

Restricted

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D.

LEAFLET D 1.

INTRODUCTION

This Section is intended to cover all shell and projectiles fired from dischargers (except grenades which are dealt with in Section C), all mortar bombs, and rocket projectiles. The following division of the Section has been arranged tentatively:—

- D 1—Introduction.
- D 2—Reserved.
- D 3—50 mm. Dischargers—General Notes.
- D 4—Finned Bangalore Torpedo (Already issued).
- D 5—Reserved.
- D 6—2½-Kg. Spigot Charge. (Already issued).
- D 7—Bomb, H.E., 320 mm. Spigot Mortar (335-Kg.) (Already issued).
- D 8—Ammunition for the 50-mm. Type '89 Discharger (Rifled).
- D 9—Ammunition for the 70-mm. Type Taisho 11 Discharger (Rifled).
- D 10—Ammunition for the 70-mm. Barrage Mortar (Smooth Bore).
- D 11—Reserved.
- D 12—Reserved.
- D 13—M.L. Mortars—General Notes.
- D 14—M.L. Mortar Bomb Fuzes.
- D 15—Ammunition for the Mortar, M.L., 81-mm.
- D 16—Ammunition for the Mortar, M.L., 82-mm. (Chinese).
- D 17—Ammunition for the Mortar, M.L., 90-mm.
- D 18—Ammunition for the Mortar, M.L., 120-mm.
- D 19—Ammunition for the Mortar, M.L., 150 mm.
- D 20—Reserved.
- D 21—Reserved.
- D 22—Reserved.
- D 23—Reserved.
- D 24—Reserved.
- D 25—Rocket Projectile 12-cm. H.E./Incendiary.
- D 26—Reserved.
- D 27—Rocket Projectile 60-Kg. H.E.
- D 28—Reserved.
- D 29—Rocket Projectile 20-cm. H.E.
- D 30—Reserved.
- D 31—Rocket Projectile 250-Kg. H.E.
- D 32—Reserved.
- D 33—Rocket Projectile 45-cm. H.E.

IDENTIFICATION

2. To assist quick identification of the many different types of projectiles and their fuze combinations, a Summary of the more common discharger, mortar and rocket projectiles is included at the end of this leaflet. Comparative illustrations of the different projectiles are included as Plates A to H. As the Finned Bangalore Torpedo, 2½-Kg. Spigot Charge, and 320-mm. Spigot Mortar Bomb have been described in detail in J. A. Ls. D. 4, D. 6 and D. 7 respectively, they have been omitted from the Plates.

3. Drawings of the more common fuzes also have been shown in the charts as it may be some time before detailed J. A. Ls. on each type of ammunition can be issued. The action of these fuzes is detailed briefly below :—

Fuze, Percussion, D.A., Type '88 (Small)—Plate 'A'.

4. On discharge, the set-back ferrule sets back over the retaining ferrule compressing the three spring projections and locking itself by means of these projections to the retaining ferrule. At the same time, by means of the sliding piece, the lower spring is compressed by the ferrule setting back. After the initial set-back, when acceleration decreases, the set-back ferrule and retaining ferrule move forward together under force of spring freeing the brass segments which fly outwards owing to centrifugal force. The striker is then held off the cap only by the spring and functions normally on impact.

Fuze, Time, Type '89 (Small)—Plate 'A'.

5. The fuze is initiated by the shock of discharge and operates after the set time interval. The powder in the lower time ring burns in a clockwise direction, that in the upper ring in an anti-clockwise direction.

Fuze, Percussion, Graze (with Optional Delay) Type '93—Plate 'E'.

6. The fuze, may be used either with slight delay or without. If slight delay is required the head portion of the fuze is unscrewed and a delay plug inserted on top of the lead washer and the head portion screwed back again. This delay plug is packed with the fuze in its cylinder.

7. On firing, the complete detonator and striker assembly housing sets back about $\frac{1}{4}$ inch, shearing the light copper shear wire on which they were suspended. This leaves the detonator together with the small sliding piece free to move forward on graze (any slight check). During flight the complete housing is kept back by air pressure on the nose of the bomb, while the detonator is kept off the striker by the light creep spring. This enables greater certainty of functioning on impact or graze. On impact or graze the detonator sets forward, overcoming the light creep spring, to initiate the bomb.

8. If the set-back force is insufficient to cause the shear wire to shear, such as might happen with a low charge or for other reasons, this wire will shear in any case on impact. The assembly housing will be forced inwards freeing the sliding piece and allowing the detonator to set forward on to the striker.

9. The fuze is therefore extremely quick-acting for antipersonnel use, but must be fitted with the delay plug for use against light earthworks etc. where a slight delay is required.

Fuze, Percussion, Graze (with Optional Delay) Type 100—Plate 'E'.

10. The action of this fuze is identical with that of the Type '93 fuze above.

Fuze, Time and Percussion, Type 3 (for Mortar Bombs)—Plate 'E'.

11. After setting, the safety clip is removed; on firing the time striker sets back on to the time detonator, overcoming its spring. This ignites the delay composition in the T-shaped channel, which in turn, after a short delay, ignites the combustible arming collar of Nitro-cellulose. This burns away igniting the time ring composition and arming the percussion striker. When the fuze is set for air burst, after the predetermined time has elapsed, the flash from the time ring travels via the G. P. in the flash channel to the booster pellet, igniting it and initiating the main filling in the gaine. When the fuze is set for percussion or, if impact occurs before the elapse of the set time, the percussion striker on impact will be driven on to its detonator thus initiating the gaine direct.

Fuze, Percussion, D.A. (with Optional Delay) Chinese—Plate E.

12. On firing, the arming sleeve sets back compressing the arming spring and jams over the locking ferrule. This frees the arming ball which moves out and leaves the inertia pellet free (unlocked) to move forward during downward flight of the bomb. The inertia pellet may move forward sufficiently during flight for the two locking balls to be parted by the striker shank thus locking the inertia pellet. Or, on impact the inertia pellet sets forward while at the same time the striker is driven in, compressing its spring, the shank passing down to separate the two locking balls forcing them out into the recess at the top of the inner body, thus locking the inertia pellet and ensuring positive penetration of the detonator by the striker point. The flash from the detonator travels down to ignite the G. P. booster in the gaine. In the drawing a straight through channel is provided for the flash, i.e. the fuze is shown set instantaneous. If delay is required the selector is turned through 90° (screw-driver slot horizontal). In this case the flash has to travel through a staggered channel filled with pressed G. P. which introduces a slight delay in the functioning.

13. The items marked with a "V" in the Summary and Plates have been critically examined at Kirkee and the details given are definitely correct. Details of other items have been based on reports, mainly American and Australian, which have been carefully cross-checked for correctness.

STANDARDIZATION AND TYPES

DISCHARGERS

14. The term "Discharger" is applied to a group of weapons which project a shell, flare or other projectile. They are really a class of mortars but the term "Discharger" is preferable to distinguish them from the more orthodox trench mortar which is also used. The Japanese usually distinguish them from their orthodox mortars by a special name, the nearest literal translation of which in English is "Discharger".

15. There are two calibres of Dischargers, 50-mm. and 70-mm. The former comprises a number of different types which are detailed in sheet 1 of the Summary. These 50-mm. Dischargers will be dealt with in detail in J. A. L. D 3. The ammunition used in Dischargers is detailed in Sheet 1 of the Summary with the exception of grenades which are dealt with in J. A. L. C 1 (Serials 1, 3 and 13). Comparative illustrations are also given of those items not already dealt with in other J. A. Ls.

16. Two Dischargers (or Mortars) in the 70-mm. calibre are used by the Japanese. They are of old design and from reports it would seem that they are at least obsolescent. The Type Taisho 11 (Eleventh Year Type) rifled Discharger is very similar in principle to the 50-mm. Type '89 Discharger and fires a H. E. shell of the same general design as the 50-mm. H. E. shell, Type '89. The Discharger is, however, more elaborate and has mechanism for elevating and traversing incorporated. It is in fact a rifled mortar and is described frequently in reports as a mortar.

17. The 70-mm. Barrage Mortar (or Discharger) appears to be intended mainly for A. A. use. It is a crude weapon consisting of a spike, a base and a smooth-bore tube. The spike is driven into the ground to give the tube the elevation required and the A. A. projectile is gravity fired. The intention presumably is to have a large number of these mortars to put up a concentrated barrage of small parachute supported H. E. charges. A drawing of the shell is given in Plate B which illustrates the general principle. It will be appreciated that if any of these explosive cylinders are found lying about they must be handled very carefully. A kick or an attempt to lift the explosive cylinder may function igniter and cause it to explode.

MORTARS

18. The main calibres of mortars used by the Japanese are 81-mm., 90-mm. and 150-mm. A mortar of Chinese origin of 82-mm. calibre is also believed to be used by the Japanese. Reports of a 120-mm. mortar have also been received. This is a Naval type and so far as is known this calibre is not used by the Army. 320-mm. calibre is a spigot mortar and owing to its large weight and size, can only have a restricted use.

Ammunition for mortars is detailed in Sheets 3 and 4 of the Summary. It will be seen that there are different types of mortars in each calibre and also different types of bombs. As can be expected, it is very difficult to state definitely what bombs are interchangeable and whether all types of mortars of a certain calibre take all bombs of that calibre. So far as possible, however, this information has been collated and detailed in the Summary.

19. Some additional points are mentioned below:—

(a) It is understood that the old system of band marking for Japanese mortar bombs was to put the yellow band below the guide bands and a white band just above the tail unit. All bombs examined at Kirkec have been found painted black with the usual red band at the mouth and yellow band just above the guide bands.

(b) Although in Sheet 3 of the Summary the 81-mm. mortar bomb is shown as taking the Type 100 fuze, there is reason to believe that in certain types of 81-mm. bombs the Type '93 fuze is used. It will be seen from Serial Nos. 18 and 19 on Plate E that the intrusion of the Type '93 fuze is greater than that of the Type 100 fuze and a difference in the method of filling is necessary for the former to be fitted. The fuzes are not interchangeable. All 81-mm. mortar bombs examined at Kirkec were found to take the Type 100 Fuze.

Although a heavy 81-mm. H. E. bomb (14-lbs. 5-ozs.) has been reported, there are very few details available. So far as is known, none has been used in the Burma Theatre.

(c) There appears to be very little information available regarding the 81-mm. Naval Mortar (Type 3), but so far as can be seen it is distinct from the Army 81-mm. types, and the ammunition is not intended to be interchangeable, although it is thought, it could be used in any 81-mm. mortar.

(d) The calibre of the Chinese 82-mm. mortar bomb is slightly larger than that of the Japanese 81-mm. mortar bombs and it is thought that the Chinese mortar must have a slightly larger bore. The same method of ignition is used and it is possible that the Japanese bombs could be fired from the Chinese mortar but not vice versa. Owing to poor sealing with the smaller bomb a considerable loss of range is to be expected.

(e) Both in the 90-mm. and 150-mm. calibres two different types of bombs have been reported. In the 90-mm. calibre the reason for the different type of bomb is not clear. It is possible that one may be an older type.

In the 150-mm. calibre one bomb is of a heavy type (56½-lbs. containing 14-lbs. of T. N. T.) while the other is a much lighter bomb (43½-lbs. containing 8½-lbs. of H. E.) probably intended for long range work.

(f) Artillery Mortars of 125-mm., 230-mm. and 280-mm. have been reported but there appears to be no definite evidence of ammunition having been found. An experimental type of 120-mm. Mortar has been reported and described as one of the chief chemical warfare weapons. It fires either H. E. or C. W. projectiles but only the H. E. round is reported as having been recovered. A 200-mm. Mortar described as a copy of a Russian model has been also reported.

(g) Recently some Chinese 150-mm. Mortar Bombs have been received for examination at Kirkec. The mean maximum diameter over guide bands is 6 inches and it is probable that they cannot be fired from Japanese 150-mm. mortars. The following details will enable the Chinese bombs to be distinguished from Japanese 150-mm. mortar bombs.

Length fuze	... 26 $\frac{1}{16}$ inches.
Maximum diameter	... 6.00 inches.
Length of bomb without plug or fuze	... 23 $\frac{1}{8}$ inches.
Weight of bomb fuze	... 48 lbs. 8 $\frac{1}{2}$ ozs.
Weight of bomb plugged	... 48 lbs.
Weight of fuze	... 8 $\frac{1}{2}$ ozs.

The Chinese bombs are distinctive also owing to the brass nose adapter and the absence of coloured bands. The body externally is heavily varnished with crude varnish.

The fuze is similar to that used in the Chinese 82-mm. bomb, shown as Serial 20 in Plate E but differs as follows:—

(i) No optional delay selector.

(ii) No markings on the fuze body.

(h) Although the 120-mm. mortar is reported to be primarily a Naval weapon, it seems to be used by the Army also. Some 120-mm. mortar bombs of Japanese manufacture recently captured in the Burma area have just been received in Kirkec for examination. The following brief details will be useful:—

Length of bomb fuze	... 24-in.
Length of bomb without fuze	... 22.52-in.
Diameter (one bomb only examined)	... 4.7-in.

Weight of bomb fuze	...	26-lbs. 8-ozs.
Type of fuze	...	Fuze percussion graze (with optional delay) Type '100.
Details of tail unit	...	6 vanes spot welded forming 12 fins. Ignition holes are placed well forward of vanes.
Markings	...	Body painted black. No colour bands.
Plug	...	Plastic.
Primary cartridge	...	Primer Type 'C' (J. A. L. E. 2) with steel body oil blackened below which is the igniter cartridge.

The Japanese 120-mm. mortar bomb closely resembles in design the German 12-cm. mortar bomb 42 (12-cm. Wgr. 42) which is based on Russian design. The shape of tail, method of ignition and form of primary and secondary charges are very similar. It is probable that the Japanese and German bombs are interchangeable. The following details of the German 120-mm. H. E. bomb may be useful for comparison:—

Overall length	...	28.4-in.
Maximum diameter	...	4.7-in.
Weight fuze	...	34.75-lbs.

20. It will be of interest to mention that in addition to the standard 2-round box the Japanese use a 20-round box which appears to be improvised packing for certain 81-mm. bombs the origin of which is not at the moment clear.

This box contains ten 81-mm. H. E. fuze bombs painted black but with the adapter painted yellow and ten fuze American bombs with the original yellow body colour. The bombs of American manufacture were fuze P. D. M52 G2 and filled T. N. T. They were packed in special cardboard containers which had a label marked "G-8 mrt. nr. 3 gec. Al-40". It would seem that these bombs are of American origin although "G2" stamped on the fuze after "P. D. M52" is not, so far as we know, a common American marking.

The ten bombs painted black were packed loose, i.e. not in containers, but were held in position by packing pieces. They were very similar in design and construction to the Japanese 81-mm. mortar bombs although in colour and finish they appeared superior. The fuzes were quite different from either American or Japanese fuzes but very similar to fuzes used in Italian 81-mm. H. E. mortar bomb. From a brief examination it is thought that the bombs may be of French or Italian origin. Full details will be issued in due course in a detailed J. A. L.

21. **Interchangeability.**—The Japanese counterpart of our 3-in. Mortar is their 81-mm. Mortar. Incidentally ammunition for the German, Italian and Japanese 81-mm. M. L. Mortars is interchangeable with ammunition for the British 3-in. M. L. Mortar with certain restrictions.

(a) The striker stud in the 3-in. Mortar has a flat blunt nose; its function only being to force the striker clip on to the primary cartridge. The foreign mortars, however, have a comparatively sharp pointed striker and the primary cartridge is not fitted with a striker clip, the striker fires the primary cartridge cap direct. While British 3-in. mortar ammunition could be fired from the foreign 81-mm. mortars, foreign ammunition cannot be fired from the 3-in. mortar unless the striker stud is modified by giving it a sharp point. The question of modifying spare striker studs of British 3-in. mortars to enable Japanese ammunition to be fired is under consideration.

(b) The windage using foreign 81-mm. mortar bombs in the 3-in. mortar is small and it is necessary to ensure that the barrel is thoroughly clean before using 81-mm. bombs. Barrels will also have to be cleaned frequently to avoid the tendency of bombs to stick in the barrel or, owing to the increased friction, to give a high incidence of misfires, particularly at angles below 60°.

ROCKETS

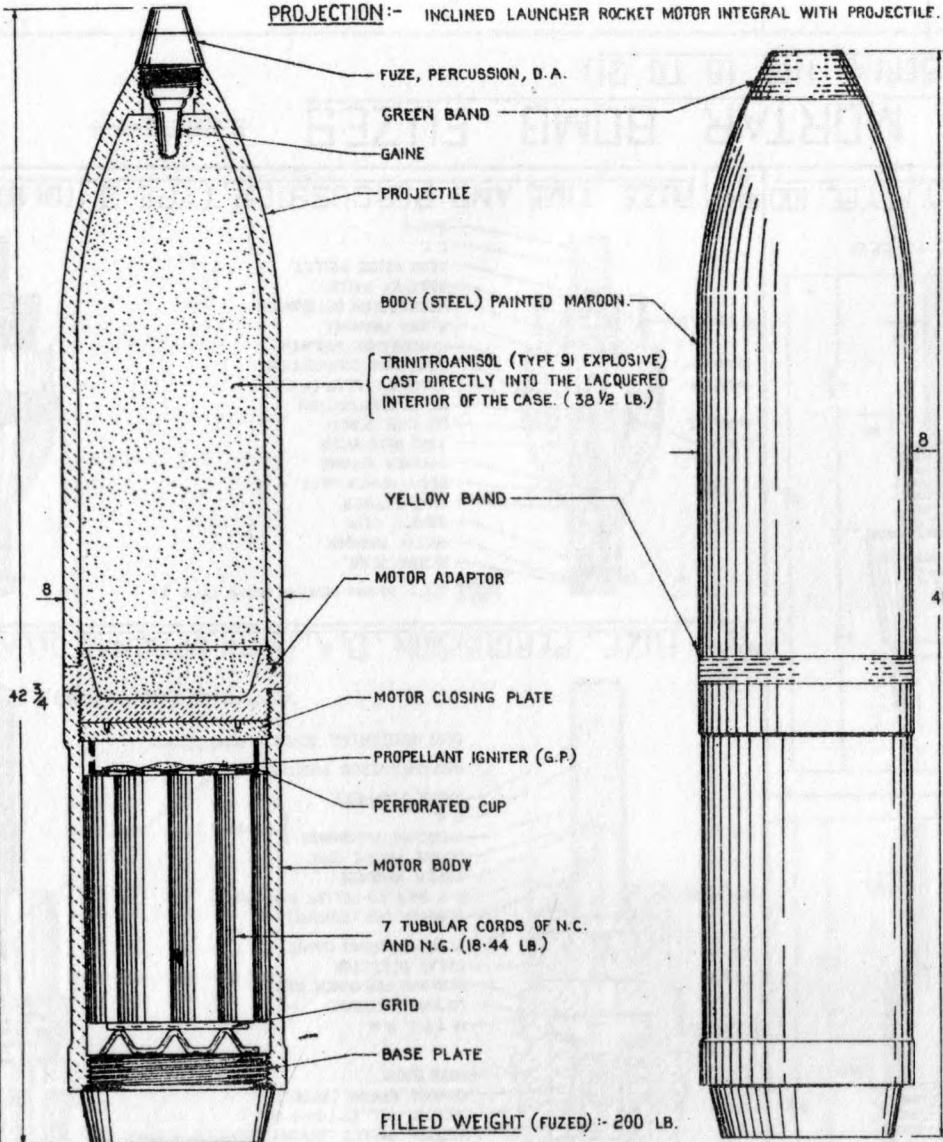
22. The last year has seen an increasing use of rocket projectiles although no reports have yet been received of these being used in the Burma Theatre. The only Army type of rocket projectiles used appear to be adaptations of aircraft bombs. This appears to be an effort to project aircraft bombs by means of rockets to make up for their inability to make use of dive bombing, strafing, etc.

23. The other three rocket projectiles are of Naval origin and have been specially designed as rocket projectiles. General details of rocket projectiles are given briefly in Sheet 5 of the Summary, and brief drawings are shown in Plates F, G and H to facilitate recognition and disposal until such time as detailed J. A. Ls. can be issued.

24. Since compiling the Summary a report has been received of an "8-cm. (A.P.) Rocket Projectile". Details reported are:—

Diameter	...	75-mm.
Length	...	16.1-ins.
Weight	...	12.32-lbs.
Weight of H. E. filling	...	1.1-lb.
Weight of Propellant	...	1.1-lb.

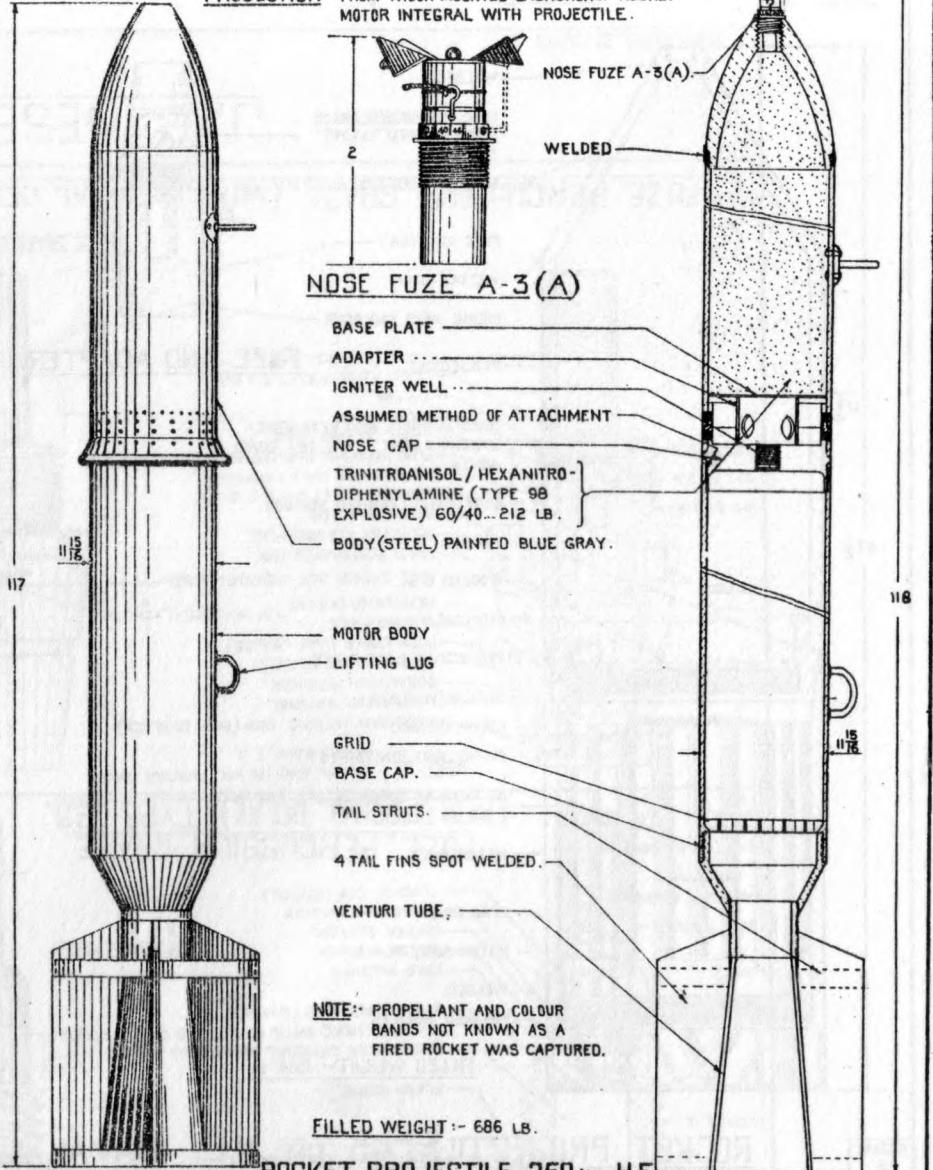
PROJECTION:- INCLINED LAUNCHER ROCKET MOTOR INTEGRAL WITH PROJECTILE.



SERIAL 24

ROCKET PROJECTILE, 20 CM., H.E. (NAVAL)

PROJECTION:- FROM TRUCK MOUNTED LAUNCHERS. ROCKET MOTOR INTEGRAL WITH PROJECTILE.



SERIAL 25

ROCKET PROJECTILE, 250 kg. H.E. (MODIFIED NAVAL TYPE '98, 250 Kg., A/C. BOMB).

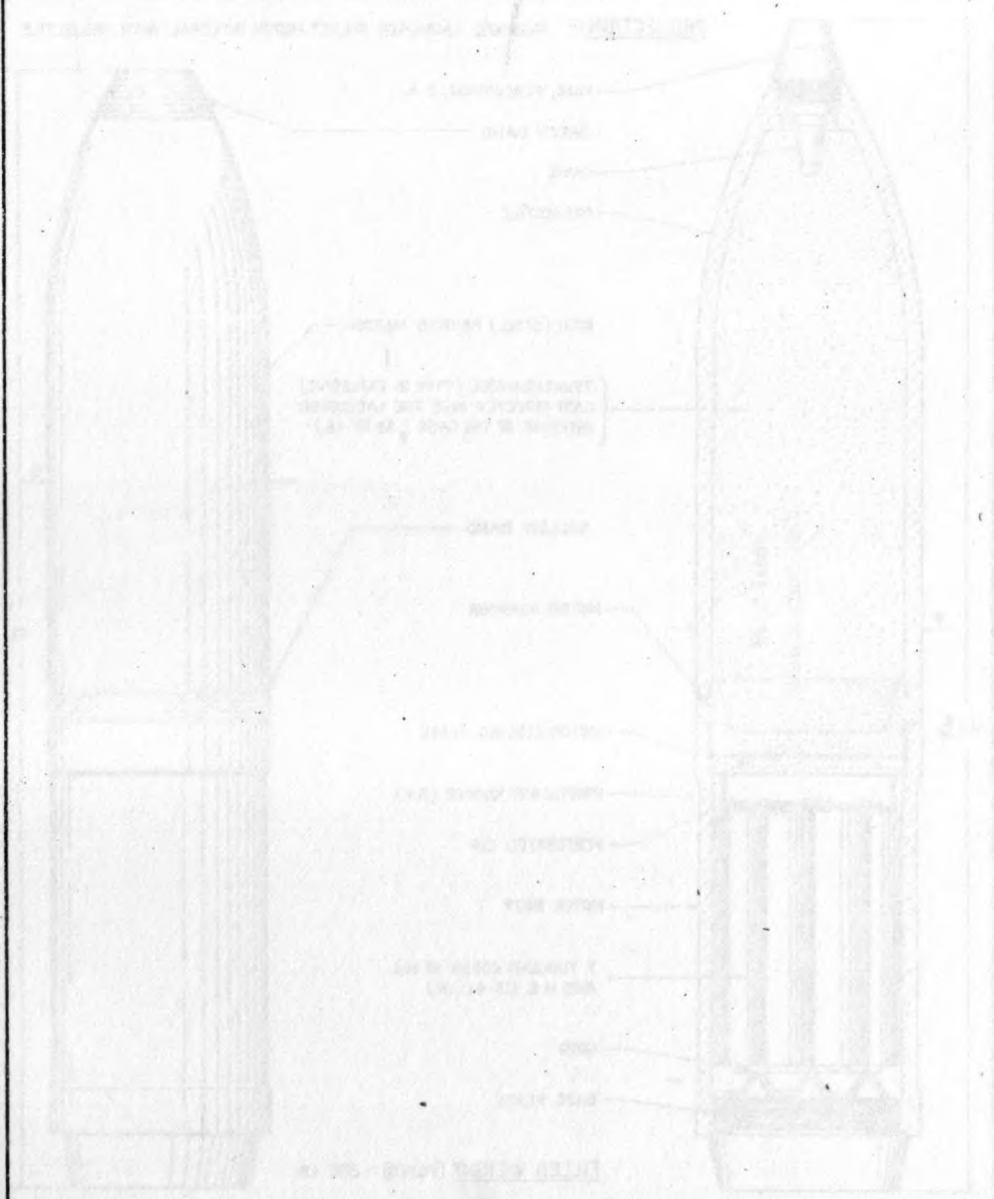
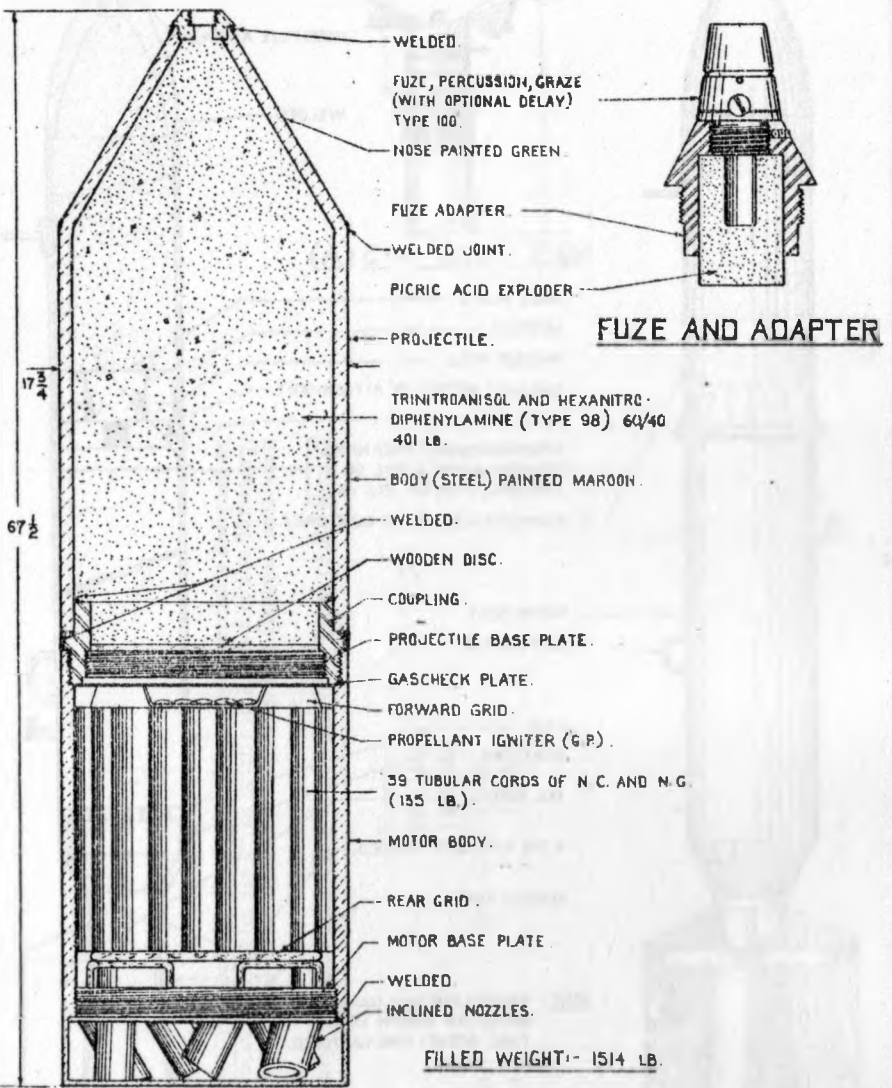
JAPANESE ROCKET AMMUNITION

(SERIAL NOS 24 & 25).

DIMENSIONS IN INCHES:

C.I. AMM 2/219
REVISED JULY 46

PROJECTION:- FROM AN INCLINED LAUNCHER.



SERIAL 26

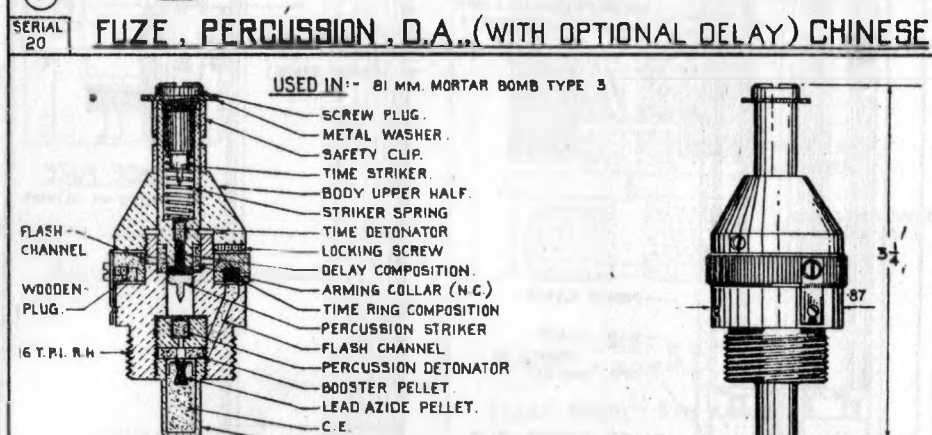
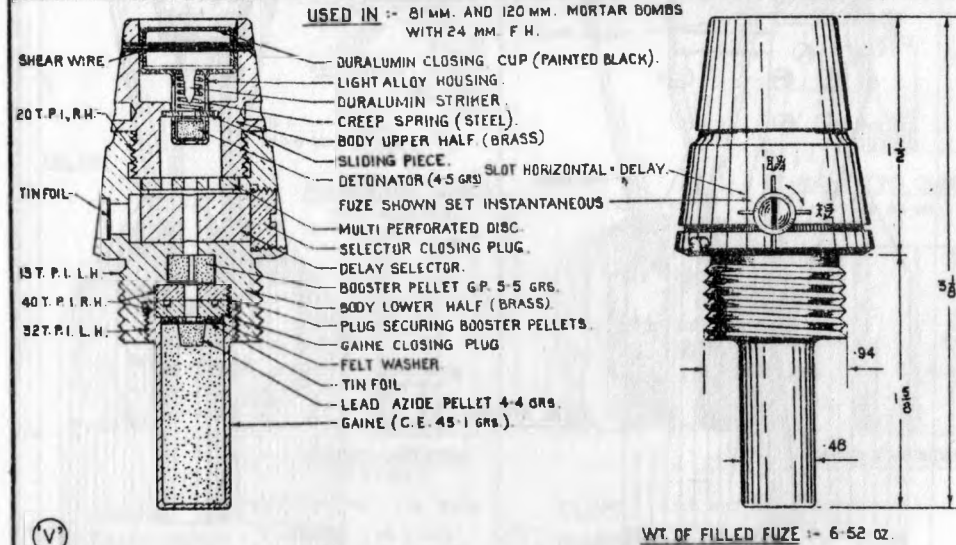
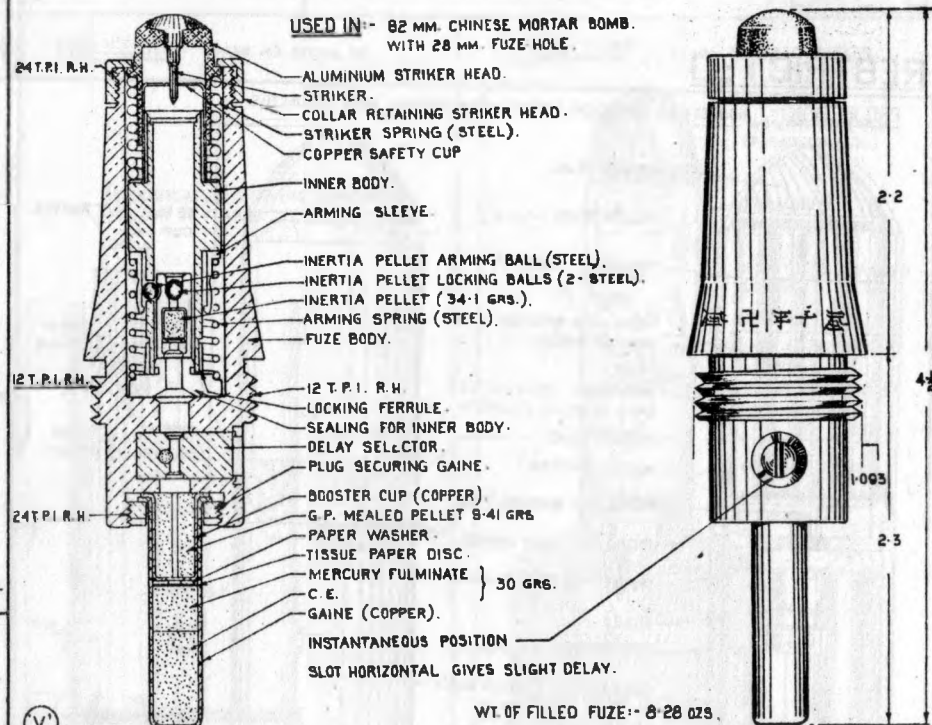
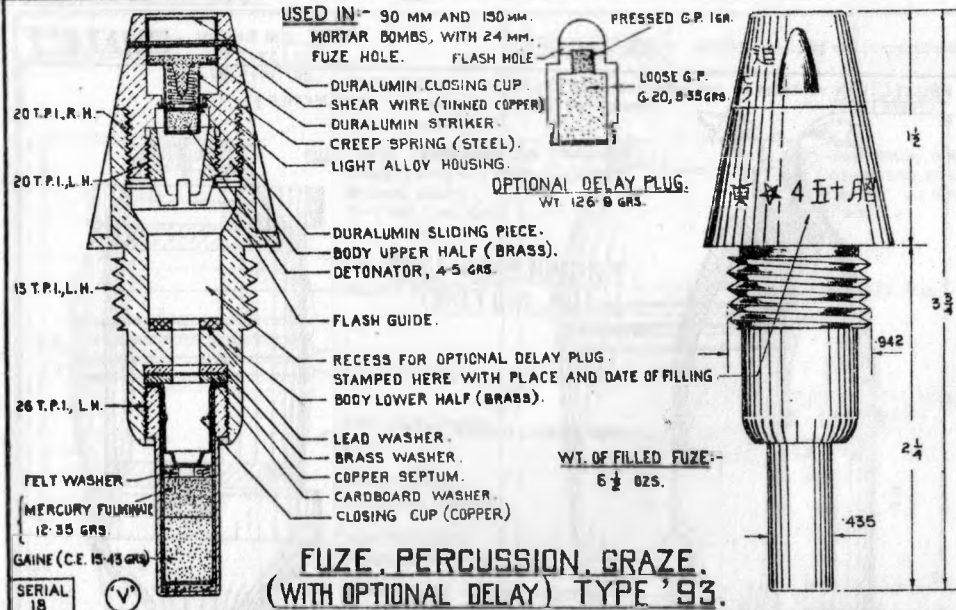
ROCKET PROJECTILE, 45 CM., H.E., (NAVAL).

JAPANESE ROCKET AMMUNITION.

(SERIAL No 26).

DIMENSIONS IN INCHES.

C.I. ANN. 5/1220
MIRKEE JULY 45



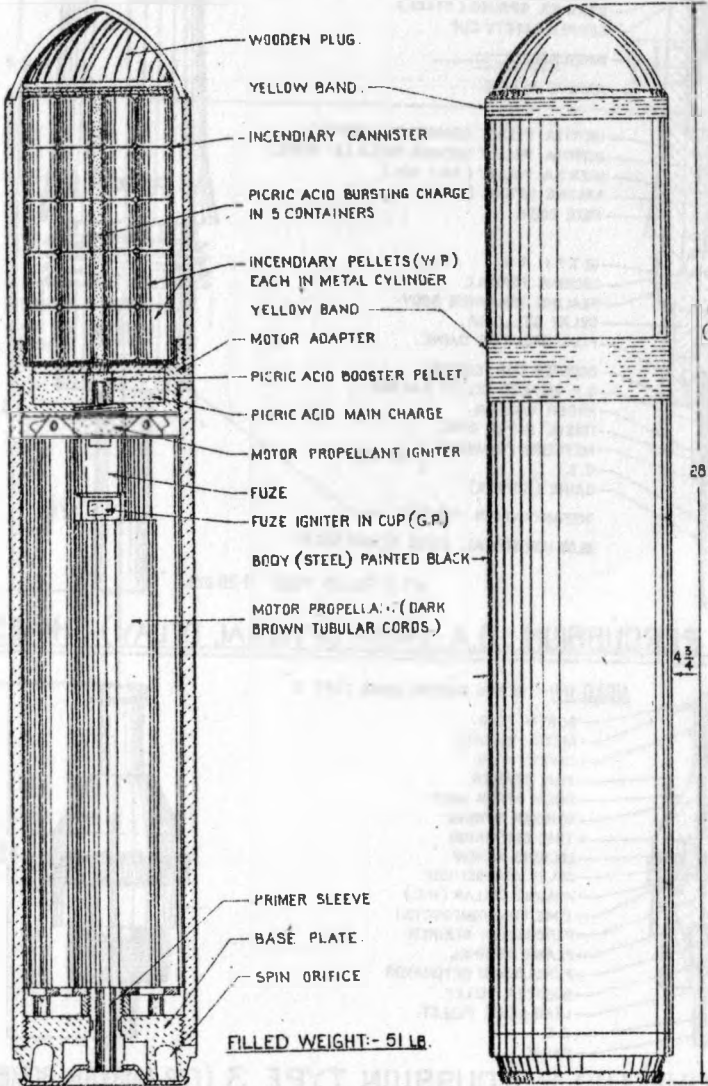
JAPANESE MORTAR BOMB FUZES.

(SERIAL NOS 18 TO 21).

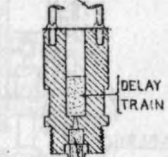
RESTRICTED.

PLATE 'F'

PROJECTION:- ADJUSTABLE LAUNCHER. ROCKET MOTOR INTEGRAL WITH PROJECTILE.



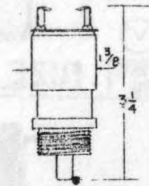
TO TAKE FUZE IGNITER CUP.



GAINE (BELIEVED TO BE) FLASH PELLET.

28 9/16

4 3/4



BASE FUZE
FILLED WT. - 14 1/4 OZS.

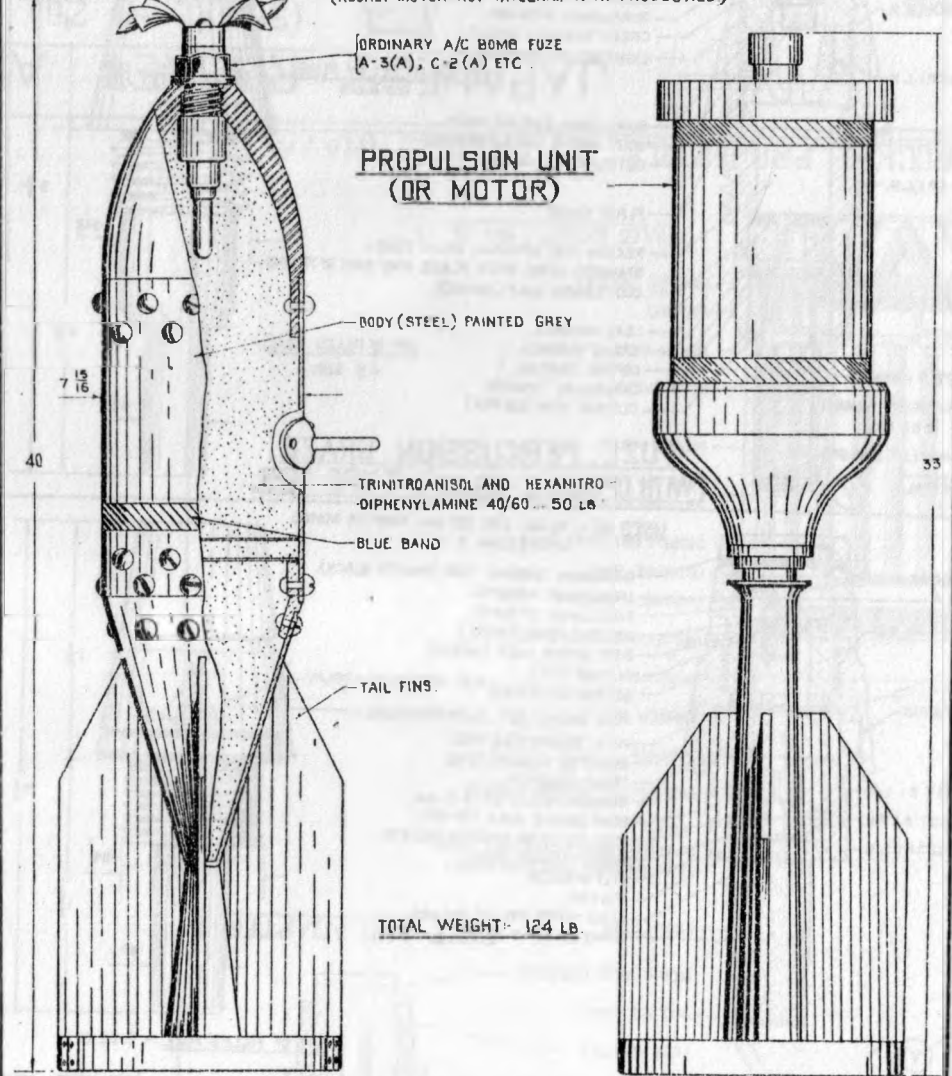
FILLED WEIGHT:- 51 LB.

SERIAL 22

ROCKET PROJECTILE, 12 cm. H.E./INCENDIARY. (NAVAL)

SERIAL 23

PROJECTION:- FROM AN INCLINED LAUNCHER (ROCKET LAUNCHER TYPE 3)
(ROCKET MOTOR NOT INTEGRAL WITH PROJECTILE)



ORDINARY A/C BOMB FUZE
A-3(A), C-2(A) ETC.

**PROPULSION UNIT
(OR MOTOR)**

BODY (STEEL) PAINTED GREY

TRINITROANISOL AND HEXANITRO-
DIPHENYLAMINE 40/60 - 50 LB

BLUE BAND

TAIL FINS.

TOTAL WEIGHT:- 124 LB.

ROCKET PROJECTILE, 60 Kg. H.E.
(NAVAL 30kg. TYPE 97, A/C. BOMB ADAPTATION)

JAPANESE ROCKET AMMUNITION.

(SERIAL NOS 22 & 23)

DIMENSIONS IN INCHES.

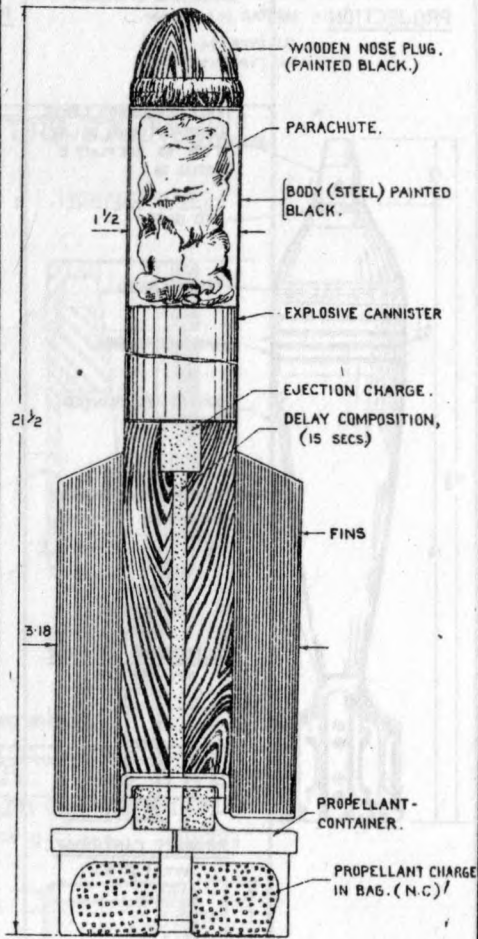
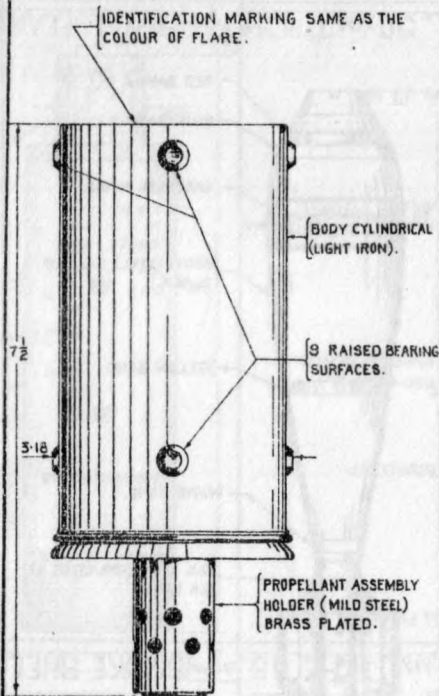
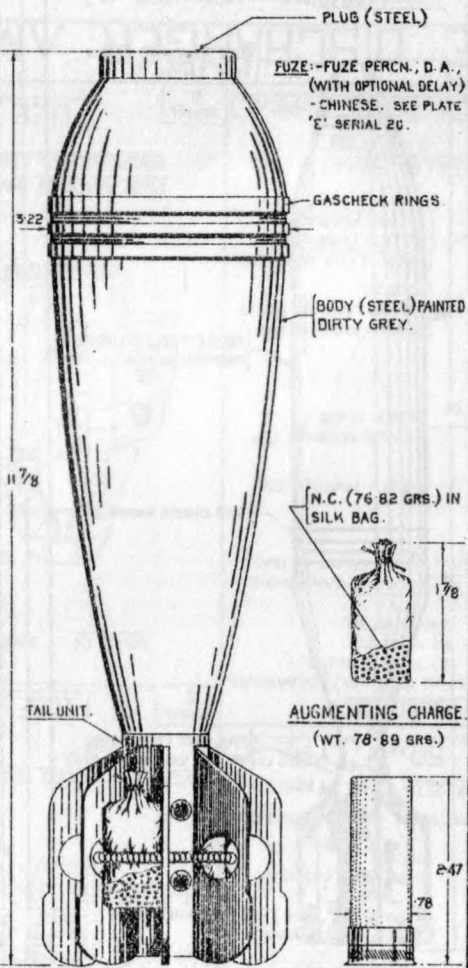
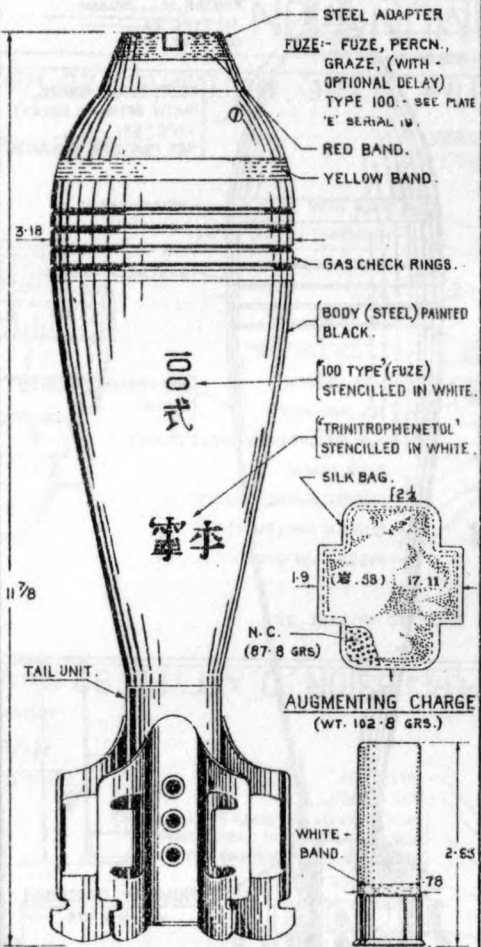
C. I. AMM. 5/29
KIRKEE, JULY '45

PROJECTION:- MORTAR M.L., 81 MM.
(U) TYPE '87.
(W) TYPE '89.

PROJECTION:- MORTAR M.L., 82 MM. (TYPE NOT KNOWN)

PROJECTION:- SAME AS SERIAL 10.

PROJECTION:- 81 MM. BARRAGE MORTAR.



FILLING:- TRINITROPHENETOL 1 LB. 2 OZS.
FILLED WEIGHT:- (PLUGGED)- 7 LB. 1 1/2 OZS.
(FUZED) - 7 LB. 6 1/2 OZS.
SERIAL 10 H.E. BOMB, 81 MM., (SMALL)

FILLING:- T.N.T. AND POT. NITRATE (11 OZS.)
FILLED WEIGHT:- (PLUGGED) 8 LB. 3 1/2 OZS.
(FUZED) 8 LB. 11 1/2 OZS.
SERIAL 11 H.E. BOMB, 82 MM. (CHINESE)

FILLING:- PYROTECHNIC COMPOSITION.
SERIAL 12. SIGNAL FLARE, 81 MM.

FILLING:- 1 BLOCK OF C.E. } 4 OZS.
2 BLOCKS OF T.N.T. }
FILLED WEIGHT:- 3 LB. 14 OZS.
SERIAL 13. H.E. A.A. BARRAGE SHELL, 81 MM.

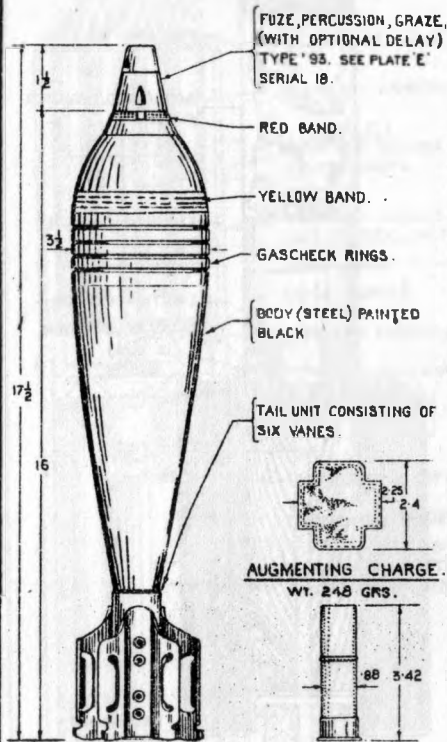
JAPANESE MORTAR AMMUNITION.
(SERIAL NOS 10 TO 13.)

DIMENSIONS IN INCHES.

C.I. AMNS/215
KIRKEE JULY '45

PROJECTION:- MORTAR M.L., 90 MM.

(A) TYPE '94.
(4) TYPE '97.



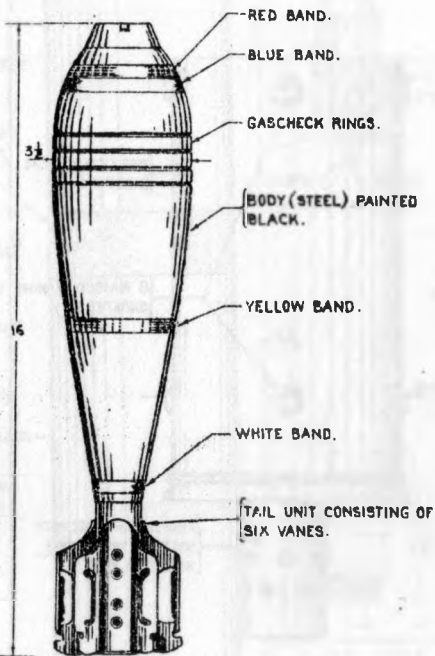
AUGMENTING CHARGE.
WT. 2.48 GRs.

PRIMARY CARTRIDGE.
WT. 1.55 OZ.

FILLING:- T.N.T. 2 LB. 5 OZs.

WEIGHT FILLED AND FUZED:- 11 LB. 6 1/2 OZs.

PROJECTION:- SAME AS SERIAL 14.

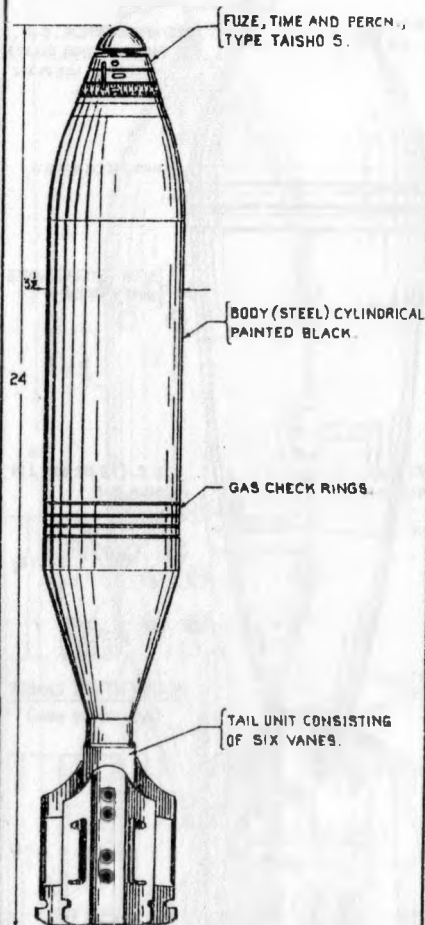


FILLING:- ABOUT 40 RUBBER PELLETS IN A SOLUTION OF WHITE PHOSPHORUS AND CARBON DISULPHIDE (2 LB. 3 1/2 OZs.)

FILLED WEIGHT:- (PLUGGED) 11 LB. 3 1/2 OZs.
(FUZED) 11 LB. 9 1/2 OZs.

FOLD HERE

PROJECTION:- SAME AS SERIAL 14.

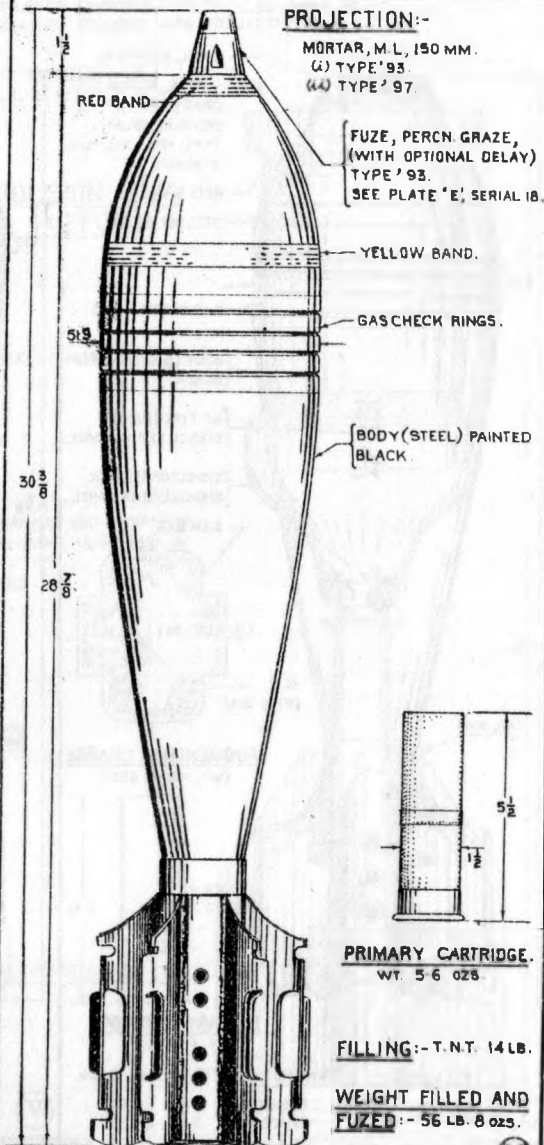


FILLING:- HEXACHLORETHANE COMPOSITION.
4 LB.

WEIGHT FILLED & FUZED:- 19 LB. 6 1/2 OZs.

PROJECTION:-

MORTAR, M.L., 150 MM.
(A) TYPE '93
(4) TYPE '97.



PRIMARY CARTRIDGE.
WT. 5.6 OZs.

FILLING:- T.N.T. 14 LB.

WEIGHT FILLED AND FUZED:- 56 LB. 8 OZs.

SERIAL 14 H.E. BOMB, 90 MM., (LONG)

SERIAL 15 INCENDIARY BOMB, 90 MM.

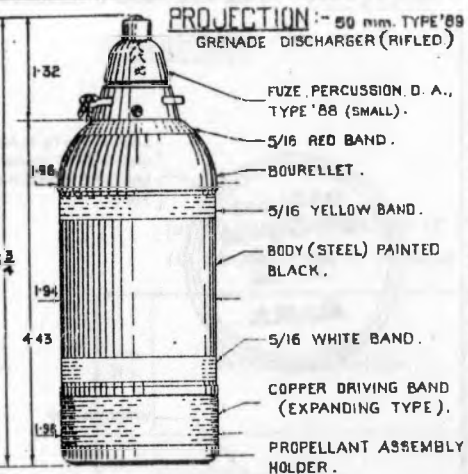
SERIAL 16 SMOKE BOMB, 90 MM.

SERIAL 17 H.E. BOMB, 150 MM., (LONG)

JAPANESE MORTAR AMMUNITION.

(SERIAL NOS 14 TO 17)

PROJECTION:- 50 mm. TYPE '89
GRENADE DISCHARGER (RIFLED)

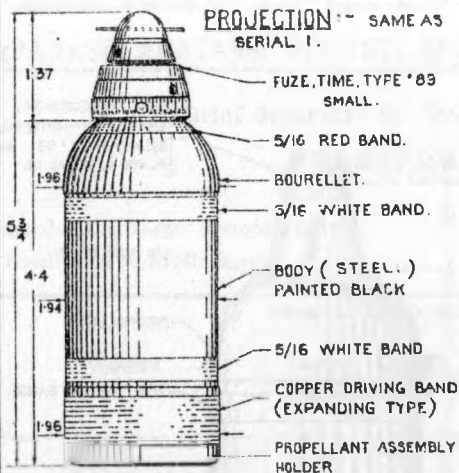


FILLING:- T. N. T. 5 ozs.

