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AMMUNITION BULLETIN Nº 26.

FOR INSPECTING ORDNANCE OFFICERS

AND

A.A. AMMUNITION OFFICERS.

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

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AMMUNITION BULLETIN NO. 26.
FOR
INSPECTING ORDNANCE OFFICERS
AND
A.A. AMMUNITION OFFICERS.

ISSUED BY :-

CHIEF INSPECTOR OF ARMAMENTS,

WOOLWICH.

Contents.

ENEMY AMMUNITION.

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

Reference Item 346, Bulletin No.22.

The correct functioning of 5-inch tails propelling Mark III up to a temperature of 120°F. has been established by trials.

3-inch tails propelling, other than those marked 32°F., function correctly at temperatures down to 0°F.

Further information regarding temperature restrictions are given in Item 364, Bulletin No.23 Item 386, Bulletin No.24 and Item 423, Bulletin No.25.

439. CARTRIDGE, Q.F., 25-PR. COMPOSITE CHARGE OF CORDITE W.M.061 AND N.H.POWDER 025.

Reference Item 385, Bulletin No.24.

The approval of the composite cartridge of W.M.061 and N.H.025 is cancelled. None of these cartridges is in supply.

440. SHELL, Q.F., SMOKE EMISSION, 3-INCH HOWITZER MARK I.
Fig.155.

Reference Item 235, Bulletin No.18.

The cylindrical body of thin steel is welded to the steel base which has considerably thicker walls and is fitted with a driving band. A hole formed in the centre at the rear of the base is screwthread in two diameters to receive a fusible alloy plug followed by a steel disc. Both the plug and the disc are holed centrally to admit the flash from the propellant for the purpose of igniting the composition. The channel formed by these holes is lightly closed by a disc of tinned plate, or tinned brass, inserted between the disc and plug.

Method of Filling 10044.

The design consists of a glazedboard washer with 120 grains of pre-pressed S.R.252 composition attached to its forward face positioned in the bottom of the shell cavity. The remainder of the cavity is filled by three pressings of composition. The first and second pressings comprise 10,500 grains of priming smoke composition P.N.83 and the third consists of 12,250 grains of smoke composition S.R.269. The flatheaded front end of the shell is closed by a steel disc inserted over a glazedboard washer. The joint between the disc and the shell wall is sealed with R.D. cement No.1 and the disc secured by turning over the mouth of the body.

Markings.

The shell is painted green and has two rectangular white patches over-stencilled with the number of the smoke composition. The red ring indicating the explosive nature of the filling is painted round the body near the head.

The period of smoke emission is between 2 and 3 minutes.

Weights and dimensions.

The approximate weight of the filled shell is 7-lb.
The approximate weight of the filling is 3-lb. 4-oz. 8-dr.
The overall length of the round is 11.75 inches.
The addition of the safety clip increases the length by .65 inches.
The diameter over the driving band is 3.09 inches.

Packages.

Details of packages are given in Item 235, Bulletin No.18.

Composition.

The priming of S.R.252 consists of Potassium Nitrate, Silicon and Sulphurless Mealed Gunpowder. The priming smoke composition, P.N.83, consists of Hexachlorethane, Zinc Oxide and Calcium Silicide. The smoke composition, S.R.269, is a similar mixture to P.N.83 but differs in the proportions.

441. SHELL, Q.F., SMOKE EMISSION, 75-MM. MARKS I AND II.

The design of these shell is based on that of the 3-inch howitzer shell of the same nature.

The Mark II shell differs from the Mark I in having a die-cast plug pressed in at the base of the shell instead of the screwed in type.

442. SHELL, Q.F., H.E. 3-INCH HOWITZER. METHODS OF FILLING 7476 AND 7712.

Reference Item 235, Bulletin No.18.

The H.E. shell Mark II of this fixed Q.F. round for the tank howitzer is filled to the following designs:-

Design 7476.

The bursting charge of cold pressed Amatol 80/20 is sealed by a waxed felt washer under a millboard washer. The 6.2-inch cavity is lined with a paper tube and contains an "A" exploder of T.N.T. or C.E. in the lower position. A "B" exploder, also of T.N.T. or C.E., is used under the fuzes No.106E or 119. The shell are normally issued fuzed but if plugged the No.13 plug is used if the "B" exploder is in position otherwise the No.3 plug is used in which case the stem of the plug occupies the space provided to receive the "B" exploder. Two cloth discs are inserted between the exploder and fuze, or plug.

Design 7712.

The bursting charge of TNT. is sealed in the same way as that in design 7476. The 3.85-inch exploder cavity is lined with a paper tube and contains a "B" exploder of C.E. The shell are normally issued fuzed with the No.106E or 119 fuze. If plugged with the exploder in position the No.13 plug is used. With no exploder the 2-inch No. 3 plug is used. Two cloth discs are inserted between the exploder and fuze, or plug.

Weights and dimensions.

The approximate weight of the shell, filled and fuzed is 13-lb. 4-oz.

The approximate weight of the bursting charge is 1-lb. 5-oz. 6-dr.

The overall length of the complete round, with fuze No.106E is 16.4 inches.

The overall length of the complete round, with fuze No.119 is 17.3 inches.

443. FUZES T & A. NO.221 FOR CHEMICAL SHELL. PACKING.

Reference Item 121, Bulletin No.12.

In view of the possibility of wastage resulting from prolonged storage of these combustion type igniferous fuzes under adverse conditions it has been decided that they will be packed, with their covers fitted, in soldered cylinders.

444. GRENADE NO.75. ASSEMBLY OF DETONATORS WITH IGNITERS.

Reference Item 429, Bulletin No.25.

Instructions for the fitting of detonators into igniters, and the removal, are given on Label L.1292 which is contained in each package.

The operation must be carried out with care to avoid breaking the glass capsules of sulphuric acid in the igniter and so firing the detonator. As a further safety precaution, these must be dealt with in small quantities.

A rubber tube is now fitted to the igniter for the purpose of covering the junction with the detonator when assembled.

445.
SHELL, Q.F., CHEMICAL, B.E., STREAMLINE 25-PR. MK.VIIID. METHOD OF HEADING FILLING 12974.

Reference Items 331 and 332, Bulletin No.22.

Details of the method of head filling to design 12974 for the Mark VIIID shell are shown in Fig.157.

446.
CARTRIDGE, Q.F., 37 MM. A.P. SHOT, M.51. PACKING.

Reference Item 224, Bulletin No.18.

U.S. authorities have discontinued the use of the metal liner in the wooden box in which this ammunition is packed. Instead, each round is packed in a fibre container and twenty containers are packed in the box. The containers are dipped in wax after sealing and coloured sealing tapes are used to indicate the nature of the projectile. The colours used and their significance are as follows :-

Black	... ...	A.P.
Blue	... ...	T.P. (target practice)
Yellow	... ...	H.E.

This system commences with the National Fireworks Lot N.F.56 of A.P. shot but white sealing tape was used until black became available.

447.
BOMBS, SPIGOT, 29 MM. MORTAR. PACKAGES.

Reference Item 336, 337 and 339, Bulletin No.22.

The approximate filled weight of the container for the 20-lb. bomb, referred to in Item 337, is 30-lb.

The package for the 14-lb. bomb is similar to that for the 20-lb. bomb (described in Item 337). The stowage dimensions are:- length 27.2 inches, diameter 5.5 inches, approximate filled weight 22 lb.

The containers are stencilled to indicate the lot number of the filled bomb, the monogram or initials of the filling station, date of filling (month and year) and the lot number of the cartridges. A red ring, appropriate to the climatic restriction applicable to the filling, is also stencilled on the container.

The designation of the bomb and the monogram or initials of the filling station are embossed on the end plates of the container.

448.
BOMB, SPIGOT 29 MM. MORTAR. NOMENCLATURE.

The following are the approved nomenclatures for the various types of spigot mortar bombs:-

Bomb, Spigot, H.E., A.T., 29 mm. Mortar 20-lb. Mk.I.
Bomb, Spigot, Practice, A.T. 29 mm. Mortar Inert Mk.I.
Bomb, Spigot, Drill, A.T. 29 mm. Mortar 20-lb. Mk.I.
Bomb, Spigot, H.E., 29 mm. Mortar, 14-lb. Mk.I.
Bomb, Spigot, Practice, 29 mm. Mortar, 20/15-lb. inert, Mk.I.

A number of packages containing the last mentioned type have been stencilled, in error, "15/20 lb." instead of "20/15-lb."

449.
BATCH MARKING. DUPLICATION OF BATCH NUMBERS OF CARTRIDGES, Q.F., H.E., 3.7-INCH GUN.

Duplication of batch marking has occurred with the following batches of Q.F., 3.7-inch gun, H.E. rounds :-

B.4001	B.4005	B.4016	B.4023	B.4029	B.4043	B.4052
4002	4010	4017	4025	4030	4044	4054
4003	4011	4019	4026	4031	4046	4055
4004	4013	4020	4028	4036	4047	4057
				4041		4060

The duplicated batches and sub-batches can be differentiated between by reference to the monogram of the filling factory on the sealing label of the package. In the event of any questions arising regarding this ammunition the monogram of the filling factory will be quoted.

450. MARKINGS, AMERICAN Q.F. AMMUNITION. THE AMMUNITION LOT.

Under normal conditions only one lot of each component, empty or filled, is included in the same Ammunition Lot. Thus in an Ammunition Lot of 20,000 complete rounds there would be one empty shell lot, one filled shell lot, one empty primer lot, one filled primer lot (primers are often filled by the manufacturer), one case lot, one booster lot and one propellant lot.

Under the conditions of war time production difficulties have arisen in carrying out this procedure and the position as it stands at present is as follows :-

(1) There is only one lot of propellant in an Ammunition Lot although, owing to the very large size of the propellant lot, several Ammunition Lots may contain the same lot of propellant.

(2) As far as is possible the number of different lots of any component entering into an Ammunition Lot is kept to a minimum and components are utilized by lots until the lot is exhausted before taking further lots into use.

The detail of the lot numbers of components used is given on the Ammunition Data Card in the package.

The numbering system by which the Ammunition Lots are identified consists of an index which is the contract or purchase order number with a suffix to denote the lot number, e.g. Ammunition Lot No.1234-2 is Lot 2 from contract No.1234. Where the contract or purchase number comprises six figures the number is split, e.g. contract number 123456 would appear as 123-456 with the lot number suffix.

Portions of certain lots of Q.F. 75 mm. ammunition originally made up with H.E. shell were broken down in the U.K. and re assembled using S.A.P. shot. This conversion has resulted in two natures of projectile being included in the Ammunition Lots affected. Packages containing these converted rounds have the stencilling indicating H.E. shell obliterated and S.A.P. substituted. They are also marked with the station monogram and date indicating the place and date of the conversion.

451. SIMULATOR GUN FLASH NO.2 MK.I.

This store consists of a cylindrical body of rolled paper, approximately 11-inches long and 2-inches in diameter, which is closed at both ends by wooden plugs and contains about 14-oz. of lightly stemmed flash composition with an electric fuze and a burster of gunpowder.

The wooden plugs are secured by shellac adhesive and tacks. The plug at the end containing the fuze is bored centrally to provide a passage for the insulated wires of the fuze.

The burster consists of a paper tube about 6 inches long and .25 inches in diameter which contains 77 grains of gunpowder G.20. The mouth of the tube is closed by a low tension electric fuze of the Nobels type and the tube positioned in a central cavity in the filling.

As an emergency measure these stores will be packed 32 in the steel box B.166. As this package is not waterproof it will be lined with three layers of waxed waterproof paper and must be stored, as far as possible, in dry conditions and raised off the ground.

The stowage dimensions of this box are 19.8 x 9.1 x 13.0 inches. The weight, filled and empty are 58-lb. and 15-lb. 10-oz. respectively.

452. NAVAL A.A. AMMUNITION IN LAND SERVICE FOR Q.F. 5.25-INCH GUN.

The ammunition used with this equipment is of the separate Q.F. type. The components of the complete round are as follows :-

Cartridge Mark I.

The cartridge consists of a Mk.II case of brass fitted with a No.17 electric primer and contains a propellant charge consisting of 18-lb. 12-dr. of Cordite S.C.140. The mouth of the case is closed by means of a Mark II lid of white metal. The lid is secured at four equidistant points on its periphery by tongues formed in the wall at the mouth of the case. These tongues are bent inwards to engage the lid.

The propellant charge is designed to provide a reduced charge when required and consists of two parts, the reduced charge and the increment charge.

The built up bundle forming the reduced charge has a nominal weight of 12-lb. 5-oz. and extends along the whole length of the case. The bundling is arranged to provide the usual recess for the magazine of the primer at the base end and a large recess to accommodate the increment charge at the front end. This large recess extends through approximately two-thirds of the bundle and the cords of propellant forming the surround are divided and tied into eight bundles.

The increment charge has a nominal weight of 5-lb. 11-oz. 12-dr. and consists of a bundle designed to fit in the recess in the reduced charge. To facilitate removal the increment charge is fitted with a shallon cap which fits over the base of the charge and is provided with two braids. The braids extended along the length of the bundle and after being passed round a tie near the forward end are tied together across the front end of the bundle. The braids thus provide a means of pulling out the increment charge when the lid is removed.

The overall length of the cartridge is approximately 35 inches.

Primer, Electric, Q.F. Cartridge, No.17, Mk.II. (Fig.156)

The primer consists of a brass screwthreaded body fitted with an ogival magazine similar to that of the No.9 primer. The length of the magazine is 3.3-inches and the overall length of the primer 4.85 inches.

The body is fitted with an electrical system of initiation similar to that in the vent electric tubes, i.e. an insulated contact plug in the base is connected by insulated wire to an iridium platinum bridge soldered at the front end of a copper bridge plug. The I.P. bridge has a 3 grain priming of guncotton dust which is retained in the recessed front face of the body by a paper wrapped perforated pellet of gunpowder. The pellet is secured to the body by a screwed cover ring. The magazine contains 415 grains of G.12 gunpowder.

