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REGULATIONS FOR ARMY ORDNANCE SERVICES
VOLUME 4—AMMUNITION
PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

AMENDMENTS No. 1

PART 1
FUZES (NUMERICAL SERIES)

By Command of the Army Co



THE WAR OF
9th Aug

**PAMPHLET No. 9—ARTILLERY FUZES, GAINES
AND TRACERS**

PART 1—FUZES (NUMERICAL SERIES)

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REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 1

FUZE, PERCUSSION, D.A., No. 44

Pam 9, Part 1, Section 1

PART 1—FUZES (NUMERICAL SERIES)

SECTION 1—FUZE, PERCUSSION, D.A., No. 44

INTRODUCTION

1. Fuze No. 44 is a direct action detonating fuze screw-threaded externally to the G.S. fuze-hole gauge (1 in. taper) and is used with the following equipments:—

Q.F., 6 pr. 10 cwt. Gun

Q.F., 12 pr. 12 cwt. Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 44, Mk. 11

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The safety cap protects the needle and needle disc from accidental damage.
- (b) The safety pin passes through the safety cap and fuze body into a seating cut on the edge of the shutter and prevents the shutter from moving into the armed position during storage and transit.
- (c) The safety pin is attached to the securing pin which is secured to the cap with a length of tarred whipcord.
- (d) The shutter, when in the unarmed position, masks off the stemmed C.E. channels in the body and detonator holder.

4. Action (Fig. 1)

(a) Before Firing

The securing and safety pins are withdrawn and the safety cap removed.

(b) On Firing

The shutter is retained in the unarmed position by friction.

(c) During Flight

The shutter overcomes the shutter spring and swings into the armed position thus carrying its stemmed C.E. fire channel into alignment with the C.E. stemmings in the detonator holder and body.

(d) On Impact

The needle disc is crushed inwards and the needle pierces the detonator. The resultant detonating wave passes through the C.E. stemmings in the detonator holder, shutter and body to detonate the C.E. pellet in the magazine.

FUZE, DRILL, PERCUSSION, D.A., No. 44, Mk. 1

5. The fuze is of brass and is similar externally to the service fuze. It is fitted with steel securing and safety pins, and a steel spring clip is riveted to the cap to retain the steel wire connecting the pins. The fuze is painted black for the purpose of identification.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 44

Pam 9, Part 1, Section 1
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	4	Brass	5 gr. F (Copper alloy shell)	(i) All marks earlier than Mk. 4 are obsolete. (ii) Fitted with an "A" type shutter. (iii) Obsolescent.
2	4*	Brass	5 gr. F (Copper alloy shell)	(i) Differs principally from the Mk. 4 in having a safety cap similar to that of the Mk. 5 fuze. (ii) Obsolescent.
3	5	Brass	5 gr. F (Copper alloy shell)	(i) Differs from previous patterns in having a new design of safety cap and a slight modification to the body. (ii) The steel safety cap has a projecting milled edge on the exterior and two bayonet joint slots in the side to engage with pins projecting from the flange of the fuze. The pins in the cap and corresponding slots in the body, as included in previous marks, are omitted. (iii) Obsolescent.
4	6	—	—	(i) Obsolete.
5	7	—	—	(i) Obsolete.
6	8	Brass	5 gr. F (Copper alloy shell)	(i) Mks. 8/2***, 8/3* and 8/4 are of Naval design and have been declared obsolete. (ii) Differs from the Mk. 4 in having a shutter ("C" type) with the recess for the reception of the spring slightly modified. (iii) Obsolescent.

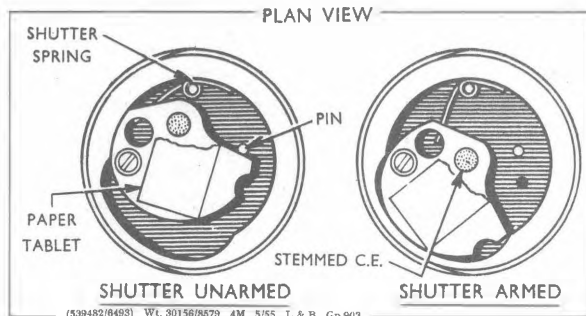
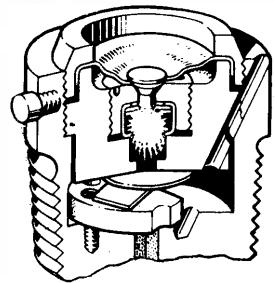
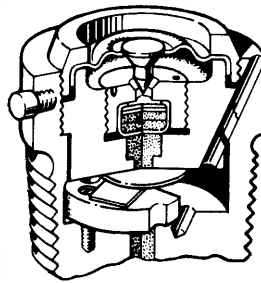
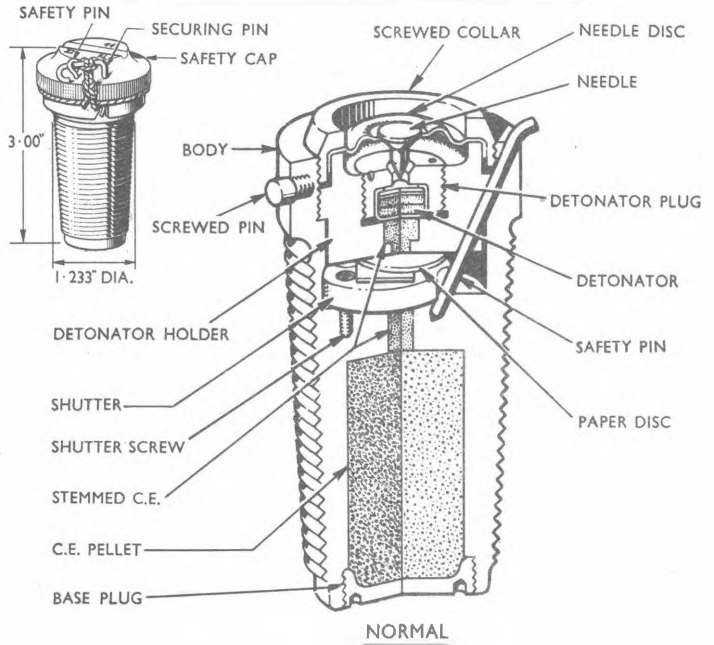
TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 44

Pam 9, Part 1, Section 1
Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
7	9	Brass	5 gr. F (Copper alloy shell)	(i) Differs from the Mk. 5 in having a shutter ("C" type) with the recess for the reception of the spring slightly modified. (ii) Obsolescent.
8	10	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mks. 10** and 10*R are of Naval design and have been declared obsolete. (ii) Differs from the Mk. 9 in being fitted with a thicker shutter. The detonator holder is correspondingly shorter and the diaphragm between the channel above the magazine and the upper cavity is slightly thicker. (iii) Obsolescent.
9	11	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 10 in having a thinner diaphragm between the channel above the magazine and the upper cavity. (ii) Obsolescent.

Note: All marks of Fuze, Percussion, D.A., No.44B and No.44P have been declared obsolete.

FUZE, PERCUSSION, D.A., No.44, MARK II



(539482/6483) Wt. 30156/8579 4M 5/55 L & B Gp 903

FIG. 1

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REGULATIONS FOR ARMY ORDNANCE SERVICES'

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 2

FUZE, PERCUSSION, D.A. IMPACT, No. 45

PART 1—FUZES (NUMERICAL SERIES)

SECTION 2—FUZE, PERCUSSION, D.A. IMPACT, No. 45

INTRODUCTION

1. Fuze No. 45 is a direct action detonating fuze, screw-threaded externally to the G.S. fuze-hole gauge (1 in. taper) and is used with the following equipments:—

Q.F., 12 pr. 12 cwt. Gun

B.L., 6 in. Gun

B.L., 9.2 in Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A. IMPACT, No. 45, Mk. 10

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

(a) The safety cap, in conjunction with the cover, protects the hammer from accidental damage and retains the safety pin in position.

(b) The safety pin passes through the screwed collar and detonator holder into a recess in the diaphragm and engages with a semi-circular slot in the edge of the shutter to prevent it from moving into the armed position during storage and transit.

(c) A shearing pin holds the hammer clear of the detonator.

(d) The shutter, when in the unarmed position, masks off the stemmed C.E. channels in the detonator plug and body.

4. *Action (Fig. 1)*

(a) *Before Firing*

The securing pin, cover, safety cap and safety pin are removed.

(b) *On Firing*

The shutter is retained in the unarmed position by friction.

(c) *During Flight*

The shutter overcomes the shutter spring and swings into the armed position thus carrying its stemmed C.E. fire channel into alignment with the C.E. stemmings in the detonator plug and body.

(d) *On Impact*

The hammer is driven inwards, the shearing pin is broken and the needle point pierces the detonator. The resultant detonating wave passes through the C.E. stemmings in the detonator plug, shutter and body to detonate the C.E. pellet in the magazine.

PART 1—FUZES (NUMERICAL SERIES)

SECTION 2—FUZE, PERCUSSION, D.A. IMPACT, No. 45

INTRODUCTION

1. Fuze No. 45 is a direct action detonating fuze, screw-threaded externally to the G.S. fuze-hole gauge (1 in. taper) and is used with the following equipments:—

Q.F., 12 pr. 12 cwt. Gun

B.L., 6 in. Gun

B.L., 9·2 in Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A. IMPACT, No. 45, Mk. 10

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

- (a) The safety cap, in conjunction with the cover, protects the hammer from accidental damage and retains the safety pin in position.
- (b) The safety pin passes through the screwed collar and detonator holder into a recess in the diaphragm and engages with a semi-circular slot in the edge of the shutter to prevent it from moving into the armed position during storage and transit.
- (c) A shearing pin holds the hammer clear of the detonator.
- (d) The shutter, when in the unarmed position, masks off the stemmed C.E. channels in the detonator plug and body.

4. *Action (Fig. 1)*

(a) *Before Firing*

The securing pin, cover, safety cap and safety pin are removed.

(b) *On Firing*

The shutter is retained in the unarmed position by friction.

(c) *During Flight*

The shutter overcomes the shutter spring and swings into the armed position thus carrying its stemmed C.E. fire channel into alignment with the C.E. stemmings in the detonator plug and body.

(d) *On Impact*

The hammer is driven inwards, the shearing pin is broken and the needle point pierces the detonator. The resultant detonating wave passes through the C.E. stemmings in the detonator plug, shutter and body to detonate the C.E. pellet in the magazine.

FUZE, DRILL, PERCUSSION, D.A. IMPACT, No. 45, Mk. 1

5. The fuze consists of the empty service fuze converted by the removal of the internal mechanism and re-assembly of the safety cap and pin. A 0.375 in diameter hole is drilled through the body and bottom plug, and the exterior of the fuze is painted black for the purpose of identification.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., IMPACT, No. 45

Pam 9, Part 1, Section 2
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	9	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) All marks earlier than Mk. 9 are obsolete. (ii) Differs from the Mk. 10 in having the gas escape hole bored obliquely through the side of the body, the exit being sealed by a brass disc. A brass disc is also spun into the top of the screwed collar to close the top of the fuze. The safety cap has two holes, one for the securing pin and the other for attachment of the cord for the safety pin. (iii) Fitted with a "D" type shutter. (iv) Obsolescent.
2	9*	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mk. 9 fuze converted after filling by fitting a new design of water-proof safety cap and cover as fitted to the Mk. 10. (ii) Fitted with a "D" type shutter. (iii) Obsolescent.
3	9/3	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mk. 3 fuze converted to approximate to the Mk. 9. (ii) Fitted with a "D" type shutter. (iii) Obsolescent.
4	9*/3	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mk. 9/3 fuze converted after filling by fitting a new design of water-proof safety cap and cover as fitted to the Mk. 10. (ii) Fitted with a "D" type shutter. (iii) Obsolescent.

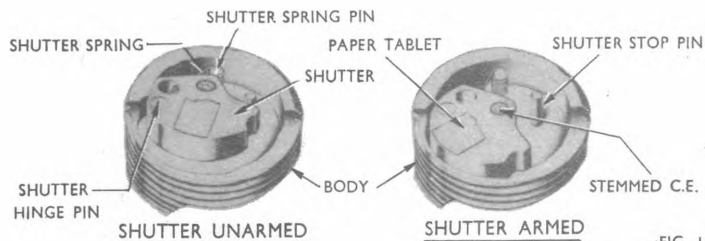
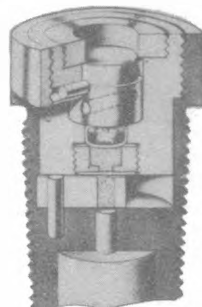
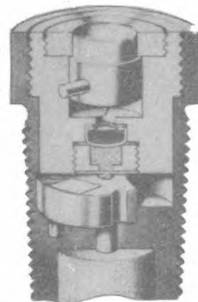
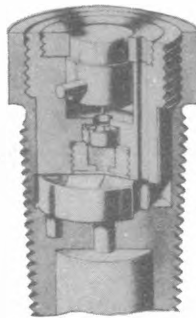
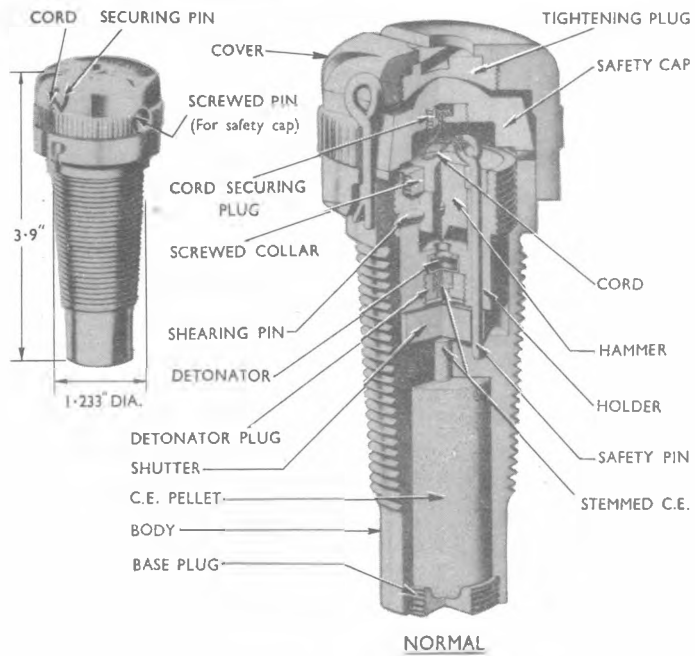
TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., IMPACT, No. 45

Pam 9, Part 1, Section 2
Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
5	9/4	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mk. 4 fuze converted to approximate to the Mk. 9. (ii) Fitted with a "D" type shutter. (iii) Obsolescent.
6	9*/4	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mk. 9/4 fuze converted after filling by fitting a new design of waterproof safety cap and cover as fitted to the Mk. 10. (ii) Fitted with a "D" type shutter. (iii) Obsolescent.
7	9/7	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mk. 7 fuze converted to approximate to the Mk. 9. (ii) Fitted with a "D" type shutter. (iii) Obsolescent.
8	9*/7	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mk. 9/7 fuze converted after filling by fitting a new design of waterproof safety cap and cover as fitted to the Mk. 10. (ii) Fitted with a "D" type shutter. (iii) Obsolescent.

9	10	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Differs principally from the Mk. 9 in being fitted with a new type of safety cap and cover. The cover is bored out and screw-threaded internally near the top to receive a tightening plug. Two counter-sunk holes diametrically opposite are drilled through the milled portion of the cover and when assembled over the top of the fuze, two screwed pins are passed through the holes and screwed into the safety cap. The fuze is rendered watertight by screwing the tightening plug down onto the safety cap, which in turn, is forced down onto a rubber washer. (ii) The fuze also differs from the Mk. 9 in that the gas escape hole is drilled vertically through the detonator holder. (iii) Fitted with a "D" type shutter. (iv) Obsolescent.
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FUZE, PERCUSSION, D.A., IMPACT No.45, MARK 10



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REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 3

FUZE, PERCUSSION, D.A. IMPACT, No. 45P

**PART 1—FUZES (NUMERICAL SERIES,
SECTION 3—FUZE, PERCUSSION, D.A. IMPACT, No. 45P**

INTRODUCTION

1. Fuze No. 45P is a direct action igniferous fuze screw-threaded externally to the G.S. fuze-hole gauge (1 in. taper) and is used with the following equipments:—

Q.F., 12 pr. 12 cwt. Gun

B.L., 6 in. Gun

B.L., 9·2 in. Gun

The fuze is similar in design to fuze No. 45 with the exception that the magazine and fire channel in the body are filled gunpowder instead of C.E. and the fire channels in the shutter and detonator plug are empty. The base plug is drilled through the centre with a flash hole which is closed by a thin brass disc.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A. IMPACT, No. 45P, Mk. 10

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

- (a) The safety cap in conjunction with the cover protects the hammer from accidental damage and retains the safety pin in position.
- (b) The safety pin passes through the screwed collar and detonator holder into a recess in the diaphragm and engages with a semi-circular slot in the edge of the shutter to prevent it from moving into the armed position during storage and transit.
- (c) A shearing pin holds the hammer clear of the detonator.
- (d) The shutter, when in the unarmed position, masks off the detonator from the gunpowder fire channel in the body.

4. *Action (Fig. 1)*

(a) *Before Firing*

The securing pin, cover, safety cap and safety pin are removed.

(b) *On Firing*

The shutter is retained in the unarmed position by friction.

(c) During Flight.

The shutter overcomes the shutter spring and swings into the armed position thus carrying its fire channel into alignment with the fire channels in the detonator plug and body.

(d) On Impact

The hammer is driven inwards, the shearing pin is broken and the needle point pierces the detonator. The resultant detonation disrupts the thin partition in the diaphragm to ignite the gunpowder fire channel in the body and, in turn, the gunpowder filling in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., IMPACT, No. 45P

Pam 9, Part 1, Section 3
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1A**	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mks. 1 and 1A are obsolete. (ii) Converted fuze No. 45, Mk. 1A**. (iii) Fitted with an "A" type shutter. (iv) Obsolescent.
2	1AC	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 1A. (ii) Differs principally from fuze No. 45P, Mk. 1A** in being fitted with a "C" type shutter. (iii) Obsolescent.
3	1*AC	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 1A** or Mk. 1A*****. (ii) Differs from fuze No. 45P, Mk. 1A** in being fitted with a "C" type shutter. (iii) Obsolescent.
4	1A*C	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 1A** or Mk. 1A*****. (ii) Differs from fuze No. 45P, Mk. 1A** in being fitted with a "C" type shutter. (iii) Obsolescent.
5	2	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 2. (ii) Differs from fuze No. 45P, Mk. 1 in being fitted with a slightly modified shutter ("A" type), the body of the fuze being cut away to accommodate it. (iii) Obsolete.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., IMPACT, No. 45P

Pam 9, Part 1, Section 3

Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
6	2C	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 2 (ii) Differs from fuze No. 45P, Mk. 2 in being fitted with a "C" type shutter. (iii) Obsolescent.
7	2*	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 2*. (ii) Converted to approximate in design to fuze No. 45P, Mk. 3. The existing gas escape hole in the fuze body is either filled with solder or closed with a disc spun in. A new gas escape hole is drilled after assembly of the new pattern holder and hammer. (iii) Fitted with an "A" type shutter. (iv) Obsolescent.
8	2*C	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 2* or 2*****. (ii) Differs principally from fuze No. 45P, Mk. 2* in being fitted with a "C" type shutter. (iii) Obsolescent.
9	2*****B	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 2*****B. (ii) Differs principally from fuze No. 45P, Mk. 2* in being fitted with a "C" type shutter. (iii) Obsolescent.

10	3	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 3. (ii) Differs from fuze No. 45P, Mk. 2 in that the holder is bored out from the bottom to receive the detonator and is closed by a screwed plug having a central flash channel. The top of the holder is bored out to receive a shortened steel hammer and a central hole is bored in the diaphragm above the detonator. Previous marks have a plug containing the detonator screwed into the holder from the top. (iii) Fitted with an "A" type shutter. (iv) Obsolescent.
11	3C	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 3. (ii) Differs from fuze No. 45P, Mk. 3 in being fitted with a "C" type shutter. (iii) Obsolescent.
12	4	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 4. (ii) Differs from fuze No. 45P, Mk. 3 in being fitted with a slightly different design of safety cap, the body of the fuze also being slightly modified. (iii) The safety cap has a projecting milled edge on the exterior and two bayonet joint slots in the side to engage with pins projecting from the head of the fuze, the pins in the cap and corresponding slots in the body of the fuze, as included in previous marks, being omitted. Two holes are drilled through the top of the cap, one in the centre to receive the cord for the safety pin, and the other near the edge for the securing pin which is secured in position with a length of cord tied round the cap. (iv) Fitted with an "A" type shutter. (v) Obsolescent.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., IMPACT, No. 45P

Pam 9, Part 1, Section 3
Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
13	4C	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 4. (ii) Differs from fuze No. 45P, Mk. 4 in being fitted with a "C" type shutter. (iii) Obsolescent.
14	7	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Mks. 5 and 6 not introduced. (ii) Converted fuze No. 45, Mk. 7. (iii) Differs from fuze No. 45P, Mk. 3 in being fitted with a "C" type shutter. (iv) Obsolescent.
15	7/1A	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 1A or Mk. 1A*****. (ii) Converted to approximate in design to fuze No. 45P, Mk. 7. (iii) Fitted with a "C" type shutter. (iv) Obsolescent.
16	7/2	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 2 or Mk. 2*****. (ii) Converted to approximate to fuze No. 45P, Mk. 7. (iii) Fitted with a "C" type shutter. (iv) Obsolescent.
17	7****/2	—	—	(i) Naval design. (ii) Obsolete.

18	8	—	—	(i) Naval design. (ii) Differs from fuze No. 45P, Mk. 4 in being fitted with a “C” type shutter. (iii) Obsolete.
19	8/2	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 2 or Mk. 2***** (ii) Converted to approximate to fuze No. 45P, Mk. 8, by fitting a “C” type shutter. (iii) Obsolescent.
20	9	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 45, Mk. 9 or of new manufacture. (ii) Differs from fuze No. 45P, Mk. 8 in that the thickness of the shutter is slightly increased, and the length of holder and detonator plug is decreased accordingly. (iii) Fitted with a “D” type shutter. (iv) Obsolescent.
21	9*	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Fuze No. 45P, Mk. 9 converted after filling by fitting a new design of waterproof safety cap and cover as fitted to fuze No. 45P, Mk. 10. (ii) Fitted with a “D” type shutter. (iii) Obsolescent.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., IMPACT, No. 45P

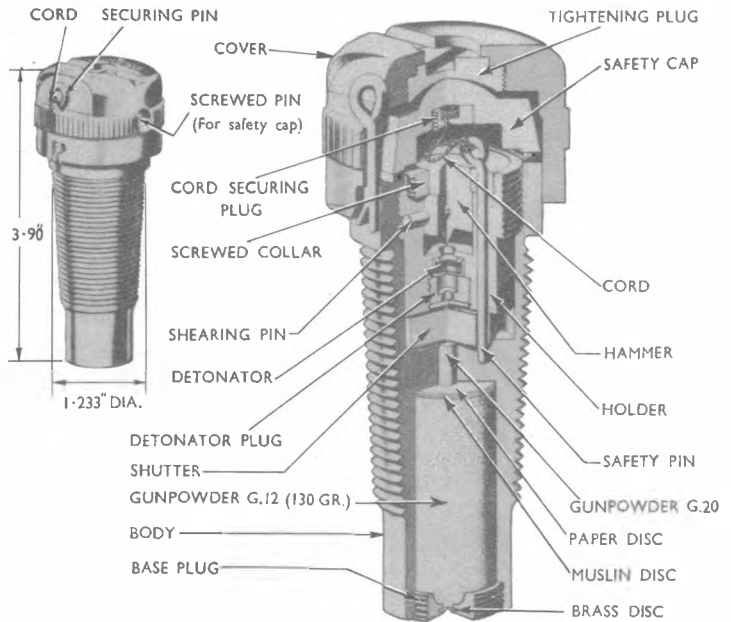
Pam 9, Part 1, Section 3
Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
22	10	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs from fuze No. 45P, Mk. 9 in being fitted with a new design of safety cap and cover. The cover is bored out and screw-threaded internally near the top to receive a tightening plug. Two counter-sunk holes diametrically opposite are drilled through the milled portion of the cover and when assembled over the top of the fuze, two screwed pins are passed through the holes and screwed into the safety cap. The fuze is rendered watertight by screwing the tightening plug down onto the safety cap, which in turn, is forced down onto a rubber washer. (ii) The fuze also differs from the Mk. 9 in that the gas escape hole is drilled vertically through the detonator holder instead of being drilled obliquely through the side of the holder and body. (iii) Fitted with a "D" type shutter. (iv) Obsolescent.
23	10/1AC	Brass	5 gr. AZ (Copper alloy shell)	(i) Fuze No. 45P, Mk. 1AC converted after filling by fitting a new design of waterproof safety cap and cover as fitted to fuze No. 45P, Mk. 10. (ii) Fitted with a "C" type shutter. (iii) Obsolescent.
24	10/1A*C	Brass	5 gr. AZ (Copper alloy shell)	(i) Fuze No. 45P, Mk. 1A*C converted after filling by fitting a new design of waterproof safety cap and cover as fitted to fuze No. 45P, Mk. 10. (ii) Fitted with a "C" type shutter. (iii) Obsolescent.

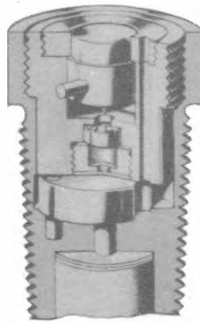
25	10/2C	Brass	5 gr. AZ (Copper alloy shell)	(i) Fuze No. 45P, Mk. 2C converted after filling by fitting a new design of waterproof safety cap and cover as fitted to fuze No. 45P, Mk. 10. (ii) Fitted with a "C" type shutter. (iii) Obsolescent.
26	10/2*C	Brass	5 gr. AZ (Copper alloy shell)	(i) Fuze No. 45P, Mk. 2*C converted after filling by fitting a new design of waterproof safety cap and cover as fitted to fuze No. 45P, Mk. 10. (ii) Fitted with a "C" type shutter. (iii) Obsolescent.
27	10/3	Brass	5 gr. AZ (Copper alloy shell)	(i) Fuze No. 45P, Mk. 3 converted after filling by fitting a new design of waterproof safety cap and cover as fitted to fuze No. 45P, Mk. 10. (ii) Fitted with an "A" type shutter. (iii) Obsolescent.
28	10/7	Brass	5 gr. AZ (Copper alloy shell)	(i) Fuze No. 45P, Mk. 7 converted after filling by fitting a new design of waterproof safety cap and cover as fitted to fuze No. 45P, Mk. 10. (ii) Fitted with a "C" type shutter. (iii) Obsolescent.
29	11/2	—	—	(i) Naval design. (ii) Obsolete.

indicates Powder Fuzed

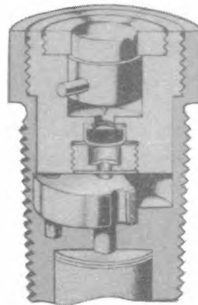
FUZE, PERCUSSION, D.A., IMPACT, No.45P, MARK 10



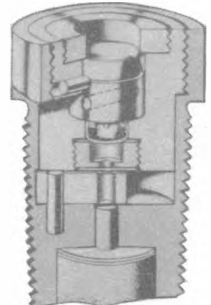
NORMAL



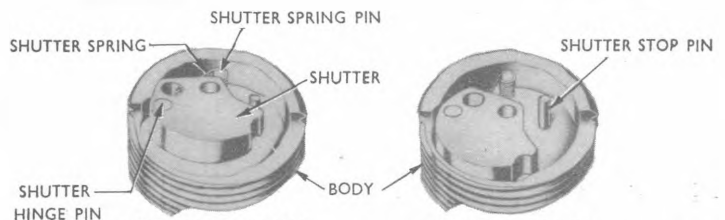
ON FIRING



DURING FLIGHT



ON IMPACT



SHUTTER UNARMED

SHUTTER ARMED

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 4

FUZE, PERCUSSION, D.A., No. 106E

PART 1—FUZES (NUMERICAL SERIES)

SECTION 4—FUZE, PERCUSSION, D.A., No. 106E

INTRODUCTION

1. Fuze No. 106E is a direct action detonating fuze of 2 in. fuze-hole gauge and is used with the following equipment:—

Q.F., 3.7 in. How.

Details of fuze marks are given in **Table 1.**

FUZE, PERCUSSION, D.A., No. 106E, Mk. 9/1

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1.**

3. Safety Arrangements

- (a) The safety cap, which is secured to the body with a soft brass sealing wire, protects the hammer, tape and half collars from accidental damage during storage and transit.
- (b) The tape and two half collars hold the hammer in the safe position and prevent the striker being driven into the detonator accidentally prior to and during loading.
- (c) The shearing wire supports the hammer and holds it clear of the detonator when the tape and half collars are thrown off during flight. The ends of the shearing wire project through to the exterior of the body and are folded round in opposite directions into a circumferential groove.
- (d) The shutter, when in the unarmed position, masks off the detonator and upper C.E. stemming from the lower C.E. stemming in the magazine fire channel.

4. Action (Fig. 2)

(a) Before Firing

The safety cap is removed.

(b) On Firing

The hammer sets back against the tape and half collars thus retaining them in position. The shutter is retained in the unarmed position by friction.

(c) During Flight

The weighted end of the tape flies outwards to unwind the tape from the half collars which then drop off. The hammer is then supported only by the shearing wire. The guide pin prevents any independent rotary movement of the hammer which might prematurely break the shearing wire. The shutter overcomes the shutter spring and swings into the armed position, thus carrying its stemmed C.E. fire channel into alignment with the C.E. stemmings in the detonator plug and magazine fire channel.

(d) On Impact

The hammer is driven in (the aluminium pad in the head of the hammer absorbs a glancing blow which might otherwise bend or break the hammer), the shearing wire is broken and the striker pierces the detonator. The resultant detonating wave passes through the C.E. stemmings in the detonator plug, shutter and magazine fire channel to detonate the C.E. pellet in the magazine.

FUZE, DRILL, PERCUSSION, D.A., No. 106E, Mk. 1

5. The Mk. 1 drill fuze consists of a solid brass body similar in external contour to the service fuze. It is fitted with a weighted copper tape and steel safety cap. The tape and weight are soldered down to prevent unwinding and the safety cap is secured by a whipcord. The exterior of the fuze is bronzed all over and the safety cap is blackened.

FUZE, DRILL, PERCUSSION, D.A., No. 106E, CONVERTED, Mk. 2

6. The fuze is converted from the service components of fuzes No. 106 or No. 106E, except No. 106, Mks. 3, 3S, 3D or 3SD. The tape with weight is soldered down to prevent unwinding, the detonator holder is omitted, the magazine is drilled with a hole to receive a set screw, and the base cap is secured by indenting the flange. In converting the fuze, when no magazines are available, the base of the fuze is fitted with a metal plug shaped to represent the magazine and base cap. The safety cap is secured by a whipcord.

The exterior of the body of brass fuzes is bronzed all over and the safety cap, base cap and fuzes with steel bodies are oil blackened.

AMMUNITION AND PACKAGE MARKINGS

7. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

8. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 106E

Pam 9, Part 1, Section 4
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Brass	4 gr. F (Copper alloy shell)	(i) Obsolescent.
2	1S	Brass	4 gr. F (Copper alloy shell)	(i) Differs from the Mk. 1 in being fitted with a hammer head of steel instead of aluminium. (ii) Obsolescent.
3	2	Brass	4 gr. F (Copper alloy shell)	(i) Differs from the Mk. 1 in having the recess in the body above the detonator plug eliminated. (ii) Obsolescent.
4	2S	Brass	4 gr. F (Copper alloy shell)	(i) Differs from the Mk. 2 in being fitted with a hammer head of steel instead of aluminium. (ii) Obsolescent.
5	3	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 106, Mks. 2 to 2ASD. The conversion consists of machining off the reduced portion of the body at the base and in boring out and screw-threading the body from the base to accommodate a larger magazine with shutter. A recess is formed in the magazine to receive a flanged detonator holder in lieu of a screwed plug. New base caps are fitted if required. (ii) Obsolescent.
6	3S	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 3 in being fitted with a hammer head of steel instead of aluminium. (ii) Obsolescent.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 106E

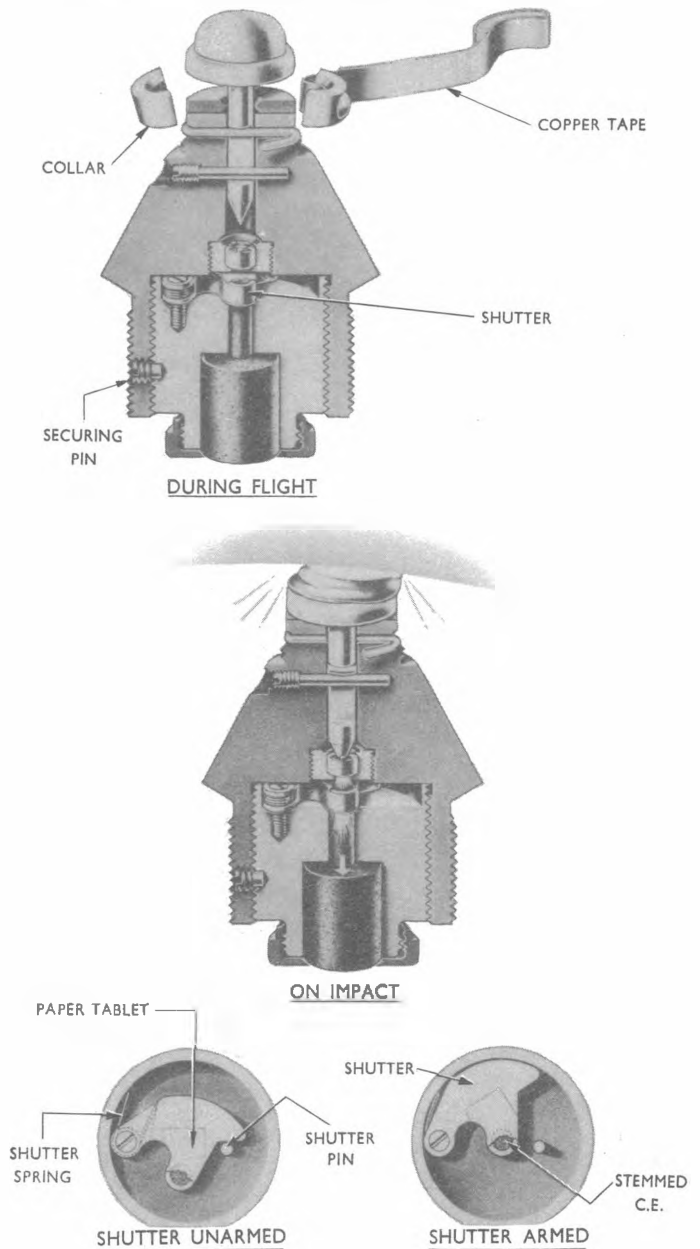
Pam 9, Part 1, Section 4
Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
7	4	Brass	5 gr. F (Copper alloy shell)	(i) Differs from the Mk. 3 in being of new manufacture throughout. The recess in the body above the detonator holder is omitted. (ii) Obsolescent.
8	5	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 4 in that the diaphragm between the shutter recess and the magazine chamber is thicker and there are various minor differences in body dimensions. (ii) Obsolescent.
9	6	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuzes Nos. 106, Mk. 1 to 5. The conversion consists of boring out the body from the base and fitting with a removable magazine, safety shutter, detonator holder and plug and in forming a thicker diaphragm between the shutter and the C.E. channel in the magazine. (ii) Obsolescent.
10	6/1	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 106E, Mk. 1. The conversion consists of fitting a thicker diaphragm and in the adjustment of various minor body dimensions. In addition, the fuze is fitted with a new metal bottom cap. (ii) Obsolescent.
11	6/3	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 106E, Mk. 3. The conversion consists of fitting a thicker diaphragm and in the adjustment of various minor body dimensions. In addition, the fuze is fitted with a new metal bottom cap. (ii) Obsolescent.

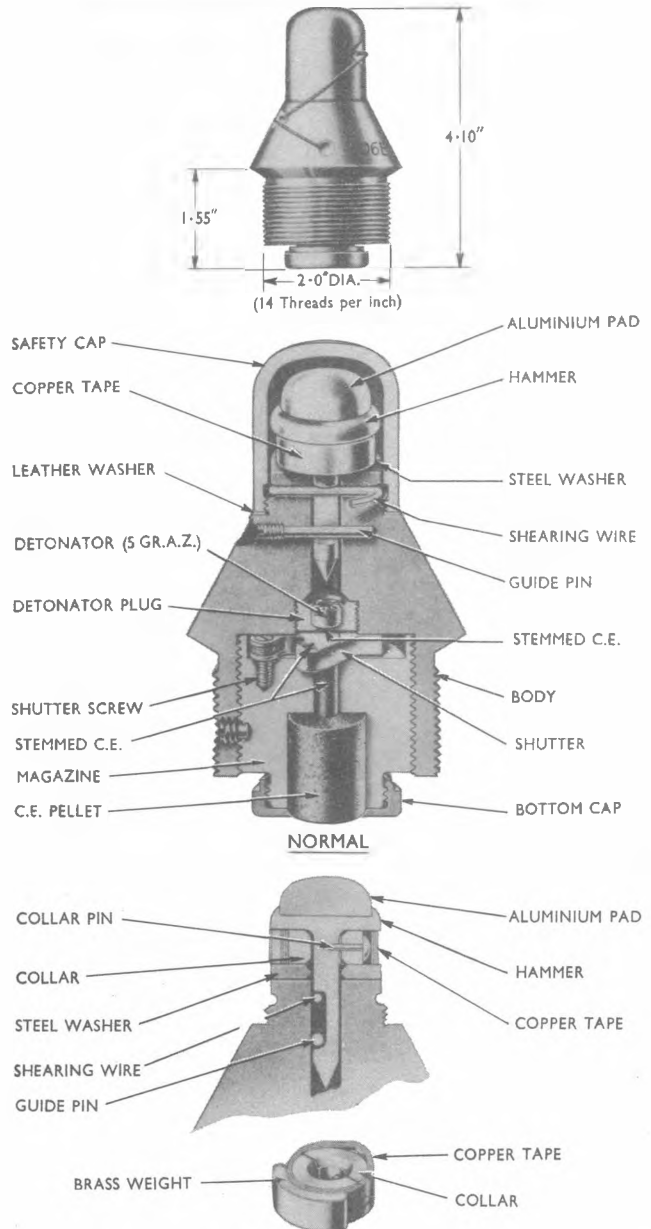
12	6/4	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 106E, Mk. 4. The conversion consists of fitting a thicker diaphragm and in the adjustment of various minor body dimensions. In addition, the fuze is fitted with a new metal bottom cap. (ii) Obsolescent.
13	7	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 106 Mks. 1 to 5. Differs from the Mk. 6 in having larger fire channels, in the detonator being housed in a plug screwed into the body, in the shutter being of a different shape and in the magazine being suitably shaped to accommodate the shutter. (ii) Obsolescent.
14	8	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Generally similar to the Mk. 7 but of new manufacture differing only in various minor dimensions. (ii) Obsolescent.
15	9	Brass	5 gr. F (Copper alloy shell) or 5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 8 in being fitted with a thinner diaphragm between the shutter and magazine channel. (ii) Obsolescent.
16	9/1	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 9 in that the shutter is assembled so that it opens in the reverse direction.
17	10	—	—	(i) Indian design.

Note: The words "PB. SPECIAL" after the mark indicate that the fuze is manufactured from lead free material.
Fuzes so marked are suitable for use with shell filled lyddite or shellite.

FUZE, PERCUSSION, D.A., No. 106E, MARK 9/1



FUZE, PERCUSSION, D.A., No. 106E, MARK 9/1



RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 5

FUZE, PERCUSSION, D.A., No. 117

PART 1—FUZES (NUMERICAL SERIES)

SECTION 5—FUZE, PERCUSSION, D.A., No. 117

INTRODUCTION

1. Fuze No. 117 is a direct action detonating fuze of 2 in. fuze-hole gauge and is used with the following equipments:—

Q.F., 25 pr. Gun

Q.F., 3·7-in. Mks. 1-3 Guns

Q.F., 5·25 in. Gun

B.L., 4·5 in. Gun

B.L., 5·5 in. Gun

B.L., 7·2 in. How.

B.L., 9·2 in. Gun

Details of fuze marks are given in Table 1.

FUZE, PERCUSSION, D.A., No. 117. Mk. 15

2. *General Assembly*

The general assembly of the fuze is illustrated at Fig. 1.

3. *Safety Arrangements*

- (a) The safety cap, which must be removed before firing, protects the striker cover and striker from accidental damage.
- (b) The striker cover protects the striker head from air resistance during flight and must not be removed.
- (c) The four brass segments, which are assembled between the guide bush and striker sleeve, hold the striker spring under compression to retain the point of the striker in the recess in the locking weight.
- (d) The shutter is held in the unarmed position by the locking weight in conjunction with the point of the striker.
- (e) When the shutter is in the unarmed position, the detonator is displaced and cannot communicate with the stemmed C.E. channel in the magazine.
- (f) To obviate shock to the detonator when the shutter revolves to the armed position, the shutter is so shaped that it can only revolve gently and the stop pin is either made of fibre or fitted with a fibre sleeve.
- (g) The two holes bored in the body diaphragm act as vent holes to relieve pressure in the shutter recess should the detonator fire prematurely. One of these holes is situated immediately above the detonator when the shutter is in the unarmed position.

4. Action (Fig. 2)

(a) Before Firing

The safety cap is removed.

(b) On Firing

The arming sleeve sets back against its spring releasing the four segments which are thrown clear.

(c) During Flight

The striker spring, which is assembled under compression, asserts itself against the underside of the striker head, forcing the striker and striker sleeve forward until the upper end of the sleeve meets the under surface of the guide bush, thus withdrawing the point of the striker from the recess in the locking weight. This allows the locking weight to revolve and in doing so its toe starts the shutter turning gently on its hinge pin. The shutter continues to revolve until it reaches the stop pin, thus locating the detonator directly beneath the striker point. The fuze is now fully armed, the striker being held clear of the detonator by the striker spring.

(d) On Impact

The striker cover is crushed and the striker head is forced inwards, compressing the striker spring. The point of the striker pierces the detonator and the resultant detonating wave passes through the C.E. stemmed channel to the C.E. pellet in the magazine.

FUZE, DRILL, PERCUSSION, D.A., No. 117, Mk. 1

5. The drill fuze is made up to represent the service fuze and is either of new manufacture or assembled from converted defective service components.

A hole is drilled in the body, magazine and bottom cap to denote that the fuze is for drill purposes only. The exterior of the fuze with the exception of the screw-threads is painted black.

GENERAL

6. Striker Cover

(a) Before 16th October 1942, a fillet of approved composition was applied at the joint between striker cover and body. After this date the application of the fillet was discontinued.

(b) Before 13th October 1942, an instructional label L.139 with the legend "DO NOT REMOVE" was affixed to the striker cover. After this date the legend was embossed on the top of the striker cover which was manufactured to design F.D. 907.

Pam 9, Part 1, Section 5

- (c) Mk. 10 fuzes and subsequent marks are assembled with a striker cover to design D3/L/2214/E/341. This design called for a heavier gauge material than that used for the cover to design F.D. 907 and the increase in thickness of the skirt made removal of the cover from the fuze impossible without the use of a special tool. The embossed legend "DO NOT REMOVE" on top of the cover was, therefore, discontinued.

7. *Safety Cap*

Before 1st October 1942, an instructional label L.1914 with the legend "WHEN PREPARING THIS FUZE FOR FIRING THE BLACK STEEL SAFETY CAP ONLY IS TO BE UNSCREWED AND REMOVED" was affixed to the safety cap. After this date the use of label L.1914 was discontinued.

8. *Guide Bush*

The exterior of the fuze at the joint between guide bush and body is waterproofed by a band of approved composition, $\frac{1}{4}$ in. in width.

9. *Fuze Body*

After 30th January 1943, the bottom of the striker bore in the fuze body was made conical in shape to facilitate correct assembly.

