

AIR PUBLICATION

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(Superseding A.P. 1661D, Vol. 1, Sect. 4,
Chap. 5 and 6)

30mm AMMUNITION AND FUZES

(Aden Gun)

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

J. Dunnett

Ministry of Defence

FOR USE IN THE
ROYAL AIR FORCE

(Prepared by the Ministry of Technology)

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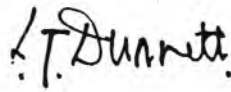
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GENERAL AND TECHNICAL INFORMATION

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Chapter 1—0

30mm. AMMUNITION

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Introduction

1. The 30mm. cartridge consists of a projectile and a cartridge case, which are issued, stored, and loaded together as one complete round, that is, as fixed ammunition. 30mm. ammunition is supplied belted in lengths of 30 rounds, made up for LH feed or RH feed, each length of belt being contained in Package H60, No. 5, Mk. 1. It is also supplied unbelted in Package H60, No. 6, Mk. 1. (See A.P.1086, Sect. 12C). High Explosive ammunition is supplied ready fuze.

General description

Projectile

2. The projectile consists of a steel shell into which is screwed either a fuze, or a nose piece. It may be either streamlined or have a parallel body with a streamlined nose.

3. Around the projectile, near its hemispherical base, is a cannellure, and above the cannellure an annular groove locates a copper driving band.

4. The driving band is secured by die pressing, and its functions are as follows:—

- (1) To form a seal between the projectile and the barrel, and thus prevent the escape of gases past the projectile when the round is fired.
- (2) To centralize the projectile in the bore of the barrel.
- (3) To stabilize the projectile during flight. As the projectile passes along the barrel, the driving band is forced into the lands and so causes the projectile to spin.

Cartridge case

5. The cartridge case is made from solid drawn brass, and in the centre of its base is a recess

which houses an electric cap; the recess is provided with a fire hole. Around the base is an extractor groove, and adjacent to the groove is a shoulder by which the cartridge is positioned in the chamber of the gun.

6. The wall of the case tapers in thickness towards its mouth, which accepts one end of the projectile. Around this reduced portion are six indents which engage the cannellure in the projectile.

7. The case contains a propellant charge, the nature and weight of which depends upon the type and mark of cartridge.

Cap

8. The electric cap is a shallow cylindrical metal shell which is closed at its lower end by a pole piece enclosed in a fibre insulator. On the inner face of the pole piece is a fibre washer, and between the washer and the upper end of the metal shell is a ring-shaped brass distance piece.

9. The distance piece houses a layer of initiating composition impregnated with graphite. A layer of cap composition is pressed on to the layer of initiating composition, and the upper end of the distance piece is closed by a varnished paper disc, which forms an effective waterproof seal.

Identification, colouring and markings

10. The projectile is painted to preserve it from rust, and the colour employed indicates the nature of the filling and the type of projectile. The colour markings for each type of 30mm. cartridge are given in the relevant sub-chapters to this chapter.

11. Stamped in the extractor groove of the cartridge case are the following markings:—

- (1) The calibre of the gun in which the cartridge is used.

(2) The manufacturer's initials or recognised trade mark, or an approved inspection stamp.

(3) The last two figures of the year of manufacture.

12. Stamped on the shoulder of the case are the following:—

(1) The Type and Mark of the cartridge, for example, PRAC 1Z denotes a practice cartridge.

(2) The monogram of the filling station, or the filling contractor's initials or recognised trade mark.

(3) The Lot number of the filling.

(4) The last two figures of the year of filling.

Functioning

13. When the electric firing circuit of the gun is completed, the graphite in the electric cap provides a conducting medium for the current between the pole piece, which is contacted by the firing pin, and the brass distance piece, which is earthed to the cartridge case. As the current passes through the cap, the heat generated in overcoming the resistance is sufficient to ignite the initiating composition. The initiating composition ignites the cap composition and the resultant flash ignites the propellant charge.

14. The gases generated by the burning propellant charge exert pressure in all directions, and expand the cartridge case against the chamber of the breech cylinder; this prevents the escape of gases to the rear.

15. The pressure of the gases against the base of the projectile drives it forward, the driving band engages the lands of the barrel of the gun and causes the projectile to spin.

Precautions

16. All 30mm. ammunition is safe to handle providing normal care is exercised, and the precautions detailed in A.P.110L-0001-1, together with those given in para. 17 to 23 are strictly observed.

17. Care must be taken that the electric cap is not struck, as a blow is liable to cause the cap to function.

18. As ammunition keeps best in sealed service packages, the packages are not to be opened until the ammunition is required for use. Ready use ammunition is to be kept to the minimum required for operational needs.

19. The cartridge must be kept clean, dry, and free from oil, and is not to be used if the driving band is damaged. Any damaged paint on the projectile is to be covered with a thin coating of lead free mineral jelly, which must be wiped off before the cartridge is used.

Changes in temperature

20. Changes in temperature have an adverse effect of the stability of propellents and HE fillings, and when 60 or more rounds have been fired from an Aden gun the temperature of the breach cylinder is raised sufficiently to render the three rounds in the cylinder unstable. Therefore, in both temperate and tropical climates, when 60 or more rounds have been fired during the previous shoot, the three rounds in the breach cylinder are to be removed and disposed of in accordance with current instructions.

Electro static risks

21. There is a remote possibility of the electric cap of 30mm. Aden gun ammunition being fired by an electro charge. The danger of this happening is improbable but care must be taken during handling and loading, that the caps of the rounds are not touched.

22. There are two conditions which would cause a round to fire, namely:—

(1) If the pole piece of the cap is touched by an electrically charged body, such as by an operator placing a finger on the cap, without contact being made with any other part of the cap or cartridge case, and with the case earthed.

(2) If the cartridge case is touched by an electrically charged body and the pole piece of the cap earthed.

Neither of these conditions is likely to occur other than by deliberate action, but all are warned of the potential danger.

Misfires

23. If a misfire occurs, the round must be treated as dangerous, it must not be re-belted, but is to be segregated and dealt with as detailed in A.P.2608A augmented by Temporary Disposal Instructions.

Chapter 1—1

CARTRIDGE, 30mm, ADEN GUN, DRILL, Mk. 1

LEADING PARTICULARS

<i>Weight of complete round</i>	...	...	...	...	...	...	...	438 grammes approx.
<i>Overall length of complete round</i>	...	...	...	...	...	...	...	199mm.

ILLUSTRATION

Fig.

1 Cartridge, 30mm. Aden Gun, drill, Mk. 1

Introduction

1. The Cartridge, 30mm. Aden Gun, drill Mk. 1 is used for training personnel in gunloading, arming and re-arming aircraft gun installations, and for proving the servicing of gun and belt mechanisms.

General description (fig. 1)

2. The cartridge is similar in shape to a standard 30mm. cartridge, but is made entirely of steel and contains no explosive; it weighs approximately 438 grammes.

3. The projectile portion of the cartridge is machined internally to obtain the correct weight, and is secured to the case by brazing. A central countersink in the base of the cartridge enables

the firing mechanism of the gun to be operated without damage to the firing pin.

Identification, colouring and marking

4. The cartridge has no protective finish. Stamped on the shoulder of the case are the symbols DRILL 1, and in the extractor groove are the following:—

- (1) The calibre of the gun in which the cartridge is used.
- (2) The manufacturer's initials or recognised trade mark, or an approved inspection stamp.
- (3) The last two figures of the year of manufacture.