Shell, H.E., Mks.IC, I*C and IIC.

The shape of head for Service purposes, as indicated by the letter "C" after the mark, is 8 C.R.H. The bursting charge, consisting of approximately 5-lb. 2½-oz. of T.N.T. is sealed with beeswax composition and has formed in it a paper lined cavity which accommodates the smoke box, exploder and the lower part of the gaine. The cavity is reduced in diameter at 4.46 inches from the lip of the fuze hole and below this point contains a 2½ oz. red phosphorus smoke box. The wrapped 26 dram C.E. exploder is provided with a lifting loop and is inserted over a felt disc above the smoke box. The No.9 or No.10 gaine is inserted in the 2-inch fuze hole below the mechanical time fuze No.206, and, with a tracing cloth disc inserted below it, bears on the exploder. The shell is issued plugged with a 2-inch No.11 fuze hole plug.

The filled weight with fuze No.206 is approximately 80.5-lb.

Markings.

The shell are marked in accordance with the Naval system which differs from the Land Service system in this instance as follows :-

(a) The T.N.T. bursting charge is indicated by a green band without the letters T.N.T.

(b) The presence of the smoke box is indicated by the stencilling "SMK.BOX" on the shell.

(c) The type, nature and weight of the exploder is stencilled on the shell.

(d) The letter "N", indicating Naval ammunition is stencilled on the shell.

(e) The design number of the method of filling (N.O.D.3427) is not stencilled on the shell.

Gaines No.9 and No.10.

Details of gaine No.9, together with an illustration, are given in "Notes on Anti-Aircraft Ammunition 1940".

It is the Naval practice to differentiate between lead free and lead bearing fuzes or gaines of the same design by using a different number in the nomenclature of each. In this instance the lead free gaine is the No.9 whereas the No.10, which is of the same design, is not lead free.

Fuze, Time, Mechanical, No.206, Mk.I.

The Mark I fuze is of similar construction to the No.207 fuze, details of which are given in "Notes on Anti-Aircraft Ammunition 1940". The running time of the fuze is 45 seconds. The setting graduations are numbered at every tenth division and extend from nought to 22.5. Numbers below 10 are prefixed by a nought. The divisions correspond to a fifth of a second.

The fuze is provided with a metal cover which is screwed to the fuze and includes a rubber washer to form a waterproof joint.

The weight of the fuze is 1-lb. 7-oz. 6-dr. and its firing length, with washer, is approximately 3.4 inches.

Packages, Weights, Dimensions and Markings.

Each cartridge, with primer inserted, is packed in "Container, cartridge, C.227". This is a cylindrical rolled paper container with metal end pieces. The stowage dimensions and the filled weight are: length 32.7 inches, diameter 9-inches, weight 53-lb. The weight of the container when empty is approximately 10-lb. Shell are issued plugged, fitted with a grummet and unboxed. For stowage purposes the length is 20.7 inches, diameter over the grummet 6.5 inches and weight 80-lb. 25 fuzes, each in a tinned plate cylinder, are packed in a wooden box, (F.230 or F.202). The stowage dimensions and weight of the box filled are: 27 x 14.25 x 8.25 inches, weight 74-lb. The weight of the box when empty is approximately 20-lb.

The cartridge container and fuze box have a red band near each end in accordance with the Naval system of indicating packages containing explosives. Details of the contents are given on a label on the exterior of the lid of the cartridge container. Details of the fuzes are stencilled on the box.

452. FUZES, TIME OR TIME AND PERCUSSION. METHODS OF WATERPROOFING.

Reference Item 96, Bulletin No.10.

It has been found that the composition R.D.1154 provides a more efficient means of protecting the composition in the time rings of these fuzes than the flexible covers providing the composition is properly applied and maintained.

Condensation is liable to occur inside flexible covers unless the rubber band is fitted to cover the junction between the shell and the skirt of the cover. Also, as it is necessary to remove the covers from some of the "Ready Use" rounds during an alert and hitherto the use of R.D.1154 in addition to flexible covers has been prohibited the composition in fuzes so exposed, particularly in wet weather, is liable to be affected.

The effect of the R.D.1154 composition on the flexible covers is not appreciable and there is no objection to the combined use of the flexible cover with its band and the composition R.D.1154.

When covers are used these should be removed periodically, in dry weather, to reduce the possibility of condensation and to examine the R.D.1154 composition.

454. SHELL, Q.F., H.E., 12-pr. 12-cwt. METHOD OF FILLING 12157.
Fig. 158.

Details of the method of filling the shell for this Coast Artillery equipment are shown in the Figure. The disc screwed into the fuze hole above the exploder, the No.24 adapter used to adapt the 1.2-inch fuze to the 2-inch fuze hole and the cap protecting the fuze are all of mild steel. The estimated weight of the bursting charge is 11-oz. 15-dr.

The shell markings include the lot number of the Picric Powder in the exploder and a black ring immediately above the red ring to indicate the use of an igniferous fuze. The cap protecting the fuze is painted buff colour.

455. GRENADE, HAND, ANTI-TANK, NO.73.

Reference Item 401, Bulletin No.24.

The above mentioned grenade has been declared obsolescent instead of obsolete.

456. CARTRIDGE, B.D., 7.2-INCH HOWITZER, 23-LB. N.H.055 MK.I.

The cartridge consists of a core (forming No.1 section) and three other sections.

The enlarged base of the core carries a standard igniter, containing 6-oz. of G.12 gunpowder, and internally is made up with four strips of webbing, or other approved material, sewn between the silk cloth backing of the igniter and the seam where the stalk joins the enlarged base of the core. The material containing the stalk portion of the core is mattress-stitched. These arrangements retain the core in shape.

The propellant in the other sections is contained in rectangular bags which are wrapped around the stalk and secured by ties of webbing which are stitched to the ends of the bags. Two tapes, sewn to the base portion of the core, are lead through fairways on the wrapped sections and tied at the front end.

The nominal weight of the sections are as follows :-

No.1 Section	7-lb. 11-oz.
No.2 Section	3-lb. 1-oz.
No.3 Section	6-lb. 4-oz.
No.4 Section	6-lb. 0-oz.
Total	23-lb. 0-oz.

The overall length of the cartridge is 23.25 inches and the diameter 7.4 inches.

Packages.

As a temporary measure, the steel box C.238 has been used for this purpose. The box holds 1 cartridge packed in a rolled paper liner. The construction of the liner does not include end pieces but 2 plywood discs, covered with cellophane, are provided to close the ends.

The stowage dimensions of the box are 26.1 x 10.1 x 9.6 inches. The estimated weight filled is 30-lb.

Container C.269 Mk.I has been introduced for this cartridge. This is a rolled paper cylindrical package with tinned plate end pieces which holds 1 cartridge. The lid of the container is secured by a webbing band with a quick release buckle.

The stowage dimensions of the container are:- length 24.6 inches, diameter 8.5-inches. The estimated weight filled is 34-lb.

457. PROPELLANTS FOR ROCKETS U. NOMENCLATURE AND CODE LETTERS.

Reference Item 266, Bulletin No.19 and Items 324 and 346, Bulletin No.22.

The following nomenclatures and code letters have been approved for cordites used in tails propelling :-

(a) Cordite

	Nomenclature
Undrilled cordite for 3-inch	S.C.R.K.2.70-0.75
Drilled cordite for 3-inch.	S.C.R.K./D.2.70-0.75.
Ungrooved cordite for 5-inch.	S.C.R.K./S.1.0-0.5.
Grooved cordite for 5-inch.	S.C.R.K./S/G.1.0-0.5.

(Grooved cordite has hitherto been referred to as "Notched").

(b) Code Letters.

Tails filled with drilled cordite to be marked [S] (D).

Tails filled with grooved cordite to be marked [S] (G).

458. SHELL, B.L. OR Q.F., H.E. 6-INCH GUN MARK XXB IN COAST ARTILLERY. CONVERSION OF EXPLODER SYSTEM FOR LANDWARDS FIRING WITH FUZE PERCUSSION 119.

1. It may be necessary to prepare a number of H.E. Mk.XXB shell held in Coast Artillery for landwards firing. The fuze perussion No.119 which will be used for this purpose is of 2-inch gauge and is normally issued with a "B" exploder included in the packing cylinder.

2. Shell Exploded for Coast Artillery.

Existing shell in Coast Artillery exploded and fuzed for use in the anti-ship role have the 2-inch fuze-hole of the shell reduced to the 1-inch gauge, by means of a No.2 adapter, to take a fuze of the No.45 type. The exploder used in conjunction with fuzes of this type varies with the design of the method of filling but, although a number of filling designs exist in Coast Artillery, only two types of exploder are involved. These are the "D" exploder in shell filled to designs 23929, 23929A, 23894A, B or C and 27222A, and the 5 dram. Picric Powder exploder in design 861. (The plates in Pamphlet No.1 of R.A.O.S. Part II give details of these designs and in some instances show the exploder system for the No.45 type of fuze).

3. The preparation of these shell for use with the No.119 fuze necessitates the removal of the No.2 adapter from the fuze-hole and a modification to the exploder system. The modification required in the case of the designs where the "D" exploder is used involves the removal of this exploder, the adjustment of the depth of cavity to 3.85, where necessary, and the insertion of a 2-inch No.3 fuze-hole plug. The "B" exploder, issued with the fuze, can then be inserted when the shell is being fuzed. In some instances it may be found impossible to remove the "D" exploder without causing damage to the exploder system. In these circumstances the exploder is left in position, the cavity adjusted to a depth of 2.36 inches, where necessary, and an "F" exploder inserted above the "D". The modification required in the case of shell filled to design 861 consists of inserting a "K" exploder of T.N.T. above the existing Picric Powder exploder. The shell are then closed by means of a 2-inch No.13 fuze-hole plug and the use of the "B" exploder normally issued with the fuze is unnecessary. The stencilling on the shell "Use 45 Fuze" should be obliterated and, in accordance with R.A.O.S. Part II, Pamphlet No.3, para.14(c), those fitted with a No.13 plug will be stencilled "Use 119 Fuze".

4. Shell Exploded for Field Army.

The Mark XXB shell is also used in equipments of the field army. These shell bear the same filling design numbers (excepting design 861) as those in Coast Artillery but differ in their exploder systems.

5. In the event of these shell being allotted to Coast Artillery for landwards firing, preparation will only be necessary in the case of those stencilled to indicate the use of a specified fuze. The particulars are as follows :-

(a) Shell bearing no stencilling regarding the fuze to be used are already prepared to receive the "B" exploder and fitted with the 2-inch No.3 fuze-hole plug. These require no change in the exploder system or plug.

(b) Shell stencilled "Use 106 Fuze" have the "B" exploder in position and are closed by the 2-inch No.13 fuze-hole plug. The No.13 plug and "B" exploder should be removed and the shell closed by a 2-inch No.3 fuze-hole plug. If the exploder cannot be removed without damage it will be left in position and the No.13 plug will be replaced.

(c) Shell stencilled "Use 44 Fuze" have the "B" exploder in position and are closed by the 1-inch No.1 special fuze-hole plug and a No.2 adapter. The No.1 plug with the No.2 adapter and the "B" exploder should be removed and the shell closed by a 2-inch No.3 fuze-hole plug. If the exploder cannot be removed without damage it will be left in position and the shell closed by means of the 2-inch No.13 fuze-hole plug.
Markings regarding specified fuzes will be obliterated and "Use 119 Fuze" substituted.

5. The existing weight marking on these shell is in accordance with the "unit system" of the field army and will be replaced by markings in accordance with the system for fixed armaments. Details of the two systems are given in R.A.O.S. Part II, Pamphlet No.1, Section III, paras.103 and 102 respectively. In obtaining the actual weight for this purpose the standard fuze is the No.45.

6. Procedure.

When carrying out the conversion of shell for landwards firing the depth of cavity will be adjusted, where necessary, by means of the "Tool for compressing exploders in shell". On no account is a fuze or plug to be used for this purpose. Where it is necessary to insert exploders in shell filled Lyddite, the exploder must be of T.N.T. In all instances before inserting the fuze hole plug, two cloth washers will be placed over the exploder. The instructions given in paras.138 and 147 to 152 of Pamphlet No.1, R.A.O.S. Part II should be observed.

7. Stores Required.

The following will be required for all shell:-

Paint, P.F.U., black, marking, lead free.
Paint, P.F.U., buff, ammunition, lead free.

The following will also be required for all shell excepting any already fitted with the 2-inch No.3 fuze hole plug that may be allotted to Coast Artillery :-

Cement, R.D., No.1, lead free.
Luting, lead free, Mark IV.
Luting, lead free, Mark V.
Discs cloth, 1.78 inch (2 per shell)
Washers, leather, lubricated, 2.35-inch (1 per shell).

The remaining requirements are dependent on the existing exploder system and plugs. An examination of the shell markings and plugs should be made to identify the existing design which, in conjunction with the following details, will indicate the stores required.

Shell Exploded for Coast Artillery.

(a) Shell fitted to designs 23929, 23929A, 23894A, B or C and 27222A, (i.e. containing "D" exploders):-

Plugs, fuze-hole, 2-inch No.3 Mk.VF or VIF (1 per shell)
or,
If the "D" exploder cannot be removed :-
Exploder, shell, "F", T.N.T. or C.E. (T.N.T. for shell filled Lyddite) Mk.VI. (1 per shell)
Plug, fuze-hole, 2-inch No.13, Mk.VM. (1 per shell).

(b) Shell filled to design 861 (i.e. Lyddite with Picric Powder exploder).

Exploder, shell, "K", T.N.T., Mk.I.
Plug, fuze-hole, 2-inch, No.13, Mk.VM.

Shell Exploded for Field Army, if allotted to Coast Artillery.