WEIGHT FILLED AND FUZED:- 1 LB. 12 3/4 OZS.

SERIAL 1 H.E. SHELL, 50 MM., TYPE '89.

PROJECTION:- SAME AS SERIAL 1.



FILLING:- HEXACHLORETHANE COMPOSITION 3-7 OZS.

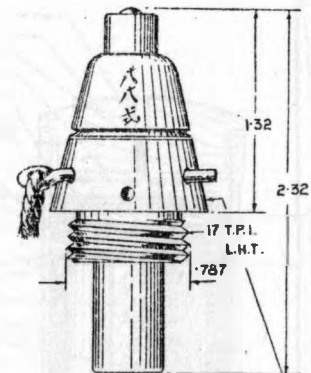
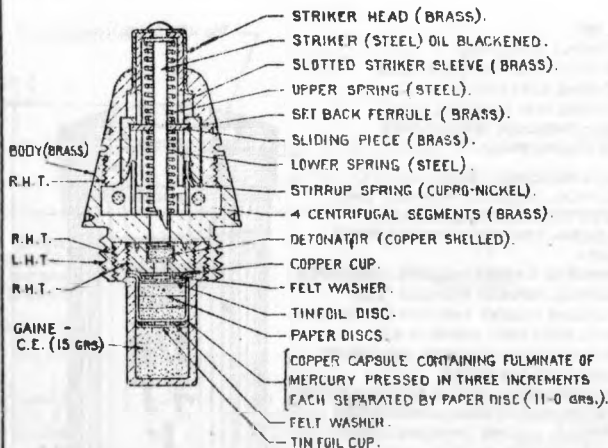
WEIGHT FILLED AND FUZED:- 1 LB. 14 OZS.

SERIAL 2 SMOKE SHELL, 50 MM., TYPE '95

USED IN:- H. E. SHELL, 50 MM. TYPE '89.

STAMPED CHARACTERS:-

火 = 8
火 = 8
花 = TYPE



TYPICAL MARKING ON REVERSE

火 火 花

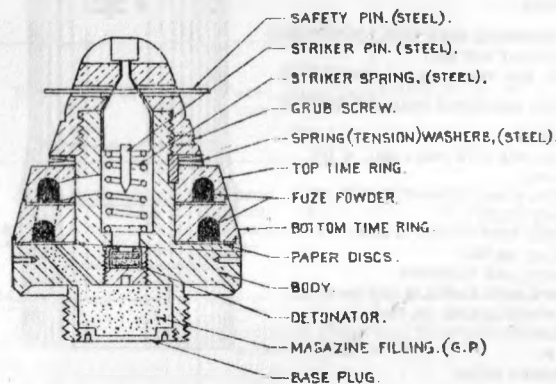
ARSENAL INSP. MARK SEPT. 1941

WEIGHT OF FILLED FUZE (2.58 OZS)

SERIAL 5

FUZE, PERCUSSION, D. A. TYPE '88 (SMALL) 20 MM. F. H.

USED IN:- SMOKE SHELL, 60 MM. TYPE '95



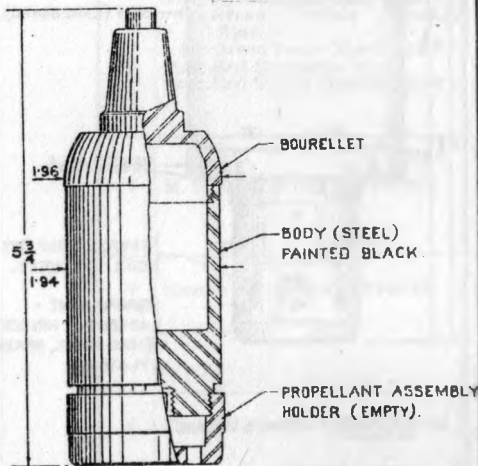
FUZE MADE OF BRASS EXCEPT WHERE STATED OTHERWISE.

WEIGHT OF FILLED FUZE:- 4.85 OZS (APPROX)

SERIAL 6

FUZE, TIME, TYPE '89, (SMALL) 20 MM. F. H.

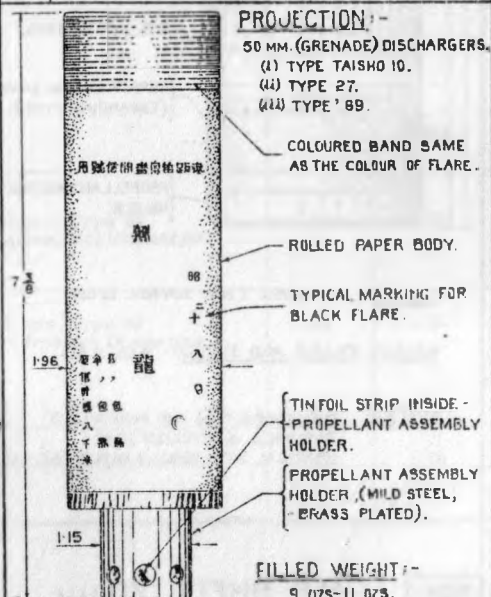
FOR DRILL PURPOSES ONLY.



TOTAL WEIGHT:- 1 LB. 10 OZS.

SERIAL 3 PRACTICE SHELL, 50 MM. TYPE '91

PROJECTION:- 50 MM. (GRENADE) DISCHARGERS.
(1) TYPE TAISHO 10.
(4) TYPE 27.
(11) TYPE '89.



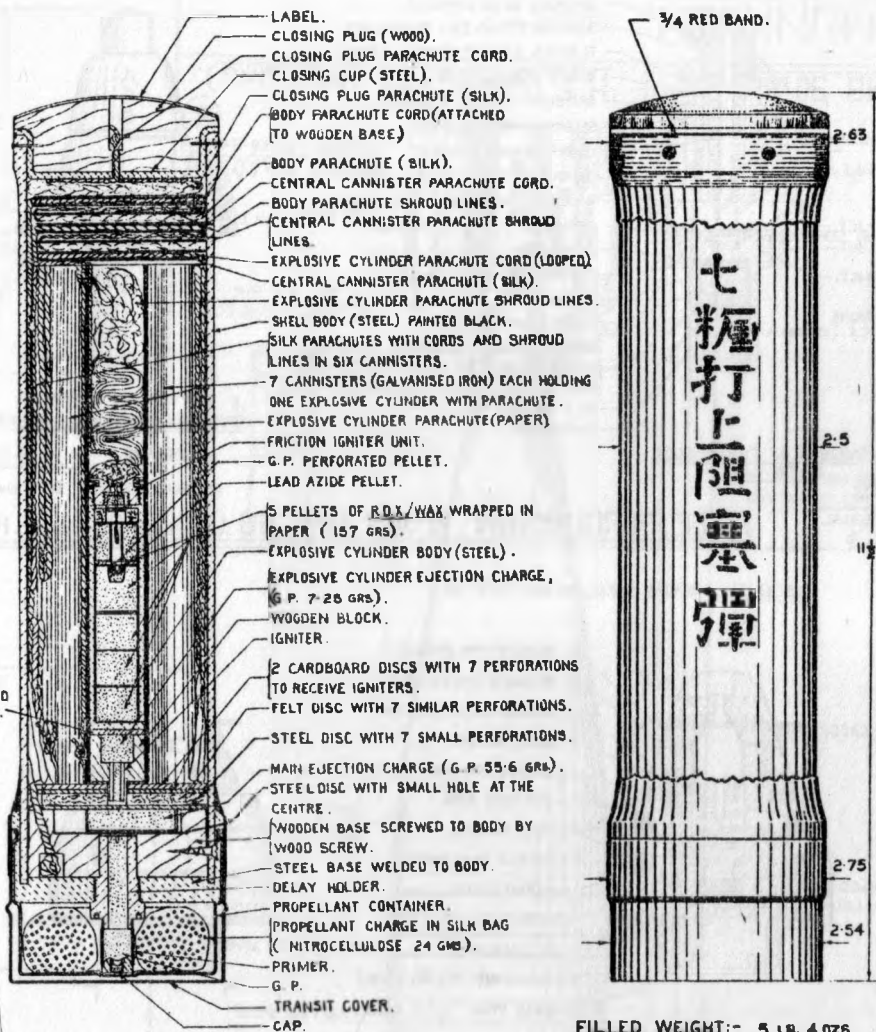
FILLED WEIGHT:- 9 OZS-11 OZS.

SERIAL 4 SIGNAL FLARES, 50 MM. (TYPICAL)

JAPANESE DISCHARGER AMMUNITION.

(SERIAL NOS 1 TO 6)

RESTRICTED. PROJECTION. 70 MM. BARRAGE MORTAR (SMOOTH BORE).

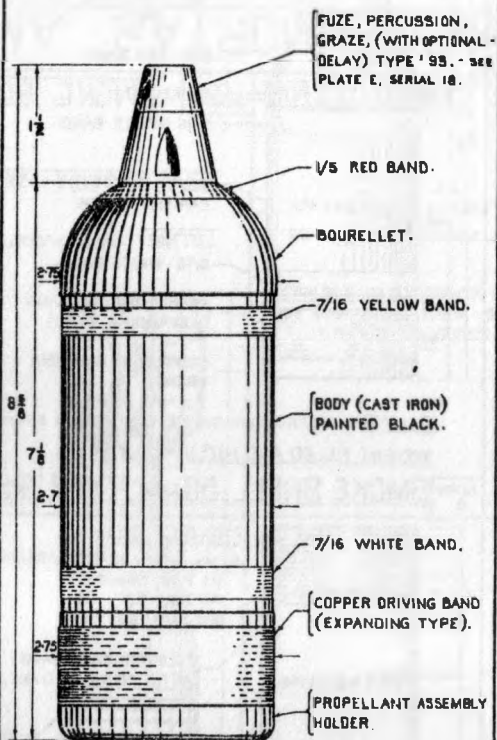


H.E., A.A., BARRAGE SHELL, 70 MM.

SERIAL 8

H.E. SHELL, 70 MM.

PROJECTION:- 70 MM. TYPE TAISHO II DISCHARGER.

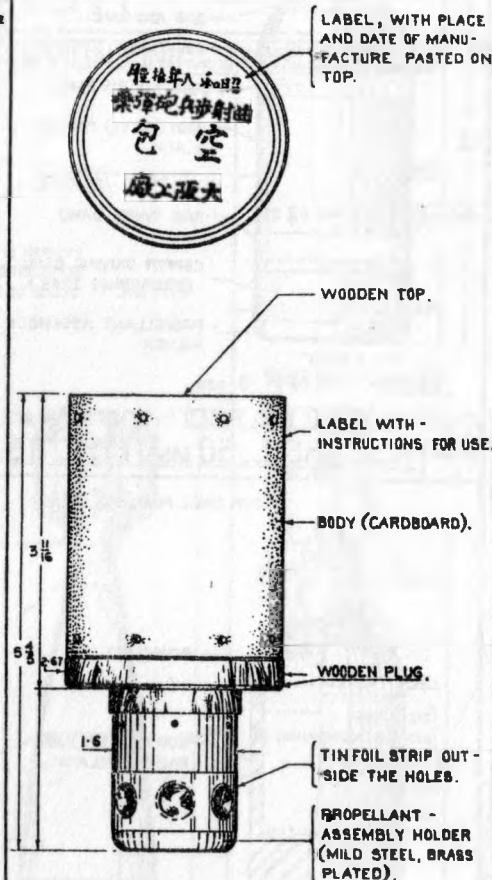


FILLING BELIEVED T.N.T. APPROX. 13 OZs.

WEIGHT FILLED AND FUZED:- 4 LB. 11 OZs.

NOTE:- THE CONSTRUCTION AND PRINCIPLE OF THIS SHELL IS REPORTED TO BE IDENTICAL WITH SERIAL 1 ON PLATE A.

PROJECTION:- 70 MM. TYPE TAISHO II DISCHARGER.



FILLING:- G. P. 3 1/5 OZs.

TOTAL WEIGHT:- 13 OZs.

SERIAL 9

BOMB TRAINING, 70 MM. (G.P. BURSTING CHARGE.)

JAPANESE DISCHARGER AMMUNITION.

(SERIAL NOS 7 TO 9)

DIMENSIONS IN INCHES

C. I. AMM B/214
KIRKEE, JULY 1945

G. P. Z. P. POONA, 1945.

Brief Summary for Quick Reference

Ammunition for:

(a) 50-mm. Type Taisho 10 (Grenade) Discharger (Smooth Bore)

(b) 50-mm. Type 27 (Grenade) Discharger (Smooth Bore)

(c) 50-mm. Type '89 (Grenade) Discharger (Rifled)

(d) 50-mm. Type '98 Discharger (Smooth Bore)

Item No.	Type of Ammunition	Weapon	Dimensions in Inches		Total Weight of round (Fuzed)		Nature and Weight of Filling	Remarks
			Length overall (Fuzed)	Maximum Diameter	Lbs.	Ozs.		
1	Signal Flares, 50 mm. ... (i) Black Dragon ... (ii) White Parachute Star ... (iii) White Single Shooting Star ... (iv) White Double Shooting Star ... (v) White Triple Shooting Star ... (vi) Yellow Dragon ... (vii) Green Parachute Star ... (viii) Green Single Shooting Star ... (ix) Green Double Shooting Star ... (x) Green Triple Shooting Star ... (xi) Red Parachute Star ... (xii) Red Triple Shooting Star ...	50-mm. Type Taisho 10 (Grenade) Discharger. 50-mm. Type 27 (Grenade) Discharger. 50-mm. Type '89 (Grenade) Discharger.	Approx. 7½ for all flares.	Approx. 1.98 for all flares	(Varying from 9 to 11-ozs.)		...	V (i) and (ii). Common pyrotechnic flares for signal and illuminating purposes. Items (i) and (vi) are smoke signals. A drawing of a typical 50-mm. flare is shown in Plate A, Serial 4.
2	H. E. Shell 50 mm., Type '80 ...	50-mm. Type '89 (Grenade) Discharger.	5½	1.96	1	12½	T. N. T. 5-ozs.	V Fuzed, Nose Percussion, Type '88, small. Maximum range about 730 yds. Plate A, Serial 1.
3	Smoke Shell 50 mm., Type 95 ...	50-mm. Type '89 (Grenade) Discharger.	5½	1.96	1	14	Hexachloro- thane Composition 3.7-ozs.	Fuzed, Nose, Time Fuze, Type '89, small. Maximum range about 790 yds. Smoke canister base ejection type. Plate A, Serial 2.
4	Practice Shell 50 mm., Type '94...	For drill purposes only ...	5½	1.96	1	10	...	Similar in shape and dimensions to Item No. 2 above. Plate A, Serial 3.

Item No.	Type of Ammunition	Weapon	Dimensions in Inches		Total Weight of round (Fuzed)		Nature and Weight of Filling	Remarks
			Length overall (Fuzed)	Maximum Diameter	Lbs.	Ozs.		
5	2½-Kg. Spigot Charge ...	50-mm. Type '98 Discharger.	27½	Of Spigot 1.9	14	3	Biscuit T.N.T. or picric acid blocks 5-lbs. 6-ozs. to 5-lbs. 12-ozs.	V See J. A. L. D-6.
6	Finned Bangalore Torpedo ...	50-mm. Type '98 Discharger.	81	Body diameter 1.37	18	8	T.N.T./R.D.X. 5-lbs.	Modified 39-mm. Standard Bangalore Torpedo, Type '99. See J. A. L. D 4 and H 3.

Ammunition for:

(a) 70-mm. Type Taisho 11 Discharger (Rifled)

(b) 70-mm. Barrage Mortar (Smooth Bore)

Item No.	Type of Ammunition.	Weapon.	Dimensions in Inches		Total weight of round (Fuzed)		Nature and weight of filling.	Remarks.
			Length overall (Fuzed)	Maximum Diameter	Lbs.	Ozs.		
1	H. E. Shell, 70-mm.	70-mm. Type Taisho 11 Discharger.	8 $\frac{3}{4}$	2.75	4	11	Believed T.N.T. approx. 13-ozs.	This is an old weapon of poor design believed obsolescent. Maximum range 1,700 yards. Fuzed Type '93 mortar bomb fuze. Shell is similar in design to the 50-mm. H. E. Shell on sheet 1, item 2. See Plate B, Serial 8.
2	H. E. A. A. Barrage Shell, 70-mm.	70-mm. Barrage Mortar (Discharger)	11 $\frac{1}{2}$	2.75	5	4	R.D.X./Wax.	V This shell is somewhat novel and has no counterpart in British or American ammunition. It is designed for use against low flying aircraft or firing over the heads of ground troops. When fired, the shell travels to a height of approximately 1,700 feet, then ejects 7 explosive cylinders, each attached to a parachute. These are apparently intended to explode only when the parachute cord is struck by some part of an aircraft causing the friction igniter in the charge to function. See Plate B, Serial 7.
3	Bomb, Training, 70-mm. (G. P. Bursting Charge)	70-mm. Type Taisho 11 Discharger.	5 $\frac{4}{5}$	2.67	0	1 $\frac{3}{5}$	G. P. 3 $\frac{1}{5}$ -ozs.	V This is thought to be a training store. Rough translation of label indicates that it bursts in air at about 150-200 feet above mortar. See Plate B, Serial 9.

Ammunition for:

(a) Mortar, M.L., 81-mm., Type '97

(b) Mortar, M.L., 81-mm., Type '99

(c) Mortar, M.L., 81-mm., Type 3 (Naval)

(d) Mortar, M.L., 82-mm., Chinese

Item No	Type of Ammunition	Weapon	Dimensions in inches.		Total weight of round (fuzed) lbs. ozs.	Nature and weight of filling	Remarks
			Length overall (fuzed)	Maximum Diameter			
1	H.E. Bomb, 81-mm. (Small) ...	Mortar, M.L., 81-mm., Type '97. Mortar, M.L., 81-mm., Type '99.	13 $\frac{1}{2}$	3.169	7 0 $\frac{1}{2}$	Trinitrophenetol 1-lb. 2-oz.	V Maximum range 3,280 yards. Nose-fuzed Type 10'. See Plate C, Serial 10.
2	H.E. Bomb, 81-mm. (Large) ...	Mortar, M.L., 81-mm., Type '97. Mortar, M.L., 81-mm., Type '99.	...	3.169	14 5	...	Maximum range 1,312 yards. No other information is available except that it is of a heavier type and can be fired in both weapons.
3	H.E. A.A. Barrage Shell, 81-mm.	Mortar, M.L., 81-mm., Type '97. Mortar, M.L., 81-mm., Type '99.	21 $\frac{1}{2}$	3.16	3 14	Pressed block of C.E. 4-ozs.	An elongated mortar shell which ejects a H. E. cylinder suspended from a parachute. Used against low flying aircraft which on striking long lead of parachute causes a friction igniter to function. Has self destroying element. See Plate C, Serial 13.
4	Signal Flares, 81-mm. ...	Mortar, M.L., 81-mm., Type '97. Mortar, M.L., 81-mm., Type '99.	7 $\frac{1}{2}$	3.18	...	...	Only green single star reported. See Plate C, Serial 12.
5	Parachute Flare, 81-mm. ...	Mortar, M.L., 81-mm., Type '97. Mortar, M.L., 81-mm., Type '99.	21 $\frac{1}{2}$	...	4 4	Barium Nitrate and Magnesium.	Similar to 81-mm. H.E. A.A. Barrage shell (Item 3 above). A flare cylinder takes the place of the H.E. cylinder.
6	H.E. Bomb, 81-mm., Type 3 ...	Mortar, M.L., 81-mm., Type 3.	13 $\frac{3}{4}$	3.169	7 3 $\frac{1}{2}$	Picric acid and Alpha-nitronaphthalene 1-lb. 1-oz.	Bomb primarily intended for Naval 3 Year Type Mortar, and it is not clear whether it can be fired from the Type '97 or Type '99 Mortars. Nose fuzed with Type 3 combination aerial burst or impact fuze. Mortar believed used for A. A. fire.
7	H.E. Bomb, 82-mm., Chinese ...	Mortar, M.L., 82-mm., Chinese (Type not known).	13 $\frac{3}{4}$	3.228	8 8 $\frac{3}{4}$	T. N. T., Potassium nitrate 11-ozs.	V Chinese bomb believed used by the Japanese. Distinguished from normal Japanese bombs by being slightly larger in calibre and having a left-handed Swastika marked on the body, plug and fuze. Not interchangeable with 81-mm. bombs. See Plate C, Serial 11.

Ammunition for:

- (a) Mortar, M.L., 90-mm., Type '94
 (b) Mortar, M.L., 90-mm., Type '97
 (c) Mortar, M.L., 120-mm., Type 2

- (d) Mortar, M.L., 150-mm., Type '93
 (e) Mortar, M.L., 150-mm., Type '97
 (f) Spigot Mortar, 320-mm., Type '98

Item No.	Type of Ammunition.	Weapon.	Dimensions in inches.		Total weight of round (Fuze) lbs. ozs.	Nature and weight of filling.	Remarks.
			Length overall (Fuze)	Maximum Diameter.			
1	H.E. Bomb, 90-mm. (long)	Mortar, M.L., 90-mm., Type '94. Mortar, M.L., 90-mm., Type '97.	17½	3½	11 6½	T. N. T. 2-lbs. 5-ozs.	V Maximum range reported 4,150 yards. Nose Fuze, Type '93, Mortar Fuze. A shorter H.E. type of this bomb has been reported, about 15½ ins. but the weight is slightly more. See Plate D, Serial 14.
2	Incendiary Bomb, 90-mm.	Mortar, M.L., 90-mm., Type '94. Mortar, M.L., 90-mm., Type '97.	17½	2½	11 9½	About 40 rubber pellets in a solution of White Phosphorus and Carbon disulphide. 2-lbs. 3½-ozs.	Maximum range 4,150 yards, Nose Fuze Type '94 Mortar Fuze. See Plate D, Serial 15.
3	Smoke Bomb, 90-mm.	Mortar, M.L., 90-mm., Type '94. Mortar, M.L., 90-mm., Type '97.	...	3½	19 6½	Hexachlorethane composition. 4-lbs.	Nose Fuze, Time and Percussion Type Taisho 5. See Plate D, Serial 16
4	Chemical Bomb, 90-mm.	Mortar, M.L., 90-mm., Type '94. Mortar, M.L., 90-mm., Type '97.	16 (Probably unfuzed).	3½	11 8	8-ozs. of Diphenylcyanarsine (D. C.) found in bomb examined.	There is very little information on this bomb. One round was captured in China, with the fuze missing. Distinctive colour markings on the body indicate that it is chemical filled.
5	H.E. Bomb, 120-mm. (Naval)	Mortar, M.L., 120-mm., Type 2.	24	4.7	26 6½	6-lbs. of T. N. T. with R. D. X./Wax Exploder.	Information at present is very meagre. Bomb is of the conventional streamlined fin stabilised type, and takes a standard Type 100 mortar bomb fuze.
6	H.E. Bomb, 150-mm. (long)	Mortar, M.L., 150-mm., Type '93. Mortar, M.L., 150-mm., Type '97.	30½	5.90	56 8	14-lbs. of T. N. T.	V Maximum range reported 2,300 yards. Nose Fuze, Type '93 Mortar Bomb Fuze. A shorter H.E. Type of this bomb is known to exist. Weight 43½ lbs. with probably longer range. See Plate D, Serial 17.
7	H.E. Spigot Mortar Bomb, 320-mm.	Spigot Mortar, 320-mm., Type '98.	62.25	12.6	738 0	Picric acid and Dinitronaphthalene. 101-lbs.	V Maximum range believed to be 1,600 yards. See J. A. L. D 7.

NOTE.—There are Reports of other 150-mm. Mortars, Type '95 and '96 which probably take the same ammunition but the details are not clear at present.

Rocket Projectiles.

Item No.	Type of Ammunition	Method of Launching	Dimensions in inches of complete round.		Total weight of projectile (Fuzed) lbs.	Nature and weight of filling	Remarks
			Length overall (fuzed)	Maximum Diameter			
1	Rocket Projectile, 12-cm., H. E./ Incendiary (Naval).	Adjustable launcher. Rocket motor integral with projectile.	28 9/16	4 3/4	51	About 60 Incendiary W. P. pellets and 5 picric acid cylinders, with picric acid. Main Explosive charge of 4 3/4-ozs.	Used in Okinawa. Launched from demolition or suicide boats. Base time fuze. Spin stabilized. Range reported about 2,000-3,000 yards <i>See Plate F, Serial 22.</i>
2	Rocket Projectile, 60-Kg., H. E. (Naval 60-Kg. Type '97 A/C Bomb adaptation).	Inclined launcher. Separate rocket motor. Two types.	Bomb only 40. Motor only:- Long Type, 51 Short Type, 41	7 15/16	124 (H. E. bomb only).	Trinitroanisol and Hexanitrodiphenylamine. 40/60 50-lbs.	Basic projectile is the common 60 Kg., Type '97 Naval A. C. Bomb. A separate rocket motor is used to propel the bomb from launcher. Flight is fin stabilized. Ordinary A. C. Bomb Nose-fuzed, e.g. A-3 (A). Maximum range 1,200-1,300 yards. <i>See Plate F, Serial 23.</i>
3	Rocket Projectile, 20-cm. H. E. (Naval).	Inclined launcher. Rocket motor integral with projectile.	42 3/4	8	200 (ap-prox.).	Trinitroanisol (Type '91 Explosive) 35 1/2-lbs.	Ground launched, relatively short range weapon. Nose-fuzed direct action. Centrifugally armed. Rocket is spin stabilized by offset venturi nozzles and rotates in a clockwise direction. <i>See Plate G, Serial 24.</i>
4	Rocket Projectile, 250-Kg., H. E. (Modified Naval Type '98, 250-Kg. A. C. Bomb).	Reported used from truck mounted launchers. Rocket motor integral with projectile.	118	11 15/16	686	Trinitroanisol/Hexanitrodiphenylamine. 60/40 (Type '99 Explosive).	Used on Iwojima. 250-Kg. Bomb head used and rocket motor fitted integral with head. Nose fuzed ordinary A. C. bomb fuze, e.g. A-3 (A). Flight fin stabilized. <i>See Plate G, Serial 25.</i>
5	Rocket Projectile, 45-cm., H. E. (Naval).	Inclined launcher. Rocket motor integral with projectile.	67 1/2	17 1/2	1,514	Trinitroanisol/Hexanitrodiphenylamine. 60/40 (Type '98 Explosive). 401-lbs.	Essentially a larger version of the 20-cm. Rocket (Item 3 above). Details of motor, fuzing etc. are generally the same. Range approximately 2,000 yards. <i>See Plate H, Serial 26.</i>

Restricted

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

SECTION D

JAPANESE AMMUNITION LEAFLETS

LEAFLET D 3

50-mm. DISCHARGERS—GENERAL NOTES

GENERAL

The Japanese 50 mm. discharger, which is the counterpart of the British 2-in. mortar, is widely used by the Japanese Infantry. In the early stages, this weapon was merely intended as a flare discharger for signalling purposes but was further developed to project grenades, shell etc. According to information available it would seem that there are four different models and in order of their introduction, these are:—

(i) Grenade Discharger Type Taisho 10 (1922) (Smooth bore).

(ii) Grenade Discharger Type 27 (Smooth bore).

The model year of this weapon seems to vary, i.e. some reports refer to the weapon as Meiji 27 (1894) but as this weapon is more or less a modification of Taisho 10 (1922) it is considered to be a 1927 pattern.

(iii) Grenade Discharger, Type '89 (1929) (rifled).

(iv) Projectile Discharger, Type '98 (1938).

This is used to project a special type of spigot charge and a modified Type '99 Bangalore Torpedo.

2. At one time, it was believed that dischargers (i) and (iii) were fired by resting the curved base plate above the knee and as such were initially referred to as 'Knee mortars' for want of a better term. It is now confirmed from various reports and actual experience that their use in this way would injure the person on account of the heavy recoil.

DESCRIPTION

3. Detailed remarks on each type of discharger are given below:—

50-mm. GRENADE DISCHARGER TYPE TAISHO 10 (1922)

4. The discharger was primarily designed to project 50-mm. Signal and Illuminating flares. It was further adapted for projecting grenades but with the development of the Type '89 discharger it is now mainly used for firing pyrotechnic signals.

5. The discharger is made of steel, and is a muzzle loading weapon with a smooth bore barrel, joined to a small curved base plate by a short tubular pedestal. Its characteristics are as follows:—

Overall Length	... 20-ins.
Length of Barrel	... 9 $\frac{3}{8}$ -ins.
Bore	... 50-mm. (nominal); 1.97-ins. (actual).
Weight	... 5 $\frac{3}{4}$ -lbs.
Range (Type '91 Hand Grenade)	... 175 yds. (reported).

The firing mechanism is actuated by hand and depends for its action on a thong attached to a lever which cocks and fires in one downward movement.

6. There is no provision for mechanical elevation but the discharger is supported by hand at an angle of 45 degrees; sighting is accomplished by aiming along a line engraved on the barrel. The range is altered by means of a gas port which is opened and closed by a knurled collar. Engraved markings 6 to 20 on the bevelled edge of the port adjusting collar and 10 to 20 on the collar itself probably indicate the range in tens of metres, i.e. 6 indicating 60 metres, 15 indicating 150 and so on. The port is fully closed when set to 20 in either case and is fully open when set to 6; this marking is probably used when projecting grenades. The setting is carried out by rotating the collar anti-clockwise and reading off against an arrowhead engraved on the barrel. The collar is locked in position by a locking collar. The marking 10-20 is presumably intended for use when projecting flares and when set to 10, the port is about one quarter open.

50-mm. GRENADE DISCHARGER TYPE 27.

7. As mentioned earlier in this leaflet the model year of this weapon is open to argument although it is more logical to accept 1927 as the model year, since modern methods of projecting grenades were evolved to suit the tactical requirements of trench warfare in World War I. The size and principle of operation is similar to the Type Taisho 10 described above and it is not unlikely that this is a crude Chinese copy of the Type 10. The main dimensions are as follows:—

Over-all length	... 17-1/4 ins.
Length of Barrel	... 10-3/8 ins.
Bore	... 50-mm. (nominal); 1.96 ins. (actual).
Weight	... 5-1/4 lbs.
Range	... 250 yds. (reported).

8. This weapon differs from the Type 10 in the following respects:—

(i) A circular gas regulator which closes the gas port is fixed to a conical portion at the base of the barrel; it is graduated from 50-220, presumably in metres. The port is fully open when set to 50 and completely closed when set at 220.

(ii) The firing pin is operated directly by the firing lever and is not driven on to the primer by a spring; in this case the firing pin spring merely retracts the firing pin.

(iii) The base plate consists of a piece of angle iron on which "27 Grenade Discharger" is stamped in Japanese characters.

50-mm. GRENADE DISCHARGER TYPE '89.

9. In external appearance this weapon is similar to the Type Taisho 10 but in this case the barrel is rifled and alteration in range is effected in a different way. The main dimensions of the discharger are:—

Overall Length	... 23.8 ins.
Length of Barrel	... 10 ins.
Bore	... 50-mm. (nominal); 1.97 ins. (actual)
Rifling	... 8 grooves—right handed.
Weight	... 10-1/4 lbs.
Range (Type '89 shell)	... 730 yds. (reported).
Range (Type '91 Hand Grenade)	... 210 yds. (reported).

10. The discharger is fired by hand, by means of a short lanyard (or thong) attached to a lever which cocks and fires in one downward movement (trip action firing mechanism). There is no mechanical elevation, the discharger being held by hand at an angle of 45 degs., or used with a wooden stand. The different ranges are obtained by altering the chamber capacity; this is carried out by means of a moveable striker barrel which is traversed up or down the bore by an external thumb screw operating on an internal rack. The striker barrel, therefore, acts as a stop for the shell and according to its position, allows it either just to enter the barrel, giving a large chamber capacity and low range, or to travel to the bottom of the barrel, giving a small chamber capacity and long range. Two range scales, 120-650 metres for H. E. shell and 40-190 metres for grenades and flares, are engraved on the shank of the discharger. These are read against a part of the firing mechanism which moves with the striker. Although the range scale is graduated for firing Type '91 grenades and flares it is doubtful whether it is current practice to fire such ammunition from this discharger.

11. The base plate is curved in shape and is larger than that for the Taisho 10 grenade discharger. It is used as a spade to support the discharger while firing.

12. An interesting feature of this rifled discharger is that it is muzzle loaded, the maximum diameter of the driving band being less than the diameter of the lands of the bore. On firing, however, spin is imparted to the projectile by the use of an expanding driving band. This is effected somewhat ingeniously by using a copper driving band, of the same diameter as the shell. This fits round the propellant container which screws into the base of the shell. On ignition of the propellant charge, the driving band is forced out into the rifling by the propellant gases.

WOODEN STAND

13. A wooden stand for this discharger is also used; its primary function is probably to permit firing on fixed lines by night or it may have been devised solely to enable the weapon to be used effectively on soft soil. It consists of a wooden base about 2 ft. long with an upright at one end, to the top of which is fixed a short cross piece. Immediately beneath the upright is a round stake about 3 ins. long which is driven into the ground. A cylindrical block covered with a sheet of rubber is attached to the other end of the base. In action, the discharger rests on the stand at an angle of 45 degs. with its barrel on the cross piece and its base plate fitting over the rubber covered cylindrical block.

FIRING ANGLE INDICATOR

14. This is a type of clinometer attached to the barrel, which enables the firer accurately to hold the discharger at 45 degs. elevation, the normal firing angle.

50-mm. PROJECTILE DISCHARGER TYPE '98

15. A brief description of this discharger has already been included in J. A. L. D. 6, but is reproduced below for convenience.

16. The discharger consists of the barrel, base plate, bipod and range control device. The barrel is made of steel and has an aperture for a friction type igniter at the breech. The bipod is clamped at the centre of the barrel and fixes the barrel at a constant elevation of 40 degs. The feet of the bipod run in grooves on the base plate being firmly held by screw clamps, and allow a 10 degree traverse left and right. The range scale, which is attached at the muzzle by a clamp, is a plate which is engraved in units from 0 to 60. The scale is moveable on its clamp, and controls the range by limiting the amount of the stick of the charge or torpedo projecting into the barrel.

The discharger is mounted with the barrel central and the base plate level. The propellant charge is placed in the barrel and pushed down to the breech end with the cleaning rod. The projectile is loaded into the discharger until stopped by the range control device. The string from the pull friction igniter in the charge is attached to a projection on the bipod. To ignite the propellant the friction tube is inserted into the aperture in the breech and the firing lanyard, about 10 ft. long, is led away to the firing position. On firing, the string attached to the bipod fires

the igniter as the charge leaves and ignites the safety fuze. After a delay dependent on the length of safety fuze, the charge is fired. The safety fuze is apparently cut by the user to suit the range required.

Note.—Military Intelligence Directorate General Headquarters (India) have now ruled that 50-mm. Projectile discharger will in future be designated 50-mm. Mortar Type '98.

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FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

SECTION D

JAPANESE AMMUNITION LEAFLETS

LEAFLET D 4

**FINNED BANGALORE TORPEDO
(Modification of Standard Bangalore Torpedo Type '99)**

GENERAL

The finned Bangalore Torpedo has already been described briefly in J. A. L. H 3 and a description of the Discharger used to propel it has been given in J. A. L. D 6.

2. This Leaflet is issued to give a more detailed description of the torpedo and of the fuze used with it. Neither torpedo nor fuze has been examined at Kirkee and the details given below are based on a review of various reports from Australia and America.

DESCRIPTION

BODY OF TORPEDO

3. The body is in two parts, the front portion being a normal length of Standard Bangalore Torpedo, Type '99 with the usual filling of about 3-1/8 lbs. of R. D. X./T. N. T. or picric acid. One end of this length takes a D. A. Percussion fuze instead of the tail transit plug. It will be seen from J. A. L. H 3 that there is a prepared cavity in the filling of each Bangalore Torpedo length and this is probably intended to take the gaine of the fuze. The tail portion of the finned torpedo is reported to be a cut down length of Bangalore Torpedo which screws on to the front portion in the usual way. This shortened length is modified by the fitting of three brackets by welding to which are attached fins secured by bolts. A collar is fitted to prevent excessive intrusion in the barrel of the discharger and a gas-check at the end ensures a good fit in the barrel of the discharger. Details of these are given in the attached drawing, but it is probable that some Bangalore Torpedoes may differ from this drawing.

4. The reports are not quite clear in regard to a number of details, e.g. the collar or stop on the Bangalore Torpedo is described in some reports as a Range Control Device, but this is unlikely, as the range appears to be adjusted by varying the charge. Reports as to the amount of explosives in the tail portion vary, but it would seem that it is about 1-7/8-lbs.

PROPELLANT CHARGE

5. Propellant charges are reported to be made in two sizes, 25-gms. and 35-gms. contained in silk bags for use with Finned Bangalore Torpedoes. The following ranges are reported to be obtained :—

PROPELLANT CHARGE.	MAXIMUM RANGE (Yds.)	MINIMUM RANGE (Yds.)
25-gms.	148	88
35-gms.	225	135
50-gms.	320	210

Note.—It would seem that a series of propellant charges are made up for the 50-mm. Discharger Type '98 and these are selected according to the projectile fired—see J. A. L. D 6.

FUZE

6. This is a direct action percussion fuze with optional delay, fitting in the nose of the torpedo. From the details received, it would seem to be a modification of the Japanese 50/60-Kg. Aircraft Bomb Nose Fuze, Type A—2(A), or at least its design follows this very closely.

7. A drawing of the fuze is given in the attached Plate which shows clearly its construction and action. It consists of a body in two pieces screwed together, the upper portion containing the arming spindle and striker, striker spring, detent and detent spring. The lower portion is screw-threaded internally to take the upper portion and screw-threaded externally to screw into the nose of the Bangalore Torpedo. It is recessed internally to take a percussion cap holder and an optional delay fitment, both being held in position by the gaine which screws into the body. The nature of the filling in this gaine is not known at present but it is probably C. E. The delay fitment has a selector screw which if turned through an angle of 90 degs. as shown in Plate will cause the open channel to be blocked. The flash from the percussion cap will then ignite the delay pellet which burns down to the gaine thus giving a short time of delay. When the selector screw slot is vertical, the channel in the screw provides a direct passage from the percussion cap to the gaine to give a comparatively instantaneous effect.

8. Safety Devices.—According to reports, there are three safety devices fitted:—

(a) A safety fork which prevents the vane boss and vanes from rotating during storage and transport.

(b) A safety bolt or detent which locks the vanes even when the transit safety fork is removed.

(c) The vanes which are attached to a vane boss and under air pressure rotate during flight to cause the boss to unscrew and fall off.

ACTION

9. The tail portion is placed in the barrel of the 50-mm. Discharger, Type '98, see J. A. L. D 6. The transit safety fork is then removed or this may be removed before loading. The Discharger is then fired by pulling the firing lanyard of the friction igniter. On shock of discharge the detent sets back freeing the vane boss and presumably locks itself. During flight the arming vanes rotate and unscrew the boss from the arming spindle. The fuze is now armed, the striker being held off the detonator only by the striker spring. On impact the fuze functions according to the setting, delay, or instantaneous.

IDENTIFICATION

MARKINGS

10. The standard length of Bangalore Torpedo is painted brown, while the modified tail portion is reported to be painted black. The usual red filling band is painted at the top of each section.

SUMMARY OF DATA. (According to reports).

11. Overall length (without fuze)	... 78-3/8-ins.
Length of tail portion	... 33-1/4-ins.
Length of fins	... 14-3/4-ins.
Maximum width of fins	... 3-1/2-ins.
Minimum width of fins	... 2-1/2-ins.
Total weight	... 17-lbs. 14-1/4-ozs.
Weight of filling	... Approx. 5½-lbs.
Overall length of fuze	... 3-15/16-ins.
Maximum diameter of fuze	... 1-5/8-ins.
Weight of filled fuze	... 14-1/2-ozs.
Fuze threads	... 24 T. P. I., R. H.
Diameter over fuze threads	... 1-1/2-ins.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

12. For normal handling and transport the Finned Bangalore Torpedo (plugged) may be treated similar to the standard issue type, *see* J. A. L. H 3. For fuze lengths, it will be obvious from the action of the fuze that if the safety fork and arming vane are in position the fuze is comparatively safe.

Blind Bangalore Torpedoes must be treated with the greatest caution and destroyed in situ whenever practicable. No attempt should be made to remove the fuze from the torpedo. If for any reason movement of the torpedo is imperative, binding the arming spindle close to the fuze body with fine wire will prevent any inward movement while securing the top of the arming spindle to the upper fuze body with adhesive tape will prevent outward movement. It must be remembered, however, that if the arming spindle is found with only a small portion protruding it is probable that the striker point is sticking in the percussion cap and any movement whatever, even vibration, may cause it to function. It is emphasized, therefore, that fuzed Bangalore Torpedoes of this type should always be destroyed in situ following normal practice for the destruction of blind projectiles.

Fuzes and lengths of torpedo must be travelled separately.

EXPLOSION/FIRE RISK

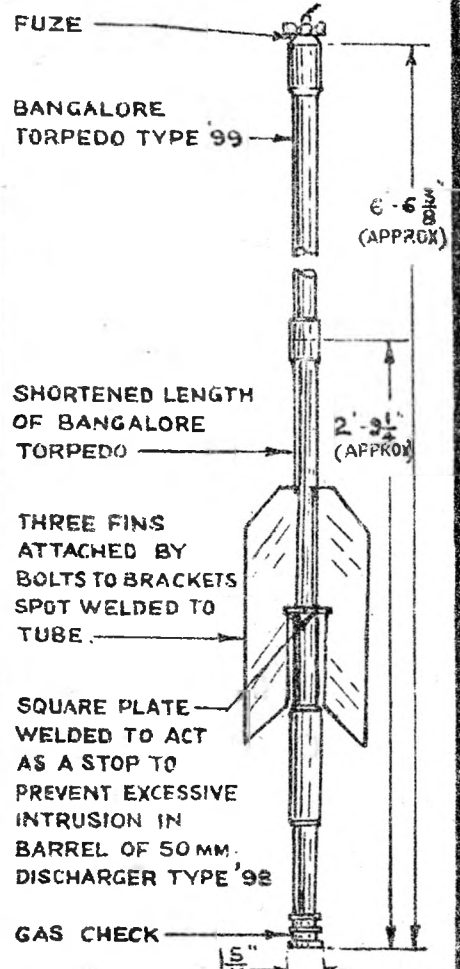
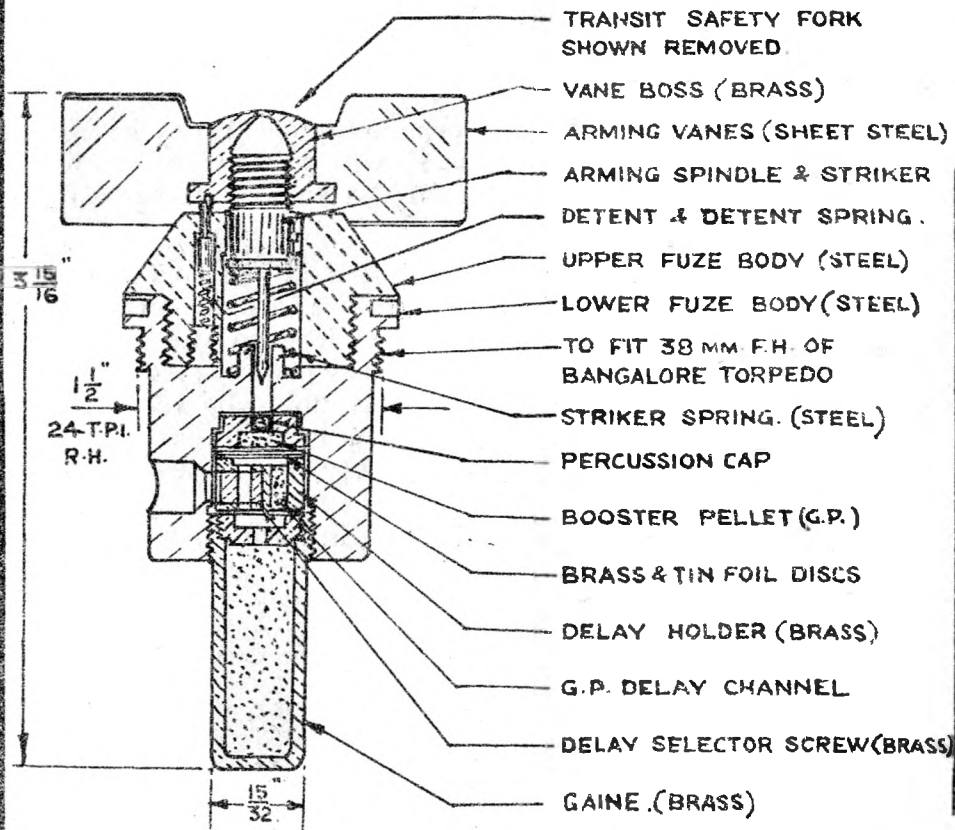
Reports not clear, take 5½-lbs.

GROUP CLASSIFICATION

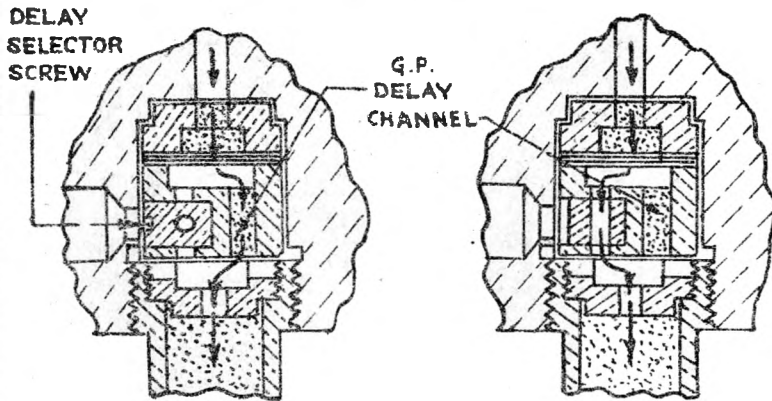
VII, Category 'Z'

CLASSIFICATION FOR SEA TRANSPORT

O.A.S.



WEIGHT OF FILLED FUZE :- 14 1/2 Ozs

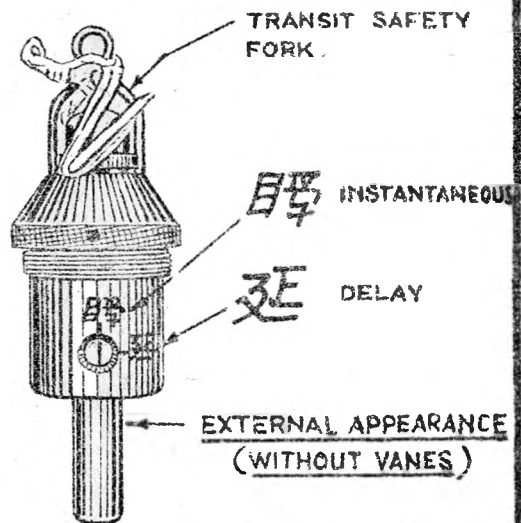


**PATH OF FLASH
WHEN FUZE IS
SET AT "DELAY"**

**PATH OF FLASH
WHEN FUZE IS
SET AT : -
"INSTANTANEOUS"**

**FUZE, D.A., PERCN. WITH OPTIONAL DELAY
FOR
FINNED BANGALORE TORPEDO.**

**FINNED BANGALORE TORPEDO
(GENERAL ASSEMBLY)**



JAPANESE FINNED BANGALORE TORPEDO

(MODIFICATION OF STANDARD TYPE '99 BANGALORE TORPEDO.)

**THIS LEAFLET MUST NOT
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D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION **D.**
LEAFLET **D 6.**

2 1/2 KG. SPIGOT CHARGE

(for Projection from the 50-mm. Discharger, type '98)

GENERAL

This type of spigot charge (or stick bomb) is projected from the "Projectile Discharger, Type '98". This discharger is also used to propel a Finned Bangalore Torpedo, which is a modification of the normal Japanese Type '99 Bangalore Torpedo. A brief description of the discharger will be useful to help in understanding the functioning of the spigot charge.

2. The discharger consists of the barrel, base plate, bipod and range control device. The barrel is made of steel and has an aperture for a friction type igniter at the breech. The bipod is clamped at the centre of the barrel and fixes the barrel at a constant elevation of 40°. The feet of the bipod run in grooves on the base plate being firmly held by screw clamps, and allow a 10 degree traverse left and right. The range control scale is a plate on which is engraved a scale in units from 0 to 60, which is attached at the muzzle by a clamp. The scale is moveable on its clamp, and controls the range by limiting the amount of the stick of the charge or torpedo projecting into the barrel.

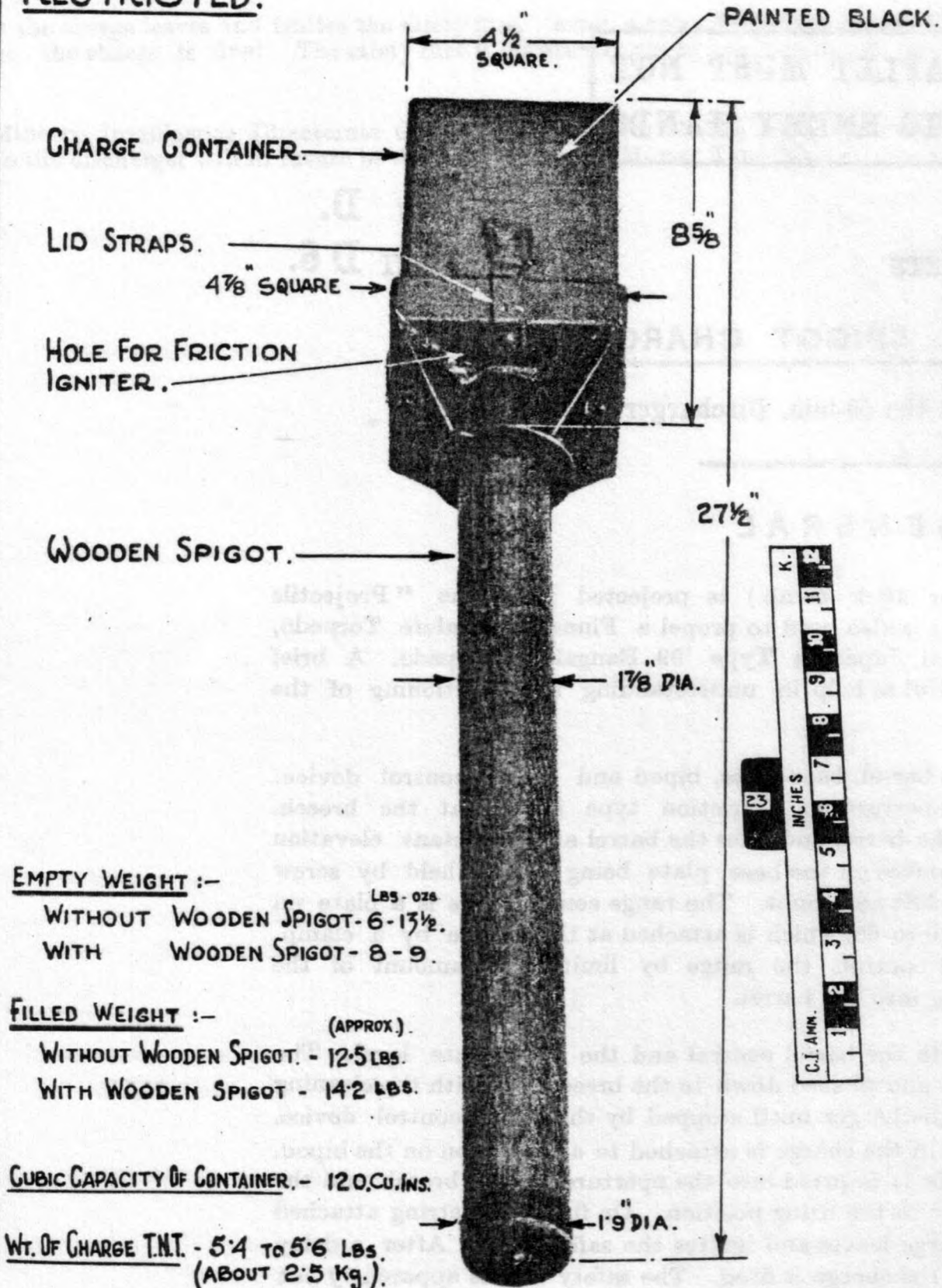
3. The discharger is mounted with the barrel central and the base plate level. The propellant charge is placed in the barrel and pushed down to the breech end with the cleaning rod. The projectile is loaded into the discharger until stopped by the range control device. The string from the pull friction igniter in the charge is attached to a projection on the bipod. To ignite the propellant the friction tube is inserted into the aperture in the breech and the firing lanyard about 10 ft. long led away to the firing position. On firing, the string attached to the bipod fires the igniter as the charge leaves and ignites the safety fuze. After a delay dependent on the length of safety fuze, the charge is fired. The safety fuze is apparently cut by the user to suit the range or point of burst required.

The Finned Bangalore Torpedo is fired similarly but it has an A.C. bomb type fuze in the nose which functions on impact.

DESCRIPTION

4. For purposes of description the spigot charge may be divided into three parts :—
- (i) The charge container.
 - (ii) The wooden spigot.
 - (iii) The explosive charge.

RESTRICTED.



≡ JAPANESE. ≡

≡ 2 1/2 Kg. SPIGOT CHARGE. ≡

(for PROJECTION FROM THE 50 M.M. DISCHARGER TYPE '98.)

C.I. AMM. 5/994.
KIRKEE, FEB. 1945.

Charge Container and Wooden Spigot

5. Details of construction of the charge container and the spigot are shown in Plate B while the external appearance can be seen from the photograph at Plate A. The charge container consists of a welded steel box with a lid secured by four screws through the medium of clamps. Two holes are drilled in the lid to take the igniters, it seems probable that the use of two igniters is the normal practice. To the lid is welded a cylindrical spigot housing which takes the wooden spigot, and is secured by two nails or screws passing right through the housing and the end of the spigot. In line with the igniter holes in the lid are small semi-circular holes in the flange of the spigot housing. These are presumably to enable a 'tie fast' to be used, so that on firing, the tension on the friction igniter is taken on this point and not transmitted to the detonator and fuze in the filling.

Explosive Charge

6. The explosive charge is inserted in the field. The internal dimensions of the container show that it is possible to load in the container, 24 of the Japanese standard H.E. demolition blocks (2"x2"x1"). Filling the container gives a total charge weight of approximately 5½ lbs. according to the density of the filling used. Any type of H.E. filling available can, of course, be used.

The 24 demolition blocks are loaded into the container in four columns, and two perforated blocks are positioned under the igniter holes in the lid to take the detonator assembly/assemblies. The detonator assembly consists of a pull igniter at one end of a length of safety fuze (depending on the range) and a detonator at the other end of the safety fuze.

Propellant Charge

7. These are reported to be made up in two sizes, 25 gms. and 35 gms., and packed in silk bags. They can be used in any combination up to 120 gms., though range graphs show them to be used in 25, 35, 50, 75 and 100 gm. units only. The table below shows the maximum and minimum ranges, taken from the range graphs, the ranges being in yards:—

Propellant charge.	Bomb	
	Max.	Min.
25 gms.	148	93
35 „	205	143
50 „	286	205
75 „	405	275
100 „	455	410

The use of variable charge weights appears to conflict with the method of adjusting the range mentioned in para 3. The reasons for this are not clear but it is possible that both methods may be used. No propellant charges have been captured nor has any report been received stating the composition etc. of the propellant charge.

PACKING.

8. No definite details are available. It is very probable that containers and wooden spigots are carried in ordinary packing cases, while charges and igniters are in the usual standard packing. The spigot charge being assembled in the field when required.

IDENTIFICATION.

9. The spigot charge can be identified readily from the details given in Plates A and B.

HANDLING AND TRANSPORT.

(Of ammunition captured by Ordnance)

10. Any spigot charges captured should be examined for igniters and detonators and these removed carefully. If necessary the lid should first be removed by removing screws and bending the straps back to release the lid with wooden spigot. The H.E. charge can then be emptied out. If the spigot charge has obviously been exposed for some time and has a corroded appearance destruction is recommended—do not attempt to remove lid and empty. Filling may be picric acid with consequent danger of picrate crystals being present round screws and joints.

Blind spigot charges found on the battlefield should be destroyed in situ whenever at all practicable. They are not likely to be unduly dangerous but the usual care is necessary. A friction igniter may be attached and the detonators inside the filling are most likely damaged and unduly sensitive.

Spigot charges should not be stored or transported filled. The H.E. filling and components will be dealt with as for similar items described elsewhere in J.A.Ls.

EXPLOSION / FIRE RISK

GROUP CLASSIFICATION

CLASSIFICATION FOR SEA TRANSPORT

} NOT APPLICABLE.

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D. OF A. (INDIA)

SECTION D.

JAPANESE AMMUNITION LEAFLETS

LEAFLET D 7.

BOMB, H. E., 320-MM., SPIGOT MORTAR (335 Kg.)

Note.—The size 320 mm. refers to the maximum external diameter of the projectile and not, as might be thought, to the diameter of the spigot of the weapon. Military Intelligence Directorate [G. H. Q. (I)] have ruled that the actual diameter of the bomb must be used in the nomenclature. The weight shown is that of the fuzed and filled bomb complete ready for firing.

GENERAL

So far as is known the first use of this mortar in the Burma Theatre was during the Japanese advance into India in 1944. The first bombs were captured about June 1944 in the Bishenpur area.

2. Since then further ammunition has been captured but little information has been received at Kirkee regarding its use and effectiveness. The weapon does not appear to have been used in other theatres on any large scale and no reports of its use have been received from Australian or American sources.

3. As a brief general introduction to this weapon some useful remarks which have been extracted from General Headquarters, India, Military Intelligence Directorate's Periodical Technical Summary No. 29 of July 1944 are reproduced below. These should be read in conjunction with the rough diagram of the mortar assembled ready for firing, in Plate C at the back of this J. A. L.

"This unusual Japanese weapon, of a type which is not known to have been encountered before in any theatre of the Far Eastern war, was captured recently in the Imphal area. It is a Spigot type weapon, different in design from any used by other Nations and showing little trace of foreign influence in other than the basic principle. In adapting the spigot principle to this weapon, however, the Japanese appear to have lost sight of many of the basic advantages of this type of weapon, and the final result is an unimpressive equipment which can have only a limited value in action. Spigot type weapons have been designed by most nations with the principal object of enabling a much larger projectile to be thrown than could be fired by a more conventional type of weapon of equivalent size and weight, without detracting from ease of handling in any way. In this particular example, the size of the projectile is in fact considerable, being very much larger than could be obtained with any other Japanese weapon in normal use. But in order to project this formidable bomb the projector itself has been made immobile in action, little traverse and no elevation has been provided, thus rendering correction for line impossible when emplaced and adjustments for range dependent upon variations of the incremental charges and a larger crew and slow rate of fire have been accepted. It is not yet possible to estimate the range and no reports have been received of ranges achieved in action. Although, according to PW, fantastic effectiveness is claimed for the weapon by the Japanese, no reports of undue annoyance being caused have been received from troops in contact. This accords with experience of much more professional equipments used elsewhere; the Germans, for example, have a 38-cm. equivalent of which no reports of great effectiveness in action have so far been received.

"The spigot is a steel cylinder with a cavity for the propellant machined at the top, integral with a small seating plate square in plan but spheroid. This seats, and is retained on, the mounting plate, by a square steel plate with the centre portion domed; within the limits allowed by the retaining bolts is a tolerance allowing very slight adjustments in setting up the spigot, being the only inherent means of adjusting line or elevation. Within and

conforming with the dome is retained a wood reinforcing disc with an iron strengthening band. The mounting plate rests on the large square steel base plate, which in turn is supported by a solid wooden base in three sections. The whole equipment, when set up, is firmly bolted together to form a heavy, massive equipment. Line of fire can be varied only slightly once the equipment has been emplaced, and, once the initial elevation has been determined by the angle at which the equipment is dug in, variation in range can only be obtained by varying the incremental charges."

4. The weight of the spigot mortar together with the mounting and emplacement is about 900 lb. The range has since been reported as being about 1,600 yards, presumably with full charge. Firing trials are being arranged.

It is clear from labels and markings that this is the Type '98 spigot mortar.

DESCRIPTION—BOMB

5. The complete round ready for firing is made up of the following components:—

- (i) Head, fitted with an exploder container and a fuze.
- (ii) Body, similarly fitted with an exploder container and a fuze.
- (iii) Tail unit, which houses the complete propellant and igniter assembly.

6. The following drawings and photographs have been included at the end of this leaflet:—

Plate A.—Photograph of one complete assembled bomb, together with one bomb in components fitted with clamps for transport. Note that transit cover plates for protecting the threads have not been shown in this photograph.

Plate B.—Photograph of the assembly sequence of components of a complete plugged bomb.

Plate C.—Detailed drawing of the general assembly, and the assembly sequence of the bomb, including a rough sketch of the spigot mortar.