AMMUNITION AND PACKAGE MARKINGS

10. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

11. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 117

Pam 9, Part 1, Section 5
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	—	—	(i) Design cancelled.
2	2	Brass	5 gr. AZ (Copper alloy shell)	(i) Modified to approximate to the Mk. 3 by forming an annular recess to receive the lower end of the arming spring. No advance in mark was made. (ii) Obsolescent. OBSOLETE
3	3	Brass or zinc base alloy.	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 2 as follows:— (a) The shutter is modified in shape and may be of mazak with a brass insert instead of brass only. (b) The body may be of zinc base alloy, has minor alterations to dimensions and omission of upstand round forward end of striker hole. (ii) Obsolescent. OBSOLETE
4	3A	Brass or zinc base alloy.	5 gr. AZ (Copper alloy shell)	(i) Similar to the Mk. 3 differing principally in the shutter recess being fitted with one extra distance pin. (ii) Obsolescent. OBSOLETE
5	4	Steel	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 3 as follows:— (a) Steel body. (b) Guide bush and magazine of steel instead of brass. (ii) Obsolescent. OBSOLETE
6	5	—	—	(i) Design cancelled.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 117

Pam 9, Part 1, Section 5
Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
7	6	Cast iron	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 4 as follows:— (a) Cast iron body. (b) Mazak ring screwed under flange thus making a shorter magazine recess. (c) The shorter magazine takes a shorter and narrower pellet. (d) Longer striker below the flange. (e) Shorter magazine set screw. (ii) Obsolescent <i>OBsolete</i>
8	7	—	—	(i) Design cancelled.
9	8	Brass or zinc base alloy.	5 gr. AZ (Copper alloy shell)	(i) Similar to the Mk. 3A but the striker and striker head are of light alloy instead of steel. (ii) Obsolescent <i>Obsolete</i>
10	9	—	—	(i) Design cancelled.
11	10	Brass or zinc base alloy.	5 gr. AZ (Copper alloy shell)	(i) Converted Mk. 3A or Mk. 8. (ii) Differs from the Mk. 8 as follows:— (a) Thicker striker cover. (b) Smaller diameter striker head. (c) Steel striker and striker head. (iii) Obsolescent <i>Obsolete</i>
12	11	Brass	5 gr. AZ (Copper alloy shell)	(i) Converted Mk. 2. (ii) Differs from the Mk. 8 as follows:— (a) Thicker striker cover. (b) Smaller diameter striker head. (c) Steel striker and striker head. (d) Only one distance piece in the magazine recess. (e) Shutter of brass only and of a slightly different design. (iii) Obsolescent <i>OBsolete</i>

13	12	Brass or zinc base alloy.	5 gr. AZ (Copper alloy shell)	(i) Converted Mk. 3. (ii) Differs from the Mk. 8 as follows:— (a) Thicker striker cover. (b) Smaller diameter striker head. (c) Steel striker and striker head. (d) Only one distance piece in the magazine recess. (iii) OBSOLETE
14	13	Steel	5 gr. AZ (Copper alloy shell)	(i) Converted Mk. 4. (ii) Differs from the Mk. 8 as follows:— (a) Thicker striker cover. (b) Smaller diameter striker head. (c) Steel striker and striker head. (d) Steel body. (e) Magazine of steel instead of brass or mazak. (f) Guide bush of steel instead of brass. (iii) OBSOLETE
15	14	Brass or zinc base alloy.	5 gr. AZ (Copper alloy shell)	(i) Converted Mk. 8. (ii) Differs from the Mk. 8 as follows:— (a) Thicker striker cover. (b) Smaller diameter striker head. (iii) OBSOLETE. <i>Obsolete</i>
16	15	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 8 as follows:— (a) Thicker striker cover. (b) Smaller diameter striker head. (c) Steel striker and striker head. (ii) OBSOLETE
17	16	Brass or zinc base alloy.	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Converted Mk. 10. (ii) Differs from the Mk. 10 in being assembled with a 5.7 gr. AZ tinned lugless detonator. (iii) OBSOLETE
18	17	Brass	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Converted Mk. 15. (ii) Differs from the Mk. 15 in being assembled with a 5.7 gr. AZ tinned lugless detonator. (iii) OBSOLETE

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 117

Pam 9, Part 1, Section 5
Table 1 (Contd)

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
19	18	Brass	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 17 as follows:— (a) The shutter and locking weight are tin-plated all over. (b) The face and walls of the shutter recess, the central hole guiding the striker, the top face of the magazine and the projecting surfaces of the distance pins, hinge pins and stop pin are tin-plated.

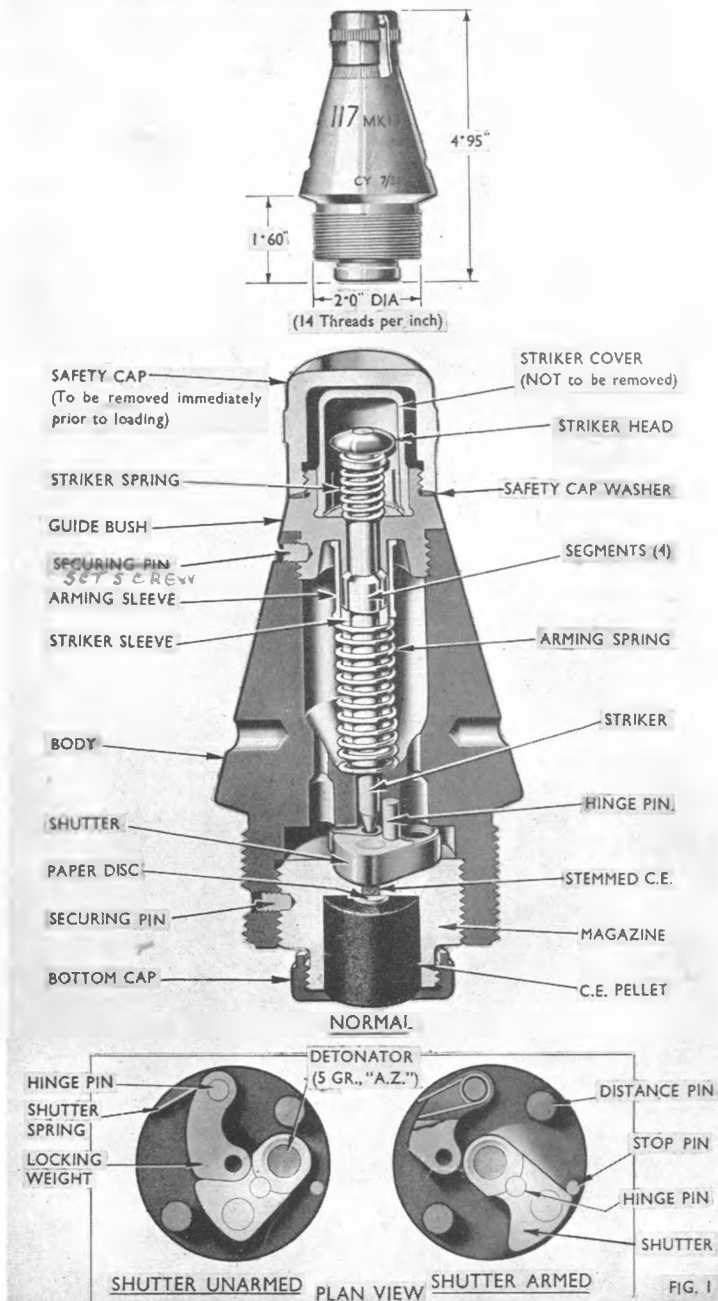
TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 117

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
19	17/1	Brass	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 17 in that the body is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze. (ii) Empty bodies of RML manufacture may be encountered with "Mk. 15" barred out. Defect reports are not necessary.
20	17/2	Brass	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Converted Mk. 15. (ii) Body is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze.
21	17/3	Brass	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Converted Mk. 17. (ii) Body is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze.
22	17/4	Brass or Zinc base alloy	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Converted empty Mk. 16. (ii) Body is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze.
23	18	Brass	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 17 as follows:— (a) The shutter and the locking weight are tin-plated all over. (b) The face and walls of the shutter recess, the central hole guiding the striker, the top face of the magazine and the projecting surfaces of the distance pins, hinge pins and stop pin are tin-plated.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 117

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
19	17/1	Brass	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 17 in that the body is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze. (ii) Empty bodies of RML manufacture may be encountered with "Mk. 15" barred out. Defect reports are not necessary.
Amdt. 10/May/58.				
(a) 22A	(b) 17/5	(c) Brass	(d) 5.7 gr. AZ (Tinned lugless copper alloy shell)	(e) Differs from all other marks as follows:— (a) The magazine cap will be made of brass. (b) A boxcloth disc is added between the pellet and magazine cap. (c) A new shortened C.E. Pellet 0.745 diam. x 0.765 long is fitted. (b) alloy shell)
				(i) Converted Mk. 15. ' is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze. verted Mk. 17. ' is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze. verted empty Mk. 16. ' is provided with a shutter gauging hole giving an additional inspection point on the assembled fuze. rs from the Mk. 17 as follows:— The shutter and the locking weight are tin-plated all over. The face and walls of the shutter recess, the central hole guiding the striker, the top face of the magazine and the projecting surfaces of the distance pins, hinge pins and stop pin are tin-plated.

FUZE, PERCUSSION, D.A., No.117, MARK 15



FUZE, PERCUSSION, D.A., No.117, MARK 15

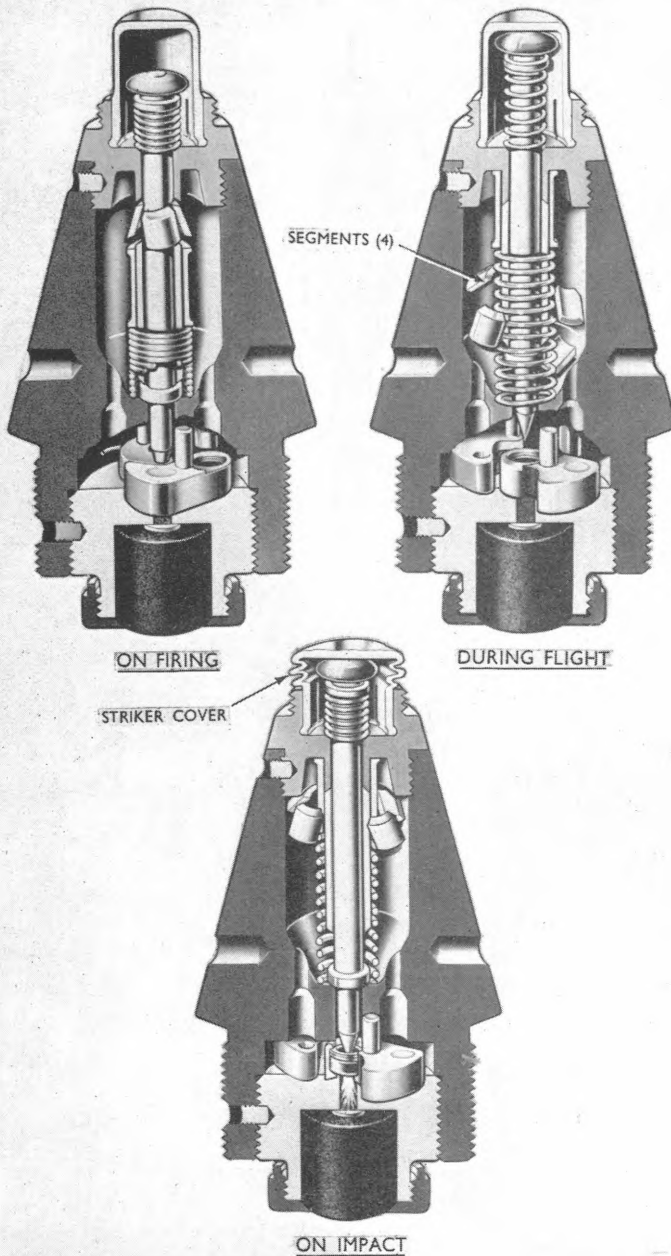


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 6

**FUZES, PERCUSSION, D.A. AND GRAZE, No. 119 AND
No. 119B**

PART 1—FUZES (NUMERICAL SERIES)

**SECTION 6—FUZES, PERCUSSION, D.A. AND GRAZE,
No. 119 AND No. 119B**

INTRODUCTION

1. Fuzes No. 119 and No. 119B are direct and graze action percussion fuzes of 2 in. fuze-hole gauge and are used with the following equipments:—

- Q.F., 25 pr. Gun
- B.L., 4.5 in. Gun
- B.L., 5.5 in. Gun
- B.L., 6 in. Gun
- B.L., 7.2 in. How.
- B.L., 9.2 in. Gun

Fuze No. 119B differs principally from the No. 119 in being fitted with a weaker detent spring.

Details of fuze marks are given in **Tables 1A and 1B.**

FUZE, PERCUSSION, D.A. AND GRAZE, No. 119B, Mk 14

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1.**

3. *Safety Arrangements*

- (a) The safety cap protects the striker cover and striker head from accidental damage.
- (b) The striker cover protects the striker head from air resistance during flight and must not be removed.
- (c) The striker is retained by the centrifugal bolt which, in turn, is retained by the detent.
- (d) The shutter is retained in the unarmed position by the shutter locking catch.
- (e) The shutter, when in the unarmed position, screens off the main detonator from the stemmed C.E. channel above the magazine.

4. *Action (Figs 1 and 2)*

(a) *Before Firing*

The safety cap is either removed or allowed to remain in position, dependent upon the nature of the target to be engaged.

(b) On Firing

The striker sets back against its spring until the shaped portion under the surface of the flange formed around the striker engages with a similarly shaped portion of the centrifugal bolt, thus preventing its movement. At the same time, the detent sets back against its spring and is prevented from rising by its stem which becomes locked under the shoulder of the detent spring recess. The shutter remains closed due to friction.

(c) During Flight

The striker moves forward under the influence of the striker spring and frees the centrifugal bolt which moves outwards and clears the striker. The striker is now supported by the striker spring, and the sleeve (inertia pellet) is prevented from moving forward by the creep spring. The shutter locking catch swings outwards to release the shutter which slides into the armed position, carrying its stemmed C.E. channel into alignment with the lower detonator and the stemmed C.E. channel leading to the magazine. When the shutter reaches the armed position, the locking pin in the side of the shutter moves out of its recess and engages behind a lug in the magazine, so locking the shutter in the open position.

(d) On Impact/Graze (Cap off)

The striker cover is crushed and the striker head is forced inwards, compressing the striker spring and the creep spring. The point of the striker pierces the detonator in the sleeve and the resultant detonating wave is transmitted through the lower detonator and C.E. stemmings to the C.E. pellet in the magazine.

If, due to the small angle of arrival or other causes, the striker is not driven in, the fuze may function by graze action, as described in Para. 4 (e).

(e) On Impact/Graze (Cap On)

Against light cover the striker is rendered inoperative by the presence of the cap, and the fuze will function by graze action. Immediately the projectile is retarded, the sleeve moves forward against the creep spring carrying the detonator onto the point of the striker. Except for a slight delay inherent in fuzes which function by graze action, all subsequent events are as previously described.

**FUZE, DRILL, PERCUSSION, D.A. AND GRAZE,
No. 119, Mk. 1**

5. The fuze is made up to represent the service fuze and is either of new manufacture or assembled from service components. A hole is drilled in the body to denote that it is for drill purposes. A knurled ring is engraved on the body and the exterior, with the exception of the screw-threads, is painted black.

GENERAL

6. *Striker Cover*

- (a) Between 1st November 1940 and 16th October 1942, a fillet of approved composition was applied between striker cover and fuze body. After 16th October 1942, the fillet was declared an optional requirement and from that date fuzes may be found without it. On 26th August 1943, however, the fillet was re-introduced.
- (b) Before 13th October 1942 an instructional label L.139 with the legend "DO NOT REMOVE" was affixed to the striker cover. After this date the legend was embossed on the top of the striker cover which was manufactured to design F.D. 907.
- (c) Fuze No. 119B, Mk. 14 and subsequent marks are assembled with a striker cover to design D3/L/2214/E/341. This design called for a heavier gauge material than that used for the cover to design F.D. 907 and the increase in thickness of the skirt made removal of the cover from the fuze impossible without the use of a special tool. The embossed legend "DO NOT REMOVE" on top of the cover was, therefore, discontinued.

7. *Safety Cap*

Before 28th August 1942 an instructional label L.508 with the legend "**THE CAP SHOULD BE LEFT ON WHEN THE TARGET IS BEHIND COVER**", was affixed to the safety cap. After this date the use of label L.508 was discontinued.

AMMUNITION AND PACKAGE MARKINGS

8. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

9. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1A—DATA FOR FUZE, PERCUSSION, D.A., AND GRAZE, No. 119 Pam 9, Part 1, Section 6
Table 1.4

Item	Mark	Body Material	Detonator		Remarks
			Sleeve	Main	
(a)	(b)	(c)	(d)	(e)	(f)
1	11	Brass	3 gr. A (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) All marks earlier than Mk. 11 are obsolete with the exception of Mks. 5, 6 and 10 which were never produced. (ii) Consists of a Mk. 3A or Mk. 4 fuze converted by fitting a new magazine, a locked shutter assembly and a weaker creep spring. (iii) <i>Obsolete</i>

TABLE 1B—DATA FOR FUZE, PERCUSSION, D.A. AND GRAZE, No. 119B Pam 9, Part 1, Section 6
Table 1B

Item	Mark	Body Material	Detonator		Remarks
			Sleeve	Main	
(a)	(b)	(c)	(d)	(e)	(f)
1	10	Brass	5 gr. AZ (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) All marks earlier than Mk. 10 are obsolete with the exception of Mk. 3, 5, 6 and 7 which were never produced. (ii) Differs principally from the Mk. 4 in being fitted with a locked shutter assembly, a striker head raising spring and a modified magazine and striker. (iii) Obsolescent.
2	11	Brass	3 gr. A (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Mk. 1 converted by fitting a new magazine, a locked shutter assembly and a weaker creep spring. (ii) Differs from the Mk. 10 in that no striker head raising spring is fitted and the inertia pellet houses a 3 gr. A instead of a 5 gr. AZ detonator.
3	12	—	—	—	(i) Allotted to India.
4	13	—	—	—	(i) Allotted to India.
5	14	Brass	5 gr. AZ (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Mk. 10 converted by fitting a magazine of brass in lieu of zinc alloy, a locked shutter assembly with minor modifications and a strengthened striker head and cover.

TABLE 1B—DATA FOR FUZE, PERCUSSION, D.A. AND GRAZE, No. 119B Pam 9, Part 1, Section 6
Table 1B (Contd)

Item	Mark	Body Material	Detonator		Remarks
			Sleeve	Main	
(a)	(b)	(c)	(d)	(e)	(f)
6	15	—	—	—	(i) Not produced. (ii) Mark held in abeyance.
7	16	—	—	—	(i) Allotted to India.
8	17	Brass	5·7 gr. AZ (Tinned lugless copper alloy shell)	5·7 gr. AZ (Tinned lugless copper alloy shell)	(i) Converted Mk. 10 or Mk. 14. (ii) Identical with the Mk. 14 except that it is fitted with two 5·7 gr. AZ tinned lugless detonators.

FUZE, PERCUSSION, D.A., AND GRAZE No. 119B, MARK 14

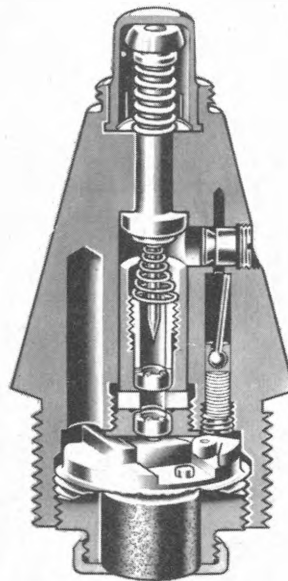
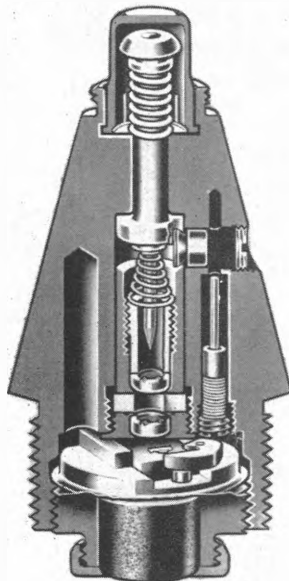
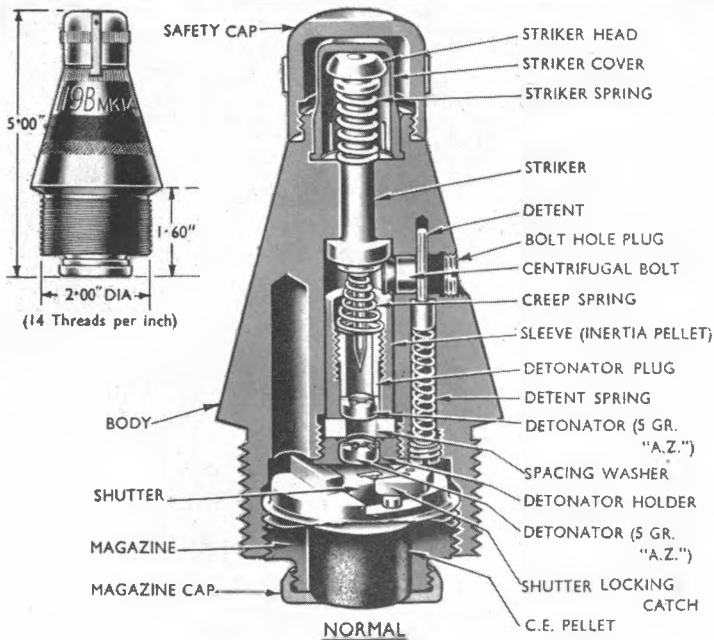


FIG. 1

FUZE, PERCUSSION, D.A., AND GRAZE No. 119B, MARK 14

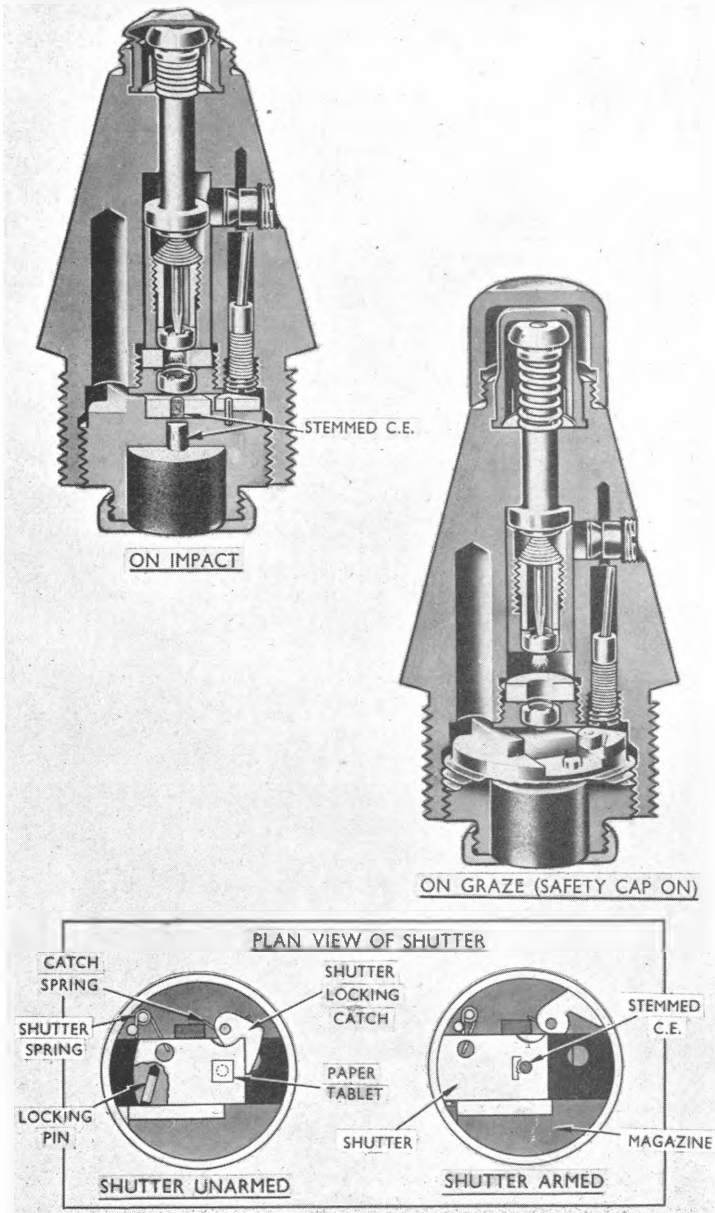


FIG. 2.

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 7

FUZE, PERCUSSION, BASE, LARGE, No. 158A

PART 1—FUZES (NUMERICAL SERIES)

SECTION 7—FUZE, PERCUSSION, BASE, LARGE No. 158A

INTRODUCTION

1. Fuze No. 158A, of 2 in. fuze-hole gauge, is a graze action base detonating fuze provided with an optional short delay and is used with the following equipment:—

B.L., 15 in. Gun.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, BASE, LARGE, No. 158A, Mk. 1

2. General Assembly

The general assembly of the fuze is illustrated at **Figs. 1–4**.

3. Safety Arrangements

- (a) The upper and lower centrifugal bolts retain the inertia pellet, thus holding the detonator clear of the needle.
- (b) The detent prevents the upper centrifugal bolt from moving outwards accidentally.
- (c) The inertia pellet, masking bolt and pea-ball provide a flash seal during storage and transit and during acceleration in the bore.

4. Delay and Non-delay Setting

Optional non-delay may be obtained when the shell incorporates either a gascheck cover plate fitted with a delay setting plug, or a night tracer fitted with a non-delay set screw by means of which the propellant gas can be prevented from exerting pressure on the delay spindle of the fuze.

Full details of base closing arrangements are given in **R.A.O.S. Volume 4—Ammunition, Pamphlet No. 6, Part 7**.

5. Action

(a) Before Firing

The optional delay/non-delay arrangement is set as required.

(b) On Firing

- (i) The inertia pellet, masking bolt and pea-ball set back thus forming a flash seal should the detonator fire prematurely. At the same time the detent sets back against its spring and is prevented from rising by its stem, which becomes locked under the shoulder of the detent spring recess.

(ii) *When Set Delay*

The propellant gas reaches the pocket in the gascheck plate and exerts pressure on the pressure plate of the delay spindle. This forces the spindle into its recess, thus closing one side of the cross channel. The flash can then pass only through that arm of the cross channel containing the delay fitment.

(iii) *When Set Non-delay*

The propellant gas is prevented from entering the pocket in the gascheck plate and from exerting pressure on the pressure plate of the delay spindle. Both sides of the cross channel, therefore, remain open and the flash can pass directly to the ignition chamber.

(c) *During Flight*

The upper centrifugal bolt retaining the inertia pellet flies outwards and is disengaged from the inertia pellet. The lower centrifugal bolt retaining the masking bolt flies outwards, compresses its spring and releases the masking bolt which also moves outwards and unmask the central channel in the inertia pellet. The centrifugal bolt retaining the pea-ball flies outwards, compresses its spring and releases the pea-ball which rolls into the horizontal channel, thereby unmasking the flash channel in the lower part of the body. The fuze is now fully armed and the inertia pellet with its detonator is held clear of the needle only by the creep spring.

(d) *On Impact or Graze*

(i) The inertia pellet overcomes the creep spring and carries the detonator onto the needle, and at the same time the circular flange at the base of the inertia pellet is withdrawn from the recess in the body, thus permitting communication between the oblique channel in the inertia pellet and the flash channel in the lower part of the body. The coned front end of the inertia pellet jams tightly in the tapered entrance of the needle cap and prevents the pellet from rebounding. The detonator is fired and the resultant flash passes through the flash channel of the inertia pellet to the cross channel in the lower part of the body.

(ii) *When Set Delay*

The flash passes through the open side of the cross channel to the delay fitment, which burns through to ignite the perforated gunpowder pellets in the flash channel. The pressure and heat from the explosion of the gunpowder pellets is sufficient to detonate the C.E. pellet in the ignition chamber and, in turn, the C.E. in the vertical channel, the C.E. magazine ring and the picric powder pellet in the magazine.

Pam 9, Part 1, Section 7

(iii) *When Set Non-delay*

The flash from the detonator reaches the cross channel. It is delayed by the delay fitment on one side, but reaches the gunpowder pellets in the flash channel by passing over the head of the delay spindle, thus avoiding the delaying action of the delay fitment. Subsequent action is then as previously described.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

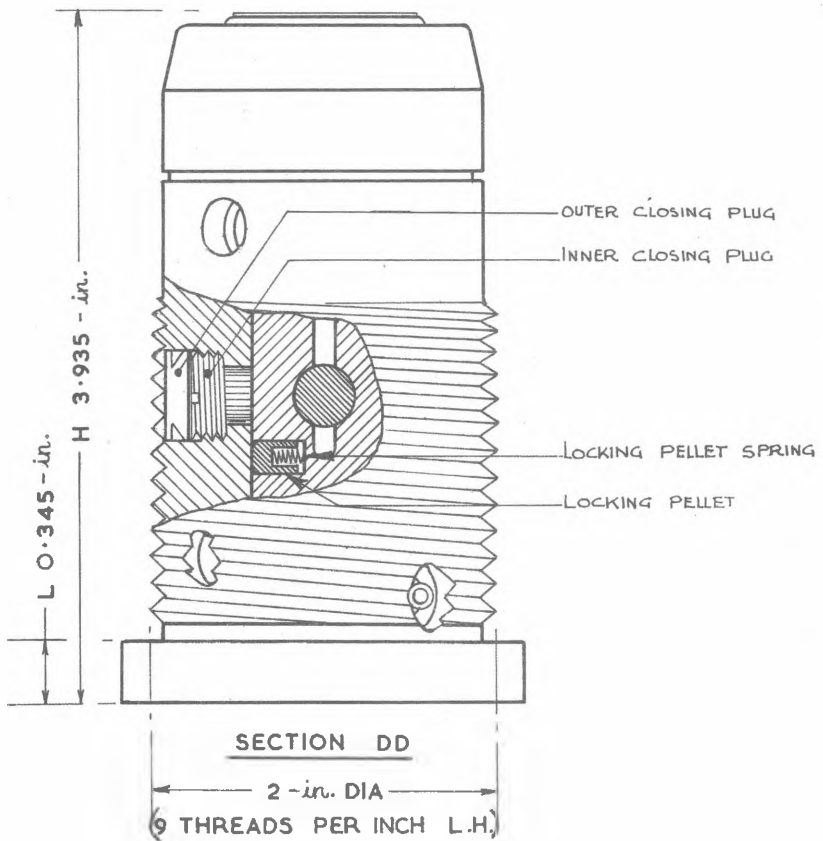
7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, LARGE, No. 158A

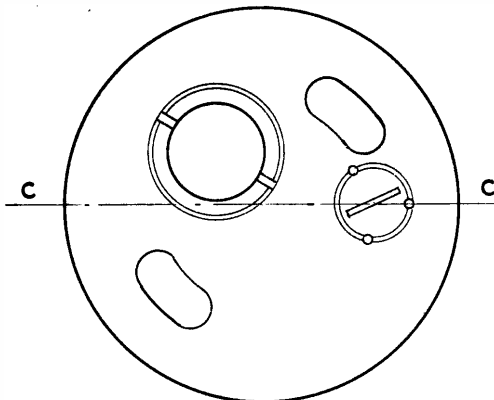
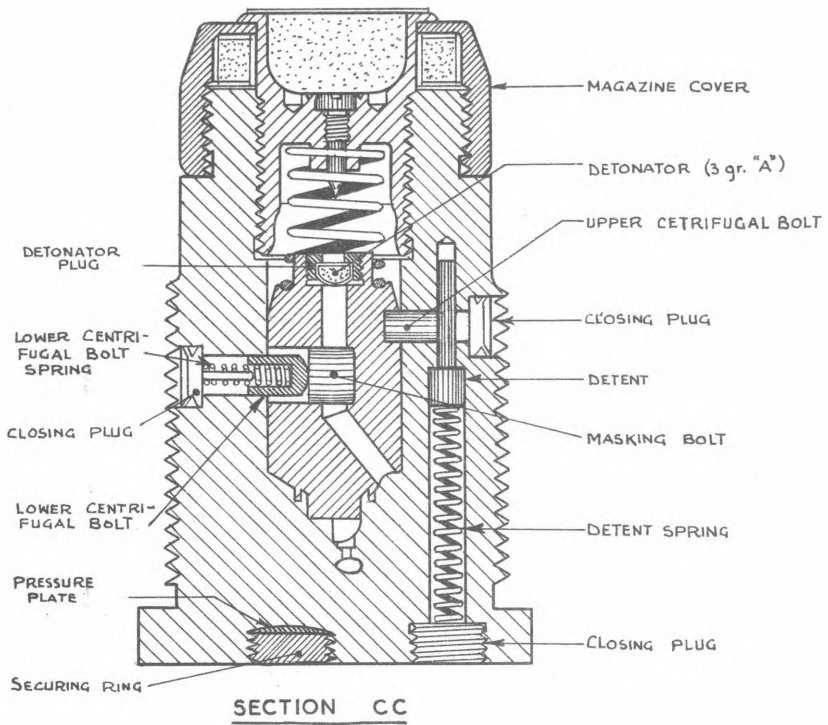
Pam 9, Part 1, Section 7
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Bronze	3 gr. A (Copper alloy shell)	(i) Naval design. Used in the Land Service for Coast Artillery. (ii) Generally similar in design to fuze No. 159 differing principally in being assembled with a shorter magazine and a smaller magazine pellet of picric powder instead of C.E. (iii) It was found that the guide pin, locking pellet and locking pellet spring were not essential. These components, therefore, are omitted from fuzes manufactured after February 1928. The guide pin was included to ensure that the inertia pellet rotated with the fuze during flight and the locking pellet was fitted to prevent the inertia pellet rebounding on impact. (iv) Obsolescent.

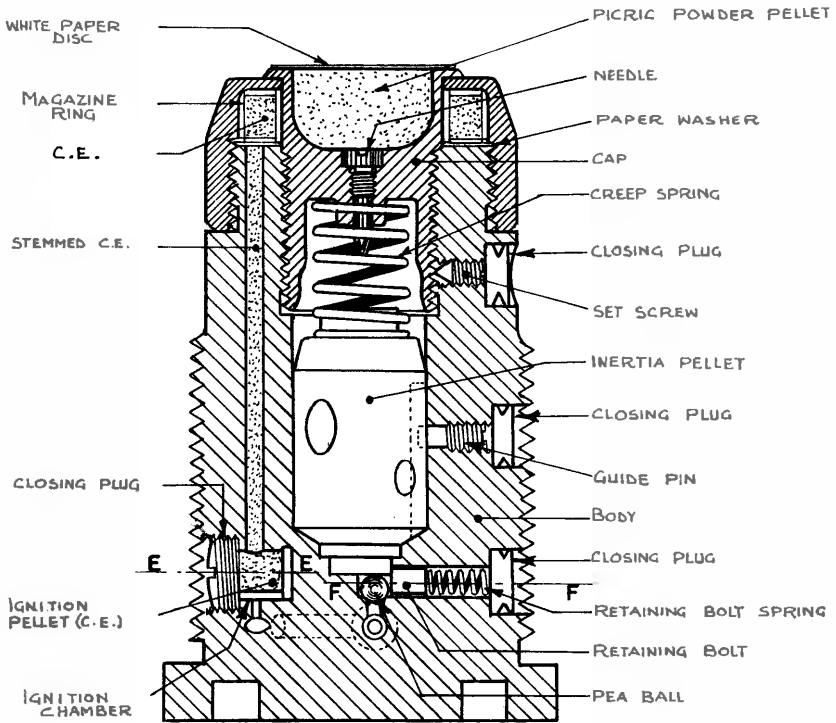
FUZE, PERCUSSION, BASE, LARGE, No.158A, MARK I



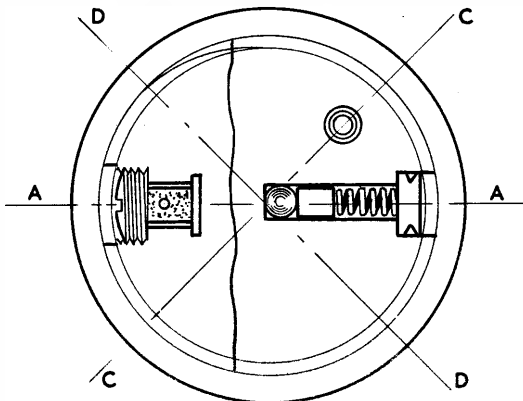
FUZE, PERCUSSION, BASE, LARGE, No.158A, MARK I



FUZE, PERCUSSION, BASE, LARGE, No.158A, MARK I



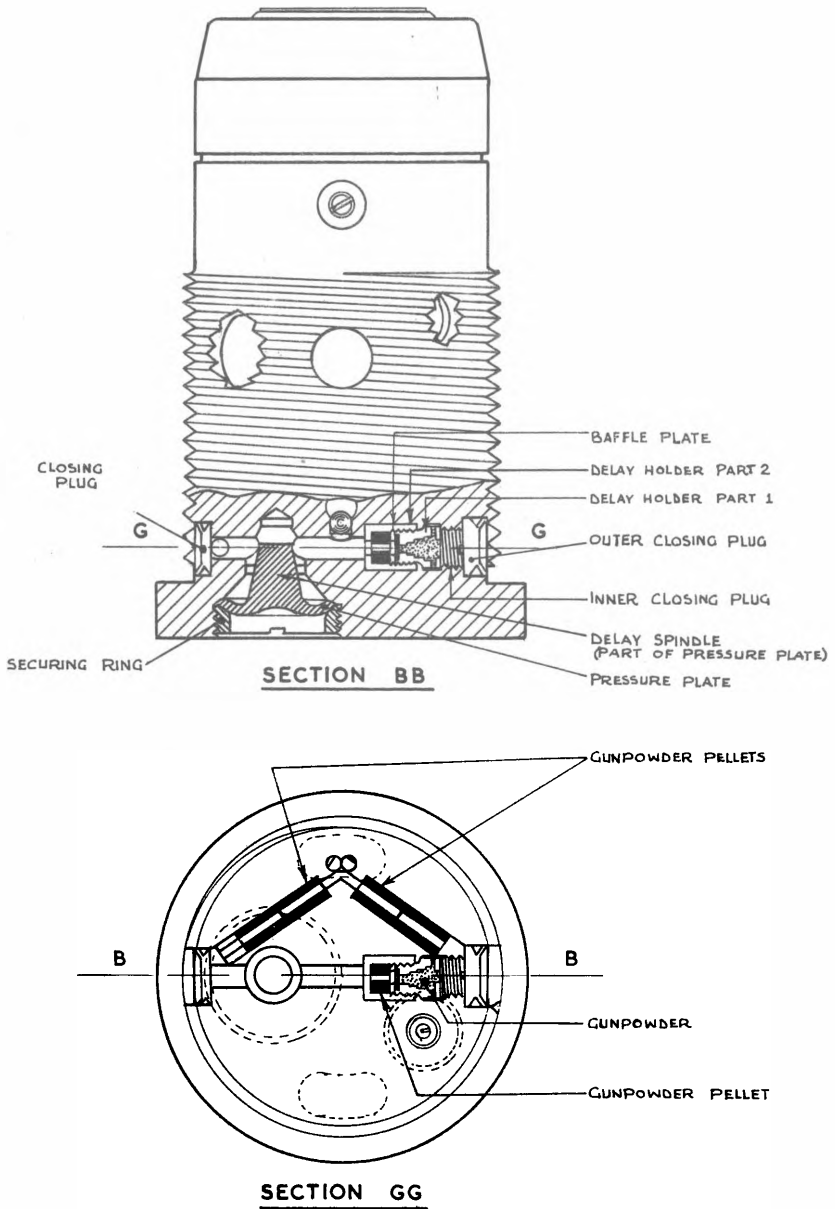
SECTION AA



SECTION EE

SECTION FF

FUZE, PERCUSSION, BASE, LARGE, No.158A, MARK I



RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 8

FUZE, PERCUSSION, BASE, LARGE, No. 159

*Whole of Section 8
deleted like above 11*

Pam 9, Part 1, Section 8

PART 1—FUZES (NUMERICAL SERIES)

SECTION 8—FUZE, PERCUSSION, BASE, LARGE, No. 159

INTRODUCTION

1. Fuze No. 159, of 2 in. fuze-hole gauge, is a graze action base detonating fuze provided with an optional short delay and is used with the following equipment:—

B.L., 15 in. Gun

The fuze is similar in design to fuzes No. 346 and No. 480 differing principally in the strength of creep spring which compresses under a load of 3 lb. 9 oz.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, BASE, LARGE, No. 159, Mk. 2

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The upper and lower centrifugal bolts retain the inertia pellet thus holding the detonator clear of the needle.
- (b) The detent prevents the upper centrifugal bolt from moving outwards accidentally.
- (c) The inertia pellet, masking bolt and pea-ball provide a flash seal during storage and transit and during acceleration in the bore.

4. Delay and Non-delay Setting

Optional non-delay may be obtained when the shell incorporates either a gascheck cover plate fitted with a delay setting plug, or a night tracer fitted with a non-delay set screw by means of which the propellant gas can be prevented from exerting pressure on the delay spindle of the fuze.

Full details of base closing arrangements are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 6, Part 7.

5. Action (Figs. 1 and 2)

(a) Before Firing

The optional delay/non-delay arrangement is set as required.

(b) On Firing

- (i) The inertia pellet, masking bolt and pea-ball set back thus forming a flash seal should the detonator fire prematurely. At the same time the detent sets back against its spring, and is prevented from rising by its stem, which becomes locked under the shoulder of the detent spring recess.

(ii) *When Set Delay*

The propellant gas reaches the pocket in the gas-check plate and exerts pressure on the pressure plate of the delay spindle. This forces the spindle into its recess, thus closing one side of the cross channel. The flash can then pass only through that arm of the cross channel fitted with delay composition.

(iii) *When Set Non-delay*

The propellant gas is prevented from entering the pocket in the gascheck plate and from exerting pressure on the pressure plate of the delay spindle. Both sides of the cross channel, therefore, remain open and the flash can pass directly to the ignition chamber.

(c) *During Flight*

The upper centrifugal bolt retaining the inertia pellet flies outwards and is disengaged from the inertia pellet. The lower centrifugal bolt retaining the masking bolt flies outwards, compresses its spring and releases the masking bolt which also moves outwards and unmask the central channel in the inertia pellet. The centrifugal bolt retaining the pea-ball flies outwards, compresses its spring and releases the pea-ball which rolls into the horizontal channel, thereby unmasking the flash channel in the lower part of the body. The fuze is now fully armed and the inertia pellet with its detonator is held clear of the needle only by the creep spring.

(d) *On Impact/Graze*

(i) The inertia pellet overcomes the creep spring and carries the detonator onto the needle, and at the same time the circular flange at the base of the inertia pellet is withdrawn from the recess in the body, thus permitting communication between the oblique channel in the inertia pellet and the flash channel in the lower part of the body. The coned front end of the inertia pellet jams tightly in the tapered entrance of the needle cap and prevents the pellet from rebounding. The detonator is fired and the resultant flash passes through the flash channel of the inertia pellet to the cross channel in the lower part of the body.

(ii) *When Set Delay*

The flash passes through the open side of the cross channel to the delay fitment, which burns through to ignite the perforated gunpowder pellet in the flash channel, and in turn, the perforated gunpowder pellet in the ignition chamber. The pressure and heat from the explosion of the ignition pellet passes through the small hole in the closing plug to detonate the C.E. in the vertical channel and the C.E. pellet in the magazine.

Pam 9, Part 1, Section 8

(iii) *When Set Non-delay*

The flash from the detonator reaches the cross channel. It is delayed by the delay fitment on one side, but reaches the ignition chamber by passing over the head of the delay spindle, thus avoiding the delaying action of the delay fitment. Subsequent action is then as previously described.

