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AMMUNITION BULLETIN No.22.

FOR INSPECTING ORDNANCE OFFICERS

AND

DIVISIONAL AMMUNITION OFFICERS.

(AUG. 1941.)

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CHIEF INSPECTOR OF ARMAMENTS,
WOOLWICH, S.E.18.

SECURITY.

AMMUNITION BULLETIN NO.22

for

INSPECTING ORDNANCE OFFICERS

and

DIVISIONAL AMMUNITION OFFICERS.

Issued by :-

CHIEF INSPECTOR OF ARMAMENTS,

WOOLWICH.

Contents.

ENEMY AMMUNITION.

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324. ROCKET, "U", CHEMICAL, 5-INCH MK.I.

Tail, Propelling, Mk.I. (Fig.108).

The tail consists principally of a mild steel outer tube containing a propelling charge of Cordite S.C. in the shape of notched, slotted, tubes, which are arranged in a ring around an inner tube and provided with an igniter and an electric fuze as the means of ignition. The closing arrangement at the front end of the tail is designed also for the attachment of the cylindrical bomb when prepared for use. Fins, to obtain head-on flight, and a throttling device for the gases during propulsion are fitted at the rear end. A container of silica gel, to absorb moisture within the tail, is attached to the inner face of the closing arrangement at the rear end.

The outer tube is closed at the front end by a circular pressure plate which is screwed into the tube with R.D. cement on the threads. A number of recesses are formed in the outer face of this plate. These recesses are used in conjunction with the assembly tool in the filling factories and the number of recesses is an indication of the material of the plate (i.e. mild steel, 8; mild steel stamping, 2; malleable casting, 6). A hole in the centre of the plate passes through a boss formed on the outer face and is screwthreaded to receive the transit plug or pressure plate plug. When prepared for use, the transit plug is replaced by the pressure plate plug. The interior of the tube is coated with stoved copal varnish or Akard lacquer. The exterior, is Parkerized or Bonderized to prevent corrosion and is painted stone colour.

The transit plug is provided as a weak closing device for the hole in the pressure plate in order to reduce the effects of accidental ignition of the charge in transport or storage. The plug is in the form of a hollow, cylindrical, zinc-base, die casting which is closed at the inner end by a thin brass disc and is provided with a rubber washer under the knurled flange formed at the outer end.

The pressure plate plug is cup-shaped and has a conical inner end. An interior screwthread is provided for the attachment of the bomb. To prevent the escape of propellant gas to the front, the plug is fitted with a copper washer - termed the obturator - under the flange.

The inner tube, which carries the propellant charge and igniter assembly, consists of a perforated tube of mild steel fitted with three sprockets to position the cordite tubes and an igniter container welded at its front end. The sprockets are tack-welded in position, one in the centre and one near each end of the tube, and consist of perforated rings with curved recesses formed around their outer circumferences to receive the eleven slotted tubes of propellant. The rear end of the inner tube is positioned in a step formed at the front end of the venturi tube. The igniter container is in the form of a cup which fits over the front end of the inner tube. The cup has a central perforation in its base and has a trough-like flange which accommodates the igniter assembly. A hole is drilled through the container and inner tube for the leads of the electric fuze and a ring of perforations in the flange portion allows the flash from the igniter to reach the propellant charge.

The propellant charge of Cordite S.C.T.S./N. 1.0-0.5 has an approximate weight of 6-lb. and is made up of eleven tubes, each 15.8-inches in length The tubes which are slotted throughout their length and notched at intervals are arranged around the sprockets of the inner tube with the slots aligned towards its axial centre and the notches positioned to leave the notches clear when adjacent tubes of propellant are in contact. They are secured in this position by ties of silk or shalloon braid over the sprockets.

The igniter assembly consists of a shalloon bag, in the form of a ring, containing 30 grams of Composition S.R.317C together with Fuze, Electric, No.F.53, Mk.I, (See Item 325) a glazedboard washer and various paper strips and washers which are secured with shellac and R.D. cement to retain and seal the igniter in the igniter container. The insulated leads of the electric fuze are enclosed in sleeves of sistoflex where they pass through the hole leading into the inner tube and at the end of the tube where they emerge and are each connected to a contact socket. The hole through which they enter the tube is sealed with R.D. cement and to prevent movement the leads are tied near this point to the tube.

The venturi tube is screwed into the rear end of the outer tube, the threads being treated with R.D. Cement before insertion. This is a tapering tube of mild steel increasing in diameter towards the rear. Enlarging discs are welded at each end to receive the fin assembly and in the case of the front disc, for attachment to the outer tube. The venturi tube is closed at the rear end by the closing disc inserted and sealed with R.D. Cement.

The closing disc is of tinned plate with radial indentations and a central hole in which is soldered a tinned plate cup. The cup protrudes from the inner face of the disc and has a number of perforations in its base. These perforations are lightly closed on the inside of the cup by a disc of paper on a silk base, secured in position by a clamping ring, also of tinned plate. The cup contains 12 grams of silica gel and is closed by means of a lever lid which is sealed under the flange with Mk.IV luting or R.D.1154 composition. Two brass plated sockets, for the reception of the wander plugs, are fitted in the closing disc in diameterically opposite positions. The sockets are insulated from the closing disc and are each connected at their inner ends to a lead of the electric fuze. The socket holes are three sixteenths of an inch in diameter and half an inch in depth.

The fin assembly is of mild steel and consists of a cylinder 4.6 inches in length which carries four rectangular fins. The fins are spot welded to the cylinder which fits around the enlarged ends of the venturi tube where it is secured by four pairs of screws at each end. Each of the fins has a notch formed in the centre of its outer edge to position the wire which secures the wooden packing pieces used to protect the fins of the packed tail unit.

Markings on Tail.

The exterior of the outer tube is painted stone colour and bears the following stencilling :-

Diameter and Mark.
Year of manufacture.
Contractors initials or recognised trade mark.
Filling station monogram.
Lot number of the propellant.
Month and year when filled.

Bomb, Chemical Mk.I (Fig.109).

The bomb has a cylindrical light case and when prepared for "Ready use" is fitted with a hemispherical fairing at the forward end. The fairing is retained in position by the fuze which passes through a hole in the fairing and is provided with a circlip. A spigot fitted to the base of the bomb is screwthreaded to engage with the internal thread of the pressure plate plug in the tail and is the means of attachment of tail and bomb. A burster container, with an external circumferential groove to facilitate fracture by the detonation of the fuze filling on impact, is fitted in the head of the bomb. The bomb has no head filling other than that contained in the magazine of the percussion fuze which is the D.A. No.721 (See Item 326) The burster container is closed by means of "Plug, bomb, nose, No.28" until prepared for "Ready use". The case contains a chemical charging.

Markings on Bomb.

The bomb with its fairing is painted light grey. The joints where leakage might occur are coated with yellow detector paint which would indicate this defect.

There is no red ring denoting the presence of an explosive content since this is not present until the bomb is fuzed for "Ready Use".

A coloured band three inches in width is painted 2½-inches from the head end of the bomb case. This band indicates the type of chemical with which the bomb is charged. The code letter and number of the chemical and, in the case of bombs with unvarnished interiors, the letters UV are stencilled on the band. Details of these markings are given in Item 332.

The following details are stencilled in black paint :-

The letter and diameter of the rocket followed by the mark of the bomb.
The initials or recognised trade mark of the contractor assembling the empty bomb followed by the date of assembling (month and year).
Monogram of firm or station charging followed by the month and year of charging and the lot number.
The design number of the method of charging.

Approximate weights and dimensions.

Overall length of tail propelling is 23.7-inches.
External diameter of outer tube is 5-inches.
Overall diameter of fins is 8.62-inches.
Filled weight of tail propelling is 27.75 lb.
Overall length of bomb, plugged and without fairing is 17.82-inches.
Filled weight of bomb, plugged and without fairing is 25.5-lb.
Overall length of complete rocket with bomb fuzed is 43.4-inches.
Weight of complete rocket with bomb fuzed is 56.5-lb.

Packing. Details, weights and dimensions.

Tails propelling are packed with the fin assembly fitted and the pressure plate closed by a transit plug. The pressure plate plugs are packed with the tails when boxes No. M.107 are used but when boxes No.M.118 are used the pressure plate plugs are packed with the bombs. Four wander plugs are packed with the tails. The following packages may be met with :-

Box, tail, propelling, rocket, "U", 5-inch, No. M.107 Mk.I.

The stowage dimensions of this box which holds 2 tails are 27.6 x 15 x 9.5 inches and the weights empty and filled are 24-lb. and 79.5-lb. respectively. The box is stained vandyke brown.

Box, rocket, "U" 5-inch, No.M.118 Mk.I.

This box is used to pack two tails or two bombs.
The stowage dimensions are 52.8 x 8.2 x 9.5-inches and the weights empty and filled when used for tails are 43.75-lb. and 102.75-lb. respectively. The box is painted stone colour when used for tails. When used for bombs it is painted light grey, fitted with rectangular packing pieces and the pressure plate plugs are carried on the inner side of the detachable end lids.

Weights empty (with packing pieces) and filled are 52-lb. and 103.5-lb. respectively. The two bombs, fitted with plugs are packed heads inwards with a packing piece carrying the bomb fairings at each end of the box. When the rounds are assembled for ready-use at the position the two bombs from a grey box are fitted with fairings, fuzed and attached to tails from a stone coloured box. The two assembled rockets are then placed in the two empty boxes, the packing pieces which carried the fairings in the bomb box are reversed and one placed over the head of the bomb in each box. The removeable end lids are then replaced in position to indicate the bomb and tail ends of the rocket, i.e. a grey end piece is fitted at the end of the box containing the bomb and a stone colour end piece is fitted at the tail end.

Bombs are also packed in Box, bomb, rocket "U" 5-inch, No.M.110, Mk.I. This wooden box holds two plugged bombs and is painted grey. The stowage dimensions are 24.1 x 15 x 9.5 inches and the weights empty and filled are 23.5-lb. and 75-lb. respectively.

325. FUZE, ELECTRIC, NO.F.53, MARK I.
Fig.110.

This fuze which is used in the igniter assembly in the propelling tails of both the 3-inch and 5-inch U Rockets as the means of ignition is identical with "Fuze, electric, low tension, L.M.N.R./Chlorate; Seekay-Wax filling".

The fuze consists of two insulated conducting wires connected to a fuze head which carries a fuzing bridge of wire surrounded by an igniting mixture consisting of lead mon-nitro-resorcinate and chlorate. The fuze head is sealed in a paper tube by means of seekay wax or other approved sealing material.

The conducting wires which are of No.25 S.W.G. (0.02) are of tinned copper enclosed by insulating material. The bared end of each wire is soldered to brass foil attached to a pressboard tube in the fuze head and with which the ends of the bridge wire are connected. The outer end of the fuze head, where the wires are soldered, is covered by a blob of sealing material. The conductor wires are twisted for a distance of three inches from the point where they emerge from the paper tube and at the outer end one and a half inches of each wire is bared of insulation. The length of the wires is varied according to the purpose for which the fuze is ordered.

The paper tube into which the fuze head is sealed is .83-inches in length and .22 inches in diameter. The tube is stamped with the fuze letter and number, the mark of the fuze and contractors initials or recognised trade mark.

The resistances of the various parts are as follows :-

Fuze head	0.9 to 1.6 ohms.
72-inch leads.	0.34 ohms.
Fuze head with 72-inch leads.	1.24 to 1.94 ohms.

326. FUZE, PERCUSSION, D.A., NO.721, MK.II.
Fig.109.

This is a detonating fuze of 2-inch gauge with a D.A. arrangement consisting of a striker, with a protruding and enlarged head, held off the detonator by an aluminium shear wire. The fuze carries a large magazine of light construction and has no safety shutter. The safety cap of the fuze IS ATTACHED BY MEANS OF A LEFT HAND SCREWTHREAD and the fuze body carries a circlip ring for the assembly of the fairing of the chemical bomb of the 5-inch U Rocket with which the fuze is used.

The steel striker with a striker head screwed to its outer end is carried in a central hole in the cast iron body of the fuze. The ends of the aluminium shear wire which passes through the striker and fuze body are visible where they emerge from the body. A safety piece assembly is fitted between the underside of the striker head and the forward end of the fuze body. This assembly consists of two metal segments rivetted one at each end of a short spring strip of steel. When assembled under the striker head the spring is under compression and the assembly is retained by the safety cap. On removing the safety cap the safety piece assembly is projected by its spring and the striker is then held off the detonator only by the shear wire.

The detonator, which is carried in a brass detonator holder, screwed into the underside of the body, is of the 5 grain desruptive type and contains 3 grains of lead azide with a 2 grain sensitizing top layer of detonating composition "A". The channel in the underside of the detonator holder is stemmed with C.E. and above the holder, interposed between the detonator and the striker, is a brass disc supported on a washer of similar material.

The cylindrical aluminium cup forming the magazine is cannelured to the body and contains a pellet of C.E. over one of T.N.T. Both pellets are paper wrapped. A waxed millboard disc is contained in the bottom of the magazine below the T.N.T. pellet and a tracing cloth disc covers the top of the C.E. pellet.

The safety cap has a ring of milling and is inscribed on the top with an arrow indicating the direction in which the cap is turned for removal.

Packing.

10 fuzes, each in cylinder No.308, are packed in a wooden box, No.M.123. The stowage dimensions of the box are 17.8 x 7.3 x 8.4-inches and the approximate weight of the filled box is 45-lb.

327. ROCKETS, U; CARE AND PRESERVATION. (See Item 346).

The following points are additional to the general instructions for the care and preservation of ammunition and chemical weapons. Brief references to previous items published in earlier numbers of the Bulletin are included to provide a convenient summary :-

(a) With regard to storage of the Rocket, U, H.E. 3-inch, the explosive quantities, the explosive limits for various types of buildings, stacking arrangements and safety precautions to be observed are given in Item 193, Bulletin No.17.

(b) The explosive quantity (Vide Mag. Regs. Pt.1, 1934, para.23) for the 5-inch tail propelling is 6-lb. and, as with the 3-inch, it is classified as Group VI, Category Y for storage. The 5-inch chemical bomb contains no explosive until fuzed for "Ready Use" and is classified as Group XIII for storage.

(c) The best storage for tails propelling is one which does not fluctuate much in temperature during each day but which follows the general average throughout each month. Well constructed brick buildings with cavity walls are suitable.

(d) Storage for tails propelling should be as dry as possible. The igniter composition is liable to generate small quantities of ammonia if it becomes damp. This would have a deleterious effect in the cordite charge. Ignition of a damp charge is, moreover, irregular.

(e) The isolation of tails propelling from wireless transmitting apparatus because of the electrical fuze in the igniter assembly is given in Item 232, Bulletin No.18.

(f) In addition to parkerizing or bonderizing, the exterior of tails propelling are now painted to prevent corrosion. The 5-inch tail is painted stone colour and that for the 3-inch, white except near the ends where the shell ring and fins are fitted. These portions are lightly smeared with mineral jelly. Unpainted tails should be preserved by an application of boiled, lead free, linseed oil. The mineral jelly on the unpainted end portions of the painted 3-inch tails should be replaced when necessary.

(g) As a safety precaution, the pressure plate at the front end of the 5-inch tail is fitted with a lightly constructed transit plug until prepared for "Ready Use". Some tails have been packed without transit plugs, the pressure plate plug-hole in these instances being closed by a millboard and cambric disc sealed with R.D. cement. Packages containing these tails are stencilled N.T.P. (no transit plug). When transit plugs are available for these tails the temporary closing device will be removed, care being taken to ensure no foreign matter enters the plug hole, and the transit plugs inserted. The threads of the transit plugs should be lightly smeared with Mark V luting (thin, lead free) before insertion. In order to avoid damage to the fins whilst carrying out this operation the tail should be handled with care and stood on its base in a wooden block which will be suitably recessed and provided with saw cuts at right angles to receive the base with its fin assembly. When completed, the N.T.P. stencilling on the package will be erased. Tails found with the temporary closing disc damaged should be set aside for examination.

