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JAPANESE AMMUNITION

C.I. AMM. TECHNICAL REPORT

No. 29

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CARTRIDGE Q.F. 75_{MM.}

WITH

H. E., A. A. SHELL TYPE '90

FOR

75_{MM.} TYPE '88 FIELD/A.A. GUN.

RESTRICTED.

JAPANESE AMMUNITION.

G.I. AMM. TECHNICAL REPORTS.

REPORT No. 29

JANUARY 1945.

CARTRIDGE, Q.F., 75-MM., WITH
H.E., A.A., SHELL, TYPE '90
FOR
75-MM. TYPE '88 FIELD/A.A. GUN.

G E N E R A L.

Before dealing in detail with this ammunition it will be useful to make a few brief remarks, as far as information is available, on this equipment.

The gun is sometimes described as Type '88 (1928) 70-mm., Field/A.A. gun. Shell dimensions, however, definitely point to it being 75-mm. calibre. The primary role of the gun is anti-aircraft, but reports say that it is also used as a field gun. There is known to be in existence at least one other type of H.E. shell, streamline, which uses the normal Type '88 nose percussion fuze, instantaneous, or delay, or delay and graze. The muzzle velocity of the gun is about 2360 f.s. and with a suitable projectile it should have a very useful role against armour. So far no reports of A.P. rounds have been received.

2. As this is the first report on ammunition for this equipment a comparative chart of typical 47-mm., 70-mm. and 75-mm. types of Japanese gun ammunition has been included as Plate A. The general layout of the round and its large chamber capacity in comparison with other Japanese 75-mm. rounds can be judged from this.

3. The following ammunition for this gun, which was captured together with the gun, in North Burma in 1944, was received here for examination in November of that year:-

- (a) Complete H.E. round fitted with gaine, but plugged,
(yellow band round the middle of shell body) ... 1.
- (b) Complete H.E. round fitted with gaine, but plugged,
(White and yellow bands on shell body) ... 1.
- (c) Time fuze, combustion type, fitted with cover and
packed in tinned plate screwed lid type cylinder. ... 1.

4.4. The shell and cartridge cases were in excellent condition but the fuze, although the cylinder appeared dry and the fuze cover intact, had been affected by damp. This was not, however, apparent in the external condition of the fuze, but time rings were slightly swollen and it was impossible to set the fuze without distorting the setting bridge. Other fuzes examined subsequently conformed generally to this condition. When the fuze was broken down and dried out for a few hours on a sunny day, ignition and time of burning, when the fuze was tested at rest, appeared to be normal and uniformity was good. See details under "Fuze" below.

5. All components in the two rounds examined are identical, except that in the round with a yellow and white band on the shell body, the propellant is of the double base type in the form of long tubular cords of N.C. and N.G. In the other round (yellow band only on the shell body) the propellant is N.C. in the form of long strips. From previous experience of Japanese gun ammunition it is not definite that the coloured bands on shell body are necessarily connected with the propellant. As it happens, however, this is the only difference in the two rounds examined. The nature of steel used, however, has not been analysed.

6. The description below, therefore, except in the case of the propellant, applies to all components of both rounds. The general appearance of the two rounds, one plugged and one fused, will be clear from the photograph in Plate B.

DESCRIPTION.

CARTRIDGE.

7. This is made of brass and the general make-up can be seen from Plates C or D. The case gradually tapers from the rim to the mouth. There is no shoulder and corresponding necking which is usually found in modern high capacity cartridge cases. The mouth of the case fits snugly under the rear driving band and is crimped tightly to the parallel portion of the shell just below the lower driving band. The closing in of the primer in a pocket, formed in the base of the case, with a small vent leading into the propellant chamber is of interest. This vent is only .22-in. in diameter.

The cubic capacity of the case for ballistic purposes is 2065 - 2070 C.Cs.

8. The stencilling on the cartridge case, Plate D, is in purple ink and the 16.9 refers to the date of filling, September 1941. The character followed by 'A' is not recognised but presumably it refers to the propellant charge, which is of the strip type. The other case had no stencilled markings.

Propellant and Igniter.

9. The arrangement of the propellant in the case can be seen from Plates C and D. The strip of lead-tin foil (decoppering) is secured to the cardboard closing cup by adhesive following normal Japanese practice. At the bottom of the charge is a cup-shaped cardboard washer to which is stitched an undyed silk igniter bag, in such a way that the bag fits centrally over the primer. The size of the gunpowder in the igniter bag is roughly G.20.

The propellant of the cartridges shown in Plates C & D, is of two types. A photograph of these two propellants is in Plate E, while the full details of composition and dimensions are given in the chemical analysis below.

Primer.

10. The primer is of the small .5-in. screw fitting type, made of brass throughout, except the percussion cap and hammer which are of copper. The thread form is 18 threads per inch, with .058 pitch and 60 degs. angle of thread. This type of primer is widely used in Japanese gun ammunition and has been found in 37-mm., 70-mm., 105-mm. and 150-mm. cartridges. The

general make-up of the primer can be seen from Plates C or D. Details of cap composition and of gunpowder in magazine are given under chemical analysis below.

S H E L L.

11. The general appearance of the shell can be seen from Plate B, while its general construction and layout is shown in Plates C and D. The centring band is somewhat unusual for Japanese gun ammunition. The copper alloy used in centring band is much softer than that used in the driving bands. This is dealt with more fully under metallurgical analysis below.

The exploder container and the shell body are made of steel. Two key slots are cut in the lip of the former for insertion and removal. Stencilling in white paint on the body of one shell (Plate D) indicates that it was filled in September 1941, while stamping on the shell body indicates that the body was manufactured in October 1940 at Osaka Arsenal. The other shell body was made in May 1940 and filled in June 1941.

Filling

12. The H.E. filling was classed as T.N.T., Grade II, based on its melting point, see chemical analysis below. The filling in the exploder container follows usual Japanese practice, three pellets of picric acid resting on a felt disc. The top pellet is perforated to take the gaine magazine. Full details of these fillings are given under chemical analysis below.

G A I N E.

13. The gaine screws down into the exploder container until the top surface is in line with the lip. The general assembly of the gaine and details of components are given in Plate F. Its appearance and the assembly sequence of components is shown in the photograph in Plate G. The gaine is generally made of brass throughout, except for certain components such as the spring (3) and retaining ferrule (4) etc. In appearance it resembles somewhat the No.11 gaine (British), but is much smaller. Its action is, however, quite different.

14. Although all details are given in the Plates it may be useful for a study of the mechanism to divide the gaine into the following four main parts:-

- (a) The gaine body which is in two parts, upper (1) and lower (8). These are secured together by screw threads and form an internal cavity to contain the gaine mechanism. The upper portion of the body (1) is threaded externally to screw into the exploder container while the lower portion of the body (8) is screw-threaded internally to take the magazine holder (10).
- (b) The set-back mechanism consisting of the set-back ferrule (2), arming spring (3) and retaining ferrule (4).
- (c) The sliding shutter mechanism consisting of a flanged detonator holder (6) the bottom portion of which acts as a housing for the centrifugal (sliding type) shutter bolt (7).
- (d) The magazine (11) comprising the magazine holder (10) into which screws the magazine proper. The magazine holder (10) screws up tightly on to the detonator holder (6) seating on a copper septum (9), which prevents any leakage of flash or gas. A coned channel holding stemmed picric acid is in the underside of

the holder (10). The channel is closed by a small paper disc. The thickness of the diaphragm above the channel is approximately 0.03-in.

Safety Devices :-

15. This consists of a simple sliding type shutter or bolt (7) which, during handling and transport, and acceleration up the bore, obstructs the passage of any flash from the detonator (5) down to the picric acid stemming in the magazine holder (10) and to the magazine proper (11). This sliding bolt, until the fuze is armed, is held in the safe position by the retaining ferrule (4).

