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JAPANESE AMMUNITION

C.I.AMM. TECHNICAL REPORT

No. 25 (SECOND ISSUE)

LAND MINE, A.T., TYPE '93.

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REPORT NO. 25.

APRIL 1945.

LAND MINE, A.T., TYPE '93.

G E N E R A L.

This type of mine is widely used by the Japanese Land Forces, and numbers of them have been recovered in operations in Assam and Burma during the past two years. The mine may be regarded as the Japanese counterpart of the British Service Mine, Contact, A.T., Mk.4, although it is considerably smaller and not nearly so powerful. The fuze operates generally on the same principle as the British Service Fuze, Mine, Contact, No.3.

It seems clear that different sizes of shear wires are used in the fuze. Although all fuzes examined at Kirkee have shear wires requiring a pressure of approximately 270-lbs. to shear, reports from American and Australian sources speak of shear wires requiring only 70 to 110-lbs. to shear, when the pressure is applied on the cover. Reports also state that fuzes have been found with wires which shear with a pressure as low as 2 or 3-lbs. Mines with fuzes of this type are reported to be used specially for anti-personnel purposes.

2. The terms 'Walking Mine', 'Tape Measure Mine' and 'Pan-cake Mine' have been used to describe the mine. The former term is presumably used because the mine can be dragged across a road or track in front of a vehicle by a rope attached to the brass Os, while the latter terms are used in view of its resemblance to these items.

3. Owing to the low power of this mine (actual explosive about 2-lbs.), it is frequently used in conjunction with supplementary charges and in some cases H.E. shells or bombs.

4. It was suggested in one of our early reports that owing to the type of cover used on this mine, it is probably susceptible to counter-mining by blast. Trials to confirm this and to determine the extent to which it is susceptible are at present proceeding at this Inspectorate.

D E S C R I P T I O N.

MINE.

5. The construction of the mine can be seen from Plate A. The mine is made in two parts, a cover and a base, both

NOTE. The inclusion of "Land Mine" in the nomenclature is not strictly correct according to British usage but, as it is in the Japanese nomenclature and has been used from the beginning, its use is being continued.

constructed from tinned plate. The cover is secured to the base by four rolled threads; the joint being rendered water-tight by the application, before assembly, of a black bitumastic compound. Two brass strips each with two brass Ds are soldered to the cover diametrically opposite each other. A short piece of rope is generally found fastened to one pair of Ds.

The cover is strengthened by a mild steel pressure plate and to function the mine with certainty it is necessary for the applied pressure to be on this plate, the effective area of which is a circle of about 4.8-ins. in diameter. Pressure outside this area will probably do nothing but dent the thin cover. This was confirmed when some trials were carried out using the "flail" or "scorpion" tank. Many mines did not function although the thin cover portion was dented badly. A small brass plate having an internally threaded socket is sweated to the base of the mine into which is screwed the fuze, passing down through the perforation in the picric acid filling.

The mine is painted dark brown and has usually a small ring in red paint on the top. Some mines which have been laid have a red blob painted over this ring. The actual intention of this is not clear but it may presumably be an indication that the mine is fuzed, although the absence of an immunizing collar (3) is thought to be the normal indication.

Filling.

6. The filling is in two parts, an outer ring and an inner ring. The outer ring consists of a precast picric acid block about 1.9-lbs. in weight, wrapped in yellow varnished paper; while the inner ring is of pressed picric acid powder 1.4-oz. in weight, similarly wrapped in paper. The perforation in the ring to take the fuze is 0.75-in. in diameter and is lined with cardboard. The complete unit is then coated again with yellow varnished paper. There is a cotton cloth-wrapping round the picric acid block secured by lacing on both sides, presumably intended to prevent direct contact of the filling with the cover and base and also provide snug fitting.

The Japanese characters on the picric acid block (Plate A) read:—

"93 Type Land Mine, Picric Acid, Tokio Powder Works
(inspection mark) Showa 17-7 (July 1942)."