(h) Instructions regarding 5-inch tails, for practice, which may be issued as a temporary measure, with an improvised arrangement in place of the socket assembly are given in Item 248, Bulletin No.19.

(i) Instructions regarding the importance of ensuring that the sealing of the closing disc at the base of the 3-inch tail is effective in preventing the ingress of moisture are given in Item 251, Bulletin No.19. This precaution will also be observed with regard to the closing disc in the base of the 5-inch tail. Tails with warped or distorted closing discs or with the R.D. cement sealing cracked, which have been set aside at the daily inspection, by the unit, of "Ready Use" ammunition will be replaced and withdrawn for examination and repair.

(j) Tails with fins which show the slightest sign of bending or similar damage should on no account be fired. Fresh fins will be fitted. In the case of the 5-inch tail this entails the removal of the complete fin assembly by the removal of the screws securing it to the high diameter portions of the venturi tube. Defective fins or fin assemblies will be returned for examination and repair.

(k) 3-inch tails found with loose contact terminals or 5-inch tails found with loose contact sockets will on no account be fired. The defect will be remedied by removing the closing disc, ensuring by inspection that the leads are properly connected and tightening the securing devices. A fresh disc will then be inserted with R.D. cement and the joint between the closing disc and the venturi tube will be sealed, also with R.D. Cement.

(l) In the unlikely event of tails being found which have become dented as the result of severe rough usage, they should on no account be fired but should be withdrawn.

(m) Instructions regarding the difficulty which may be experienced in the insertion of the 3-inch H.E. shell in the shell ring of the tail if the springs of the shell ring are displaced are given in Item 247, Bulletin No.19.

(n) Item 282, Bulletin No.20, contained instructions to the effect that the paper collar surrounding the No.13 gaine should not be removed when the gaine with its adapter and the No.700 fuze is inserted in the 3-inch H.E. shell.

(o) Instructions regarding the following points for 3-inch "Ready Use" rounds are given in Item 193, Bulletin No. 17 :-

Limiting the number of rounds to be prepared to the minimum.
Points of support for racked rounds and protection from fire risks. (Figs.111 and 112, included in this current Bulletin, give details of the shelter and racking recently approved for the storage of "Ready Use" rounds. The scale for provision is one shelter for two projector mountings. Where the number of "Ready Use" rounds is small the spare available racking space may be used for the storage of the components of the rounds in their packages. The racking is designed to provide access to the fuzed end of the assembled "Ready Use" rounds and to give the necessary support for the various natures of projectiles).
The importance of keeping the perforations in the head of fuze No.700 clear and the use of rubber covers or composition R.D.1154 for the protection of the fuze powder in the time rings.

328. SHELL, Q.F., H.E., 3.7 AND 4.5-INCH GUNS. METHOD OF FILLING AMATOL 50/50.

Design 12056 for the above mentioned shell has been approved for use when authorized. The design provides for the usual two diameter cavity lined with a paper tube which contains a $1\frac{1}{2}$-oz. or $1\frac{1}{4}$-oz. smoke box of red phosphorus. The smoke box has a boxcloth disc beneath it and two glazeboard discs between it and the exploder above. The exploder is a 26 dram. C.E. pellet or alternatively a "W" bag exploder, also of C.E. The bag exploder, when used is inserted into the cavity with the choke downwards. The No.11 gaine is included and has two tracing cloth discs between it and the exploder. The amatol bursting charge has a topping of T.N.T. The shell is marked with the ring of red crosses which indicate the filling is suitable for hot climates.

The green discs painted on the shell, indicating the presence of the smoke box, are stencilled "A" to indicate an aluminium box containing $1\frac{1}{2}$-oz. or "B" to indicate a bakelite box containing $1\frac{1}{4}$-oz.

The shell is closed by means of the 2-inch fuze hole plug No.17 or fuzed as follows :-

3.7-inch.	4.5-inch.
Fuze, Time, No.199.	Fuze, Time, No.207.
" " No.207.	" " No.208.
" " No.209.	" D.A.No.230P (anti-ship).

329. PROPELLANTS. NATURES OF N.C.T. AND CODE LETTERS.

N.C.T. of 1918 or earlier manufacture will be known as "N.C.T." and has been allotted the code letter "N".

N.H. (Non-hygroscopic) powders will be known as "N.H. powder" or in short "N.H." and will be allotted the code letter "O".

F.N.H. (Flashless non-hygroscopic) will be known as "F.N.H. powder" or in short F.N.H. and the variety containing potassium sulphate as "F.N.H./P powder" or in short "F.N.H./P ". The code letter "L" will be used for these.

330. SHELL, B.L., OR Q.F., CHEMICAL, BURSTING. METHOD OF HEAD FILLING 8154.

Fig.113 shows the details of the design for the 6-inch howitzer shell Variations of the design are as follows :-

Calibre.	Mark of Shell.	Lower filling of burster container.	Burster - Fumyl Mark III.	Exploder.	Filled Weight. Fuze No.106.E.		
					lb.	oz.	dr.
Q.F. 4.5-inch How.	XI	Wood block 1.31-inch.	3-oz. 10-dr. Pressed block and cylinder.	"F",T.N.T. or C.E.	35	1	15
		Wood block 1.05-inch.	-do- Direct pressing.	"F", C.E.	35	1	11
		Approved composition.	-do- -do-	"F", C.E.	35	3	0
	XII	Wood block 2.31-inch.	-do- Pressed block and cylinder.	"F",T.N.T. or C.E.	35	5	2
		Wood block 2.05-inch.	-do- Direct pressing	"F", C.E.	35	4	14
		Approved composition.	-do- -do-	"F", C.E.	35	7	10
B.L. 6-inch How.	V	Wood block 1.84-inch.	4-oz. Two pressed cylinders.	"B",T.N.T. or C.E.	100	5	1
		Wood block 1.5-inch.	4-oz. 11-dr. Direct pressing.	"F", C.E.	100	4	12
		Approved composition.	-do- -do-	"F", C.E.	100	6	14
	IX	Wood block 1.84-inch.	4-oz. Two pressed cylinders.	"B",T.N.T. or C.E.	101	4	6
		Wood block 1.5-inch.	4-oz. 11-dr. Direct pressing.	"F",C.E.	101	4	1
		Approved composition.	-do- -do-	"F",C.E.	101	6	3
	XII/V	Wood block 1.84-inch.	4-oz. Two pressed cylinders.	"B",T.N.T. or C.E.	100	4	11
		Wood block 1.5-inch.	4-oz. 11-dr. Direct pressing.	"F", C.E.	100	4	6
		Approved composition.	-do- -do-	"F", C.E.	100	6	8
	XIII/IX	Wood block 1.84-inch.	4-oz. Two pressed cylinders.	"B",T.N.T. or C.E.	101	4	0
		Wood block 1.5-inch.	4-oz. 11-dr. Direct pressing.	"F", C.E.	101	3	11
		Approved composition.	-do- -do-	"F", C.E.	101	5	13
Q.F. 3.7-inch mortar.	IA.	-	3-oz. 10-dr. Block and cylinder.	"F",T.N.T. or C.E.	19	11	-

NOTES.

The approved composition, used as an alternative filling for the lower portion of the burster container, consists of kaolin and paraffin wax.

Fumyl, Mk.III, is an H.E. composition which produces smoke and consists of C.E. 38%, aluminium powder 24%, sodium chloride 35% and boiled, lead free, linseed oil 3%.

331. SHELL, B.L., OR Q.F., CHEMICAL, BASE EJECTION. METHODS OF HEAD FILLING 10171 and 10593.

Design 10171 for Q.F. 25-pr. streamline shell is shown in Fig.114 for Mark ID to VID shell and in Fig.115 for Mark VIID shell. The burster for this design consists of a bag containing 1¼-oz. of G.12 gunpowder and the bakelite smoke box in the lower part of the burster container holds 1¾-oz. of red phosphorus. The piston, in the form of a cupped ring secured to the lower end of the burster container by a nut, shown in the earlier marks of shell, ejects the chemical charging through the lightly closed base of the shell when the burster container is fractured at the groove near its base by the explosion of the burster. In the Mark VIID shell the diameter of the burster container has been increased and the piston dispensed with.

Design 10593 for the B.L. streamline 6-in. howitzer 100-lb. and 5.5-inch shell is shown in Fig.116 for both shell. The burster for this design is 2-oz. of G.12 for the 6-inch and 1¾-oz. for the 5.5-inch. Two 1¾-oz. bakelite smoke boxes containing red phosphorus are carried in the burster container. The lower part of the burster container contains a composition of kaolin and paraffin wax and the space above the smoke boxes is adjusted, according to the size of the burster, by the use of glazedboard discs. These discs are placed on the top of the upper smoke box. The burster container is fitted with a piston.

332. MARKINGS OF CHEMICAL SHELLS.
Fig.116A.

The nature of the shell is indicated as chemical by the body being painted a light grey.

The type of chemical with which charged is indicated by a coloured band above the shoulder of the shell. The code letter and number of chemical is stencilled on this band and stamped in the shell. The distinguishing colours used for the band are :-

Code Letter.	Colour of Band.	
B	Black	(Tear gas)
G	Green	(Choking gas)
Y	Yellow	(Blister gas)

The date of chemical charging (month and year) and the monogram of the firm or station which carried out the charging are stencilled just above the shoulder of 5.5-inch and 6-inch shell and below the shoulder of 25-pr. shell. Shell containing Y chargings have a yellow detector ring around the nose at the junction of the burster container and shell to enable leakage to be detected.

Shell with unvarnished interiors are indicated by the letters "UV" stencilled in two places, diametrically opposite, on the coloured band.

Base ejection type of shell are distinguished by the stencilling "B.E." adjacent to the particulars of the equipment and mark of shell which are stencilled on the charging coloured band in the case of the 25-pr. and below the band with the 5.5-inch and 6-inch.

In the case of the bursting type, cast iron or semi steel shell are distinguished by a light brown ring around the nose, i.e. below the yellow detector ring if so marked.

The presence of the explosive head filling is indicated by a red ring around the nose in a position lower than that for the brown ring.

The presence of the smoke box or boxes of red phosphorus is indicated by two green discs, positioned diametrically opposite, below the coloured band.

The design number of the method of head filling is stencilled above th shoulder of 5.5 and 6-inch shell and below the shoulder of 25-pr. shell.

The series number, in a ring, which distinguishes the head filling lot is stencilled on the coloured band.

Stencilling on the shell is in black. Where a black band is used to indicate the type of chemical, stencilling on the band is in white.

333. BOMB, M.L., CHEMICAL, BURSTING, 3-INCH MORTAR, METHOD OF CHARGING 9758.

Bombs stencilled with this design number have a head filling in the exploder container identical with that in bursting smoke bombs filled to design 7299, i.e. a $6\frac{1}{4}$ dram. C.E. pellet and fuze No.138.

The bomb is painted light grey above the lower guide ring. A coloured band over-stencilled with a code letter and number indicating the nature and type of the chemical charging is painted between the guide rings. With cast iron bombs a brown ring is painted above the red filling ring.

334. ELECTRICAL IGNITION STORES. REPORTS AND EXAMINATION OF DEFECTIVE STORES.

Reference R.A.O.S. Part 2, Pamphlet No.5, para.18, sub-para.(b).

As a war measure, failures with electric stores need to be reported as usual, but samples need not be sent in when it is obvious that broken bridges are the cause of the failures.

Variable resistance failures should be forwarded to C.I.A./F.74.A, Royal Arsenal, Woolwich and also reported to D.C.I.A.(2), Eltham, S.E.9.

335. ROCKET, SIGNAL, THREE STAR, WHITE TRAILER, MARK I, T.P.

The rocket is a trade pattern pyrotechnic and is similar in construction to the rockets described in Item 290, Bulletin No.20.

The trade nomenclature is :-

Rocket, Signal, 3 White Stars, with Luminous Smoke.

This type of rocket has been introduced to replace Rocket Signal, Golden Rain, Mark I.T.P.

Details showing assembly, marking and labelling are depicted in Figure 117.

On functioning the rocket should rise to an approximate height of 1000 ft. and burst at the top of its trajectory. The time of burning of the stars should be approximately 8.5 seconds.

The stars should give a good white light and a cloud of small white sparks.

Trials revealed that the signal is visible in daylight up to 3000 yards.

Package.

A trade pattern cylinder to hold 6 rockets is to be adopted for packing this type of rocket.

The service nomenclature provisionally allocated is Cylinder No.367, Mark I.

The cylinder is made of tinned-plate and is fitted with a rolled paper liner, and slip on lid.

The packed cylinder is sealed by means of adhesive tape. A contents label is affixed to the top of lid. The exterior of the cylinder is black. The approximate stowage sizes of the cylinder are as follows :-

16.3 long x 5.9 dia.

The estimated weight of complete package is 8-lb.

Details of Labels.

Affixed to head of rocket.

H.1434.

ROCKET, SIGNAL,
3 STAR, WHITE TRAILER, MARK I T.P.

Directions for Use.

Insert stick in socket.
TO FIRE:- Expose the friction composition in front of rocket by tearing away the tape, withdraw the PLUG from the socket and draw it smartly across the top of the exposed composition.

Made by _____ LOT_____

/

Affixed to lid of cylinder.

H.1437.

6

ROCKETS, SIGNAL, 3 STAR
WHITE TRAILER.
MARK I T.P.

Made by _____ Lot_____

/

336. BOMB, SPIGOT, MORTAR, H.E., 29-M.M. 14-LB. MARK I.
Fig. 118.

This bomb also referred to as the anti personnel bomb, and known during its development as a "Blacker Bombard" type, consists of an eliptical cast iron body with a direct action nose fuze and a driving unit assembly comprising an adapter with tail tube which carries a cartridge and is fitted with vanes.

The body has a bursting charge of Nobels No.704.B. explosive and is fitted with a burster container of the type used in the M.L. 3-inch Mortar bomb. The fuze No.152 is used over a 12 dram. C.E. exploder pellet. A hole in the base of the body is threaded to receive the spigot formed on the block adapter.

The block adapter secures the tail tube to the body. The rear face of the adapter is recessed to receive the front end of the tail tube which is either welded in position or screwed into the adapter in which case a gasket is included in the base of the recess.

The tail tube is made up of two tubes, the inner one being expanded inside the outer from which it emerges at approximately 5½-inches from the tail end. The end of this tube carries the vane assembly and is fitted with a circlip ring to retain the latter.

The vane assembly is of the drum type with three vanes.

The whole of the exterior is painted service green (lead free, matt finish) and the marking around the nose of the body, denoting the presence of explosive, is of the type indicating a limited life in hot climates (i.e. X - X - X, in red). Particulars of this marking are given in Item 300, Bulletin No.21.

The cartridge, which is positioned in the forward end of the tail tube, consists of a brass case of the 20 m.m. Madsen type, adapted for the purpose, with a propelling charge, priming and percussion cap including an anvil. The case is in two parts lightly attached so that on firing the rear portion is projected to the rear whilst the front portion accompanies the bomb in flight. The rear portion is reduced in diameter near the base and grooved to facilitate removal when necessary and carries a percussion cap. A flash channel leads from the cap chamber to the interior where a priming consisting of 10 grains of gunpowder is provided. The priming is kept separate from the propellant by a cup shaped disc of celluloid. The front portion of the case is in the form of a cup with its base to the front and has three circumferential rings of knurling for identification purposes. The propellant charge is a composite charge of Cordite W.M. with a weight of 20 grams comprising 10 grams of size 061 and a similar weight of size 118. Two smaller charges will be provided, these will be identified by two rings of knurling and one ring of knurling respectively around the forward portion of the case.

The bomb body has a length of 7 inches and the maximum diameter is approximately 4 inches. The driving unit assembly is approximately 16 inches in length and the diameter of its vane assembly is 4 inches. The approximate overall length of the bomb, fitted with fuze No.152, is 24.5-inches.