Plate D.—Photograph of the propellant charges and the general appearance of components comprising the obturation and igniter systems.

Plate E.—Detailed drawings of the igniter holder with extension, primer, percussion and electric igniters and exploder container. The latter component forms part of the head and body of the bomb to take the fuze.

Plate F.—Drawing of the propellant transport box holding

- (a) Propellant charges with primer, container and obturation chamber.
- (b) Two Fuzes, Percussion, Graze, H. E.
- (c) One each, electric and friction igniter (Type '96).
- (d) One igniter holder with extension.

Plate G.—Photograph of the general appearance and assembly sequence of components of the fuze, Percussion and Graze, H. E. used in the bomb.

Plate H.—Detailed drawing showing general assembly and component details of this fuze.

Head

7. The head (4)—See Plates A, B and C—is a dome-shaped steel container finished internally with a dark purple lacquer. The cast block of picric acid dinitronaphthalene (6) is securely packed inside with a wooden packing piece (5) in the nose and secured by a screwed plate (8) in the base. This has a convex surface in the centre to accommodate the protruding portion of the body fuze.

8. The exploder container (see Plate E item 3) is lacquered internally and externally and screws into the nose. It contains in the bottom two exploder pellets of R. D. X. Wax wrapped in a paper container. Above this the cavity of the container is lined internally with a copper cup, a further copper cup being used to line the top perforated exploder pellet. These two cups are soldered together. An adapter (2) is fitted to take the plug (1) or fuze.

9. For purposes of locating and positively securing the transit clamp a hole and a slot are provided diametrically opposite along the line of the centre of gravity of the head.

10. The head is painted black, with a red band at the nose and a yellow band just above the threads at the base.

Body

11. The body (12) is a cylindrical forged steel structure having female threads at the top to receive the head (4) and male threads in the base to screw into the tail unit (17). Similar to the head it is internally lacquered and holds a picric acid and dinitronaphthalene block filling (11). The body is closed by a screwed plate (9) which takes an exploder container (10) in the centre; this is secured by welding. The details of the exploder container are the same as those described above.

12. The body is also provided, described in Para. 7, with a hole and slot for fitting a transit clamp during transport.

13. It is painted black and two dashes presumably weight marking and date of filling in this instance is 17.12 (December 1942) followed by an inspection mark (OSAKA) are stencilled in white.

Tail Unit

14. The tail unit (17) consists mainly of a hollow forged steel tube having an external taper with a reduced diameter at the base. Four sheet steel fins are attached by welding and eight strong 9 S. W. G. wires (16), which act as strengthening stays, are fastened to eye hooks (19) on the fins, see Plate A. The tail is threaded internally at the top to receive the male threads on the body (12) and below these threads a shoulder is formed to seat the propellant assembly [flange of the obturation chamber (16)]. Immediately below the thread is a screwed hole, normally plugged, to take the igniter holder with extension (15).

The tail unit is painted black internally and externally.

Note.—The significance of the Arabic figures stencilled in white on head, body and tail unit is not known. These numbers are all different and are unlikely to have been used as mating numbers.

PROPELLANT ASSEMBLY

15. The details of the propellant assembly are shown in Plates D, E and F.

Obturation Chamber

16. The obturation chamber (16) is a heavy bell-shaped chamber made of brass. The mouth is slightly flanged outwards to form a seal on firing against the walls of the tail unit. A shoulder is formed just below the flange which rests on the lip of the cavity in the mortar spigot. There is a hole in the centre of the base through which passes the spigot of the propellant container (15). Two lifting straps are welded diametrically opposite on the inside of the chamber. The obturation chamber, as its name indicates, acts as a seal against the rush of propellant gases to the rear past the mortar spigot. It is very probable that the obturation chamber is left behind in the mouth of the spigot after the bomb has been fired. If so, its removal may be difficult. This point is being watched during firing trials which are to take place shortly and a supplement to this J. A. L. will be issued if necessary.

Propellant Container

17. The Propellant container (15) is comprised of a cylinder of cardboard strengthened by a stout brass base. Fitted centrally in the base is the primer adapter (Plate F) secured by four rivets. The primer adapter has an externally screw-threaded spigot which mates with a corresponding recess at the base of the cavity for the obturation chamber, in the spigot of the mortar. A screw-threaded cup is formed in the adapter to hold an igniter charge of about 41 grs. of gunpowder. Four flash holes are bored in the walls to allow the flash to reach the gunpowder bag igniter in the main propellant increment (500 gms.). Into the mouth of the primer adapter screws the primer (14).

18. The propellant charge increments rest in the propellant container and are held in position by the cover (15A). The position of this cover is adjustable to suit the size of charge used. This adjustment is arranged by means of serrations on the primer body and a corresponding quick release spring catch on the propellant container cover (15A).

Propellant Charge

19. This consists of a number of increments contained in silk bags of different sizes and shapes—see Plate D. The two bottom increments are in the form of rings, the lower (500 gms.) has an internal (igniter) filled with gunpowder to boost the flash from the primer. The weight of charge in grammes, date of filling (various dates in 1941-42) and Arsenal inspection mark (OSAKA) are stencilled on each bag.

The number of increments forming a full charge is not known. Those packed in propellant containers received at Kirkee were found to vary in different boxes. It is open to doubt whether they actually represent original Japanese packing; boxes may have been opened and charges mixed at some time.

20. The result of an examination of five different sets of charges in regard to the number of increments found, is tabulated below:—

Box.	Number and weight of charge increments found.						Total Charge Weight.	
	500 gm.	400 gm.	100 gm.	50 gm.	10 gm.	5 gm.	gm.	lb.
No. 1	1	1	4	1	3	2	1390	3.06
No. 2	1	1	2	1	3	3	1195	2.63
No. 3	1	1	4	1	3	3	1395	3.07
No. 4	1	1	4	1	2	4	1390	3.06
No. 5	1	1	3	1	2	2	1280	2.81

To establish what is a full charge is therefore difficult. In the absence of any better data it is suggested that it is probably 1,400 gms. made up as follows:—

1 Increment of 500 gms.	...	500 gms.
1 Increment of 400 gms.	...	400 gms.
4 Increments of 100 gms.	...	400 gms.
1 Increment of 50 gms.	...	50 gms.
3 Increments of 10 gms.	...	30 gms.
4 Increments of 5 gms.	...	20 gms.
Total		... 1400 gms.

The reason for the unusual shape of the 50 gr. increment is not clear. Its shape, however, is probably the reason why only one increment of this size is used. There may be some particular arrangement of increments recommended in the Japanese firing instructions.

The above remarks are, of course, based on conjecture and should be taken only as a guide.

Primer

21. The primer (14) is a long brass tube with flash holes at the top, filled throughout its length with mealed G. P. A perforated plug closes each end and the body has circular grooves or serrations forming a ratchet to provide adjustment of the cover (15A).

Igniter Holder

22. The igniter holder (13) screws into the screwed hole in the side of the tail unit—see para. 11. It consists of a brass housing to take either an electric or friction igniter. The igniter is held in position by a slotted retaining plug which allows the leads of the electric igniter or the friction wire loop of the friction igniter to protrude. The other end of the holder (13) is closed by a perforated diaphragm which in conjunction with a fluted sealing plug seals the back-flash of gases. Below this the holder (13) is screw-threaded internally to take an extension. This is filled with perforated G. P. pellets and conveys the flash to the 12 flash holes in the head of the primer (14). This assembly is shown in Plate C.

Note that the igniter holder (13) is normally plugged with a small elaborately made transit plug to prevent the ingress of dust etc. to the holder.

Electric Igniter

23. There is nothing unusual in the design of this igniter (21) and its manufacture follows general Japanese practice. It differs somewhat from British types in that the ends of the electric leads are carried down to form pole pieces to which the fuzing bridge is joined.

24. Electric tests show that the bridge when cold has a resistance of 0.92 ohms and fuzes with a current of about 0.9 to 1.0 amps. A current of 0.8 amps. maintained for 4 seconds did not fuzes the bridge.

Friction Igniter

25. Again there is nothing unusual in the design of the friction igniter (20) although the method of securing the end of the friction wire, as a safety precaution against an accidental light pull appears new. This principle of flattening the end of a brass wire forming jagged edges is also used in Japanese flares.

Note.—It is clear from markings on labels etc. that these two igniters are known to the Japanese as the "Type '96 electric igniter (primer)" and "Type '96 friction igniter (primer)". These components were manufactured on various dates in 1940-41.

FUZE, PERCUSSION, GRAZE, H. E.

26. The construction and general principle of this fuze can be seen from the drawing at Plate H while its general appearance and assembly sequence is given in Plate G. The fuze is of a somewhat ingenious design and the method of arming does not follow usual Japanese practice. So far as can be recollected the use of an arming pellet which burns during flight follows an old German practice for fuzes.

27. For purposes of description the fuze may be divided into three main parts:—

(i) Arming Mechanism

This comprises a closing cap (1) screwed into the fuze body (12) which acts as a guide for the striker needle holder or inertia pellet (3). This pellet (2) and the arming detonator (5) in its holder (6) are kept apart by the striker spring (4). Below this is a cup shaped arming pellet holder (7), containing a pressed gunpowder pellet. This holder (7) rests on a copper sealing ring (10). This ring (10) prevents the escape of any flash or gas down to the graze mechanism of the fuze. Fitting inside the arming pellet holder (7) is the arming unit (8). This is a flanged disc having a short stud bearing against the pressed G. P. pellet and two long studs which, in the safe position, act as stops to prevent the graze pellet (16) moving on to the striker needle (11A) on any accidental jolt etc. when the safety fork (12A) is removed. The arming unit (8) owing to its short stud bearing against the pressed G. P. pellet keeps the arming spring (9) in compression while the fuze is in the safe condition.

(ii) Graze Mechanism

This comprises a creep spring (13) held under slight compression between the striker needle holder (11) and the graze pellet (16). The general design of this graze pellet will be clear from the drawing at Plate H.

(iii) Gaine

The gaine (21) follows general Japanese practice and is screwed into the base of the fuze body on to a lead washer (18) to hold the graze pellet (16) in position.

Safety Devices

28. The following safety devices are incorporated:—

(i) A safety fork (1A) passing through the closing cap (1) and engaging in the annular groove round the striker needle holder (2), thus preventing any movement during handling and transport of the latter.

(ii) Another safety fork (12A) passing through the body above the graze pellet (16) thus preventing any movement in the direction of the striker (11A).

(iii) A steel striker spring (3) which, when the safety fork (1A) is removed, holds the striker (2) away from the arming detonator (5). This prevents accidental firing owing to any light jolt etc. during final assembly and to some extent also ensures positive functioning on shock of discharge.

(iv) Arming unit (8) which by reason of its two long studs prevents movement of the graze pellet (16) on to the striker owing to any accidental jolt etc. during final assembly. This arming unit (8) also forms a slow arming device which renders the fuze safe against any check etc. of the bomb during discharge until it is well clear of the mortar and mortar crew. It has not been possible yet to establish the actual time of delay provided by the pressed gunpowder pellet. It is considered to be roughly of the order of 0.05 second. A method of measuring this delay is being considered and a supplement will be issued if the delay can be determined definitely.

(v) A creep spring (13) which prevents forward creep of the graze pellet (16) during the flight of the bomb.

Action

29. Before fuzeing, the safety fork (12A) is removed from both fuzes. The safety fork (1A) of the fuze intended for the body is removed just before fitting the head on the body. The safety fork (1A) of the fuze in the head is removed just prior to firing.

30. The fuze is armed during flight as follows. On shock of discharge, the striker needle holder (2) sets back; the needle piercing the detonator (5) and the flash igniting the G. P. pellet in its holder (7) which commences to burn from the top. The gases from this burning pellet pass via slots in the base of the detonator holder (6) and out to the atmosphere through the pressure release holes in the closing cap (1). The tin foil discs covering these holes are blown out as soon as sufficient pressure is generated. The G. P. pellet continues to burn until such time as that portion of the pellet which is bearing against the short stud in the arming unit (8) is sufficiently weakened for the arming spring (9) to force the arming unit (8) upwards, thus withdrawing the two long studs through the striker needle holder (11) to uncover the striker needle (11A). The time which elapses between the shock of discharge and the moment when the long studs are withdrawn to arm the fuze is not yet known. It is, of course, dependent on the rate of burning of the gunpowder pellet, *see* para. 28 (iv) above. Both the fuzes in the bomb are now armed and the graze pellet (16) is held off the striker needle (11) only by the creep spring (13). On impact, or on any appreciable check to the bomb, the graze pellet sets forward to fire the fuzes.

31. The presence of two fuzes in this bomb has decided advantages:—

(a) The chances against fuze failure are two to one.

(b) By having simultaneous head and body initiation a high standard of detonation is ensured. It is thought, however, owing to the main filling of picric acid and the powerful exploder system used that even with one fuze the rate of detonation should be good.

Marking

32. The fuze is lacquered externally with a transparent varnish and a paper label is pasted on the body as shown in Plate G. The characters on this label have not been translated but appear to refer to instructions for fuzeing. The stamped markings on the flange of the body indicate the date of manufacture and are followed by the Osaka Arsenal inspection mark—*see* Plate H.

ASSEMBLY AND LOADING

33. In the absence of any lifting equipment on the mortar site, it is reasonable to assume that the sequence of assembly and loading of the bomb is probably as follows:—

(a) The tail unit (17) by means of its transit clamp is placed on the spigot after removing the transit cover protecting the threads. The tail unit is located on the spigot by diametrically opposite slots at the base of the tail, fitting in two corresponding studs on the mortar spigot. This method of fitting has probably two functions. Firstly, it helps to prevent rotation of the tail when screwing on the body (12) and head (4). Secondly, the screwed hole for the igniter holder (13) can be positioned towards the rear in a suitable firing position.

(b) The obturation chamber (10) is inserted in the tail unit so that its shoulder rests on the lip of the cavity in the mortar spigot. The propellant container is then placed in position and rotated to cause the screwed spigot of the primer adapter to mate with the corresponding threaded recess in the cavity of the mortar spigot, thus securing the propellant container and obturation chamber firmly to the mortar spigot. To facilitate screwing the primer adapter has four machined flats to accommodate a box type spanner. It is assumed that the propellant charge is now loaded according to the range required and the cover (15A) fitted in position. Alternatively, the propellant container, complete with charge and cover, could be fitted and screwed up by hand, but the use of a spanner would not then be possible. It is also assumed that the igniter holder with extension (13) is now screwed in position into the tail unit (17). This can be done at any time but it would be more convenient at this stage.

(c) The body, after removal of the thread protecting transit covers, is screwed into position by means of the transit clamp. The body-fuze, after removal of safety fork (12A) is then screwed home. The safety form (1A) is then removed, just before head is assembled.

(d) The head, after removal of the thread protecting transit covers, is then screwed in position by means of its transit clamp. The head fuze, after removal of the lower safety fork (12A), is then screwed home. This fitting of the fuze may, of course, be done before the head is assembled.

(e) All transit clamps are now removed and the igniter (friction or electric) inserted in the igniter holder (13). The bomb is now ready for firing except for removal of safety fork (1A) from head fuze, and most probably firing is done at a safe distance from behind cover.

34. On firing, the flash from the igniter passes via the extension in the igniter holder (13) through the flash holes to the primer filling and down to the base and again through flash holes out to the gunpowder igniter ring in the 500 gm. charge increment. The propellant gases generated bear on the base of the bomb propelling it forward (when sufficient pressure is generated) and at the same time expand the obturation chamber until the flange at the mouth fits tightly against the parallel walls of the tail unit, thus preventing any appreciable escape of the gas to the rear. The lip of the mouth of the obturation chamber as explained in para. 16 is flanged to facilitate its expansion outwards to seal the gases.

PACKING AND METHOD OF TRANSPORT

35. The bomb, for purposes of transport, is divided into three components. There is a painted character on each clamp indicating for what portion of the bomb it is intended. The clamps are not interchangeable. The ignition and propellant components are packed separately in a transport box. The method of packing is shown clearly in Plate A.

36. Considerable care has been taken in the design of the propellant transport box which is made of well seasoned white wood lined internally throughout with zinc sheet. A felt seating is formed in the mouth of the box into which a raised rib on the lid is seated to render the box water-proof. Details of this box and the items packed in it are shown clearly in Plate F.

A label on the underside of the lid gives full details of component types and dates of manufacture—see Plate F.

SUMMARY OF DATA

37. Complete Round		
Overall length	...	62.25 ins. fuzed. 62.0 ins. plugged.
Maximum diameter of body	...	12.6 ins.
Total weight filled (without transit clamps)	...	738 lbs.
Total explosive charge	...	101 lbs.

38. **Head and Body (Plugged) (4)**

	<i>Head</i>	<i>Body</i>
Overall length	... 15.0 ins.	13.2 ins.
Maximum diameter	... 12.6 ins.	12.6 ins.
Weight filled (without transit clamp)	... 174.5 lbs.	208.5 lbs.
Weight of transit clamp	... 9 lbs.	9 lbs.
Explosive charge, Nature and Weight	... 56 lbs.	45 lbs.

Picric acid and dinitronaphthalene.

Exploder container (with adapter) (3)
(identical for head and body).

Length	... 4.52 ins.
Diameter	... 2.36 ins. (over flange) 1.51 ins. (over body)
Filling, Nature and Weight	... 1.4 ozs.; R. D. X. and Wax in paper container.
Fuze hole	... 35 mm.

39. **Tail Unit (17)**

Overall length	... 36.5 ins.
Maximum diameter	... 12.6 ins. (over cylindrical portion).
Dimensions over tail fins	... 18 ins. square.
Weight without transit clamp	... 345 lbs.
Weight of transit clamp	... 9 lbs.

40. **Propellant Assembly**

Complete weight. (Obturation chamber, propellant container with charge and primer) ... 13 lbs.

Obturation Chamber (16)

Length	... 8 ins.
Maximum external diameter	... 10.15 ins.
Weight	... 7 lbs. 5½ ozs.

Propellant Container (15)

Height	... 5.4 ins. (max.)
Diameter	... 7.25 ins.
Weight	... 5 lbs. 10 ozs.
Details of propellant charge	... Graphited N. C./N. G. tubular cords. (See para. 20 of text for number of increments charge weight etc.)

Gunpowder bag igniter

Weight and size. ... 198.2 grs. G. 20.

Primer (14)

Length	... 7.72 ins.
Diameter at top	... 0.4 ins.
Diameter at base over threads	... 0.68 ins.
Weight filled	... 3.8 ozs.
Magazine filling and weight	... Moaled G. P. 43.7 grs.
At the base of primer (in primer adapter)	... G.P., G. 20, 41.25 grs.

41. Igniter holder with extension (13)

Length	...	6.48 ins.
Diameter of body	...	0.469 ins.
Diameter over flange	...	1.15 ins.
Weight	...	1.62 ozs.
Length of extension	...	2.98 ins.
Diameter of extension	...	0.314 ins.
Weight of extension	...	355.57 grs.
Filling in extension	...	Perforated G. P. pellet, 18.21 grs. 0.39" x 0.156" dia.; Perforation dia. 0.05".

42. Friction Igniter (20)

Length	...	2.17 ins. body and 5.62 ins. with friction wire loop.
Diameter	...	0.25 ins.
Friction composition	...	2.93 grs.
Filling	...	G. P. G. 20, 8.02 grs.

43. Electric Igniter (21)

Length	...	2.17 ins.
Diameter	...	0.25 ins.
Electric bridge	...	0.92 ohms. resistance; fuzing current of 0.9 amp.
Filling	...	G.P., G. 20, 8.18 grs.

44. Fuze

Type	...	Percussion Graze H. E.
Length	...	3.9 ins.
Weight (filled)	...	13.9 ozs.
Grain filling	...	R. D. X./Wax. 31 grs. Lead azido pellet 13.4 grs.

45. Details for Transport :—

Components.	Stowage Dimensions.	Weight.
Head with clamp and thread cover ...	18.5" x 15.0" x 15.0"	180 lbs.
Body with clamp and thread covers ...	18.5" x 11.0" x 14.0"	220 lbs.
Tail unit with clamp and thread cover .	18.5" x 18.0" x 37.0"	355 lbs.
Propellant container box ...	12" x 12" x 10.5"	30 lbs.
TOTAL ...	...	785 lbs.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

46. Captured spigot bombs in dumps or depots, when in components, can be handled in the same way as British Service depths charges and depth charge pistols. The usual care is, however, necessary to ensure that the components are not booby trapped.

47. If an assembled bomb is found it must be regarded with suspicion and destruction is desirable. Disassembly of the bomb is difficult and unless it is found on a firing site abandoned hurriedly there must be some special reasons why it was assembled—probably a booby trap.

48. Blind bombs should, if at all possible, be destroyed in situ. A study of the fuze mechanism will show the dangers involved. Firstly, the striker may be sticking in the graze pellet detonator and there are two chances of this happening. Secondly, impact of the bomb may have caused distortion of the fuze and rendered it unduly sensitive. If a bomb must be moved, it is suggested that a careful study of the fuze mechanism should be made and action taken according to local conditions and equipment available. The problem is one which is frequently met by Bomb Disposal Officers. Removal of the nose fuze may be possible but it is thought that under any conditions unscrewing of the head to get at the body fuze will be impracticable.

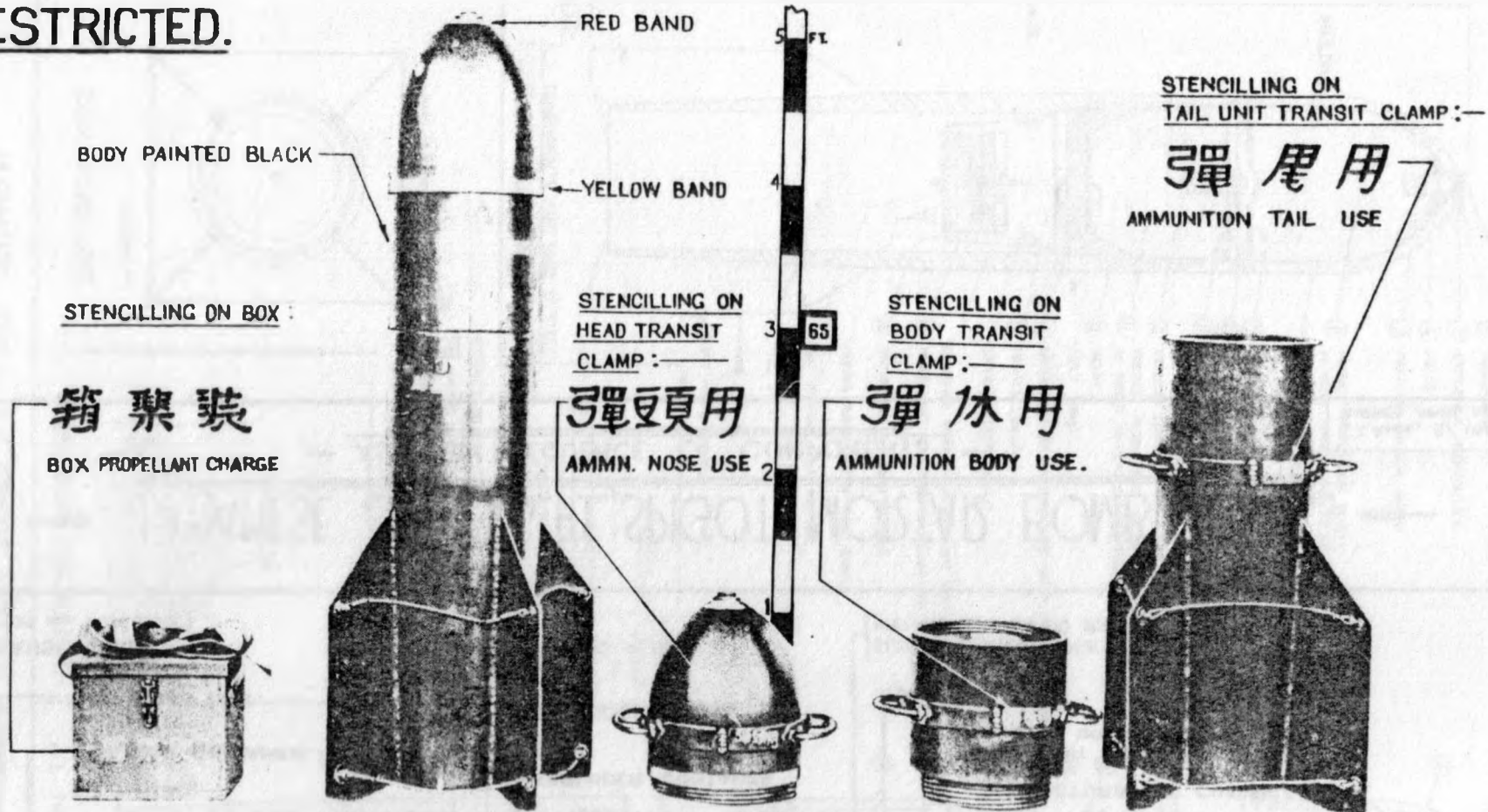
49. In regard to safety during demolition, the safety distances to be observed can well be taken as those for the 1000 lb. H.E. A.C. G.P. bomb detailed below as a guide.

Position of Bomb.	Minimum safety distance in yards from the position of Operator.		
	In the open.	With side cover only 1-ft. brick or concrete or 3-ft. sandbag wall.	With side and overhead cover 4" RCC roof or two layers of sandbags.
(a) Buried bomb to a depth of not less than twice its length.	450	350	90
(b) Protected bomb with sand bag walls 4-ft. wide along the length or 2-ft. vertical.	1200	350	120
(c) Bomb in the open	...	350	150

If the head and body are being demolished separately half the distances against (b) and (c) are recommended.

EXPLOSION/FIRE RISK	...	Head 45 lbs.	Body 56 lbs.	Propellant 4 lbs.
GROUP CLASSIFICATION	...	Head and Body. VII—Z.	Propellant and components in box. VI—X.	
CLASSIFICATION FOR SEA TRANSPORT	...	O. A. S.		O. A. S.

RESTRICTED.



PROPELLANT TRANSPORT BOX.

FOR PACKING & TRANSPORT OF (I) PROPELLANT (II) FUZES (III) PRIMERS & PRIMER EXTENSION & (IV) ELECTRIC & FRICTION IGNITERS.

BOMB COMPLETE

PLUGGED, WITHOUT TRANSIT CLAMPS.

HEAD

WITH TRANSIT CLAMPS.

(ALUMINIUM TRANSIT COVERS FOR PROTECTING THREADS NOT SHOWN)

BODY

WITH TRANSIT CLAMPS.

TAIL UNIT

WITH TRANSIT CLAMPS.

JAPANESE 320 MM. H.E. SPIGOT MORTAR BOMB (335kg.)

BOMB ASSEMBLED AND SEPARATE COMPONENTS DURING TRANSPORT.

CIAMM-V/1046
KURKIE APRIL 26

PLATE A

RESTRICTED

- MARKING ON WAX PAPER COVER -
(ITEM I.)

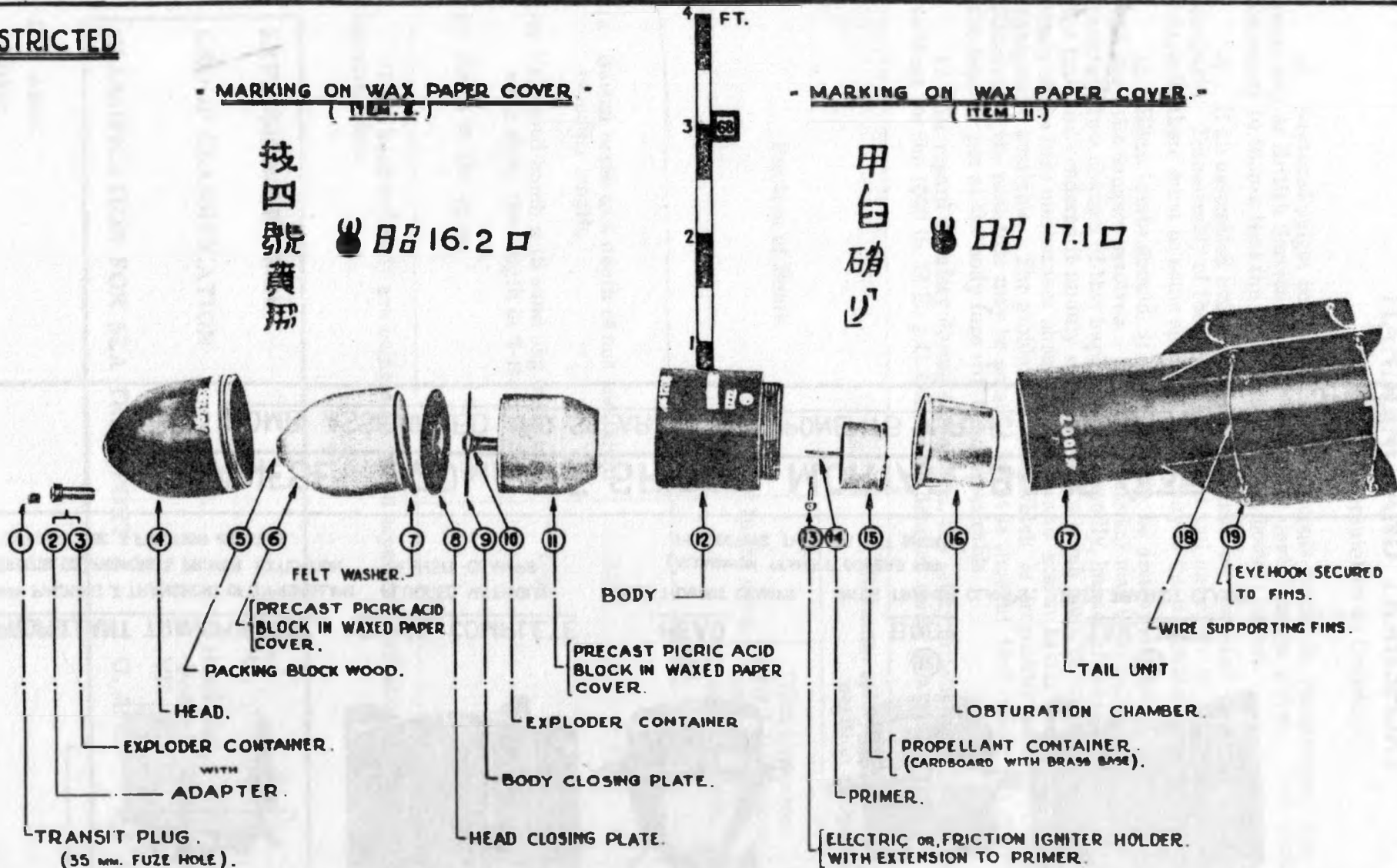
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- MARKING ON WAX PAPER COVER -
(ITEM II.)

甲
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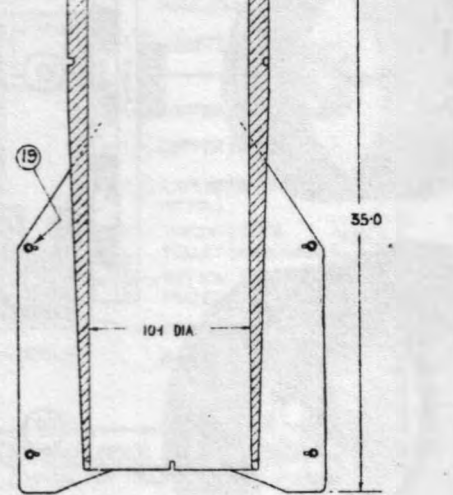
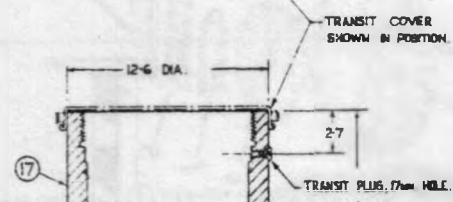
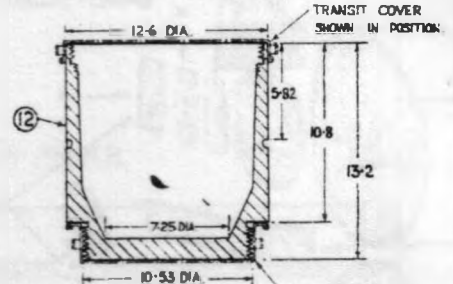
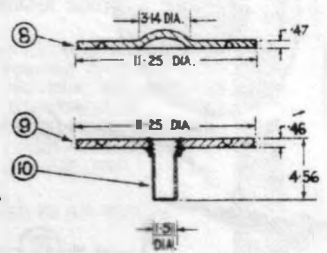
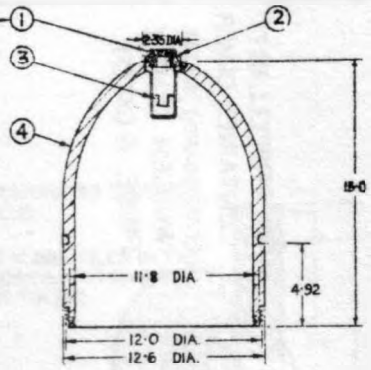
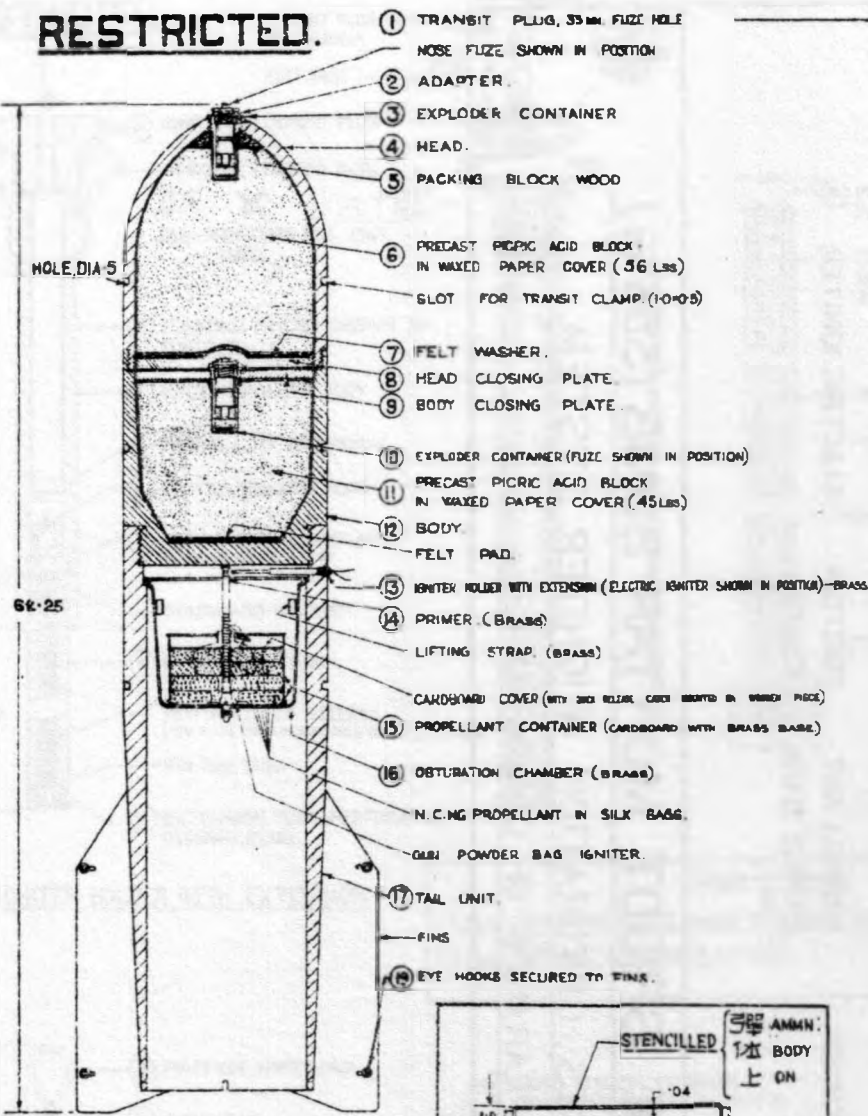


JAPANESE 320 MM., H.E., SPIGOT MORTAR BOMB (335 Kg.)

— ASSEMBLY SEQUENCE OF COMPONENTS —

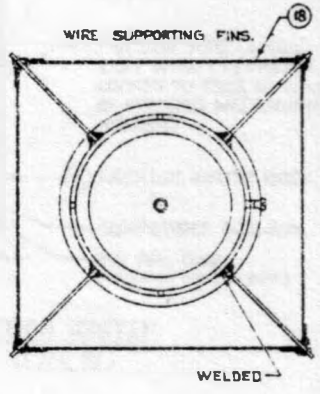
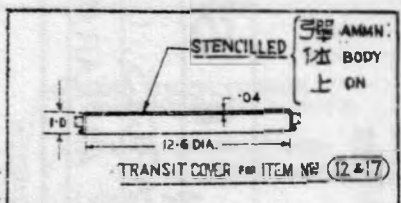
C.I. Amm. 5/1045.
KIRKEL, APRIL, 1945.

RESTRICTED.

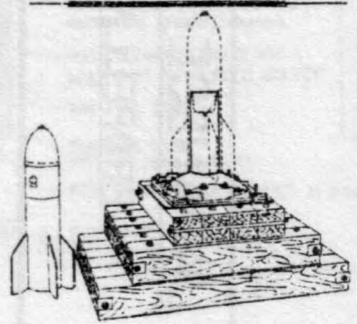


- ① TRANSIT PLUG, 33 MM FUZE HOLE
NOSE FUZE SHOWN IN POSITION
- ② ADAPTER.
- ③ EXPLODER CONTAINER
- ④ HEAD.
- ⑤ PACKING BLOCK WOOD
- ⑥ PRECAST PICRIC ACID BLOCK
IN WAXED PAPER COVER (36 LBS)
- ⑦ SLOT FOR TRANSIT CLAMP (10-0-0)
- ⑧ FELT WASHER.
- ⑨ HEAD CLOSING PLATE.
- ⑩ BODY CLOSING PLATE.
- ⑪ EXPLODER CONTAINER (FUZE SHOWN IN POSITION)
- ⑫ PRECAST PICRIC ACID BLOCK
IN WAXED PAPER COVER (45 LBS)
- ⑬ BODY
- ⑭ FELT PAD
- ⑮ IGNITER HOLDER WITH EXTENSION (ELECTRIC IGNITER SHOWN IN POSITION)—BRASS
- ⑯ PRIMER (BRASS)
- ⑰ LIFTING STRAP (BRASS)
- ⑱ CARDBOARD COVER (WITH 3/8" RIBS CASE BENT IN WAXED PAPER)
- ⑲ PROPELLANT CONTAINER (CARDBOARD WITH BRASS BASE)
- ⑳ OBTURATION CHAMBER (BRASS)
- ㉑ N.C.M.G PROPELLANT IN SILK BAGS.
- ㉒ GREY POWDER BAG IGNITER.
- ㉓ TAIL UNIT
- ㉔ FIN
- ㉕ EYE HOOKS SECURED TO FIN.

NOTE:
ALL COMPONENTS ARE MADE OF STEEL
EXCEPT WHERE OTHERWISE STATED.



PLAN OF TAIL UNIT



SPIGOT MORTAR TYPE '98 & BOMB.

ALL THREADS ARE RIGHT HANDED.

JAPANESE 320 MM. H.E. SPIGOT MORTAR BOMB. (335 Kg.)

GENERAL ASSEMBLY & ASSEMBLY SEQUENCE.

C.I. AMM. 5/1056
MIRAGE, APRIL, '45

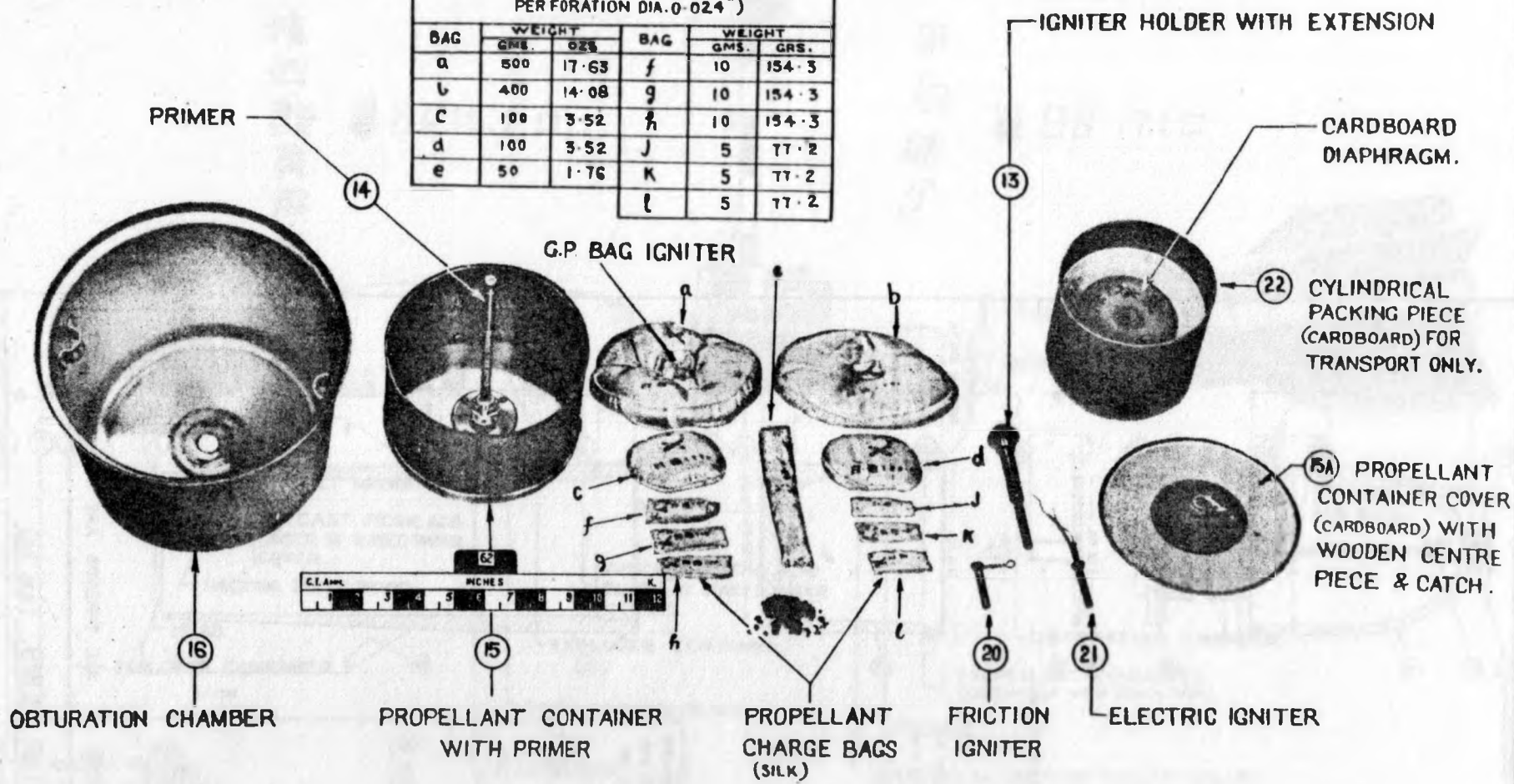
DIMENSIONS IN INCHES.

REF. FORM. 1375.

RESTRICTED.

— PROPELLANT INCREMENTS —
 GRAPHITED N.C. TUBULAR CORDS
 (LENGTH = 0.14 TO 0.245" EXT. DIA. = 0.1"
 PERFORATION DIA. 0.024")

BAG	WEIGHT		BAG	WEIGHT	
	GMS.	OZS.		GMS.	GRS.
a	500	17.63	f	10	154.3
b	400	14.08	g	10	154.3
c	100	3.52	h	10	154.3
d	100	3.52	J	5	77.2
e	50	1.76	K	5	77.2
			l	5	77.2

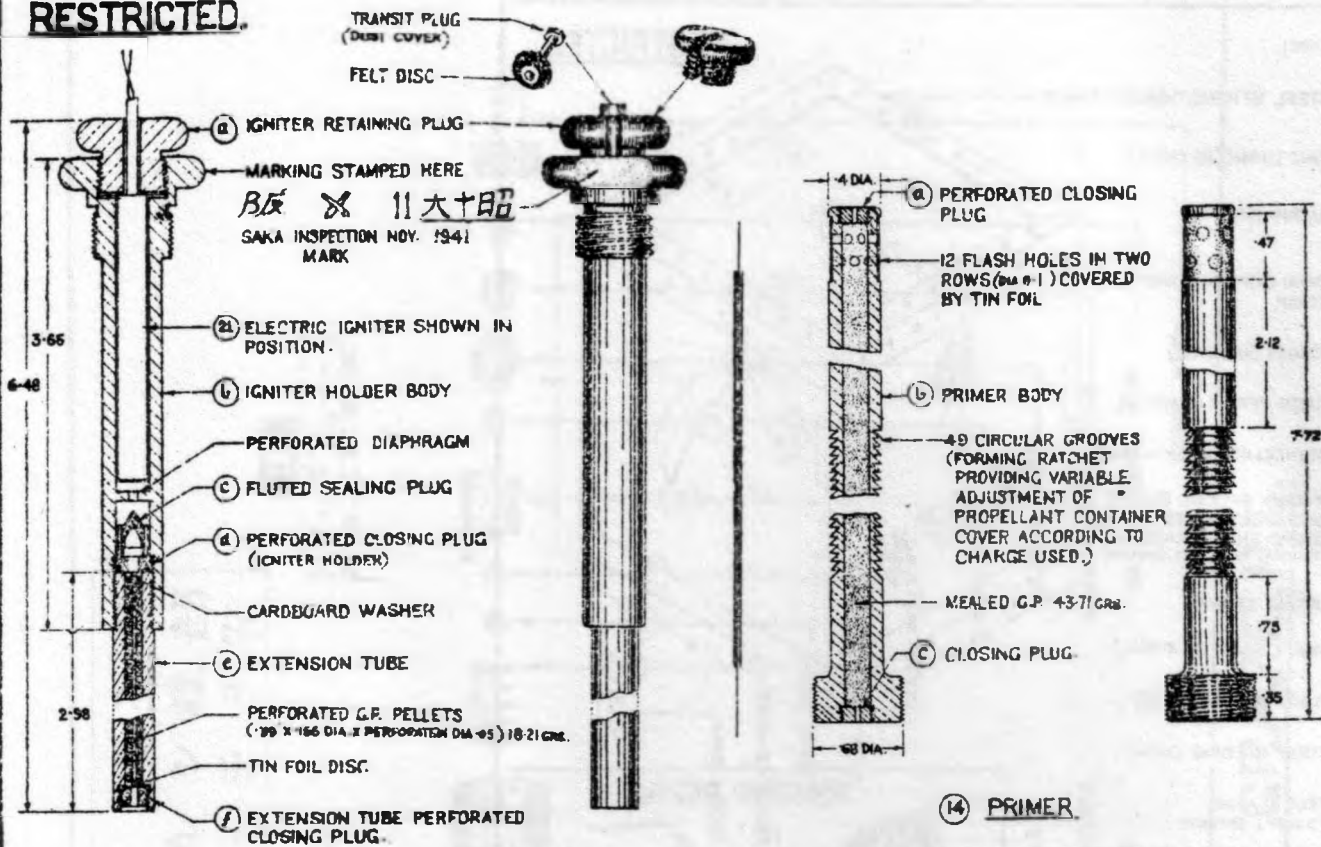


JAPANESE 320 MM. H.E. SPIGOT MORTAR BOMB (335 kg)

PROPELLANT CHARGES, OBTURATION & IGNITER SYSTEM.

GENERAL APPEARANCE OF COMPONENTS.

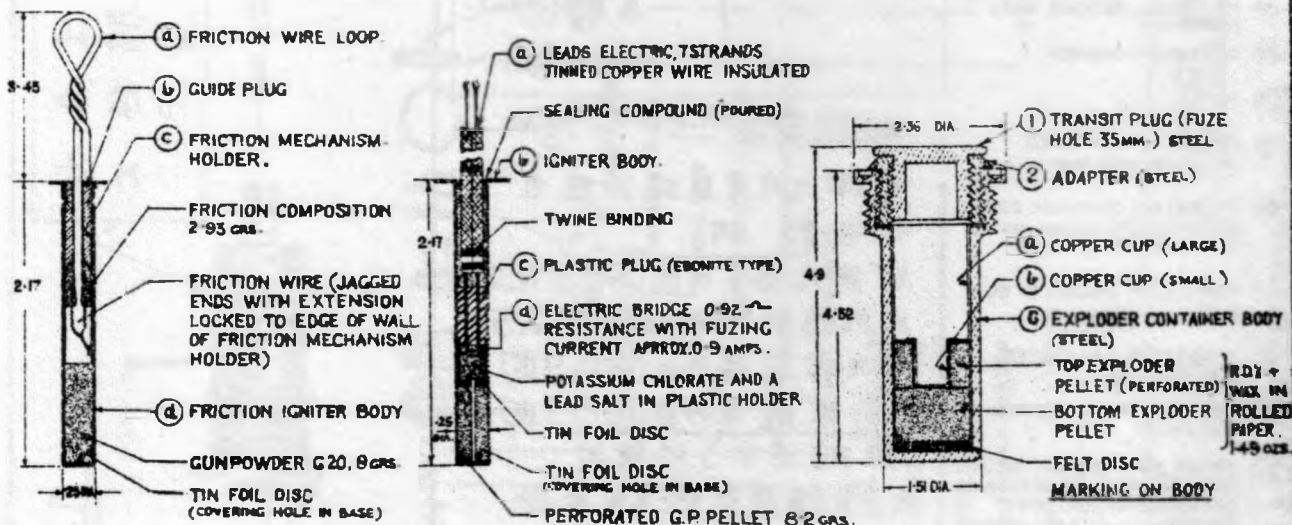
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(15) IGNITER HOLDER WITH EXTENSION

GENERAL NOTES

- (1) ALL COMPONENTS ARE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.
(11) ALL THREADS ARE RIGHT HANDED.



(20) FRICTION IGNITER
(TYPE 96)

(21) ELECTRIC IGNITER
(TYPE 98)

(23) EXPLODER CONTAINER
(TYPICAL FOR HEAD AND BODY OF BOMBS)

JAPANESE 320 MM. H.E. SPIGOT MORTAR BOMB (335 kg).

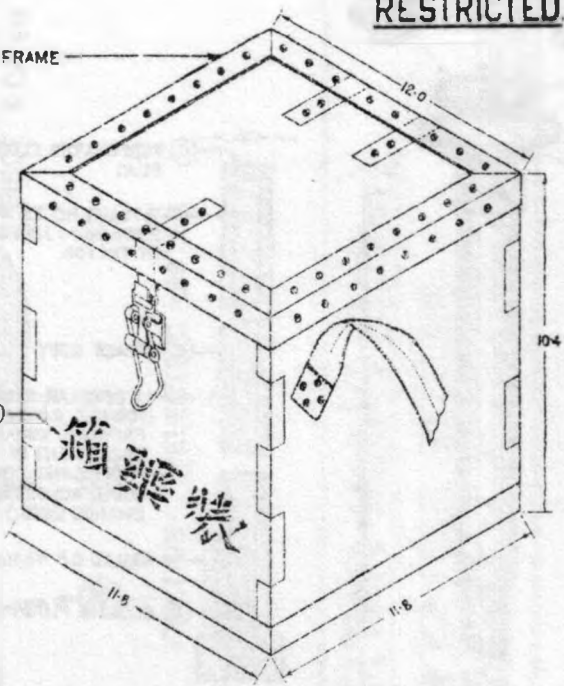
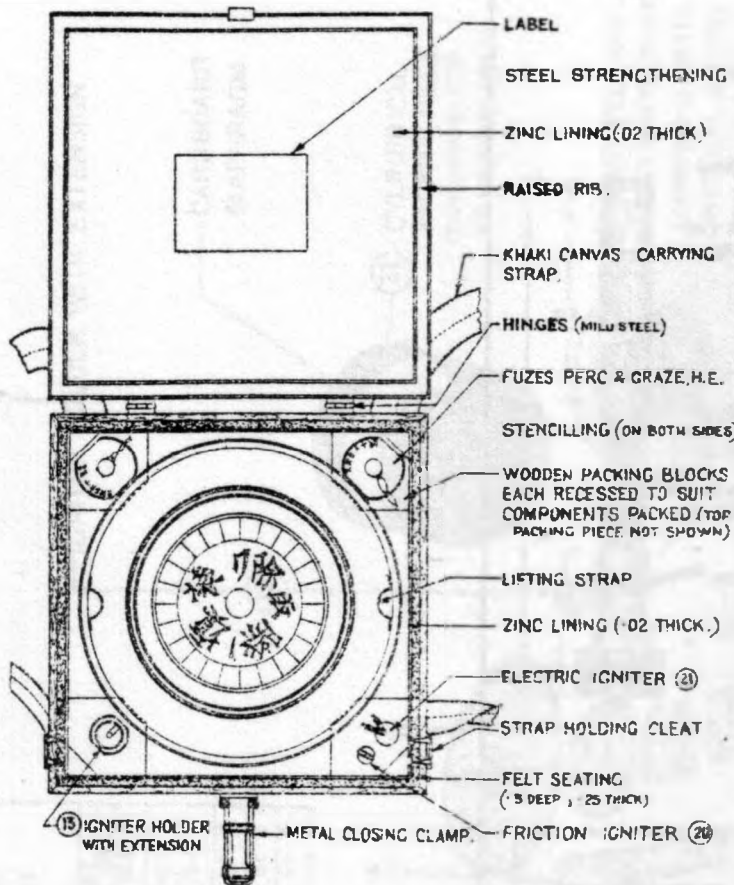
DETAILS OF —

- (I) IGNITER HOLDER (WITH EXTENSION),
(II) PRIMER, (III) FRICTION IGNITER,
(IV) ELECTRIC IGNITER, (V) EXPLODER CONTAINER.

DIMENSIONS IN INCHES

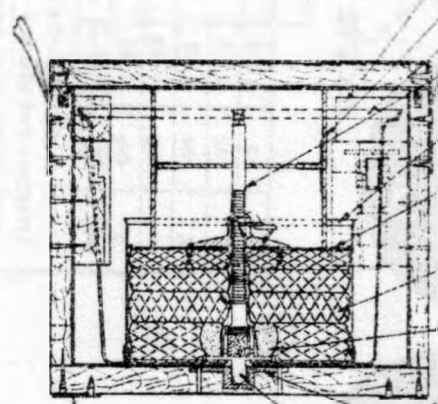
CLASS. 5 / 1087
REVISED APR. 43

RESTRICTED



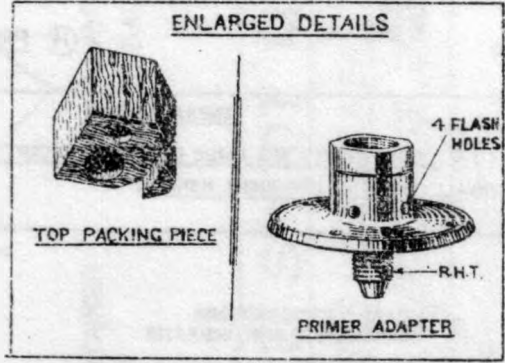
PLAN

BOX MADE OF WHITE WOOD PAINTED DRAB-KHAKI EXTERNALLY
(SIDES - 5/8, TOP & BOTTOM - 3/4)



SECTIONAL ELEVATION

STRAP HOLDING CLEAT



JAPANESE CHARACTERS ON PAPER LABEL ON UNDERSIDE OF LID

名種九八式自砲裝藥包
收管 射 組
裝藥九番管狀藥 (照1710号96号)
点状藥冰状藥 (照175号275号)
九六式摩擦明管 (照159東)
九六式毒氣明管 (照159東)
昭和18年3月調製
大阪陸軍兵器廠

JAPANESE 320 MM H.E. SPIGOT MORTAR BOMB (335kg) PROPELLANT TRANSPORT BOX.

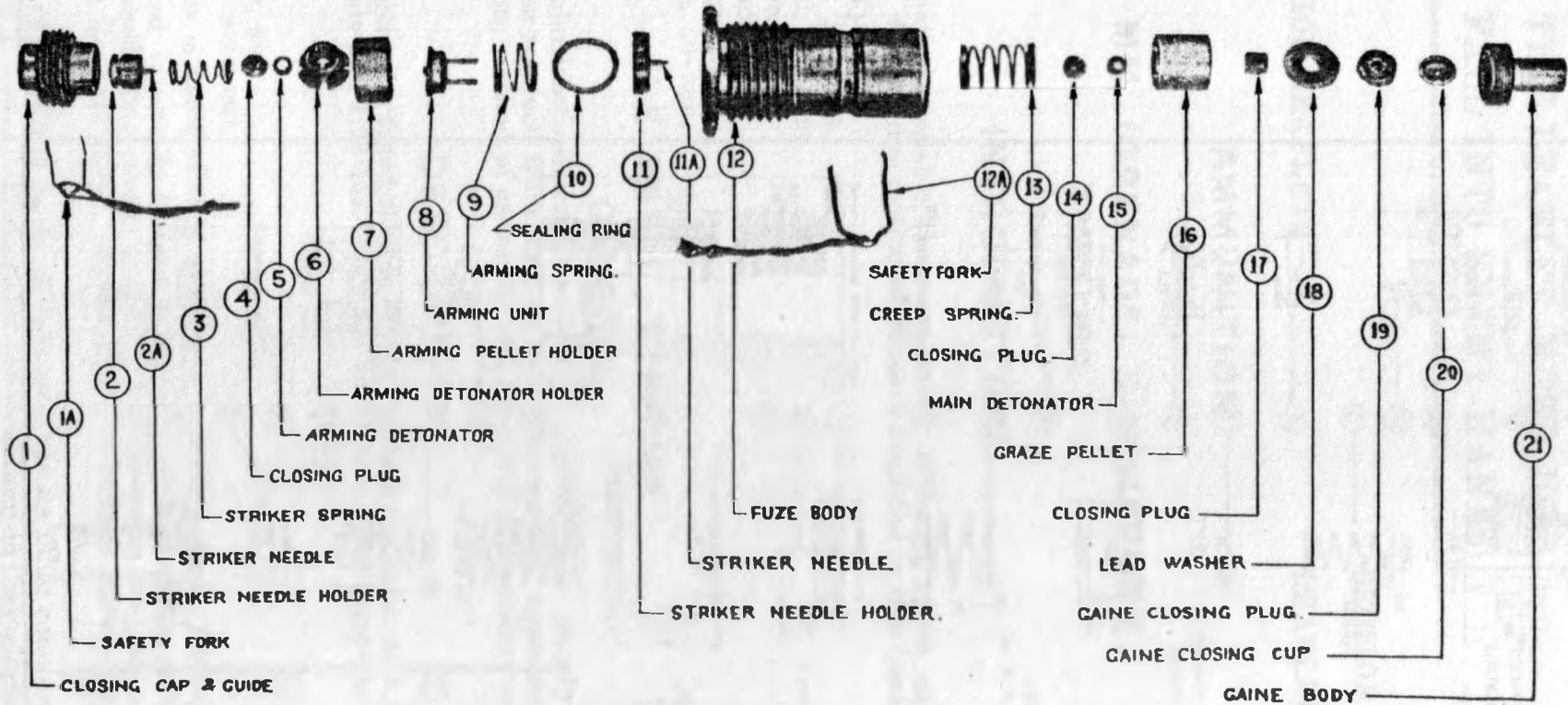
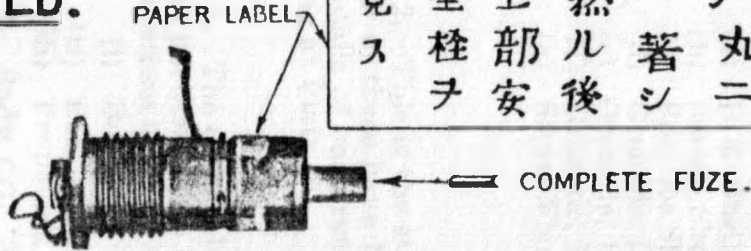
- HOLDING :-
- (1) PROPELLANT CHARGES WITH PRIMER, CONTAINER & OBTURATION CHAMBER
 - (b) TWO FUZES PERC & GRAZE, H.E.
 - (c) ONE EACH ELECTRIC & FRICTION IGNITER.
 - (d) ONE-IGNITER HOLDER WITH EXTENSION

DIMENSIONS IN INCHES

CLASS 5/1056
MAYBE, APRIL 50

RESTRICTED.

免 全 上 然 ヲ 呪 全 下
ス 栓 部 ル 著 丸 シ 栓 部
ヲ 安 後 シ ニ テ ヲ 安



FUZE, PERC. & GRAZE. H.E.

FOR

JAPANESE 320 MM. H. E. SPIGOT MORTAR BOMB (335 KG.)

