequently approved are as follows:—

- (a) Empty fuzes are marked by the manufacturer, on the top of the safety cap, the No. and Mark of the fuze, initials or recognized trade mark and the year of manufacture.
- (b) Filled fuzes bear the following additional markings on the top of the cap and on the exposed surface of the arming tape when the cap is removed: initials or station monogram; the filler, date of filling (month and year), Lot number and the letter "A" or "Z" after the Mark, as applicable, to indicate the material of the detonator pellet.
- (c) Distinguishing colours of caps as described in para. 5.

Assembly

9. The adhesive tape, securing caps, in transit, is removed and the fuzes are assembled into grenades, *with the caps in position*. When assembled, the rim of the cap screws down on to a vulcanized rubber washer and, after assembly in this manner, a strip of adhesive tape, approximately 2-in. x 2½-in is fixed obliquely across the cap and the top of the grenade, to prevent the cap unscrewing.

When fuzes are not required to be removed to prepare the grenades for action, for example, as in the Grenade No. 69, in which the detonator is inserted from the base, the threads which screw into its housing in the grenade are normally coated with R.D. cement to ensure the fuze remaining in a fixed position.

In cases where it is necessary to remove the fuzes to prepare the grenades for action, the threads are not cemented, thus allowing the fuzes to be removed and reinserted without difficulty.

Action

10. The adhesive tape and safety cap are removed immediately before throwing the grenade. The grenade is held with one finger over the lead sleeve to prevent the tape unwinding until the grenade has left the hand. On throwing, the arming tape, carrying with it the safety bolt, falls away. To facilitate this a spinning motion should be imparted with the fingers as the grenade leaves the hand.

After the tape and bolt fall away, the fuze is armed, the striker being held off the detonator only by its creep spring. On impact, whatever the angle of fall, the lead ball rides or rebounds between the concave surface on the striker head and the screwed cup, and tends to displace the movable striker. Under the pressure thus exerted, the striker, overcoming its creep spring, impinges on the detonator which reacts with a strong downward flash and initiates the functioning of the grenade.

Examination

11. Fuzes secured into grenades with R.D. cement *will not be removed* for the purpose of examination and the disassembly of the fuzes will be restricted to the removal of the adhesive tape and the safety cap. During this process the grenade will not be held in the hands, but will be laid on a table or bench covered with a wadmilt, old blanket or similar material.

12. Fuzes which can be removed from grenades may be disassembled completely, if such action is considered necessary owing to their visual condition, *but only after removal from the grenades*. During this operation the fuzes will be laid on a table or bench covered with a wadmilt, old blanket or similar material, with the base pointing away from the operator.

13. A safety cap which is found to be cracked or chipped and cannot be replaced, will be removed, care being taken to ensure that the arming tape is not displaced. The arming tape will then be secured with several turns of adhesive tape. If the fuze is cemented into the grenade, the whole will be removed for destruction. If the fuze can be removed it will be destroyed alone.

14. Arming tapes should be in a fully serviceable condition and there should be no signs of corrosion or other detrimental appearance of the lead sleeve and its fastener. If such occurs, the fuze will be sentenced unserviceable and destroyed.

15. Adhesive tape, once removed from fuzes, will be discarded, and new tape will be used in replacement.

16. Fuzes may be sentenced unserviceable on the visual condition of any component part, at the discretion of the I.O.O. and destroyed under the principles laid down in para. 13, except that when large quantities of grenades are involved, either for destruction or replacement of fuzes, a report will be rendered to the War Office (W.S.9).

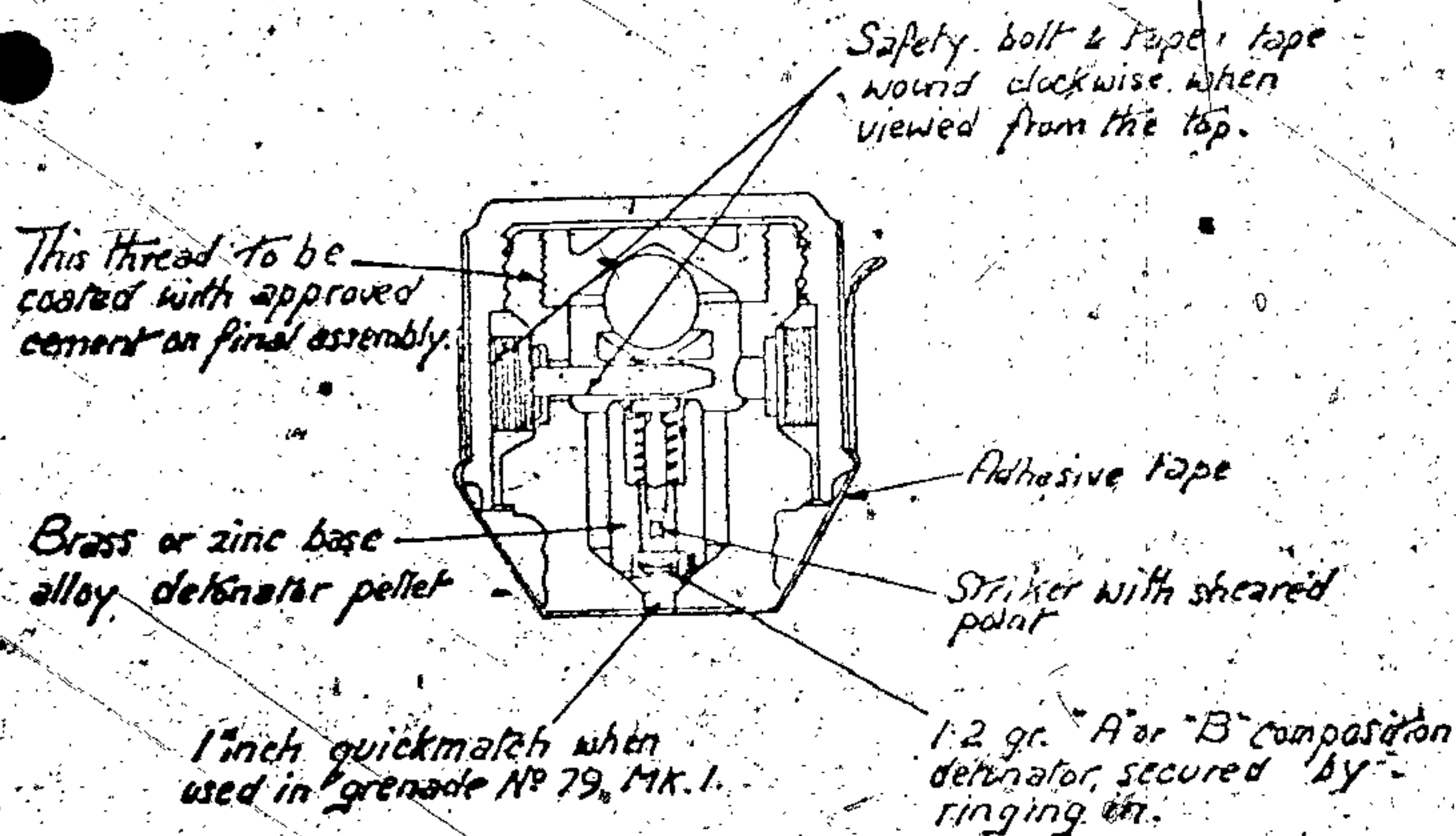


App. 1

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Diagram 1A

FUZE, PERCUSSION, No. 247, MK. 1A AND MK. 1Z



Notes:—When fuze is fitted with brass cap pellet, the letter "A" is to be added on cover after mark.

When fuze is fitted with zinc base alloy cap pellet, the letter "Z" is to be added on cover after mark.

Adhesive tape to be removed before assembling into grenades.

See Diagram 1D for markings on fuzes.