Packages for this bomb have not yet been approved.

The explosive quantity is 1.6-lb. and the classification for storage is Group VIII, Category Z.

37. BOMB, SPIGOT, MORTAR, H.E., 29-M.M., 20-LB, MARK I.
Fig.119.

This bomb, also referred to as the anti-tank bomb and known during its development as a "Blacker Bombard" type consists of a body of mild steel plate the fore part of which is semi oval, the rear part being conical. The body is fitted with streamlined fairing at its rear end and is attached to a driving unit assembly consisting of an adapter with tail tube in which is carried the cartridge. A vane assembly is fitted to the rear end of the tail tube and a cup device with bayonet joint fittings is fixed at the forward end of the driving unit assembly for the attachment of the bomb body. This method of attachment permits of ready removal of the body for the insertion of a base percussion fuze-in its rear part. The fuze used is, "Fuze, base, percussion No.283 Mk.I."

The rear part of the body is spun into the fore part and has a hole in its base which is prepared to engage with the locking plate portion of the bayonet joint. A fuze container, inside the inner end of which is cast an exploder pellet of Nobels Explosive No.831, is fitted inside the base by means of a ring attachment, the fuze container holder. The body has a bursting charge of Nobels Explosive No.808 (See Item 223, Bulletin No.18), and the filling hole in the head is closed by a steel plug cemented in position.

The cup device, which is fitted at the front end of the driving unit assembly for the reception of the coned rear part of the body, consists of two cups and a locking plate. The hind cup, which is the smaller of the two, fits over the base of the fore cup and a central perforation in the base of both fits over a spigot on the front of the adapter block. The locking plate, which is a steel disc with portions cut away to form one member of a bayonet joint, is also assembled on this spigot and the assembly is secured by the head of the recessed spigot being turned over to form a flange.

The block adapter forms the attachment between the tail tube and the cup and is welded to the forward end of the former.

The tail tube is of similar construction to that described in the Item 336. The vane assembly is also similar but is larger in diameter.

The fairing is of mild steel and fits over the fore cup and the forward portion of the tail tube. A circlip ring - a form of split ring - sprung into a groove in the tail tube retains the fairing in position.

The whole of the exterior of the assembled bomb is coloured service green with a lead free paint which has a matt finish. The exterior of the assembled cups is painted in the usual buff colour denoting H.E.

The marking around the nose, denoting the presence of explosive, is of the type indicating a limited life in hot climates (i.e. X - X - X). Particulars of this marking are given in Item 300, Bulletin No.21.

The cartridge, positioned in the forward end of the tail tube, is generally similar to that described in the Item on the 14-lb. bomb, but has no knurled rings in the exterior of the case. The propellant charge, $17\frac{1}{2}$ grams. of Cordite W.M., is composite and is made up of $8\frac{3}{4}$ grams. of size 118 and a similar weight of size 061.

The overall length of the bomb is approximately 27.2 inches. The diameter of the vane assembly and the maximum diameter of the body are both six inches.

The bomb with cartridge in position but unfuzed is packed in a rolled paper container. The container and its closing cap are each fitted with a tinned plate end piece. The cap is attached to the container by a webbing band with buckle and is fitted with a hardwood plug on the inner side of the end piece which enters the tail tube of the bomb. The container is fitted with a webbing handle and its stowage dimensions are, length 28.9 inches, diameter 6.5 inches.

The explosive quantity is 8.8-lb. and the classification for storage is Group VIII, Category Z.

338. FUZE BASE PERCUSSION NO.283, MARK I.
Fig.120.

The fuze is used with 20-lb. H.E. bomb of the 29-m.m. spigot mortar and is of the detonating type with a graze action.

The fuze body, of die cast mazak, is cylindrical in shape and is without external screwthreads. An expanded rubber disc is cemented to the base of the fuze which when compressed in the assembled bomb ensures the close contact with the exploder for successful detonation. Three channels and a number of recesses are formed in the body. One channel accommodates the graze or inertia pellet and creep spring, another accommodates the shutter detent with its spring. The third is a bye-pass for the escape of pressure set up by the accidental firing of the detonator in the safe position. The channel accommodating the graze pellet is partially closed at the base end by a mazak washer which is secured by the turned over edge of the channel.

The front end of the body is recessed in varying diameters to accommodate the shutter, the magazine disc, and the magazine. The portion which receives the magazine is screwthreaded.

The graze pellet carries a mild steel needle and is in the form of a mazak cylinder with three equi-distant semi-circular grooves formed on the exterior along its length.

The detent which retains the shutter in the safe position until displaced by 'set-back' consists of a brass cylinder located to engage one side of the mazak shutter which carries a 5 grain disruptive detonator containing a sensitizing layer of detonating composition over 3 grains of lead azide. With the shutter in the safe position its spring is under compression and the detonator is positioned under the bye pass channel in the fuze body.

The mazak magazine disc has a notch formed on its periphery to engage a projection in the fuze body, thus locating the disc in a fixed position and has a lightly closed channel leading to the magazine.

The magazine consists of a mazak cylinder, - of smaller diameter than the body - screwthreaded on the exterior for assembly, containing a perforated pellet of C.E. and closed at the front end by a tinned mild steel plate.

Action.

On acceleration the detent sets back compressing its spring and releasing the shutter. The shutter is then rotated on its axis by its spring and detonator brought into alignment with the needle of the graze pellet and the fuze is armed. Creep action by the graze pellet during deceleration in flight is prevent by the creep spring. On graze, the momentum of the graze pellet overcomes the creep spring and moves forward thus causing the needle to pierce the detonator.

Packages for this fuze have not yet been approved.

339. BOMB, SPIGOT, MORTAR, PRACTICE, 29-M.M. 14-LB. MARK I.

The bombs consists of a body the same as that of 3-inch M.L. mortar bomb and a driving assembly the same as that used with the 14-lb. H.E. bomb (See Item 336). The body is filled with an inert weighting material.

The cartridge which is identified by a black band around the case is similar to that for the 14-lb. H.E. bomb but has a 20 grain priming of gunpowder and the propellant charge consists of 12 grams of Cordite W.M. The charge is composite and is made up of 9 grams of size 061 and 3 grams of size 118.

340. PETARD, NO.1, MARK I.
Fig.121.

The petard consists of a rectangular container of black moulded plastic, approximately 2.1 x 2.2 x 4.1 inches in dimensions, which contains a charge of baratol, picric acid or T.N.T. The lid, also of plastic, is shaped to form a pocket to hold the detonator and is secured by a brass sealing strip. The outer end of the pocket is screwthreaded to receive a plug, a percussion fuze or an adapter.

Markings.

The presence of the explosive filling is indicated by a red band near the head.

A baratol bursting charge is indicated by the letters "BAR" followed by the mixture fraction stencilled on a green band.

A T.N.T. bursting charge is indicated by the letters T.N.T. stencilled on a green band.

A picric acid bursting charge is indicated by the letters "LYD" stencilled in white.

The lot number, also the month and year of filling are stencilled in white.

Initiating Arrangements.

The petard is fitted with a No.27 detonator when prepared for use and is initiated by means of the "Fuze, percussion, petard" which is inserted over the detonator or by means of "Trip Mechanisms" No.4, 5 or 6. When a trip mechanism is used it is attached to the petard by means of an adapter. The adapter consists of a brass tube with an external screwthread at each end. One end of the adapter is screwed into the detonator pocket and the other receives the trip mechanism.

Fuze, percussion, petard (Fig.122).

The fuze consists of a striker held, with its spring under compression, by a pull-out pin and a cap holder which positions a .5 grain cap in the path of the striker and is designed to accommodate the open end of the No.27 detonator. The pull-out pin is provided with a safety collar which is hinged to its outer end and encircles the head of the fuze. The safety collar is fitted with a split ring as a means of removal. The cap holder is provided with milling and an external screwthread for insertion in the detonator pocket.

The brass cylindrical body of the fuze has a diameter of .5 inch and the overall length of the fuze is approximately 3 inches.

Packing.

Box, outfit, petards, M.122 Mark I, holds :-

25 petards No.1.
25 fuzes, percussion petard.
25 detonators No.27 in cylinder No.274.
10 adapters.

The box is made of wood and has the following stowage dimensions 22.4 x 10.3 x 6.3 inches.

Storage Classification.

These stores are classified as Group VIII, Category Z.

341. GRENADES, S.I.P. INSPECTION AND PROOF.

1. Markings.

Boxes containing S.I.P. grenades have not hitherto been marked with the date of filling. From 1.6.41 crates of S.I.P. grenades will be marked with the month and year of filling. The following will give some indication of the age of undated S.I.P. grenades :-

(a) Red capped grenades were filled between 8.40 and 10.40. None have been filled since, and, in future, filling of this type will be dated.

(b) Green capped grenades were all filled between 11.40 and 5.41, if undated.

2. Inspection.

Grenades will be inspected and tested or proved, if necessary, by "dates". The percentage of each date to be inspected is left to the discretion of Inspecting Ordnance Officers, and should normally be from 1 per cent. to 5 per cent. of the date. For undated grenades, Inspecting Ordnance Officers must use their discretion in grouping stocks according to their past history and conditions of storage. Grenades should not normally require testing or proof if less than two years old, provided that they have been stored under proper conditions.

Inspection of grenades will be carried out to ascertain :-

(a) Serviceability of crown corks; see para.5.

(b) That glass bottles have not developed cracks; see para.6.

(c) Condition of crates and correctness of markings.

3. Testing and proving.

In addition to the inspection above, tests are necessary to ascertain the condition of crown corks and the liability of bottles to crack, and a proof is required for correct functioning. Details of the tests and proof follow.

4. Selection and quantities for proof and test.

"Dates" of 1200 or more will be tested and proved separately; smaller dates may be grouped into quantities not exceeding 2,400, provided all dates so grouped fall within a period of not more than three months.

For test and proof, red-capped and green-capped grenades must not be grouped together.

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

Undated grenades should be grouped according to the type of storage, condition and history of the grenades at the discretion of the Inspecting Ordnance Officer, preferably into groups of about 2,400.

Twelve grenades will be taken from each group or "date" for tests and proof.

5. Testing of crown corks.

Crown corks may be tested in two ways :-

(a) Thumb test. - Press hard on the cork with the thumb; the cork should not crack or become loose.

(b) Immersion test. - The grenades should be immersed in water for a period of two hours, during which the temperature of the water should be maintained between temperature limits of 90 degs. to 110 degs. F. in temperate climates, or in warm climates at temperatures of 20 degs. F. above normal summer temperature for the station. The corks should not become loosened or show any signs of leaking.

The immersion will be applied wherever possible in preference to the thumb test.

Six grenades of each "date" or group of "dates" will be tested. If any grenade fails this test the date concerned will be provisionally sentenced 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.

6. Test for cracking of bottles.

During the inspection of grenades, any bottles showing flaws or incipient cracks will be set aside for this test. Six of these, or if none are found, six of the twelve selected for test and proof will be tested by dropping base downwards on to a wooden sleeper (or similar firm wood surface) from a height of four feet (4 ft.). 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.

There is no objection to using the grenades which have passed the crown cork test for this test, provided they have cooled down before dropping.

7. Firing Proof.

If the grenades pass the "crown cork" and "cracking" tests, they will be sentenced on firing proof results as follows :-

Twelve grenades will be thrown 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 not shaken up before throwing. Grenades which have passed the tests given above will be used for this purpose. All grenades should break; all should ignite without a delay of more than 3 seconds; a proportion of the burning contents of each grenade should adhere to the wall.

Sentencing in firing proof. - If on first proof there are more than two of any particular type of failure, or if the total number of failures exceed 3, 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 total failures exceed three, the sentence will be provisionally unserviceable.

342. SHELL, S.B., H.E., 3-INCH: COMPLETE ROUND.
Fig.123.

The following details are published in amplification of those given in Item 264 and Fig.85, Bulletin No.19:-

(a) Fuze, percussion, No.245, is also used in this shell. Details of this fuze are given in Item 343. Details of the bakelite fuze, referred to in the previous item on this ammunition (Item 264) are shown in Fig.53, Bulletin No.17.

(b) The detonator used is the service detonator No.27 or the commercial lead azide detonator No.8.

(c) The xylonite tube of the primer is secured at the forward end by a fillet of approved cement and is surrounded by a strip of paper secured by shellac adhesive. A paper disc is secured also by shellac adhesive at the rear end of the primer tube.

(d) The periphery of the paper container, or diaphragm, in the cartridge is secured between the junction of the front and rear portions of the case.

(e) The protecting disc is secured in position to cover the igniter by means of adhesive.

(f) The following markings appear on the base of the cartridge :-

Monogram of filling station.
Month and year of filling.
Lot number.

(g) The overall length of the complete round with fuze No.245 is 8.3 inches. The maximum diameters of shell and cartridge are 3.17 and 3.64 inches respectively.

NOTE.

Rounds of early manufacture may be met with in which the flat portion near the centre of the base of the shell is not in close contact with the cartridge. This does not affect the serviceability of the round.

343. FUZE, PERCUSSION, NO.245, MARK I.
Fig.123.

This fuze has an "Always" action and is used in the 3-inch S.B. H.E. shell.

The fuze consists of a light cover and body of brass or tinned plate enclosing the "Always" mechanism which is provided with a spring loaded safety pin secured internally by an arming spring and externally by adhesive tape. This safety device is augmented by a split pin which, together with the adhesive tape - to which it is attached - is removed before firing.

The "Always" mechanism, as will be seen in the drawing, is typical of those included in other fuzes of this nature.

The steel safety pin has a spring under its enlarged head and is provided with a hole to receive a pin fitted to the arming spring.

The steel arming spring is in the form of a disc which is secured above the body of the fuze. A portion of the disc, forming almost a ring just inside the periphery, is cut away and the centre portion thus formed is inclined at an angle towards the safety pin. This inclined portion has a central hole to fit around the striker guide or detonator holder and is fitted with a pin which engages in the hole in the safety pin. This device retains the safety pin when the wrapping of adhesive tape around the fuze has been removed. On firing, acceleration causes the arming spring to set back and release the safety pin which is then ejected by its spring.

For storage and transport the disengagement of the arming spring from the safety pin is prevented by means of a split pin which passes under the inclined portion of the spring. The split pin has a becket to which one end of the adhesive tape is attached.

344. GELIGNITE, INSPECTION AND TESTING.

1. The requirements for inspection and testing of gelignite have been reviewed, and it has been decided that the instructions in paras.72 to 75 of Pamphlet 10, R.A.O.S. Part II, will be modified as follows.

2. Gelignite need not be inspected nor tested if under 12 months old. Gelignites over 12 months old, or whose date of manufacture is not known, will be inspected and tested at intervals depending on the result of the test, as given in para.5.

3. The inspection should consist of 5 per cent. of packages, with a minimum of one, of each lot, and 50% of the cartridges in each package should be opened. There should be no sign of nitro-glycerine exudation, nor of the formation of crystals of metallic salts, due to exposure to moisture. Good gelignite may feel slightly greasy, but though soft it should feel firmly soft; whereas deteriorating gelignite feels extra soft and spongy, and extra greasy.

4. A firing proof will also be taken, at the same periods as heat test, but the firing proof given in para.72A will be superseded by the following test.

Two 4 oz. cartridges will be laid end to end longitudinally on a flat piece of ground, with a space of one inch between adjacent ends. One cartridge will be fired either electrically or by means of a suitable length of safety fuze with a No.33 or No.27 detonator as applicable. Both charges must detonate completely. Two such tests will constitute a first proof for each lot.

5. On firing test, two failures at first proof entails condemnation of the lot concerned, irrespective of heat test result. One failure at first proof entails a second proof of double the number, i.e. 4 tests. Any failure at second proof entails condemnation.