Action :-

16. On set-back, the set-back ferrule (2) compresses the arming spring (3) and sliding back over the retaining ferrule (4) locks itself to the latter. During acceleration up the bore the set-back ferrule (2) and retaining ferrule (4) tend to remain back and keep the centrifugal bolt (7) from moving out under centrifugal force. In any case set-back during acceleration will keep the centrifugal bolt in the safe position, even if the strength of the spring is sufficient to return the set-back ferrule, taking with it the retaining ferrule (4).

17. On deceleration outside the bore the set-back ferrule (2) together with the retaining ferrule (4), to which it is locked, moves upwards freeing the centrifugal bolt (7). This at once moves upwards under centrifugal force unmasking the flash channel, leaving the fuze armed and ready to function as soon as it receives the flash impulse from the magazine of the fuze.

F U Z E.

18. The general appearance of the fuze together with its cover and cylinder are shown in Plate H. The cylinder is of tinned plate with a screwed-on lid, and has a paper label showing the type of fuze, fuze correction, and date of manufacture in Japanese characters. As mentioned above the cylinder examined was in good condition and dry internally.

The fuze cover was also in good condition. It is made of aluminium (see metallurgical analysis below) and fits snugly over the fuze. It is turned over at the skirt to secure to the fuze, and further fixed in position by the metal being punched into two slots in the side of the fuze body. In some cases the metal was found to be torn owing to this punching. These slots and the junction of the cover with the fuze are coated with a waterproofing composition of a waxy nature. It would seem that it is not the intention to obtain a hermetically sealed cover, except by the aid of this waterproofing composition. With properly closed cylinders in visually good condition the covers and fuzes externally were in quite a good condition. On breaking down the fuzes, however, there was evidence that the composition in the time rings had been affected by damp and was slightly swollen. This damp had not been sufficient, however, to cause any appreciable deterioration of the composition and the gunpowder in the magazine was in good condition. Owing to the effects of this slight damp, or for some other reason, setting with the original tension is practically impossible. Although a setting tension of well over 500-inch-ounces was used, the result was to distort the setting bridge. It is possible, with a proper setting machine, that the fuzes could be set but it was not practicable to verify this.

19. From the markings on the cylinder lid label, this is the "Type '89 (1929)" fuze. The stencil markings on the fuze and cylinder label indicate that it was manufactured and filled in December 1940 at Osaka. It is a time fuze only of the combustion type with four time rings made of brass throughout. Full details of the fuze are shown in the Plates as below :-

- | | | |
|---------|---|---------------------------------------|
| Plate J | - | General assembly and markings. |
| Plate K | - | Dimensions and details of components. |
| Plate G | - | Assembly sequence of components. |

These plates are self-explanatory and provide a complete description of the fuze. To assist a study of the fuze and its mechanism the following general remarks may be useful:-

- (a) The second (7) and fourth (9) time rings are coupled together for purposes of setting by a brass setting bridge (10). The ends of this bridge fit in a dove tailed seating in each ring. The bridge is not positively connected to the rings and when pressure is applied the tendency is to distort the bridge, if the tension is excessive as described in para. 18 above.
- (b) The brass wire, under the fuze cover is intended for quick removal of the cover, and is secured to the stud on body of the fuze only to prevent weakening of the cover sealing during handling etc. The two slots in the body of the fuze into which the cover is punched are presumably for fuzing and unfuzing.
- (c) Contrary to usual practice with British time fuzes the gases from the burning composition in the time rings are vented internally and pass up through the grooves in the body stem and out through a small orifice in the nose of the fuze, the closing disc of which is blown out when sufficient pressure is developed.
- (d) The direction of burning, looking in the direction of the travel of the shell, is :-

Top ring (6)	-	anti-clockwise;
Second ring (7)	-	clockwise;
Third ring (8)	-	anti-clockwise;
Fourth ring (9)	-	clockwise.
- (e) When fuze is set to zero, i.e. scribe line on fourth ring (9) is in line with scribe line on body, flash passes direct from detonator down through perforated G.P. pellets in each ring to magazine of fuze.
- (f) When fuze is set to "Safe" i.e. setting bridge (10) is in line with scribe line on body, the blank portion of the top ring (6) seals the flash channel in the second ring (7). Although composition in top ring (6) burns, there is no continuity to the second ring (7).
- (g) The fuze is secured in the nose of the shell by means of a small grub screw.

Safety Devices:-

20. There are no special safety devices except the usual set "safe" position of the rings found in fuzes of similar types e.g., No.199, time fuze (British)

Actions:-

21. On set-back, the inertia pellet (13) with time detonator (12) sets back on to the needle, initiating the detonator, the flash from which passes through a channel to the time ring composition in top ring (6). The composition in the time rings then burns according to the fuze setting employed.

Time of burning at rest.

22. Owing to the impossibility of setting the time rings and the appearance of a slight swelling of the time ring composition three fuzes were dried out on a sunny day in the shade for a few hours and the composition carefully smoothed down where any slight roughness appeared. The fuze was then re-assembled and adjusted to the original tension. Efforts to set the fuze again failed, with a locally improvised key. The tension applied exceeded 500 ~~inch-ounces~~ and distorted the setting bridge without moving the rings. The segmented tensioning nut (2) and the grub screw (2A) were then loosened and the fuze set to full, i.e. "fuze 30". The fuze was then proved at rest in the usual way for time fuzes, the time being recorded electrically and checked by hand operated stop watches. The following times of burning were recorded. 33.1, 33.1 and 32.22 seconds. This gives a mean time of burning of 32.8 and an M.D. of .39 seconds. The mean time of burning of each time ring was as follows :-

1st time ring	(6)	6.36 seconds
2nd time ring	(7)	7.89 "
3rd time ring	(8)	9.0 "
4th time ring	(9)	9.86 "

The uniformity of burning, both in the case of each ring and of the total time of burning of all the four rings was reasonably good.

METALLURGICAL ANALYSIS.

23. As only two rounds (one of each nature) were received it was not possible to arrange for a proper metallurgical analysis to be carried out. The following rough details may be useful.

Brass used for cartridge case,
primer, fuze and gaine :-

This appears to be of the same general nature as that used in components of similar British items of ammunition. Lacquer is used to prevent surface corrosion of the brass

Copper of centring band :-

Copper . 98.93%
Impurities
(Traces of tin, zinc, iron and
silicon). 1.07%

Copper of driving Band :-

Copper 96.7 %
Tin 3.2 %
Zinc and other
impurities .1 %

Nature of metal of fuze cover :-

Anodised aluminium 0.013-in. thick.

Decoppering strip :-

Lead/tin alloy. (97.36 grs.)
size $\frac{9}{8}$ " x $\frac{1}{2}$ " x .004"

CHEMICAL ANALYSIS.
(By C.I.M.E., Kirkee)

PROPELLANTIn cartridge in Plate D

) 3-lb. 2-oz. of olive drab strips
) size $13\frac{3}{8}$ " x $\frac{5}{8}$ " x $\frac{3}{16}$ " of :-
) N.C. 98 %
) Diphenylamine 2 %

In cartridge in Plate C

) 3-lb. 2-oz. of dark green tubular
) cords,
) size $13\frac{3}{8}$ " $\frac{3}{16}$ " and $\frac{1}{8}$ " in per-
) foration of :-
) N.C.
) N.G.
) Phthalic acid derivative presumably
) as plasticiser. A more detailed
) analysis is being made and results
) will follow as a supplement.

IGNITER.

Gunpowder, size approximately G.20
 Potassium nitrate 73.0 %
 Sulphur 11.5 %
 Charcoal 15.5 %

PRIMER

Magazine filling :- 7.7 grs. of pressed mealed gunpowder.
 Cap composition :- 4.62 grs. of a composition of :-
 Mercury fulminate) Quantitative analysis
 Potassium chlorate) was not possible the
 Antimony sulphide) quantity being too
 small

SHELL.

H.E. filling :- 14-ozs. of T.N.T. Grade II S.P. 79.66°.

