

AMMUNITION BULLETIN No 47

ITEMS 1289-1346

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THE CHIEF INSPECTOR OF ARMAMENTS.

MINISTRY OF SUPPLY

AMMUNITION BULLETIN NO.47

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CHIEF INSPECTOR OF ARMAMENTS

Item No.

- 1289 Bombs, M.L. 3 in. Mortar, 10 lb. Cartridge restriction
- 1302 " " " " H.E. Batches packed in Box B.166A
- 1320 " " " " M. of F. Designs for H.E. and Practice
- 1326 " " " " Smoke. (Special package marking)
- 1292 Boxes, A.S.A. "Obsolescent"
- 1301 Box, A.S.A. H.13
- 1306 Cartridges, M.L. 2 in. Mortar, Use in 2 in. Bomb Thrower
- 1319 " S.B. M.L. 4.2 in. Mortar, Smokeless, 140 Grains Ballistite Mk.1
- 1297 Cartridges, B.L. 4.5 in. gun, Cylindrical type
- 1296 " B.L. 5.5 in. gun " "
- 1295 " B.L. 9.2 in. Mk.10, 10v, 10x and 15 Guns. Extension of use.
- 1293 " Q.F. 25 pr. Temporary use of No. 1 Primer plus Igniter
- 1311 Container, Cartridge, No.207 Mk.2 (for B.L. 5.5 in. or B.L. 4.5 in.)
- 1310 " " No.223 Mk.2
- 1304 " " No.239 Mk.1 } (for Q.F. 6 pr. 7 cwt.)
- 1312 " " No.237 Mk.2 (for Q.F. 17 pr. A.P.D.S.)
- 1317 " " No.257 Mk.1 (for B.L. 4.5 in. Ch.3)
- 1294 Conversion of U.S. Cartridges for decoppering. Package Markings
- 1316 Fuze, D.A. and Percussion No.119 (Fig.533)
- 1318 Fuze, drill, Time, No.207 or No.208 Mk.1. Plastic caps obsolescent
- 1313 Fuze, No.233. Marking of F.F.C. on fuze covers
- 1290 Fuze, perc. D.A. No.244. Mks.1 to 5.
- 1309 Fuze, perc. No.425 "Obsolete"
- 1315 Generator, Smoke, No.28 Mk.1. Time to effective smoke emission
- 1299 Grenade, hand, No.77. Package.
- 1314 " " No.80 Mk.1. Number constituting filled lot
- 1326A Igniters, B.L. Cartridges. Marking
- 1303 Igniters, No.88 and 90. Group classification
- 1308 Projectiles, Marking of stores filled R.D.X.
- 1300 S.A.A. Universal package
- 1325 " " " Markings
- 1307 " Incendiary. Packing details
- 1298 Shell, B.L., H.E. 5.5 in. and below. Re exploder containers
- 1321 Signal, One Star, Red, Green or Yellow, Mk.3 (Fig.535)
- 1322 Signal, Illuminating, Mk.1 (Fig.534)
- 1323 Signal, Double Star, Red, Green or Red and Green Mk.1 (Fig.536)
- 1324 Signal, 2 Star, Red and Green Mk.1 (Fig.537)
- 1305 Simulators, Gun-flash, "Obsolescent" and "Obsolete"
- 1291 Slabs, demolition, CE/TNT. Group classification

ENEMY AMMUNITION

GERMAN

- 1327 7.5 cm Pak 40, Ctge. Q.F. Hollow charge shell (7.5 cm Gr 38 HL/B)
- 1328 7.5 cm Geb K.15 Q.F. Cartridge (Fig.538)
- 1329 7.5 cm Geb K.15 H.E. Shell (Fig.539)
- 1330 7.5 cm le.F.K.18 Q.F. Cartridge
- 1331 7.5 cm le.F.K.18 APCBC/T Shell(Tracer Fig.540)
- 1332 8.8 cm Flak 41 Cartridge Q.F. H.E. (Fig.541)
- 1333 Fuze A.Z.23 (0,15) (Pr) with plastic body(Fig.542)
- 1334 Fuze Percussion A.Z.49 (Fig.543)
- 1335 Tracer No. 5 (Fig.544)
- 1336 Primer Percussion Q.F. Ctge. C/43 St and C/113 (Fig.545)
- 1337 Fuzes Electric for ignition of 28 cm and 32 cm Rockets
(Steckzunder 40, Druckknopfzunder 42 and
Gluhzundketten 40 MV) (Figs.546 and 547)
- 1338 15.2 cm (6 inch) A.A. Rocket (15.2 cm Kz 1000 (Kp)) (Fig.548)
- 1339 8.8 cm Anti-tank Hollow charge rocket projectile
(8.8 cm Raketen, Panzerbusche Granate 4312) (Fig.549)
- 1340 8.6 cm A.A. "Wire barrage" Rocket (Fig.550)

Item No.

- 1341 3 cm Rifle smoke grenade
(Gewehrblendgranate 42) (Gw.B.Gr.42) (Figs.551 and 552)
- 1342 46 mm Hollow charge rifle grenade
(Gewehr Panzergranate 46 mm) (Figs. 553 and 554)
- 1343 61 mm Hollow charge rifle grenade
(Gewehr Panzergranate 61 mm) (Fig.555)
- 1344 Hollow charge Anti-tank bomb with projector
(Panzerfaust Klein 30) (Fig.556)

JAPANESE

- 1345 Smoke grenade for use with discharger type 89 (Fig.557)
- 1346 4 cm Hollow charge rifle grenade (Fig.558)

AMENDMENTS

- Bulletin No.46, Item 1260, Last line. Delete "Group IX" and substitute "Group 6"
- " " Item 1261, Last line. Delete "Group IX" and substitute "Group 6"
- " " Item 1267, Page 7. First three lines, for ".30 inch" substitute ".303 inch"
- " " Item 1267, Page 8. Under column headed "Abbreviation",
Item 2. Amend "40 MM TNT 6 SEC" to read "40 MM TNT 7 SEC"
" 4 " "40 MM PENT 6 SEC" " " "40 MM PENT 7 SEC"
" 5 " "40 MM RDX 6 SEC" " " "40 MM RDX 7 SEC"
Page 11. After Item 23 insert "Grenade No.77 Mk.2" in
Col.1 and "77 GREN RM" in Col.2
After Item 25 insert "Grenade No.81 Mk.1" in
Col.1 and "81 GREN WP" in Col.2
- " " Item 1280, Page 19. For Item "1281 GERMAN FUZE AZ.1" read "1280
GERMAN FUZE AZ.1"
- Bulletin No.45, Item 1231. Sub-para.(a) Line 2. Delete "always". Line 3 Delete "."
after "numeral" and add "except when the meaning of the
numerals cannot be mistaken, as on the base of the
S.A. cartridge"
- " " Item 1246. Line 29 For "0.22" read "0.022"
- Bulletin No.38, Item 939. Last line. Delete "Group 1" and substitute "Group 4,
Category 2".
- Bulletin No.34, Item 756. Line 7. Delete "Group 1" and substitute "Group 4"

1289.

BOMB, M.L. 3 in. MORTAR, 10 lb. - CARTRIDGES RESTRICTION

Approval has been given for the use of the 280 grain N.R.N. No. 9 Augmenting cartridge to be discontinued with M.L. 3 in. Mortar bombs fitted with tail units of U.K. production which have the vanes attached by spot or arc welding.

1290.

FUZE, PERCUSSION, D.A. No.244, Mks.1 to 5.

Reference Bulletin No.21, Item 304 and Bulletin No.32, Item 654. The latest Mark of this fuze is the Mk.5 and the following is a summary of the variations between Marks to date :-

Mk.1 (Obsolescent) had eccentric recess in magazine for the shutter and a flat shutter spring around outside of shutter.

Mk.2 (Obsolescent) had a modified shutter and coiled shutter spring.

Mk.3 (Obsolescent) had concentric recess for shutter.

Mk.4 similar to Mk.3 but with modified upper detonator holder to take 1.7 gr. detonator in lieu of 1.62 gr. detonator. Later fitted with safety cap with steel disc marked "Fire with cap on".

Mk.5 has shutter opening in reverse direction to the Mk.4. The needle disc is of steel in lieu of copper. Safety cap with 6 lugs in lieu of 8 with brass disc marked "Remove before firing". Cushioned detonator.

1291.

SLABS, DEMOLITION, CE/TNT - GROUP CLASSIFICATION OF

Reference Bulletin No.38, Item 939 and Bulletin No.34, Item 756. The classification of Slabs, Demolition, CE/TNT has now been given as Group 4, Category Z and the necessary amendment to the above quoted Items appears on Page 2, this Bulletin.

1292.

BOXES, A.S.A. - "OBSCULESCENT"

The following Boxes, A.S.A. have been rendered "OBSCULESCENT" :-

H.13 Mk.1B
H.13 Mk.2
H.20 Mk.1
H.20 Mk.1A
H.22 Mk.1
H.22 Mk.1E
H.28 Mk.1
H.28 Mk.1E
H.29 Mk.2

1293.

CARTRIDGES, Q.F. 25 pr. TEMPORARY USE OF NO.1 PRIMER PLUS IGNITER

Approval has been given for the use of the No.1 Primer plus a supplementary igniter, as a temporary concession, in lieu of the No.11 Primer, in Q.F. 25 pr. cartridges.

Igniter fillings, of G.12 powder, will be as follows :-

NH/FNH - Normal charge - 126 gr. for initial fillings, changing over as soon as possible to 164 grs.

NQ - Normal charge - 164 gr.

NV/S - Super charge - 219 gr.

Charge 1 will not be shellacked to the base of the cartridge case but retained by two paper strips $\frac{1}{4}$ in. wide at right angles, passing over the charge and shellacked to bottom of case.

The igniters are arranged to sit over the No. 1 Primer and paper strips are also used to retain Charges 2 and 3.

1294.

CONVERSION OF U.S. CARTRIDGES FOR DECOPPERING. PACKAGE MARKINGS

Certain cartridges of U.S. origin are being converted to decoppering charges by breakdown, insertion of foil, and re-assembly. These cartridges will normally be repacked in the U.S. package.

On repacking, the letters 'DEC' will be stencilled in white on each side and end of the package.

1295.

CARTRIDGES, B.L. 9.2 in. Mks. 10, 10v, 10^{RT} and 15 Guns. EXTENSION OF USE.

Approval has been given for the following cartridges, B.L. 9.2 in. gun, hitherto used in Coast Defence, to be extended to the Mks. 10RT, 10vRT and 10^{RT} guns on railway mountings :-

107 lb. Cordite M.D. 26
109 lb. Cordite S.C. 150, W.173 or W.M.182.

These charges will normally consist of two half charges but the equivalent quarter charges may be used if the necessity arises.

1296.

CARTRIDGES, B.L. 5.5 in.

The undermentioned cylindrical type cartridges, to replace the existing stalk type cartridge to DD(L)9759 (which will become obsolescent), has been approved for the B.L. 5.5 in. gun :-

2 lb. 10 oz. 8 dr. cordite WM.061 ... Charge 1 }
Increment-1 lb. 9 oz. 8 dr. " " ... Charge 2

1297.

CARTRIDGE, B.L. 4.5 in. GUN

The undermentioned cylindrical type cartridge, to replace the existing stalk type cartridge to DD(L)8723, has been approved for the B.L. 4.5 in. gun:-

Charge 1. 2 lb. 15 oz. cordite WM.061, Mk.2

1298.

SHELL, B.L. H.E., 5.5 in. AND BELOW. M. of F. DESIGNS

Approval has been given for exploder containers to be omitted from medium Field Artillery shell (5.5 in. and below) with poured fillings, with both optional fuizing and normal fuizing M. of F. designs, with the following provisos :-

- (a) For fillings other than Amatol the exploder cavity to be lined with a stout varnished paper tube, and for Amatol fillings the cavity to be lined with a stout waxed paper tube.
- (b) The exploder(s) to be contained in a robust carton or wrapper (on the lines of the 26 dr. C.E. pellet exploder).

The above M. of F. designs will be used concurrently with exploder container designs, according to the availability of exploder containers. The order of preference for filling is :-

- (a) Large pellet exploders with exploder containers.
- (b) Large pellet exploders without exploder containers.
- (c) Small pellet or bag exploder with exploder containers.

1299.

GRENADE, HAND, NO.77 - PACKAGE.

The following package for the No.77 Grenade and No.63 Detonator has been approved:-

Container, packing, No.268 Mk.I .. To hold 4 grenades, and 4 detonators in cylinder No.528.
Box C.238 Mk.2 To hold 6 containers No.268 Mk.1 (i.e. 24 grenades with detonators)

Stowage dimensions of steel box C.238 Mk.2 are 25.9 x 10.1 x 9.6 inches.

1300.
SMALL ARMS AMMUNITION - UNIVERSAL PACKAGE.

Reference Bulletin No.45, Item 1244. In view of some confusion which has arisen from the use of the term "Jungle Package", it has been decided that the new design S.A.A. packages referred to therein will in future be known as the "Universal S.A.A. Package."

A further reason for this change in nomenclature is that the package fulfils the requirement of providing adequate protection for M.M.G. ammunition and for free or parachute dropping from aircraft.

1301.
BOX, A.S.A. H.13 - "OBSCULESCENT"

Reference Bulletin No.46, Item 1269. Consequent to the removal of identification battens and the use of brown stain, Boxes A.S.A. H.13 have become identical with the corresponding H.1 boxes and have therefore been endorsed "Obsculescent".

1302.
BOMBS, M.L. 3 in. MORTAR, H.E. - BATCHES PACKED IN BOX B.166A

Batches B.8031 - B.8035 inclusive of Bombs M.L. 3 in. Mortar, H.E., with Carriers Ammn. No. 1 Mk.1 have been packed into Boxes B.166A instead of B.166. As Boxes B.166A have no fittings to keep carriers in correct position, millboard packing pieces have been used between the two carriers.

1303.
IGNITERS NO.88 and 90. GROUP CLASSIFICATION.

Reference Bulletin No.43, Items 1146 and 1147 and Bulletin No.46, Items 1260 and 1261. The abovementioned Igniters have now been classified as Group 6, instead of Group 9.

1304.
CONTAINER, CARTRIDGE, NO.239 Mk.I (for Q.F. 6 pr. 7 cwt.)

The above container, in waterproof board, has been approved for Far East use, as an interim measure, to pack one round Q.F. 6 pr. 7 cwt. A.P. or A.P.C. shot. One end of the container tube is prepared internally to locate the projectile and the end closed by a metal cap spun into the end of the tube. The other end is closed by a metal cap which is a push fit over the tube. Both end caps are painted.

The container bears the following stencilled markings on the outside:- No. and Mark; Contractor's initials or recognised trade mark; Year of manufacture.

Stowage dimensions are Length 25 x Dia. 3.78 inches.

1305.
SIMULATORS, GUNFLASH - "OBSCULESCENT" AND "OBSCULETE"

Reference Bulletin No.32, Item 638. Simulator, Gunflash, No. 1 Mk.2 has been declared "Obsculescent".

Reference Bulletin No.26, Item 451, Simulator, Gunflash, No.2 Mk.1 has been declared "OBSCULETE".

1306.
CARTRIDGES, M.L. 2 in. MORTAR. USE IN 2 in. BOMB THROWER.

The extension of use of the undermentioned cartridge to the 2 in. Bomb Thrower has been approved :-

Ctges. M.L. 2 in. Mortar			
55	Grns.	Ballistite	Mk.1
"	"	"	Mk.2
50	"	"	Mk.1

1307.
SMALL ARMS INCENDIARY AMMUNITION. DETAILS OF PACKING

The following list, giving details of methods of packing S.A. incendiary ammunition, is published for information :-

<u>Calibre & Mark</u>	<u>Method of Packing</u>	<u>Package</u>
.30" B.2z	1000 Rds. in 50 Ctns.No.21	Box A.S.A. H.13
.30" W/G/B 2z	500 Rds. in 2 Belts	" " H.20
.30" Ball W/G/B 2 z	450 Rds. in 2 Belts	" " H.29 Mk.2
	in 2 M.L. Steel boxes	

<u>Calibre & Mark</u>	<u>Method of packing</u>	<u>Package</u>
.303" B7 & 7z	500 Rds in 10 Ctns. No.2	Box A.S.A. H.3
.303" B7	1000 Rds. in 2 Browning Link Belts	" " H.31
.303" B 7z	1248 Rds in 26 Ctns. No.1	" " H.13
.303" W1/G3/B7z	864 Rds. in 6 Browning Link Belts	" " H.31
7.92 mm B 2z	990 Rds. in 33 Ctns.No.8	" " H.13
7.92 mm. W 2z/G 2z/B 2z	450 Rds. in 2 Linked Belts	" " H.29
7.92 mm 2z/W 2z/G 2z/B 2z	450 Rds. in 2 Linked Belts	" " H.29
.5" V. B 1z	320 Rds. in Bulk	" H.4 Mk.16
.5" V. B 1z	270 Rds. in 27 Ctns. No.8	" H.4
.5" V. B 1z	370 Rds. in 37 Ctns. No.8	" H.13
.5" V. F.G.1z/B 1z	300 Rds. in 3 Articulated Belts	" H.24
.5" V. F.G.1z/W 1z/ B 1z	-do-	" H.24
.5" V. F.G.2z/F 1z/B 1z	-do-	" H.24
.5" Brng B 2z	140 Rds. in 14 Ctns. No.19	" " H.32
20 mm. Oer.H.E/I Mk.1z	60 Rds. in bulk	" " H.47 Mk.2
20 mm. Oer.H.E/I/T 5z	-do-	-do-
20 mm. Oer SAP/HE/I Mk.1z	-do-	-do-
20 mm Oer. H.E/I/T/5D. 9z & 8z	-do-	-do-
Ditto above types	50 Rds. Link belts	-do-
-do-	60 Rds. in Ctns. No.12	Box A.S.A. H.32 Mk.1E

1308.

PROJECTILES. MARKING OF STORES FILLED R.D.X.

Approval has been given for the adoption of a Blue band to be the distinguishing band for stores in Land Service filled R.D.X. also for the adoption of Codes, as under, for R.D.X. fillings:-

<u>Filling</u>	<u>Constitutes</u>	<u>Code</u>
R.D.X.	91% R.D.X. 9% Beeswax	1
	P.E.1. 88.3% R.D.X. 11.7% P.E.oil (Type 1)	2
	P.E.2. 88.3% R.D.X. 11.7% P.E.oil (Type 2)	3
	P.E.3. R.D.X. Poly-ise-butylene	4
R.D.X/T.N.T.	55% R.D.X. 45% T.N.T.	T.N.T. 1
	60% R.D.X. 40% T.N.T.	T.N.T. 2
	50% R.D.X. 50% T.N.T.	T.N.T. 3

<u>Filling</u>	<u>Constitutes</u>	<u>Code</u>
R.D.X./T.N.T.	40% R.D.X.	T.N.T. 4
	60% T.N.T.	
	55% R.D.X. (Grade 2)	T.N.T. 5
	45% T.N.T.	
Torpex	60% R.D.X. (Grade 2)	T.N.T. 6
	40% T.N.T.	
	45% R.D.X.	T.X. 1
	37% T.N.T.	
	18% Aluminium powder	
	42% R.D.X.	T.X. 2
	40% T.N.T.	
	18% Aluminium powder	

The code letters and/or number are stencilled in black on the blue band on the stores and their packages.

1309.

FUZE, PERCUSSION, No. 425. "OBSOLETE"

Approval has been given for the abovementioned fuze to be declared "OBSOLETE".

1310.

CONTAINER, CARTRIDGE, No.223 Mk.2 (for Q.F. 6 pr. 7 cwt.)

The above container, in rolled paper, to hold 1 round Q.F. 6 pr. 7 cwt. S.V., A.P.C.R., has been approved. It is fitted internally at one end with a stop collar, floating diaphragm, nose sleeve and collar to locate the projectile and is painted internally and externally.

The container bears the following stencilled markings on the outside:- No. and Mark; Contractor's initials or recognised trade mark; Year of manufacture.

Stowage dimensions are Length $17\frac{7}{8}$ x Dia. 3.75 inches.

1311.

CONTAINER, CARTRIDGE, NO.207 Mk.2 (for B.L. 5.5 in. or B.L. 4.5 in.)

The above container has been approved, as an interim measure, to pack one B.L. 5.5 in. 9 lb. 13 oz. cartridge or one B.L. 4.5 in. 10 lb. 9 oz. cartridge. The body is of paper impregnated with paraffin wax and is provided with painted metal ends.

The following markings are stencilled on the outside:- No. and Mark; Contractor's initials or recognised trade mark; Year of manufacture.

Stowage dimensions are Length 22.6 x Dia. 4.6 inches.

1312.

CONTAINER, CARTRIDGE, NO. 237 Mk.2 (for Q.F. 17 pr.A.P.D.S.)

The above container, in rolled paper, to hold 1 round Q.F. 17 pr. A.P.D.S., has been approved. It is fitted internally at one end with a floating diaphragm and collars to locate the projectile and is painted internally and externally.

The container bears the following stencilled markings on the outside:- No. and Mark; Contractor's initials or recognised trade mark; Year of manufacture.

Stowage dimensions are Length $24\frac{1}{2}$ x Dia. 5.1 inches.

1313.

FUZE NO.223. MARKING OF F.F.C. on FUZE COVERS

It has been confirmed that Fuze No.223 is not likely to be used in the Q.F. 3 in. 20 cwt. gun and in future the F.F.C. for the Q.F. 3.7 in. gun only will be marked on the fuze cover.

1314.

GRENADE, HAND, No.80, Mk.1 - NUMBER CONSTITUTING A FILLED LOT

Reference Bulletin No. 41, Item 1050. The number of No.80 Mk.1 grenades constituting a filled lot has been increased to 4800 in lieu of 2400 as shown in the above quoted item.

1315.

GENERATOR, SMOKE, No.28 Mk.1 - TIME TO EFFECTIVE SMOKE EMISSION

Reference Bulletin No.39, Item 970, last sentence. An amendment to specification to provide for a maximum of 90 seconds delay to effective smoke emission, instead of 30 seconds, has been approved.

1316.

FUZE, D.A. AND PERCUSSION, NO.119 (Fig.533)

Reference Bulletin No.36, Item 878 and Fig.342. The current design of the 119 type fuze for new production is 119B Mark 10. As compared with 119B Mk.4 the Mark 10 incorporates as new features :-

- (1) The "locked" shutter assembly
- (2) A 15 lb. striker raising spring

The 119 Mk.11 is a conversion from 119 Mk.4 and 119B Mk.11 is a conversion from 119B Mk.1.

The conversion incorporates :-

- (1) The "locked" shutter assembly as for 119B Mk.10
- (2) 20 oz. creep spring as for 119B Mk.4 and 10.
- (3) Flanged type detonator holder as for 119B Mk.4 and Mk.10.

No.119 Mk.11 and 119B Mk.11 are identical except for the strength of detent spring which is 40 oz. in Mk.11 and $33\frac{1}{2}$ oz. in B Mk.11. These Marks do not incorporate the striker raising spring and have a 3 grain detonator in the inertia pellet, whereas 119B Mk.4 and 10 have a 5 grain detonator. Production of the two Mk.11 fuzes will be limited and the designs will be declared "Obsolescent" as soon as the present conversion programme is completed.

The proposed 119B Mk.10/4 has not been proceeded with and all B Mk.4 and B Mk.4M fuzes will be filled as such without conversion.

1317.

CONTAINER, CARTRIDGE, NO.257 Mk.1 (for B.L. 4.5 in. Charge 3)

The above container has been approved, as a temporary measure, to pack one B.L. 4.5 in. (Charge 3) 10 lb. 9 oz. cartridge and is for use in theatres other than tropical. The body is of paper impregnated with paraffin wax and is provided with painted metal ends.

The following markings are stencilled on the outside:- No. and Mark; Contractor's initials or recognised trade mark; Year of manufacture.

Stowage dimensions are Length 22.65 x Dia. 4.92 inches.

1318.

FUZE, DRILL, TIME, NO.207 or No.208 Mk.1. PLASTIC CAPS-OBSOLESCE

Plastic caps for the abovementioned drill fuzes have been declared "Obsolescent".

1319.

CARTRIDGE, S.B. M.L. 4.2 in. MORTAR, SMOKELESS, 140 GRAINS BALLISTITE, Mk.1

The abovementioned cartridge, (to DD(L)21329) to meet a Service requirement for a smokeless cartridge, has been approved. The design provides for the use of a priming of 10 ± 0.5 grains of NC(Y) in place of 17 ± 0.75 grains of gunpowder G.20 as required by design DD(L)13393 (140 grains Ballistite B.16 Mk.2) which is to be declared "OBSOLESCE".

The following tables, giving particulars of M. of F. designs, H.E. and Practice bombs, M.L. 3 in. Mortar, are published for information :-

BOMBS, M.L. 3 in. MORTAR (H.E.)

Bomb	M. of F.	Nature of Filling	Cavity Depth inches	Exploder	Fuze	Plug, fuze hole	Nose Contr.	Remarks
10 lb. Mk.3 with nose adapter	DD(L)11757	Amatol 80/20 or 60/40 topped T.N.T.	3.15	1½ oz. C.E. pellet.	Percn. D.A. No.150	1.375 in. No.5 Mk.1 with leather washer	No	
10 lb. Mk.4	DD(L)11213	Amatol 80/20 topped T.N.T.	3.16	"	"	"	Yes	
10 lb. Mk.4 with nose adapter	DD(L)12215	Amatol 80/20 topped T.N.T.	3.16	12 dr. C.E. pellet or Expr."R" C.E.	Percn. D.A. No.152,152A or 162.	1.375 in. No.6 Mk.1 with leather washer	No	
10 lb. Mk.4	DD(L)12174	Amatol 80/20 topped T.N.T.	3.16	12 dr. C.E. pellet or Expr."R" C.E.	Percn. D.A. No.152,152A or 162.	"	Yes	
10 lb. Mk.4 with nose adapter	DD(L)12188	Amatol 80/20 topped T.N.T.	3.16	1½ oz. C.E. pellet	Percn. D.A. No.150	1.375 in. No.5 Mk.1 with leather washer	No	
10 lb. Mk.2 or 3.	DD(L)9638	Amatol 80/20 or 60/40 topped T.N.T.	3.16	12 dr. C.E. pellet or Expr."R" C.E.	Percn. D.A. No.152,152A or 162.	1.375 in. No.6 Mk.1 with leather washer	Yes	
10 lb. Mk.2 or 3	DD(L)7407	Amatol 80/20 or 60/40 topped T.N.T.	3.16	1½ oz. C.E. pellet	Percn. D.A. No.150	1.375 in. No.5 with leather washer.	Yes	

BOMBS, M.L. 3 in. MORTAR (H.E.) (Contd.)