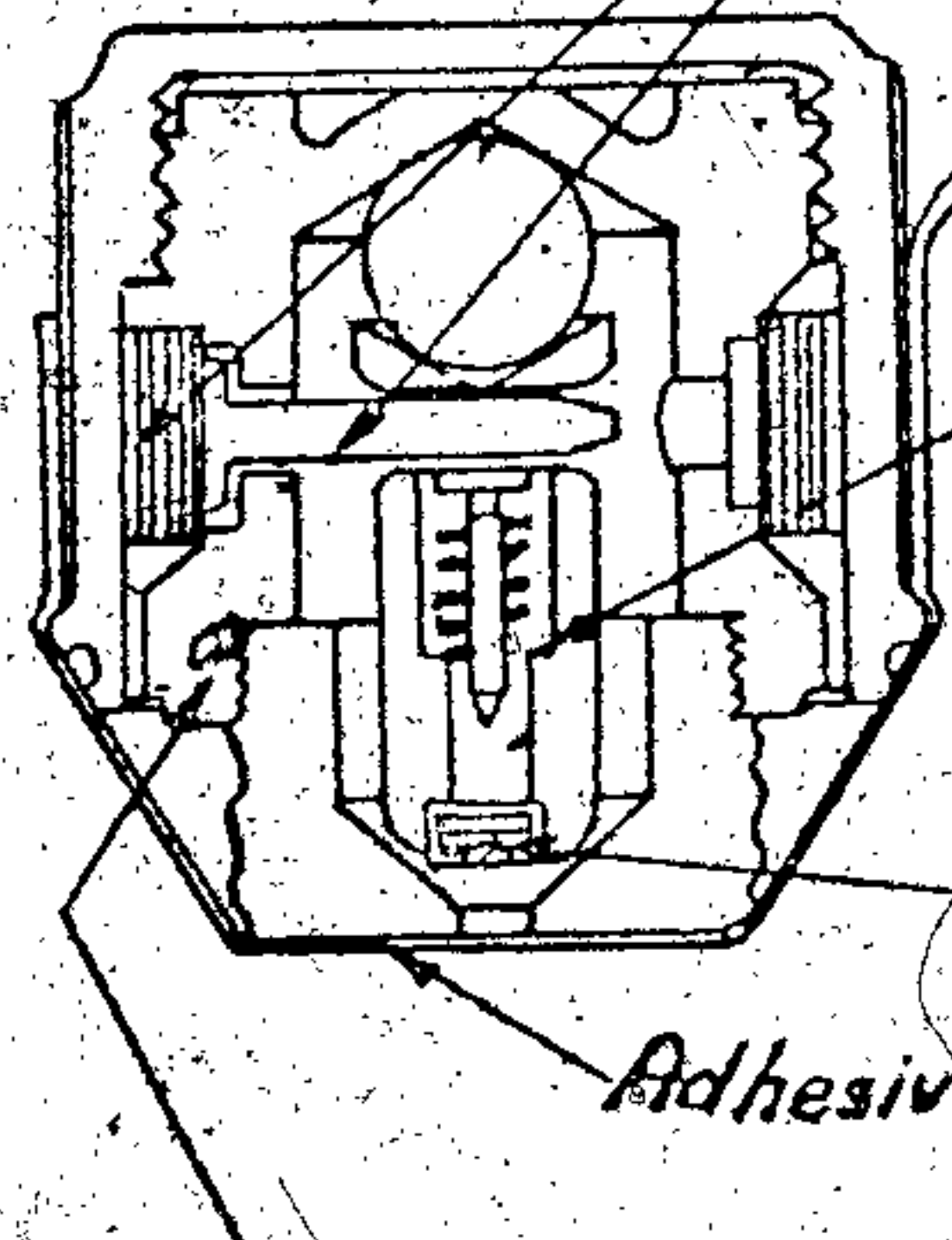


App. 1

Diagram 1C

FUZE, PERCUSSION, No. 247, MK. 3

Safety bolt and tape: tape wound clockwise when viewed from top.



Lead/antimony detonator pellet

1.7 gr. "B" detonator secured by turning over burr

Adhesive tape

This thread coated with approved cement on final assembly.

Notes:—See Diagram 1D for markings on fuzes.
Adhesive tape to be removed before assembling into grenades.

