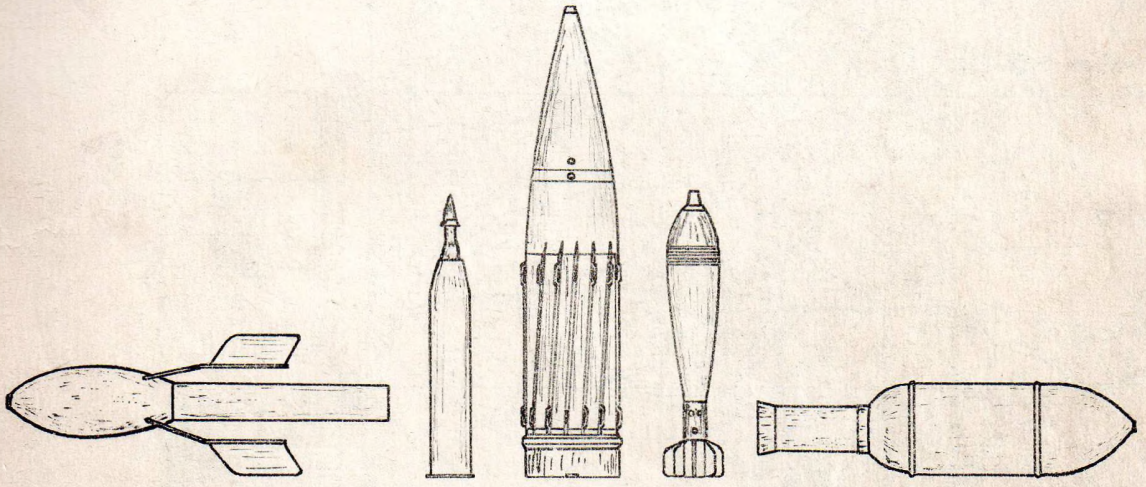
RESTRICTED

CAPTURED AMMUNITION

BULLETIN



No. 1

Date 9 FEB 1945

Office of A.C. of S., G-2
Supreme Headquarters Allied Expeditionary Force

SUPREME HEADQUARTERS
ALLIED EXPEDITIONARY FORCE
Office of Assistant Chief of Staff, G-2
Main Headquarters

CAPTURED AMMUNITION BULLETIN

FOREWORD

Vast quantities of ammunition have been captured in this and other theaters, and as a result, Allied troops must of necessity familiarise themselves, not only with their own ammunition, but also with that of GERMANY, occupied and liberated countries.

The study of Enemy Ammunition is of considerable value. It reveals new trends in German design and shows useful and practical designs which may be exploited by the Allies. Shortages of raw materials and manufacturing faults are also often revealed.

Information on enemy ammunition is derived from a variety of sources, the majority coming from actual examination of captured specimens and the study of captured documents.

It is the function of Intelligence to collate all these sources, as only by such collation can a complete picture be drawn. Documentary evidence on the introduction of new types of ammunition is often to hand long before the ammunition itself is recovered. This is a useful guide to future examination of enemy dumps and gun sites.

In the past a considerable amount of information on enemy ammunition has been collected and has been published in US, UK and various Theaters of operation. Much of this information is not available to interested personnel in the European Theater of Operations.

This Ammunition Bulletin will be devoted entirely to captured ammunition, exclusive of bombs and engineer stores. It will appear at frequent but irregular intervals. As far as is possible, the information will be in collated form, each item being devoted to either one series of ammunition or a complete collation on the ammunition of a certain country.

K.W.D. STRONG,
Major-General, G.S.,
A C of S., G-2.

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Office of Assistant Chief of Staff, G-2
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9 Feb 45

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1. INCENDIARY AND HE/INCENDIARY PROJECTILES

These are of recent introduction into the German Army and at present very little is known concerning them. A certain amount of information has been obtained from documents concerning the 10.5 cm incendiary projectile. This appears to contain an opening charge similar to a smoke projectile, and the main filling consists of phosphorus absorbed in wood wool.

The following incendiary projectiles for mortars and artillery equipments are known to exist:-

1. for the 10.5 cm le F H 18 and associated equipments - light field howitzer.
   German nomenclature - F H Gr Br

2. for the 15 cm s J G 33 - heavy infantry howitzer
   German nomenclature - 15 cm Igr Br

3. for the 8 cm s Gr W 34 - mortar
   German nomenclature - 8 cm Wgr. 34 Br.

4. for the 10 cm Nb. W. 35 - mortar
   German nomenclature - 10 cm Wgr. 35 Br.

All the abdve projectiles include "Br" in their nomenclature and have "Br" stencilled on the body. All are initiated by a nose percussion fuze.

An HE/Incendiary projectile, known as the F H Gr Spr Br., has been introduced for use in the le F H 18 and associated equipments. It includes "Spr Br" in the nomenclature and has "Spr Br" stencilled on the body. It is initiated by a nose percussion fuze.

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2. COLOURED SMOKE INDICATOR PROJECTILES

This type of projectile is designed to emit coloured smoke and its function is to indicate targets to aircraft and supporting arms.

It would appear that initially such projectiles were designed for the emission of BLUE smoke although there is evidence that the intention is to introduce other colours.

The nomenclature of such projectiles includes "deut", and also the colour of the smoke, e.g. "blau" = blue. "deut" and also the colour of the smoke, e.g. "blau" is stencilled on the body of the projectile.

The following types are known to exist in the German army for use in artillery equipments. All are fitted with a T and P fuze:-

1. for the 7.5 cm le J G 18 - light infantry gun
German nomenclature - 7.5 cm Jgr. Deut.

2. for the 7.5 cm Geb G 36 - mountain gun
German nomenclature - K Gr Rot Deut.
Weight of projectile - 5.83 kg.
T and P fuze - Dopp. Z. S/60

3. for the 10.5 cm le F H 18 and associated equipments - light field howitzer
German nomenclature - F H Gr 40 Deut.
Weight of projectile- 15.25 kg.
T and P fuze - Dopp. Z. S/60

There is evidence, at least in the case of 3, that the design is based on that of a smoke (screening) projectile with base ejection, e.g. at some pre-determined height a smoke canister is ejected through the base and falls to the ground.

The following types are known to exist in the German army for use in mortar equipment:-

4. for the 8 cm s Gr W 34
German nomenclature - 8 cm Wgr 38 Deut (diagram 1 and 2 att'd)

The design of this bomb is based on the HE air-burst bomb - 8 cm Wgr. 38.

The bomb cannot function on soft or boggy ground and is liable to break up on very hard or stony ground. When the bomb strikes, the nose fuze ignites the ejection charge in the head projects the main body and tail unit backwards. The backward flight may be up to 50 yards and is allowed for by overshooting the target an equivalent distance.

/Detonation of

Detonation of the ejection charge ignites a pressed gunpowder pellet contained in a loose plug at the front of the main body. This plug is held in by a spiral spring running through a central perforated tube in the bomb, and is attached to the spring by a loop of string cord. When the burning of the central gunpowder pellet reaches the gunpowder fuze (leading to the ignitionsystem for the smoke composition), it also burns the string cord loop, and the plug is free to be forced out. Smoke is emitted through the central perforated tube and the hole left by the plug.

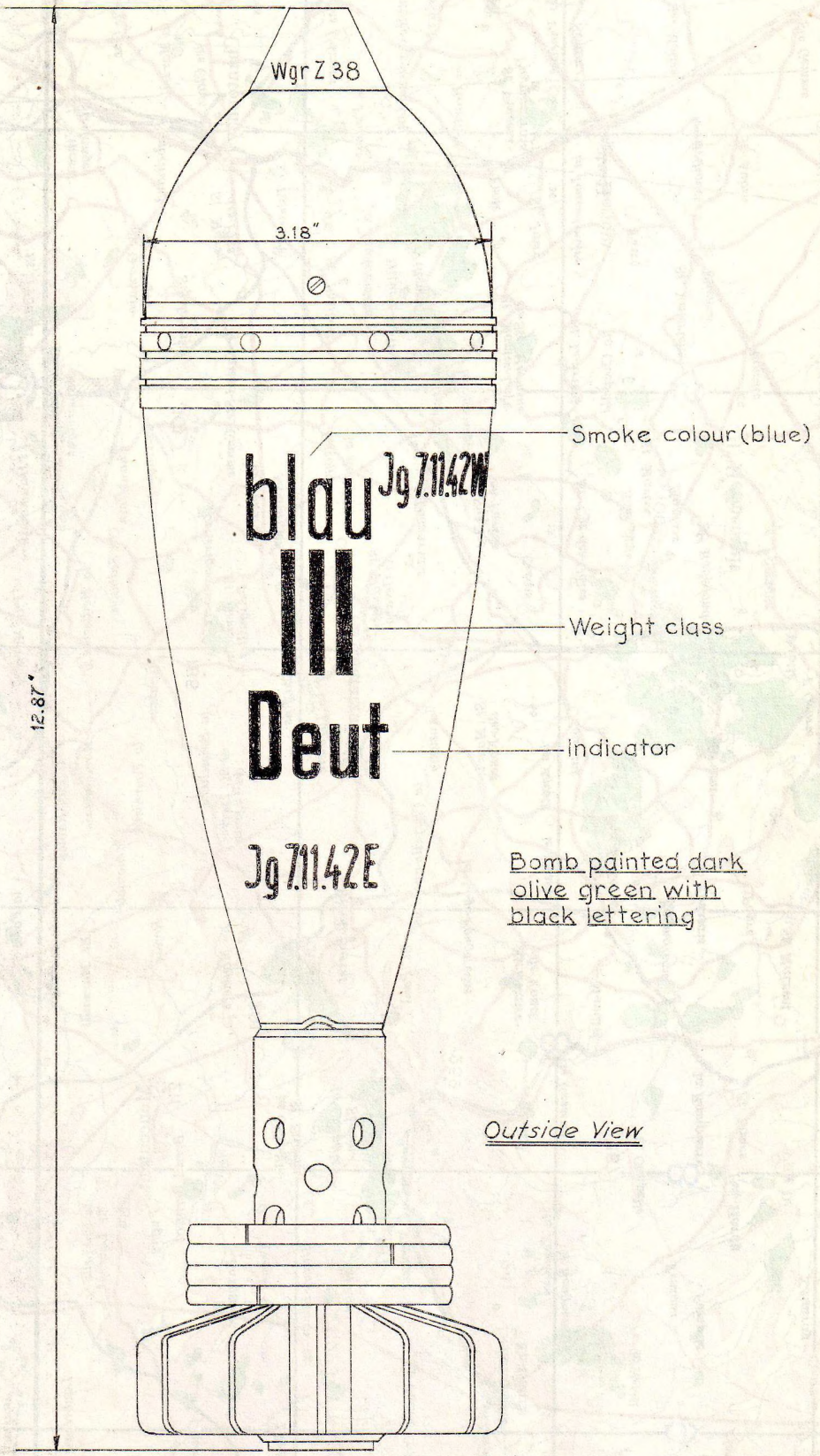
5. for the 12 cm Gr. W. 42
German nomenclature - 12 cm Wgr. Deut.

