AMMUNITION BULLETIN Nº 7.

FOR INSPECTING ORDNANCE OFFICERS.

(JANUARY 1940).

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

SECURITY.

AMMUNITION BULLETIN NO. 7.

For Inspecting Ordnance Officers.

Issued .. January, 1940.

Issued by
Chief Inspector of Armaments,
Woolwich.

Contents:

(62) Proof of No.199 Time fuzes.

With reference to R.A.O.S. Part II, Pamphlet No,5, paras. 146 and 165, the following instructions are issued for the proof of No.199 Time fuzes pending amendment to the above Regulations :-

C.M.T. Limits.	M.D.	
21.0" - 22.3"	0.20 max.	Lots giving results outside these limits must be referred to C.I.A., Woolwich, before final rejection.

Corrector fractions.		Standards.
Atmospheric pressure	- 0.014 per inch.	30 inches.
Air temperature	- 0.0005 per degree F.	60 deg. F.

During proof, therefore, the reading of the barometer and the dry bulb thermometer should be noted, and, if the atmospheric pressure and/or temperature is not standard, the "mean time" of burning of the fuzes must be corrected as follows :-

From the "standard" figures, deduct the readings of temperature and pressure obtaining at the time of proof. Multiply the results, whether plus or minus, by the mean time of burning and the relevant fractions shown above; then proceed in normal manner for time (composition) fuzes.

(63) Boxes, ammunition, S.A. Distinguishing marking.

In future, boxes containing small arm, rifle grenade or illuminating cartridges, will have special distinguishing marking, by the use of numerals and letters of raised metal, to facilititate identification of the contents in the dark, as shown in the table below. The letters indicate the nature of the cartridges and the numerals the calibre; they will be affixed to each end of the box in place of the small "end" labels at present used.

Calibre.	Armour piercing	Ball	Observing.	Tracer	Illuminating.	Rifle Grenade
.303 inch	W	See remarks below.	O	G	-	N
.5 "	5 W	5	-	-	-	-
.55 "	55 W	55	-	55 G	-	-
7.92 mm.	-	7	-	7 G	-	-
15 mm.	15 W	15	-	-	-	-
Illuminating -						
1-inch	-	-	-	-	1 J	-
1½-inch	-	-	-	-	1½ J	-

No letters or figures will be used for .303-inch ball ammunition, except when charger packed, or mixed with tracer ammunition in stripless belts. The distinguishing letters for boxes containing charger packed Mark VII .303-inch ammunition will be "CC" and Mark VIII.Z .303inch ball and tracer ammunition in stripless belts mixed, the letter "M".

In the case of machine gun ball ammunition mixed with

tracer ammunition in belts, other than .303-inch, the letter "M" will be added to the numeral.

This marking will be additional to the existing method for identifying ammunition in the dark, i.e:-

Bandolier packed	..	no horizontal batten at end.
Belt "	..	a 'v' shaped wood piece at each end.
Carton "	..	one horizontal batten at each end.

4) Mines, Contact, A.T., Mark III.

With reference to No.5 Bulletin, pages 6 and 7, further information regarding the safe load for this mine is now circulated.

(a) Laid on the surface on medium ground, the mine cannot be fired by a 12-stone man, walking or running. The fuze may function by jumping on the cover with both feet from a height of approximately 1 foot.

(b) Dropping the mine 1 foot plumb on to medium ground, cover down, is sufficient to fire the fuze, but the chances of this happening are very remote as the cover is a loose fit and rocks freely on the end of the striker of the fuze. If the mine is allowed to fall so that the blow comes even partly on the outer edge of the cover, they can be dropped from 3 feet without firing the fuze.

(c) The approximate safe load of the steel safety pin is 600-lbs. Even if this is exceeded and the safety pin broken, it is unlikely that the detonator will fire on account of the short distance of striker travel. This mine was designed on the distinct understanding that it should never be carried fuzed. From the above information it is clear that fuzing should be done at the moment of laying the mine only.

(65) German aircraft bombs.

A sketch of a blind German aircraft bomb, with tail broken off, which fell in the County of Zetland (Shetlands), is shown in Fig. 7.

This is the H.E. General Bombardment Bomb S.C.50, fitted with an armour-piercing cap, described in Bulletin No. 5. This bomb formed one of a group of four blinds which fell within a radius of 30 yards.

(66) German shell.

Fig. 8 shows the principal features of a German 105 mm. H.E. Shell fitted with one driving band and a percussion fuze A.Z.23 with .25" delay.

The shell is streamlined and fitted with a screwed-on head. The driving band consists of an inside portion of mild steel or iron and an external portion of copper. The method used to prevent the band slipping round the body of the shell is by simple knurling. The adhesion of the copper to the iron is so good that twisting of the band on firing does

not cause any separation between the two metals. The reason is not clear whether the two-metal driving band is due to shortage of copper or as a remedy for the tearing off of driving bands.