Diagram 1D

FUZE, PERCUSSION, No. 247

Markings

Maker's initials or recognised trade mark

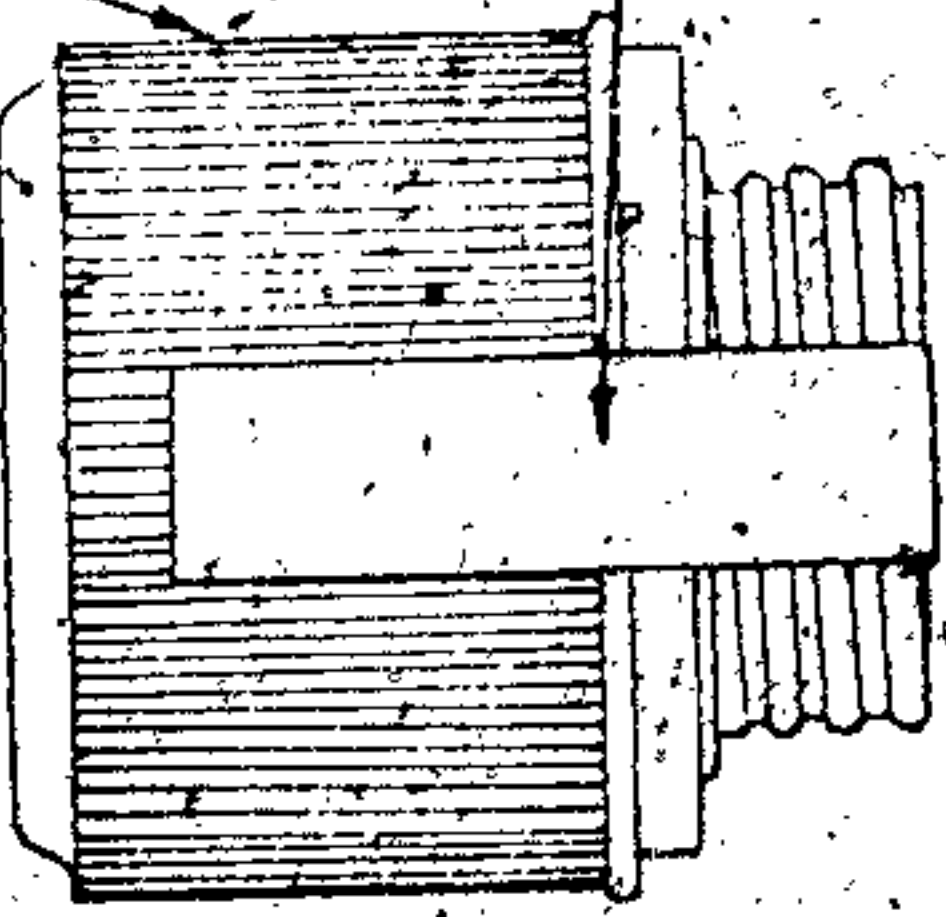
Mark 1A, 1Z, 2 or 3 as applicable

Year of manufacture

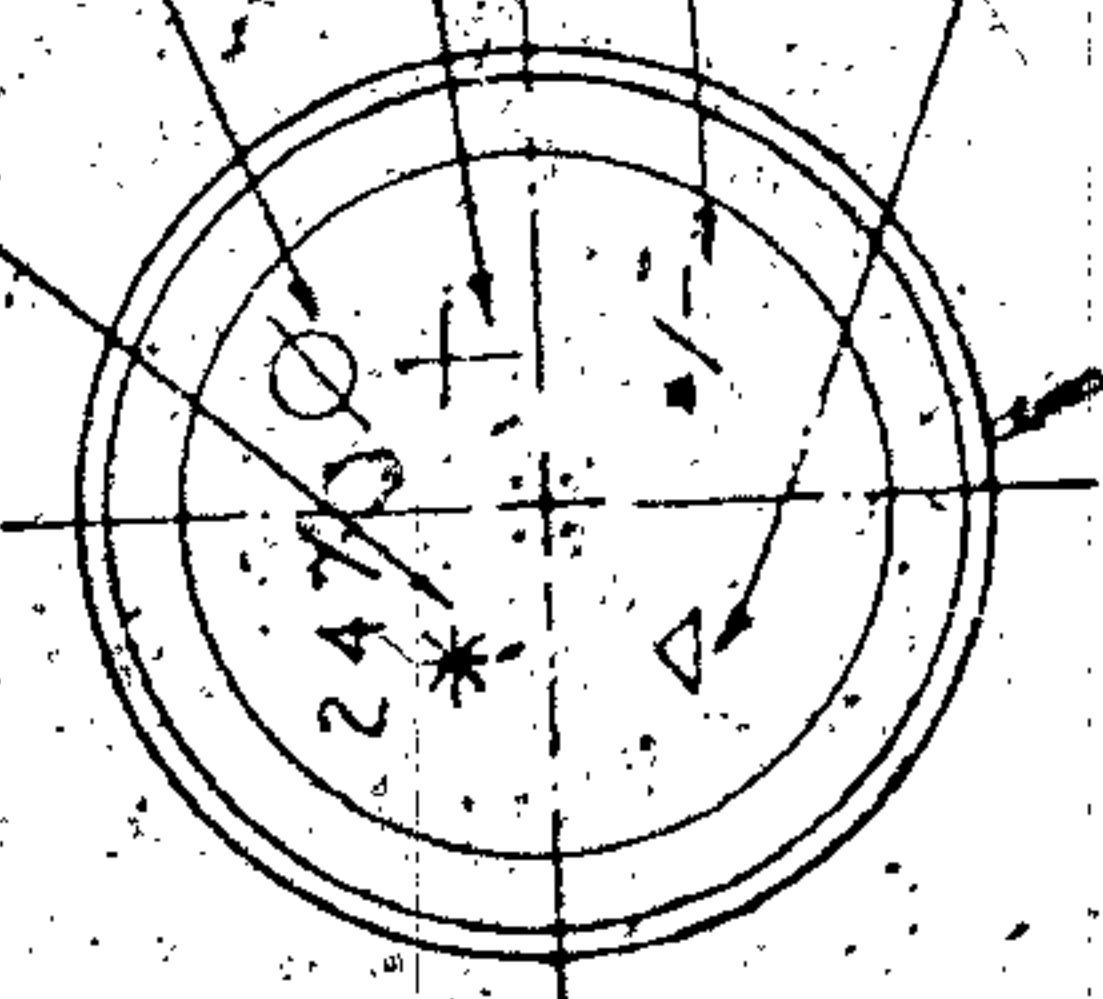
Date of filling (month & year)

Filler's initials or recognised trade mark

These surfaces to be painted red when 4 1/2 in. tape is fitted: green when fitted with "B" deflator. White when empty and used in drill grenades.



Securing tape adhesive 1/2 in wide about 4 3/8 long securing cover to body as shown: End of tape to be turned back on itself for 1/4 in. to form a non-sticky tab. To be removed before assembling into grenades.





App. 2

APPENDIX 2.—STRIKER MECHANISMS USED WITH GRENADES

DESCRIPTION

1. The striker mechanisms used with certain grenades are of the same basic design, differing only in the shapes of the fly-off levers, slight constructional dimensions and the material which is commonly known as the "mouse-trap", that is, the striker is held by the lever against a spring under tension, which, when released, causes it to rotate through 180 degrees.

A mechanism consists of a body, striker, spring, sleeve, axis pin, fly-off lever, safety pin with ring, and a brass adaptor.

The body is screw threaded on its lower portion to enable it to be screwed to the adaptor. It is recessed centrally to accommodate an igniter set. On one side, two shoulders are formed, each with two coincidental holes; the two larger to take the axis pin and the two smaller to take the safety pin. On the other side, it is squared off and undercut to form a seating for the turned-over lip of the fly-off lever.

The striker is a stepped piece of metal with an indentation forming a protrusion on its underside. Two lugs each have a hole through which the axis pin passes.

The steel spring is coiled round a brass sleeve which is a loose fit on the axis pin. The ends of the spring bear against the striker and the body.

The fly-off lever is shaped to fit the contour of the mechanism and has a shank which extends down the side of the grenade body. A lip is formed to fit in the undercut side of the mechanism and four tabs are turned down for the purpose of positioning the lever correctly. In the two larger tabs, holes are made coincidental with the smaller holes in the shoulders of the mechanism, to take the safety pin.

The safety pin and ring are similar to those used with the Grenade, No. 36M; that is, a split pin carrying a split ring.

The adaptor is a solid piece of metal, recessed and threaded in the top to take the body of the mechanism and has a central perforation through which the detonator and/or safety fuze of the igniter is inserted during assembly. Externally it is cut away to form a shoulder, this having two key slots. The cut away portion is roll-threaded to enable it to be screwed into the housing of the grenade.

2. The following are the particular features of the different mechanisms:—

(a) No. 1 Mk. 1.

This is the original British model of this type of mechanism. The adaptor and body is made of Mazak alloy. The striker, spring and lever are of steel and the sleeve is of brass.

The shank of the lever is straight and, as no grenades to which it will fit are in the Service, none has been produced.

(b) No. 2 Mk. 1. (See Diagram 2A.)

The lever of this Mark is shaped to fit the contour of the Grenade, No. 80, and for the purpose of identification it is root-proofed grey. The component parts are made from the same materials as those of the No. 1 Mk. 1, differing only in the shape of the spring and the sleeve.

When assembled into the grenade, the threads of the adaptor which screw into the housing are coated with approved cement. The threads of the body which screw into the adaptor are not coated with cement, thus allowing the body to be unscrewed for the purpose of inserting the igniter set which carries a detonator.

(c) No. 3 Mk. 1. (See Diagram 2B.)

This is the same in all respects as the No. 2 Mk. 1 except that the lever is shaped to fit the contour of the Grenades Nos. 81 and 83 Mk. 2, and is rustproofed black.

When assembled into the Grenade No. 81 the threads of the adaptor and body are treated as described in (b) above. When assembled into the Grenade No. 83 Mk. 2 the igniter, which does not carry a detonator, is already included, and as the mechanism will not require to be removed from the grenade, the threads of both the body and the adaptor are coated with approved cement.

(d) No. 4 Mk. 1. (See Diagram 2C.)

This is approved for use with grenades which do not have to be primed by the user, for example, No. 83, Mk. 2. The body and adaptor are in one piece and made of an approved moulded composition. The central recess is dimensioned to take the cap chamber of the igniter, which is fitted with a small adaptor to ensure satisfactory positioning. The adaptor and the igniter are cemented into the body before the mechanism is assembled and cemented to the grenade.

Action

3. The body, carrying the striker, lever and safety pin, is removed, if necessary and the appropriate igniter set is inserted through the hole in the adaptor. The body is then reinserted and screwed down tightly.

4. The grenade is then held with the fingers firmly holding the lever against the side of the grenade, whilst the safety pin is withdrawn. On throwing, the striker pin asserts itself and rotates the striker on the axis pin which, in doing so, throws the fly-off lever clear. The projection on the underside of the striker face strikes the rimfire cap of the igniter set, thus igniting the safety fuze.

Examination

4. Striker mechanisms with the exception of those secured to their adaptors with cement, for example, as in the Grenade, No. 83, Mk. 2 will always be removed before any examination is commenced, to ascertain whether or not igniter sets are fitted.

5. Those which are normally stored with the igniters assembled and which are secured to their adaptors with cement, will not be disassembled for the purpose of examination. In such cases, the examination will be restricted to ascertaining visually the condition of the mechanisms and grenades.

6. Mechanisms which are badly rusted or corroded, or with distorted fly-off levers, will be discarded. If cemented to the grenades, the whole will be sentenced provisionally unserviceable.

7. Loose or distorted safety pins and soft rings will be replaced. Rings should withstand a pull test of 30-lb. without distortion.