EXPLODER PELLETS :-

Bottom pellet :-	313.7 grs, of picric acid.	} M.P. 121°C
Middle pellet :-	208.3 " " "	
Top perforated pellet :-	87.9 " " "	

GAINES :-

Detonator (12) :- 20 grs. of a composition of fulminate of mercury.

Stemming in coned channel
 of magazine holder
 (10) :-

3.5 grs. of picric acid (M.P. 121°C)

Magazine filling (11) :- 27.4 grs. of C.E. (M.P. 129°C)

FUZE :-

Magazine filling :- 5 grs. gunpowder, size approximately G.20

Time ring composition :- Gunpowder. A composite sample of 2nd and 4th rings (7 & 9) composition gave :-

Sulphur	9.6%
Potassium nitrate	71.9%
Charcoal	18.5%

Flash channels :- Perforated pellets of mealed gunpowder.

Cloth washers in time rings :- Pure woolen cloth similar to box cloth.

Colours

in 1st ring (6)	--	Light grey
in 2nd ring (7)	)	
4th ring (9)	)	Salmon pink
body (11)	)	
in 3rd ring (8)	--	White.

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

(Economic, manufacture, and development aspects).

25. The round and its components show a good standard of workmanship which appears generally to be up to British standards. General design etc. is conventional and the only marked features are the forward centring band on the shell, the primer pocket in the base of the cartridge case, and the internal venting of the time fuze. The forward band is thought to be purely a centring band and is not intended to have any part in the rotation of the shell, which might suggest a special form of rifling in the gun.

26. The ammunition can, it is thought, be compared generally with our old 3-in. 20-cwt. equipment. While the Japanese projectile is about 2-lbs. lighter than that for the 3-in. 20-cwt. weight, the M.V. is about 300 ft. seconds more. This gives the Japanese equipment a greater maximum height of burst, about 30,000 feet according to their trajectory charts, using the type '89 time fuze (30 - 32 secs.).

27. Briefly, it is considered that there is nothing outstanding in this round and its design agrees closely to what might be expected in a round initially evolved about 1930. The gun is the '88 Type (introduced in 1928), the shell is the '90 Type (introduced in 1930), and the fuze is the '89 Type (introduced in 1929).

S U M M A R Y O F D A T A .

COMPLETE ROUND :-

Length plugged.		28-ins.
Length fuze		31-ins.
Weight fuze	21 lbs. 15½ ozs.	21 lbs. 11½ ozs.
	(yellow and white band on shell)	(yellow band only on shell)

C A R T R I D G E C A S E :-

Length	19.62-ins.
Diameter over rim	3.68-ins.
Diameter under rim	3.37-ins.
Diameter at mouth	2.99-ins.

JAPANESE AMMUNITION.

C.I.AMM. TECHNICAL REPORT NO. 29.

CARTRIDGE, Q.F., 75-MM. WITH H.E., A.A., SHELL, TYPE '90
FOR
75-mm., TYPE '88 FIELD/A.A. GUN.

AMENDMENT NO. 1.

Page 9.

Under SHELL against Length

For " 8.75 "
Read "10.1 ".

Plates C. & D.

Amend accordingly.

Amendment No.1 (Issued with C.I.Amm. No.
J/TR. dated 2 -3-45).

PROPELLANT.Plate C.

3-lb. 2-oz. of dark green tubular cords of N.C. and N.G., with diphenylamine, size 13 3/8" x 3/16" & 1/8" in perforation.

Plate D.

3-lb. 2-oz. of olive drab strips of N.C. with diphenylamine, size 13 3/8" x 5/8" x 3/16".

IGNITER.

0.53 oz. of gunpowder, size approximately G.20, contained in an undyed silk bag.

PRIMER.

Length
Diameter over rim.
Weight (filled)
Magazine filling

Cap composition

0.729-ins.
0.628-ins.
0.47 -oz.
7.7 grs. of pressed mealed gunpowder.
4.62 grs. of a composition of :-
Mercury fulminate.
Potassium chlorate.
Antimony sulphide.

SHELL (without plug).

Type
Length
Diameter over body
Diameter over centring band
Diameter over driving band
H.E. filling
Exploder filling

Weight of shell fuze.

H.E., A.A., Type '90.
8.75-ins.
2.9-ins.
2.93-ins.
3.03-ins. S.P. 79.66°
14-ozs. of T.N.T. Grade II /
1.39 ozs. of picric acid -
(M.P. 121°C) 3 pellets.
14-lbs. 8 1/2 ozs.

GAINES :-

Length (overall)
Weight (filled)

1.87-ins.
6.4-ozs.

FUZE :-

Type
Length
Weight (filled)
Magazine filling
Mean time of burning when set full

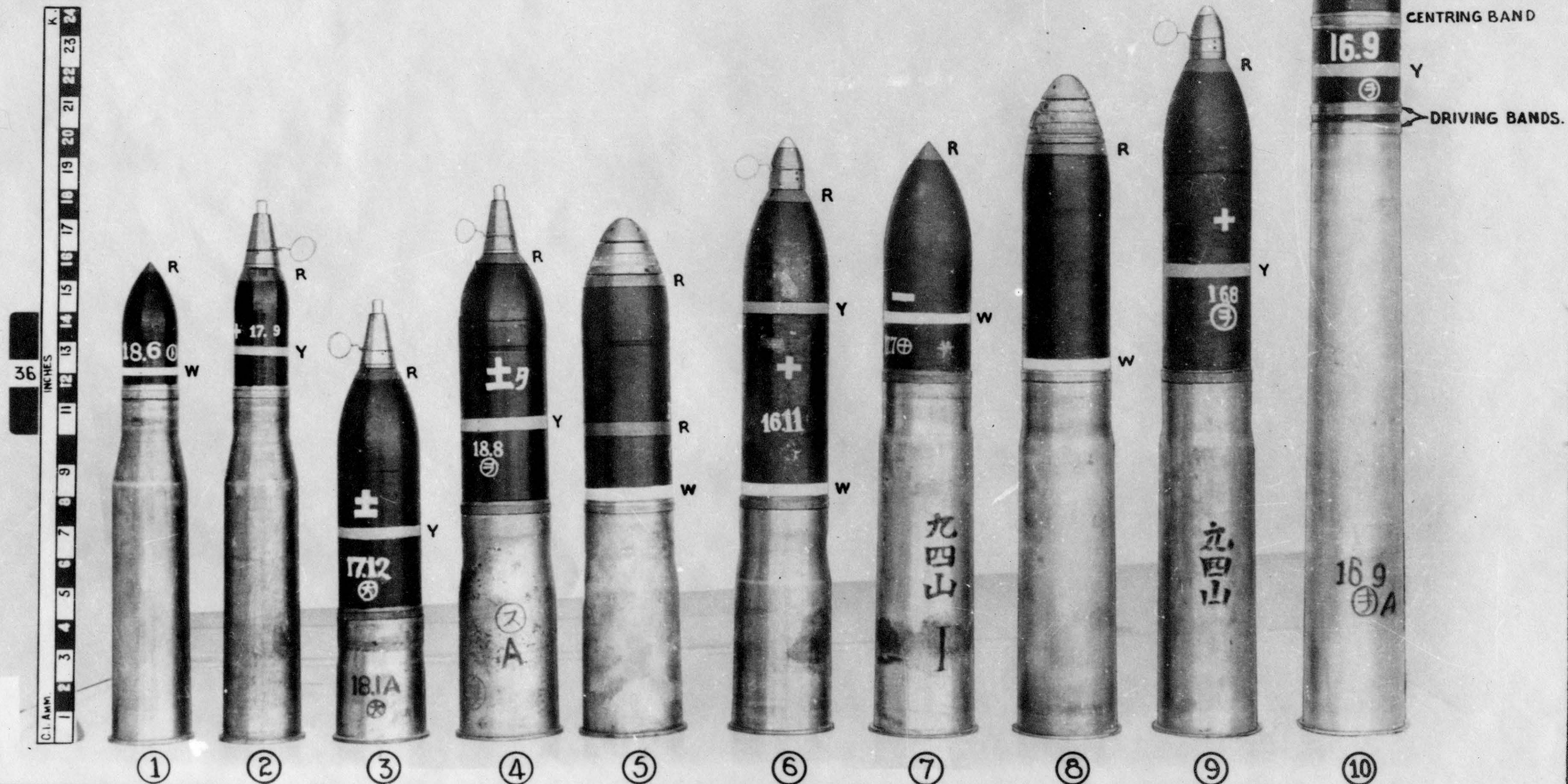
Time, Type '89 (four time rings)
3.81-ins.
1-lb. 7 1/2-ozs.
5 grs. of G.P.,
size approximately G.20.
32.8 seconds.