(a) Shell fitted with plug fuze-hole 2-inch No.13 or No.2 adapter with plug fuze-hole special No.1 and stencilled "Use 106 Fuze" or "Use 44 Fuze" :-

Plug, fuze-hole, 2-inch No.3 Mk.VF or VIF (1 per shell)
or,
If the exploder "B" cannot be removed and the No.13 plug is not already a component of the shell:-
Plug, fuze-hole, 2-inch, No.13 Mk.VM.

8. Fuzing by R.A. Units.

Instructions for R.A. personnel regarding the insertion of exploders and fuzes for landwards firing are contained in Coast Artillery Drills, Part III, Pamphlet No.1, Section 15.

459. AMENDMENTS.

Bulletin No.10
Item 96. Delete from "R.D.1154" in line 14 to "cover" in line 16 and substitute "See Item 453, Bulletin No.26".

Bulletin No.20.
Item 287, line 11. After "Item 263" insert "page 8";

Bulletin No.21.
Item 312. Insert the following details in the appropriate columns for the B.L. 7.2-inch How:-
(Charge) "Core and 3 Secs.", (Weight) "23-lb.",
(Nature) "N.H.055", (dimensions) "23.25 x 7.4",
(Type & No.) "Contr.C.269 (Paper)", (holds) "1",
(Stowage dimensions) "24.6 x 8.5", (Gross Weight) "34-lb.",
(Explosive Qty.) "23-lb.".

Bulletin No.22.
Fig.124. Delete the decimal point in "4.5" in the heading.

Bulletin No.25.
Pages 1, 10 and 12. Renumber Items on Enemy Ammunition to read 435, 436 and 437 in sequence.

ENEMY AMMUNITION.

460. GERMAN 5 CM., Q.F., H.E. CARTRIDGE.

Case.

The case of this fixed Q.F. ammunition is of solid drawn steel, electro-plated with brass. A screwthreaded primer hole is formed in the base, the body taper increases sharply near the neck and the overall length is 41.8 cm.

Propellant Charge.

The propellant charge consists of a viscose rayon bag containing graphited flake propellant and a 30 cm. tube of propellant nearly half of which protrudes above the choked mouth of the bag. The external and internal diameters of the tube are .665-.5 cm. An annular bag, containing 5 grams of Potassium Sulphate, is attached round the choked mouth of the bag and the tube. This is presumably intended to reduce the flash. The flake propellant also is presumably intended to be flashless and contains diethylene diglycol-dinitrate, nitro-guanidine and nitrocellulose; no stabilizer is added. The dimensions of the flakes are 4 x 4 x .6 mm. and the mean weight per flake is .0154 gram. The tubular core is a nitroglycerine propellant and contains nitrocellulose and diethylene diglycal-dinitrate with akardite.

The igniter composition consisting of small graphited cylinders without surface moderant is contained in a viscose rayon bag stitched to the underside of the bag containing the charge. The bottom of the bag is of cotton dyed pink.

Primer (Fig. 159)

The percussion primer is of the normal German type and consists of a brass body with the enclosed cap and brass anvil plug. The cap filling is shaped to fit round the anvil and consists of Mercury Fulminate 28%, Potassium Chlorate 34%, Antimony Sulphide 32%, and glass powder 6%. The cap is a push fit in the underside of the anvil plug. The magazine contains a 1.44 gram pellet of gunpowder over .65 gram of granular gunpowder. The primer is closed by a brass washer and varnished fabric disc.

Shell (Fig.162)

The shell is fitted with a driving band wholly of soft iron.

The filling, in a paper container which is cemented to the wall of the shell, consists mainly of pressed T.N.T. over which a smoke box is positioned in a surround of cast T.N.T. The exploder system consists of a 7.6 gram pellet of P.E.T.N./wax (90/10) over a 9.2 gram pellet of P.E.T.N./wax (91/9). The total weight of the filling is 5-oz. 14-dr. and the complete weight of the shell 3-lb. 15-oz.

The smoke box which weighs 10.6 grams is similar to that in the 7.5 cm. H.E. shell but is smaller.

The shell is coloured green and stencilled in black.

Fuze (Fig.163)

The fuze used is the AZ.39 which is a detonating type with a direct action in which the needle is supported by a shutter.

The direct action mechanism consists of an aluminium needle supported over the detonator by the shutter which engages under the enlarged head on the needle. An aluminium striker is positioned in front of the needle in a recess in the cap of the fuze. The recess is closed against air pressure by an aluminium disc.

The shutter slides in a diametrical groove in the front face of the body where it is retained in the safe position by means of two centrifugal steel bolts. The bolts are housed in holes in the body within an expanding spring ring and engage in slots in the shutter. The shutter has two holes formed in it, one each side of its centre. One of these holes has formed in the inner side of its periphery a recess which extends to the centre of the shutter and receives the needle. The dimensions of the recess prevents the head of the needle passing it but the hole will permit this movement when the shutter is in the armed position. With the shutter in the unarmed position the second hole coincides with a channel in the body which houses a steel ball.

The brass magazine of the fuze is fitted to the underside of the body by means of an aluminium screwed plug. The magazine is fitted with a brass detonator containing .33 grams of lead azide with calcium silicide over a filling of .48 grams P.E.T.N.

Action.

On acceleration the ball is held in the channel by set back. During flight the ball is caused to move forward by creep action, combined with the effect of the slope of the channel and centrifugal force until it enters the hole in the shutter. The rotation of the shell also causes the spring ring to expand and the bolts to disengage the shutter which, with the ball as a displaced weight, slide across the body and ceases to support the needle at the head. The needle is then held off the detonator by creep action. On impact the needle is driven in and pierces the detonator.

461. GERMAN Q.F. 4.7 CM. H.E. SHELL AND FUZE.
Fig.161.

Shell.

The shell contains a bursting charge of cast T.N.T. in which a cavity is formed which contains T.N.T. pressed to a density of 1.44. A brass container, to receive the magazine of the fuze, is inserted into a cavity formed in the pressed T.N.T. at the fuze hole. The weight of the filling is 6-oz. 3.9-dr. (cast T.N.T. 5-oz. 14-dr. pressed T.N.T. 5.9-dr.) and weight of the filled shell is 3-lb. 2-oz. 2-dr.

Fuze. (Fig.164)

The fuze used is of the direct action detonating type in which the needle is held off the detonator by 4 steel balls.

The hollow stemmed aluminium needle with enlarged head passes through a cup shaped ferrule and is supported at the cone, near the point, by 4 steel balls. The balls are located in an internally coned metal cup and retained by the ferrule which is pressed on to them by the spiral spring. The cone of the needle corresponds with the coned interior of the cup so that a force acting along the axis of the needle will not displace the balls. The head of the needle is housed in a recess in the cap of the fuze, the recess being closed against air pressure by a copper disc.

The magazine is screwed into the underside of the fuze and contains the initiator compositions in a copper capsule over a .48 gram filling of P.E.T.N. The copper capsule has a copper disc soldered in the front end and a second copper disc, with felt washer attached, interposed between it and the needle point. The initiator filling in the capsule consists of a .25 gram layer of detonating composition over .31 grams of lead azide. The detonating composition consists of: Mercury Fulminate 28.7%, Potassium Chlorate 39.8% and Antimony Sulphide 31.5%.

The fuze is fitted with a brass cover secured by a tear off strip. The strip is provided with a finger ring which is lightly soldered to the cover.

Action.

The cover is removed before loading. During acceleration the balls are held by set back and the ferrule. When acceleration ceases and the rate of spin is sufficient the balls are forced outwards by centrifugal force and retained in this position by the ferrule under the pressure of the spring. The needle is then held off the detonator by creep action. On impact the needle is driven in and pierces the detonator.

The copper disc over the initiator capsule is probably intended to act as a resistance to the needle and to prevent premature action by wind pressure acting on the needle such as might occur if the copper disc in the cap of the fuze were punctured.

Neither the needle, ferrule, nor the spring are positively located, and it appears that the needle head is so designed that the point of the needle may rove considerably off its normal axis without jamming which, should it occur, would render the fuze insensitive on a light target.

462. GERMAN 4.7 CM., Q.F., AP. SHOT (ARROW-HEAD)
Fig. 166.

The shot consists of an armour piercing core enclosed in a mild steel body. The body is fitted with a conical ballistic cap and prepared to receive a tracer. The weight of the shot (without tracer) is 1-lb. 13 ozs.

The core is made from tungsten carbide cemented by nickel. The portion enclosed in the steel body is painted white.

The body is made from free cutting mild steel of low carbon content and appears to have been machined from rolled bar. In construction it is similar to the body of the 37 mm. shot.

The ballistic cap is made from a plastic consisting of a black moulding with fibrous filler. The cap is apparently moulded into position under pressure.

463. GERMAN, Q.F., 7.5 CM., SMOKE SHELL.
Fig. 168.

Shell.

The shell consists essentially of two parts - (i) the body and (ii) the burster container, screwed into the nose of the shell and extending almost to the base of the shell cavity. The driving band consists of soft iron clad with copper on the outside. The burster container accommodates a bursting charge of 4 pressed pellets of picric acid weighing 78.5 grams (2-oz. 12.5-dr.) The four pellets are wrapped in a single wrapping of paper, about .005-inch thick, secured with an aqueous adhesive. The whole assembly is coated with paraffin wax. The wrapping is marked "KL. Ldg. Zd. K. Gr. Nb."

The smoke mixture contained in the body of the shell, surrounding the burster container, consists of 80 parts of oleum absorbed in 20 parts of pumice. The method of charging appears to be as follows. The pumice is pressed into the shell body and the burster container screwed in. Oleum is introduced into the shell through a side charging hole which is subsequently closed with a screwed plug.

The shell is coloured green, stencilled in black and white and has a red ring above the driving band. The weight complete is 13-lb. 9-oz.

The magazine consists of a tinned plate cylinder with central tube. The cylinder contains T.N.T. and is closed at the base, where it rests on the coned base cap of the body, by a perforated cap.

The detonator with its percussion cap is housed in the perforated tube of the needle pellet within the centre tube of the magazine. Details of the initiator compositions used are not available but that in the detonator is probably lead styphnate and P.E.T.N. and that in the cap is probably Mercury Fulminate, Antimony Sulphide and Potassium Chlorate.

A safety bar of tinned plate is inserted in the body of the grenade between the needle and the percussion cap of the detonator. The outer end of this bar is attached to the safety cover by a brass tape which is wound round the grenade when the cover is fitted.

The safety cover is a perforated tinned plate cup which acts as a drogne for the removal of the safety bar when the grenade is in flight. The cover is fitted with a curved portion which fits to the body when cover is fitted over the head of the grenade. The cover is secured by the safety strip passing through the body of the grenade and the curved portion of the cover. The safety strip is of brass and is fitted with a vulcanised rubber tab by means of which it is pulled out of the grenade by hand.

The grenade is painted red and the safety cover black. The base is stamped "BREDA".

Action.

To prepare the grenade for throwing, the safety strip is withdrawn by pulling the vulcanised rubber tab. The grenade is now ready but, if accidently dropped remains unarmed. During flight the air acting on the safety cover removes it from the grenade, unwinding the brass tape and withdrawing the safety bar which falls away leaving the needle and cap of the detonator held apart by the spiral spring. The action on impact depends upon the position of the grenade. If it strikes head or base downwards the spiral spring is compressed by the momentum of magazine or needle pellet respectively and the needle pierces the cap. With side impact, the outer ends of the needle pellet and magazine move down the inclines of the coned ends of the body causing both members to move towards each other and the needle pierces the cap.

It is known that the Italians have had accidents with their grenades even though the safety bar was in position. The grenades should therefore be treated with caution.

466. JAPANESE FUZE.
Fig. 171.

This is a direct action fuze of the detonating type in which the striker is held off the detonator by a spiral spring. For safety in transport and in the bore a safety device is included which consists of segments positioned under the striker holder to prevent its movement towards the detonator.

The steel striker, attached to the aluminium striker head by means of the steel holder, is supported in the brass body by means of a steel spiral spring. The spring is held in compression between the brass guide ring and a collar formed on the striker head.

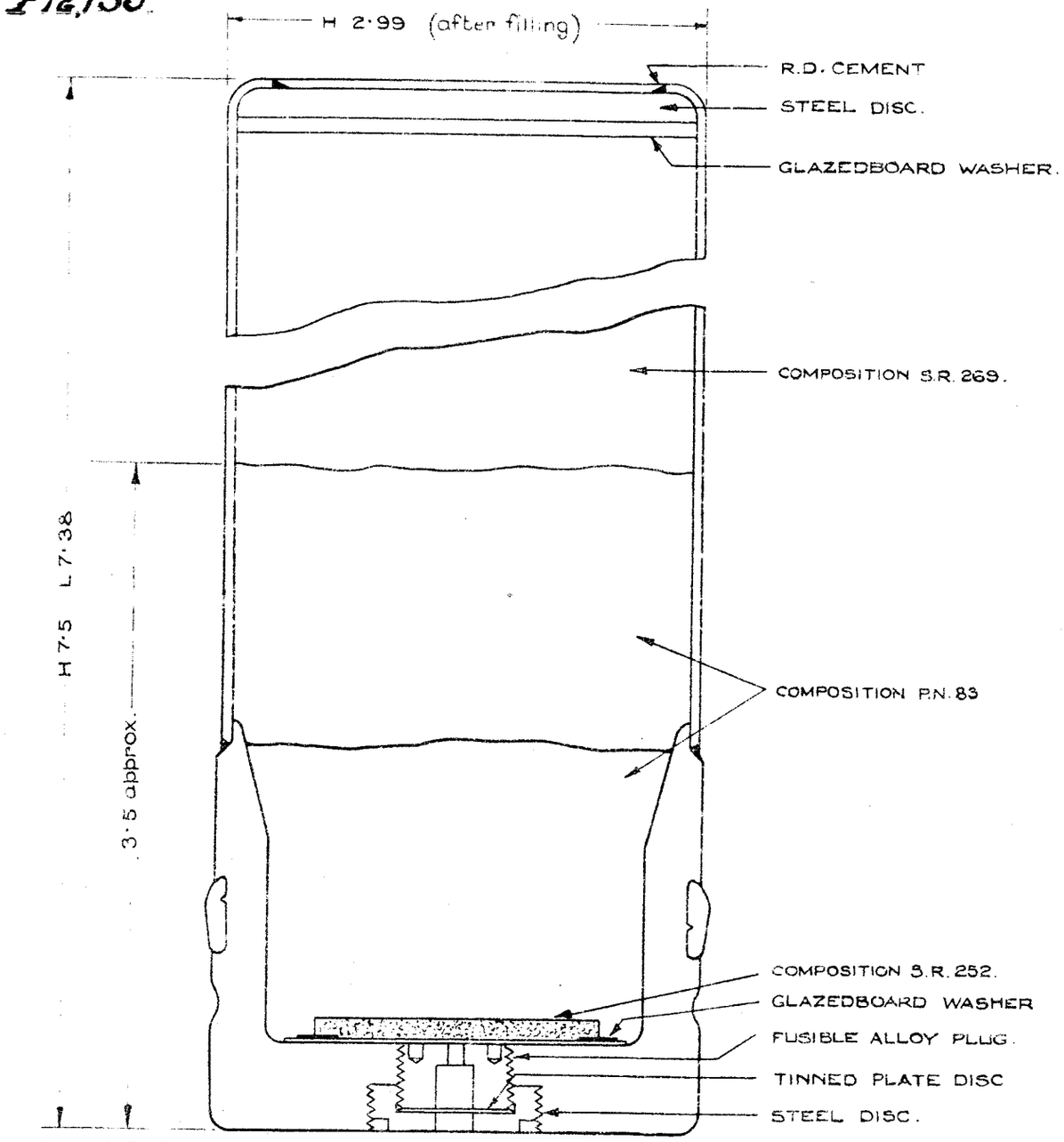
The brass base of the fuze screws into the body and carries a brass cylindrical ferrule supported on a cupro-nickel stirrup spring. The ferrule locates four brass segments between the striker holder and the base and has an internal groove to engage the arms of the stirrup spring when in the armed position.