6. Provided that firing proof is successful, the gelignite will be sentenced on the following table :-

Heat Test Result.	Temperate Climates.	Tropical Climates.
Over 10 minutes	1 year	6 months
Over 7 minutes to 10 minutes.	6 months	4 months
Over 4 minutes to 7 minutes.	3 months	2 months
4 minutes and under.	Destroy	Destroy

7. Gelignites giving Heat Test below 7 minutes should not be issued overseas from home stations without prior reference to War Office.

8. C.O.O.s and Inspecting Ordnance Officers should endeavour to ensure that lots giving the lowest heat tests are issued and used up in preference to lots giving higher results.

9. American Gelignites made by Hercules and N.P.C. (National Powder Co.) will not be issued overseas. (57/Engrs/3402 (W S.9.)).

345. PLUGS, FUZE HOLE. TYPES USED FOR PRACTICE.

The following letters added to the nomenclature and stamped in the plug indicate the material of which the plug is made :-

M ..... Metal
S ..... Steel
F ..... Cast Iron.
Z ..... Zinc alloy.

A footnote to Appendix VIII on page 57 of Pamphlet No.1, R.A.O.S. Part II states "Iron plugs will not be fitted in projectiles to be fired "plugged"."

The following plugs (and adapters, where applicable), will be used in filled shell which are to be fired at anti-tank practice :-

Field Equipments.

Q.F. 18-pr. and 25-pr., H.E.
Plug, F.H., 2-inch, No.13M or 13S
or
Adapter 2-inch fuze-hole No.2 Marks II or III with plug F.H. special No.1.

Q.F. 18-pr. Shrapnel
Plug, F.H. 2-inch, No.1, Mks.IIS or M or alternatively Mks.IIS or M.

Anti-Aircraft Equipments.

Q.F., 3-inch, 20-cwt. H.E. - Plug, F.H., 2-inch No.17M or S.
-do- Shrapnel - Plug, F.H., 2-inch No.2, Mks.IIM or S.

Q.F. 3.7-inch and 4.5-inch, H.E. - Plug, F.H., 2-inch, No.17 M or S.
-do- -do- Shrapnel - Plug, F.H., 2-inch, No.1 Mks.IIS or M, or alternatively, Mks.IIIS or M.

346. ROCKETS, U. TEMPERATURE LIMITATIONS TO USE OF TAILS PROPELLING.

The limitation to the use of 3-inch tails to temperatures not exceeding 86°F. (as indicated by the stencilling "86°F.", in red, on these tails) is not extended to the 5-inch tails.

3-inch tails containing propellant charges which have been drilled to overcome irregular burning and are also fitted with igniters containing composition S.R.354 cannot be relied upon to ignite correctly at the temperatures below 32°F. and will not be fired below this temperature. These tails and their boxes are marked (86°F.)-(32°F.). Tails of later manufacture have larger igniters containing composition S.R.371C and are not subject to this limitation.

ENEMY AMMUNITION.

347. AMMUNITION FOR THE ITALIAN 45 MM. BRIXIA MORTAR MODEL 35.
Fig.124.

The ammunition for the 45 mm. Brixia Mortar, Model 35, is a 0.465 Kg. (1 lb.) projectile having a cylindrical steel body 1 with a rounded head 1a. A conical aluminium tail 2 with four vanes 2a is screwed into the rear end of the body. The tail and vanes are painted red.

The bursting charge 21, consisting of 70 grams (1080 grains) of a TNT-dinitronapthalene mixture in a compressed block, is housed partly in an aluminium container 4 and partly in the tail 2. The container 4 is surrounded by a flat-section coiled spring 5, which is probably intended to increase fragmentation, and its front end rests against a steel disc 7.

The fuze comprises a fuze body 8, striker-pin 15, graze pellet 25, detonator 16 and a creep spring 17.

The fuze is provided with two safety devices, one for ensuring safety during storage and the other for ensuring safety in flight.

The device for ensuring safety in storage consists of a brass safety pin 3 which extends transversely through apertures 1b in the head 1a of the body and through similar apertures in the fuze cap 20. This brass pin separates the striker-pin 15 from the graze pellet 25 and prevents arming of the fuze until it is withdrawn by means of a ring 23.

The device for ensuring safety in flight comprises a rotor 11 and a pin 13, which is mounted in the fuze body 8 by means of a stirrup spring 14, so that its point engages in the rotor. When the projectile is discharged, the pin 13, owing to inertia, overcomes the resistance of the stirrup spring 14 and moves back, freeing the rotor 11, which is immediately caused to rotate by the air flowing past the nose of the fuze, thereby unscrewing itself from the screw-threaded stem 15a of the striker-pin and causing the point of the striker-pin to project through the hole in the diaphragm 18 of the striker-pin sleeve 9. The arming of the fuze in this way is not, however, completed until the projectile has travelled about 10 yards from the muzzle of the mortar.

In an earlier model of this projectile, the container 4 is made of brass instead of aluminium, and the graze pellet is in one piece i.e. without any closure cap.

348. ITALIAN - FUZE MODEL 16.
Fig.125.

The fuze model 16, which is used with 120 mm. and 380 mm. ammunition is in the shape of a truncated cone with screw threaded adapter at base to screw into the nose of the shell. The entire fuze - apart from the brass wind-shield at the nose, and base plug - is painted black and the outer casing is stamped

L 11
O. Rb. BO
AG. OS 36 - XIV
27

18

The overall length of the fuze is 7.9 cms., and the diameter at its widest part is 6.2 cms.

The steel outer casing is closed at the top by a brass cover plate or wind shield, fixed at the top end of a cylindrical mouthpiece by a brass ring positioned over the cover plate and fixed by indentations of the rim of the mouthpiece.

A brass base plug with central channel screwed (L.H.) into a brass bush is itself screwed (R.H.) into the base of a steel adapter screw threaded internally and externally.

The steel adapter screws internally into the base of the outer case for about 1 cm., and holds in position, by a flange at the top end, the aluminium housing to the brass cylinder block in which is found the mechanical shutter arrangement.

The brass bush is screwed at the bottom end of the adapter against the aluminium housing and has a central cylindrical cavity containing creep spring and detonator adapter.

The detonator adapter is cylindrical, of reduced diameter at the top half, to carry the creep spring, the lower half being hollow and screw threaded to take the detonator holder which is also cylindrical with a cylindrical cavity in the inner half to hold the detonator. This too is cylindrical and loose, being positioned when the detonator holder is screwed into the adapter. The upper half of the detonator adapter has a central longitudinal channel, down which a needle passes to pierce the detonator on impact or graze.

The aluminium housing is positioned on top of the brass bush thus holding the creep spring in tension. It is fixed by a flange at the top of the steel adapter. The brass cylinder block fits into the lower end of the housing and is positioned by a closing flange at the top end and fixed by a set screw.

The brass cylinder block contains the shutter mechanism and the components are shown in diagram "C". "C" shows the external appearance - a bottom brass cylinder surmounted by a brass positioning disc with a small central guide tube for the second connecting rod, two steel washers (C3) and a closing disc (C4) all attached to the main body by two screws. The central guide tube is positioned directly above the flanged head of the needle supported by the flange on the U end of the horse-shoe centrifugal bolt - see C2, C6 (longitudinal sections) and C7 (transverse section).

The shutter arrangement can be seen from C7, to consist of a centrifugal bolt with a small protruding lug on the inner end, working against a centrifugal spring, held in place by a screw plug. The lug fits into a hole in the side of one of the arms of the horseshoe centrifugal bolt so that until the centrifugal is thrown out, the horseshoe centrifugal bolt and the needle are immovable.

The horseshoe centrifugal bolt is a cylindrical bolt, forked at the end and flattened at the top and bottom so that it cannot move in the channel. The whole of one side is grooved transversely to fit the teeth of the first cog wheel so that as the bolt moves the first cog wheel rotates. This drives a second cog wheel by an axial cog as shown in C6 and the 2nd cog wheel drives a third, and the third a fourth in the same way, so that each cog wheel overlaps the previous one over quite a large area. The 4th cog contacts a stabilizing disc which vibrates as the cogs rotate i.e. as the centrifugal bolt moves outwards. When the bolt moves inwards the cogs rotate but the disc remains still.

Above the brass cylinder block and fitting to the cavity formed by the flange of the aluminium housing, but separate from the latter by a brass washer, is a long aluminium guide shaped at the top end to fit the cylindrical mouthpiece of the outer casing and having a central channel throughout the length. Into the top end of the channel fits the rod with hammer head attached. Inside the channel is the first connecting rod of the same diameter, and below that, protruding from the guide, is a second connecting rod of much smaller diameter so that it passes through the small central guide of the brass positioning disc in the shutter block and emerges in contact with the top end of the needle supported on the arms of the horseshoe centrifugal bolt.

The channel inside the guide has a reduced diameter at the top half so that the hammer head can move forward, but not the first connecting rod whereas they can both move backwards as on impact.

Action: Both graze and direct action.

On firing, the centrifugal bolt immediately flies out leaving the horseshoe centrifugal bolt free to move out under the action of centrifugal force. If this were also to take place immediately, the needle would be released during acceleration and would set back on the detonator,

thus causing a premature in the barrel. To prevent this, the horseshoe centrifugal bolt is controlled by the system of cogs. During acceleration, the cogs set back on one another and the friction set up between the comparatively large faces of contact is sufficient to prevent the bolt moving outwards. On deceleration however the cogs set forward and separate, friction forces are small and the horseshoe centrifugal bolt can move out, releasing the needle which however, owing to set forward remains in its original positions against the second connecting rod.

The detonator holder at this stage tends to set forward but is held away from the needle by the creep spring.

On graze.....the detonator holder sets forward on the needle.

On impact....the impacting force is transmitted through both connecting rods to the needle which pierces the detonator.

In both cases, the flash is transmitted through the flash channel in the base plug to the exploder system.

349. AMENDMENTS.

Bulletin No.17, Item 193, Page 2, para. headed "storage" lines 2 and 5 :-
Delete "3-lbs.11-oz." and substitute "4-lb.4-oz."

Bulletin No.19, Fig.86, arrow indicating the closing disc:-
Delete "Paper Balelite" and substitute "Paper or Bakelite".

Bulletin No.20, Item 275, page 4, col.7, last line :-
Delete "4" and substitute "14"

Item 282, line 3 :-
Delete "Bomb" and substitute "shell"

Item 289, last line:-
Delete "9636" and substitute "9638"

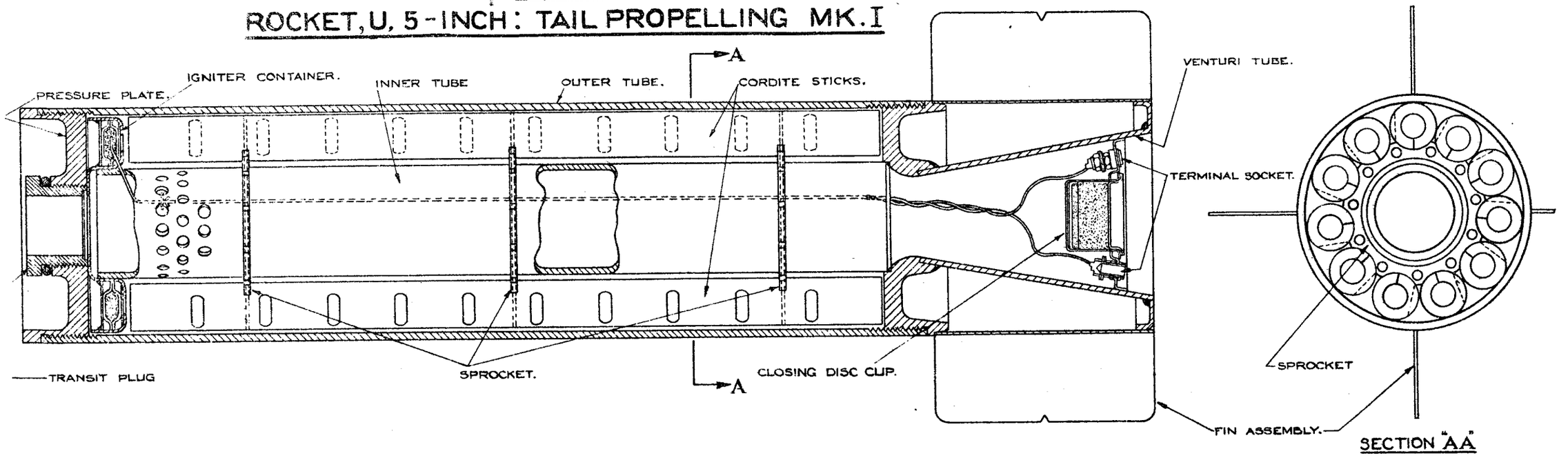
Bulletin No.21:- Item 320, line 3:-
Delete "with two sections" and substitute "and one section".

line 5:-
Delete "two sections" and substitute "the section".

Bulletin No.20, Figs.95 and 96.
Delete "Rocket" from the nomenclatures in each case.

FIG. 108.

ROCKET, U, 5-INCH: TAIL PROPELLING MK. I



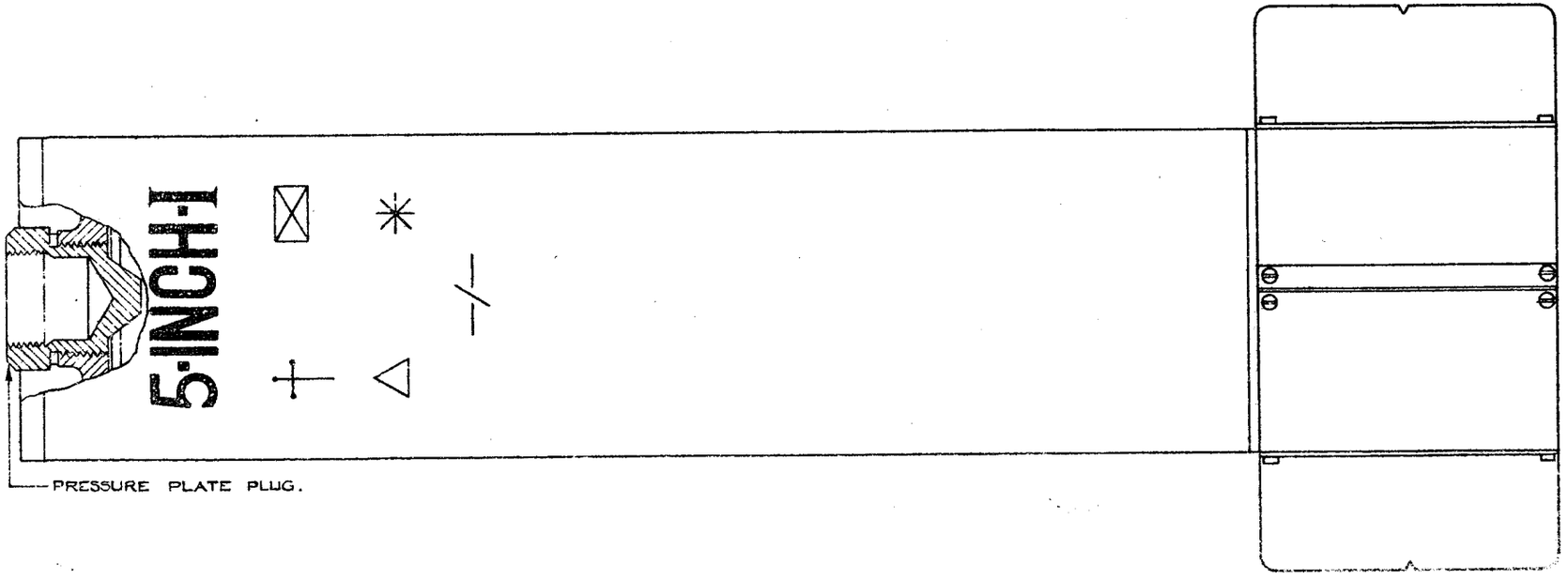


FIG. 110.