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KEY TO COLOUR BANDS:-

W = WHITE.
Y = YELLOW.
R = RED.

SHELL BODY COLOUR, BLACK.
ALL STENCILLING ON SHELL, WHITE.
STENCILLING ON CARTRIDGE CASE, PURPLE OR BLACK INK.



JAPANESE GUN AMMUNITION

COMPARATIVE CHART

FOR

TYPICAL 47 MM., 70 MM. & 75 MM. TYPES.

C.I. AMM. S/930.
KIRKEE. NOV 1944.

PLATE A

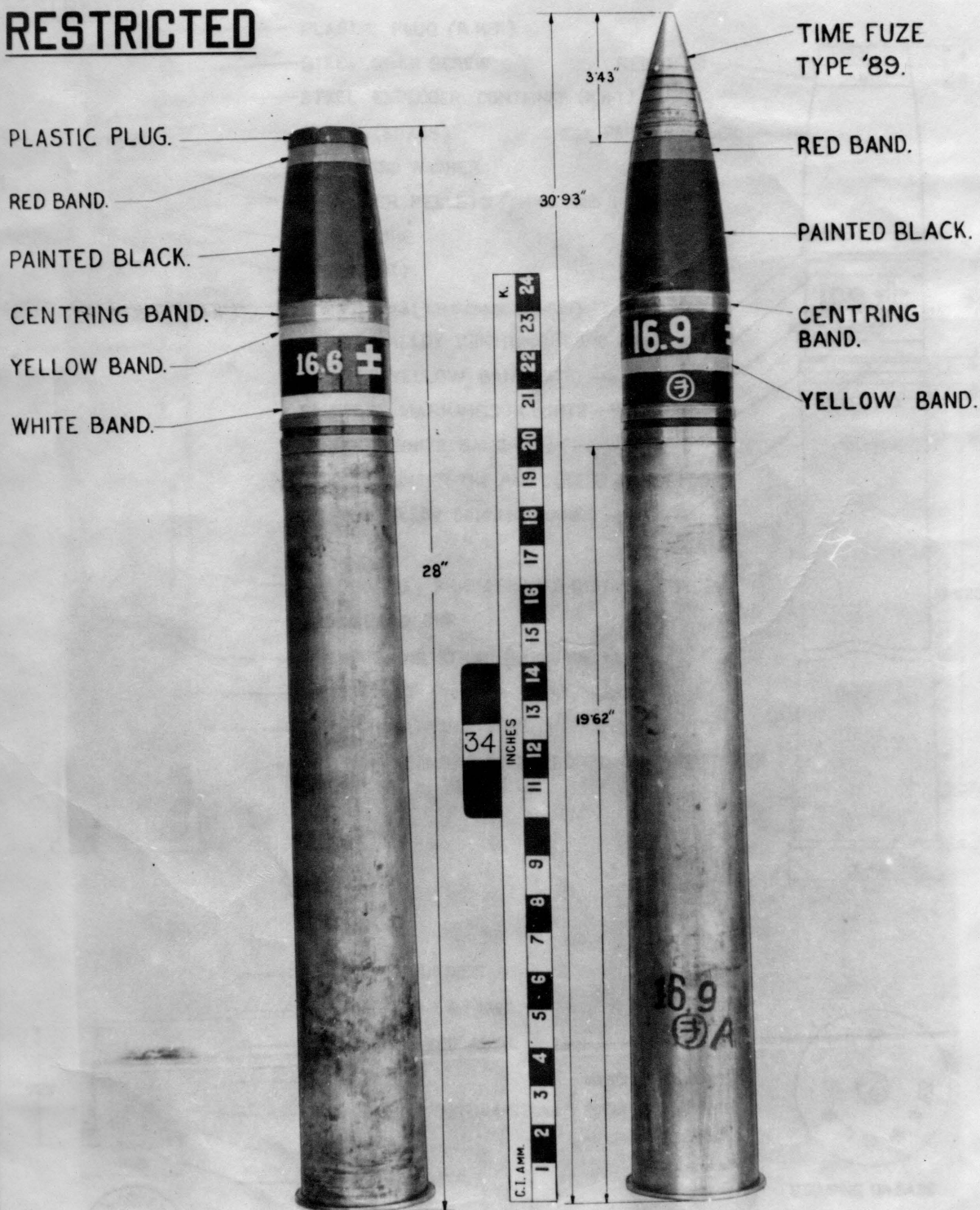
KEY TO COMPARATIVE CHART
FOR
TYPICAL 47 MM., 70 MM. AND 75 MM., TYPES.

NO.	CALIBRE MM.	TYPE OF SHELL	WEAPON	WEIGHT OF COMPLETE ROUND LB. - OZ.	O/A LENGTH OF COMPLETE ROUND INCHES.	LENGTH OF CARTG. CASE INCHES.
1	47	A.P./H.E. BASE FUZED.	47MM. TYPE '1, MOBILE, A.T. GUN.	6 - 7 1/2	15.7	11.19
2	47	H.E., FUZED, TYPE '88 (INSTANTANEOUS)	47MM. TYPE '1 MOBILE, A.T. GUN.	6 - 3	17.66	11.19
3	70	H.E., FUZED, TYPE '88 (INSTANTANEOUS)	70MM. TYPE '92 BATTALION GUN.	9 - 11 1/2	14.28	4.0
4	75	H.E., HOLLOW CHARGE FUZED, TYPE '88 (INSTANTANEOUS)	75MM. TYPE MEIJI 41 REGIMENTAL GUN.	10 - 15	18.0	7.25
5	75	SHRAPNEL, FUZED, T & P (TWO TIME RINGS)	75MM. TYPE MEIJI 41 REGIMENTAL GUN.	17 - 8	16.91	7.25
6	75	H.E. FUZED, TYPE '88 (SLIGHT DELAY)	75MM. TYPE MEIJI 41 REGIMENTAL GUN.	15 - 10	10.5	7.25
7	75	A.P./H.E. BASE FUZED.	75MM. TYPE '94 MOUNTAIN GUN.*	18 - 12	19.44	11.56
8	75	SHRAPNEL, FUZED, T & P TYPE 5 (THREE TIME RINGS)	75MM. TYPE '94 MOUNTAIN GUN.*	19 - 0	21.5	11.56
9	75	H.E., FUZED, TYPE '88 (SLIGHT DELAY)	75MM. TYPE '94 MOUNTAIN GUN.*	17 - 2	23.5	11.56
10	75	H.E. TYPE '90 SHELL (A.A.) FUZED, TIME FUZE TYPE '89 (FOUR TIME RINGS)	75MM. TYPE '88 FIELD A.A./GUN.	21 - 15	30.94	19.6

* { AMMUNITION FOR THE MEIJI TYPE 38 FIELD GUN IS IDENTICAL IN APPEARANCE TO THIS AMMUNITION, BUT THE PROPELLANT CHARGE IS GREATER. AMMUNITION FOR TYPE '94 MOUNTAIN GUN CAN BE DISTINGUISHED BY THE CHARACTERS ON THE CASE AND USUALLY A SMALL RED RING ON THE SHELL. → 九四山 I OR 九四山 I