Details of the initiator fillings and the filling of the brass magazine are not available.

Action.

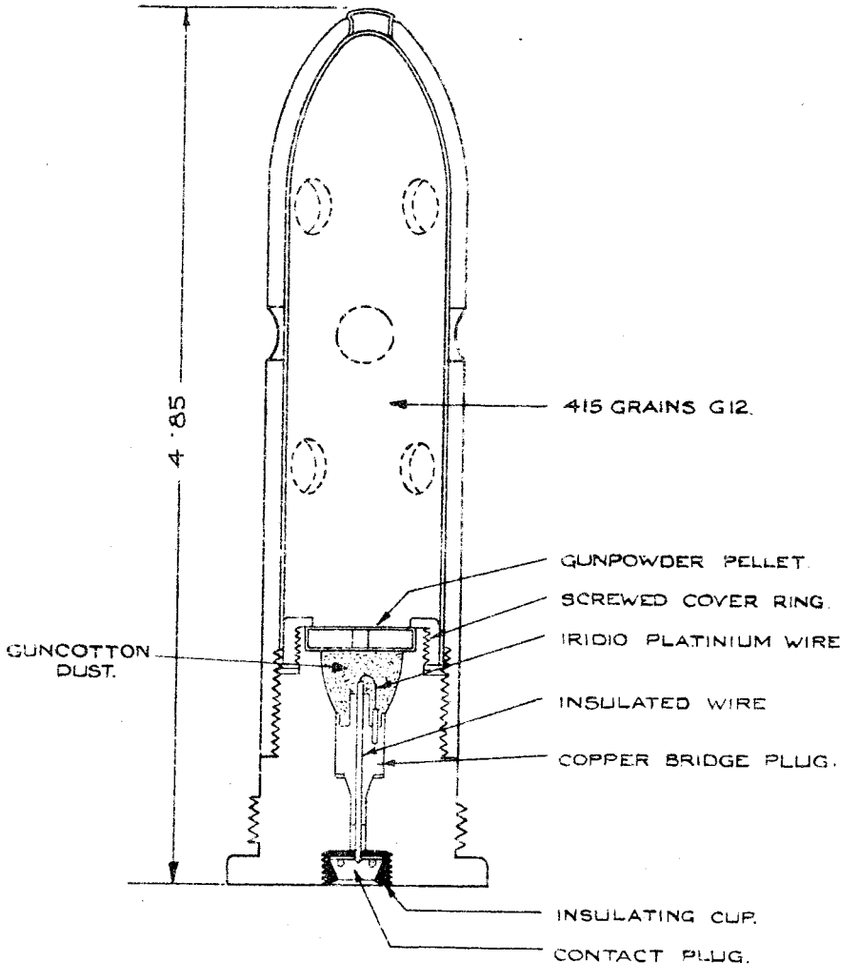
On acceleration the ferrule sets back and is retained in this position by the arms of the stirrup spring engaging the groove in the ferrule. The striker head also sets back causing the segments to be held by the striker holder. When acceleration ceases, centrifugal force set up by the rotation of the projectile, causes the segments to move outwards and leave the striker held off the detonator by the spiral spring. On impact the striker head is driven in, compressing the spring and the striker pierces the detonator.

Fig. 155.



SHELL, O.F., SMOKE EMISSION, 3-INCH HOWITZER. Mk I M.O.F. 1044.

Fig. 156.



PRIMER, ELECTRIC, No 17. Mk II.

FIG. 157.

CHEMICAL B.E. 25 PR MK VIIID.

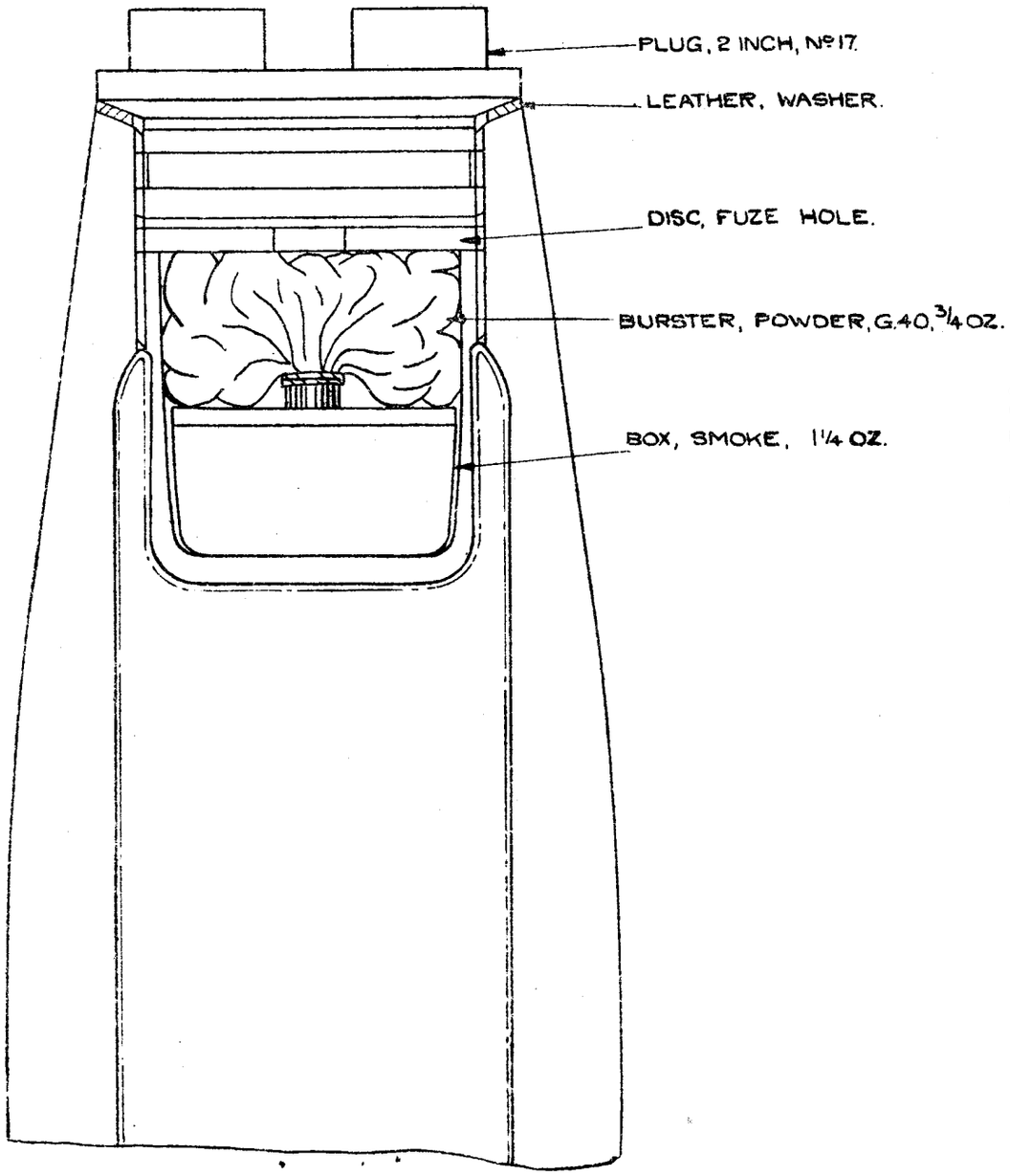
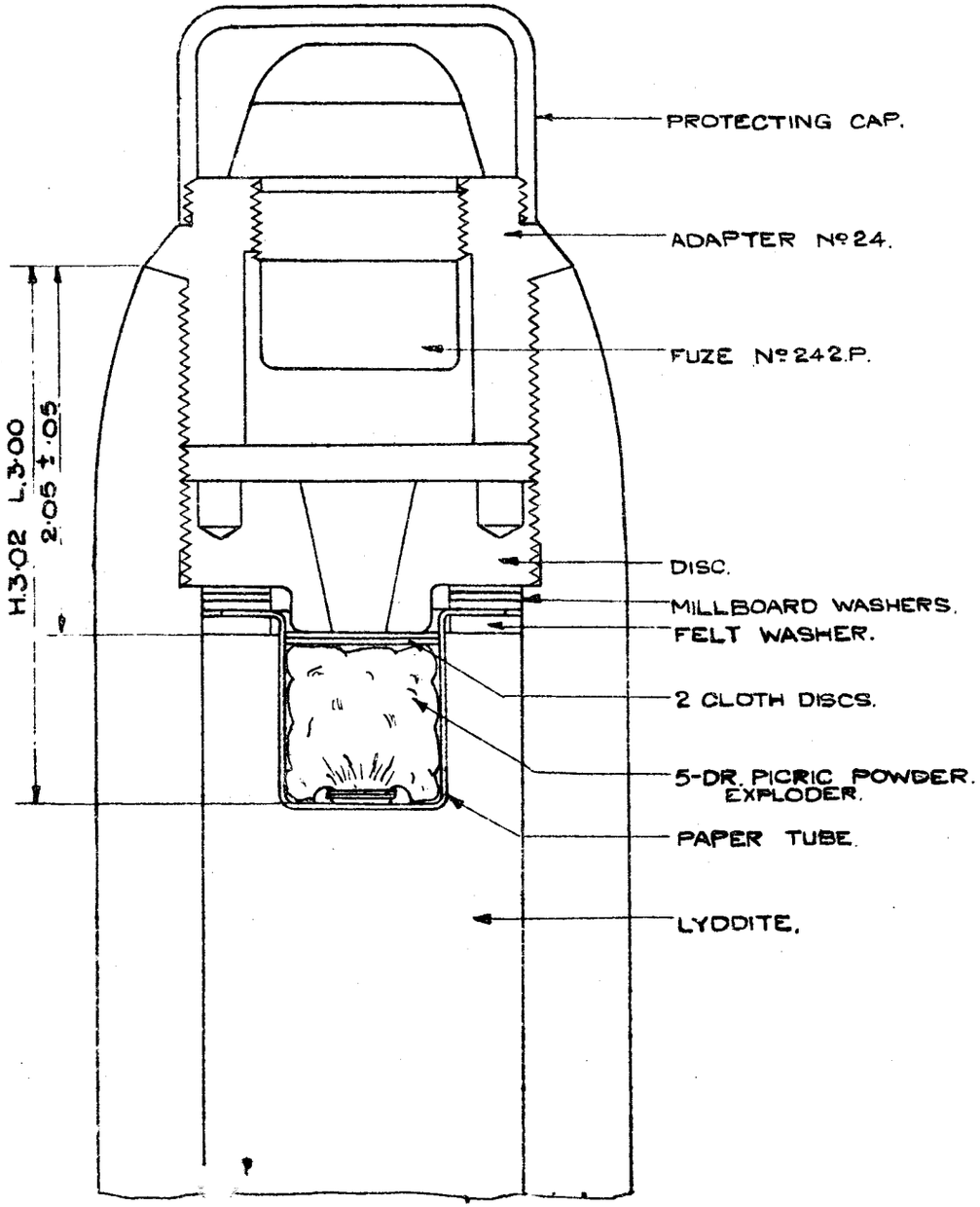


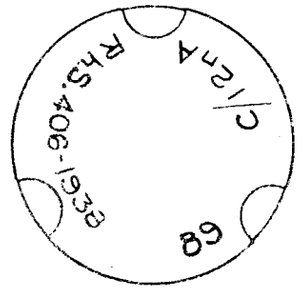
FIG. 158.

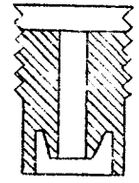
SHELL Q.F., H.E. 12-PR 12 CWT. M.O.F. 12157.