FUZE, ELECTRIC Nº F 53. MK. I

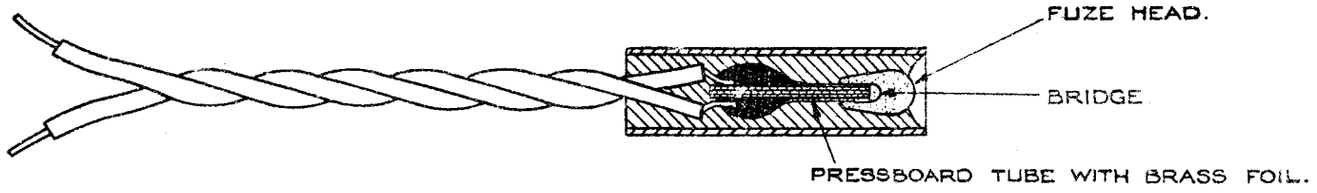


FIG. 109.

ROCKET, U., 5-INCH : BOMB, CHEMICAL MK. I AND FUZE Nº 721 MK. II.

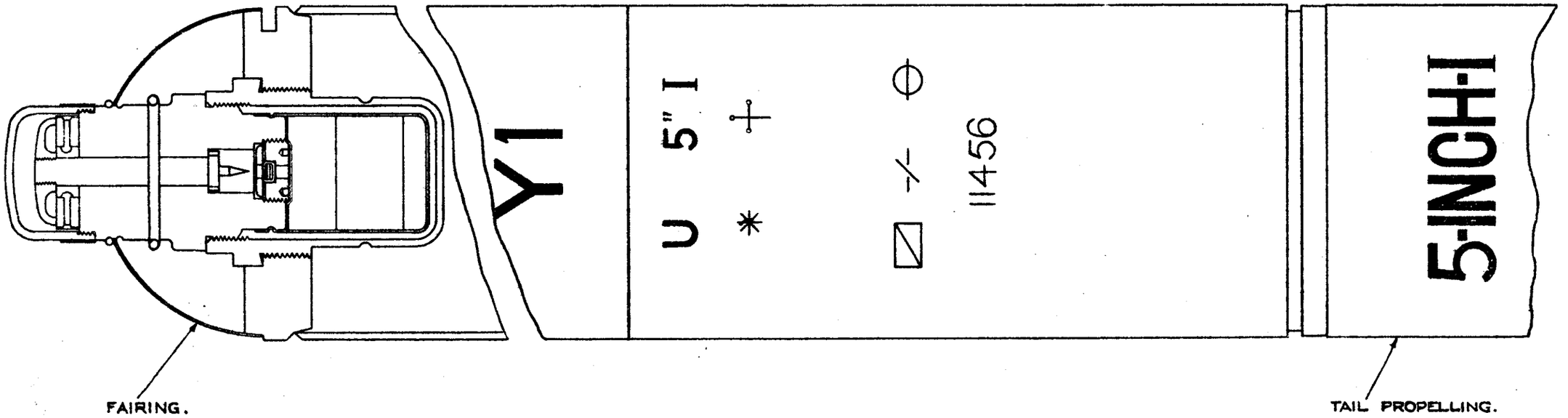


FIG. 115.

SHELL, Q.F. CHEMICAL, B.E., 25 PR. MK. VII .D.

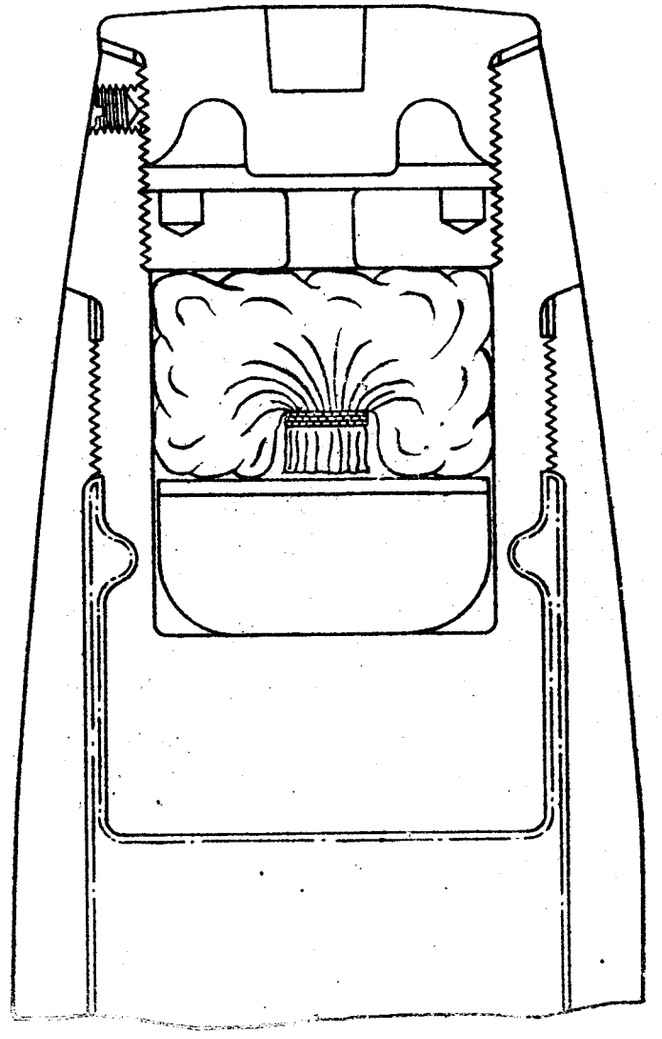


FIG. 114.

SHELL, Q.F. CHEMICAL, B.E., 25 PR. MKS. I.D. TO VI D.

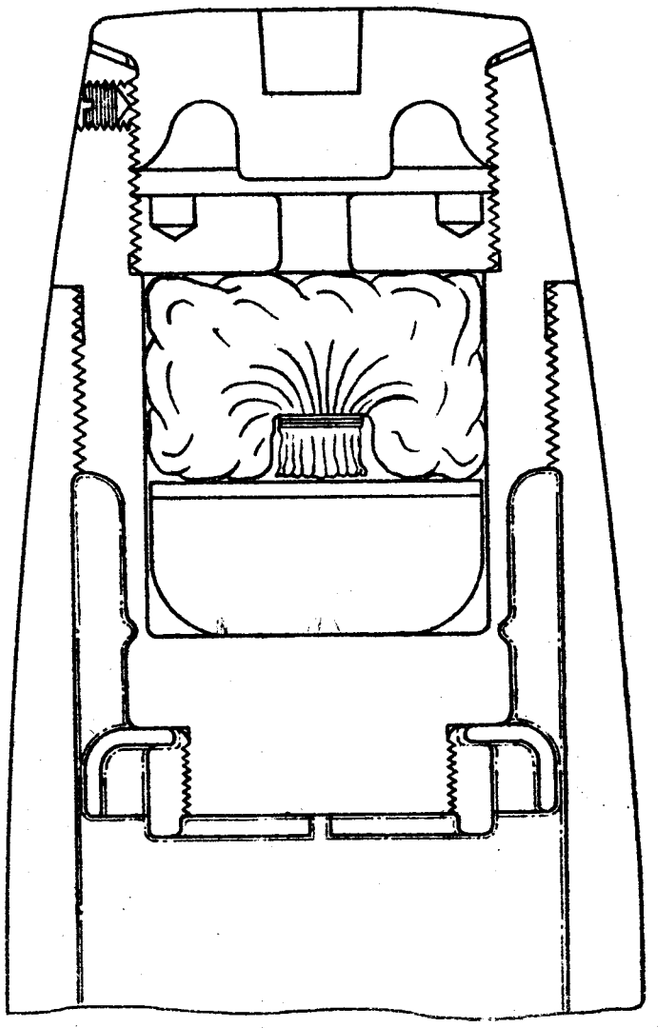


FIG. 116.

SHELL, B.L. CHEMICAL, BASE EJECTION.

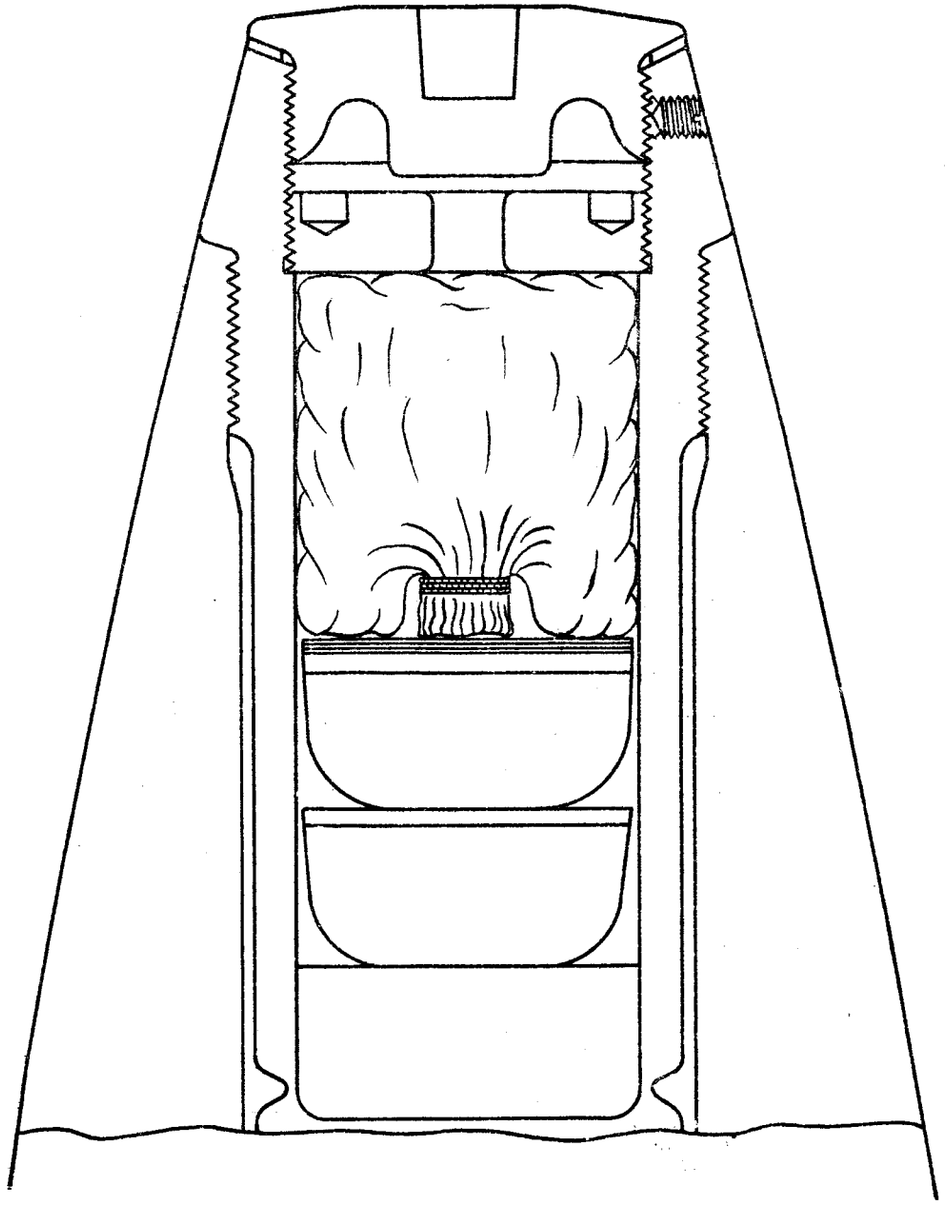


FIG. 113.

SHELL, B.L., CHEMICAL, BURSTING.

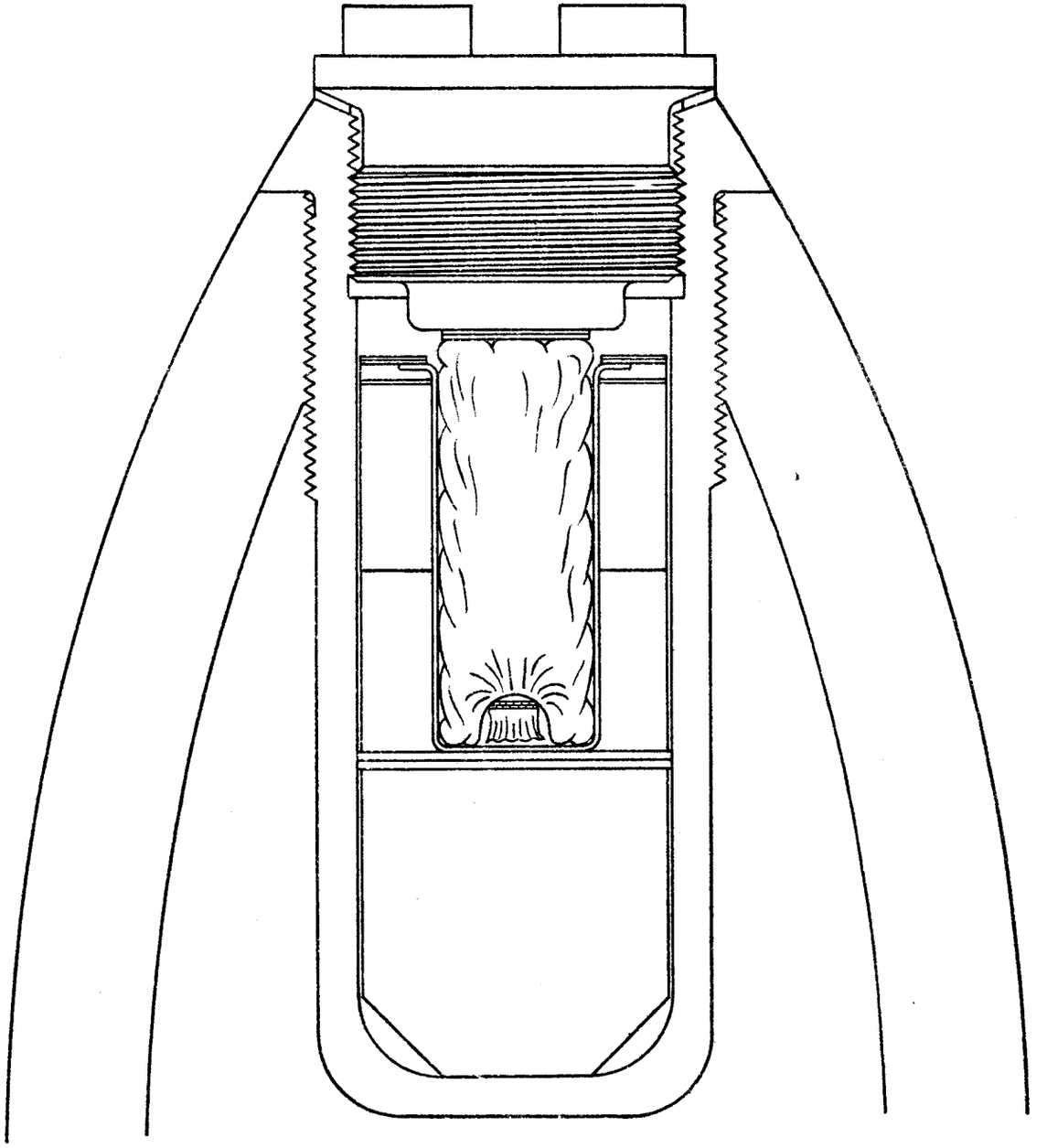
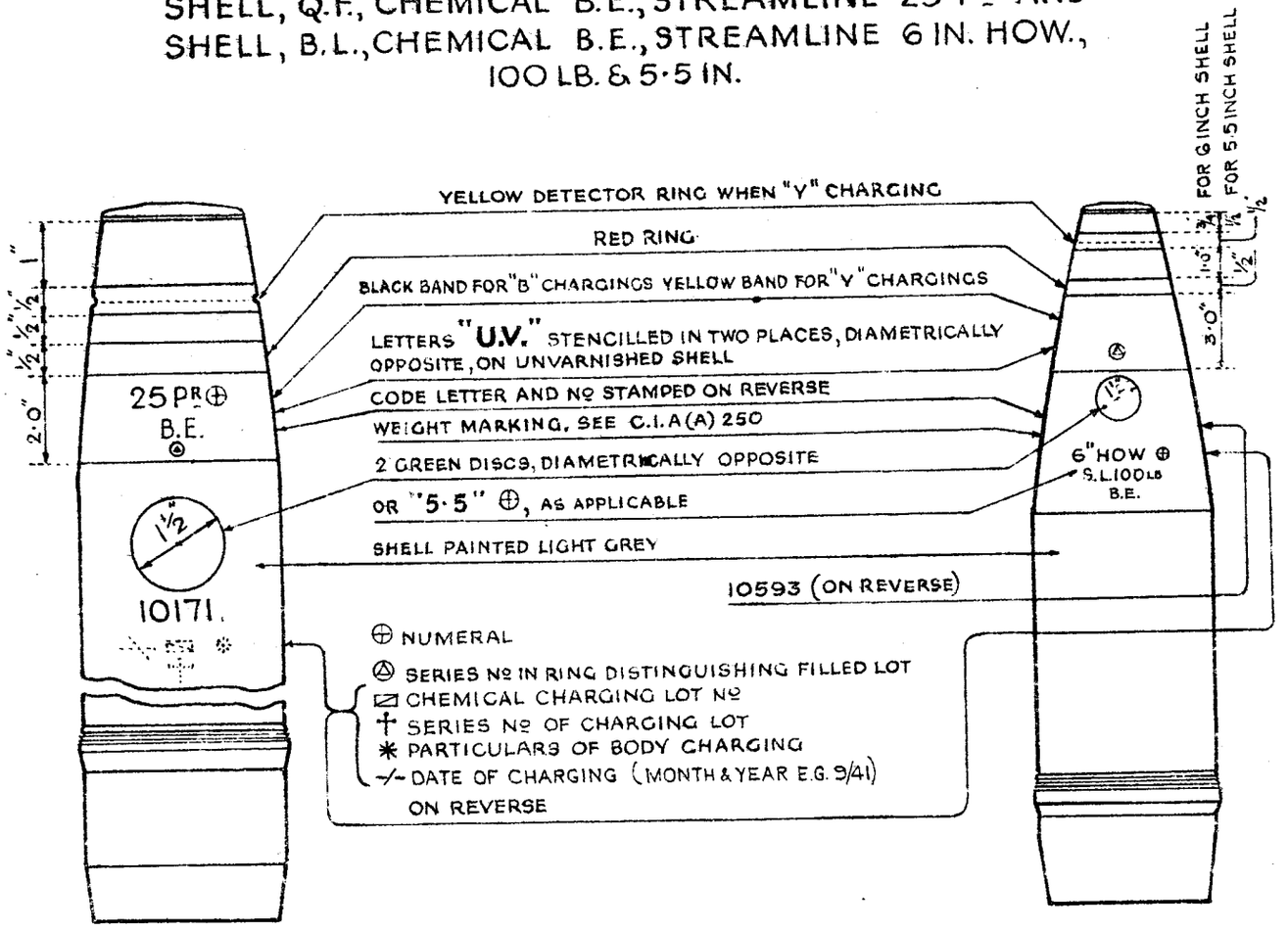


