

for N. Bonney

A.D.W.S.

D.A.D.V.S.

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Staff Col.

Chief Clk.

Handwritten notes:
21/6
87P-4 23 June

JAPANESE AMMUNITION

C.I. AMM. TECHNICAL REPORT

No. 1 (SECOND ISSUE)

(This Supersedes the *First Issue* which should now be destroyed)

MAGNETISED ANTI-TANK MINE, TYPE '99.

JAPANESE AMMUNITION

C.I.AMM. TECHNICAL REPORTS

REPORT NO.1 (SECOND ISSUE)

MAY 1945

MAGNETISED ANTI-TANK MINE, TYPE '99

G E N E R A L

Although descriptions of this mine have been widely published in various publications including C.I.Amm. Technical Report No.1 a fully detailed description of the mine and fuze has not yet been made. This report therefore gives a detailed description and incorporates all information available at the time of issue.

2. This mine has been described elsewhere under various names, such as "Type '99 Armour Piercing Mine"; "Magnetic A.T. Mine, Model '99"; "Adhesive A.P. Grenade", and "Hako-Bakurai". The latter is presumably the Japanese name and a literal translation of the Japanese characters, "Hako" meaning demolition armour and "Bakujirai" meaning H.E. Mine, which may be found stencilled on packages.

3. General Headquarters (India), G.S.I.(t), have directed that the nomenclature "Magnetised A.T. Mine, Type '99" should be used. This is necessary to avoid any misunderstanding of what is intended.

Actually the weapon might be regarded more correctly as a hand grenade. It is normally initiated by the user and lobbed or placed by hand on the object attacked. As the weapon was initially termed a mine, presumably based on an interpretation of the Japanese characters, this name has continued.

4. Trials to determine the performance of this mine against armour plate have not been carried out at Kirkee but reliable reports estimate that one mine is capable of perforating a 22-mm. armour plate while two mines super-imposed will penetrate 30-mm. of armour.

5. Although the delay measured in all fuzes examined here was of the order of 9 to 10 seconds, recent reports from American sources indicate that the standard delay is 4 to 6 seconds, while 25 minutes and several hours have also been reported. Long delays of this nature call for some mechanical or chemical device and it is probable that some form of different fuze must be used, e.g. a time pencil. These are known to be used by the Japanese.

6. This mine appears to be standard equipment and has been used on a fairly wide scale in the Burma Theatre. Its use as a gun bursting charge has also been reported from Burma. The magnets and all but three explosive blocks were removed from the mine and the cloth cover wrapped round the remainder and tied with tape. In this way it can be placed in the barrel of a 25-pdr. gun. The normal fuze was used.

7. The majority of Fuzes for this mine examined here had the characters "Experimental Demolition Armour H.E. Mine Fuze" on a paper label, pasted on the fuze cylinder. One or two cylinders had the characters "'99 Type etc." on a similar label. It would seem that the mine was initially described as "Experimental" and subsequently designated "Type '99". No differences were found in the fuzes or mines examined.

DESCRIPTION.

MINE

8. The general appearance of the complete mine, its components and carrying pouch is shown in Plate A. The mine consists of a waterproof canvas cover fitted with four magnets of a peculiar design, see Plate A. It is filled with 8 precast blocks of R.D.X./T.N.T. varying in the proportions of 60/40 to 50/50, and each block is wrapped in varnished paper pressed into the block. The blocks are so formed that when assembled together they are circular and completely fill the canvas cover. Three of the four central blocks are perforated to take the fuze. During transport and storage this perforation is closed by a wooden transit plug as shown in Plate A. The canvas cover of the mine critically examined for this report had the date of filling 'September 1941' and the inspection marks of 'Tokyo Arsenal' stencilled in Japanese characters as shown in Plate A.

FUZE, DELAY - PUSH ACTION

9. The general construction and component details of the fuze are given in Plate B, while a photograph of its general appearance and assembly sequence of components is given in Plate C. For purposes of description the fuze may be divided into three main parts:-

- (a) Arming and Striker Mechanism.
- (b) Ignition and Delay System.
- (c) Detonator Tube.