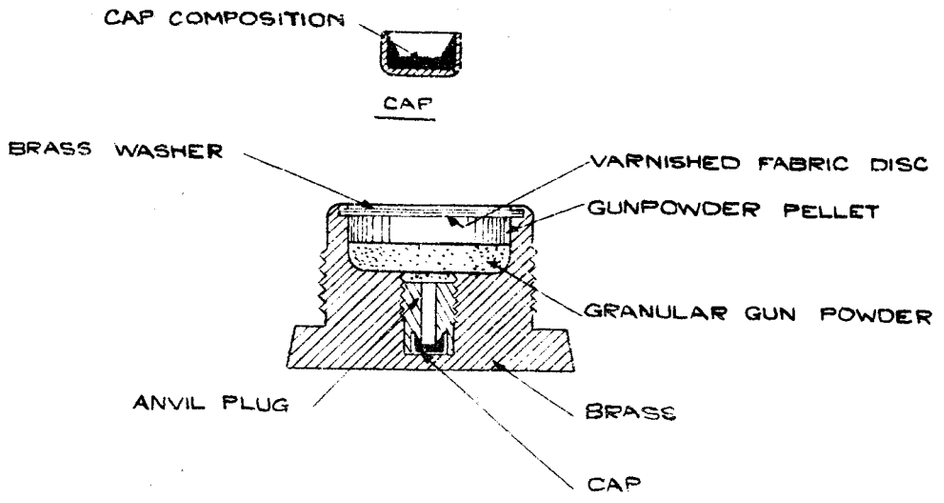
GERMAN PERCUSSION PRIMER 5 C.M. Q. CARTRIDGE.

Fig. 159.



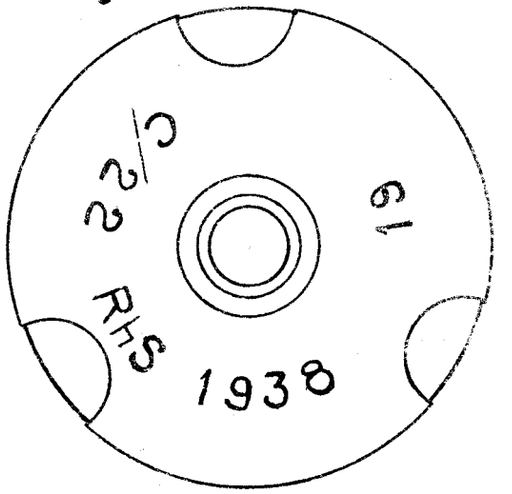


BRASS ANVIL PLUG



GERMAN ELECTRIC PRIMER FOR 7·5 C.M. Q.F. CARTRIDGE.

Fig. 160.



SPRING WASHER

FUZE HEAD.

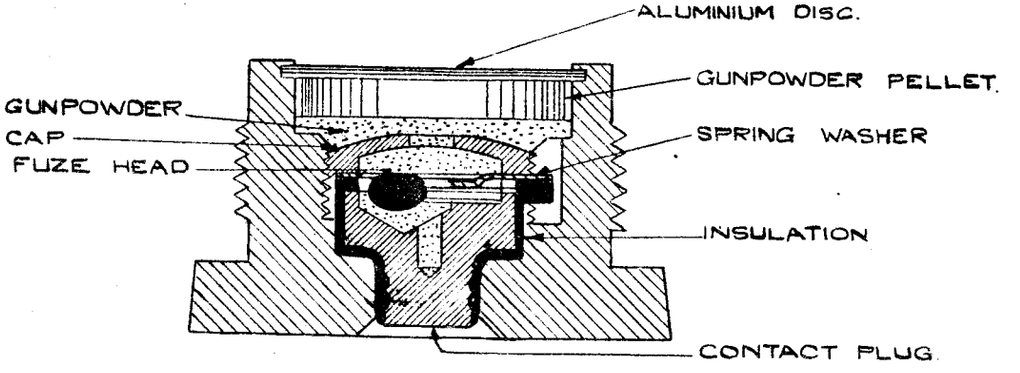


FIG. 161.

GERMAN 4·7 CM. H.E. SHELL.

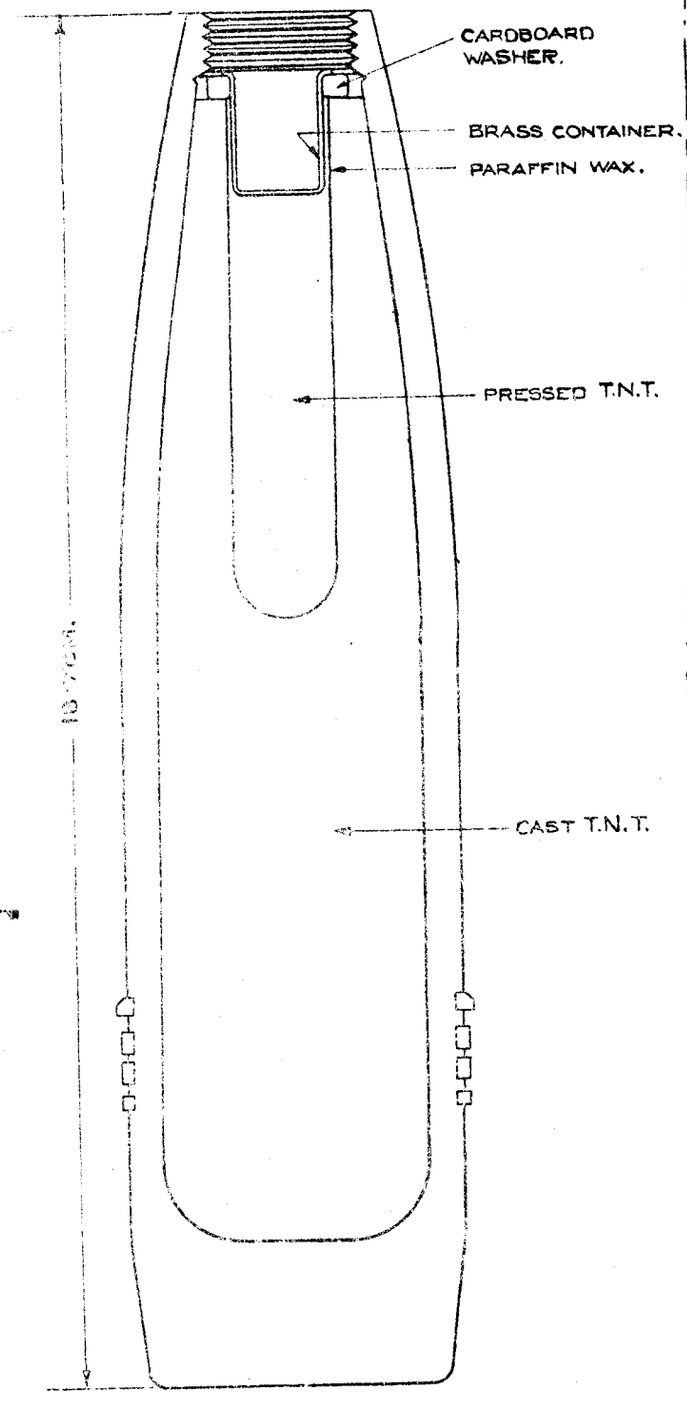


FIG. 162.

GERMAN 5 CM. H.E. SHELL.

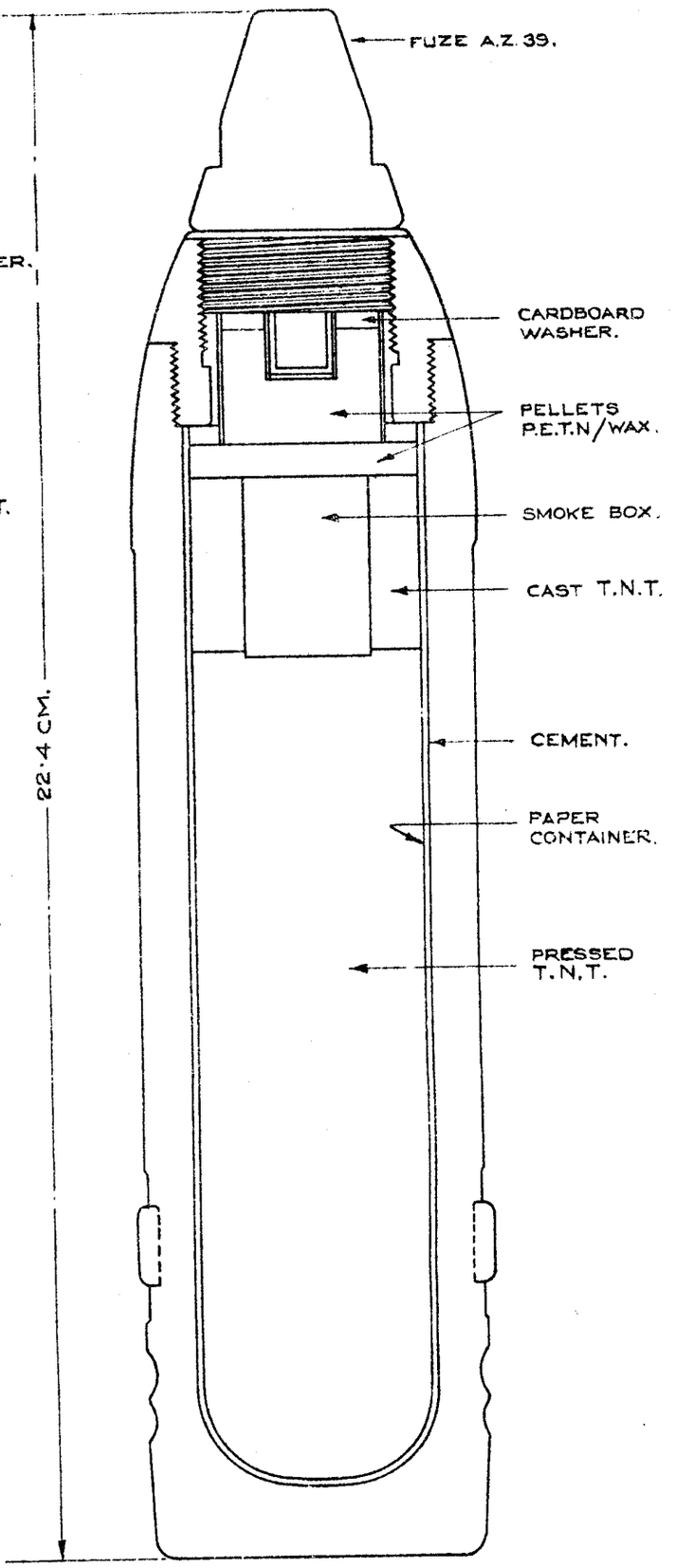


FIG. 163.

GERMAN FUZE AZ.39. (5 CM. H.E. SHELL.)

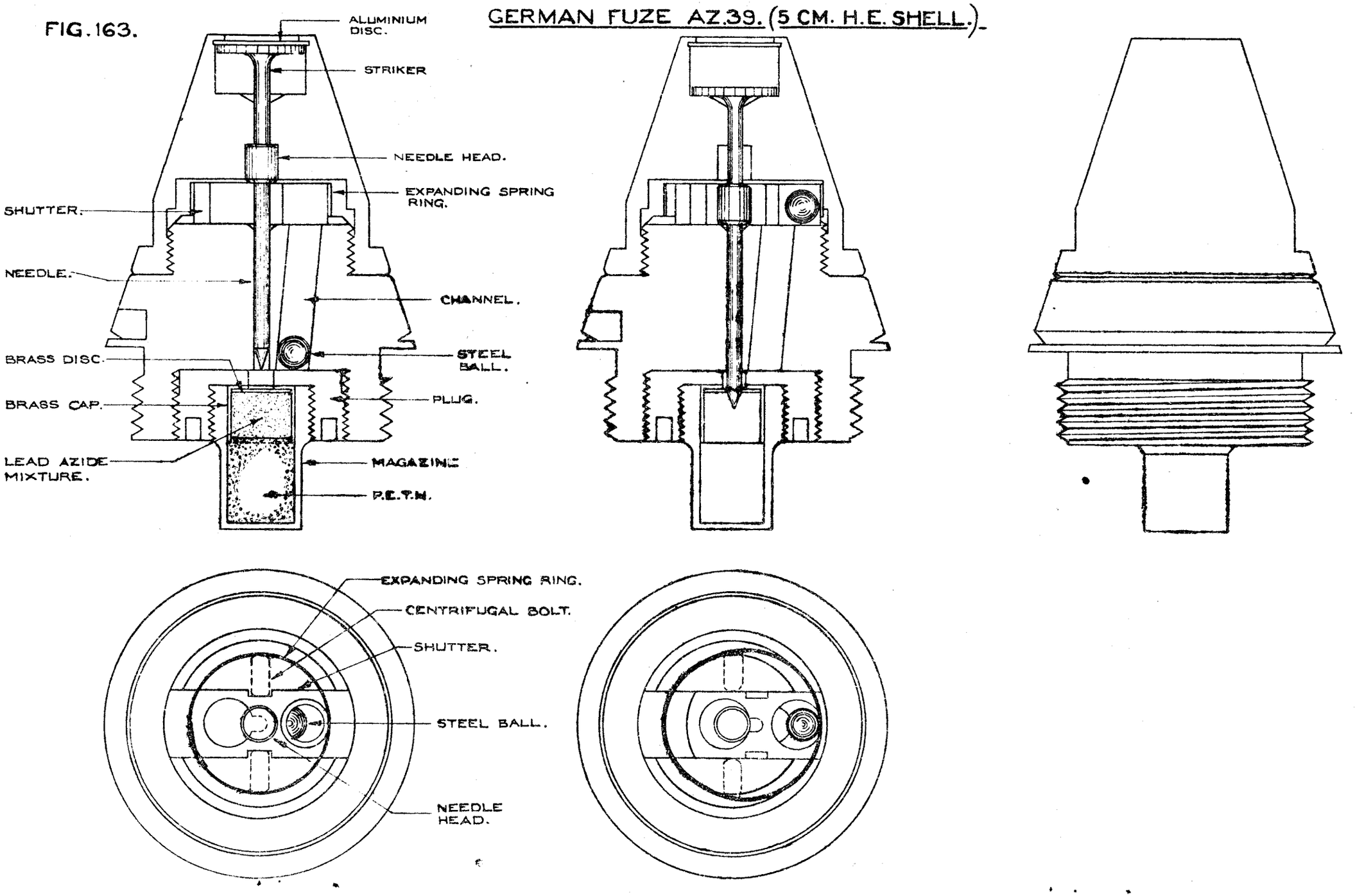
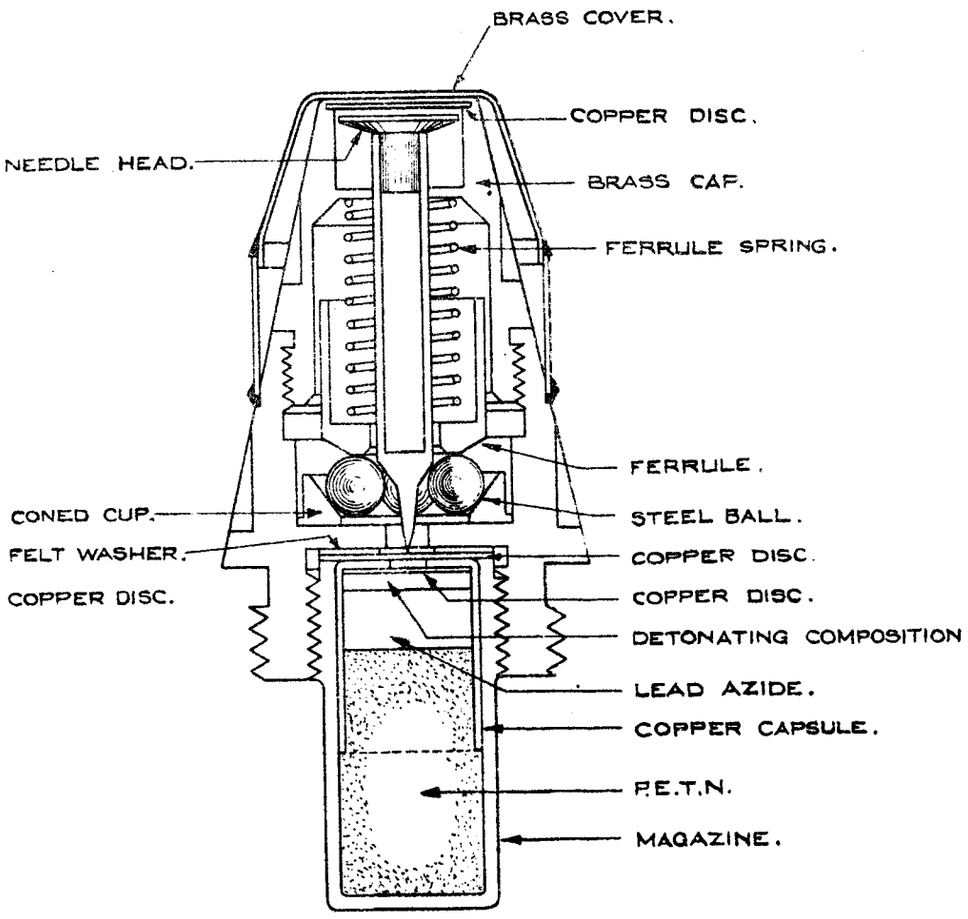