The shell filling is probably T.N.T. In some cases the filling is effected by pouring, the shell being protected internally by varnish, and in other cases by block charges, each contained in a carton cover, a plastic substance being used to make a joint between the covers and internal surface of the shell. The shell is filled up to the level of the ring securing the exploder container.

The steel exploder container is secured by means of a steel securing ring, the inner thread of which is screwed to the container, and the outer thread to the fuze hole of the shell. These two components are treated externally with a protecting coat of black preservative the nature of which is not specified.

An exploder of Picric Acid contained in a cylindrical casting in tinned brass fits into the container.

The detonator containing the cap is housed in the upper part of this casting. The detonator consists of a small copper thimble pierced by five holes (nature of filling not stated). The thimble is closed by a washer, the central hole of which is closed by a paper disc. The detonator is held in position by a leather washer crimped into the edge of the cylindrical brass casting.

The same type of exploder appears to be used in 75 and 150 mm. H.E. Shells.

The driving bands of certain projectiles of 105 and 150 mm. are in some cases of copper only and in this case the method used to prevent the band slipping is in the form of a checker pattern.

(67) German percussion fuze.

The German percussion fuze A.Z.23 R.H.S. with .25 seconds delay (Fig.9) is used in the 105 mm. howitzer and probably also in 75 mm. separate ammunition. It is designed to function on impact or graze.

The fuze consist chiefly of a body, needle and needle pellet, centrifugal bolts with spring, detonator pellet with detonator, creep spring, delay mechanism and magazine.

The body, of aluminium, is in two parts, screwed together and secured by a set screw. The upper part has a central channel throughout its length to receive the needle, which is secured in the aluminium needle pellet by a securing screw. The needle is fitted with a wooden extension. On the underside of the needle pellet, the central channel is enlarged to house five brass centrifugal bolts, each with its pivot pin. The bolts are kept pressed towards the centre of the fuze by means of a phosphor bronze spring, which maintains the bolts in such a position that when the fuze is at rest, the needle cannot pierce the detonator.

The lower part of the body contains a brass detonator pellet and detonator, the delay mechanism and a magazine. The detonator is secured in the pellet by a screw having a

central fire channel. Four radial slots are cut on the underside of the pellet to ensure that the flash from the detonator reaches the delay channel.

The delay mechanism consists chiefly of a delay holder, index plug with centrifugal bolt and spring, and a copper plate. The holder is pierced by two channels, one central and empty, the other eccentric and carrying the delay. On the upper portion of the holder a recess is cut in which a copper plate can slide. According to its position this plate covers or uncovers the central channel.

The index plug is secured in the body of the fuze by a screwed collar. A cylindrical cavity is formed in the plug to receive the centrifugal bolt with spring and a recess is cut in the plug to receive the copper plate. On the outside of the plug a slot is cut which serves as an index for setting the delay mechanism. If the plug is set in the delay position (Fig. 9a) the recess does not coincide with the plate, the latter therefore remains in the closed position masking the central fire channel. If the fuze is set to the instantaneous position (Fig . 9b) the recess is in line with the plate and the latteris free to move outwards under centrifugal force and so unmask the central fire channel. A brass plate with holes bored to correspond with the delay and central channels is placed on the delay holder and forms an upper bearing surface for the copper plate.

The bottom of the fuzes is closed by the magazine, having a central fire channel, which is screwed in and retains in position the delay holder.

Action.

Before firing. (Fig. 9c) The needle is separated from the detonator by the centrifugal bolts which are retained in the closed position by their spring. The copper plate of the delay mechanism closes the central fire channel by the pressure from the centrifugal bolt. This position is maintained whether the fuze is set delay or instantaneous. The delay channel is always uncovered.

Thus, even if a failure of the safety arrangements occur and the needle pierces the detonator or the detonator itself fires, the fuze can only function with delay; the shell, therefore, cannot burst at less than .25 seconds time of flight from the muzzle.

To set the fuze for instantaneous action the slot in the index plug is turned to a position parallel to the axis of the fuze bringing the recess in the plug opposite the copper plate (Fig. 9d). For delay action the slot is turned at right angles to the fuze axis opposite the marks M and V.0.25; in this position the plug retains the copper plate in the closed position. (Fig. 9e).

After firing. The centrifugal bolts swing outwards overcoming the spring thus leaving the needle and detonator pellets free to move towards each other. The creep spring prevents creep action. The centrifugal bolt of the delay mechanism moves outwards compressing its spring. If the index plug is in the delay position, the copper plate is held by the plug and thus the central channel remains closed (Fig. 9f) If the plus is in the instantaneous position, the plate is moved by centrifugal force into the slot in the plug and the central channel is thus opened (Fig. 9g).