Arming and Striker Mechanism.

10. This consists of a fuze body (4) screw-threaded internally at its lower end to take the delay tube (9) with an external flange on which fits the securing collar (3) to retain the fuze in the mine. Above the flange is a vent hole to allow the escape of gas when the pyrotechnic delay is burning. This is normally covered by a tinfoil disc to prevent the ingress of damp. The upper end of the fuze body (4) is closed by a screwed plug, and machined down externally to a smaller diameter to accommodate the arming spring (2), which at its other end bears against the push cap (1). Four steel balls spaced equi-distant are set in the wall forming a ball cage. Internally the fuze body (4) contains a hollow striker block (6) and spring (5). When cocked, the striker spring (5) is held under compression by the striker block (6) into the annular groove of which the four steel balls are forced when the push cap (1) is in the safe position.

11. The push cap (1) is secured to the fuze body (4) by a small set screw, passing through a longitudinal slot in the cap (1) and screwing into the body (4). This allows a downward movement of the push cap (1) of about $\frac{1}{4}$ of an inch, see para.17 below.

12. The diameter of the push cap (1) is increased internally for a length of about $\frac{3}{8}$ of an inch, the purpose of which will be clear from para.17. The fuze body (4) has two holes diametrically opposite to take a safety split pin. Japanese characters are stamped on the body just above the flange indicating the date of manufacture; in this case 'January 1941'.

Ignition and Delay System.

13. This consists of a brass tube (9) screw-threaded externally at both ends, the upper end screwing into the fuze body (4) while the lower end screws into the detonator tube (12). A percussion cap in a holder (8) is fitted in the upper end (friction fit). This holder has an anvil with two flash holes leading on to loose gunpowder below which is a gunpowder pellet. The percussion cap is a small cap pressed into the holder and is somewhat similar to that used in pistol cartridges. The peculiar shape of the cap holder (8) should be noted from the enlarged details given in Plate B. The four gas escape holes are normally covered with tinfoil discs to prevent the ingress of moisture. The delay tube is filled with pressed gunpowder to give the necessary time of delay, and is closed at the bottom end by a perforated G.P. pellet covered with a paper washer.

14. Three delays tested were found to give the following times:-

9.5 seconds; 10 seconds and 10.5 seconds.

Detonator Tube.

15. This consists of a tube closed at one end and screw-threaded at the other to take the delay tube (9). This tube (12) contains two detonators resting on felt washers. The mouth of the tube is closed by a felt washer (10) on which rests a perforated G.P. pellet covered by a paper washer. These detonators are of the standard type identical with those used in Type '97 and Type '91 grenades.

Safety Devices.

16. A split safety pin passes through the fuze body (4) preventing any appreciable downward movement of the push cap (1) thus preventing the fuze from being accidentally functioned during storage and transport. This safety pin also prevents the striker reaching the percussion cap in case of any mechanical failure in the fuze.

Action.

17. The mine is fuzed by removing the wooden transit plug and inserting the fuze in its place. The securing collar (3) of the fuze is then screwed on to the screwed boss of the fuze hole in the mine. The mine is now ready for use, and can be carried fuzed if necessary in the carrying pouch. Just before use the safety pin is withdrawn and when required the push cap (1) is forced down. As soon as the increased diameter of the push cap (1) comes opposite the steel balls the striker block (6) owing to the rounded shape of the annular groove and the compression of the spring, forces the balls outwards, thus releasing itself. The striker then continues forward under the force of the spring to strike the percussion cap. The flash from the percussion cap passes down to the delay composition in the tube which commences to burn according to the delay incorporated.

The burning gases escape out through the four holes in the cap holder (8) and up past the flattened head of the cap holder (8) into the fuze body to vent themselves out to the atmosphere through the vent hole in the fuze body (4). It should be noticed that when initiating the fuze, the hand must be kept clear of the vent hole.