FIG.116.A.

SHELL, Q.F., CHEMICAL B.E., STREAMLINE 25 PR AND SHELL, B.L., CHEMICAL B.E., STREAMLINE 6 IN. HOW., 100 LB. & 5·5 IN.



STENCILLING ——— BLACK ON COLOURED AND WHITE ON BLACK.

FIG. 117.

ROCKET, SIGNAL, THREE STAR, WHITE TRAILER, MK I. T. P.

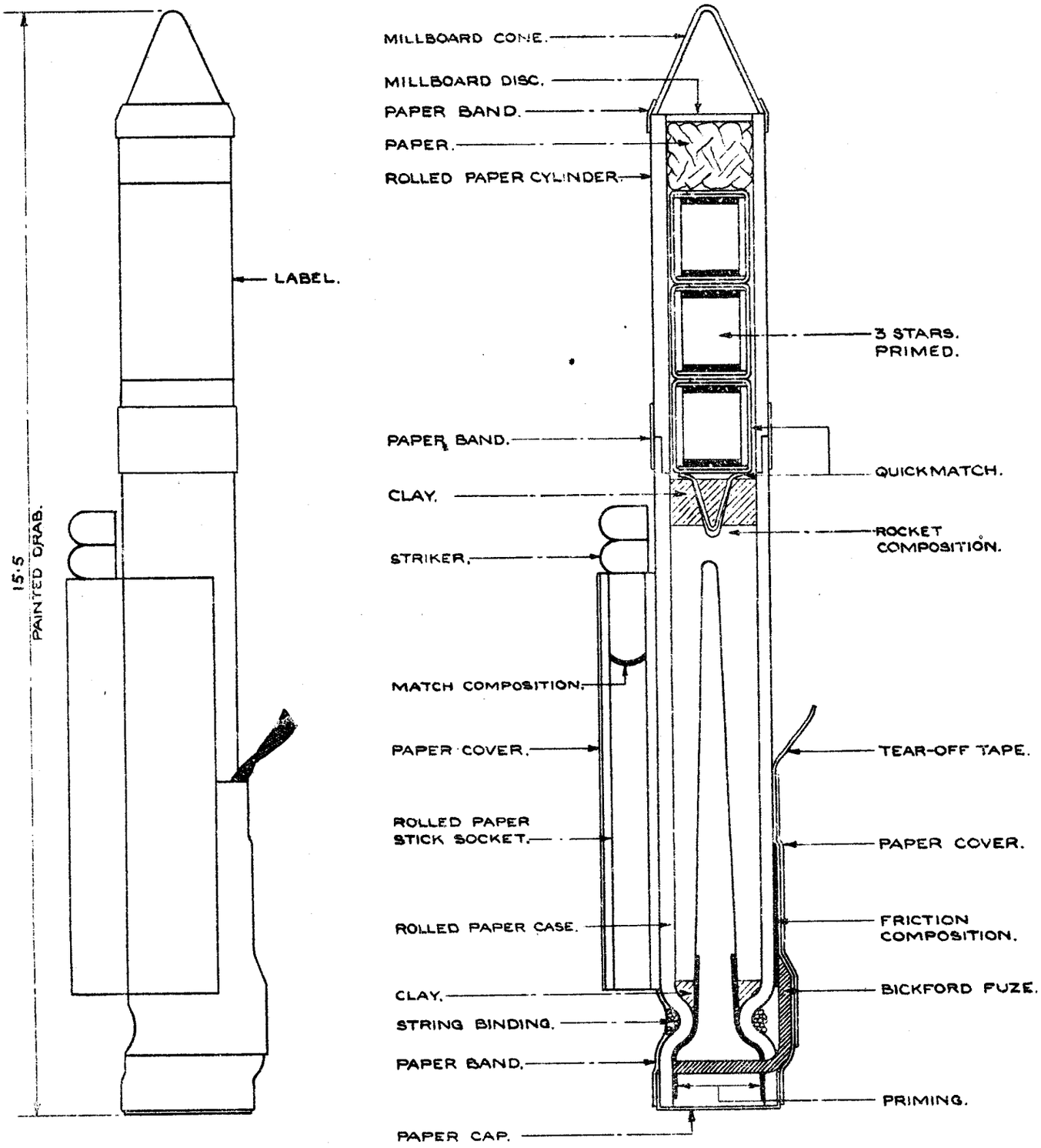


FIG. 118.

BOMB, SPIGOT, MORTAR, H.E., 29 M.M. 14 LB. MK.I.

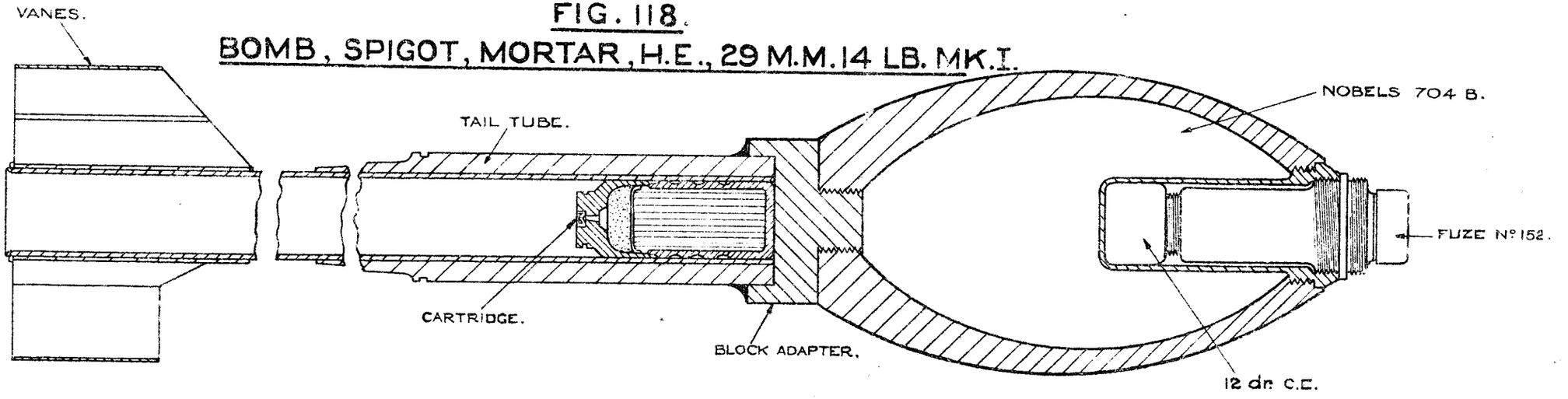


FIG. 119.

BOMB, SPIGOT, MORTAR, H.E., 29 M.M. 20 LB. MK.I

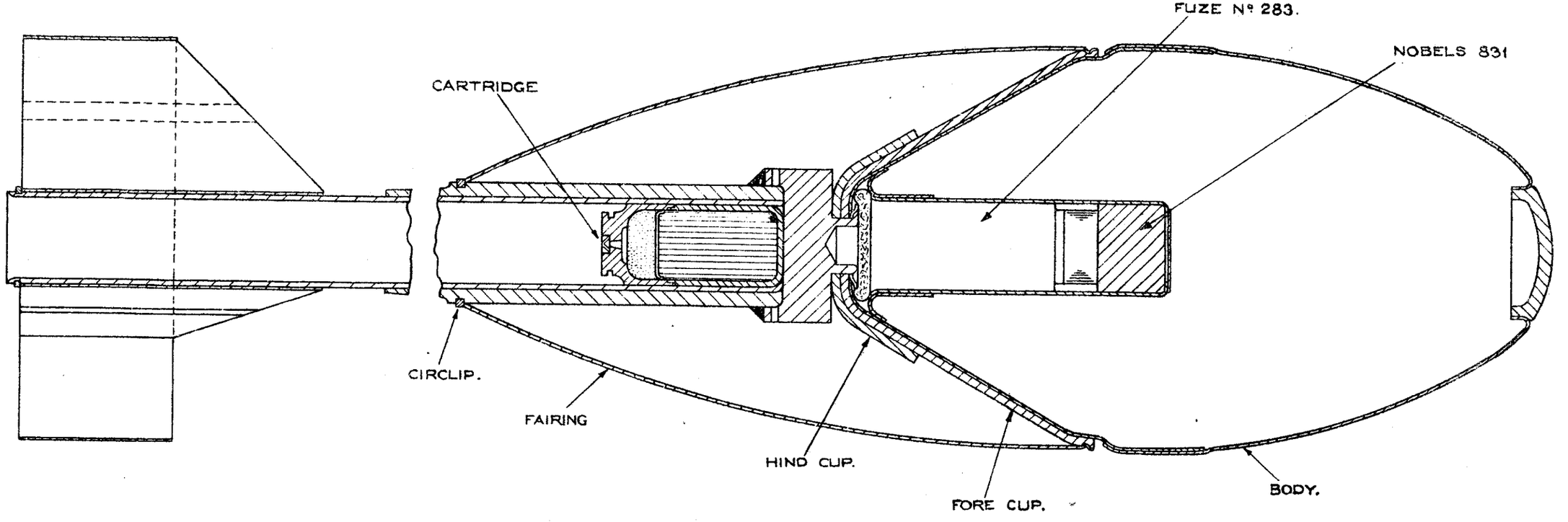
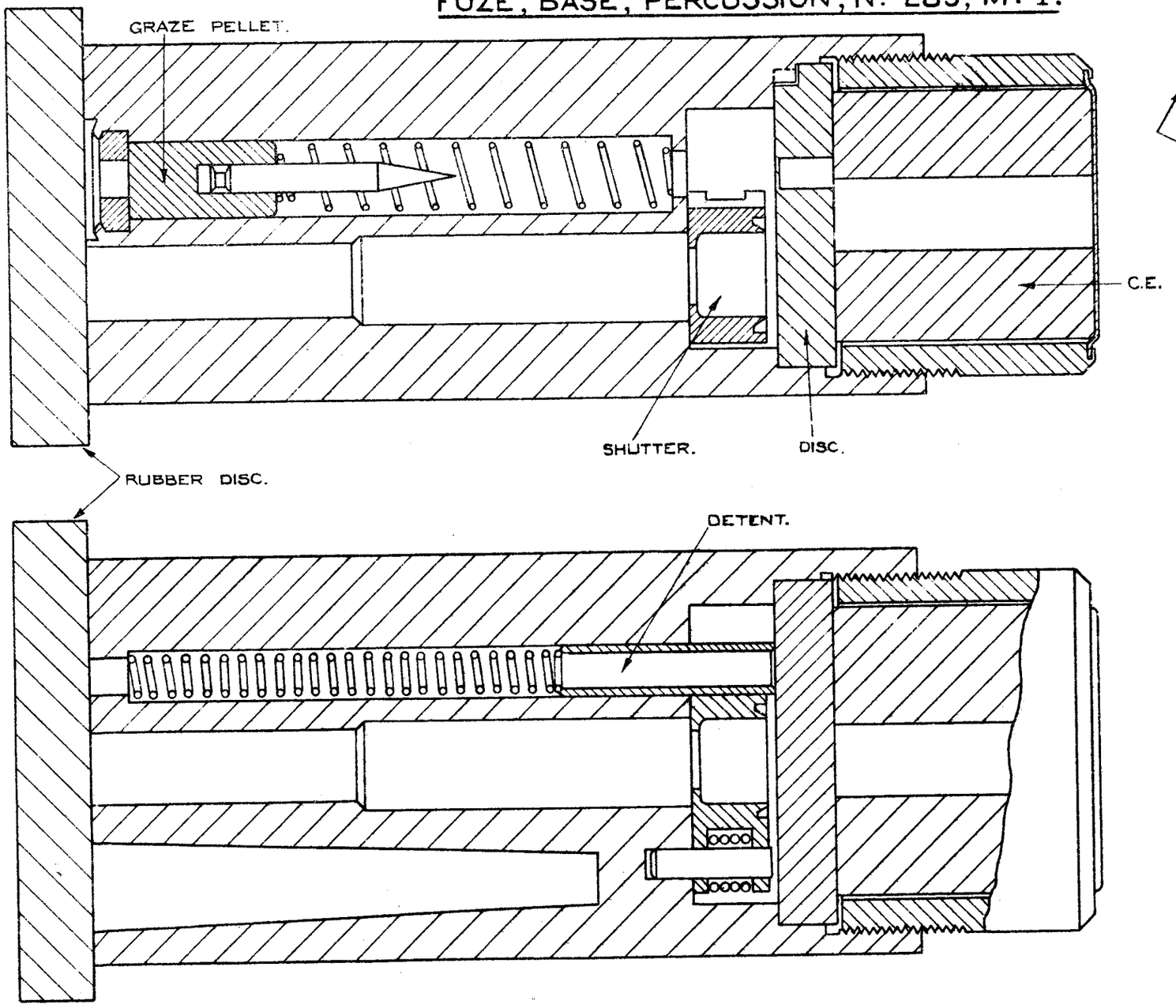


FIG. 120.