On impact the needle is forced on to the detonator by direct action. On graze the detonator pellet is carried forward on to the needle. The flash from the detonator

passes either through the delay channel or the central channel, according to the setting of the fuze, to the magazine and thence to the detonator and exploder in the shell.

Other fuzes operated on the above principle are -

(a) I Gr. Z 23 n A used with 75 mm. separate ammunition and possibly 105 mm.

(b) A Z 23 (0.8) urng. used with 150 mm.

(c) A Z 23 M. (2 V) " "

(d) A Z 1502 DWM " 20 mm.

The only difference between the above types is in the system controlling the delay.

68) 7.92 mm. Ammunition (for use in BESA medium machine guns).

There are four types of cartridges to date -

BALL
TRACER
DUMMY
DRILL

The ball cartridge (Fig. 10) consists of a rimless brass case fitted with a brass cap containing about 5 grains of cap composition, crimped or coned on to a streamline bullet. The bullet has a steel envelope, coated cupro-nickel or gilding metal and a lead and antimomy core.

The charge is about 45 grains N.C.
The annulus at junction of case and cap is lacquered DARK PURPLE.
The base mark is I.Z.

The tracer cartridge is similar to the ball cartridge and is attached in a similar manner. The bullet is not streamlined; its steel envelope is coated cupro-nickel or gilding metal and contains a lead and antimony tip, a copper tube with the tracer composition, and a brass washer.

The charge is about 45 grains N.C.
The annulus is lacquered RED.
The base mark is G IZ.

The dummy cartridge case is of chromium plated brass or of white metal, crimped or coned on to a streamlined bullet which rests on a shaped boxwood distance piece. The bullet has a steel envelope coated gilding metal or cupro-nickel and copper plated, with a lead and antimony core, or it may be made entirely of gilding metal.

The base mark is U I.

The drill cartridge case is of brass, chromium plated, with three elongated indents in the side and a cavity representing the cap chamber. The indents and the cavity are painted RED. The case is crimped or coned on to a bullet which is not streamlined . The bullet, which rests on a wooden distance piece, consists of a cupro-nickel envelope with an aluminium core.

The base mark is D I.

For details of packing see Ammunition Bulletin No.4, Table 30.

15 mm. Ammunition (for use in BESA heavy machine guns).

There are four types of Service cartridges to date, viz:

BALL
ARMOUR PIERCING (Cordite or N.C. charge).
DUMMY.
DRILL

The ball cartridge consists of a rimless case coned on to a streamlined bullet, consisting of a lead and antimony tip and steel core inside a gilding metal envelope.

The charge is approximately 370 grains of Neonite, tubular, (see Ammunition Bulletin No.6, page 3.)

The annulus at junction of case and cap is lacquered DARK PURPLE.

Base mark is I Z.

The Armour-piercing cartridge (Fig. 11) is similar to the ball cartridge, except that the annulus is lacquered GREEN, and the core is of A.P. Steel.

Charge is 370 grains of Neonite, tubular, or 325 grains Cordite W.T.8-2.

Base marks :- N.C. charge .. W IZ.
Cordite " .. W I.

The dummy cartridge consists of a brass chromium-plated or white metal case, coned on to a solid gilding metal bullet which is not streamlined. The bullet rests on a shaped boxwood distance piece.

Base mark is U I.

The drill cartridge consists of a brass chromium-plated case in the body of which are three elongated indents, and in its base a cavity representing a cap chamber. The three indents and the cavity are painted RED. The case is coned on to a semi-hollow gilding metal bullet which is not streamlined. The bullet rests on a shaped wooden distance piece.

Base mark is D I.

15 mm. ammunition is packed in Box H.30, wood, with two tinned plate boxes to hold 50 rounds (two linked belts of 25 rounds in two tinned plate boxes). Stowage dimensions - length 16.1"; breadth 10.7"; depth 8.6". Estimated weight - empty 17-lbs; filled 45-lbs.

(69) Classification of ammunition for 20 mm. Hispano Gun.

The ammunition for this gun has been placed in Group VI for storage purposes. As a large quantity of descriptive labels for this ammunition, printed in brown ink on white paper with black overprints, have been delivered it has been decided for the sake of economy to use these labels in conjunction with the correct (Group VI) label.

The necessity for "end" labels will cease on the introduction of metal letters and/or numerals for identification purposes in the dark, the use of which has now been approved by the Air Ministry. (See marking of S.A. ammunition in this Bulletin). This ammunition is packed in Box, A.S.A. H.32, Mark I, wood, with tinned plate lining to hold 60 rounds in 6 cartons. Stowage dimensions - length 17.85"; width 7.45"; height 10.1". Weight - empty 12-lbs; filled 48-lbs.