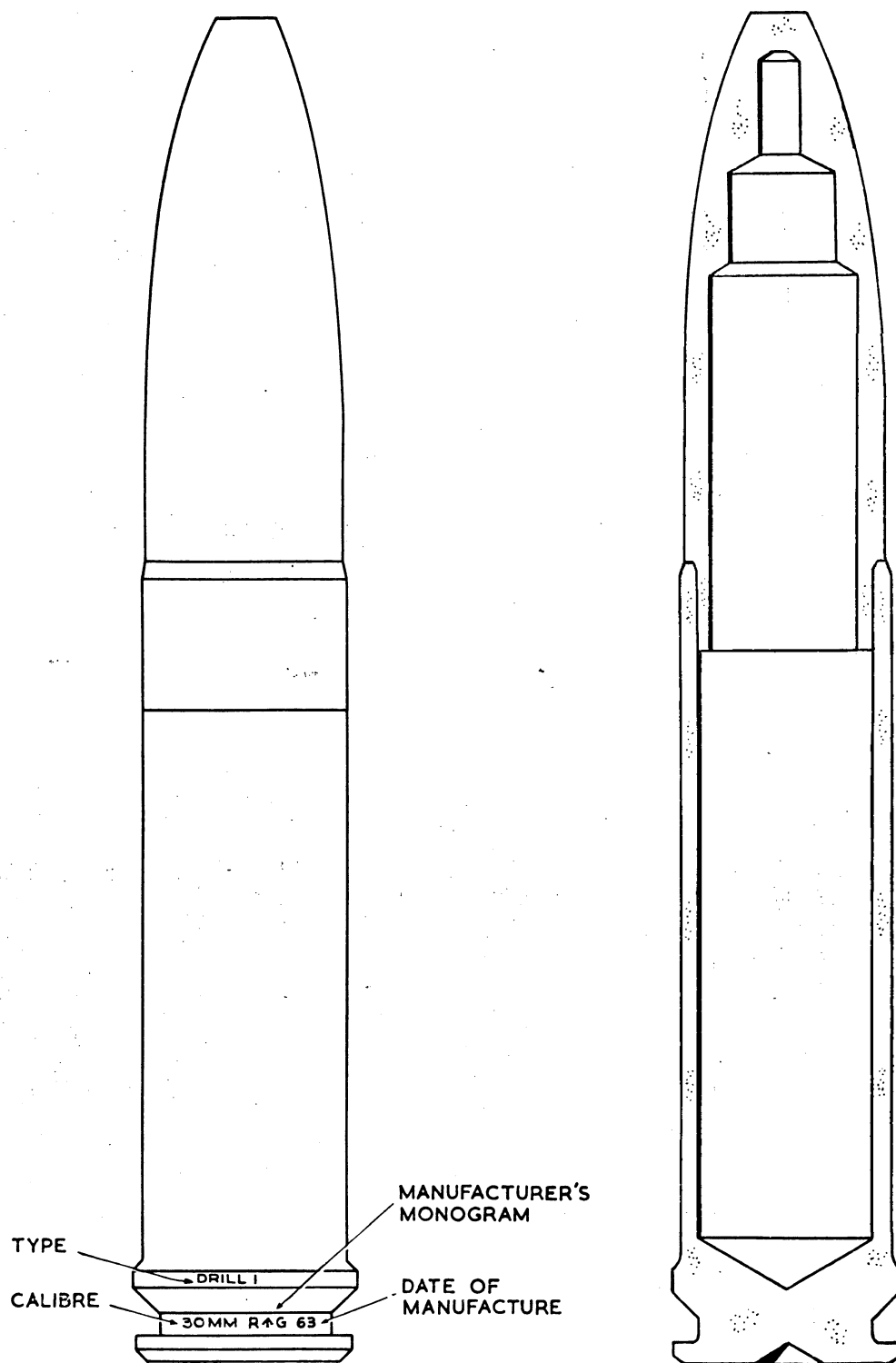


Fig. 1. Cartridge, 30mm, Aden Gun, drill, Mk. 1

Chapter 1—2

CARTRIDGE, 30mm, ADEN GUN, BALLAST, Mk. 1

LEADING PARTICULARS

<i>Weight of complete round</i>	...	...	...	...	...	...	...	438 grammes approx.
<i>Overall length of complete round</i>	...	...	...	...	...	...	...	199mm.

Introduction

1. The Cartridge, 30mm., Aden Gun, ballast, Mk. 1 is used in aircraft which require ballast in the ammunition tanks of 30mm. installations under certain conditions of flight, and also for training armament personnel in arming aircraft.

2. When ballast cartridges are used for training purposes, a short length of 30mm. Aden Gun drill cartridge is to be connected to the beginning of the belt, as ballast cartridges must not be fed into the feed mechanism of a gun.

General description

3. The ballast cartridge, which weighs approxi-

mately 438 grammes, is a zinc alloy die casting, the rear end being closed by a plug. It is similar in shape to the Cartridge, 30mm., Aden Gun, drill, Mk. 1 except that the ballast cartridge has no extractor groove and the plug protrudes beyond the shoulder.

Identification

4. The cartridge is identified by its greenish colour which is the result of an anti-corrosion surface treatment, the manufacturer's initials cast in the cartridge, the protrusion of the plug beyond the shoulder, and the absence of an extractor groove.

Chapter 1—3

CARTRIDGE, 30mm, ADEN GUN, PRACTICE Mk. 2Z

LEADING PARTICULARS

<i>Weight of complete round</i>	...	...	...	...	...	...	438 grammes approx.
<i>Overall length of complete round</i>	...	...	...	...	...	...	199mm.
<i>Net explosive content of complete round</i>	...	...	...	...	...	...	46 grammes approx.

ILLUSTRATION

Fig.

1 Cartridge, 30mm., Aden Gun, practice, Mk.
2Z

General description (fig. 1)

1. The Cartridge, 30mm., Aden Gun, practice, Mk. 2Z, is approximately 7.84 inches in length, weighs approximately 438 grammes, and consists of a projectile and a cartridge case.

2. The projectile weighs approximately 226 grammes and consists of a cylindrical steel body into which is screwed an aluminium alloy firing plug.

3. The firing plug is dumb-bell shaped, one end having a blunt nose, a curved taper, and a thread to screw into the body; the other end being shaped to fit, in the rear of the body.

4. The remaining features of the projectile are similar to those described in Chapter 5.

5. The cartridge case is similar to that described in Chapter 1—0 and contains a propellant charge of approximately 46 grammes of nitrocellulose and potassium sulphate boosted by a primer. ▶◀

6. The primer is a bag of silk gauze containing approximately 10 grains (648mg) of NPP 160 powder, and is located over the fire hole in the case. The initiating composition of the cap consists of approximately 0.6 grains (38.88mg) RD 1302 impregnated with 10 per cent of graphite, and has a resistance of between 20 and 400 ohms. The cap composition consists of approximately 2.1 grains (136.08mg) of RD 1652. The annulus surrounding the cap is coated with purple varnish to act as a seal and is not for identification purposes.

Identification, colouring and markings

7. The projectile is painted black, and both the body and the firing plug are stamped with the manufacturer's initials or recognised trade mark, or an approved inspection stamp.

8. Purple lacquer in the annulus in the base of the cartridge case acts as a seal, and is not a means of identification. The markings on the case are similar to those described in Chapter 1—0.