Bomb	M. of F.	Nature of Filling	Cavity Depth Inches	Exploder	Fuze	Plug, fuze hole	Nose Contr.	Remarks
10 lb. Mk.2 or 3	DD(L)5143	Amatol 80/20 topped T.N.T.	3.16	6 1/4 dr. C.E.	Percn.D.A. No.138	1.375 in.No.4 Mk.1 or 1.375 in. No.3 and wood distance piece. Leather washer	Yes	
10 lb.Mk.3 with nose adapter	DD(L)11575	Amatol 80/20 or 60/40 topped T.N.T.	3.16	12 dr. C.E. pellet or Expr."R" C.E.	Percn. D.A. No.152,152A or 162.	1.375 in.No.6 Mk.1 with leather washer.	No	

BOMBS, M.L. 3 in. MORTAR (PRACTICE)

Bomb	M. of F.	Nature of Filling	Fuze	Plug, fuze hole	Remarks
Practice, 10 lb. Mk.1 or 2.	DD(L)8194	Ammonium alum and buckshot, Burster bag 4 oz. 4 dr. G.12 powder 2 7 dr. primers, shell.	Percn.D.A. No.138	1.375 in. No. 4 Mk.1 with leather washer	Obsolescent
Practice, 10 lb. Mk.1 or 2.	DD(L)9872	-do-	Percn.D.A. No.152 or 152A	1.375 in. No.6 Mk.1 with leather washer	Obsolescent
Practice, 10 lb. Mk.1 or 2.	DD(L)8171	Ammonium alum and buckshot. Burster bag 7 oz. G.12 powder 2 7 dr. primers, shell	Percn.D.A. No.150 or 150P	1.375 in. No. 5 Mk. 1M, 1S or 1Z.	Obsolescent

BOMBS, M.L. 3 in. MORTAR (PRACTICE) (Contd.)

Bomb	M. of F.	Nature of Filling	Fuze	Plug, fuze hole	Remarks
Practice, 10 lb. Mk. 1 or 2	DD(L)5145	Ammonium alum and buckshot. Burster bag 7 oz. G.12 powder. 2 7 dr. primers, shell.	Peron. D.A. No.139P.	1.375 in. No.3 Mk.1 with leather washer.	Obsolescent
Practice, 10 lb. Mk.4	DD(L)14757	Ammonium alum and buckshot. Primers, shell, 7 as required, according to fuze or plug used.	Peron. D.A. No.152,152A, 318,139,150 or 162.	1.375 in. No.6 Mk.1 with leather washer for 152, 152A or 162. 1.375 in. No. 4 Mk.1 with leather washer for 138. 1.375 in. No. 3 Mk.1 with leather washer for 139. 1.375 in. No.5 Mk.1 with leather washer for 150.	
Practice, 10 lb. Mk.3	DD(L)13696	Ammonium alum and buckshot	Peron.D.A. No.152,152A, 162,138,139 or 150	1.375 in. No.6 Mk.1 with leather washer for 152,152A or 162. 1.375 in. No.4 Mk.1 with leather washer for 138. 1.375 in.No.3 Mk.1 with leather washer for 139. 1.375 in. No.5 Mk.1 with leather washer for 150.	

1321.

SIGNAL, ONE STAR, RED, GREEN OR YELLOW, MARK 3 (Fig.535)

The empty components of this signal comprise a tubular tinned plate body closed at one end by a soldered on cap and fitted internally with a brown paper or asbestos paper insulating tube, a steel star tube, and a millboard disc positioned at the bottom.

The open end of the body has a tinned plate neck soldered on the neck having a rolled thread to receive the screwed cap with washer. The striker tube is soldered into a tinned plate holder and supported by a cork washer. The bottom of the striker tube is enlarged to receive a capped cartridge case.

The star, suitably primed and wrapped in a strip of primed cotton cambric, is inserted over 35 grains of gunpowder G.20 in the bottom of the container. A cork plug, with a hole through the centre, and two short lengths of quickmatch are arranged over the star, and pressed down firmly.

Igniting arrangements comprise a cut down 9 m.m. capped cartridge case secured in the bottom of the striker tube with a celluloid capsule. The striker, with its spring under compression, is held over the igniter by a fork shaped release lever positioned on the top of the neck portion and engaging in a groove cut round the striker stem near the top. The release lever is fitted with a link and ring which are arranged to fold conveniently together over the lever to enable the closing cap to be screwed home.

The complete igniter assembly is positioned on the star tube and placed into the tinned plate body and the cap screwed on. Early supplies of this signal were printed in black on a ground coloured appropriate to the colour of the star. The base of these early signals were also embossed with the applicable night identification symbol. Further supplies will be printed in white or bluish grey on a black ground and embossed as indicated in Fig.535.

The star is designed to burn for 6 to 9.5 seconds and project to a height of 100 feet. It has no delay. Package details will be given in a later Bulletin.

1322.

SIGNAL, ILLUMINATING, MARK 1 (Fig.534)

The empty components for this signal are the same as for the Signal, One Star with the exception that the body is approximately one inch larger.

The method of filling is also similar.

Early supplies of this signal were labelled with instructional labels. Further supplies will be printed in white or bluish-grey on a black ground as indicated in Fig.534.

This signal has no day or night identification. It is design to burn for 7 to 9.5 seconds and project to a height of 175 feet. It has no delay. Package details will be given in a later Bulletin.

1323.

SIGNAL, DOUBLE STAR, RED, GREEN OR RED AND GREEN, MARK 1 (Fig.536)

The empty components for this signal are the same as for the Signal, One Star with the exception that the body is approximately one inch longer.

The method of filling is also similar except that two stars are used, the colour of the stars being as required i.e. two red stars, two green stars or one red and one green star. The body is printed and embossed as indicated in Fig.536.

The signal is designed to burn for 6 to 9.5 seconds and project to a height of 100 feet. It has no delay. Package details will be given in a later Bulletin.

1324.

SIGNAL, 2 Star, RED AND GREEN MARK 1 (Fig.537)

The empty components for this store are the same as for the Signal One Star with the exception that the body is approximately one inch longer.

The stars, each wrapped in a strip of primed cotton cambric are inserted over about 10 grains of gunpowder G.20 and covered with about 60 grains of composition S.R.214. The whole being pressed at a dead load of $\frac{1}{2}$ ton.

The igniting arrangements are the same as for the Signal One Star.

Early supplies of this signal were printed in black on a red ground. A red star and green star were also printed on the body. Further supplies will be printed in white or bluish grey on a black ground and embossed as indicated in Fig.537.

The signal is designed to burn for 4 to 6 seconds and has a delay of 2 seconds. It projects to a height of 80 feet.

Package details will be given in a later Bulletin.

1325.

SMALL ARMS AMMUNITION - UNIVERSAL PACKAGE MARKINGS

Reference Bulletin No.45, Item 1244 and Item 1300 this Bulletin. The following markings have been approved for the abovementioned package:-

Outer Box

- (a) To be painted camouflage brown.
- (b) To have a patch of diagonal stripes 1 inch wide and 1 inch apart the patch being about nine inches wide on the top surface of the package.
- (c) Identification of the ammunition to be stencilled in yellow.
- (d) Restrictive stencilling to be in red.
- (e) Explosive group stencilling to be in red on a blue background.
- (f) Symbols, denoting type of ammunition will not be used.
- (g) Stencilling.

Top of Box. To show calibre, type, letter, mark and type of packing. In the case of mixed packing code letters only will appear, marks will be omitted.

Example

.303 TRACE
G MK. 7 CTN

Ends of Box. To show calibre, letter and mark except in the case of mixed ammunition where letters indicating such will appear in lieu.

Example

.303
G MK. 7

Sides of Box To show the number of cartridges, calibre, type, letter, mark and type of packing.

Example

576 CART
.303 TRACE
G. MK. 7 CTN.

When "Operational Stencilling" i.e. stencilling for ready identification, is called for, the Top and Hinge side of the outer box will show calibre, type and mark, stencilled in white in lieu of the normal stencilling. The abbreviations to be used are special for this particular purpose.

Example

.303
TRA 7

Calibre, type, letter, mark and type of packing to be the largest possible type in relation to the area available for stencilling. Other stencilling to be half size. Where the box is so constructed that only one side or one end can be stencilled this will be acceptable, otherwise both ends and both sides must be stencilled. All restrictive stencils relative to the ammunition are to be stencilled in appropriate positions on the box.

Inner carrying box. To be painted camouflage brown.

Sides of box. To be stencilled as for sides of outer box.

Top of box " " " " " top of outer box.

All restrictive stencils other than storage restrictive stencils are to be stencilled in appropriate positions on the box.

Linings. No stencilling is required on linings except when they may be removed for operational purposes i.e. when filled with 7.92 mm. Besa ammunition for R.A.C. use, in which case they will bear the same stencilling, as for the sides of the outer box although this will be on one side only.

Abbreviations or words to be used are as follows:-

Ball	Ball	
Tracer	Trace	
Incendiary	INC	
High Explosive	H.E.	In describing the calibre the
Armour Piercing	A.P.	word "inches" will not be stated,
Semi Armour Piercing	S.A.P.	but a calibre in millimetres will
Cartons	CTN.	be indicated by "mm".
Bandoliers	BDR	
Belts	BLT	
Cartridges	CART	
Mixed Ammunition	MIX	
Oerlikon	OER	
Hispano Suiza	HIS	

In the case of 20 mm. composite fillings the abbreviations HET (SD) or HET or SAPHEI etc., will be used in lieu of the letter and description of type and the legend "OER" or "HIS" will also appear.

1326.

BOMBS, SMOKE, M.L. 3 in. MORTAR - SPECIAL PACKAGE MARKING

Reference Item 1289 this Bulletin. Approval has now been given for the use of Spot or Arc-welded tails in conjunction with Long Range Charges (1 x 90 Grain Primary plus 4 x 280 grain N.R.N. No.9 Secondaries) when these are fitted to M.L. 3 in. Mortar Screening SMOKE BOMBS.

Boxes containing these bombs will have the right hand panel on both sides of the box painted yellow (in lieu of blue).

1326A.

IGNITERS, B.L. CARTRIDGES, MARKING

It has been approved that, where B.L. cartridges are fitted with an igniter at each end and one or both of the following conditions exist,

- (a) the cartridge is fitted with tapes for the addition of an increment
- (b) the igniters are of different charge weight

the "forward" igniter (i.e. the igniter remote from the breech when the cartridge is loaded) shall be neutral in colour and marked with the word "FRONT".

ENERGY AMMUNITION

1327.

GERMAN 7.5 cm Pak 40 CTGE. Q.F. HOLLOW CHARGE SHELL
(7.5 cm Gr 38 H1/B)

This fixed Q.F. round is fired from the 7.5 cm anti-tank gun model 40. The overall length of the complete round is 38 inches and it weighs approximately 17 lb. 6 oz. The shell is painted the usual deep olive green and stencilled in black.

The complete round consists of the following components:-

Hollow charge shell filled Cyclonite/wax 95/5
Fuze AZ 38
Gaine Zdlg 40 B.
Propellant charge of double base with the addition of nitroguanidine
Steel case coated with brass, model 6340 St.
Primer percussion C/12 nA.St.

SHELL

The shell filled and fuzed weighs 10 lb. 1 $\frac{3}{4}$ oz. and its overall length is 12.2 inches. It is streamlined and similar in design to the 7.5 cm L.G.40 Hollow Charge Shell described in Bulletin No.33 Item 746 and illustrated in Fig.310. The bursting charge consists of three pressed pellets in a cardboard container and weighs 1 lb. 1 oz. 7 $\frac{1}{2}$ dr. A label affixed to the carton reads as follows:

Sprldg.		
d.7.5 cm	Gr 38	H1/B
versch	H.5	42
cwg	91	322/42

FUZE AZ 38 and GAINÉ Zdlg 40 B

The fuze is described in Bulletin No.33, Item 741 and the gaine in Bulletin No.43, Item 1160.

PROPELLANT

The propellant charge is contained in a knitted filament viscose rayon bag with an igniter at the base. It consists of graphited flakes approximately 0.1565 x 0.1565 x 0.022 inches in dimensions, weighing 14 oz. 13.2 dr. and a central tubular stick, cruciform in cross section, weighing approximately 2 oz. 1.9 dr. The stick protrudes from the choked neck of the bag. The igniter composition consists of approximately 1 oz. 6.6 dr. of chopped cord, light green in colour.

The composition, as found by analysis consists of :-

	Flake Per cent	Central Stick. Per cent	Igniter Per cent
Nitrocellulose	34.50	63.62	92.29
Nitroguanidine	30.27	-	-
Diethylene-glycol-dinitrate	34.17	32.33	5.73
Diphenylamine	-	0.23	0.45
Sodium sulphate	0.62	-	-
Potassium Sulphate	-	3.52	0.33
Graphite	0.44	0.30	1.20
	100.00	100.00	100.00

The propellant bag is stencilled, in red "Auch für Tropen" and in black "7.5 cm Pak 40, 490 g GU.Bl.P. A0 (4 - 4 - 0,6)"

A flash reducer, consisting of 18 grams of potassium sulphate in a knitted bag of cellulose material, is fitted over the tubular propellant at the neck of the main bag. The bag is stencilled 20g K₂SO₄.

CASE

The case is of steel solid drawn, of conventional design, coated with brass, and is 28.1 inches in length. The model number "6340 St" is stamped in the base.

PRIMER

The percussion primer C/12 nA is described in Bulletin No.26 Item 460. The letters St added to the designation indicate that the primer body is of steel. 1238.

GERMAN 7.5 cm Geb K 15 Q.F. CARTRIDGE (Fig. 538)

This cartridge is used in the 7.5 cm mountain gun (7.5 cm Geb K 15) and is of the Q.F. separate loading type. It consists of a brass plated steel case with the percussion primer C/12 nA St and a propellant charge of double base composition arranged in four sections for normal use. A super or special charge, which is packed separately in a cylindrical container, is also provided.

PROPELLANT CHARGE (Sections 1 to 3)

The charge consists of black graphited double base propellant in flake form and has a gross weight of 8 oz. 8 dr. It is made up into four sections each in flat circular bags. Each bag is marked in black as under, with the charge section numeral and details of the propellant and, in addition, the place and date of filling

- | | | |
|-----|---------------------|-----------------|
| 1. | 60g. Ngl Bl.P. 12,5 | (4 . 4 . 1) |
| 1a. | 87g. Ngl Bl.P. 12,5 | (10 . 10 . 1,5) |
| 2. | 35g. Ngl Bl.P. 12,5 | (10 . 10 . 1,5) |
| 3. | 50g. Ngl Bl.P. 12,5 | (10 . 10 . 1,5) |

Section 1 contains smaller flakes, and is the igniter.

Chemical analysis of the propellant shows the composition to be

	Section 1	Sections 1a, 2 and 3
Nitrocellulose	58.95 per cent	56.11 per cent
Nitroglycerine	40.25 " "	42.65 " "
Akardite	-	1.18 " "
Ethylcentralite	0.74 " "	-
Graphite	0.06 " "	0.06 " "

SPECIAL CHARGE (Sonderkart 4)

The special charge, Section 4, is issued and packed in a separate cylindrical container and, when required for use, is inserted in the case in place of sections 1 to 3. It consists of dark green tubular cords in a bag which is choked and tied. The bag is marked in black, with a large numeral 4, the designation of the equipment "Geb K 15" and the weight, nature, shape and size of the propellant, i.e. "331 g.Ngl R.P. - 9,5 (125 - 3/1,8)." An igniter, consisting of 10 grams of perforated discs, 4.9 cm in diameter, is sewn to the base of the cartridge bag.

The composition of the charge and igniter as found by analysis is :-

	Section 4	Igniter
Nitrocellulose	64.09 per cent	59.79 per cent
Nitroglycerine	29.78 " "	38.86 " "
Akardite	1.47 " "	0.97 " "
Phenyl Ethyl Urethane	4.10 " "	-
Depheyl Urethane	0.45 " "	-
Graphite	0.11 " "	0.38 " "

CASE

The case is of solid drawn steel coated with brass, and is 5.08 inches in length. The base is stamped with the model number "6335 St" and equipment "Geb K 15". The mouth of the case is closed by a cardboard cup to which is affixed a label showing the designation of the equipment and the nature, shape and size of the propellant.

CHARGE REDUCING FLASH

Flash reducing charges are issued separately in a bakelite box. They consist of white flat circular bags with granular fillings and are marked "Kart Vorl d Geb K15 u 14 Kp 20g." A label on the box corresponds with markings on the charges.

PRIMER PERCUSSION C/12 nA St.

A description of this primer is given in Bulletin No.26, Item 460. The additional abbreviation "St" denotes that the body is made of steel instead of brass.

1329.

GERMAN 7.5 cm Geb K 15 H.E. SHELL (Fig.539)

This shell is used in the 7.5 cm mountain gun (7.5 cm Geb K 15). It is painted the usual dark olive green and stencilled in black. Its overall length, including the fuze "AZ 23 v Geb," is 12.8 inches and weighs 11 lb. 15 $\frac{1}{4}$ oz.

SHELL

The shell is fitted with a single driving band of copper and iron, 0.4 inches wide. The body is punched and drawn with a solid base, and machined externally to shape. It is screwthreaded internally to receive a nose adapter. The adapter is provided with a shoulder and is screwthreaded externally for insertion in the shell. Its forward end is screwthreaded internally to receive a screwed ring adapter to which is screwed a steel exploder container.

The bursting charge, as indicated by the numeral 1 stencilled on the shell shoulder, is pressed flake TNT. It consists of four pellets weighing approximately 15 oz. 7.4 dr. in a cardboard carton. The three top pellets are made annular to accommodate the gaine container and a smoke box. A pink label printed "Sprengladung f Geb Gr 15 Fp 02. Krl 1936 Rdf 5 Lief 1937", was affixed to the base of the charge.

GAINES AND SMOKE BOX

The gaine in the container is the large size C/98 details of which are given in Bulletin No.32 Item 669.

The smoke box, located immediately below the gaine, is the No.8 described in Bulletin No.40 Item 1025.

FUZE AZ 23 v Geb

The fuze has an optional delay of 0.25 seconds and is similar to the AZ 23 (0.25) fuze described in Bulletin No.7, Item 67 except that its overall length is reduced from 4.53 inches to 3.82 inches.

1330.

GERMAN 7.5 cm 1e F.K.18 Q.F. CARTRIDGE

The cartridge is of the Q.F. separate loading type consisting of a plated steel case, a propellant charge of double base composition arranged in sections to form three charges, an igniter and the percussion primer C/12 nA. St. The complete cartridge weighs approximately 3 lb. 9 $\frac{1}{2}$ oz.

CASE

This is a solid drawn steel tapered case with rimmed base which has a screwthreaded recess for the primer. It may be identified by the model number "6316 St" and the designation of the equipment "1.F.H.18" stamped in the base. The length of the case is 10.2 inches. It is brass plated internally and copper plated externally.

PROPELLANT CHARGE

The propellant charge comprises three sections, numbered 1 to 3, of approximately 1 lb. 3 oz. 6 dr. of Digl propellant, and a nitrocellulose type igniter. Each section is enclosed in a viscose silk bag. The weight of the propellant is adjusted for a normal charge temperature of 25°C indicated by the stencilling "PT + 25°C" in red on the base of the case and on the bags of sections 2 and 3.

Section No.1 consists of 2 oz. 15 $\frac{1}{2}$ dr. of perforated disc propellant in a flat circular bag, and the igniter consisting of approximately 7 dr. of small chopped cord covered by a disc of nitrated cotton sewn to the bag.

Sections No. 2 and No.3 each consist of tubular propellant weighing 8 oz. 9 dr. and 7 oz. 13 $\frac{1}{2}$ dr. respectively.

The sections are retained in the case by a cardboard cup to which is affixed a label indicating the equipment, weight, nature and size of the propellant and manufacturing and assembly details.

The composition of the propellant and igniter as found by analysis is as follows:

	Sections		Igniter
	No.1	No.2 & No.3	
Nitrocellulose	55.64 per cent	65.16 per cent	80.16 per cent
Diethylene-glycol-dinitrate	43.20 " "	28.27 " "	15.73 " "
Akardite	0.12 " "	-	-
Graphite	0.14 " "	0.36 " "	0.34 " "
Mineral Jelly	0.31 " "	1.07 " "	-
Potassium sulphate	0.59 " "	0.55 " "	-
Ethyl Centralite	-	4.59 " "	1.98 " "
Diphenylamine	-	-	0.59 " "
Camphor	-	-	1.20 " "

Markings, stencilled in black on the bags, which include the weight, nature and size of the propellant in each section, are as follows:

Section 1	Section 2	Section 3
1 1.F.K.18 84g Digl. Pl.P - 10.5 (50 . 0,15) dbg 1940/1 Pn. 18. 8. 41.A	2 1.F.K. 18 243g Digl RP -GO,5 - (170 -2/1) dbg 1940/1 Pn. 18. 8. 41 A.	3 1.F.K. 18 216g Digl RP. -GO,5 - (170 - 2/1) dbg 1940/1 Pn 18. 8. 41 A.

1331. GERMAN 7.5 cm 1e.F.K.18. APCBC/T SHELL

This shell is fired from the 7.5 cm light field gun Model 18 (7.5 cm 1e.F.K.18) using a Q.F. separate loading cartridge.

The filled shell with fuze Bd.Z.f.7.5 cm. Pzgr weighs 14 lb. 15 oz. It has a single driving band, of the bi-metallic (copper and iron) type as indicated by the letters "KPS" stencilled in white on the shell. The shell is painted black and has a red band, 0.67 inches wide, on the body immediately in front of the driving band. With the exception of the letters "KPS", the stencilling on the body is in red.

The shell is of the large capacity type and similar in design to the 7.5 cm APCBC/T shell described in Bulletin No.25 Item 435 and illustrated in Fig.149.

The shell body is punched and drawn with a solid nose and is machined externally to correct dimensions. The cavity, except near the base, is not machined. The penetrative cap is a machined forging, hardened throughout, and attached to the shell body by soldering. The ballistic cap is pressed from mild steel to approximately 0.05 inches in thickness and attached to the penetrative cap by a ring of spot welds.

The method of filling design is similar to that of the 7.5 cm APCBC/T shell described in Bulletin No.25 Item 435 and illustrated in Fig.149, excepting that the three TNT pellets are pressed and not cast, and all four pellets are coated with paraffin wax. The aluminium container is marked "Sprgldg.K.Gr.rot. Pz.16".

FUZE Bd.Z.f.7.5 cm Pzgr.

This base fuze is described in Bulletin No.25, Item 435 and illustrated in Fig.151.

TRACER (Fig. 540)

The filled tracer weighs approximately 3 oz. 7 dr.

The body is of steel, cup shaped and rustproofed. It is screwthreaded, externally for insertion into the base of the fuze and, internally at the mouth to receive a choke ring and a retaining ring.

The tracer composition weighs approximately 160 grains and consists of two increments pressed into a brass cylindrical liner by a drift which leaves a cavity in the base. An analysis of the composition shows it consists of Barium nitrate 65.6 per cent, Magnesium metal 26.1 per cent, Shellac 8.3 per cent.

The priming composition weighs approximately 54 grains and consists of two increments, each pressed in by a serrated drift, the first into the cavity in rear of the priming composition and the second into the choke ring. An analysis of the composition shows it consists of Barium peroxide 62.0 per cent, Barium carbonate 24.4 per cent and Magnesium metal 13.6 per cent.

The tracer is closed by a celluloid closing disc which is secured by the screwed retaining ring. The joint between the disc and ring is coated with brown varnish.

1332.

GERMAN 8.8 cm Flak 41 CARTRIDGE Q.F. H.E. (Fig.541)

This fixed Q.F. round is fired from the 8.8 cm Flak 41 gun. The weight of the complete round is 44 lb. 12 oz. and its overall length 47.2 inches.

The complete round consists of the following components:-

H.E. Shell filled Amatol (40/60)
Fuze Zt.Z.S/30. Fgl. or AZ 23/28
Gaine G/98 Np of the larger size
Brass case
Propellant charge of double base flashless propellant
Primer electric C/22.

SHELL

The shell is streamlined and, filled and fuzed, weighs 20 lb. 11½ oz. It is fitted with two driving bands of soft iron. Two cannellures for the attachment of the case are formed behind the driving bands. The shell is painted yellow and stencilled in black. The numeral "13" stencilled on the shell shoulder indicates the bursting charge is Amatol 40/60 which weighs approximately 2 lb. 4 oz. A topping of pure TNT surrounds the gaine container. The container is secured by screwing it into a screwed ring adapter which screws into the bottom of the fuze hole.

FUZE AND GAINE

Details of fuze Zt.Z.S/30 Fgl. are given in Bulletin No.33 Item 743, fuze AZ 23/28 in Bulletin No.42 Item 1118, and the gaine Gr Zdlg G/98 in Bulletin No.32 Item 669.

CARTRIDGE CASE AND PRIMER

The cartridge case and primer is identical to that used with the APCBC/T round described in Bulletin No.43 Item 1169. The stencilling "TROPEN" on the case indicates the charge is suitable for hot climates.

PROPELLANT CHARGE AND IGNITER

The propellant is flashless, and basically of the same composition as that used in the APCBC/T Cartridge. It is tubular in form but of slightly different size as indicated by the markings stencilled on the case. The propellant bag is stencilled as follows

5,355 Kg.
GU. R.P. - KN - (740 - 4,2/1,5)
dbg 1942/5
Wn. 24. 9. 42. P.

An analysis of the propellant shows it consists of Nitrocellulose 39.44 per cent, Diethylene-glycol-dinitrate 16.04 per cent, Nitroguanidine 29.73 per cent, Diphenyl-urethane 3.66 per cent, Akardite 0.21 per cent, Phenyl-ethyl-urethane (by diff) 5.98 per cent, Graphite 0.21 per cent, Potassium nitrate 4.73 per cent.