FUZE, BASE, PERCUSSION, Nº 283, Mk I.



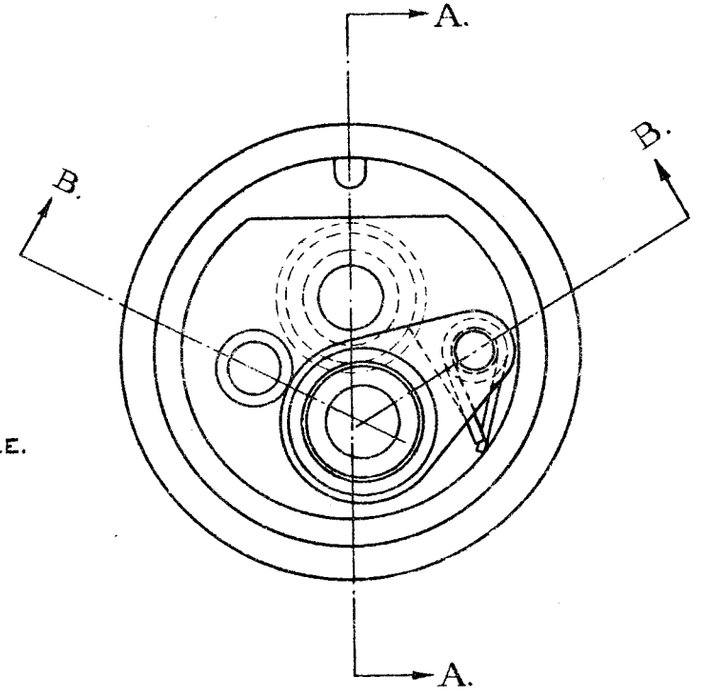


FIG. 122.
FUZE, PERCUSSION, PETARD.
(Scale 2/1)

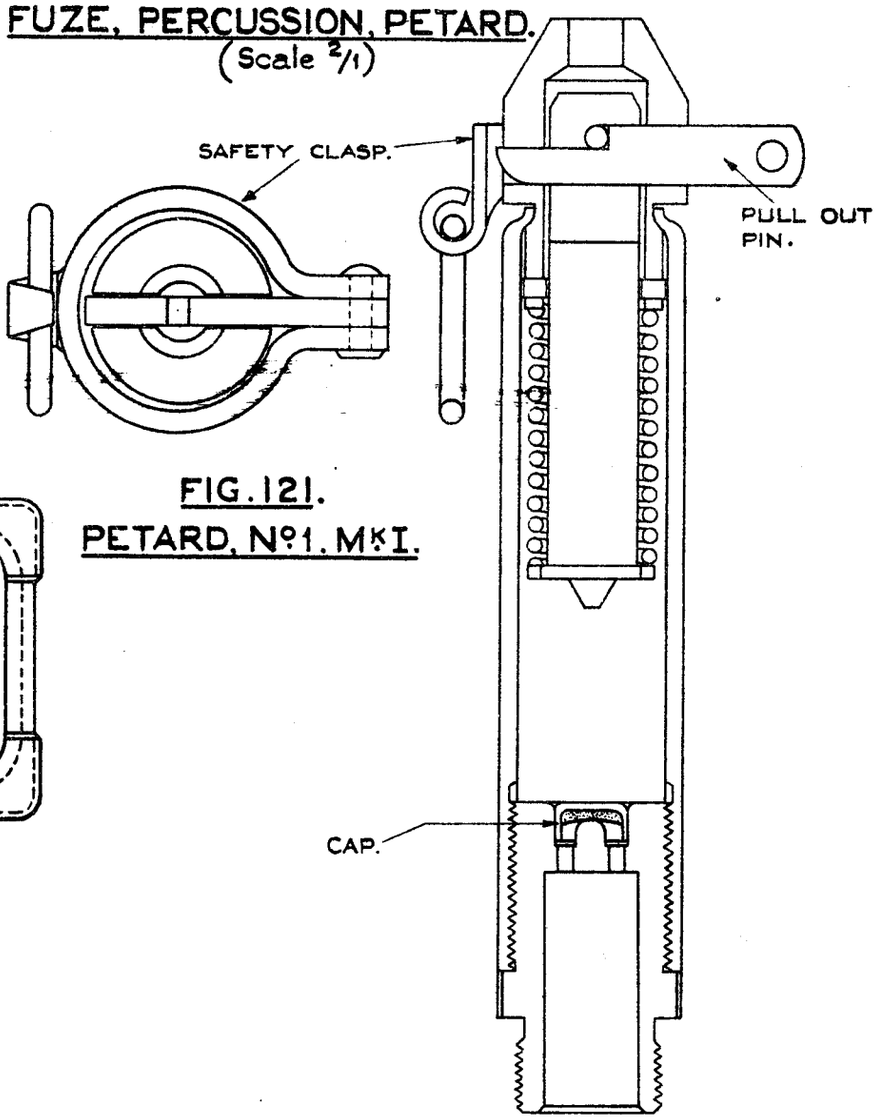
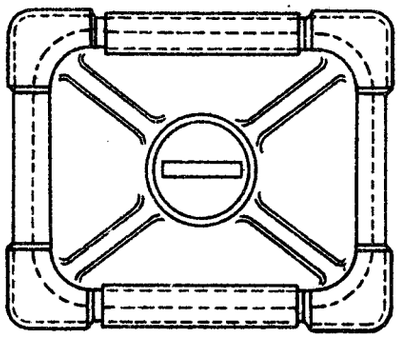


FIG. 121.
PETARD, No 1. MK I.



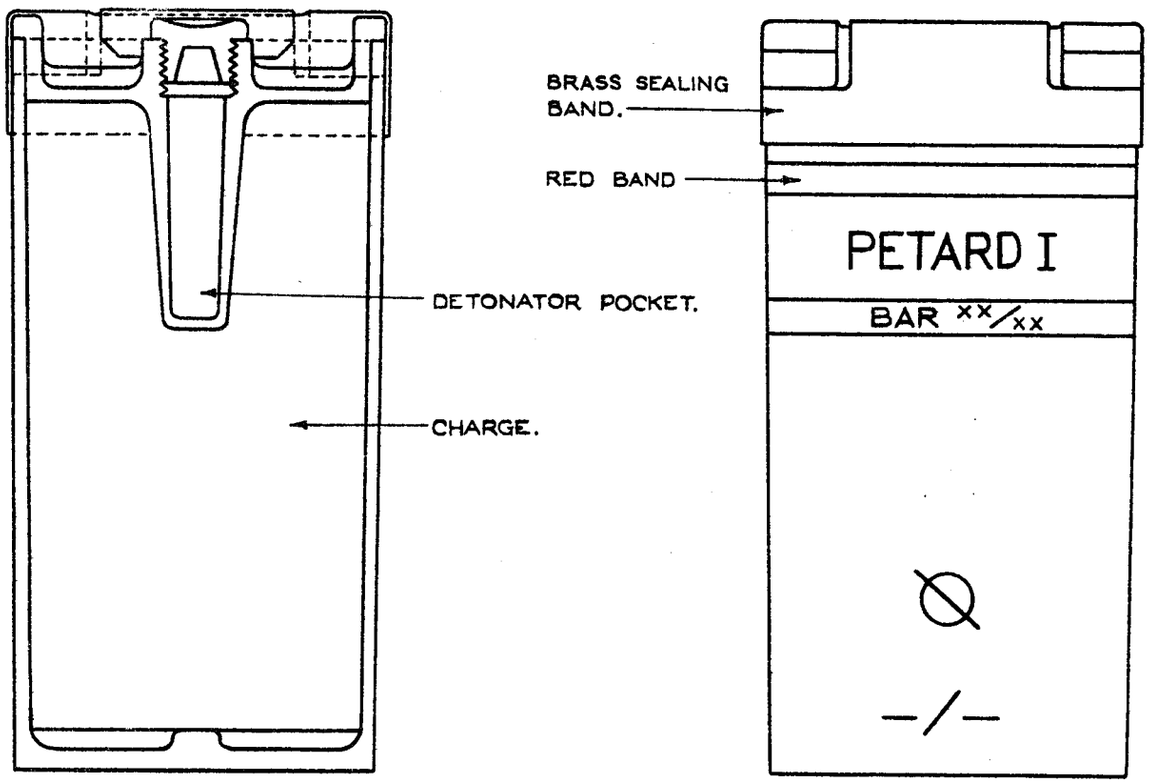


FIG. 123.

SHELL, S.B., H.E., 3-INCH COMPLETE ROUND.

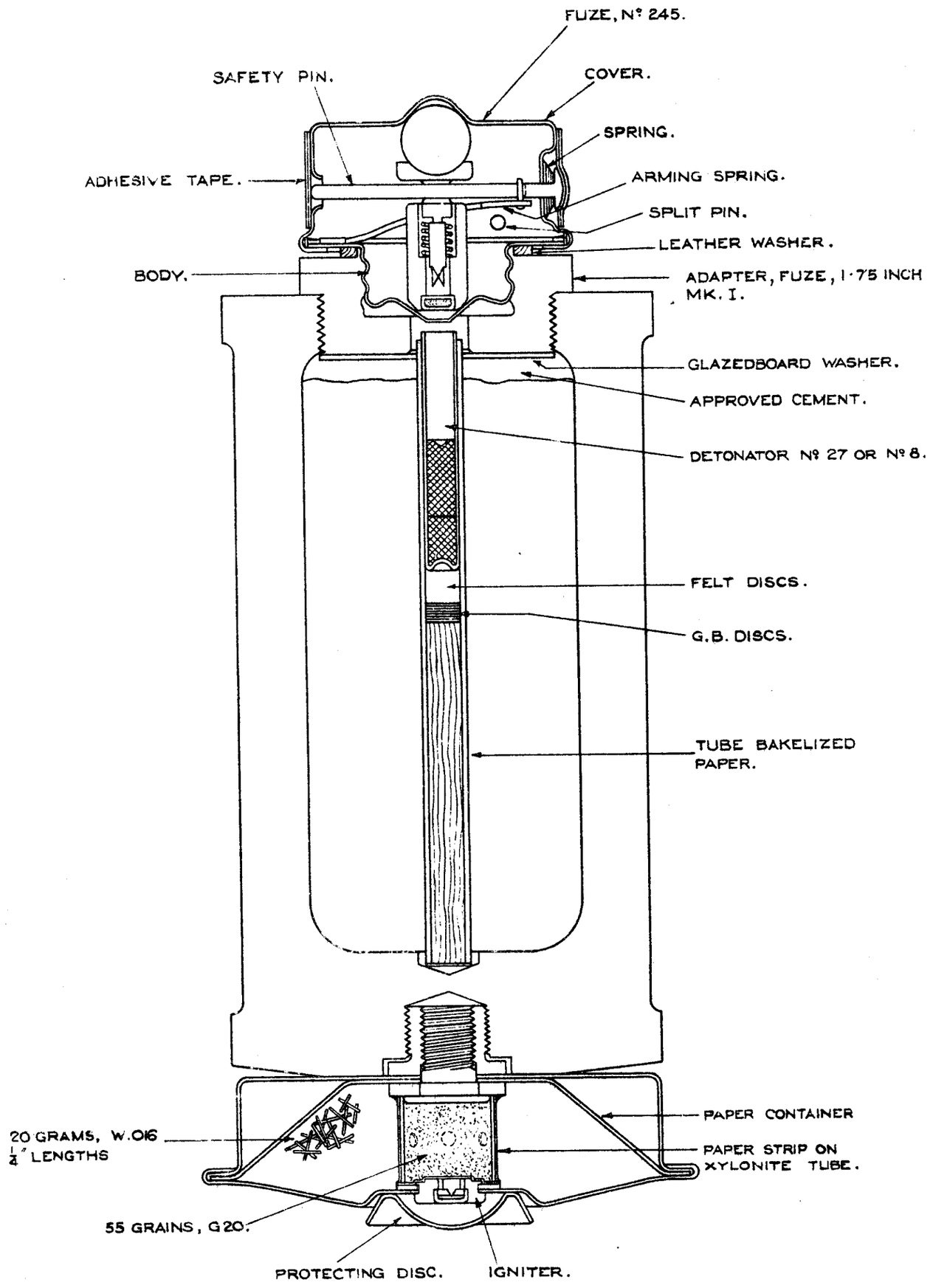
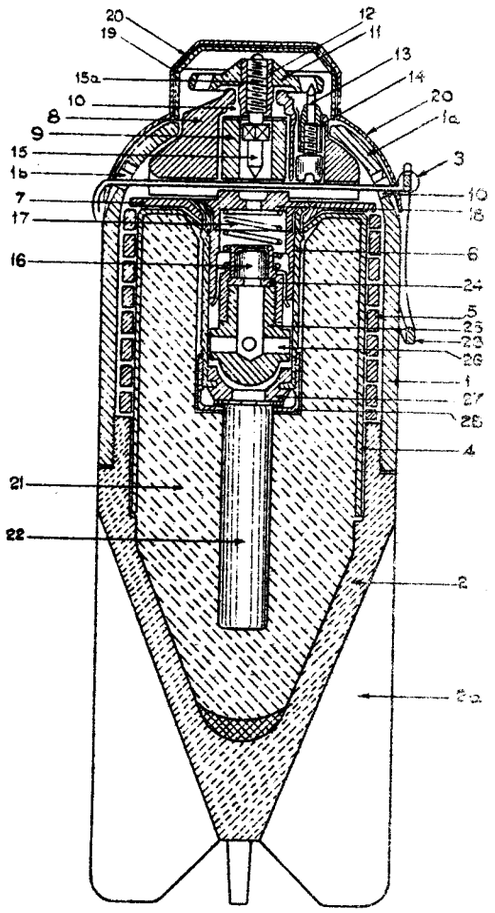


FIG. 124.

BOMB, H.E. 4·5 M.M. BRIXIA MORTAR, MODEL 35.



KEY TO DIAGRAM.

1. CYLINDRICAL BODY.
1a. ROUNDED HEAD.
1b. APERTURES FOR SAFETY PIN.
2. TAIL.
2a. VANES
3 SAFETY PIN.
4 ALUMINIUM CONTAINER.
5 FLAT-SECTION COILED SPRING.
6 GUIDE TUBE FOR GRAZE PELLET.
7 STEEL DISC.
8 FUZE BODY.
9 STRIKER -- PIN SLEEVE.
10. WASHER.
11. ROTOR.
12. ROTOR HUB.
13. PIN FOR PREVENTING ROTATION OF ROTOR.
14. STIRRUP SPRING.
15. STRIKER - PIN.
15a. SCREW-THREADED STEM OF STRIKER SPRING.
16. DETONATOR.
17. CREEP SPRING.
18. DIAPHRAGM OF SLEEVE 9.
19. ROTOR CAP.
20. FUZE CAP.
21. BURSTING CHARGE.
22. GAINE.
23. RING.
24. WASHER.
25. GRAZE PELLET WITH CLOSURE CAP.
26. FIRE HOLES.
27. HEAD WASHER.
28. ADAPTER FOR GAINE.