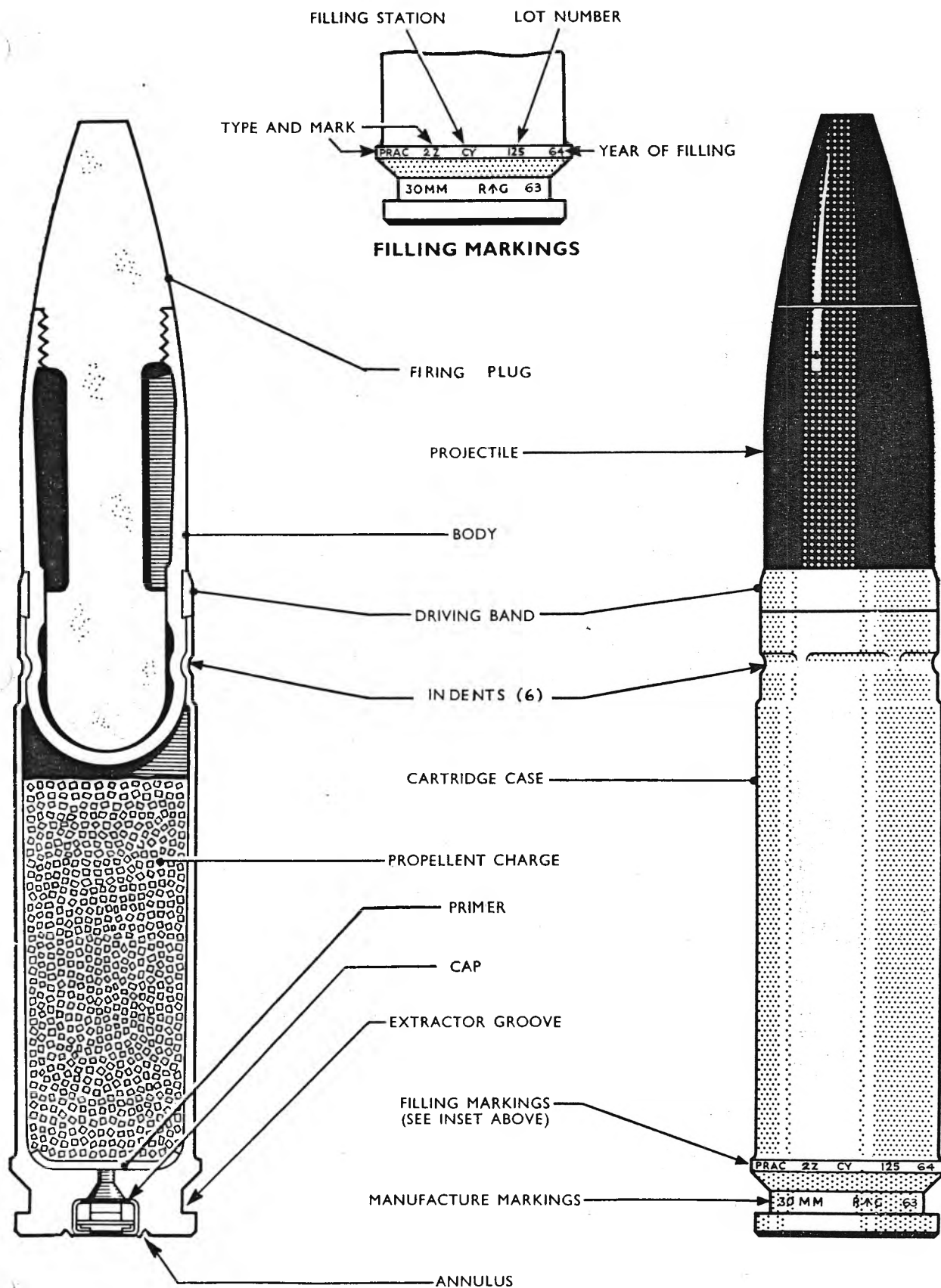


Fig. 1. Cartridge, 30mm, Aden Gun, practice, Mk. 2Z

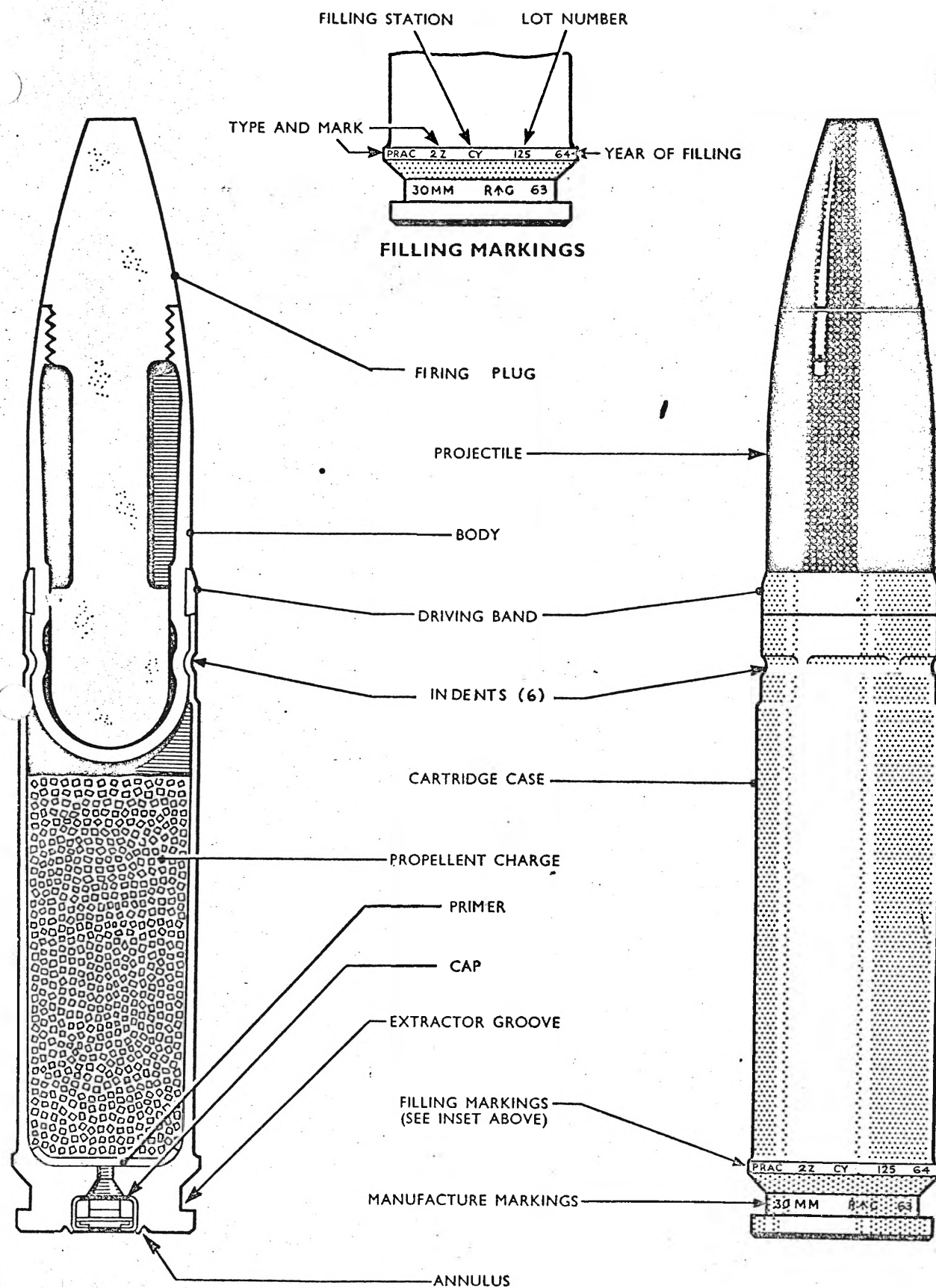


Fig. 1. Cartridge, 30mm, Aden Gun, practice, Mk. 2Z

Chapter 1—4

CARTRIDGE, 30mm, ADEN GUN, HIGH EXPLOSIVE, Mk. 3Z

LEADING PARTICULARS

<i>Weight of complete round</i>	...	...	...	...	...	...	438 grammes approx.
<i>Net explosive content of projectile</i>	...	...	...	...	...	...	56 grammes approx.
<i>Net explosive content of complete round</i>	...	...	...	...	...	...	102 grammes approx.
<i>Overall length of complete round</i>	...	...	...	...	...	...	199mm.

ILLUSTRATION

Fig.

1 Cartridge, 30mm, Aden Gun, High Explosive, Mk. 3Z

General description (fig. 1)

1. The Cartridge, 30mm. Aden Gun, HE, Mk. 3Z, is approximately 7.84 inches (199mm.) in length, weighs approximately 438 grammes, and consists of a projectile and a cartridge case.

2. The projectile weighs approximately 226 grammes and consists of a cylindrical steel body in the nose of which is screwed a Fuze, percussion, D.A., No. 933, Mk. 1 (Chap. 2—1).

3. The body is filled with a high-explosive charge of 56 grammes of Torpex 5, and the threads for the fuze are coated with Cement RD 1248 to form a seal.

4. The remaining features of the projectile are similar to those described in Chapter 1—0.

5. The cartridge case is similar to that described in Chapter 1—0, and contains a propellant charge of approximately 46 grammes of nitro-cellulose and potassium sulphate boosted by a primer. ▶◀

6. The primer is a bag of silk gauze containing approximately 10 grains of NPP 160 powder,

and is located over the fire hole in the case. The initiating composition of the cap consists of approximately 0.6 grains (38.88mg) RD 1303 impregnated with 10 per cent of graphite, and has a resistance of between 20 and 400 ohms. The cap composition consists of approximately 2.1 grains (136.08mg) of RD 1652. The annulus surrounding the cap is coated with purple varnish to act as a seal and is not for identification purposes.