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des IM 44

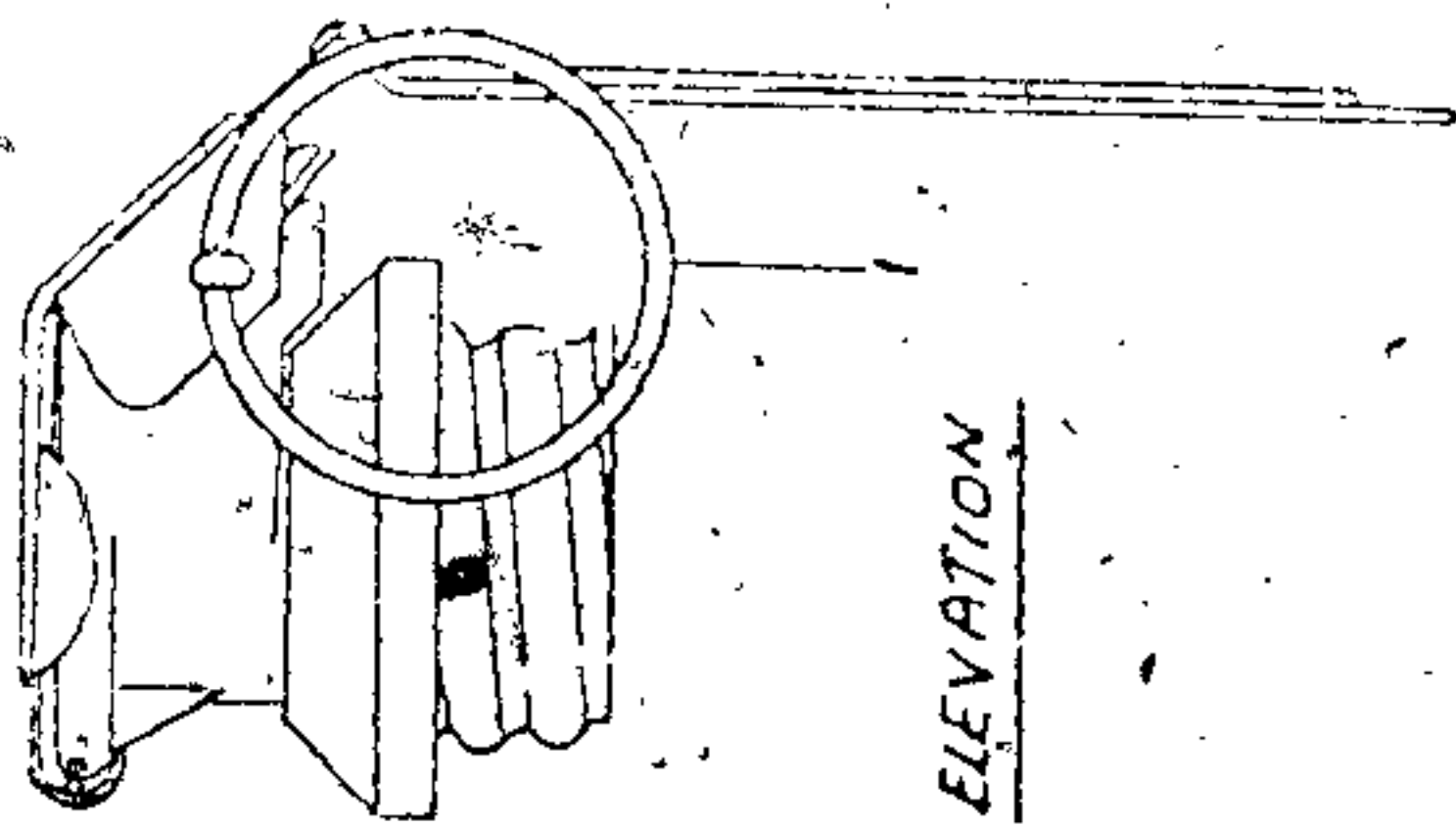


Werkstatt für angepaßte Arbeit GmbH
Bestätigung der Übereinstimmung mit dem Original.
Düsseldorf, den 21.12.83 Unterschrift: *U. Johnson*