(70) Amendment to Bulletin No. 6.

Item 58. Oiling shell. It has been found necessary to deal with the question of oiling shell in a more comprehensive manner and the following instructions are issued to replace those in the above Bulletin.

Delete Item 58 and substitute -

" Shell are given a protective coating of paint to prevent the formation of rust, and so long as this coating remains sound and in good condition NO FURTHER ACTION IS NECESSARY for purposes of preservation.

Every care must be taken in the handling and storage of shell to avoid damage to the paint. When, however, such damage does occur, the best procedure is the restoration of the damaged protective coating by re-painting. Such re-painting must be confined to the damaged portions only, because additional paint over the existing coating may cause the shell to become "high to gauge", and therefore unusable.

Repainting of shell, however, requires careful supervision and the use of special kinds of paint only, consequently work of this nature is not to be undertaken under unit control. The I.O.O. is responsible for supervising the painting of shell; ordinary paints are not to be used on any account as they may affect the explosive.

Units, however, having 6-pr. equipment or above can effect temporary protection by the use of "Boiled Linseed oil, lead free", which is procurable, on demand, from the R.A.O.C.

This oil must not be used with smaller calibre shell.

This oil is applied with a clean brush over those portions of the shell only where the paint has been damaged and is then allowed to dry and harden. This forms a hard protective coating almost equal to paint.

Any light rust on the shell, where the paint has been damaged, should be removed before applying the Linseed oil.

Should the oil film be subsequently damaged it should be restored by a fresh coating of Linseed oil as described in previous para.

No other treatment is necessary in order to keep shell in a fully serviceable condition.

Units having equipment below 6-pr. can effect temporary protection by the use of "lead free" red mineral jelly. This is applied very lightly over the parts of the shell where the paint is damaged. The exposed steel should be free from rust before application of the jelly. In dusty positions, the shell should be cleaned and fresh jelly applied frequently as dirt may collect on the jelly.

Shell which fail to gauge must not be scraped in order to bring them to gauge. They are to be returned to R.A.O.C. The only exception to this rule is when it it is clear that the shell are to be fired within 48 hours.

No oil other than linseed, lead free, is to be used on shell. Such oils remain fluid and may damage the fuze, the shell filling, or in the case of fixed Q.F. ammunition, the propellant charge or primer, causing defects which may lead to failures to function efficiently.

The correct methods for dealing with shell in unit charges are therefore -

1. Great care in handling.

2. To be kept as dry as possible.

3. To be kept as clean as possible.

4. When paint is damaged, apply boiled linseed oil or "lead free" red mineral jelly to the affected part.

5. No other oil to be used on shell.

6. Repainting to be done under supervision of I.O.O. "

(71) A.A. Ammunition.

199 fuzes.

Cases have occurred where the lower time rings of these fuzes have become set fast so that they can no longer be moved by the fuzes keys provided. This may be caused by damaged slots, swollen filling, swollen cloth washers, or the use of Luting as a seal. If the fuzes are part of the equipment of a mobile unit, the question of movement with fuzes set in this manner arises. Strictly speaking, all fuzes should be set to safety before moving to a fresh battery position, but if the cause of the trouble is damaged slots or the correct use of Luting, the fuzes are probably quite serviceable and it may be a military necessity to transfer the ammunition to the new site. In such cases, the rounds with fuzes set should be loaded on to a separate lorry and kept apart from other lorries in the column en route. The safety element in the cartridge under these conditions is the gaine shutter.