Identification, colouring and markings

7. The projectile is painted a buff colour to denote that it contains high-explosive. The purple lacquer in the annulus of the percussion cap acts as a seal, and is not a means of identification.

8. The projectile bears the manufacturer's initials or recognised trade mark, or an approved inspection stamp.

9. In addition to the cartridge case markings given in Chapter 1—0, the shoulder of the case is stamped with code letters and a number to denote the type of filling, namely TX5.

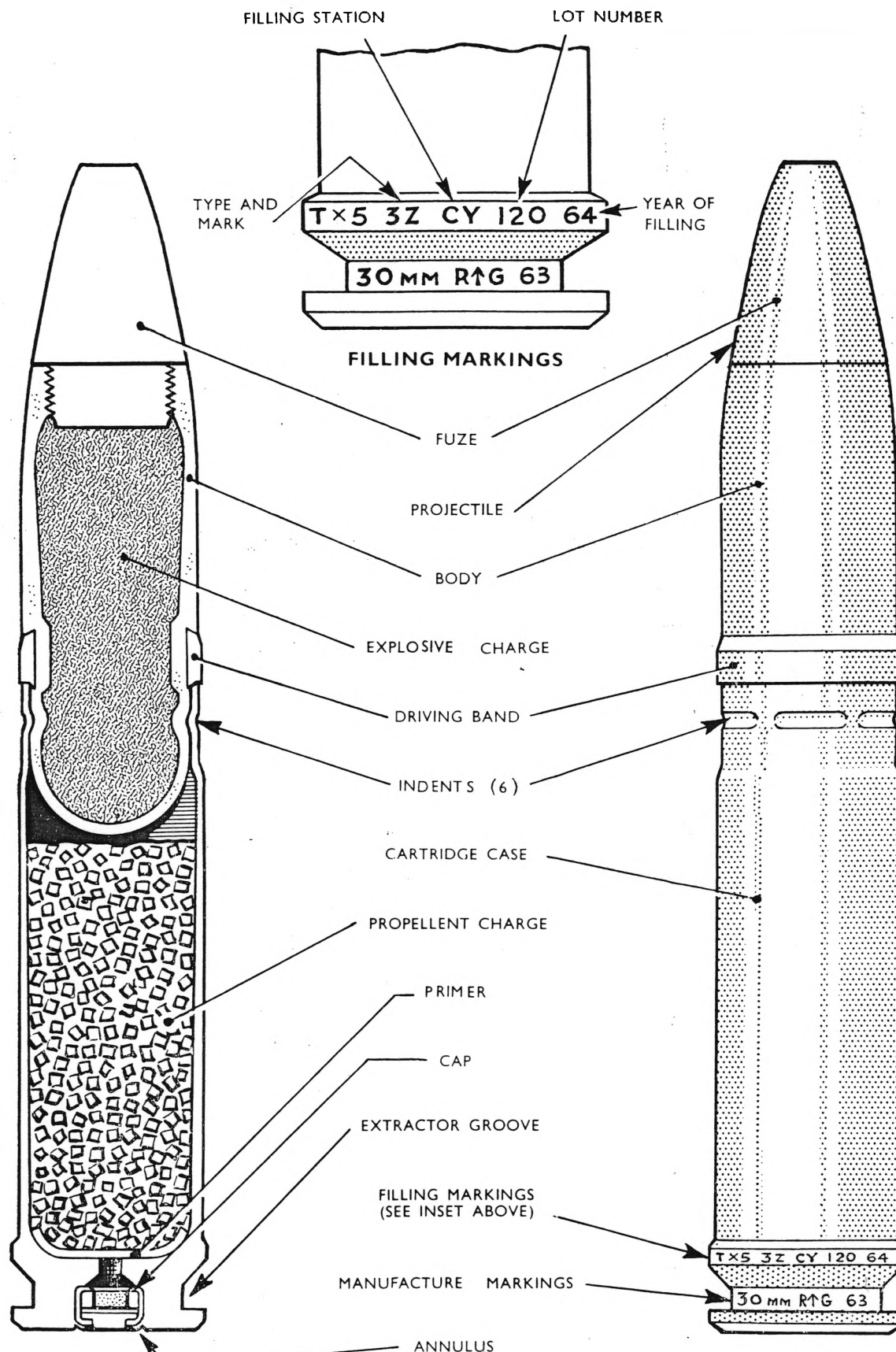


Fig. 1. Cartridge, 30mm, Aden Gun High Explosive, Mk. 3Z

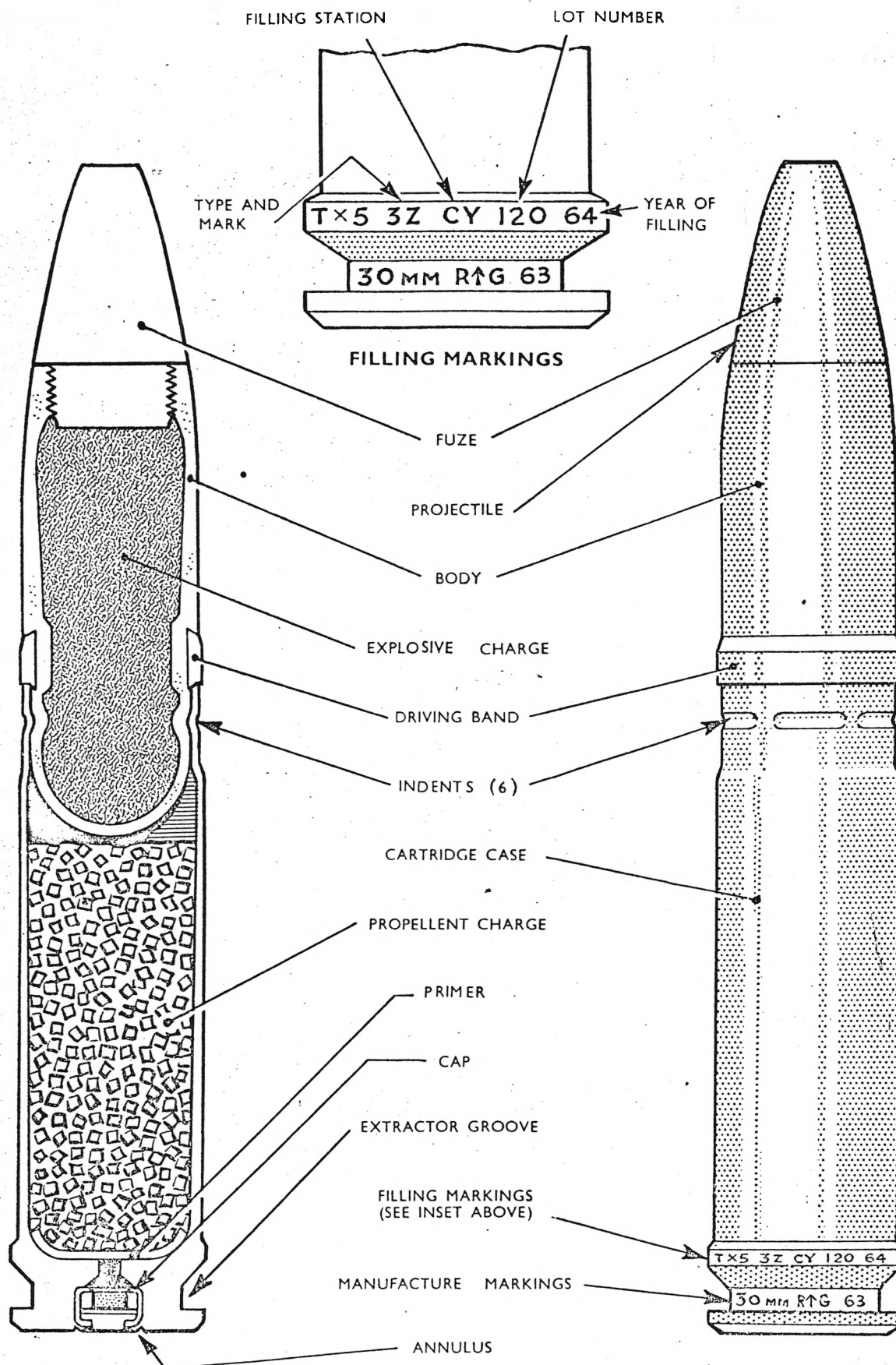


Fig. 1. Cartridge, 30mm, Aden Gun High Explosive, Mk. 3Z

Chapter 1—5

CARTRIDGE, 30mm, ADEN GUN, HIGH EXPLOSIVE, Mk. 5Z

LEADING PARTICULARS

<i>Weight of complete round</i>	...	...	...	...	...	...	496 grammes approx.
<i>Net explosive content of projectile</i>	...	...	...	...	...	...	48 grammes approx.
<i>Net explosive content of complete round</i>	...	...	...	...	...	...	95 grammes approx.
<i>Overall length of complete round</i>	...	...	...	...	...	...	200mm.