FIG. 164.

GERMAN FUZE FOR 4·7 CM. H.E. SHELL



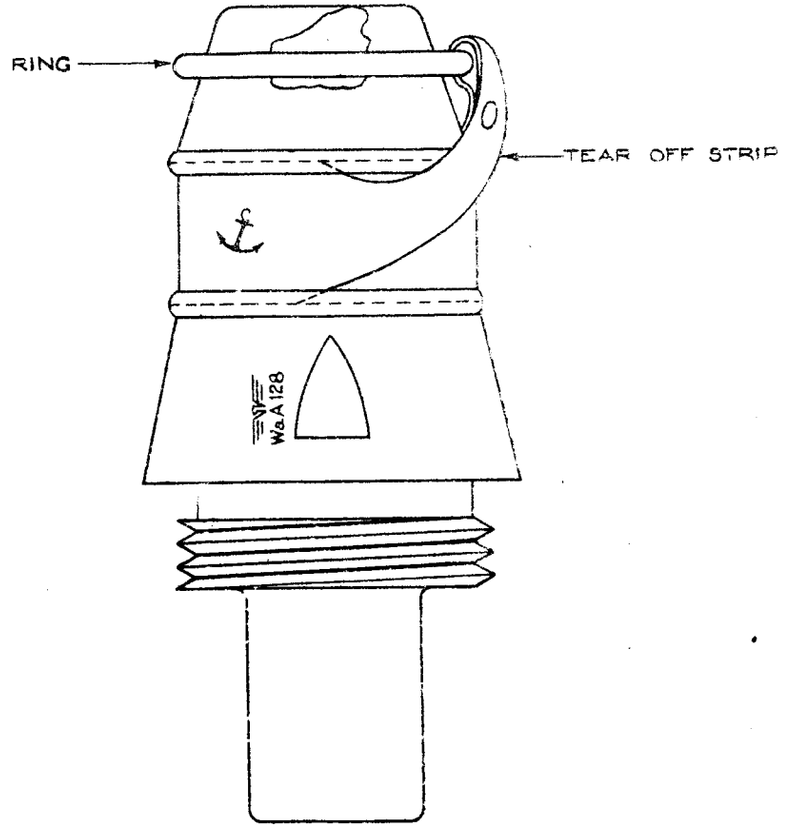


FIG. 165.
ITALIAN HAND GRENADE.

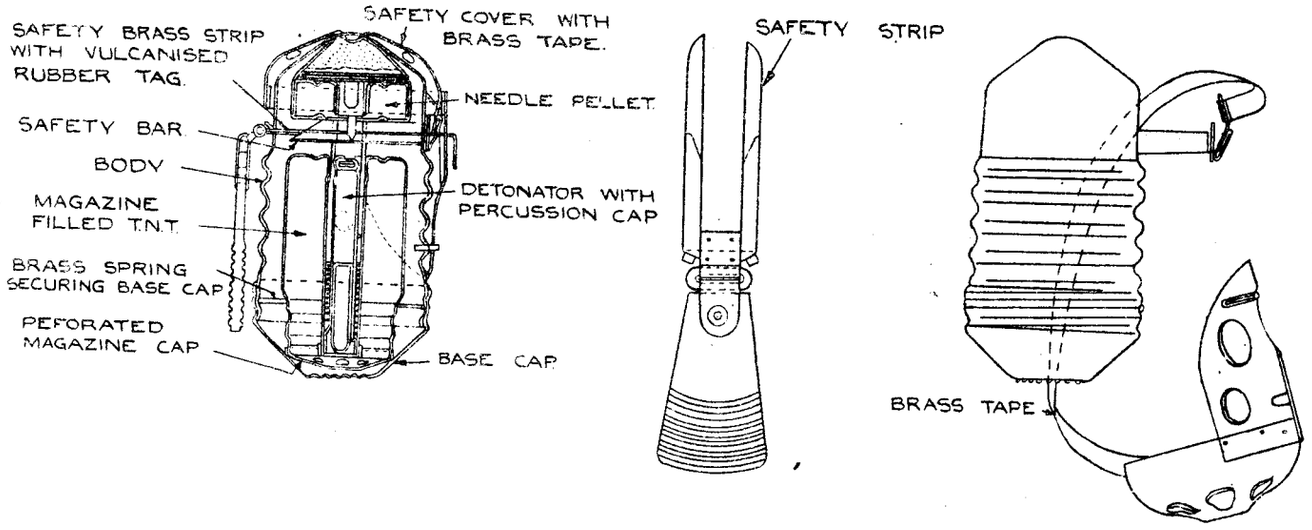


FIG. 166.
GERMAN 4·7 C.M. A.P. SHOT.

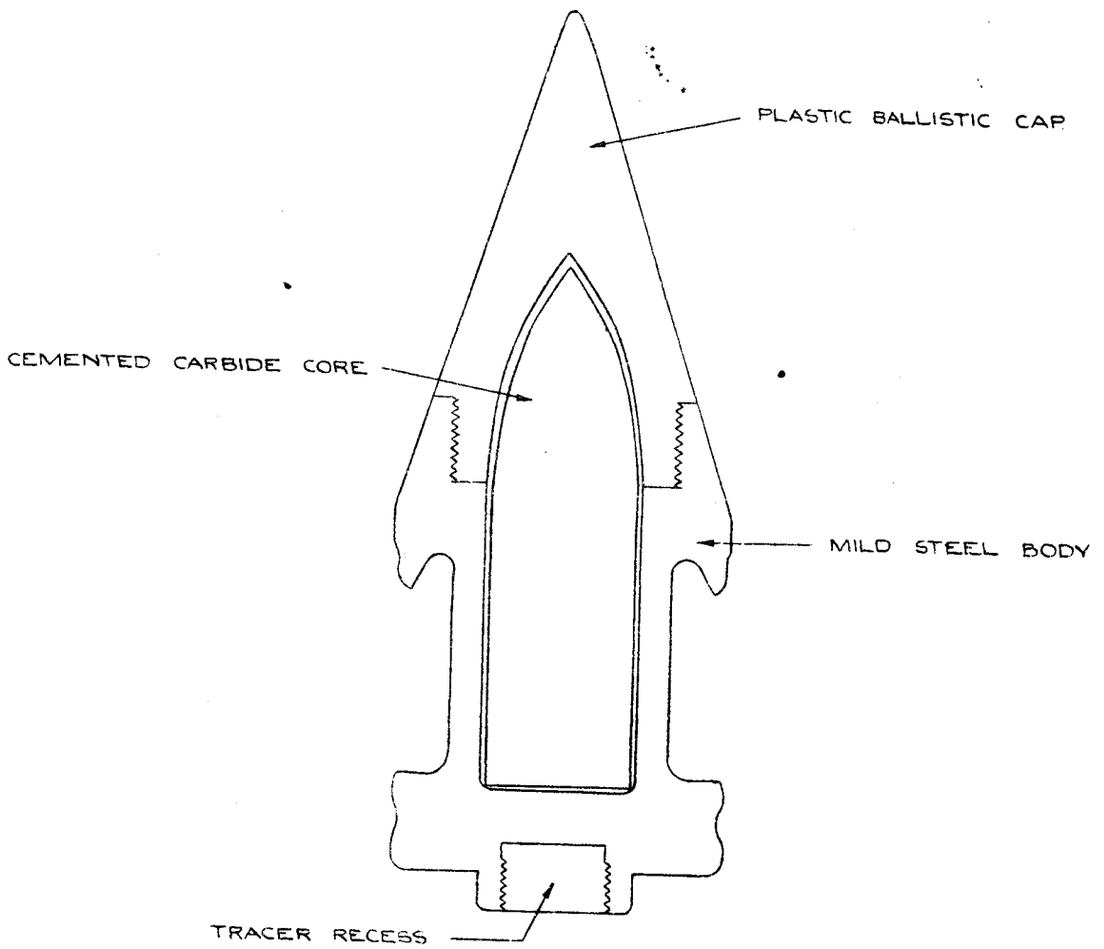


FIG. 167.
GERMAN 7·5 CM. H.E. SHELL.