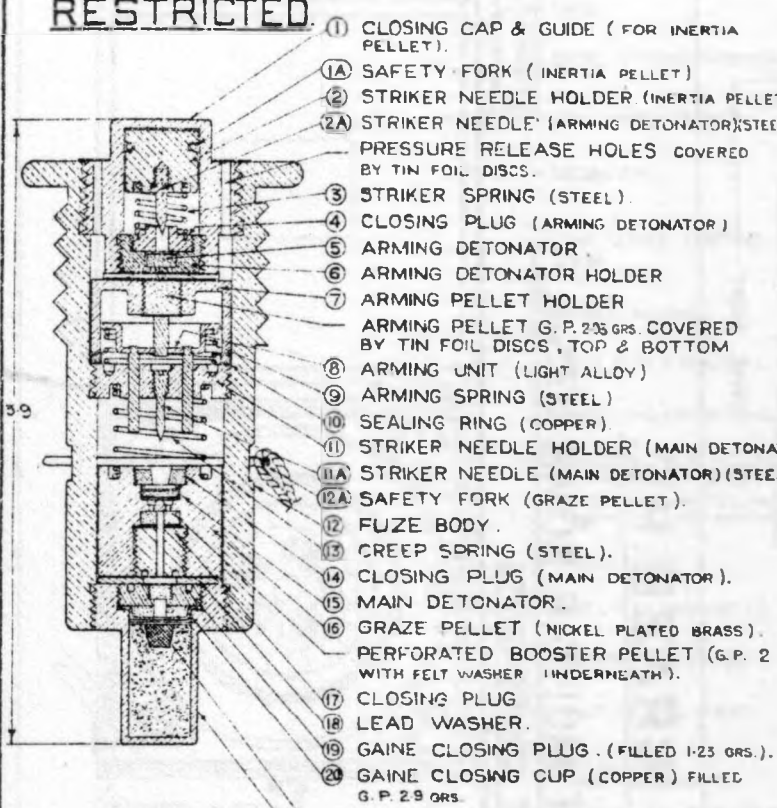
ASSEMBLY SEQUENCE OF COMPONENTS.

C.I. AMM 5/1043
KIRKEE APRIL '35

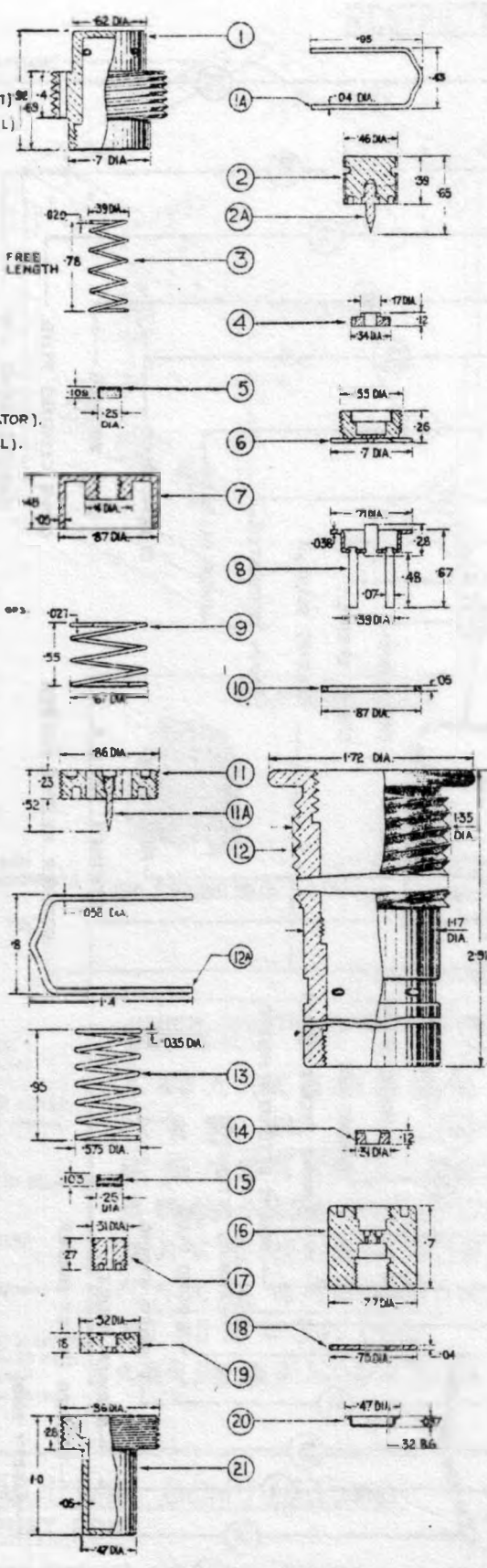
G.P. 2.P. POONA. 1945.

PLATE G

RESTRICTED

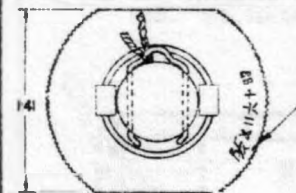


- ① CLOSING CAP & GUIDE (FOR INERTIA PELLET).
- ①A SAFETY FORK (INERTIA PELLET)
- ② STRIKER NEEDLE HOLDER (INERTIA PELLET)
- ②A STRIKER NEEDLE (ARMING DETONATOR)(STEEL)
- PRESSURE RELEASE HOLES COVERED BY TIN FOIL DISCS.
- ③ STRIKER SPRING (STEEL).
- ④ CLOSING PLUG (ARMING DETONATOR)
- ⑤ ARMING DETONATOR.
- ⑥ ARMING DETONATOR HOLDER
- ⑦ ARMING PELLET HOLDER
- ARMING PELLET G. P. 2.25 GRs. COVERED BY TIN FOIL DISCS. TOP & BOTTOM
- ⑧ ARMING UNIT (LIGHT ALLOY)
- ⑨ ARMING SPRING (STEEL)
- ⑩ SEALING RING (COPPER).
- ⑪ STRIKER NEEDLE HOLDER (MAIN DETONATOR).
- ⑪A STRIKER NEEDLE (MAIN DETONATOR)(STEEL).
- ⑫ SAFETY FORK (GRAZE PELLET).
- ⑫ FUZE BODY.
- ⑬ CREEP SPRING (STEEL).
- ⑭ CLOSING PLUG (MAIN DETONATOR).
- ⑮ MAIN DETONATOR.
- ⑯ GRAZE PELLET (NICKEL PLATED BRASS).
- PERFORATED BOOSTER PELLET (G.P. 2 GRs. WITH FELT WASHER UNDERNEATH).
- ⑰ CLOSING PLUG
- ⑱ LEAD WASHER.
- ⑲ GAINE CLOSING PLUG (FILLED 1.23 GRs.).
- ⑲A GAINE CLOSING CUP (COPPER) FILLED G. P. 2.9 GRs.



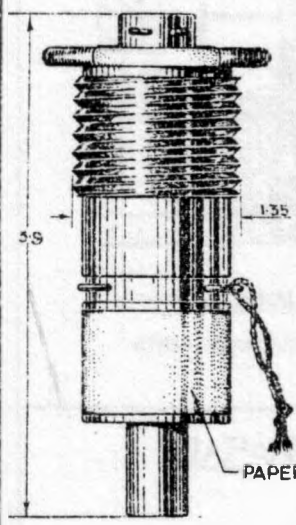
NOTE :- FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.
ALL THREADS ARE RIGHT HANDED THREADS.

- ⑳ LEAD AZIDE PELLET 3.4 GRs.
- ㉑ GAINE BODY (FILLED R.D.X + WAX 31 GRs.).



MARKING STAMPED ON TOP OF THE FUZE.

OSAKA INSPECTION MARK NOV. 1941



⑤

COPPER DISC.
COPPER CUP
MERCURY FULMINATE
POTASSIUM CHLORATE
ANTIMONY SULPHIDE
MEAL GUN POWDER
FILLED WT. 5.75 GRs.

⑮

COPPER
MERCURY FULMINATE
POTASSIUM CHLORATE
ANTIMONY SULPHIDE
THREE FLASH HOLES.
FILLED WT. 5.02 GRs.

BASE VIEW ⑥

⑧

ENLARGED DETAILS

FUZE, PERC. & GRAZE, H.E.

FOR
JAPANESE 320 MM. H.E. SPIGOT MORTAR BOMB (335 KG)
 GENERAL ASSEMBLY & COMPONENT DETAILS.

DIMENSIONS IN INCHES.

C.I. AMM. S/108 B
KIRKEE, APRIL '45

G.P.Z. P. PORDA 1945.

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

SECTION D

JAPANESE AMMUNITION LEAFLETS

LEAFLET D 8

AMMUNITION FOR 50-MM. (GRENADE) DISCHARGER TYPE '89.

INTRODUCTION

According to information available, there are seven different types of projectiles for use with this Discharger. A brief description of these is included in this Leaflet :—

- (a) H.E. Shell, Type '89.
- (b) Smoke Shell, Type '95.
- (c) Practice Shell, Type '94.
- (d) Grenade, Incendiary.
- (e) Grenade, Smoke.
- (f) Grenade, Type '91.
- (g) Signal Flares, 50-mm.

H.E. SHELL, TYPE '89

GENERAL

2. This is the standard anti-personnel projectile and is very widely used. A large number of these have been received from time to time for critical examination at Kirkee. The details of construction, method of assembly and details of components are shown in the drawing at Plate A.

DESCRIPTION

3. The overall length of a fuze shell is 5½-ins. with a diameter of 1.94-ins. over the parallel portion of the body and 1.96-ins. over the bourrelet. The complete shell consists of three sections :—

- (i) Body,
- (ii) Base adapter, and
- (iii) Propelling attachment.

4. Body (3). This is made of steel and has a bourrelet about 0.9-in. below the nose. The nose is screw-threaded internally to form a 20-mm., left hand threaded fuze hole. A cavity in the top of the shell filling, about 5-ozs. of T.N.T., takes an aluminium or copper flanged cup (2) to receive the fuze gain. At the base the body is screw-threaded to receive the base adapter (4).

5. Base Adapter (4). This is made of steel and has an inner concave surface in which is fitted a pre-pressed T.N.T. pellet. The general construction of the adapter will be clear from the drawing in Plate A.

6. Propelling Attachment. This consists of :—

- (i) A Propellant Container Cup (8) of copper, holding 46-grs. of N.C. wrapped in a paper tube bent to form a ring (7). The cup is closed with a copper lid (6) fitting into the mouth of the container cup (8). In the base of the propellant container cup is a perforation to accommodate a brass percussion cap holder (9).

- (ii) **A Brass Percussion Cap Holder (9)**. This is in the form of a cylinder holding 4 3/4-grs. of G.P. The base of the holder is shaped to form an anvil and cap chamber. The cap chamber takes a Berdan type brass percussion cap similar in construction to that used in Japanese S.A.A. cartridges.
- (iii) **Propellant Assembly Holder (10)** This is a steel cup having eight holes 0.2-in. in diameter equi-spaced round the circumference. Externally the holder (10) is grooved to receive the copper driving band (5) which fits over the eight holes and is pressed tightly into the groove; it is secured in position by five steel pins. Under the driving band and fitting lightly over the holes is a tinfoil strip to prevent ingress of moisture.

7. Alternatively the shell body may be manufactured in two parts, the head and body, as shown in the drawing at Plate A.

8. **Filling**. All shell examined have been found with a filling of Grade I T.N.T. The base adapter is filled with a pellet of T.N.T. pre-pressed to shape. The main filling of T.N.T. is stemmed into the shell from the base. No exploder is used and initiation is direct from the fuze gaine.

ACTION.

9. On firing, the striker in the Discharger initiates the cap, the flash from which passes via the booster charge in the cap holder (9) to the propellant (7). The propellant gases then rupture the copper cup (8) and pass through the holes in the wall of the holder (10) to force the driving band into the rifling and also escape through holes in the base to propel the shell to a range dependent on the position of the striker barrel in the bore of the Discharger. The sealing of the driving band in the Discharger is also assisted by set up as the body of the shell is propelled violently forward by the gases.

FUZE, PERCUSSION, D. A. TYPE '88 (SMALL), 20-mm. F. H.

10. This is a direct action nose fuze with a left hand screw thread to fit the 20-mm. fuze hole of the shell. So far as is known this fuze is also used in the 70-mm. 11 Year Type mortar smoke shell and sometimes adapted for booby traps. The details of the components and the general construction of the fuze are clearly shown in the drawing at Plate B. For purposes of description the fuze may be divided into three main parts:—

- (i) Brass body, upper half (1) containing the striker mechanism.
- (ii) Brass body, lower half (10) to which is fitted gaine (14).
- (iii) Gaine (14) holding the main filling and detonator holder (12.)

The body upper half is centrally bored to varying diameters to take the striker comprising a brass striker head (2), a steel striker (2A) and a slotted striker sleeve (2B). Under the striker head and bearing on a brass sliding piece (5) is the upper spring (3). Below the brass sliding piece (5) is the lower spring (6). Both the springs tend to force the striker out of the upper half of the body but are prevented from doing so by the flange on the striker head (2). Fitting round the slotted striker sleeve (2B) and resting on the brass sliding piece (5) is a brass setback ferrule (4). The setback ferrule (4) at its lower end surrounds a cupronickel stirrup spring (7), the mouth of the setback ferrule (4) resting on the prongs of a stirrup spring (7). Immediately below the slotted striker sleeve (2B), preventing its downward movement (and that of the striker (2A)), are four brass centrifugal segments (8) which are held under the striker sleeve (2B) by the barrel of the stirrup spring (7),

The lower half of the body screws on to the upper half thus forming a housing for the striker mechanism. A mild steel safety fork (9) passes through holes in the lower body and prevents any appreciable downward movement of the setback ferrule (4) and thus prevents the fuze from arming. At its lower end the body (10) is screw-threaded externally with a left-hand thread to screw into the shell. It is centrally perforated to provide a passage for the striker (2A) and screw threaded internally to take the gaine (14).

11. The method of filling of the gaine will be clear from Plate B. The mouth is closed by a screwed detonator holder (12) in which is fitted a detonator secured by turning over. Note that a somewhat complicated method of filling is used in this gaine. It is possible, however, that different methods of filling are used and a simplified method of gaine filling may be used as in the slight delay and graze action fuze Type '88 (24-mm. fuze hole), see Plate D in J. A. L. E3.

12. Safety Devices. The fuze incorporates three safety devices :—

- (a) A safety fork (9) which during handling and transport secures the setback ferrule (4) and prevents it from riding over the stirrup spring (7).
- (b) Four centrifugal segments (8) which fit round the lower striker spring (6) and are seated inside the stirrup spring (7) to prevent any appreciable downward movement of the striker (2A).
- (c) Two steel springs which prevent any inward movement of the striker onto the detonator during flight.

ACTION.

13. Before loading, the safety fork (9) is removed. On discharge, the setback ferrule (4) sets back over the stirrup spring (7) compressing the three spring projections and locking itself by means of these projections to the stirrup spring (7). At the same time, by means of the sliding piece (5), the lower spring (6) is compressed by the ferrule (4) setting back. After initial setback, when acceleration decreases, the set-back ferrule (4) and stirrup spring (7) move forwards together under force of the spring, freeing the brass segments (8) which fly outwards owing to centrifugal force. The striker is then held off the detonator only by the springs and functions normally on impact.

PACKING.

14. A number of different methods of packing have been found. Typical packing of shell received at Kirkee is shown in Plate D.

- (a) A wooden case holding 20 plugged shell each contained in an unbleached brown paper envelope, which had been treated with tar to render it waterproof. Five shell each in a paper envelope, together with five fuzes, each in a tinned plate container, are packed in between a pair of shaped wooden packing trays. Four of these trays are placed horizontally, two in each of the two compartments inside the case. The case is either painted yellowish green or left unpainted and bears black stencilled markings on the sides as in Plate D.
- (b) Another method of packing appears to be a copy of the American system. Two plugged shell are packed in a rolled paper, asphalt impregnated cylinder. The shell are held 'snug' in the container by wooden packing pieces. The two fuzes for the shell are packed separately in a tinned plate container, each fuze being wrapped in blue waxed paper secured by a piece of string.

Ten of these containers are reported to be packed in a wooden case together with ten cylinders each containing two fuzes.

- (c) Another method of packing received at Kirkee is a cardboard container holding one plugged shell with one fuze wrapped in a piece of blue waxed paper secured by a piece of string. The construction of this container is rolled paper throughout coated with a waxy matter. Twenty containers each containing one plugged shell and one fuze are packed in a wooden case with four compartments, five in each compartment.

15. In addition to the above methods of packing which have been examined at Kirkee, the following methods have also been reported :—

- (a) A wooden case holding 40 plugged shell designed for carriage on a pack horse.
- (b) A five round unit in a wooden packing tray which is wrapped in an asphalt impregnated paper container.
- (c) Bulk issue of fuzes is reported to be in a wooden case holding 100 fuzes.

16. Transport on the man is in pouches slung on a leather strap over the shoulder or on the belt by means of a loop at the back of the pouch. Two types of pouches have been examined at Kirkee and details are shown in Plate C.

IDENTIFICATION.

17. The shell is distinctive in the arrangement of the propellant container in the base. It should be remembered that there is also a 70-mm. discharger with a very similar shell, but the difference in the calibre will prevent confusion.

SUMMARY OF DATA

<u>Shell</u>	<u>Fuzed</u>
Weight of complete round	.. 1-lb. 12.3-ozs.
Length of complete round	.. 5.75-ins.
Diameter over bourrelet	.. 1.96-ins.
Diameter over body	.. 1.94-ins.
Diameter over driving band	.. 1.96-ins.
Weight and nature of shell filling	.. 5.0-ozs. of T. N. T.
Weight and nature of propellant	.. 46-grs. N. C. with D. P. A. as a stabilizer
Weight and nature of igniter charge in percussion cap holder	.. 4.75-grs. of G. P.
 <u>Fuze</u>	
Overall length	.. 2.32-ins.
Weight	.. 2.6-ozs.
Weight of detonator filling	.. 2.4-grs.
Weight of filling in copper cup	.. 11-grs.
Weight of gaine filling	.. 15-grs.

HANDLING AND TRANSPORT.

(Of captured ammunition by Ordnance)

18. Although the shell has no counterpart in British ammunition it may be handled the same way as our 2-in. mortar bombs. Shell are normally issued plugged, but if fuzed shell are found, they should be defuzed and carried plugged. It should be noted that the becket on the safety fork can be caught up easily in packing and may be pulled out accidentally. The fuze can then be armed by a heavy fall; fuzes therefore should always be examined to ensure that the safety fork is in position.

	<u>Shell</u>	<u>Fuze</u>
EXPLOSION/FIRE RISK	.. 5-ozs. per. plugged round	6½-ozs. per 100
GROUP CLASSIFICATION	.. VIII Category Z	VI Category X
CLASSIFICATION FOR SEA TRANSPORT	.. O. A. S.	O. A. S. (C)

SMOKE SHELL.

GENERAL.

19. Samples of smoke shell which are believed to be the Type '95 have not been received for examination at Kirkee. The information in this Leaflet is based on reports received from American and Australian authorities.

20. The intended use of the smoke shell is not certain. The small quantity (3.57-ozs.) of smoke mixture would not enable the shell to be used effectively for smoke screening. Its use for observation or signalling purposes is more probable. If burst low above the jungle it could possibly be employed to indicate targets for air support.

21. The shell is fired from the Type '89 Grenade Discharger and the range is reported to be about 140 to 700 yards. It may be fitted with either a fuze-hole plug or a Type '89 Small Time Fuze shown in Plate E. The fuze-hole plug used is slotted and flanged and is made of a red-brown plastic material.

DESCRIPTION.

SHELL.

22. The general arrangement of the shell is shown in the drawing at Plate E, and it will be seen that it is made in four sections :—

- (a) The head,
- (b) The body,
- (c) The base adapter,
- (d) The propellant assembly holder.

23. The body (9) is lined with two semi-cylindrical steel segments (10) formed by cutting a steel sleeve longitudinally. These two segments stand on a split support disc (12) which lies across the top of the base adapter (15). An aluminium cup (13) rests on the concave surface of the base adapter and is attached by a piece of cord to the smoke container (11). The propellant assembly holder (20) and the base adapter (15) are very similar to those employed in the H.E. shell except the latter is a push fit into the body and is secured by four screwed shear pins (14) instead of being screwed to the body. The baffle plate (3) fits into an undercut in the head (2) and is separated from the semi-cylindrical segments by millboard washer (4).

24. The smoke container (11) of drawn brass is swaged near the top to support a rimmed brass diaphragm (6) having a central hole surrounded by six equi-spaced smoke ports covered with tinfoil. A flanged zinc cup (8) with a central hole covered with tinfoil is sweated to the lower side of the diaphragm (6), and contains the igniter mixture (7) and an inner core of black powder. A brass disc (5) with holes corresponding to those in the diaphragm (6) is positioned so that it rests on the rim of the diaphragm and is retained by lugs from the end of the smoke container. Attached to the lower side of the disc (5) is a cotton cambric disc primed with gunpowder.

25. Filling. The filling from the shell was found to be :—

- (a) Smoke composition.
Hexachlorethane mixture
- (b) Ignition mixture
Potassium nitrate
Sulphur
Aluminium
Antimony trisulphide.

FUZE

26. This is a time fuze with left hand fuze threads. The construction and action are clear from the drawing. It has only two time rings and it is presumed that the name "Type '89, Small Time Fuze" is used to distinguish it from the Type 89 Time fuze used in the 75-mm A. A. shell, Type '90, which has four time rings.

27. Safety devices.

- (a) The usual safe position of the time rings.
- (b) The safety pin which prevents movement of the inertia pellet.

ACTION

28. The safety pin is removed before inserting the shell into the barrel of the discharger. The fuze is initiated by the shock of discharge and operates after the set time interval. The powder in the lower time ring burns in a clockwise direction, that in the upper ring in an anti-clockwise direction.

29. Smoke ejection. The flash from the booster of the fuze passes through the holes in the baffle plate and ignites the primed cambric disc. This initiates the ignition mixture which in turn ignites the smoke mixture. At the same time the pressure built up between the fuze and the baffle plate is transmitted to the base plate via the cylindrical steel segments and the split support disc. The 4 screwed shear pins are sheared and the base plate and propellant container are forced out. At the same time the smoke mixture container is ejected with the aluminium cup attached. The split in the support disc allows it to fall free in two halves without fouling the string.

Note :—The object of the aluminium cup is not clear. It is improbable that it would appreciably retard the fall but it should steady the container so that the fall is more nearly vertical. It might be intended to catch on branches when fired over jungle and thus give a signal from a tree top visible to aircraft.

IDENTIFICATION.

30. The plugged shell can be readily identified from the H. E. shell by the two white bands on the body and the marking stencilled in white in a circle on the body. Fuzed shell can be identified by the difference in the shape of the fuze.

HANDLING AND TRANSPORT.

(Of captured ammunition by Ordnance)

31. Treat as for similar British stores, e.g. 25-pdr. B.E. Smoke Shell.

EXPLOSION/FIRE RISK per plugged round	.. 4½ Ozs.
GROUP CLASSIFICATION	.. XI Category Y
CLASSIFICATION FOR SEA TRANSPORT	.. O.A.S. (D).

PRACTICE SHELL TYPE '94

32. A separate sketch of this shell has not been included as there is nothing of importance. Some details have already been given in J.A.L., D 1 Plate A Serial 3. As this shell has not been received at Kirkee, it is not clear whether it is an inert shell intended for drill purposes only or a practice shell.

INCENDIARY GRENADE

33. See J. A. L., C 1 Plate A Serial 3. The body is made of brass with an inner brass container holding white phosphorus.

SMOKE GRENADE

34. See J. A. L., C 1 Plate C Serial 13. This grenade is also referred to as the 10 year Type Illuminating flare. It consists of a cylindrical sheet metal tube with hemispherical nose containing hexachlorethane mixture. On discharge the flash from the propellant ignites the igniter pellet at the base of the grenade which in turn ignites the filling.

This grenade with an incendiary filling of potassium nitrate, aluminium etc. has also been reported.

GRENADE, TYPE '91

35. See J. A. L., C 2. This grenade is obsolescent and during operations in Assam and Burma very few were recovered.

SIGNAL FLARES, 50-mm

GENERAL

36. These signal flares appear to be widely used by the Japanese. The body of the flare is made of rolled paper and its general construction suggests cheap and easy manufacture, probably by civil firms who normally produce flares and crackers for display purposes. These flares are often referred to as the 10 Year Type Signal Flares.

The coloured plate at the end of this leaflet gives a good idea of the various Japanese flares and the general construction of a typical one is shown in Plate F.

DESCRIPTION

37. According to information available, the performance of each flare is as shown in the statement given below :—

Type of Flare 1	Colour of parachute and Smoke/Light 2	APPROXIMATE RANGE OF VISIBILITY.	
		Day (Yards) 3	Night (Yards) 4
1. Black Dragon—Long Range Day Signal.	Black (Smoke Signal)	8800	—
2. White Parachute Star—Long Range Night Signal.	White	3300	27500
3. White Single Shooting Star—Close Range Signal.	„	2200	8800
4. White Double Shooting Star—Close Range Signal.	„	2200	8800
5. White Triple Shooting Star—Close Range Signal.	„	2200	8800
6. Yellow Dragon—Long Range Day signal, (Also effective at night, but no details are available).	Orange (Smoke Signal)	8800	—
7. Green Parachute Star—Long Range Night Signal.	Green	3300	27500
8. Green Signal Shooting Star—Close Range Signal.	„	2200	8800
9. Green Double Shooting Star.	„	2200	8800
10. Green Triple Shooting Star.	„	2200	8800
11. Red Parachute Star—Long Range Night Signal.	Red	3300	27500
12. Red Triple Shooting Star—Close Range Signal.	„	2200	8800
13. Red Dragon—Long Range Day Signal.	Red (Smoke Signal)	8800	—
14. Red Single Shooting Star.	Red	2200	8800
15. Red Double Shooting Star.	„	2200	8800
16. Green Dragon.	Green (Smoke Signal)	Probably 8800	—

Note:—The above figures should be taken only as a guide since background, weather conditions and other factors will cause variation in the range at which the flare is visible.

PACKING.

38. The flares are each packed in a tinned-plate cylinder, which has a push type lid sealed with a length of adhesive tape. The length of the cylinder is 7.4-ins. and the diameter approx. 2-ins. For identification, the same markings appear on the cylinders as on the flares. The cylinder lid also has raised studs etc. to facilitate night identification. See coloured plate.

ACTION.

39. The action will be obvious. On firing, the flash from the propellant ignites a short length of fuze depending on the delay required. This burns while the flare is in flight. It then reaches the ejection charge of gunpowder which expels the star and parachute if fitted. Quickmatch or primer composition in the star picks up from the ejector charge,

IDENTIFICATION.

40. The flare can be readily recognized from the drawing and the coloured plate. The nature of the flare can also be identified from the colour marking chart in the photograph.

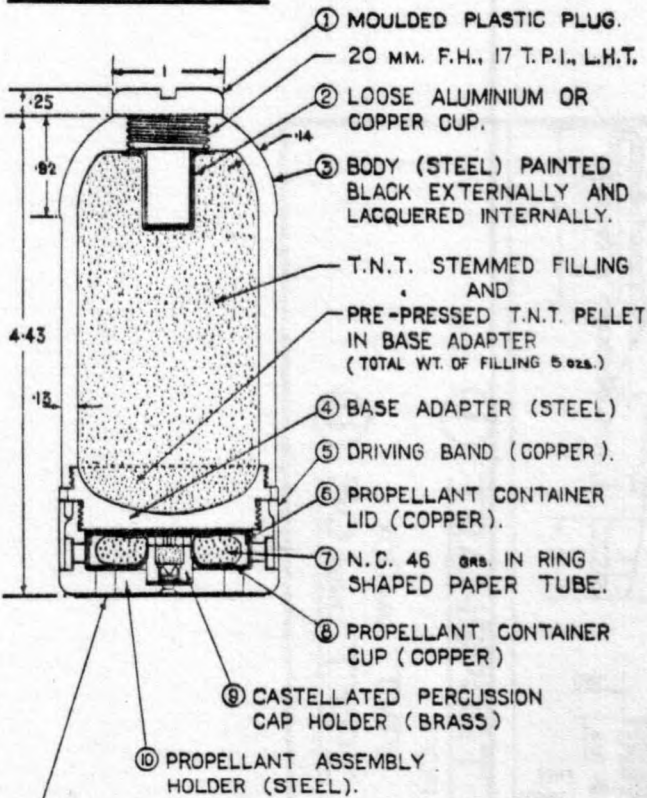
HANDLING AND TRANSPORT

(of Captured ammunition by Ordnance).

41. Treat in the same way as Service Types of Ground Flares. It should be remembered, however, that the Japanese flares are fitted with propellant container and a percussion cap, like a signal cartridge. The possibility of spontaneous ignition of these flares (depending on flare composition) cannot be over-looked, particularly if they have been wet and dried out. It is recommended that these flare should be segregated with other pyrotechnic stores. If the flares have to be used, care should be taken to use only those which are obviously in good condition and have not been wet. A flare which has been wet and dried out can very likely cause a premature in the discharger.

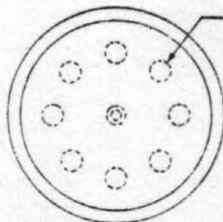
EXPLOSION/FIRE RISK	.. Varies in individual cases. Assume 4-ozs. for each flare.
GROUP CLASSIFICATION	.. IX Category X
CLASSIFICATION FOR SEA TRANSPORT	.. A. S. P.

RESTRICTED.

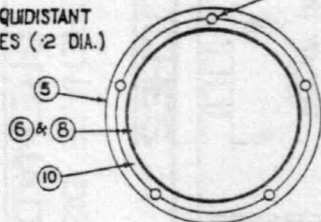


THIN TISSUE PAPER DISC SHELLACKED OVER BASE.

5 STEEL PINS TO PREVENT ROTATION OF DRIVING BAND.

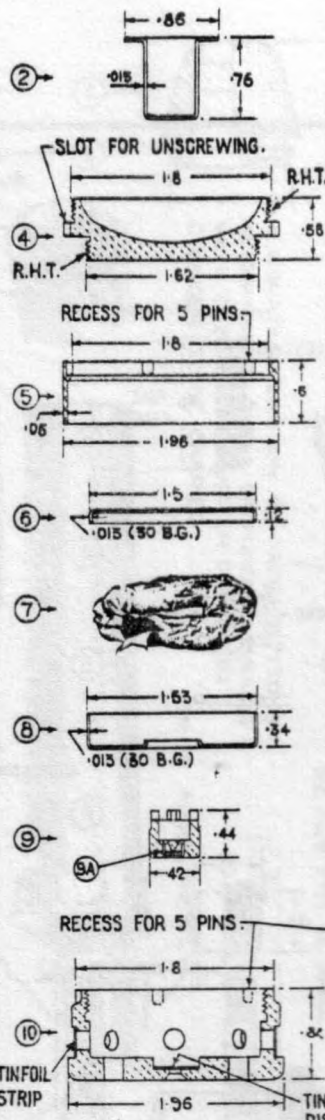


PLAN OF BASE.

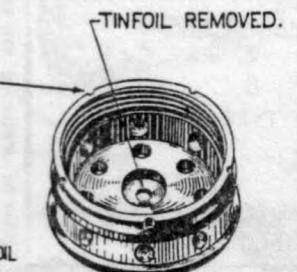
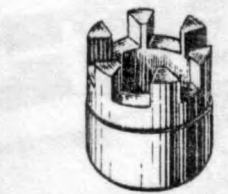
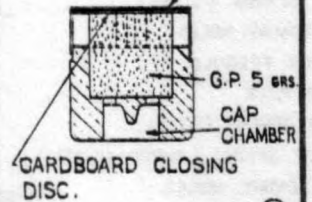


PLAN

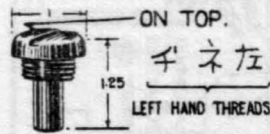
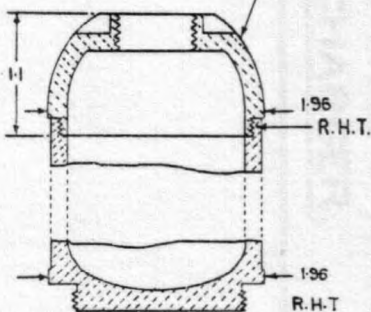
ENLARGED DETAILS.



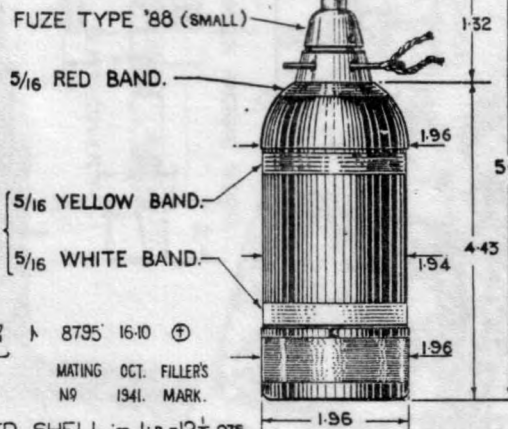
TISSUE PAPER CAP SHELLACKED ON



ALTERNATIVE METHOD OF CONSTRUCTION.



ONE YELLOW BAND ONLY IN THE MIDDLE OF BODY. OR



STAMPED:-

Ⓝ Ⓜ Ⓟ
NAGOYA ARSENAL MFG'S INSPECTION MARK. MARK.

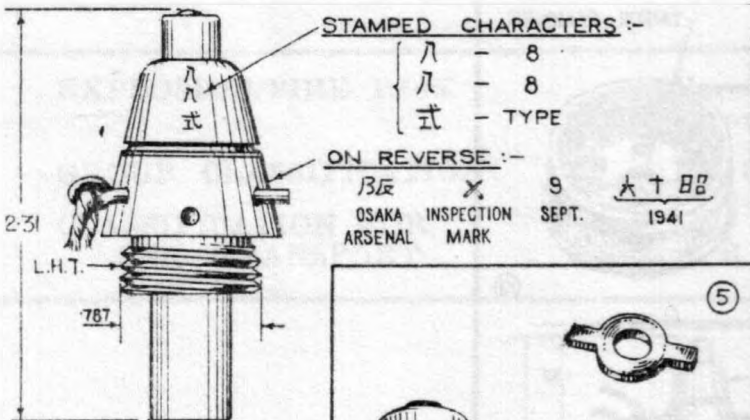
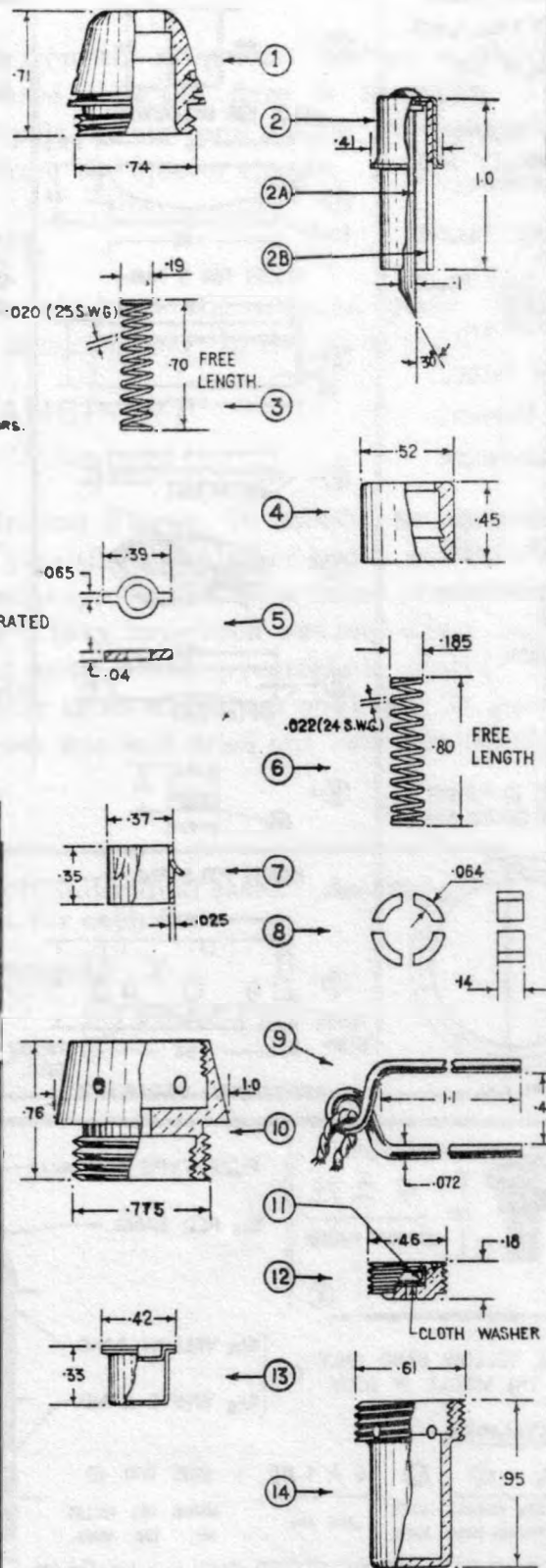
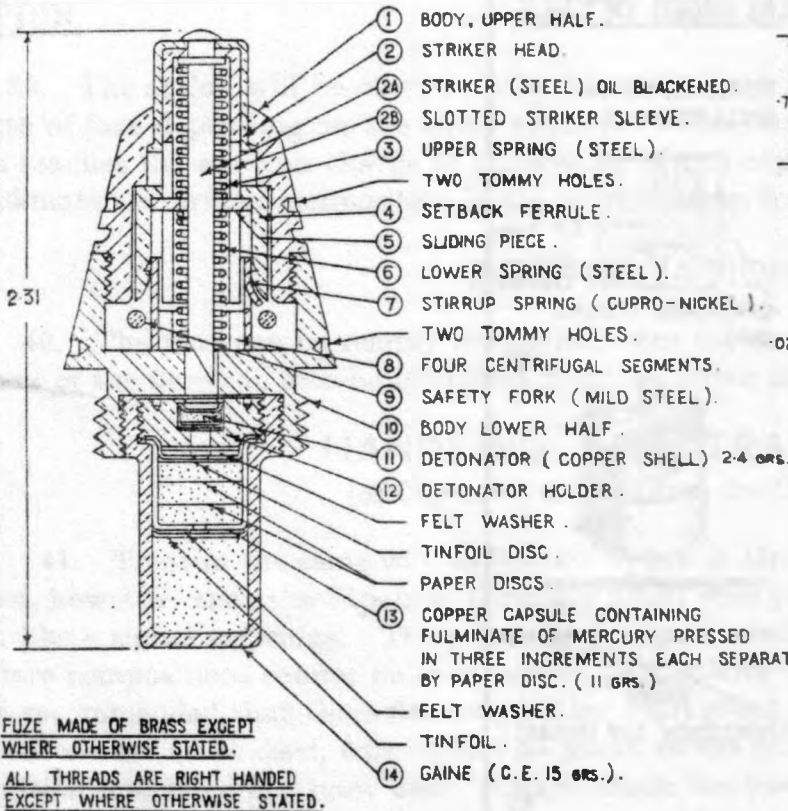
6 大 十 月 日 1941
JUNE 1941

8795 16-10
MATING OCT. FILLER'S N9 1941. MARK.

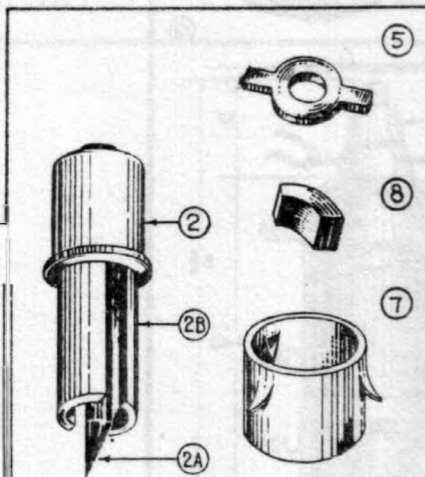
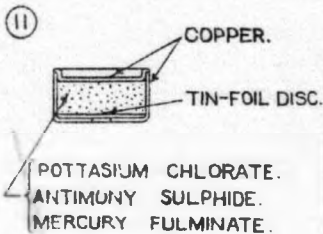
COMPLETE WT. OF FUZED SHELL:- 1LB.-12 1/2 OZS.

JAPANESE
H.E. SHELL .50 MM., TYPE '89

FOR
50MM. RIFLED (GRENADE) DISCHARGER, TYPE '89.



WT. OF FILLED FUZE :- 2.58 grs.



ENLARGED DETAILS.

— FUZE, PERCUSSION D.A. TYPE '88 (SMALL) —

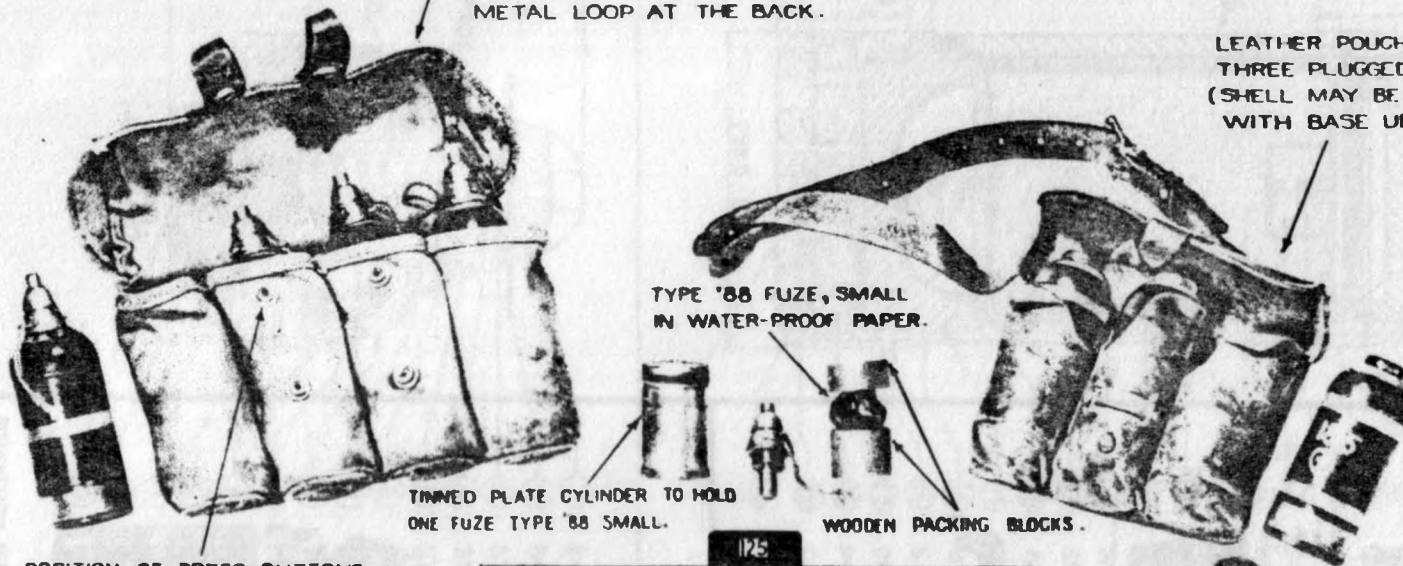
— FOR —

— JAPANESE TYPE '89. 50MM. H.E. SHELL WITH 20 MM. FUZE HOLE. —

RESTRICTED.

CANVAS (WATER-PROOF) POUCH
HOLDING FOUR FUZED SHELL. FITTED
WITH TWO LEATHER LOOPS AND ONE
METAL LOOP AT THE BACK.

LEATHER POUCH HOLDING
THREE PLUGGED SHELL
(SHELL MAY BE PACKED
WITH BASE UPWARDS).



TYPE '88 FUZE, SMALL
IN WATER-PROOF PAPER.

TINNED PLATE CYLINDER TO HOLD
ONE FUZE TYPE '88 SMALL.

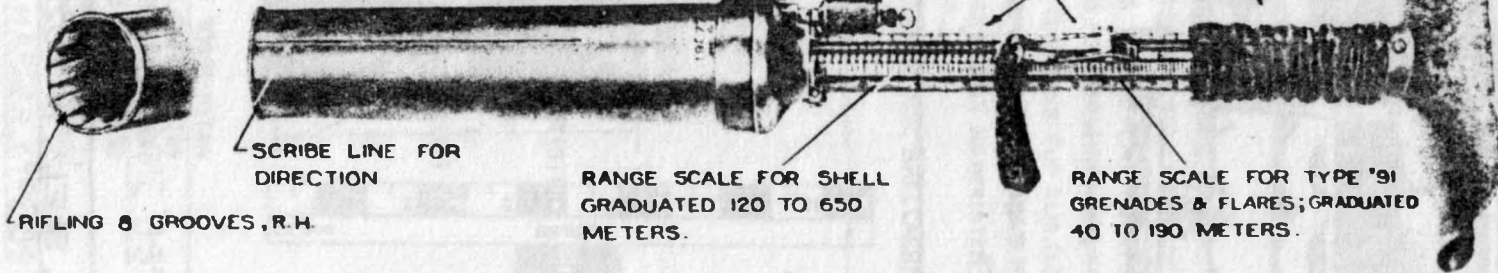
WOODEN PACKING BLOCKS.

ALTERNATIVE POSITION OF PRESS BUTTONS
ALLOW FUZED SHELL OR PLUGGED SHELL
WITH FUZE IN CYLINDER OR FLARES IN
CYLINDER TO BE CARRIED.



RANGE ADJUSTMENT.

DUST COVER.



(i) TRANSPORT POUCHES

FOR

50 MM. TYPE '89 GRENADE DISCHARGER SHELL & FLARES ETC.

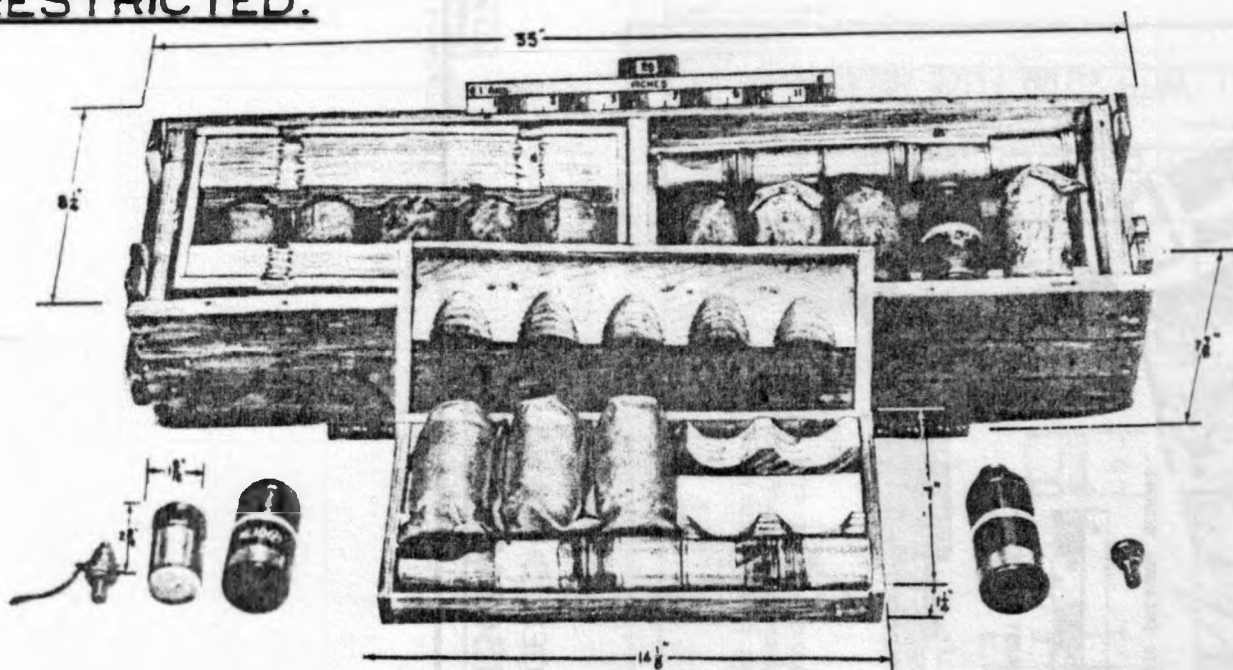
(ii) 50 MM. TYPE '89 GRENADE DISCHARGER.

C.I. ANN S/1152
MIRKEE JUNE 35

U.S. G.P.O. FORM 1945

PLATE C.

RESTRICTED.



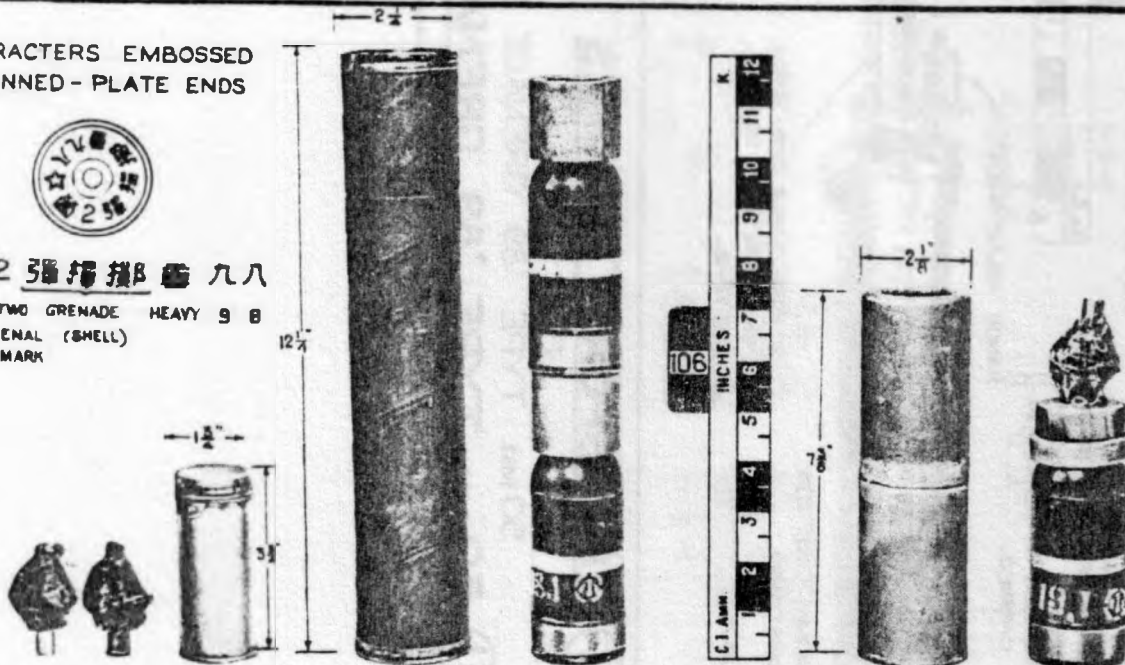
PACKING CASE FOR 20 H.E. SHELL IN 4 TRAYS EACH HOLDING 5 SHELL, WITH 5 FUZES IN TINNED PLATE CYLINDERS.

NOTE JAPANESE CHARACTERS ON SIDE OF BOX ARE UPSIDE DOWN PROBABLY THAT SIDE OF BOX WAS OPENED WHICH WAS INTENDED AS BOTTOM BOTH TOP & BOTTOM OF BOX ARE THE SAME

CHARACTERS EMBOSSED ON TINNED-PLATE ENDS



☆ 八九番 擲彈 強 2 筒
 ↓ PIECES TWO GRENADE HEAVY 9 8
 TOKYO ARSENAL (SHELL)
 INSPECTION MARK



TINNED PLATE CONTAINER TO HOLD TWO FUZES.

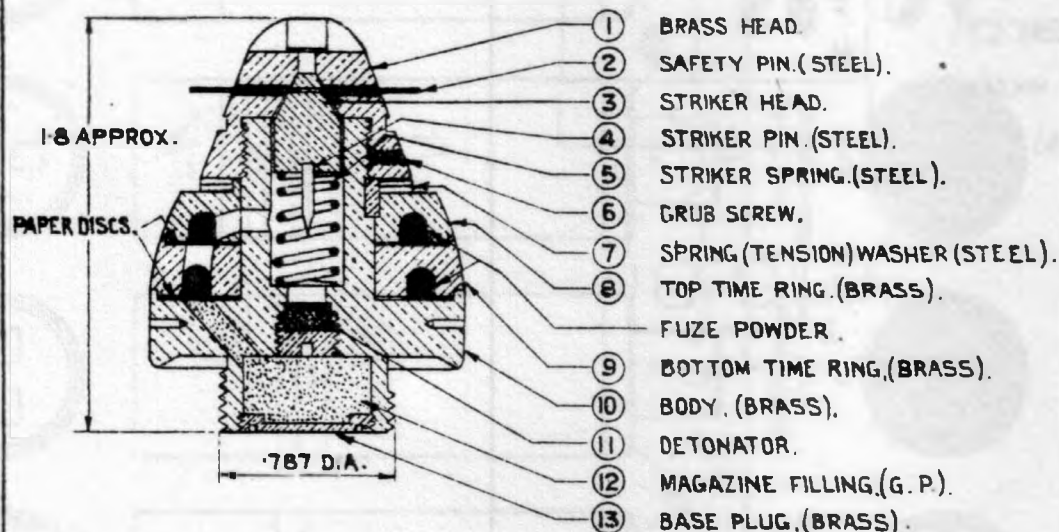
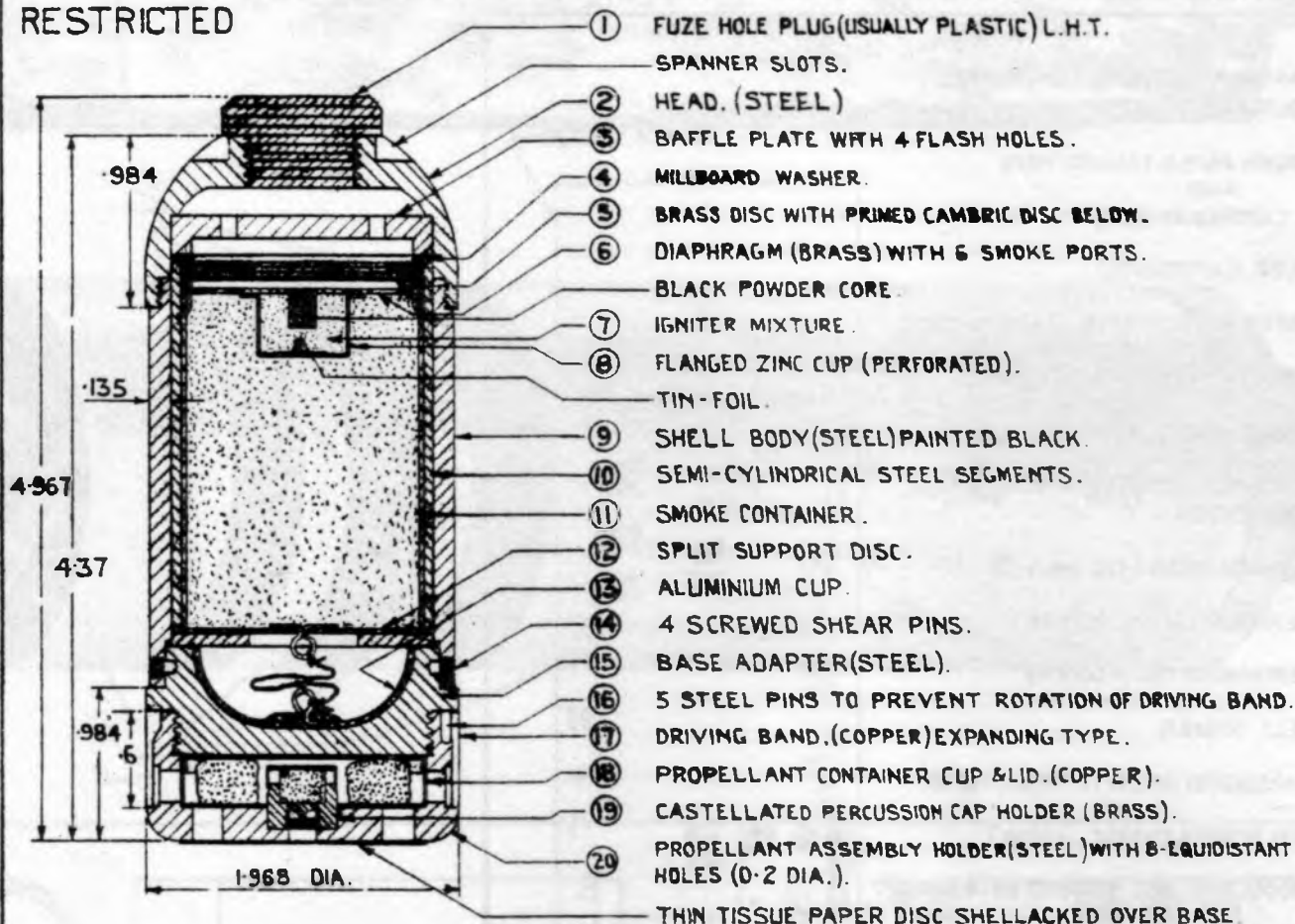
WATER-PROOF ROLLED PAPER CONTAINER TO HOLD TWO SHELL, PLUGGED OR FUZED.

WATER-PROOF ROLLED PAPER CONTAINER WITH SUITABLE PACKING PIECES TO HOLD ONE SHELL PLUGGED WITH FUZE OR A FUZED SHELL.

METHODS OF PACKING H.E., SHELL & FUZES FOR 50 MM. TYPE '89 GRENADE DISCHARGER

CLAMM. 5/1153
 WREKE JUNE 23

RESTRICTED



JAPANESE SMOKE SHELL, 50 MM, TYPE '95

WITH FUZE, TIME TYPE '89 (SMALL)

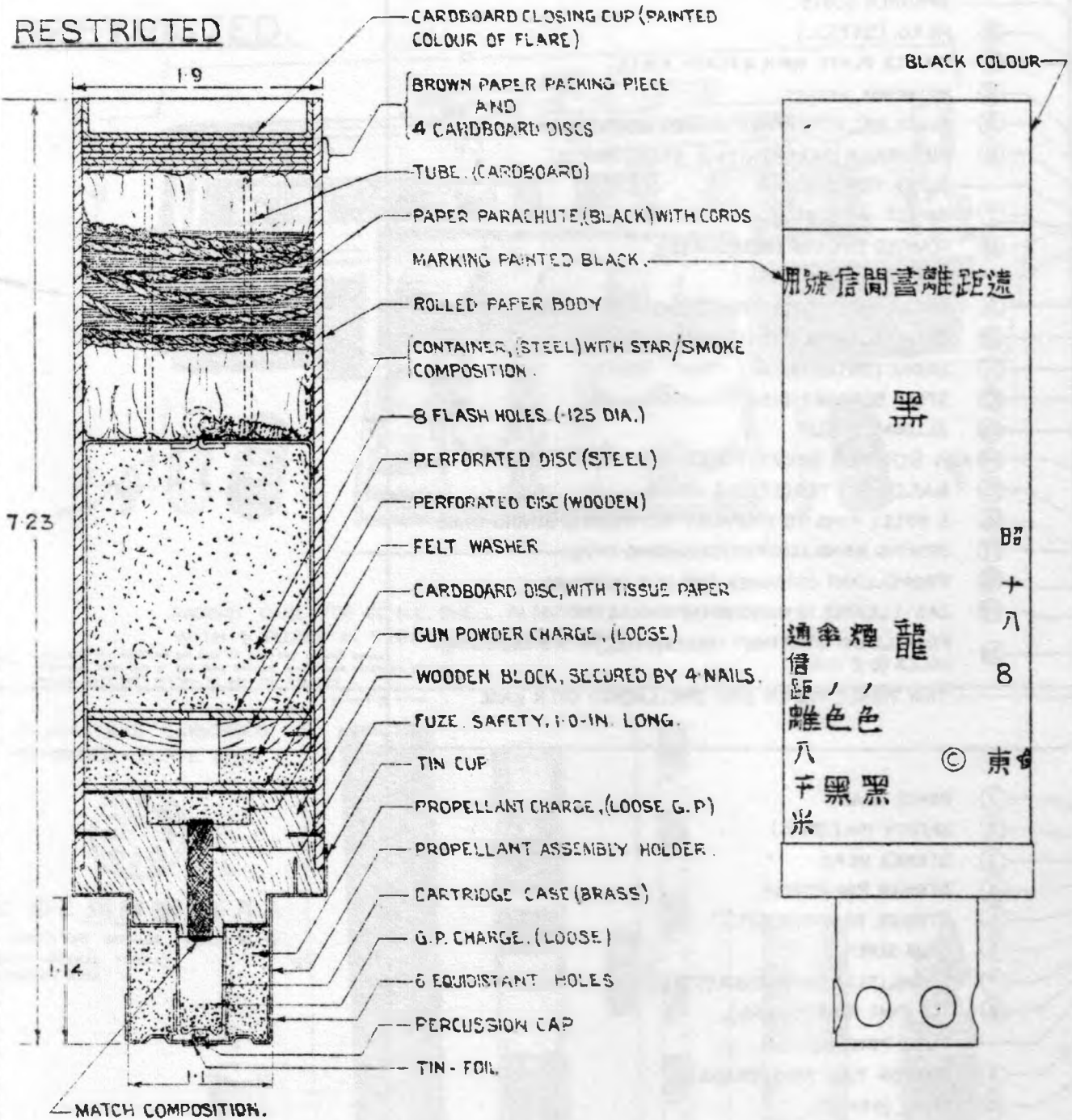
FOR 50 MM. RIFLED (GRENADE) DISCHARGER, TYPE '89

DIMENSIONS IN INCHES

C.I.A.M.N.S/1243
 KIRKEE, SEPT '45.