The igniter filling is in the form of chopped cord, green in colour and weighing 20 grams. The composition as found by analysis consists of Nitrocellulose 94.20 per cent, Diethylene-glycol-dinitrate 2.97 per cent, Diphenylamine 0.48 per cent, Graphite 1.02 per cent, Potassium sulphate 1.33 per cent.

1333.

GERMAN FUZE AZ 23 (0,15) (Pr) with plastic (Pressstoff) body (Fig.542)

This is a direct action and graze fuze with an optional delay of 0.15 seconds. The mechanism is substantially the same as that of the AZ 23 (0,15) described in Bulletin No.41 Item 1080. It differs mainly in that the body is of plastic and is reinforced and encased in a steel sheath. The forward part of the body does not unscrew and there are other minor differences described below. The fuze weighs 1 lb. 1 oz. 2 dr. and has an overall length of 4.4 inches. The diameter of the threads is 1.96 inches and fits the standard German fuze hole.

The body of the fuze consists of an outer steel ogival sheath, an inner steel casing, a steel base piece and a moulded plastic interior. The sheath has a hole at the top which is closed by turning the edge over a steel disc; its base is turned in to form a flange for the fuze body. It is reinforced by the inner casing, the upper end of which is turned inwards and embedded in the plastic. The base piece is cylindrical and screwthreaded externally at the bottom for insertion in the shell. Its upper end is cut to form four tongues which are embedded in the plastic. The steel components are lightly welded together as shown in Fig.542. The plastic interior is bored centrally in several diameters to accommodate the fuze mechanism and magazine.

The fuze mechanism is similar to the normal "AZ 23v (0,15) (see above) except that the graze pellet is housed in a plastic mechanism holder which forms a platform for the centrifugal segments.

The magazine is of plastic, and contains a perforated gunpowder pellet weighing approximately 2 drams. It is retained by a metal screwed plug having a central flash hole closed by a transparent disc secured by varnishing.

ACTION

The action is the same as the normal AZ 23v (0,15) fuze.

1334.

GERMAN FUZE PERCUSSION AZ.49 (Fig.543)

This is a direct action percussion fuze of the floating needle type and is used as an alternative fuze in H.E. shell fired from the 2 cm. Flak 38 and 2 cm Flakvierling 38 equipments. The fuze with gaine weighs approximately 5½ dr.

The fuze consists mainly of a body, head, hammer, striker, a coil of metal tape and a gaine, all of aluminium or light alloy.

FUZE

The body is screwthreaded externally below the flange for insertion in the shell. Internally there are two recesses separated by a diaphragm. The top recess accommodates the fuze mechanism which is retained by the fuze head, and that in the bottom receives the gaine. A central boring in the diaphragm connects the two recesses and forms a guide for the striker stem.

The fuze head conforms to the general contour of the fuze body and is provided with two spanner flats to facilitate assembly. It has a shallow recess in the base and is bored in two diameters; the larger to accommodate and permit longitudinal movement of the hammer head, and the smaller to receive the hammer stem and the head of the striker. The top of the fuze is closed against air pressure by a thin metal disc which is let in and varnished.

The hammer is in the form of a thin disc with a stem on its underside. The lower end of the stem rests on the top of the striker.

The striker consists of a short stem with, near its centre, an integral collar in two diameters one above the other. The larger collar supports the needle on a coiled soft metal tape, whilst the smaller collar centres the coiled tape around the needle stem. The striker is centred in the fuze body by its head and lower end of the stem which are accommodated in the small borings in the head of the fuze and in the fuze body respectively.

The coil of tape is of soft metal and is 4.7 inches long, 0.14 inches wide and 0.009 inches in thickness. The inside end of the coil is ribbed to about 0.4 inches from the end and has a small hole. It is wound clockwise, as viewed along the line of flight, into a tight coil. There are no segments inside the coil as is usual in German fuzes.

GAINE

The body is of aluminium and cup shaped. It is screwthreaded externally

near the mouth for insertion in the base of the fuze body, and is closed by an inverted aluminium capsule, having a thin base, which fits into the mouth. The main filling is PETN and the initiator in the capsule is lead azide/calcium silicide.

A washer of soft cardboard surrounds the gaine and is attached by varnish to the bottom of the fuze body.

ACTION

On acceleration, set back of the hammer and needle prevent the tape unwinding.

During flight, the tape uncoils and expands under centrifugal action and ceases to support the needle. The hammer and striker are then free, but creep action due to deceleration in flight keeps the striker away from the detonator.

On impact the hammer is forced in and drives the needle of the striker into the detonator of the gaine.

1335.

GERMAN TRACER NO.5 (Fig.544)

The tracer consists of a body, sleeve, retaining ring, all of steel, an aluminium closing disc and washer, tracer composition and priming composition.

The body is cup shaped and rust proofed. It is screwthreaded externally at the forward end for insertion in the shell and internally at the mouth to receive the retaining ring. The sleeve contains the tracer composition and is secured in the body by the retaining ring. The hole in the ring forms a choke opening to the tracer.

The tracer composition weighs 7.48 grams and is pressed into the sleeve by a spigot drift which leaves a cavity in the base. The priming composition weighs 7.21 grams, and is pressed in in two increments by a serrated drift, the first into the cavity in the tracer composition and the second in the choke of the retaining ring.

An analysis of the compositions is as follows -

	Tracer Composition	Priming Compositions	
		1st Increment	2nd Increment
Barium peroxide	-	75.07 per cent	75.90 per cent
Barium nitrate	49.37 per cent	-	-
Magnesium	39.00 " "	13.79 " "	13.27 " "
Potassium oxalate	9.51 " "	9.90 " "	9.08 " "
Wax	2.00 " "	0.45 " "	0.73 " "
Iron	0.12 " "	0.79 " "	1.02 " "
	100.00	100.00	100.00

The tracer body is closed by an aluminium foil disc, 0.10 mm. thick, which is secured by turning the mouth of the body over an aluminium washer.

1336.

GERMAN PRIMERS PERCUSSION Q.F. CARTRIDGE C/43 St and C/113 (Fig.545,

PRIMER C/43 St.

This is a modified version of the C/13 NA, percussion primer described and illustrated in Bulletin No.32 Item 671, and is used in the 7.5 cm LG 40 cartridge.

The modifications are

- The body is of steel instead of brass
- The thickness of the diaphragm in rear of the percussion cap, is reduced from 0.051 inches to 0.037 inches.
- The base has two flat keyways instead of three semi-circular key recesses.
- The cap composition, which weighs 0.28 grains, consists of Barium nitrate 52 per cent, Lead styphnate 25 per cent, Acid soluble 4 per cent, Benzine soluble 1 per cent, Residue 18 per cent. The acid soluble constituent is probably antimony sulphide and the residue is probably calcium silicide. A small amount of tetrazene may also be present as a sensitising agent.

The magazine contains a pressed pellet of gunpowder weighing 7.3 grains above a layer of grain gunpowder weighing 1.9 grains, and was found by analysis to consist of :-

	Pellet	Layer
Potassium nitrate	75.6 per cent	75.1 per cent
Charcoal	14.4 " "	14.9 " "
Sulphur	9.4 " "	9.6 " "
Moisture	0.6 " "	0.4 " "

PRIMER C/113

This primer, which is also used in the 7.5 cm L.G.40 cartridge, has a brass body and is almost identical with the C/13 NA percussion primer. It differs mainly in the diaphragm thickness which is reduced to 0.023 inches to make it more sensitive to striker blows, and the design of key recess which is similar to the C/43 St primer described above.

The cap composition, which weighs 0.32 grains, consists of Mercury fulminate 29.0 per cent, Potassium chlorate 33.5 per cent, Antimony sulphide 27.5 per cent and Glass 10 per cent.

The magazine contained a pressed pellet of gunpowder weighing 5.4 grains above a layer of grain gunpowder weighing 2.8 grains and was found by analysis to consist of :-

	Pellet	Layer
Potassium nitrate	76.3 per cent	77.2 per cent
Charcoal	14.3 " "	13.6 " "
Sulphur	9.4 " "	9.2 " "

1337.

GERMAN FUZES ELECTRIC FOR IGNITION OF 28 cm and 32 cm ROCKETS (Steckzunder 40, Druckknopfzunder 42 and Gluhzundketten 40 MV) (Figs. 546 and 547)

These three types of electric fuzes for the initiation of 28 cm and 32 cm rockets, with the exception of the "Gluhzundketten 40 M.V." which is fitted with a delay unit, differ only in their external electrical connections. In all other respects they are similar. The internal arrangements are shown in Fig. 546.

The fuzes are issued in a cardboard box measuring 9.0 inches x 6.5 inches x 3.0 inches. The label on the box, shown in Fig. 547, illustrates how they are packed and their external differences.

STECKZUNDER 40

This fuze consists mainly of a black tubular polystyrene case and cap, an aluminium tubular container and sleeve, electric fuze arrangement with two leads, a perforated gunpowder pellet and a waxed cardboard cap.

The case is approximately 2.1 inches long and 0.6 inches in diameter. The forward end accommodates a threaded mild steel tubular insert, which projects and provides a means of screwing the fuze into the rocket. The rear end is screw-threaded externally to receive the cap which is provided with a central hole through which the firing leads pass. The case houses the tubular container.

The tubular container is approximately 2.8 inches long and 0.25 inches in diameter. The rear end is embedded in wax and accommodated in a sleeve. The forward end protrudes from the case and is closed by a waxed cardboard cap which is a sliding fit over the end and is removed when the fuze is inserted in the rocket. The tube contains the electrical arrangement and a gunpowder pellet.

The electrical arrangement consists of a fuze head, and two paper insulated copper strips soldered to the external leads and connected at their forward ends by a "soldered on" bridge wire. The bridge wire is surrounded by a blob of

priming composition consisting of a mixture of aluminium, magnesium, lead monoxide and picric acid, under another blob of similar composition without the picric acid element, the whole being enclosed in a coating of nitrocellulose.

The iron wire connecting leads each approximately 13 inches in length are covered with white polyvinyl chloride insulation, and terminate in brass strips inset along the sides of a rectangular block of ester-plasticised cellulose acetate.

The leads pass through the white embedding wax at the rear end of the tubular container and are secured in rear of the fuze head by a plug of polyvinyl chloride coloured red.

The gunpowder pellet in the forward end of the container has a coned perforation; it weighs 0.36 grams and is composed of Potassium nitrate 75 per cent, carbon 14 per cent, sulphur 10 per cent and volatile matter 0.4 per cent. A gap of approximately $\frac{1}{4}$ inch separates the pellet from the fuze head.

DRUCKKNOPFZUNDER 42

The design of this fuze, is similar to the Steckzunder 40. Each lead is 28 inches long and terminates in a press stud approximately 0.4 inches in diameter and closely resembling the type in common use on men's gloves.

GLUHZÜNDKETTEN 40 M.V.

This consists of four fuzes (three with delay pellets) linked together in series, by 24 inches of connecting lead between each. The design of each fuze, with the exception of the incorporation of delay pellets, is similar to the steckzunder 40. The leads are insulated by a covering of white polyvinyl chloride. The terminal leads are 12 inches in length ending in about one inch of bare lead, but otherwise covered in insulation. Clamped to one of the leads below each fuze is a small metal tag bearing a single figure; reading from left to right the figures are 4, 0, 2 and 6 indicating the time of delay in seconds.

The delay composition is contained in aluminium tubes approximately $\frac{1}{4}$ inch and $\frac{1}{8}$ inch in external and internal diameter and 0.318 inch, 0.517 inch and 0.728 inch in length. The weights of the corresponding units are 0.68 grams, 1.15 grams and 1.61 grams and give a delay of approximately 2, 4 and 6 seconds respectively. Each consist of a main delay composition black in colour and composed mainly of potassium permanganate 62.2 per cent and antimony 35.4 per cent, and, at one end of the tube, a quantity of reddish brown powder consisting of nitrocellulose and oxides of lead.

The tube is inserted in the fuze between the fuze head and the gunpowder pellet so that the reddish brown composition is next to the gunpowder pellet.

ACTION

Using a circuit of 6 volts, not less than 0.4 amps, is required to heat the bridge wire and fire the fuze. The flash produced by the priming composition is transmitted, either directly across the gap or through the delay pellet if fitted, to the perforated pellet of gunpowder. The gunpowder pellet in turn initiates the rocket propelling unit.

1338.

GERMAN 15.2 cm (6 inch) A.A. ROCKET
15.2 cm Kz.1000 (Kp)
(Fig. 548)

This anti-aircraft rocket which weighs approximately 150 lb. is fired electrically, and when projected into the air, it "pays out" a steel cable approximately 950 yards in length. One end of the cable is fixed to the ground whilst the other, when fully extended is suspended from a parachute to which it is attached. The body of the rocket is destroyed by a delay igniter and two cyclonite/wax charges after the parachute has been pulled out.

The rocket consists of the following principal components which are screwed together.

Nose cap containing a hollow charge of Cyclonite/Wax.

Propelling unit with ignition system

Parachute housing containing two parachutes and a hollow charge of Cyclonite/Wax

Cable and housing with fins

NOSE CAP

The nose cap is of metal and dome shaped to a low crh, the base is screwthreaded internally for attachment to the propelling unit. It contains a dome shaped hollow charge of Cyclonite/Wax (95/5) weighing approximately 2 lb. 6 oz. with an exploder pellet and detonator in the apex, and a cavity liner. The charge is in an outer cover of red paper to which is affixed a blue label printed in black as follows

Sprengladung nach
Zeichn. 5 GA 20700 - 258
K.5
Gefertigt: rdf Januar 1943

The cavity for the exploder is lined with white paper which is lacquered to the bursting charge.

The exploder pellet which is approximately 1.1 inches long and 1.2 inches in diameter consists of approximately 1 oz. of PETN/Wax (95/5) dyed pink.

The detonator is housed in a cavity in the base of the pellet, and is similar in external appearance to that in the German C/98 gaine but contains three layers of composition instead of the normal two.

The cavity liner is of steel, 2 mm thick, loosely fitted, and has a hole in the apex which permits the flash from the delay igniter to reach and initiate the exploder pellet.

The charge and liner is supported at the base by a thick cardboard washer.

PROPELLING UNIT

The propelling unit consists of a cylindrical steel tube containing the propellant charge, an ignition system and a delay igniter.

The tube is approximately 15 inches long. The rear end is screwthreaded externally for the attachment of the parachute housing, and the forward end is closed by fitting it into an adapter to which it is welded. The adapter is screwthreaded externally for the attachment of the nose cap. The diaphragm in the adapter is thickened in the centre and provided with a threaded hole into which screws the delay igniter. Three short steel pins, equally spaced, are welded to the under side of the adapter to position the forward igniter and to prevent it being crushed by the propellant charge.

The delay igniter which initiates the H.E. charge in the nose cap is initiated directly by heat from the propellant gases.

The propellant charge weighs 11 lb. 10 oz. and consists of a single multi-perforated stick, 11.7 inches long, having four longitudinal ribs formed on its exterior when extruded from press. An analysis of the propellant shows it comprises nitrocellulose 57.7 per cent, diglycol-dinitrate 38.1 per cent, dibutyl phthalate 2.7 per cent, akardite 0.4 per cent, ash 0.6 per cent and graphite 0.3 per cent.

The central perforation in the propellant houses a length of nitrocellulose tube contained in a celluloid tube. The ends of the tube are in contact with the forward igniter at the head and a primary igniter at the base.

The propellant charge is supported on a grid which is in the form of a steel ring welded centrally to the bottom of the cavity and four steel strips welded equidistant near the outer edge of the base of the cavity.

The forward igniter consists of a flat circular aluminium container filled with a compressed grey powder composed of aluminium and barium nitrate and, above it, a thin black layer of zirconium metal and potassium nitrate under a perforated pellet of nitrocellulose. The compositions are retained by turning in the lip of the container. The container is housed in a suitably shaped cardboard holder provided with three holes which fit over the steel distance pins.

The primary igniter consists of a bag containing very coarse gunpowder and is held in position by the ring of the grid. It is initiated by a bridge wire and a low voltage applied to two leads which pass through one of the venturis in the parachute housing.

PARACHUTE HOUSING

This is a metal cylinder closed at the forward end by a dome shaped metal plate. A cavity above the plate, is screwthreaded to receive the rear end of the propelling unit and accommodates the primary igniter held in position by a small metal ring.

Four venturis, approximately $\frac{1}{2}$ inch in diameter, are bored equidistant near the top of the unit. The rear end of the housing is flanged and secured to it is a steel ring, screwthreaded internally, to receive the forward end of the cable housing.

Two parachutes are provided, a main or supporting parachute made of silk approximately 11 feet in diameter, of which green, white, and blue ones have been found, and a drag parachute made of linen 6 inches in diameter. The supporting parachute has eight steel wire shrouds and is attached to the barrage wire by a weak link.

The parachutes are contained in an asbestos cover which fits inside the parachute housing.

Between the domed plate closing the head of the cylinder, and the parachute cover is a second loose hollow charge of cyclonite/wax (95/5) in an outer cover of asbestos paper. The cavity liner is of cardboard. An exploder cavity passes completely through the apex of the hollow charge.

The exploder, in pellet form, is similar in design and composition to that in the nose cap and is wrapped in white paper, lacquered on the outside and surrounded by a thin cardboard tube. The detonator is housed in a cavity at the top of the exploder. The mouth of the detonator and top of the pellet is covered with a thick red lenticular cap consisting of layers of cardboard shaped to fit the top of the parachute housing. Beneath the exploder is a separate disc of Cyclonite/wax (95/5) approximately 0.12 inches thick and weighing 1.4 dr. It is coated on the underside with paper to which is stuck a disc of cardboard. In transport the electric leads are folded and packed inside one of the venturis and the venturis are each sealed with a wide strip of adhesive tape.

CABLE HOUSING

The cable housing consists mainly of two cylinders.

The upper cylinder with the fin assembly forms part of the tail unit, and is secured to the parachute housing by a screwed ring. It is provided with fins.

The fin assembly consists of a drum with eight radial fins. The drum is spot welded to the upper cylinder and forms a loose fitting sleeve over the lower cylinder.

The lower cylinder is flanged at the base and provided with two eyebolts. A small hole is bored through the side of the cylinder near the flange.

In transport, the cylinders are tied together by two lengths of wire which pass through the eyebolts and slots cut in two of the fins.

STEEL CABLE

The cable is a continuous length of approximately 950 yards of $\frac{1}{8}$ inch steel wire rope. Approximately equal lengths are coiled in each cylinder. The end of the coil in the top cylinder passes through the top of the housing and is fixed to the main parachute by a weak link. The other end of the cable passes through the hole in the side of the bottom cylinder and terminates in an eyesplice with thimble.

ACTION

The rocket is probably projected from a special frame to which the lower portion of the cable housing is fixed.

A low voltage applied to the leads heats the bridge wire and ignites the primary igniter which in turn ignites the celluloid tube, forward igniter and propellant charge. Pressure set up inside the rocket and escaping through the venturis propels the rocket upwards.

When the cable in the front part of the cable housing has "payed out", the parachute is pulled out of its housing and opens, so suspending the cable which gradually falls to the ground. The remainder of the rocket continues on its course and is eventually destroyed in the air by the charge in the nose which presumably by sympathetic detonation detonates the second H.E. charge, detonation of the former being initiated through the exploder by the delay igniter.

Details of the delay igniter are not yet available, but it is probably initiated by heat from the propellant gases.

On impact of the wire by aircraft, the supporting parachute, which is attached by a weak link, breaks away and a heavy drag is imposed by the small parachute as the wire is pulled at high velocity over the leading edge of the aircraft wing.

1339.

GERMAN 8.8 cm ANTI TANK HOLLOW CHARGE ROCKET PROJECTILE
(8.8 cm Raketen Panzerbusche Granate 4312)
(Fig. 549)

This self-propelled streamlined hollow charge rocket projectile is fired by percussion from the infantry 8.8 cm Anti-tank rocket projector (Raketenwerfer 43).

The overall length of the complete round is 19.4 inches and it weighs approximately 5 lb. 12 oz. The rocket is painted a deep olive green and stencilled in black. The propellant is contained in the tail tube, and in flight the rocket is stabilized by fins and not by rotation.

The rocket consists of -

- Hollow charge bomb filled Cyclonite/TNT (60/40)
- Fuze AZ 5095
- Gaine Kl. Zdlg 34 Np.
- Tail unit with propellant charge and ignition system.

BOMB

The bomb is similar in design to the R.Pz.B.Gr.4322 described in Bulletin No.43 Item 1175 and illustrated in Fig.477 but the number "4312" instead of "4322" is stencilled on the body. The weight of the filled bomb with fuze and gaine is approximately 4 lb. 4 oz. The bursting charge weighs 1 lb. 8 oz.

FUZE AND GAIN

The fuze AZ.5095 is described in Bulletin No.44 Item 1209 and the gaine Kl.Zdlg 34 Np is described in Bulletin No.39 Item 989.

TAIL UNIT

The tail unit, including the fins, has an overall length of 6.53 inches and weighs 24.3 oz.

It consists principally of -

- Tail tube,
- Venturi block
- Fin assembly
- Propellant charge
- Two grids
- Ignition system with percussion cap and firing mechanism

The tail tube is cylindrical and closed at the head. Its overall length is 4.81 inches, and its external and internal diameter is 1.16 inches and 0.95 inches respectively. Externally, near the head, it is screwthreaded for insertion in the bomb and, at the base for the attachment of the venturi block.

The venturi block has two recesses which are screwthreaded internally, the larger or forward recess receives the end of the tail tube and that in the base the firing mechanism. The recesses are connected by a central fire channel. Six venturis, on a circle 0.79 inches in diameter, are bored in the base. The throat and outlet diameter of each is 0.12 inches and 0.16 inches respectively. They are closed on the inside by a thin waxed paper disc.

The fin assembly consists of a bush, drum and six fins. The fins are made in pairs and are welded to the bush and drum. The bush is spot welded to the venturi block.

The propellant charge weighs 1.7 oz. It consists of a single tubular stick 3.95 inches long with an external and internal diameter of 0.9 inches and 0.35 inches respectively, and has 14 perforations throughout the annulus. Preliminary chemical analysis has shown that it contains nitrocellulose 62.8 per cent, diglycoldinitrate 36.1 per cent, akardite 0.7 per cent, ash 0.2 per cent. No graphite is incorporated. The charge is held between a grid and forward igniter at the head and a grid at the base.

The grids are identical and consist of a small triangular platform on three legs. A disc of metal mesh is fitted between the grid and charge at the venturi end.

The ignition system consists of a forward igniter, a celluloid tube with a gunpowder pellet at each end, and a firing mechanism with percussion cap.

The igniter consists of a compressed pellet of black powder secured by two cardboard rings in an aluminium ring "U" shaped in section which permits the pellet to burn on both faces.

The celluloid tube is housed in the centre of the propellant charge and contains quickmatch. The gunpowder pellet at the forward end is in contact with the igniter and that in the base end is accommodated in the rear grid in close proximity to the percussion cap.

The mechanism is of steel and consists of a cylindrical striker housing, striker, percussion cap and a sleeve.

The striker housing is flanged at one end, and screwthreaded at the other for insertion in the venturi block. The body is recessed circumferentially to form a neck. It is bored centrally in several diameters to accommodate the percussion cap and striker. The base end is closed by an aluminium disc. The sleeve surrounds the body and forms a distance piece between the venturi block and the obturator.

The obturator is in the form of a shallow flanged cup which fits over the base of the fins and is secured by the flange of the striker housing.

ACTION

Tail Unit

On firing, the striker is forced on to the percussion cap the flash from which ignites the gunpowder pellets, quickmatch and forward igniter, the latter ensures complete ignition of the propellant charge. Pressure set up inside the tail and escaping through the venturis propels the rocket forward, at the same time the striker housing is ruptured at the neck and the threaded portion is retained with the obturator in the gun.

Bomb

On impact, the fuze is functioned by direct action and the impact cap is shattered. The flash from the fuze passes through the cavity in the bomb filling to the gain which in turn detonates the bursting charge.

1340.

GERMAN 8.6 cm A.A. "WIRE BARRAGE" ROCKET (Fig. 550)

This is a self propelled base venting rocket fired by percussion and stabilized in flight by rotation. It is designed to be projected into the air, up to a maximum height of 8,000 feet depending on the time delay given by the delay unit, and to eject a parachute having approximately 310 feet of steel wire suspended from it. The overall length of the rocket is 16.5 inches and its maximum diameter 3.4 inches. It weighs 11 lbs. The general shape of the rocket is shown in Fig. 550.

The rocket consists mainly of the body, a parachute in a housing, a steel wire cable in a container, an ejection charge, a delay arrangement, a tail tube containing the propellant charge and igniter, and a venturi block housing a percussion cap.

BODY

The tubular body is made from 0.03 inch thick steel sheet. It is 8.8 inches in length and has a maximum diameter of 3.4 inches. A circumferential rib is formed near its centre, and its base is screwthreaded internally for the attachment of the tail tube.

The parachute housing is a suitably shaped steel container split longitudinally into two parts. The closed end is dome shaped to serve as the head of the rocket, and a circumferential rib is formed at the base of the dome. The base is provided with a small central opening through which the parachute shrouds are passed. A small hole, displaced from the centre, receives a stud on a closing washer of the cable container which prevents rotation of the housing. The housing is a sliding fit into the rocket body and the base is seated against the cable container. The head protrudes approximately 3 inches from the body. The housing is secured to the rocket body by two strips of adhesive tape one of which is passed over the dome to seal the split.

The parachute, when opened, is 3 feet in diameter and 20 inches in depth. It consists of eight triangular sections of yellow silk fabric each having a central red strip $1\frac{7}{8}$ inches wide radiating from the centre of the parachute. The sections are sewn together and reinforced along the seams by silk braid. The outer ends of the braid extend beyond the edge of the parachute and are looped for the attachment of the shrouds. The eight shrouds consist of four lengths of cable, each looped so that shrouds diametrically opposite are continuous cable. The shrouds are secured just above the loop by a metal clasp.

The cable container is a steel cylinder 4 inches in length and 2.9 inches in diameter. One end is closed by turning the end of the cylinder over a steel washer and the other is closed by a loose fitting metal washer. The container is a sliding fit in the rocket and is housed immediately below the parachute container.

The cable is 310 feet in length and consists of 42 strands of steel wire (approximately 17 s.w.g.) with a hemp core. It is coiled in the container and one end is attached to the parachute shrouds by a loop secured by two metal clasps.