NOTE:

The 8 cm Wgr. Deut. has a blue band at the shoulder. This has been omitted from the diagram.

/G-2(Tech) Plate No. D108
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Diagram I



GERMAN 8 cm. (3 in.) MORTAR BOMB

(8 cm. Wurfgranate 38 Deut)

GERMAN 8 cm. (3 in.) MORTAR BOMB

(8 cm. Wurfgranate 38 Deut)

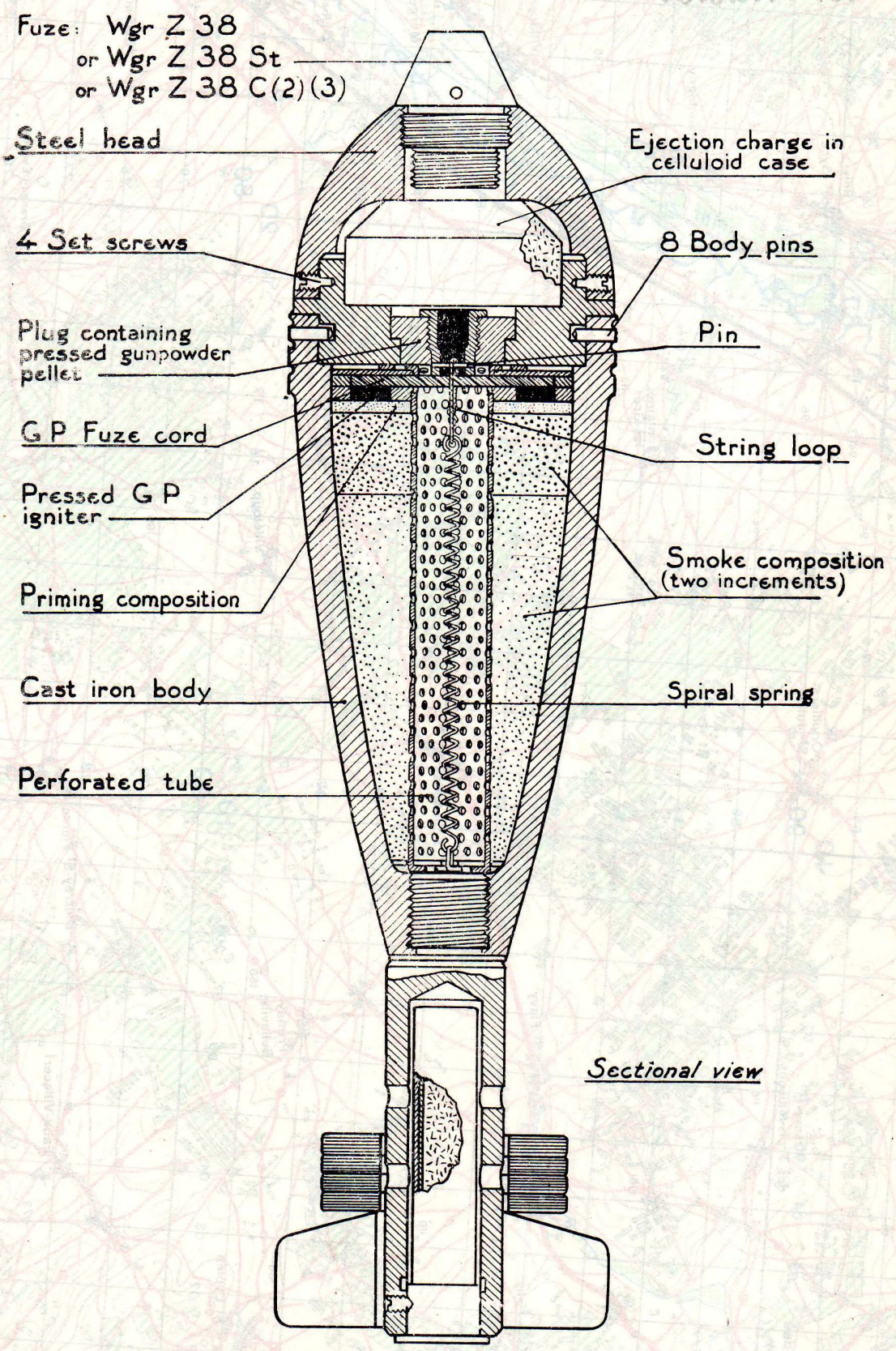


Diagram 2

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3. PROJECTILES FOR SEA-RANGING (Diagram 3)

A specimen of this type of projectile has not as yet been recovered but a certain amount of documentary evidence has accumulated on the 10.5 cm projectile.

This projectile contains a small bursting charge and also a quantity of dyestuff which colours the water thrown up by the force of explosion, a vivid green. Such projectiles include (Ei) in their nomenclature and also have Ei stencilled on their bodies.

The following types are known to exist:-

1. for the s 10 cm K 18 - gun
German nomenclature - 10 cm Pzgr Rot (Ei)
Nose percussion fuze - AZ 38
Weight of bursting charge - 70 gm

2. for the 28 cm K.5 (E) - Railway gun
German nomenclature - 28 cm Gr. 35 (Ei)
Weight of projectile - 225 to 250 kg
Base fuze - Bd. Z. 35 K.
Weight of bursting charge - 9.5 kg.

3. for the 28 cm K. 5/1 (E) and 28 cm K. 5/2 (E) - Railway guns
(a) German nomenclature - 28 cm Gr. 42 (Ei) m. Hbgr. Z.
a percussion fuze is fitted under a ballistic cap.

(b) German nomenclature - 28 cm Gr. 39/42 (Ei) m. Hbgr. Z.
a percussion fuze is fitted under a ballistic cap.

Note: Ei = Einschiess geschoss.

NOTE

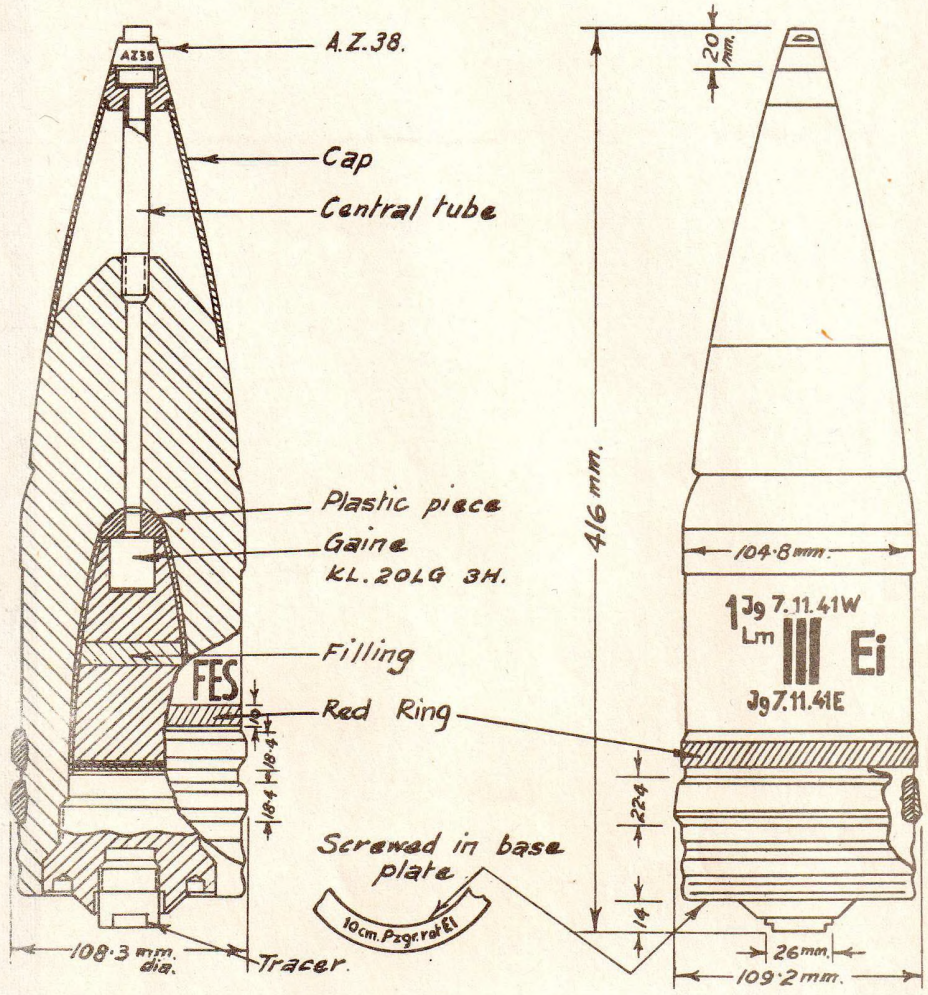
A document states that the bursting charge of the 10 cm Pzgr Rot (Ei) consists of:-

PETN
Tetrachloronaphthalene
Brilliant green (a green dyestuff)

It will be noted that this composition is very similar to that used in the "Buntrauch" series of projectile. The former, however, is designed to colour water and the latter, the burst. The function of the tetrachloronaphthalene is to reduce the temperature of explosion in order that undue amounts of dyestuff should not be destroyed.

/G-2 (Tech) Plate No. D.100

10 cm. Pzgr. rot (Ei)



Soft Iron Driving Bands

Bimetallic Driving Bands

Diagram 3

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4. SPECIAL TYPES OF HE PROJECTILES FOR USE IN MOUNTAINS

Two special types of HE projectiles are in service in the German Army for use in mountain equipments and are designed to assist observations under the special conditions in which these equipments are used.