Packing.

7. Mines are issued unfuzed, fuzes being packed and issued separately. Each mine is packed with an immunizing collar (3) fitted under the brass operating plug (1). The use of the former is explained in para 10 below. Mines are packed one in a flat rectangular wooden box as shown in the photograph at Plate C. The holes in the packing pieces and in the loose lid are intended only to facilitate insertion and removal. Twenty of these mines, each in its flat box, are reported to be packed in a larger wooden case. The dimensions of this case are given in the summary of data below.

FUZE.

8. The details are shown in Plate B. To assist easy study of the components, they have been arranged in their assembly

sequence and sectioned to show their internal construction. The construction and function of the fuze should be quite clear from the drawing in the Plate and there is little that can be added in amplification.

9. When the steel striker (9) is assembled, the steel striker spring (8) is under heavy tension but the striker (9) is held against this tension by the copper shear wire (10) or by the brass safety cap (7) when it is screwed fully home. If the cap (7) is not screwed home tension is then on the shear wire. If the cap (7) is unduly loose, the fuze could function owing to a defect in the shear wire or pressure on the cap. The threads of the cap (7) under these conditions might or might not be sufficiently strong to hold up the striker.

SAFETY DEVICES.

10. The only safety device in the fuze is the brass safety cap (7). This performs the same function as the safety pin in the British Service Fuze, Mine, Contact, No.3. It has, however, the somewhat doubtful advantage that when screwed fully home the tension is taken off the shear wire.

The purpose for which the immunizing collar is used by the Japanese is not quite clear. The following are possible uses:-

(a) It could be placed under the brass operating plug (1) in all mines which do not have a fuze fitted. The small tab extension with the Japanese character for 'Safe' is then an indication that the mine is not fuzed. The construction of the collar is, however, unnecessarily complicated if this were its only purpose.

(b) To immunize mines when

(1) Time is an important factor, and/or

(ii) It is necessary to lift or rearrange the mine field. The brass operating plug (1) could be unscrewed and the immunizing collar (3) slipped under it. The mine is then relatively safe for handling and short transport without removing the fuze.

(c) To render a mine field relatively safe when enemy action is not imminent.

PACKING.

11. The fuze is packed separately from the mine in a small tinned plate cylinder with a push type lid, the joint being waterproofed by a piece of adhesive tape. In some cases cylinders have been found completely covered with varnished paper.

A small brass coupling (15) is packed as shown in the drawing presumably to prevent any excessive pressure being accidentally put on the striker head. The base of the fuze is held snug in the cylinder by a wooden packing ring in two parts. 100 fuzes, each in its cylinder, are packed in a wooden case; the dimensions are given in the summary of data below.

Note:- Although the brass coupling (15) is used as a packing piece in the cylinder, this is obviously not its main function. It is screw-threaded internally at both ends with the same thread form and pitch as that used in the mine base socket. It can, therefore, be used to couple two fuzes together. The reason for coupling fuzes in this way is obscure, but it is possible that the combination is intended for booby trap use.

ACTION.

12. To arm the mine, the brass operating plug (1) and immunizing collar (3) (if present) are removed. The fuze is inserted and screwed into the base of the mine. The brass safety cap (7) is removed from the striker of the fuze; the removal of this cap allows the striker to be forced down by its spring until it is held up only by the shear wire. The brass operating plug (1) is then replaced and the mine is ready for action.

CHEMICAL ANALYSIS

13. (By the Chief Inspector of Military Explosives, Kirkee)

Filling in mine.

Outer ring	.. Cast picric acid.
Inner ring	.. Pressed picric acid powder.

Filling in fuze.

Composition in detonator (13A)	.. Fulminate of mercury.
Perforated G.P. pellet	.. Gunpowder.
Composition in gaine pellet (14A)	.. Lead azide + C.E. stemmed in.