The ejection charge consists of 7 grams of gunpowder in a flat silk bag. The bag is supported on a fibre ring which is glued to the upper side of a wooden block. The block is bored centrally to accommodate the delay unit.

The delay unit consists of a steel holder, a brass sleeve, 1.6 grams of compressed gunpowder, and 0.4 grams of loose gunpowder.

The delay holder is cylindrical, screwthreaded externally at one end, and bored centrally in three diameters. It screws into the closed end of the tail tube and protrudes into the centre of the wooden block. The open ends are in contact with the ejection charge and propellant charge respectively. The brass sleeve is housed in the holder and is filled with the compressed gunpowder. The larger borings at each end of the holder are filled with the loose gunpowder priming composition.

An analysis shows the compositions consist of -

	Compressed powder	Loose powder
Potassium nitrate	68 per cent	72 per cent
Charcoal	16 per cent	18 per cent
Sulphur	16 per cent	10 per cent

TAIL UNIT

The tail tube is of steel 4.65 inches in length and 3.02 inches in diameter. The forward end is closed and bored centrally to receive the screwed end of the delay holder. Externally it is screwthreaded for attachment to the rocket body. The rear end is chamfered internally, and screwthreaded externally to receive the venturi block.

The propellant charge weighs 1 lb. 9 $\frac{3}{4}$ oz. and consists of a solid cylindrical block of compressed gunpowder, 3.95 inches long and 2.76 inches in

diameter, primed with small grains of gunpowder sprinkled and stuck to the base end. An analysis of the composition shows it consists of Potassium nitrate 75 per cent, charcoal 15 per cent and sulphur 10 per cent. The charge is held away from the walls of the tail tube by a frame made from felt like material and is supported at the venturi end on three small circular felt pads.

The venturi block is of steel. It is recessed and screwthreaded at the forward end to receive the tail tube. The bottom of the recess is provided with a raised platform to keep the propellant charge away from the venturis. The base of the block is recessed and provided with eight venturis equally spaced on a circle 2.72 inches in diameter. The venturis each have a throat diameter of 0.22 inches and are inclined about 10 degrees to rotate the rocket in flight. The diaphragm, separating the recesses in the block, is bored centrally in two diameters to provide a flash channel and a chamber to accommodate the percussion cap.

ACTION

The flash from the percussion cap ignites the propellant charge and delay composition. Pressure set up inside the rocket and escaping through the venturis propels the rocket forward. The inclination of the ring of venturis causes the rocket to rotate. The delay composition burns until such time as it ignites the ejector charge. Gas pressure from the ejector charge forces the parachute and cable containers out of the nose of the rocket body. The parachute container falls apart and the parachute opens. The cable container moves on as a unit uncoiling the wire which is eventually suspended from the parachute.

1341.

GERMAN 3 cm RIFLE SMOKE GRENADE
Gewehrblendgranate 42 (Gw.B.Gr.42)
Figs.551 & 552.

This smoke grenade is fired from the 3 cm rifled discharger cup, which can be fitted to the 7.92 mm German rifle, using a 1.5 gram propelling cartridge. It is used for blinding purposes in attack against A.F.Vs. The weight of the filled grenade is 17 oz. Exterior markings are shown in Fig.551. The propellant cartridge is similar to the type shown in Bulletin No.39, Item 988, Fig.391.

The grenade consists mainly of a body with a filling of smoke composition, skirt, stem, rifled base cap, self destroying delay arrangement, central tube containing an opening charge, fuze mechanism and a detonator which forms part of the self destroying arrangement. The body, skirt and stem are made of thin sheet metal and are welded together.

The body is cylindrical and formed with an ogival head. The metal is 0.025 inches in thickness and dents easily under a light blow. The base end is slightly reduced in diameter and fits into the forward end of the skirt where they are cannellured and spot welded at six points under the cannellure. Spaced equidistant around the inside of the body are three baffles consisting of shaped strips of sheet metal which are flanged along one edge. Each flange is spot welded to the body at three points, and the baffle projects towards the centre to support the central tube. The rear end of each baffle extends into the stem.

The grenade filling, contained in the body and stem, consists of approximately $5\frac{3}{4}$ oz. of Titanium Tetrachloride. It is a clear yellow liquid and fumes strongly when exposed to the air. The grenade is filled to within approximately 12 cc of its total capacity.

The skirt is fluted and increases slightly in diameter towards the base where it is strengthened by folding in the edge.

The stem is tubular and approximately 29.8 mm (1.18 inches) in external diameter. The forward end is flanged and the rim of the flange is turned over and reinforced by a channeled steel ring "n" shape in section. The flange and ring are inserted in the base of the body and secured by welding their rims together. The rear end of the stem is reduced in diameter in two steps, both are screwthreaded externally, the larger for the attachment of the base cap and the smaller to receive a hexagonal locking nut which secures the central tube.

The base cap is of steel, screwthreaded internally at the mouth, and is formed with eight external lands. The base of the cap is pressed in to form a hollow spigot. The top of the spigot is recessed leaving a thin diaphragm separating the spigot cavity and the recess which protrudes into the cavity. The cavity is extended to the rear by a short tube which is flanged at one end and turned in at the other; the flange being welded to the base of the cap. A thin washer of laminated cardboard, approximately 1.36 inches in diameter is fitted over this tube. It is held firmly between the flange of the tube and another on a thin sleeve which fits over the tube and is spot welded to it,

The recess in the top of the spigot contains 0.68 grains of flashing composition, coloured blue, which is pressed into a small cup. The surface of the composition is covered by a transparent paper disc. The cup is retained by a steel washer which is secured by turning the rim of the recess over.

The cavity in the base of the cap and in the tube extension contains a tracer type and a delay composition. It consists of approximately 15.4 grains of a grey coloured composition pressed in in one increment, followed by a heavily consolidated reddish brown composition weighing approximately 54.0 grains which is pressed in by a drift having a large flat ended spigot. The compositions are retained by three washers of thick paper under a steel washer and a thin steel disc. The disc is secured by turning in the rim of the tube extension.

An analysis of the compositions is not yet available.

The central tube is of steel, approximately 6.3 inches long, 0.55 inches in external diameter and 0.2 inches in thickness. The upper end is closed by inserting an inverted steel cup which is secured by welding. The lower end is provided with a narrow flange in front of which is fitted a lead washer. The tube is passed through the base of the stem and is secured at its lower end by screwing a hexagonal nut down on to the flange of the stem thereby compressing the lead washer. This arrangement also effectively seals the joint against the escape of the smoke filling. The upper half of the tube is supported by the baffle plates.

The tube houses a tubular cardboard distance piece, gaine, fuze and a detonator assembly forming part of the self destroying arrangement, in a bakelite holder.

The cardboard distance piece is 2.78 inches long, and 0.492 inches and 0.23 inches in external and internal diameter respectively. It is accommodated at the upper end of the tube and below it is fitted a gaine which functions as an opening charge.

The gaine is approximately 0.85 inches in length and 0.5 inches in diameter. It consists of an aluminium cylinder, closed at one end, and containing a main filling and a detonator assembly. The main filling of PETN/wax weighs 46.3 grains. The detonator assembly comprises a flanged cylindrical container having in its base 1.03 grains of PETN composition and above it a composition of lead azide/lead styphnate/calcium silicide, weighing 2.41 grains. The container is closed by an inverted flanged cup, and is housed in a cavity in the open end of the main filling. The gaine is closed by turning in the mouth over a cardboard washer and is assembled in the central tube next to the cardboard distance piece with the open end facing the fuze assembly.

FUZE (Fig. 552)

The fuze assembly consists mainly of the body fitted with an igniferous cap, a striker, arming sleeve, expanding tape spring, hexagonal wire spring and an arming sleeve spring. All metal components are made of steel.

The body is cylindrical and approximately 1.7 inches long and 0.5 inches in diameter. It is closed near the top by a thick diaphragm with an internal projection; the former being recessed centrally to receive the percussion cap and the latter bored and shaped to form a striker guide. The bottom is closed by turning the rim over the striker mechanism retaining washer which has a square of thin paper varnished to its underside.

The percussion cap consists of a steel cup, with a perforated base, filled with 5 grains of a yellow-green cap composition. The composition is directly exposed to the striker needle through the perforation in the base of the cup.

The mouth of the cup is covered by a paper disc which is secured around the edge by varnish. The cup is retained by turning the top of the fuze body over a steel washer which has a paper washer on its underside.

The striker is tubular, approximately 1.19 inch long and 0.27 inches in diameter. The forward end is closed and formed with an integral needle. Four longitudinal flash channels are bored equidistant around the base of the needle. Externally, near the forward end, the striker body is grooved circumferentially to accommodate a steel hexagonal spring ring, and the base is reduced in diameter to fit into a washer which is secured by burring the rim of the base under the washer. The striker is centred in the fuze body by the arming sleeve, and longitudinal movement is prevented by the expanding tape spring.

The arming sleeve is slightly shorter than the striker and is made in two diameter. The smaller diameter is a sliding fit around the top of the striker. In the unarmed position it is retained beyond the top of the striker by a helical spring and accommodates the expanding tape spring which prevents the striker moving forward. The sleeve also retains the hexagonal spring in the circumferential groove in the striker. The larger diameter of the arming sleeve is a sliding fit in the fuze body and surrounds the upper half of the main spring.

The arming sleeve spring is held in slight compression between the internal shoulder on the sleeve and the washer at the base of the striker.

The detonator assembly, comprising a detonator in a short tubular bakelite holder and forming part of the self destroying arrangement, is approximately 0.56 inches in length. It is accommodated between the base of the fuze and a rubber washer in front of the base cap spigot. The detonator consists of a flanged cylindrical container, having in the base P.E.T.N. weighing 0.85 grains and above it a composition of lead azide/lead styphnate/calcium silicide, weighing 2.52 grains. The container is closed by an inverted flanged cup. The detonator is secured in the holder by its flange which is held between the end of the holder and a bakelite washer varnished to it.

ACTION

SELF DESTROYING ARRANGEMENT

On firing, the flash from the cartridge pierces the thin steel closing disc in the base cap and ignites the delay and tracer composition. After a short delay, and if the fuze has not already functioned, heat generated causes the composition in the recess at the top of the spigot to fire the lower detonator. The flash from this passes through the striker to the cap in the fuze body. The flash from this cap initiates the detonator in the gaine which in turn opens the grenade.

FUZE

On acceleration the arming sleeve sets back compressing its spring, and is prevented from rebounding by the arms of the hexagonal wire spring which it releases. The coiled tape spring is then free to expand so that on graze or impact the striker, arming sleeve and its spring move forward as one unit, through the expanded tape spring, carrying the needle on to the igniferous cap at the top of the fuze body. The flash from the cap initiates the detonator in the gaine which opens the grenade.

1342.

GERMAN 46 mm. HOLLOW CHARGE RIFLE GRENADE

Gewehr Panzergranate 46 mm

Figs. 553 and 554.

This grenade is fired from the 3 cm rifled discharger cup which can be fitted to the 7.92 mm Mauser rifle. An earlier model of the grenade is described in Bulletin No.39 Item 987.

The grenade weighs approximately 15 oz. 1½ dr. and has an overall length of approximately 7.73 inches. The maximum diameter of the body is 1.825 inches. The rear end of the tail is provided with eight rifle lands.

The grenade consists mainly of a body, hollow charge liner, impact cap, tail tube, a cast filling of cyclonite/TNT (50/50), a gaine and a fuze. With the exception of the igniferous cap and gaine all metal components are of steel.

The body is cylindrical at the top and conical at the bottom terminating in a short cylindrical neck which fits into the tail tube. Its wall thickness is 0.035 inches. The lower part of the conical portion is reinforced by an internal sleeve. A deep cannellure, approximately ¼ inch from the top of the

body, forms a seating for the flange of the hollow charge liner.

The liner consists of a coned sleeve, 2.1 inches in length with a flange which turns into a cylinder for approx. $\frac{1}{4}$ inch from its mouth. The cone opens at an inclusive angle of 36 degrees and its wall thickness tapers from 0.037 inches at the mouth to 0.22 inches at its other end. The flange is pierced by six equidistant holes.

The impact cap is seated on the rim of the liner and is secured by lightly turning in the mouth of the body.

The tail tube is cylindrical, approximately 3 inches in length, and has a wall thickness of approximately 0.048 inches. Externally at the rear end it is provided with eight lands, each approximately 1.2 inches in length. The tube is secured to the neck of the body under a wide cannellure and prevented from rotating by eight spot welds spaced around the cannellure. The rear end of the tube is screwthreaded internally and closed by the fuze housing.

The bursting charge in the grenade body and tail tube consists of a cast filling of Cyclonite/TNT (50/50) weighing 4 oz. $1\frac{1}{2}$ dr. A cavity formed in the base accommodates the small gaine Kl.Zdlg.34 Np.

An inverted thin steel cup with central flash hole is inserted between the gaine and fuze. It is a push fit in the tail tube so that the flat bottom bears firmly against the top of the gaine and the surrounding H.E. filling, and is retained by the bottom cone of the fuze assembly.

GAINE Kl Zdlg 34 Np.

The gaine is similar to that described in Bulletin No.39 Item 989 except that the initiator filling of lead azide and lead styphnate, is contained in an inverted aluminium cup with flash hole covered by a piece of gauze in its base, instead of the filling being retained by a perforated disc as illustrated in Fig.392. The main filling of PETN/wax (87/13) weighs approximately 3.7 dr. and the initiator fillings of lead azide and lead styphnate (70/30) and PETN weighs 6.48 grains and 5.09 grains respectively.

FUZE (Fig.554)

The fuze is of the all ways action type and is held in compression between the apices of two cones forming a holder. It weighs 1 oz. 1 dr.

The holder consists of two steel cones, the lower of which is screwthreaded, externally for insertion in the tail of the grenade and, internally to receive the mouth of the other. The apex of the upper cone is provided with a flash hole.

The fuze consists mainly of an inertia pellet, needle, arming collar, cap holder, creep spring and ^{an}igniferous cap. All components except the cap are of steel.

The inertia pellet is cylindrical and formed with a solid base which is shaped to fit in the apex of the lower cone. Externally, on one side, there is a key way to engage a key on the arming collar, and a recess forming a notch to engage a flat spring on the arming collar when the fuze is armed. The pellet is recessed, and formed with a central spigot in the base which is bored to receive the striker and provides a guide for the creep spring. The rim of the pellet is provided with a projecting stop and, adjacent to it, a slot which provides a clearance for the stop pin on the cap holder, when this has been turned to the armed position, to avoid the pin impeding the forward movement of the inertia pellet on impact.

The arming collar is a sliding fit over the inertia pellet, and is prevented from turning by an internal key which engages the key way in the inertia pellet. The top of the collar is slotted to engage the stop pin which protrudes from the side of the cap holder. A flat spring out in the side of the collar bears against and projects beyond the top of the inertia pellet to hold the collar in the safe position.

The cap holder is cylindrical with a radiussed head. It is bored centrally in three diameters to form two chambers connected by a needle guide. The small chamber in the head houses the cap whilst the larger chamber in the base accommodates one end of the creep spring and the top of the spigot. The stop pin projects from the side and is the main safety arrangement. On assembly it rests on the rim of the inertia pellet, thereby preventing relative movement of pellet and cap holder.

The spiral creep spring is held in compression between the inertia pellet and the cap holder. One end is turned inwards and secured in a radial slot at the bottom of the recess in the inertia pellet whilst the other is turned up and secured in a boring in the cap holder. During assembly the spring is tightened by two turns of the cap holder in a clockwise direction, and held in this position by the stop pin engaging the slot in the rim of the arming collar. The creep spring is compressed and the assembly is secured firmly when the fuze cones are tightened.

The igniferous cap consists of a cup shaped brass shell with a perforated base closed on the inside by a tinfoil disc, and 1 grain of cap composition. The mouth of the cup is closed by a disc of tinfoil. None of the components are varnished.

The composition, as found by analysis, consisted of Mercury fulminate 10.2 per cent, Potassium chlorate 60.3 per cent, Antimony sulphide 29.5 per cent.

The cap is inserted in the holder base first.

CARTRIDGE

The cartridge is similar to that used with the "Gewehr Panzergranate" described in Bulletin No.39 Item 987 and illustrated in Fig.390.

ACTION

On acceleration the arming collar sets back and is held to the rear by its spring which engages in the notch on the inertia pellet, thereby freeing the stop pin which permits the cap holder to be rotated anti-clockwise under the action of the creep spring. This rotational movement is limited by the projecting stop on the inertia pellet which places the stop pin in line with the slot adjacent to it.

Creep action is prevented by the creep spring.

On impact or graze the inertia pellet compresses the creep spring and carries the needle on to the cap. Sideways action of the cap holder carries the cap on to the needle. The flash from the cap detonates the gain in the grenade.

PERFORATION OF ARMOUR

At short range, the grenade has been found to perforate 70 mm. of IT.80 homogeneous plate in direct normal attack. At longer ranges the thickness of plate perforated will increase, towards a limit of 90 mm deduced from static trial. A skirting plate of $\frac{1}{4}$ inch mild steel 11 inches in front of the armour completely defeats the grenade.

GERMAN 61 mm HOLLOW CHARGE RIFLE GRENADE

Gewehr Panzergranate 61 mm

Fig. 555

The grenade is similar in design to the 46 mm Hollow charge rifle grenade but has a larger body, hollow charge liner and impact cap, and has a greater weight of explosive filling. It is fired from the 3 cm rifled discharger cup which can be fitted to the 7.92 mm Mauser rifle.

The grenade differs from the 46 mm type mainly in the following particulars.

The grenade weighs approximately 1 lb. 4 oz. and has an overall length of approximately 9.45 inches. The maximum diameter of the body is 2.42 inches.

The hollow charge liner opens at an inclusive angle of 32 degrees and is provided with a flange in which are eight equidistant holes. The metal tapers in thickness from 0.057 inches at the mouth to 0.020 inches at its other end.

The impact cap is seated on the flange and not on the rim of the liner.

The bursting charge consists of a cast filling of cyclonite/TNT (50/50) and weighs $8\frac{1}{2}$ oz.

The tail tube and fuze assembly is similar to the 46 mm grenade.

GAINES

The gaine is similar in dimensions to that in the 46 mm grenade, but the body is made of steel and the filling is retained by a washer of tuinol type material instead of aluminium.

The main filling of PETN/Wax (90/10) weighs approximately 3.6 dr and the initiator fillings of lead azide and lead styphnate (75/25) and PETN weigh 4.72 grains and 6.56 grains respectively.

CARTRIDGE

The cartridge is similar to that used with the "Gross Gewehr Panzergranate" described in Bulletin No.39 Item 988 and illustrated in Fig.391.

PERFORATION OF ARMOUR

At short range, the grenade has been found to perforate 100 mm of homogeneous plate I.T.80 in direct normal attack, increasing to approximately 125 mm. at longer ranges deduced from static trials.

1344.

GERMAN HOLLOW CHARGE ANTI-TANK BOMB WITH PROJECTOR

(Panzerfaust Klein 30)

Fig. 556

This recoilless weapon with its anti-tank bomb is a smaller version, with minor modifications, of the Faustpatrone 2 now known as "Panzerfaust 30", described in Bulletin No.43, Item 1154. It is designed for use up to a maximum range of 30 yards, and it is estimated that the hollow charge will perforate 5.3 inches of homogeneous plate at normal. The bomb and projector are painted stone colour. The projector, with the bomb inserted, weighs approximately 9 lb.5½ oz. and has an overall length of approximately 41 inches.

PROJECTOR

The projector is identical in construction to that of the Panzerfaust 30, except that the diameter of the tube is 1.39 inches.

PROPELLANT

The propellant charge consists of 1 oz. 14 drams of granular gunpowder in a cylindrical cardboard container.

BOMB (Fig.556)

The hollow charge bomb is of light construction and has an overall length of 14.2 inches and a maximum diameter of 3.98 inches; without the fuze and gaine it weighs 3 lb. 5 oz. 10 dr. The body is of steel and tapers towards the base which is tubular and stepped in two diameters. The larger diameter of the base is reinforced by a sleeve which is welded to its exterior. The sleeve has a pressed screwthread for the attachment of the tail unit. The filling consists of a hollow charge of cyclonite/TNT (60/40), weighing 1 lb. 7 oz. 14 dr. with a flanged cavity liner. The liner is a flanged die cast cone of a mazak type of alloy, approximately 0.12 inches thick, and is formed with a cone opening of 60 degrees. It is secured by turning the rim of the bomb body over the flange. The impact cap is bell shaped with a flat top and concave walls. It is secured by turning the rim of its mouth over the rim of the bomb body.

The tail unit consists of a steel tube and a wooden stem to which is riveted four rectangular flexible steel fins. The tube is closed at the base and its open end is increased in diameter and screwthreaded internally to receive the base of the bomb body. Externally, near the open end it is fitted with a bracket to receive a pin which secures the bomb to the sighting arm of the projector for transit purposes. The tube accommodates the fuze below the gaine, the latter being housed in a wooden sleeve. The upper end of the gaine is in contact with the bomb filling. The wooden stem is fitted with a steel cap at each end; the cap at the upper end is welded to the base of the steel tube.

FUZE (F.P.Z.8001)

This fuze is described in Bulletin No.44 Item 1208 and illustrated in Fig. 483.

GAINES Kl. Zdlg. 34 No

This is a small PETN/Wax gaine and is described in Bulletin No.39 Item 989 and illustrated in Fig.392.

1345.

JAPANESE SMOKE GRENADE - FOR USE WITH DISCHARGER TYPE 89 (Fig.557)

This Japanese smoke grenade weighs approximately 1 lb. $3\frac{1}{2}$ oz. and is fired from a rifle discharger cup type 89; it can also be used as a hand grenade.

The grenade consists mainly of an outer cylindrical brass body, an inner container filled phosphorus, fuze, delay arrangement, opening charge, and a propelling charge with ignition cap in a container.

The body is approximately 3 inches long and 2 inches in diameter, and in two parts. Part I is cylindrical with a solid base and thin walls. The base is bored in two diameters and screwthreaded to receive the end of the propellant charge container. Part II is a separate domed top which is attached by soldering after the insertion of the inner container; it is thickened at the centre, bored and screwthreaded to receive the fuze.

The inner container consists of a thin cylindrical body with domed top in one piece, a separate base attached by soldering, and a brass tube which passes centrally through the body.

The base of the container has a small rectangular filling hole which is closed by a rectangular soldered on disc.

The filling consists of 6 oz. 6 dr. of white phosphorus with a small quantity, estimated not to exceed 1 cc., of water. The phosphorus and water fills the container to within 1 cc of its total capacity.

The brass tube accommodates the delay arrangement and opening charge.

A cardboard washer, suitably shaped, is fitted between the top of the container and the body.

The fuze consists mainly of a brass body, percussion cap, striker with steel needle, steel helical spring, brass ferrule, safety pin and a delay holder.

The fuze body is cylindrical, has a circumferential groove near its centre and is screwthreaded externally at the base for insertion in the top of the grenade body. It is bored centrally in three diameters. The recess in the top accommodates the percussion cap and fuze mechanism, and that in the base is screwthreaded to receive one end of the delay holder. A radial hole is bored through to the central channel.

The percussion cap is similar to that in a small arms cartridge and is housed in a cap holder. The holder has a hemispherical anvil and two fire channels. The assembly is a push fit into the fuze body and is coated heavily with varnish.

The needle screws into the striker head and is provided with a rounded point.

The striker head is a cylindrical pellet with a bevelled top and two flats cut diametrically opposite in its side. It protrudes from the top of the fuze body and its forward movement is limited by the ferrule which fits over the fuze body.

The needle is held off the percussion cap during flight by the helical spring, one end of which is seated on the underside of the holder whilst the other is seated on the cap holder.

The ferrule is cup shaped and fits over the top of the fuze body. It is secured by all round indentation into the cannellure in the fuze body. Its walls are cut longitudinally into four segments.

For safety in transport a pin with two prongs, passes through two radial borings in the fuze body and ferrule, and under the flats on the side of the needle holder, thereby preventing the needle coming in contact with the percussion cap.

The space in the diaphragm between the percussion cap and the delay holder is filled with a small charge of approximately 0.46 grains of granulated gunpowder. A radial hole in the side is plugged with a black non inflammable composition.

The delay holder is tubular and screwthreaded at its forward end for attachment to the fuze. The top of the holder is covered by a steel washer with a 0.1 inch diameter hole. The bottom of the holder is open and the delay filling is in contact with the detonator.

The filling consists of 8.64 grains of heavily pressed delay composition with a small perforated gunpowder pellet in the base. An analysis of the delay composition shows it contains Potassium nitrate 47.0 per cent, Trinitrotoluene 34.3 per cent, Charcoal 12.6 per cent and Sulphur 6.1 per cent.

The detonator consists of 9.29 grains of mercury fulminate in a copper cup inside a larger copper sheath containing 17.76 grains of tetryl pressed in two increments.

The cup has a perforated base closed by a thin disc of metal foil. The cup is placed in the sheath open end first, and secured by turning the mouth of the sheath over it.

The opening charge, housed in the bottom of the central tube, consists of two pellets of picric acid, weighing 0.85 drams, in a paper wrapping. The pellets are coated with a black film probably graphite.

The propellant charge container is solid at the front end which is reduced in diameter and screwthreaded for insertion in the base of the grenade body. Its walls are pierced radially by eight holes. The rear end of the container is closed by a cupped screwed plug with central firing hole. The hole is closed on the inside by a thin disc of metal foil secured by varnishing.

The plug contains a cap assembly similar to that in the fuze and is closed on the inside by a thin disc of metal foil varnished to it. The cavity in front of the cap is filled with loose granular gunpowder which is retained by a paper disc varnished to the front of the plug.

The propellant charge consists of 17.59 grains of nitrocellulose in flake form and is contained in a thin copper cup.

A steel washer with a 0.1 inch hole is interposed between the plug and the cup.

ACTION

The safety pin is withdrawn before firing or before being thrown by hand.

When fired from a discharger cup

The flash from the percussion cap ignites the propellant charge, which sets up pressure behind the base to project the grenade forward. On acceleration the striker sets back and fires the percussion cap in the fuze which in turn ignites the delay composition. After an interval the grenade is opened by the detonator and opening charge which also ignites the smoke composition.