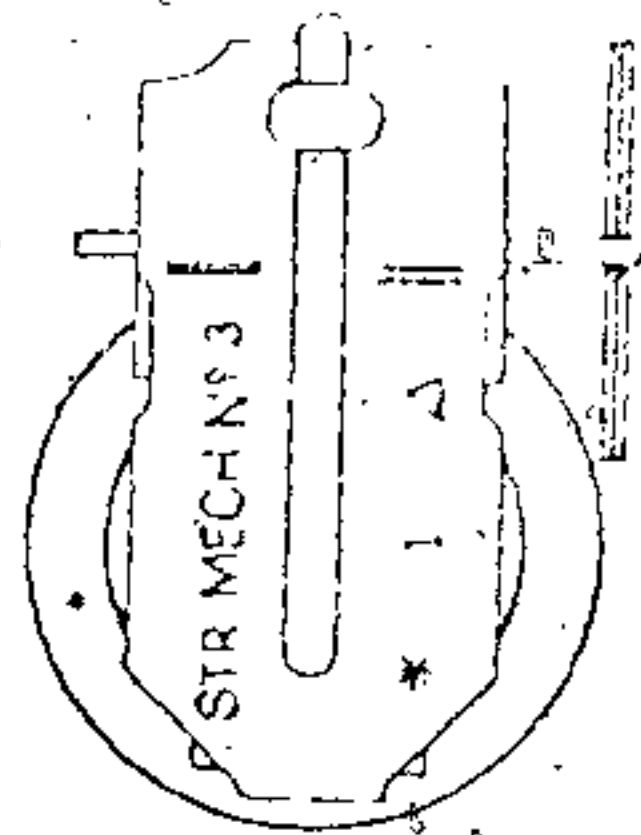
App. 2

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Diagram 2A



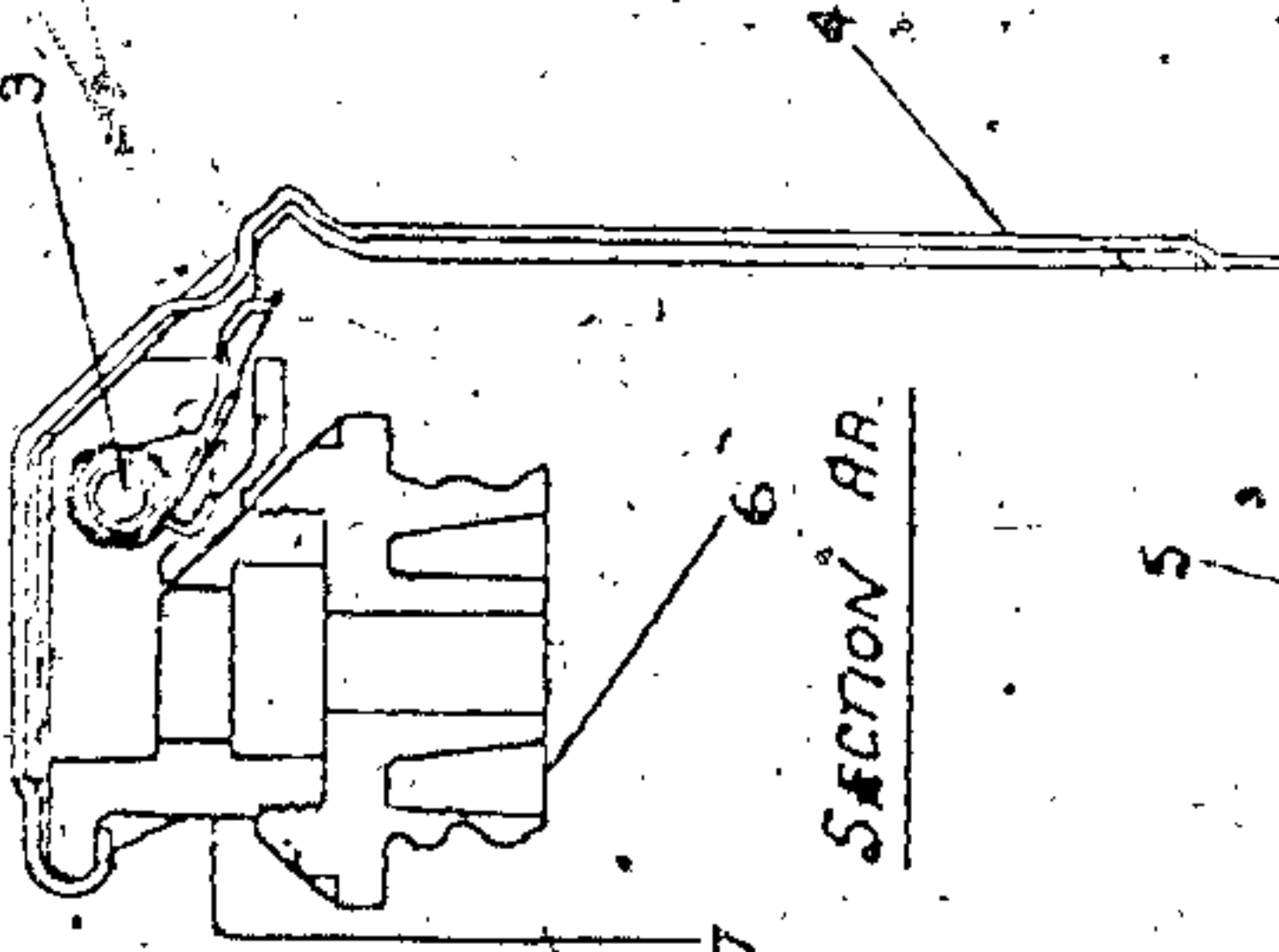
ELEVATION



PLAN

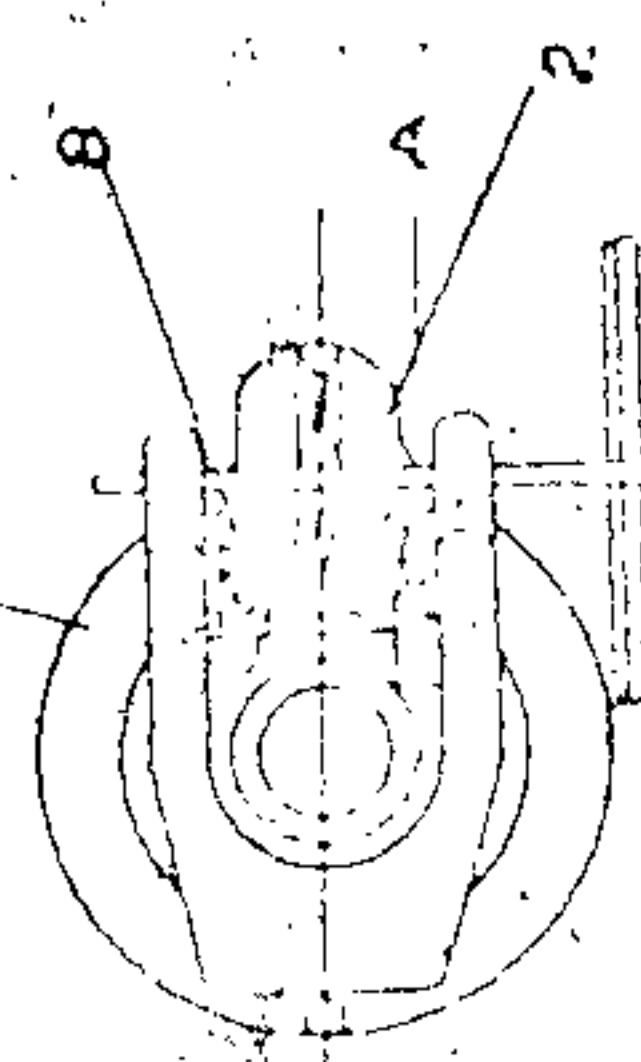
STRIKER, MECHANISM, No. 2, MK. 1

ITEM No.	DESCRIPTION
1.	Safety pin.
2.	Striker.
3.	Hinge pin.
4.	Fly off lever.
5.	Striker spring.
6.	Adaptor.
7.	Housing.
8.	Sleeve.



SECTION AA

Marking to be stamped in
position shown in 1/8 letters.
STR. MECH. No. 2
* Contractor's initials or
recognised trade-mark
Mark
Δ Year of manufacture.



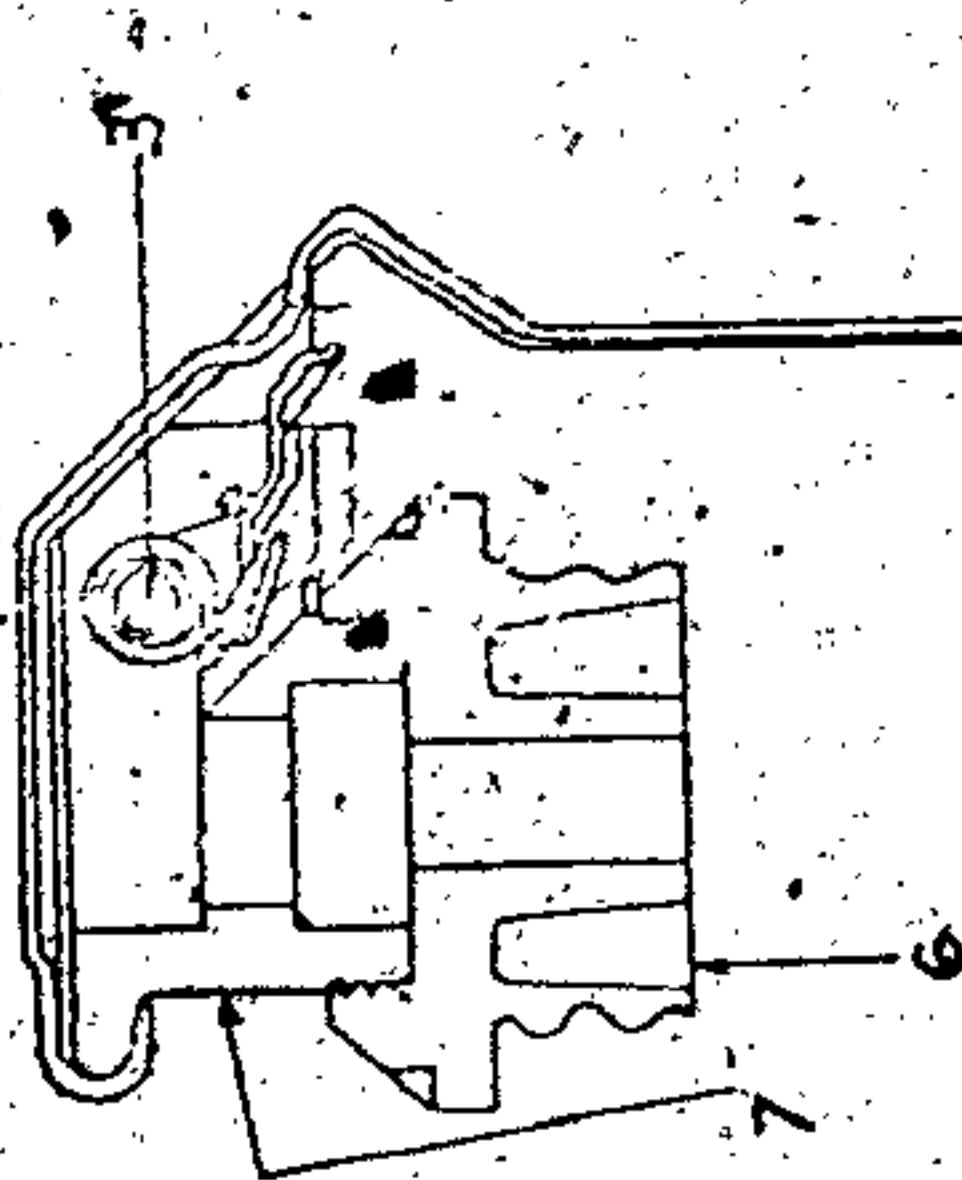
PLAN

(with fly-off lever removed)