The general design of such projectiles is that of a standard HE projectile.

A. In this type, the bursting charge includes 10% of aluminium - the flash at burst being thereby increased. Such projectiles include "Al" in the nomenclature and have "Al" stencilled on the body.

Such projectiles may be fitted with a nose percussion or a T and P fuze.

B. In this type, a red dye is included in the bursting charge, the smoke at burst being cloured RED.

Typical analyses are as follows:-

F H Gr Buntrauch - the bursting charge consists of a mixture of PETN, tetrachloronaphthalene and Sudan Red.

K Gr Rot Buntrauch - top layer; a mixture of PETN and Sudan Red.
middle layer; a mixture of naphthalene and Sudan Red.
bottom layer; Sudan red

Such projectiles include "Buntrauch" in their nomenclature and have "Buntr" stencilled on the side of the projectile. These projectiles appear to be fitted only with a T and P fuze.

The following table includes all known varieties of the two types in existence:-

/Special HE

SPECIAL HE PROJECTILES FOR USE IN MOUNTAIN EQUIPMENTS

Types - "Al" and "Buntrauch"

4. (Cont'd)

German Nomenclature	Weight of Projectile (kg)	Fuze	Bursting Charge (kg)	Type of gaine	Equipment
Type A					
7.5 cm Gr. 34 Al.	5.7	1. A.Z. 23 v	0.62	Gr. Zdlg. C/98	7.5 cm Geb. G. 36
K Gr Rot Al	5.7	Dopp. Z. S/60	0.435	Gr. Zdlg. C/98	7.5 cm Geb. G. 36
7.5 cm Igr 18 Al	5.45	Igr. Z. 23nA or Dopp. Z. S/60 Geb.	0.52	Gr. Zdlg. C/98	7.5 cm le Geb I.G. 18
Geb. Gr. 15 Al	5.47	AZ 23 Geb or Dopp. Z. S/60 Geb.	0.64	Gr. Zdlg. C/98	7.5 cm Geb. K. 15
F H Gr Al	14.81	AZ 23/42 or Dopp. Z. S/60	1.575	Gr. Zdlg. C/98	10.5 cm Geb H 40
Type B					
K. Gr Rot Buntrauch	5.7	Dopp. Z. S/60	0.20	Gr. Zdlg. C/98	7.5 cm Geb. G. 36
F. H. Gr. Buntrauch	14.81	Dopp. Z. S/60	0.565	Gr. Zdlg. C/98	10.5 cm Geb. H. 40

NOTE: AZ = auschlagzünder = percussion fuze. Dopp. Z. = doppelzünder = Time and percussion fuze.

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5. UNUSUAL TYPE OF AP PROJECTILE - Pzgr. 40 (W) (Diagram 4)

Until the recovery of this projectile, German AP projectiles Model 40, consisted of AP shot which contained a core of tungsten carbide. It would appear that it was the original intention to use Model 40 (W) operationally but this proved unsatisfactory since recent documents have stated that this type of projectile is to be used for practice purposes only.

The projectile is a solid shot to which is attached a ballistic cap. A noteworth feature of the projectile is that it is constructed entirely of SOFT steel. It is painted black and apart from normal markings has a white "W" stencilled on the body.

This type of projectile is used in the following equipments:-

Equipment	Nomenclature of Round
7.5 cm KwK 40) 7.5 cm Stu. K. 40)	7.5 cm Pzgr Patr 40(W) KwK 40
7.5 cm Pak 40	7.5 cm Pzgr Patr 40(W) PAK 40
+ 7.5 cm PAK 41	7.5 cm Pzgr Patr 41(W) PAK 41
+ 7.5 cm KwK 41	7.5 cm Pzgr Patr 41(W) KwK 41

Note:

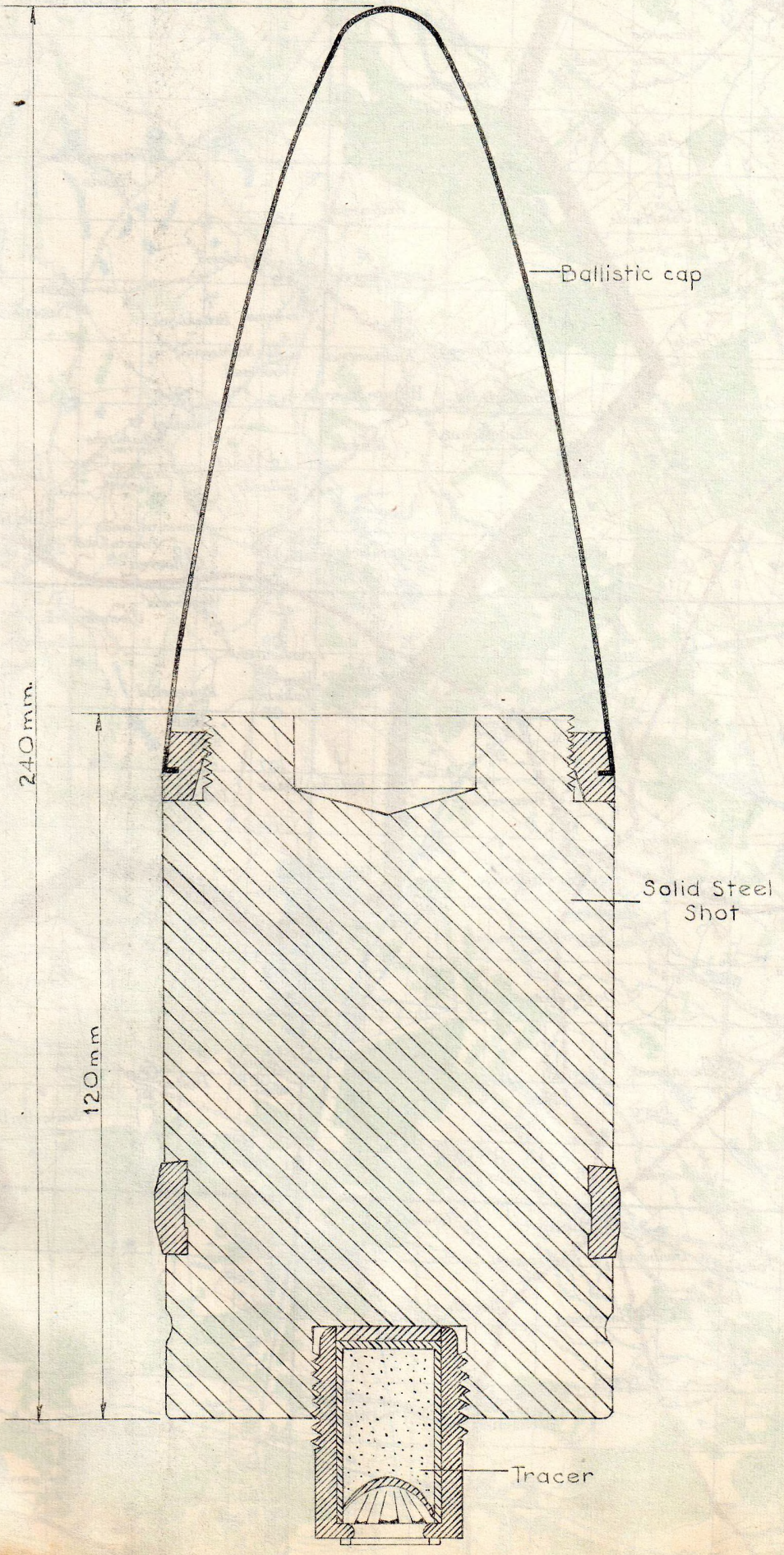
1. All the above are issued with the cartridge case attached to the projectile, i.e. Q.F. fixed.

2. + These are equipments with a tapering bore, hence the use of the model number 41.

3. (W) = weichs = soft.

/G-2 (Tech) Plate No. D.109

7.5 cm. Pzgr. 40 (W)



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6. STAR SHELL AND ILLUMINATING PROJECTILES

Star shell are a recent introduction to the various types of projectile at the disposal of the German Army. The following are known to exist:-

10.5 cm Leuchtgeschoss (10.5 cm Lt. Gs.) (Diagram 5)

This projectile is fitted with a T and P fuze, type Dopp. Z. S/60, and is used in the following equipments:-

10.5 cm le. F. H. 18 and associated equipments
10.5 cm Geb. H. 40

(a) Marking

Shell painted olive green and stencilled in black "LEUCHT".

(b) Dimensions

	Metric	British
Calibre	10.5 cm.	4.14 in.
Length (less fuse)	38.1 cm.	15 in.
Weight (less fuse)	13.6 kg.	30 lbs.
Weight of fuse (Dopp Z S/60v)	450 g.	15.75 oz.
Weight of gunpowder ejection charge	65 g.	2.25 oz.
Weight of filled star container	2500 g.	5.5 lbs.
Weight of illuminating composition	1400 g.	3.1 lbs.
Diameter of Parachute	81 cm.	31.9 in.
Diameter of cnetral hole in Parachute	7.5 cm.	2.93 in.

(c) Construction

The attached drawing shows most of the details of the construction of the shell. The piston, flare container, parachute container and base plate are all of steel. The parachute is made of rough, heavy canvas, wire reinforced, and has wire shroud lines. Six shear pins and three taper pins hold the base plate in place. The star composition consists of:-

Barium Nitrate	48.7%
Magnesium Powder	46.9%
Wax	4.4%

8.8 cm Lt. Gs. Patrone L/4,4 Kz.

This is very similar to the above and is intended for the following equipments:-

8.8 cm Flak 18, 36 and 37

/The projectile

6. (Cont'd) SHCAB 1

The projectile is . fitted with a time fuze, type Zt. Z. S/60nA, with a maximum time of running of 60 seconds.