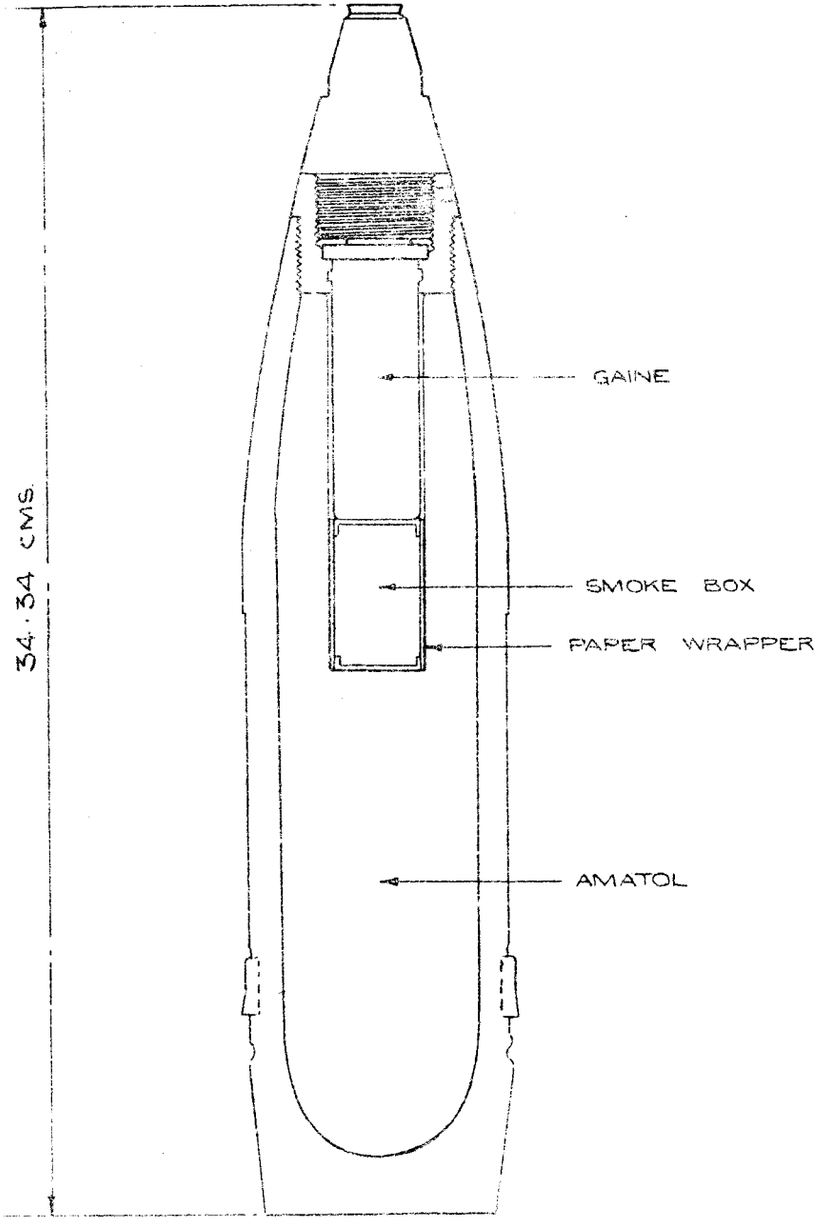
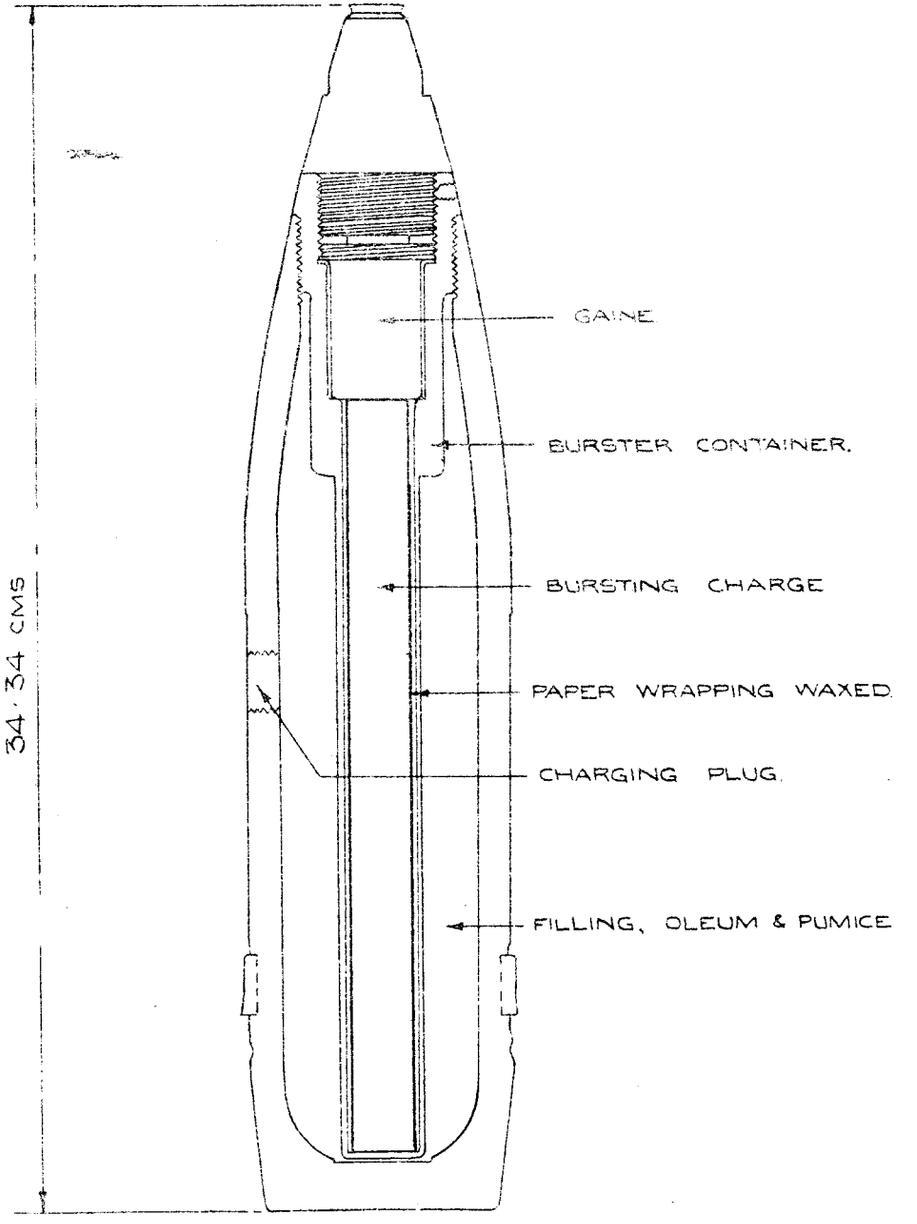
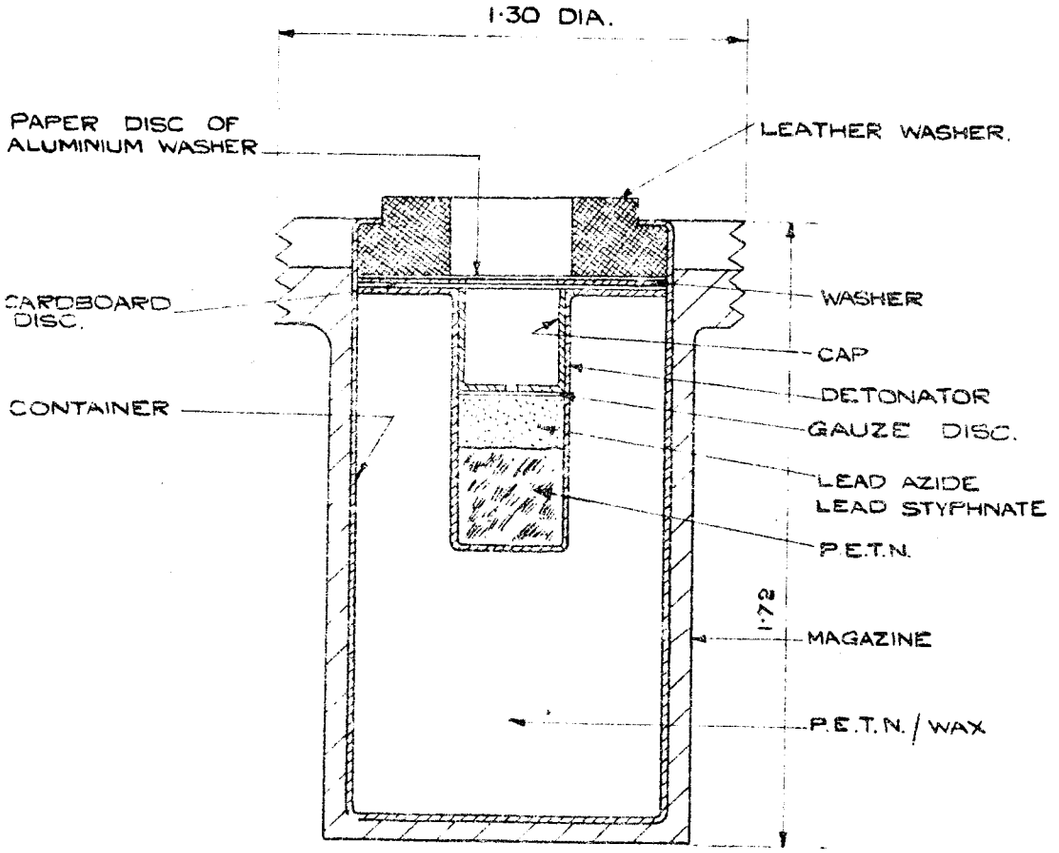


FIG. 168.
GERMAN 7·5 CM SMOKE SHELL.



GERMAN GAINE FROM 7·5 C.M. SMOKE SHELL.

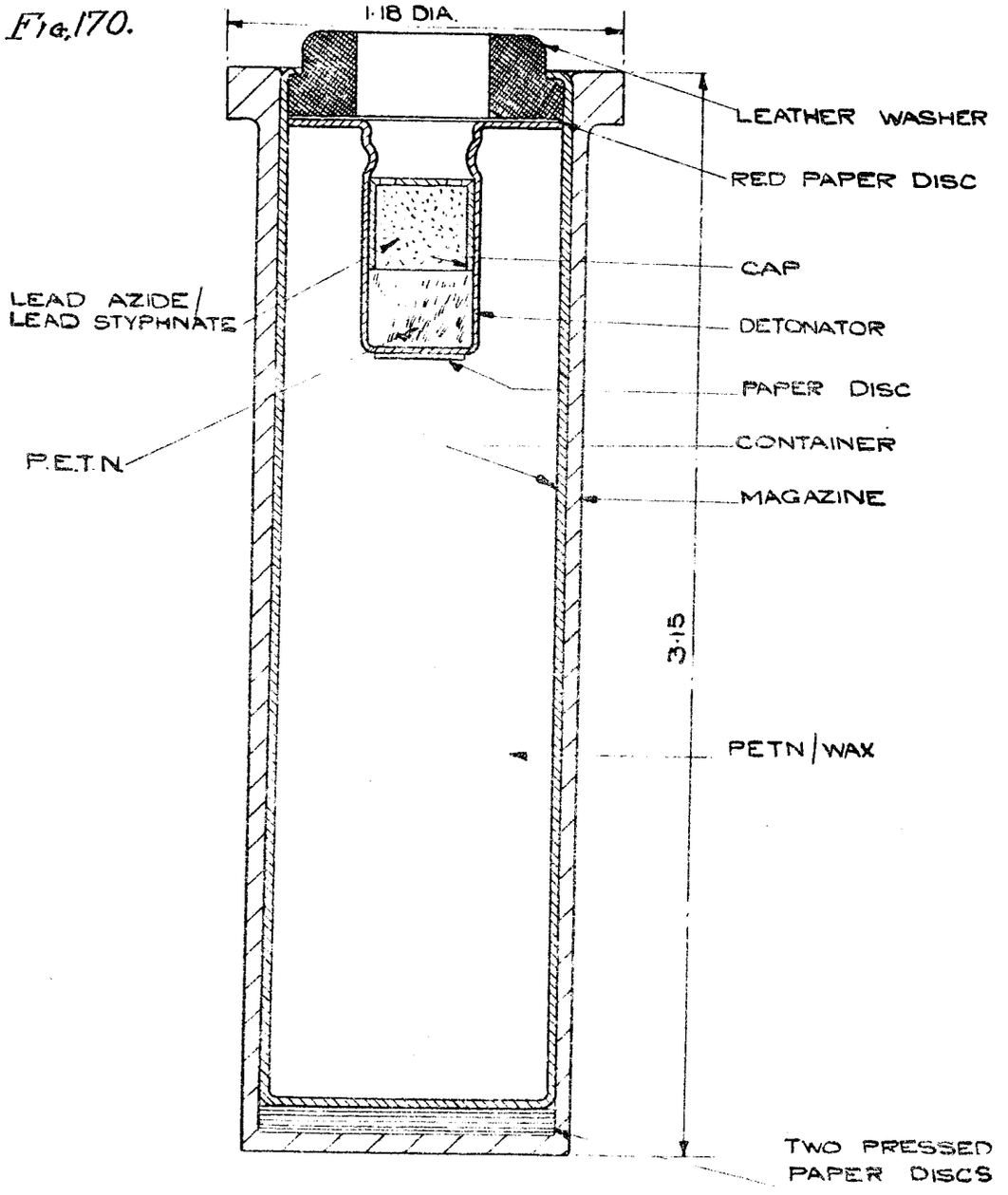
Fig, 169.



SCALE:- 2/1

GERMAN GAINE FROM 7·5 C.M. H.E. SHELL.

Fig. 170.



SCALE:- 2/1

JAPANESE FUZE.