ILLUSTRATION

Fig.

1 Cartridge, 30mm. Aden gun, High Explosive,
Mk. 5Z

General description

1. The Mk. 5Z HE Aden gun cartridge is approximately 7.87 in. (200mm.) long and weighing approximately 496 grammes. It consists of a projectile filled with high explosive, and a filled cartridge case fitted with an electric cap.

2. The projectile is a cylindrical shell streamlined at the base, and into the nose is screwed a Fuze, Percussion, D.A. No. 944, Mk. 1 (Chap. 2—2). The screw thread is coated with cement to provide a waterproof joint between the shell and the fuze, and the fuze is prevented from unscrewing by three or four circumferential stabs. The shell is filled with approximately 48 grammes of Torpex 5, the total weight of the projectile being approximately 270 grammes. The remaining features of the projectile are similar to those described in Chap. 1—0.

3. The cartridge is similar to that described in Chap. 1—0 and it is fitted with the same type of

electric cap. The initiating composition consists of approximately 0.6 grains of RD 1303 impregnated with 10 per cent of graphite, and has a resistance of between 20 and 400 ohms. The cap composition consists of approximately 3.1 grains (233.28mg) of RD 1652. The annulus surrounding the cap is coated with purple varnish to act as a seal and is not for identification purposes. The propellant charge is approximately 46.5 grammes of NC, NRN.

Identification

4. The projectile is painted a deep bronze green which is its most distinguishing feature.

5. The base of the cartridge case is stamped with the code letter Tx5 to indicate the type of HE filling, namely Torpex 5, in addition to the standard markings described in Chap. 1—0.