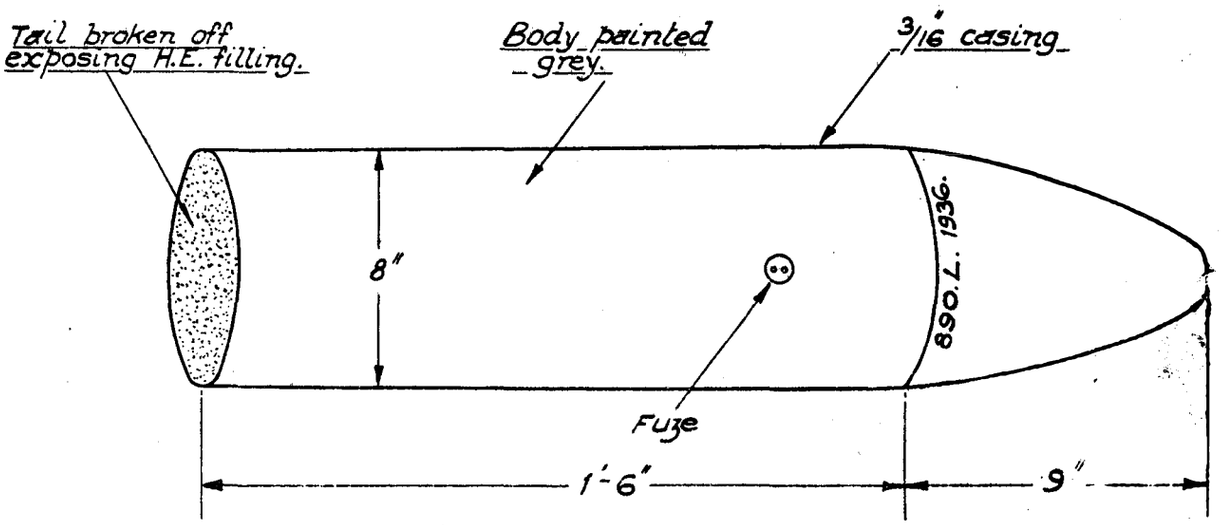
Should the defect be due to swollen filling or swollen cloth washers, damp fuzes are indicated. These are probably unserviceable. In such cases the fuze is to be removed from the shell, under I.O.O. instructions, the cap loosened, lower ring moved to safety and cap screwed home tight. If serviceable fuzes are available the round is refuzed; if plugs only are available, the round is plugged; if neither plugs or serviceable fuzes are available, the unserviceable fuzes, having been set at safety, are again inserted in the round which which should then be returned to R.A.O.C. for overhaul and repair.

209 fuzes.

Cases have occurred in which the Index Pegs of these fuzes have been broken off or distorted, usually by carelessness in setting the fuzes back beyond zero or up beyond the maximum setting of 40 seconds with unnecessary force. In such cases, no attempt should be made to move the setting cap further in either direction as this may cause serious damage to the mechanism of the fuze. The fuze should be removed, a new fuze inserted or the round plugged and the damaged fuze returned to the Inspection Department, Royal Arsenal.

Fuzes of this type are quite safe for transport or storage whatever their setting.