AMMUNITION AND PACKAGE MARKINGS

- 6.** See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

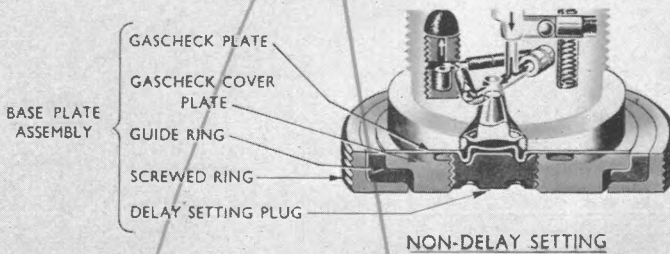
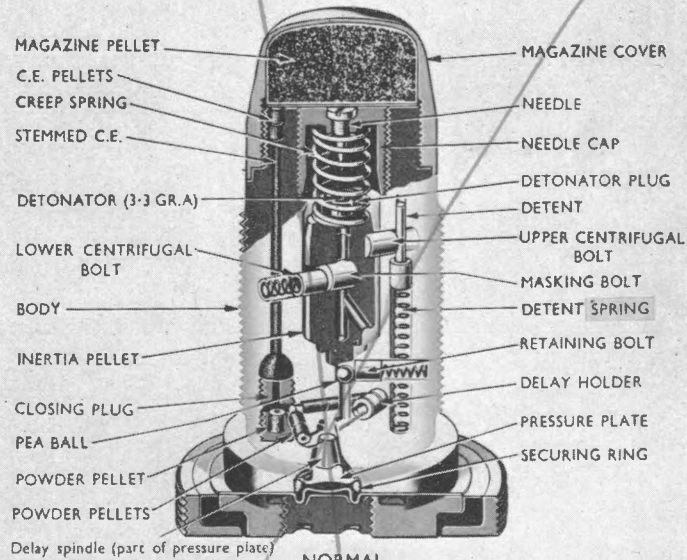
- 7.** Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, LARGE No. 159

Pam 9, Part 1, Section 8
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	—	—	(i) Naval design.
2	2	Bronze	3.3 gr. A (Copper alloy shell)	(i) Before 13 July 1943 fuzes were assembled with Detonator 3 gr. A.

FUZE, PERCUSSION, BASE, LARGE No.159, MARK 2



2.0" DIA
(9 Threads per inch L.H.)

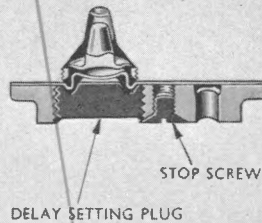
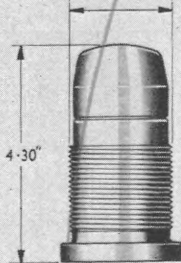


FIG. 1

FUZE, PERCUSSION, BASE, LARGE No.159, MARK 2

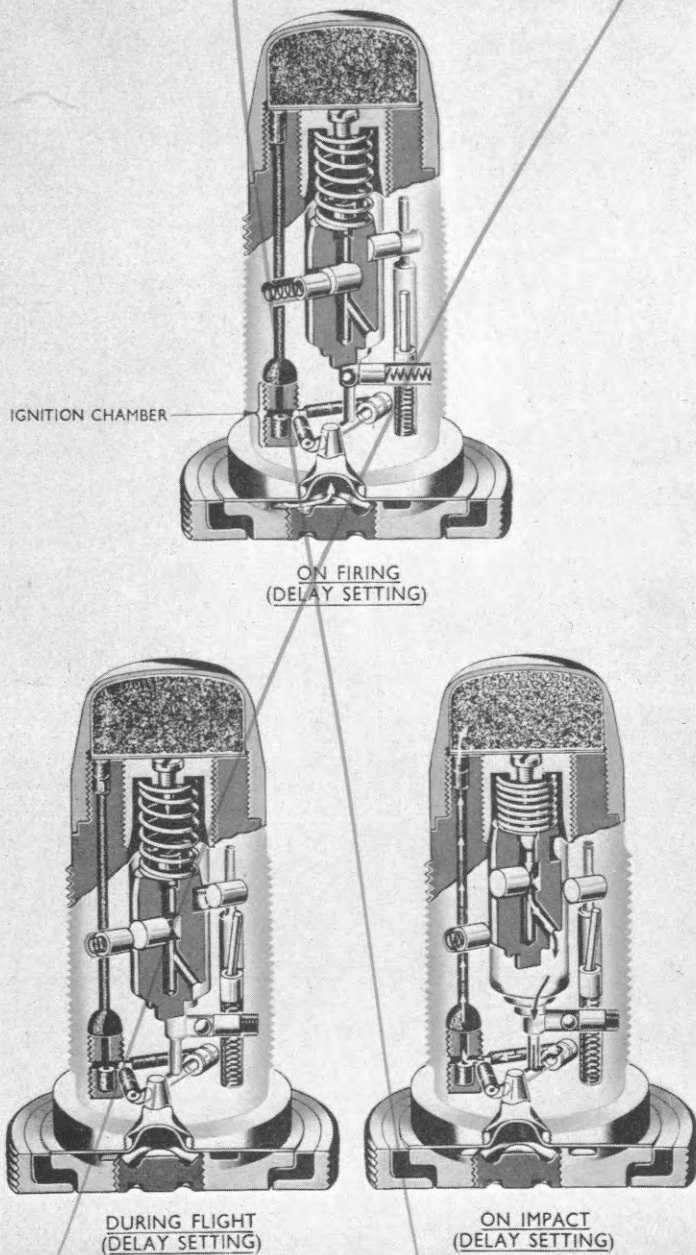


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 9

FUZE, TIME, No. 207

PART 1—FUZES (NUMERICAL SERIES)

SECTION 9—FUZE, TIME, No. 207

INTRODUCTION

1. Fuze No. 207 is an igniferous mechanical time fuze which incorporates a clockwork mechanism of the Thiel type. The fuze, of 2 in. fuze-hole gauge, is used with the following equipment:—

Q.F., 3.7 in. Mks. 1—3 Guns

The movement is generally similar to that of the detonating time fuze No. 208.

Details of fuze marks are given in Table 1.

FUZE, TIME, No. 207, Mk. 1 *Obsolete*

2. *General Assembly*

The general assembly of the fuze and time mechanism is illustrated at Figs. 1 and 2.

The upper portion of the coned surface of the body is graduated from 0 to 30 and a small ungraduated portion between the two numbers is marked with a red arrow head against the word "SAFE". When set at safe, the setting mark engraved on the dome coincides with the arrow head. The maximum time of running is 45 seconds.

3. *Safety Arrangements*

- (a) When the fuze is set at "SAFE", the trigger safety catch is forced in by the stud inside the dome. The catch engages under the trigger and prevents it setting back to release the hand. Immediately the dome is rotated the stud releases the catch which is forced out by its spring.
- (b) The trigger prevents the hand from rotating and the time mechanism from starting until the gun is fired.
- (c) The tensioning wire ring in conjunction with the screwed collar prevents the dome being accidentally moved in storage and transit and after the fuze has been set.
- (d) Three equi-spaced wire rivets secure the locking ring to the wall of the dome thus preventing any movement of the locking ring before firing.
- (e) The centrifugal safety catch, which is housed under the striker cam until the shell rotates in flight, serves a dual purpose:—
 - (i) In the event of the time mechanism being set in action accidentally, the catch prevents the striker reaching the detonator.

- (ii) If a fuze with the time mechanism accidentally set in action were loaded and the gun fired, the centrifugal safety catch would be prevented from swinging out from under the striker cam as the latter would, immediately the hand is lifted, jam down onto a step cut in the catch for this purpose and hold it firmly in place.

4. *Action*

(a) *Before Firing*

The dome of the fuze is rotated until the indicating line is coincident with the required graduation on the body, thus positioning the hand-race slot.

(b) *On Firing*

The locking ring in the dome sets back, shears the three wire rivets and is impaled on the five steel pins in the body, thus locking itself and preventing any movement of the dome by reason of the guide pin in the dome being still engaged in the guide slot in the locking ring. Immediately the ring has set back, the two flat springs attached to the periphery of the top plate move outwards and engage the upper end of the ring, thereby retaining it. The trigger sets back, its top projection clears the hand and the trigger locking bolt is forced outwards by its spring into a notch in the barrel plate, thereby retaining the trigger in the set back position and releasing the hand. During acceleration in the bore it is unlikely that the pallet will oscillate owing to the force of set back.

(c) *During Flight*

On leaving the bore the oscillation of the pallet starts the time mechanism and the hand begins to rotate by the action of the mainspring. The centrifugal safety catch flies outwards to leave the striker supported only by its cam resting on the bevelled surface of the pillar.

(d) *At the end of the Time as Set*

The hand reaches the hand-race slot, into which it rises under the influence of its spring and releases the lever which controls the striker. The lever flies outwards under the action of the striker spring in conjunction with the bevelled surface of the cam and coned pillar, the cam is rotated off the pillar and the striker is forced into the detonator. The resultant flash ignites the gunpowder in the magazine.

FUZE, DRILL, TIME No. 207 ~~or No. 208~~, Mk. 1

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 9, Part No. 1, Section No. 10.

AMMUNITION AND PACKAGE MARKINGS

- 6.** See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

- 7.** Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

AMMUNITION AND PACKAGE MARKINGS

- 6.** See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

- 7.** Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, TIME, No. 207

Pam 9, Part 1, Section 9
Table 1

Item	Mark	Material			Detonator	Remarks
		Body	Dome	Cap		
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	1	Metal	Aluminium alloy	Aluminium alloy or moulded plastic.	3 gr. A. (Copper alloy shell)	(i) Obsolescent. <i>Obsolete</i>
2	2	—	—	—	—	(i) Naval design.
3	3	—	—	—	—	(i) Naval design.
4	4	—	—	—	—	(i) Design cancelled.
5	5	—	—	—	—	(i) Design cancelled.

FUZE, TIME, No. 207, MARK I.

Revised

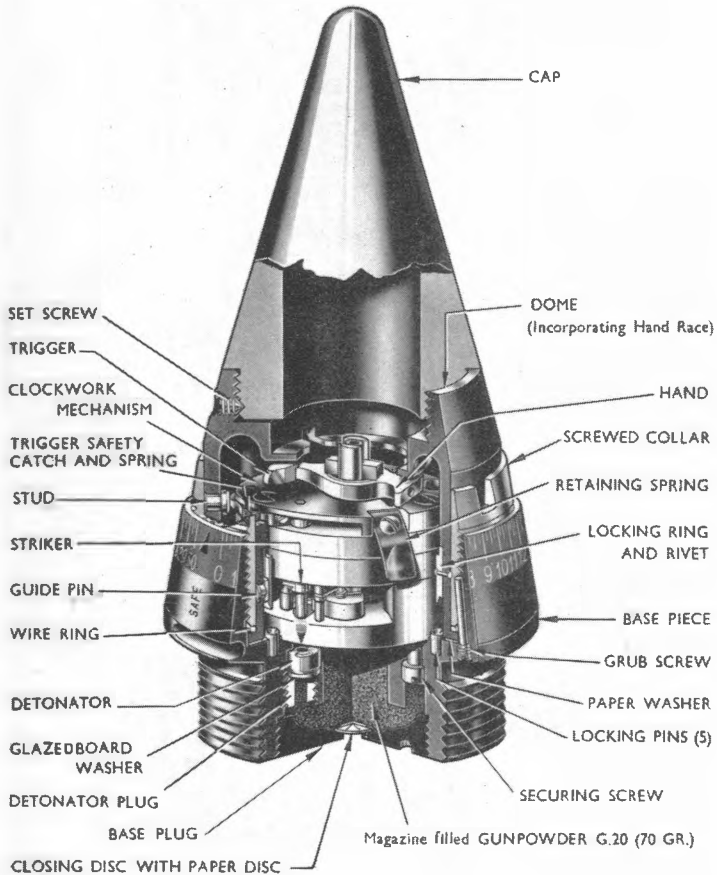
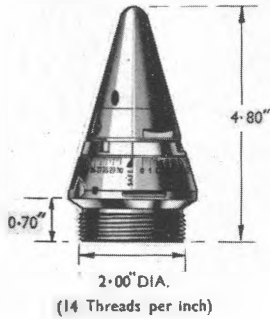
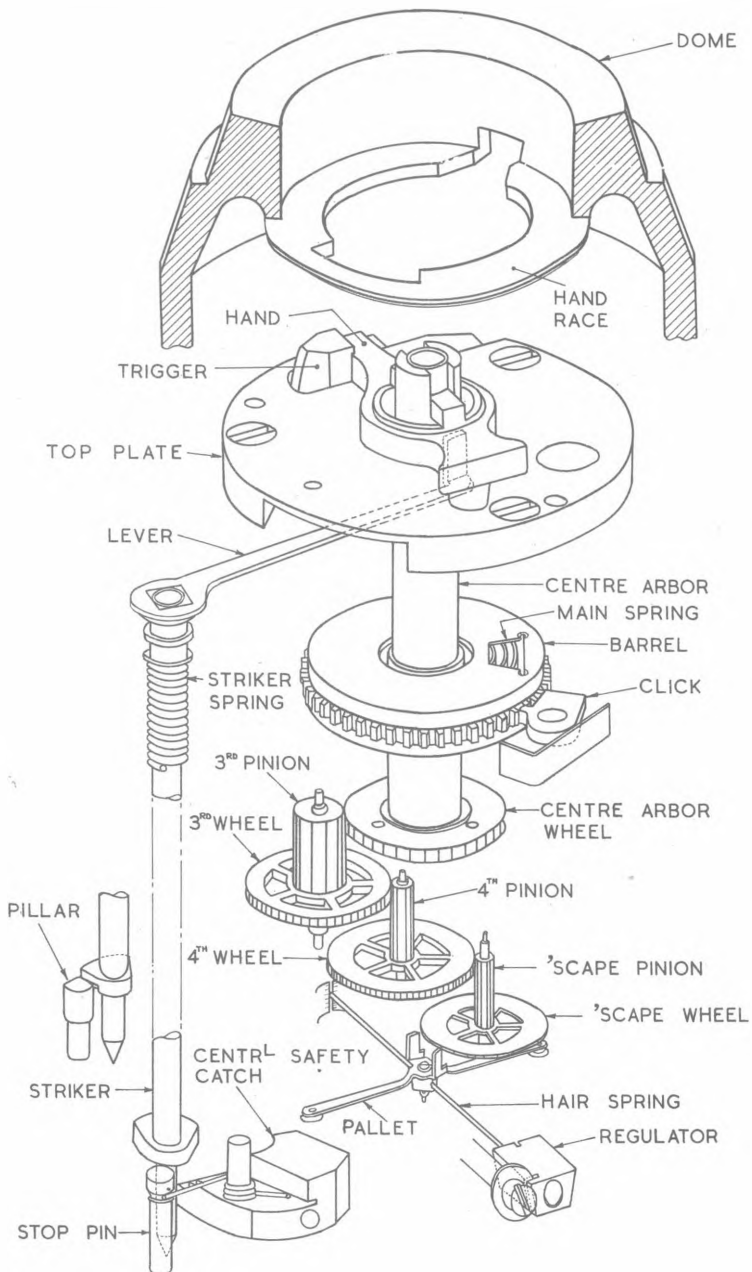


FIG. 1

FUZE, TIME, No. 207, MARK 1 *Obsolete*



PERSPECTIVE DIAGRAM OF CLOCKWORK MECHANISM

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 10

FUZE, TIME, No. 208

PART 1—FUZES (NUMERICAL SERIES)

SECTION 10—FUZE, TIME, No. 208

INTRODUCTION

1. Fuze No. 208 is a detonating mechanical time fuze fitted with a Mechanism, Time, 43 seconds, of the Thiel type. The fuze, of 2 in. fuze-hole gauge, is used with the following equipments:—

Q.F., 3·7 in. Mks. 1–3 Guns

Q.F., 3·7 in. Mk. 6 Gun

Q.F., 5·25 in. Gun

Details of fuze marks are given in **Table 1**.

FUZE, TIME, No. 208, Mk. 8/1

2. General Assembly

The general assembly of the fuze and time mechanism is illustrated at **Figs. 1 and 3**.

Fuze marks earlier than Mk. 8 have the upper portion of the coned surface of the body graduated from 0 to 28 and a small ungraduated portion between the two numbers is marked with a red arrow head against the word “SAFE”. When set at safe, the setting mark engraved on the dome coincides with the arrow head. The maximum time of running is 43 seconds.

3. Safety Arrangements

- (a) A shear wire passes through a radial hole just below the coned portion of the body to engage in a recess in the flange of the dome. This shear wire prevents accidental movement of the dome during storage and transit. It also ensures that the fuze is accurately set at safe.
- (b) The tensioning wire ring in conjunction with the screwed collar prevents accidental movement of the dome after the fuze has been set.
- (c) Three equi-spaced shearing pins secure the locking weight to the wall of the dome thus preventing any movement of the locking weight before firing.
- (d) When in the unarmed position, the shutter screens off the stemmed C.E. in the magazine channel and prevents a prematurely fired detonator from initiating the C.E. pellet in the magazine.
- (e) The shutter detent prevents the shutter moving into the armed position before firing.
- (f) The trigger prevents the hand from rotating and the time mechanism from starting until the gun is fired.

- (g) The centrifugal safety catch which is housed under the striker cam until the shell rotates in flight, serves a dual purpose:—
- (i) In the event of the time mechanism being set in action accidentally, the catch prevents the striker reaching the detonator.
 - (ii) If a fuze with the time mechanism accidentally set in action were loaded and the gun fired, the centrifugal safety catch would be prevented from swinging out from under the striker cam as the latter would, immediately the hand is lifted, jam down onto a step cut in the catch for this purpose and hold it firmly in place.
- (h) The muzzle safety bridge prevents the hand rising until 0.72 seconds after firing, by which time the shell is well clear of the muzzle.

This device operates if the fuze is set too short.

4. *Action (Figs. 2 and 4)*

(a) *Before Firing*

The setting of the fuze rotates the dome and thus positions the hand-race slot. In the process of rotating the dome the copper shear wire securing dome to body is broken.

(b) *On Firing*

The locking weight sets back, shearing the three shearing pins and driving the three equi-spaced locking pins downwards to lock the dome to the body, thus preventing any alteration of fuze setting. The trigger sets back, its top projection clears the hand and the trigger locking bolt is forced outwards by its spring into a notch in the barrel plate, thus retaining the trigger in the set back position. The hand is now released from the trigger, but is prevented from rising by the muzzle safety bridge. During acceleration in the bore it is unlikely that the pallet will oscillate owing to the force of set back. The shutter is retained in the unarmed position by friction. The shutter detent in the base of the fuze also sets back and becomes locked in the detent channel, thus allowing the shutter to move outwards during flight.

(c) *During Flight*

On leaving the bore the oscillation of the pallet starts the time mechanism and the hand begins to rotate by action of the main spring. The centrifugal safety catch flies outwards, to leave the striker supported only by its cam resting on the bevelled surface of the pillar. The shutter slides outwards against its spring to bring the stemmed C.E. fire

channel coincident with both the detonator channel and the magazine channel. When the shell is well clear of the muzzle, 0.72 seconds after firing, the hand clears the muzzle safety bridge and bears on the lower surface of the hand-race.

(d) At the end of the Time as Set

The hand reaches the hand-race slot, into which it rises under the influence of its spring and releases the lever which controls the striker. The lever flies outwards under the action of the striker spring in conjunction with the bevelled surface of the cam and coned pillar, the cam is rotated off the pillar and the striker is forced into the detonator. The resultant detonating wave passes through the C.E. stemmings in the shutter and magazine channel to initiate the C.E. pellet in the magazine.

SIGNIFICANCE OF SUB-MARKS

5. A sub-mark indicates that the time mechanism has been regulated for use with a particular ordnance. Thus:—

Fuze No. 208, Mk. /1 is regulated for use in the Q.F., 3.7 in. Mk. 6 Gun.

Fuze No. 208, Mk. /2 is regulated for use in the Q.F., 5.25 in. Gun.

Fuze No. 208, Mk /3 is regulated for use in the Q.F., 3.7 in. Mks. 1-3 Guns.

The only exception to this rule is the Mk. 5/1 which is regulated for use in the Q.F. 5.25 in. Gun.

FUZE, DRILL. TIME ~~No. 207~~ or No. 208. Mk. 1.

6. The drill fuze is made up to represent the service fuze. It consists of a steel body, tensioning screw and nut, lock nut and an aluminium cap.

The body is made up of a base piece and setting sleeve, the latter being shaped at the lower end to fit in a recess in the top of the base piece and screw-threaded at the other end to suit the cap. Recesses are provided in the body to house the tensioning screw, which is actuated by the tensioning nut bearing on a spring washer; the tensioning nut is secured by the lock nut. A hole is drilled in the stem of the screw for the reception of a steel pin to prevent the screw from turning.

The cap is threaded externally at the base to fit the sleeve and is secured by a set screw.

The graduations on the base piece are identical with those on the service fuze.

A hole is drilled in the cap to denote that the fuze is for drill purposes, and the exterior of the fuze is painted black with the exception of a bright patch on either side of the setting line, the graduated portion of the base piece and the screw-threads.

Pam 9, Part 1, Section 10

channel coincident with both the detonator channel and the magazine channel. When the shell is well clear of the muzzle, 0.72 seconds after firing, the hand clears the muzzle safety bridge and bears on the lower surface of the hand-race.

(d) At the end of the Time as Set

The hand reaches the hand-race slot, into which it rises under the influence of its spring and releases the lever which controls the striker. The lever flies outwards under the action of the striker spring in conjunction with the bevelled surface of the cam and coned pillar, the cam is rotated off the pillar and the striker is forced into the detonator. The resultant detonating wave passes through the C.E. stemmings in the shutter and magazine channel to initiate the

PART 1. Section 10. Para. 5. *Delete lines 8 and 9 and substitute:—*
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The exceptions to this rule are:—

- (i) Mks. 1 and 3 —for 3.7-in. Mks. 1—3 Guns.
- (ii) Mks. 5 and 5/1—for 5.25-in. Gun.
- (iii) Mk. 6 —for 3.7-in. Mk. 6 Gun.

In addition, the following may be used with the Guns stated, but only when the correct fuze is unobtainable, their performance being best with the Guns for which they are intended:—

- (i) Mks. 1, 3, 6/3 and 8/1—5.25-in. Gun.
- (ii) Mks. 5, 6, 6/2 and 8/1—3.7-in. Mks. 1—3 Guns.

PART 1. See also Landscape amendment attached.

6. The drill fuze is made up to represent the service fuze. It consists of a steel body, tensioning screw and nut, lock nut and an aluminium cap.

The body is made up of a base piece and setting sleeve, the latter being shaped at the lower end to fit in a recess in the top of the base piece and screw-threaded at the other end to suit the cap. Recesses are provided in the body to house the tensioning screw, which is actuated by the tensioning nut bearing on a spring washer; the tensioning nut is secured by the lock nut. A hole is drilled in the stem of the screw for the reception of a steel pin to prevent the screw from turning.

The cap is threaded externally at the base to fit the sleeve and is secured by a set screw.

The graduations on the base piece are identical with those on the service fuze.

A hole is drilled in the cap to denote that the fuze is for drill purposes, and the exterior of the fuze is painted black with the exception of a bright patch on either side of the setting line, the graduated portion of the base piece and the screw-threads.

AMMUNITION AND PACKAGE MARKINGS

7. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

8. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, TIME, No. 208

Pam 9, Part 1, Section 10
Table 1

Item	Mark	Material			Detonator	Remarks
		Body	Dome	Cap		
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	1	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Fitted with Mechanism, Time, 43 seconds. (ii) No recess in fuze body to take fuze key No. 223. (iii) Fuzes manufactured before 16 May 1947 may be fitted with a moulded plastic cap. (iv) For use with the Q.F., 3·7 in. Mks. 1-3 Guns. (v) The fuze may also be used with the Q.F., 5·25 in. Gun when the correct fuze is unobtainable but best performance given with the Q.F., 3·7 in. Mks. 1-3 Guns. (vi) Obsolescent.
2	2	—	—	—	—	(i) Obsolete.
3	3	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 1 in being fitted with Mechanism, Time, 43 seconds, No. 2, which embodies a strengthened brass wheel train. A recess is formed in the fuze body to take fuze key No. 223. (ii) Fuzes manufactured before 16 May 1947 may be fitted with a moulded plastic cap. (iii) For use with the Q.F., 3·7 in. Mks. 1-3 Guns. (iv) The fuze may also be used with the Q.F., 5·25 in. Gun when the correct fuze is unobtainable but best performance given with the Q.F., 3·7 in. Mks. 1-3 Guns. (v) Obsolescent.

TABLE 1—DATA FOR FUZE, TIME, No. 208

Pam 9, Part 1, Section 10
Table 1 (Contd)

Item	Mark	Material			Detonator	Remarks
		Body	Dome	Cap		
(a)	(b)	(c)	(d)	(e)	(f)	(g)
4	4	—	—	—	—	(i) Obsolete
5	5	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 3 in being fitted with Mechanism, Time, 43 seconds, No. 3 which has the third, fourth and 'scape wheels of duralumin instead of brass. The mechanism is regulated to suit the ballistics of the Q.F., 5.25 in. Gun. (ii) The fuze may also be used with the Q.F., 3.7 in. Mk. 1-3 Guns when the correct fuze is unobtainable but best performance given with the Q.F., 5.25 in. Gun. (iii) Obsolescent.
6	5/1	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 5 in being fitted with Mechanism, Time, 43 seconds, No. 3A which is regulated to suit the ballistics of the Q.F., 5.25 in. Gun. (ii) The Mk. 5/1 and earlier marks are fitted with a trigger locking strip. The locking strip, which is secured to the top of the trigger by means of a screw, engages with a notch in the hand to prevent the trigger setting back accidentally. (iii) Obsolescent.

7	6	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 3 in being fitted with Mechanism, Time, 43 seconds, No. 4 which has a wider and stronger mainspring than Mechanism No. 2 in the Mk. 3 fuze. The mechanism is regulated to suit the ballistics of the Q.F., 3.7 in. Mk. 6 Gun. (ii) The Mk. 6 and subsequent marks do not embody a trigger locking strip. The locking strip is not essential as the trigger engages with the top surface of the hand and is thus prevented from setting back before firing. (iii) The fuze may also be used with the Q.F., 3.7 in. Mk. 6 Gun. (iv) Obsolescent.
8	6/1	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 6 in being fitted with Mechanism, Time, 43 seconds, No. 4A which is regulated to suit the ballistics of the Q.F., 3.7 in. Mk. 6 Gun. <i>(ii) OBSOLETE</i>
9	6/2	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 6 in being fitted with Mechanism, Time, 43 seconds, No. 4B which is regulated to suit the ballistics of the Q.F., 5.25 in. Gun. (ii) The fuze may also be used with the Q.F., 3.7 in. Mk. 1-3 Guns when the correct fuze is unobtainable but best performance given in the Q.F., 5.25 in. Gun. <i>(iii) OBSOLETE</i>
10	6/3	Brass	Aluminium alloy	Aluminium alloy <i>OR PLASTIC</i>	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 6 in being fitted with Mechanism, Time, 43 seconds, No. 4C which is regulated to suit the ballistics of the Q.F., 3.7 in. Mk. 1-3 Guns. (ii) The fuze may also be used with the Q.F., 5.25 in. Gun when the correct fuze is unobtainable but best performance given with the Q.F., 3.7 in. Mk. 1-3 Guns. <i>(iii) OBSOLETE</i>
11	7	—	—	—	—	(i) Not introduced.
12	7/1	Brass	Aluminium alloy	Aluminium alloy	5 gr. AZ. (Copper alloy shell)	(i) Differs from the Mk. 6/1 in being fitted with a detent to lock the shutter in the safe position until fired. (ii) None issued to the Service. <i>(iii) OBSOLETE</i>
13	8	—	—	—	—	(i) Not introduced.

TABLE 1—DATA FOR FUZE, TIME, No. 208

Pam 9, Part 1, Section 10
Table 1 (Contd)

Item	Mark	Material			Detonator	Remarks
		Body	Dome	Cap		
(a)	(b)	(c)	(d)	(e)	(f)	(g)
14	8/1	Brass	Aluminium alloy	Aluminium alloy	5 gr. AZ. (Copper alloy shell)	(i) New manufacture. Identical with the Mk. 7/1 except that the graduations on the body are omitted. (ii) Time mechanism regulated to suit the ballistics of the Q.F., 3·7 in. Mk. 6 Gun. (iii) The fuze may also be used with the Q.F., 3·7 in. Mks. 1-3 Guns and the Q.F., 5·25 in. Gun when the correct fuze is unobtainable but best performance given in the Q.F., 3·7 in. Mk. 6 Gun.
15	9/1	Brass	Aluminium alloy	Aluminium alloy	5·7 gr. AZ. (Tinned lugless copper alloy shell)	(i) Identical with the Mk. 7/1 except that a 5·7 gr. AZ tinned lugless detonator replaces the 5 gr. AZ copper alloy shell detonator and the body (detonator recess and surrounding faces), detonator holder, shutter and magazine (top face) are tin-plated. (ii) Time mechanism regulated to suit the ballistics of the Q.F., 3·7 in. Mk. 6 Gun.
16	10/1	Brass	Aluminium alloy	Aluminium alloy	5·7 gr. AZ. (Tinned lugless copper alloy shell)	(i) Identical with the Mk. 8/1 except that a 5·7 gr. AZ tinned lugless detonator replaces the 5 gr. AZ copper alloy shell detonator and the body (detonator recess and surrounding faces), detonator holder, shutter and magazine (top face) are tin-plated. (ii) Time mechanism regulated to suit the ballistics of the Q.F., 3·7 in. Mk. 6 Gun. (iii) The fuze may also be used with the Q.F., 3·7 in. Mks. 1-3 Guns and the Q.F., 5·25 in. Gun when the correct fuze is unobtainable but best performance given in the Q.F., 3·7 in. Mk. 6 Gun.

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TABLE 1—DATA FOR FUZE, TIME, No. 208

Pam 9, Part 1, Section 10

Table 1 (Continued)

Item	Mark	Material			Detonator	Remarks
		Body	Dome	Cap		
(a)	(b)	(c)	(d)	(e)	(f)	(g)
13	7/2	Brass	Aluminium alloy	Aluminium alloy	5 gr. AZ. (Copper alloy shell)	(i) This fuze is identical with the Mk. 6/2, but is fitted with a detent to lock the shutter in the safe position until fired. (ii) Obsolescent.
14	7/3	Brass	Aluminium alloy	Aluminium alloy	5 gr. AZ. (Copper alloy shell)	(i) This fuze is identical with the Mk. 6/3, but is fitted with a detent to lock the shutter in the safe position until fired. (ii) Obsolescent.
15	8	—	—	—	—	Not introduced.
16	8/1	Brass	Aluminium alloy	Aluminium alloy	5 gr. AZ. (Copper alloy shell)	(i) New manufacture. Identical with the Mk. 7/1, except that the graduations on the body are omitted. (ii) Obsolescent.
17	8/2	Brass	Aluminium alloy	Aluminium alloy	5 gr. AZ. (Copper alloy shell)	(i) Similar to the Mk. 7/2, except that the graduations on the body are omitted. (ii) Obsolescent.
18	8/3	Brass	Aluminium alloy	Aluminium alloy	5 gr. AZ. (Copper alloy shell)	(i) Identical with the Mk. 7/3 except that the graduations on the body are omitted. (ii) Obsolescent.
19	9	—	—	—	—	Not introduced.
20	9/1	Brass	Aluminium alloy	Aluminium alloy	5.7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 7/1 except that a 5.7 gr. AZ lugless tinned case detonator replaces the 5 gr. AZ copper shell detonator. (ii) Obsolescent.

TABLE 1—DATA FOR FUZE, TIME, No. 208

Pam 9, Part 1, Section 10
Table 1 (Contd)

Item	Mark	Material			Detonator	Remarks
		Body	Dome	Cap		
(a)	(b)	(c)	(d)	(e)	(f)	(g)
21	9/2	Brass	Aluminium alloy	Aluminium alloy	5.7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 7/2 except for detonator. (ii) Obsolescent.
22	9/3	Brass	Aluminium alloy	Aluminium alloy	5.7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 7/3 except for detonator.
23	10	—	—	—	—	Not introduced.
24	10/1	Brass	Aluminium alloy	Aluminium alloy	5.7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 8/1 except for detonator. (ii) Unlikely to be issued to the Service. (iii) Obsolescent.
25	10/2	Brass	Aluminium alloy	Aluminium alloy	5.7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 8/2 except for detonator. (ii) Unlikely to be issued to the Service. (iii) Obsolescent.
26	10/3	Brass	Aluminium alloy	Aluminium alloy	5.7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 8/3 except for detonator. (ii) Unlikely to be issued to the Service. (iii) Obsolescent.
27	11	—	—	—	—	Not introduced.
28	11/1	Brass	Aluminium alloy	Aluminium alloy	5.7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 9/1 except that the Body, Magazine, Detonator holder and Shutter are tin-plated.

TABLE 1—DATA FOR FUZE, TIME, No. 208

Pam 9, Part 1, Section 10
Table 1 (Contd)

Item	Mark	Material			Detonator	Remarks
		Body	Dome	Cap		
(a)	(b)	(c)	(d)	(e)	(f)	(g)
29	11/2	Brass	Aluminium alloy	Aluminium alloy	5·7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 9/2 except that the Body, Magazine, Detonator holder and Shutter are tin-plated.
30	11/3	Brass	Aluminium alloy	Aluminium alloy	5·7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 9/3 except that the Body, Magazine, Detonator holder and Shutter are tin-plated.
31	12	—	—	—	—	Not introduced.
32	12/1	Brass	Aluminium alloy	Aluminium alloy	5·7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 10/1 except that the Body, Magazine, Detonator holder and Shutter are tin-plated.
33	12/2	Brass	Aluminium alloy	Aluminium alloy	5·7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 10/2 except that the Body, Magazine, Detonator holder and Shutter are tin-plated.
34	12/3	Brass	Aluminium alloy	Aluminium alloy	5·7 gr. AZ. (lugless tinned case)	(i) Identical with the Mk. 10/3 except that the Body, Magazine, Detonator holder and Shutter are tin-plated.

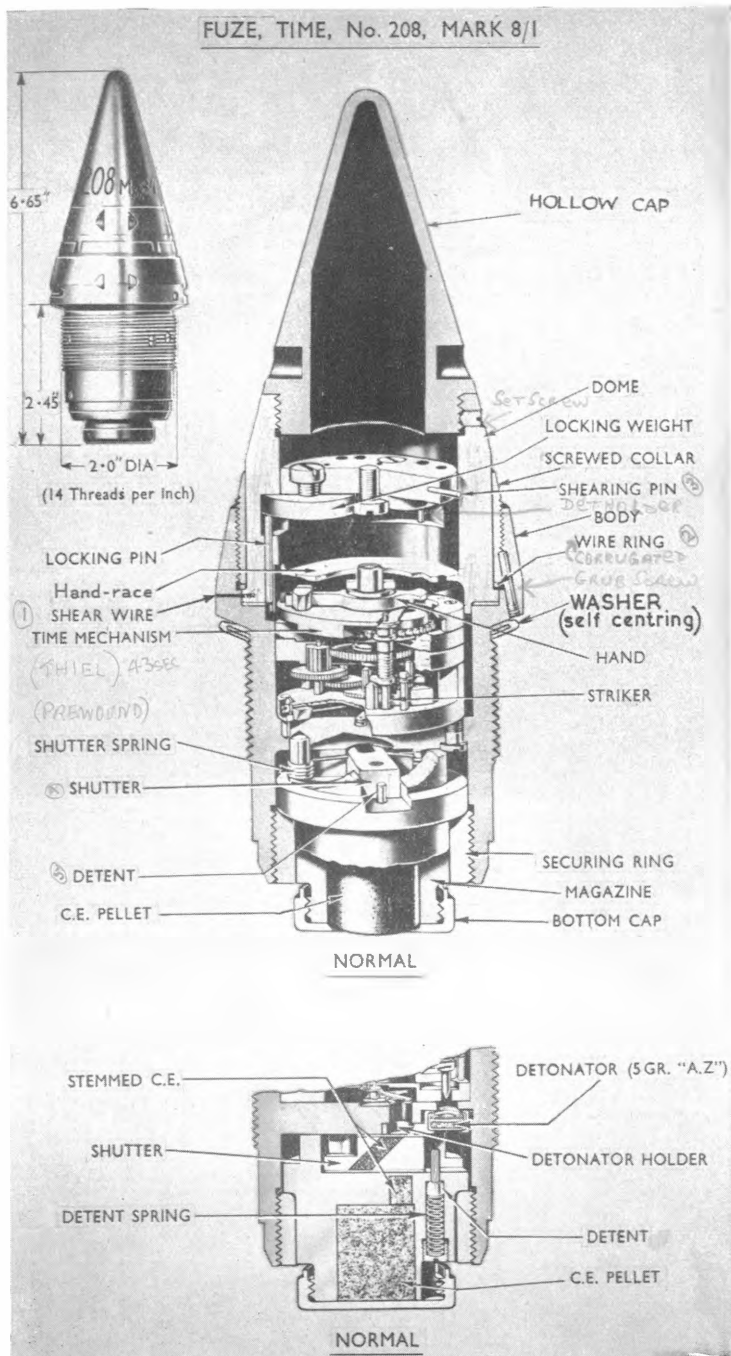
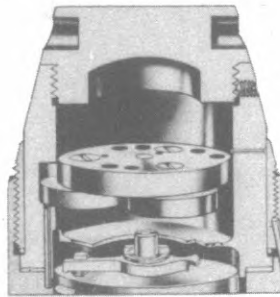
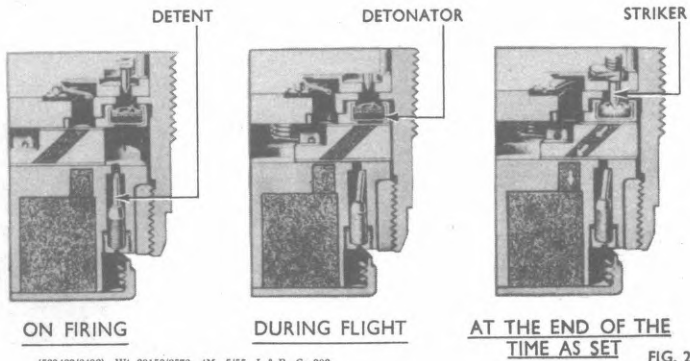
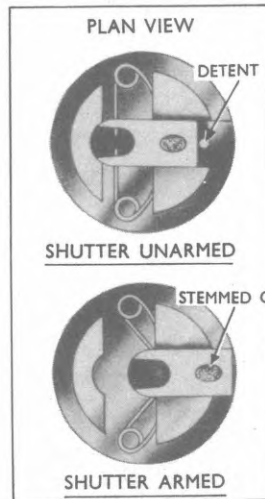


Fig. 1

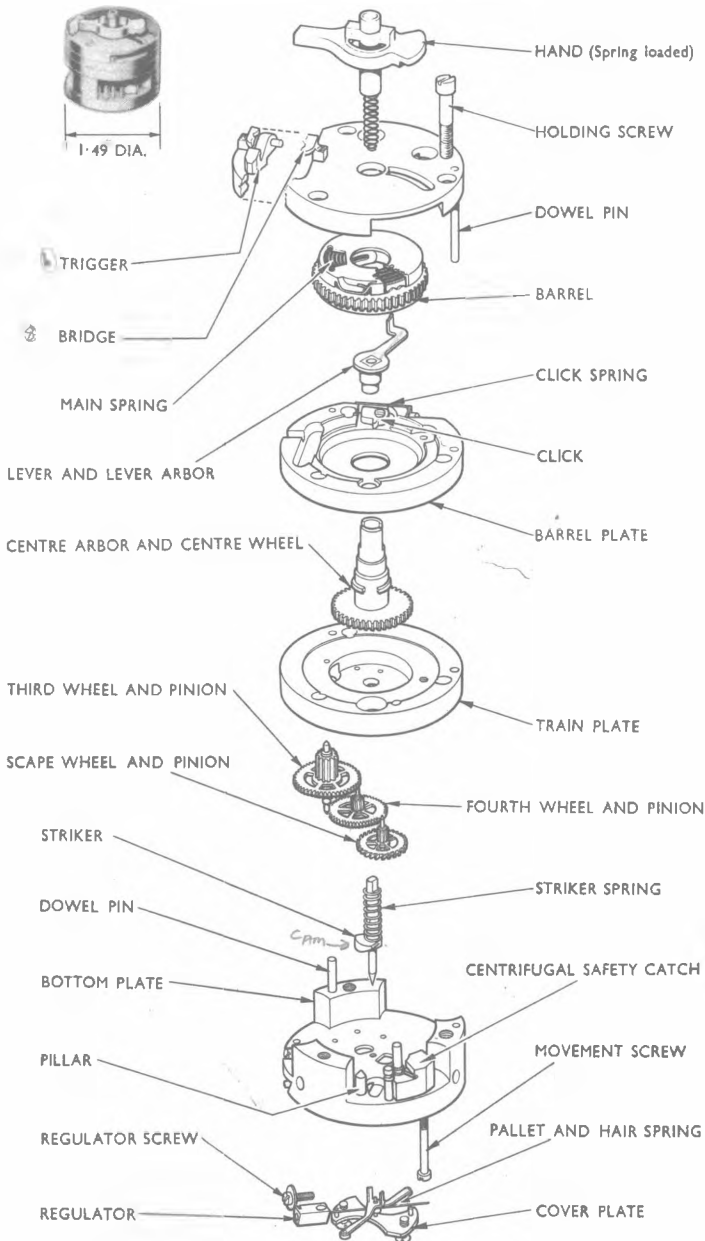
FUZE, TIME, No. 208, MARK 8/I



ON FIRING



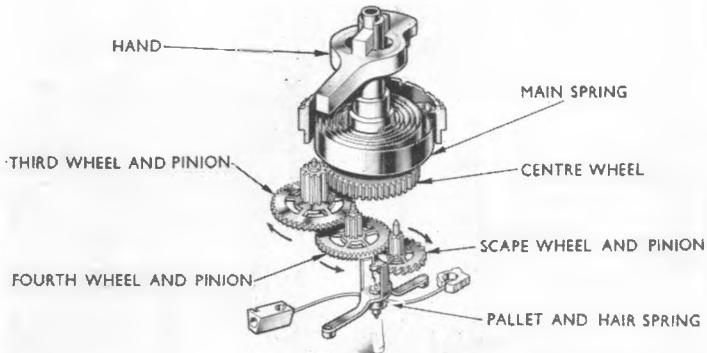
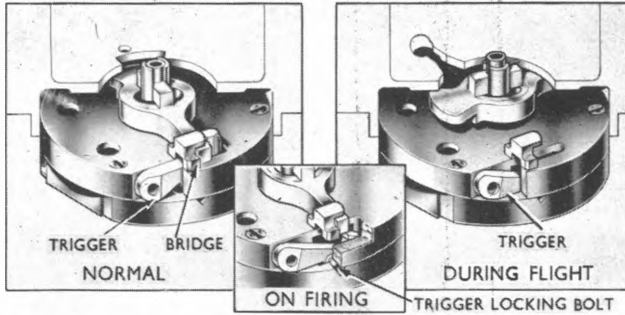
MECHANISM, TIME, 43 SEC, No. 4A.



MECHANISM, TIME, 43 SEC. No. 4A.

Hand race at SAFE
Hand retained by trigger and bridge

Hand race SET
Trigger in set back position Hand
travelling towards slot in hand race



Hand retaining LEVER and keeping
cam of STRIKER on PILLAR.