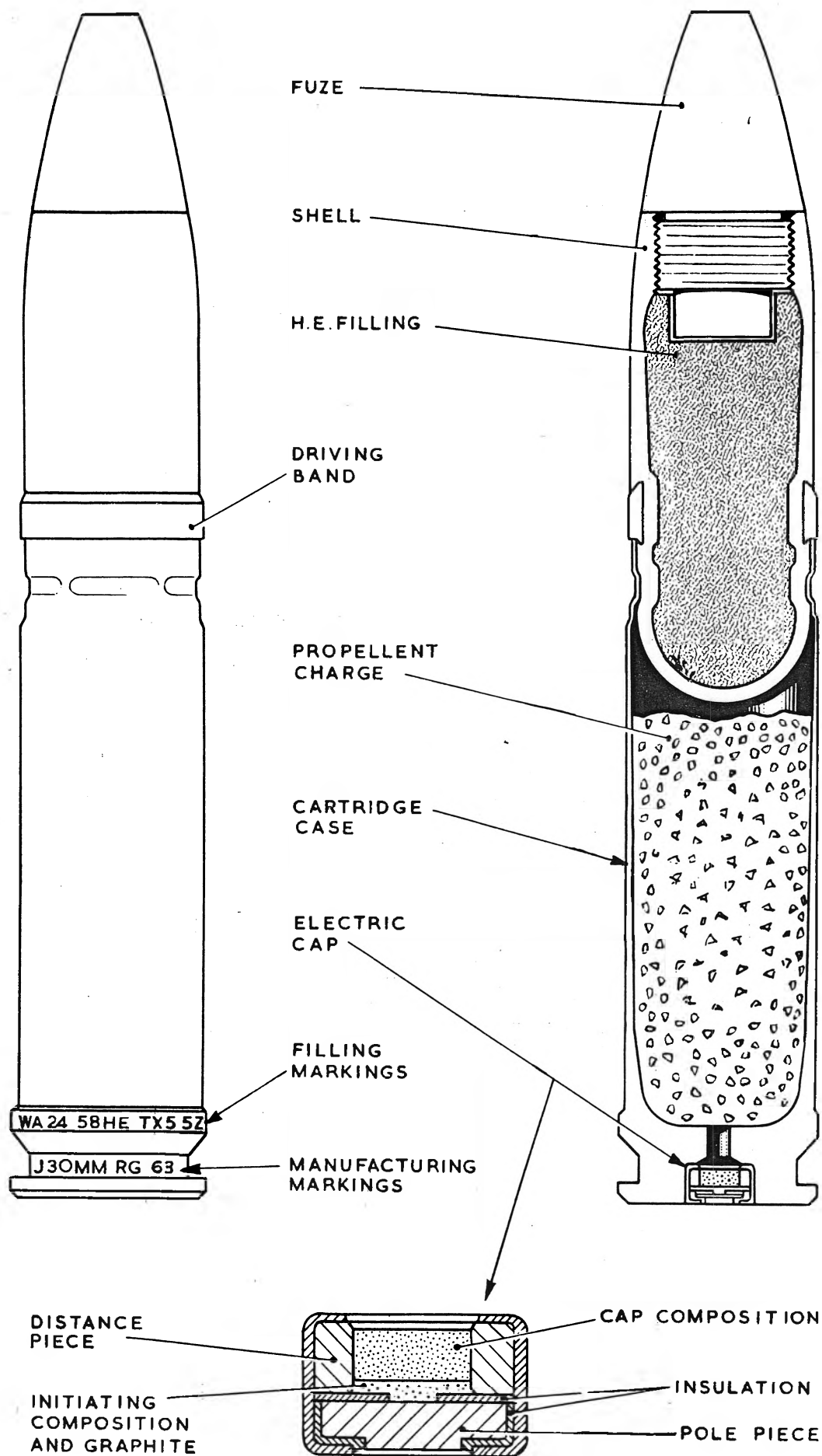


Fig. 1. Cartridge, 30mm, Aden Gun, High Explosive, Mk. 5Z

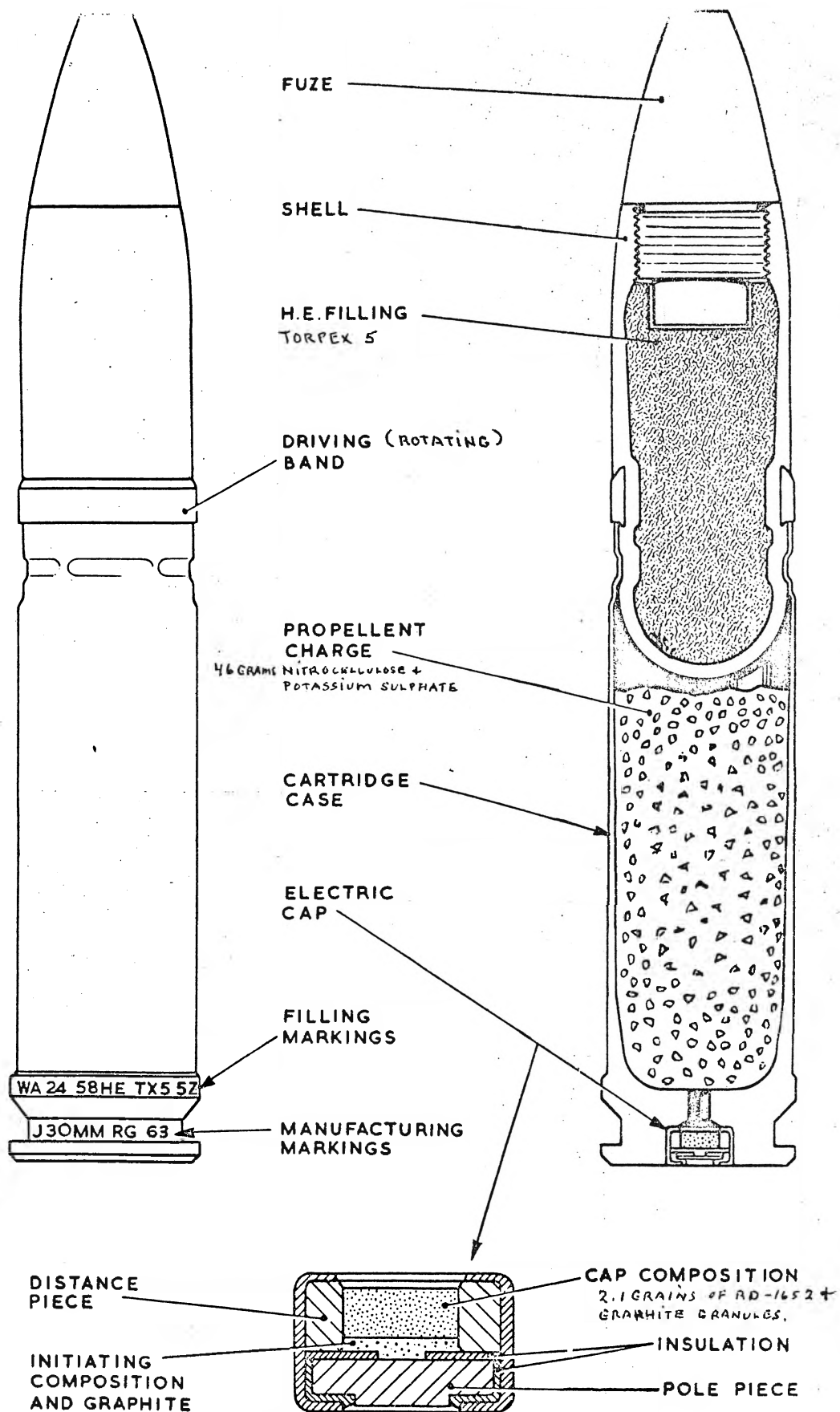


Fig. 1. Cartridge, 30mm, Aden Gun, High Explosive, Mk. 5Z

Chapter 1—6

CARTRIDGES 30mm. ADEN GUN, PRACTICE Mk. 4Z and HIGH EXPLOSIVE Mk. 6Z

Introduction

1. Both the Mk. 4Z Practice and the Mk. 6Z High Explosive will be of new manufacture to eventually replace the Practice Mk. 2Z and the High Explosive Mk. 3Z cartridges now in current use.

2. The Cartridge, 30mm. Aden gun, Practice Mk. 4Z is similar to the Practice Mk. 2Z Chap. 1—3, para. 5) but with the exception of the cap

initiating composition, and a passivated cartridge case; passivation of the case protects against corrosion. The cap initiating composition is increased to 3.1 grains (200.88mg).

3. The Cartridge, 30mm. Aden gun, High Explosive Mk. 6Z will be similar to the High Explosive Mk. 3Z but having a passivated case, and a cap initiating composition of the same weight as that contained in the Mk. 4Z Cartridge.

Chapter 2—0

FUZES FOR 30mm. AMMUNITION

General description

1. Fuzes for use with 30mm. ammunition are described in the sub-chapters to this chapter. The fuzes are supplied fitted to the projectiles and the ammunition and fuzes are stored in this condition. It is essential therefore, that a fuze is provided with adequate safety arrangements to eliminate the possibility of premature initiation of the fuze.

2. The fuzes are of the percussion type but vary slightly in their construction, their main components being the body, magazine, intermediary, detonator, hammer and/or striker, and the safety arrangements. The detonator and the intermediary, which may or may not have a small amount of delay composition incorporated in it, are contained in some form of housing. The magazine usually contains a CE pellet.

3. Whatever its number or mark, the fuze is designed to screw into the nose of the projectile. The threads are coated with cement as the fuze is being assembled to the projectile the cement acting as a seal and preventing the fuze from unscrewing whilst the ammunition is being handled.

Both the threads and the spin of the projectile are right-hand so there is a tendency for the fuze to tighten during flight.

Precautions

4. Fuzed ammunition should not be removed from its box until it is required for use, and care should be exercised when handling the ammunition to protect the fuzes from damage.

5. Fuzes are not to be removed from the projectiles or tampered with in any way. If a fuze is found to be loose or damaged the round of ammunition is to be segregated and a report rendered as stated in A.P.2608A.

Identification

6. The fuze is usually painted with the same colour as the projectile, which identifies the projectile filling and not the fuze. Stamped on the fuze are:—

- (1) The number and Mark of the fuze.
- (2) The manufacturer's initials or recognised trade mark.

Chapter 2—1

FUZE, PERCUSSION, D.A. No. 933 Mk 1

ILLUSTRATION

Fig.

1 Fuze, percussion, D.A. No. 933 Mk. 1

Introduction

1. The Fuze, percussion, DA, No. 933, Mk. 1 is used in the nose of the projectile in the 30mm HE Mk. 3Z cartridge.

General description (fig. 1)

2. The body of the fuze screws into the projectile and houses a plunger, a ring, a detonator housing, a shutter housing and a magazine cap.

3. The plunger is in the form of a truncated hollow cone, which is secured in the nose of the fuze by the inturned end of the fuze body.

4. The ring is located around the apex of the plunger, and is secured in position by an inturned rim on its lower face engaging an undercut portion of the detonator housing. The housing which screws into the fuze body, contains a 4.5 grain ZY detonator, and is provided with a flash hole.

5. The shutter housing screws into the fuze body to abut the detonator housing and is locked in position by stabbing. The shutter housing accommodates a spring, a spherical shutter, and a pressing of CE, the CE being screened from the shutter by a diaphragm.

6. The shutter contains a pressing of CE, and a sleeve filled with CE and is provided with a flash hole. The spring retains the shutter in the safe position until the projectile has left the gun barrel; thus forming a delay device which eliminates the risk of premature functioning of the projectile in the gun barrel.

7. The magazine cap screws into the fuze body, and is locked in position by stabbing. The cap contains a 2.1 gramme pellet of CE, which is separated from the CE in the shutter housing by a paper disc.

Functioning

8. When a 30mm. HE cartridge is fired, the rifling in the gun barrel causes the projectile to spin about its longitudinal axis. Centrifugal force,

induced by the spinning fuze, relieves the pressure of the spring, and the shutter moves to bring the sleeve in line with the detonator.

9. On impact, the plunger, guided by the ring, is forced inwards to fire the detonator. The CE in the sleeve and in the shutter is thereby detonated, bursting the metal diaphragm, and detonating the CE in the shutter housing. This detonates the CE pellet, which initiates the main charge in the projectile.

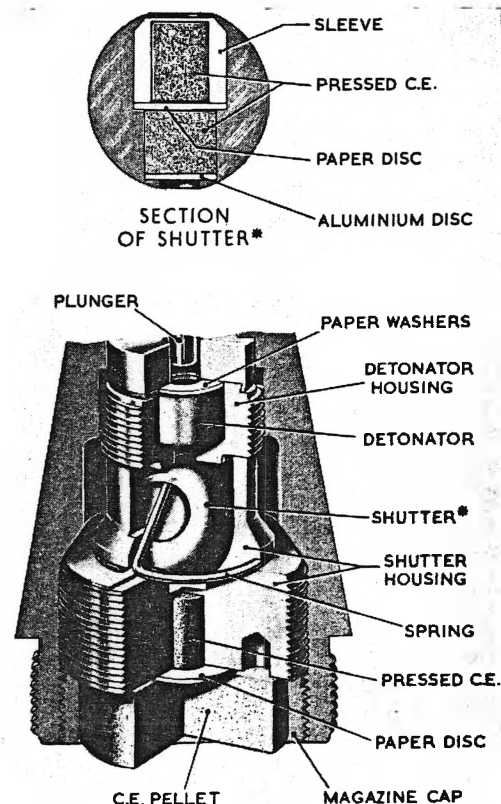


Fig. 1. Fuze, percussion, D.A. No. 933 Mk. 1

Chapter 2—2

FUZE, PERCUSSION, D.A. No. 944, Mk. 1

ILLUSTRATION

Fig.

1 Fuze, Percussion D.A. No. 944, Mk. 1

General description

1. The No. 944 D.A. fuze is a nose fuze for use with the 30mm. HE Mk. 5Z cartridge. The fuze screws into the projectile, the threads being coated with cement to form a seal and prevent the ingress of dust and moisture. The cement also prevents the fuze from unscrewing.