P A C K I N G

18. Two mines are packed in a small wooden packing case 8" X 6½" X 4" high. The two mines are placed together in such a way that north and south poles contact, thus prolonging the life of the magnets. The mines are tied together by a piece of tape. To protect the magnets and to give snug fitting in the packing case 4 waxed cardboard covers are placed over each set of two magnets. An end compartment in the box carries two fuzes each wrapped in waxed paper and packed in a tinned plate cylinder.

19. On receipt by troops the mines are presumably unpacked as required and placed in the carrying pouches (Plate A), one mine and one fuze per pouch. This pouch has a fabric loop fitted to the back, through which can be passed a belt, to secure it round the waist or over the shoulder. Any number of mines can be carried in this way. The mine and fuze can be readily removed from the pouch when required.

METALLURGICAL ANALYSIS

20. There is nothing to add to the details given in Plates A and B.

CHEMICAL ANALYSIS

(Chief Inspector of Military Explosives, Kirkee)

21. Mine Filling.

Eight blocks of a precast mixture of R.D.X./T.N.T. varying in proportions of 50/50 to 60/40; each block is wrapped in varnished paper.

Total weight of 8 blocks - 1 lb. 6 ozs.

22. Fuze:-

Percussion cap ...	...	0.2 grs. of mercury fulminate, antimony sulphide and potassium chlorate.
Cap holder ...	...	0.3 grs. of loose G.P. and perforated pellet of G.P., weighing 0.77 grs.
Delay tube ...	...	9.57 grs. of G.P. & T.N.T. and a 4.32 grs. perforated G.P. pellet.
Detonator tube ...	...	3.7 grs. perforated G.P. pellet at the top.
Each detonator ...	...	Mercury fulminate in the inverted copper cup; and C.E. below.
		Total weight 28 grs.

APPRECIATION

(Economic, development and manufacture aspects)

23. Samples of mines examined were well made and considerable

attention appears to be given to putting the best material possible into its construction. The fabric of the mine cover is of good quality throughout and very strongly made and the magnet for its size and weight (about 3-ozs.) is quite powerful. The peculiar construction of the magnet is resorted to probably for this reason, although it may indicate a shortage of cobalt steels etc., and facilities, for producing powerful permanent magnets with a useful life. The fuze is well designed and of excellent manufacture throughout. It does, however, seem unnecessarily complicated for the job it has to do.

24. Similarly the carrying pouch is of excellent material and very well made.

SUMMARY OF DATA

25. Mine:-

Diameter over magnets ...	...	6.5-ins.
Diameter over mine casing. ...	...	4.8-ins.
Thickness ...	...	1.5-ins.
Weight of mine plugged... ..	...	2-lbs. 5 $\frac{1}{4}$ -ozs.
Weight of mine fuzed ... ..	...	2-lbs. 8 -ozs.
Nature and weight of explosive filling ... ..	...	8 blocks of precast R.D.X./T.N.T.
		Total weight of 8 blocks - 1-lb.6-ozs.
Diameter of perforation in the three central blocks ... ..	...	0.5-ins.
Dimensions of magnet casing ... ..	...	1.5" X 1.1" X .8".
Length of wooden transit plug ... ..	...	3.7-ins.

26. Fuze:-

Length, overall ... ..	...	5 $\frac{1}{4}$ -ins.
Weight, filled ... ..	...	3.2-ozs.

PACKING.

27. Mine:-

Dimensions of pouch ... ..	...	7" X 6.25" X 1.9".
Wooden box holding 2 mines:-		
Dimensions (external) ... ..	...	8" X 6.5" X 4".
Weight	6-lbs. 4-ozs.

28. Fuze:-

Length of tinned-plate container.	5.5-ins.
Diameter " "	1.06-ins.

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MINE :-

DIA. OVER MAGNETS 6.5 INS.
WEIGHT PLUGGED 2 LBS.-5.25 OZS.
WEIGHT FUZED 2 LBS.-8.2 OZS.