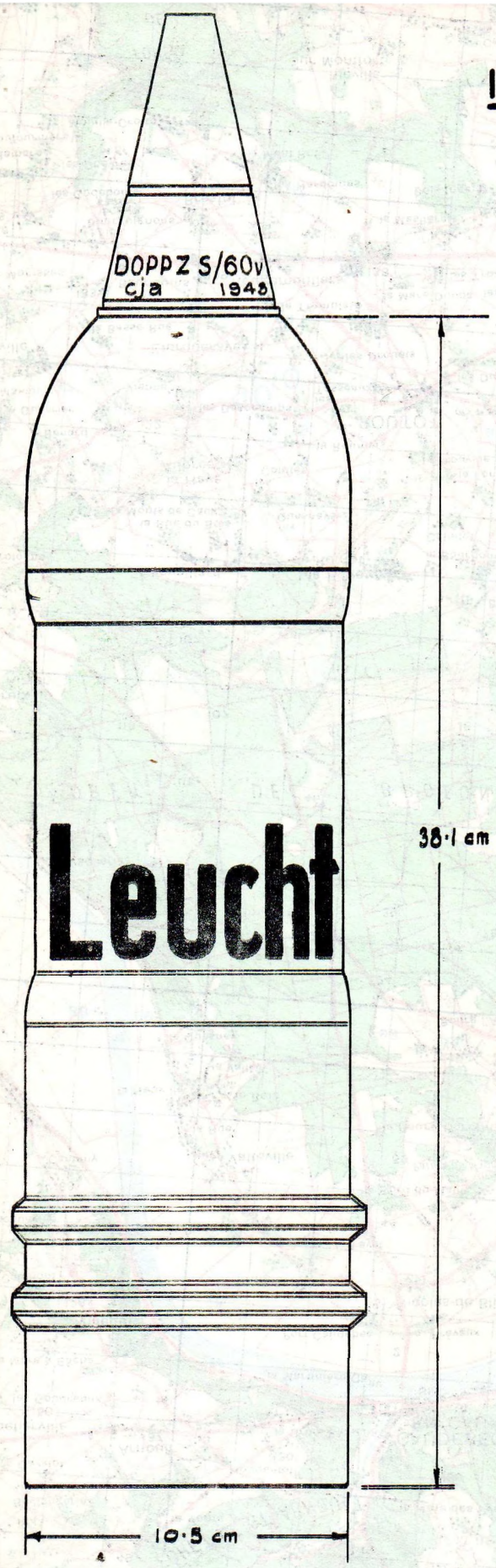
The projectile has a cartridge case attached, i.e. Q.F. fixed.

8 cm W. Lt. Gs. 4447

This illuminating bomb is fired from the 8 cm mortar - s. Gr. W. 34. Specimens have not as yet been recovered and therefore very little is known about this projectile.

/G-2 (Tech) Plate No. D.98

10.5 cm. Leucht Geschoss



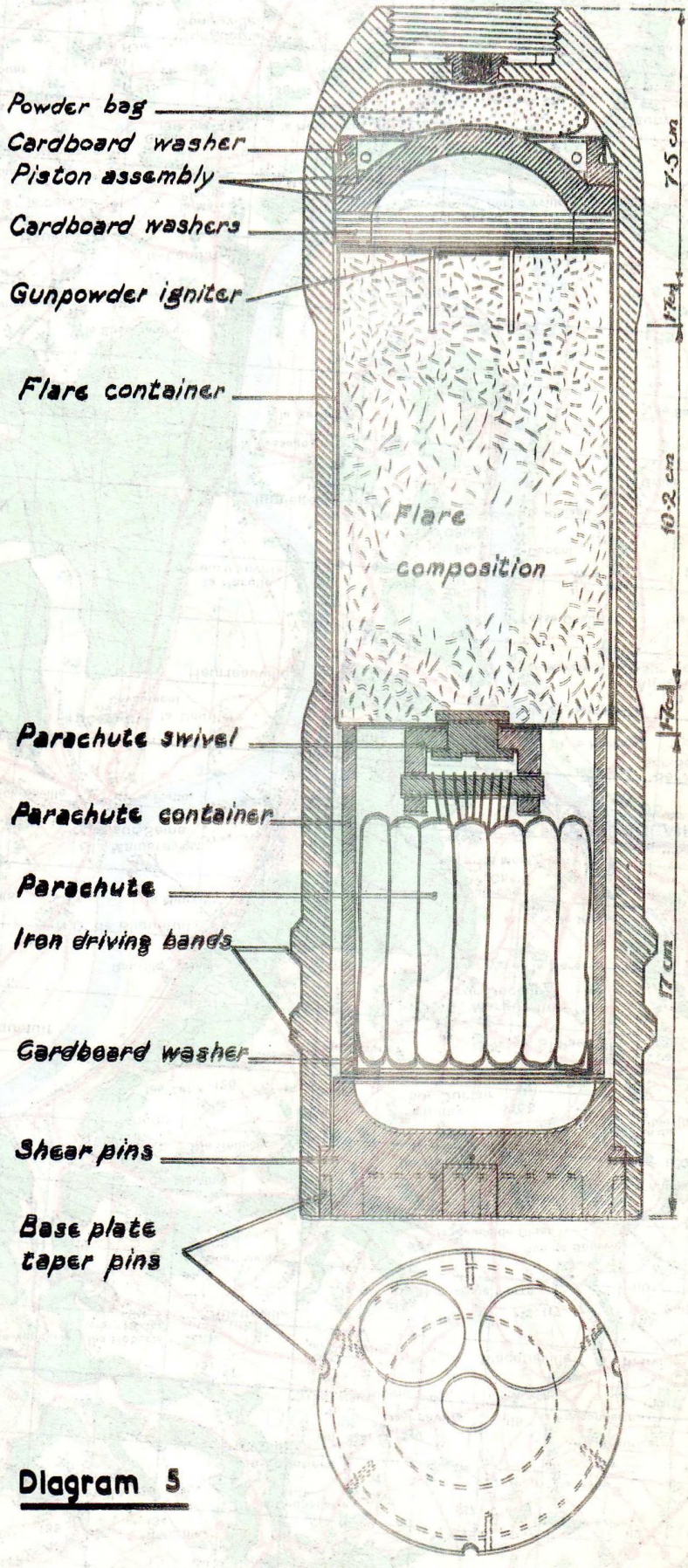


Diagram 5

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7. SMOKE PROJECTILES (SCREENING) FOR GERMAN ARTILLERY AND MORTAR EQUIPMENTS

Smoke projectiles are generally of two types:-

(a) burster
(b) base ejection.

A. Burster Type

In this type of projectile the smoke mixture consists of a material such as oleum and the projectile is designed to burst open on impact and thus expose the smoke mixture to the air.

In external appearance, these projectiles resemble HE projectiles.

A nose percussion fuze is fitted which contains a striker and detonator. Down the centre of the projectile is a steel tube. At the top of the tube immediately under the nose fuze is a gaine or booster. This consists of penthrite wax in which is embedded a large disruptive detonator. This detonator can be initiated by flash or explosion. The whole, which is known as a "Zundladung" is enclosed in an aluminium case. The remainder of the tube is filled with HE such as picric acid or TNT, usually in the form of pellets. A filling plug may be identified on the side of the projectile.

Function. On impact the fuze functions, i.e. the needle is driven onto the detonator which in turn initiates the detonator in the gaine. The bursting charge of TNT or picric acid is thereby initiated via the penthrite wax and the projectile split open.

NOTES

1. The smaller mortar bombs, e.g. 8 cm rely on the bursting effect of the gaine only. There being no additional bursting charge of TNT or picric acid.

2. The earlier type of smoke projectile had a narrow central tube which contained picric acid pellets but later types have a wide tube which contained TNT pellets.

The two types may be distinguished by nomenclature and markings.

3. Smoke mixture in artillery projectiles, the most usual mixture has been oleum impregnated in pumice. Some variations have, however, been encountered.

The 8 cm mortar bomb - 8 cm Wgr. 34 Nb - has been identified with a filling of solid sulphur trioxide.. Certain mortar bombs have an external stencilling "NbS". This is believed to indicate a fluid filling. The nature of which has not been established.

/4. Smoke

4. Smoke projectiles are fitted with a nose percussion fuze which bears slight differences from those normally used in HE projectiles. The following are the differences:-

(a) There is no optional delay,
(b) There is no gunpowder magazine.

Such fuzes include "Nb" in their nomenclature. They are of the same gauge as corresponding fuzes for HE projectiles but for HE projectiles, the Germans prefer to use a fuze which incorporates an optional delay. As a temporary measure, fuzes, really intended for smoke projectiles, have been used on HE projectiles. Such fuzes have been also fitted to large calibre hollow charge projectiles. In the case of smoke mortar bombs, the same fuze is used as for HE bomb.

The following special fuzes for smoke projectiles are in use in the German Army:-

Type	
kl. A.Z. 23 Nb	constructed mainly of aluminium.
kl. A.Z. 23 Nb Pr	same gauge as above but constructed mainly of plastic and contained in a steel sheet liner. Painted grey green.
kl. A.Z. 40 Nb Pr	similar to above except that constructed for projectiles from low velocity equipments.
A.Z. 23 Nb	constructed mainly of aluminium. A safety pin is fitted.
s. Igr. Z. 23 Nb	similar to above.

B. Base Ejection Type (Diagram 6)

Only one projectile of this type is known to exist in the German Army, viz F H Gr. 40 Nb. It is functioned by a standard T and P fuze, a smoke canister containing smokey mixture being ejected through the base at a pre-determined height.

The following T and P fuze is fitted:-

Dopp. Z. S/60s, S/60 Fl or S/60v.

The above fuze has a maximum time setting of 60 seconds.

The general appearance, identification markings and a cross section are shown in the attached drawing.

The shell is of the base ejection type, having a single smoke container. The container appears to be made of drawn steel tubing, 27 cm. long, 7 cm. external diameter and 2 mm. wall thickness, it is threaded internally to take screwed plugs at each end.

The bottom plug has a flange on it which is gripped between the base plate and a shoulder in the shell wall. A notch in this flange engages with the anti-twist pin of the shell base plate.

7. (Cont'd) SHCAB 1

The front plug of the smoke container carries a destabilising plate mounted on an eccentric bolt. On ejection of the container from the shell, the destabilising plate flies out, due to the rotation of the container, spoils the ballistics, retards the container, and so tends to prevent it burying. The plug also has a smoke emission hole 1 cm. in diameter which is screw threaded and filled with soft wax. A flash hole 1.5 mm. in diameter in the centre of the plug leads to the igniter cup which is fixed to the bottom of the plug by a small plate secured by two screws.

The smoke composition is well compacted into the container. Its rate of burning, determined by the standard test is 32.5 sec/in. The total "range table" time of burning of the container is 5 minutes.