G. P. Z. P. POONA, 1945.

RESTRICTED



JAPANESE SIGNAL FLARE 50 MM
WITH PARACHUTE
(BLACK DRAGON)

DIMENSIONS IN INCHES.

C.I.A.M.N. S/1239
 KIRKEE. SEPT 45.

G-L-Black
 R-Red
 W-White
 L/B = L/Brown

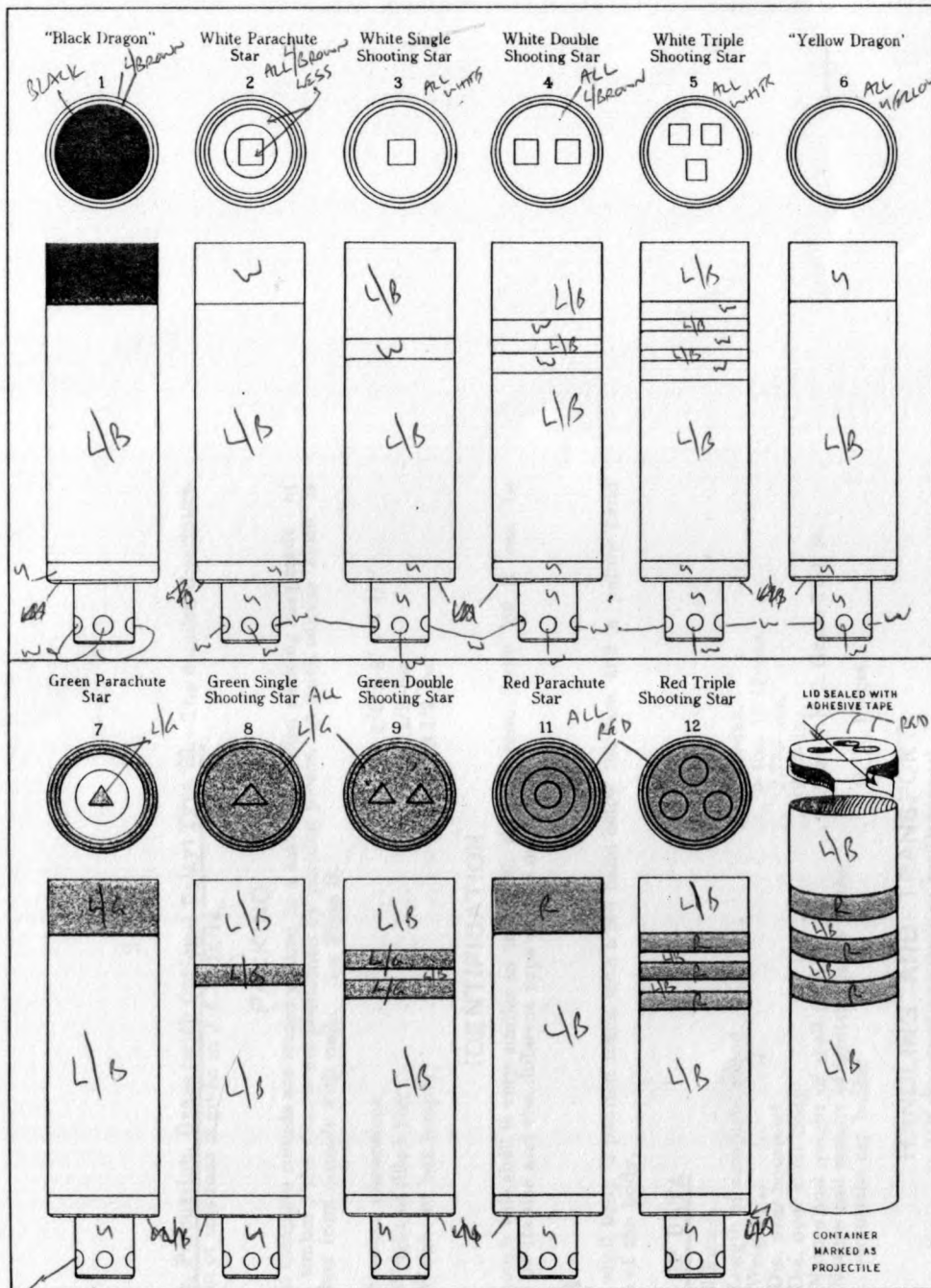


Chart of 50mm Type 89 Grenade Discharger Flares

ALL HOLES
 WHITE



Green Triple Shooting Star
 50mm Flare.



Yellow Dragon
 50mm Flare.

WITH ACKNOWLEDGEMENTS TO
 U.S.N.M.E.I.U

CI.Amm S/1000
 KIRKEE Oct 1944

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D

LEAFLET D 9

AMMUNITION FOR 70-mm. TYPE TAISHO II MORTAR (RIFLED)

GENERAL

Samples of H.E. rounds of the above calibre were received at Kirkee late in 1945 and this leaflet is based on a critical examination carried out here.

2. The Type Taisho 11 Mortar (Discharger) used by the Japanese is of old design and from reports it would seem that it is at least obsolescent. It is the same in principle as the 50-mm. Type '89 Discharger, and fires a large variety of shell such as H. E., Smoke, Illuminating, Practice, Bomb Training etc. This discharger is however more elaborate and has a mechanism for elevating and traversing. It is in fact a rifled mortar and is described frequently in reports as such. A description of this weapon has already been given in J.A.L. D 13.

3. Although various natures of projectiles are fired from this weapon, only two types, namely the H.E. and the Bomb Training have been received and examined at Kirkee. The details given in this leaflet on those projectiles which have not been received here are taken from various American and Australian sources. There is however no specific mention that these shell have actually been encountered in any theatre during the past years and a number of details are believed to be statements by P.O.Ws. They are possibly obsolete or not very widely used.

H.E. SHELL, 70-mm.

DESCRIPTION

4. The shell examined at Kirkee is almost identical in design, construction and in the method of filling to the H.E. shell, 50-mm. Type '89 (see J.A.L. D. 8) and the drawing at Plate 'A' gives a good idea of its general make up and the details of construction. It differs from the H.E. shell 50-mm. in the following respects.

- (i) The separate nose adapter to take the fuze.
- (ii) The paper tube exploder as in the British 3" mortar bomb.
- (iii) The base adapter which forms a part of the body.
- (iv) The entirely different type of fuze.
- (v) The cap holder in the propelling attachment is not castellated but has 4 flash holes near the mouth.

5. The shell body (5) is made of steel with a raised bourrelet 2.735 in dia. below the nose adapter. It is painted black externally and lacquered black internally. The cavity in the top of the shell filling is lined with a paper tube (4) in which is fitted a paper cup to receive the gaine. Surrounding the cup are three pellets of picric acid, the top two being perforated. At the rear end the body is threaded (R.H.T.) externally to receive the propelling attachment.

All shell examined at Kirkee had a filling of 1-lb. of grade II T.N.T.

6. Fuze, Percussion. Graze (with Optional Delay) Type '93.—The detailed description and the action of this fuze is given in J.A.L. D. 14.

PACKING

7. Eight complete rounds are issued packed in a smooth wooden packing case made of $\frac{1}{2}$ -in. finished timber; the rounds are positioned by packing pieces. A thick canvas cloth is fixed to the box from outside with nails. See Plate B.

Stowage dimensions	..	..	..	23 3/4" x 8" x 8 1/2".
Weight of filled box	..	..	..	61 1/2-lbs.
Weight of box (empty)	..	..	..	15 1/2-lbs.

IDENTIFICATION

8. Although this shell is very similar to the H.E. shell 50-mm. Type '89 it can be distinguished by its size and the different type of fuze used.

MARKINGS

9. The shell body is painted black with a red band below the fuze and a yellow band in the middle of the body.

SUMMARY OF DATA

10. Shell Fuzed.

Length of complete round	..	..	8.65-ins.
Weight " " "	..	..	5-lbs. 12 1/4-ozs.
Dia. over bourrelet	..	..	2.735-ins.
Dia. over shell body	..	..	2.73-ins.
Nature and weight of shell filling	..	..	Cast T.N.T. Grade II-1 lb.
Nature and weight of igniter charge in the percussion cap holder	..	..	G. P. 15-grs.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

11. Contrary to usual Japanese practice these shell appear to be issued fuzed. Handle in the same way as H.E. shell, 50-mm. Type '89.

	Shell	Fuzes
EXPLOSION/FIRE RISK	.. 1-lb. 2-ozs	10-ozs./100
GROUP CLASSIFICATION	.. VIII Cat. Z	Group VI Cat. X
CLASSIFICATION FOR SEA TRANSPORT	.. O. A. S.	O. A. S. (C)

SHELL, SMOKE, 70-mm.

12. This shell, although similar in appearance to the corresponding 50-mm. round, differs from it in being a bursting smoke shell designed to function on impact. The method of construction, which can be clearly seen at Plate C (i), differs from that of the 50-mm. round in the following respects.

- (i) The base of the shell is forged integral with the body.
- (ii) The head is closed at the base to form a burster container, filled with T. N. T.
- (iii) The smoke container is filled W. P. instead of hexachlorethane.
- (iv) There are no semi-cylindrical segments or steady cup.
- (v) It is fitted with a D. A. fuze.
- (vi) The cap holder is not castellated but has 4 flash holes near the mouth.

13. Fuze, Percussion, D.A. Type '88 small.—The detailed description and the action of this fuze is given in J. A. L. D. 8.

IDENTIFICATION

14. The shell can be easily distinguished from the H. E. shell 70-mm. by the yellow band round the upper end of the projectile and the Japanese ideograph stamped on the shoulder. It may also be identified from the Smoke Shell, 50-mm. by the difference in coloured bands and by the size.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

15. The usual precautions should be taken as this shell is filled W. P.

EXPLOSION/FIRE RISK	..	for plugged round 1-lb. 7-ozs.
GROUP CLASSIFICATION	..	XII Category X.
CLASSIFICATION FOR SEA TRANSPORT..		O. A. S. (D)

SHELL, ILLUMINATING, 70-mm.

16. Very little information on this shell is available but the general appearance and construction shall be clear from the drawing at the Plate 'C' (ii). This projectile is very similar to the smoke shell, 50-mm. Type '95 and is also fitted with the same type of fuze '89 small; it differs, however, from the smoke shell 50-mm. in that the smoke container is replaced by a star and parachute.

PACKING

17. No packing details are available.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

18. Treat in the same way as in Service 2-in. mortar illuminating bomb.

EXPLOSION/FIRE RISK	..	for plugged 11 3/4-oz.
GROUP CLASSIFICATION	..	XI Category Y.
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S. (D).

SHELL, PRACTICE, 70-mm.

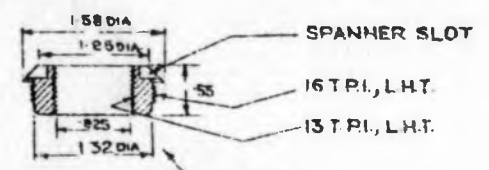
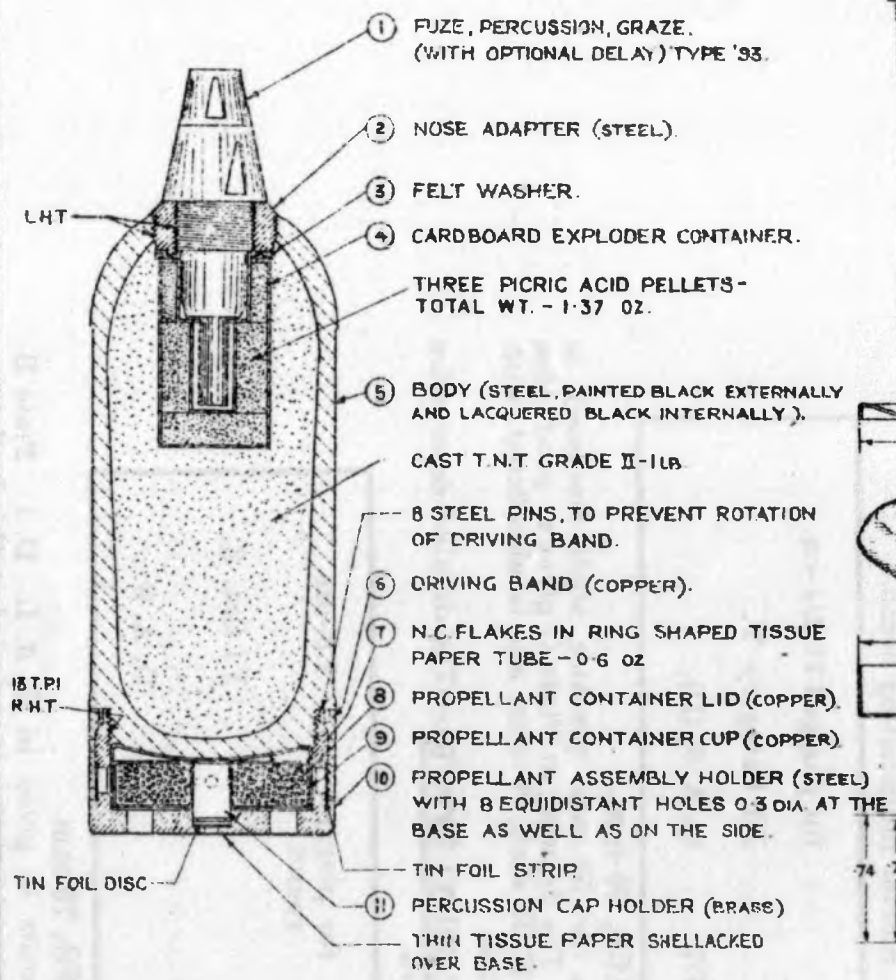
19. This projectile differs considerably from the 50-mm. practice shell discussed in J. A. L. D. 1. chiefly in that this is a live round. The drawing at Plate C gives a good idea of its construction. It is somewhat similar to the H. E. shell, 70-mm. and is also fitted with the same type of fuze i.e. Type '93 mortar bomb fuze.

20. Fuze, Percussion, Graze, (with Optional Delay) Type '93.—The detailed description and the action of this fuze is given in J. A. L. D. 14,

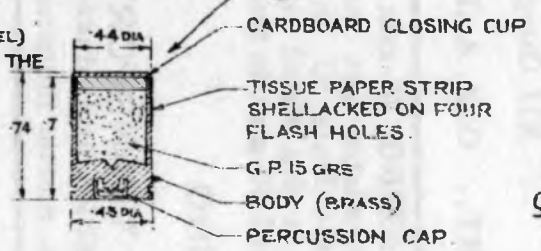
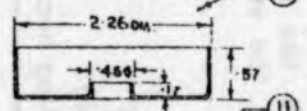
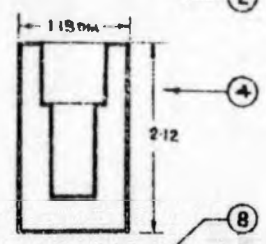
EXPLOSION/FIRE RISK	..	for plugged round.	1.8-ozs.
GROUP CLASSIFICATION	..		VI Cat. Z.
CLASSIFICATION FOR SEA TRANSPORT	..		O. A. S.

BOMB TRAINING, 70-mm.

21. The general arrangement of this projectile is given in J. A. L. D. 1. Plate B. Serial 9. The details given are sufficient and no separate sketch is included in this leaflet.



SPANNER SLOT
16 T.P.I., L.H.T.
13 T.P.I., L.H.T.



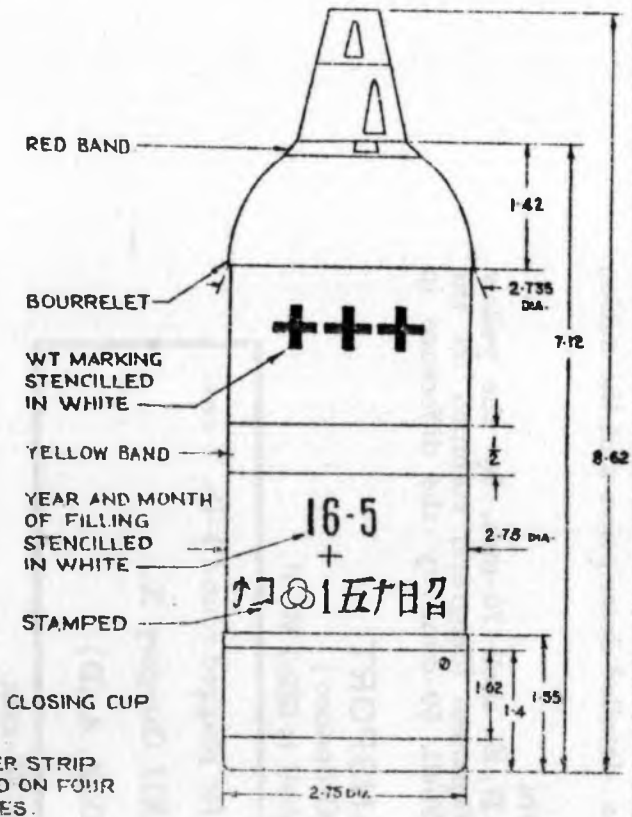
CARDBOARD CLOSING CUP

TISSUE PAPER STRIP SHELLACKED ON FOUR FLASH HOLES.

G.P. 15 GRE

BODY (BRASS)

PERCUSSION CAP



JAPANESE H.E., SHELL 70 MM.

FOR

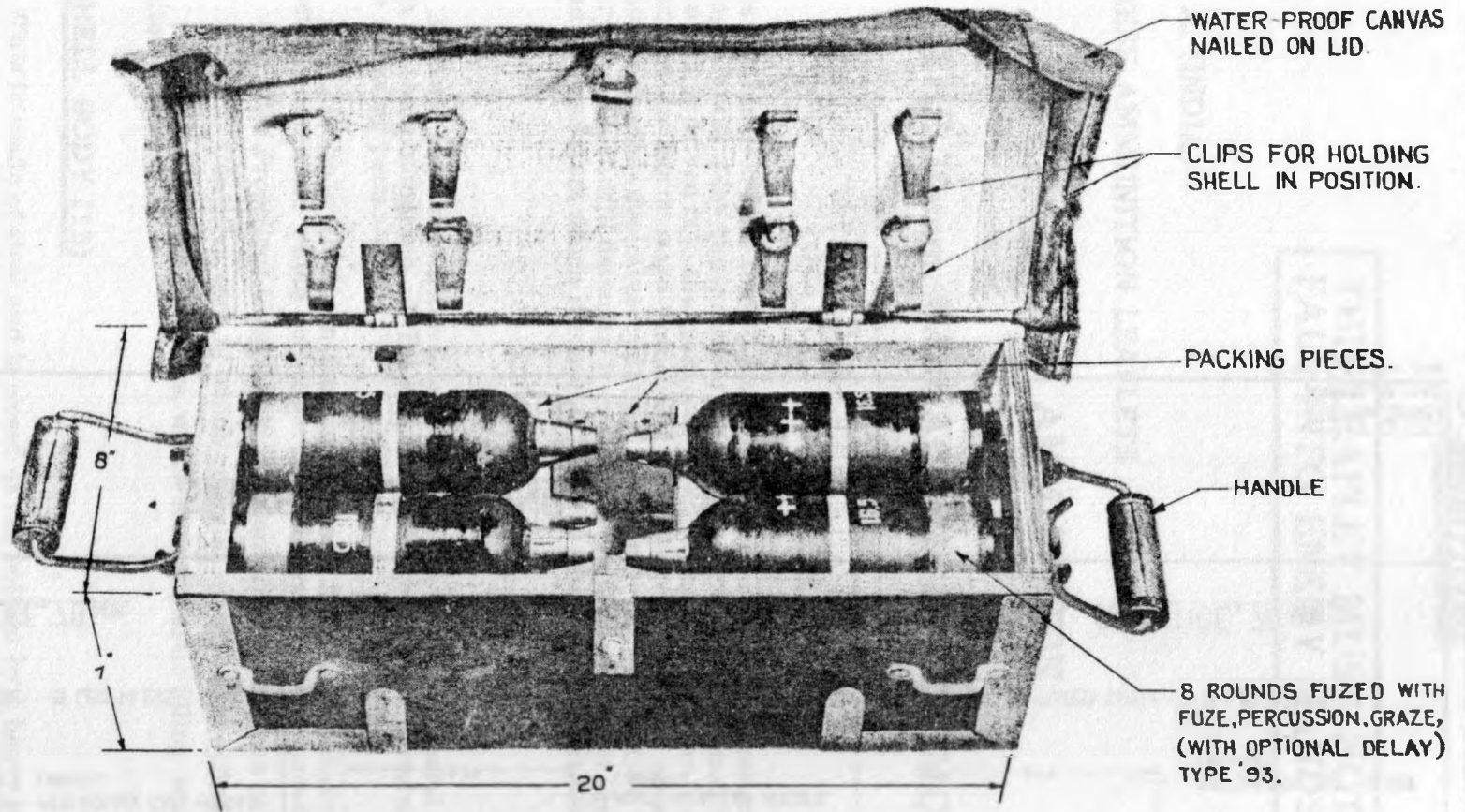
70 MM., TYPE TAISHO 11 MORTAR (RIFLED).

DIMENSIONS IN INCHES.

CI AMN 2/1832
KURNEY JAN 48

G.P.Z.P. P. 000A. 1255.

RESTRICTED.



WATER-PROOF CANVAS
NAILED ON LID.

CLIPS FOR HOLDING
SHELL IN POSITION.

PACKING PIECES.

HANDLE

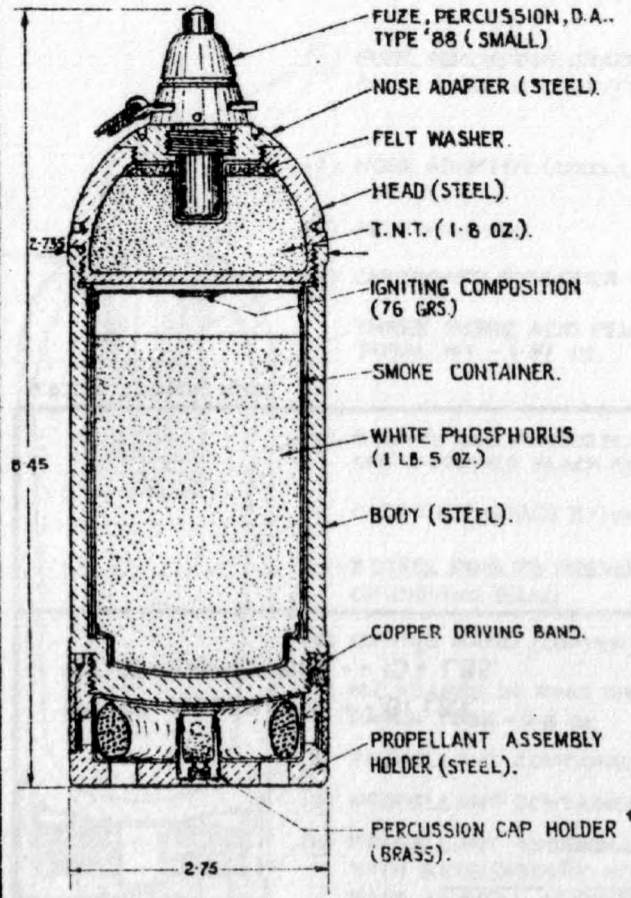
8 ROUNDS FUZED WITH
FUZE, PERCUSSION, GRAZE,
(WITH OPTIONAL DELAY)
TYPE '93.

WT. OF FILLED BOX -- 61 LBS.
WT. OF EMPTY BOX -- 15½ LBS.



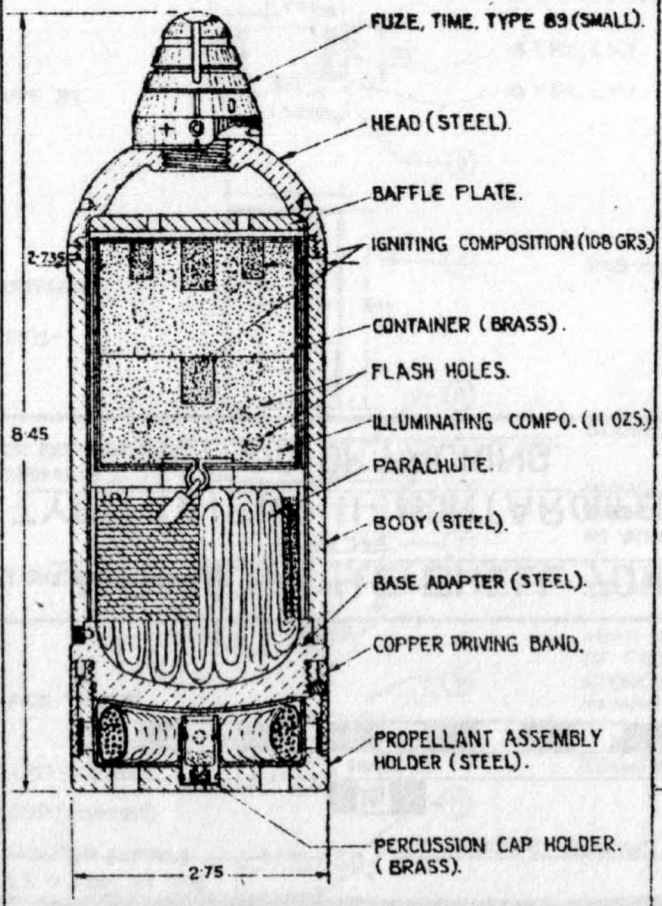
JAPANESE H.E. SHELL 70MM.
— FOR —
TYPE TAISHO II MORTAR (RIFLED).
METHOD OF PACKING.

C.I. ANN S/1372
KIRKEE JAN 1946



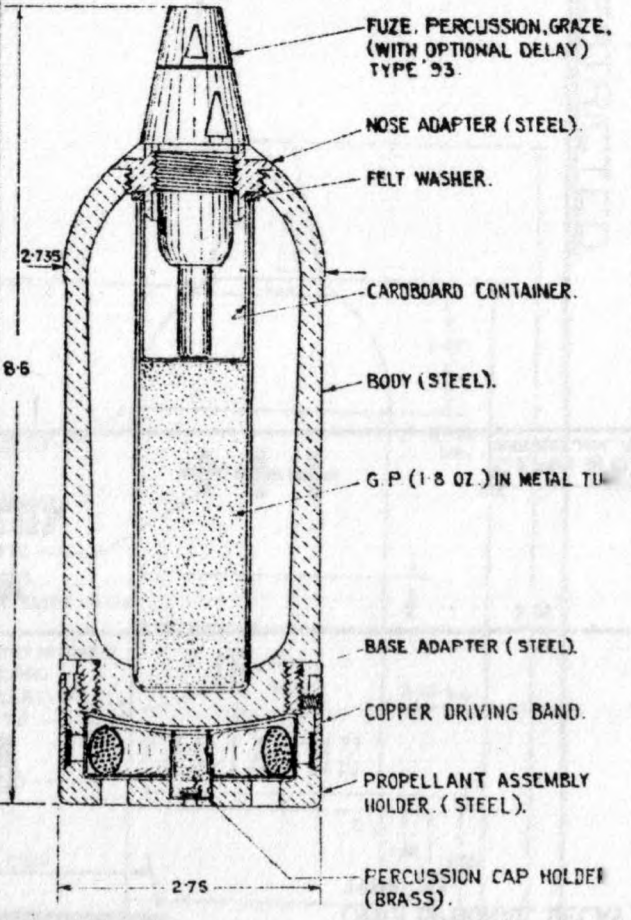
WT. OF FUZED SHELL--- 5 LBS. 14 OZS.

SHELL, SMOKE, 70 MM.



WT. OF FUZED SHELL--- 5 LBS. 8 OZS.

SHELL, ILLUMINATING, 70 MM.



WT. OF FUZED SHELL--- 5 LBS. 11 OZS.

SHELL, PRACTICE, 70 MM.

SMOKE, ILLUMINATING & PRACTICE SHELL.

—FOR—

70 MM. TYPE TAISHO II MORTAR (RIFLED)

DIMENSIONS IN INCHES.

CIA M. S/1367
BIRKBE, JAN 1946

G.P.I.P. POONA. 1946.

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

SECTION D

JAPANESE AMMUNITION LEAFLETS

LEAFLET D 10

AMMUNITION
FOR
THE 70-mm. BARRAGE MORTAR (SMOOTH BORE)

GENERAL

This shell is fired from the 70-mm. Barrage Mortar and is presumably intended for use against low-flying aircraft. The mortar is a crude weapon consisting of a smooth bore tube, a wooden base and a spike which is driven into the ground at an angle to give the elevation required. It is presumably the intention to use a large number of these mortars to put up a heavy concentration of small parachute supported explosive cylinders which will be ejected from the shell near the top of its trajectory and which will detonate if an aircraft strikes any part of the cylinder or parachute. The body and the canisters which it contains are also attached to parachutes.

DESCRIPTION

2. At Plate A are shown the details of the shell while the general appearance of the components is shown in the photograph at Plate B. For the purposes of description the shell may be divided into the following parts:—

- (i) *The Body* which contains in the base its own propellant charge, a delay and the main ejection charge and which houses seven canisters with their parachutes.
- (ii) *The Propellant Charge* held in a container at the base of the shell body.
- (iii) *The Canisters*, each of which contains an explosive cylinder and its parachute, and
- (iv) *The Explosive Cylinders*, which have a plastic filling and are initiated by a friction igniter.

THE SHELL BODY (13)

3. This is made of steel and is closed at the bottom by a heavy steel base (31) which is welded on to the body. A block of wood (30) is secured into the bottom of the body by one wood screw; knotted into this block is the body parachute cord (5) to the other end of which is attached the body parachute (7). The delay holder (32) is screwed into the metal base and passes up a central hole in the wooden block. The delay composition is meal gunpowder containing a high percentage of sulphur, which will give a slow rate of burning.

The Wooden block is recessed at the top and at the bottom of this recess lies a steel disc (29) with a small hole in the centre. Resting on the top of the block is a steel disc (27) to the underside of which is welded a strip of steel bent into the form of a triangle which contains the main ejection charge (28). The disc (27) has seven small holes and on top of it lie one felt (26) and two cardboard washers (25) each of which is perforated with 7 holes to accommodate the igniters (24) of the seven canisters (15).

The bulk of the shell is filled with these canisters, six of which are arranged around the periphery with their parachutes, cords and shroud lines (14). The remaining canister occupies the centre space but its parachute etc. are carefully folded and laid over the top of the seven canisters.

The body (13) and closing plug parachute (4) with their cords and shroud lines (5, 2, 6) are carefully folded and housed in the remaining space at the top of the shell. They are separated from each other by light cardboard or brown paper discs and the body parachute is in addition wrapped in brown paper. All these parachutes are made of silk. The top of the shell is closed by a cup (3) and plug (1) into which is knotted the parachute cord and which are secured to the body by six nails.

THE PROPELLANT CHARGE

4. The propellant charge consists of rhombic, greenish yellow pellets of nitrocellulose and is contained in a sausage-shaped silk bag (34) which is bent end to end and stuck to the bottom of the propellant container (33).

This container is a steel cup which is drilled with six flash holes to allow the propellant gases to escape. The holes are sealed with tissue paper. The propellant container is attached to the body by coning into an annular groove in the base.

A brass primer (35) fitted over the end of the delay holder and also rests on the bottom of the container, access to the cap being gained by a small central hole in the propellant container, which is normally covered by a tinfoil disc. In the primer body are four flash holes over which is stuck a strip of white paper. A transit cover fits over the base of the shell, and is held in place by a strip of adhesive tape.

THE CANISTERS (15)

5. Each of these is a welded, galvanised iron tube closed at the bottom and open at the top. Close to the bottom is soldered a wire eye to which is attached the canister parachute cord and hence the parachute, so that when floating to earth the canister will hang upside down. A wooden block (23) fits into the bottom of this tube; this is similar in shape to, although much smaller than, the block (8) in the shell body. A recess at the top of the block (23) contains the explosive cylinder ejection charge (21) which is fired by an igniter (24) which projects through a hole in the bottom of the canister into one of the seven holes in the cardboard discs (25). A millboard disc (22) placed on top of the ejection charge acts as an obturator. The explosive cylinder (20) with its parachute, cord and shroud lines occupy the rest of the space in the canister which is closed by a piece of brown paper stuck over the top. The explosive cylinder parachute cord (11) which is attached to the friction igniter (17) is led out through a slot at the top of the canister, is doubled back and brought back into the canister through the same slot. In this way the explosive cylinder parachute is packed immediately above the explosive cylinder and its cord is thus formed into a large loop which is packed outside the canister. In the case of the central canister this loop (11) is accommodated at the top of the shell; in the other six cases it is fitted into the main part of the shell.

THE EXPLOSIVE CYLINDER (20)

6. This is a fairly thick-walled seamless steel tube closed at one end and filled with four pellets of R. D. X/wax. The bottom three are contained in a paper sleeve closed at both ends and are separated one from the other by a paper disc. The fourth pellet is also paper wrapped and is recessed at the top to take a booster consisting of a lead azide pellet (19) and a perforated powder pellet (18). A cardboard washer lies on top of these pellets, above which is perforated pellet of R. D. X/wax, which is paper wrapped and whose central cavity is lined with a paper sleeve. The red phosphorus head of the friction cord hangs down into this central cavity.

The friction igniter unit (17), which is also of steel, screws into the top of the explosive cylinder, the space between the igniter and the top pellet being taken up by a thick felt washer. The friction composition is held in a brass cup which screws into a recess in the bottom of the igniter unit. The friction cord passes right through the igniter unit and is knotted to the explosive cylinder parachute cord. The knot lies on top of the igniter unit and is covered with a piece of silk cloth, which is drawn into the annular groove of the igniter unit and secured with a length of silk thread; it is also tied to the parachute end by a similar piece of thread. In this case the parachute is made of paper.

ACTION

7. The transit cover is removed and the shell is dropped down the barrel; a fixed striker at the bottom of the barrel fires the shell in the usual manner. The flash from the primer ignites both the delay composition and the propellant at the same time. The delay burns for about 8 seconds which roughly corresponds to the time of flight to the top of the trajectory. When the delay is burnt through, the flash travels through the small hole in the disc (29) and ignites the main ejection charge. This pushes forward the felt and cardboard discs (26 and 25) which act as an obturator, and forces out the canisters, parachutes and closing plug shearing the six nails in so doing. At the same time the small delay at the bottom of each canister is ignited and these in turn ignite each explosive cylinder ejection charge. This forces the explosive cylinder with its parachute out of the canister.

The shell body and canisters, now empty of their contents, and the closing plug fall harmlessly to earth attached to their parachutes. The explosive cylinders also fall earthwards, the jerk caused by the opening of the parachute not being sufficient to operate the friction igniter. If an aircraft strikes any part of the cylinder or parachute, the friction igniter will be functioned and the cylinder will detonate. Should no hit be obtained on the cylinder, it, too will fall to earth. In this state it is in a dangerous condition as a pull of 10-20 lbs. will function the igniter.

IDENTIFICATION

8. The shell body and explosive cylinders are oil blackened internally and externally and are also painted black on the outside. The propellant container and transit cover appear to be oil-blackened both inside and out. The canisters are painted a light-blue grey inside and out and bear no other markings.

Both the shell body and the explosive cylinders have a red band round the top, indicating that they are filled. The nature of the round is painted in white in Japanese Characters on the shell body; painted in white on the body of the explosive cylinder is a warning in Kana syllables which may be translated as: "Dangerous; do not disturb".

SUMMARY OF DATA

9. Complete Round

Length (with transit cover)	... 11.4-ins.
Diameter (over rear band)	... 2.75-ins.
Weight	... 5-lbs. 4-ozs.

Propellant Charge

Weight	... 372-grs.
--------	--------------

Primer

Length	... 0.86-ins.
Diameter (rim)	... 0.48-ins.
Diameter (mouth)	... 0.37-ins.

Body

Length	... 9.75-ins.
Diameter (over parallel portion)	... 2.5-ins.
Length of parachute cord	... 6 ft. 3-ins.
Length of shroud lines	... 1-ft. 2-ins.
Diameter of parachute	... 1-ft. 4-ins. (12 sided, each side 4-ins.)

Canister

Length	... 6.5-ins.
Diameter	... 0.777-ins.
Weight (filled—less parachute etc.)	... 3.25-ozs.
Length of parachute cord	... 11-ins.
Length of shroud lines	... 10-ins.
Size of parachute	... 5.8-ins. x 5.5-ins.

Explosive Cylinder

Length (overall)	... 3.88-ins.
Length (without igniter)	... 3.0-ins.
Diameter	... 0.6-ins.
Weight (filled—less parachute etc.)	... 2.75-ozs.
Weight of filling	... 154-grs.
Length of parachute cord	... 3-ft. 6-ins.
Length of shroud lines	... 2-ft. 2-ins.
Diameter of parachute	... 1-ft. 11-ins. (Octagonal, each side 9").

Closing Plug

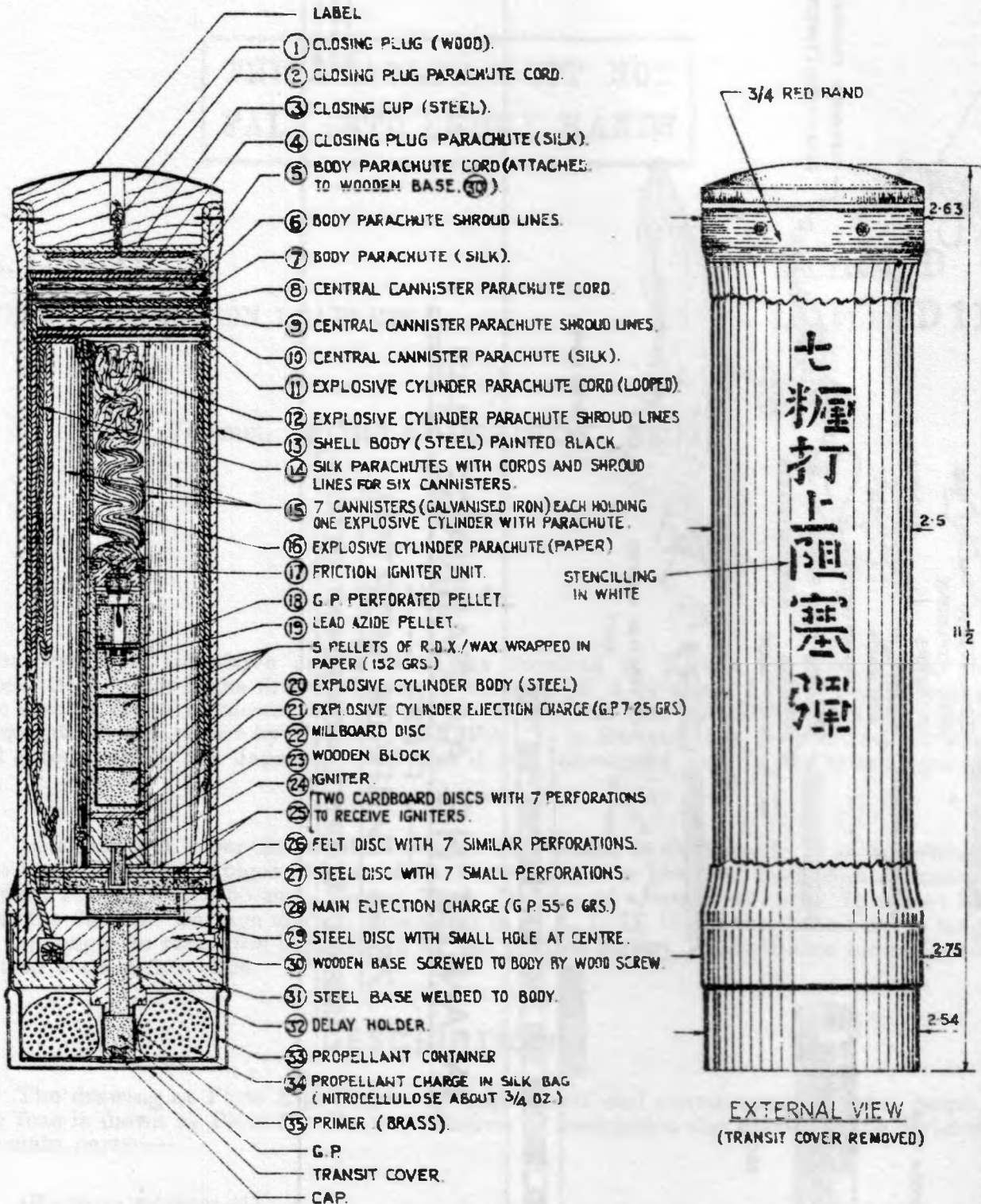
Length of parachute cord	... 1-ft. 9-ins.
Length of shroud	... 11-ins.
Size of parachute	... 8-ins. x 8-ins.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

10. No special precautions need be taken in dealing with this shell as it is perfectly safe to handle when complete. Unexploded explosive cylinders are, however, dangerous since a pull of 10-20 lbs. on the parachute cord is sufficient to actuate the friction igniter. If unexploded cylinders are found they should, whenever possible, be destroyed in situ; and if this is not practicable, the friction igniter should be carefully unscrewed, care being taken not to exert any pull on the cord. The cylinder and igniter may then be removed separately.

EXPLOSION/FIRE RISK	... 3½-ozs.
GROUP CLASSIFICATION	... Group VI, Category Z.
CLASSIFICATION FOR SEA TRANSPORT	... O. A. S.

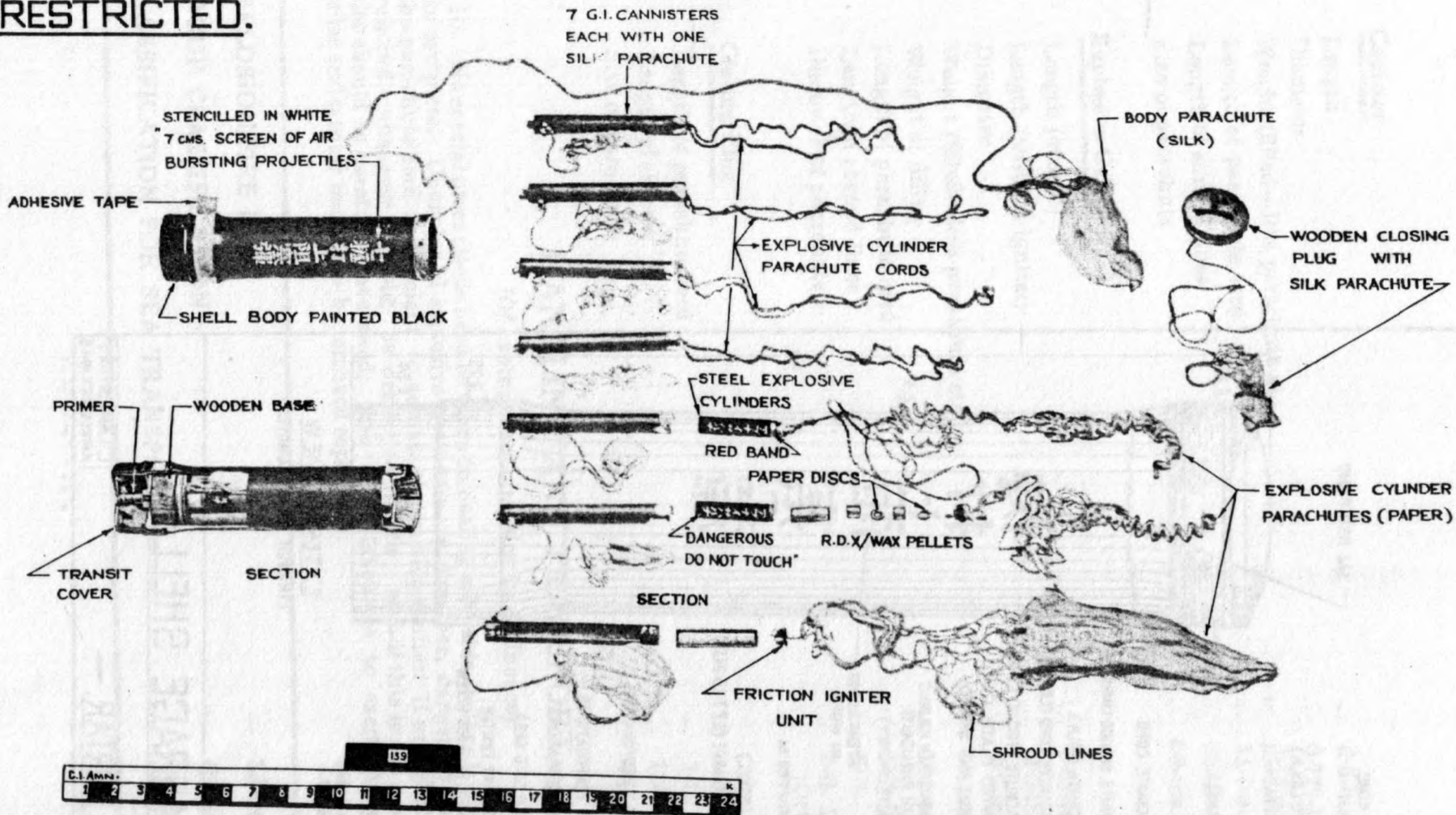


— JAPANESE. H E. A. A. BARRAGE SHELL. —

— FOR —

— 70 MM. BARRAGE MORTAR. —

RESTRICTED.



JAPANESE H.E. A.A. BARRAGE SHELL.

— FOR —
70 MM. BARRAGE MORTAR.

ASSEMBLY SEQUENCE & COMPONENT DETAILS.

Restricted

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D

LEAFLET D11

70-mm. MORTAR SPIGOT BOMB

GENERAL

One round of the above ammunition was received in Kirkee for examination in September 1945. This is the first evidence of the use of a 70-mm. Spigot bomb by the Japanese and, as far as is known, there is no information on this equipment from any other sources except a brief report by D. O. S., ALFSEA. It is thought that the ammunition was not used extensively by the Japanese, and that it was introduced only in the later stages of the War.

2. It is not yet clear from what weapon this bomb is discharged; it is somewhat similar to the 2 1/2 Kg. Spigot Charge (J. A. L. D. 6) and is possibly fired from a smooth bore mortar, similar to the 50-mm. Mortar, Type '98, but of a larger calibre. It cannot be fired from the 70-mm. Barrage mortar, described in J. A. L. D. 10, as the barrel is too long to allow the spigot to reach the bottom and as the pointed striker is unsuitable for use with bombs fitted with striker clips.

DESCRIPTION

3. The drawing at Plate A gives general appearance and construction of the bomb, while the fuze is shown at Plate B. For convenience of description the bomb can be divided into four main parts :—

- (i) Fuze adapter (1).
- (ii) Bomb body (2) or Charge Container.
- (iii) Wooden Spigot (6).
- (iv) Tail Unit (8) which holds the primary cartridge (11).

FUZE ADAPTER

4. The fuze adapter (1) is conical in shape and is made of mild steel. Two rings welded to the inside of the adapter are threaded (R. H. T.) to take the fuze and the bomb body respectively. The fuze hole is 20-mm. in diameter.

BOMB BODY

5. The bomb body (2) is of light welded steel construction and is shaped as shown in the drawing. A steel ring is welded to the top of the body and is threaded internally to take the fuze adapter (1). Four large steel fins (3) are welded to the body to give stability in flight. A cylindrical steel spigot housing (4) is welded to the bottom of the body and is further strengthened by four steel plates (5) welded both to the housing and the body.

As the bomb received in Kirkee was empty, no details of nature and weight of filling etc. can be given.

WOODEN SPIGOT (6)

6. This is about 25.75-ins. long and 2.8 inches in diameter, and is made of unpainted hard wood. The two ends of the spigot are specially grooved to fit into the steel housing (4) at the top and the steel cup (7) at the bottom.

TAIL UNIT AND PRIMARY CARTRIDGE

7. The tail unit (8) is of steel and has four vanes. A steel cup (7) welded to the tail takes the rear end of the wooden spigot, which is secured to the cup by two wood screws.

8. Although augmenting charges and an igniter bag are reported to be used, these have not been received at Kirkee.

Four augmenting charges (9) are placed in between the vanes similar to British practice. An igniter bag (10), presumably filled with G. P., is placed above the primary cartridge to take up the flash and distribute it to the augmenting charges. The primary cartridge (11) is made from a British .303-in. Mk. 7 cartridge case (K. F. manufacture) cut in the middle and suitably modified to fit into the tube of the tail unit. An improvised striker clip (12) is also rivetted to the tail tube.

FUZE. PERCUSSION, D.A.

9. The fuze received here for examination was not quite complete; it had no safety devices although D.O.S., ALFSEA reports that a safety clip is normally fitted round the striker immediately below the head. A built up drawing of this clip (2) has therefore been included in the Plate B.

10. This is a direct action fuze with right hand screw threads to fit into the 20-mm. fuze hole of the bomb. The various components and the method of construction of the fuze are given at Plate B. For purposes of description the fuze may be divided into three main components :—

(i) Head (3)

(ii) Body (8)

(iii) Gaine (6).

11. The head (3) is made of brass and is bored centrally to receive the striker (1); it is screw-threaded (R.H.T.) internally to screw on to the body.

12. The body (8) is cylindrical in shape and is also made of brass. It is threaded externally (R.H.T.) throughout its length both to take the head and to screw into the projectile. The upper half of larger diameter houses the striker guide (5) in which the striker (1) is free to move. The striker (1) is kept off the percussion cap by a weak striker spring (4) and is held in position by the safety clip (2). The lower half contains the gaine (6), which is held in position by the striker guide.

13. The gaine (6) is improvised from a British .303-in. Mk. 7 cartridge case. A standard detonator (7) is secured inside the case immediately below the cap and is surrounded by 8 grs. of mealed G.P. The bottom filling of the detonator is 7 grs. of pressed C.E. above which is 8 grs. of mealed G.P. An inverted copper cup containing about 7 grains of fulminate mercury is placed on top of the C.E. filling. The main filling of the gaine is 15 grs. of coarse C.E.

14. Safety Device. The safety clip (2) whilst in position prevents any inward movement of the striker onto the percussion cap during flight.

ACTION

15. After the bomb has left the mortar, the striker (1) is held off the percussion cap by means of the weak striker spring (4) and the safety clip (2). On impact, the safety clip (2) is crushed and the striker (1) is forced on to the percussion cap, causing the fuze to function.

IDENTIFICATION

16. The bomb and the fuze can be easily identified from the drawing at Plates A and B. The fuze is similar to the Switch Combination Australian, Mk. 1.

SUMMARY OF DATA

Overall length of bomb (with fuze)	..	43.45 ins.
.. .. (without fuze)	..	42.25 ins.
Diameter on bomb body	..	6.1 ins.
Diameter over fins	..	13.25 ins.
Length of wooden spigot	..	25.75 ins.
Diameter of wooden spigot	..	2.8 ins.
Diameter of tail unit.	..	2.75 ins.
Weight empty	..	12 lb. 12 ozs.

FUZE

Length	..	3.7 ins
Nature and weight of gaine filling	..	Loose mealed G.P. 8 grs. Coarse C.E. 15 grs.

DETONATOR

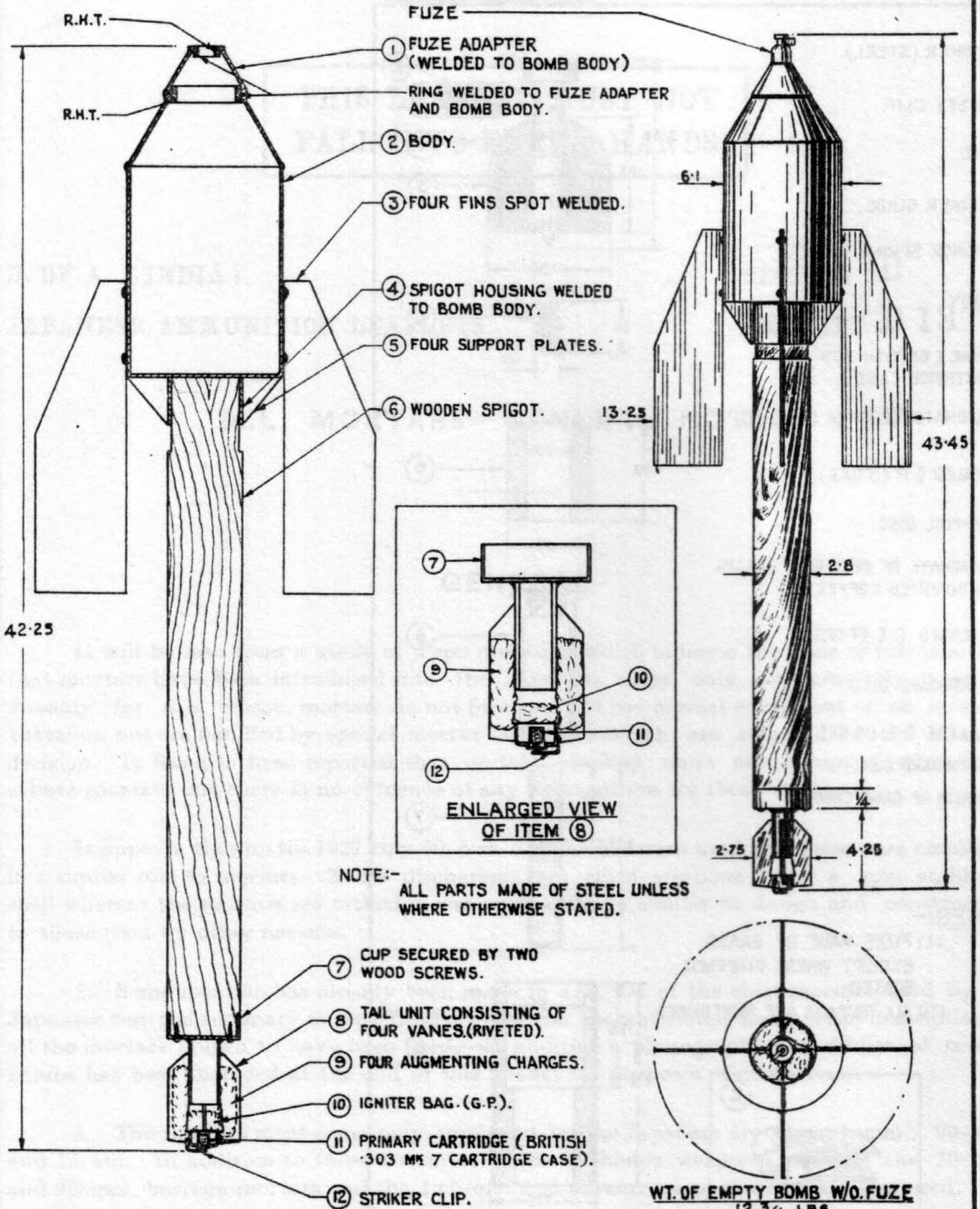
Length	..	1.37 ins.
Diameter	..	.26 in.
Weight of filling	..	about 22-grs.

HANDLING AND TRANSPORT

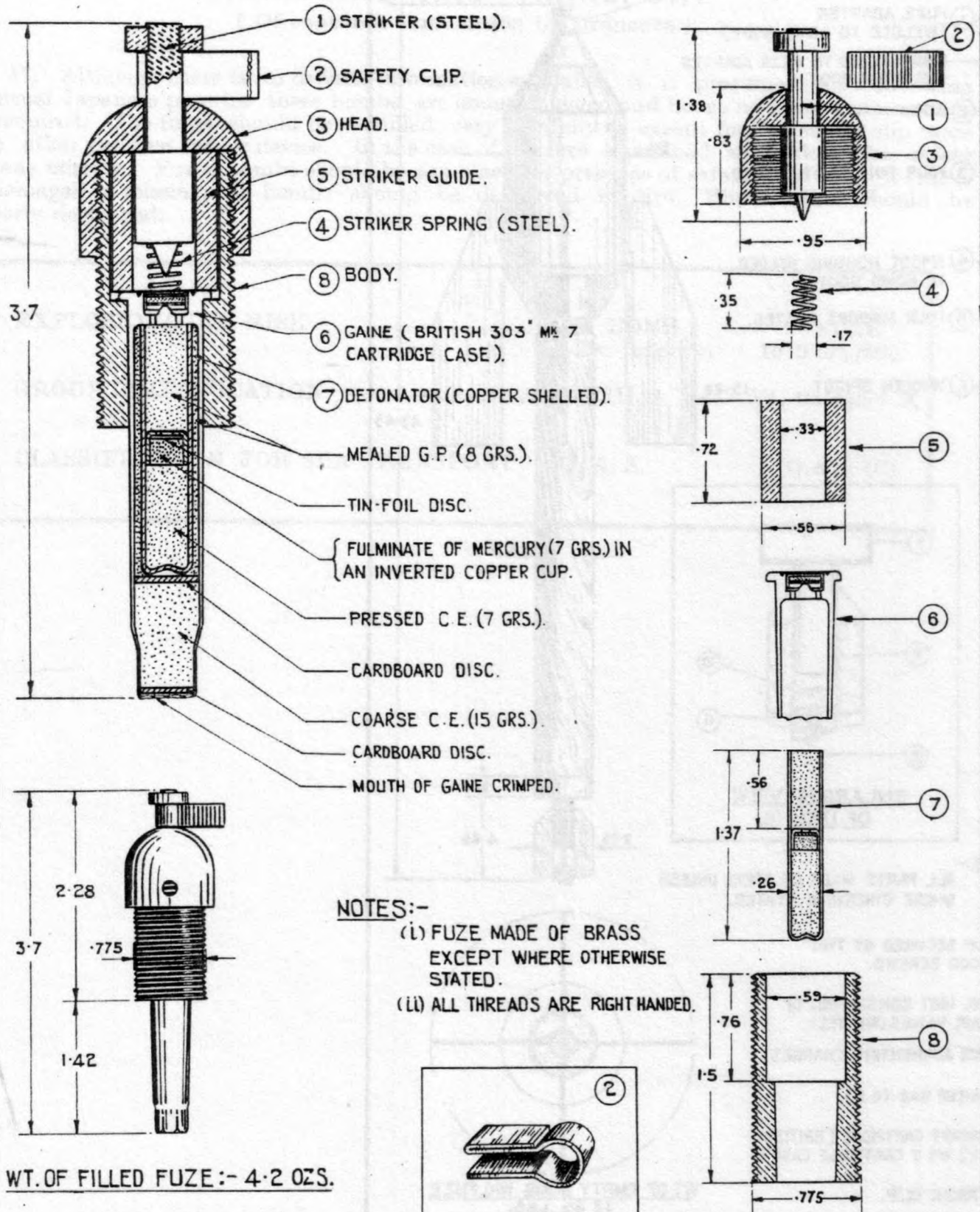
(Of captured ammunition by Ordnance)

17. Although there is no definite information available, it is presumed that following the usual Japanese practice these bombs are issued plugged and hence no special precautions are required. The fuzes should be handled very carefully as except for the safety clip there is no other positive safety device. In the case of the fuze examined at Kirkee, the safety clip was missing. Fuzed bombs should be examined for presence of safety clips and if these are damaged or missing, the bombs should be destroyed in situ. Blind bombs should be similarly destroyed.

EXPLOSION/FIRE RISK	..	BOMB	FUZE
		10-lbs. (approx)	10.0-ozs./100.
GROUP CLASSIFICATION	..	VIII	VI, Category X
CLASSIFICATION FOR SEA TRANSPORT		O. A. S.	O.A.S. (C)



JAPANESE 70 MM. MORTAR. SPIGOT BOMB.



FUZE, PERCUSSION, D.A.,
- FOR -
JAPANESE 70 MM. MORTAR, SPIGOT BOMB.

DIMENSIONS IN INCHES

C.I. Amn. S/1334
 KIRKEE. DEC. 45

G. R. P. POONA, 1945.

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D

LEAFLET D 13

M.L. MORTARS—GENERAL NOTES

GENERAL

It will be seen from a study of Type numbers, which indicate the year of introduction, that mortars have been introduced into the Japanese army only comparatively recently. Possibly for this reason, mortars do not form part of the normal equipment of an infantry battalion but are handled by special mortar battalions which are attached to the infantry division. It has also been reported that certain artillery units are equipped with large calibre mortars but there is no evidence of any ammunition for these weapons.

It appears that up till 1927 only 50-mm. dischargers were used and these were employed in a similar role to mortars. These dischargers are rifled weapons firing a spin stabilised shell whereas the mortars are orthodox weapons generally similar in design and construction to those used by other nations.

2. Some mention has already been made in JAL DI of the chief mortars used by the Japanese but the summary in this Leaflet gives the characteristics and a brief description of all the mortars known to have been used. In addition a photograph of a number of mortar bombs has been included at the end of this Leaflet for purposes of comparison

3. The mortars most commonly employed by the Japanese are the 81-mm., 90-mm. and 15-cm. In addition to these a number of less orthodox weapons, such as the 70-mm. and 80-mm. barrage mortars and the 10.5-cm. and 32-cm. spigot mortars are also used.

4. A number of other mortars have been reported but these have not been included in the summary because insufficient details are available:—

- (a) 12.5-cm., 23-cm. and 28-cm. Artillery mortars have been reported but there is no definite evidence of their existence.
- (b) Chinese 82-mm. and 15-cm. mortars are believed to have been used by the Japanese, as ammunition for these equipments has been captured.