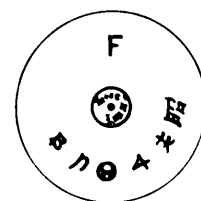
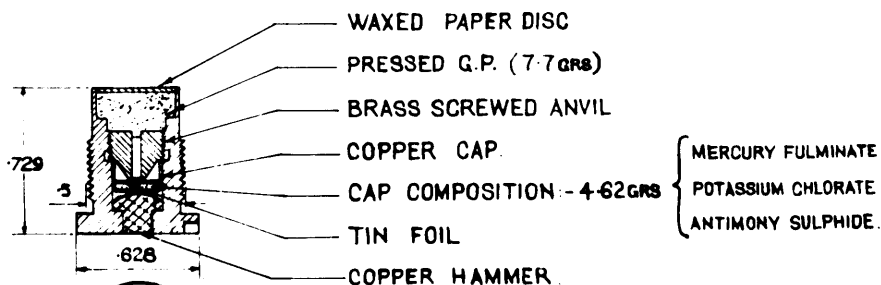
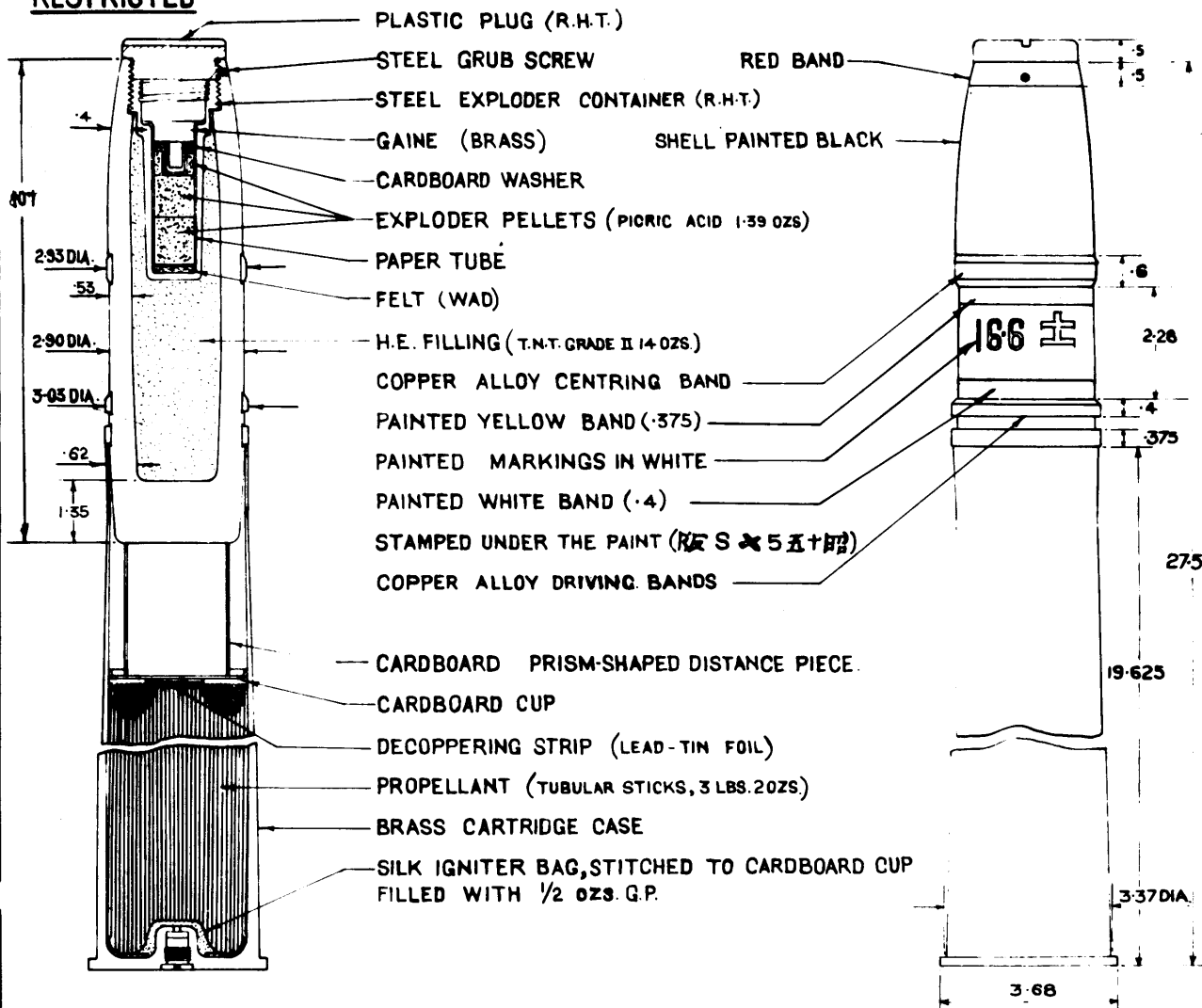
C.I. AMM. S/930.
KIRKEE. DEC. 1944.

RESTRICTED



JAPANESE GUN AMMUNITION.
H.E.A.A. SHELL TYPE '90
FITTED WITH FUZE, TIME, '89 TYPE
FOR
75MM. A.A./FIELD GUN TYPE '88
(EXTERNAL APPEARANCE AND MARKINGS)