The igniter cup is an aluminium pressing 4 cm. long by 1.5 cm. diameter. The igniter composition, in two layers the top one 1 cm. deep, is secured in the cup by a perforated dished lid of aluminium.

The ejection charge is a pressed pellet of gunpowder 5 cm. long, 3.5 cm. in diameter with a central hole 7.5 mm. diameter. The pellet is wrapped in red waxed paper, and is held centrally in the nose of the shell by a moulded plastic adaptor, which is firmly gripped between the base of the fuze and the front of the smoke container.

The base of the shell is held in position by four equally spaced shear pins of mild steel and has a single anti-twist pin, which also engages in the flange of the smoke container.

The shells are manufactured both with bi-metallic driving band and with sintered iron band. The shell with the latter type of band range somewhat short.

Chemical Compositions

Ejection Charge

Gunpowder KNO_3 73%, S 10% C 14%.

Igniter Composition

Upper layer	Red lead + Silicon.
Lower layer	Lead Chromate + Silicon.

Smoke Composition

HCE/Zn mixture with magnesium added to increase rate of burning.

Typical analysis:-

50.4%	-	Hexochloro-Ethane
40.6%	-	Zinc metal
2.8%	-	Zinc oxide
1.7%	-	Magnesium metal
0.9%	-	Magnesium chloride

Tables are attached giving particulars of known smoke projectiles in service in the German Army.

/Smoke Mortar

SMOKE MORTAR BOMBS IN USE IN THE GERMAN ARMY

German Nomenclature	Weight (kg)	Type of Gaine	Weight of Bursting Charge - excluding Gaine (grams)	Equipments
8 cm Wgr. 34 Nb	3.4		0	8 cm Gr. W. 34
10 cm Wgr. 35 Nb.	7.36		65	10 cm Nebelwerfer 35
10 cm Wgr. 35 Nb S	7.36		65	10 cm Nebelwerfer 35
10 cm Wgr. 40 Nb. m. H)) 10 cm Wgr. 40 Nb.)	8.90		65	10 cm Nebelwerfer 40 - le. H. T.
10 cm Wgr. 40 Nb S	8.90		65	10 cm Nebelwerfer 40 - le. H. T.
10 cm Wgr. 40 w. Kn. Nb.	8.90		300	10 cm Nebelwerfer 40 - le. H. T.

NOTE: The following nose percussion fuzes may be fitted:-

Wgr. Z. 38 - composed mainly of aluminium
Wgr. Z. 38 St. - composed mainly of steel
Wgr. Z. 38 C - composed mainly of steel sheet
Wgr. Z. T - composed mainly of plastic.

SMOKE PROJECTILES FOR GERMAN ARTILLERY EQUIPMENTS

7. (Cont'd)

German Nomenclature	Weight of Projectile (kg)	Fuze	Bursting Charge (kg)	Type of Gaine	Equipments
K. Gr. Rot Nb	6.2	Kl. AZ 23 Nb	0.065	Kz. Zdlg. 34 Np.	7.5 cm Le. F K 18 - 7.5 cm F K 16 n A
7.5 cm Nbgr. Patr. KwK			ditto		7.5 cm KwK 38 - 7.5 cm Stu G 38
7.5 cm Nbgr. Patr. KwK 40			ditto		7.5 cm KwK 40 - 7.5 cm Stu K 40
7.5 cm Nbgr. Patr. Pak 40			ditto		7.5 cm Pak 40
F H Gr. Nb.	14.0	Kl. AZ 23 Nb	0.120	Gr. Zdlg. C/98 Np.	10.5 cm L.F.H. 16, 18, 18 M, 18/39 and 18/40
F H Gr. 38 Nb.	14.71	Kl. AZ 23 Nb	0.545		10.5 cm L G 42
F H Gr. 39 Nb.			0.247		10.5 cm Stu. H. 42
F H Gr. 40 Nb.	15.25	Dopp. Z. S/60	0.08 (gunpowder)	none	
10 cm Gr. 38 Nb	15.14		640		s 10 cm K 18 and 42 lg. 10 cm K. T.
F H Gr. 41 Nb.	14.0	Kl. AZ 23 Nb	0.545		10.5 cm L G 40
15 cm Jgr. 38 Nb.	38.5	s Igr. Z. 23 NB.	2.215	Gr. Zdlg. C/98 Np.	s.J.G. 33 - 15 cm Stu H 43

RESTRICTED

SHCAB 1

German Nomenclature	Weight of Projectile	Fuze	Bursting Charge (kg)	Type of Gaine	Equipments
15 cm Gr. 19 Nb	39	AZ 23 Nb	0.55	Gr. Zdlg. C/98 Np.	s.F.H. 13, 18, 36 and 42 s.H.T.
15 cm Gr. 38 Nb	39	Kl. AZ 40 Nb	2.21	Gr. Zdlg. C/98 Np.	s.F.H. 13, 18, 36 and 42 s.H.T.

Identification

1. Projectiles of the older design include "Nb" in the nomenclature and "Nb" is stencilled on the side of the projectile.

2. Projectiles in which the bursting charge content has been increased include "38 Nb" in the nomenclature and "38 Nb" is stencilled on the side of the projectile.

3. Smoke mortar bombs in which the bursting charge content has been increased include "w Kh Nb" in the nomenclature and "w. Kh. Nb" is stencilled on the side of the bomb.

4. Smoke mortar bombs which contain a fluid filling include "NbS" in the nomenclature and "NbS" is stencilled on the side of the bomb.

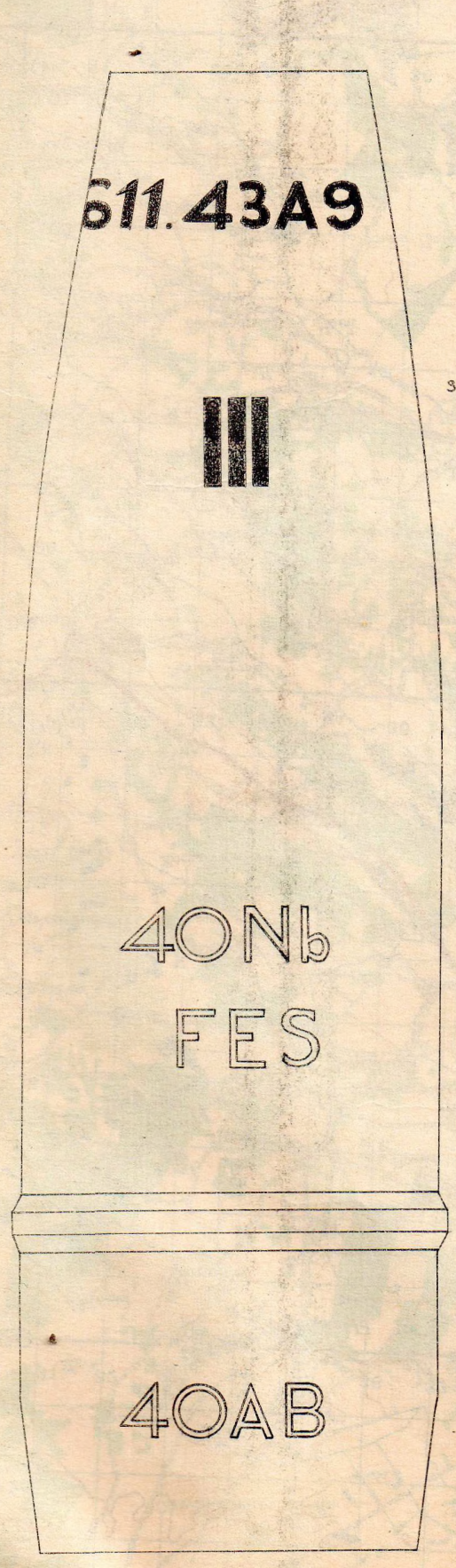
5. Smoke projectiles with base ejection, include "40 Nb" in the nomenclature and "40 Nb" is stencilled on the body of the projectile.

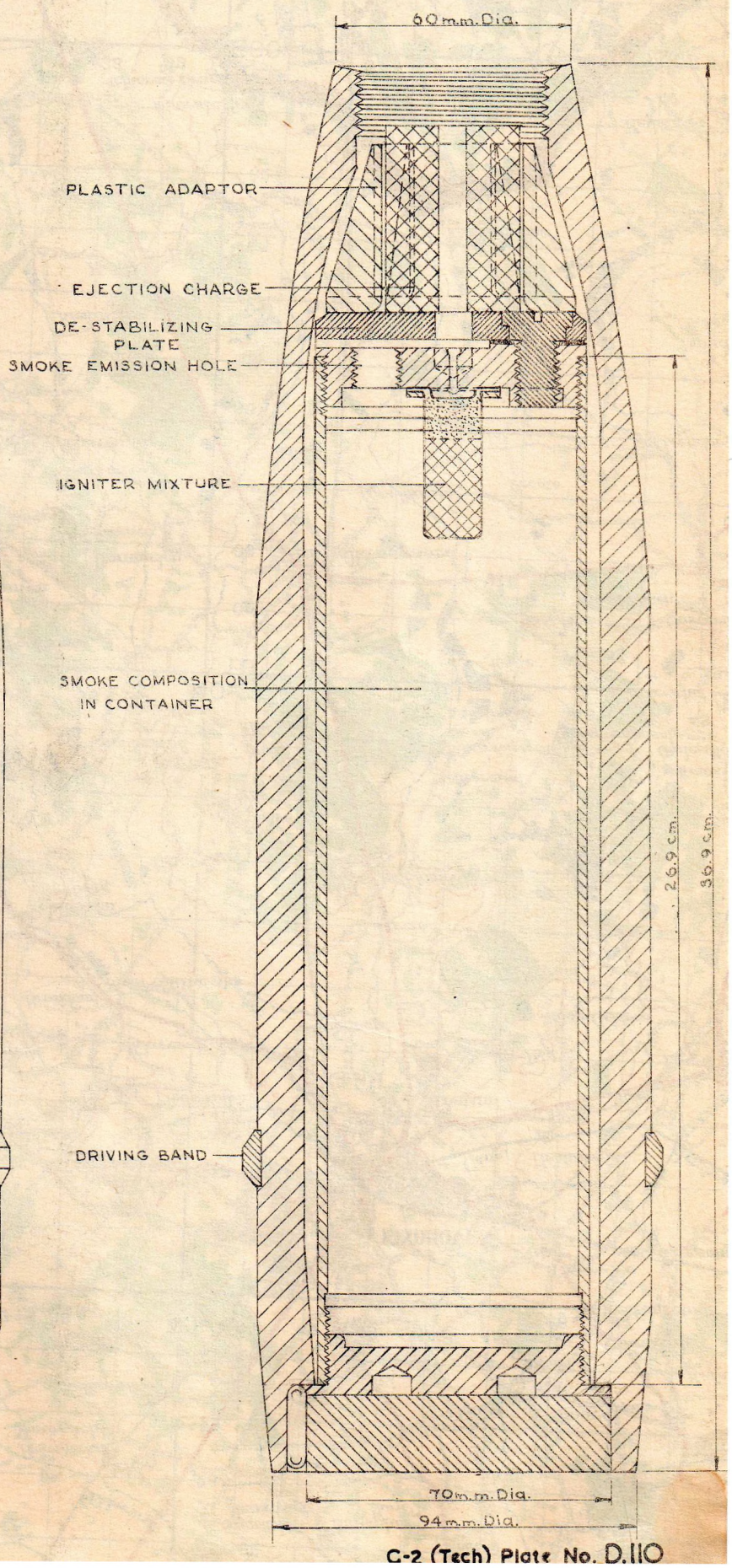
NOTE: Nb - Nebel
w.Kh Nb - weiter Kümmerhülse Nebel
Nb.S. - Nebelgeschoss mit flüssiger Füllung