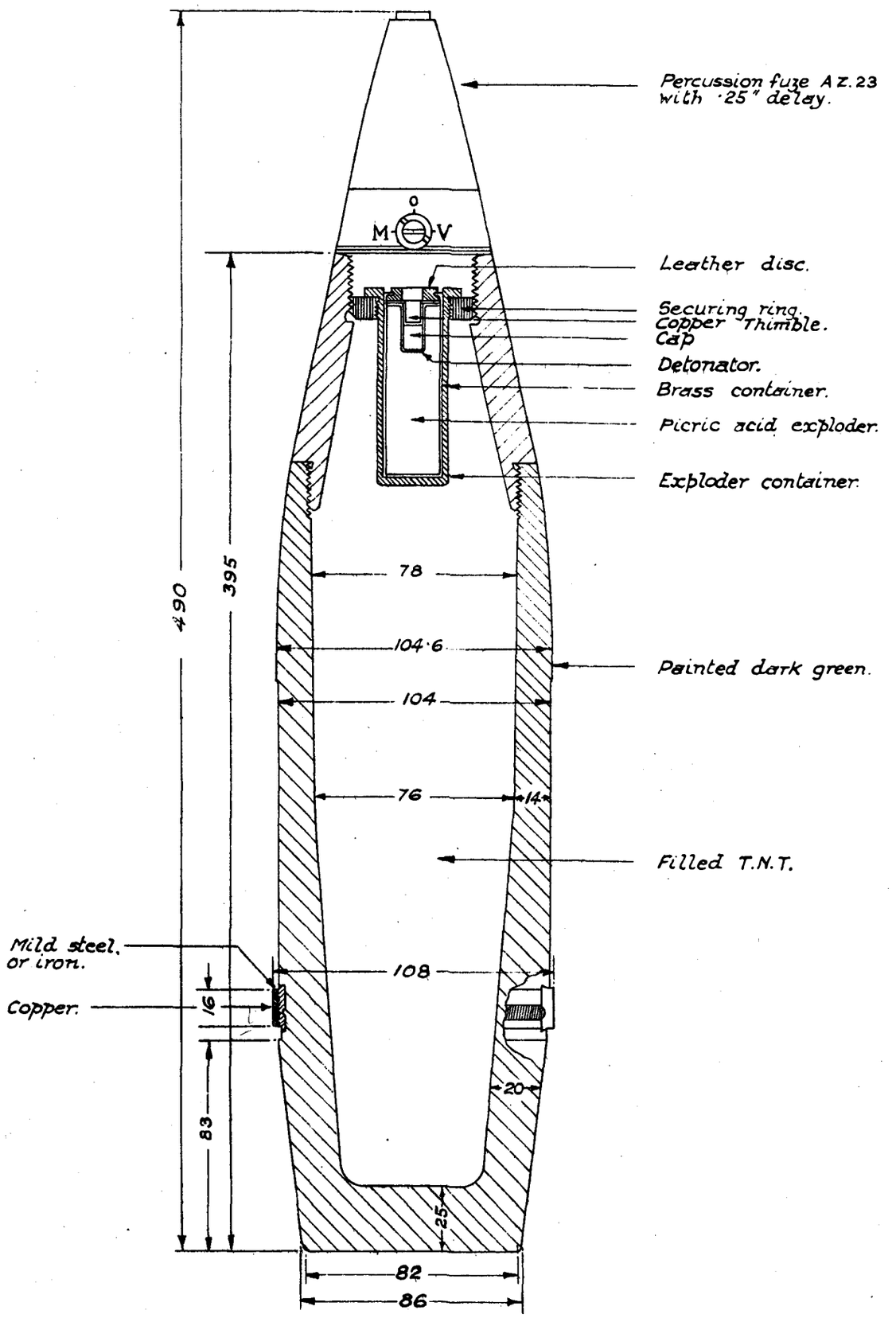
FIG: 7



Markings on fuze.

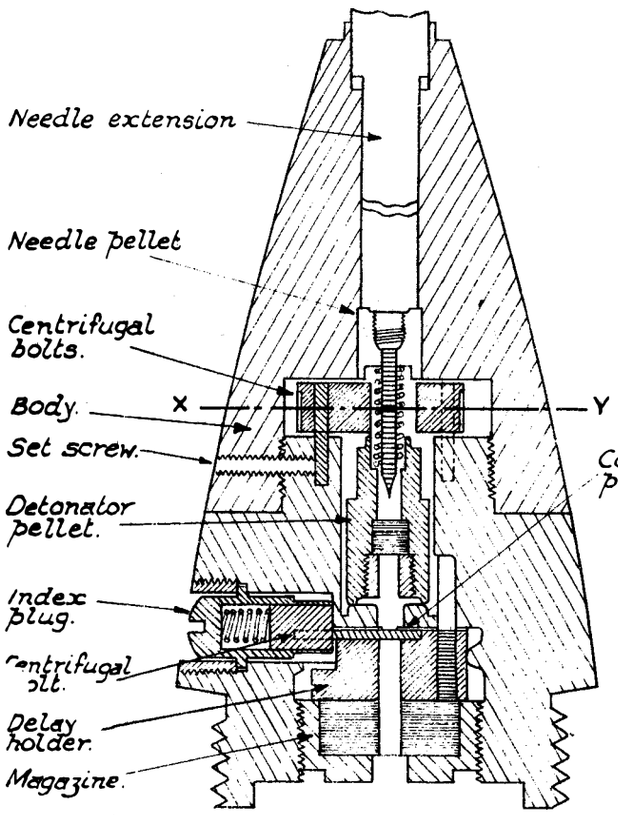
FIG. 8.

Dimensions are shown in M.M.



R.2565.

FIG.9.

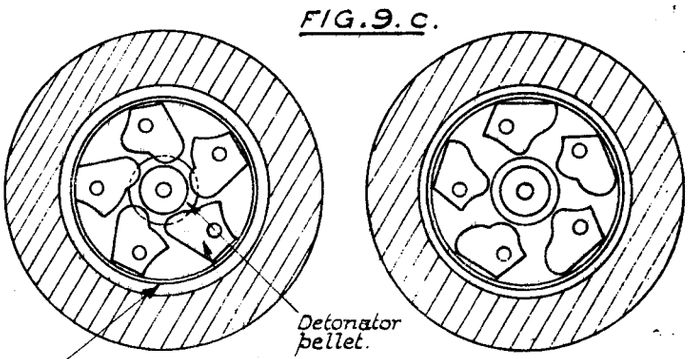


SECTION THROUGH X.Y.

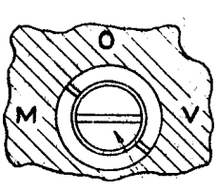
BEFORE FIRING

AFTER FIRING

FIG.9.c.



SETTING FOR DELAY FIG. 9.a.



Index plug.

FIG. 9.e.

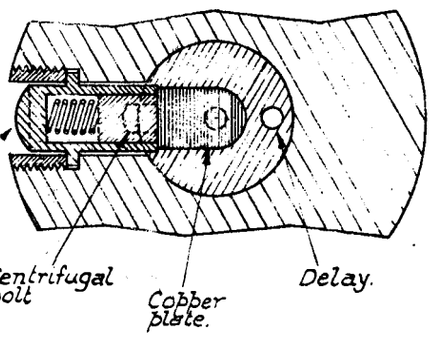
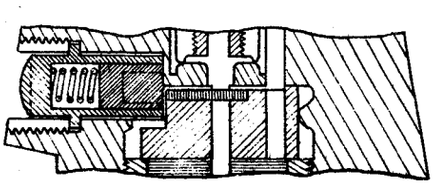


FIG.9.f.