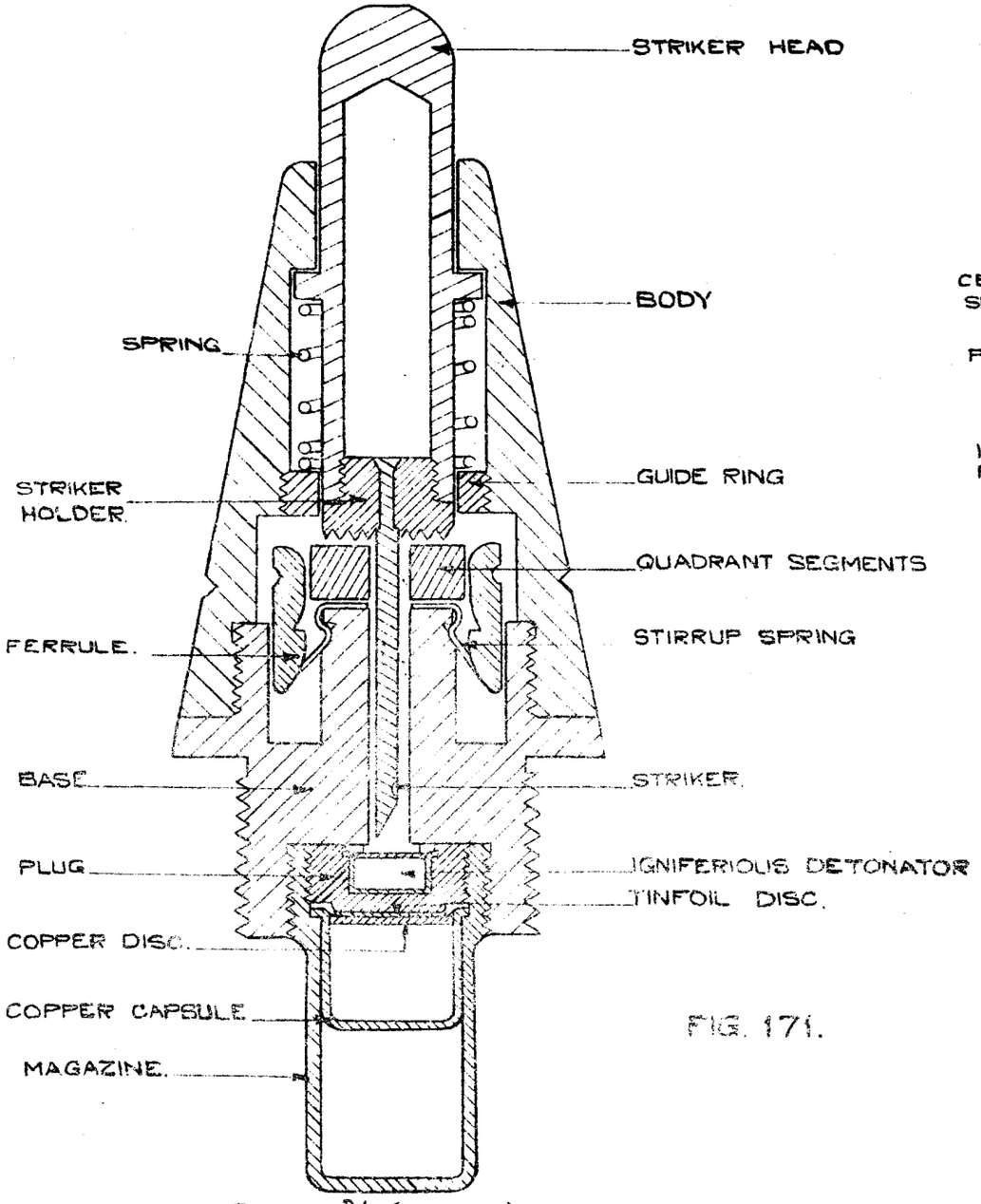
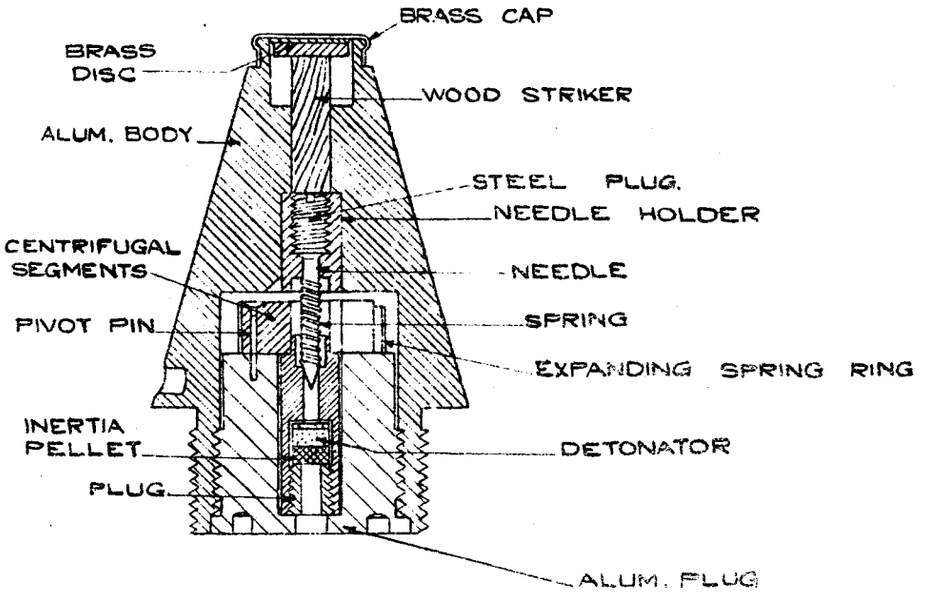


FIG. 171.

GERMAN FUZE FOR 7·5 C.M. SMOKE SHELL.



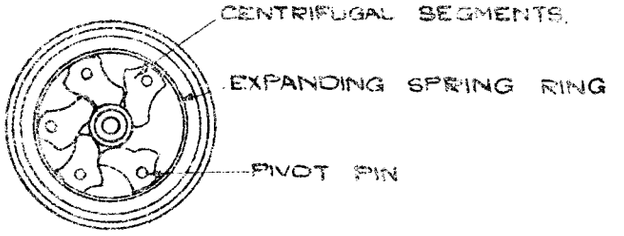


FIG. 172.

Action.

The cover is removed before loading. During acceleration the balls are held by set back and the ferrule. When acceleration ceases and the rate of spin is sufficient the balls are forced outwards by centrifugal force and retained in this position by the ferrule under the pressure of the spring. The needle is then held off the detonator by creep action. On impact the needle is driven in and pierces the detonator.

The copper disc over the initiator capsule is probably intended to act as a resistance to the needle and to prevent premature action by wind pressure acting on the needle such as might occur if the copper disc in the cap of the fuze were punctured.

Neither the needle, ferrule, nor the spring are positively located, and it appears that the needle head is so designed that the point of the needle may rove considerably off its normal axis without jamming which, should it occur, would render the fuze insensitive on a light target.

462. GERMAN 4.7 CM., Q.F., AP. SHOT (ARROW-HEAD)
Fig. 166.

The shot consists of an armour piercing core enclosed in a mild steel body. The body is fitted with a conical ballistic cap and prepared to receive a tracer. The weight of the shot (without tracer) is 1-lb. 13 ozs.

The core is made from tungsten carbide cemented by nickel. The portion enclosed in the steel body is painted white.

The body is made from free cutting mild steel of low carbon content and appears to have been machined from rolled bar. In construction it is similar to the body of the 37 mm. shot.

The ballistic cap is made from a plastic consisting of a black moulding with fibrous filler. The cap is apparently moulded into position under pressure.

463. GERMAN, Q.F., 7.5 CM., SMOKE SHELL.
Fig. 168.

Shell.

The shell consists essentially of two parts - (i) the body and (ii) the burster container, screwed into the nose of the shell and extending almost to the base of the shell cavity. The driving band consists of soft iron clad with copper on the outside. The burster container accommodates a bursting charge of 4 pressed pellets of picric acid weighing 78.5 grams (2-oz. 12.5-dr.) The four pellets are wrapped in a single wrapping of paper, about .005-inch thick, secured with an aqueous adhesive. The whole assembly is coated with paraffin wax. The wrapping is marked "KL. Ldg. Zd. K. Gr. Nb."

The smoke mixture contained in the body of the shell, surrounding the burster container, consists of 80 parts of oleum absorbed in 20 parts of pumice. The method of charging appears to be as follows. The pumice is pressed into the shell body and the burster container screwed in. Oleum is introduced into the shell through a side charging hole which is subsequently closed with a screwed plug.

The shell is coloured green, stencilled in black and white and has a red ring above the driving band. The weight complete is 13-lb. 9-oz.

Gaine. (Fig.169)

The cylindrical steel body has a screw thread at the front end for insertion in the burster container. The magazine filling of 16.8 grams P.E.T.N./Wax is in an aluminium container. The container is closed at the front end by the flange formed on the aluminium body of the detonator. The detonator fits into a cavity formed in the magazine filling and contains .6 grams of P.E.T.N. topped with .3 grams of lead azide/lead styphnate. The mouth of the detonator is closed by an aluminium cap which has four perforations lightly closed by a gauze disc. An aluminium washer, between cardboard and paper discs, is fitted over the detonator and retained by a leather washer. The leather washer is secured by turning over the mouth of the aluminium container.

Fuze. (Fig.172)

The fuze used is the A Kl AZ 23 Nb. This has a combined direct and graze action and, excepting the igniferous detonator, has no explosive filling. The aluminium body of the fuze, which is closed at the top by a brass cap, carries a wooden striker positioned over a steel needle secured in an aluminium holder. An aluminium plug screwed into the base of the body contains the graze brass pellet with its 3.16 grain igniferous detonator and receives the pointed end of the needle. A steel spiral spring, fitted between the needle holder and graze pellet, keeps these two members apart during flight when the centrifugal safety segments have been swung clear. The five segments which prevent the needle approaching the detonator in transport and in the bore are of aluminium and are pivotted on steel pins at the front end of the plug where they are retained in the safe position by an expanding spring ring of phosfer bronze. A flash hole is formed in the base of the plug.

Action.

Centrifugal force set up by the spin of the projectile in flight causes the spring ring to expand and permit the segments to rotate clear of the graze pellet thus leaving the needle and graze pellet held apart by the spiral spring. On graze or impact the spring is compressed by the striker being driven in and the graze pellet setting forward. The flash produced by the needle piercing the detonator passes through the flash hole in the base of the plug to the detonator in the gaine. The recess in the underside of the needle holder fitting over the projection on the front of the graze pellet prevents the flash escaping in the wrong direction.

Details of the cartridge and primer are given in the Section describing the H.E. cartridge.

464. GERMAN 7.5 CM., Q.F., H.E. CARTRIDGE.

The propellant charge of this fixed Q.F. round is contained in a viscose rayon bag with an igniter sewn to the bottom. The propellant consists of a bundle of green, yellow, brown and grey-black tubes. The colours are due to the inclusion of dye-stuffs and appear to bear no relation to compositions but may be used for blending purposes. The nitrocellulose used has a nitrogen content of 13.3 per cent. and the stabilizer is diphenylamine. A small proportion of sodium sulphate is also included. The igniter composition contains nitrocellulose and nitroglycerine with possibly a small proportion of poly-nitroglycerine.

Primer. (Fig.160)

The primer is initiated electrically and is of unusual design. The fuze head with a composition consisting mainly of lead styphnate in a nitrocellulose sheath has a resistance of approximately 2.2 ohms and is in circuit with the insulated contact plug and, through the spring washer, the body of the primer. The gunpowder filling consists of a pellet and granular with a total weight of 31 grains. The magazine is closed by an aluminium disc with discs of paper or varnished fabric.

Shell. (Fig.167)

The Amatol 40/60 bursting charge is directly pressed into the shell; the weight of the filling is 653 grams (1-lb. 7-oz.). The exploder cavity contains a smoke box and gaine.

The smoke box, weighing 32 grams (1-oz. 2-dr.), consists of a waxed paper carton containing a smoke pellet of the following composition :-

Red Phosphorus	85 parts
Paraffin Wax	13 "
Alumina	2 "

The carton is marked "Ravchenwickler No.8".

The shell is coloured green, stencilled in black, and has a complete weight of 12-lb. 9-oz.

The driving band consists of soft iron clad with copper on the outside.

Gaine. (Fig.170)

The gaine has a cylindrical body of steel with a flange formed at its front end to engage the fuze hole bush. The magazine filling, 33.8 grams of P.E.T.N./Wax is in an aluminium container which rests on pressed paper discs in the bottom of the body. The container is closed at the front end by the flange formed on the aluminium body of the detonator. The detonator fits into a cavity formed in the magazine filling and contains .38 grams of P.E.T.N. over which is positioned an aluminium cap containing .41 grams of lead azide/lead styphnate. Four perforations are formed in the front end of the cap. The detonator is closed by means of a disc of red paper and secured in the container by a leather washer over which the mouth of the container is turned.

Fuze.

The fuze Kl.AZ.23 is designed to function on graze or impact and is similar in construction and action to the AZ 23 described in Item 67, Bulletin No.7.

465. ITALIAN H.E. HAND GRENADE.

Fig.165.

The grenade has a percussion action of the "Always" type, is lightly constructed and has a T.N.T. bursting charge weighing approximately 2½-oz.

The grenade has a cylindrical corrugated body of tinned plate coned at each end to produce the movement of the needle and detonator necessary for "Always" action. The base cap of the body forms the cone at the base of the grenade and is secured by corrugations and an internal brass spring.

The needle pellet is in the form of a tinned plate cylinder carrying the needle and is fitted with a coned cap of brass at its outer end which bears against the coned end of the body. This cap contains T.N.T. and fine lead shot apparently for weighting and destructive effect. A perforated tube of aluminium, fitted to the pellet, surrounds the needle and extends from the inner face of the pellet. This tube fits over the detonator and, bearing against a brass spiral spring in the centre tube of the magazine, is the means of keeping the needle off the cap of the detonator when the grenade is armed in flight.

The magazine consists of a tinned plate cylinder with central tube. The cylinder contains T.N.T. and is closed at the base, where it rests on the coned base cap of the body, by a perforated cap.

The detonator with its percussion cap is housed in the perforated tube of the needle pellet within the centre tube of the magazine. Details of the initiator compositions used are not available but that in the detonator is probably lead styphnate and P.E.T.N. and that in the cap is probably Mercury Fulminate, Antimony Sulphide and Potassium Chlorate.

A safety bar of tinned plate is inserted in the body of the grenade between the needle and the percussion cap of the detonator. The outer end of this bar is attached to the safety cover by a brass tape which is wound round the grenade when the cover is fitted.

The safety cover is a perforated tinned plate cup which acts as a drogue for the removal of the safety bar when the grenade is in flight. The cover is fitted with a curved portion which fits to the body when cover is fitted over the head of the grenade. The cover is secured by the safety strip passing through the body of the grenade and the curved portion of the cover. The safety strip is of brass and is fitted with a vulcanised rubber tab by means of which it is pulled out of the grenade by hand.

The grenade is painted red and the safety cover black. The base is stamped "BREDA".

Action.

To prepare the grenade for throwing, the safety strip is withdrawn by pulling the vulcanised rubber tab. The grenade is now ready but, if accidently dropped remains unarmed. During flight the air acting on the safety cover removes it from the grenade, unwinding the brass tape and withdrawing the safety bar which falls away leaving the needle and cap of the detonator held apart by the spiral spring. The action on impact depends upon the position of the grenade. If it strikes head or base downwards the spiral spring is compressed by the momentum of magazine or needle pellet respectively and the needle pierces the cap. With side impact, the outer ends of the needle pellet and magazine move down the inclines of the coned ends of the body causing both members to move towards each other and the needle pierces the cap.

It is known that the Italians have had accidents with their grenades even though the safety bar was in position. The grenades should therefore be treated with caution.

466. JAPANESE FUZE.
Fig. 171.

This is a direct action fuze of the detonating type in which the striker is held off the detonator by a spiral spring. For safety in transport and in the bore a safety device is included which consists of segments positioned under the striker holder to prevent its movement towards the detonator.

The steel striker, attached to the aluminium striker head by means of the steel holder, is supported in the brass body by means of a steel spiral spring. The spring is held in compression between the brass guide ring and a collar formed on the striker head.

The brass base of the fuze screws into the body and carries a brass cylindrical ferrule supported on a cupro-nickel stirrup spring. The ferrule locates four brass segments between the striker holder and the base and has an internal groove to engage the arms of the stirrup spring when in the armed position.

Details of the initiator fillings and the filling of the brass magazine are not available.