A P P R E C I A T I O N

(Economic, development and manufacture aspects)

14. This mine and fuze is well made and probably represented requirements when it was designed, 1933. It is, however, too light for use against modern tanks, but a number of them can be used to offset this disadvantage. The size of the mine and the reported use of light shearing wires in the fuzes makes it very suitable for use as a booby trap or as a part of a booby trap system. The system of safety used in the fuze is not good, and has many disadvantages which will be clear from a study of its construction.

15. The picric acid powder exploder round the fuze to boost up the impulse from the latter is typical of the care taken by the Japanese in most methods of filling, to get a high standard of detonation.

16. SUMMARY OF DATA.

Mine.

Diameter maximum	.. 6.75 ins.
Height maximum (with operating plug and immunizing collar)	.. 2 ins.
Weight filled (less fuze)	.. 2 lbs.

Mine (contd).

Weight and nature of filling			
Outer ring	..	1 lb. 14 oz.	Precast picric acid.
Inner ring	..	- 1.4 oz.	Powdered picric acid.
Total weight	..	1 lb. 15 oz.	
Colour	..	Painted dark brown with a small red ring.	

Fuze (less brass coupling)

Length complete	..	1.8 ins.
Weight filled	..	1.5 oz.

Packing.Mines.

- 1 Mine in a small (loose lid) flat box.

Dimensions (in ins.)		Exterior.	Interior.
Length	..	7.7	7
Width	..	2.4	1.9
Weight filled	..	3 lb. 12 oz.	

- 20 Mines, each in its flat box, packed in a large wooden packing case.

Dimensions (in ins.)		Exterior.	Interior.
Length	..	32.75	31.25
Width	..	9.25	7.8
Weight filled	..	95 lb. (approx.)	

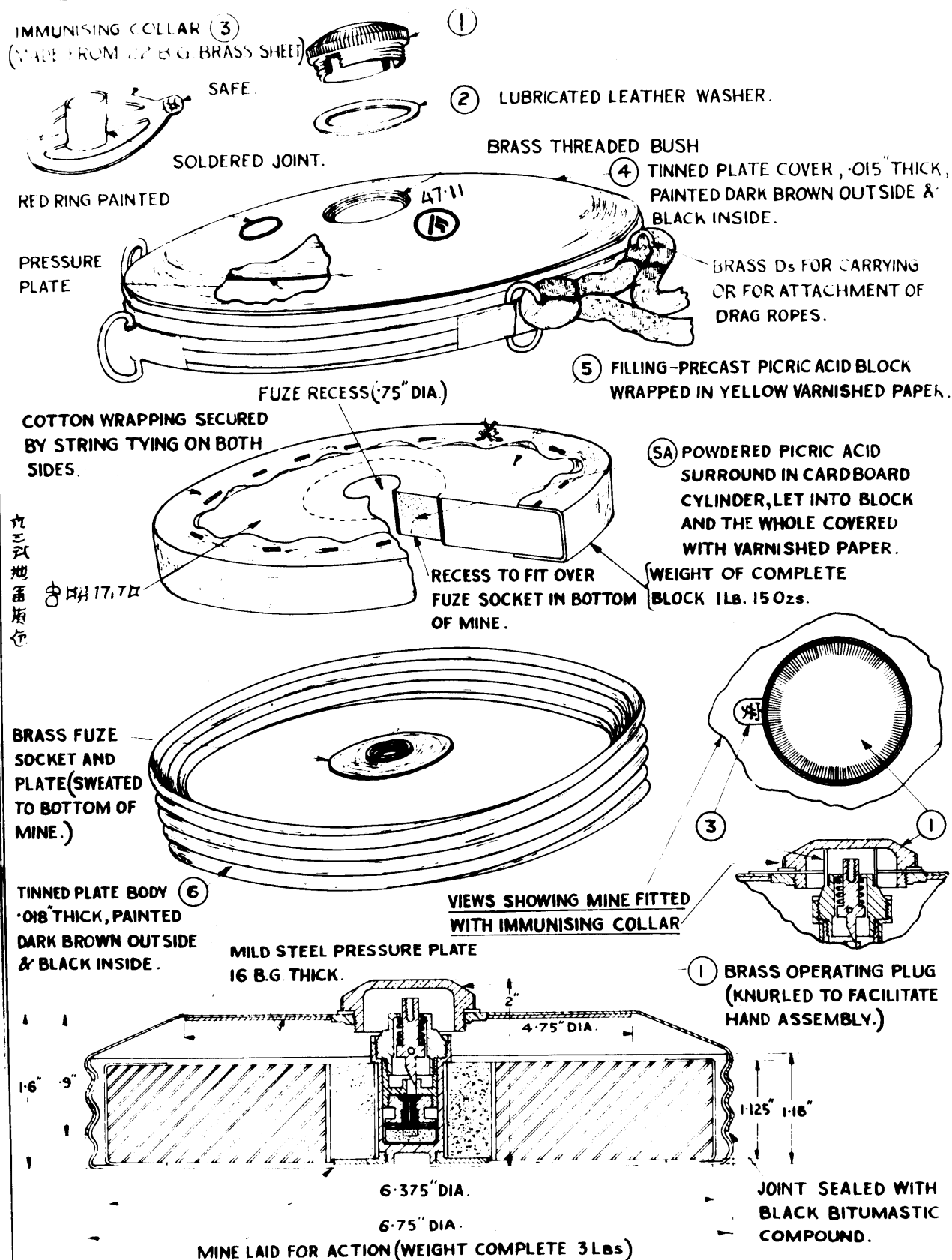
Fuzes.