EXPLOSIVE BLOCKS :-

EIGHT BLOCKS (PRECAST, R.D.X./ T.N.T.
EACH WRAPPED IN VARNISHED PAPER)
TO FORM A CIRCULAR BLOCK 4-8" DIA. X
1-5" HEIGHT. THREE BLOCKS PERFORATED
.5" DIA.
TOTAL WT. OF EIGHT BLOCKS ... 1 LB.-6 OZS.

MAGNETIC STONE :-

IRON OXIDE AS Fe_2O_3 65.4%
ACID INSOLUBLE - MAINLY
SILICEOUS MATTER 21%
PARAFFIN (WITH A LITTLE
BEES WAX) 13.5%

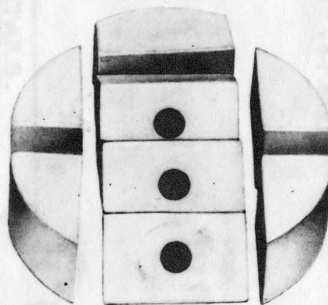
FUZE CONTAINER.



WATER-PROOF KHAKI
FABRIC (STRENGTHENED
BY PLASTIC STRIPS).

①

MINE & FUZE IN
CARRYING POUCH.



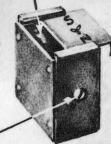
②

EXPLOSIVE FILLING,
(8 BLOCKS) RDX/TNT 60/40



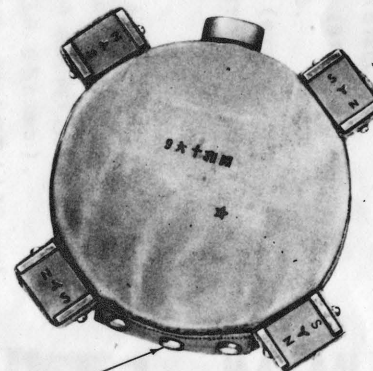
TRANSIT PLUG
WOOD

SECURING SCREW



CLOSING PLATE
(ALUMINIUM)

MAGNET
(TYPICAL)



THREE PRESS BUTTONS
FOR FILLING FLAP.

③

COMPLETE MINE (PLUGGED).

JAPANESE MAGNETISED ANTI-TANK MINE, TYPE '99

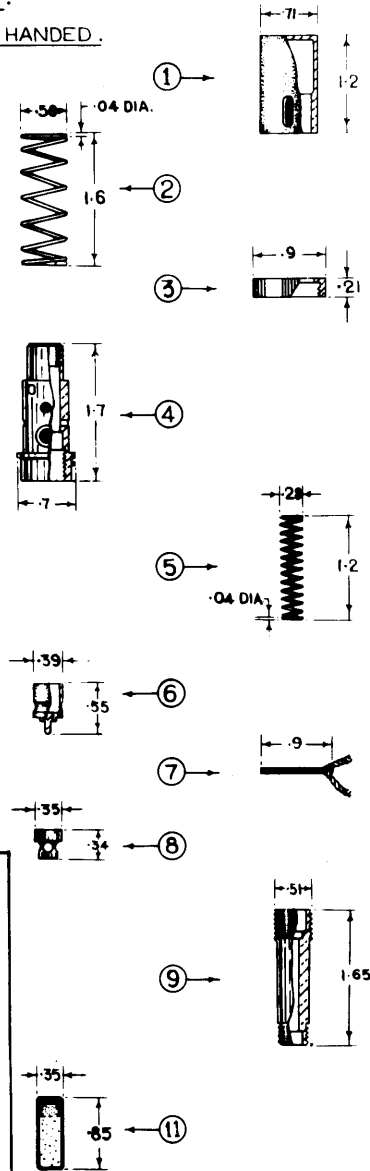
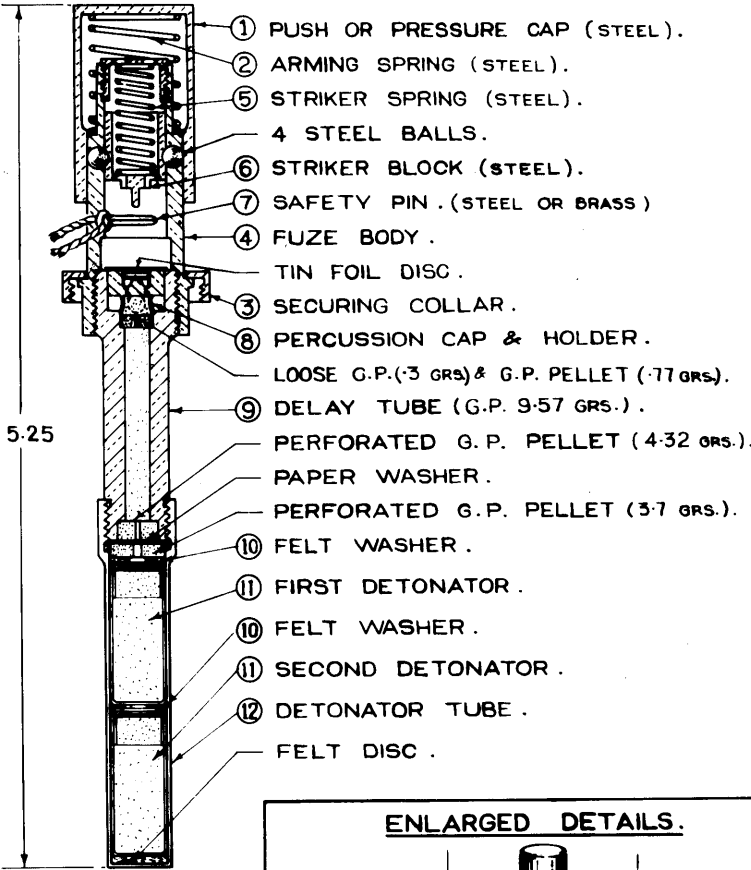
GENERAL APPEARANCE AND METHOD OF TRANSPORT