(c) An experimental 12-cm. mortar has been reported and is described as being the chief C. W. weapon; although it is said to fire both H. E. and C. W. projectiles, only the H. E. round has been recovered.

(d) A 20-cm. mortar, said to be a copy of a Russian model is also reported to have been used by the Japanese.

5. The 50-mm. Type '98 Mortar, already described in JAL D3 as a Discharger, is now regarded as a mortar and should be referred to as such.



FUZE, PERCUTING

SUMMARISED PRINCIPAL DATA OF JAPANESE MORTARS.

SHEET 1.

RESTRICTED

Calibre	Model or Type	Length of barrel	Complete weight	Range of elevation	Maximum range	Identification details	Remarks
70 mm.	Barrage Mortar	48 ins.	25 lbs.	As emplaced by digging in the spike	4000 ft. vertical	This is an extremely simple weapon firing a complicated projectile. It consists only of a smooth bore tube, a rectangular wooden block and a short iron spike for driving in the ground. Normally the weapon is fired in a vertical position.	
70 mm.	Taisho '11' Discharger	30 ins	134 lbs.	43°-78°	1700 yds.	This is muzzle loading rifled weapon having barrel, elevating and traversing mechanisms made of steel. The base plate is wood reinforced by metal with spades on the bottom surface. There is a quadrant seat on the lower portion of the tube to permit accurate laying in elevation. The traversing mechanism is composed primarily of a pinion moving a traversing gear rack which in turn moves the mortar and its mounting around a pintle in the front centre of the base plate. The mortar is fired by means of a lanyard attached to a striker lever.	The projectile is similar in construction to 50 mm G.D. shell.
81 mm.	'97	49½ ins.	145 lbs.	40°-80°	3200 yds. Light bomb. 1300 yds. Heavy bomb	This is muzzle loading smooth bore weapon and closely resembles the U.S. 81 mm. mortar M1. It can be broken down in three sections for transport. The mortar is attached to the bipod by means of a clamp and can be readily dismantled and similar to the British service 3 in. trench mortar, the mortar is assembled to the base plate. It is provided with a collimator sight and is not provided with open sights for rough laying.	Reports state that the range when using the Jap. mortar and amu. is less than the range of U. S. M1. with American amu. but the range is lesser when American am.u. is used in Japanese mortar. See para. 21 of J.A.L. D. 1. for remarks regarding interchangeability.

RESTRICTED

Calibre	Model or Type	Length of barrel	Complete weight	Range of elevation	Maximum range	Identification details	Remarks
81 mm,	'99	25½ ins.	52 lbs.	50°-70°	2200 yds.	Generally similar to Type '97 but has a much shorter barrel and is equipped for trigger firing with a mechanism at the base of the barrel. The mortar is fired by hitting the protruding end of the firing pin cam shaft with a wooden mallet. For transport, this mortar breaks into three sections each weighing 17 lb. The interesting features are:—(a) Buffer system incorporated in the bipod. (b) Safety device for the withdrawal of striker.	Resembles the German 8 cm, short mortar.
81 mm.	3 (1928)	49.5 ins.	167 lbs.	45°-85°	2500 yds.	<p>Primarily a Naval weapon adapted for land Service. Reported to be used for A.A. fire. It is a smooth bore weapon of conventional design. The bipod is constructed of light weight tubing and there is no cross levelling device. Two types of base plates have been reported. One is of heavy ribbed construction with a single socket to secure the barrel. The other is a light flat metal plate with a similar socket.</p> <p>A modified version of this mortar may also be found. The base plate is composed of a wooden block 16½ ins. square and 4 ins. thick; bolted to its top is a carrying handle and an iron plate with a socket in the centre. There are three spades in the bottom. The traversing hand-wheel on the right is larger, and the elevating screw is much shorter.</p>	

RESTRICTED

Calibre	Model or Type	Length of barrel	Complete weight	Range of elevation	Maximum range	Identification details	Remarks
81 mm.	Barrage Mortar	35 ins.	—	As emplaced by digging in the spike.	—	Like the 70-mm. barrage mortar this consists merely of a barrel, wooden base block and spike. The base consists of a wooden block 12 $\frac{5}{8}$ "x8"x6". The spike assembly which passes through the base from the top is 24" long. The barrel which is 35 ins. long is threaded externally at the base to fit the spike assembly. The firing mechanism consists of a fixed firing pin.	The normal projectile is the 81mm. barrage shell, but the 81 mm. flare shell can also be projected.
90 mm.	'94	51 $\frac{11}{16}$ ins.	350 lbs.	45°-80°	4150 yds. (approx)	<p>This is a smooth bore muzzle loading weapon with a fixed firing pin, generally similar in so far as ammunition projection is concerned, to our 3-in. or 4.2-in. mortar. Unlike most mortars, it has a heavy recoil mechanism, which consists of two equal cylinders mounted on a one piece U shaped frame.</p> <p>The mortar is elevated by turning a crank at the junction of the bipod legs and the elevating screw. Traversing is accomplished by turning the knob situated at the end of the traversing screw. A panoramic sight with an elbow telescope is furnished for the weapon.</p> <p>The bipod is of normal design and incorporates twin shock absorbers similar to German & Italian mortars.</p>	

SUMMARISED PRINCIPAL DATA OF JAPANESE MORTARS.—(Contd.)

RESTRICTED

Calibre	Model or Type	Length of barrel	Complete weight	Range of elevation	Maximum range	Identification details	Remarks
90 mm.	'97	52½ ins.	233 lbs.	85° (maximum)	4150 yds.	This weapon is similar in general appearance to the Type '97, 81 mm. mortar, but differs greatly from the earlier model i. e. the 90 mm. Type '94, in that it does not have the heavy recoil mechanism or the tube reinforcing hoop.	
						The base plate is the same as that used with the Type '94 mortar. The sight is identical to that used with the 81 mm. mortar Type '97 and the bipod is fundamentally the same as that used with the Type '94, differing primarily in the recoil mechanism, clamping collar and saddle.	
105 mm.	Improvised mortar	17 ins.	114 lbs.	45° fixed	275 yds. (approx)	This is a crude weapon and is comparatively light in weight. The sides of the base are made of steel pipe, while the spigot mount and the struts are made of angle iron. The spigot is composed of a 4 in. (external) diameter tube welded to the spigot mount and is secured at an angle of 45° to the base by means of two bolts and wing nuts. It is a lanyard fired weapon with no traversing or elevating mechanisms.	A 105 mm. cartridge case with its lower portion cut off is fixed to the base of a 105mm. shell and the four fins are attached to the case by welding. The shell is fuzed with Type '88 instantaneous nose fuze.

RESTRICTED

Calibre	Model or Type	Length of barrel	Complete weight	Range of elevation	Maximum range	Identification details	Remarks
12 cm.	2	55½ ins.	..	..	..	This is smooth bore muzzle loading weapon of naval design, generally similar in appearance and construction to the Type '97, 15 cm. mortar. The main distinguishing feature other than the general size, is the location of two integral reinforcing hoops in the middle of the barrel.	
15 cm.	'93	64 ins.	558 lbs.	45°-80°	2300 yds. with long type H. E. Bomb.	The firing mechanism is similar to that used on the Type, '99, 81 mm. mortar. The base plate is very heavy and is fitted with four carrying handles. The sight bracket fits the standard mortar sight. Information on this mortar is very meagre, however it is believed, that this is a smooth bore muzzle loading lanyard fired weapon and is intended to be carried in a vehicle in order to give it mobility.	
15 cm.	'95	50 ins.	556 lbs.	45°-80°	2300 yds. (approx)	Details are not available.	
15 cm.	'96	..	..	..	..	This is called a Medium mortar. No further details are available.	

SUMMARISED PRINCIPAL DATA OF JAPANESE MORTARS.—(Contd.)

RESTRICTED

Calibre	Model or Type	Length of barrel	Complete weight	Range of elevation	Maximum range	Identification details	Remarks
15 cm.	'97	75.37 ins.	770 lbs.	..	2300 yds.	<p>This is a smooth bore, muzzle loading weapon generally similar in design to the 81 mm. and 90 mm. Type '97 mortars.</p> <p>The breech cap and stud with assembled firing mechanism are screwed on in the normal manner. The firing pin may be adjusted to three different positions by means of a cam lock. The traversing screw, buffer mechanism and collar assembly are of the same design as the other Type '97 mortars. The base plate is of a heavy ribbed stamping metal and has the usual ball and socket locking arrangement. The sight provided is a panoramic elbow telescope.</p>	
15 cm.	'99	..	341 lbs.	..	755 yds. (approx)	<p>Another Type '97 mortar is known to exist weighing about 1540 lbs. and is claimed to have a maximum range of 3828 yds.</p> <p>This is a short barrelled mortar and has only recently been reported.</p>	
15 cm.	Shipborne Mortar Type '96	..	..	...	4800 yds. (approx)	<p>Resembles the Type 3 mortar described below, and could be used for land use.</p> <p>The mortar employs a lanyard firing device. Elevating and traversing handles are on the left, while the loader stands on a platform on the right. There are two prominent recoil cylinders of the hydro-spring type above the barrel.</p>	

RESTRICTED

Calibre	Model or Type	Length of barrel	Complete weight	Range of elevation	Maximum Range	Identification details	Remarks
15 cm.	Shipborne Mortar Type 3	49½ ins.	..	0-80°	4905 yds.	<p>This is a smooth bore, muzzle loading weapon called by the Japanese, a Type 2 ship mounted medium mortar.</p> <p>The firing mechanism is believed to consists of a cammed firing pin similar in construction to that used with the Type '97 15 cm. mortar. The weapon is fired by a hand cocked spring loaded mechanism. A percussion hammer which is secured to the upper rear of the barrel, operates the firing pin. A lanyard probably fires the weapon. Traversing and elevating handwheels are located on the left side of the mounting. There are two prominent recoil cylinders of the hydrospring type above the barrel.</p>	
32 cm.	'98	Length of spigot 31.7 ins.	900 lbs.	Emplaced at 45°	1600 yds.	<p>This is a spigot type weapon having a spigot with a diameter of 255 mm</p> <p>The mounting plate rests on the larger square steel base plate, which in turn is supported by a solid wooden base in three sections. The whole equipment when set up is firmly bolted together to form a heavy massive equipment. Line of fire can be varied slightly once the equipment has been emplaced, and, once the initial elevation has been determined by the angle at which the equipment is dug in; variation in range can only be obtained by varying the incremental charges.</p>	

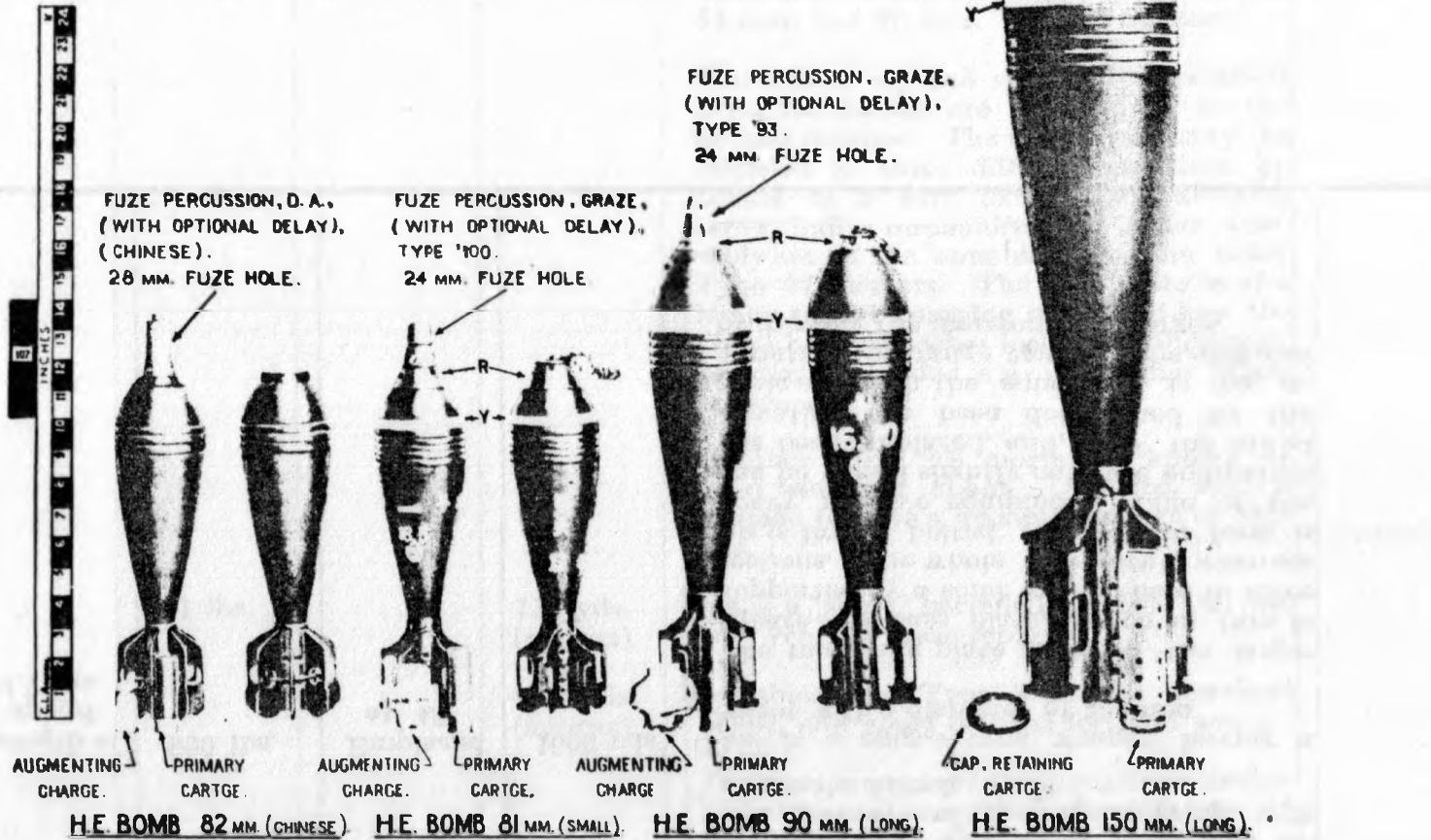
RESTRICTED.

KEY TO COLOUR BANDS :-

R - RED.

Y - YELLOW.

BODY PAINTED BLACK EXCEPT FOR 82 MM.
WHICH IS VARNISHED OVER METAL GIVING
A DIRTY-GREY FINISH.
ALL STENCILLING IN WHITE.



JAPANESE MORTAR AMMUNITION

COMPARATIVE CHART

FOR

TYPICAL 82 MM. (CHINESE), 81 MM., 90 MM. & 150 MM.

C.I. AMN. S/1133
MORRIS JULY '43

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

SECTION D.

JAPANESE AMMUNITION LEAFLETS

LEAFLET D 14

FUZES

FOR

JAPANESE 81-mm., 90-mm., 120-mm. and 150-mm. MORTAR BOMBS

AND

CHINESE 82-mm. and 150-mm. MORTAR BOMBS

GENERAL

There has, in the past, been some confusion about the fuzes used in Japanese Mortar Bombs. As a result of the examination of typical rounds at Kirkee, the following details are now available:—

FUZE

BOMB WITH WHICH USED

Fuze, Percussion, Graze (with Optional Delay),
Type '93.

- (a) Bomb, M. L., 81-mm. Mortar.
- (b) Bomb, M. L., 90-mm. Mortar.
- (c) Bomb, M. L., 150-mm. Mortar.

Fuze, Percussion, Graze (with Optional Delay),
Type 100.

- (a) Bomb, M. L., 81-mm. Mortar.
- (b) Bomb, M. L., 120-mm. Mortar.

Fuze, Time and Percussion, Type 3.

Bomb, M. L., 81-mm. Mortar Type 3 (Naval).

Fuze, Percussion, Graze (Chinese)

Bomb, M. L., 82-mm. Mortar (Chinese).

Fuze, Percussion, D. A. (with Optional Delay),
Chinese.

Bomb, M. L., 82-mm. Mortar (Chinese).

Fuze, Percussion, D. A. (Chinese)—non-delay.

Bomb, M. L., 150-mm. Mortar (Chinese).

DESCRIPTION

FUZE, PERCUSSION, GRAZE (WITH OPTIONAL DELAY), TYPE '93

2. The details of construction of this fuze are given in Plate A, while its general appearance is shown at Plate E. It is used in 90-mm. and 150 mm. Mortar Bombs, having a 24-mm. fuze hole and in suitably exploded 81-mm. Bombs. The fuze consists of:—

(a) The body, upper half (8) which is made of brass, and houses the detonator (6) and striker assembly which is enclosed in a light alloy housing (7). The space below the detonator and striker assembly is closed by a hollow screwed brass plug which acts as a flash guide (9) when the delay plug is fitted.

(b) The body lower half (10) which is made of brass, houses the optional delay plug when fitted. The body is screw-threaded externally (L. H. T.) to screw into the bomb. It is also screw-threaded internally (L. H. T.) at its lower end to take the gaine body (13). At its upper end it is internally threaded (R. H. T.) to take the upper half of the body. The detonator is of the normal type consisting of a copper shell containing about 2 grains of a detonating composition of mercury fulminate, potassium chlorate and antimony sulphide.

(c) The gaine body (13) which is made of brass contains at its lower end a copper container having a pellet of C. E. on top of which is a pressing of fulminate of mercury. Above this is an inverted copper closing cup (11) acting as a distance piece. Felt pads are used to cushion the copper container in the gaine body.

SAFETY DEVICES

3. (a) A small sliding piece in the detonator housing prevents the detonator from moving forward on to the striker, as its projecting lugs fit under the diaphragm in the upper half of the body.

(b) The copper shear wire prevents the complete housing from moving and so freeing the sliding piece.

(c) The creep spring keeps the detonator off the striker during flight.

ACTION

4. The fuze may be used either with slight delay or without. If slight delay is required the head portion of the fuze is unscrewed and a delay plug inserted on top of a lead washer and the head portion screwed back again. This delay plug is packed with the fuze in its cylinder.

5. On firing the complete detonator and light alloy housing (7) sets back about $\frac{1}{4}$ -inch, shearing the light copper shear wire (2) on which they were suspended. This leaves the detonator (6) together with the small sliding piece (5) free to move forward on graze (any slight check). During flight the complete housing is kept back by air pressure on the nose of the bomb, while the detonator is kept off the striker by the light creep spring (4). This enables greater certainty of functioning on impact or graze. On impact or graze the detonator sets forward, overcoming the light creep spring, to initiate the bomb.

If the set-back force is insufficient to cause the shear wire to shear, such as might happen with a low charge or for other reasons, this wire will shear in any case on impact. The assembly housing will be forced inwards freeing the sliding piece and allowing the detonator to set forward on to the striker.

The fuze is therefore extremely quick-acting for anti-personnel use but must be fitted with the delay plug for use against light earthworks, etc. where a slight delay is required.

FUZE, PERCUSSION, GRAZE (WITH OPTIONAL DELAY), TYPE 100

6. The details of this fuze are given at Plate B and its general appearance is shown at Plate E.

It consists essentially of:—

- (a) The body, upper half (8) which contains the light alloy housing (7), striker (3) and detonator (6);
- (b) The body, lower half (12) which contains the delay mechanism (11).
- (c) The gaine (15).
- (d) The fuze cover.

It will be seen from the Plates that this fuze is generally very similar to the Type '93 fuze described above. The chief difference lies in the method adopted to achieve a delay. In this case the delay mechanism takes the form of a cylindrical selector (11). This has a hole drilled through it and a half through channel drilled at right angles to the first thus forming a 'T' channel when viewed in cross section. The head of the T is unfilled and forms a flash channel; the other channel is filled with .3 grs. of gunpowder. For instantaneous action the unfilled channel is vertical and the flash passes directly downwards (as shown at Plate B); for slight delay the selector is turned through 90 degs. so that the flash channel is horizontal and the gunpowder channel vertical. The flash now enters the selector through the sides and has to pass through the gunpowder delay. The delay is set by turning the screw-driver slot in the head of the selector which is covered by tinfoil. A stop screw in the side of the body engages in a groove in the selector so that movement through only 90 degs. is permitted.

The fuze cover takes the form of a thin envelope of aluminium alloy which fits over the fuze and with the aid of a waterproofing composition forms a waterproof seal between the base of the cover and the body of the fuze.

There are two key holes in the cover which fit opposite the key holes of the fuze. A thin brass wire fits in a groove formed at the base of the fuze body, and the end is completed in the form of a ring. This facilitates the removal of the cover.

The cover is intended to render the fuze waterproof and to ensure that the duralumin cup at the nose of the fuze is not damaged during transport. A steel stud fits in a small hole in the base of the cover and this prevents the cover from undue rotation due to rough handling.

SAFETY DEVICES

7. This fuze employs the same safety devices as the Type '93.

ACTION

8. The action of the fuze is similar to that of the Type '93 explained in para. 5 above. If delay is required, the rotor is turned through 90 degs. so that the flash passes through the delay channel in the selector.

FUZE, TIME AND PERCUSSION, TYPE 3 (FOR MORTAR BOMBS)

9. The report which follows is based on M. E. I. U. No. 4 Report No. 25 dated 15-12-44, as none of these fuzes have so far been received at Kirkee.

This is a combination air burst and percussion fuze with a pyrotechnic arming device and is of an entirely new design. The details are shown at Plate C.

The percussion striker is hollow and is closed by a screw plug. It is a sliding fit into the upper body and is kept away from the percussion detonator during transit by the safety clip; it is also supported in the body by the pyrotechnic arming collar. Inside the percussion striker is the

time striker, striker spring and time detonator, below which is a T-shaped black powder delay. The arming collar is of Nitrocellulose and has a burning time of 2 seconds. The lower body, into the base of which screws the gaine, has an extension at the top through which are drilled 4 flash channels. It also houses the percussion detonator in its holder and a black powder relay. A flash train connects the time ring to this relay, by passing the percussion detonator. The time ring fits between the upper and lower fuze bodies and is filled with 55 grs. of a composition of Lead chromate, Barium peroxide, Barium carbonate, "metallic" silicon and powdered glass or silica. At the section where the flash enters, the composition is different and consists of about 1 grain of a 50 : 50 mixture of Barium peroxide and "metallic" silicon. A wooden block in the time ring prevents the flash from continuing to the gaine, when the fuze is set for percussion firing. The setting dial has 4 graduations 5, 10, 15 and 20.

SAFETY DEVICES

10. (a) Safety Clip :—This prevents the percussion striker from moving on to the detonator during handling and transport. In later fuzes this clip is probably replaced by a safety strip secured to the body by a grub screw which may also pass through the time striker.

(b) Pyrotechnic Arming Collar :—This keeps the striker off the detonator after the safety clip has been removed.

It burns for 2 seconds thus allowing the projectile to travel 200-450 yards before arming and therefore preventing early bursts on obstructions close to the mortar position.

ACTION

11. After setting, the safety clip is removed; on firing, the time striker sets back on to the time detonator, overcoming its spring; this ignites the T shaped delay composition which in turn, after a short delay, ignites the combustible arming collar. This burns away igniting the time ring composition and arming the percussion striker. When the fuze is set for air burst, after the predetermined time has elapsed, the flash travels via the flash channel to the G. P. Booster igniting it and initiating the main filling in the gaine. When the fuze is set for percussion or if impact occurs before the elapse of the set time, the percussion striker will be driven on to its detonator on impact thus initiating the gaine.

FUZE, PERCUSSION, GRAZE FOR CHINESE 82-MM. MORTAR BOMB

12. The account which follows is based on M. E. I. U. No. 1 R. 77 dated 30th June 1944 as so far none of these fuzes have been received at Kirkee. This fuze may also be used in Chinese 150-mm. bombs but none has so far been received so fuzed.

The fuze is extremely simple and the general arrangement is clearly shown at Plate C.

SAFETY DEVICES

13. (a) Safety pin :—Holds inertia pellet to rear of body.

(b) Creep Spring :—Keeps striker off detonator during flight.

ACTION

14. The fuze is armed by removing the safety pin; on impact the inertia pellet sets forward against the creep spring and fires the detonator, the flash from which ignites the gaine.

IDENTIFICATION

15. Each fuze is stamped with Chinese characters and either stamped or painted with a Swastika usually the left-handed type.

**FUZE, PERCUSSION, D.A. (WITH OPTIONAL DELAY) FOR CHINESE
82-mm. MORTAR BOMBS**

16. A detailed drawing of this fuze is given in Plate D while its general appearance is shown in the photograph in Plate E.

The body (13) contains the inner body (5) on the upper shoulder of which the copper safety cap (4) and striker spring (3) the striker (2) rides on top of the spring and is held in by the collar (1). Note the chamfered recess at the top of the inner body. A tapered locking ferrule (11) which locks the arming sleeve (6) in the armed position fits over a cut-away portion at the lower end of the inner body, which is closed by the plug. On this plug rests the arming spring (7) and arming sleeve (6). The inertia pellet is held at the bottom of the inner body by an arming ball (8). Two further locking balls (9) lie in a slot in the pellet. The delay selector fits into the lower end of the body, into the bottom of which screws the gaine.

SAFETY DEVICES

17. (a) Arming Ball (8): Prevents forward movement of inertia pellet until after set-back.

(b) Safety Cap. (4): Prevents set-forward of detonator on to striker until striker is driven further inward.

ACTION

18. On firing, the arming sleeve sets back compressing the arming spring and jams over the locking ferrule. This frees the arming ball which moves out and leaves the inertia pellet free (unlocked) to move forward during downward flight of the bomb. The inertia pellet may move forward sufficiently during flight for the two locking balls to be parted by the striker shank thus locking the inertia pellet. Or, on impact the inertia pellet sets forward while at the same time the striker is driven in, compressing its spring, the shank passing down to separate the two locking balls forcing them out into the recess at the top of the inner body, thus locking the inertia pellet and ensuring positive penetration of the detonator by the striker point. The flash from the detonator travels down to ignite the G. P. booster in the gaine. In the drawing a straight through channel is provided for the flash, i.e. the fuze is shown set instantaneous. If delay is required the selector is turned through 90° (screw-driver slot horizontal). In this case the flash has to travel through a staggered channel filled with pressed G. P. which introduces a slight delay in the functioning.

IDENTIFICATION

19. This fuze is marked in the same way as the graze fuze.

FUZE, PERCUSSION, D.A. (NON-DELAY) FOR CHINESE 150 mm. MORTAR BOMBS

20. Chinese 150 mm. mortar bombs have been received here fitted with a fuze which is identical with that used in the 82 mm. bomb except that no delay is incorporated. It is probable that these two fuzes are used in either bomb, the choice as to which is used depending on whether delay is required or not.

PACKING

(Plate E)

21. The Type '93 fuze is packed in a soldered tin plate container with a screwed on lid. It is held rigid by two wooden blocks shaped to fit into the container and internally recessed to take the base and nose of the fuze respectively. The top wooden block has a second hole in the upper surface to house the delay plug. The container is 5.3 inches in length and 1.6 inches in diameter.

Another tin plate container, slightly shorter in length has been examined at Kirkee. This is the short type, and is only 3-3/4-in. in length. It has only one wooden block and has no accommodation for the delay plug.

In some cases the upper wooden block in the container has two recesses side by side to hold two optional delay plugs, but in the container examined at Kirkee, only one delay plug was found.

Red or green blobs are marked on the containers. It is not clear what they actually indicate, but it is possible that they may have some connection with the number of delay plugs in the container, if any. For instance, a green blob is found in the case of those containers which have two delay plugs.

The optional delay plugs and the fuzes may be wrapped in blue, white or green waxed papers.

22. The Type 100 fuze is packed in a soldered tinplate container with a screwed on lid and is 4 in. long and 1.6 in. in diameter. It is held in position by a wooden block at the bottom, internally recessed to take the base of the fuze. There is no wooden block to take the nose of the fuze, but there are two waxed cloth discs between the nose of the fuze and the container lid.

23. Chinese 82-mm. Mortar fuze with optional delay.—Three of these fuzes, each in a waxed paper bag, are packed in a tinplate container together with three primary and 24 augmenting cartridges. The lid, which is varnished dark brown on top, is secured to the body with a soldered, tear-off band.

IDENTIFICATION

24. SUMMARY OF DATA

Fuze.	Length.	Diam.	Weight.	Grain Filling.	Delay compo.	Special features.
Type 93	3.75"	1.26"	6.5 ozs.	Mercury fulminate and C.E.	G.P.	Optional delay plug.
Type 100	3.125"	1.25"	6.5 ozs.	Lead azide and C.E.	G.P.	Delay selector. This fuze will also fit Jap. 75-mm. H.E. A.T., H.C. shell.
Type 3	3.25"	1.34"	7.5 ozs.	.....	...	Pyrotechnic Arming Collar.
Chinese Percussion Fuze.	3.75"	1.2"	6.0 ozs.	.....	Nil	.....
Chinese D. A. Fuze with optional delay.	4.5"	1.16"	8.3 ozs.	Mercury fulminate and C.E.	G.P.	Rotating selector switch for delay setting.

HANDLING AND TRANSPORT

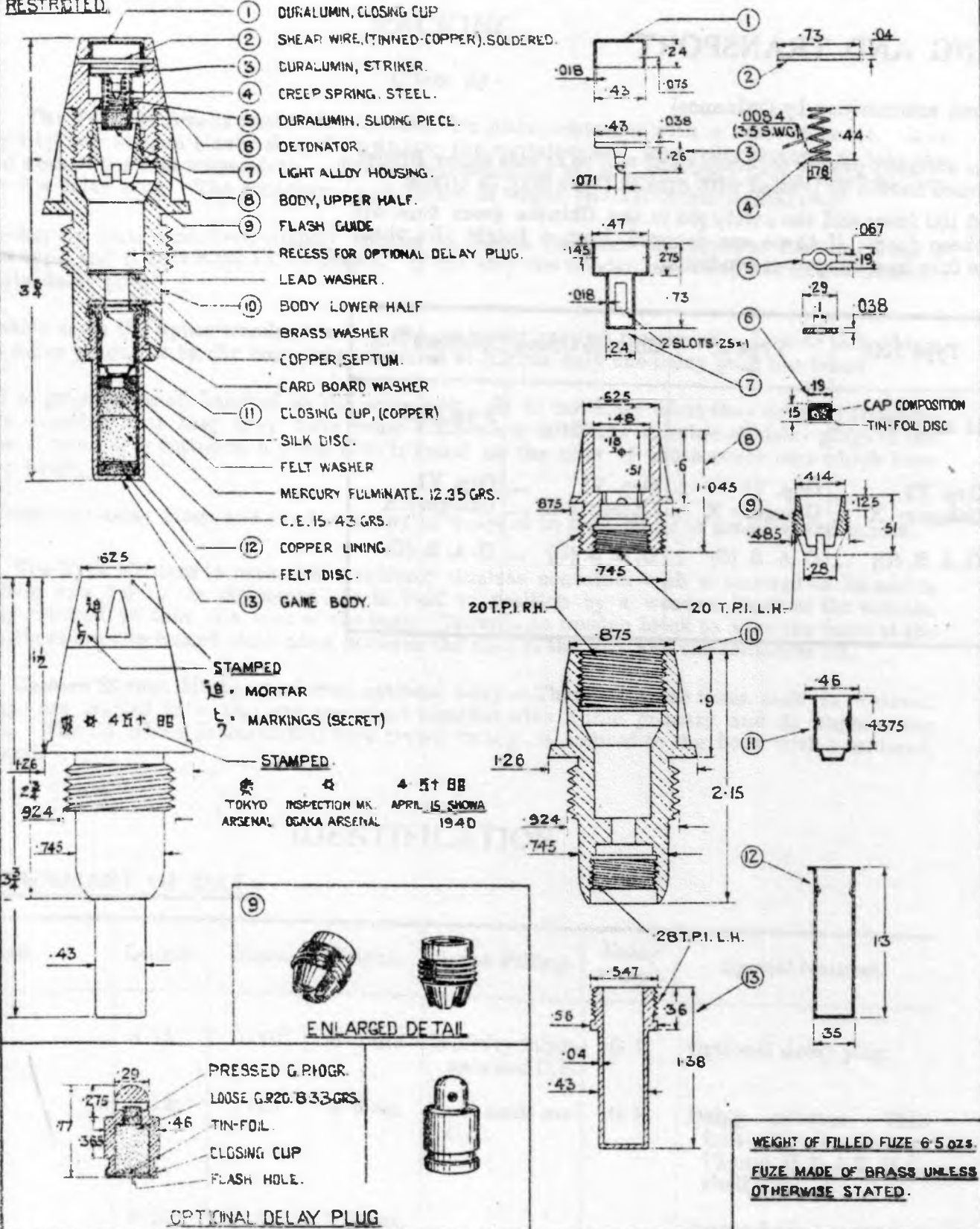
(Of captured ammunition by Ordnance)

25. Japanese mortar bomb fuzes are normally packed separately and will be as safe as any British fuze when ~~any~~ packed. Bombs found fuze should be treated with care as these may be blinds.

The shear wire in the Types '93 and 100 fuzes and the safety pin in the Chinese graze fuze are the only positive safety devices in these fuzes; if these are dropped from a height the shear wire/safety pin may break and leave the fuze in a dangerous condition.

	Type 93.	Type 100.	Type 3.	Chinese Graze.	Chinese D.A.
EXPLOSION/FIRE RISK	10 ozs./100 ...	14 ozs./100 ...	...	...	9 ozs./100
GROUP CLASSIFICATION	Grp. VI ... Category X ...	Grp. VI ... Category X ...	Grp. VI ... Category X ...	Grp. VI ... Category X ...	Grp. VI ... Category X ...
CLASSIFICATION FOR SEA TRANSPORT	O. A. S. (C) ...	O. A. S. (C) ...	O. A. S. (C) ...	O. A. S. (C) ...	O. A. S. (C)

RESTRICTED



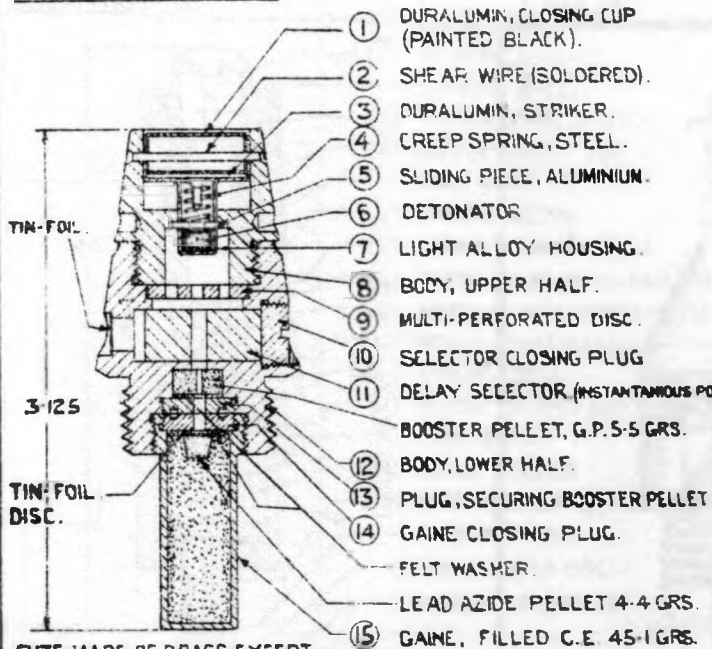
JAPANESE FUZE, PERCUSSION GRAZE (WITH OPTIONAL DELAY)
 TYPE 93.

90MM & 150MM MORTAR BOMBS, & 81MM. BOMBS SUITABLY EXPLODED, WITH 24MM FUZE HOLE.
 GENERAL ARRANGEMENT & ASSEMBLY SEQUENCE.

DIMENSIONS IN INCHES

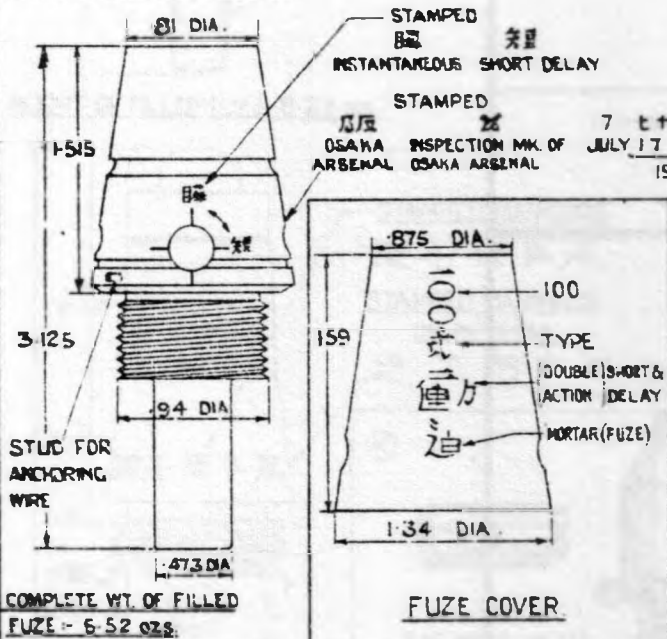
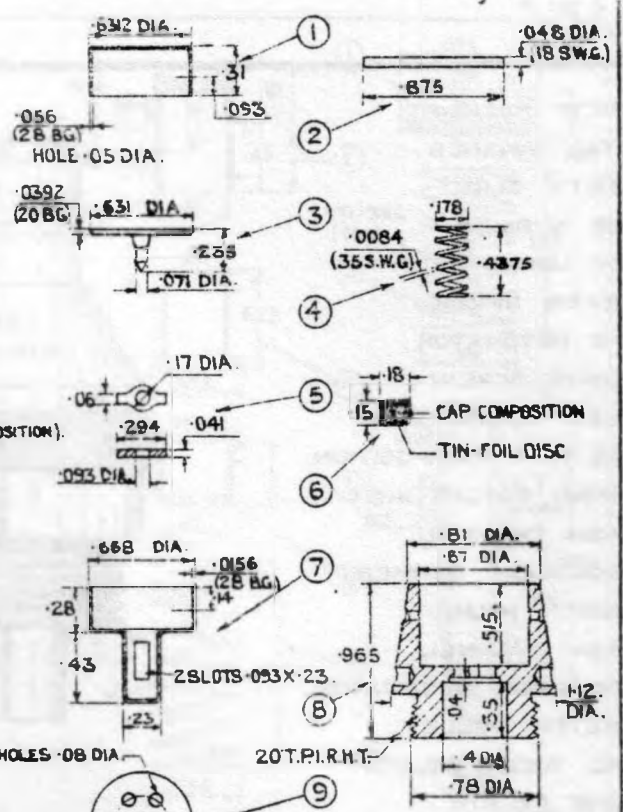
C.I ANN 5/1236
 KIRKLE SEPT. '45

RESTRICTED



- ① DURALUMIN, CLOSING CUP (PAINTED BLACK).
- ② SHEAR WIRE (SOLDERED).
- ③ DURALUMIN, STRIKER.
- ④ CREEP SPRING, STEEL.
- ⑤ SLIDING PIECE, ALUMINIUM.
- ⑥ DETONATOR
- ⑦ LIGHT ALLOY HOUSING.
- ⑧ BODY, UPPER HALF.
- ⑨ MULTI-PERFORATED DISC.
- ⑩ SELECTOR CLOSING PLUG.
- ⑪ DELAY SELECTOR (INSTANTANEOUS POSITION).
- ⑫ BOOSTER PELLETT, G.P.S-5 GRS.
- ⑬ BODY, LOWER HALF.
- ⑭ PLUG, SECURING BOOSTER PELLETT.
- ⑮ GAINING CLOSING PLUG.
- FELT WASHER.
- LEAD AZIDE PELLETT 4-4 GRS.
- GAINING, FILLED C.E. 45-1 GRS.

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

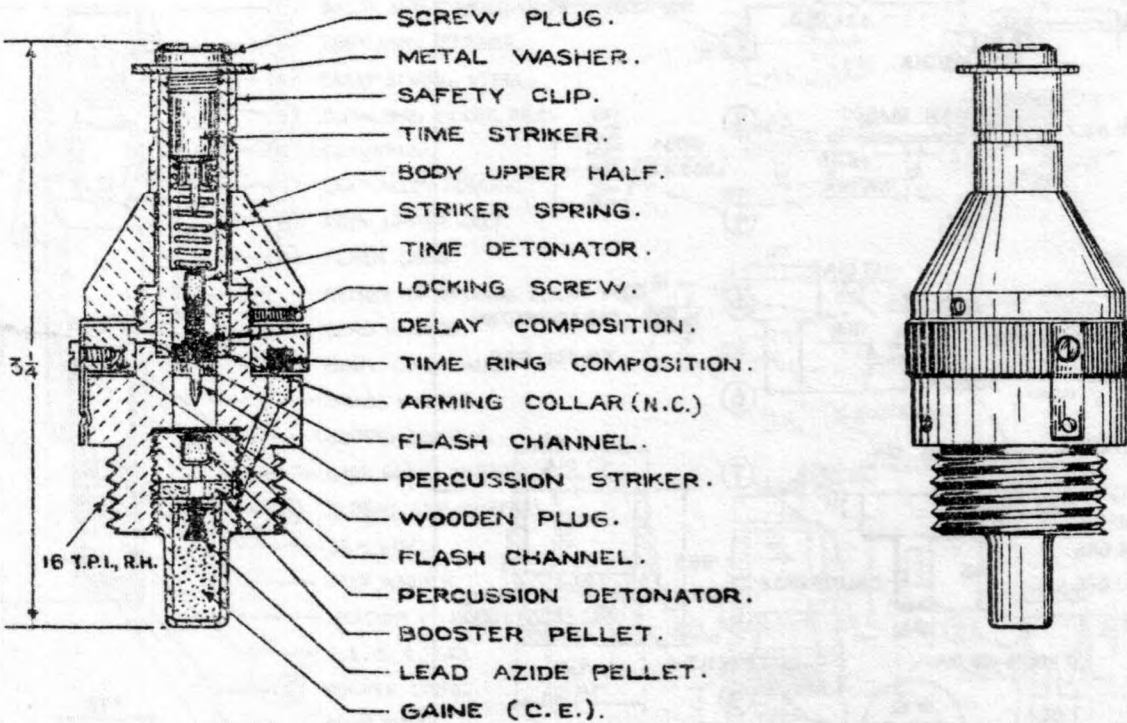


JAPANESE FUZE, PERCUSSION, GRAZE (WITH OPTIONAL DELAY)
TYPE 100

81 MM. & 120 MM. MORTAR BOMBS WITH 24 MM. FUZE HOLE.
GENERAL ARRANGEMENT & ASSEMBLY SEQUENCE

DIMENSIONS IN INCHES

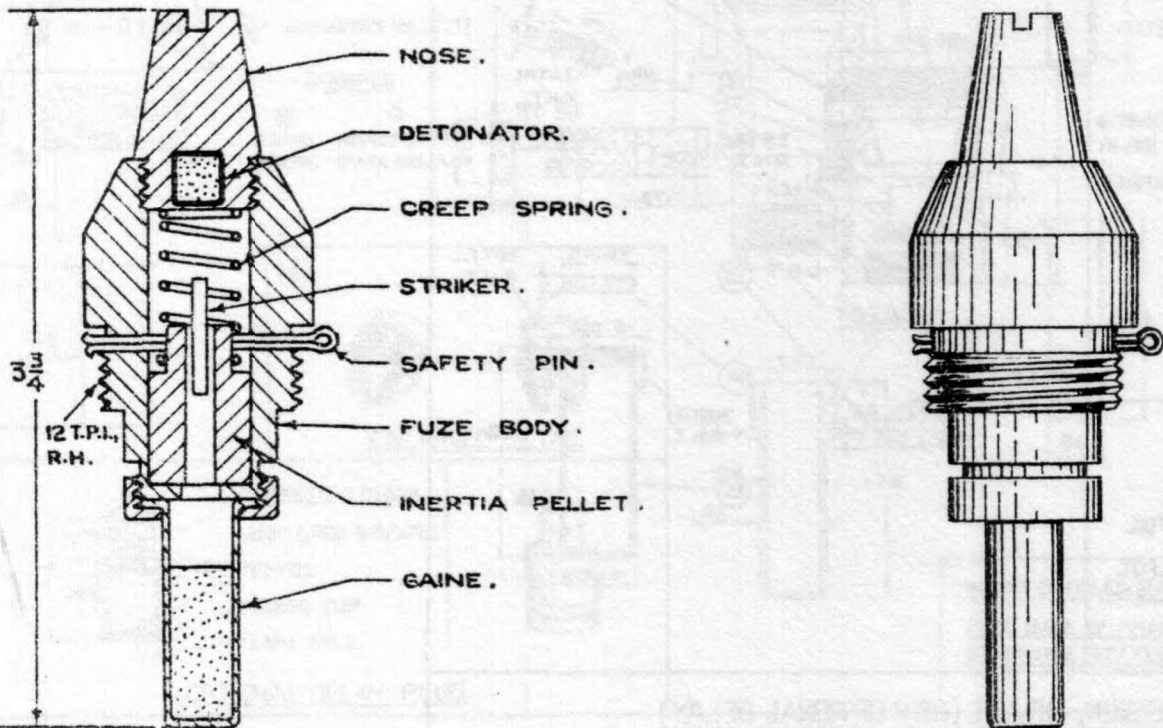
C.I. AMN. S/1238
KIRKEL, SEPT 45
C.I. P. P. D. 1945



— FUZE, TIME & PERCUSSION, TYPE '3, —

— FOR —

— 81 MM. MORTAR AMMUNITION, NAVAL, TYPE '3. —



— FUZE, PERCUSSION, GRAZE, —

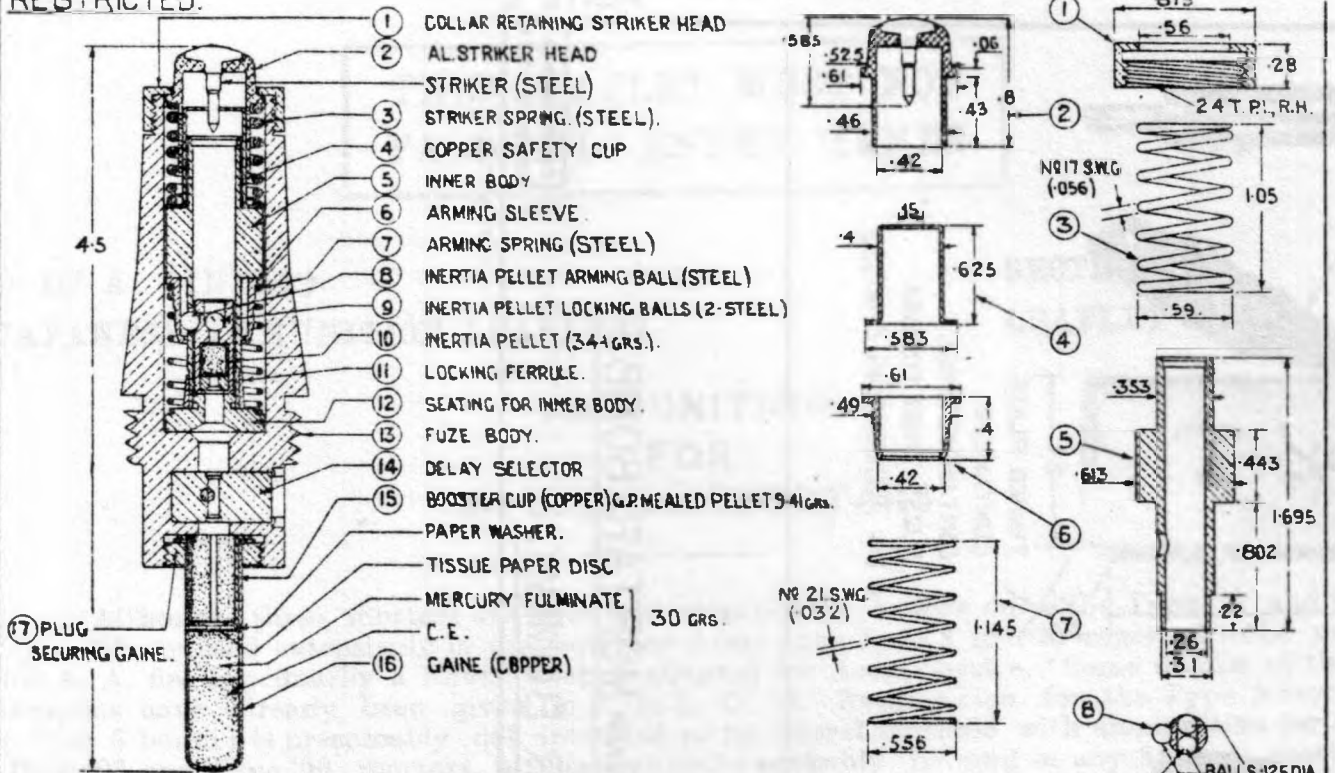
— FOR —

— CHINESE 82 MM. MORTAR BOMB. —

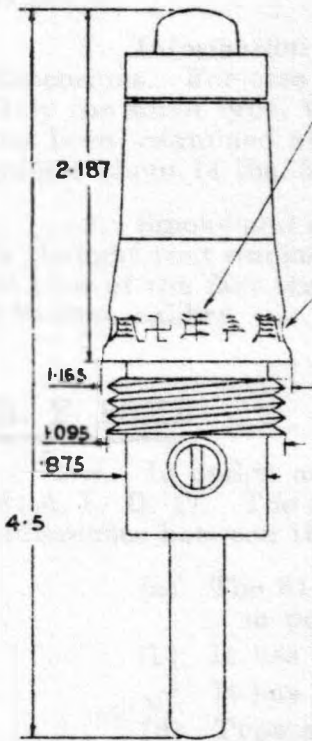
DIMENSIONS IN INCHES.

C.I. Amn S/1234
KIRKEE SEPT. '45

RESTRICTED.



WEIGHT OF FILLED FUZE 8.28 ozs.



STAMPED MARKINGS

風子年平風

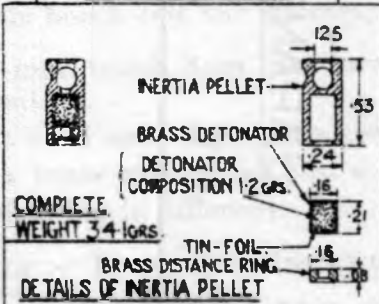
STAMPED MARKINGS ON REVERSE

風子年平風

(14)



ENLARGED DETAIL

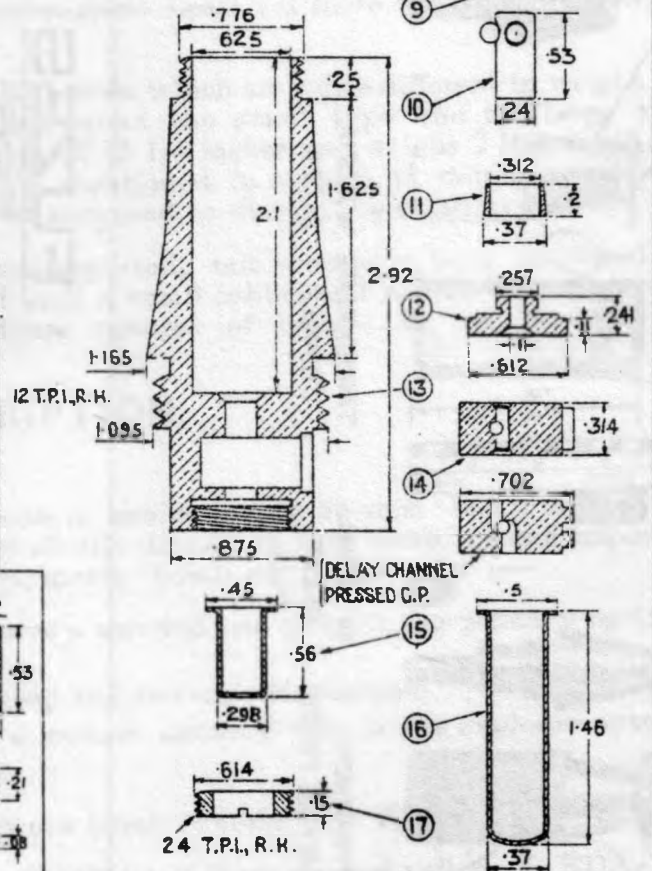


COMPLETE WEIGHT 3.41GRS.

TIN-FOIL

BRASS DISTANCE RING

DETAILS OF INERTIA PELLET



12 T.P.I., R.H.

DELAY CHANNEL PRESSED C.P.

FUZE MADE OF BRASS EXCEPT WHERE OTHERWISE STATED.

FUZE PERCUSSION, D.A. (WITH OPTIONAL DELAY).

CHINESE.

82 MM MORTAR BOMB WITH 28 MM. FUZE HOLE.

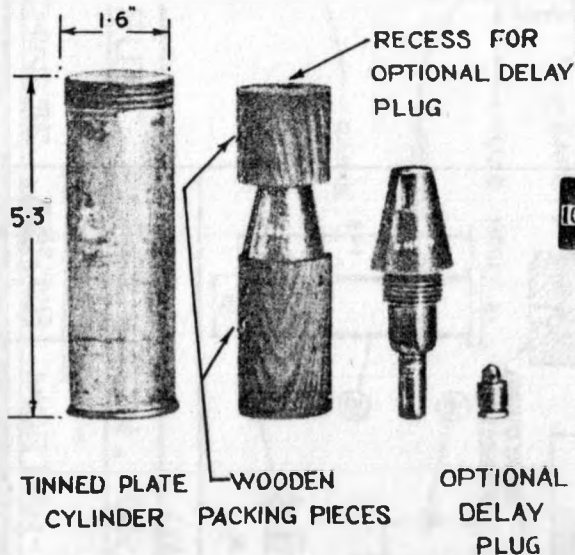
GENERAL ARRANGEMENT & ASSEMBLY SEQUENCE.

C.LAMN. S/1237 KIRKEE. SEPT. 45.

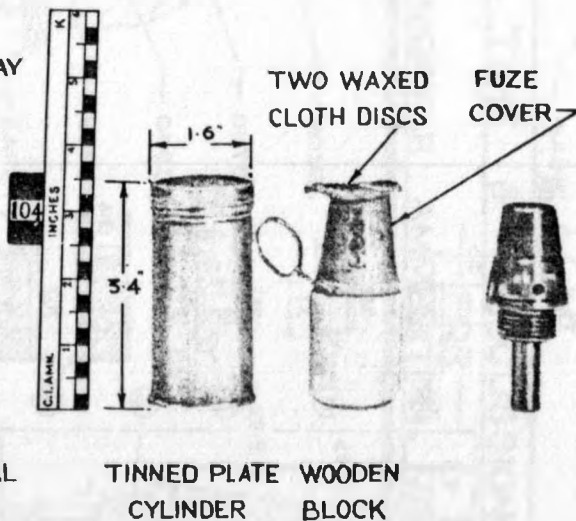
DIMENSIONS IN INCHES.

RESTRICTED.

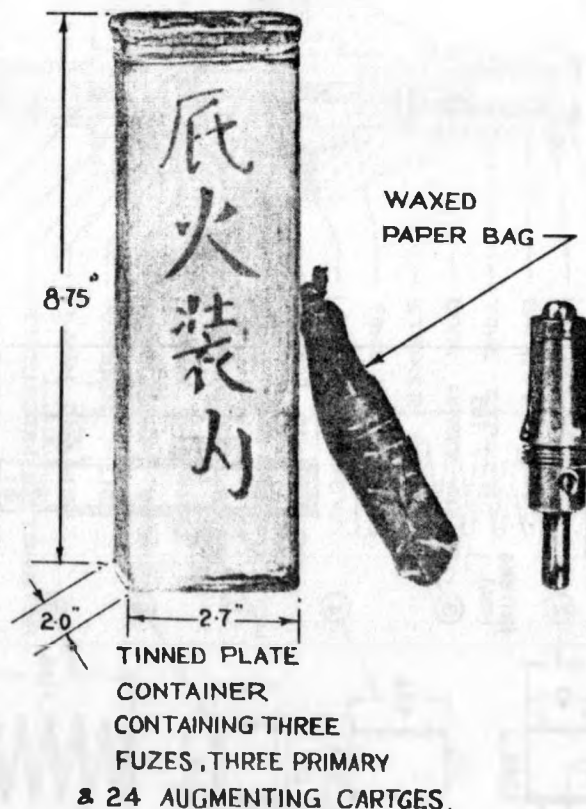
FUZE, PERCUSSION, GRAZE
(WITH OPTIONAL DELAY)
TYPE '93



FUZE, PERCUSSION, GRAZE
(WITH OPTIONAL DELAY)
TYPE 100



FUZE, PERCUSSION, D.A.
(WITH OPTIONAL DELAY)
CHINESE



FUZES
FOR

JAPANESE 81 MM, 90 MM, 120 MM, & 150 MM MORTAR BOMBS
AND
CHINESE 82 MM. MORTAR BOMBS

CL. AMN. S/1244
KIRKEE SEPT. 45

G.P.Z.P. FORM 1145.

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)
JAPANESE AMMUNITION LEAFLETS

SECTION D
LEAFLET D 15

AMMUNITION
FOR
M. L. 81-mm. MORTARS

Although three mortars are known to exist in this calibre only the Type '97 and the Type '99 are used extensively in the Japanese Army; the Type 3 mortar reported to be used for A. A. fire is primarily a Naval weapon adapted for Land Service. Some details of these weapons have already been given in J. A. L. D. 13. Ammunition for the Type 3 mortar (Type 3 bomb) is presumably not intended to be interchangeable with ammunition for the Type '97 and Type '99 mortars, although it could probably be used in any 81-mm. mortar. This question will be discussed in detail in a subsequent Leaflet if more information becomes available.

2. Information is available on two H. E. bombs which are quite different in weight and dimensions. For ease of reference, they may be called the small type and the large type. Only the small type, which has an overall length of 13 1/4 inches and weighs 7 lbs. 6 1/2 ozs., has been examined at Kirkee. The large type, mentioned in reports, is much heavier and, weighs about 14 lbs. 5 ozs. In this Leaflet it is proposed to discuss the small type only.

3. Smoke and chemical bombs have been reported, but none have been captured. It is thought that smoke and chemical bombs of such a small calibre will not be very important in view of the fact that the Japanese have these natures of bombs in the 90-mm. and 150-mm. calibre.

DESCRIPTION

H. E. BOMB

4. In design and construction this bomb is similar to the 90-mm. bomb described in J. A. L. D. 17. The drawing at Plate A gives all the details of this bomb. Some important differences between this bomb and the 90-mm. mortar bomb are listed below:—

- (a) The 81-mm. bomb does not have a screwed cap to hold the primary cartridge in position.
- (b) It has a steel securing pin to keep the tail unit in position.
- (c) It has a brass cup holder and a wooden distance ring in the exploder system.
- (d) Type of filling is different.

5. H. E. Filling:—The main filling of the bomb examined at Kirkee was 1-lb. 2-ozs. of cast Trinitrophenetol. The exploder filling consisted of three pressed pellets of RDX/Wax, the top pellet being recessed to house the aluminium cup.

6. Propellant:—The propellant arrangement is very similar to that in the 90-mm. mortar bomb. Six augmenting charges can be accommodated on each bomb, forming a full charge. Each charge is contained in a silk bag, stitched at the edges, the seams being heavily coated with lacquer. The charge in each bag consists of 88 grains of a double based propellant in the form of thin rectangular flakes. The primary cartridge is somewhat similar to the British Mk. 9 primary cartridge. The charge consists of brownish flakes of a double based propellant.

FUZE

7. The fuze used in the bombs examined at Kirkee is the percussion graze fuze Type 100 with an optional delay which is discussed in detail in J. A. L. D. 14. Reports from other sources state that the percussion graze fuze Type '93 is also used in the 81-mm. bomb. This, however, is possible only with bombs having a different type of exploder to accept the enlarged gaine portion of the Type '93 fuze.

PACKING

8. See Plate B. Three rounds are packed in a wooden box. The fuzes are packed as usual in tinned-plate cylinders and the primary and augmenting charges in a tarred paper bag. This type of packing has been examined at Kirkee.

9. Another method of packing consists of four rounds in a wooden box, the fuzes and primary and augmenting charges being packed as above. Reports state that in some cases the packing has been modified by the addition of an asphalt-impregnated paper lining to improve waterproofing.

IDENTIFICATION

10. The bomb can be easily identified in view of its close resemblance to the American bomb, H. E., M. 43 A. 1, 81-mm. Although in weight, length, arrangement of tail vanes etc. the two bombs are similar, other external differences are obvious. The American bomb is painted olive drab and has the type of filling stencilled in yellow below the bourrelet:—"T.N.T.", "AM 50/50" or "TRIMONITE". The Japanese bomb is painted black, with a yellow band just above the gas check rings and a red ring round the adapter. Some Japanese characters are stencilled on the body in white.