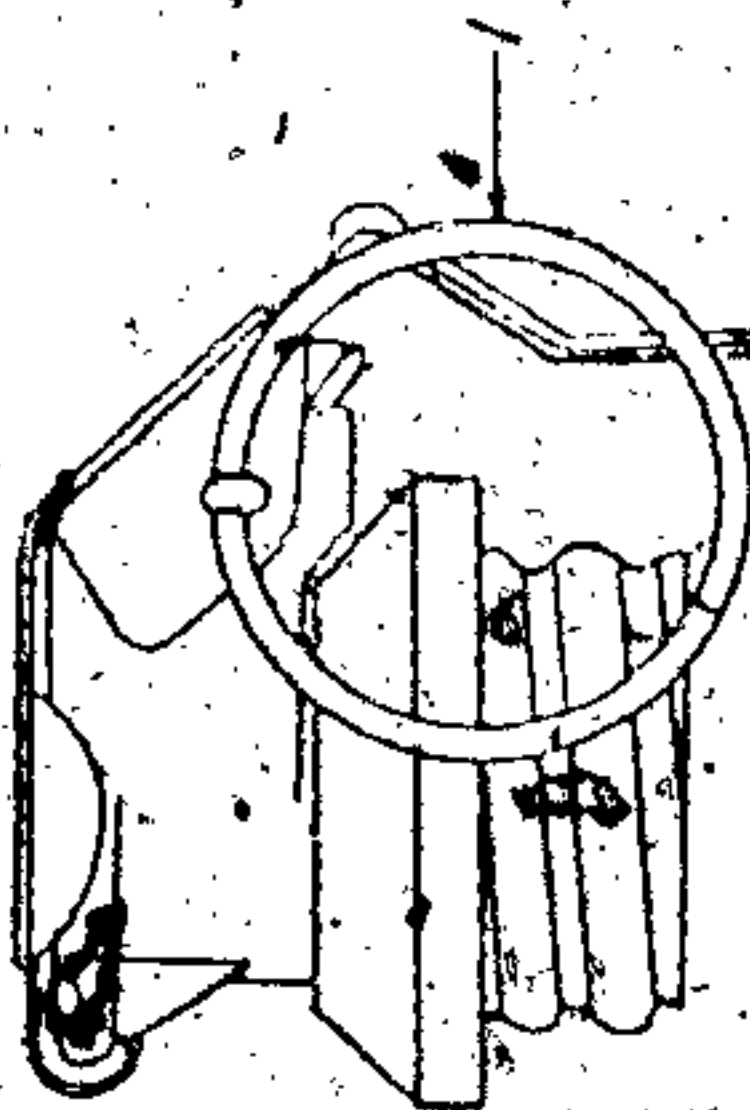
Diagram 2B

STRIKER MECHANISM, No. 3, MK. 1

ITEM NO	DESCRIPTION
1	Safety pin.
2	Striker.
3	Hinge pin.
4	Fly-off lever.
5	Striker spring.
6	Adapter.
7	Housing.
8	Sleeve.



ELEVATION



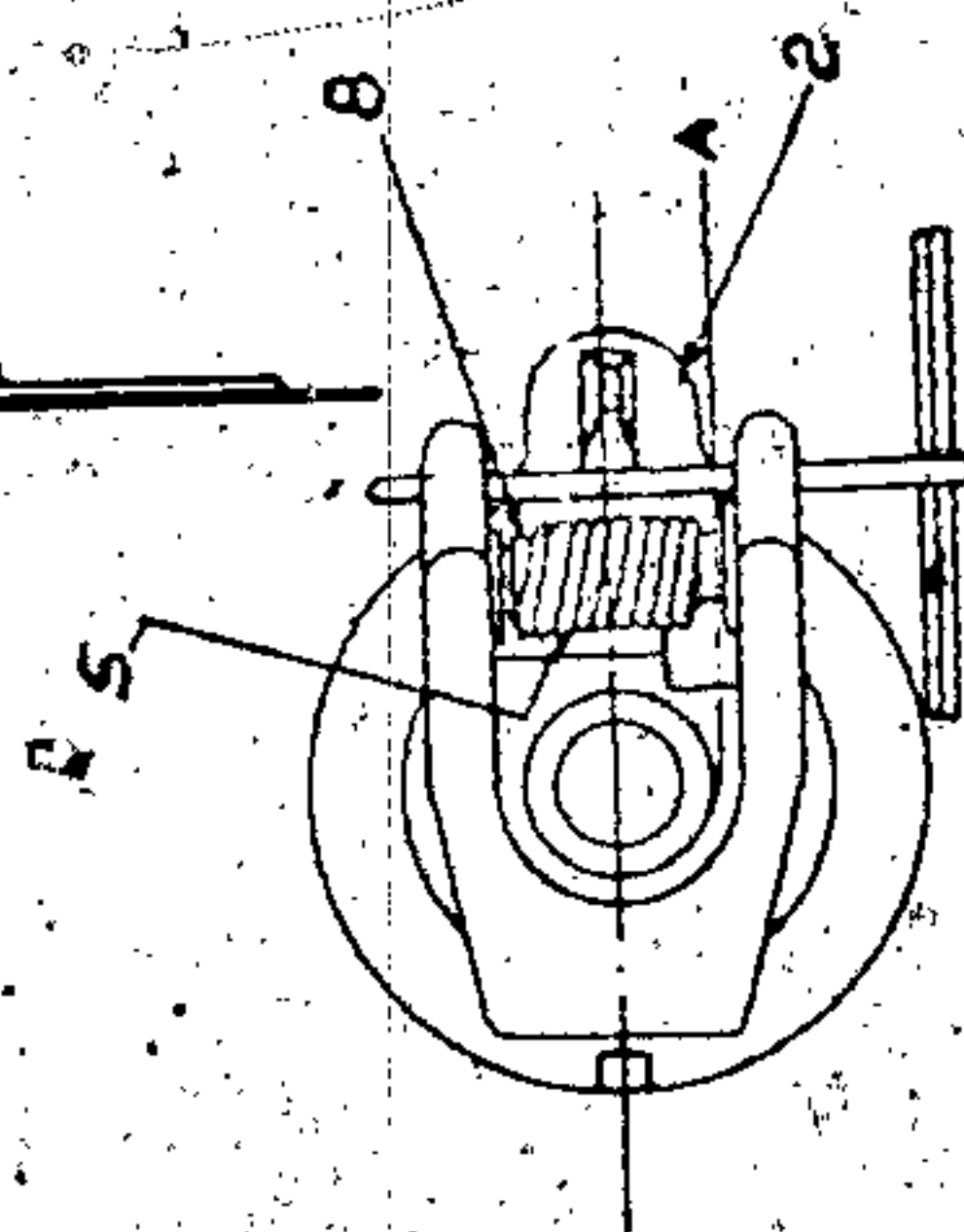
Marking to be stamped in position shown in 1/8 in. letters STR MECH NR2.

* Contractor's initials or recognised

Trade-mark.

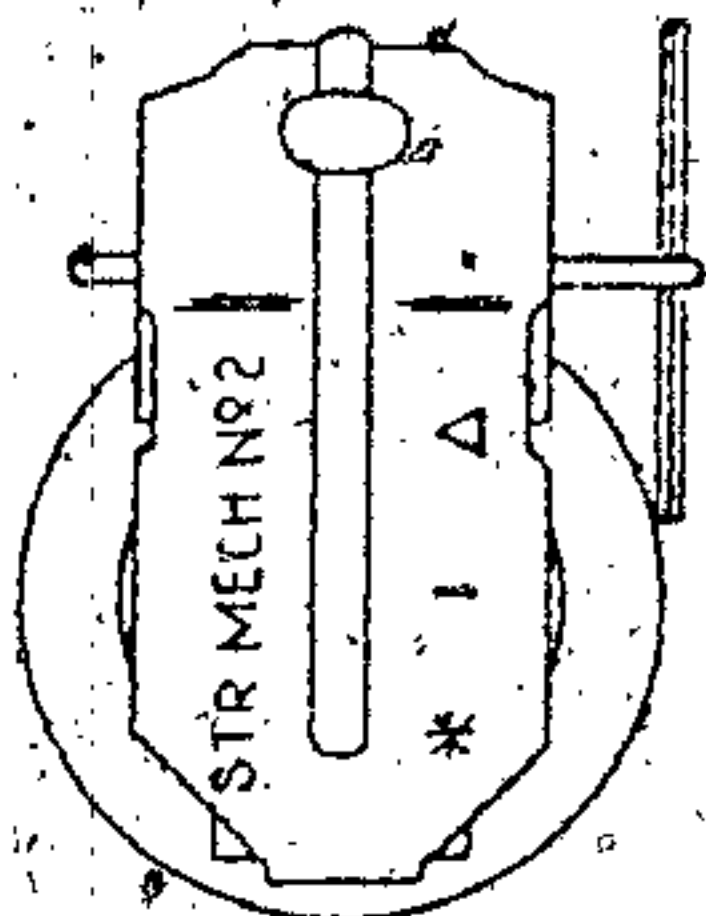
Mark.