Diagram 6

10.5 cm. BASE EJECTION SMOKE SHELL

(F.H. Gr. 40b)





C-2 (Tech) Plate No. D.110

SUPREME HEADQUARTERS
ALLIED EXPEDITIONARY FORCE
Office of Assistant Chief of Staff, G-2
Main Headquarters

CAPTURED AMMUNITION BULLETIN NO. 1

8. 8 cm HE ROCKET (UNROTATED) - 8 cm RAKETEN SPRENGGRANAT (Diagrams 7, 8 and 9)

The following is a description of the German 8 cm Unrotated HE Rocket. It is not certain at present whether it is both ground and aircraft launched. A crashed aircraft recently examined contained racks for these rockets. The projector for ground launching, if it exists, has not as yet been found.

HE Head Markings

The whole of the HE head is painted dark green with the exception of the adaptor which is unpainted. There are no stencilled markings. Of two stampings on the body one is probably a makers monogram and the other is an inspection stamp.

Fuzing System

The fuzing system of this projectile is entirely novel; the arrangement is shown in Fig. 2. It consists of a steel nose piece (1) housing a light alloy striker (2) and a light raising spring (3), a percussion detonator (4), a magazine (5) containing four pressed pellets, and a thermal arming device.

The detonator (4), which has a steel body, screws into the forward end of the steel magazine tube (5), which is crimped to the spring-loaded plunger (7). The plunger is held in a sleeve (8) which is screwed into the central adaptor, the lower end of the sleeve being accommodated in the hollow spigot which intrudes into the motor unit (see Fig. 1). In the safe position the plunger is held back against the force of the spring (9) by the screw (10), whose mushroom-head bears on the fusible metallic ring (11). This ring fits rather closely inside the spigot.

The four pellets in the magazine together weigh 12.6 gm. and have an average density of 1.52 gm/cc. They are composed of a mixture of 58.6 per cent TNT and 41.4 per cent PETN. The base of the detonator, which is perforated, is in contact with the foremost pellet.

The detonator, which has a steel shell, contains two well consolidated increments (C & D) of HE, the second (upper) increment (C) being annular and containing a core of initiator (B). This is topped by a layer (A) of ignitory mixture. The detonator is closed by a brass thimble (12) having a central hole which is closed by a tinfoil disc. The detonator compositions have been analysed as follows:-

Composition A -	Mercury fulminate 12%	Weight 0.08 grams
	Potassium chlorate 52%	
	Antimony sulphide 34%	
	Ground glass 2%	
Composition B -	Lead azide	Weight 0.07 grams
Composition C -	PETN	Weight 0.30 grams
Composition D -	PETN	Weight 0.47 grams

/When in

8. (Cont'd) SHCAB 1

When in the position shown in the sketch (safe position), the detonator is beyond the reach of the striker. When the rocket is fired the heat of the propellant gases is conducted through the wall of the spigot (thickness 1.5 mm) and the ring (11) melts (melting point approximately 189° C = 356°F).

The plunger, magazine, and detonator are thus free to move forward; the position immediately assumed by this assembly depends upon the acceleration of the rocket. Approximate measurements indicate that when this is less than 40 to 50 g. the detonator is sufficiently far forward to be fired by the striker. It appears likely that if the projectile strikes a substantial target at any range it will fire. When properly armed the fuze must be regarded as rather sensitive (probably comparable to Service fuze No. 243).

Main HE Filling

The main filling consists of 3 perforated pellets of pressed flake TNT (D = 1.56 and Setting Point 80.35°C) weighing together 1 lb. 5½ ozs. (610 g.). At the nose end is a small card washer, at the base two waxed paper washers and up the centre a waxed card tube. Between the shell wall and the explosive is a thin layer of bituminous material and the outer surfaces of the pellets are waxed.

Weights	lb.	oz.	drm.	Kg.
Projectile as received	15	3	0	6.90
Motor unit with central adaptor	10	0	0	4.54
HE Head with same " adaptor	6	5	8	2.88
Main HE filling	1	5	8	0.61
Fuze complete	0	4	14	0.14
Magazine pellets	0	0	7	0.01
Propellant sticks in motor unit	2	3	12	1.01

Safety

The HE head is considered to be safe against accidental firing during normal storage and handling.

It is pointed out, however, that the fusible metal ring and the crimped joint of the magazine tube are points of weakness which might yield and cause the round to function if it were dropped from a considerable height, e.g. if it were jettisoned from an aircraft.

Motor Unit

The only markings on the motor are:-

13d dov 44 ... on the motor tube.

The motor unit differs completely from that of any other German weapon so far examined. It is composed of a motor tube of about three inches external diameter and a single straight-through venturi; the projectile is fin-stabilised and no provision is made for rotation. The motor tube is 12.75 inches (325 mm) long and 3.06 inches (78 mm) external diameter, it is threaded internally at each end. In one end is screwed the venturi which has a throat diameter of 0.80 inches (20 mm). The grid, which is in the form of a multiperforated plate, is a push fit into the entrant portion of the nozzle.

/The propellant

8. (Cont'd) SHCAB 1

The propellant charge consists of six tubular sticks 0.87 - 0.23 inch (22-6 mm) diameter. Four of the sticks are cut to 11.1 inches (283 mm) and the other two to 10.45 inches (265 mm). At the head end the motor tube is closed by a steel plug which also acts as a connecting collar to the shell. Ignition is effected by means of two flat silk bags of gunpowder, one at each end of the propellant charge. The gunpowder bag at the venturi end is initiated from two small primer units which are screwed on to contacts passing through the wall of the tube. These small primer units each contain a small amount of gunpowder which is apparently fired by a hot wire.

Total weight of complete round	15 lb. 3 ozs. (6889 grams)
Propulsion system	Rocket motor. Six tubular sticks of propellant supported on a grid. Single venturi. Fin stabilised. Fired electrically.
Weight of propellant	2 lb. 3½ ozs. (1010 grams)
Type of propellant	
Volatile matter	0.6%
Ether insoluble matter	63.4% (N.C. + Ash + graphite)
Nitroglycerine	28.4%

The ground range of this projectile is estimated (roughly) to be:-

3500 yds. - at Q.E. 15°
5500 yds. - at Q.E. 30°
6300 yds. - at Q.E. 45°

The velocity at burst is approximately 950 ft/sec.

/G-2 (Tech) Plate No. D.101
D.102
D.111

H.E. HEAD for GERMAN 8 cm. ROCKET

(8 cm. Raketen Sprenggranate)

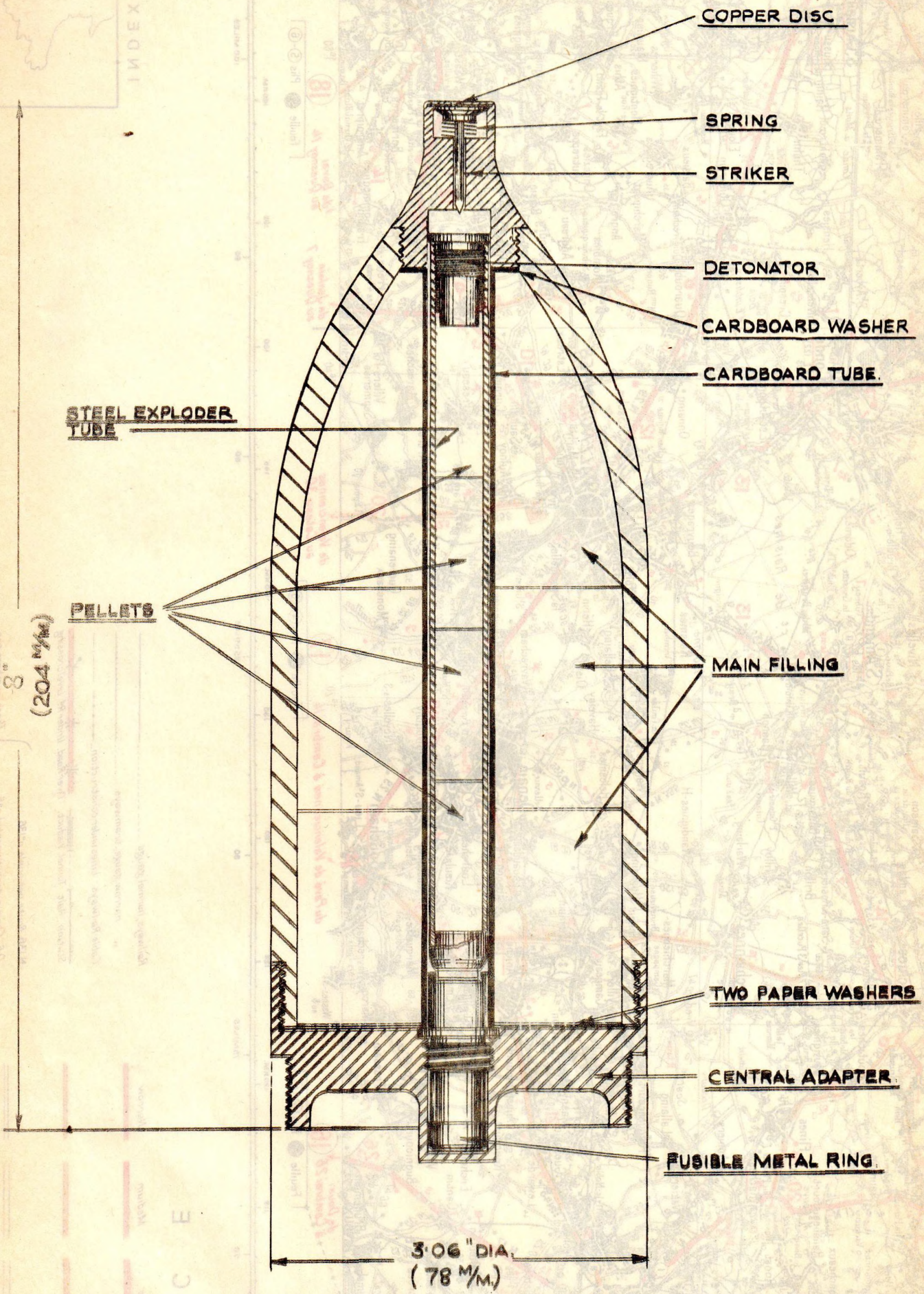


Diagram 7

Fuse for H.E. Head for German 8cm. Rocket

(8cm. Raketen Sprenggranate)