SUMMARY OF DATA

11. Length of complete bomb fuze	—	13 1/4-ins.
Weight of complete bomb fuze	—	7-lbs. 6 1/2 ozs.
Weight of H. E. filling	—	1-lb. 2-ozs.
Diameter of fuze hole	—	24-mm.
Length of primary cartridge	—	2.65-ins.
Average diameter of primary cartridge	—	.78-ins.
Weight of primary cartridge	—	1.1-ozs.
Length of augmenting charge	—	2.2-ins.
Width of augmenting charge	—	1.9-ins.
Weight of augmenting charge	—	102.8-grains.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

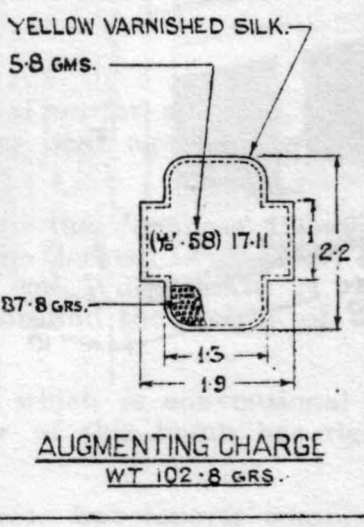
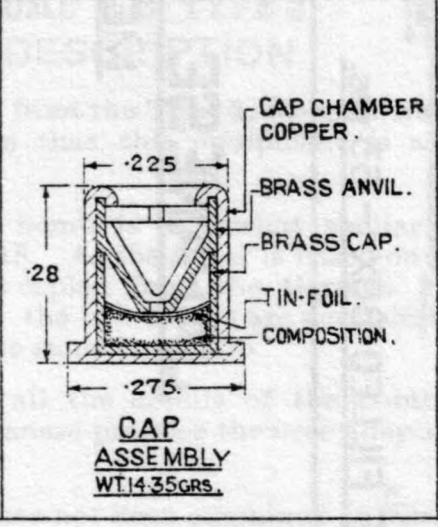
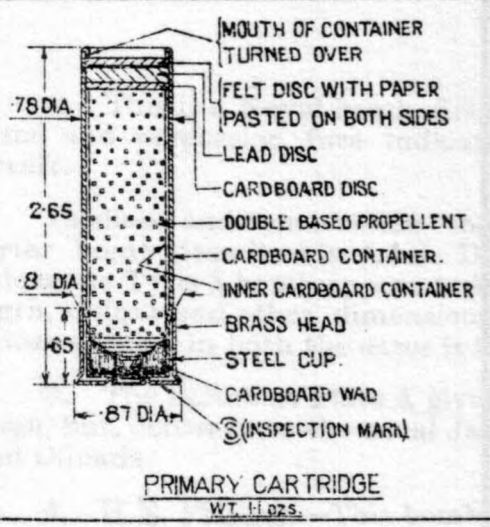
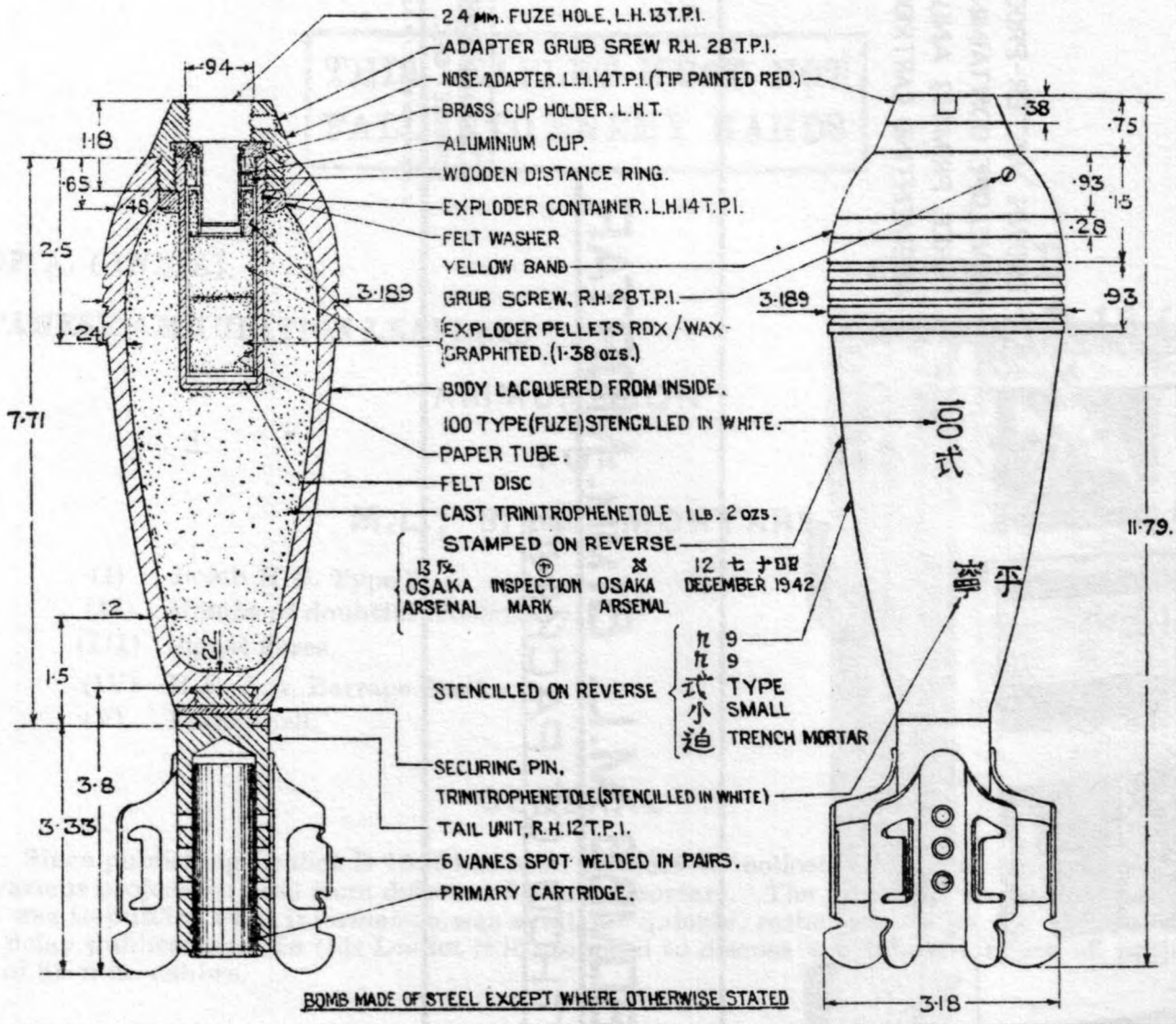
12. As for 90-mm. bomb, see J. A. L. D 17.

EXPLOSION/FIRE RISK	1 1/4-lbs.
(per rd. fuze)	
GROUP CLASSIFICATION	VIII, Category Z.
CLASSIFICATION FOR SEA TRANSPORT ..	O. A. S.

Amendment

Plate B:—For "Priming" read "Primary."

RESTRICTED



JAPANESE, BOMB. H.E., M.L., 81 MM. MORTAR.

DIMENSIONS IN INCHES.

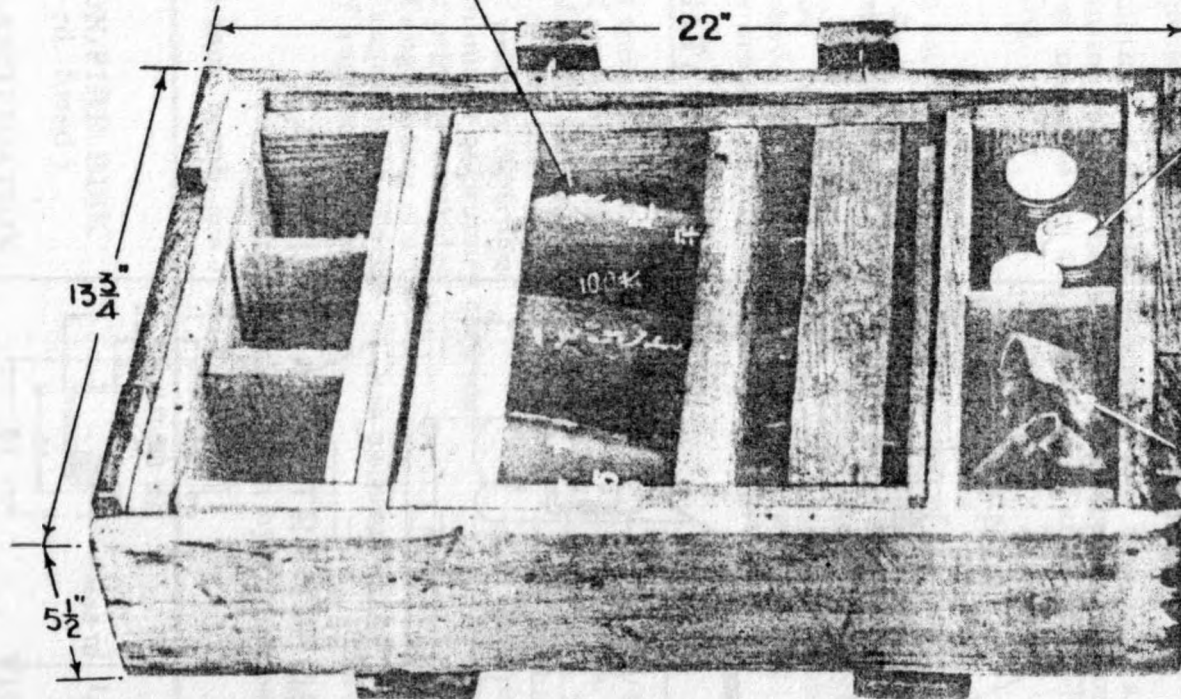
WITH 24 MM. FUZE HOLE.

C.I. AMN. S/1139
KIRKEE, NOV. 1945.

RESTRICTED.

THREE BOMBS M.L. 81 MM.
MORTAR (PLUGGED).

THREE TINNED PLATE CONTAINERS
CONTAINING THREE FUZES PERCUSSION
WITH OPTIONAL DELAY TYPE 100.



BROWN WATER-PROOF
ENVELOPE CONTAINING
THREE PRIMING AND
AUGMENTING CARTRIDGES

WT. OF FILLED BOX :- 63 LBS.

JAPANESE BOMBS M.L. 81 MM. MORTAR
METHOD OF PACKING

C.I.A.M.N.S/1336
KIRKEE DEC. '45

D.P.P. POONA. 1945.

PLATE B.

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D

LEAFLET D 15 (a)

AMMUNITION FOR M.L., 81-mm. MORTARS

- (I) Bomb H.E. Type 3.
- (II) Bombs of doubtful nationality.
- (III) Signal flares.
- (IV) H.E. A.A. Barrage Shell.
- (V) Flare Shell.

GENERAL

Since publishing Leaflet D 15 it has been possible to collect additional information on the various projectiles fired from different 81-mm. mortars. The intention in issuing Leaflet D 15 was to publish what information was available quickly, rather than wait for details and thus delay publication. In this Leaflet it is proposed to discuss six different types of projectiles of 81-mm. calibre.

BOMB H.E. TYPE 3 DESCRIPTION

2. This is a Naval bomb, fired from the Type 3, 81-mm. Naval mortar and the use of a time and percussion fuze indicates that this equipment is also used against low-flying aircraft.

In shape and construction the bomb is somewhat similar to the Japanese 120-mm. mortar bomb described in J.A.L D 18. As the latter is based on the German 12 cm. Wgr. 42, so does the Type 3 bomb appear to be copied from the German 8 cm. Wurfgranate 34. In length, weight and other dimensions, the two bombs are very similar, and the weight of the explosive filling in both the cases is the same i.e. 1.1-lb.

3. The sketch at Plate A gives all the details of the bomb which is conventional in design, but, contrary to the usual Japanese practice the nose adapter of this bomb has right hand threads.

4. H.E. Filling:—This bomb has not been examined at Kirkee, but reports compiled by the U.S. Navy indicate that the filling is 1.1-lb. of a mixture of picric acid 57% and alphanitronaphthalene 43 %. A picric acid exploder, as in the case of the 120-mm. mortar bomb, is wrapped in thin paper and placed directly into the main filling in contrast to the usual practice of using a metal exploder container. Other reports make no mention of the use of an exploder so that it would appear that modifications in filling design have been made.

5. Primary Cartridge:—This comprises two separate parts, the cardboard cylinder containing the propellant charge, and the primer. The cardboard cylinder contains about $\frac{1}{2}$ oz. of a double base propellant; it fits into the cartridge container and is held in position by the screwed primer which is clearly shown in the drawing at Plate A.

6. Augmenting charges:—These are contained in flat circular silk bags which fit around the cartridge container just above the tail vanes. The correct number of increments is determined from the following range table:—

<u>Range in Metres</u>	<u>Designation</u>	<u>Increments</u>
1000-2800	Ordinary charge	5
600-1600	Weak charge	3
300-800	Reduced charge	1
100-500	Specially reduced charge	0

The following statement, which appears beside the range table, proves that the mortar is used for A.A. fire "For A.A. use always the ordinary charge (5 increments)".

Chemical analysis of the augmenting charge is not available, but an American Report calls it a small grain, single-perforated, graphited, smokeless powder.

FUZE

7. This bomb takes the Time and Percussion Fuze Type 3 described in J.A.L. D 14. Note that in a modification of this fuze, the safety clip is replaced by a safety strip secured to the body by a grub screw which may also pass through the time striker.

IDENTIFICATION

8. It will be easy to identify this bomb from other 81-mm. mortar bombs by the unusually long cartridge container and the distinctive arrangement of the tail vanes. As in the Naval 120-mm. bomb, a percussion primer screws into the base of the cartridge container.

The projectile is reported to have a green band at the nose followed by a red band. The body is coloured black, which is in keeping with army markings. The green nose band, indicating H.E. filled, is in accordance with Naval practice, but the red band, also indicating H.E. filled, is definitely an army colour code. This is not a standard Japanese way of marking ammunition, but an overlapping of the Naval and Army Systems; this suggests that the bomb is used by both Services.

SUMMARY OF DATA

9. Length of the bomb fuzed	14 inches approx.
" " " " w/o fuze	11½ inches.
Diameter over gas check rings	3.18 inches.
Weight of the bomb fuzed	7¼ lbs.
Weight of H.E. filling	1.1 lbs.
Fuze hole	24-mm. R.H.T.
Weight of propellant in Primary cartge	¼ oz.
Length of Primary cartridge	4 inches.
Weight of augmenting charge	not known

HANDLING AND TRANSPORT (Of captured ammunition by Ordnance)

10. See J.A.L. D 17 and para 25 of J.A.L D 14.

EXPLOSION/FIRE RISK	..	1½ lbs.
GROUP CLASSIFICATION	..	VIII Category Z.
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S.

BOMBS OF DOUBTFUL NATIONALITY GENERAL

11. A Japanese box containing 20 rounds of 81-mm. mortar bombs was received in the middle of 1945. On examination it was found that there were 10 bombs painted yellow, resembling American bombs, and 10 bombs painted black, resembling Italian bombs. There were no primary or secondary charges in the box. So far, it has not been possible to determine for certain the origin of these bombs, but to facilitate reference they will be referred to in this Leaflet as American type bombs and Italian type bombs.

AMERICAN TYPE BOMB DESCRIPTION

12. A sketch of the bomb is given at Plate B. The bomb is almost identical with the American Shell, H.E., M43 A1, 81-mm. described in Ammunition Circular (India) AI/22 of Nov. 1945, but the body markings (see under identification) do not conform to standard American practice; in addition the American bomb is fitted with a bakelite cup only when filled Trimonite. The tail units of the two bombs are identical.

13. The main filling of the bomb examined at Kirkee consisted of 1-lb. 11-oz. of Grade I T.N.T.

FUZE P.D. M 52 G 2.

14. The fuze found in this bomb bore stamp markings stating that it was the M 52 G 2. No such fuze is known to exist however in the American service. In its mode of action it is identical with that of the fuze PDM52A1B1 (also described in AI/22), but it differs in the method of construction in the following respects:—

- (a) The firing pin is attached eccentrically to the striker head.
- (b) The striker head is secured by a shear wire.
- (c) Body is of metal and in one piece.
- (d) Booster container (magazine) is not knurled.

As the sketch at Plate C gives all the details of the fuze, a detailed description is not included in this Leaflet.

ACTION

15. Although the fuze works in the same way as the M52A1B1, its action is repeated here for convenience. On firing, the detent sets back and the safety pin moves outward under tension of its spring until stopped by the mortar barrel. When the projectile leaves the barrel, the safety pin flies clear, allowing the spring-loaded slider to move until stopped by the wall of the recess. At this position, the detonator is in line with the striker and the booster lead (which consists of two C.E. pellets held in a cup).

On impact, the shear wire breaks and the striker is forced on to the detonator causing it to function. The detonation wave is then transmitted through the booster lead into the booster, and thence to the main filling.

PACKING

16. Only one box, containing 20 bombs, 10 of each type, has been received at Kirkee. The American type bombs were packed in German cardboard containers which bore a label marked "G8 mrt. nr 3 gec A1-40". The other bombs were not packed in containers, but held in position by packing pieces.

IDENTIFICATION

17. The bomb was painted yellow with the following stencilled in black :—
" 81 MM TNT LOT 17 "

There were no stamped markings on the bomb body. The tail unit was painted dark brown.

SUMMARY OF DATA

18. Length of the complete bomb	..	..	13½ ins.
Length without fuze	..	..	11 ins. (Approx)
Weight fuzed	..	..	7 lb.
Weight w/o fuze	..	..	6 lbs. 7½ ozs.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

19. See Para 10 above.

EXPLOSION/FIRE RISK	..	1½ lbs.
GROUP CLASSIFICATION	..	VIII Category Z.
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S.

ITALIAN TYPE BOMB DESCRIPTION

20. This bomb is believed to be of Italian origin. Except for the exploder system it is similar in construction to the Japanese 81-mm. mortar bomb described in J.A.L. D 15. In length, weight, and dimensions also the two bombs are very similar and the weight of the explosive filling in both the cases is the same i.e. 1 lb. 2 ozs. The sketch at Plate D gives all the details and further description is not necessary.

21. Filling :—The main filling of the bomb examined at Kirkee was 1 lb 2 ozs. of T.N.T. In accordance with the usual Japanese practice, the exploder consisted of a pressed C.E. pellet in a metal container lined with a paper tube.

FUZE

22. The bomb was fitted with a fuze which is shown in Plate E. The mechanism is exactly similar to the Fuze Percussion D.A. (with optional delay) used in the Chinese 82 mm. mortar bombs, see Plate D and paras 16 to 19 of J.A.L. D 14. Note the slightly different method of obtaining delay. The design is based on that of the Italian spoletta da 81 I.R. used in their 81 mm. mortar bomb.

PACKING

23. See para 16 above.

IDENTIFICATION

24. The bombs are painted black with a yellow nose adapter. Since these bombs are issued fuzed they can be readily distinguished from the Japanese bombs of the same calibre by the presence of Italian fuzes.

Note the marking on the bomb body and the fuze; the absence of Japanese characters is significant.

SUMMARY OF DATA

25. Length of complete bomb	..	..	..	..	13.37"
Length w/o fuze	..	..	..	..	11.44"
Weight fuzed	..	..	..	..	7 lbs. 7 ozs.
Weight w/o fuze	..	..	..	..	6 lbs. 15.3 ozs.
Weight of H.E. filling	..	..	..	..	1 lb. 2 ozs.

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

26. See para 10 above.

EXPLOSION/FIRE RISK	..	1½ lbs.
GROUP CLASSIFICATION	..	VIII Category Z.
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S.

Note :—Whatever the origin of these bombs, it seems that they have at least been re-fuzed by the Japanese for their own use. They may have been filled or even manufactured by the Japanese, being copied from the parent American and Italian bombs.

SIGNAL FLARES GENERAL

27. Two types of signal flares have been reported in this calibre the green type and the parachute smoke type, though none has been examined at Kirkee. Except for the sketch at Plate F no information is available on this store; the description and the action of the flares are therefore largely matters of conjecture. It is, however, known that the two types are very similar in design and construction and the following description of the green flare is generally applicable to the parachute smoke type also. In the latter case, however, the illuminating composition is substituted by a smoke container to which is attached a parachute.

The green signal flare can be recognised by the six green discs on the top surface, while the parachute smoke type is distinguished by a broken yellow ring.

DESCRIPTION

28. The sketch at Plate F gives all the available details. A light iron cylindrical container is closed at the upper end by a cardboard cover and at the lower end by an iron base plate to which is attached the propellant assembly. There are eight raised bearing surfaces on the upper and lower portions of the container to steady the projectile in the mortar. Inside the container is a cardboard lining which contains two increments of illuminating composition separated by a perforated felt wad. The space above the illuminating composition is empty except for a cardboard distance piece.

29. The propellant assembly is rather unconventional. A brass propellant container is fitted with a percussion cap and contains the propellant charge. Above the charge are an aluminium, and a number of cardboard washers, and the propellant container is finally closed by a dished metal plate. A second cap is held in the wooden block, as shown in the sketch, and from it a length of safety fuze leads to the ejection charge.

ACTION

30. As no sample of this flare has been received at Kirkee, it is not clear in what manner it functions. It is believed that on firing, the flash from the percussion cap ignites the propellant charge and the round is expelled from the mortar. At the same time, the heat produced by the burning of the propellant is conducted through the aluminium washer and sets off the second cap, which in turn ignites the safety fuze. After a given period of time the safety fuze burns through and ignites the ejection charge. This throws out the inner cardboard lining complete with its contents. The flash from the ejection charge is also conveyed to the illuminating composition which burns, emitting a green light.

Note :—The sketch of this flare is based on Supplement to P.T.S. No. 9 of August 1942, compiled by the M. I. Directorate, General Headquarters (India). The dished metal plate shown in Plate F is called the "Striker Device", and presumably it was thought to impinge on the second cap on account of the pressure built up by the propellant gases and thus initiate the cap. As this seems rather improbable, the theory of thermal relay discussed in the preceding paragraph is considered more likely.

FLARE SHELL GENERAL

31. Two new types of 81-mm. mortar shell have been reported from the Philippines; these are a flare or illuminating shell, and an A.A. barrage shell. The Japanese nomenclature for this ammunition is not yet known. The two projectiles are externally of the same design, but can be distinguished by the colour markings. The barrage shell is entirely black except for the light tan wooden nose plug, while the flare shell is light grey in colour and the wooden nose plug is painted red.

The flare shell is described here, and the barrage shell will be dealt with in subsequent paragraphs. At Plate G is given a sketch of a typical shell, along with details of the flare cylinder and the H.E. cylinder.

DESCRIPTION

32. The flare shell consists of a steel tube with an ogival wooden plug sealing the forward end. Six stabilising fins, which give the shell an 81-mm. diameter, are spot welded to the rear end of the tube. A steel cup is welded about $\frac{1}{2}$ inch inside the rear end of the tube and above this is a 5-inch wooden block through the centre of which runs the 12 to 15 seconds delay train. The top end of the wooden block contains a black powder ejection charge.

The tinned steel propellant container shown in the sketch is 81-mm. in diameter and 1 inch deep. A neck on the cover of the container fits into the base of the tube and is secured by three small screws passing through the sides of the tube and neck. This connection leaves a space of $\frac{3}{16}$ inch between the base of the shell and container. The base of the propellant container has 6 vent holes and is fitted with a percussion primer.

33. A cylinder containing flare composition (apparently a magnesium composition) is a sliding fit in the shell tube above the wooden block containing the delay train and ejection charge. Above the flare cylinder and attached to it are two parachutes, one 16 inches square and attached to the flare cylinder by 14-inch shroud lines and the other 25 inches square and attached by 23-inch shroud lines and a 13-ft. cord. The larger parachute has a hole $4\frac{1}{2}$ in. in diameter in the centre, presumably to reduce swing. The shell body is closed by an ogival wooden plug.

ACTION

34. When the shell is fired the flash from the primer ignites the propellant and the delay train in the wooden block. At the same time, the projectile sets back on the propellant container and shears the small screws securing it to the shell. When the force of the propellant is expended the container falls free and the shell continues its onward flight. From 12 to 15 seconds after firing, the delay train ignites the ejection charge, blowing the flare cylinder, parachute and nose plug from the top end of the shell. The burning of the ejection charge also ignites the flare, which descends to earth on the two parachutes.

H.E., A.A. BARRAGE SHELL

DESCRIPTION

35. This shell is identical with the flare shell except that the flare cylinder is replaced by an explosive cylinder. The explosive cylinder is similar to those found in the 70-mm. H.E. Barrage mortar shell (see J.A.L. D. 10). It consists of a steel cylinder closed at the bottom by a screwed steel plug, and which holds the main bursting charge, and a central tube containing a 40 to 45 second self-destroying element, the gaine and a friction igniter. The details of the explosive cylinder are shown in Plate G. The main bursting charge consists of perforated R.D.X. or C.E. pellet, over two perforated T.N.T. pellets. The gaine in the central tube consists of a gunpowder pellet over a lead azide pellet, both being surrounded by a perforated R.D.X. or C.E. pellet.

36. Above the H.E. cylinder are two parachutes. The smaller parachute is 12 inches in diameter with 13-in. shroud lines and is attached to the cylinder by means of small fixed U-bolt. The larger parachute is 16 in. in diameter with 15-in. shroud lines and is attached to the friction igniter by a cord 32 ft. long, passing through the centre of the smaller parachute. An ogival wooden plug closes the shell.

ACTION

37. Up to a point, the action of this shell is similar to that of the flare shell. When the ejection charge ignites, in addition to blowing out the explosive cylinder, parachutes and nose plug, it also conveys the flash to the 40-45-second self-destroying element contained in the explosive cylinder. The action of the explosive cylinder is presumably similar to that of the one in the 70-mm. H.E. Barrage mortar shell. When an aircraft strikes the 32-ft. cord attached to the igniter and the larger parachute, the igniter will be functioned and the cylinder will detonate. Failing this, after 40-45 seconds the self-destroying element burns through and initiates detonation.

PACKING

38. This applies to both the flare and the barrage shell. Each shell is packed in separate tinned plate container $21\frac{1}{2}$ inches long and $3\frac{5}{16}$ in. in diameter, and the containers are packed eight in one wooden box.

IDENTIFICATION

39. See para 31. Except for the colour markings, the two shell are externally identical. The barrage shell is entirely black except for the light tan wooden nose plug, while the flare shell is light grey in colour and the wooden nose plug is painted red.

SUMMARY OF DATA

40. The weights and dimensions given here pertain to H.E. Barrage shell, but it is presumed that these figures generally apply to the flare shell also.

Total weight of barrage shell	..	..	..	3 lbs. 14 ozs.
Wt. of H.E. cylinder and parachutes..	..	..	..	1 lb. 5 ozs.
Wt. of Propellant	..	..	..	$\frac{3}{4}$ oz.
Total weight of H.E. block	..	..	..	4 ozs.
Overall length	..	..	..	21 in.
Diameter	..	..	..	$1\frac{1}{2}$ in.
Length of H.E. cylinder	..	..	..	7 in.

HANDLING AND TRANSPORT

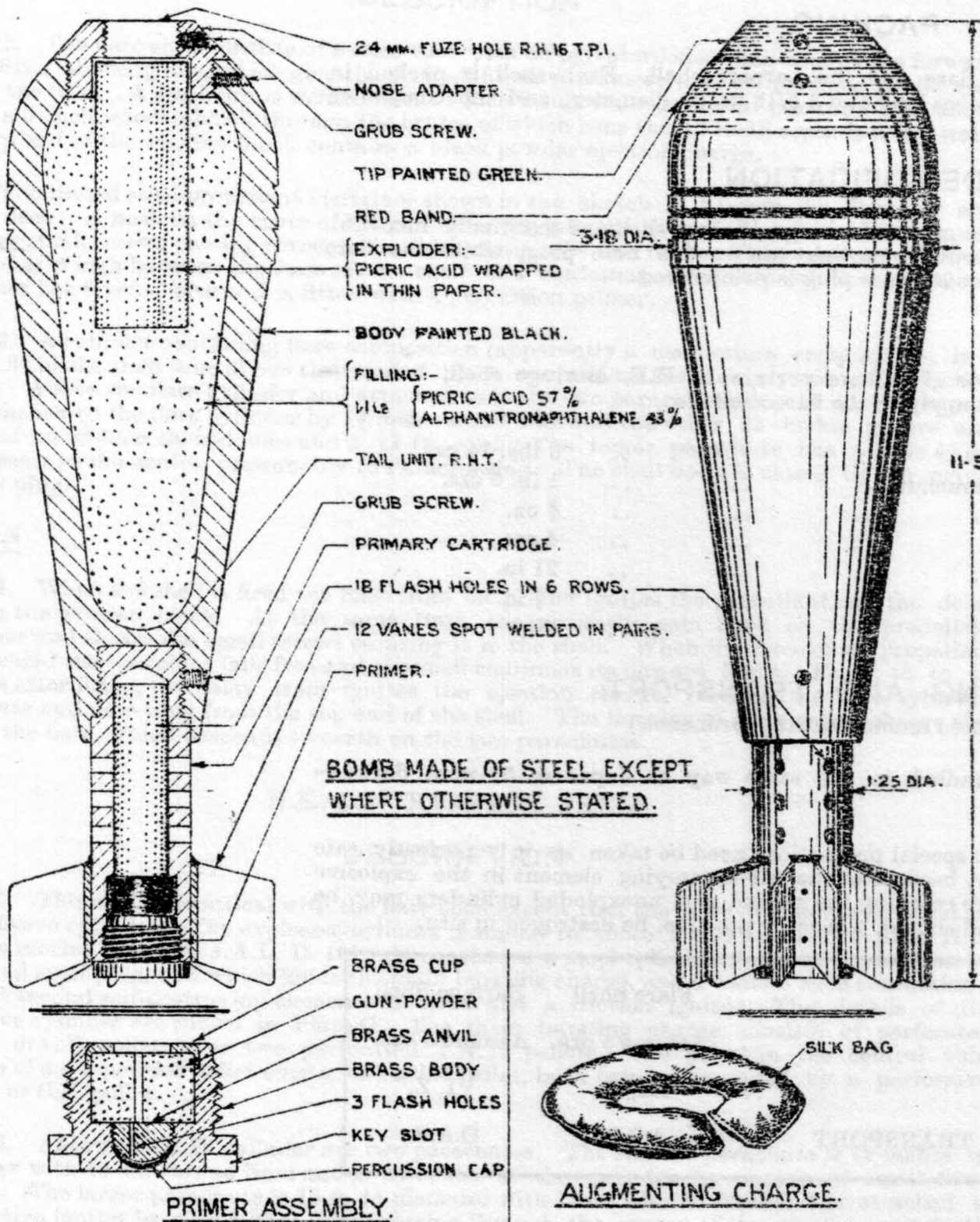
(Of captured ammunition by Ordnance)

41. The flare shell should be handled in the same way as Japanese 50-mm, flares.— See para 41 of J.A.L. D8.

In the case of barrage shell, no special precautions need be taken as it is perfectly safe to handle when complete. Normally, because of the self-destroying element in the explosive cylinder, it is expected to burst before reaching the ground; but unexploded cylinders may be found. These are very dangerous and should, whenever possible, be destroyed in situ.

	Flare Shell	Barrage Shell
EXPLOSION/FIRE RISK	.. Assume 5 ozs.	Assume 5 ozs.
GROUP CLASSIFICATION	.. IX, X.	VI, Z.
CLASSIFICATION FOR SEA TRANSPORT	.. A.S.P.	O.A.S.

FUZE:- TYPE '3. SEE J. A. L. DIA PLATE C.



JAPANESE BOMB, H.E., M.L. TYPE '3 81MM. MORTAR.

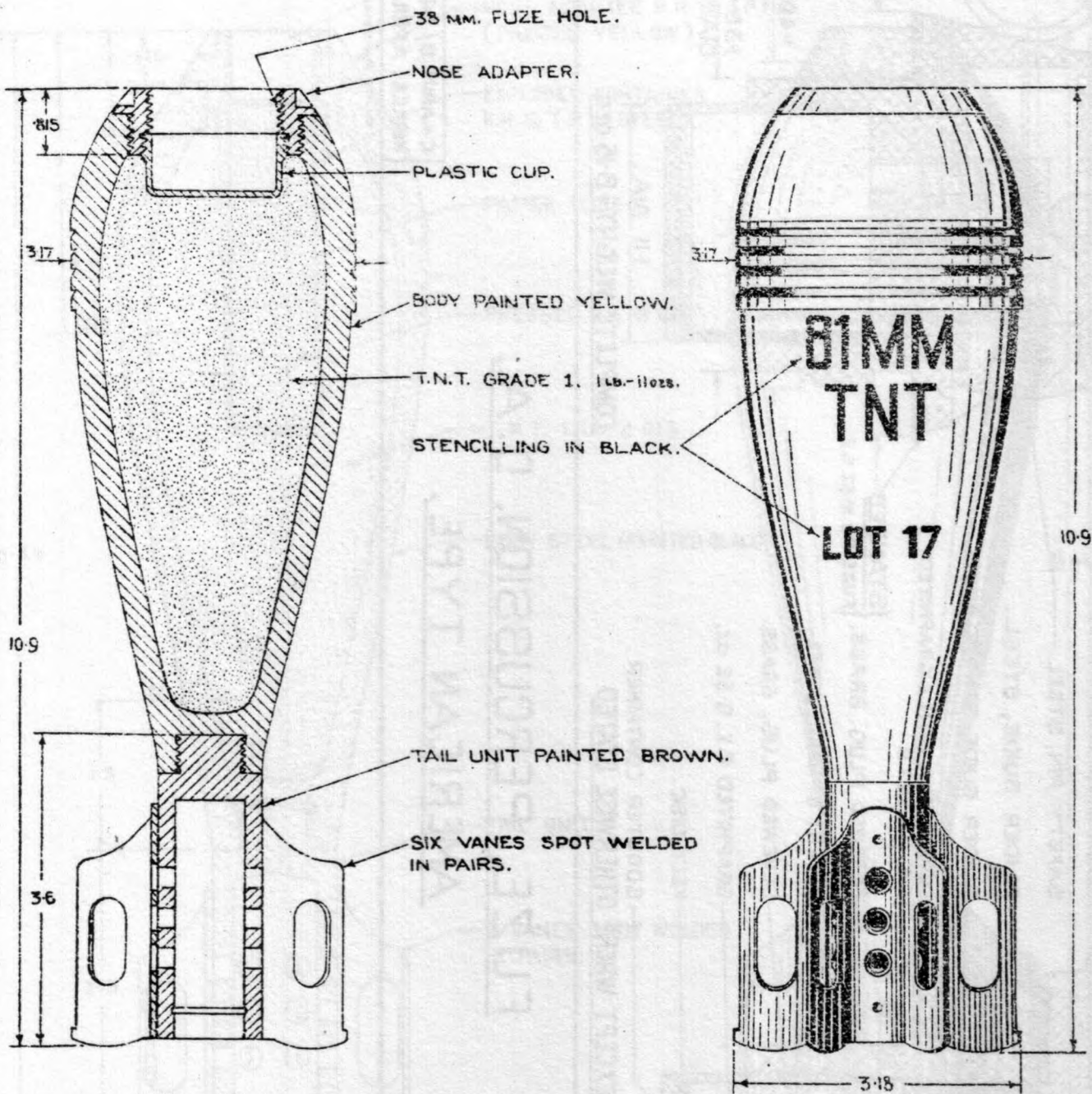
WITH 24 MM. FUZE HOLE.

DIMENSIONS IN INCHES.

C.I.A.M.N. S/1432
KIRKEE MARCH. 46.

G.P.O.P. FORM 1246

RESTRICTED.



BOMB, H.E., M.L., 81 MM. MORTAR

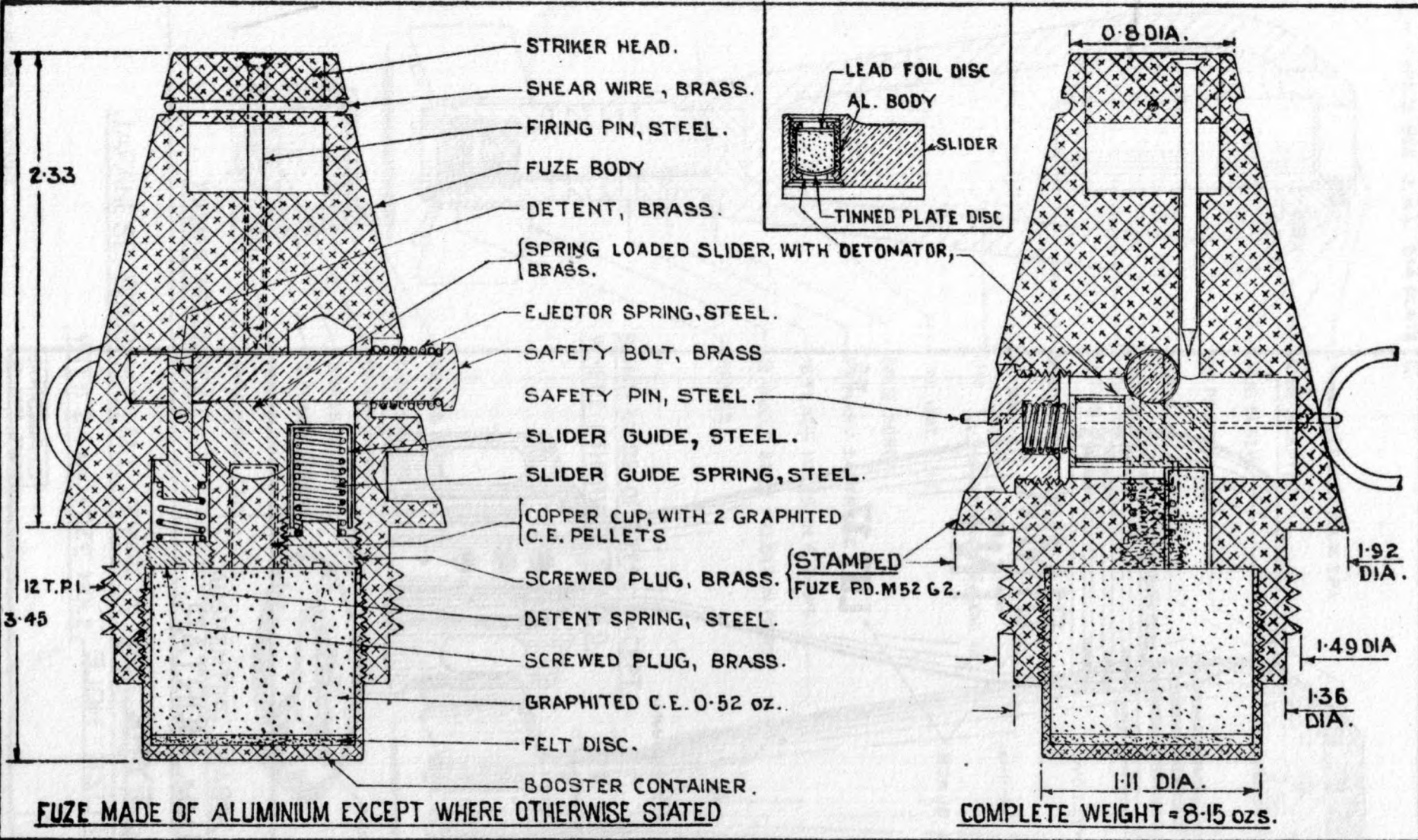
AMERICAN TYPE

WITH 38 MM. FUZE HOLE.

DIMENSIONS IN INCHES

C.I. Amn. S/1443
KIRLEE APRIL 45

G.P.O. FORM 1946



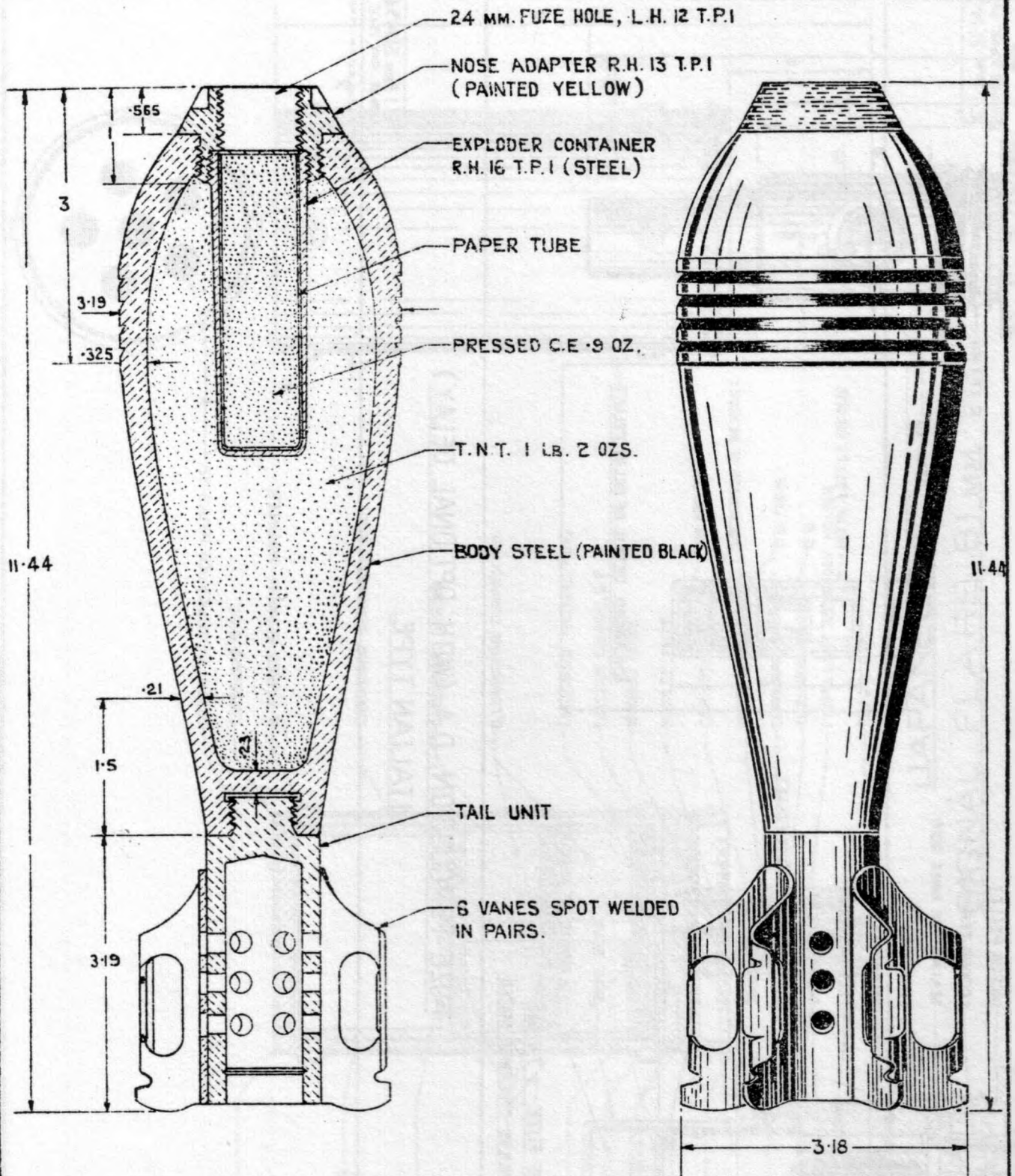
FUZE MADE OF ALUMINIUM EXCEPT WHERE OTHERWISE STATED

FUZE, PERCUSSION, D. A.,
AMERICAN TYPE.

DIMENSIONS IN INCHES

C.I.A.M.N.-S/1444
KIRKEE. APRIL. 46.

G. P. 2. P. POONA. 1946.

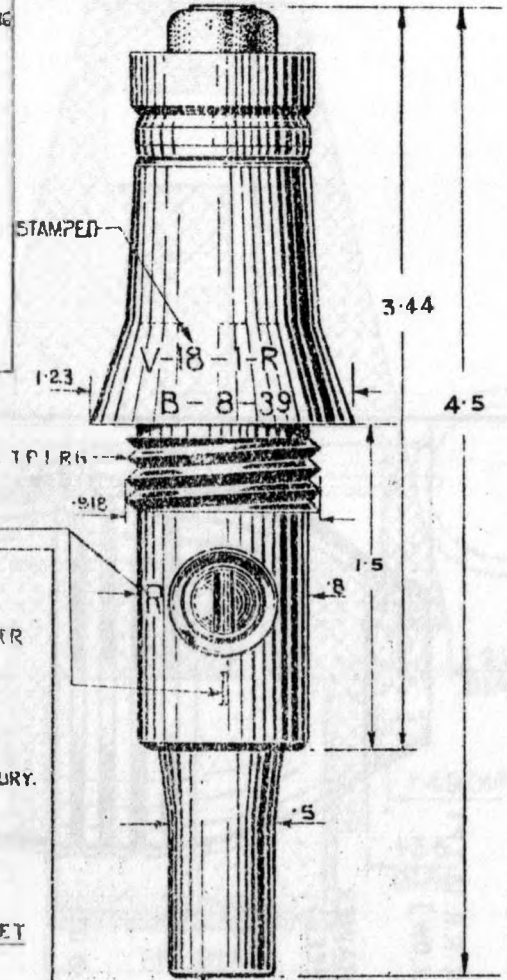
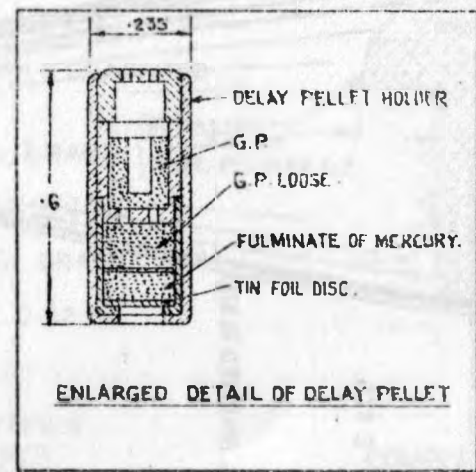
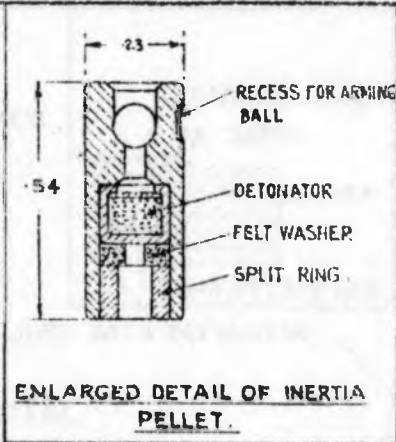
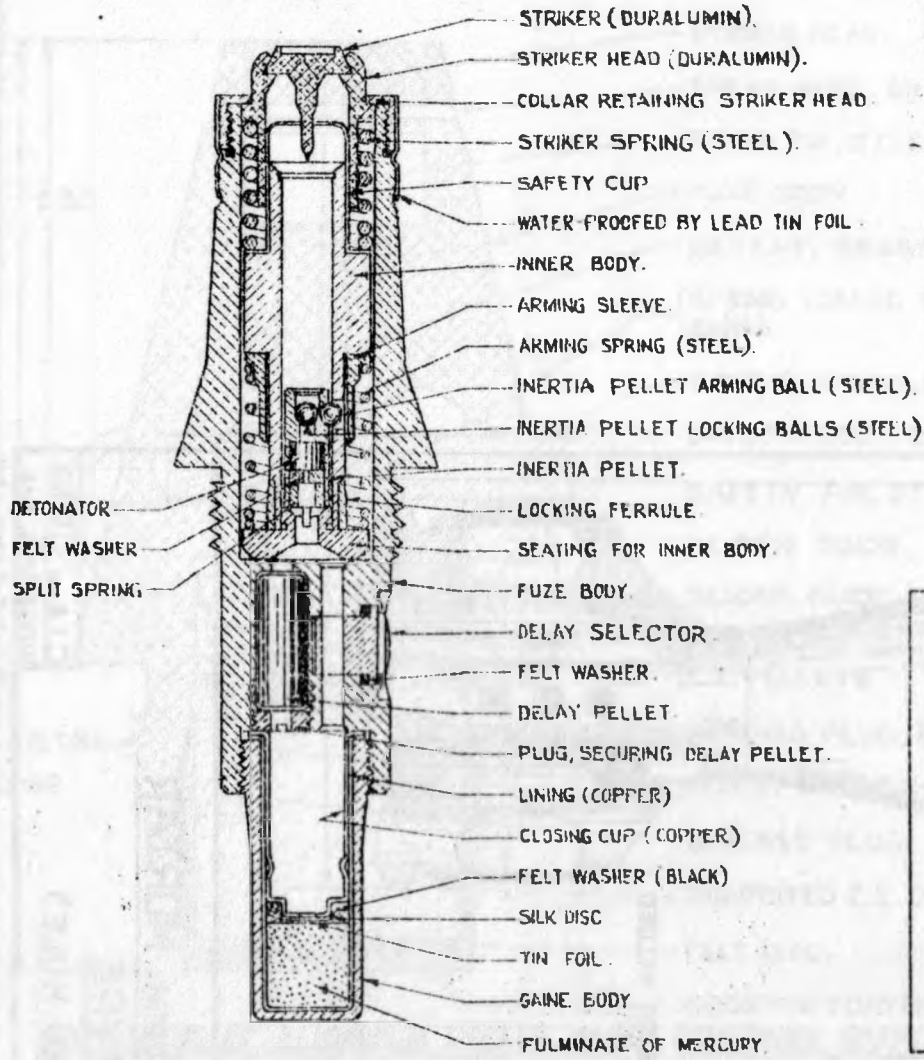


**BOMB H.E., M.L., 81 MM. MORTAR
ITALIAN TYPE
(WITH 24 MM. FUZE HOLE)**

DIMENSIONS IN INCHES.

C.I.A.M.N. S/1452
KIRKEE, APRIL 1946

G.P.I.P. POBNA 1946.



COMPLETE WT. OF FUZE ---- 7.7 Ozs.
 FUZE MADE OF BRASS UNLESS OTHERWISE STATED.

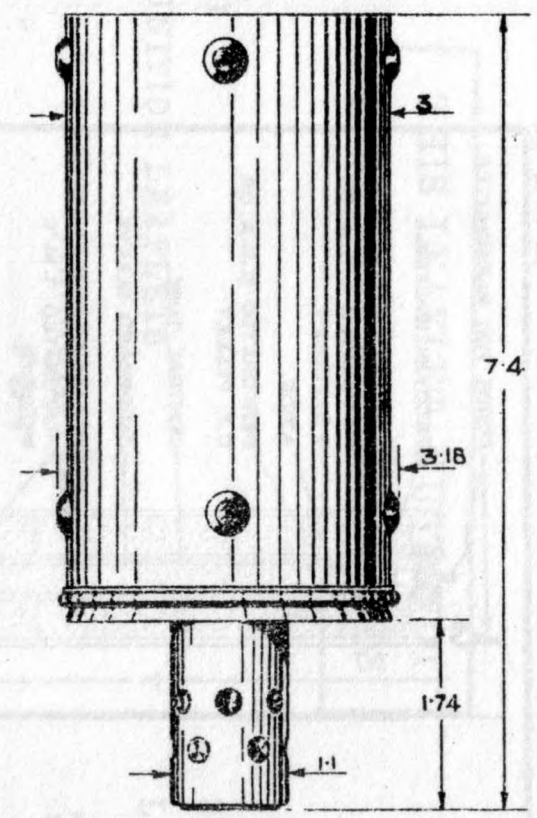
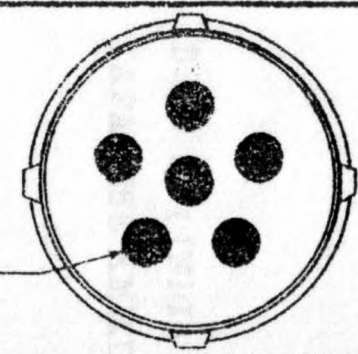
FUZE PERCUSSION, D.A. (WITH OPTIONAL DELAY)
ITALIAN TYPE.

DIMENSIONS IN INCHES

C.I. Ann 5/1454
 KIRKEE, MAY 1946

G.P. 2-P.P. ROMA 1946.

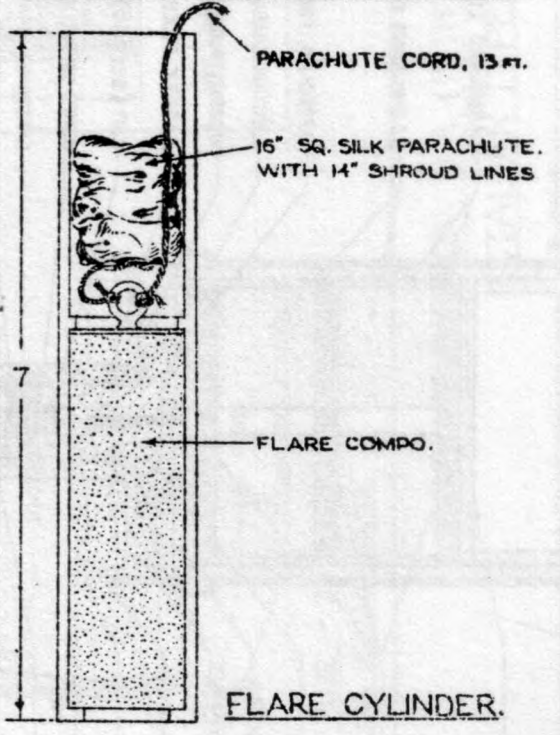
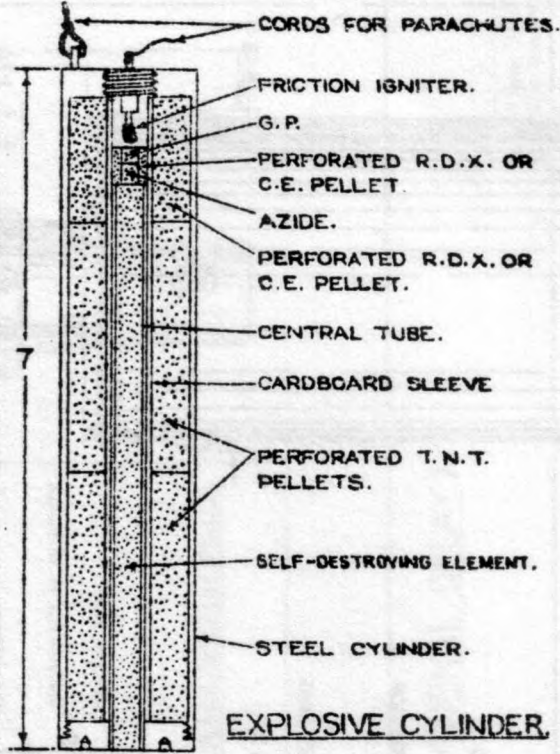
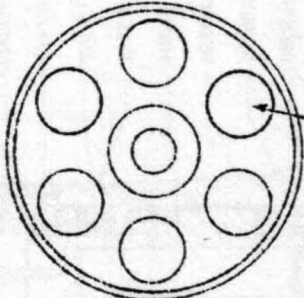
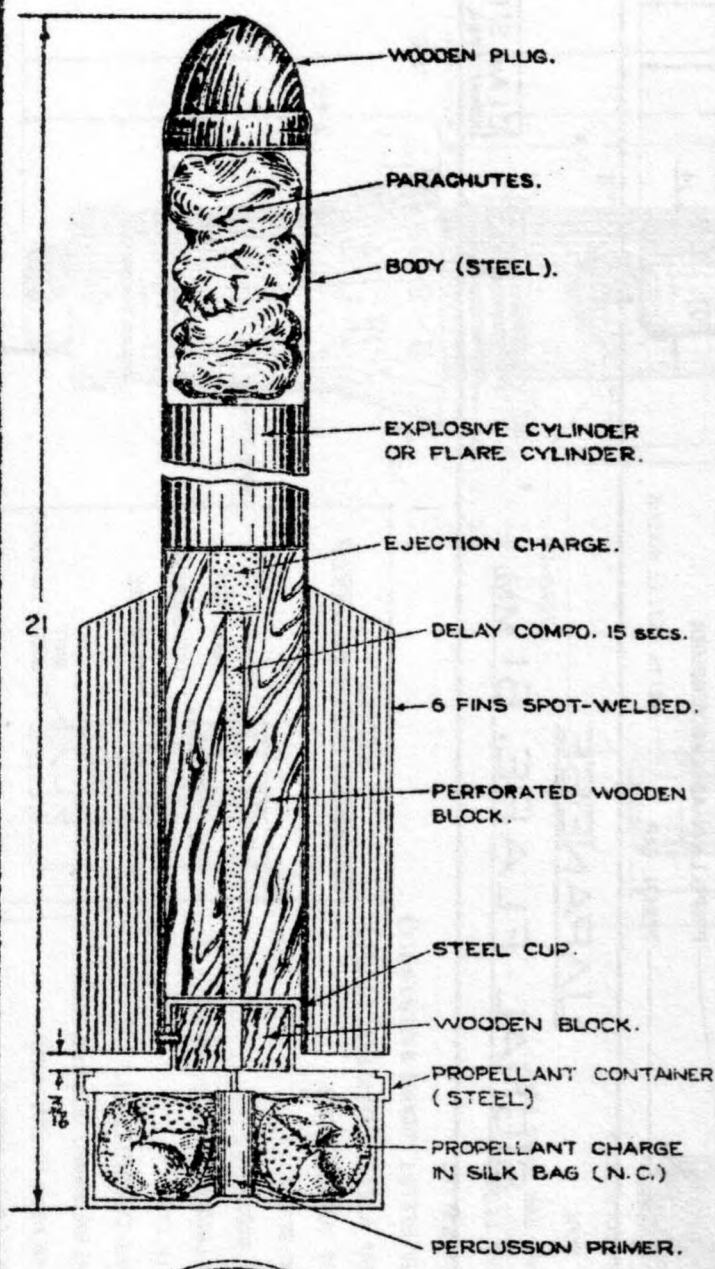
- LIGHT IRON COVER
- LIGHT IRON CONTAINER
- CARDBOARD DISC
- FELT WADS
- CARDBOARD DISC
- ALUMINIUM WASHER
- CARDBOARD PACKING PIECES
- BRASS WIRE RING
- IRON BASE PLATE
- COPPER WASHER
- PROPELLANT CHARGE
- PROPELLANT CONTAINER
- CARDBOARD PACKING.
- BRASS BASE PLATE
- GREEN IDENTIFICATION MARKINGS
- CARDBOARD DISC.
- 8 RAISED BEARING SURFACES.
- CARDBOARD DISTANCE PIECE.
- CARDBOARD LINING
- ILLUMINATING COMPOSITION
- CARDBOARD PACKING RING
- EJECTION CHARGE, G.P.
- WOODEN BLOCK.
- SAFETY FUZE
- CAP (SECOND)
- DISHED METAL PLATE
- CARDBOARD WASHERS
- ALUMINIUM WASHER.
- PROPELLANT ASSEMBLY HOLDER
- PERCN. CAP.



JAPANESE
SIGNAL FLARE. 81 MM.

DIMENSIONS IN INCHES

C.I. AMM. S/1436
KIRKEE, APRIL 1946



JAPANESE SHELL, H.E.
A.A. BARRAGE & FLARE
 FOR
81 MM. MORTARS.

DIMENSIONS IN INCHES

C.I. Army S/1442
KUDDEE APRIL 48

G. W. P. 192622 1285

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D
LEAFLET D 16

AMMUNITION FOR M. L., 82-mm. MORTAR (CHINESE).

GENERAL

A mortar of Chinese origin of 82-mm. calibre is believed to have been used by the Japanese, and some bombs were captured in the Burma area during the Japanese retreat from that theatre in early 1945. It is unlikely that the bombs, which have a maximum diameter of 3.228 inches, can be fired from the Japanese 81-mm. mortars as it is considered that there would not be sufficient windage (see JAL D1, para. 19 (d)). It is thought that large quantities of Chinese 82-mm. mortars and bombs were captured by the Japanese during the Chinese campaign, and that later on this equipment was extensively used in the Burma theatre.

2. In this leaflet it is proposed to discuss the H, E. bomb only, as there is no information about the existence of smoke and chemical bombs. It is not certain whether other types of H, E. bombs are used, but it is probable that the Japanese have used only the one type of bomb in the Burma theatre.

DESCRIPTION

3. It will be interesting to compare this bomb with Japanese 81-mm. and the British 3-in. mortar bomb.

Chinese 82-mm.	Japanese 81-mm.	British 3-in.
1. Percussion graze fuze.	Percussion graze and optional delay fuze	Percussion D. A. Fuze
2. 28-mm. F. H.	24-mm. F. H.	35-mm. F. H.
3. No Nose adapter	Nose adapter	Nose adapter
4. No exploder system	RDX/Wax exploder	C.E. exploder pellet.
5. Main filling is a mixture of T. N. T. and Potassium Nitrate	Trinitrophenetole	Amatol 80/20
6. 3 gascheck rings	4 gascheck rings	Guide band.
7. 8 tail vanes.	6 vanes	6 vanes
8. No striker clip	No striker clip	Striker clip
9. Augmenting charges retained by a spring.	Charges clipped in position	Retained by spring or rubber band.
10. No colour bands	Tip painted red, yellow band on bourrelet	Tip painted red, green band on bourrelet.

4. **Filling**:—The main filling of the bomb examined at Kirkee was 11 ozs. of a mixture of T. N. T. and Potassium Nitrate with some traces of iron. There was no exploder. The use of a comparatively insensitive filling and the absence of any exploding system suggests that this bomb may never give complete detonation and that blinds will be common.