A Year of manufacture.



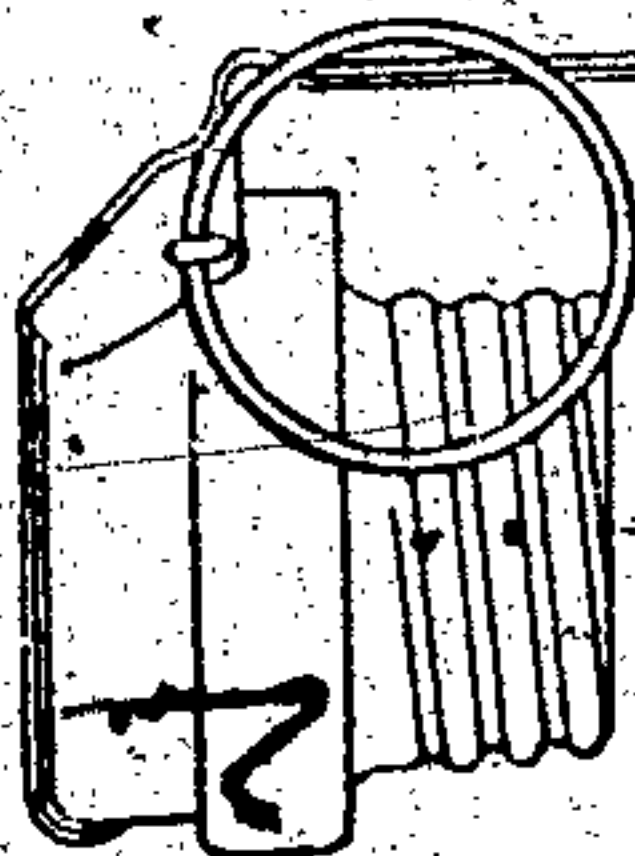
PLAN (with fly-off lever removed)

PLAN

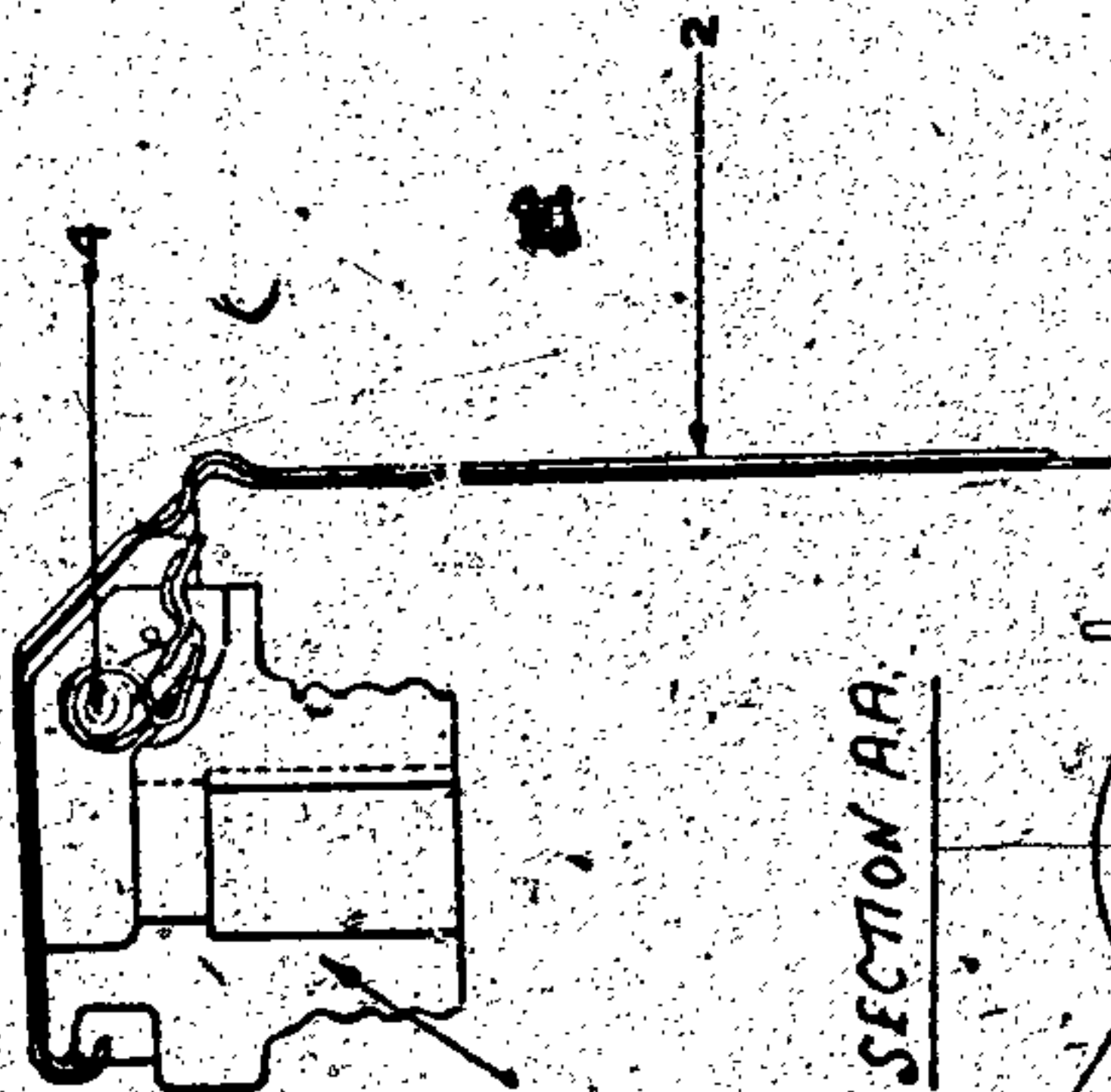


App. 2

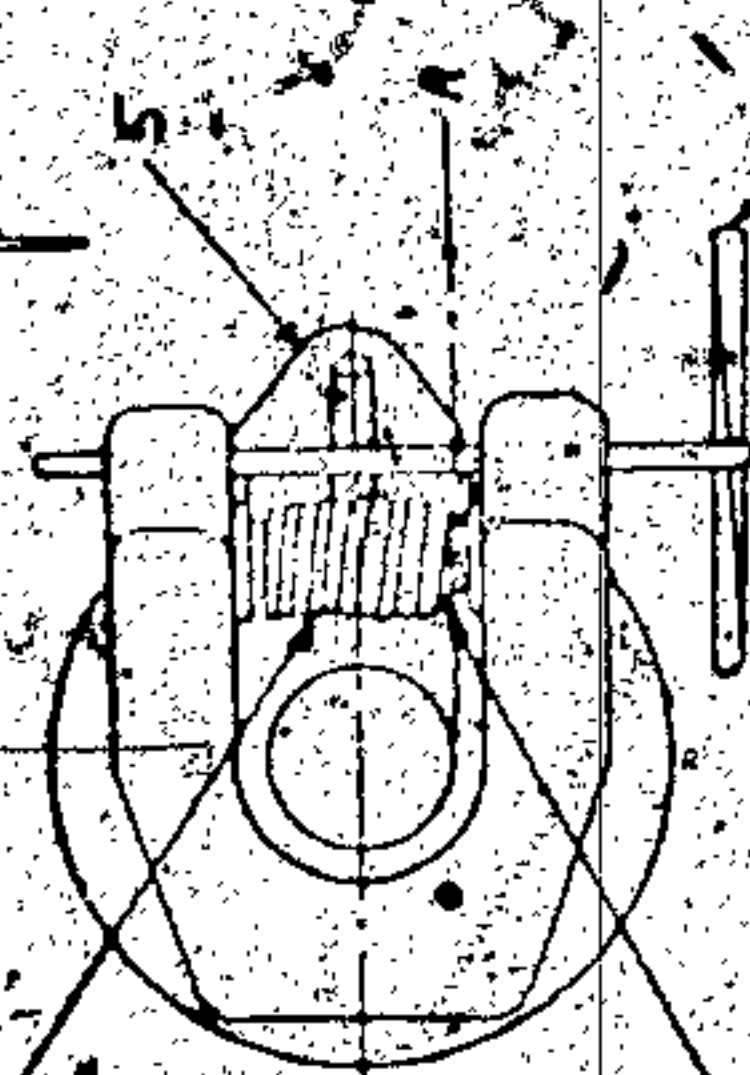
STRIKER MECHANISM, No. 4, MK. I, MOULDED/L.