SETTING FOR NON-DELAY. FIG. 9 b.

BEFORE FIRING.



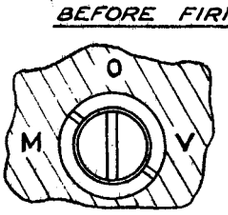
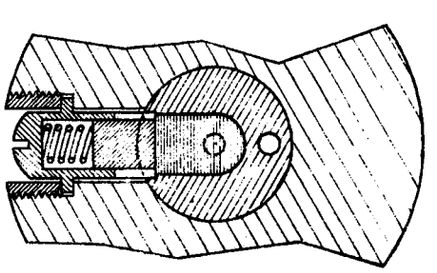
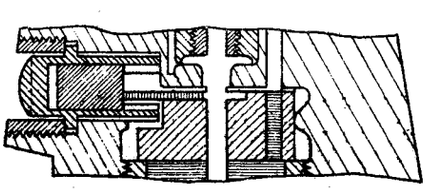


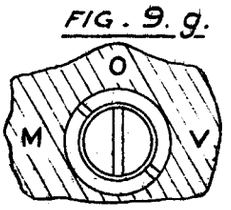
FIG. 9.d.

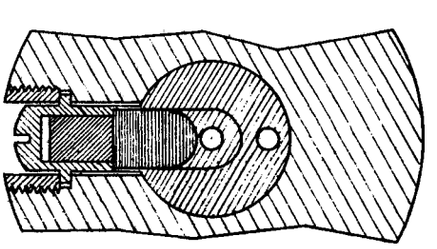


AFTER FIRING

FIG. 9.g.