When thrown by hand

The percussion cap of the fuze is fired by a sharp blow on the fuze head. Subsequent action of the fuze is the same as when fired from the discharger cup.

1346.

JAPANESE 4 CM. HOLLOW CHARGE RIFLE GRENADE (Fig.558)

The grenade weighs approximately 12 oz. 9 dr. and has an overall length of 7 inches. External markings are shown in Fig.558. The grenade body is painted black and a yellow band 0.32 inch wide is painted around its centre; stencilling on the body is in white. The grenade stem forming the tail unit is of light alloy and unpainted.

GRENADE BODY

The body is a steel cylinder cannellured near the top to form a support for the flange of a hollow charge liner. The base is bevelled and formed with a short cylindrical neck which is screwthreaded externally for the attachment of the grenade tail unit.

The hollow charge liner consists of a flanged steel cone opening at an inclusive angle of 20 degrees. It is 1.15 inches in internal diameter at the mouth reducing to approximately 0.18 inch in diameter at the apex. The apex is closed by a steel cap which is attached by soldering.

A dome shaped impact cap is seated on the flange of the liner and is secured by lightly turning in the mouth of the grenade body.

The bursting charge consists of a main filling of cast Cyclonite/Wax weighing 3 oz., and a pressed filling of the same composition, weighing approximately $2\frac{1}{2}$ dr., in the neck of the body.

TAIL UNIT

The tail unit consists of a tail tube, percussion cap, gaine and a striker assembly.

The tail tube is a cylinder of light alloy with an integral perforated diaphragm about the centre which accommodates the percussion cap. The recess formed at the forward end houses the gaine and is screwthreaded internally for attachment of the tube to the body. The recess in the base houses the striker assembly which is retained by a screwed plug. Externally, near the base, it is provided with eight lands, in rear of which the tube is reduced in diameter.

The percussion cap consists of 1.7 grains of a dark grey composition lightly pressed in a copper or copper alloy cup. The surface of the composition is covered by a thin disc of white paper under what appears to be a thin disc of tinfoil. The discs are secured by turning in the mouth of the cup. The cap is inserted into a small recess in the diaphragm from the top and secured by a perforated screwed plug of light alloy.

The gaine is similar in design and dimensions to the German small gaine (Kl.Zdlg.34) described in Bulletin No.39 Item 989. The main filling, probably of Cyclonite/Wax or PETN/Wax, weighs approximately 3.26 dr. The detonator assembly consists of approximately 5.1 grains of lead azide and lead styphnate over 6.5 grains of cyclonite/wax or PETN/Wax. A felt and paper washer is fitted respectively below and above the gaine.

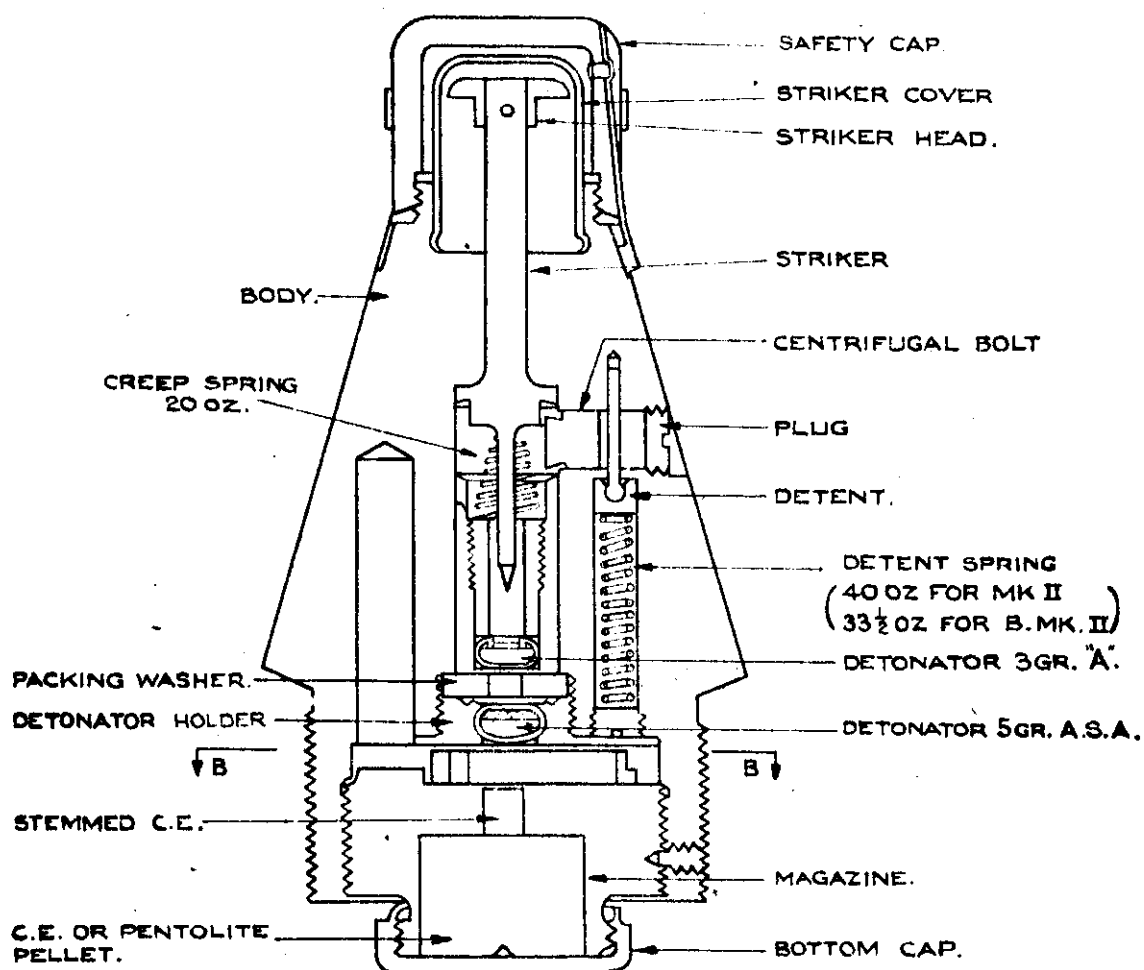
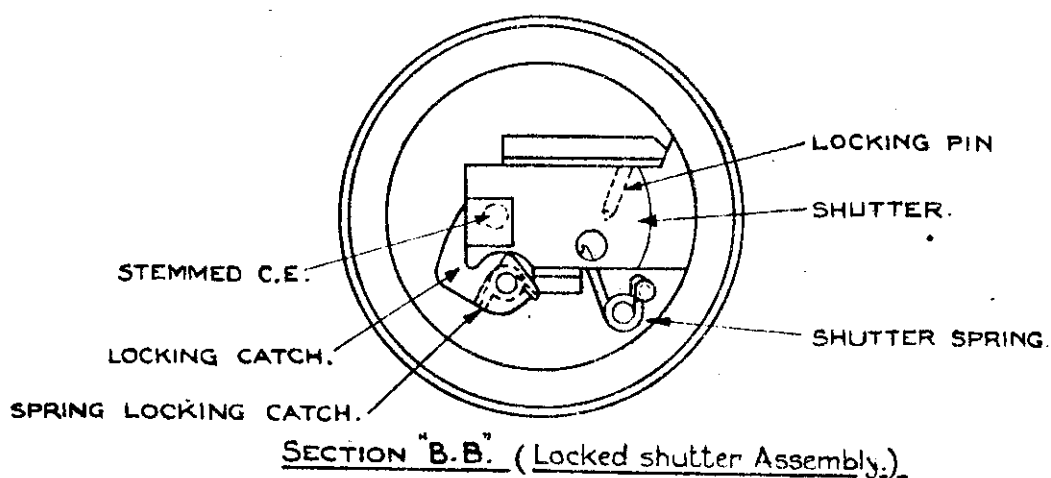
The striker assembly is similar to that used in the German 30 mm. Hollow charge rifle grenades with the addition of a light creep spring fitting over the striker needle.

PENETRATION OF ARMOUR

It is estimated that the grenade will penetrate 80 mm. of homogeneous armour (I.T. 80 plate) under static conditions.

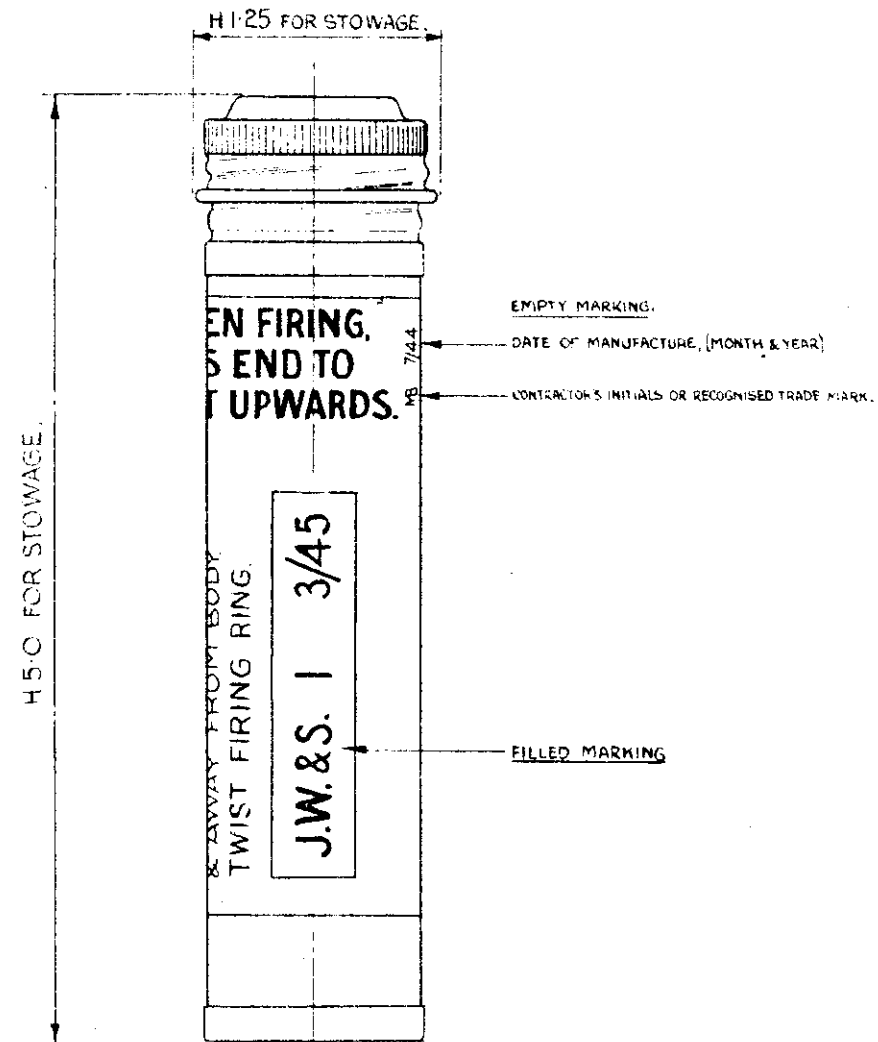
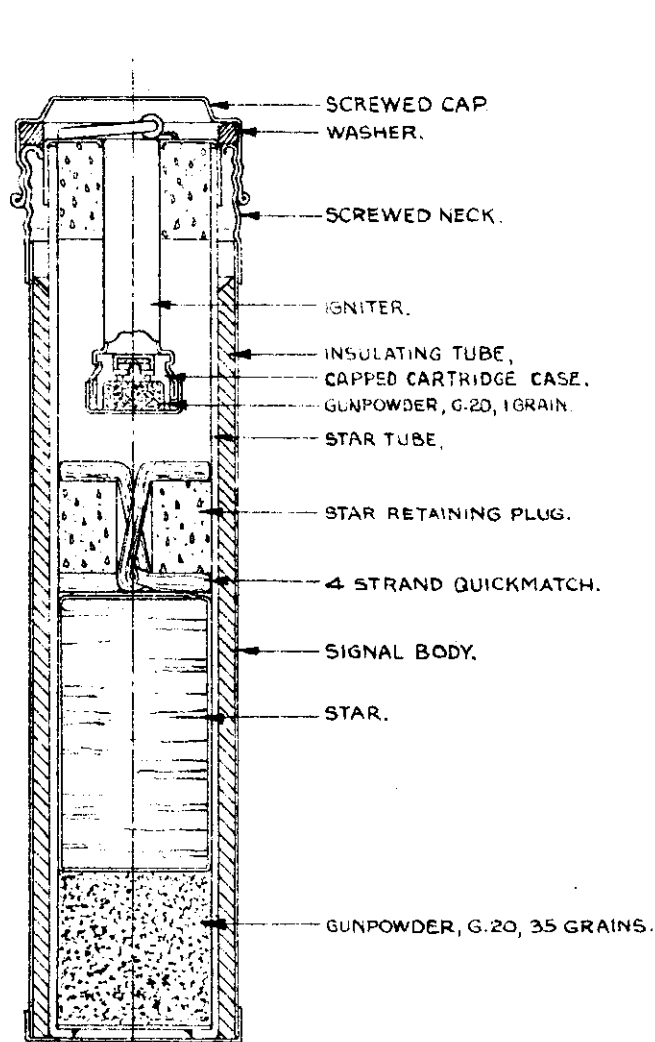
FIG. 533. (ITEM. 1316.)

FUZE, D.A. AND PERCUSSION, N° 119. MARK. 11.



SIGNAL, ILLUMINATING, MARK I/L/.

FIG. 534. (ITEM. 1322.)



SIGNAL, ONE STAR, RED, GREEN OR YELLOW, MARK 3/L/.

FIG. 535. (ITEM 1321.)

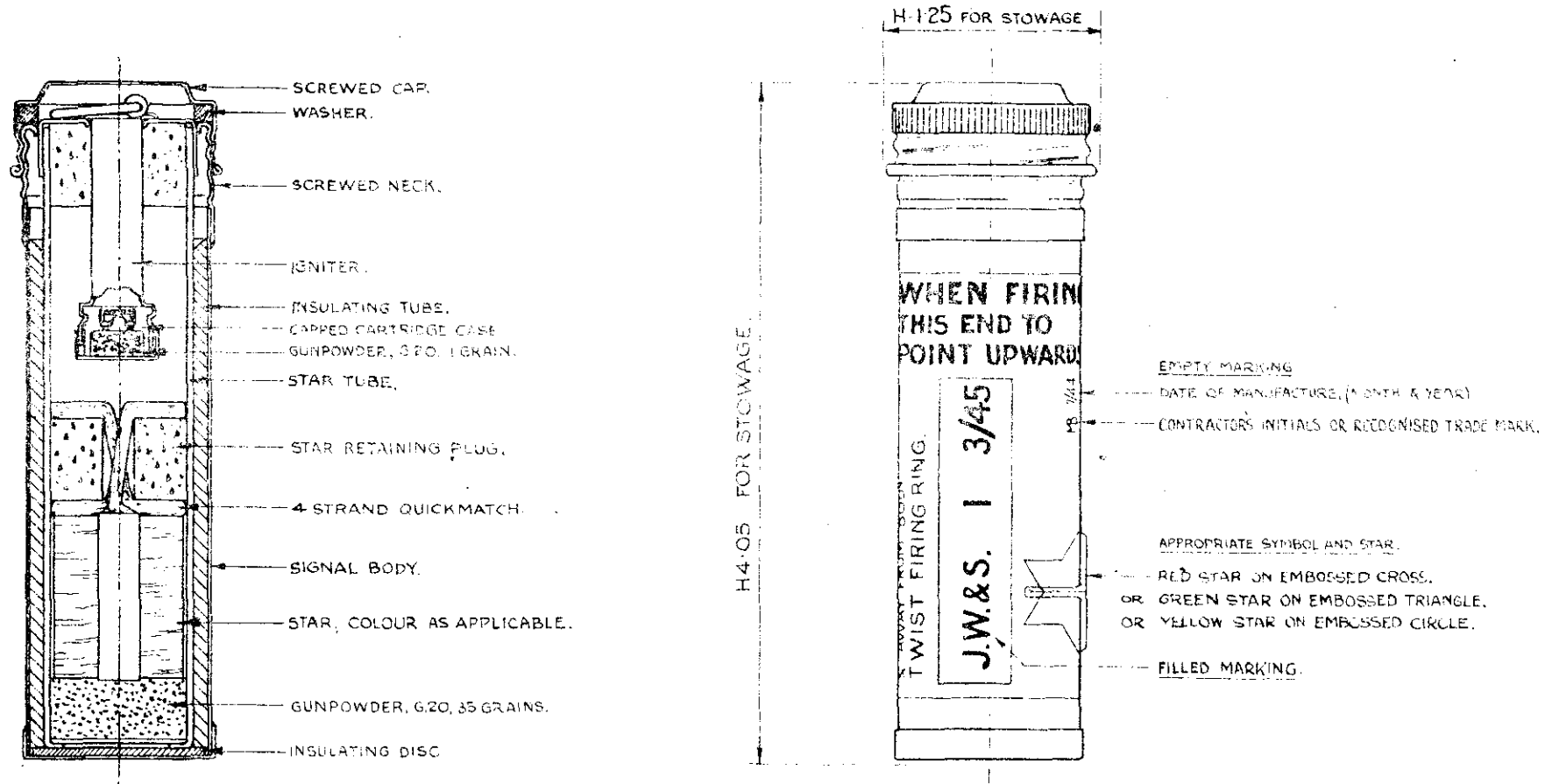
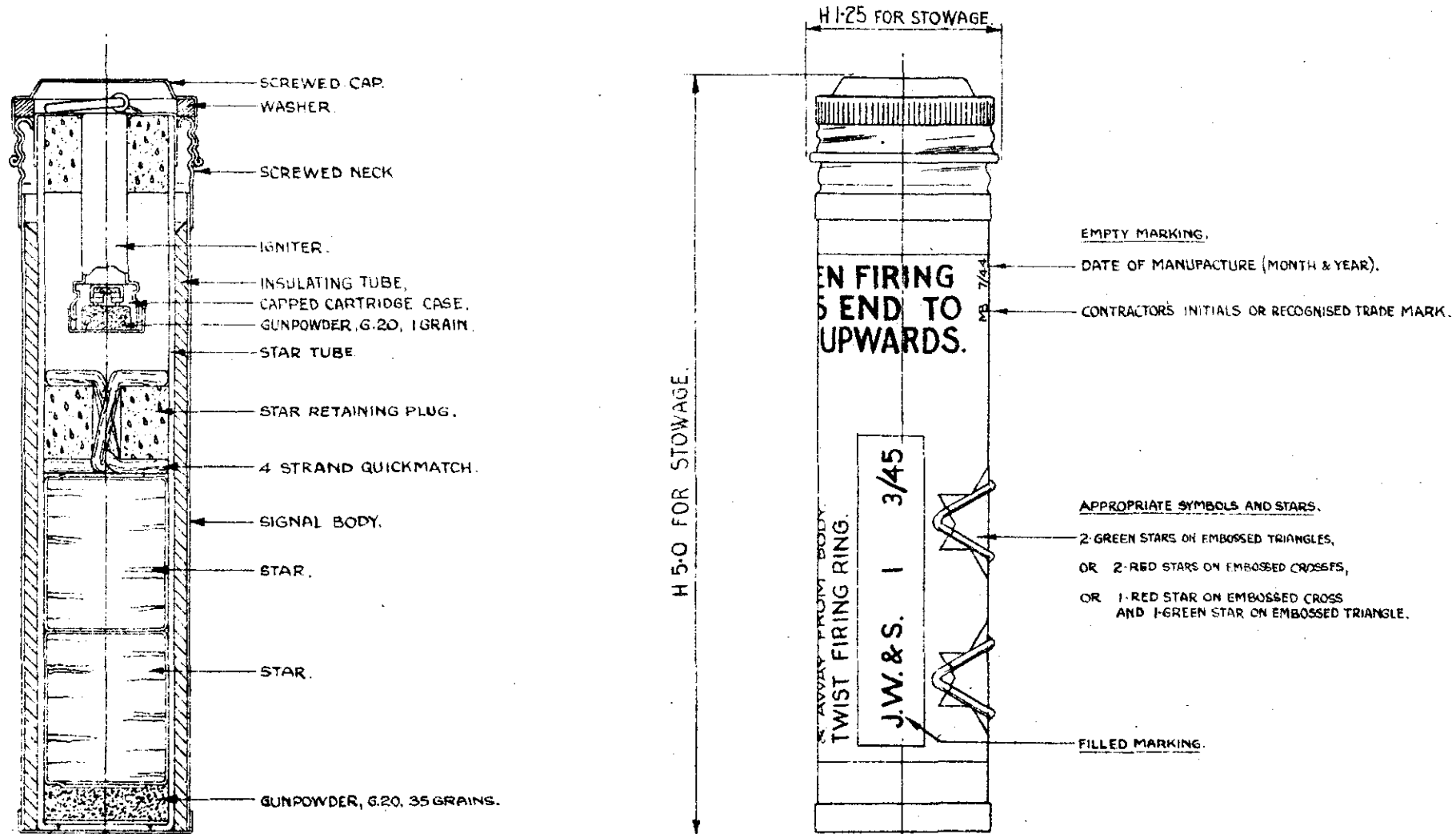


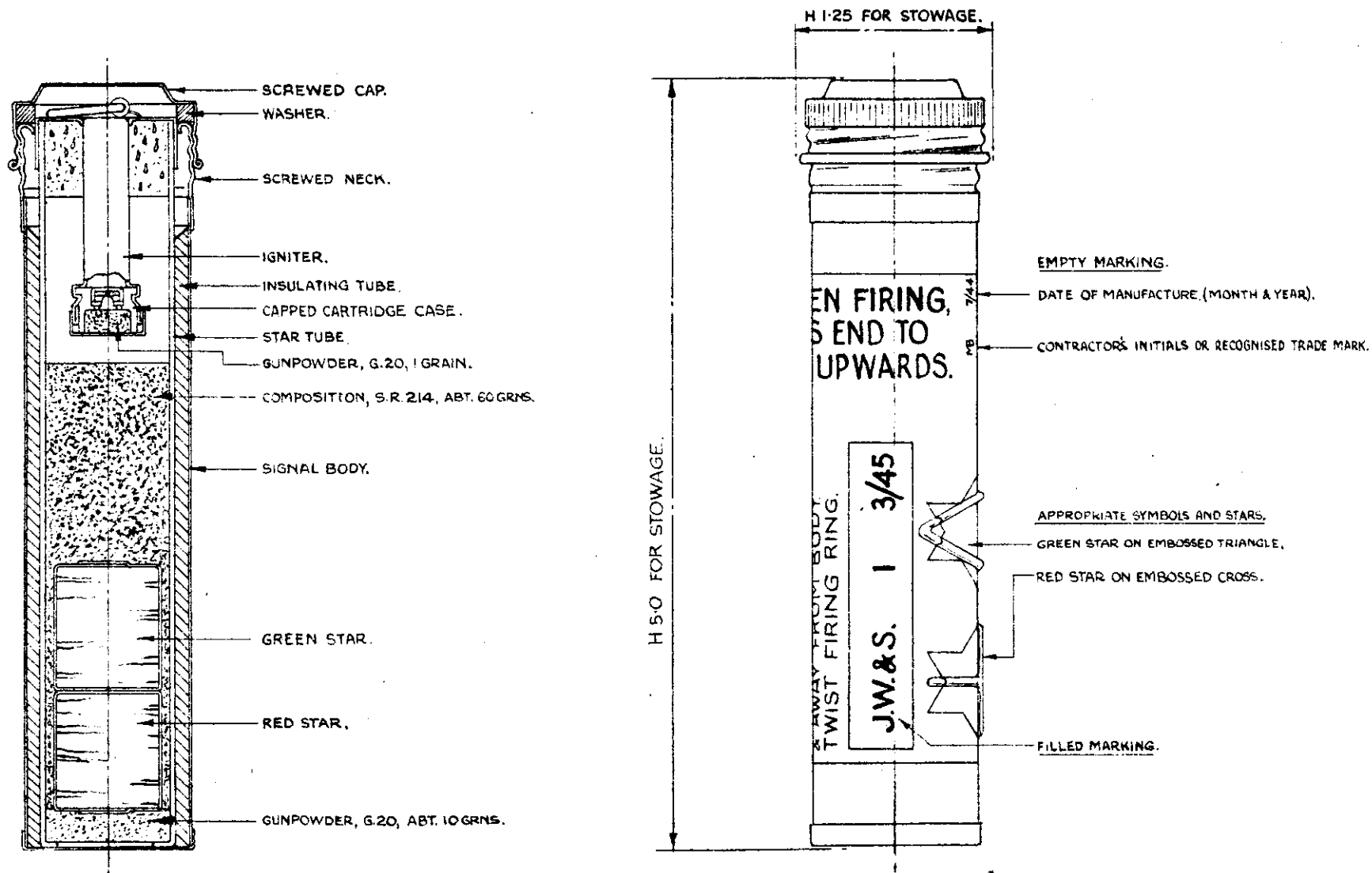
FIG. 536. (ITEM. 1323.)

SIGNAL, DOUBLE STAR, RED, GREEN, OR RED & GREEN, MARK I/L/.



SIGNAL, 2-STAR, RED & GREEN, MARK 1/1/L/.

FIG. 537. (ITEM. 1324.)