- 1 Fuze in a tinned plate cylinder.

Dimensions (in ins.)		
Length	..	1.9
Diameter	..	0.9
Weight filled	..	2 oz.

- 100 Fuzes, each in its cylinder, packed in a wooden packing case.

Dimensions (in ins.)		Exterior.	Interior.
Length	..	27.5	22.75
Width	..	12	10.6
Weight filled	..	30 lb. (approx.)	



GENERAL ARRANGEMENT

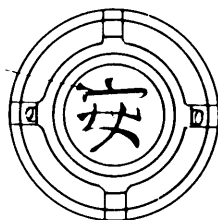
JAPANESE TYPE '93', A.T. MINE.

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KIRKEE SEPT. 1944

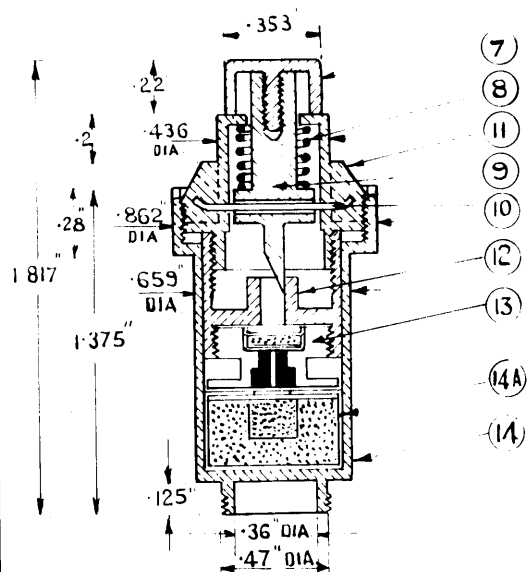
DETAILS OF FUZE

ASSEMBLY SEQUENCE OF COMPONENTS.

'SAFE'

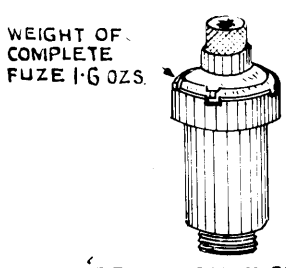


NOTE:-
COMPONENTS HAVE BEEN
BROKEN TO SHOW INTERNAL
CONSTRUCTION.