C.I.Amm.S/1062
KIRKEE APR. 45

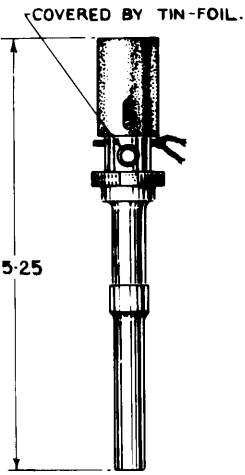
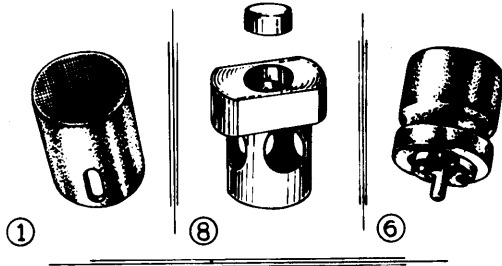
RESTRICTED.

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

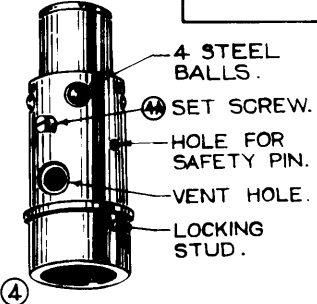
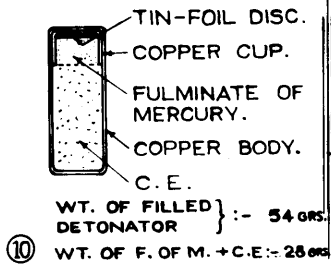
ALL THREADS ARE RIGHT HANDED.



ENLARGED DETAILS.