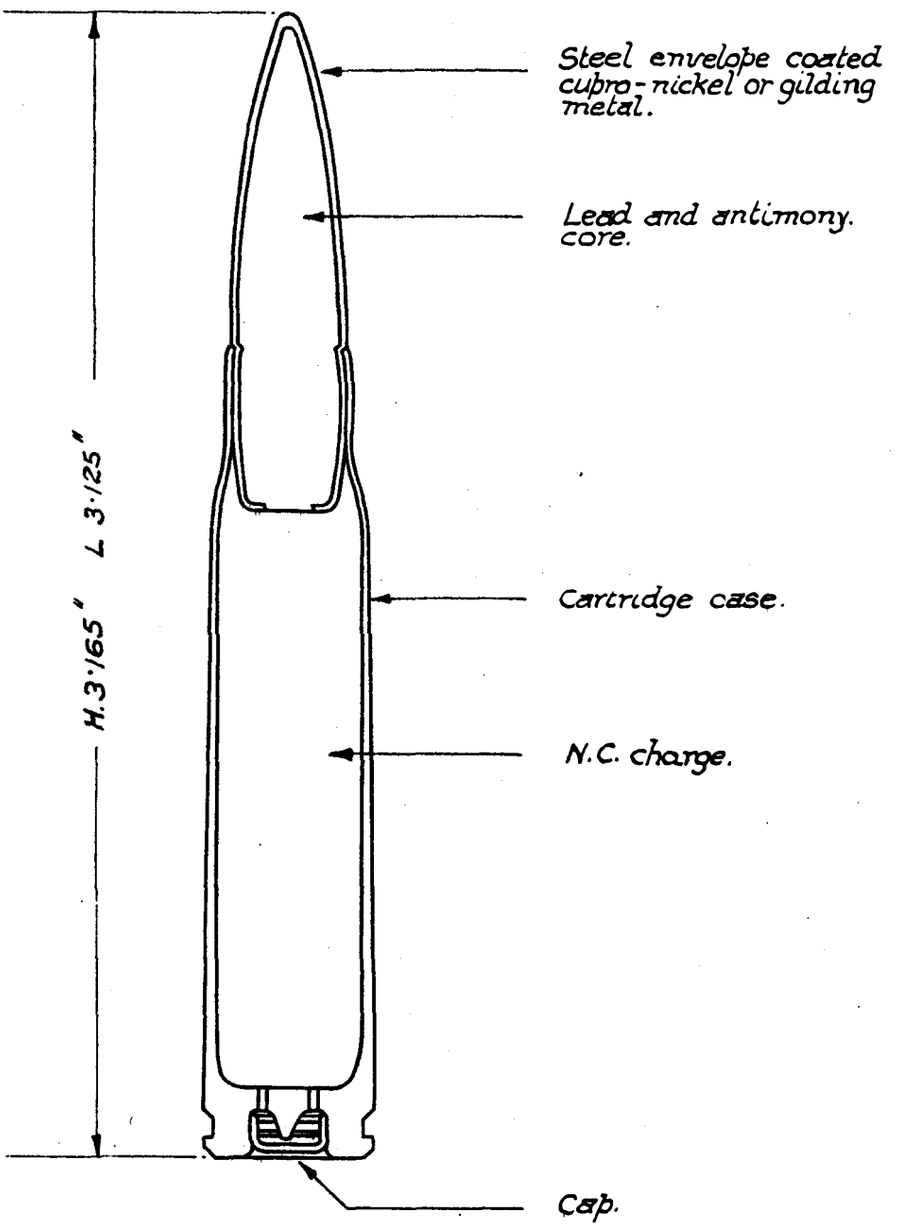






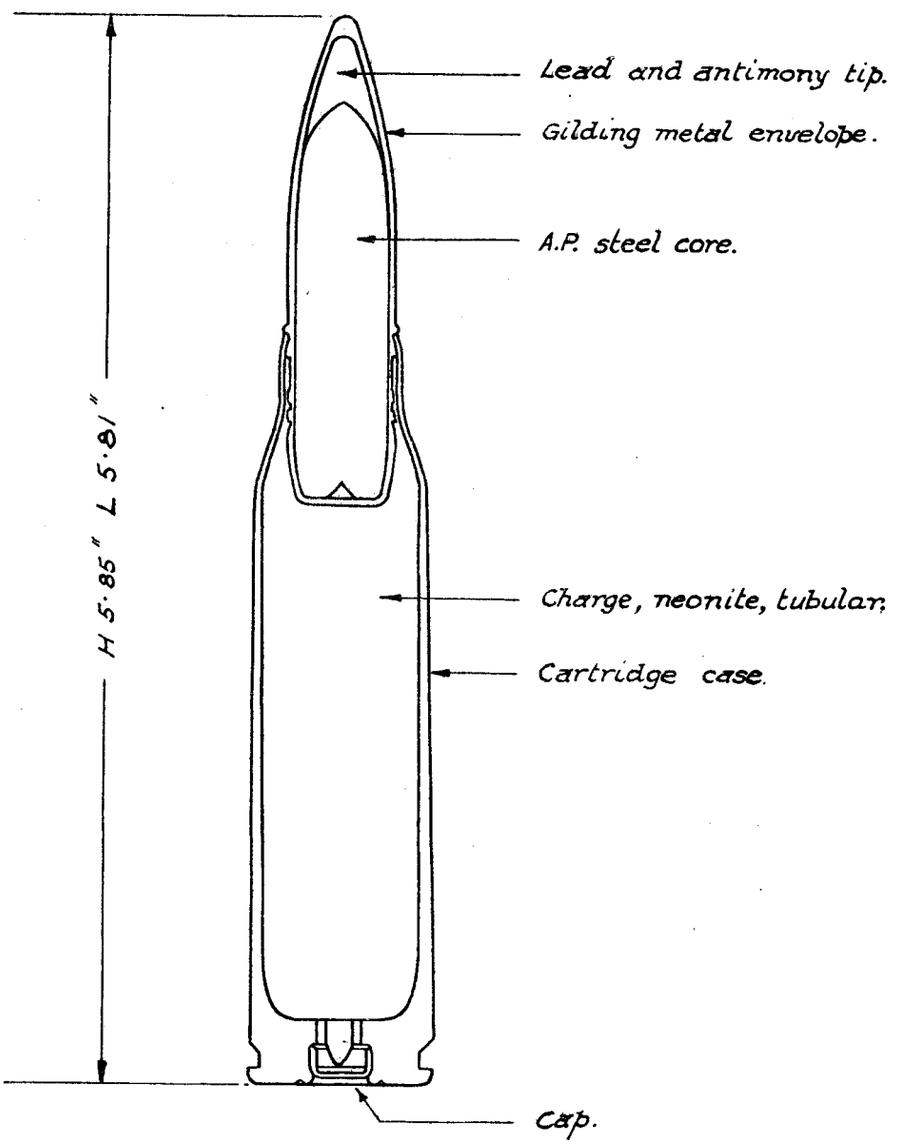
R.2565.

FIG: 10.


Steel envelope coated cupro-nickel or gilding metal.
Lead and antimony. core.
Cartridge case.
N.C. charge.
Cap.
H. 3·165" L 3·125"

R.2565.

FIG: 11.


H 5·85" L 5·81"
Lead and antimony tip.
Gilding metal envelope.
A.P. steel core.
Charge, neonite, tubular.
Cartridge case.
Cap.