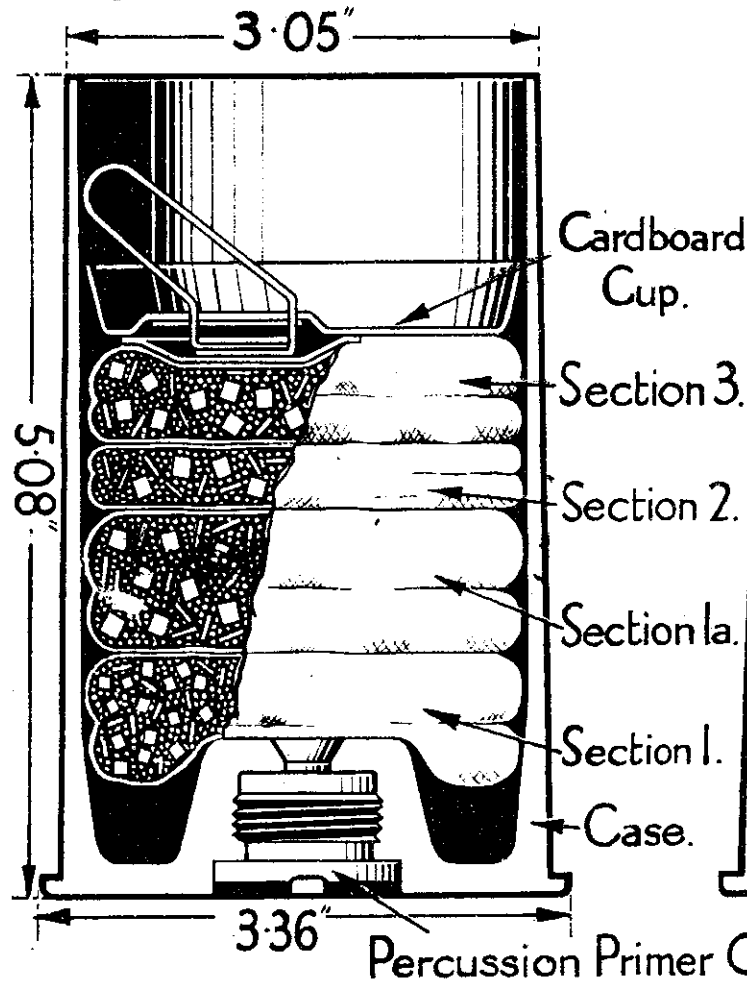


GERMAN 7.5 cm Geb KI5 Q.F. CARTRIDGE (Separate loading)

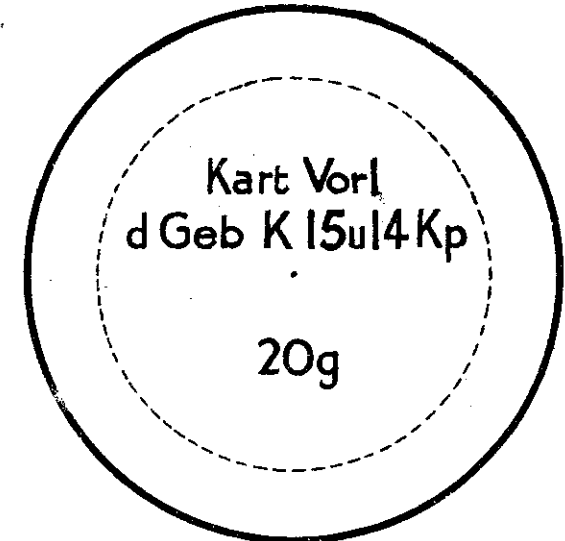
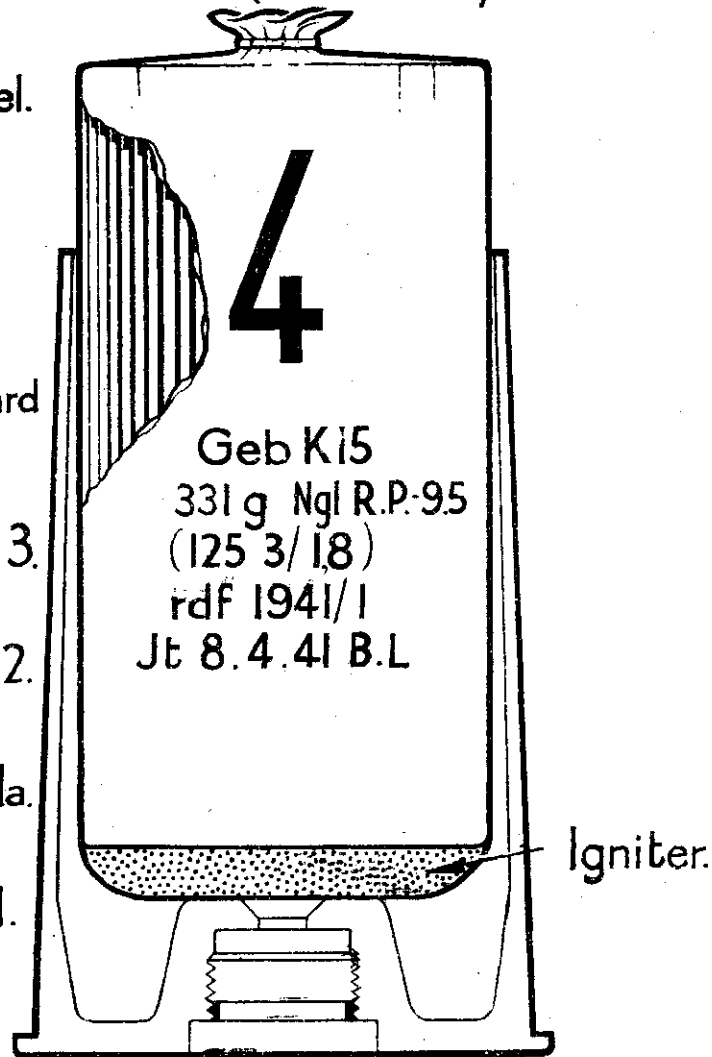
NORMAL CARTRIDGE

Geb KI5
Ngl B.I.P. - 125 (4-4-1)
Ktz 1937/20
Ngl B.I.P. - 125 (10-10-15)
blu 1939/22
Jt 14.3.41 B.L.

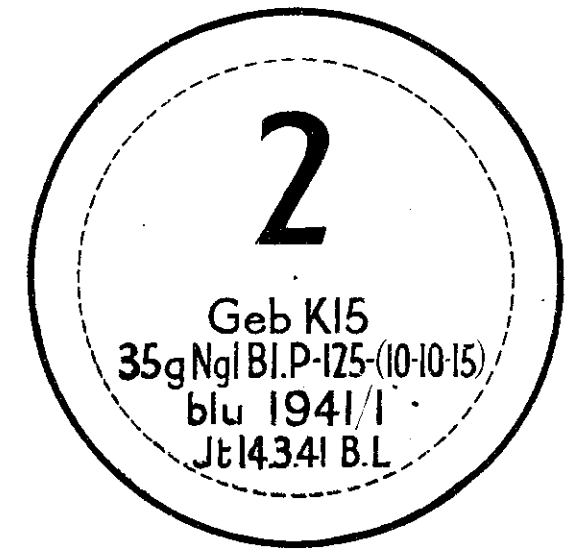
Cup label.



SPECIAL CARTRIDGE FIG. 538. (ITEM 1328)

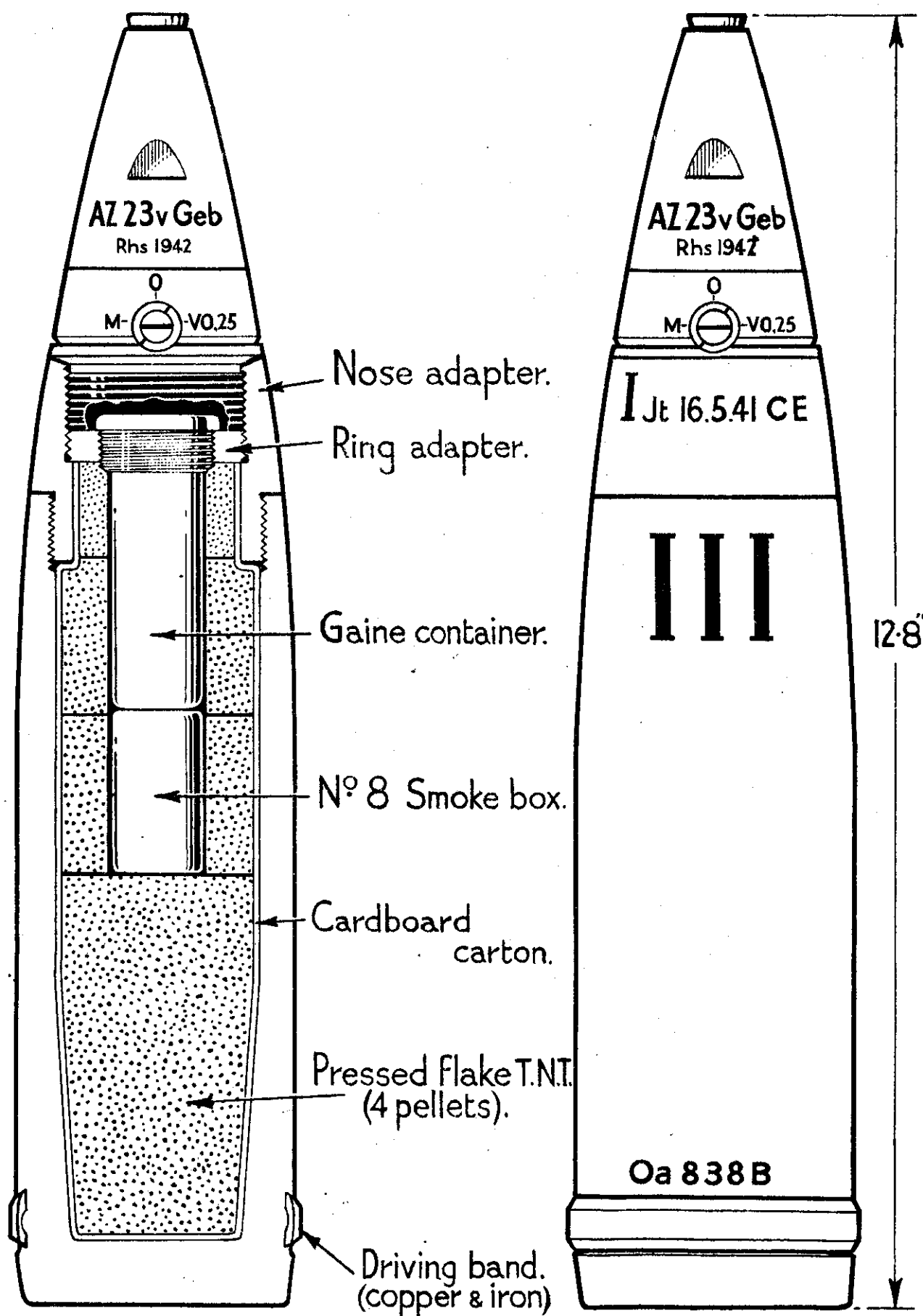


FLASH REDUCING CHARGE



SECTION 2.

FIG. 539. (ITEM.1329.)
GERMAN 7.5cm. Geb K 15 H.E. SHELL.



GERMAN TRACER FROM 7.5cm. le.F.K.18 APCBC/T SHELL.

FIG.540 (ITEM 1331.)

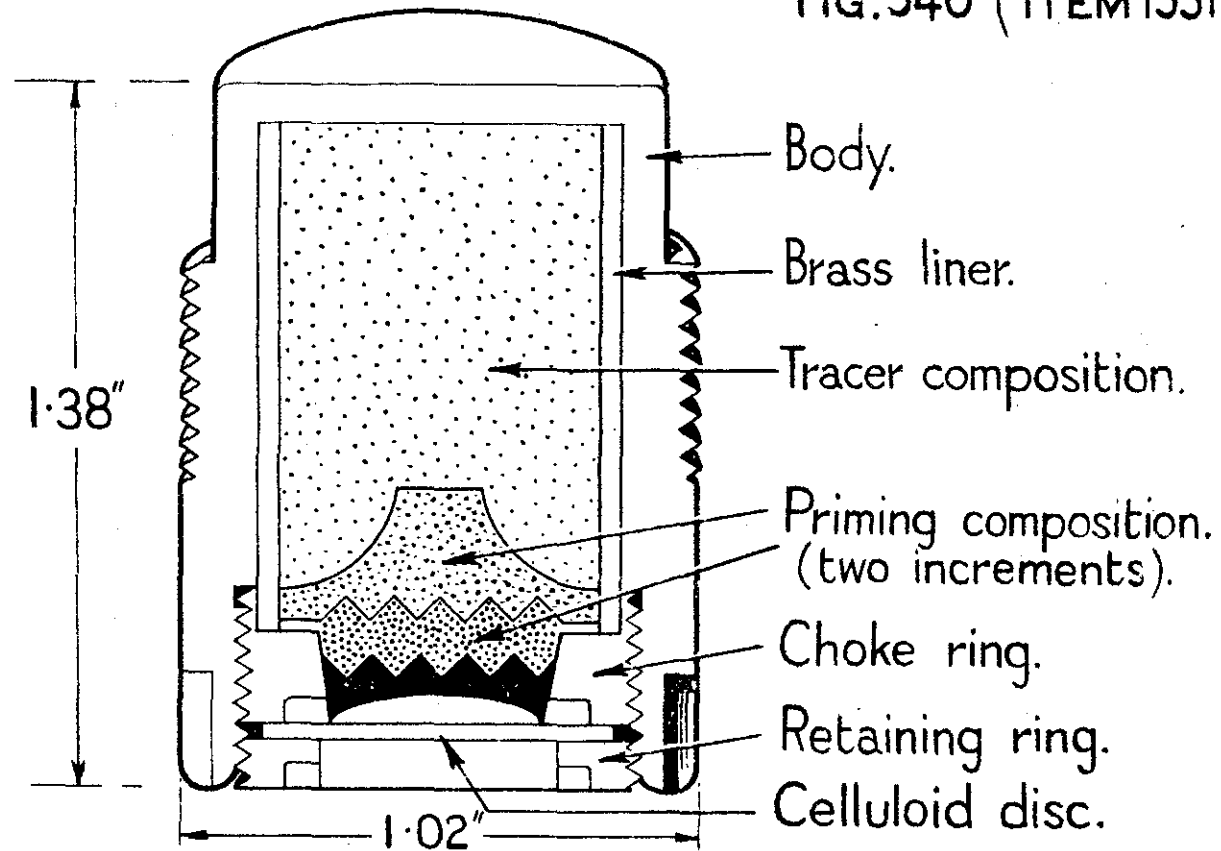
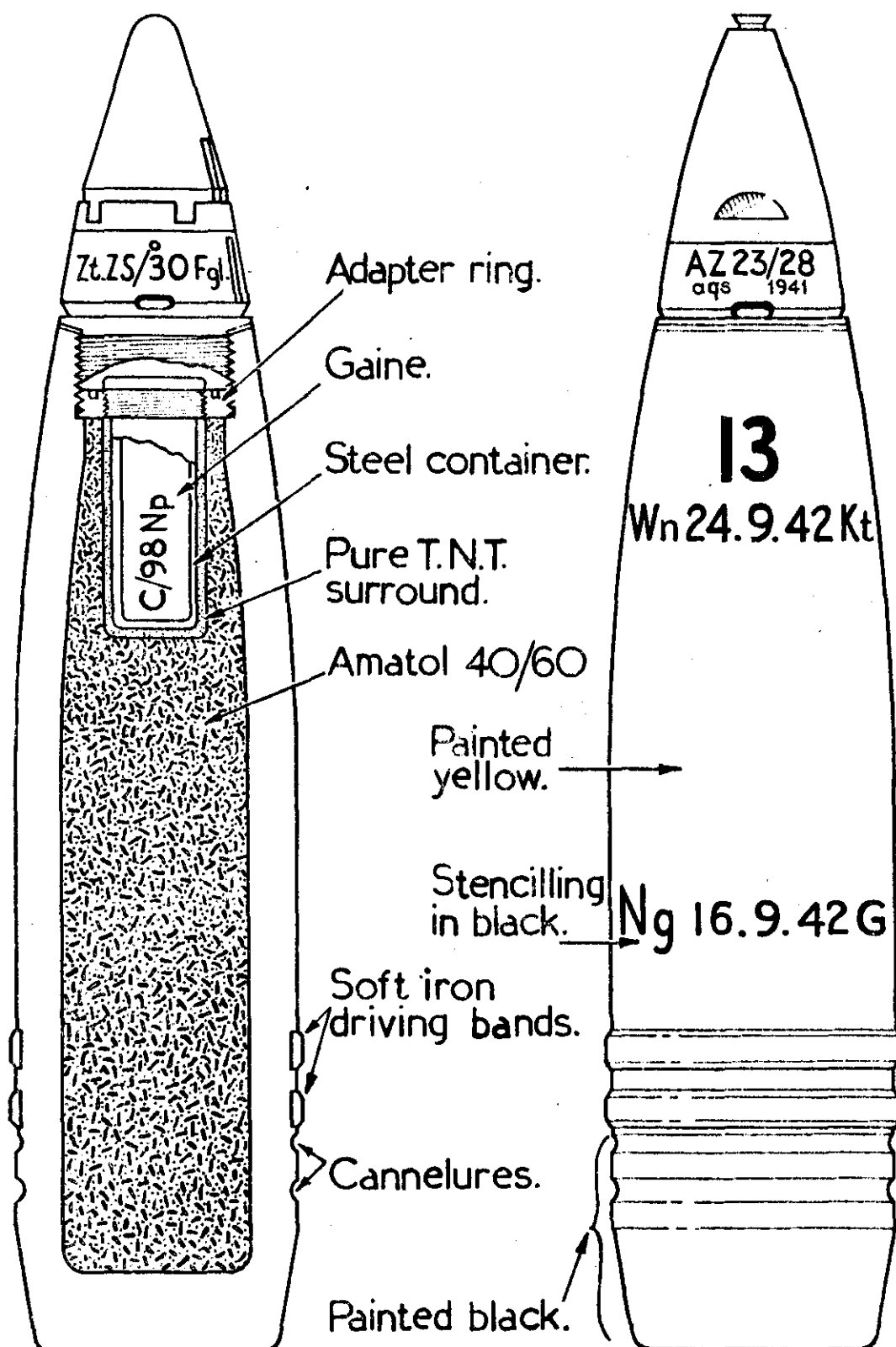


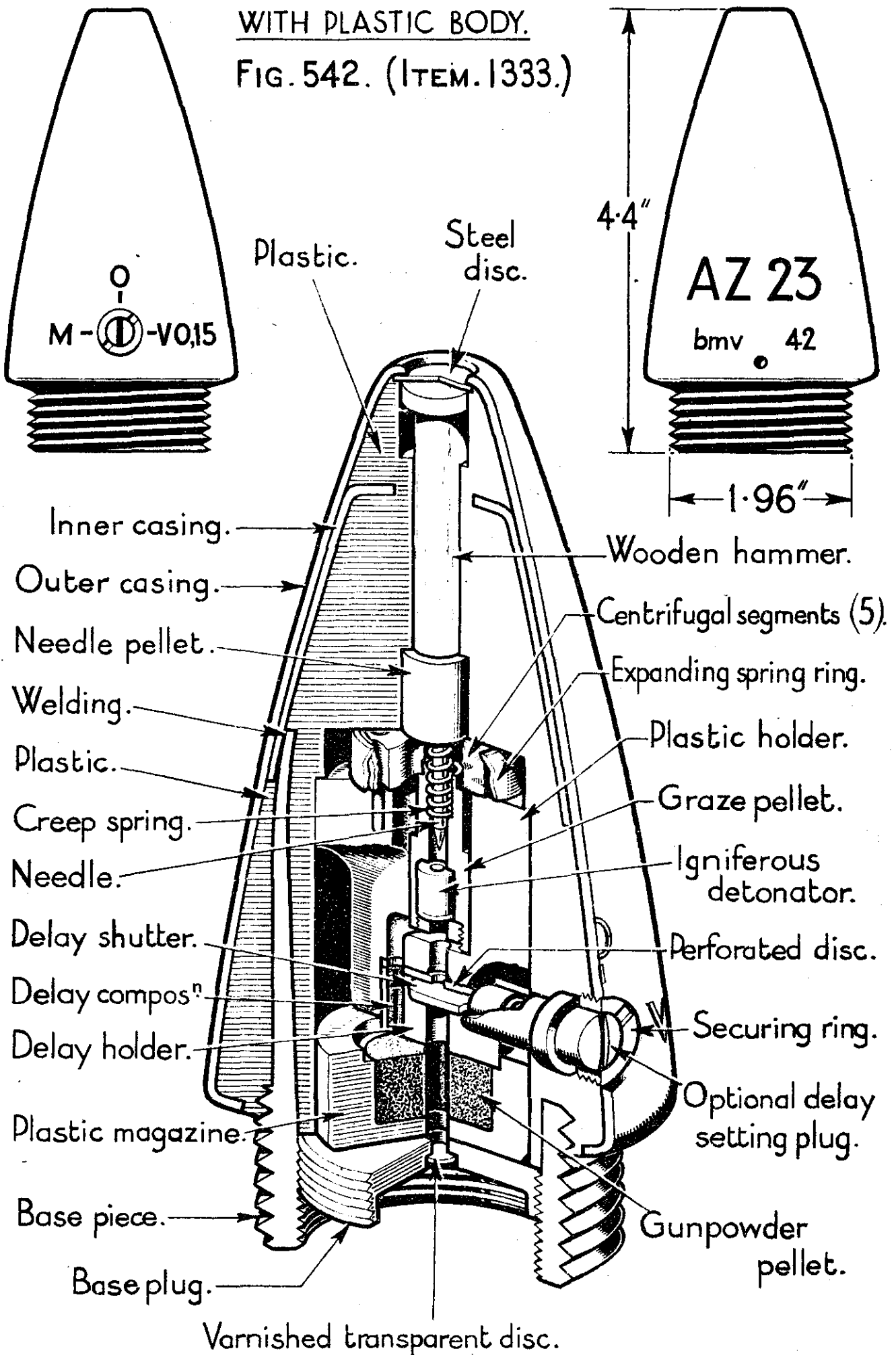
FIG. 541 (ITEM 1332.)
GERMAN 8.8cm. FLAK 41 SHELL H.E. FILLED AMATOL
40/60 FUZED Zt.ZS/30Fgl. or AZ 23/28.



GERMAN FUZE A.Z. 23(O,15)(Pr.)

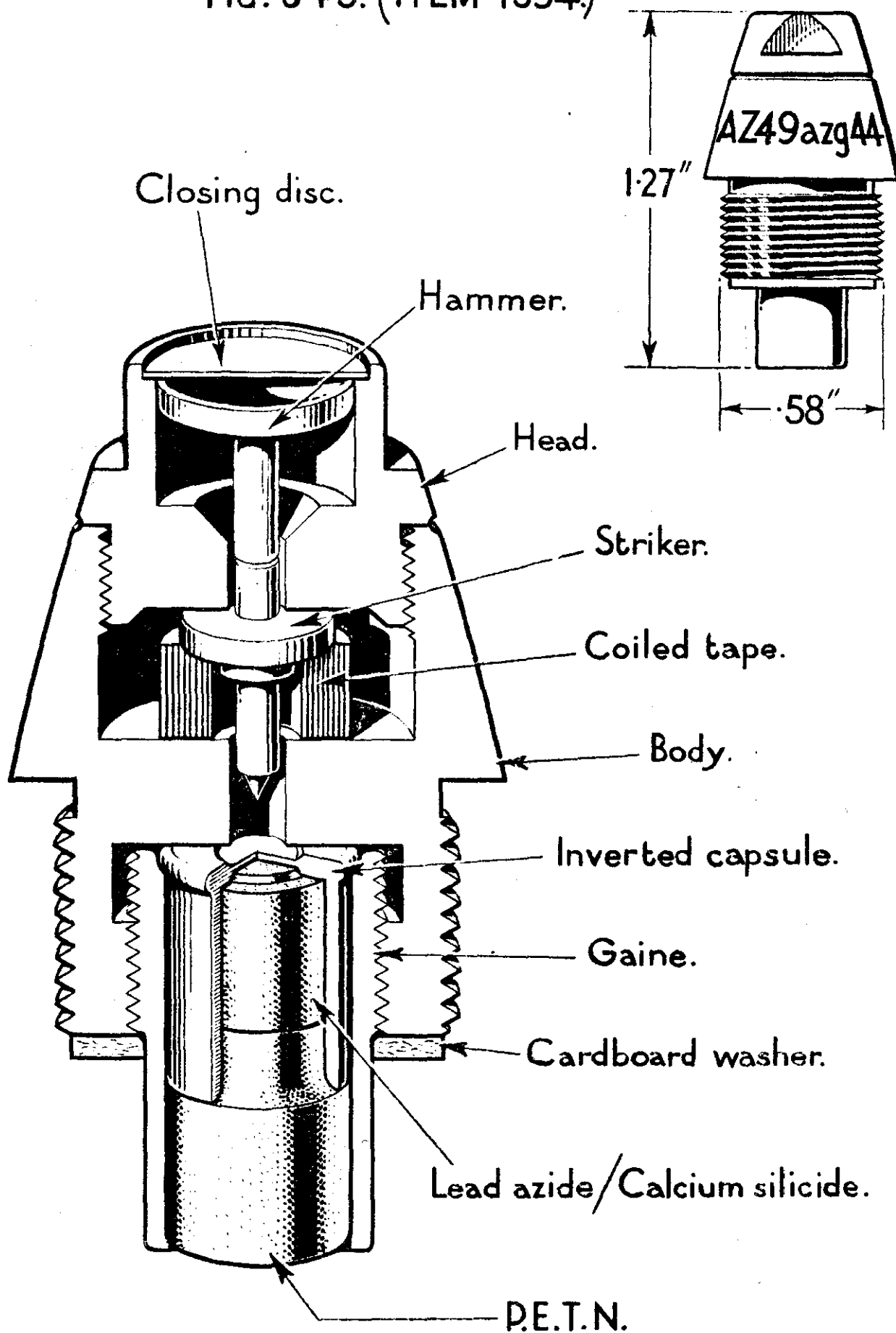
WITH PLASTIC BODY.

FIG. 542. (ITEM. 1333.)