Spring loaded HAND jumps upwards,
releases LEVER and STRIKER flies off
PILLAR downwards to fire detonator

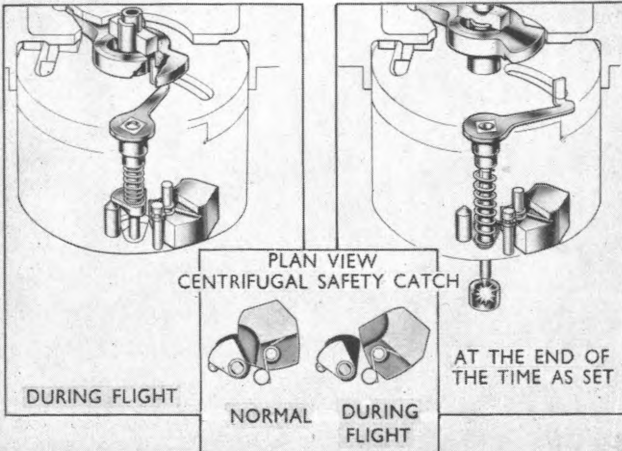


FIG. 4

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 11

FUZE, TIME, No. 210 *Obsolete*

PART 1—FUZES (NUMERICAL SERIES)

SECTION 11—FUZE, TIME, No. 210 *Obsolete*

INTRODUCTION

1. Fuze No. 210 is a detonating mechanical time fuze fitted with a Tavaro (Swiss) clockwork mechanism. The fuze, of 2 in. fuze-hole gauge, is used with the following equipment:—

B.L., 9.2 in. Gun

Details of fuze marks are given in **Table 1**.

FUZE, TIME, No. 210, Mk. 1

Obsolete

2. *General Assembly*

The general assembly of the fuze and time mechanism is illustrated at **Figs. 1 and 2**.

The body of the fuze is fitted with a cap which encloses the clockwork mechanism. Engraved on the cap is an assembly mark which coincides with a similar mark on the body and above the assembly mark is a triangular setting mark with a vertical extension line at the apex, painted black. Fitted over the reduced upper end of the cap is a setting indicator, the bottom edge of which is graduated from 0 to 10 divided into 100 divisions. Each line and figure showing graduations is filled in with black paint. In addition, the indicator has a vertical slot graduated up to 60 in divisions of 10, lines and figures being filled in with red paint. A brass index peg fitted in the vertical slot engages in spiral grooves cut in the cap to indicate the fuze setting in tens of seconds. The maximum time of running is 60 seconds.

FIGURES 1 and 2

3. *Safety Arrangements*

- (a) The mechanism securing washer provides torque between the cap and the mechanism (upper part) and prevents the accidental movement of the one in relation to the other.
- (b) The vertical slots in the cylinder grip the upper part of the mechanism to prevent accidental alteration of the fuze setting.
- (c) The stop levers, which are held inwards by their springs, prevent the balance arm from rotating and, therefore, the clock from starting.
- (d) The barrel arbor collar slot prevents accidental damage to the mechanism by permitting idle movement of the setting indicator cap to about half a second of setting.

- (e) When the fuze setting is at zero, the centrifugal bolt is locked in the "SAFE" position by the bottom crown on account of the bevelled surfaces, even if the centrifugal bolt spring ceases to operate. The bottom crown cannot turn (clockwise) through the small angle necessary to release the striker bolt. The mechanism itself is, therefore, never set at zero, but at approximately five small divisions of the setting indicator cap. It is necessary to turn the bottom crown back (anti-clockwise) through a further small angle before the centrifugal bolt is released. This position of the bottom crown is equivalent to a setting of approximately 1.25 seconds, and the fuze, if fired at any setting less than this will be a blind.
- (f) If the fuze is to be reset to zero, the bottom crown can be turned back only until its slot is coincident with the centrifugal bolt, which under the action of its spring engages the slot. This prevents the crown from being rotated further, thus ensuring that the spade of the striker bolt will retain the striker in the cocked position.
- (g) The centrifugal locking levers are forced out on rotation of the fuze, to engage the teeth formed inside the cap. This locks the mechanism in the position as set and, therefore, prevents alteration of setting in the bore and in flight. The locking lever is designed to be heavier towards the free arm. The position of the fulcrum is also suitably adjusted so as to reduce the friction due to set back of the lever to the minimum. The lever is thus capable of swinging out owing to the rotation of the projectile in the bore.
- (h) When the shutter is in the unarmed position, the detonator is displaced and cannot communicate with the stemmed C.E. channel in the magazine. Should the striker be prematurely released, it will lock the shutter in the unarmed position.

4. Action

(a) Before Firing

The fuze is issued with the main spring partially wound. The setting of the fuze rotates the mechanism key and the setting indicator cap, until the latter registers the fuze setting required. The tens are read by the peg in the vertical slot, and the units by the scale on the indicator cap.

When the mechanism key is turned, the complete upper part of the mechanism rotates in the cylinder, carrying with it the top crown of the lower part of the mechanism. This winds the main spring and causes the bottom crown to move backwards from its position of engagement with the

Pam 9, Part 1, Section 11

centrifugal bolt. After the bottom crown has turned through about 1.25 seconds of setting, the bevelled edges of the slot and centrifugal bolt force the latter through the slot to ride on the outside of the bottom crown.

(b) On Firing

Owing to the construction and arrangement of the centrifugal locking levers, centrifugal force overcomes friction set up by acceleration in the bore. The levers fly outwards and engage in the toothed ring inside the fixed cap of the fuze, thereby preventing the indicator cap and mechanism from rotating independently of the fuze. The setting of the fuze (and bottom crown) is thus locked. Set back of the mechanism key, the upper part of the clock and the bottom crown also assist initially in preventing alteration of fuze setting. The stop levers set back and prevent the balance arm from oscillating and the clock from starting. In addition, friction on pivots and bearings due to setback probably prevents the clock from starting. There is no positive unlocking action at this stage as compared with the Thiel mechanism, where the trigger sets back to release the hand. The centrifugal bolt sets back and is prevented from flying outwards by friction.

The locking weight and shutter set back and are prevented from opening by friction.

(c) During Flight

The stop levers fly outwards against their springs to release the balance arm, which permits the clockwork mechanism to start working under the action of the main spring. The barrel arbor rotates the bottom crown wheel with pinion, which turns the bottom crown at a controlled rate towards the zero position.

The centrifugal bolt is retained in the open position, compressing its spring, by centrifugal force. This ensures that the slot in the bottom crown is free to rotate to the zero position.

The "follower" toe of the striker bolt bears on the inner rim of the bottom crown as it turns backwards. At settings below 1.25 seconds the "follower" toe of the striker bolt is prevented from entering the slot in the bottom crown by the step of the centrifugal bolt, which occupies the slot.

The locking weight overcomes its spring and the shutter moves into the armed position thus carrying the detonator into alignment with the striker and the stemmed C.E. channel in the magazine.

(d) At the end of the Time as Set

The slot in the bottom crown arrives opposite the projection or toe of the striker bolt, which is rotated under the action of its spring to enter the slot and thus withdraw its spade end from the notch in the striker. The freed striker is forced violently down by its spring to impinge upon the detonator and the resultant detonating wave is transmitted through the C.E. stemming to the C.E. pellet in the magazine.

FUZE, DRILL, TIME, No. 210, Mk. 1

5. The fuze consists of a steel body, tension rod with pins, upper and lower tension rings, tension and lock nuts, brass setting key cap and setting indicator cap with index peg.

The body is bored out centrally and recessed at the bottom to accommodate the tension rod, tension rings and the tension and lock nuts. It has spiral grooves cut in the top for the indicator peg and an indicator mark is recessed and painted black.

The tension rod is screw-threaded at the top to receive the setting key cap and at the base to suit the tension and lock nuts. It is secured at each end by a steel pin.

The upper tension ring is held in position by the setting key cap and the lower, by the tension and lock nuts, the latter closing the body at the base.

A dish-shaped steel washer is positioned between the tension nut and the lower tension ring.

The setting indicator cap is fitted over the body and is graduated on the bottom edge from 1-10, divided into 100 divisions, the lines and figures of the divisions being filled in with black paint. In addition, the indicator cap is provided with a vertical slot, graduated up to 60 in divisions of 10, the lines and figures showing the graduations being filled in with red paint. A brass index peg is fitted in the vertical slot and engages in the spiral grooves in the body.

A hole is drilled in the body of the fuze to denote that it is for drill purposes only.

The exterior of the fuze is painted black except for a bright patch each side of the indicator mark on the body, the setting indicator cap and the screwthreads.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, TIME, No. 210

Pam 9, Part 1, Section 11
Table 1

Item	Mark	Material				Detonator	Remarks
		Body	Cap	Setting Indicator Cap	Magazine		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	1	Aluminum (Anti-corroding brass) or equivalent aluminum alloy.	Brass	Brass	Aluminum alloy with aluminum alloy bottom cap	5 gr. AZ (Copper alloy shell)	(i) Obsolete.

FUZE, TIME, No. 210, MARK I.

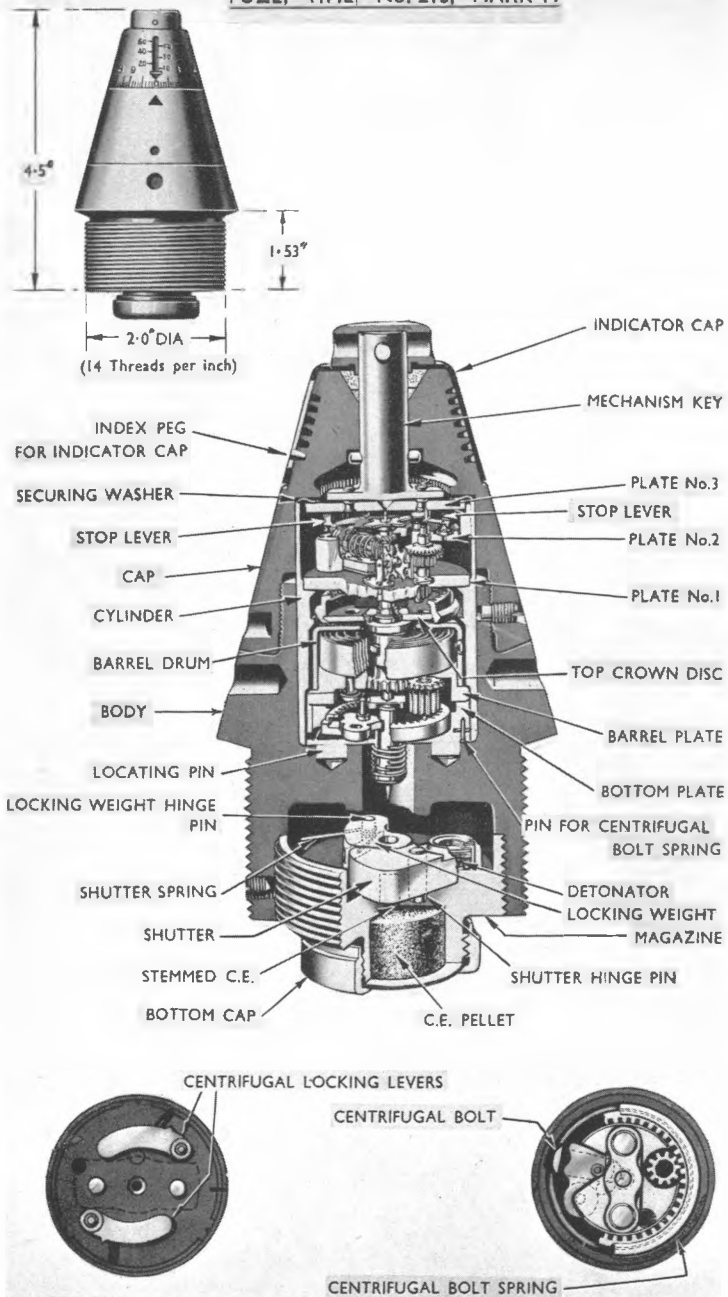
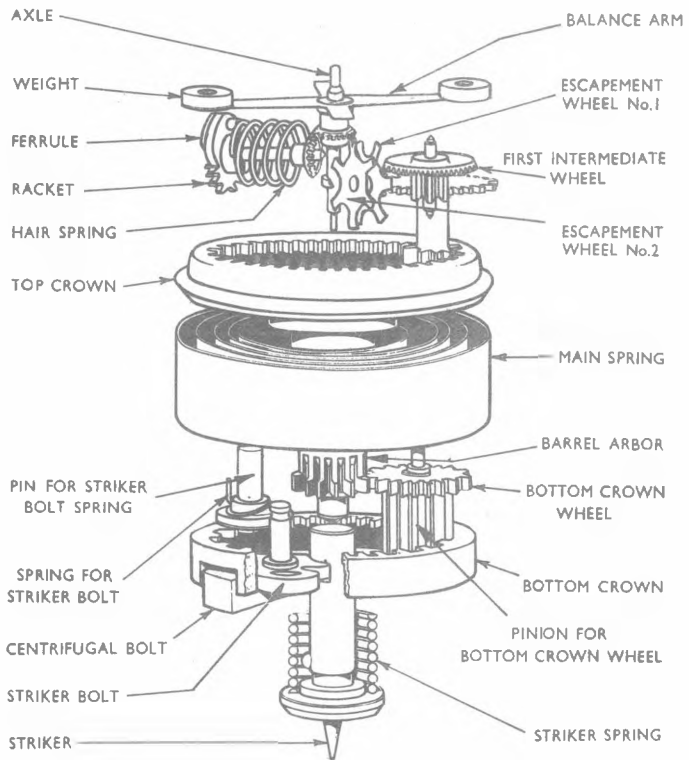


FIG. 1

FUZE, TIME, No. 210, MARK I
MECHANISM



RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 12

FUZE, TIME AND PERCUSSION, D.A., No. 213

Pam 9, Part 1, Section 12

PART 1—FUZES (NUMERICAL SERIES)

**SECTION 12—FUZE, TIME AND PERCUSSION, D.A.,
No. 213**

INTRODUCTION

1. Fuze No. 213 is a detonating mechanical time fuze which incorporates a direct action head designed to ensure that the fuze functions on impact independently of the time mechanism. The fuze, of 2 in. fuze-hole gauge, is fitted with Mechanism, Time, 80 seconds and is used with the following equipments:—

Q.F., 25 pr. Gun

B.L., 4.5 in. Gun

B.L., 5.5 in. Gun

B.L., 7.2 in. How.

Details of fuze marks are given in **Table 1**.

FUZE, TIME AND PERCUSSION, D.A., No. 213, Mk. 2

2. General Assembly

The general assembly of the fuze and time mechanism is illustrated at **Figs. 1 and 3**.

The dome is retained by a tensioning ring fitted over a flange at the foot of the dome and held by three small set screws.

The inclined surface above the shoulder of the body is graduated from 0 to 80, and a small ungraduated portion between the two numbers is marked with a red arrow head against the word "SAFE". When set at safe, the setting mark engraved on the dome coincides with the arrow head. The maximum time of running is 80 seconds.

3. Safety Arrangements

- (a) The safety cap protects the windshield and striker head during storage and transit.
- (b) The tensioning ring prevents accidental movement of the dome during storage and transit.
- (c) Three equi-spaced shear wires secure the locking weight to the wall of the head thus preventing any movement of the locking weight before firing.
- (d) When in the unarmed position the shutter screens off the stemmed C.E. in the magazine channel and prevents a prematurely fired lower detonator from initiating the C.E. pellet in the magazine.
- (e) The trigger prevents the hand from rotating and the time mechanism from starting until the gun is fired.

- (f) The centrifugal safety catch, which is housed under the striker cam until the shell rotates in flight, serves a dual purpose:—
 - (i) In the event of the time mechanism being set in action accidentally, the catch prevents the striker reaching the detonator.
 - (ii) If a fuze with the time mechanism accidentally set in action was loaded and the gun fired, the centrifugal safety catch would be prevented from swinging out from under the striker cam as the latter would, immediately the hand is lifted, jam down onto a step cut in the catch for this purpose and hold it firmly in place.
- g) The muzzle safety bridge prevents the hand rising until the shell is well clear of the muzzle. This device operates if the fuze is set too short.

4. Action (Figs. 1, 2 and 4)

(a) Before Firing

The fuze is set by rotating the dome until the indicating line is coincident with the required graduation on the body, thus positioning the hand-race slot. The safety cap is removed.

(b) On Firing

The locking weight sets back, shearing the three shear wires any driving the three equi-spaced locking pins into recesses in the body, thus locking dome to body and preventing ~~any~~ and alteration of fuze setting. The trigger sets back, its top projection clears the hand and the trigger locking bolt is forced outwards by its spring to retain the trigger in the set back position. The hand is now released from the trigger, but is prevented from rising by the muzzle safety bridge. During acceleration in the bore it is unlikely that the pallet will oscillate owing to the force of set back. The shutter is retained in the unarmed position by friction.

(c) During Flight

On leaving the bore the oscillation of the pallet starts the time mechanism and the hand begins to rotate by action of the mainspring. The centrifugal safety catch flies outwards to leave the striker supported only by its cam resting on the bevelled surface of the pillar. The shutter slides outwards against its springs to bring its stemmed C.E. fire channel coincident with both the lower detonator and the channel leading to the magazine. When the shell is well clear of the muzzle, the hand clears the muzzle safety bridge and bears against the lower surface of the hand-race.

Pam 9, Part 1, Section 12

(d) At the end of the Time as Set

The hand reaches the hand-race slot into which it rises under the influence of its spring and releases the lever which controls the striker. The lever flies outwards under the action of the striker spring in conjunction with the bevelled surface of the cam and the coned pillar, the cam is rotated off the pillar and the striker is forced into the detonator. The resultant detonating wave passes through the C.E. stemmings in the shutter and magazine channel to initiate the C.E. or Pentolite pellet in the magazine.

(e) On Impact

The striker head is crushed in and the needle pierces and fires the upper detonator which ignites the gunpowder pellet. The resultant flash passes down a groove in the side of the time mechanism housing, through a cross channel leading to the time mechanism striker housing and past the striker to initiate the lower detonator. Subsequent action is then as previously described.

FUZE, DRILL, TIME AND PERCUSSION. D.A.

No. 213. Mk. 1

5. The drill fuze is generally similar to the Mk. 2 empty service fuze, differing principally in that the time mechanism is omitted. A hole is drilled through the body of the fuze to denote that it is for drill purposes, and the exterior of the fuze is painted black with the exception of the graduated portion of the body and the screw-threads. The setting line on the dome is painted white.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, TIME AND PERCUSSION, D.A., No. 213 Pam 9, Part 1, Section 12
Table 1

Item	Mark	Material			Detonator		Remarks
		Body	Dome	Head	Upper	Lower	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	1	Brass or Steel	Brass	Aluminum alloy	5 gr. AZ (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Obsolescent.
2	2	Brass or Steel	Brass	Aluminum alloy	5 gr. AZ (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 1 as follows:— Fitted with an internal locking device, the tensioning screws requiring less pressure. The pellet holder is secured by a set screw. The magazine assembly is secured by a copper pin. (ii) OBSCOLESCENT
3	3	Brass or Steel	Brass	Aluminum alloy	5·7 gr. AZ (Tinned lugless copper alloy shell)	5·7 gr. AZ (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 2 in being fitted with 5·7 gr. AZ tinned lugless detonators. (ii) OBSCOLESCENT
4	4	Brass or Steel	Brass	Aluminum alloy	5·7 gr. AZ (Tinned lugless copper alloy shell)	5·7 gr. AZ (Tinned lugless copper alloy shell)	(i) Identical with the Mk. 3 except that the striker cup, upper detonator washer, upper and lower detonator holders, body (detonator recess and surrounding faces), shutter, pin retaining shutter spring, dowel pin, magazine (top face) and securing ring are tin-plated.

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TABLE 1—DATA FOR FUZE, TIME AND PERCUSSION, D.A., No. 213 Pam 9, Part 1, Section 12
Table 1

Item	Mark	Material			Detonator		Remarks
		Body	Dome	Head	Upper	Lower	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	1	Brass or Steel	Brass	Aluminum alloy	5 gr. AZ (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Obsolescent. Amdt. 9/Feb/1958
2	2	Brass or Steel	Brass	Aluminum alloy	5 gr. AZ (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) 2 (h) (iii) To improve sealing, the junction of the safety cap and fuze body is coated with Shellac Lacquer.
3	3	Brass or Steel	Brass	Aluminum alloy	5.7 gr. AZ (Tinned lugless copper alloy shell)	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) 1 g (ii) 1 Amdt. 9/Feb/1958 (h)
4	4	Brass or Steel	Brass	Aluminum alloy	5.7 gr. AZ (Tinned lugless copper alloy shell)	5.7 gr. AZ (Tinned lugless copper alloy shell)	(i) 1 c c e sh and (iii) To improve sealing, the junction of the safety cap and fuze body is coated with Shellac Lacquer. Amdt. 9/Feb/1958 (h) (ii) To improve sealing, the junction of the safety cap and fuze body is coated with Shellac Lacquer.

PART 1—FUZES (NUMERICAL SERIES)

Section 12. Table 1. *After item 4 insert item 5.*

Amdt. 5/ /1957.

5	3/1	Brass or Steel	Brass	Aluminium alloy	5.7 gr. AZ (Tinned lug- less copper alloy shell)	5.7 gr. AZ (Tinned lug- less copper alloy shell)	(i) Differs from the Mk. 3 in being provided with a modified dome and locking pins and being tensioned to 800-in. oz. in lieu of 600-in. oz. thus improving the safety and performance of the fuze.
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Amdt. 11/Oct/1958

6	4/1	Brass or Steel	Brass	Alumin- ium alloy	5.7 gr. AZ (Tinned lugless copper alloy shell)	5.7 gr. AZ (Tinned legless copper alloy shell)	(i) Differs from earlier marks in that:— (a) Magazine cap is of brass only (b) A Boxcloth disc is added between pellet and magazine cap (c) A shortened CE Pellet (QX 1500) is fitted.
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PART 1—FUZES (NUMERICAL SERIES)

Section 12. Table 1. *After* item 4 *insert* item 5.

Amdt. 5/ /1957.

5	3/1	Brass or Steel	Brass	Aluminium alloy	5·7 gr. AZ (Tinned lug- less copper alloy shell)	5·7 gr. AZ (Tinned lug- less copper alloy shell)
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Amdt. 9/Feb/1958

(h)
(ii) To improve sealing, the junction of the safety cap and fuze body is coated with Shellac Lacquer.

Amdt. 11/Oct/1958

6	4/1	Brass or Steel	Brass	Alumin- ium alloy	5·7 gr. AZ (Tinned lugless copper alloy shell)	5·7 gr. AZ (Tinned legless copper alloy shell)	(i) Differs from earlier marks in that:— (a) Magazine cap is of brass only (b) A Boxcloth disc is added between pellet and magazine cap (c) A shortened CE Pellet (QX 1500) is fitted.
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FUZE, TIME AND PERCUSSION, D.A., No. 213, MARK 2

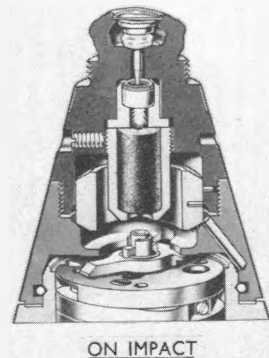
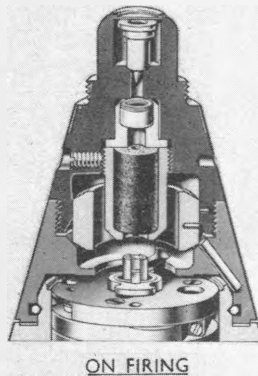
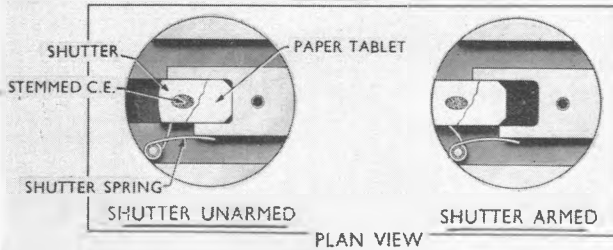
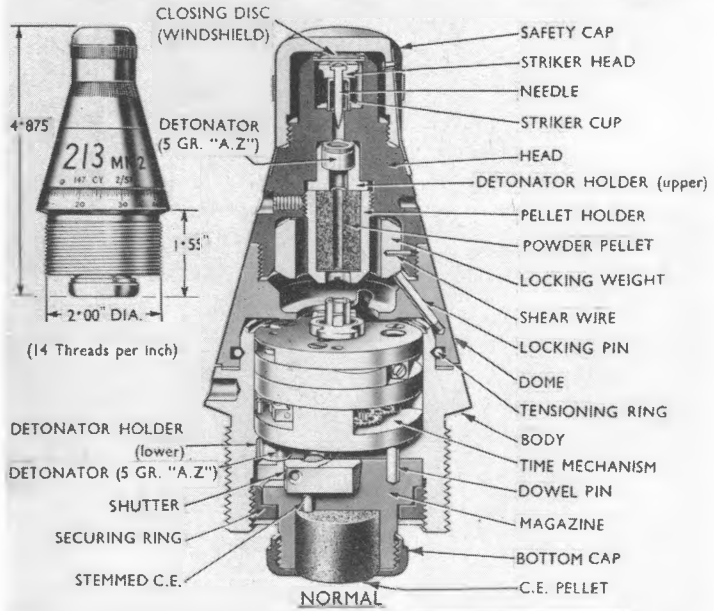


FIG. 1

FUZE, TIME AND PERCUSSION, D.A., No.213, MARK 2

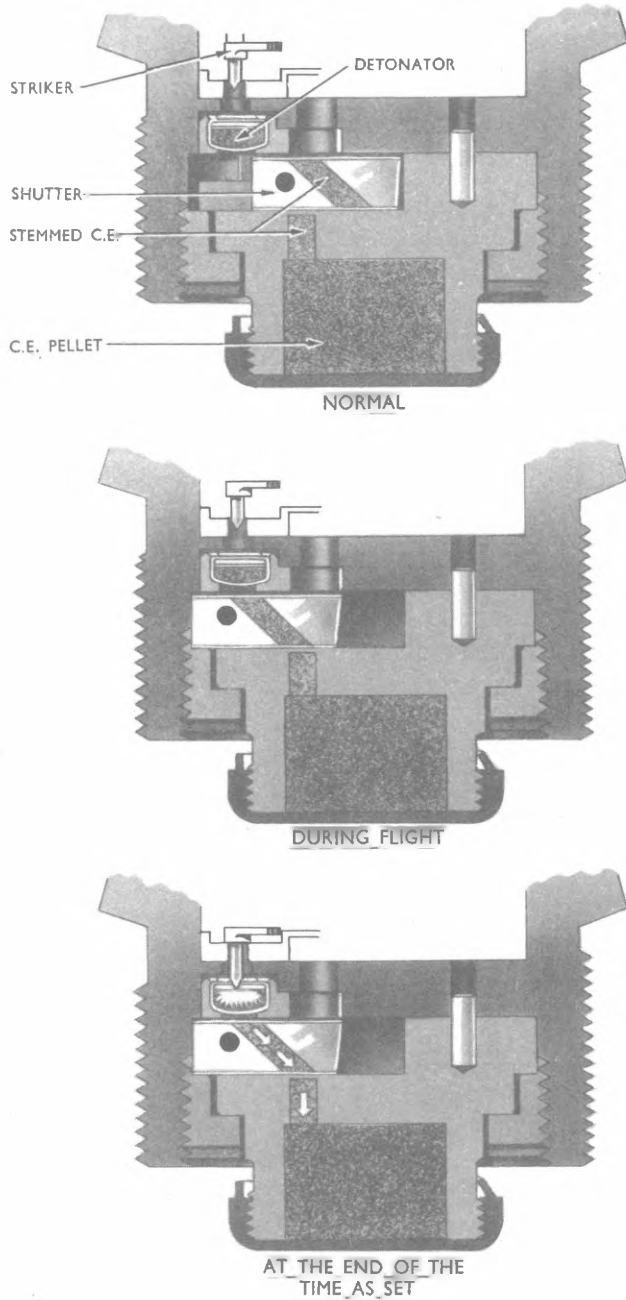
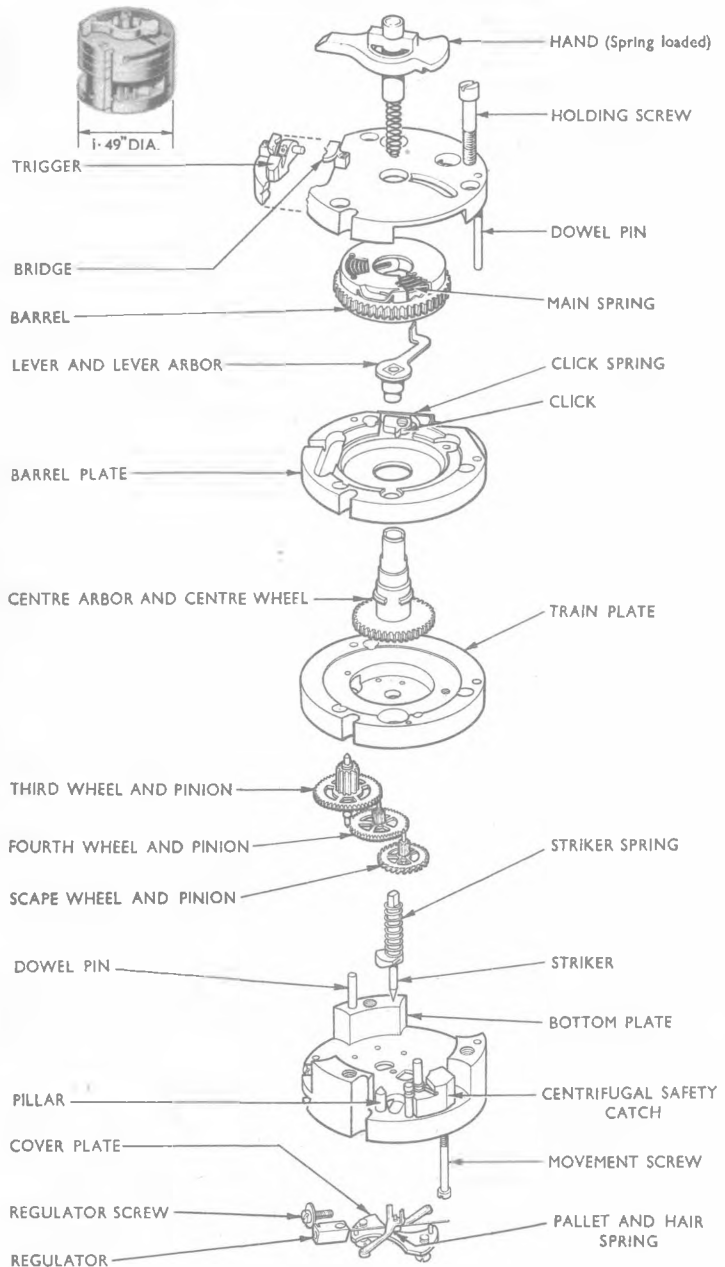


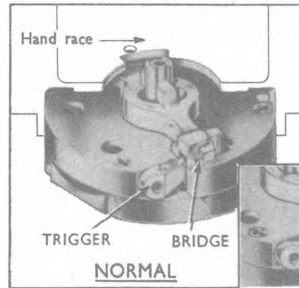
FIG. 2

MECHANISM, TIME, 80 SEC, No. 1 *AMBIA*

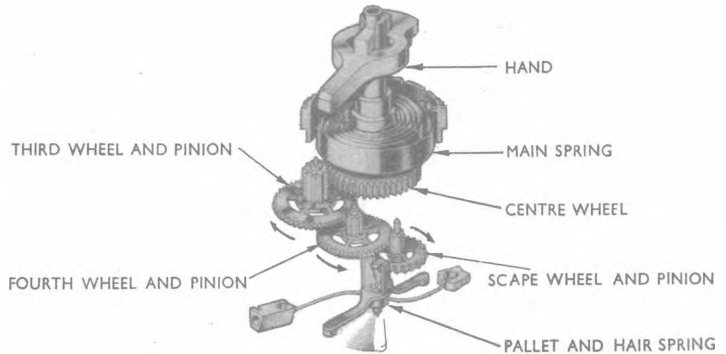
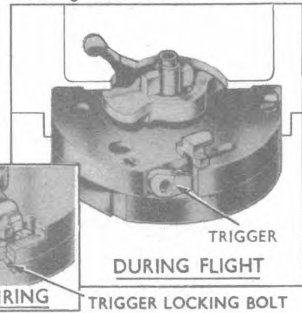


MECHANISM, TIME, 80 SEC, No. 1 AND 1A

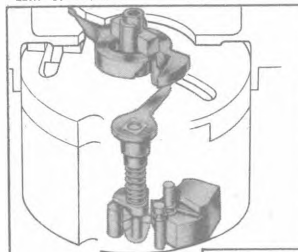
Hand race at SAFE
Hand retained by trigger and bridge



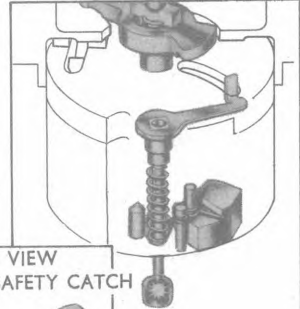
Hand race SET
Trigger in set back position. Hand travelling towards slot in hand race



Hand retaining LEVER and keeping cam of STRIKER on PILLAR.



Spring loaded HAND jumps upwards, releases LEVER and STRIKER flies off PILLAR downwards to fire detonator



PLAN VIEW
CENTRIFUGAL SAFETY CATCH

DURING FLIGHT



NORMAL

DURING FLIGHT

AT THE END OF THE TIME AS SET

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

*Whole Section 13
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PART 1

FUZES (NUMERICAL SERIES)

SECTION 13

FUZE, TIME, No. 214

PART 1—FUZES (NUMERICAL SERIES)

SECTION 13—FUZE, TIME, No. 214

INTRODUCTION

1. Fuze No. 214 is a detonating mechanical time fuze fitted with a Mechanism, Time, 43 seconds, of the Junghans type. The fuze, of 2 in. fuze-hole gauge, is used with the following equipment:—

Q.F., 3·7-in. Mks. 1–3 Guns.

Details of fuze marks are given in **Table 1**.

FUZE, TIME, No. 214, Mk. 1

2. *General Assembly*

The general assembly of the fuze and time mechanism is illustrated at **Fig. 1**.

The upper portion of the coned surface of the body is graduated for nearly the whole circumference in quarter divisions from 0 to 28·5. A small ungraduated portion between the two numbers is engraved with a safety mark coloured red with the word "SAFE" engraved underneath. When set at safe, the vertical line engraved on the dome coincides with the safety mark. The maximum time of running is 43 seconds.

3. *Safety Arrangements*

- (a) The tensioning ring in conjunction with the screwed collar prevents accidental movement of the dome during storage and transit and after the fuze has been set.
- (b) The timing disc is retained by the setting pin until the gun is fired.
- (c) No energy is available for running the time mechanism and rotating the timing disc until centrifugal force is created by rotation of the shell.
- (d) The set-back pin prevents the firing arm rotating before the gun is fired.
- (e) The striker safety plate prevents the striker from reaching the detonator should the firing arm be rotated before the shell reaches the muzzle.
- (f) The safety lever locks the escapement and prevents the time mechanism starting until the shell is clear of the muzzle.
- (g) The safety disc prevents the firing arm rotating until 1·67 seconds after firing by which time the shell is well clear of the muzzle. This device operates if the fuze is set too short.
- (h) When in the unarmed position, the shutter screens off the stemmed C.E. in the magazine channel and prevents a prematurely fired detonator from initiating the C.E. pellet in the magazine.

4. *Action (Fig. 1)*

(a) *Before Firing*

The setting of the fuze rotates the dome and setting pin and thus positions the timing disc.

(b) *On Firing*

The hammers attached to the hammer spring set back and flatten the bent-up lug of the timing disc, thereby freeing it from the setting pin. The hammer spring then returns the hammers to the original position. The set-back pin overcomes its spring and sets back, thus ceasing to act as a stop to the firing arm pin and releasing the firing arm.

(c) *During Flight*

The safety lever rotates against its retaining spring to release the escapement lever and to assist in starting the escapement oscillating. The weights on the centrifugal segments cause the segments to rotate and impart a turning movement to the main driving pinion and shaft which carries with it the timing disc assembled at its upper end. The turning movement is regulated by the escapement through a train of gears. The weighted end of the firing arm tends to swing outwards, but is prevented from doing so by the upturned finger coming into contact with the periphery of the timing disc. After 1.67 seconds the firing slot in the timing disc has rotated clear of the safety disc. The shutter overcomes its springs and slides outwards into the armed position to bring the stemmed C.E. shutter channel into alignment with both the detonator and the magazine channel.

(d) *At the end of the Time as Set*

The timing disc has rotated sufficiently to bring the firing slot in its rim into alignment with the upturned finger of the firing arm. The finger slips into the slot and in doing so, rotates the firing arm and shaft. This releases the striker safety plate, which swings clear of the firing arm shaft and allows the firing pin to be driven down into the detonator under the influence of its spring. The resultant detonating wave is transmitted through the C.E. stemmings in the shutter and magazine channel to initiate the C.E. pellet in the magazine.

ALTERNATIVE DESIGNS NOT ALLOCATED DISTINCTIVE MARKS

5. The Mk. 1 fuze has been produced with the following three alternative designs of dome assembly:—

- (a) *A dome assembly (Fig. 1)* in two parts consisting of a cap and a hammer spring cup. The hammer spring cup covers the clock and forms a platform to take the hammer spring

Pam 9, Part 1, Section 13

and setting pin. The hollow cap fits over the hammer spring cup to form a ballistic head. The bottom of both the cap and the hammer spring cup is cut away to leave three equally spaced segments, flanged at the base. When assembled together the segments of both components interlock to form a continuous flange to take the tensioning ring.

The dome is assembled on a washer inserted on the bearing surface inside the enlarged upper portion of the fuze body. It is held in position by the screwed collar.

The cap of pressed steel is cylindrical at the base and conical at the top. The lower part is cut away to leave three flanged segments. It fits over and interlocks with the hammer spring cup. On the coned portion are two recesses for the spring-loaded plungers of pawl type fuze keys.

The hammer spring cup is of pressed steel and shaped like an inverted cup. The lower part is cut away at the bottom to leave three flanged segments, a shoulder being formed at the top of the segments to take those parts of the cap above its cut-away portions.

The top of the hammer spring cup is flat. Two holes near the circumference are for the rivets fixing the hammer spring, and diametrically opposite is a hole for the setting pin.

- (b) *A dome assembly* in two parts consisting of a dome and top cap. The dome covers the clock and has an internal platform to carry the hammer spring and setting pin.

The dome is an aluminium forging and is cylindrical in shape with a flange at the foot to take the tensioning ring. The top part is coned to conform to the shell contour and is screw-threaded internally to take the top cap with a small hole in the side for a set-screw to secure it.

On the coned portion are two recesses for the spring-loaded plungers of pawl type fuze keys.

The interior of the dome is bored from both top and bottom to leave a ring-shaped platform at the centre. The lower part covers the top of the clock and the platform has two screwed holes on one side for screws to fasten the hammer spring and, diametrically opposite, a screwed hole for the setting pin.

The dome is assembled on a washer inserted on the bearing surface inside the enlarged upper portion of the fuze body. It is held in position by a screwed collar.

The top cap consists of a hollow aluminium forging, the base of which is screw-threaded externally to enter the top of the dome to which it is secured by a set-screw. Two recesses at the base of the coned portion are for an assembly tool.

- (c) *A dome assembly* consisting of a single aluminium forging forming a combination dome and cap. The assembly is similar to the assembled dome and top cap described in Para. 5 (b).

6. The Mk. 1 fuze has also been produced with the following two alternative designs of body:—

- (a) *A body* of brass, the lower part being cylindrical and the upper part being enlarged over a flange and coned. The lower half of the bottom part is plain and the upper half is screw-threaded. On the plain portion is a radial hole for a set-screw to secure a magazine securing ring, and just below the flange are three equi-distant holes for movement holding screws to fix the mechanism to the fuze body. Under the flange is a small oblique hole for a grub-screw to secure the screwed collar.

At the base of the upper coned part of the body are two grooves diametrically opposite to take the fuze key for inserting or removing the fuze. Two recesses near the bottom are to take the spring-loaded plungers of pawl type fuze keys.

The interior platform is formed by recessing from both top and bottom. The clock rests on top of the platform and is positioned by a movement locating pin and fixed by three equi-distant movement screws inserted from underneath. Near the circumference of the platform is a screw-threaded hole to take a detonator holder.

The interior of the upper part of the body forms a bearing for the dome and is screw-threaded on the inside wall to take the screwed collar to secure it.

The bottom part of the body contains the magazine which is positioned by a long magazine dowel pin to the platform. It is screw-threaded internally for the magazine securing ring.

The detonator holder is of brass, cylindrical in shape and screw-threaded externally to enter the hole in the body platform immediately beneath the striker. Internally, the top is recessed to take the detonator, and below this is a small fire channel. Two recesses underneath and on either side of the fire channel are for an assembly tool.

- (b) *A body* which differs from the body described in Para. 6 (a) in that the internal platform is prepared to take an alternative design of detonator holder.

Near the circumference of the platform is a plain hole for the centre of the detonator holder with a small screwed hole on either side for the detonator holding screws. The under-surface is recessed to take the flange of the holder.

Pam 9, Part 1, Section 13

The detonator holder is of brass, cylindrical in shape with two opposite flanges at the base for the holding screws. Internally the top is recessed to take the detonator and below this a hole is drilled to form a small fire channel.

The holder is inserted in the body platform from underneath.

AMMUNITION AND PACKAGE MARKINGS

7. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

Obsolete

LIMITATIONS AND RESTRICTIONS

8. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, TIME, No. 214

Pam 9, Part 1, Section 13
Table 1

Item	Mark	Material		Detonator	Remarks
		Body	Dome Assembly		
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Brass	Steel or Aluminium	5 gr. AZ (Nickel-plated copper alloy shell)	(i) Obsolescent.

FUZE, TIME, No. 214, MARK I

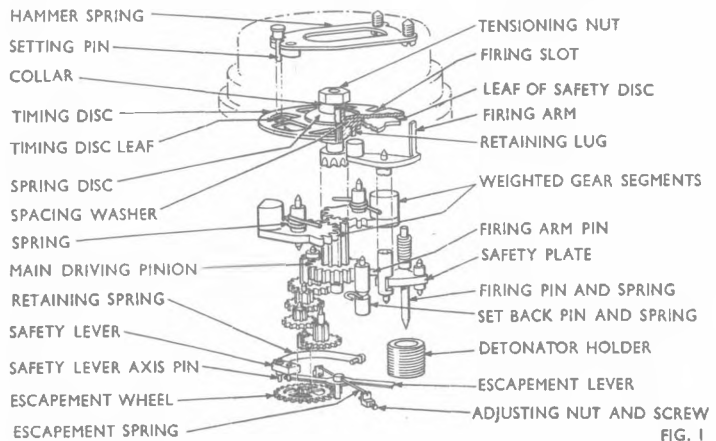
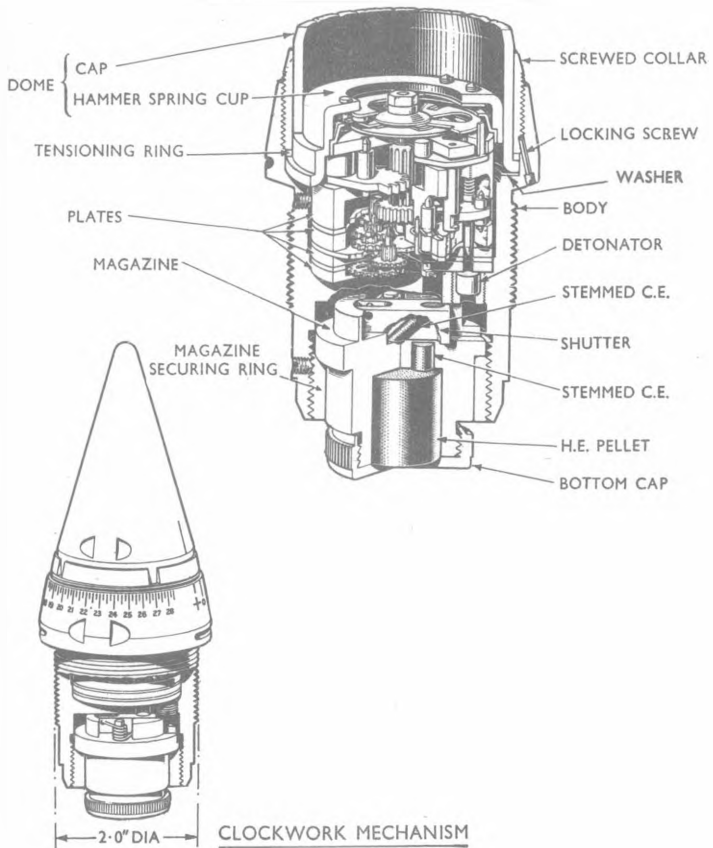


FIG. 1

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 14

**FUZES, TIME AND PERCUSSION GRAZE, No. 221,
No. 221B and No. 221T**

PART 1—FUZES (NUMERICAL SERIES)

**SECTION 14—FUZES, TIME AND PERCUSSION GRAZE,
No. 221, No. 221B and No. 221T**

INTRODUCTION

1. Fuzes No. 221 and No. 221B are both tensioned type combustion time and graze action percussion fuzes of 2 in. fuze-hole gauge and are used with the following equipments:—

Q.F., 25 pr. Gun

B.L., 5.5 in. Gun

A number of fuzes No. 221 were modified by the removal of the percussion mechanism. These fuzes are also used with the above mentioned equipments and can be identified by the addition of the letter "T" after the number.