2. The main body of the fuze is of steel and is machined and drilled to accommodate the majority of the fuze components. The bottom of the body is threaded externally to screw into the projectile, and internally to take a shutter housing and the magazine. The threads of these parts are coated with cement which acts as a seal and prevents the parts from unscrewing. Around the body near the middle is a circumferential groove into which the base of a nose cover is crimped.

3. In the body are two diametrically opposite inclined holes in which two centrifugal bolts are situated. Until the effect of spin causes the bolts to move outwards, they are held fast by metal stirrups, tags on the stirrups engage the outer ends of the bolts and prevent the bolts from moving outwards. The inner ends of the bolts support the striker which is accommodated in an axial hole in the nose end of the body.

4. A nose block is held against the body by the nose cover and has an axial hole which accommodates the hammer. The inner end of the hammer bears against the outer end of the striker.

The striker is thus held steady by the hammer and the centrifugal bolts, until the bolts are withdrawn after the round has been fired.

5. The shutter housing accommodates a shutter and has a small pocket in its base which contains a small quantity of CE. Around the shutter housing is a groove in which a leaf spring is anchored, the purpose of the spring is to prevent inadvertent rotation of the shutter.

6. The shutter is spherical in shape and is capable of rotation within the housing. It has an axial hole in which is a baffle containing the detonator, and a sleeve containing a delay column.

The delay column consists of a small charge of RD 1320 delay composition, a pressing of lead azide, and a small quantity of CE. When the fuze is assembled during manufacture the shutter is so placed that the detonator is turned away from the striker, the shutter being held in this position by the leaf spring until the spin of the projectile causes the spring to become disengaged.

7. The magazine is of aluminium alloy and is screwed into the fuze body against the shutter housing. It accommodates a pellet of CE weighing about 2.10 grammes.

Functioning

8. When the round is fired, the projectile, in passing down the bore of the barrel, is caused to spin about its longer axis as a result of the driving band engaging the rifling; advantage is taken of the spin of the projectile to render the fuze live. As soon as sufficient force is generated, the centrifugal bolts move outwards forcing open the tags of the stirrups. When the bolts are completely withdrawn, the tags spring back into cannellures near the outer ends of the bolts and prevent the bolts from slipping back. The outward movement of the bolts frees the striker, but this does not render the fuze live because of the shutter.

9. The leaf spring, which is holding the shutter, is also caused to move outwards by the spin of the projectile and the shutter is released. The shutter now commences to spin, the spin, which is gradual at first, being induced into the shutter by the spin of the projectile. The shutter is so shaped and its weight is so displaced that the detonator and delay column becomes its axis. As the rate of spin increases the shutter gradually moves to bring the detonator and delay column (its axis) on to the axis of the fuze. When the shutter is spinning at the same speed as the projectile, they will be spinning about a common axis, the detonator will be aligned with the striker, and the fuze will be live. The positioning of the shutter takes a few milli-seconds, so that the projectile will be clear of the barrel before the fuze is rendered live.

10. The fuze therefore, has two safety arrangements, namely, the centrifugal bolts and the shutter.

11. During flight deceleration of the projectile prevents the hammer from forcing the striker on to the detonator, but on impact the nose of the fuze is crushed and the striker is driven on to the

detonator. The detonator ignites the delay composition which burns and then initiates the lead azide. The lead azide, being very sensitive, detonates and the detonating wave passes to the CE filling, and then, via the CE in the shutter housing, to the magazine pellet. The magazine pellet detonates the HE charge in the projectile, the slight delay enabling the projectile to penetrate a soft target before disruption.