5. **Propellant**:—Eight augmenting charges can be accommodated on each bomb, forming a full charge. Each charge is contained in a silk bag, machine-stitched on the sides, with the mouth closed by a silk thread. Each bag contains 77 grains of a double based propellant. The primary cartridge found in the bomb examined at Kirkee was an American 12 bore shotgun cartridge containing 124 grains of a double based propellant.

6. **Fuze**:—See paras 12 to 20 in J. A. L. D 14. Three types of fuzes may be used with this bomb, depending on whether delay is required or not. The third type of fuze works on graze also.

PACKING

7. See Plate B. Three rounds are packed in a wooden box. Three fuzes, 24 augmenting charges and three primary cartridges are packed in a tinned-plate container. In addition, the fuzes are kept in waxed paper covers.

IDENTIFICATION

8. The body of the bomb is varnished dark brown and may be identified by the absence of any colour bands. It can be distinguished from similar Japanese and British bombs by being slightly larger in calibre and having a left-handed Swastika (never used by the Germans) marked on the body, plug and fuze. The presence of 8 tail vanes will also help in identification.

SUMMARY OF DATA

9.	Length of bomb fuzed	—	13 $\frac{3}{4}$ "
	" " plugged	—	11 $\frac{3}{4}$ "
	Diameter across Gas-check rings.	—	3.22"
	Weight plugged	—	8-lbs. 1-oz.
	Weight fuzed	—	8-lbs. 8 $\frac{3}{4}$ -ozs.
	Weight of fuze	—	8.3-ozs.
	Weight of filling	—	11-ozs.
	Diameter of fuze hole	—	28-mm.
	Length of primary cartridge.	—	2.48"
	Weight of primary cartridge	—	.7-ozs.
	Weight of augmenting charge.	—	79 grs.
	Package		
	Length	—	15 $\frac{3}{4}$ "
	Breadth	—	11 $\frac{3}{4}$ "
	Height	—	5"
	Weight filled	—	34 lbs.

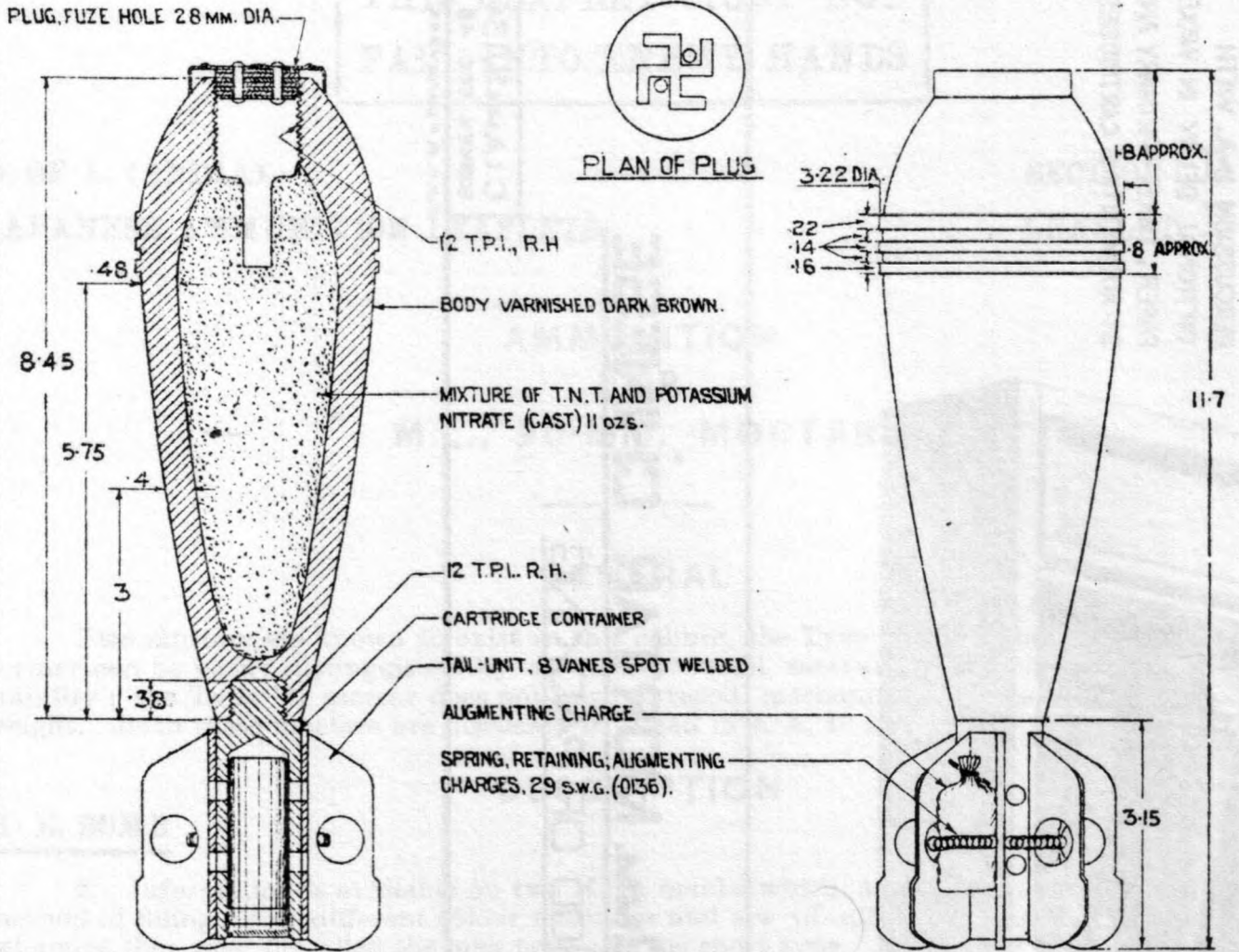
HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

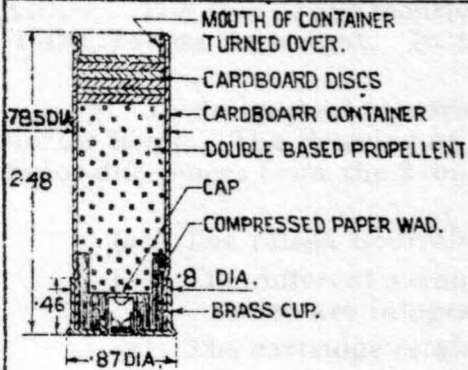
10. As for Japanese 90-mm. mortar bomb, See J. A. L. D, 17.

EXPLOSION/FIRE RISK	..	$\frac{1}{4}$ -lb.
GROUP CLASSIFICATION	..	VIII, Category Z.
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S.

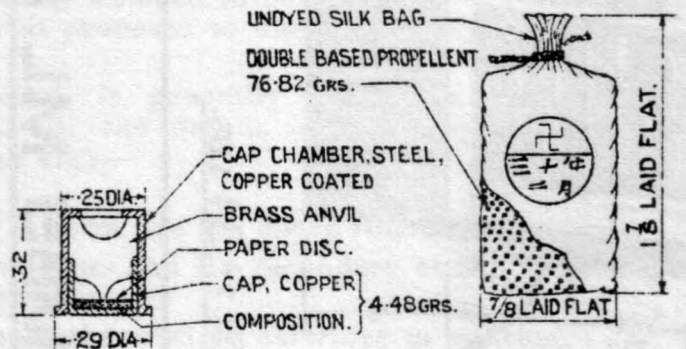
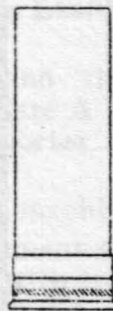
RESTRICTED



BOMB MADE OF STEEL EXCEPT WHERE OTHERWISE STATED.



PRIMARY CARTRIDGE
WT. .7 OZ.



CAP ASSEMBLY

AUGMENTING CHARGE

BOMB, HE., M.L., 82 MM. MORTAR.

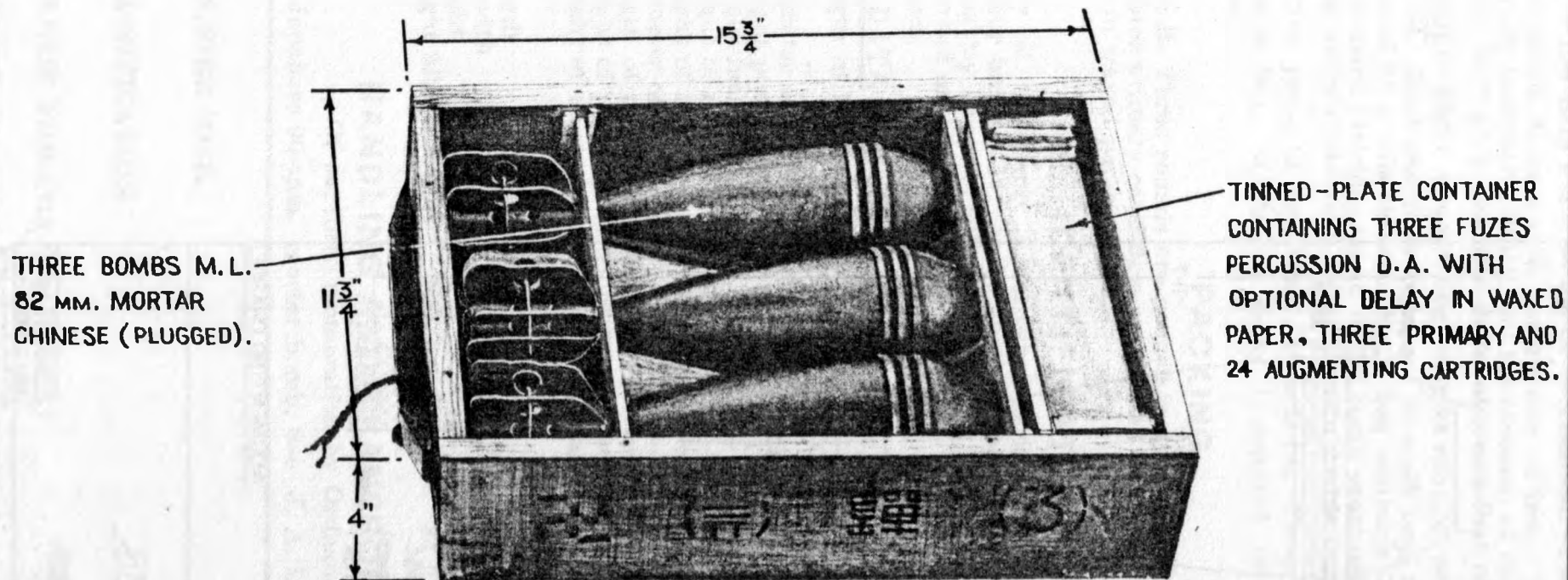
WITH 2.8 MM. FUZE HOLE.

CHINESE ORIGIN BELIEVED USED BY THE JAPANESE.

DIMENSIONS IN INCHES.

C.LAMN S/1240
KIRKEE SEPT. 45.

RESTRICTED.



WT. OF FILLED BOX :- 34 LBS.

BOMBS M.L. 82MM. MORTAR CHINESE
METHOD OF PACKING

C.I.A.M.N.S/1340
KIRKEE DEC. 45

S.P.Z. P. Poonna 1946.

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)
JAPANESE AMMUNITION LEAFLETS

SECTION D
LEAFLET D 17

AMMUNITION FOR M.L., 90-MM. MORTAR

GENERAL

Two mortars are known to exist in this calibre, the Type '94 and the Type '97. The former can be easily distinguished by its heavy recoil mechanism which gives it greater stability; the Type '97 mortar does not have a recoil mechanism, and is much lighter in weight. Both these mortars are discussed in detail in J. A. L. D 13.

DESCRIPTION

H. E. BOMB

2. Information is available on two H. E. bombs which, although they have the same method of filling, have different colour markings and are of different lengths. For ease of reference they may be called the long type and the short type. Only the long type, which has an overall length of 17 1/2-ins. and weight 11-lbs. 6 1/2-ozs., has been examined at Kirkee. The short type mentioned in Reports is believed to be about 15 1/2-ins. long and 11-lbs. 14-ozs. in weight. In this Leaflet, it is proposed to discuss the long type only.

3. In design and construction the bomb is generally similar to the British 3-in. mortar bomb. The drawing at Plate A gives all the details of the bomb. Some of the major differences from the 3-in. mortar bomb are:—

- (a) The raised bourrelet, machined to form five gas check rings.
- (b) The different arrangement of the vanes and the secondary charge retaining clips, which are integral with the vanes.
- (c) The cartridge retaining cap to hold the primary cartridge in position.
- (d) An entirely different type of fuze.
- (e) A different type of exploder system and nose adapter.

Actually this bomb is very similar in design to the Italian 81-mm. H. E. mortar bomb.

4. H. E. Filling. The main filling of the bomb examined at Kirkee was approximately 2-lbs. 5-ozs. of T. N. T. The filling in the burster container was in one instance 1 1/4-ozs. of picric acid; in another, the filling was about the same weight and consisted of three pellets, the bottom two being of picric acid while the top perforated pellet round the gaine was graphited C. E.

5. Propellant. The propellant arrangement is similar to that in our 3-in. mortar bomb. A primary cartridge (8 bore approximately) on firing, ignites the augmenting charges which are retained by clips round the vanes. Six augmenting charges can be accommodated on each bomb, forming the full charge and each charge is contained in a silk bag,

stitched at the edges; the seams are heavily coated with lacquer. The charge in each bag consists of 223-grs. of a double base propellant in the form of thin rectangular flakes.

The primary cartridge is somewhat similar to our Mk. 9 primary cartridge, but is larger in size. The charge consists of thin graphited bluish flakes of a double base propellant.

6. Fuze. The fuze used in this bomb is the percussion graze fuze Type '93 with an optional delay which is discussed in detail in J. A. L. D 14.

INCENDIARY BOMB

7. The general layout and construction of this bomb is identical with the H. E. bomb described above. The fuze and exploder container are the same. In this case, however, the exploder container filling acts only as a burster to open up the bomb and distribute the incendiary filling. This consists of rubber pellets (about 40) in a solution of white phosphorus in carbon disulphide. This is a common incendiary filling used by the Japanese in A. C. bombs and hand grenades. The total weight of the fuze bomb is about 11-lbs. 9 1/2 ozs.

The report on which the above is based is dated August 1942. No reports have been received of this type of bomb being used in Burma. A sketch of this bomb is given in J. A. L. D 1, Plate D.

SMOKE BOMB (EXPERIMENTAL)

8. A smoke bomb also has been reported in this calibre and the information below is based on a captured Japanese document. The bomb was reported in the document to be "Experimental No. 1 Smoke Shell, B-3".

The body is more cylindrical and longer than the H. E. bomb, since it is filled with six smoke canisters which are ejected from the bomb during flight on the same principle as our B. E., 25-pr. smoke shell. The mortar bomb is fuze with a time fuze reported to be "Type 5" which is the normal T. & P. fuze used in 75-mm shrapnel shell such as that of the Type Meiji 41 Regimental Gun. The document mentions that the fuze is modified to ensure functioning with the low muzzle velocity of mortar bomb.

As mentioned above, this is a base ejection type smoke bomb, similar to our 25-pr. B.E., smoke shell; the fuze is set before firing to the required range and height of burst. When the set time is reached, the fuze functions and ignites a bursting charge, which pushes out the containers, at the same time forcing the tail off the bomb. The smoke containers are ignited in the same way as those in the 25-pr., B.E., smoke shell, and burn on the ground. The time of burning was not stated.

9. The Type 5 fuze having a percussion element would also function the bomb on impact unless it buries itself to such an extent as to prevent ejection of the containers. The ejection charge, however, is small and it is possible that the bomb is really intended only for air burst.

10. The above is based on a report compiled in August 1944 in S.W.P. Area. No report has been received of this nature of bomb having been used in Burma.

PACKING

11. Packing details of only the H.E. bomb are available. These bombs are received plugged, two complete rounds in a box. Two fuzes are usually packed in a tinned plate container with a screwed lid. The fuzes may have a wrapping of waterproof paper, and wooden blocks are used to ensure snug fitting. A delay plug is packed in a wooden block with each fuze and there may be a lead washer also included. If not, it will be found already fitted in the fuze body.

The primary cartridge may be already in place in the tail of the bomb. In other cases, the primary cartridges are each wrapped in waxed paper, and packed two in a tinned plate cylinder. A steel key to remove the cartridge retaining cap may be found tied to the tail unit of one of the bombs. This key is shown in the Plate at the end of this Leaflet.

IDENTIFICATION

12. The H.E. bomb is shown in Plate A.

13. The smoke bomb can be identified by its long cylindrical shape in comparison with the pear-shaped H. E. and incendiary types. See sketch of the complete round given in J.A.L. D 1.

14. No details of markings on the incendiary bomb are available. The rough sketch in the report from which the above information was taken shows a blue band below the usual red filling band on the nose. There is also a yellow band well down on the body just above the junction of the tail unit and body. See sketch of the complete round given in J.A.L. D1.

15. There should be no difficulty in identifying each type of mortar bomb, but for convenience the main data is listed below in comparative form :—

Item	H E.	Incendiary	Smoke
BOMB			
1. Wt. of complete bomb, fuze, with primary cartridges ..	11-lbs. 6½-ozs.	11-lbs. 9½-ozs.	19-lbs 6½-ozs.
2. Wt. of H.E. filling ..	2-lbs. 5-ozs.	—	—
3. Wt. of Smk./Inc. mixture ..	—	2-lbs. 3½-ozs.	4-lbs.
4. Nature of filling ..	T.N.T.	40 rubber pellets in a solution of W.P. and CS ₂ .	—
5. Maximum diameter ..	90-mm.	90-mm.	90-mm.
6. O/A length without fuze or plug ..	17½-ins.	15.9-ins.	—
7. Fuze hole diameter ..	24-mm.	—	—

HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

H.E. BOMB

16. Treat as for British 3-in. mortar ammunition, unfuze and plug before moving. The fuze, owing to the type of gaine used, requires more care in handling and transport than equivalent British types. Blind bombs should preferably be destroyed in situ; see also para 25 J.A.L. D14.

INCENDIARY BOMB

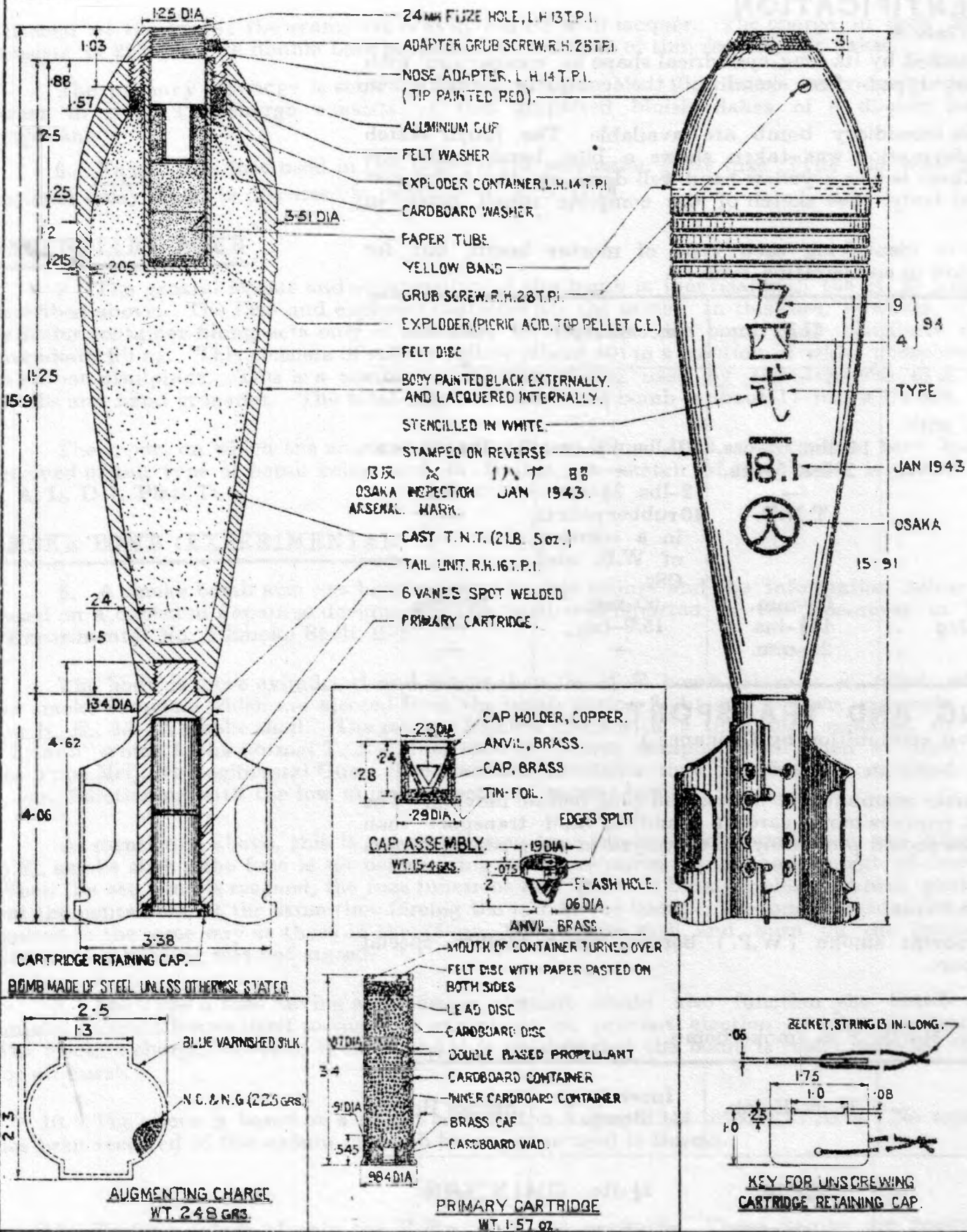
17. Treat as for British 3-in mortar smoke (W.P.) bombs, which require special precautions during storage and transport.

SMOKE BOMB

18. Treat on similar lines to 3-in. Mortar B.E. smoke bomb.

	H. E. Bomb.	Incendiary Bomb.	Smoke Bomb.
EXPLOSION/FIRE RISK ..	2½-lbs.	2½-lbs.	4-lbs.
GROUP CLASSIFICATION ..	VIII Category Z	XII Category Y	XI Category Y
CLASSIFICATION FOR SEA TRANSPORT.	O.A.S.	S.A.S. (D) (R)	O.A.S. (D).

RESTRICTED



JAPANESE BOMB, HE, M.L., 90MM, MORTAR.

WITH 24 MM FUZE HOLE.

DIMENSIONS IN INCHES.

C.I. AMN. S/1307. KIRKEE, OCT. '45.

S.P.E.P. FORM 1-1945.

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)
JAPANESE AMMUNITION LEAFLETS

SECTION D
LEAFLET D 18

AMMUNITION
FOR
M. L. 120 mm. MORTAR

GENERAL

The 120-mm. Mortar Type 2 was first reported to be used in the Philippines, and it was only in the middle of 1945 that a few rounds for this weapon were recovered in the Burma theatre. It is therefore evident that though this mortar is primarily a Naval weapon, it was used also by the Army in the later stages of the war. The mortar closely resembles the conventional Stokes-Brandt 81-mm. mortar, except for the firing mechanism, which is similar to that used in the Type '99, 81-mm. mortar (for details see Leaflet D 13).

2. This Leaflet is based on the examination of a few rounds at Kirkee. The Japanese bomb closely resembles in design the German 12-cm. bomb 42 (12-cm. Wgr : 42) which is in turn based on a Russian model. The shape of tail, method of ignition and form of primary and augmenting charges are very similar. It is probable that the Japanese and German bombs are interchangeable, but there is no definite information. It is however known that the German and Russian ammunition is interchangeable.

3. There is no information about the existence of smoke and chemical bombs ; only H.E. bombs have been examined at Kirkee and only this type is described here.

DESCRIPTION

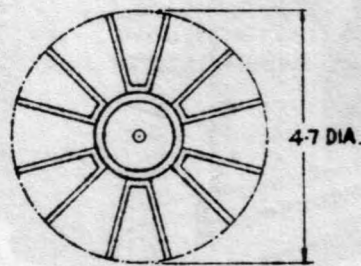
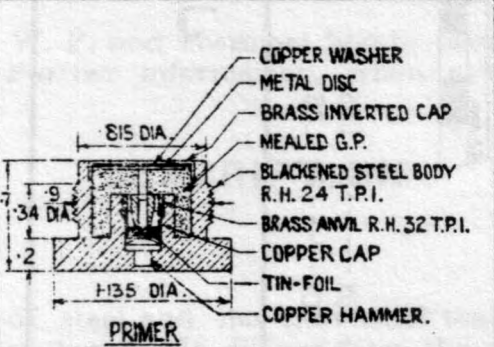
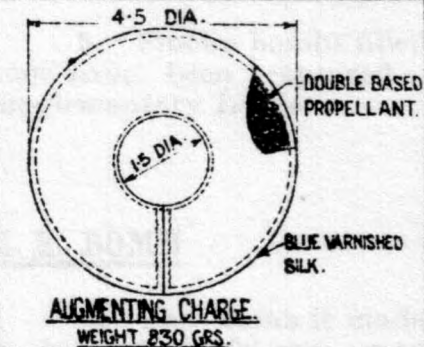
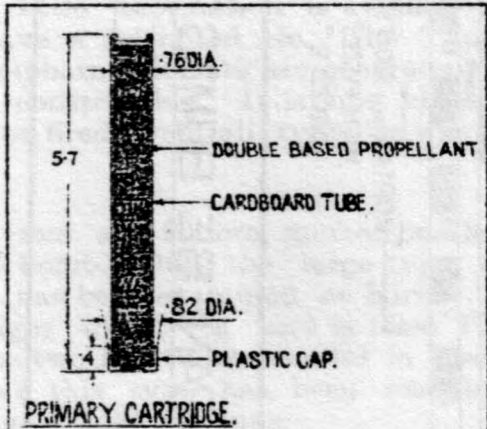
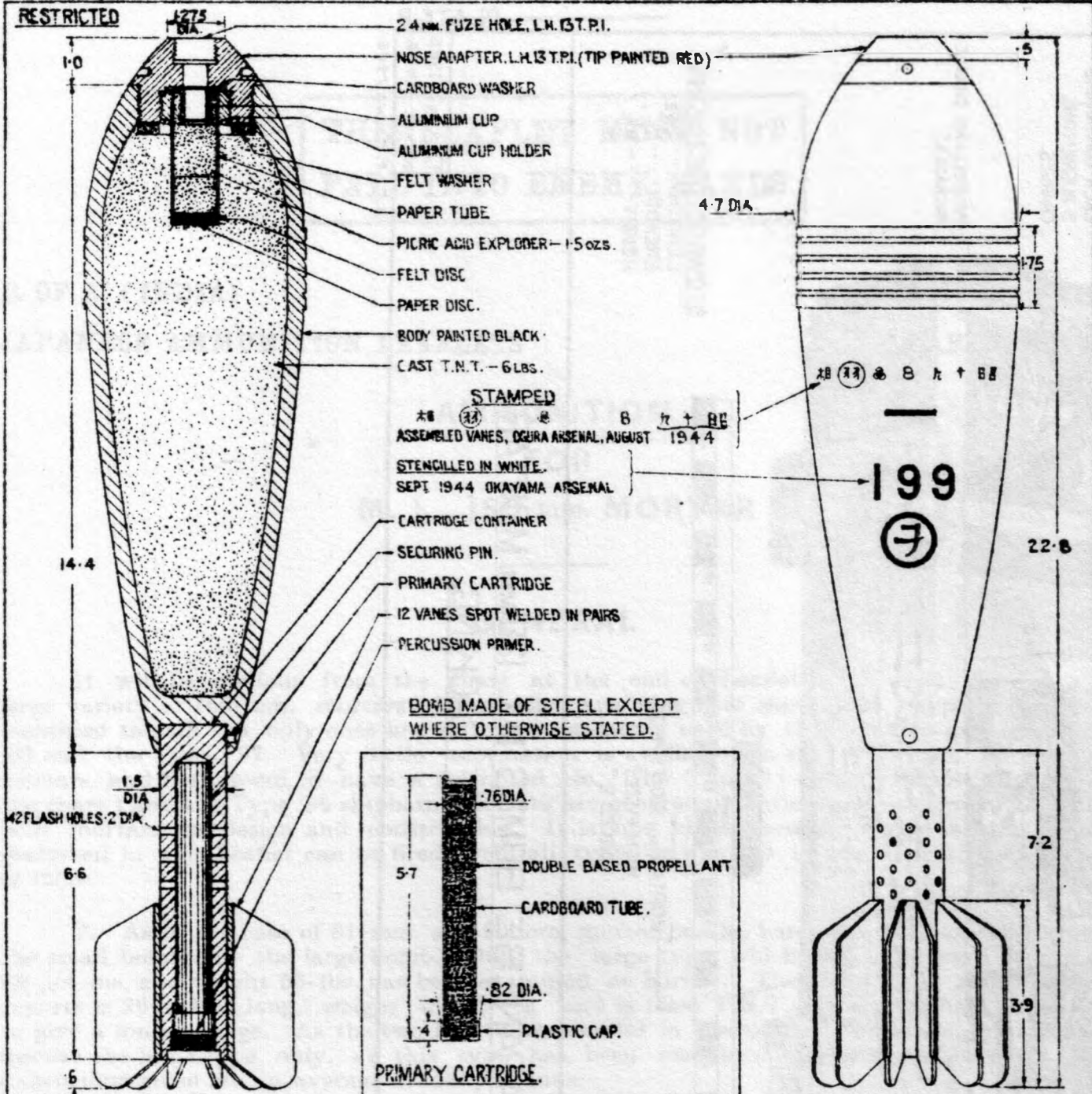
4. The bomb is of the conventional streamlined, fin stabilized type; but differs from the other Japanese mortar bombs in the method of ignition, arrangement of primary and augmenting charges and the shape of the tail unit.

The tail unit is welded to the bomb, and has 12 vanes spot welded in pairs. The cartridge container has 42 flash holes just above the vanes, and accommodates the five augmenting charges around it. It should be noted that the augmenting charges are not held in between the vanes, but round the cartridge container, just above them.

5. H.E. Filling :—The bomb examined at Kirkee had a filling of 6 lbs, of cast T.N.T. The exploder filling consisted of three pre-pressed pellets of Picric Acid, the top pellet being recessed to house the aluminium cup. American Reports suggest that the exploder may also be R.D.X./Wax.

6. Primary Cartridge :—The primary cartridge actually comprises two separate parts, the primer and the cartridge. The cartridge is a cardboard tube containing 306 grains of a double based propellant; it is closed at the lower end by a thin black plastic cap, and at the upper end by a cardboard disc. The cartridge fits snugly in the cartridge container and is held in position by the screwed primer. This is the Type 'C' primer with an oil blackened steel body. See J.A.L. E2.

RESTRICTED



JAPANESE, BOMB, H.E., M.L. 120 MM. MORTAR
 WITH 24 MM. FUZE HOLE.

DIMENSIONS IN INCHES.

C. LANN. S/359.
 NIKKEI, DEC. '45.
 S.P.Z.P. Poona, 1946.

RESTRICTED.

PITCH IMPREGNATED
PAPER TAIL COVER.

PACKING FRAME.

TWO JAPANESE 120 MM. MORTAR
BOMBS WITH PRIMARY CARTRIDGE
FITTED.

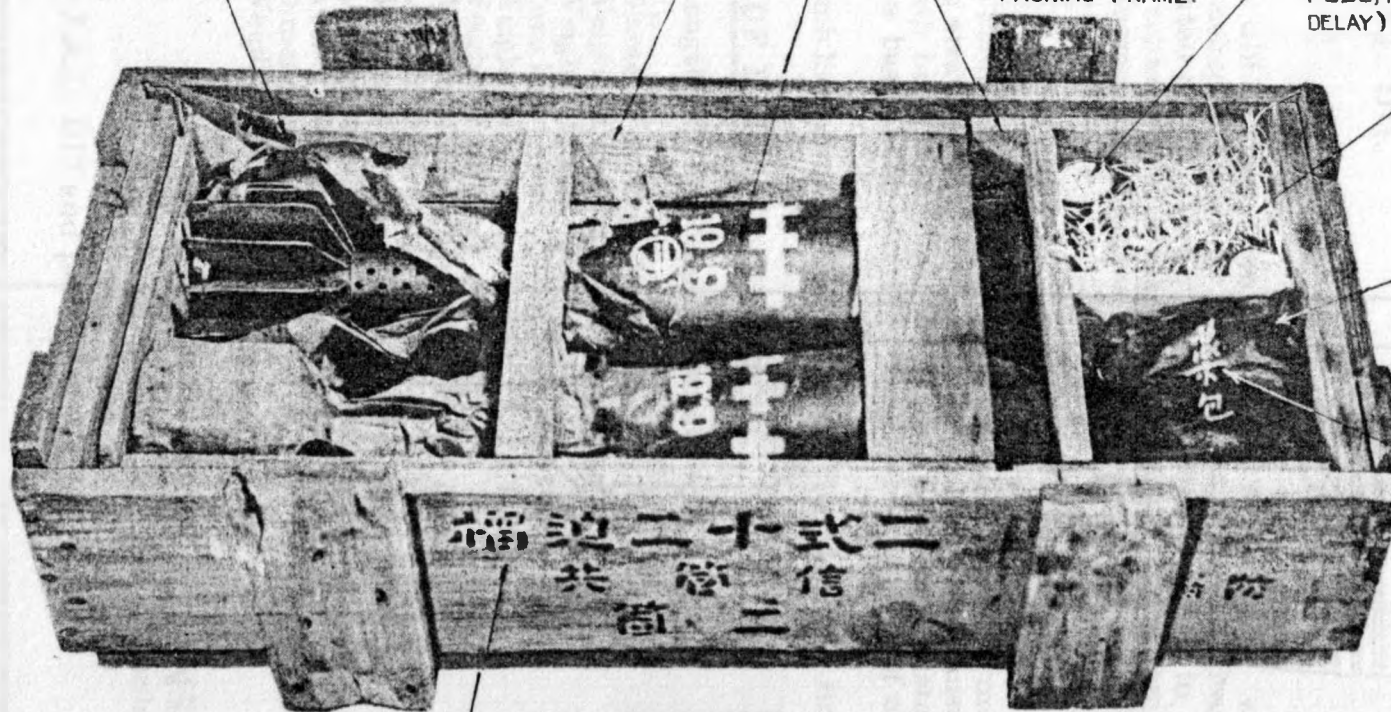
PACKING FRAME.

TIN CONTAINER CONTAINING
FUZE, PERCN., GRAZE (OPTIONAL
DELAY) TYPE 100.

WOOD SHAVINGS.

TWO PACKAGES
EACH CONTAINING
5 AUGMENTING
CHARGES.

PROPELLANT CHARGE
PACKAGES.



WT. OF FILLED BOX-----81 LBS.
WT. OF EMPTY BOX-----26 LBS.

← MORTAR .MM 120 TYPE 2
WITH FUZE
PIECES 2 →

STORAGE DIMENSIONS
LENGTH-----30½"
BREADTH-----15"
HEIGHT-----8½"

JAPANESE BOMBS M.L. 120 MM. MORTAR.
METHOD OF PACKING.

CIAMNS/1385
KIRKEE JAN 46

G.P.Z.P. POONA. 1946.

Restricted

THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D

LEAFLET D 19

AMMUNITION FOR M. L., 150-mm. MORTAR

GENERAL

It will be obvious from the chart at the end of Leaflet D 13 that there are a large variety of 150-mm. mortars; information available here shows that 7 types have been identified though the only ones known to be commonly used by the Japanese are the Type '93 and the Type '97. Very little information is available on the Types '95, '96 and '99 mortars, and they seem to have a restricted use. The Type 2 (wrongly termed Type 3 in the chart) and the Type '96 shipborne mortars are generally identical and are similar to other land mortars in design and construction. It is not clear, however, whether the bomb described in this Leaflet can be fired from all types or whether its use is restricted to one or more.

2. As in the case of 81-mm. and 90 mm. mortar bombs, here also there are two types, the small bomb and the large bomb. Only the large type which has an overall length of 30 3/4-ins. and weight 56-lbs. has been examined at Kirkee. The small type mentioned in reports is 26 inches long, weighs 43 1/2-lbs. and is filled T.N.T.; it is probably intended to give a longer range. As the two bombs are similar in essential details it is proposed to discuss the large type only, as this type has been examined here and the weights and dimensions given are an average of many rounds.

3. Smoke bombs filled W. P. and chemical bombs filled HCN have been reported, but none have been captured. Further information, when available, will be published in a supplementary Leaflet.

DESCRIPTION

H. E. BOMB

4. The bomb is made of steel and has the usual tear-drop shape, almost identical to that of the 90-mm. mortar bomb. It differs from the 90-mm. bomb in the following respects:—

- (a) The use of a tail adapter to secure the tail unit to the bomb body.
- (b) Individual tail vanes are welded to the cartridge container.

5. H. E. Filling:—The main filling of the bombs examined at Kirkee was 13 1/2-lbs. of T.N.T. The exploder filling consisted of three pellets, the bottom two being of picric acid while the top perforated pellet was graphited C. E.

6. **Propellant** :—The arrangement of primary and augmenting charges etc. is similar to that in the 90-mm. mortar bomb. The primary cartridge contains 2-ozs. of a double based propellant. The augmenting charges consist of six blue lacquered silk bags, each containing 3.3-ozs. of a double based propellant.

7. **Fuze**:—The bomb is fuzed with the Percussion Graze Fuze Type '93 with optional delay. See J. A. L. D 14.

PACKING

8. This will be clear from Plate B. One round is packed in a wooden box $11\frac{1}{4} \times 11\frac{1}{4} \times 38\frac{1}{4}$ ". The fuze is contained in a tinned-plate cylinder and the primary and augmenting charges in a waxed paper bag. In some boxes examined at Kirkee, the primary cartridges were fitted in the tail unit.

IDENTIFICATION

9. The bomb can be readily identified from other mortar bombs because of its large calibre. Japanese characters stamped on the bomb and the presence of colour bands will be helpful to distinguish it from the Chinese 6-in. bomb.

SUMMARY OF DATA

10. Length of the complete bomb fuzed	..	..	..	30.84-ins.
Weight of the complete bomb fuzed	..	..	..	56 lbs.
Weight of H. E. filling	..	..	..	13 1/2-lbs.
Diameter of fuze hole	..	..	..	24-mm.
Length of primary cartridge	..	..	..	5.5-ins.
Average diameter of primary cartridge	..	..	..	1.44-ins.
Weight of primary cartridge	..	..	..	5.5-ozs.
Length and width of augmenting charge	..	..	..	Not known.
Weight of augmenting charge	..	..	..	3.3-ozs.
Stowage dimensions of the package :—				
Length	..	..	..	38.25-ins.
Breadth	..	..	..	11.25-ins.
Height	..	..	..	11.25-ins.

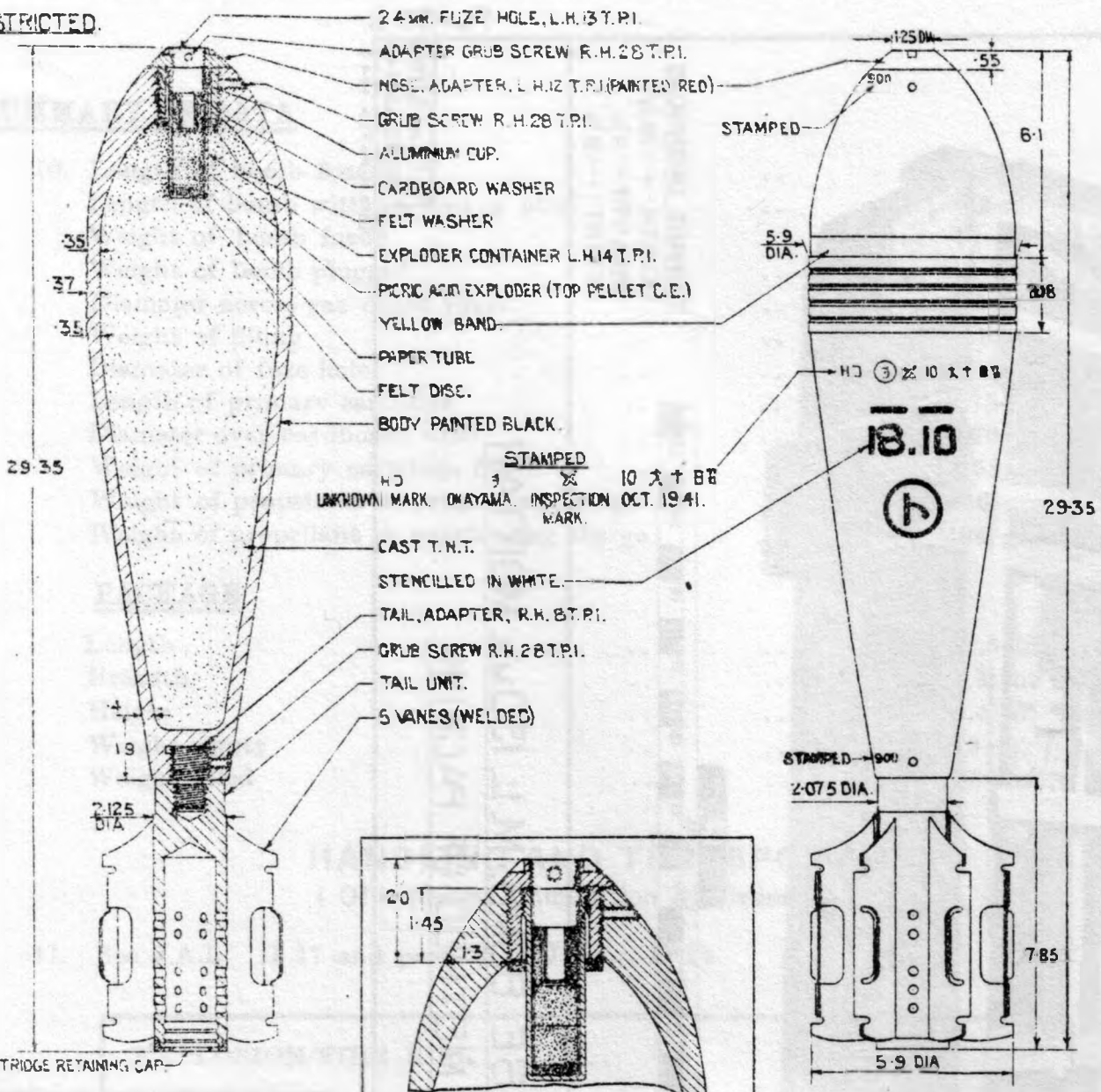
HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

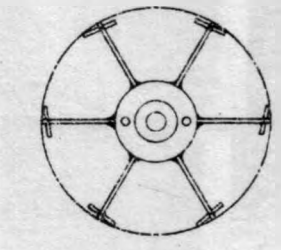
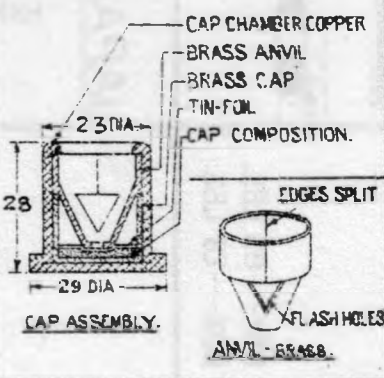
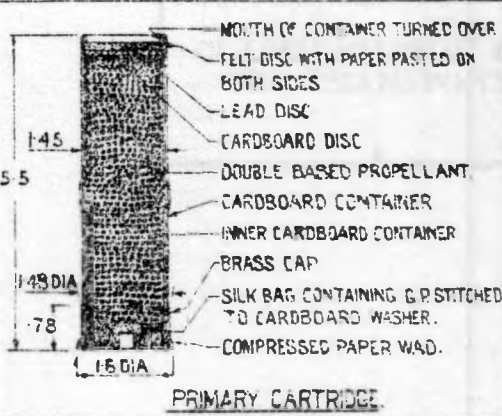
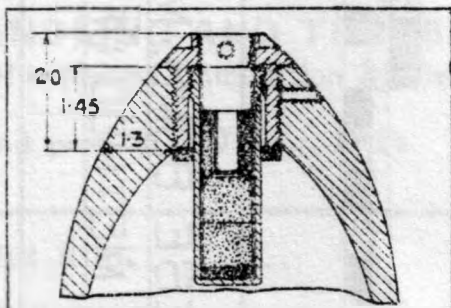
11. As for 90-mm. bomb. See J. A. L. D 17.

EXPLOSION/FIRE RISK	..	14-lbs.
GROUP CLASSIFICATION	..	VIII Category Z.
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S.

RESTRICTED.



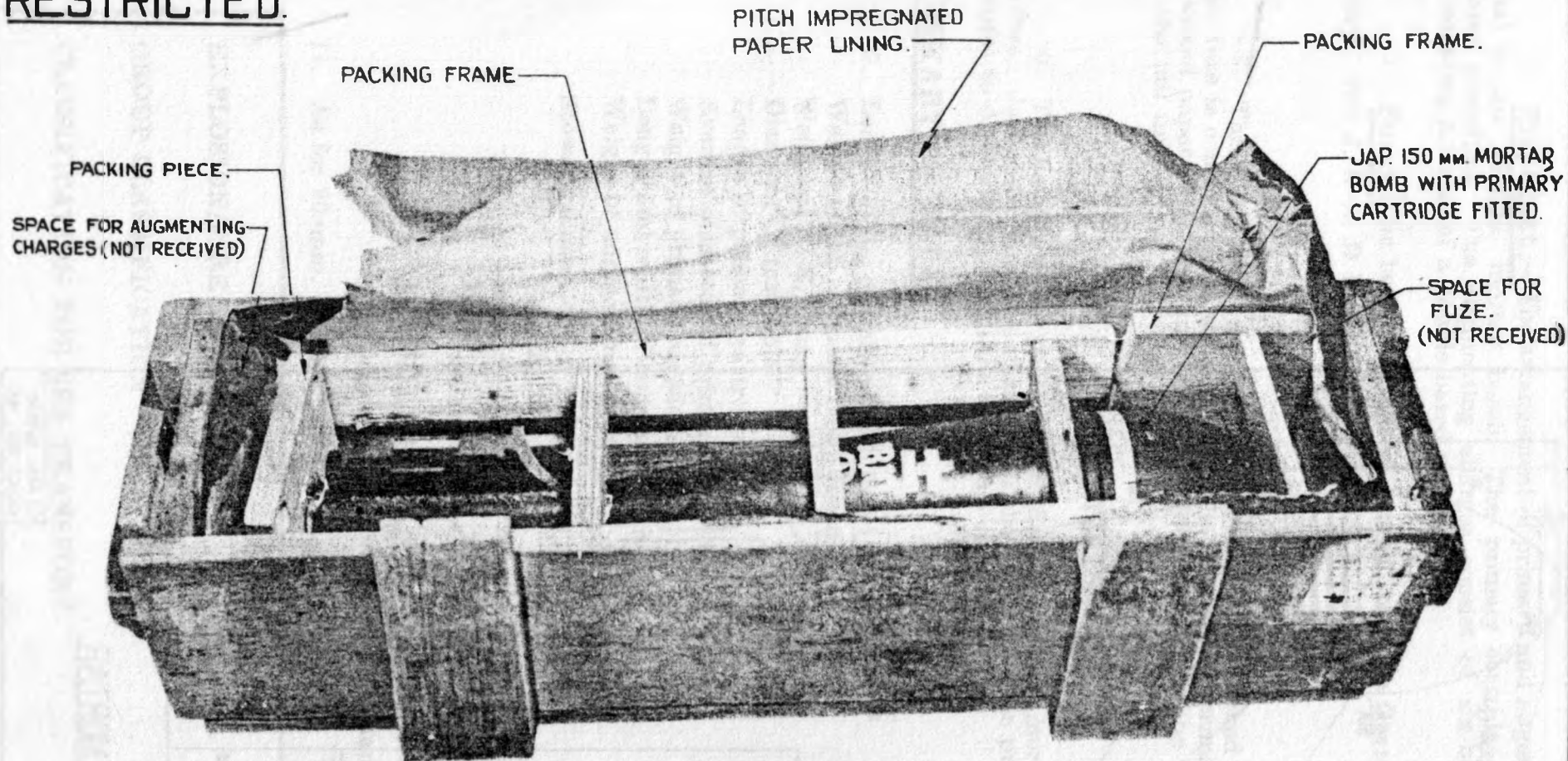
CARTRIDGE RETAINING CAP.
BOMB MADE OF STEEL EXCEPT WHERE OTHERWISE STATED



JAPANESE BOMB, H.E., M.L., 150 MM. MORTAR. WITH 24 MM. FUZE HOLE.

DIMENSIONS IN INCHES.

RESTRICTED.



WT. OF FILLED BOX--- 83 LBS.
WT. OF EMPTY BOX--- 28 LBS.



STOWAGE DIMENSIONS.
LENGTH ---- 38 1/4"
BREADTH --- 11 1/4"
HEIGHT ---- 11 1/4"

JAPANESE BOMB, M. L. 150 MM. MORTAR.
METHOD OF PACKING.

C. I. AMN. S/1386
KIRKEE, JAN 46

G. P. P. PHOTO. 1946.

PLATE B.

Restricted

**THIS LEAFLET MUST NOT
FALL INTO ENEMY HANDS**

D. OF A. (INDIA)

JAPANESE AMMUNITION LEAFLETS

SECTION D
LEAFLET D 20

AMMUNITION FOR M.L., 6-IN. MORTAR (CHINESE)

GENERAL

There is no definite information available on the use of the Chinese 6-inch mortar by the Japanese, although some bombs of this calibre were recovered from the Burma area in the middle of 1945. This is the first indication of the existence of such a bomb, as a Chinese 6-inch equipment has not been reported from any other theatre of operation. It is probable that some Chinese mortars and bombs were captured by the Japanese during the Chinese campaign, and that later on this equipment was possibly used in the Burma theatre on a very restricted scale.

It is considered that this bomb, which has a maximum diameter of 6-inches (152.4 mm.), cannot be fired from the Japanese 150-mm. mortar, as there would not be sufficient windage. On the other hand, the Japanese bomb should not be fired from the Chinese mortar as the clearance will be too great resulting in escape of gas and consequent loss in range and accuracy.

2. In this Leaflet it is proposed to discuss the H.E. bomb only, as there is no information about the existence of any smoke or chemical bombs.

DESCRIPTION

3. The bomb is of conventional design, being a scaled-up version of the Chinese 82-mm. mortar bomb described in J.A.L. D 16. A noteworthy difference is the use of an exploder to ensure complete detonation.

Although this bomb is of about the same calibre as the Japanese 150-mm. mortar bomb it differs from it in the following respects:—

- (a) The Chinese bomb has five prominent gas check rings.
- (b) It has a brass nose adapter of different design.
- (c) It has 8 vanes, spot and arc welded.

4. H. E. Filling. The main filling of the bomb examined at Kirkee was 9-lbs of T.N.T.; the exploder filling was also T.N.T. weighing 9-ozs.

5. Primary Cartridge. This contains 246 grains of a double based propellant having the following chemical composition :—

Carbon	..	1.3	%
N. C.	..	58.2	%
N. G.	..	36.3	%
Potassium Nitrate	..	3.7	%
Diphenylamine	..	.5	%

6. Augmenting Charge. Eight augmenting charges can be accommodated on each bomb, forming a full charge. They are retained in position on the tail unit by two silk cords. Each charge is contained in an undyed silk bag, machine stitched on the sides, with the mouth closed by a silk thread. Each bag contains 494 grains of a double based propellant having the same chemical composition as shown in para 5 above.

7. Fuze. The 6" Chinese bombs received at Kirkee were fitted with Fuze, Percussion, D.A. instantaneous, see para 20 of J.A.L. D 14. It is, however probable that the other two types of Chinese fuzes (Paras 12 to 19 of J.A.L. D 14) may also be used depending on whether delay is required or not.

PACKING

8. A separate photograph showing the method of packing of the bomb is not included in this Leaflet, as it is packed similarly to the Japanese 150-mm. mortar bomb, see Plate B of J.A.L. D 19.

One round is packed in a wooden box 31.5" x 8.4" x 8.4", the filled weight being 68-lbs. A compartment is formed in one end of the box to house the fuze, augmenting charges etc. One fuze and one primary cartridge, wrapped in a white paper, are packed in a tinned plate container. They are held rigid by two wooden blocks shaped to fit into the container and internally recessed to take the fuze and the primary cartridge. The cartridge, fuze and the container are coated with a waterproofing composition.

Eight augmenting charges with two silk cords are wrapped in a thin white paper and packed in an oval shaped tinned plate container. Both the silk cords and the container are coated with a waterproofing composition.

IDENTIFICATION

9. The body of the bomb is varnished dark brown. It can be distinguished from other bombs of the same calibre, by the brass nose adapter and the absence of any coloured bands. Note the prominent gas check rings, having a maximum diameter of 152.4-mm.

SUMMARY OF DATA

10. Length of bomb fuzed	..	..	..	25 $\frac{1}{2}$ -in.
Length of bomb without fuze or plug	..	..	..	23 $\frac{3}{8}$ -in.
Weight of bomb fuzed	..	..	..	48-lbs 8 $\frac{1}{2}$ -ozs
Weight of bomb plugged	..	..	..	48-lbs.
Diameter across gas check rings	..	..	..	6.0-in.
Weight of filling	..	..	..	9-lbs.
Diameter of fuze hole	..	..	..	28-mm.
Length of primary cartridge	..	..	..	3.75-in.
Diameter over cardboard tube	..	..	..	0.79-in.
Weight of primary cartridge filled	..	..	..	1.58-ozs.
Weight of propellant in primary cartridge	..	..	..	246-grains
Weight of propellant in augmenting charge	..	..	..	494-grains.

PACKAGE

Length	..	..	..	31.5-in.
Breadth	..	..	..	8.4-in.
Height	..	..	..	8.4-in.
Weight empty	..	..	..	19-lb.
Weight filled	..	..	..	68-lbs.

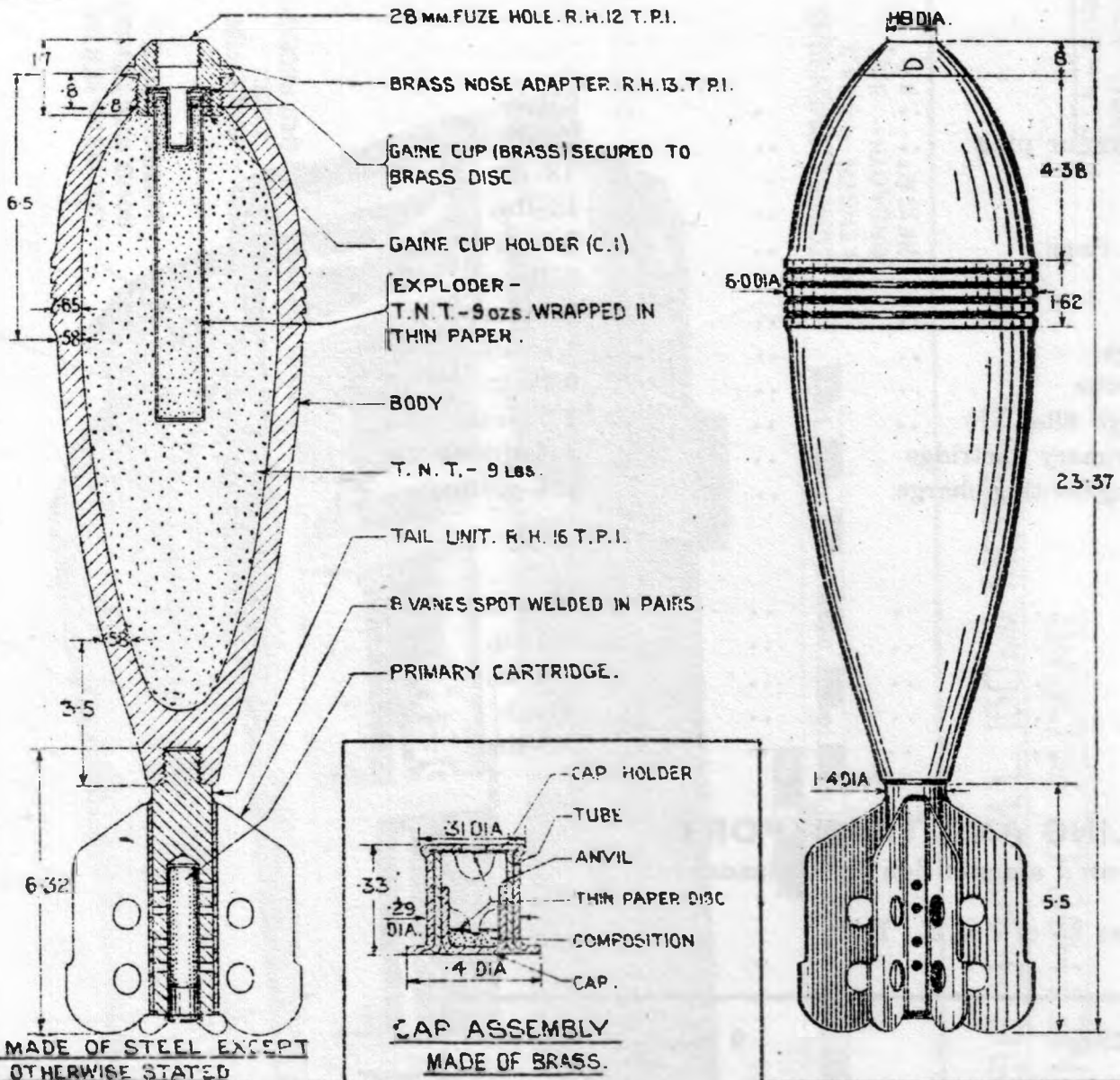
HANDLING AND TRANSPORT

(Of captured ammunition by Ordnance)

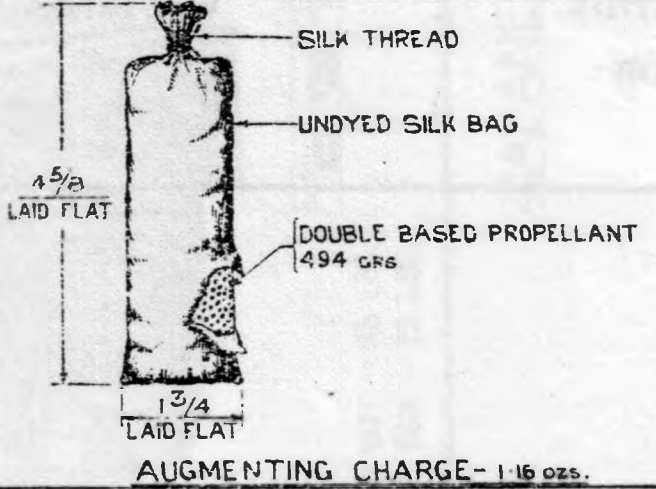
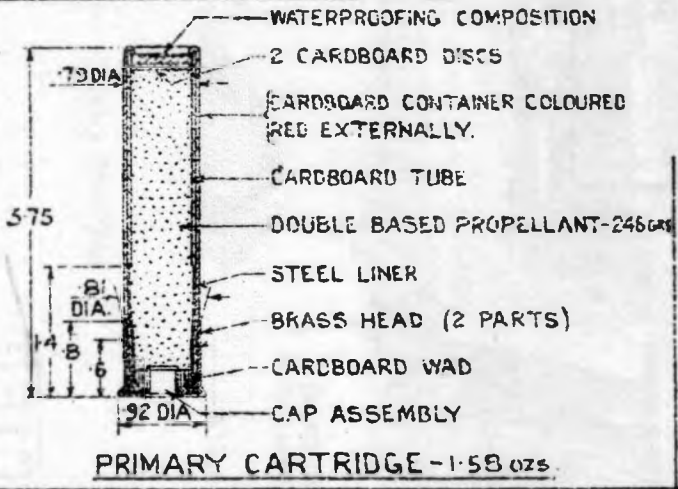
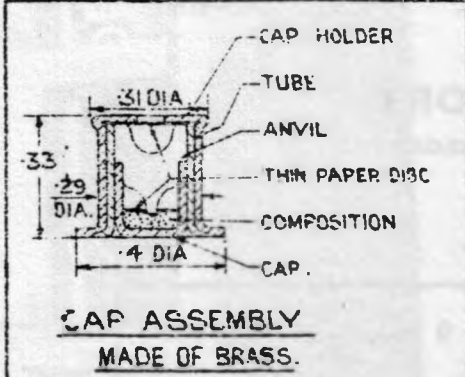
11. See J.A.L. D 17 and para 25 of J.A.L. D 14.

EXPLOSION/FIRE RISK	..	9 lbs.
GROUP CLASSIFICATION	..	VIII, Category Z
CLASSIFICATION FOR SEA TRANSPORT	..	O. A. S.

RESTRICTED



BOMB MADE OF STEEL EXCEPT WHERE OTHERWISE STATED



BOMB, H.E. M.L. 6 IN. MORTAR
WITH 28 MM FUZE HOLE
(CHINESE ORIGIN, BELIEVED USED BY JAPANESE.)

DIMENSIONS IN INCHES.

C.I. AMN S/1429
KIRKEE, MARCH '46.