- DETONATOR (13A)
- COPPER CUP
- TINFOIL DISC
- (13) DETONATOR HOLDER
- PAPER WRAPPING
- TINFOIL DISC
- (14A) GAINIE PELLET
- COPPER CLOSING DISC
- FULMINATE OF MERCURY COMPOSITION
- G.P. PELLET PERFORATED
- PAPER PERFORATED DISC
- LEAD AZIDE } 27.3
- C.E. STEMMED IN } GRAINS

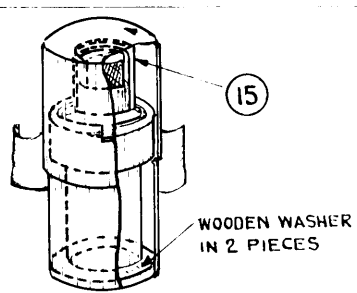
- (15) BRASS COUPLING
- 'SAFE'
- (7) BRASS SAFETY CAP (FITTED TO FUZE DURING TRANSIT)
- (11) STEEL STRIKER HOLDER
- (10) COPPER SHEAR WIRE (14 S.W.G)
- (8) STEEL SPRING
- (9) STEEL STRIKER
- (12) BRASS STRIKER GUIDE
- (13A) DETONATOR
- (13) BRASS DETONATOR HOLDER (WITH CHANNEL BELOW FOR GUNPOWDER)
- (14A) GAINIE PELLET
- (14) BRASS FUZE BODY



WEIGHT OF
COMPLETE
FUZE 1.6 OZS.

'93 MINE FUZE, COMPLETE
WITH SAFETY CAP.

FUZES ARE PACKED
SEPARATELY FROM
MINE.



TIN CYLINDER FOR FUZE,
SEALED WITH TAPE BAND.



LABEL - PAPER

DETAILS OF FUZE FOR JAPANESE TYPE '93 ANTI-TANK MINE.

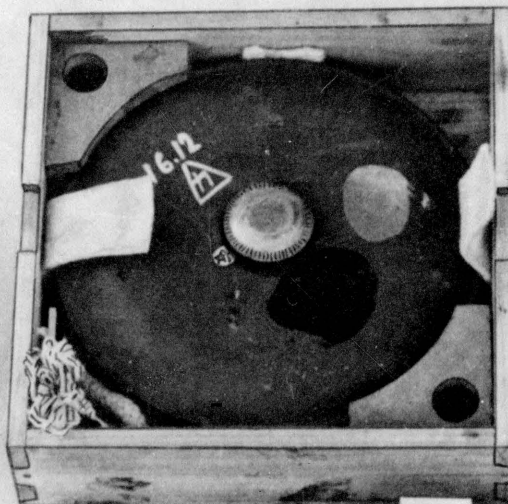
C.I. AMM (S) 798.
KIRKEE. SEPT. 1944

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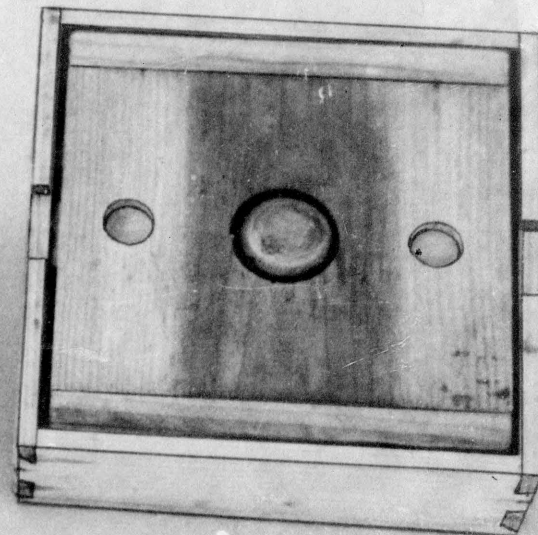
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JAPANESE ANTI-TANK MINE TYPE '93.
(TYPICAL PACKING)

C.I. AMM. S/ 904.
KIRKEE. OCT. 1944.