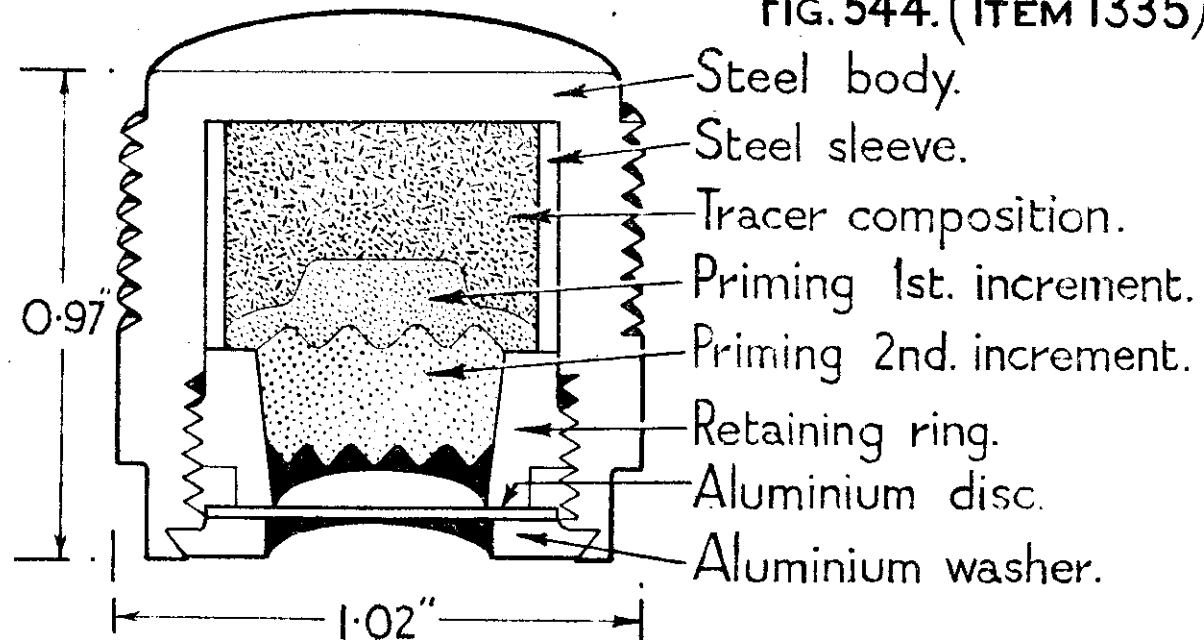
GERMAN FUZE - A.Z.49.

FIG. 543. (ITEM 1334.)



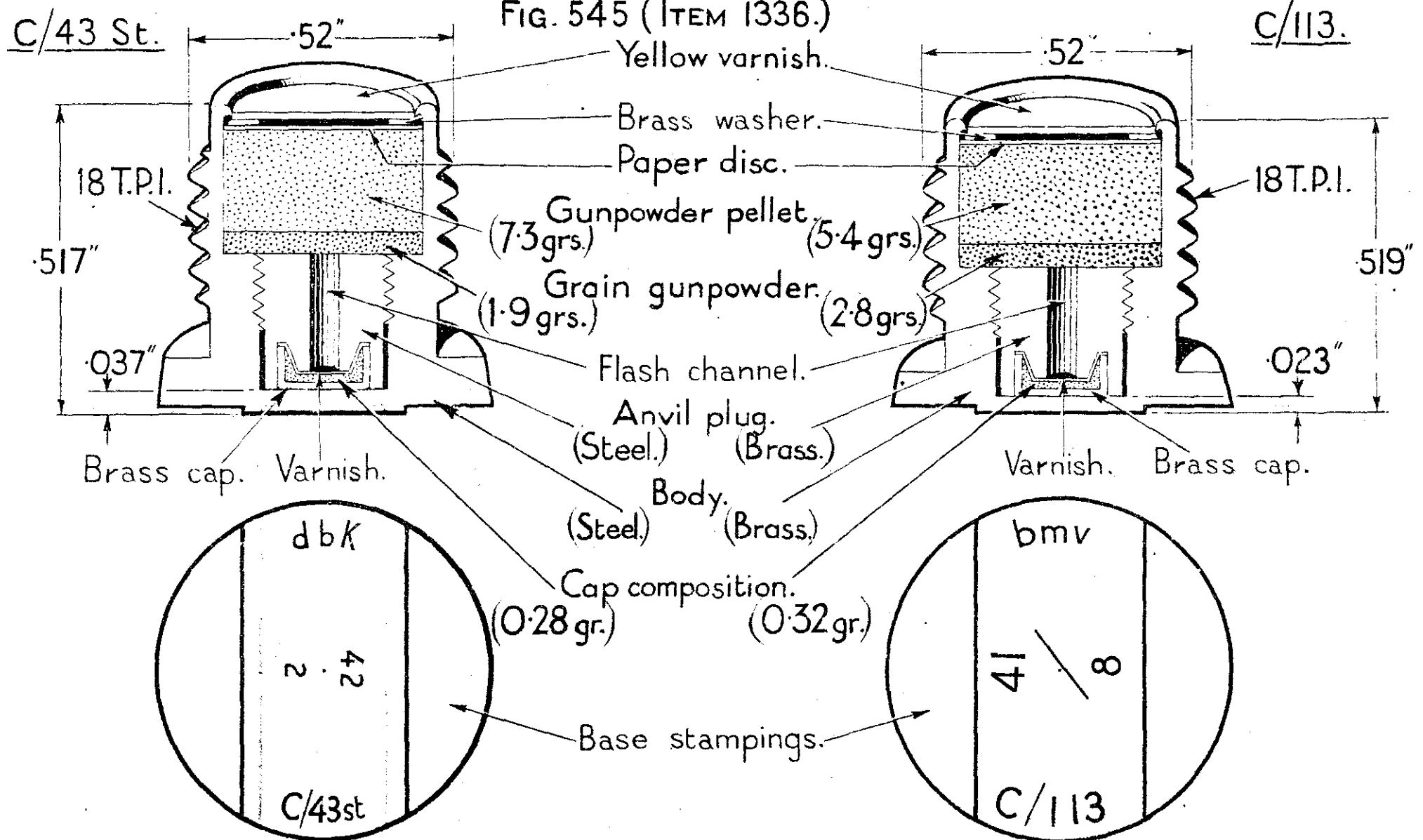
GERMAN TRACER N^o 5.

FIG. 544. (ITEM 1335).



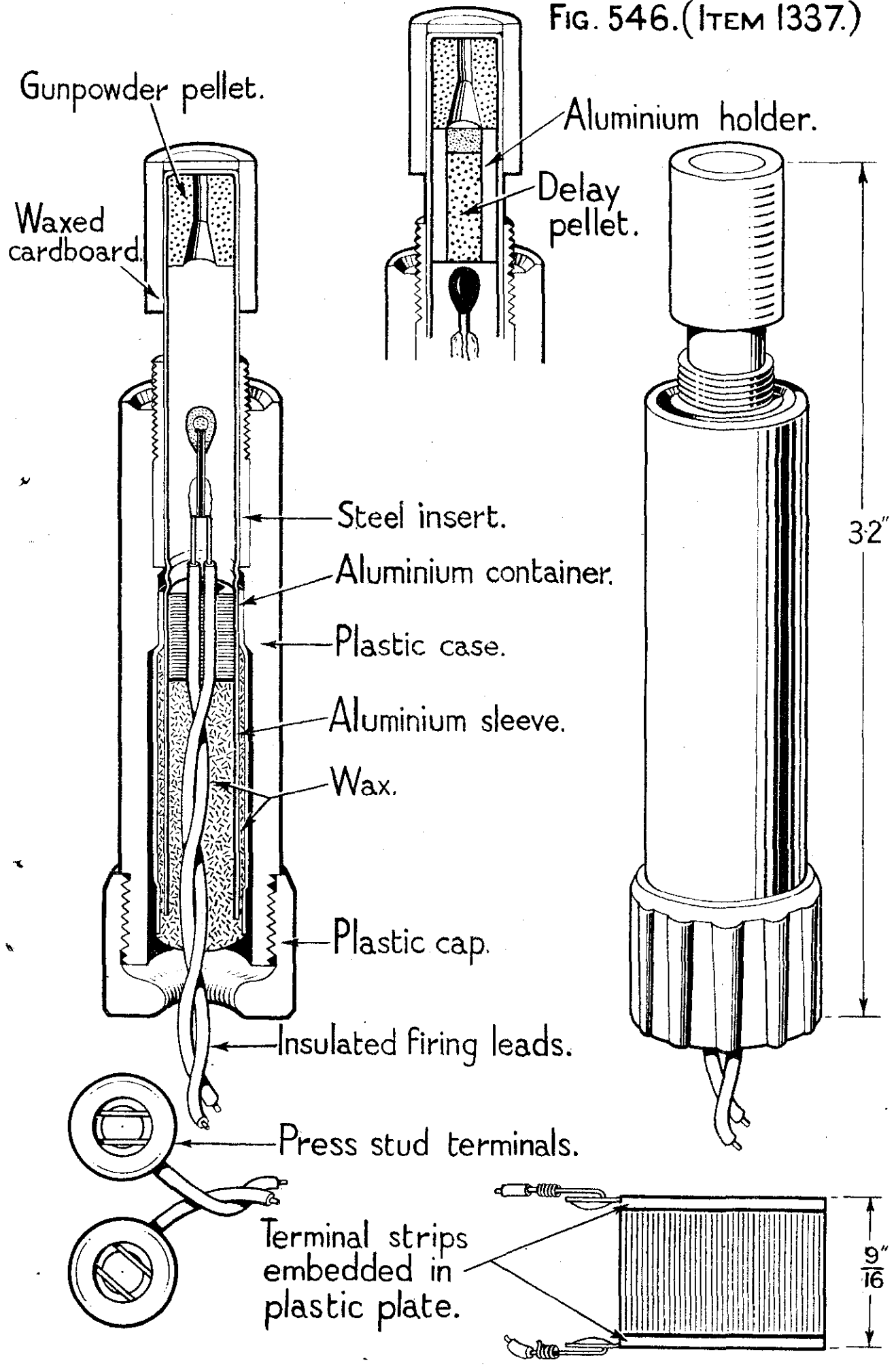
GERMAN PRIMERS, PERCUSSION, Q.F. CARTRIDGES.

FIG. 545 (ITEM 1336.)

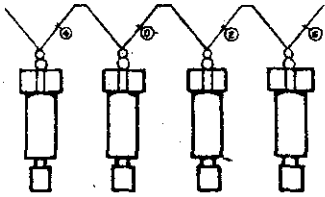
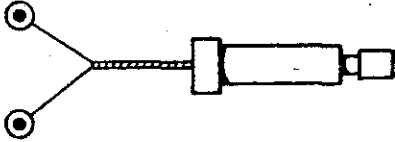


GERMAN FUZE ELECTRIC FOR IGNITION OF 28cm.&32cm.ROCKETS.

FIG. 546.(ITEM 1337.)



GERMAN FUZES ELECTRIC FOR IGNITION OF 28cm & 32cm ROCKETS. PACKAGE LABEL.

16 Stück Steckzünder 40 f. 28/32cm. Nb W 41 u.s. Wu R. 40 (A) h s c ----- Lfg.----- abgenommen: -----	
4 Stück Glühzündketten 40 m. V. f.s. W.G. 40 u. 41 h s c ----- Lfg.----- abgenommen: -----	
16 Stück Druckknopfzünder 42 f.s. Wu R. 40 (Ausführung B) h s c ----- Lfg.----- abgenommen: -----	
<i>Bei Beanstandungen des Inhalts, Kasten mit den beanstandeten und den unverbrauchten Zündern und Glühzündketten an O.K.H. Heereswaffenamt (Wa.Pruf.II) senden, Bericht über Beanstandungen O.K.H. In 9 auf dem Dienstwege vorlegen</i>	

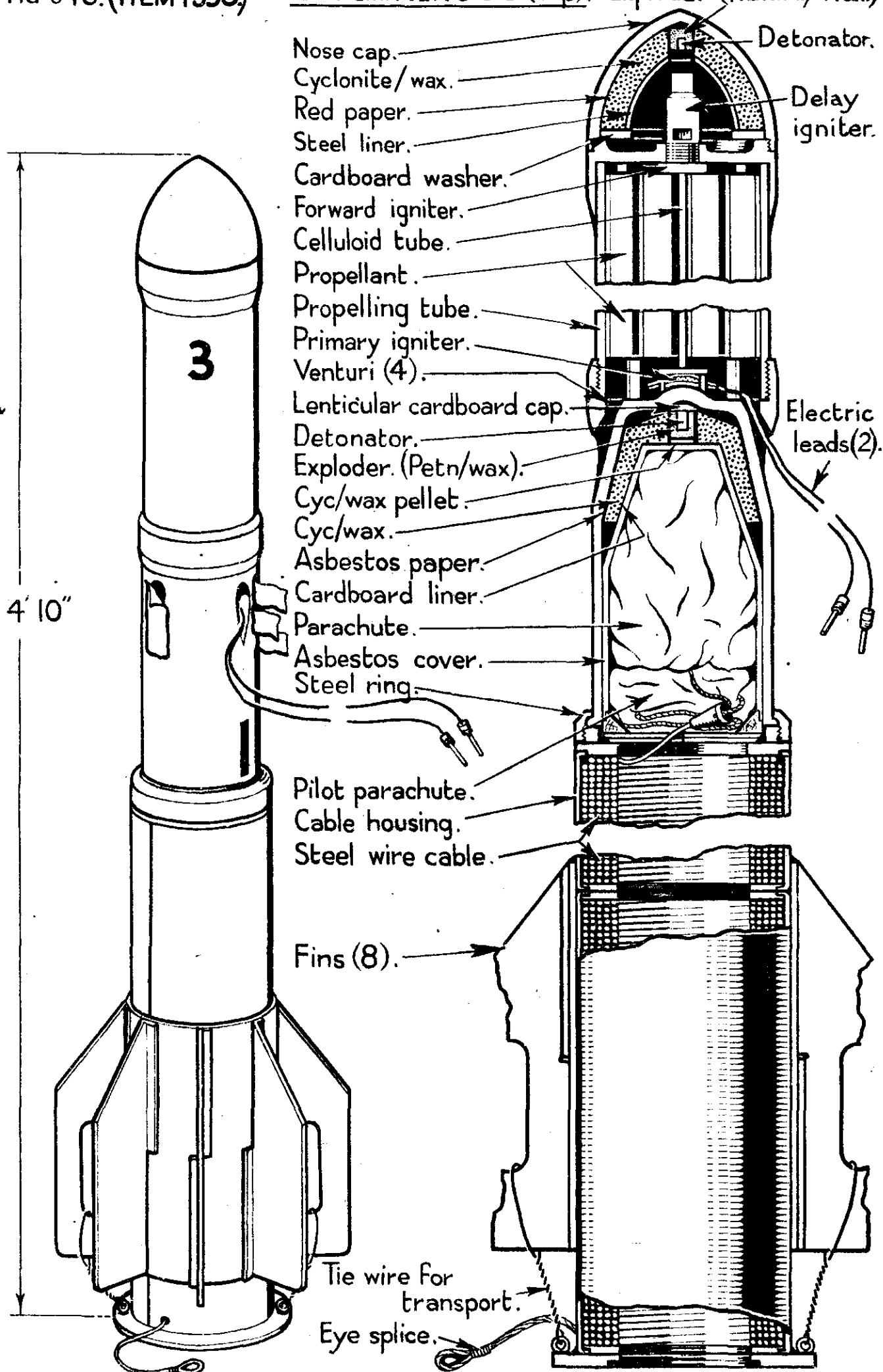
Nur durch Truppe öffnen

FIG. 547. (ITEM 1337)

Note: The "numbered tags" on the Fuze Glühzündketten 40mV are not shown on the original label but are included here to illustrate where they are secured.

GERMAN 15.2cm.(6-inch) A.A. CABLE & PARACHUTE ROCKET.

FIG 548. (ITEM 1338) 15.2 cm. Kz. 1000 (Kp). Exploder (P.E.T.N./Wax.)



GERMAN 8.8cm A/TK HOLLOW CHARGE PROJECTILE.

(8.8cm RAKETEN PANZERBUSCHE GRANATE 4312.)

FIG. 549 (ITEM 1339.)

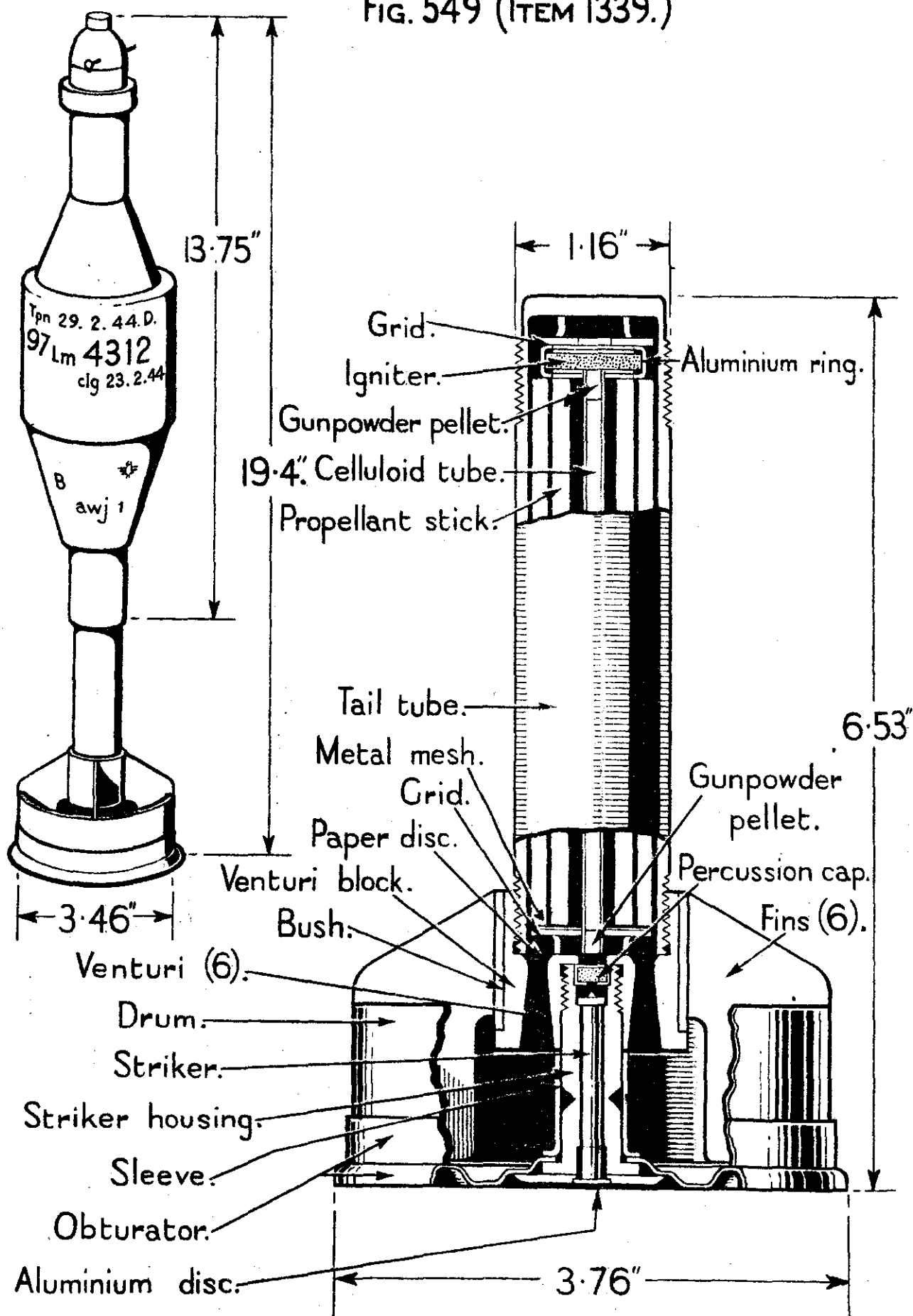
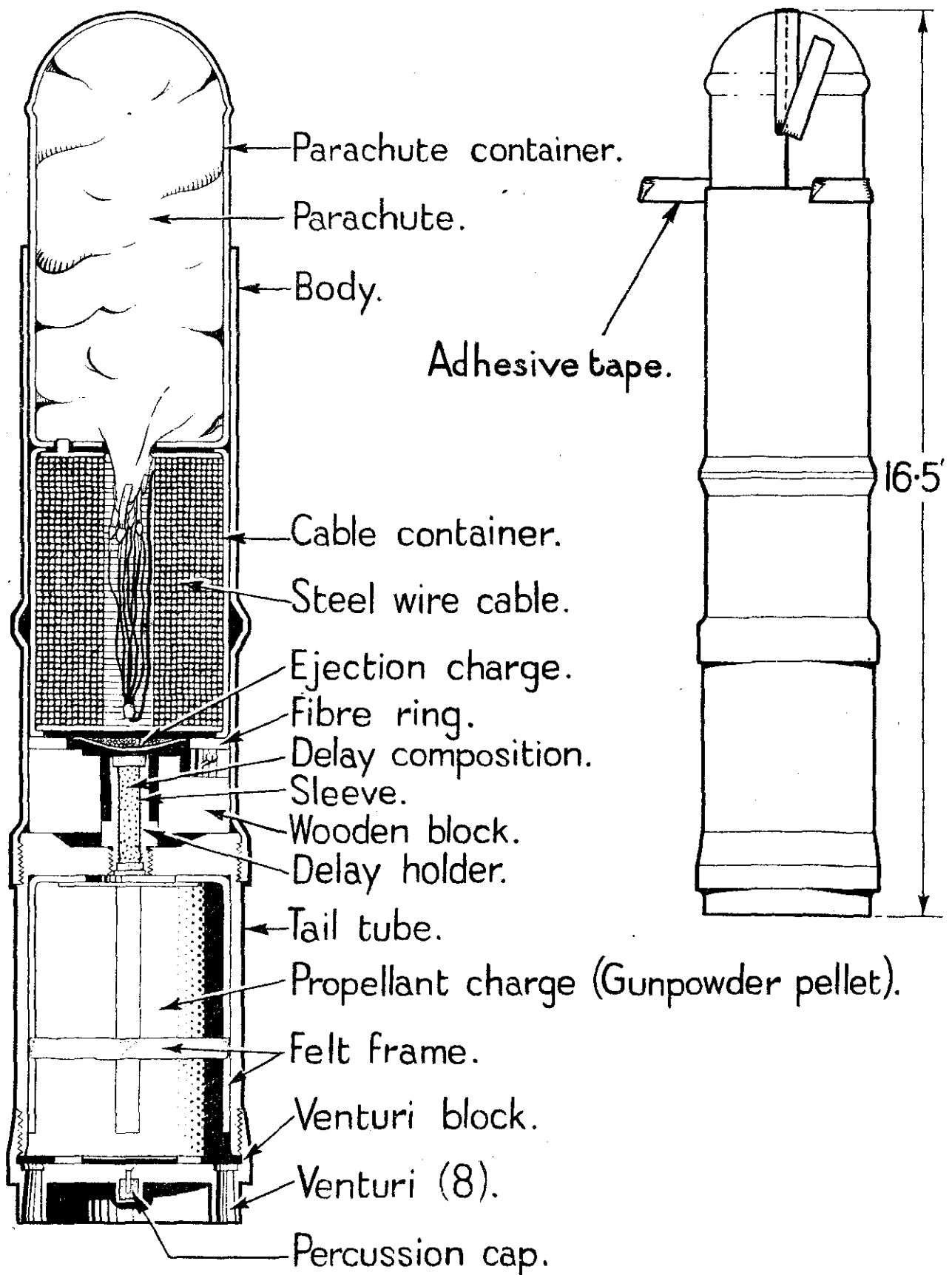


FIG. 550 (ITEM 1340)

GERMAN 8.6cm. A.A. "WIRE BARRAGE" ROCKET.



GERMAN 3_{cm} RIFLE SMOKE GRENADE.

(GEWEHRBLENDGRANATE 42.)

FIG 551. (ITEM 1341.)