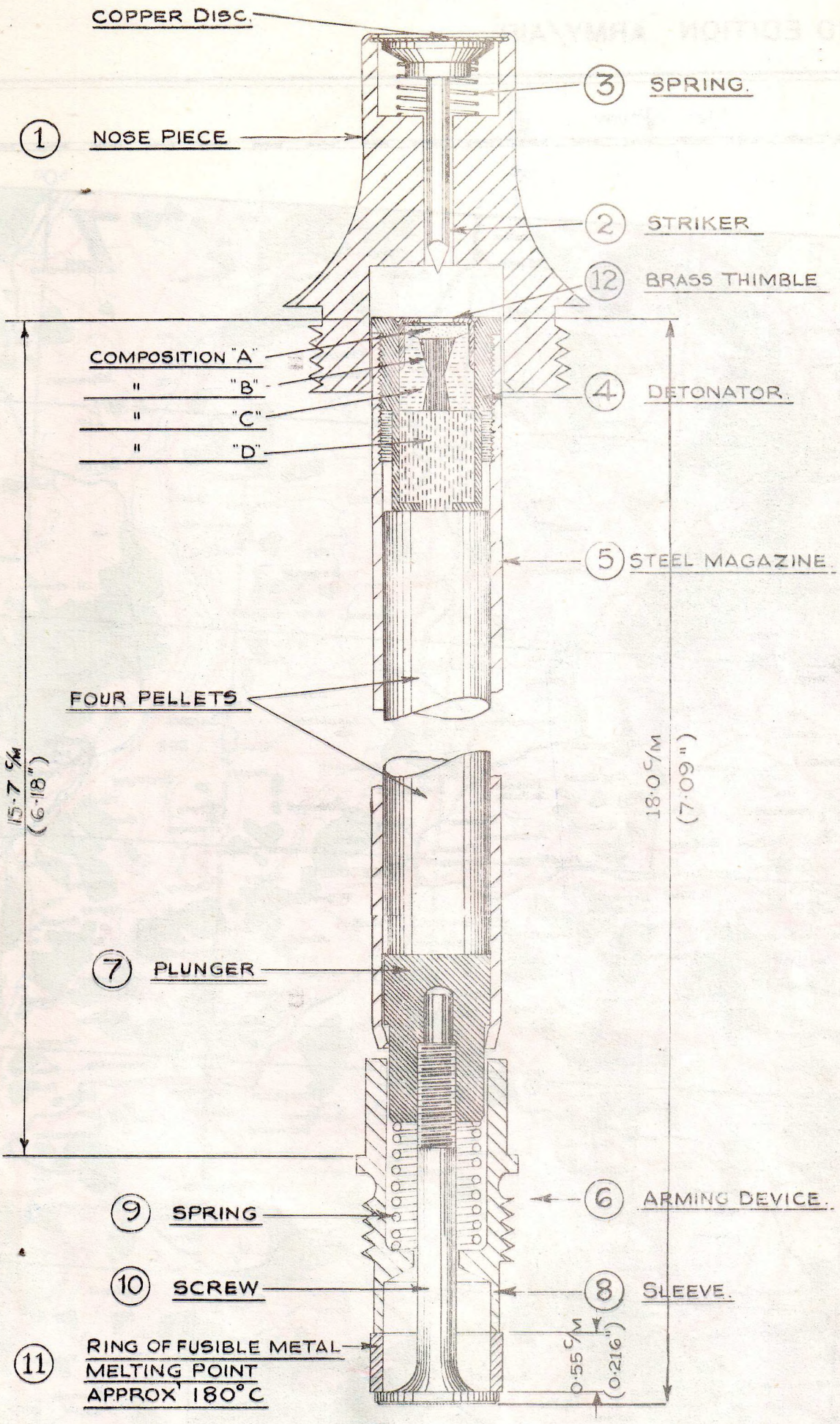
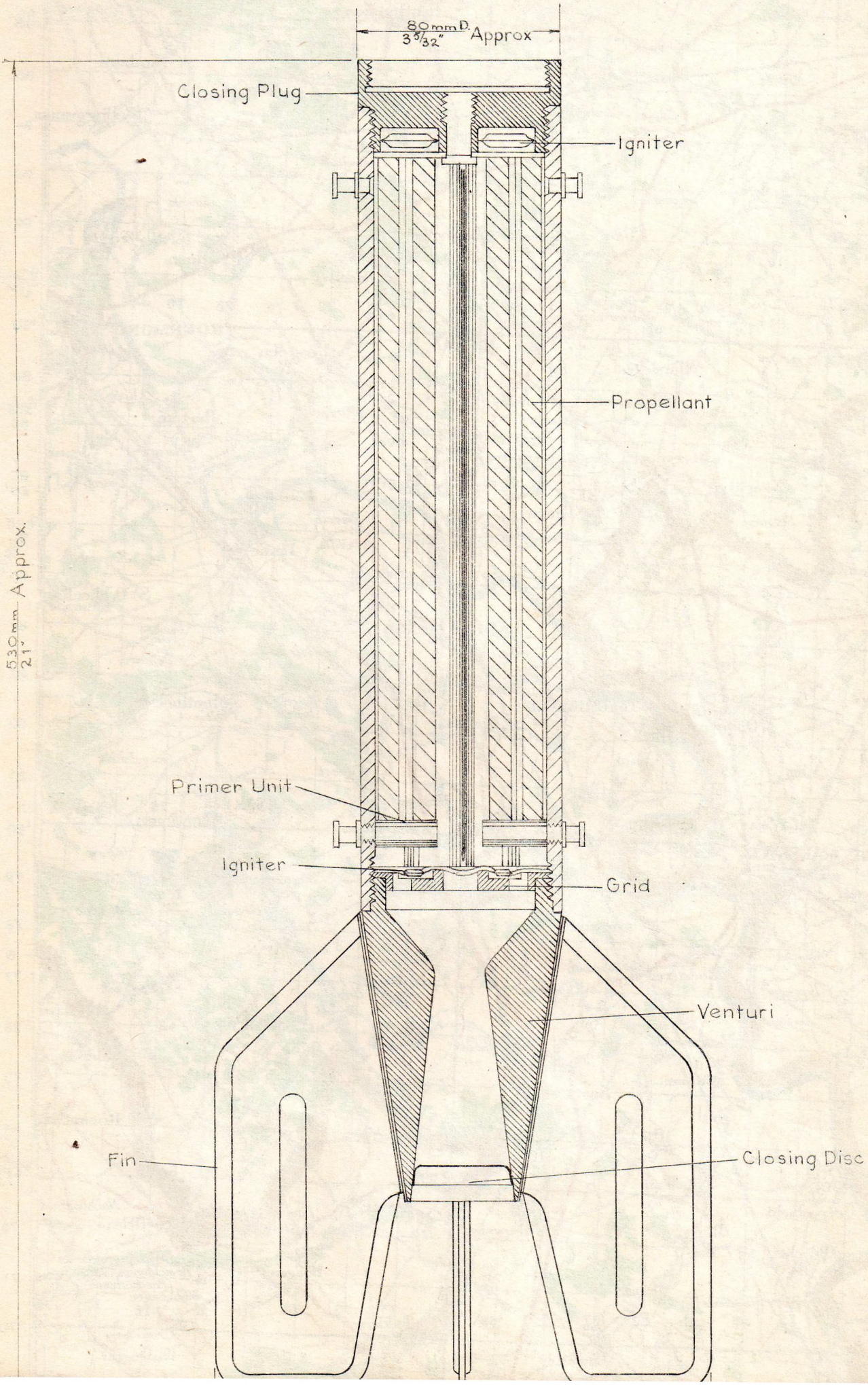


Diagram 8

GERMAN 8 cm. RAKETEN SPRENGGRANATE
(MOTOR UNIT)



SUPREME HEADQUARTERS
ALLIED EXPEDITIONARY FORCE
Office of Assistant Chief of Staff, G-2
Main Headquarters

CAPTURED AMMUNITION BULLETIN NO. 1

9. 15.2 cm GERMAN AA ROCKET (PARACHUTE AND CABLE TYPE) (Diagrams 10 & 11)

Description

(a) The Nose

Is a dome shaped metal unit which screws on to the rocket propulsion unit. Contained inside the nose is a dome shaped charge of TNT weighing approx. 2.3 lbs. which has a self contained detonator.

(b) Rocket Propulsion Unit

A cylindrical metal housing which screws on to the parachute housing. It contains the propelling charge. The cylinder is closed at one end (nearest the nose) by a metal plate through the centre of which is a tapped hole. Inside the cylinder and hard up against the metal plate a detonator is held in position by a cardboard frame. The delay fuze screws into the tapped hole until it is hard up against the detonator.