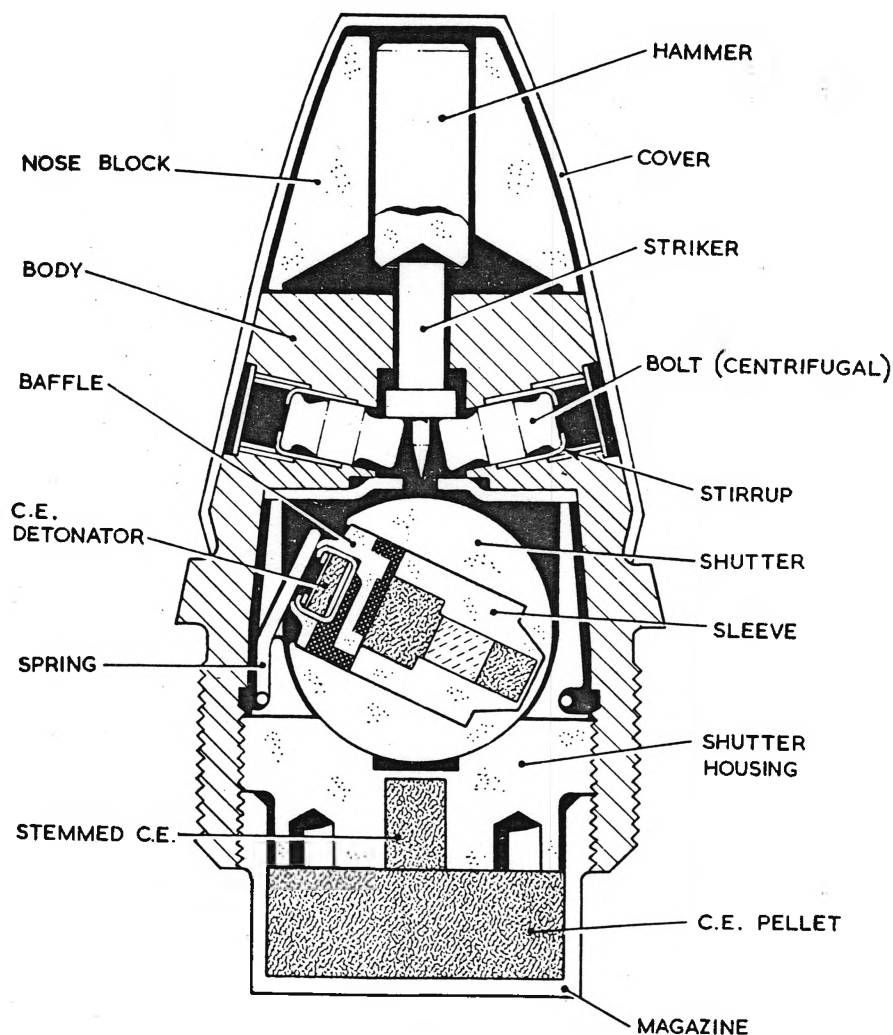


Fig. 1. Fuze, Percussion, D.A. No. 944, Mk. 1

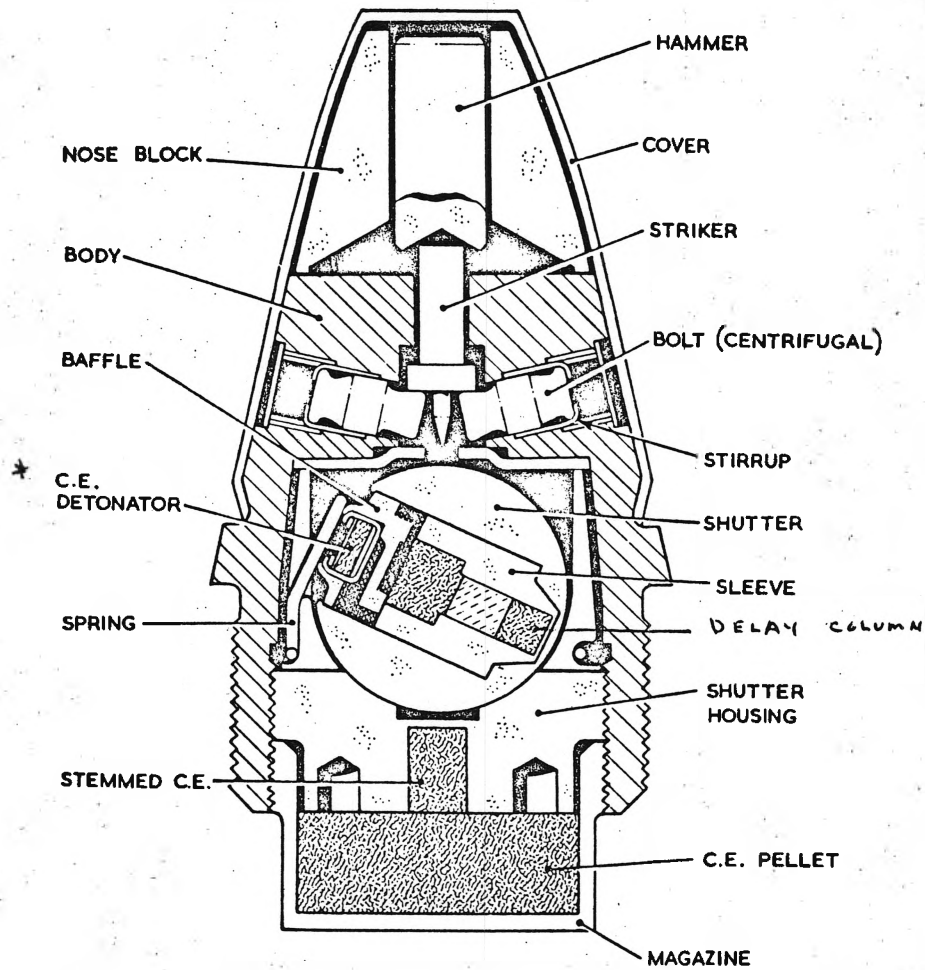


Fig. 1. Fuze, Percussion, D.A. No. 944, Mk. 1

* C.E. - COMPOSITION EXPLODING

Subject: 30 mm Ammunition
 Courses: A Mech/Fitt (W)
 Ref: AP 110L-0201-1
 Date: July 1970

1. Introduction

There are four basic types of 30 mm ammunition:

- a. Practice
- b. High explosive
- c. Drill
- d. Ballast

2. General Description of HE and practice Rounds

The HE and Practice ammunition consists of a projectile and a cartridge case, which are issued, stored and loaded together as one complete round (ie fixed ammunition). It is supplied belted in lengths of 30 rounds, made up for LH feed or RH feed. Around the projectile is a copper driving band and its functions are as follows:

- a. To form a seal between the projectile and the barrel thus preventing escape of gases past the projectile.
- b. To centralize the projectile in the bore of the barrel.
- c. To stabilize the projectile during flight. As the projectile passes along the barrel, the driving band is forced into the lands and so causes the projectile to spin.

The cartridge case is made from solid drawn brass, and in the centre of its base is a recess which houses the electric conducting cap; the recess is provided with a fire hole. Around the base is an extractor groove, and adjacent to the groove is a shoulder by which the cartridge is positioned in the chamber of the gun. The case contains a propellant charge, the nature and weight of which depends upon the type and mark of cartridge.

3. Identification, colouring and markings of HE and Practice Rounds

- a. The projectile is painted to preserve it from rust, and the colour employed indicates the nature of the filling and the type of projectile.

Practice (Mk 2Z)	-	Black Projectile	<i>Turquoise B2</i>
High Explosive (Mk 5Z)	-	Deep Bronze Green Projectile	

- b. Stamped on the shoulder of the case are the following:

- (1) Type and mark of cartridge
- (2) Monogram of Filler
- (3) Lot number
- (4) Year of filling

- c. Stamped in the extractor groove of the cartridge case is the calibre, and details of the case manufacture.

4. Functioning

When the electric firing circuit of the gun is completed, the graphite in the electric cap provides a conducting medium for the current between the pole piece, which is contacted by the firing pin, and the brass distance piece, which is earthed to the cartridge case. As the current passes through the cap, the heat generated in overcoming the resistance is sufficient to ignite the initiating composition. The initiating composition ignites the cap composition and the resultant flash ignites the propellant charge. The gases generated by the propellant charge exert

4.
Cont'd

pressure in all directions, and expand the cartridge case against the chamber of the breech cylinder; this prevents the escape of gases to the rear. (Obturation) The pressure of the gases against the base of the projectile drives it forward, the driving band engages the lands of the barrel of the gun and causes the projectile to spin.

5.

Precautions

All 30 mm ammunition is safe to handle providing normal care is exercised, and precautions detailed in AP 100L-0001-1 and AP 110L-0201-1 are strictly observed.

- a. Care must be taken that the electric cap is not struck, as a blow is liable to cause the cap to function.
- b. Changes in temperature have an adverse effect on the stability of propellents and HE fillings. Therefore, in both temperate and tropical climates, when 60 or more rounds have been fired during the previous shoot the 3 rounds in the breech cylinder of the Aden Gun are to be removed and disposed of IAW current instructions.
- c. Electro Static Risks. There is a remote possibility of the electric of 30 mm ammunition being fired by an electro static charge. There are two conditions which would cause a round to fire namely:

(1) If the pole piece of the cap is touched by an electrically charged body, such as by an operator placing a finger on the cap, without contact being made with any other part of the cap or cartridge case, and with the case earthed.

(2) If the cartridge case is touched by an electrically charged body and the pole piece of the cap earthed.

Neither of these conditions is likely to occur other than by deliberate action, but all are warned of the potential danger.

d. Misfires

If a misfire occurs, the round must be treated as dangerous, it must be re-belted, but is to be segregated and dealt with as detailed in AP 2608A augmented by Temporary Disposal Instructions.

6.

Fuzes 30 mm

DIRECT ACTING

Fuze percussion DA No 944 Mk 1 is fitted to HE Mk 5Z ammunition. It is screwed into the projectile, the threads being coated with cement for sealing, and locking the fuze in place. In the body of the fuze are two diametrically opposite inclined holes in which are two centrifugal bolts situated. The bolts are held in place by metal stirrups to prevent them moving outwards, and they support the striker preventing it from moving down. Below the striker is a spherical shutter capable of rotation within its housing. The shutter contains a detonator and a quantity of CE.

On firing, the driving band engaging the rifling, causes the projectile to spin. When sufficient force has been generated the centrifugal bolts move outwards, forcing open the stirrups and freeing the striker. A leaf spring, holding the shutter, also moves outwards releasing the shutter and allowing the projectile to impart a spin to it. The shutter is so shaped and its weight is so displaced that the detonator and delay column becomes its axis. When the shutter is spinning at the same speed as the projectile they will be spinning about a common axis. The detonator will be aligned with the striker and the fuze will be live.

The positions of the shutter takes a few milliseconds so that the projectile will clear of the barrel before the fuze is rendered live.

The fuze therefore has two safety arrangements; namely, the centrifugal bolts on the shutter.

6.
Cont'd

Warning

When handling 30 mm ammunition if a projectile is found to have a loose fuze no attempt is to be made to tighten or remove that fuze.

The suspect round is to be set aside and treated in accordance with current instructions.

7. Cartridge 30 mm Aden Gun, Drill Mk 1

Used for training personnel in gunloading, arming and re-arming aircraft gun installations, and for proving the servicing of gun and belt mechanisms.

It contains no explosive and is made entirely of steel.

8. Cartridge 30 mm Aden Gun Ballast Mk 1

Used in aircraft which require ballast in the ammunition tanks of 30 mm installations under certain conditions of flight.

THESE ROUNDS MUST NOT BE FED INTO THE FEED MECHANISM OF A GUN.

They are made from a zinc alloy die casting the rear end being closed by a plug. They have no extractor groove.

30 mm Barrels

a. After firing immerse the barrel in Stripalene for 10 mins remove barrel from cleaning compound and clamp over drip trays. Clean bore using the wire brush and Stripalene and scrubbing vigorously, vigorously, clean and dry bore and examine. If fouling is still present repeat cleaning as above. Clean the gas vent with hard brass wire taking care to remove all fouling. Lubricate with a thin film of Oil OEP -70.

b. Coppering

Coppering is a defect in the bore of a barrel which results from deposits left by the driving band. The bore is gauged for coppering at each group 'F' inspection. (800 rds + - 10%)

To de-copper a bore, plug the breech end and the gas vent with wooden plugs and fill the barrel with the following solution.

* Ammonium Persulphate	1 $\frac{1}{4}$ lb	} NOT PRE-MIXED
Ammonia SG 0.880	5 pt	
Water distilled	4 $\frac{1}{2}$ pt	

Leave for 3 hours. drain and regauge. If copper is still present repeat the process.

* Mixture must be used immediately.