ELEVATION



SECTION AA



PLAN

(with fly-off lever removed)

ITEM NO.	DESCRIPTION
1	Body, moulded plastic
2	Fly off lever
3	Striker spring
4	Hinge pin
5	Striker
6	Safety pin
7	Sleeve

Diagram 2C



Eintragung der Erfindung mit dem Off. Nr.
 Dated: 21.12.83 Unterschrift: [Signature]

APPENDIX 3

EXAMINATION AND CLOSING OF PACKAGES

1. The external appearance of packages is generally an indication of the condition of the ammunition contained in them. Therefore, whatever the circumstances under which filled ammunition packages are being handled, any which are found to be damaged to such a degree as to render the ammunition suspect, affected by damp or which are not properly sealed, will be set aside for further examination.

2. **Steel boxes** are particularly prone to the following defects:—

(a) *Rust*.—Small patches of rust on the exterior are not important providing they do not affect legibility of the stencilled markings and the adherence of labels, but it is preferable to clean off the rust and repaint in order to prevent the patches enlarging. Internal rust is serious and must always be removed, although if the rust is extensive it may be more economical to repack the ammunition into serviceable boxes and dispose of the rusty boxes as salvage.

(b) *Distortion*.—Slight distortion of boxes may not affect the serviceability of the contents, but if there is any doubt the boxes should always be opened and the contents examined. Severe distortion invariably indicates damage to the ammunition. Special attention should be paid to the corners of boxes, damage to which is usually an indication that the boxes have been dropped, possibly rendering the contents unsafe.

(c) *Perforations*.—These are usually caused by the corner of one box coming into sharp contact with a plain surface of another. They should not occur if handling of boxes is carried out correctly and with normal care. Perforated boxes will in all cases be replaced and, if otherwise serviceable, set aside for repair.

(d) *Broken hinges and toggle catches, loose handles, rivets, etc.*.—Any defect of this nature will necessitate repair, and the ammunition will be repacked into serviceable boxes.

3. **Wooden boxes** should be carefully watched to ensure that none which are damp or affected by rot are allowed to pass as serviceable. Any found to be damp will be dried out after removal of the contents, or alternatively, the contents will be repacked into serviceable boxes. Those found to be affected by rot will be discarded.

Cleats, rope handles, securing wires, etc., should be correctly fitted. Boxes which are broken or split, or damaged in any way which indicates that they have been dropped, will not be passed until the contents have been examined.

4. **Cartons of paper or cardboard** are particularly liable to become unserviceable through exposure to damp, and unprotected corners are rapidly frayed if they are mishandled. They are normally secured with steel tape bands and care must be taken to ensure that these are in good condition.

Damp cartons will delaminate and swell, and exert a constant deteriorative effect on their contents. They should be replaced without delay.

Particular attention should be paid during examination of cartons for visible signs of internal leakage, breakage or misplacement of the contents.

5. Filled grenade boxes returned from units will be treated with suspicion until a full examination of their contents can be carried out. Accidents have occurred owing to loose detonators or igniter sets being returned in boxes containing grenades or other components and, supposedly empty boxes. These constitute a definite risk until they are properly disposed of.

Whenever detonators or igniter sets are found loose in boxes, a special immediate report will be sent to the War Office (W.S.9), giving the following particulars:—

- (a) Type of store involved, Lot Nos., etc.
- (b) Quantity in consignment.
- (c) Number of boxes in which loose detonators or igniter sets are found.
- (d) Total number of loose detonators or igniter sets found.
- (e) Consignor; any relevant certificates or packers' labels to be attached to the report, or copies if originals cannot be sent; or if no certificate or packers' labels are contained, a note to that effect.
- (f) Any other information which may be of use during investigation, for example, reason for the return of the ammunition, condition of the ammunition and packages, method of loading trucks, etc.

6. Close examination will be made for signs of contamination of boxes which have contained leaking S.T. grenades (No. 74). Contaminated steel boxes will be cleaned with rags and, if necessary, the final traces of the explosive, that is, at the hinges, will be removed by burning. Contaminated parts of wooden boxes and crates will be destroyed by burning.

Rags used for cleaning contaminated boxes will be destroyed by burning in the open. See Section 6, para. 17.

7. Markings on boxes should always agree with their contents. If there is any discrepancy in quantities, the I.O.O. will decide, according to the circumstances, whether investigation is necessary or not.

8. When repacking the ammunition, markings on boxes will be brought up-to-date with the latest instructions and checked against the contents before the boxes are closed.

9. A packers' label, L 566A, will in all cases be shellacked to the under side of the lid of a box before it is closed and sealed, or the existing label will be endorsed to show the service which has been carried out. It is important that the correct description of the service is given, for example, visually examined, repaired, repacked, etc.

In addition to the service as described above, the label will be completed with the monogram of the station or depot, the date (day, month and year), and the name, rank and work number of the responsible person carrying out the job.

App. 3

Original packers' labels, that is, those affixed at filling, labels which show details of any repairs which have been done, will be removed from boxes, providing that the boxes retain their original contents. If there is not sufficient space on them to record the latest service, an additional label will be used.

10. Boxes containing less than the number of complete rounds for which the boxes are designed will be stencilled in red with the word "FRACTION" on the lid and on, at least, one side.

11. Boxes which are provided with screwed-down lids will not be secured with nails, nor will the screws be hammered in, as this rapidly weakens the structure.

12. When boxes are closed they will be sealed with one or two linen sealing labels, L 600, overpainted with the station monogram, affixed with shellac or other approved adhesive. Hinged steel boxes require one label on the junction of the lid and the body, on the side opposite to the hinges; wooden boxes with concealed hinges require one label in a similar position, but wooden boxes with visible hinges or with unhinged lids will be sealed with two labels, one on each side at the joint of the lid and the body.

13. All boxes must bear an explosive group label, indicating the correct group to which the ammunition is allotted for the purposes of storage and transport.

14. Packages, the contents of which after examination and/or repair are found to be serviceable, will be stencilled "EXD. I.O.O." on "RPD I.O.O." as applicable, with the date (month and year) and the monogram of the station, such particulars replacing those of any previous examination or repair.

APPENDIX 4.—TREATMENT OF PHOSPHORUS BURN

1. All ranks connected in any way with the examination, proof, destruction and handling of ammunition containing phosphorus should be conversant with, at least, the method of rendering first aid to themselves or to others who become contaminated.

2. Phosphorus will burn spontaneously on exposure to the air and therefore swift action is essential in order to prevent a contaminated person suffering severe injuries. An ample supply of fresh water must always be available at the scene of operations.

3. First Aid.

- (a) Apply water immediately to the affected part to extinguish any burning phosphorus; and keep the area moist.
- (b) Apply clean lint or a clean cloth soaked in water, and keep it moist.
- (c) Proceed to the nearest R.A.P. or medical establishment for treatment.

4. Treatment.

- (a) Thoroughly flood and wash the affected part with bicarbonate of soda solution (two tablespoonfuls of the powder to a pint of cold tap water) to neutralize the phosphoric acid.
- (b) Swab the affected part with a 1 per cent. solution of copper sulphate and remove the resulting dark coloured copper phosphide with forceps or gauze.
- (c) Immerse the affected area in bicarbonate of soda solution for a prolonged period: the duration of this immersion will depend on the size and depth of the burn, that is, small burns half an hour, large burns one to two hours. If immersion is not possible, keep the sterile dressing repeatedly wetted with bicarbonate of soda solution.
- (d) Finally, re-examine in the dark for phosphorescence. If there is none present, dress the wound as for an ordinary burn. If there is still any doubt about the presence of phosphorus, dress the wound four hourly with lint soaked in bicarbonate of soda solution.

Note.—No oils or greasy dressings and no tannic acid, triple dye or brilliant green must be used in the treatment of phosphorus burns as long as any trace of phosphorus remains in the tissues: oils and grease are solvents of phosphorus, and their use while it is present will cause risk of poisoning from absorption.