WT. OF FILLED FUZE :- 3.2 grs



⑩ WT. OF F. OF M. + C.E. :- 28 GRS

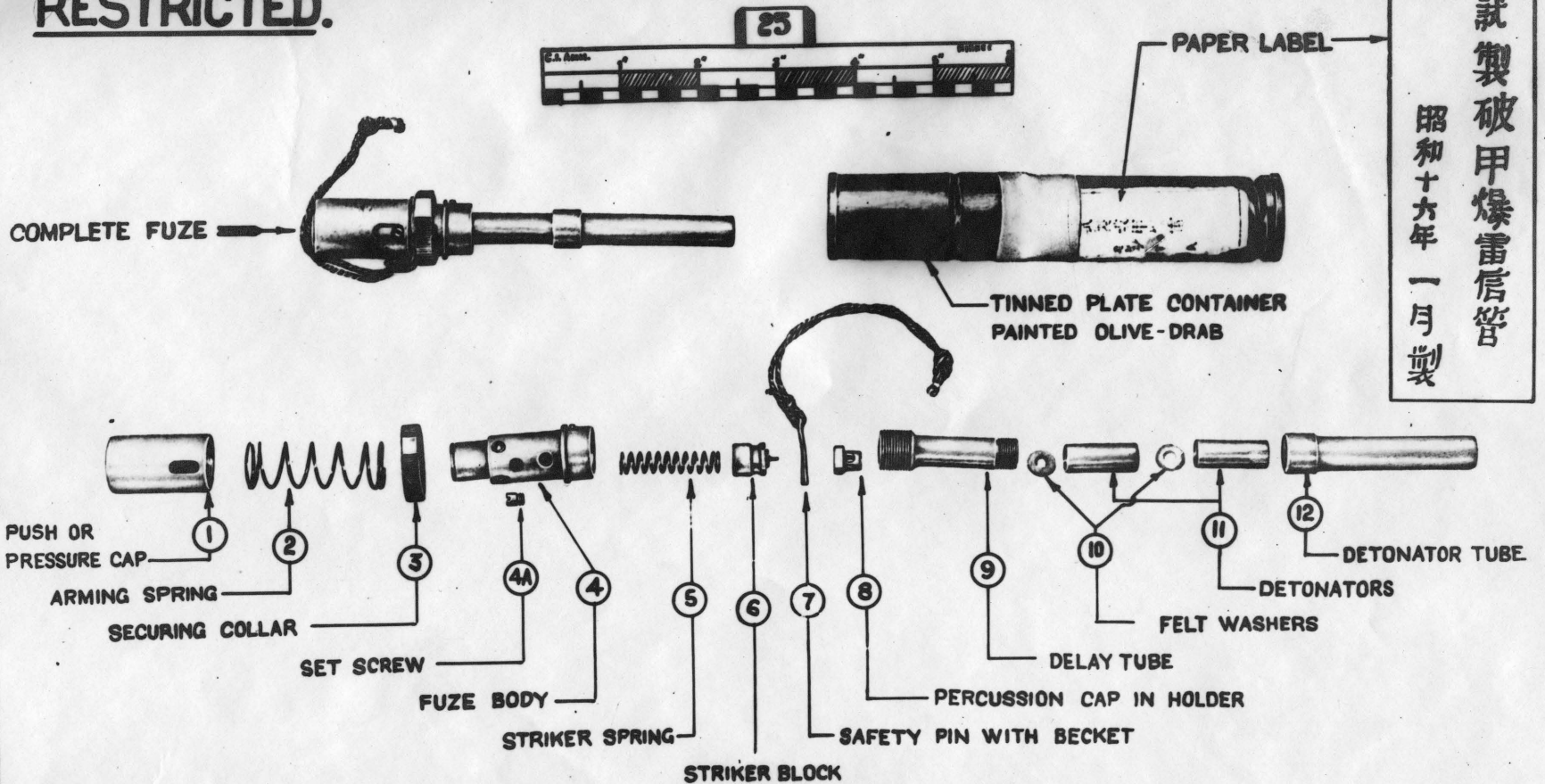
FUZE, DELAY (PUSH ACTION)

FOR

JAPANESE MAGNETISED ANTI-TANK MINE TYPE '99

DIMENSIONS IN INCHES. **GENERAL ASSEMBLY & COMPONENT DETAILS.**

RESTRICTED.



FUZE, DELAY (PUSH ACTION)

FOR

JAPANESE MAGNETISED ANTI-TANK MINE TYPE '99

ASSEMBLY SEQUENCE OF COMPONENTS.

C1 AMM. S/10 44
KIRKEE. APRIL '45