RESTRICTED



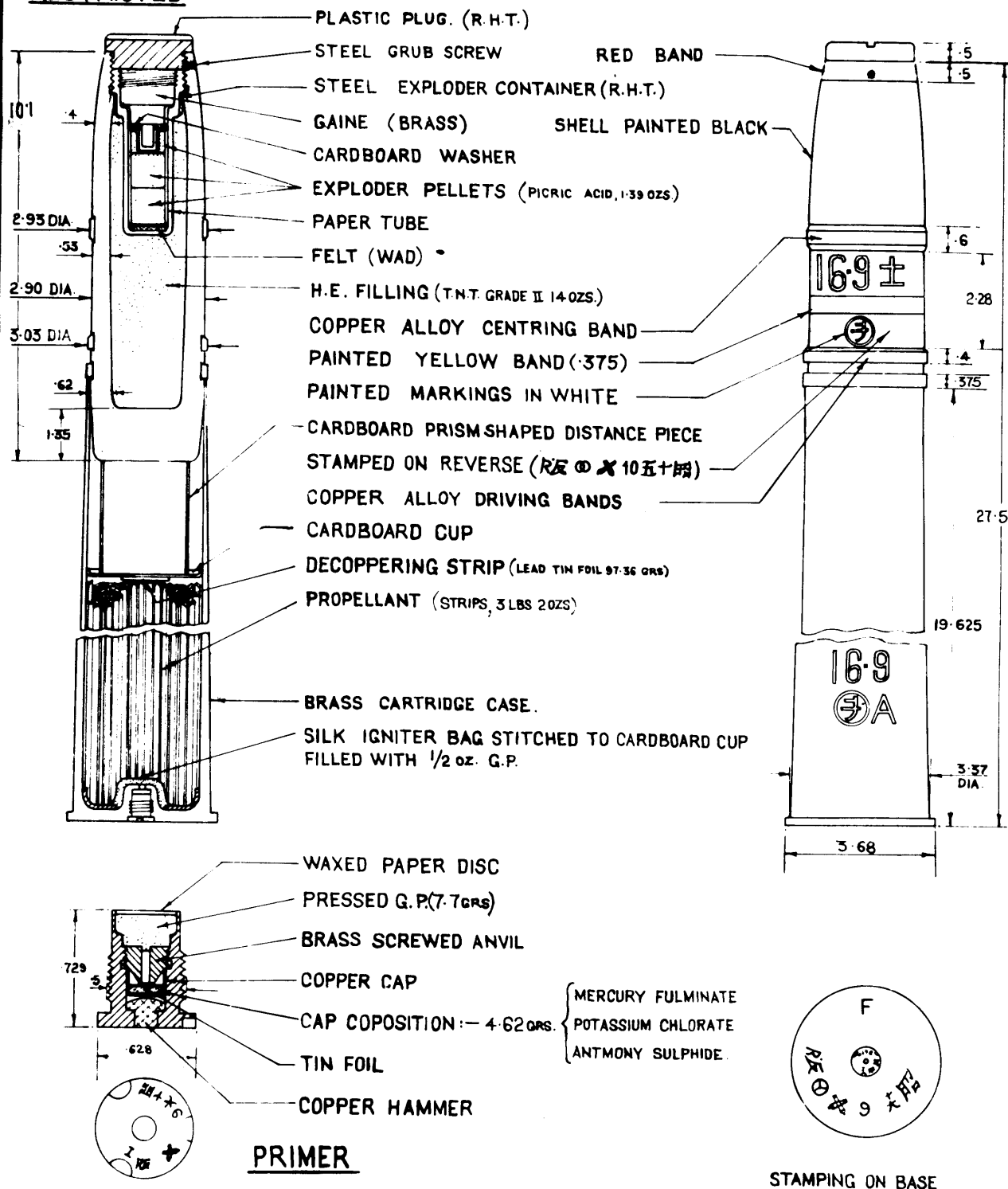
STAMPING ON BASE

PRIMER

DIMENSIONS IN INCHES

H.E. A.A. SHELL, TYPE '90
FOR
JAPANESE 75 MM. A.A./ FIELD GUN TYPE '88
YELLOW & WHITE BANDS MARKING
(INTERNAL DETAILS & DIMENSIONS)

RESTRICTED



DIMENSIONS IN INCHES

H.E.A.A. SHELL, TYPE '90

FOR

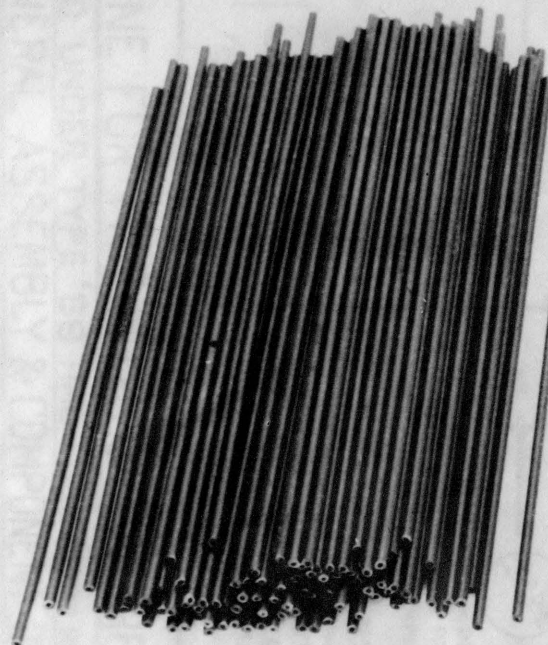
JAPANESE 75 MM. AA/FIELD GUN TYPE '88

YELLOW BAND MARKING

(INTERNAL DETAILS & DIMENSIONS)

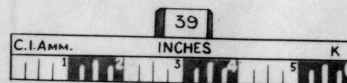
CIAMM.S. 966
KIRKEE JAN 1945

RESTRICTED.



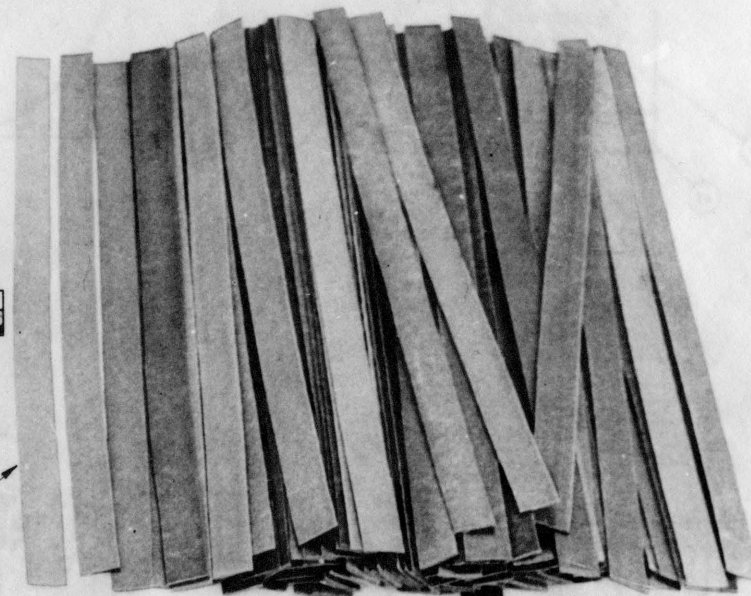
①
PROPELLANT FROM SHELL
WITH YELLOW AND WHITE BAND.
WEIGHT:- 3 Lb. 2 Oz.

DARK GREEN TO BLACK



OLIVE DRAB.

ABOUT 90 Grs. DECOPPERING
FOIL WITH EACH CHARGE.

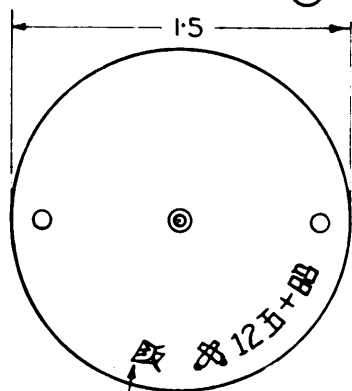
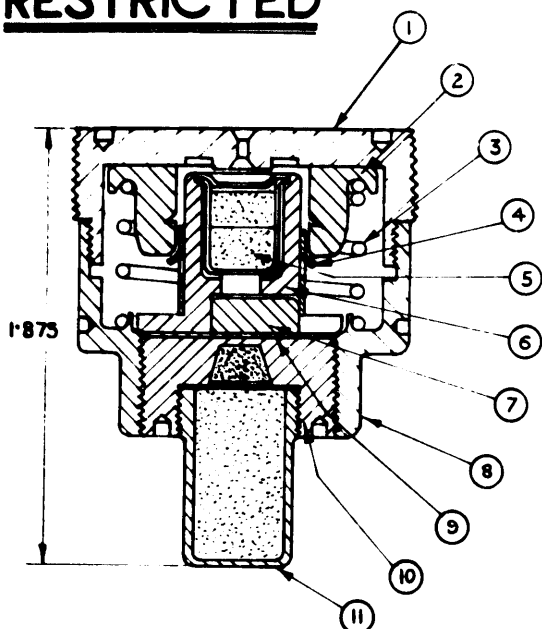


②
PROPELLANT FROM SHELL
WITH YELLOW BAND ONLY.
WEIGHT:- 3 Lb. 2 Oz.

PROPELLANT CHARGES
FROM
JAPANESE H.E.A.A. SHELL TYPE '90

RESTRICTED

WEIGHT OF COMPLETE GAINE- 6'4 ozs.