FIG. 125

ITALIAN FUZE MODEL 16

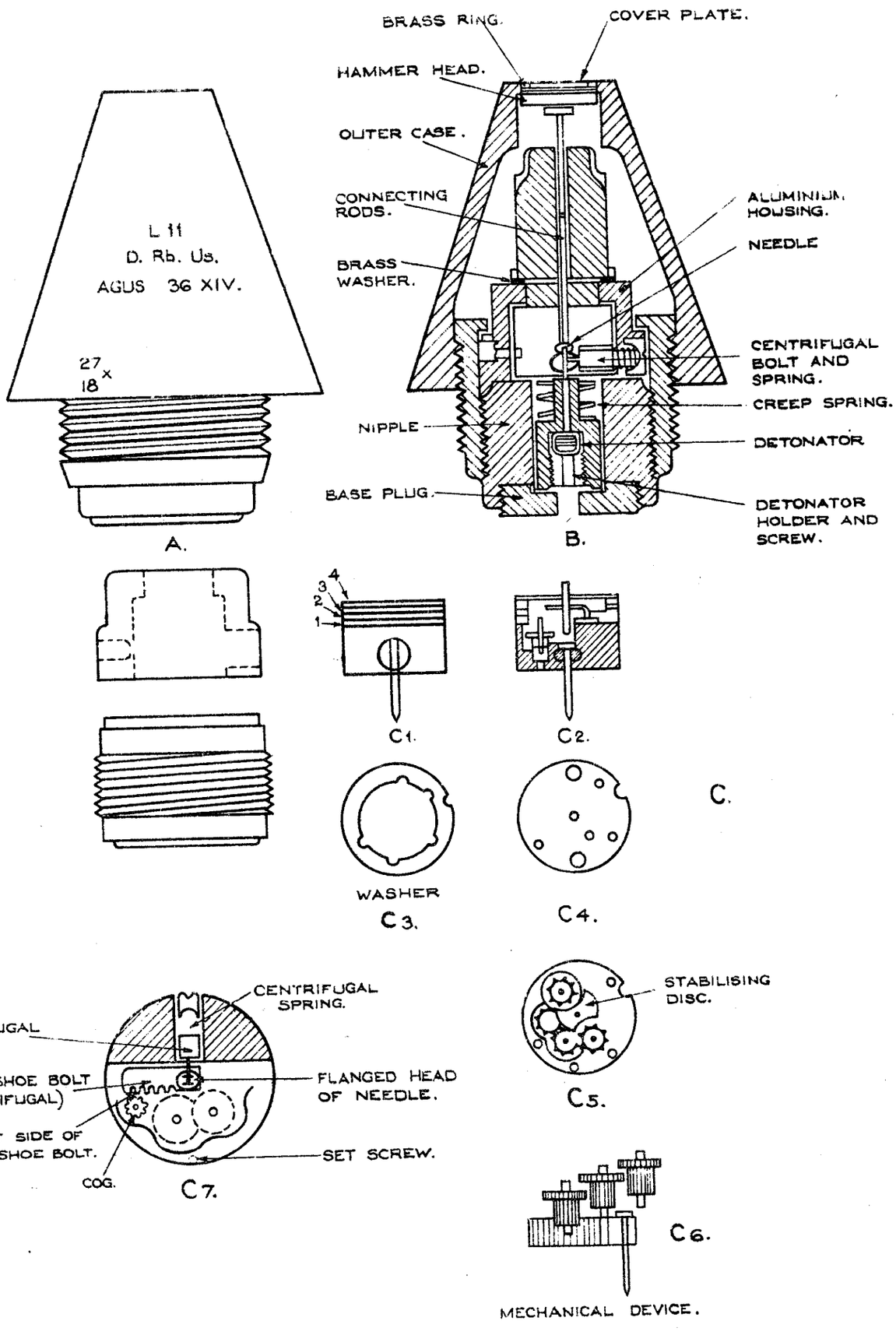


FIG.111.

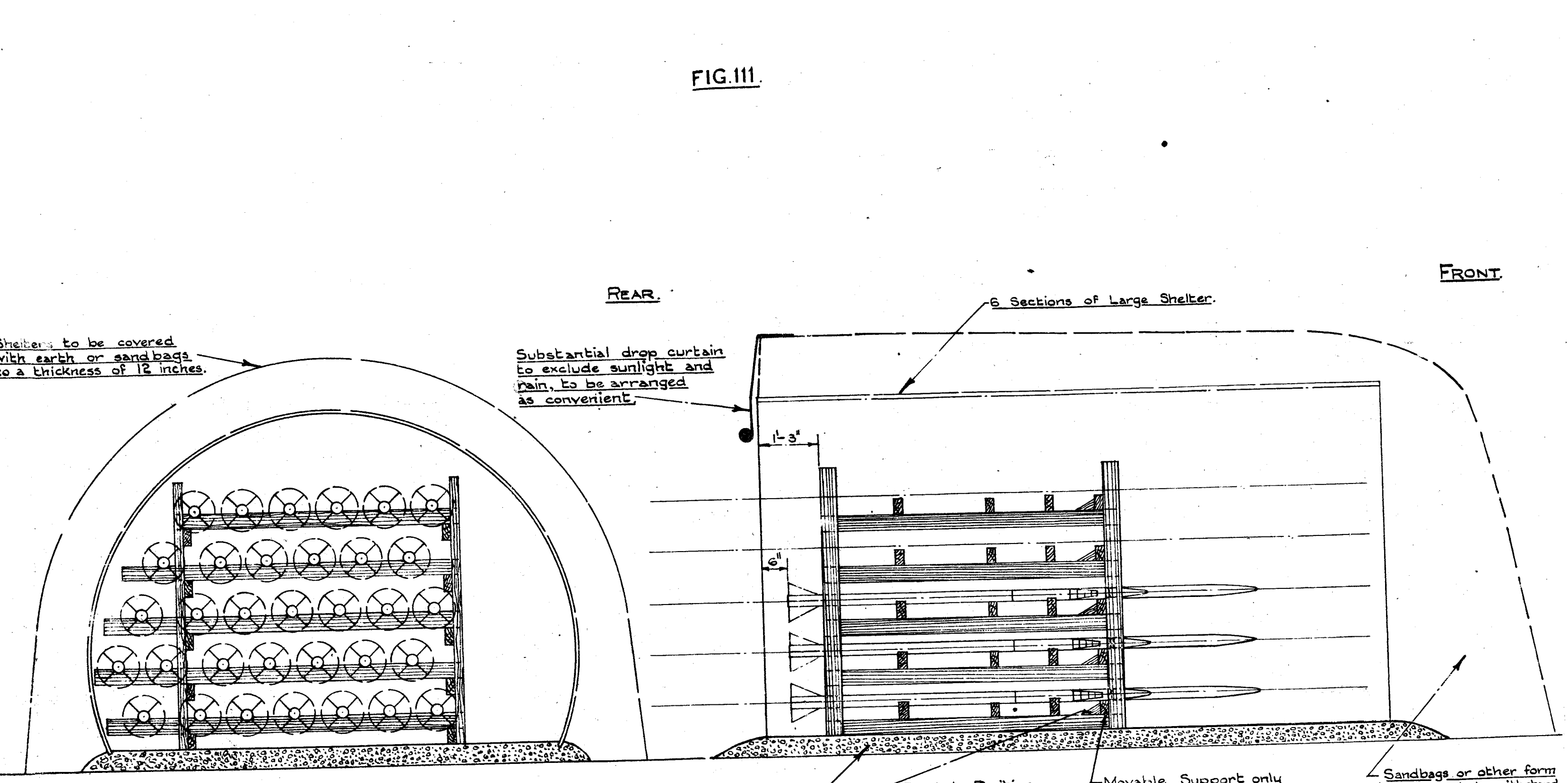
REAR.

FRONT.

Shelters to be covered with earth or sandbags to a thickness of 12 inches.

Substantial drop curtain to exclude sunlight and rain, to be arranged as convenient.

6 Sections of Large Shelter.

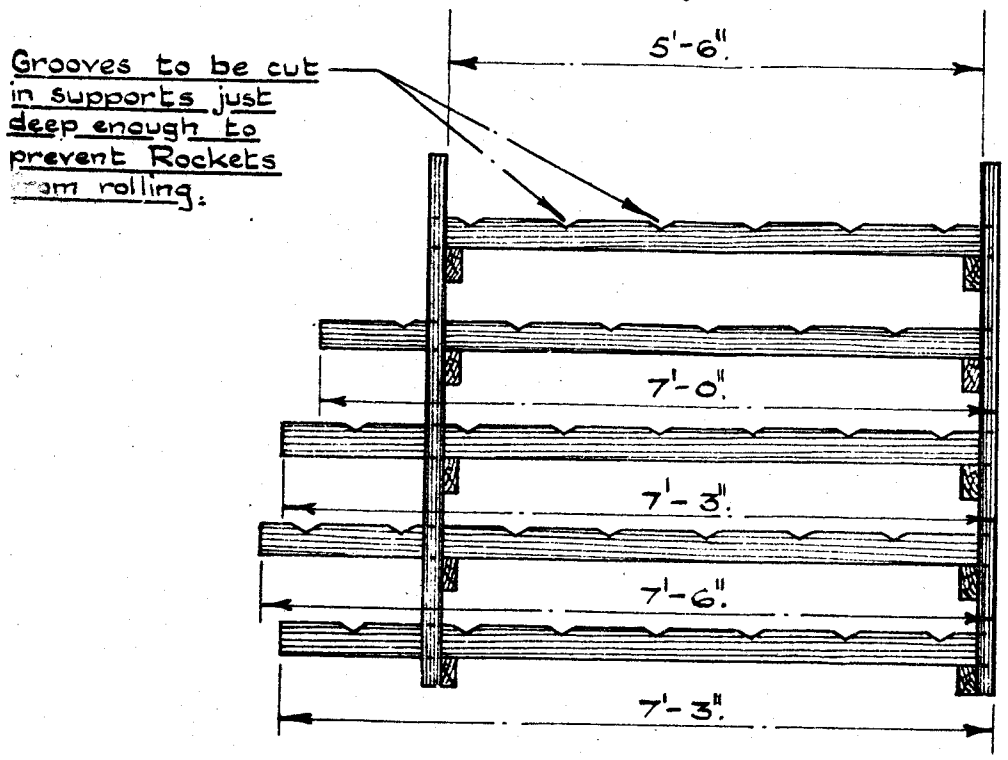


METHOD OF STORING 33 ROCKETS. (END VIEW)

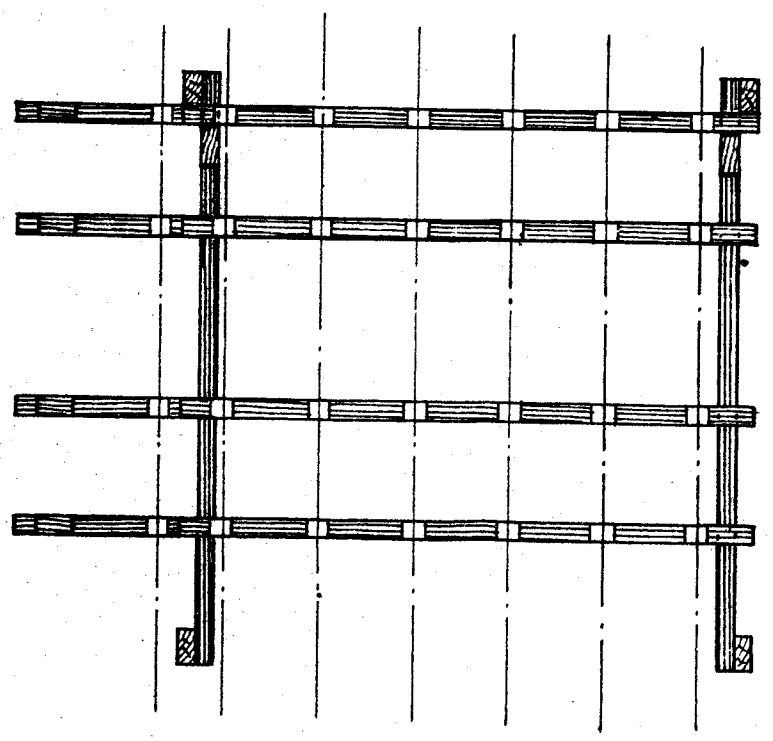
STORAGE OF "READY FOR USE" AMMUNITION FOR PROJECTOR, ROCKET, U, 3 INCH A.A. IN LARGE ANDERSON SHELTERS.

PLAN No 53
I.P.C/D.O.
H.J.L. 31-7-41.

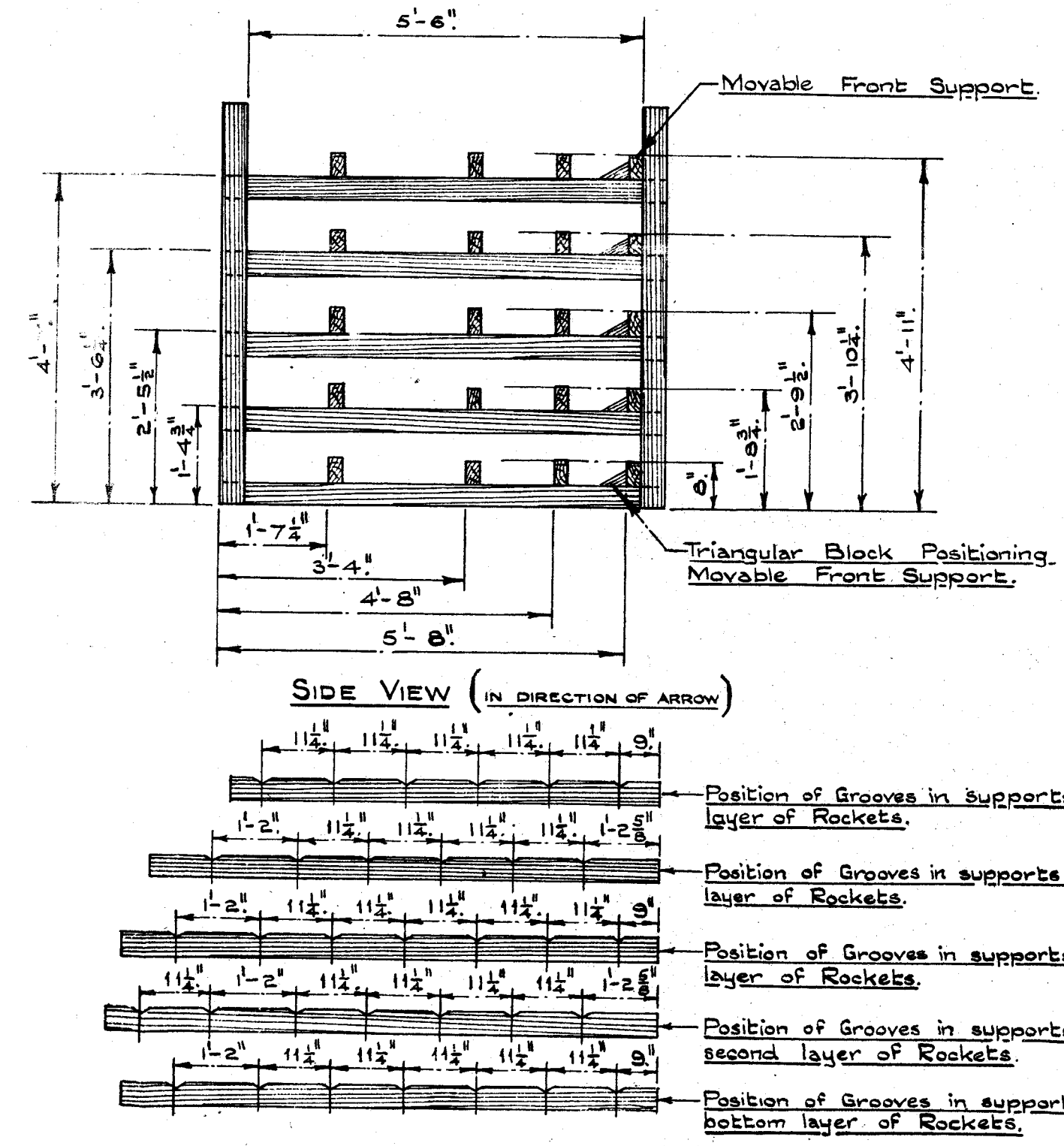
FIG. 112.



ELEVATION.



PLAN.



SIDE VIEW (IN DIRECTION OF ARROW)

RACK FOR THE STORAGE OF 33 ROCKETS.

TO BE CONSTRUCTED FROM 4" x 2" TIMBER.

FOR USE IN LARGE TYPE ANDERSON SHELTER.

PLAN No 54
I.P.C./D.O.
H.J.L. 31-7-41.