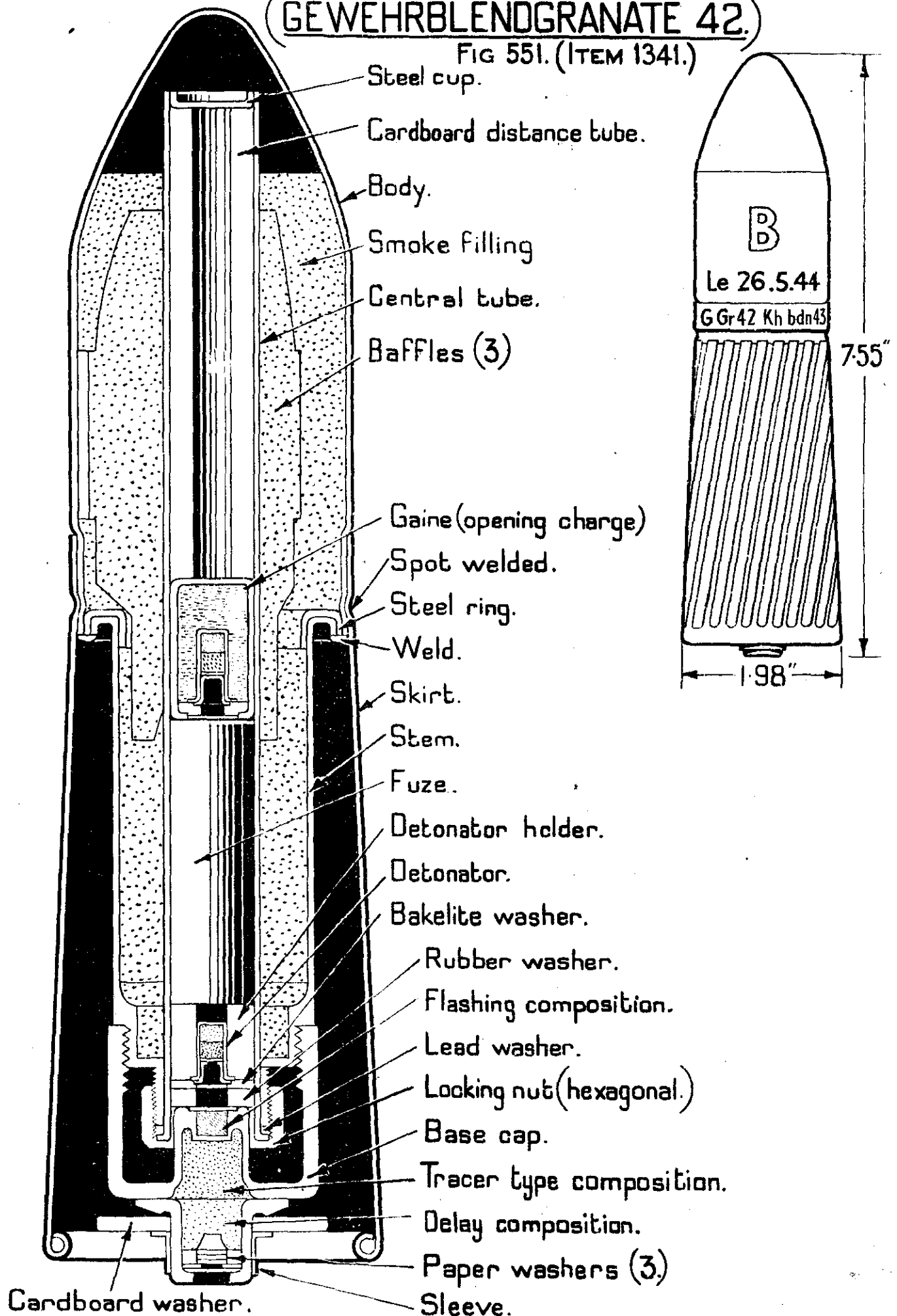
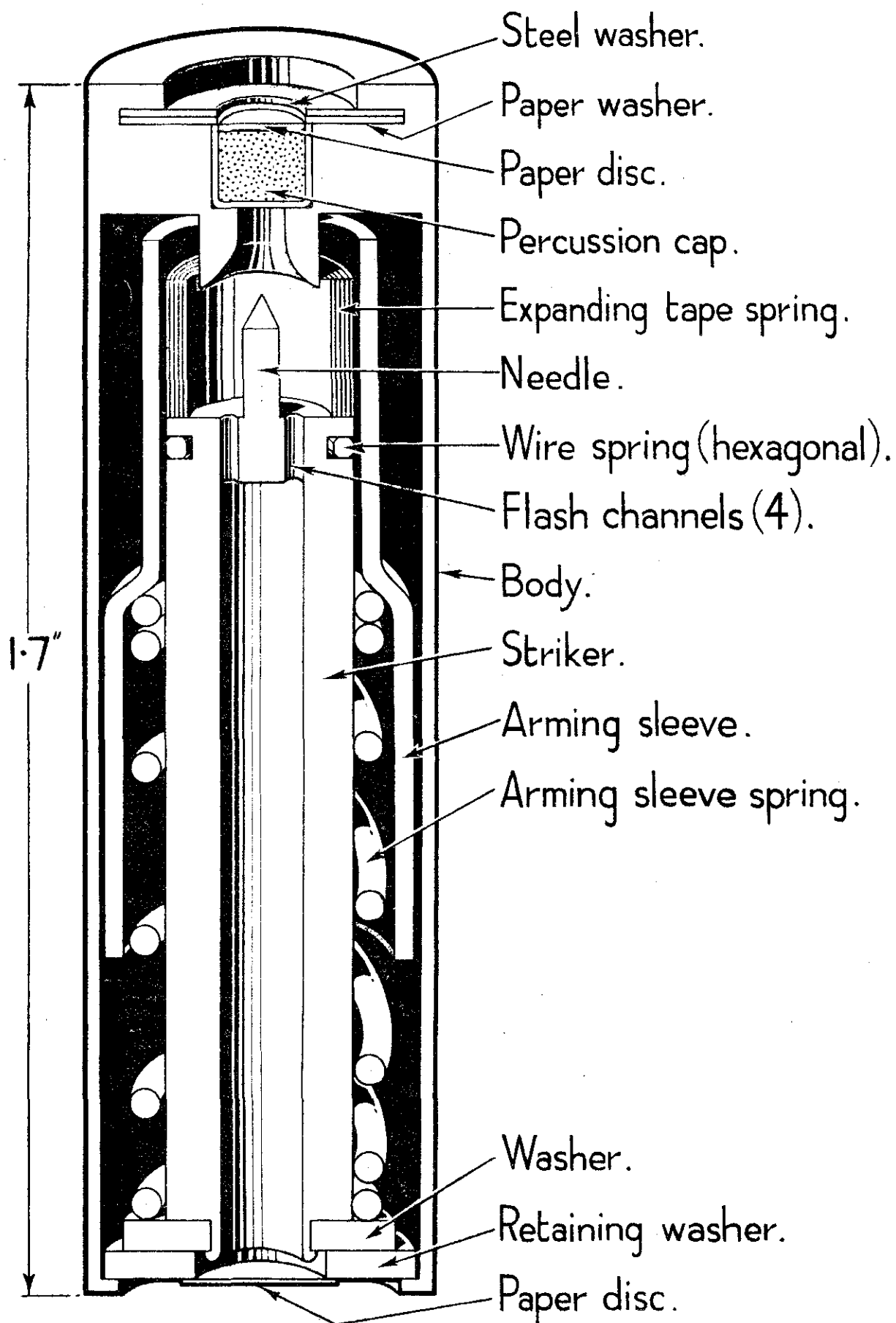


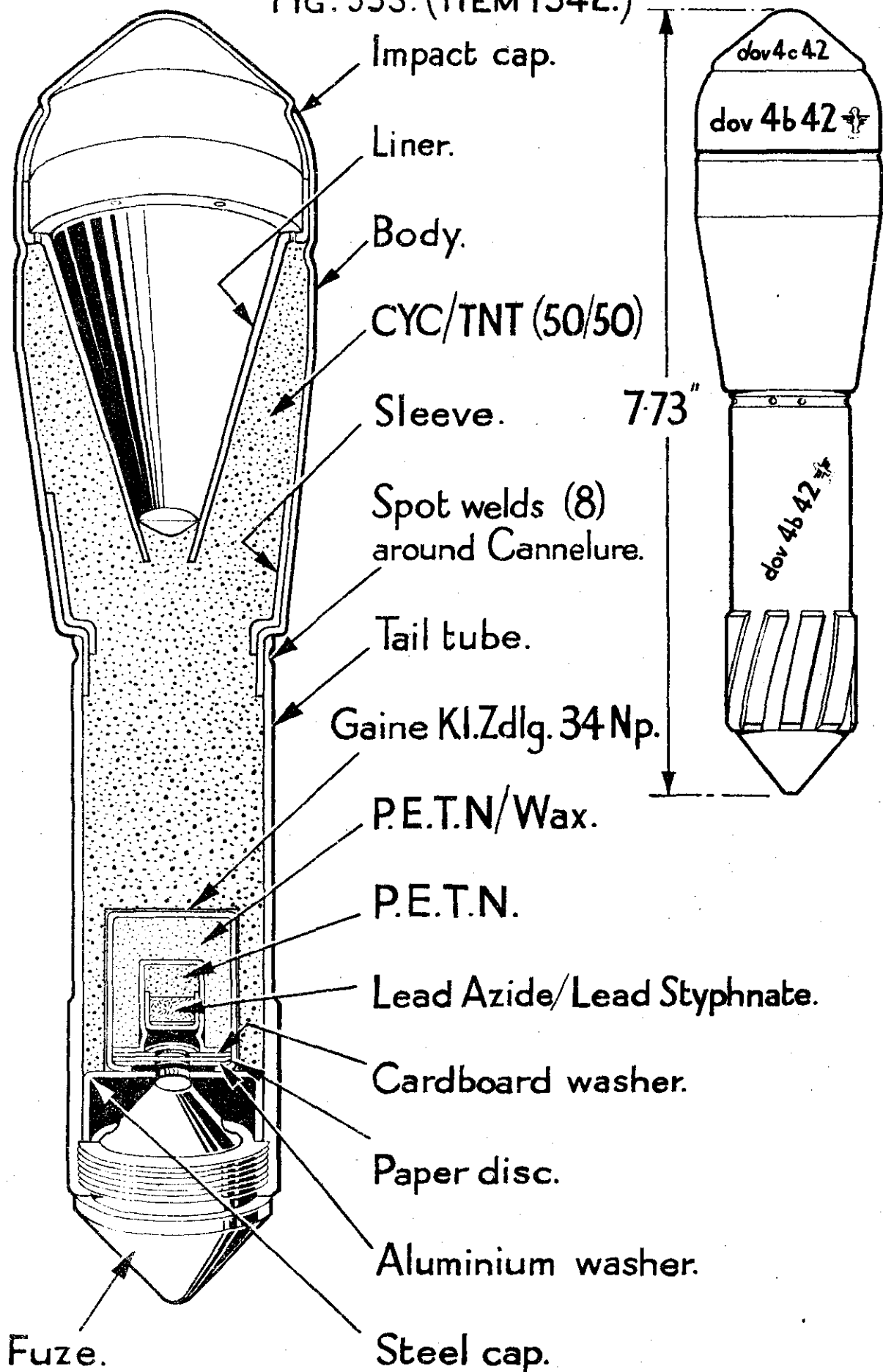
FIG. 552. (ITEM 1341.)
GERMAN 3_{cm}. RIFLE SMOKE GRENADE FUZE.



GERMAN 46mm HOLLOW CHARGE RIFLE GRENADE

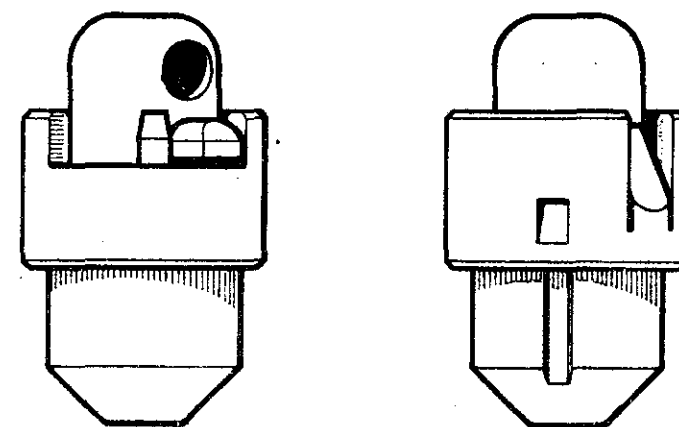
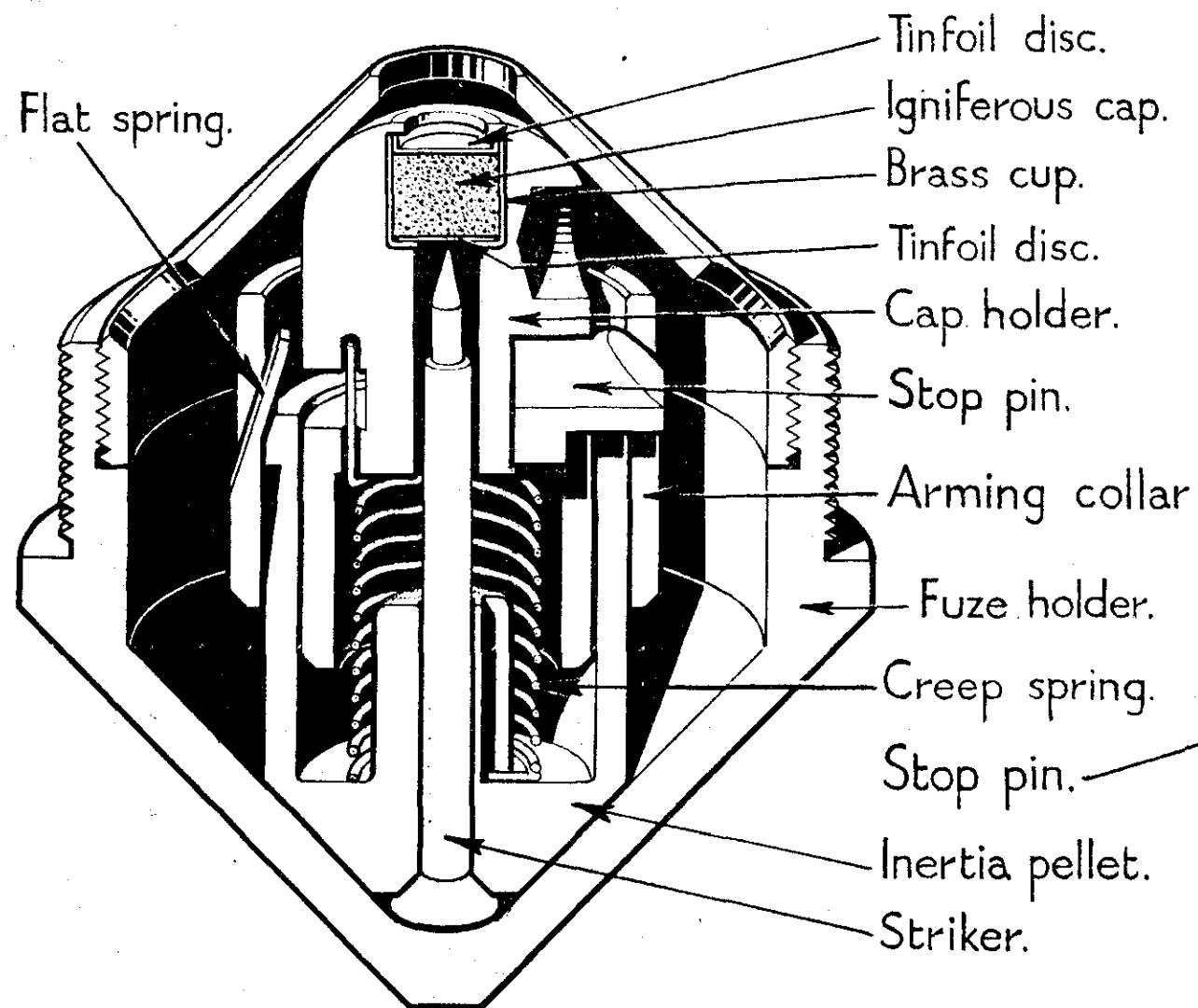
GEWEHR PANZERGRANATE 46mm.

FIG. 553. (ITEM 1342.)

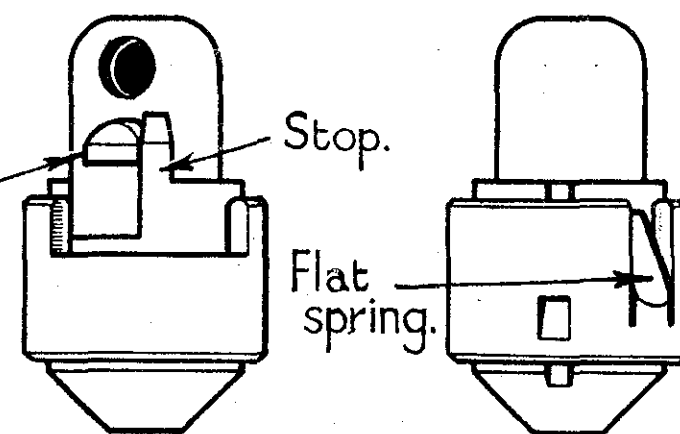


GERMAN 46m.m. & 61m.m. HOLLOW CHARGE RIFLE GRENADE PERCUSSION FUZE

FIG. 554. (ITEM 1342.)



SAFE POSITION.



ARMED POSITION.

GERMAN 61mm HOLLOW CHARGE RIFLE GRENADE. (GEWEHR PANZERGRANATE 61mm.)

FIG. 555. (ITEM 1343)

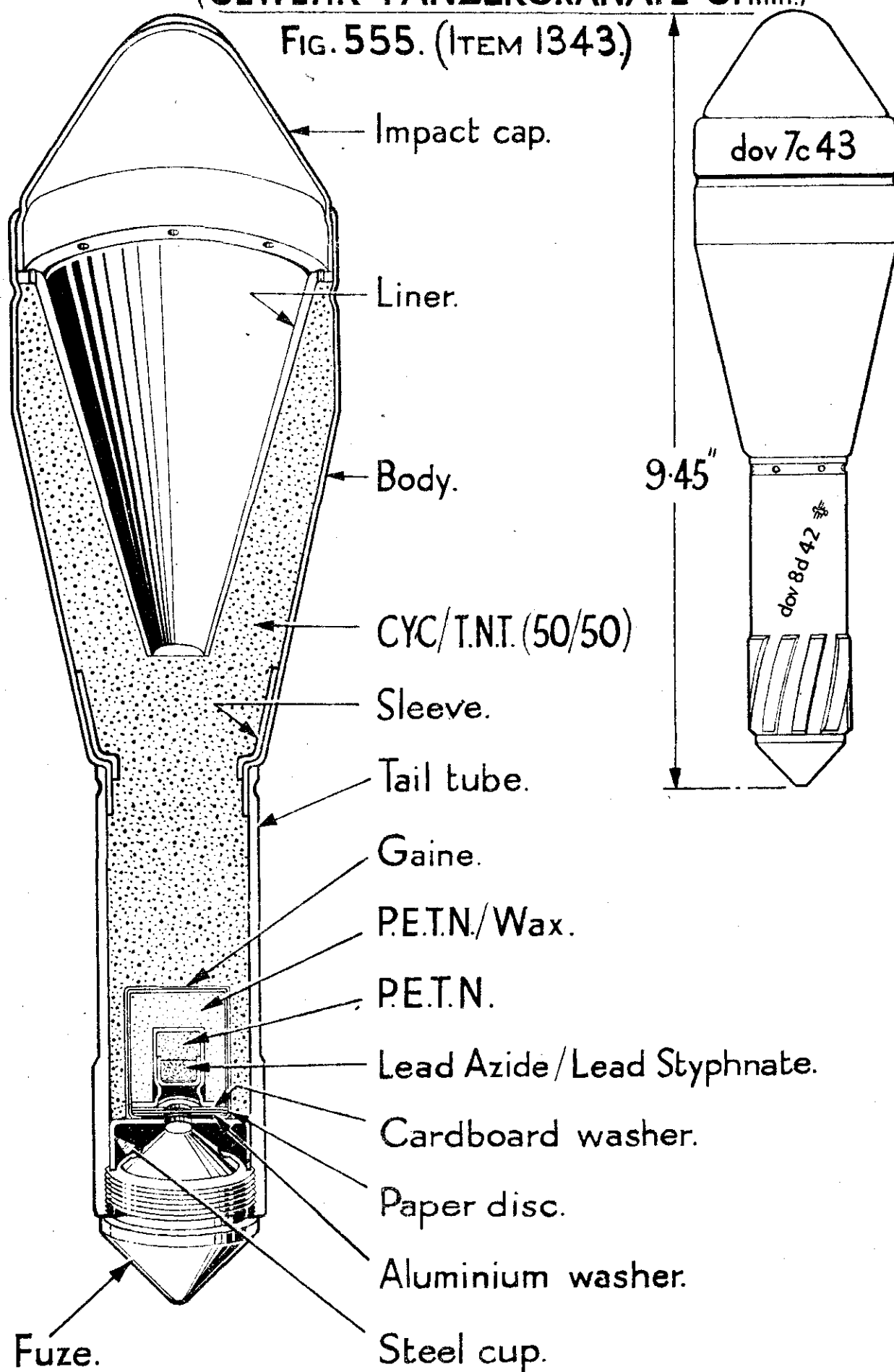
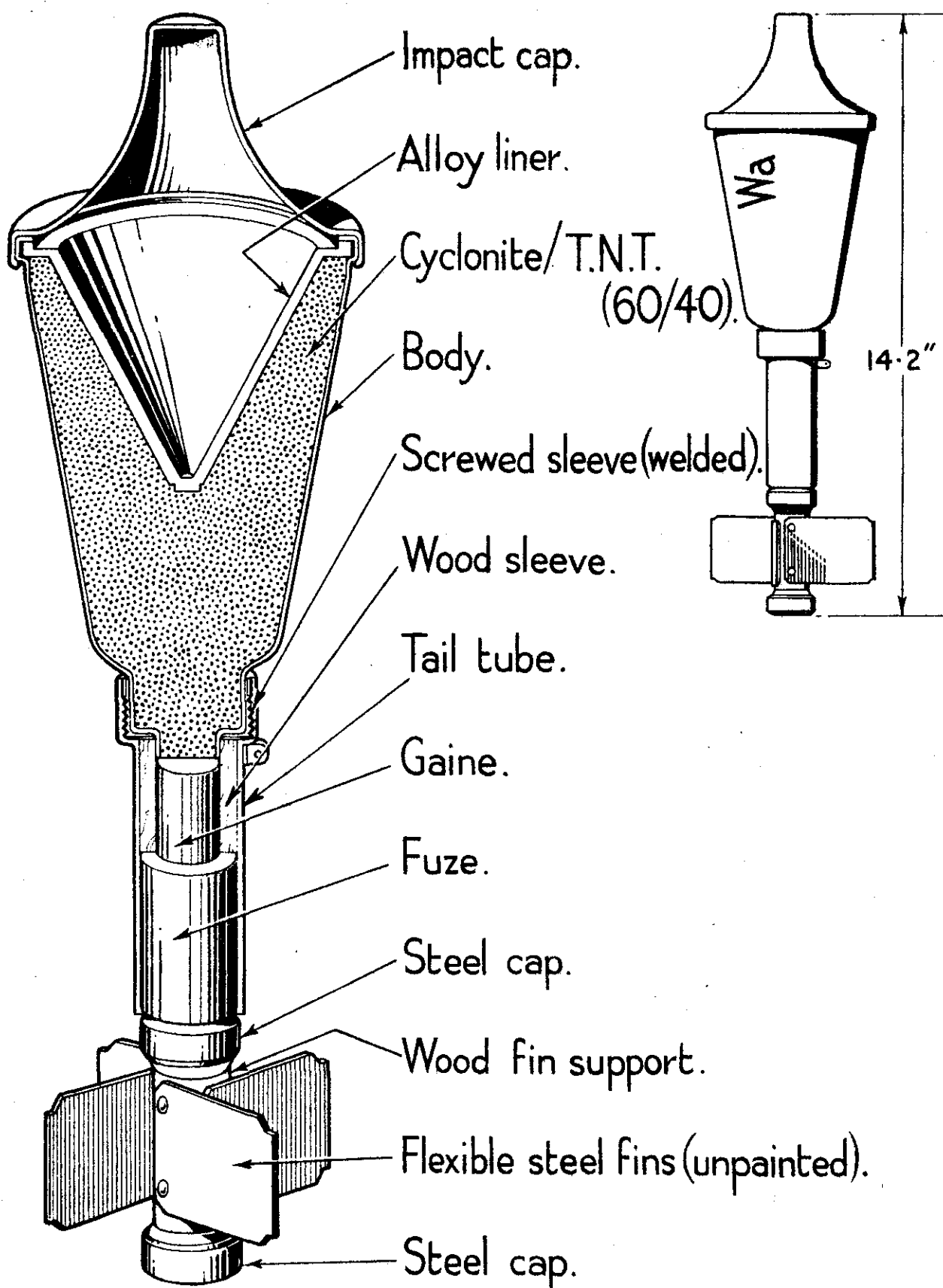


FIG. 556. (ITEM 1344.)
GERMAN HOLLOW CHARGE ANTI-TANK-BOMB.
(Panzerfaust Klein 30).



JAPANESE SMOKE GRENADE. FIG. 557.

(For use with discharger Type 89) (ITEM 1345)

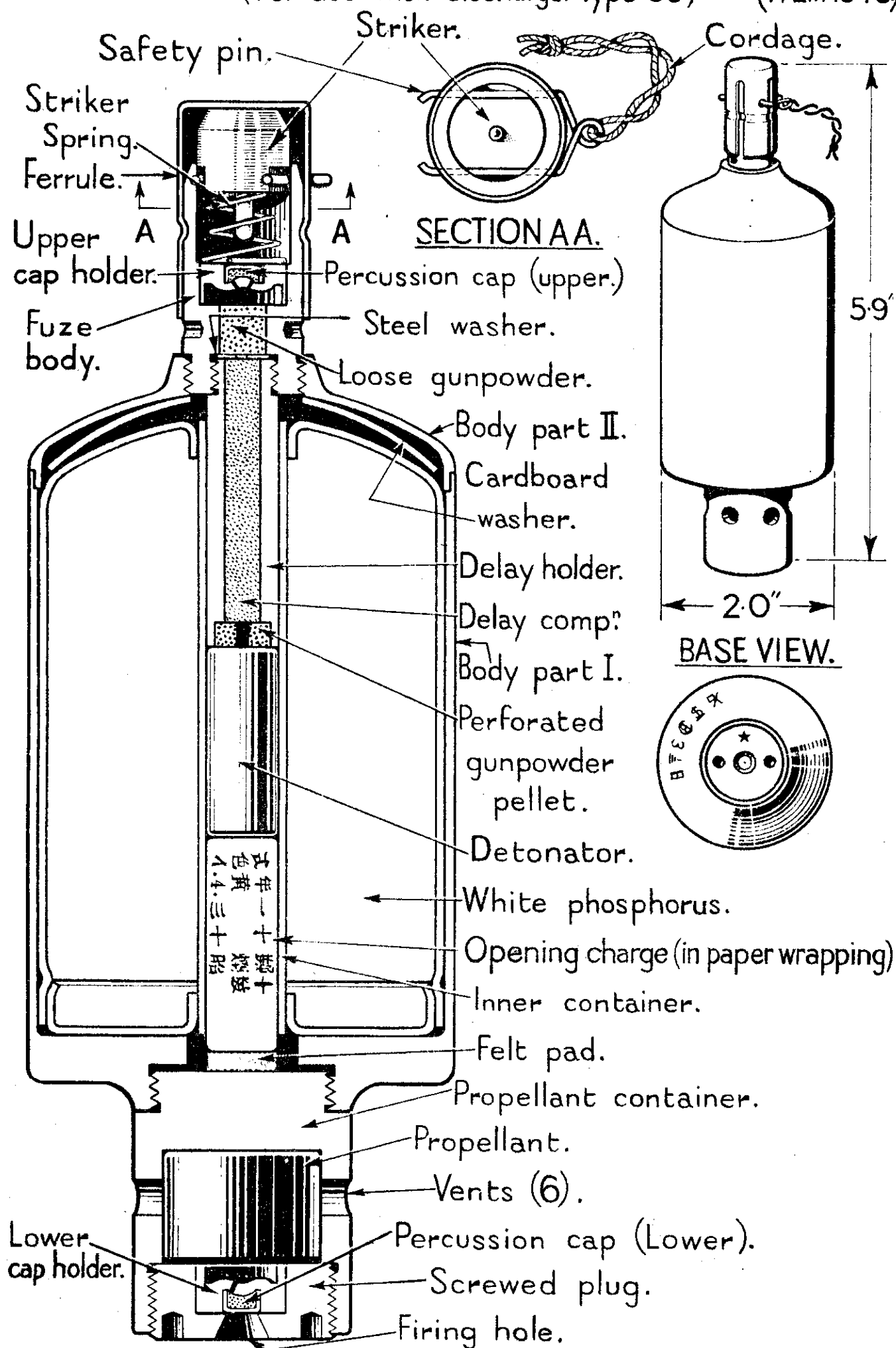


FIG. 558. (ITEM 1346.)
JAPANESE 4cm. HOLLOW CHARGE RIFLE GRENADE.