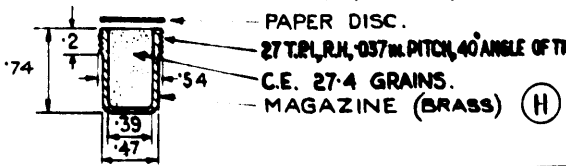
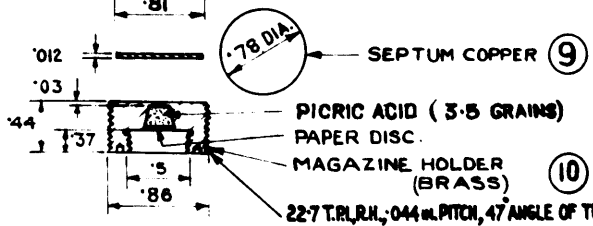
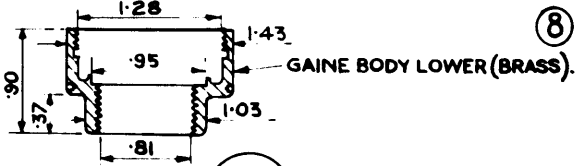
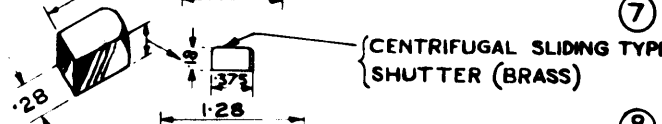
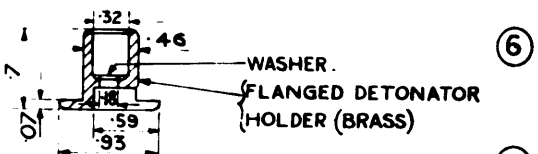
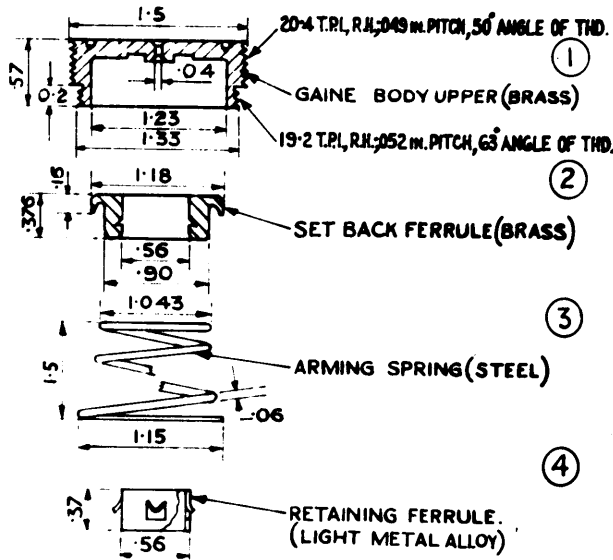
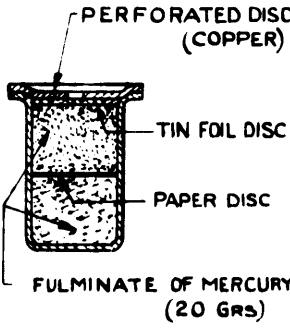


TOP PLAN.

ENLARGED DETAILS

ITEM (4)

ITEM (5)

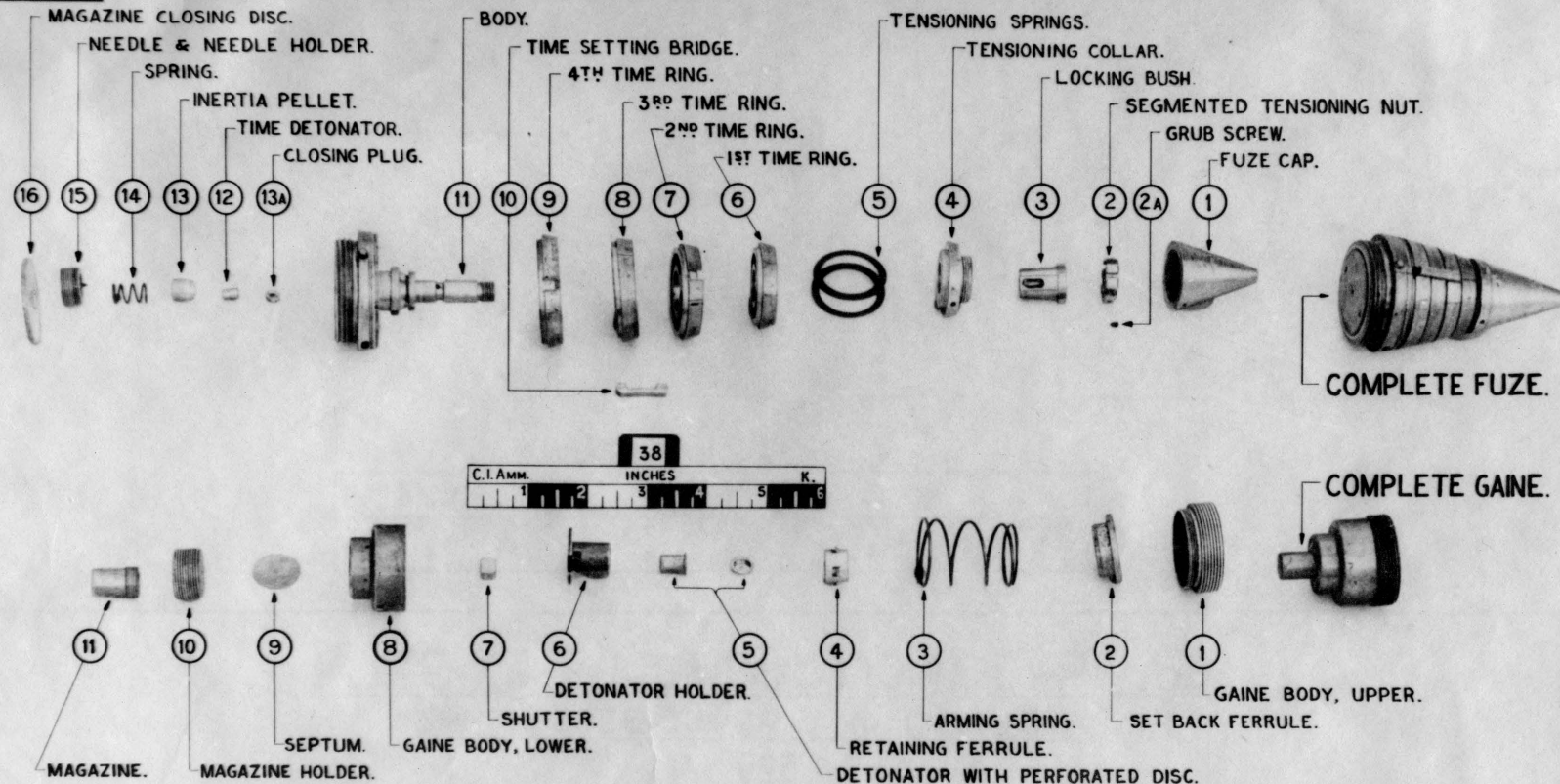


— GAIN E FOR TYPE '90 H.E., A.A. SHELL —
— USED UNDER TYPE '89 TIME FUZE (FOUR RINGS) —
— GENERAL ASSEMBLY & COMPONENT DETAILS —

DIMENSIONS IN INCHES.

C.I.A.M.M. 3/ 968.
KIRKES, DEC. 1944.

RESTRICTED.