(c) The Parachute Housing

Screws on to the steel cable housing and is a cylindrical metal housing closed at one end (nearest to the nose) by a dome shaped metal plate. On the top of this plate the initiating charge for the propelling charge is held in position by a small metal ring. This charge is itself initiated by a small electric bridge the leads from which pass through one of the vent holes. Four vent holes for the propellant charge are provided near the top of the unit. The parachute is contained in an asbestos cover which fits inside the metal cylinder. Between the domed plate and the asbestos cover is another TNT charge complete with primer and is completely encased in asbestos. The main parachute is made of silk approx. 11'0" diam. and has eight S.W.R. cables. The parachutes vary in colour, green, white and blue ones have been found. The pilot parachute is made of linen and is 6" in diam.

(d) The Steel Cable Housing

This is in two parts. The upper portion accompanies the missile on its flight whilst the lower portion remains on the ground. A continuous length of approx. 950 yards of 1/8" diam. S.W.R. is coiled equally inside each portion. The end of the cable in the top portion passes through the housing and is fixed, by a special clamp provided, to the parachute. The other end of the S.W.R. passes through a hole in the bottom of the lower portion and terminates in an eyebolt. The tail unit, which is spot welded to the upper portion, acts as a sleeve for the lower portion and a slot is provided in two of the fins through which a thin wire is passed and holds the lower portion in position. It is a very loose fit between the two portions.

/OPERATION

9. (Cont'd) SHCAB 1

OPERATION

The unit is evidently launched from a special frame (not found) to which the lower portion of the steel housing is fixed. A low voltage applied to the leads ignits the charge in the small linen bag which in turn sets off the main propelling charge. This main charge initiates the detonator held in the cardboard frame which in turn initiates the delay fuze. When all the steel cable has "payed out" the parachute is pulled out of its housing and the main unit continues on its course. The delay fuze then operates and fires the detonator in the nose charge which explodes the main charge thus destroying the unit. It is not quite clear how the small charge situated in the parachute housing is fired since although it is equipped with a primer, there is no means of initiation. It is assumed that it is initiated by sympathetic detonation.

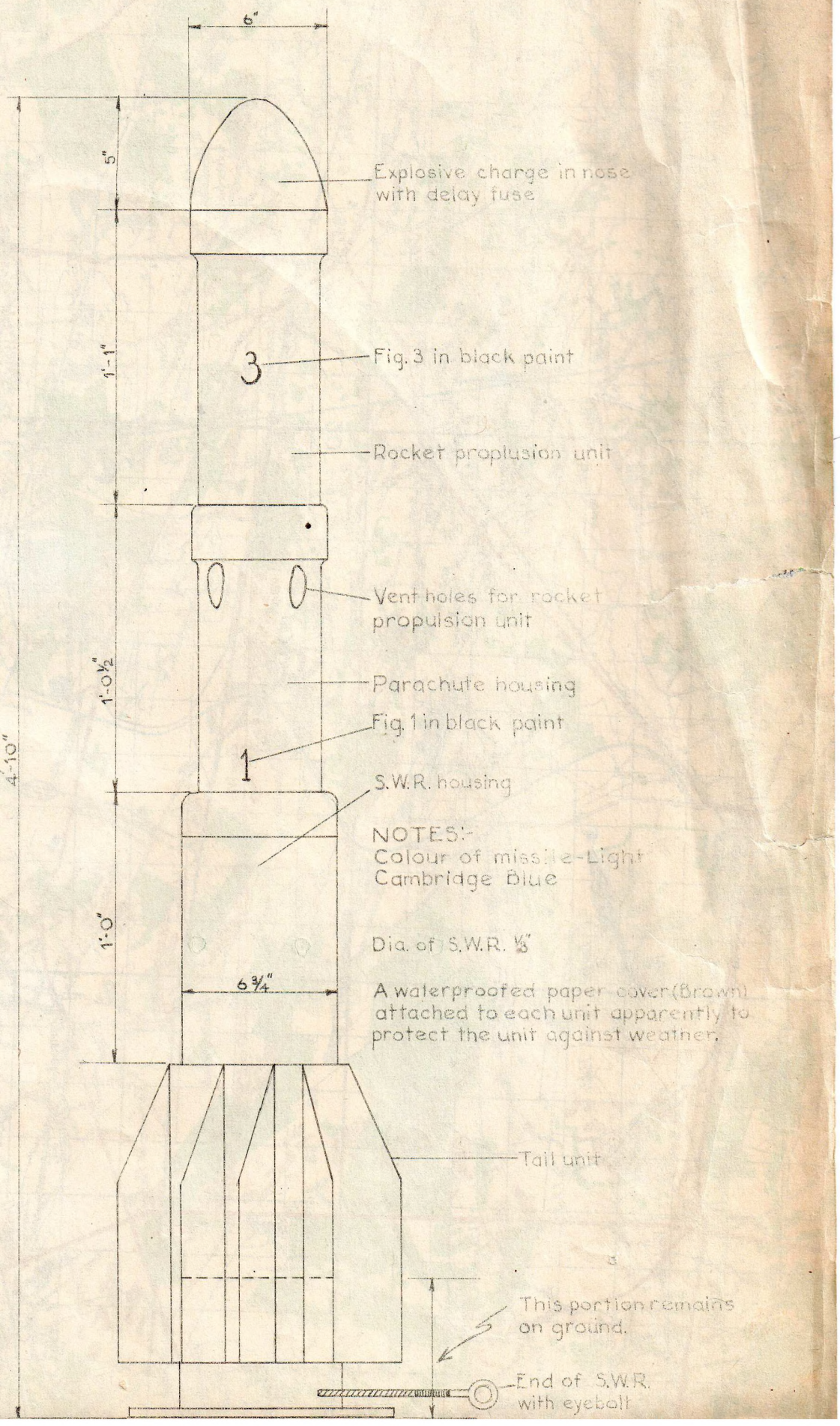
PERFORMANCE

An improvised launching frame was made and two of these missiles were fired. The first one was not effective and only attained a height of approx. 50 feet then nose dived and exploded on impact. The second one was more successful, it attained a height of approx. 1500 feet and the parachute opened. The housing was destroyed about five seconds afterwards. The parachute remained in the air for six minutes. It is not quite clear why the parachute was pulled out before all the S.W.R. had "payed out", this may have been due to the weight of the cable itself. There was quite a considerable explosion when the ousing was destroyed, sufficient in itself to be dangerous to aircraft.

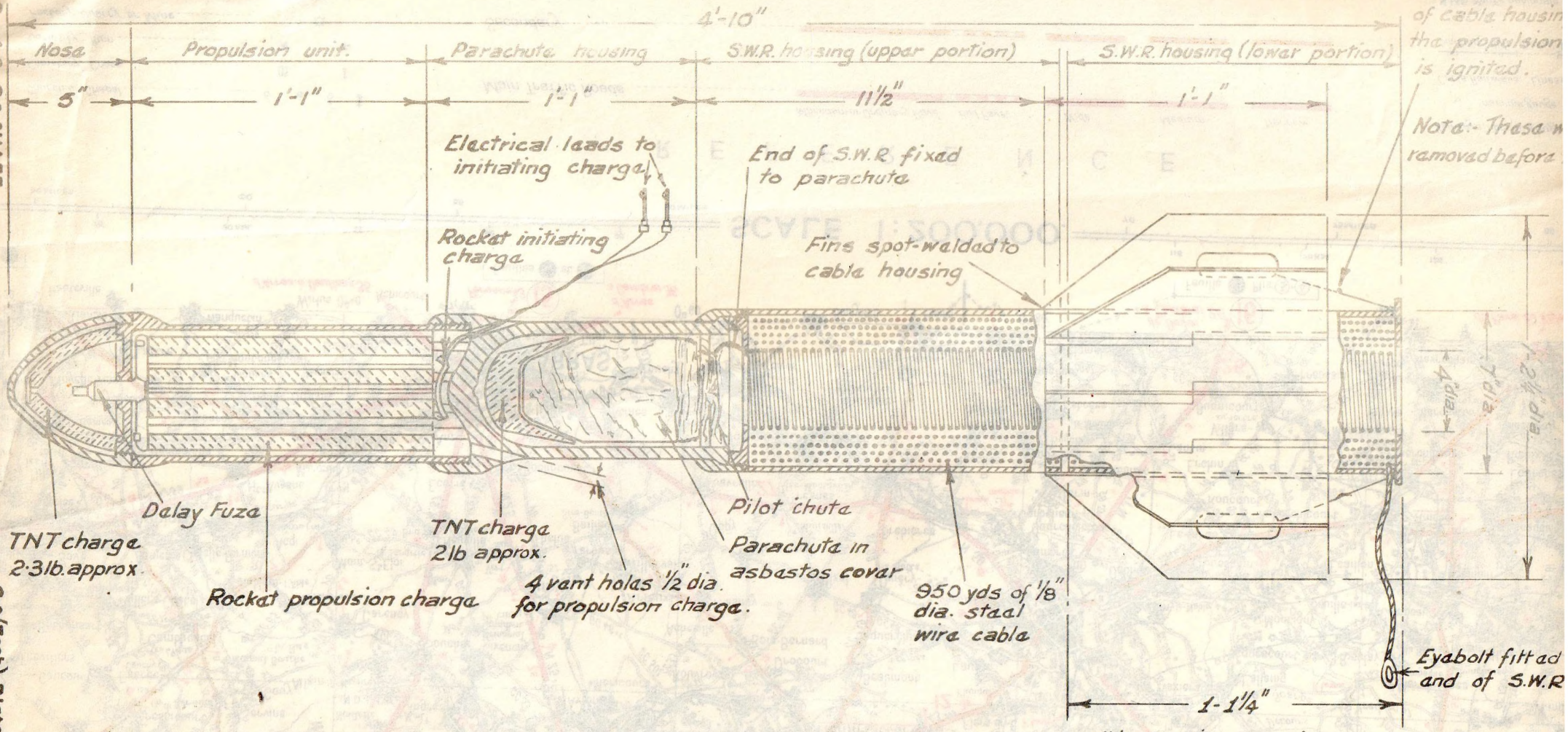
/G-2 (Tech) Plate No. D.112
99

GERMAN 6 in (152mm) A.A. ROCKET

Cable & Parachute type



Office of A.C. of S. G-2 SHAEF



GERMAN A.A. ROCKET.

G-2(Tech) Plate No:D.99