Certain marks of fuze No. 221 were modified by the substitution of a weaker detent spring, the suffix "B" being added to the mark for identification purposes. All current production is of the "B" type.

Details of fuze marks are given in Tables 1A, 1B and 1C.

FUZE, TIME AND PERCUSSION GRAZE, No. 221B, Mk. 4

2. General Assembly

The general assembly of the fuze is illustrated at Fig. 1.

The top time ring is filled with 30 second powder and the bottom ring with Composition R.D.202. Both rings are provided with setting slots. The top time ring, however, is prevented from rotating by a single brass pin. The flange of the body is graduated from 0 to 22 round its outer edge, and a small ungraduated portion between the two numbers is marked with a red arrow head against the word "SAFE". When set at safe the setting mark engraved on the bottom ring coincides with the arrow head. When set at full, the time of burning is approximately 50 seconds.

Two flash channels lead from the detonator channel to the top time ring to allow the flame and gas from the time detonator to circulate in the body of the fuze, thus ensuring less violent ignition of the time ring. The magazine is filled with approximately 60 gr. Gunpowder G.20.

The fuze is fitted with Cover, 2 in. Time or Time and Percussion Fuze, No. 5, which is hermetically sealed and retained by a band pressed tightly round the fuze.

3. Safety Arrangements

- (a) The inertia pellet is retained in position by the centrifugal bolt which is in turn retained by the detent.
- (b) The resistance of the time spring holds the time detonator holder clear of the needle.

- (c) When the fuze is set at safe, the flash holes to the lower time ring and to the magazine are masked by the bridges of the upper and lower time rings respectively. This provides a double safety device against ignition of the magazine, should the initiating mechanism act prematurely.

4. *Action (Fig. 2)*

(a) *Before Firing*

The fuze cover is removed and the fuze is set by rotating the bottom ring until the setting mark is opposite the required graduation on the body.

(b) *Time Mechanism*

(i) *On Firing*

The time detonator holder sets back, overcomes the resistance of the spring and carries the detonator onto the needle. The resultant flash from the detonator passes through the flash channels in the stem of the fuze body to ignite the mealed powder in the oblique channel in the top ring which, in turn, ignites the powder pellet and the fuze powder. The closing disc in the gas escape hole is blown out and thus a vent is provided for the gases generated as the burning of the time train progresses.

(ii) *During Flight*

The powder in the top time ring burns round until after an interval of time determined by the setting, the flame ignites the powder pellet and the fuze powder in the bottom ring. At the same time the closing disc in the gas escape hole is blown out. The powder in the bottom ring burns round in the reverse direction and after an interval of time determined by the setting, the flame ignites the powder pellets in the channel leading to the magazine and, in turn, the magazine filling.

(c) *Percussion Mechanism*

(i) *On Firing*

The detent sets back against its spring thus releasing the centrifugal bolt.

(ii) *During Flight*

The centrifugal bolt moves outwards from its recess in the fuze body leaving the inertia pellet retained only by the creep spring.

(iii) *On Impact or Graze*

The inertia pellet overcomes the creep spring and carries the needle onto the detonator. The resultant flash passes through the two slots formed in the sides of the inertia pellet to ignite the gunpowder in the magazine.

Pam 9, Part 1, Section 14

FUZE, DRILL, TIME AND PERCUSSION GRAZE, No. 221, Mk. 1

5. The fuze is similar in external contour to the service fuze and consists of a solid body with cap, top and bottom rings, fibre washers, set screw and securing pins.

A fibre washer is fitted between the top and bottom time rings and another between the bottom ring and body. The graduations are similar to those of the service fuze. The cap is identical with the service cap except that it is drilled with four equi-spaced holes. A copper and asbestos washer is fitted under the fuze flange.

The exterior of the fuze is coloured black with the exception of the fuze threads, the graduations and a patch which is left bright on the bottom ring.

CLASSIFICATION FOR CHEMICAL AND SMOKE

6. During the 1939-45 War, fuzes No. 221 and No. 221B were classified by their performance at acceptance proof for use either with C.W. or smoke shell, the highest grade fuzes being classified for C.W. and the remainder for smoke. Fuzes No. 221B are now required to conform to a fixed standard and there is, therefore, no sub-division of use for C.W. and smoke.

CONVERTED AND RECTIFIED FUZES

7. Fuzes No. 221 had been in production for some time when defects were found in the attachment of the needle to the inertia pellet of the percussion mechanism and a proportion of the fuzes in the Service had to be modified. Two processes were adopted:—

- (a) A number of fuzes No. 221, Mk. 1 were converted to No. 221T, Mk. 1 by removal of the percussion mechanism.
- (b) A number of fuzes No. 221, Mk. 1 and Mk. 2 were modified so that the attachment of needle to pellet was secure. These fuzes were re-designated No. 221, Mk. 1* and Mk. 2* respectively.

There existed some fuzes with needles which required no rectification and the star marking was extended to these fuzes also. The star marking therefore, is a general indication of a satisfactory percussion mechanism.

The star marking does not apply to fuzes No. 221, Mk. 3 and later marks as they are fitted with a needle which forms an integral part of the inertia pellet.

The defects in fuze No. 221 necessitating conversion or rectification do not apply to fuze No. 221B.

MARKING OF CONVERTED AND RECTIFIED FUZES

8. (a) *Bulk Packed*

It was decided that a "T" or a six-pointed star, as appropriate, should be stamped on the fuze and stencilled

on the fuze cover and on packages. It was impossible, however, to carry out marking of all fuzes and covers as fuzes fitted with needles requiring no rectification were never unpacked and only packages were marked. Fuze covers of such fuzes must be appropriately marked when assembled into shell.

(b) Fuzed Shell

Smoke shell issued fuzed from factory should bear a "T" or a six-pointed star on the fuze cover and on the package.

Both red and blue stencilling has in the past been employed for star marking. The colour of the star has no significance and any future marking will be stencilled only in blue.

AMMUNITION AND PACKAGE MARKINGS

9. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

10. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1A—DATA FOR FUZE, TIME AND PERCUSSION GRAZE, No. 221 Pam 9, Part 1, Section 14
Table 1A

Item	Mark	Material		Detonator		Remarks
		Body	Cap	Time	Percussion	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	1	—	—	—	—	(i) Obsolete.
2	1*	Brass	Aluminium alloy or Moulded plastic	2.5 gr. BP (Copper alloy shell)	2.5 gr. BP (Copper alloy shell)	(i) Mk. 1 fuze modified to ensure that the needle is secured to prevent it becoming loose in the inertia pellet. Modification carried out in 1942. (ii) <i>OBsolete</i>
3	2	—	—	—	—	(i) Obsolete.
4	2*	Brass	Aluminium alloy or Moulded plastic	2.5 gr. BP (Copper alloy shell)	2.5 gr. BP (Copper alloy shell)	(i) Mk. 2 fuze modified to ensure that the needle is secured to prevent it becoming loose in the inertia pellet. Modification carried out in 1942. (ii) Similar to the Mk. 1* but manufactured with a stepped shoulder and therefore requires no washer. (iii) <i>OBsolete</i>

TABLE 1B—DATA FOR FUZE, TIME AND PERCUSSION GRAZE, No. 221B

Pam 9, Part 1, Section 14
Table 1B

Item	Mark	Material		Detonator		Remarks
		Body	Cap	Time	Percussion	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	1	Brass	Aluminium alloy or Moulded plastic	2·5 gr. BP (Copper alloy shell)	2·5 gr. BP (Copper alloy shell)	(i) Fuze No. 221, Mk. 1 modified by fitting a weaker detent spring. (ii) Obsolescent.
2	2	Brass	Aluminium alloy or Moulded plastic	2·5 gr. BP (Copper alloy shell)	2·5 gr. BP (Copper alloy shell)	(i) Fuze No. 221, Mk. 2 modified by fitting a weaker detent spring. (ii) Similar to the Mk. 1 but manufactured with a stepped shoulder and therefore requires no washer. (iii) Obsolescent.
3	3	Brass	Aluminium alloy	2·5 gr. BP (Copper alloy shell)	2·5 gr. BP (Copper alloy shell)	(i) Generally similar to the Mk. 1 but of new manufacture
4	4	Brass	Aluminium alloy	2·5 gr. BP (Copper alloy shell)	2·5 gr. BP (Copper alloy shell)	(i) Similar to the Mk. 3, but manufactured with a stepped shoulder and therefore requires no washer.

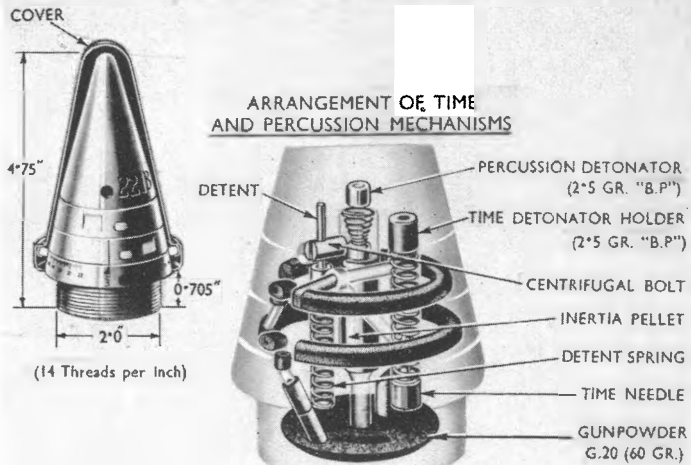
TABLE 1C--DATA FOR FUZE, TIME AND PERCUSSION GRAZE, No. 221T

Pam 9, Part 1, Section 14

Table 1C

Item	Mark	Material		Detonator	Remarks
		Body	Cap		
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Brass	Aluminium alloy or Moulded plastic	2.5 gr. BP (Copper alloy shell)	(i) Fuze No. 221, Mk. 1 converted by removal of the percussion mechanism. (ii) Obsolete <i>OBsolete</i>

FUZE, TIME AND PERCUSSION GRAZE, No. 221B, MARK 4



NORMAL

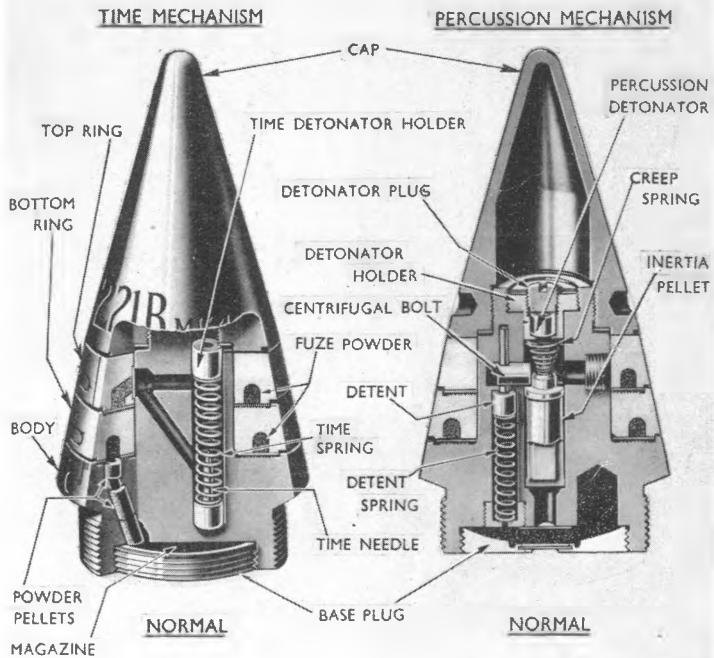
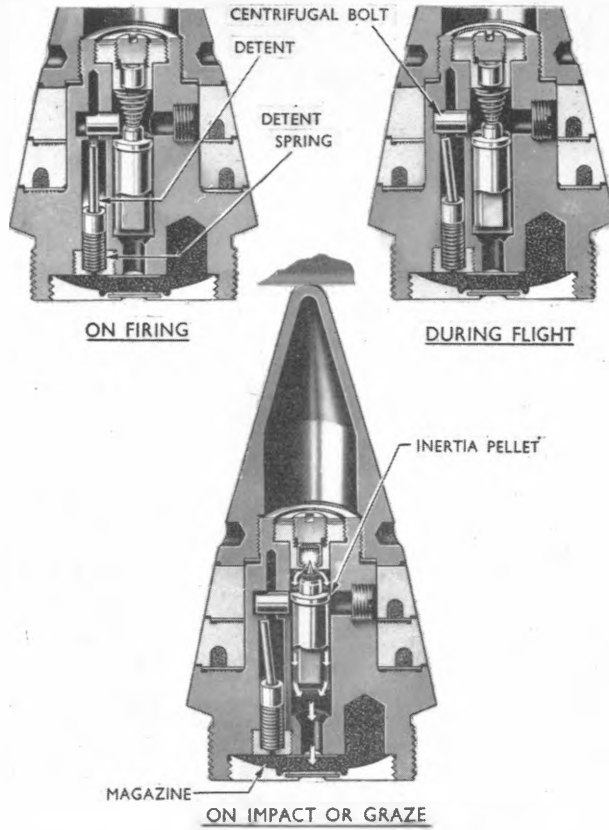


FIG. 1

FUZE, TIME AND PERCUSSION GRAZE, No. 221B, MARK 4

ACTION OF PERCUSSION MECHANISM



ACTION OF TIME MECHANISM

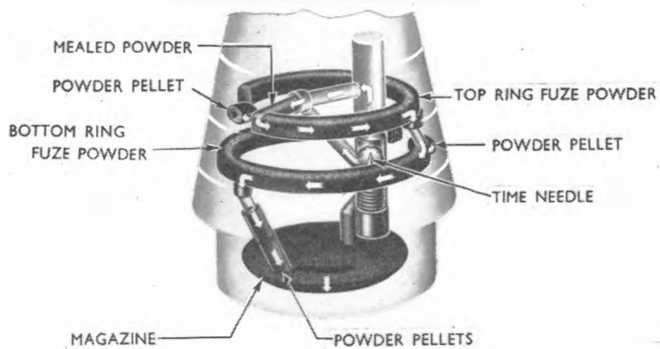


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 15

FUZE, TIME AND PERCUSSION, D.A., No. 228

PART 1—FUZES (NUMERICAL SERIES)

SECTION 15—FUZE, TIME, AND PERCUSSION D.A.,

No. 228

INTRODUCTION

1. Fuze No. 228, is an igniferous mechanical time fuze incorporating a direct action head designed to ensure that the fuze functions on impact independently of the time mechanism. The fuze, of 2 in. fuze-hole gauge, is fitted with Mechanism, Time, 80 seconds and is used with the following equipments—

B.L., 5.5 in. Gun.

Q.F., 25-PR. GUN (SHELL, B.E., S/L, RADAR ONLY)

The fuze is similar in design to fuze No. 213, differing principally in having a shutter holder, base plug and a G.20 gunpowder filling instead of a magazine, bottom cap and a C.E. or Pentolite pellet. The base plug has a 0.25 in. diameter flash hole drilled through the centre. The hole is closed by a thin brass disc to which a paper disc is affixed by shellac. The base plug is also drilled off centre with a filling hole which is screw-threaded and closed with a screwed plug.

Details of fuze marks are given in Table 1.

FUZE, TIME AND PERCUSSION, D.A. No. 228, Mk. 1

2. *General Assembly*

The general assembly of the fuze and time mechanism is illustrated at Figs. 1 and 2.

The dome is retained by a tensioning ring fitted over a flange at the foot of the dome and held by three small set screws.

The inclined surface above the shoulder of the body is graduated from 0 to 80, and a small ungraduated portion between the two numbers is marked with a red arrow head against the word "SAFE". When set at safe, the setting mark engraved on the dome coincides with the arrow head. The maximum time of running is 80 seconds.

3. *Safety Arrangements*

- (a) The safety cap protects the closing disc and striker head during storage and transit.
- (b) The tensioning ring prevents accidental movement of the dome during storage and transit.
- (c) Three equi-spaced shear wires secure the locking weight to the wall of the head, thus preventing any movement of the locking weight before firing.
- (d) When in the unarmed position the shutter screens off the channel in the shutter holder and prevents a prematurely fired lower detonator from initiating the gunpowder filling in the magazine.

- (e) The trigger prevents the hand from rotating and the time mechanism from starting until the gun is fired.
- (f) The centrifugal safety catch, which is housed under the striker cam until the shell rotates in flight, serves a dual purpose:—
 - (i) In the event of the time mechanism being set in action accidentally, the catch prevents the striker reaching the detonator.
 - (ii) If a fuze with the time mechanism accidentally set in action were loaded and the gun fired, the centrifugal safety catch would be prevented from swinging out from under the striker cam as the latter would, immediately the hand is lifted, jam down onto a step cut in the catch for this purpose and hold it firmly in place.
- (g) The muzzle safety bridge prevents the hand rising until the shell is well clear of the muzzle. This device operates if the fuze is set too short.

4. *Action (Figs. 1 and 3)*

(a) *Before Firing*

The fuze is set by rotating the dome until the indicating line is coincident with the required graduation on the body, thus positioning the hand-race slot. The safety cap is removed.

(b) *On Firing*

The locking weight sets back, shearing the three shear wires and driving the three equi-spaced locking pins into recesses in the body, thus locking dome to body and preventing any alteration of fuze setting. The trigger sets back, its top projection clears the hand and the trigger locking bolt is forced outwards by its spring to retain the trigger in the set back position. The hand is now released from the trigger, but is prevented from rising by the muzzle safety bridge. During acceleration in the bore it is unlikely that the pallet will oscillate owing to the force of set back. The shutter is retained in the unarmed position by friction.

(c) *During Flight*

On leaving the bore the oscillation of the pallet starts the time mechanism and the hand begins to rotate by action of the mainspring. The centrifugal safety catch flies outwards to leave the striker supported only by its cam resting on the bevelled surface of the pillar. The shutter slides outwards against its springs to bring its stemmed C.E. fire channel coincident with both the lower detonator and the channel leading to the magazine. When the shell is well clear of the muzzle, the hand clears the muzzle safety bridge and bears against the lower surface of the hand-race.

(d) At the end of the Time as Set

The hand reaches the hand-race slot into which it rises under the influence of its spring and releases the lever which controls the striker. The lever flies outwards under the action of the striker spring in conjunction with the bevelled surface of the cam and the coned pillar, the cam is rotated off the pillar and the striker is forced into the detonator. The resultant detonating wave passes through the C.E. stemming in the shutter to ignite the gunpowder filling in the magazine.

(e) On Impact

The striker head is crushed in and the needle pierces and fires the upper detonator which ignites the gunpowder pellet. The resultant flash passes down a groove in the side of the time mechanism housing, through a cross channel leading to the time mechanism striker housing and past the striker to initiate the lower detonator. Subsequent action is then as previously described.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1, and Inter-Service Ammunition and Ammunition Package Markings.

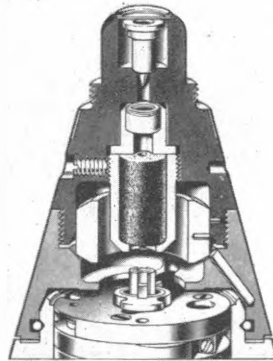
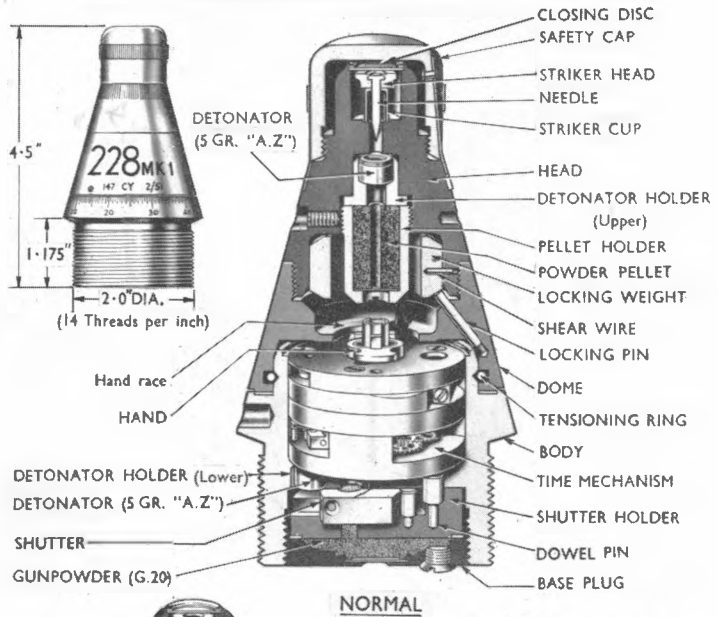
LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

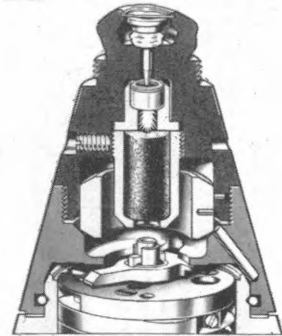
TABLE 1—DATA FOR FUZE, TIME AND PERCUSSION, D.A., No. 228 Pam 9, Part 1, Section 15
Table 1

Item	Mark	Material			Detonator		Remarks
		Body	Dome	Head	Upper	Lower	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	1	Brass or Steel	Brass	Aluminum alloy	5 gr. AZ (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	

FUZE, TIME AND PERCUSSION, D.A., No.228, MARK I



ON FIRING



ON IMPACT

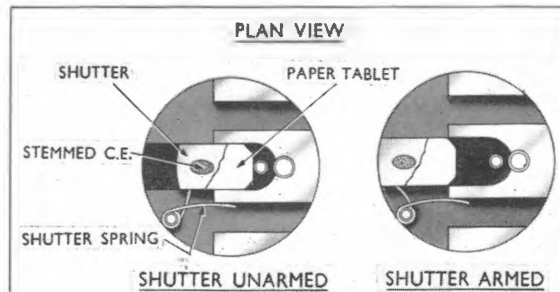


FIG. 1

MECHANISM, TIME, 80 SEC, No. 1 AND 1A.

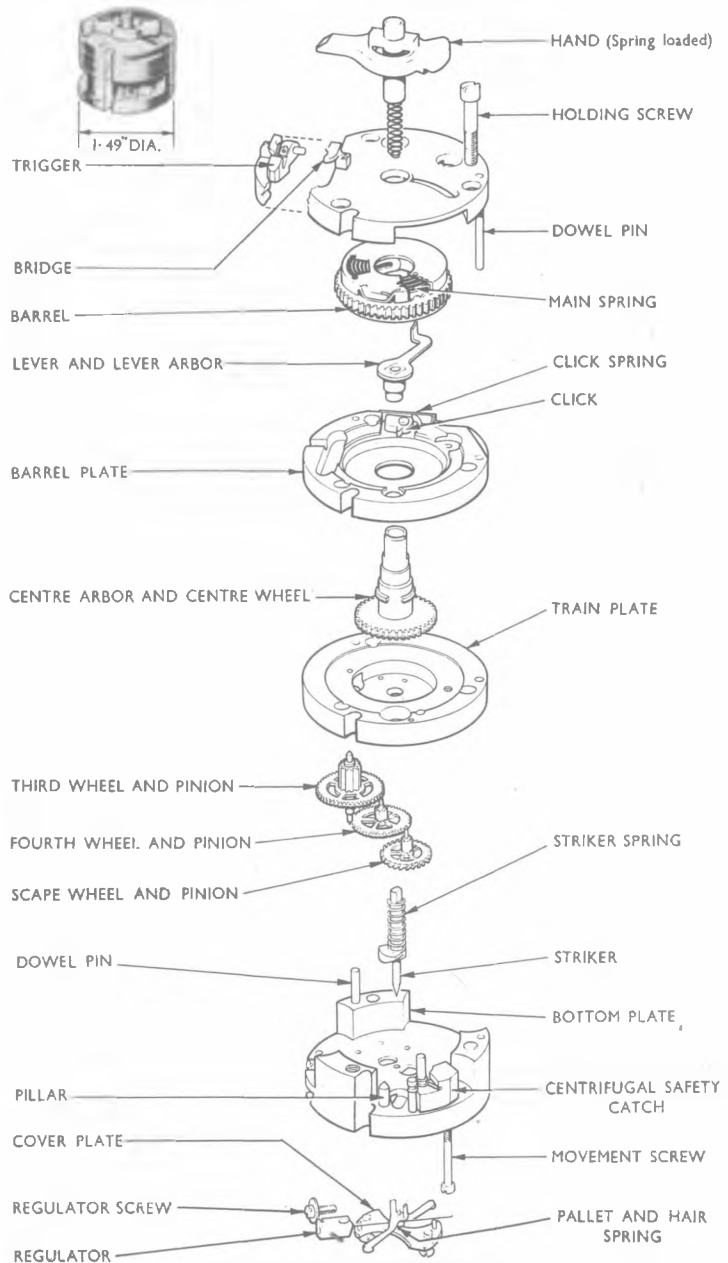
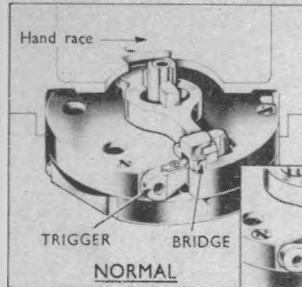


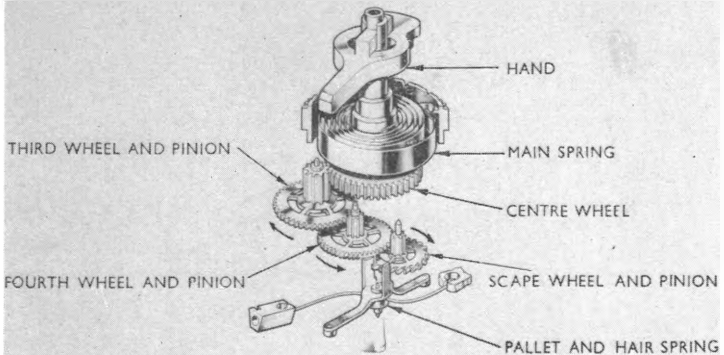
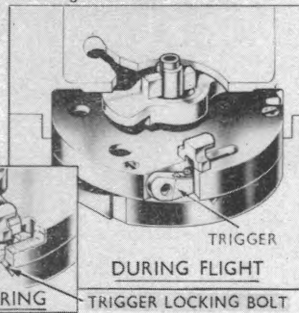
FIG. 2

MECHANISM, TIME, 80 SEC. No. 1 *INDIA*

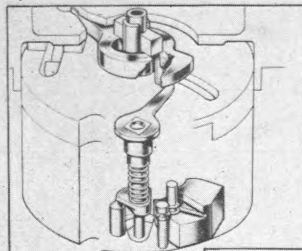
Hand race at SAFE
Hand retained by trigger and bridge



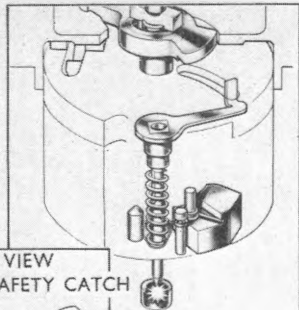
Hand race SET
Trigger in set back position. Hand travelling towards slot in hand race



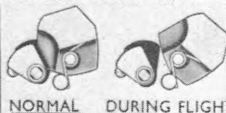
Hand retaining LEVER and keeping cam of STRIKER on PILLAR.



Spring loaded HAND jumps upwards, releases LEVER and STRIKER flies off PILLAR downwards to fire detonator



PLAN VIEW
CENTRIFUGAL SAFETY CATCH



DURING FLIGHT

AT THE END OF THE TIME AS SET

FIG. 3

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 16

FUZE, PERCUSSION, D.A., No. 230

PART 1—FUZES (NUMERICAL SERIES)

SECTION 16—FUZE, PERCUSSION, D.A., No. 230

INTRODUCTION

1. Fuze No. 230 is a direct action detonating fuze of 2 in. fuze-hole gauge and is used with the following equipment:—

B.L., 6 in. Gun

Details of fuze marks are given in **Table 1.**

FUZE, PERCUSSION, D.A., No. 230, Mk. 3

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1.**

3. Safety Arrangements

- (a) The safety cap, which must be removed before firing, protects the striker cover and striker thus preventing accidental damage during storage and transit.
- (b) The striker cover protects the striker head from air resistance during flight and must on no account be removed.
- (c) The four brass segments, which are assembled between the guide bush and striker sleeve, hold the striker spring under compression, thus retaining the point of the striker in the recess in the locking weight.
- (d) The shutter is held in the unarmed position by the locking weight in conjunction with the point of the striker.
- (e) When the shutter is in the unarmed position, the detonator is displaced and cannot communicate with the stemmed C.E. channel in the magazine.
- (f) In order to obviate shock to the detonator when the shutter revolves, the shutter is so shaped that it can only revolve gently and the stop pin is fitted with a fibre sleeve.
- (g) The two holes bored in the body diaphragm act as vent holes to relieve pressure in the shutter recess should the detonator fire prematurely. One of these holes is situated immediately above the detonator when the shutter is in the unarmed position.

4. Action (Fig. 2)

(a) Before Firing

The safety cap is removed.

(b) On Firing

The arming sleeve sets back against its spring releasing the four segments which are thrown clear.

(c) *During Flight*

The striker spring, which is assembled under compression, asserts itself against the underside of the striker head, forcing the striker and striker sleeve forward until the upper end of the sleeve meets the under surface of the guide bush, thus withdrawing the point of the striker from the recess in the locking weight. This allows the locking weight to revolve and in doing so its toe starts the shutter turning gently on its hinge pin. The shutter continues to revolve until it reaches the stop pin, thus locating the detonator directly beneath the striker point. The fuze is now fully armed, the striker being held clear of the detonator by the striker spring.

(d) *On Impact*

The striker cover is crushed and the striker head is forced inwards, compressing the striker spring. The point of the striker pierces the detonator and the resultant detonating wave passes through the stemmed C.E. channel to the C.E. or Pentolite pellet in the magazine.

GENERAL

5. *Striker Cover*

Before 13th October 1942 an instructional label L.139 with the legend "DO NOT REMOVE" was affixed to the striker cover. After this date the legend was embossed on the top of the striker cover which was manufactured to design F.D.907.

6. *Safety Cap*

Before 1st October 1942 an instructional label L.1914 with the legend "**WHEN PREPARING THIS FUZE FOR FIRING THE BLACK STEEL SAFETY CAP ONLY IS TO BE UNSCREWED AND REMOVED**" was affixed to the safety cap. After this date the use of label L.1914 was discontinued.

7. *Guide Bush*

The exterior of the fuze at the joint between guide bush and body is waterproofed by a band of approved composition $\frac{1}{4}$ in. in width.

AMMUNITION AND PACKAGE MARKINGS

8. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

9. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 230

Pam 9, Part 1, Section 16
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	—	—	(i) Design cancelled.
2	2	Brass	5 gr. AZ (Copper alloy shell)	(i) Manufactured from lead-free material.
3	3	Brass	5 gr. AZ (Copper alloy shell)	(i) Identical in design with the Mk. 2 but not manufactured from lead-free material.
4	4	—	—	(i) Naval Service.
5	5	—	—	(i) Naval Service.

FUZE, PERCUSSION, D.A., No.230, MARK 3

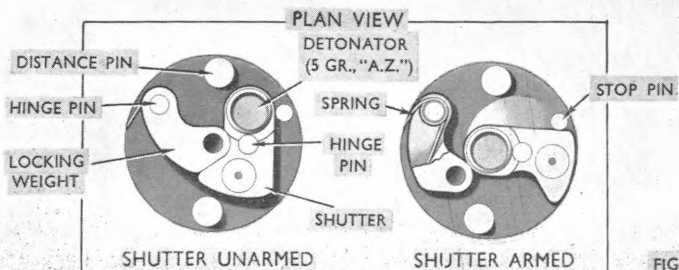
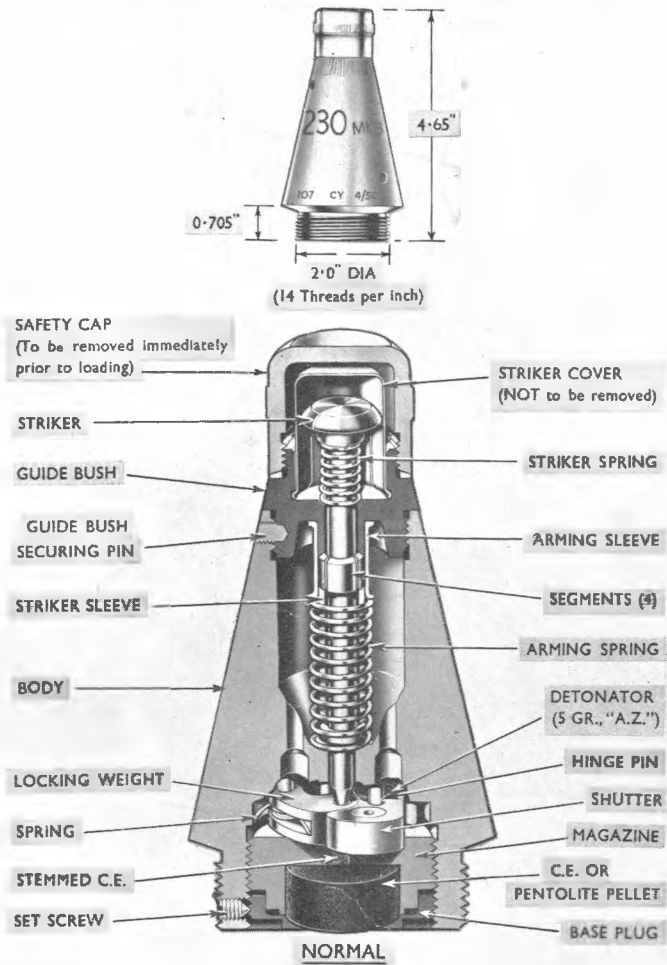


FIG. 1

FUZE, PERCUSSION, D.A., No.230, MARK 3

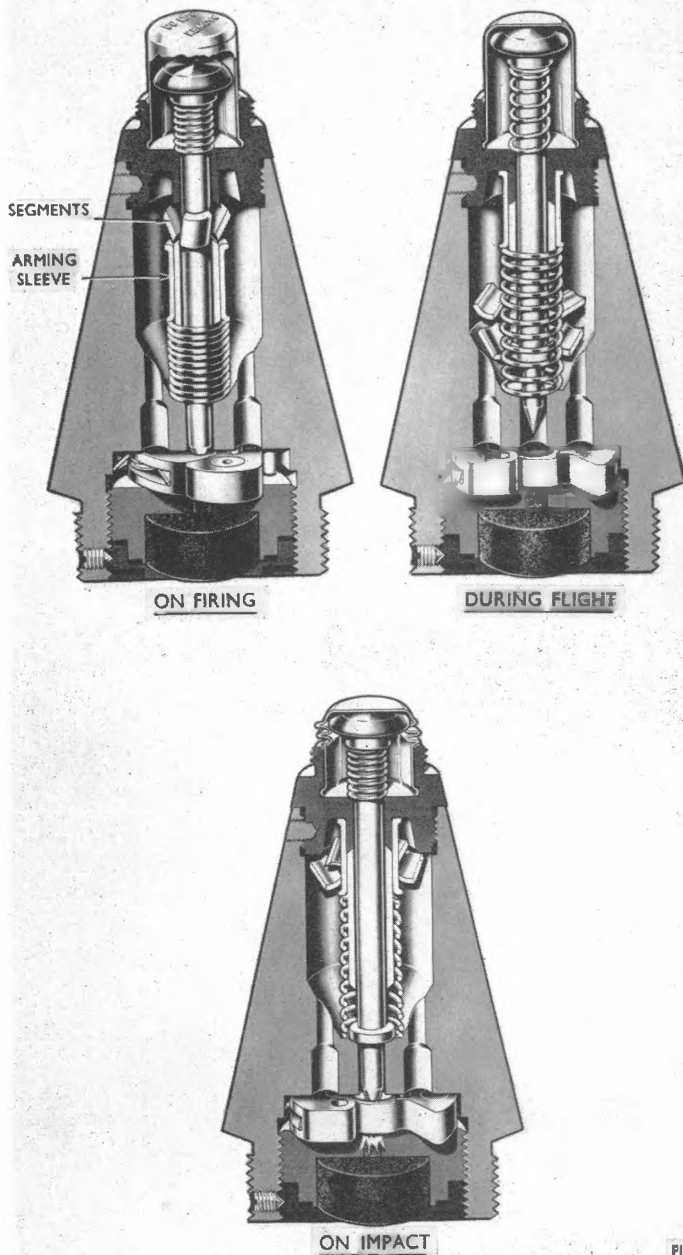


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 17

FUZE, PERCUSSION, D.A., No. 230P

PART 1—FUZES (NUMERICAL SERIES)

SECTION 17—FUZE, PERCUSSION, D.A., No. 230P

INTRODUCTION

1. Fuze No. 230P is a direct action igniferous fuze of 2 in. fuze-hole gauge and is used with the following equipments:—

B.L., 6 in. Gun

B.L., 9·2 in. Gun

The fuze is similar in design to fuze No. 230 with the exception that the magazine and flash channel are filled gunpowder instead of C.E. and the base plug is drilled through the centre with a 0·25 in. diameter flash hole, closed with a linen disc.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 230P, Mk. 3

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The safety cap, which must be removed before firing, protects the striker cover and striker, thus preventing accidental damage during storage and transit.
- (b) The striker cover protects the striker head from air resistance during flight and must on no account be removed.
- (c) The four brass segments, which are assembled between the guide bush and striker sleeve, hold the striker spring under compression, thus retaining the point of the striker in the recess in the locking weight.
- (d) The shutter is held in the unarmed position by the locking weight in conjunction with the point of the striker.
- (e) When the shutter is in the unarmed position, the detonator is displaced and cannot communicate with the gunpowder flash channel in the magazine.
- (f) In order to obviate shock to the detonator when the shutter revolves, the shutter is so shaped that it can only revolve gently and the stop pin is fitted with a fibre sleeve.
- (g) The two holes bored in the body diaphragm act as vent holes to relieve pressure in the shutter recess should the detonator fire prematurely. One of these holes is situated immediately above the detonator when the shutter is in the unarmed position.

4. *Action (Fig 2)*

(a) *Before Firing*

The safety cap is removed.

(b) *On Firing*

The arming sleeve sets back against its spring releasing the four segments which are thrown clear.

(c) *During Flight*

The striker spring, which is assembled under compression, asserts itself against the underside of the striker head, forcing the striker and striker sleeve forward until the upper end of the sleeve meets the under surface of the guide bush, thus withdrawing the point of the striker from the recess in the locking weight. This allows the locking weight to revolve and in doing so its toe starts the shutter turning gently on its hinge pin. The shutter continues to revolve until it reaches the stop pin, thus locating the detonator directly beneath the striker point. The fuze is now fully armed, the striker being held clear of the detonator by the striker spring.

(d) *On Impact*

The striker cover is crushed and the striker head is forced inwards compressing the striker spring. The point of the striker pierces the detonator and the resultant flash ignites the gunpowder filling in the flash channel and magazine.

GENERAL

5. *Striker Cover*

Before 13th October 1942 an instructional label L.139 with the legend "DO NOT REMOVE" was affixed to the striker cover. After this date the legend was embossed on the top of the striker cover which was manufactured to design F.D. 907.

6. *Safety Cap*

Before 1st October 1942 an instructional label L.1914 with the legend "**WHEN PREPARING THIS FUZE FOR FIRING THE BLACK STEEL SAFETY CAP ONLY IS TO BE UNSCREWED AND REMOVED**" was affixed to the safety cap. After this date the use of label L.1914 was discontinued.

7. *Guide Bush*

The exterior of the fuze at the joint between guide bush and body is waterproofed by a band of approved composition $\frac{1}{4}$ in. in width.

Pam 9, Part 1, Section 17

AMMUNITION AND PACKAGE MARKINGS

8. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

9. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 230P

Pam 9, Part 1, Section 17
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	—	—	(i) Not introduced.
2	2	Brass	5 gr. AZ (Copper alloy shell)	(i) Naval design. (ii) Converted fuze No. 230, Mk. 2. (iii) Manufactured from lead-free materials. (iv) Obsolescent.
3	3	Brass	5 gr. AZ (Copper alloy shell)	(i) Converted fuze No. 230, Mk. 3. (ii) Identical in design with fuze No. 230P, Mk. 2, but not manufactured from lead-free materials. (iii) Obsolescent.
4	4	—	—	(i) Naval Service.
5	5	—	—	(i) Naval Service.