JAPANESE TYPE '89 TIME FUZE (FOUR RINGS) AND GAINE

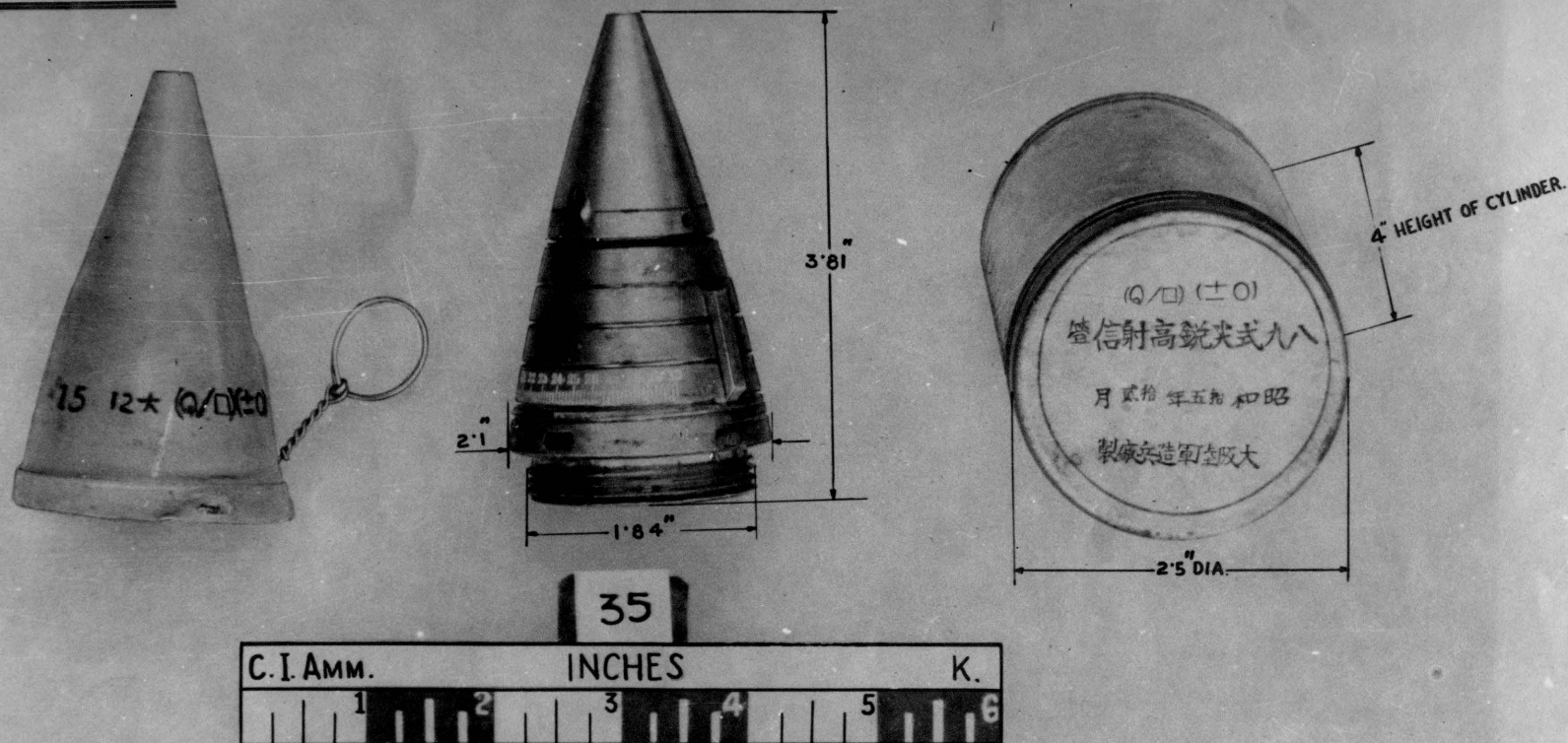
FOR

'90 TYPE H.E. A.A. SHELL.
(ASSEMBLY SEQUENCE OF COMPONENTS.)

C.I. AMM. S/956
 KIRKEE. DEC. 1944.

PLATE G.

RESTRICTED.



FUZE TIME (COMBUSTION) TYPE '89

WITH FUZE COVER AND CYLINDER

FOR

H.E.A.A. SHELL TYPE '90

FOR

75 MM. A.A./FIELD GUN TYPE '88

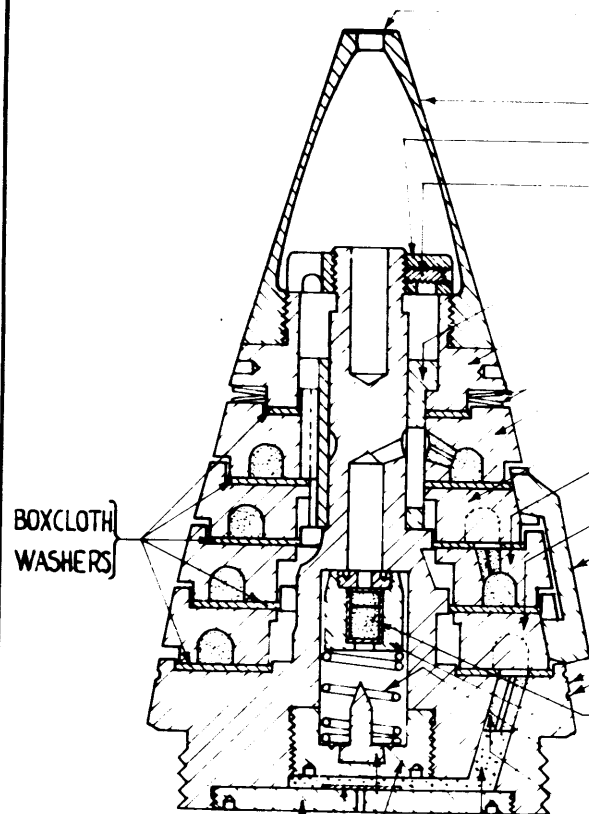
(EXTERNAL APPEARANCE, MARKINGS AND DIMENSIONS.)

RESTRICTED.

COMPLETE WEIGHT OF FUZE :- 1 LB. 7.5 OZS.

MANUFACTURED & PASSED INSPECTION
IN OSAKA ARSENAL DECEMBER 1941

- BRASS COVER DISC, SPUN LIGHTLY IN.



- ① FUZE CAP.
- ② SEGMENTED TENSIONING NUT.
- ②A GRUB SCREW.
- ③ LOCKING BUSH.
- ④ TENSIONING COLLAR.
- ⑤ TWO, STEEL TENSIONING SPRINGS.
- ⑥ 1ST TIME RING (FIXED)
- ⑦ 2ND TIME RING (MOVABLE)
- ⑧ 3RD TIME RING (FIXED)
- ⑨ 4TH TIME RING (MOVABLE)
- ⑩ TIME SETTING BRIDGE.
- ⑪ BODY.
- GROOVE FOR BRASS WIRE HOLDING FUZE COVER.
- STUD FOR ANCHORING WIRE.
- ⑫ TIME DETONATOR.
- ⑬ INERTIA PELLET WITH CLOSING PLUG.
- ⑭ INERTIA PELLET SPRING (STEEL)
- PERFORATED G.P. PELLET (7.7GRS.)
- LOOSE G.P. (5GRS.) SIZE G-20.
- ⑮ STEEL NEEDLE & NEEDLE HOLDER.
- TIN FOIL DISC.
- ⑯ MAGAZINE CLOSING DISC.

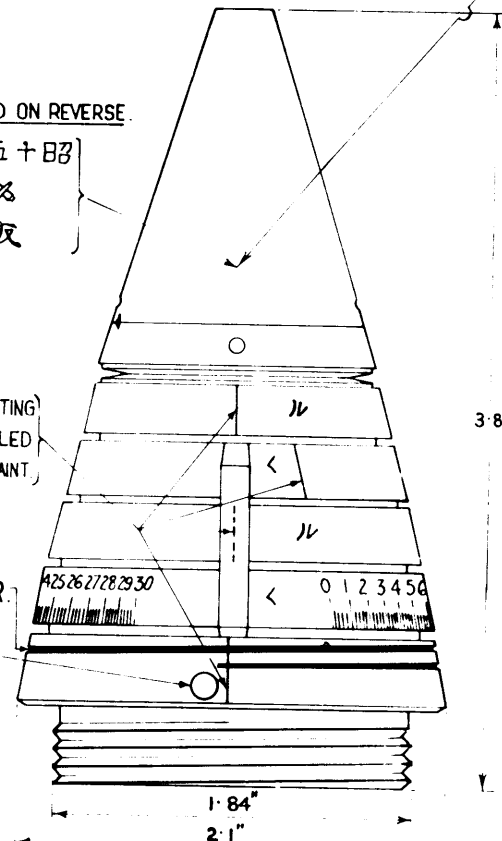
STAMPED ON REVERSE

12 五 + 88

88

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TIME SETTING
MARKS FILLED
WITH RED PAINT



FUZE SET AT SAFE POSITION.

— TYPE '89 TIME FUZE (FOUR RINGS) FOR '90 TYPE H.E., A.A. SHELL. —
(GENERAL ASSEMBLY & APPEARANCE)

SHEET 1 OF 2 SHEETS

C.I.A.M.M. S/ 962.
KIRKEE, DEC. '44.

PLATE J