FUZE, PERCUSSION, D.A., No.230P, MARK 3

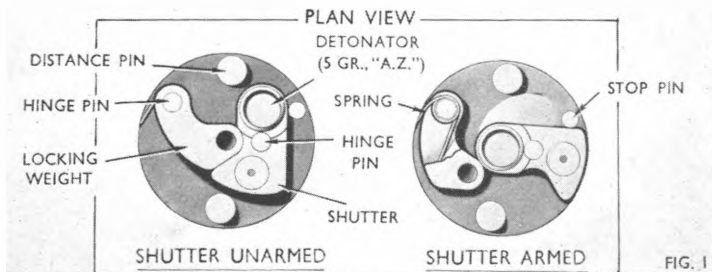
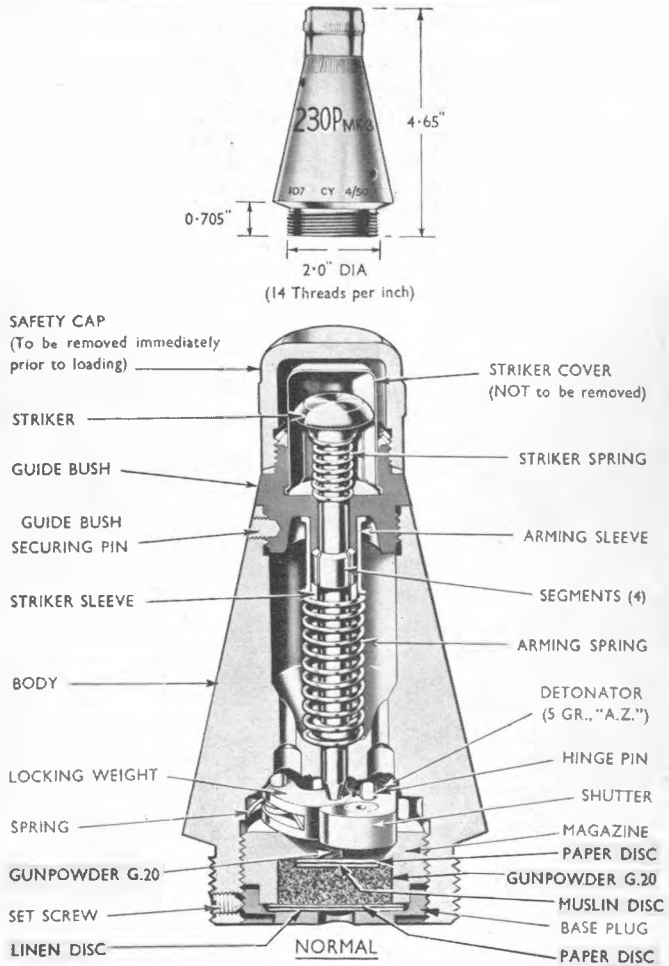


FIG. 1

FUZE, PERCUSSION, D.A., No.230P, MARK 3

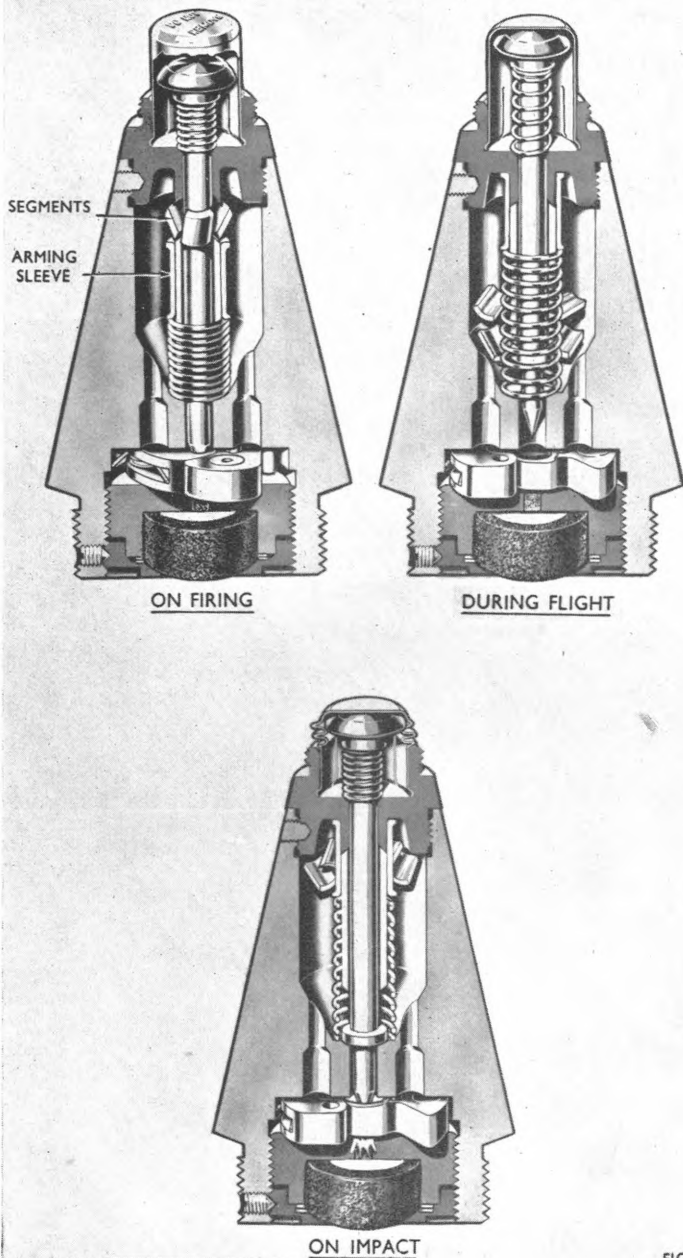


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 18

FUZE, PERCUSSION, D.A., No. 242

Pam 9, Part 1, Section 18

PART 1—FUZES (NUMERICAL SERIES)

SECTION 18—FUZE, PERCUSSION, D.A., No. 242

INTRODUCTION

1. Fuze No. 242 is a direct action detonating fuze of 1·2 in. fuze-hole gauge and is used with the following equipments:—

Q.F., 6 pr. 10 cwt. Gun

Q.F., 6 pr. Sub-Calibre Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 242, Mk. 4

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

The shutter, which is held in the unarmed position by the shutter spring, masks off the upper C.E. stemming in the needle holder and the lower C.E. stemming in the fuze body.

4. *Action (Fig. 1)*

(a) *On Firing*

The shutter sets back and is retained in its original position by friction.

(b) *During Flight*

The shutter swings outwards, overcoming the resistance of its spring and bringing the C.E. stemming in the shutter flash channel into alignment with the C.E. stemmings in the needle holder and in the channel leading to the magazine.

(c) *On Impact*

The fairing and needle disc are crushed in and the needle pierces the detonator. The resultant detonating wave passes through the C.E. stemmings in the needle holder, shutter and body to detonate the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

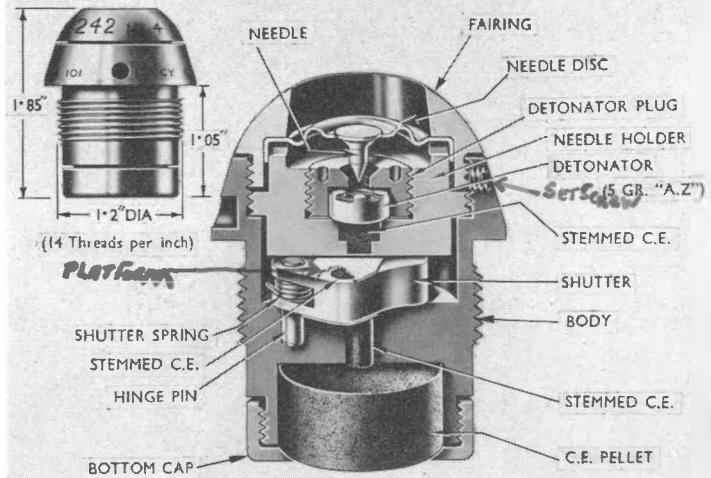
6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 242

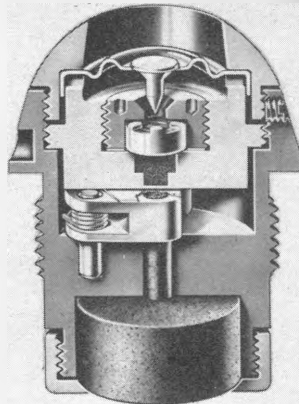
Pam 9, Part 1, Section 18
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Brass	5 gr. AZ (Copper alloy shell)	(i) Fitted with a copper needle disc. (ii) The shutter spring is flat in section and spiral in shape. (iii) Obsolescent.
2	2	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs principally from the Mk. 1 in having a modified shutter fitted with a coil spring. A slot is cut in the shutter to accommodate the spring and brass hinge pin. (ii) Obsolescent.
3	3	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs principally from the Mk. 2 in being fitted with a modified shutter stop pin. (ii) Obsolescent.
4	4	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 3 in that the shutter opens in the reverse direction.

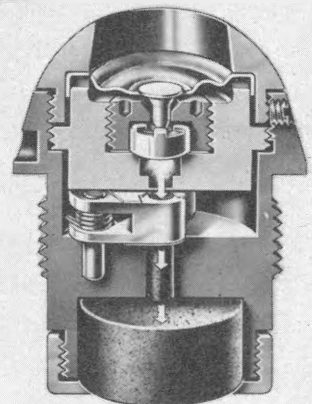
FUZE, PERCUSSION, D.A., No. 242, MARK 4.



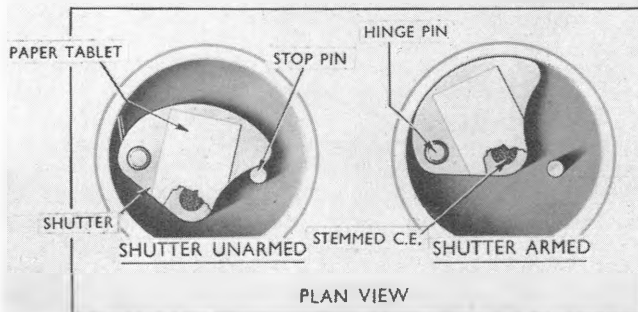
NORMAL



DURING FLIGHT



ON IMPACT



PLAN VIEW

FIG. 1

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 19

FUZE, PERCUSSION, D.A., No. 242P

PART 1—FUZES (NUMERICAL SERIES)

SECTION 19—FUZE, PERCUSSION, D.A., No. 242P

INTRODUCTION

1. Fuze No. 242P is a direct action igniferous fuze of 1.2 in. fuze-hole gauge and is used with the following equipment:—

Q.F., 12 pr. 12 cwt. Gun

The fuze is similar in design to fuze No. 242 with the exception that the magazine and lower flash channel in the body are filled gunpowder instead of C.E. and the bottom cap is drilled through the centre with a 0.25 in. diameter flash hole, closed with a thin brass disc.

Details of fuze Marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 242P, Mk. 4

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

The shutter, which is held in the unarmed position by the shutter spring, masks off the upper C.E. stemming in the needle holder and the gunpowder channel leading to the magazine.

4. *Action (Fig. 1)*

(a) On Firing

The shutter sets back and is retained in its original position by friction.

(b) During Flight

The shutter swings outwards overcoming the resistance of its spring and bringing the C.E. stemming in the shutter flash channel into alignment with the C.E. stemming in the needle holder and the gunpowder channel leading to the magazine.

(c) On Impact

The fairing and needle disc are crushed in and the needle pierces the detonator. The C.E. stemmings in the needle holder and shutter are detonated and the resultant flash ignites the gunpowder flash channel and, in turn, the gunpowder in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 242P

Pam 9, Part 1, Section 19
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Brass	5 gr. AZ (Copper alloy shell)	(i) Fitted with a copper needle disc. (ii) The shutter spring is flat in section and spiral in shape. (iii) Obsolescent.
2	2	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs principally from the Mk. 1 in having a modified shutter fitted with a coil spring. A slot is cut in the shutter to accommodate the spring and brass hinge pin. (ii) Obsolescent.
3	3	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs principally from the Mk. 2 in being fitted with a modified shutter stop pin. (ii) Obsolescent.
4	4	Brass	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 3 in that the shutter opens in the reverse direction.

FUZE, PERCUSSION, D.A., No.242P, MARK 4

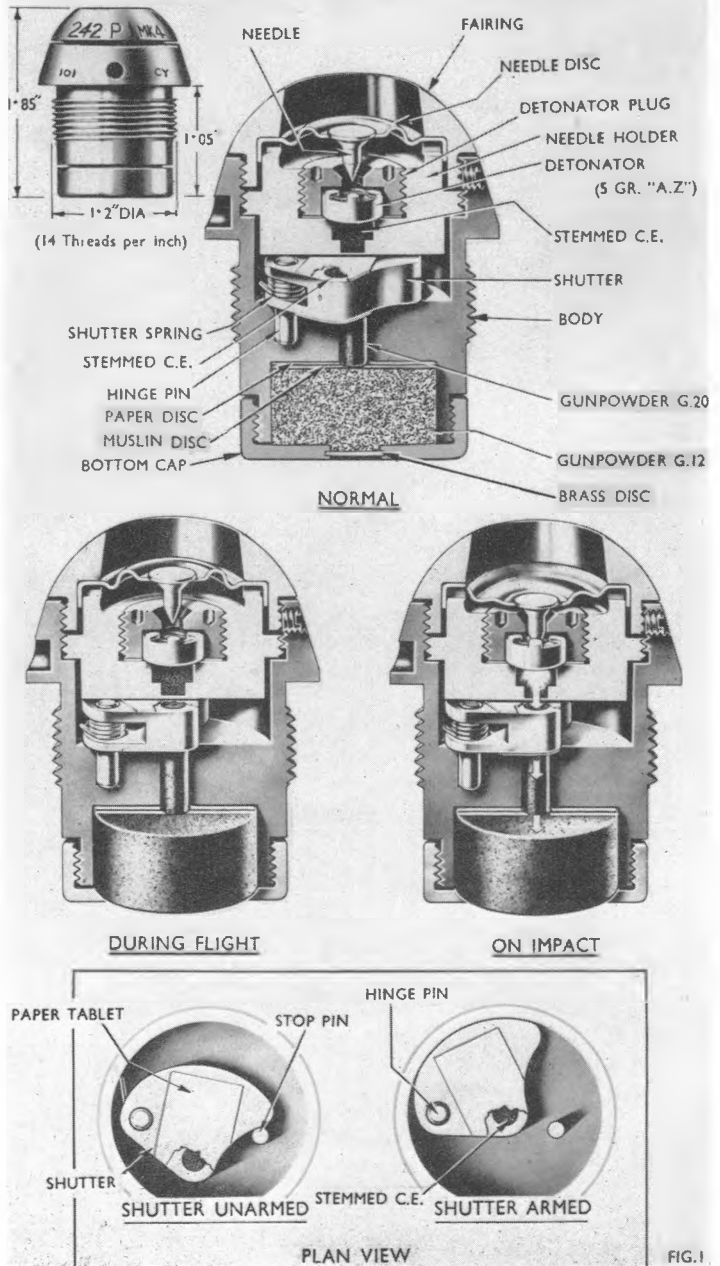


FIG. 1

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 20

FUZE, PERCUSSION, D.A., No. 243 *Absolute*

PART 1—FUZES (NUMERICAL SERIES)

SECTION 20—FUZE, PERCUSSION, D.A., No. 243

INTRODUCTION

1. Fuze No. 243 is a direct action detonating fuze of 1.05 in. fuze-hole gauge and is used with the following equipment:—

Q.F., 2 pr., Mks. 9A and 10A Guns

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 243, Mk. 3

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

- (a) The shear wire retains the striker assembly and holds it clear of the detonator until impact.
- (b) The half collars, which are retained by the safety ferrule and arming ring, prevent the point of the striker from piercing the detonator should the shear wire be broken accidentally.
- (c) The shutter, when in the unarmed position, masks off the ZY sleeve in the magazine.

4. *Action (Figs. 1 and 2)*

- (a) *On Firing*

The arming ring sets back and overcomes the safety ferrule, thereby releasing the half collars which are retained by friction. The shutter is also retained by friction in the unarmed position.

- (b) *During Flight*

The two half collars fly outwards. The striker is then prevented from impinging on the detonator only by the shear wire. The shutter overcomes the shutter spring and swings into the armed position, carrying its flash channel into alignment with the central channel in the detonator plug and the sleeve in the magazine.

- (c) *On Impact*

The closing disc is crushed and the striker is driven inwards, breaking the shear wire. The needle pierces the detonator and the resultant flash passes through the flash channels in the detonator plug and shutter to initiate the ZY filling in the sleeve which, in turn, detonates the C.E. pellets in the magazine.

AMMUNITION AND PACKAGE MARKINGS

- 5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.**

LIMITATIONS AND RESTRICTIONS

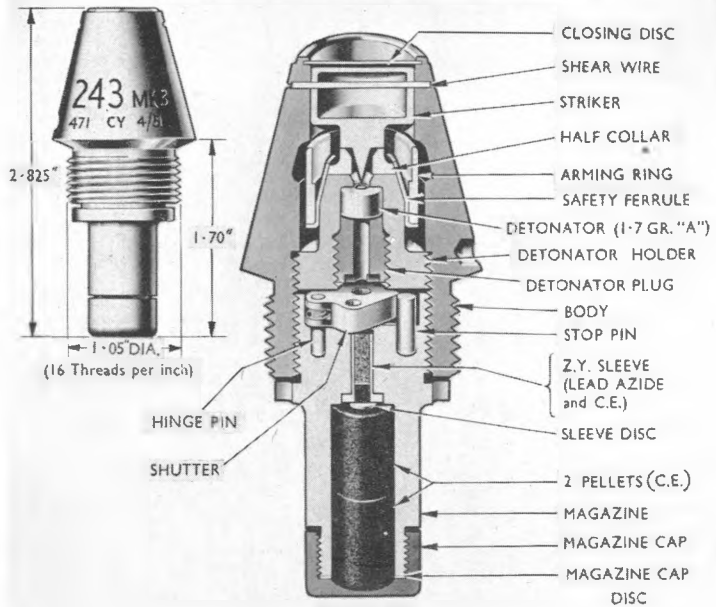
- 6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.**

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 243

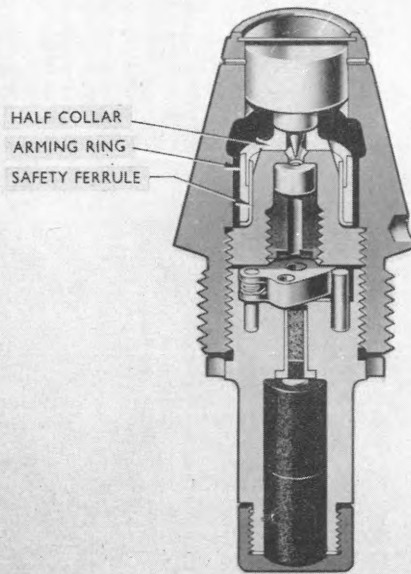
Pam 9, Part 1, Section 20
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Aluminium alloy	1.7 gr. A. (Copper alloy shell)	(i) Obsolescent. <i>Obsolete</i>
2	2	Aluminium alloy	1.7 gr. A. (Copper alloy shell)	(i) Differs from the Mk. 1 in being assembled with a thicker closing disc. (ii) Obsolescent. <i>Obsolete</i>
3	3	Aluminium alloy	1.7 gr. A. (Copper alloy shell)	(i) Differs from the Mk. 2 in that the shutter opens in the reverse direction. (ii) Obsolescent. <i>Obsolete</i>

FUZE, PERCUSSION, D.A., No. 243, MARK 3



NORMAL



ON FIRING

FIG. 1

FUZE, PERCUSSION, D.A., No. 243, MARK 3

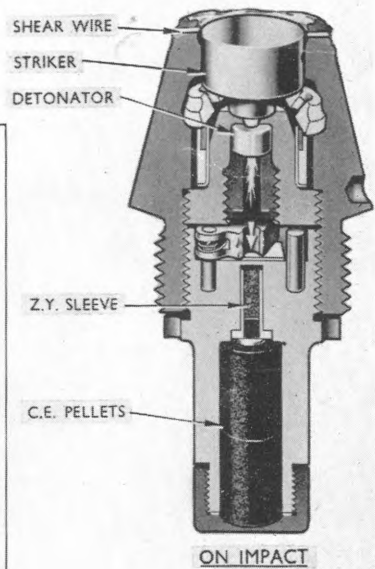
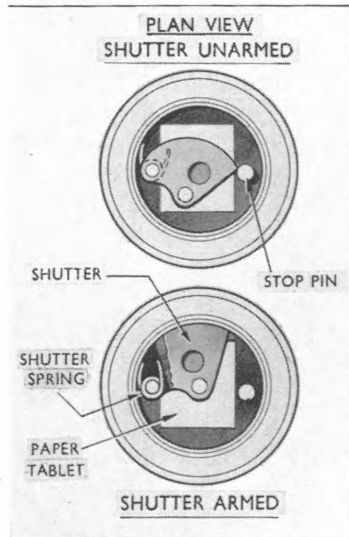
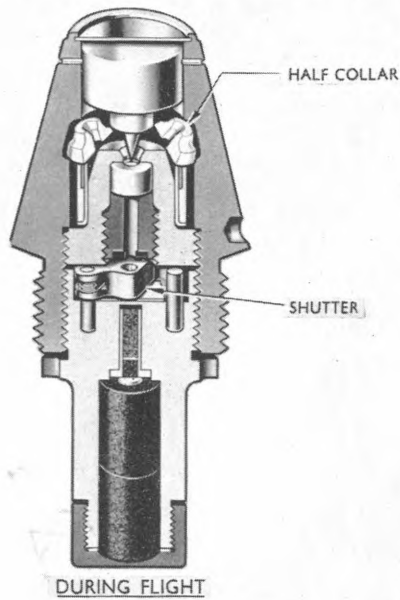


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 21

FUZE, PERCUSSION, D.A., No. 244

PART 1—FUZES (NUMERICAL SERIES)

SECTION 21—FUZE, PERCUSSION, D.A., No. 244

INTRODUCTION

1. Fuze No. 244 is a direct action detonating fuze with short delay. The fuze, of 1.6 in. fuze hole gauge, is used with the following equipments:—

Q.F., 6 pr. 7 cwt. Gun

Q.F., 6 pr. 10 cwt. Gun

Q.F., 17 pr. Gun

Q.F., 77 mm. Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 244, Mk. 5

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The cage (or cap) protects the needle disc from accidental damage.
- (b) The shutter, when in the unarmed position, masks off the C.E. stemming in the detonator plug from the C.E. stemming in the magazine.

4. Action (Fig. 1)

(a) Before Firing

The cage is removed.

Note: Special instructions apply to Mks. 1, 2, 3 and 4, all of which are fitted with copper needle discs.

(b) On Firing

The shutter sets back and is retained in the unarmed position by friction.

(c) During Flight

The shutter swings outwards, overcoming the resistance of the shutter spring and bringing the C.E. stemming in the shutter flash channel into alignment with the C.E. stemmings in the detonator plug and magazine.

PART 1—FUZES (NUMERICAL SERIES)

SECTION 21—FUZE, PERCUSSION, D.A., No. 244

INTRODUCTION

1. Fuze No. 244 is a direct action detonating fuze with short delay. The fuze, of 1.6 in. fuze hole gauge, is used with the following equipments:—

Q.F., 6 pr. 7 cwt. Gun

Q.F., 6 pr. 10 cwt. Gun

Q.F., 17 pr. Gun

Q.F., 77 mm. Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 244, Mk. 5

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The cage (or cap) protects the needle disc from accidental damage.
- (b) The shutter, when in the unarmed position, masks off the C.E. stemming in the detonator plug from the C.E. stemming in the magazine.

4. Action (Fig. 1)

(a) Before Firing

The cage is removed.

Note: Special instructions apply to Mks. 1, 2, 3 and 4, all of which are fitted with copper needle discs.

(b) On Firing

The shutter sets back and is retained in the unarmed position by friction.

(c) During Flight

The shutter swings outwards, overcoming the resistance of the shutter spring and bringing the C.E. stemming in the shutter flash channel into alignment with the C.E. stemmings in the detonator plug and magazine.

(d) On Impact

The needle disc is crushed inwards, the needle pierces the upper detonator and the resultant flash passes, by means of the boring and channels in the upper detonator holder, to the interior of the fuze body, where it ignites the gunpowder in the muslin bag. The flash from the powder passes by way of two channels to the central boring in the lower detonator holder to fire the 5 gr. detonator. The resultant detonating wave passes through the C.E. stemmings in the detonator plug, shutter and magazine to detonate the C.E. pellet.

FUZE, DRILL, PERCUSSION, D.A., No. 244 and No. 257

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 9, Part 1, Section 26.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 244

Pam 9, Part 1, Section 21
Table 1

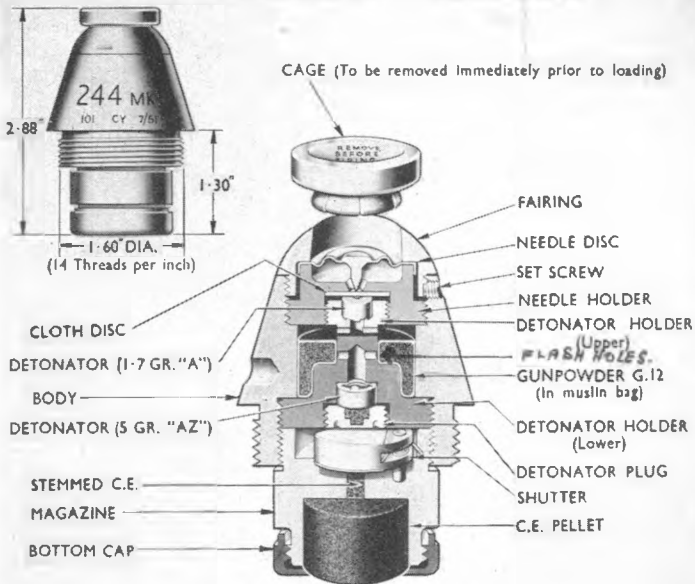
Item	Mark	Body Material	Detonator		Remarks
			Upper	Lower	
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Brass	1·62 gr. BP (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Received into the Service without cages. (ii) Fitted with a copper needle disc. (iii) Obsolescent.
2	2	Brass	1·62 gr. BP (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 1 in being fitted with a thicker copper needle disc and a modified shutter and coil spring. (ii) Received into the Service without cages. (iii) Obsolescent.
3	3	Brass	1·62 gr. BP (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 2 in being fitted with a modified magazine and in the shutter bore being concentric instead of eccentric. (ii) Received into the Service without cages. (iii) Obsolescent.
4	4	Brass	1·7 gr. A (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 3 in being fitted with Detonator 1·7 gr. A instead of Detonator 1·62 gr. BP. (ii) From 20 April 1944 the top of the fairing was fitted with a cage. (iii) From 15 May 1944 the top of the cage was inscribed with the legend "FIRE WITH CAP ON". (iv) Obsolescent.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 244

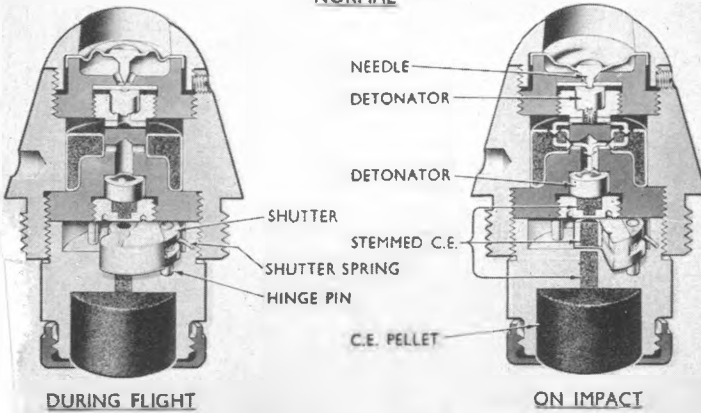
Pam 9, Part 1, Section 21
Table 1 (Contd)

Item	Mark	Body Material	Detonator		Remarks
			Upper	Lower	
(a)	(b)	(c)	(d)	(e)	(f)
5	5	Brass	1·7 gr. A (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Differs from the Mk. 4 in being fitted with a needle disc of steel instead of copper and in being fitted with a shutter opening in the reverse direction. (ii) Fitted with cage inscribed "REMOVE BEFORE FIRING". (iii) Obsolescent.
6	5/1	Brass	1·7 gr. A (Copper alloy shell)	5 gr. AZ (Copper alloy shell)	(i) Converted empty Mk. 3 or Mk. 4 fuze. (ii) Differs from the Mk. 5 in that the shutter opens in the original direction. (iii) Fitted with a modified cage inscribed "REMOVE BEFORE FIRING". (iv) Obsolescent.

FUZE, PERCUSSION, D.A., No. 244, MARK 5



NORMAL



PLAN VIEW



FIG. 1

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 22

FUZE, PERCUSSION, D.A., No. 246

PART 1—FUZES (NUMERICAL SERIES)

SECTION 22—FUZE, PERCUSSION, D.A., No. 246

INTRODUCTION

1. Fuze No. 246 is a direct action detonating fuze with short delay. The fuze, of 1.05 in. fuze-hole gauge, is used with the following equipment:—

Q.F., 2 pr. Mks. 9A and 10A Guns

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 246, Mk. 2

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

- (a) The shear wire retains the striker assembly and holds it clear of the detonator until impact.
- (b) The half collars, which are retained by the safety ferrule and arming ring, prevent the point of the striker from piercing the detonator should the shear wire be broken accidentally.
- (c) The shutter, when in the unarmed position, masks off the sleeve in the magazine.

4. *Action (Figs 1 and 2)*

(a) *On Firing*

The arming ring sets back and overcomes the safety ferrule thereby releasing the half collars which are retained by friction. The shutter is also retained by friction in the unarmed position.

(b) *During Flight*

The two half collars fly outwards. The striker is then prevented from impinging on the detonator only by the shear wire. The shutter overcomes the shutter spring and swings into the armed position, carrying its flash channel into alignment with the central channel in the detonator plug and the sleeve in the magazine.

(c) *On Impact*

The closing disc is crushed and the striker is driven inwards breaking the shear wire. The needle pierces the detonator and the resultant flash passes through the flash channels in the detonator plug and shutter, then through

the displaced fire holes in the baffle and the flash hole in the vent washer to ignite the composition in the delay ring. The delay composition burns through to initiate the lead azide or ZY filling in the sleeve which, in turn, detonates the C.E. pellets in the magazine.

AMMUNITION AND PACKAGE MARKINGS

- 5.** See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings

LIMITATIONS AND RESTRICTIONS

- 6.** Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 246

Pam. 9, Part 1, Section 22
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Aluminium alloy	1·7 gr. A (Copper alloy shell)	(i) Naval design. (ii) Differs principally from fuze No. 243 in being modified to give a short delay.
2	2	Aluminium alloy	1·7 gr. A (Copper alloy shell)	(i) Naval design. (ii) Differs from the Mk. 1 in that the shutter opens in the reverse direction.

FUZE, PERCUSSION, D.A., No. 246, MARK 2

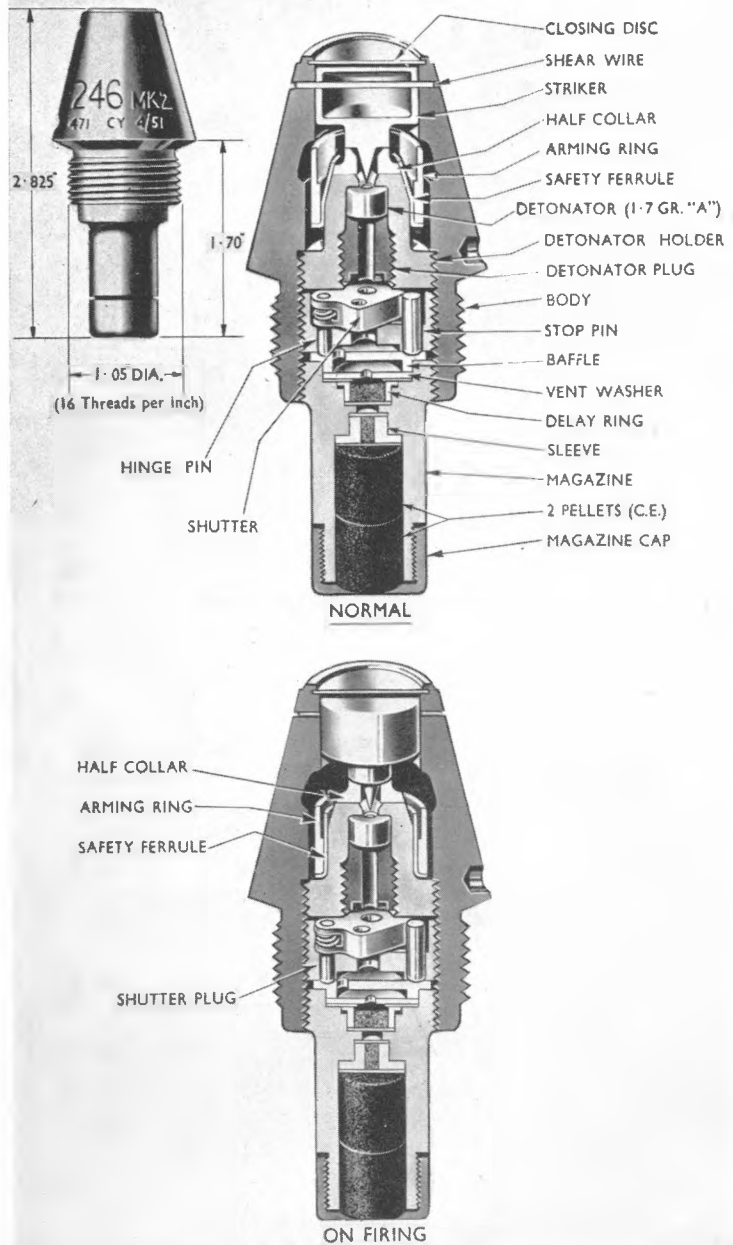
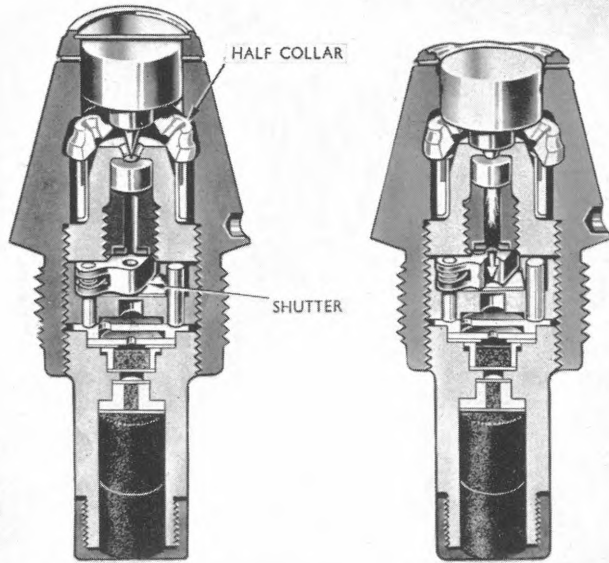


FIG. 1

FUZE, PERCUSSION, D.A., No. 246, MARK 2



DURING FLIGHT

ON IMPACT

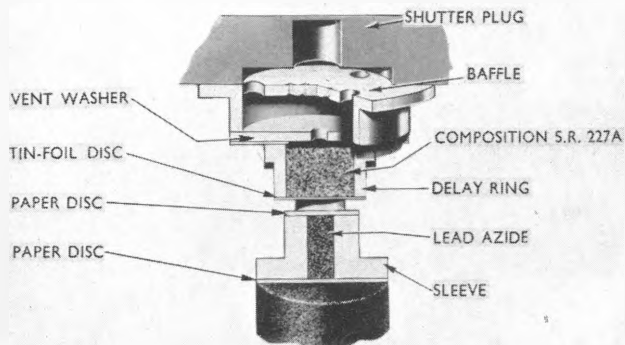
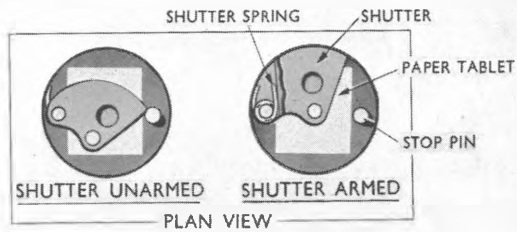


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 23

FUZE, PERCUSSION, D.A., No. 248

PART 1—FUZES (NUMERICAL SERIES)

SECTION 23—FUZE, PERCUSSION, D.A., No. 248

INTRODUCTION

1. Fuze No. 248 is a direct action detonating fuze of 1·2 in. fuze-hole gauge and is used with the following equipment:—

B.L., 15 in. Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 248, Mk. 1

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The shutter detent prevents the shutter from moving into the armed position before firing.
- (b) When in the unarmed position, the shutter masks off the detonator and upper C.E. stemming from the pressed C.E. channel in the body plug.
- (c) When the fuze is used with the “K” device, the needle disc is protected by a steel safety cap which must be removed before firing.

4. Action

(a) *Before Firing*

The safety cap, when fitted, is removed.

(b) *On Firing*

The detent sets back against its spring and becomes locked under the shoulder of the detent channel, thus freeing the shutter which is retained in the unarmed position by friction.

(c) *During Flight*

The shutter swings outwards, overcoming the resistance of the shutter spring and carrying the C.E. stemming in the shutter flash channel into alignment with the C.E. stemming in the holder and the pressed C.E. in the body plug.

(d) *On Impact*

The needle disc is crushed inwards and the needle pierces the detonator. The resultant detonating wave passes through the C.E. stemmings in the holder and shutter, and through the pressed C.E. in the body plug to detonate the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

- 5.** See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

- 6.** Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the use of Fuzes for Training.

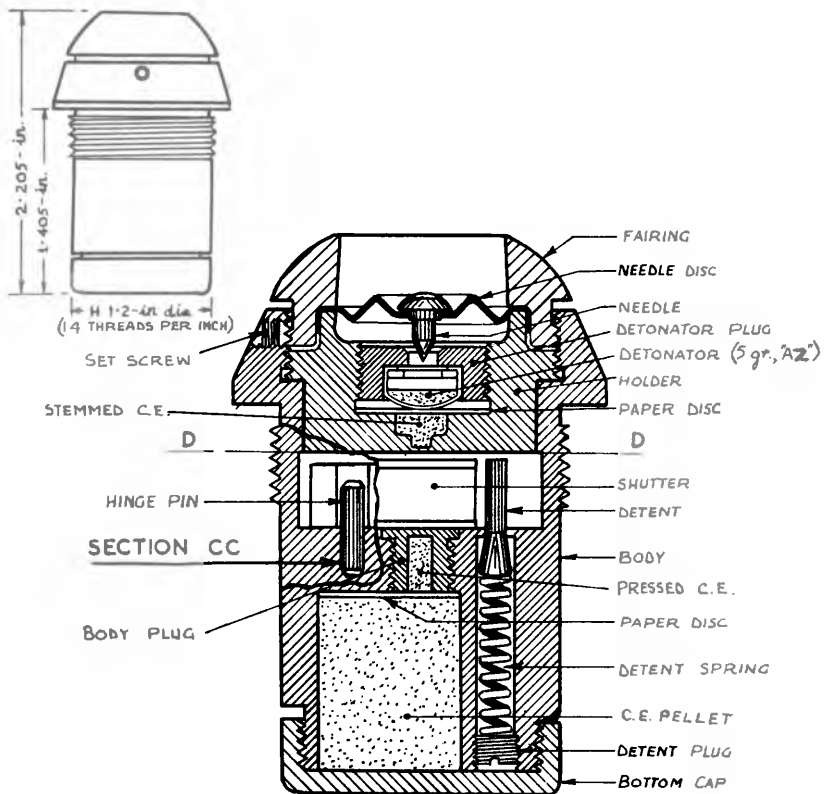
TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 248

Pam 9, Part 1, Section 23

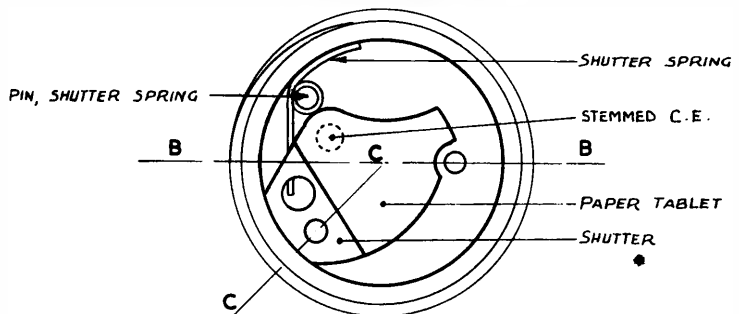
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Brass	5 gr. AZ (Copper alloy shell)	(i) Naval design. Used in the Land Service for Coast Artillery. (ii) Obsolescent.

FUZE, PERCUSSION, D.A., No.248, MARK I



SECTION BB



SECTION DD

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 24

FUZE, PERCUSSION, D.A., No. 251

PART 1—FUZES (NUMERICAL SERIES)

SECTION 24—FUZE, PERCUSSION, D.A., No. 251

INTRODUCTION

1. Fuze No. 251 is a direct action detonating fuze of 30 mm. fuze-hole gauge and is used with the following equipment:—

Q.F., 40 mm. Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 251, Mk. 3

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

- (a) The fuze cannot arm until the two ferrules set back on firing to release the arming sleeve and shutter respectively.
- (b) The needle is retained in the safe position by three steel balls which project from three radial holes in the striker guide into a groove in the striker. The steel balls are in turn retained by the arming sleeve.
- (c) The shutter, when in the unarmed position, masks off the detonator pellet from the stemmed C.E. channel above the magazine.

4. *Action*

- (a) *On Firing*

The striker and shutter ferrules set back, overcoming their stirrup springs and releasing the arming sleeve and shutter respectively. The arming sleeve sets back retaining the balls and locking the needle, and the detonator pellet holder also sets back against the shutter, retaining it in the unarmed position.

- (b) *During Flight*

The arming sleeve is forced forward by its spring, unmasking the three holes in the striker guide and thus releasing the three steel balls which fly outwards. The needle is then free to move downwards on impact. The two parts of the shutter move outwards, allowing the detonator pellet spring to force the pellet housing down onto the stemmed plug. The detonator pellet is locked in position by the two halves of the locking collar which fly outwards into the annular recess in the body, part 2.

(c) On Impact

The cover plate and hammer are forced in and the hammer drives the needle into the detonator. The flash from the detonator initiates the lead azide and C.E. filling of the detonator pellet, and the resultant detonation blows out the thin metal disc to detonate the C.E. stemming in the plug and, in turn, the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

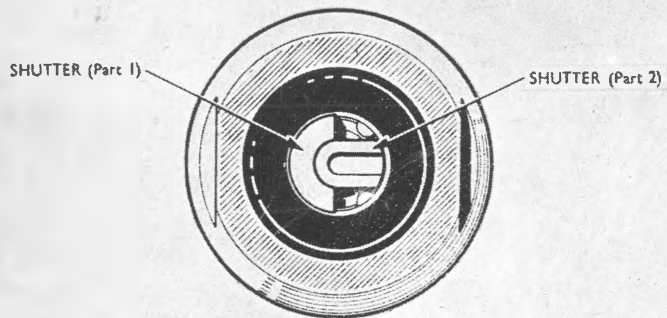
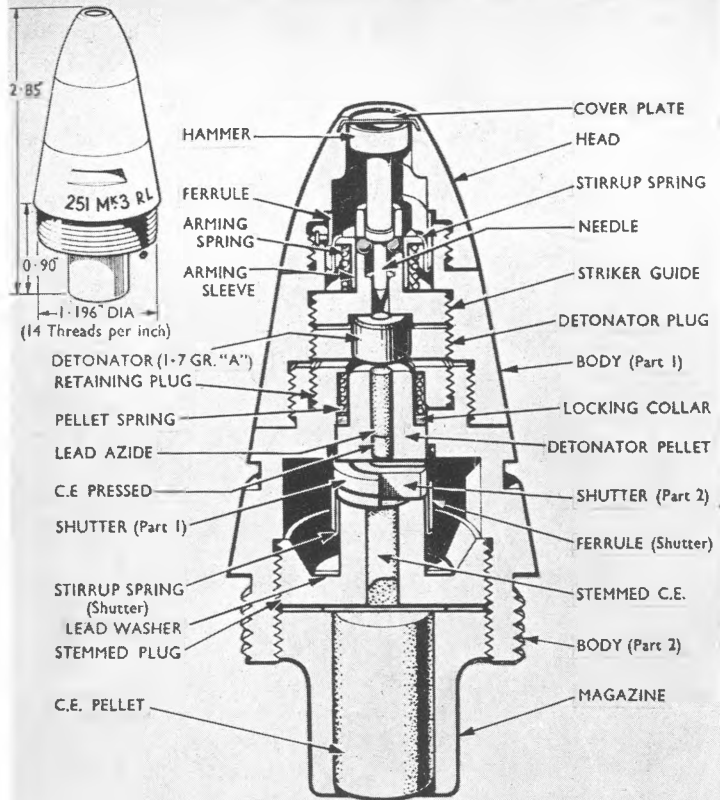
6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 251

Pam 9, Part 1, Section 24
Table 1

Item	Mark	Body Material	Detonator	Detonator Pellet	Remarks
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Aluminium alloy	1·7 gr. A. (Copper alloy shell)	Lead Azide/ CE. (Aluminium alloy pellet)	(i) Fitted with a thin cover plate and a beechwood hammer. (ii) Obsolescent.
2	1A	Aluminium alloy	1·7 gr. A. (Copper alloy shell)	Lead Azide/ CE. (Aluminium alloy pellet)	(i) Differs from the Mk. 1 in that the cover plate is thicker and is made of sheet brass instead of copper. The striker guide is fitted with two balls instead of three. (ii) Obsolescent.
3	2	Aluminium alloy	1·7 gr. A. (Copper alloy shell)	Lead Azide/ CE. (Aluminium alloy pellet)	(i) Differs from the Mk. 1A in that the striker guide is fitted with three steel balls instead of two and the hammer is of plastic. (ii) Obsolescent.
4	3	Aluminium alloy	1·7 gr. A. (Copper alloy shell)	Lead Azide/ CE. (Aluminium alloy pellet)	(i) Similar to the Mk. 1A, but fitted with a plastic hammer. (ii) Obsolescent.

FUZE, PERCUSSION, D.A., No.251, MARK 3



PLAN VIEW OF SHUTTER

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 25

FUZE, PERCUSSION, D.A., No. 255

PART 1—FUZES (NUMERICAL SERIES)

SECTION 25—FUZE, PERCUSSION, D.A., No. 255.

INTRODUCTION

1. Fuze No. 255 is a direct action detonating fuze which incorporates a delay of 0.3 to 1.44 milli seconds. The fuze, of 30 mm. fuze-hole gauge, is used with the following equipments:—

Q.F., 2-pr., Mks. 9A and 10A Guns

Q.F., 40 mm. Gun

EQUIPMENT 4.0/70 (L70 BRITISH)

Details of fuze marks are given in Table 1.

FUZE, PERCUSSION, D.A., No. 255, Mk. 2

2. *General Assembly*

The general assembly of the fuze is illustrated at Fig. 1.

3. *Safety Arrangements*

- (a) The fuze head diaphragm protects the hammer from accidental damage.
- (b) The fuze cannot arm until the two ferrules set back on firing to release the arming sleeve and shutter respectively.
- (c) The striker is retained in the safe position by two steel balls which project from two radial holes in the striker guide into a groove in the striker. The steel balls are in turn retained by the arming sleeve.
- (d) The shutter, when in the unarmed position, masks off the detonator pellet from the stemmed C.E. channel above the magazine.

4. *Action (Figs. 1 and 2)*

(a) *On Firing*

The striker and shutter ferrules set back, overcoming their stirrup springs and releasing the arming sleeve and shutter respectively. The arming sleeve sets back retaining the balls and locking the striker, and the detonator pellet holder also sets back against the shutter, retaining it in the unarmed position.

(b) *During Flight*

The arming sleeve is forced forward by its spring, unmasking the two holes in the striker guide and thus releasing the two steel balls which fly outwards. The striker is then free to move downwards on impact. The two parts of the shutter move outwards allowing the detonator holder spring to force the pellet holder down onto the stemmed plug. The detonator pellet holder is locked in position by the two halves of the locking segment which fly outwards into the annular recess in the body.

(c) On Impact

The diaphragm is crushed, the hammer is forced back and the striker is driven into the detonator. The flash from the detonator is baffled by the detonator plug and its displaced fire holes so allowing a normal ignition of the delay element (R.D. 1305) which burns through to initiate the lead azide and C.E. filling of the detonator pellet. The resultant detonation fractures the thin diaphragm of the pellet holder to detonate the C.E. stemming in the plug and, in turn, the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 255

Item	Mark	Body Material	Detonator	Detonator Pellet	Remarks
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Aluminium alloy	1.7 gr. B. (Copper alloy shell)	RD 1305/Lead Azide/CE (Aluminium alloy pellet)	(i) Fitted with a plastic hammer. (ii) With effect from 30.1.51 the outside surface of the fuze which protrudes from the shell is coated with Varnish, R.D.1177. (iii) Obsolescent.
2	1A	Aluminium alloy	1.7 gr. B. (Copper alloy shell) or 1.7 gr. A. (Copper alloy shell)	Lead Azide/ CE (Aluminium alloy pellet)	(i) Similar to the Mk. 1 except that there is no delay filling in the detonator pellet. Some slight delay is effected, however, by the shape of the detonator plug and the baffling effect of the three displaced fire holes. (ii) Detonator 1.7 gr. A may be used as an alternative to Detonator 1.7 gr. B. (iii) With effect from 30.1.51 the outside surface of the fuze which protrudes from the shell is coated with Varnish, R.D.1177. (iv) <i>OBSCOLESCENT</i>

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 255

Item	Mark	Body Material	Detonator	Detonator Pellet	Remarks
(a)	(b)	(c)	(d)	(e)	(f)
3	2	Aluminium alloy	1.7 gr. B. (Copper alloy shell)	RD 1305 or RD 1337/ Lead Azide/ CE (Aluminium alloy pellet)	(i) Differs from the Mk. 1 principally in being fitted with an improved type shutter and a hammer of aluminium instead of plastic. (ii) With effect from 30.1.51 the outside surface of the fuze which protrudes from the shell is coated with Varnish. R.D.1177. (iii) OBSOLETE
4	3	Aluminium alloy	1.7 gr. B. (Tinned lugless copper alloy shell)	Lead Azide/ CE (Aluminium alloy pellet)	(i) Identical with the Mk. 1A except that the fuze is fitted with a 1.7 gr. B tinned lugless detonator and the striker guide, detonator plug and striker needle are tin-plated. The striker needle was previously plated with nickel, brass, copper or cadmium. (ii) On 20.10.55 Aluminium alloy (A.W.15) was authorized as an alternative material to brass for the detonator plug and striker guide, when aluminium alloy is used it is anodised. Reason for introduction—incompatibility of brass and lead azide. (iii) With effect from 30.1.55 the outside surface of the fuze which protrudes from the shell is coated with Varnish, R.D.1177. (iv) OBSOLETE

Amdt. 5/ /1957

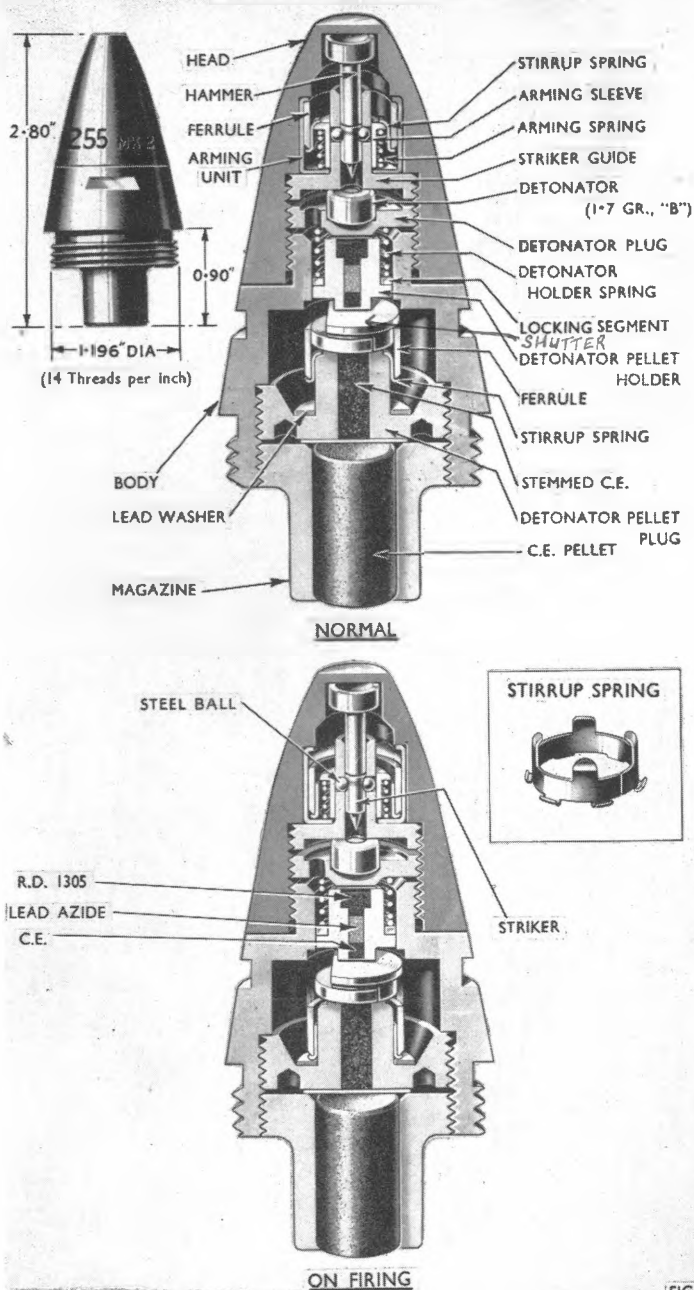
Pam 9, Part 1, Section 25

Table 1

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 255

Item	Mark	Body Material	Detonator	Detonator Pellet	Remarks
(a)	(b)	(c)	(d)	(e)	(f)
5	4	Aluminium alloy	1.7 gr. B. (Tinned lugless copper alloy shell)	RD 1305 or RD 1337/ Lead Azide/ CE (Aluminium alloy pellet)	(i) Identical with the Mk. 2 except that the fuze is fitted with a 1.7 gr. B tinned lugless detonator and the striker guide, detonator plug and striker needle are tin-plated. The striker needle was previously plated with nickel, brass, copper or cadmium. (ii) On 20.10.55 Aluminium Alloy (A.W.15) was authorized as an alternative material to brass for the detonator plug and striker guide, when aluminium alloy is used it is anodised. Reason for introduction—incompatibility of brass and lead azide. (iii) With effect from 30.1.55 the outside surface of the fuze which protrudes from the shell is coated with Varnish, R.D.1177.
6	5	Aluminium alloy	1.7 gr. B. (Tinned lugless copper alloy shell)	Lead Azide/ CE (Aluminium alloy pellet)	(i) Differs from the Mk. 4 in that there is no delay filling in the detonator pellet. The detonator plug is made of steel and has a hole 0.125-in. diameter in the centre. (ii) With effect from 30.1.55 the outside surface of the fuze which protrudes from the shell is coated with Varnish, R.D.1177.

FUZE, PERCUSSION, D.A., No. 255, MARK 2



FUZE, PERCUSSION, D.A., No. 255, MARK 2

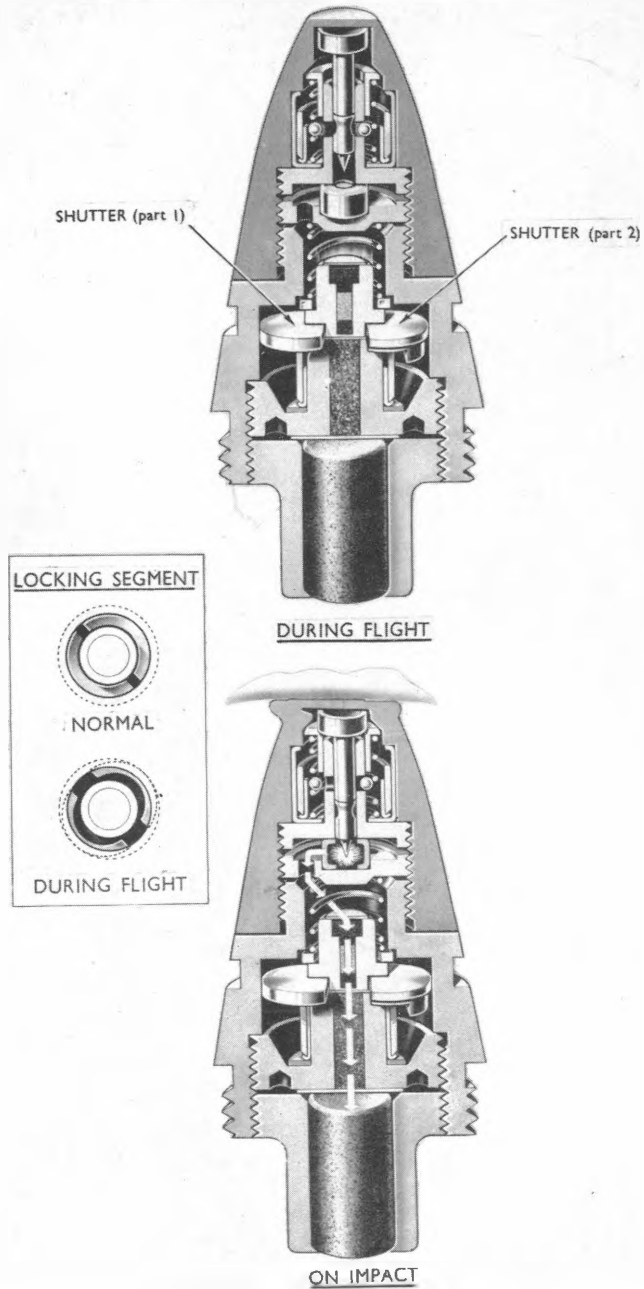


FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 26

FUZE, PERCUSSION, D.A., No. 257

PART 1—FUZES (NUMERICAL SERIES)

SECTION 26—FUZE, PERCUSSION, D.A., No. 257

INTRODUCTION

1. Fuze No. 257 is a direct action detonating fuze of 1.6 in. fuze-hole gauge and is used with the following equipments:—

Q.F., 6 pr. 7 cwt. Gun

Q.F., 17 pr. Gun

Q.F., 20 pr. Gun

Q.F., 77 mm. Gun

Details of fuze marks are given in Table 1.

FUZE, PERCUSSION, D.A., No. 257, Mk. 2/1

2. *General Assembly*

The general assembly of the fuze is illustrated at Fig. 1.

3. *Safety Arrangements*

(a) The cage (or cap) protects the needle disc from accidental damage.

(b) The shutter, when in the unarmed position, masks off the C.E. stemming in the detonator plug from the C.E. stemming in the magazine.

4. *Action (Fig. 1)*

(a) *Before Firing*

The cage is removed.

Note: Special instructions apply to the Mk. 1 fuze which is fitted with a copper needle disc.

(b) *On Firing*

The shutter sets back and is retained in the unarmed position by friction.

(c) *During Flight*

The shutter swings outwards, overcoming the resistance of the shutter spring and bringing the C.E. stemming in the shutter flash channel into alignment with the C.E. stemmings in the detonator plug and magazine.

(d) *On Impact*

The needle disc is crushed inwards and the needle pierces the upper detonator. The flame passes through the central channel in the lower detonator holder to fire the 5 gr. detonator. The resultant detonating wave passes through the C.E. stemmings in the detonator plug, shutter and magazine to detonate the C.E. pellet.

FUZE, DRILL, PERCUSSION, D.A., No. 244 AND No. 257

5. The drill fuze is of brass or steel and is shaped to represent the service fuzes No. 244 and No. 257. The exterior of the fuze, except the top disc and the fuze threads, is blackened.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

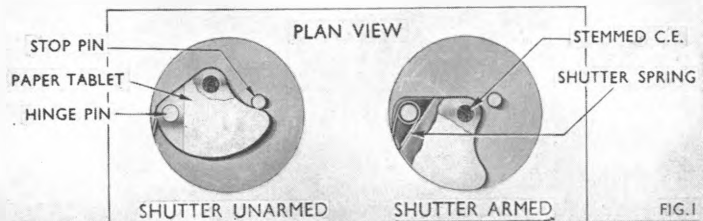
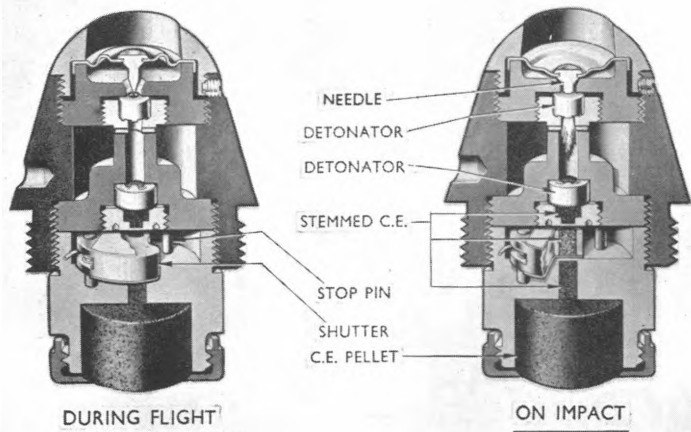
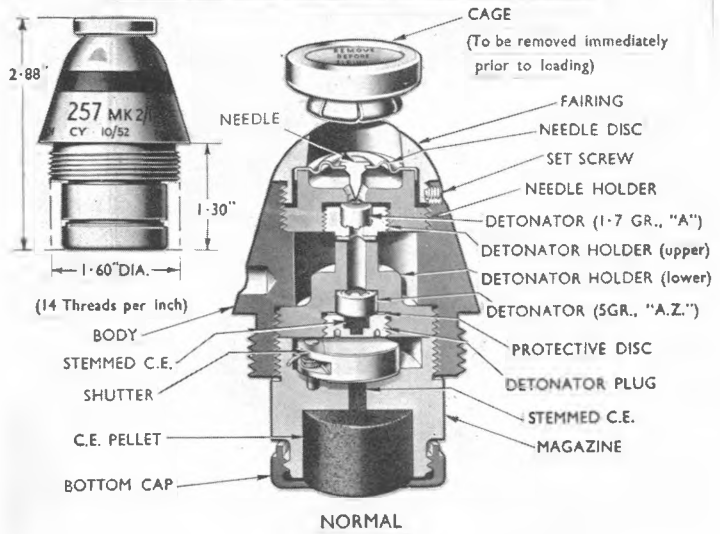
LIMITATIONS AND RESTRICTIONS

7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 257

Item	Mark	Body Material	Detonator		Remarks
			Upper	Lower	
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Brass	1.7 gr. A. (Copper alloy shell)	5 gr. AZ. (Copper alloy shell)	(i) Converted Fuze No. 244, Mk. 3 but without the delay element and incorporating a Detonator 1.7 gr. A. (ii) Fitted with a copper needle disc. (iii) From 20 April 1944 the top of the fairing was fitted with a cage. (iv) From 15 May 1944 the top of the cage was inscribed with the legend "FIRE WITH CAP ON". (v) Obsolescent. <i>Obsolete</i>
2	2	Brass	1.7 gr. A. (Copper alloy shell)	5 gr. AZ. (Copper alloy shell)	(i) Converted Fuze No. 244, Mk. 3 or Fuze No. 257, Mk. 1. (ii) Differs from the Mk. 1 in being fitted with a needle disc of steel instead of copper and with a shutter opening in the reverse direction. (iii) Fitted with a cage inscribed "REMOVE BEFORE FIRING". (iv) Obsolescent.
3	2/1	Brass	1.7 gr. A. (Copper alloy shell)	5 gr. AZ. (Copper alloy shell)	(i) Converted Fuze No. 244, Mk. 1 or Mk. 3. (ii) Differs from the Mk. 2 in that the shutter opens in the original direction. (iii) Fitted with a modified cage inscribed "REMOVE BEFORE FIRING". (iv) Obsolescent.

FUZE, PERCUSSION, D.A., No. 257, MARK 2/1



RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 27

FUZE, PERCUSSION, BASE, TRACER, No. 281

PART 1—FUZES (NUMERICAL SERIES)

**SECTION 27—FUZE, PERCUSSION, BASE, TRACER,
No. 281**

INTRODUCTION

1. Fuze No. 281, Mk. 1, of 0.772 in. fuze-hole gauge, is a base percussion fuze incorporating a tracer fitment. It was originally introduced for the A.P. shell with Q.F., 2 pr. Mks. 9A and 10A Guns, but it was found subsequently that this combination was not a service requirement, the A.P. shell having been superseded by a solid A.P. shot.

It was then decided to utilize existing stocks of A.P. shell in the role of A.P. shot by rendering the fuze percussion mechanism inoperative and leaving only the tracer portion to function. Such fuzes, which were virtually plugs with tracers, were introduced as Mk. 2 and Mk. 3 pattern fuzes.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, BASE, TRACER, No. 281, Mk. 1

2. General Assembly

The general assembly of the fuze is given at **Fig. 1**.

3. Safety Arrangements

Safety before firing is effected by the inertia pellet which comprises a brass tube filled with lead alloy, embedded in which is a hard brass needle holder with a steel needle. The holder is crimped to grip the lead alloy and the brass tube projects beyond the needle to prevent the latter reaching the detonator.

4. Action

(a) On Firing

The inertia pellet sets back along the stem of the needle holder until it comes to rest on the rear portion of the fuze body, thus exposing the point of the needle. The creep spring prevents the pellet rebounding.

The brass disc fitted to the base of the tracer plug is blown in and the flame from the propellant ignites the gunpowder priming which, in turn, ignites the illuminating composition of the tracer.

(b) During Flight

The creep spring holds the inertia pellet and needle clear of the detonator.

(c) On Impact or Graze

The inertia pellet overcomes the creep spring and the needle pierces the detonator. The resultant flash passes through the fire hole in the top cap to initiate the exploder fitted to the shell.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, TRACER, No. 281

Pam 9, Part 1, Section 27
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Brass	2 gr. A (Copper alloy shell)	(i) Obsolescent.
2	2	Brass	—	(i) Differs from the Mk. 1 in having the inertia pellet, creep spring, detonator and detonator plug removed thus becoming, in effect, a plug with tracer. (ii) Obsolescent.
3	3	Brass	—	(i) The Mk. 3 fuze is, in effect, a plug with tracer. It differs from the Mk. 2 in the tracer filling by the addition of a waxed paper tube in the tracer cavity and a pre-pressed pellet inserted in the paper tube. (ii) Obsolescent.

FUZE, PERCUSSION, BASE, TRACER, No.281

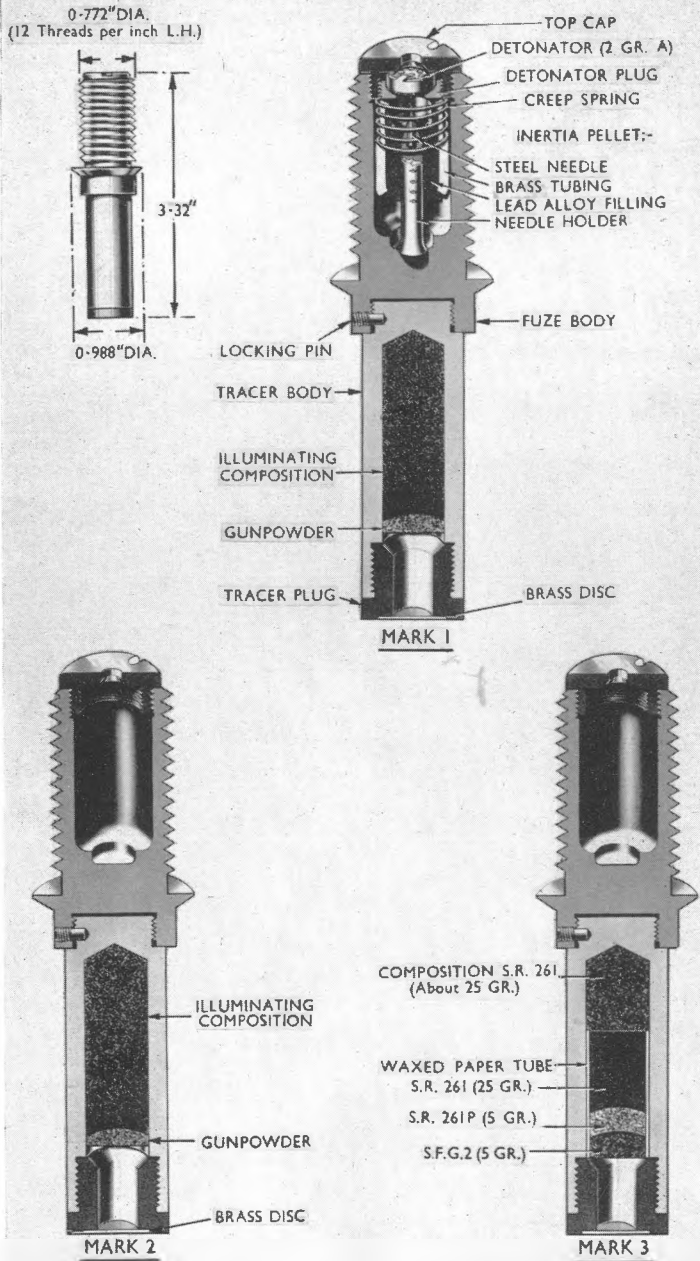


FIG. 1

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 28

FUZE, PERCUSSION, BASE, MEDIUM, No. 303

PART 1—FUZES (NUMERICAL SERIES)

**SECTION 28—FUZE, PERCUSSION, BASE, MEDIUM,
No. 303**

INTRODUCTION

1. Fuze No. 303 is a base detonating fuze of 1·6 in. fuze-hole gauge and is used with the following equipment:—

B.L., 6·5 in. A.V.R.E. Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, BASE, MEDIUM, No. 303, Mk. 1

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**

3. *Safety Arrangements*

- (a) The stem of the detent engages in a slot in the rotor assembly and retains it in the unarmed position before firing.
- (b) The rotor assembly, when in the unarmed position, screens off the detonator and ZY sleeve from the striker and stemmed C.E. plug respectively.
- (c) The stems of the two centrifugal plungers engage in a recess formed in the striker and prevent the striker from moving forward before firing.
- (d) The collar, in conjunction with the shear wire, prevents the striker moving forward during flight after the centrifugal plungers have been disengaged.

4. *Action*

- (a) *On Firing*

The detent sets back against its spring and disengages from the recess in the rotor assembly. The rotor assembly and the two centrifugal plungers set back and are retained by friction.

- (b) *During Flight*

The rotor assembly rotates under the influence of its spring until the side of the detent slot engages with the arrester pin. In this position the detonator is located immediately above the striker channel and the ZY sleeve is brought into alignment with the stemmed C.E. channel leading to the magazine. The centrifugal plungers retaining the striker overcome their springs and fly outwards, but the striker is prevented from moving forward by the shear wire inserted through the collar and rear end of the striker. The striker spring also assists in holding the striker clear of the detonator.

(c) On Impact

The shear wire is broken, the striker moves forward compressing the striker spring and the point of the striker pierces the detonator. The resultant flash initiates the ZY sleeve which, in turn, detonates the stemmed C.E. channel in the plug and the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, MEDIUM, No. 303 Pam 9, Part 1, Section 28
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Aluminium alloy	1.7 gr. A (Copper alloy shell)	(i) Limited production only.
2	2	—	—	(i) Design cancelled.

FUZE, PERCUSSION, BASE, MEDIUM, No. 303 MARK I

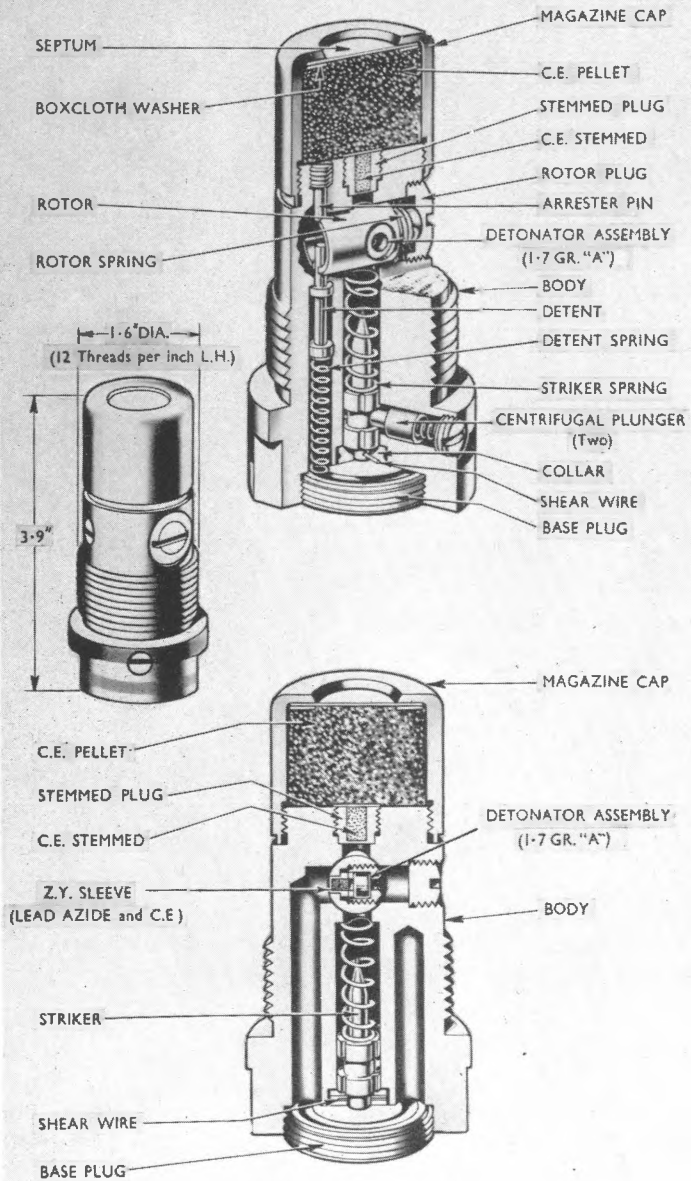


FIG. 1

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 29

FUZE, PERCUSSION, BASE, LARGE, No. 346

PART 1—FUZES (NUMERICAL SERIES)

**SECTION 29—FUZE, PERCUSSION, BASE, LARGE,
No. 346**

INTRODUCTION

1. Fuze No. 346, of 2 in. fuze-hole gauge, is a graze action base detonating fuze provided with an optional short delay and is used with the following equipment:—

B.L. 9.2 in. Gun.

The fuze is similar in design to fuzes No. 159 and No. 480 differing principally in the strength of creep spring which compresses under a load of 6 lb. 4 oz.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, BASE, LARGE, No. 346, Mk. 2

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The upper and lower centrifugal bolts retain the inertia pellet, thus holding the detonator clear of the needle.
- (b) The detent prevents the upper centrifugal bolt from moving outwards accidentally.
- (c) The inertia pellet, masking bolt and pea-ball provide a flash seal during storage and transit and during acceleration in the bore.

4. Delay and Non-delay Setting

Optional non-delay may be obtained when the shell is fitted with a gascheck cover plate incorporating either a non-delay set screw or a delay setting plug, by means of which the propellant gas can be prevented from exerting pressure on the delay spindle of the fuze. With the older types of gascheck cover plates which do not provide for optional setting, gas pressure is free to act on the delay spindle and the fuze always gives delay action.

The base plate assembly illustrated at **Fig. 1** shows one type of gascheck cover plate only. Full details of base closing arrangements are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 6, Part 6.

5. Action (Figs. 1 and 2)

(a) Before Firing

The optional delay/non-delay arrangement is set as required.

(b) *On Firing*

(i) The inertia pellet, masking bolt and pea-ball set back, thus forming a flash seal should the detonator fire prematurely. At the same time the detent sets back against its spring and is prevented from rising by its stem which becomes locked under the shoulder of the detent spring recess.

(ii) *When Set Delay*

The propellant gas reaches the pocket in the gas-check plate and exerts pressure on the pressure plate of the delay spindle. This forces the spindle into its recess thus closing one side of the cross channel. The flash can then pass only through that arm of the cross channel fitted with delay composition.

(iii) *When Set Non-delay*

The propellant gas is prevented from entering the pocket in the gascheck plate and from exerting pressure on the pressure plate of the delay spindle. Both sides of the cross channel, therefore, remain open and the flash can pass directly to the ignition chamber.

(c) *During Flight*

The upper centrifugal bolt retaining the inertia pellet flies outwards and is disengaged from the inertia pellet. The lower centrifugal bolt retaining the masking bolt flies outwards, compresses its spring and releases the masking bolt which also moves outwards and un.masks the central channel in the inertia pellet. The centrifugal bolt retaining the pea-ball flies outwards, compresses its spring and releases the pea-ball which rolls into the horizontal channel, thereby unmasking the flash channel in the lower part of the body. The fuze is now fully armed and the inertia pellet with its detonator is held clear of the needle only by the creep spring.

(d) *On Impact or Graze*

(i) The inertia pellet overcomes the creep spring and carries the detonator onto the needle, and at the same time the circular flange at the base of the inertia pellet is withdrawn from the recess in the body, thus permitting communication between the oblique channel in the inertia pellet and the flash channel in the lower part of the body. The coned front end of the inertia pellet jams tightly in the tapered entrance of the needle cap and prevents the pellet from rebounding. The detonator is fired and the resultant flash passes through the flash channel of the inertia pellet to the cross channel in the lower part of the body.

Pam 9, Part 1, Section 29

(ii) *When Set Delay*

The flash passes through the open side of the cross channel to the delay fitment, which burns through to ignite the perforated gunpowder pellet in the flash channel and, in turn, the perforated gunpowder pellet in the ignition chamber. The pressure and heat from the explosion of the ignition pellet passes through the small hole in the closing plug to detonate the C.E. in the vertical channel and the C.E. pellet in the magazine.

(iii) *When Set Non-delay*

The flash from the detonator reaches the cross channel. It is delayed by the delay fitment on one side, but reaches the ignition chamber by passing over the head of the delay spindle, thus avoiding the delaying action of the delay fitment. Subsequent action is then as previously described.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

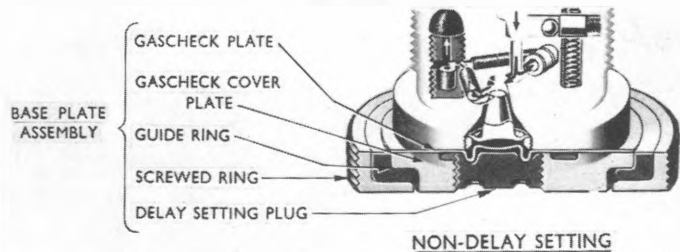
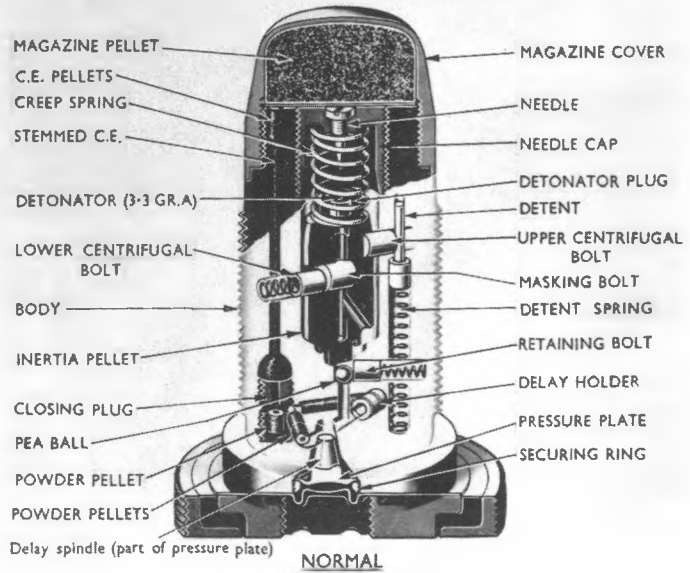
7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, LARGE No. 346

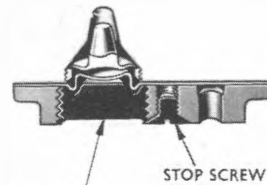
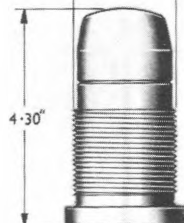
Pam 9, Part 1, Section 29
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	—	—	(i) Design cancelled.
2	2	Bronze	3·3 gr. A (Copper alloy shell)	(i) Before 13 July 1943 fuzes were assembled with Detonator 3 gr. A. (ii) Obsolescent.

FUZE, PERCUSSION, BASE, LARGE, No.346 MARK 2



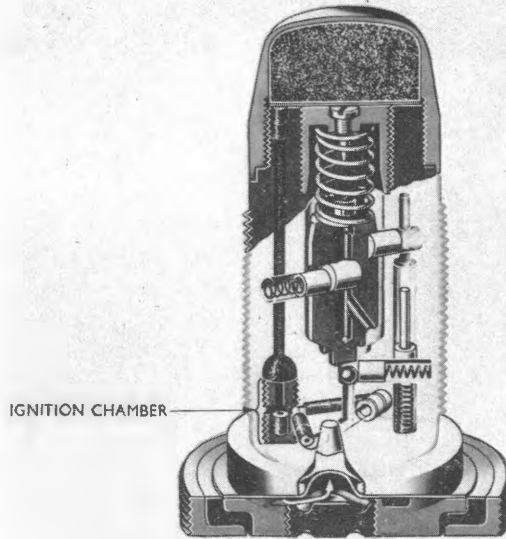
2.0" DIA
(9 Threads per inch L.H.)



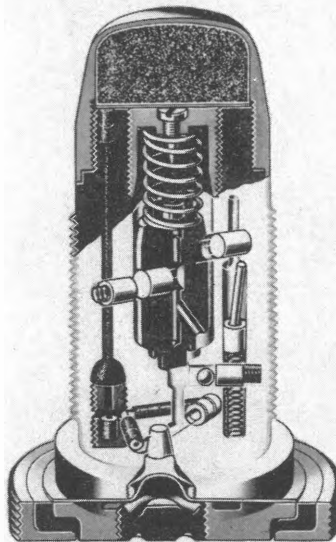
DELAY SETTING PLUG

FIG. 1.

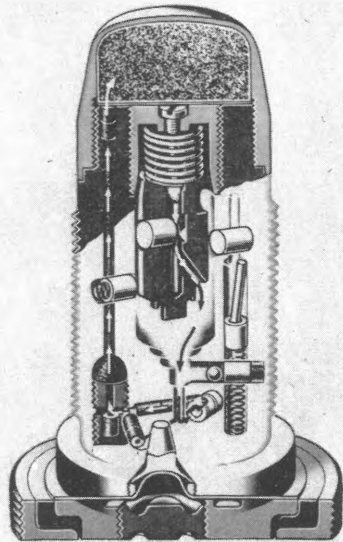
FUZE, PERCUSSION, BASE, LARGE, No.346 MARK 2



ON FIRING
(DELAY SETTING)



DURING FLIGHT
(DELAY SETTING)



ON IMPACT OR GRAZE
(DELAY SETTING)

FIG. 2

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REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 30

FUZE, PERCUSSION, D.A., No. 360C

PART 1—FUZES (NUMERICAL SERIES)

SECTION 30—FUZE, PERCUSSION, D.A., No. 360C

INTRODUCTION

1. Fuze No. 360C is a direct action detonating fuze of 2 in. fuze-hole gauge and is used with the following equipment:—

B.L., 15 in. Gun

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, D.A., No. 360C, Mk. 1

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

3. *Safety Arrangements*

- (a) The safety cap protects the striker head and striker from accidental damage. It is replaced by a light dome-shaped watertight cap with a hexagonal base when the fuze is used in shell under a ballistic cap.
- (b) The four brass segments, which are assembled between the guide bush and striker sleeve, hold the striker spring under compression, thus retaining the point of the striker in the recess in the locking weight.
- (c) The shutter is held in the unarmed position by the locking weight in conjunction with the point of the striker.
- (d) When the shutter is in the unarmed position, the detonator is displaced and cannot communicate with the stemmed C.E. channel in the magazine.
- (e) In order to obviate shock to the detonator when the shutter revolves to the armed position, the shutter is so shaped that it can only revolve gently and the stop pin is either made of fibre or fitted with a fibre sleeve.
- (f) The two holes bored in the body diaphragm act as vent holes to relieve pressure in the shutter recess should the detonator fire prematurely. One of these holes is situated immediately above the detonator when the shutter is in the unarmed position.

4. *Action*

(a) *On Firing*

The arming sleeve sets back against its spring releasing the four segments which are thrown clear.

(b) During Flight

The striker spring, which is assembled under compression, asserts itself against the underside of the striker head, forcing the striker and striker sleeve forward until the upper end of the sleeve meets the under surface of the guide bush, thus withdrawing the point of the striker from the recess in the locking weight. This allows the locking weight to revolve and in doing so its toe starts the shutter turning gently on its hinge pin. The shutter continues to revolve until it reaches the stop pin, thus locating the detonator directly beneath the striker point. The fuze is now fully armed, the striker being held clear of the detonator by the striker spring.

(c) On Impact

The striker head is forced inwards compressing the striker spring. The point of the striker pierces the detonator and the resultant detonating wave passes through the C.E. stemmed channel to the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

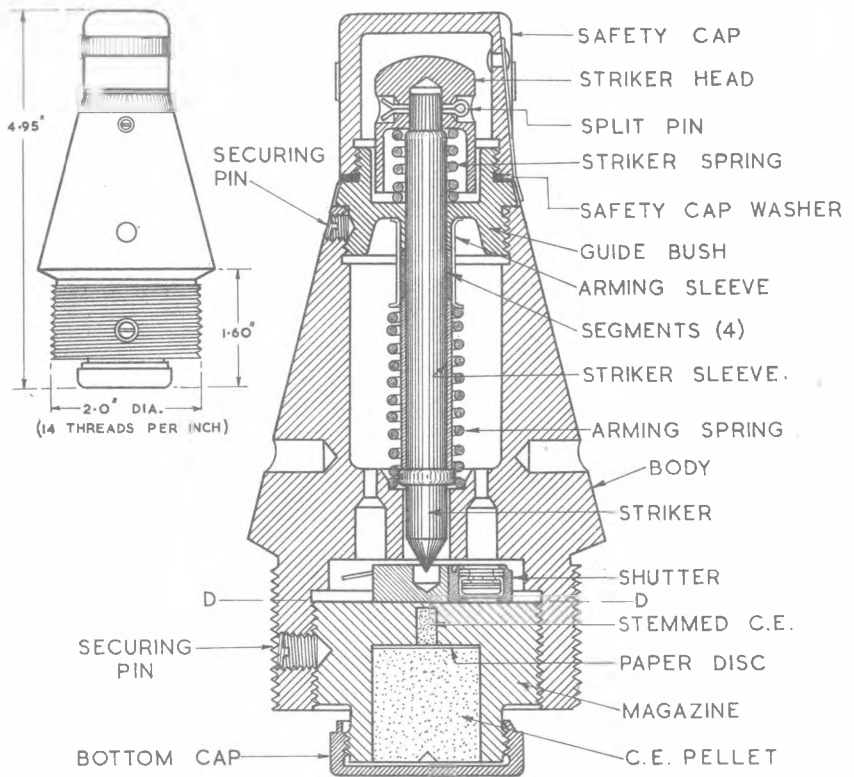
TABLE 1—DATA FOR FUZE, PERCUSSION, D.A., No. 360C

Pam 9, Part 1, Section 30

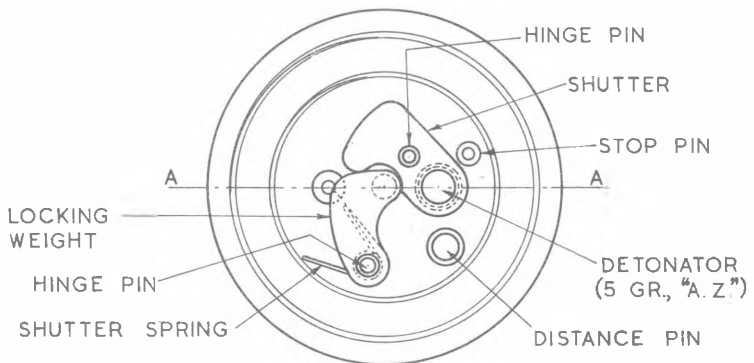
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Brass or zinc base alloy.	5 gr. AZ. (Copper alloy shell)	(i) Naval design. Used in the Land Service for Coast Artillery. (ii) The fuze is converted from fuze No. 117, Mk. 3. Details of the conversion are as follows:— (a) The striker cover is omitted. (b) A steel cylindrical striker head with rounded top is fitted. (c) A new hole is drilled in the striker at right angles to the existing hole to receive a steel split pin which secures the striker head. (d) The central hole in the guide bush is enlarged. (e) A weaker shutter spring is fitted.

FUZE, PERCUSSION, D.A., No.360C, MARK I



SECTION AA



SECTION DD

FIG. 1.

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REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 31

FUZE, TIME, No. 390

PART 1—FUZES (NUMERICAL SERIES)

SECTION 31—FUZE, TIME, No. 390

INTRODUCTION

1. Fuze No. 390 is a tensioned type combustion time fuze of 2 in. fuze-hole gauge and is used with the following artillery equipments:—

Q.F., 17 pr. Gun

Q.F., 20 pr. Gun

Q.F., 75 mm. Gun

Q.F., 77 mm. Gun

Details of fuze marks are given in **Table 1**.

FUZE, TIME, No. 390, Mk. 1

2. *General Assembly*

The general assembly of the fuze is illustrated at **Fig. 1**.

Both time rings are filled with Composition S.R. 227 and are provided with setting slots. The top time ring, however, is prevented from rotating by a single brass pin. The flange of the body is graduated from 0 to 30 round its outer edge, and a small ungraduated portion between the two numbers is marked with a red arrow head against the word "SAFE". When set at safe, the setting mark engraved on the bottom ring coincides with the arrow head. When set at full, the time of burning is approximately 21·5 seconds.

Two flash channels lead from the detonator channel to the top time ring to allow the flame and gas from the detonator to circulate in the body of the fuze, thus ensuring less violent ignition of the time ring.

The magazine is filled with approximately 80 gr. Gunpowder G.20 and a wooden, plastic or compressed paper ring fitted inside the magazine serves to reduce the weight of the fuze and the capacity of the magazine.

The fuze is fitted with Cover, 2 in. Time or Time and Percussion Fuzes, No. 5 which is hermetically sealed and retained by a band pressed tightly round the fuze.

3. *Safety Arrangements*

(a) The resistance of the spiral spring holds the detonator clear of the striker.

(b) When the fuze is set at safe, the flash holes to the lower time ring and to the magazine are masked by the bridges of the upper and lower time rings respectively. This provides a double safety device against ignition of the magazine, should the initiating mechanism act prematurely.

4. *Action (Fig. 1)*

(a) *Before Firing*

The fuze cover is removed and the fuze is set by rotating the bottom ring until the setting mark is opposite the required graduation on the body.

(b) *On Firing*

The detonator sets back on its spring and is fired by the needle. The resultant flash from the detonator passes through the flash channels in the stem of the fuze body to ignite the mealed powder in the oblique channel in the top ring which, in turn, ignites the powder pellet and the fuze powder. The closing disc in the gas escape hole is blown out and thus a vent is provided for the gases generated as the burning of the time train progresses.

(c) *During Flight*

The powder in the top time ring burns round until after an interval of time determined by the setting, the flame ignites the powder pellet and the fuze powder in the bottom ring, and the disc in the gas escape hole is blown out. The powder in the bottom ring burns round in the reverse direction and after an interval of time determined by the setting, the flame ignites the powder pellets in the channel leading to the magazine and, in turn, the magazine filling.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, TIME, No. 390

Pam 9, Part 1, Section 31
Table 1

Item	Mark	Material		Detonator	Remarks
		Body	Cap		
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Brass	Aluminium alloy	1.93 gr. BP (Copper alloy shell)	(i) Converted Fuze, Time, No. 199. (ii) Not interchangeable with Mks. 2 and 2A.
2	2	—	—	—	(i) For use with Mortar Bombs only. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 12, Part 2.
3	2A	—	—	—	(i) For use with Mortar Bombs only. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 12, Part 2.

FUZE, TIME, No. 390, MARK I.

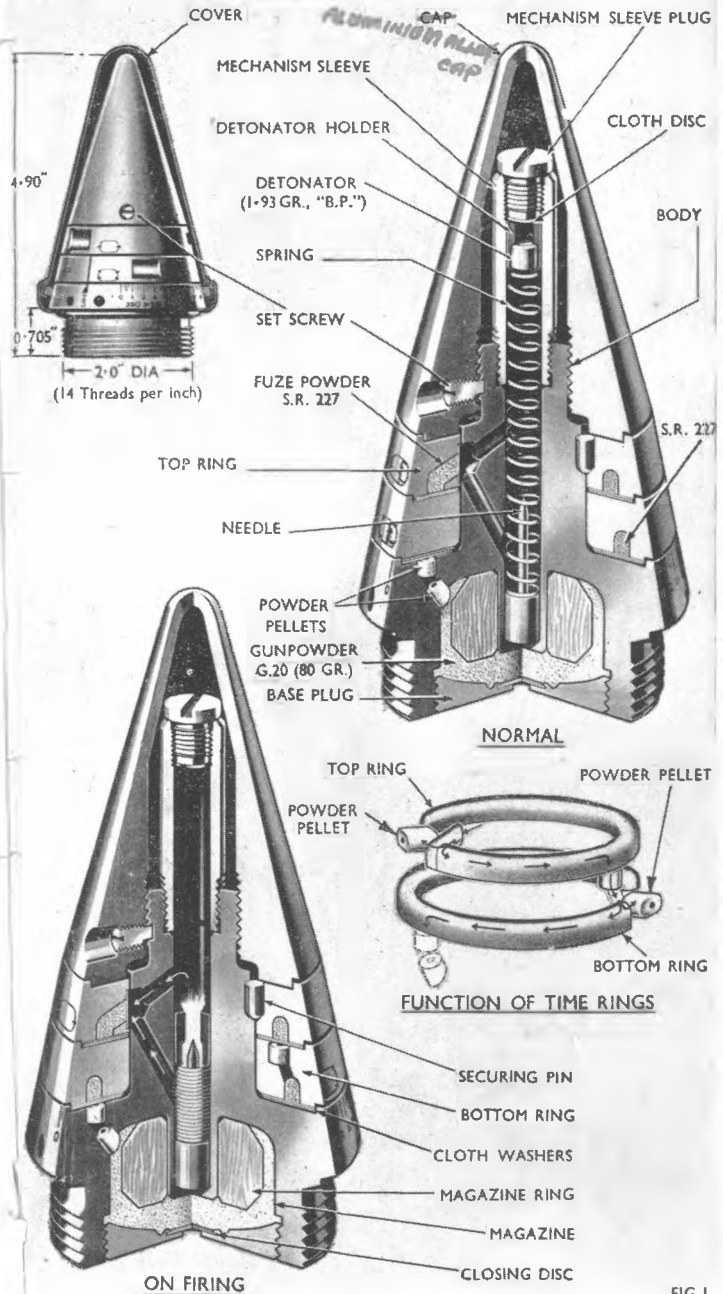


FIG. I

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 32

FUZE, PERCUSSION, D.A. AND GRAZE, No. 410

PART 1—FUZES (NUMERICAL SERIES)

SECTION 32—FUZE, PERCUSSION, D.A. AND GRAZE,
No. 410

INTRODUCTION

1. Fuze No. 410, of 1.6 in. fuze-hole gauge, is a direct action and graze fuze with optional delay and is used with the following equipments:—

Q.F., 6-PR. TOWT GUN

Q.F., 17 pr. Gun

Q.F., 20 pr. Gun

Q.F., 77 mm. Gun

Details of fuze marks are given in Table 1.

FUZE, PERCUSSION, D.A. AND GRAZE, No. 410, Mark. 1/3

2. *General Assembly*

The general assembly of the fuze is illustrated at Fig. 1.

3. *Safety Arrangements*

- (a) The nose cap, protects the striker cover and striker, thus preventing accidental damage during storage and transit.
- (b) The striker and inertia pellet are retained in the safe position by the upper and lower steel balls in conjunction with the striker sleeve, arming sleeve and detent. The striker is also retained by a brass shear wire which passes through a hole drilled in the striker head.
- (c) The shutter is held in the unarmed position by the safety plunger.
- (d) When in the unarmed position, the shutter screens off the detonator and delay pellet from the stemmed C.E. channel in the magazine.

4. *Action (Figs 1 and 2).*

(a) *Before Firing*

The selector is set at "D" for delay or at "S.Q." for super quick, according to the action required.

(b) *On Firing*

The detent sets back against its spring, thus allowing the top set of steel balls to move partially out of the arming sleeve into the cup recess at the top of the detent, so locking the detent to the arming sleeve.

The shutter is held in the unarmed position by means of the safety plunger and by friction.

(c) *During Flight*

The detent spring reasserts itself and the detent and arming sleeve move forward to the top of the striker assembly bore. The lower balls then fall clear of the striker sleeve into the inertia pellet recess. The striker mechanism is then in the armed position, the striker being supported by the shear wire which rests on the washer cover. The detent spring then acts as a creep spring and prevents forward movement of the inertia pellet.

The safety plunger in the top of the magazine moves outwards, overcoming its spring and allowing the shutter to rotate until it reaches the stop formed in the magazine. When in this position the locking plate slides into the recess in the magazine, locking the shutter in the armed position. The detonator in the shutter is then positioned directly below the central flash channel and above the stemmed C.E. channel in the magazine.

(d) *On Impact*

(i) *Direct Action*

The nose cap and striker cover are crushed and the striker is driven in, breaking the shear wire and piercing the inertia pellet detonator.

(ii) *Graze Action*

The nose cap, cover plate and shear wire remain intact and the inertia pellet moves forward, compressing the detent spring and carrying the inertia pellet detonator onto the point of the striker.

(e) *Selector System*

(i) *Non-delay*

When the selector is set at "S.Q." the masking shutter overcomes its spring during flight and moves into the slot in the selector, thus clearing the central flash channel and permitting the flash from the inertia pellet detonator to communicate directly with the detonator in the shutter. The resultant detonation initiates the stemmed C.E. channel and, in turn, the C.E. pellet in the magazine.

(ii) *Delay*

When set at "D" the selector is turned through 90° so that its two lugs are positioned at right-angles to and against the face of the masking shutter, thus preventing it from moving outwards. This diverts the flash from the inertia pellet detonator through the two flash holes in the masking shutter housing to ignite the mealed powder delay pellet which, after a delay of 0.07 seconds, initiates the detonator in the shutter. Subsequent action is then as previously described.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

Amdt. 5/ /1957

Pam 9, Part 1, Section 32

Table 1

TABLE 1—DATA FOR FUZE, PERCUSSION D.A., AND GRAZE No. 410

Item	Mark	Body Material	Detonator		Remarks
			Inertia Pellet	Shutter	
(a)	(b)	(c)	(d)	(e)	(f)
6	2/1	Brass	1·7 gr. A (Copper alloy shell)	1·8 gr. ZY (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 2 in that the shutter is fitted with a 1·8 gr. ZY tinned lugless detonator.
8	3	Brass	1·7 gr. A (Copper alloy shell)	1·8 gr. ZY (Copper alloy shell)	(i) Differs from the Mk. 2 in being fitted with a stronger safety plunger spring and in being manufactured with modified tolerances to obviate difficulties in assembly. (ii) Obsolete. This Mk. of Fuze was never produced and the design has been cancelled.
9	4	Brass	1·7 gr. A (Copper alloy shell)	1·8 gr. ZY (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 3 in that the shutter is fitted with a 1·8 gr. ZY tinned lugless detonator. (ii) Obsolete. This mark of fuze was never produced and the design has been cancelled.

Amdt. 5/ /1957

Pam 9, Part 1, Section 32

Table 1

TABLE 1—DATA FOR FUZE, PERCUSSION D.A., AND GRAZE No. 410

Item	Mark	Body Material	Detonator		Remarks
			Inertia Pellet	Shutter	
(a)	(b)	(c)	(d)	(e)	(f)
6	2/1	Brass	1·7 gr. A (Copper alloy shell)	1·8 gr. ZY (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 2 in that the shutter is fitted with a 1·8 gr. ZY tinned lugless detonator.
7	2/2		1·7 gr. A (Copper alloy shell)	1·8 gr. ZY (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 2/1 in being provided with a new pattern fuze body (QX 100A) which incorporates a modified masking shutter (QX 1371) and selector (QX 1373) designed to improve the functioning of the fuze.
7	2	Brass	1·7 gr. A (Copper alloy shell)	1·8 gr. ZY (Tinned lugless copper alloy shell)	(i) Differs from the Mk. 3 in that the shutter is fitted with a 1·8 gr. ZY tinned lugless detonator. (ii) Obsolete. This mark of fuze was never produced and the design has been cancelled.

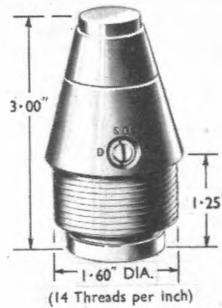
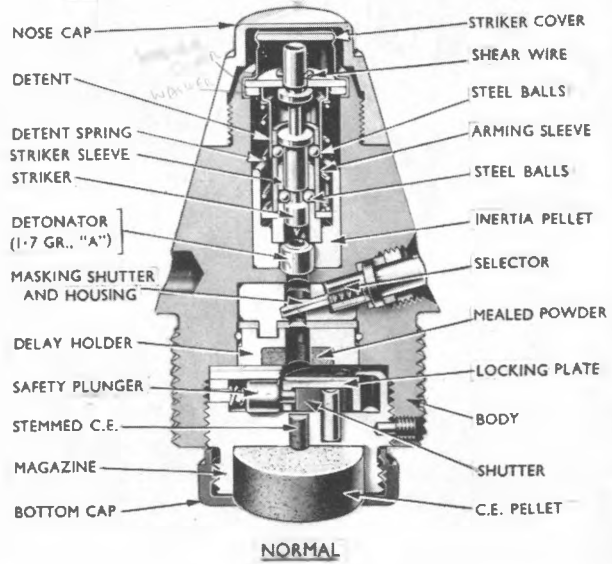
Amdt. 6/May/1957.

Table 1

TABLE 1—DATA FOR FUZE, PERCUSSION D.A., AND GRAZE No. 410

Item	Mark	Body Material	Detonator		Remarks
			Inertia Pellet	Shutter	
(a)	(b)	(c)	(d)	(e)	(f)
1	1	Brass	1.7 gr. A. (Copper alloy shell)	1.8 gr. ZY (Copper alloy shell)	(i) Obsolescent
2	1/1	—	—	—	(i) Design not proceeded with.
3	1/2	Brass	1.7 gr. A (Copper alloy shell)	1.8 gr. ZY (Copper alloy shell)	(i) Differs from the Mk. 1 in thickness of magazine diaphragm being H.015, L.008 in lieu of H.008, L.003. (ii) Obsolescent.
4	1/3	Brass	1.7 gr. A (Copper alloy shell)	1.8 gr. ZY (Copper alloy shell)	(i) Similar to the Mk. 1/2 except that radius on shutter recess and tolerances on diameter of shutter hinge pin are amended. The magazine is secured by a cupped grub-screw in lieu of a copper pin. (ii) Obsolescent.
5	2	Brass	1.7 gr. A (Copper alloy shell)	1.8 gr. ZY (Copper alloy shell)	(i) Differs from the Mk. 1/3 in that it is fitted with a lengthened masking shutter. (ii) Obsolescent.

FUZE, PERCUSSION, DIRECT ACTION AND GRAZE
No. 410, MARK 1/3 WITH OPTIONAL DELAY

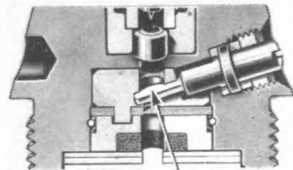


SUPER QUICK SETTING

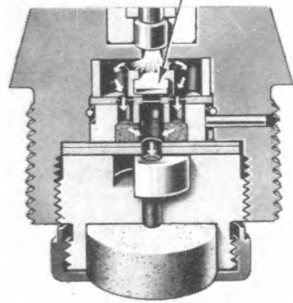


DELAY SETTING

ACTION OF DELAY



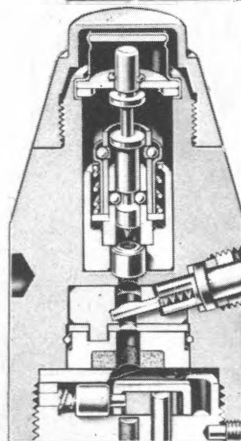
MASKING SHUTTER AND HOUSING



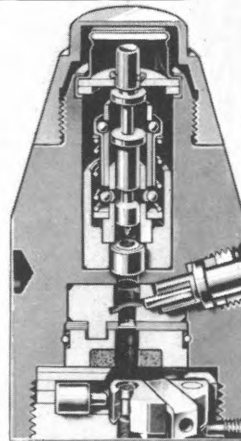
ON IMPACT

FIG. 1.

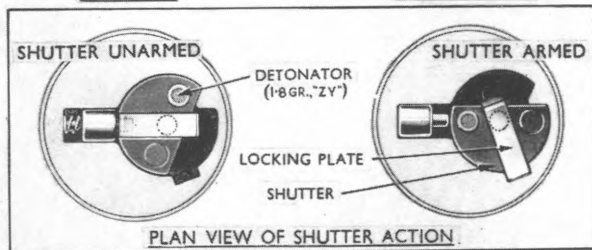
FUZE, PERCUSSION, DIRECT ACTION AND GRAZE
No. 410, MARK 1/3 WITH OPTIONAL DELAY



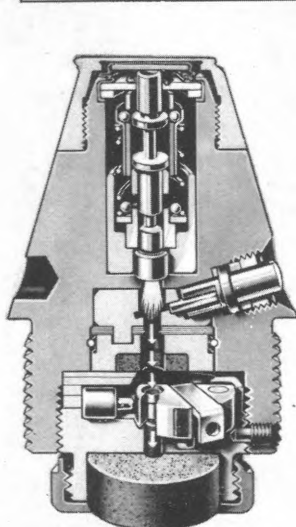
ON FIRING



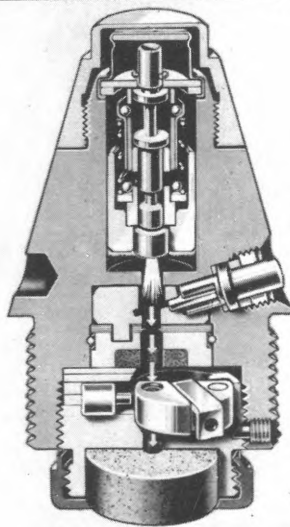
DURING FLIGHT



PLAN VIEW OF SHUTTER ACTION.



ON IMPACT



ON GRAZE

FIG. 2

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 33

FUZE, PERCUSSION, BASE, LARGE, No. 480

(PART 1—FUZES NUMERICAL SERIES)

SECTION 33—FUZE, PERCUSSION, BASE, LARGE, No. 480

INTRODUCTION

1. Fuze, No. 480, of 2 in. fuze-hole gauge, is a graze action base detonating fuze provided with an optional short delay and is used with the following equipments:—

B.L., 6 in. Gun

B.L., 9.2 in. Gun

The fuze is similar in design to fuzes No. 159 and No. 346 differing principally in the strength of creep spring which compresses under a load of 10 lb.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, BASE, LARGE, No. 480, Mk. 2

2. General Assembly

The general assembly of the fuze is illustrated at **Fig. 1**.

3. Safety Arrangements

- (a) The upper and lower centrifugal bolts retain the inertia pellet, thus holding the detonator clear of the needle.
- (b) The detent prevents the upper centrifugal bolt from moving outwards accidentally.
- (c) The inertia pellet, masking bolt and pea-ball provide a flash seal during storage and transit and during acceleration in the bore.

4. Delay and Non-delay Setting

Optional non-delay may be obtained when the shell is fitted with a gascheck cover plate incorporating either a non-delay set screw or a delay setting plug, by means of which the propellant gas can be prevented from exerting pressure on the delay spindle of the fuze.

The base plate assembly illustrated at **Fig. 2** shows one type of gascheck cover plate only. Full details of base closing arrangements are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 6, Parts 3 and 6.

5. Action (Figs. 1 and 2)

(a) Before Firing

The optional delay/non-delay arrangement is set as required.

(b) *On Firing*

- (i) The inertia pellet, masking bolt and pea-ball set back thus forming a flash seal should the detonator fire prematurely. At the same time the detent sets back against its spring and is prevented from rising by its stem which becomes locked under the shoulder of the detent spring recess.

(ii) *When Set Delay*

The propellant gas reaches the pocket in the gas-check plate and exerts pressure on the pressure plate of the delay spindle. This forces the spindle into its recess thus closing one side of the cross channel. The flash can then pass only through that arm of the cross channel fitted with delay composition.

(iii) *When Set Non-delay*

The propellant gas is prevented from entering the pocket in the gascheck plate and from exerting pressure on the pressure plate of the delay spindle. Both sides of the cross channel, therefore, remain open and the flash can pass directly to the ignition chamber.

(c) *During Flight*

The upper centrifugal bolt retaining the inertia pellet flies outwards and is disengaged from the inertia pellet. The lower centrifugal bolt retaining the masking bolt flies outwards, compresses its spring and releases the masking bolt which also moves outwards and unmask the central channel in the inertia pellet. The centrifugal bolt retaining the pea-ball flies outwards, compresses its spring and releases the pea-ball which rolls into the horizontal channel, thereby unmasking the flash channel in the lower part of the body. The fuze is now fully armed and the inertia pellet with its detonator is held clear of the needle only by the creep spring.

(d) *On Impact or Graze*

- (i) The inertia pellet overcomes the creep spring and carries the detonator onto the needle, and at the same time the circular flange at the base of the inertia pellet is withdrawn from the recess in the body, thus permitting communication between the oblique channel in the inertia pellet and the flash channel in the lower part of the body. The coned front end of the inertia pellet jams tightly in the tapered entrance of the needle cap and prevents the pellet from rebounding. The detonator is fired and the resultant flash passes through the flash channel of the inertia pellet to the cross channel in the lower part of the body.

Pam 9, Part 1, Section 33

(ii) *When Set Delay*

The flash passes through the open side of the cross channel to the delay fitment which burns through to ignite the perforated gunpowder pellet in the flash channel and, in turn, the perforated gunpowder pellet in the ignition chamber. The pressure and heat from the explosion of the ignition pellet passes through the small hole in the closing plug to detonate the C.E. in the vertical channel and the C.E. pellet in the magazine.

(iii) *When Set Non-delay*

The flash from the detonator reaches the cross channel. It is delayed by the delay fitment on one side, but reaches the ignition chamber by passing over the head of the delay spindle, thus avoiding the delaying action of the delay fitment. Subsequent action is then as previously described.

AMMUNITION AND PACKAGE MARKINGS

6. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

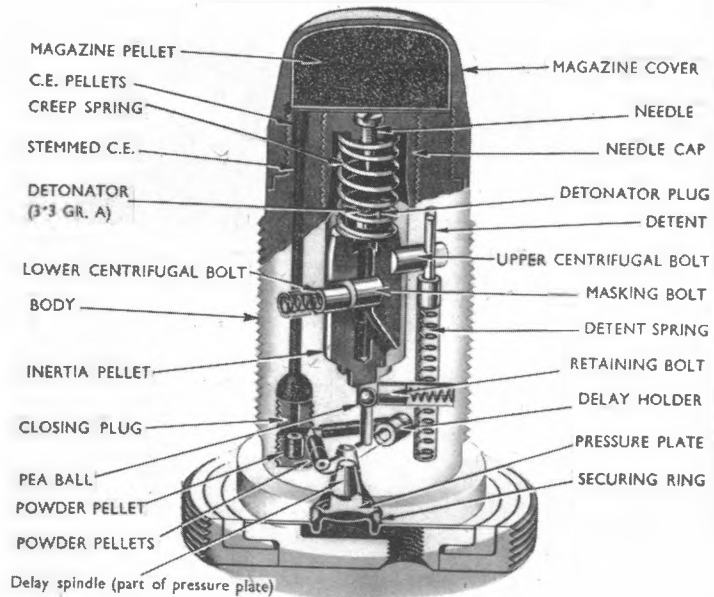
7. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, LARGE, No. 480

Pam 9, Part 1, Section 33
Table 1

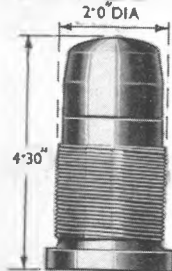
Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	—	—	(i) Design cancelled.
2	2	Bronze	3.3 gr. A (Copper alloy shell)	(i) Before 13 July 1943 fuzes were assembled with Detonator 3 gr. A.

FUZE, PERCUSSION, BASE, LARGE, No.480, MARK 2.

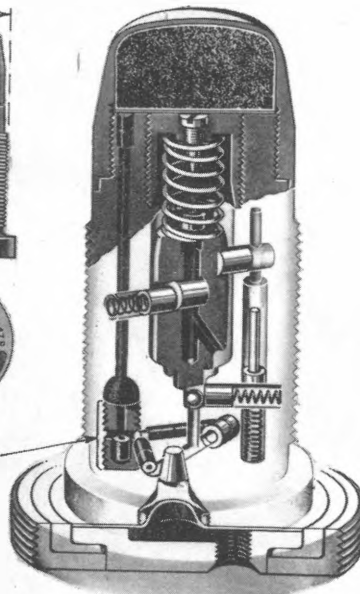


(9 Threads per inch. L.H.)

NORMAL



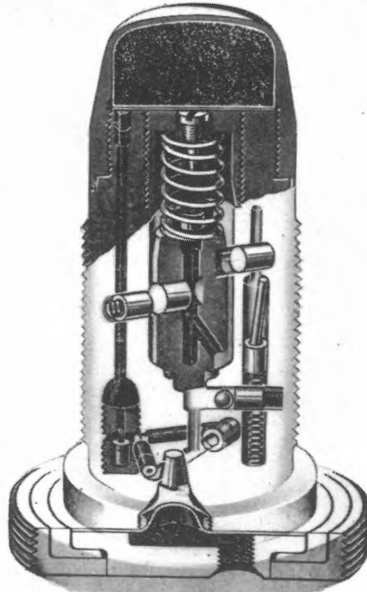
IGNITION CHAMBER



ON FIRING

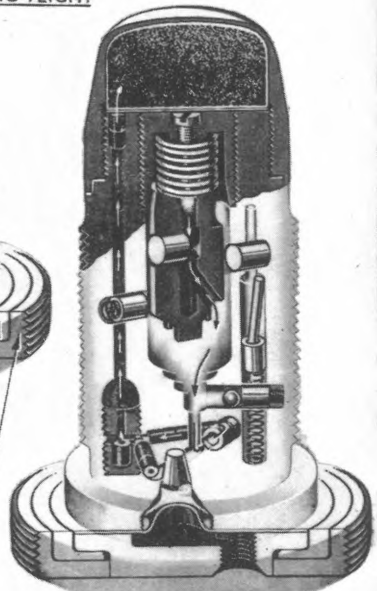
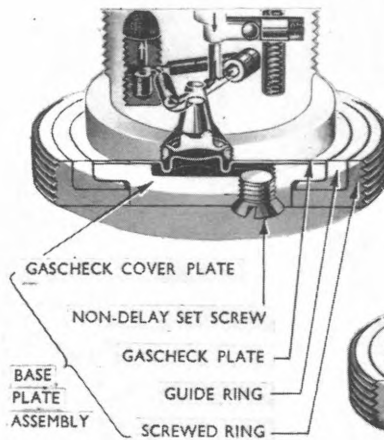
FIG. 1

FUZE, PERCUSSION, BASE, LARGE, No.480, MARK 2.



DURING FLIGHT

NON-DELAY SETTING



ON IMPACT OR GRAZE

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 34

FUZE, PERCUSSION, BASE, MEDIUM, No. 501

PART 1—FUZES (NUMERICAL SERIES)

SECTION 34—FUZE, PERCUSSION, BASE, MEDIUM,
No. 501

INTRODUCTION

1. Fuze No. 501 is a graze action base detonating fuze of 1.6 in. fuze-hole gauge and is used with the following equipment:—

Q.F., 5.25 in. Gun

Although this fuze has no delay fitment nor optional delay setting device, the delay given ensures that the projectile bursts after penetration. The delay actually attained is greater than that inherent in the graze action alone and a large part of this delay results from the method of filling.

Details of fuze marks are given in Table 1.

FUZE, PERCUSSION, BASE, MEDIUM, No. 501, Mk. 2

2. *General Assembly*

The general assembly of the fuze is illustrated at Fig. 1.

3. *Safety Arrangements*

- (a) The upper and lower centrifugal bolts retain the inertia pellet, thus holding the detonator clear of the needle.
- (b) The detent prevents the upper centrifugal bolt from moving outwards accidentally.
- (c) The inertia pellet, masking bolt and pea-ball provide a flash seal during storage and transit and during acceleration in the bore.

4. *Action (Fig. 1)*

(a) *On Firing*

The inertia pellet, masking bolt and pea-ball set back, thus forming a flash seal should the detonator fire prematurely. At the same time the detent sets back against its spring and is prevented from rising by its stem which becomes locked under the shoulder of the detent spring recess.

(b) *During Flight*

The upper centrifugal bolt retaining the inertia pellet flies outwards and is disengaged from the inertia pellet. The lower centrifugal bolt retaining the masking bolt flies outwards, compresses its spring and releases the masking bolt which also moves outwards and unmask the central

channel in the inertia pellet. The centrifugal bolt retaining the pea-ball flies outwards, compresses its spring and releases the pea-ball which rolls into the horizontal channel, thereby unmasking the flash channel in the lower part of the body. The fuze is now fully armed and the inertia pellet with its detonator is held clear of the needle only by the creep spring.

(c) *On Impact or Graze*

The inertia pellet overcomes the creep spring and carries the detonator onto the needle, and at the same time the circular flange at the base of the inertia pellet is withdrawn from the recess in the body, thus permitting communication between the oblique channel in the inertia pellet and the flash channel in the lower part of the body. The coned front end of the inertia pellet jams tightly in the tapered entrance of the needle cap and prevents the pellet from rebounding. The detonator is fired, and the flash passes through the flash channel of the inertia pellet to the flash channel in the base of the body and ignites the perforated gunpowder pellet. The resultant explosion is sufficient to cause the C.E. pellet in the ignition chamber to detonate. This in turn detonates the C.E. in the vertical fire channel and the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

- 5.** See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

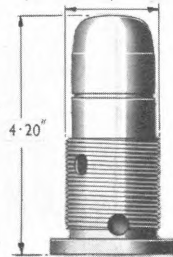
- 6.** Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, MEDIUM, No. 501 Pam 9, Part 1, Section 34
Table 1

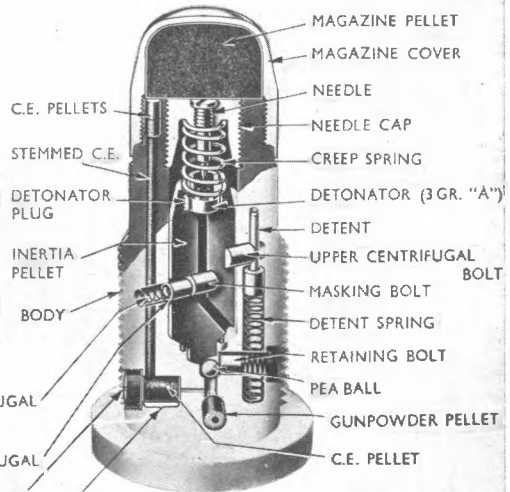
Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Bronze	3 gr. A (Copper alloy shell)	(i) Manufactured from lead-free materials.
2	2	Bronze	3 gr. A (Copper alloy shell)	(i) Differs from the Mk. 1 in being manufactured from non lead-free material.

FUZE, PERCUSSION, BASE, MEDIUM, No. 501, MARK 2

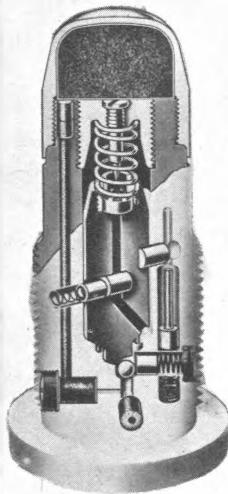
1-604" DIA.
(12 Threads per inch L.H.)



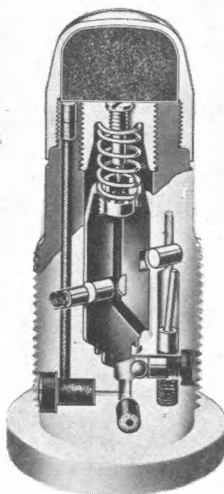
LOWER CENTRIFUGAL
BOLT SPRING
LOWER CENTRIFUGAL
BOLT
CLOSING PLUG
IGNITION CHAMBER



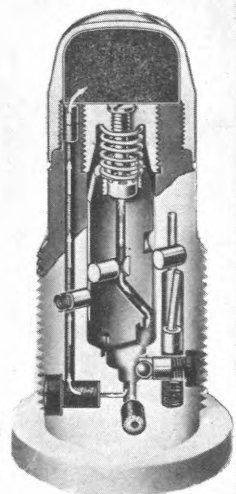
NORMAL



ON FIRING



DURING FLIGHT



ON IMPACT OR GRAZE

RESTRICTED

REGULATIONS FOR ARMY ORDNANCE SERVICES

VOLUME 4—AMMUNITION

PAMPHLET No. 9

ARTILLERY FUZES, GAINES AND TRACERS

PART 1

FUZES (NUMERICAL SERIES)

SECTION 35

FUZE, PERCUSSION, BASE, MEDIUM, No. 551

PART 1—FUZES (NUMERICAL SERIES)

**SECTION 35—FUZE, PERCUSSION, BASE, MEDIUM
No. 551**

INTRODUCTION

1. Fuze No. 551 is a graze action base detonating fuze of 1.6 in. fuze-hole gauge and is used with the following equipment:—
B.L., 15 in, Gun

Although this fuze has no delay fitment nor optional delay setting device, the delay given ensures that the projectile bursts after penetration. The delay actually attained is greater than that inherent in the graze action alone and a large part of this delay results from the method of filling.

Details of fuze marks are given in **Table 1**.

FUZE, PERCUSSION, BASE, MEDIUM, No. 551, Mk. 3

2. *General Assembly*

The general assembly of the fuze is illustrated at **Figs. 1-4**.

3. *Safety Arrangements*

- (a) The upper and lower centrifugal bolts retain the inertia pellet, thus holding the detonator clear of the needle.
- (b) The detent prevents the upper centrifugal bolt from moving outwards accidentally.
- (c) The inertia pellet, masking bolt and pea-ball provide a flash seal during storage and transit and during acceleration in the bore.

4. *Action*

- (a) *On Firing*

The inertia pellet, masking bolt and pea-ball set back, thus forming a flash seal should the detonator fire prematurely. At the same time the detent sets back against its spring and is prevented from rising by its stem, which becomes locked under the shoulder of the detent spring recess.

- (b) *During Flight*

The upper centrifugal bolt retaining the inertia pellet flies outwards and is disengaged from the inertia pellet. The lower centrifugal bolt retaining the masking bolt flies outwards, compresses its spring and releases the masking bolt which also moves outwards and unmask the central channel in the inertia pellet. The centrifugal bolt retaining the pea-ball flies outwards, compresses its spring and releases the pea-ball which rolls into the horizontal channel, thereby unmasking the flash channel in the lower part of the body. The fuze is now fully armed and the inertia pellet with its detonator is held clear of the needle only by the creep spring.

(c) On Impact or Graze

The inertia pellet overcomes the creep spring and carries the detonator onto the needle, and at the same time the circular flange at the base of the inertia pellet is withdrawn from the recess in the body, thus permitting communication between the oblique channel in the inertia pellet and the flash channel in the lower part of the body. The coned front end of the inertia pellet jams tightly in the tapered entrance of the needle cap and prevents the pellet from rebounding. The detonator is fired and the flash passes through the flash channel of the inertia pellet to the flash channel in the base of the body and ignites the perforated gunpowder pellet. The resultant explosion is sufficient to cause the C.E. pellet in the ignition chamber to detonate. This in turn detonates the C.E. in the vertical fire channel and the C.E. pellet in the magazine.

AMMUNITION AND PACKAGE MARKINGS

5. See R.A.O.S. Volume 4—Ammunition, Pamphlet No. 1 and Inter-Service Ammunition and Ammunition Package Markings.

LIMITATIONS AND RESTRICTIONS

6. Limitations and restrictions imposed on the issue or use of fuzes are given in R.A.O.S. Volume 4—Ammunition, Pamphlet No. 26 and the current edition of Limitations in the Use of Fuzes for Training.

TABLE 1—DATA FOR FUZE, PERCUSSION, BASE, MEDIUM, No. 551 Pam 9, Part 1, Section 35
Table 1

Item	Mark	Body Material	Detonator	Remarks
(a)	(b)	(c)	(d)	(e)
1	1	Bronze	3 gr. A (Copper alloy shell)	(i) Naval design. Used in the Land Service for Coast Artillery. (ii) Similar in design to fuze No. 501, but fitted with a weaker creep spring. (iii) Obsolescent.
2	2	Bronze	3.3 gr. A (Copper alloy shell)	(i) Naval design. Used in the Land Service for Coast Artillery. (ii) Differs principally from the Mk. 1 in being assembled with a longer magazine cover and a larger magazine pellet.
3	3	Bronze	3.3 gr. A (Copper alloy shell)	(i) Naval design. Used in the Land Service for Coast Artillery. (ii) Differs from the Mk. 2 in being fitted with a stronger creep spring.

FUZE, PERCUSSION, BASE, MEDIUM, No.551, MARK 3

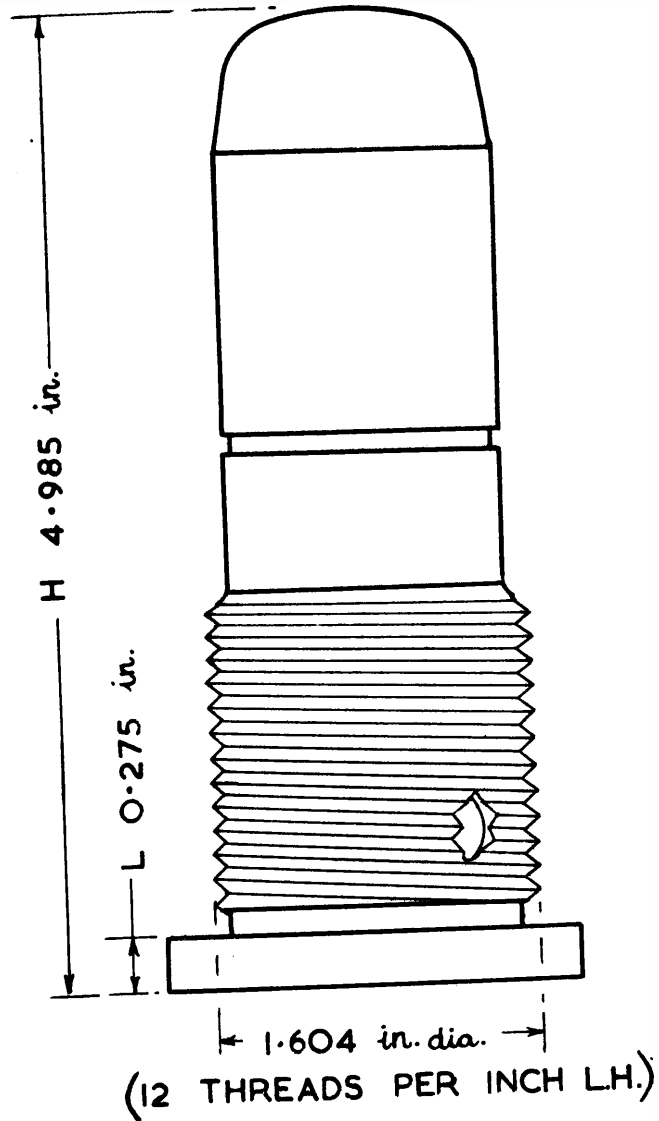
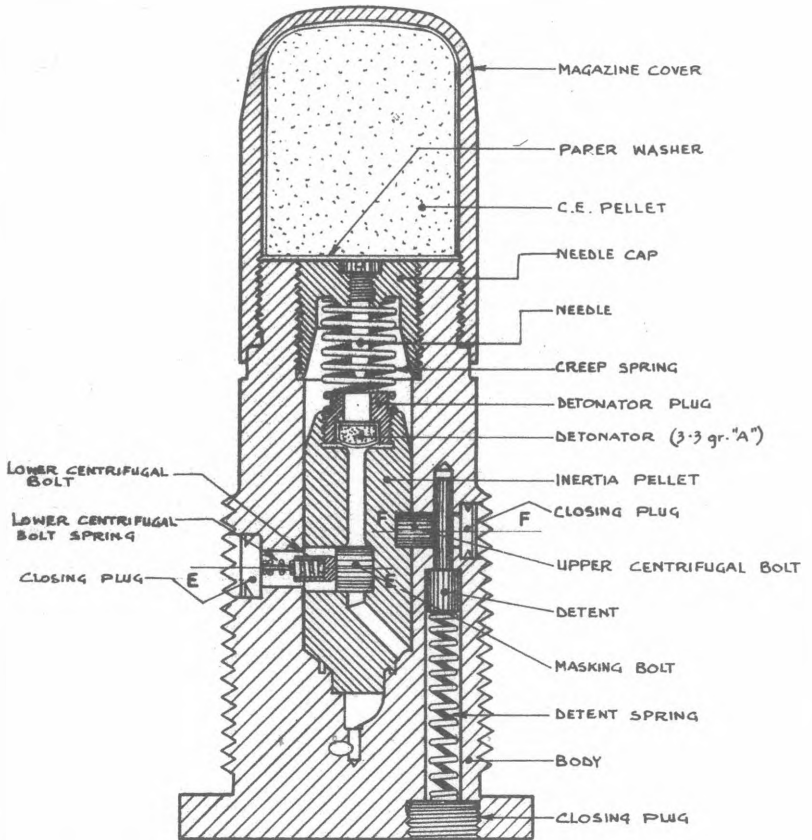
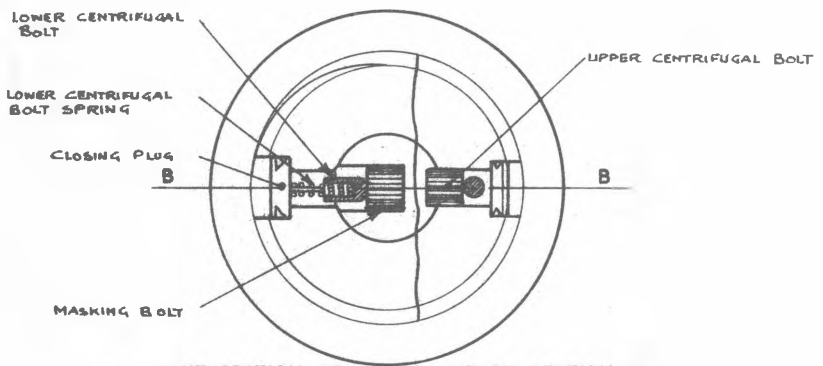


FIG. 1

FUZE, PERCUSSION. BASE, MEDIUM, No.551, MARK 3



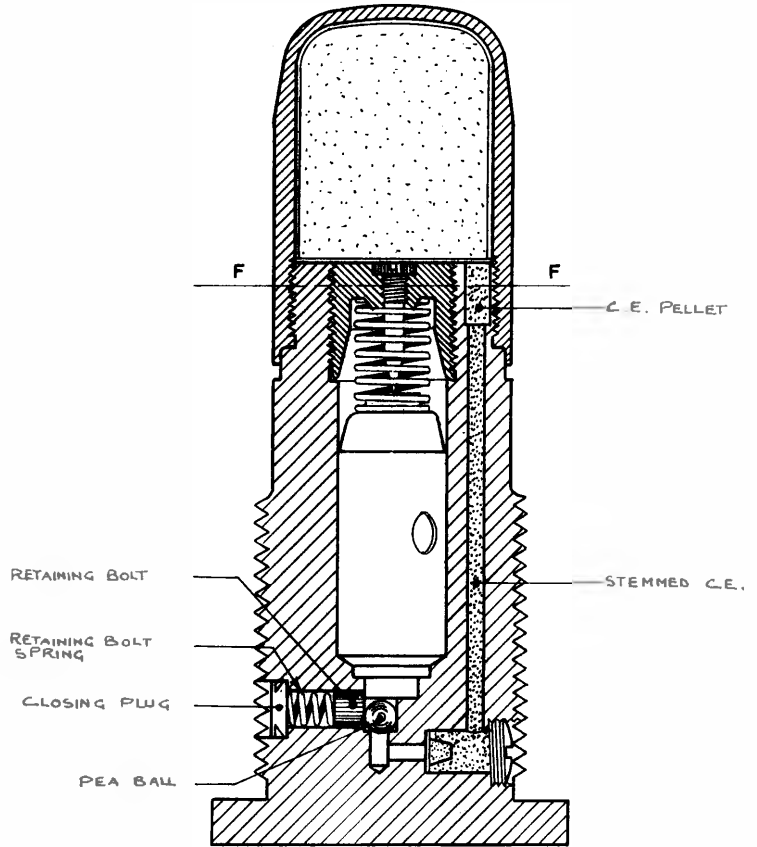
SECTION BB



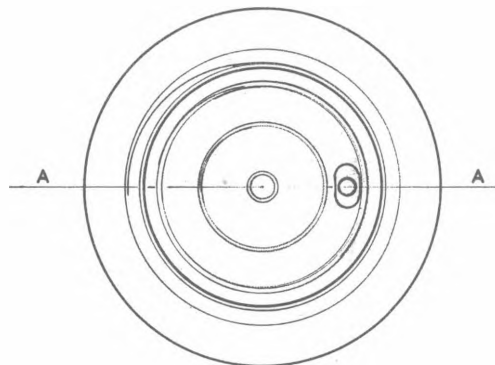
PART SECTION EE

PART SECTION FF

FUZE, PERCUSSION. BASE, MEDIUM, No.551, MARK 3



SECTION AA



SECTION FF

FUZE, PERCUSSION, BASE, MEDIUM, No.551, MARK 3

