AP 109C-0206-1
(Formerly AP 109C-0206-15F)

BREECH TYPE TIME-DELAYED EJECTION GUN FIRING UNITS

GENERAL AND TE

Chapter 1-0

GENERAL INFORMATION

CONTENTS

FUNCTION

1. The breech type time-delayed ejection gun firing unit which combines the functions of a time-delayed mechanism and firing unit is screwed into the ejection gun inner piston. The various types of unit covered by this publication are similar in construction and operation and differ only as shown in Table 1.

TABLE 1 TYPES OF BREECH TYPE TIME-DELAYED EJECTION GUN FIRING UNITS

Type of unit (1)	Applicability (2)	Time-delay (3)	Remarks (4)
1, Mk 1	2CB Mk 1 and 2, 3CT/1 and 2, Mk 2 and 3, 4P1 and 2, 4PA/1 and 2, 4PB/1 and 2, 4H/1 and 2.	1 s. + 0.2, - 0.1 s.	
1, Mk 2	2CB Mk 1 and 2.	1 s. + 0.2, - 0.1 s.	Same as Type 1 Mk 1 but Mod. ESA 39 introduces a new sear and plug in type safety pin.
2, Mk 2	4BSC, Mk 2		The same as Type 1, Mk 1 but incorporates a restrictor mechanism.
3, Mk 1	4HA	1 s. + 0.2, - 0.1 s.	The same as Type 1, Mk 1 but incorporates guard plates.
3, Mk 2	4HA	0.5 s. ± 0.1 s.	Introduced by Mod No ESA 26 to Type 3, Mk 1.
5, Mk 1	2CA2 Mk 2 and 4	0.5 s. ± 0.1 s.	The same as Type 2, Mk 2 except for delay and different type sear.
5, Mk 2	2CA2 Mk 2 and 4	0.5 s. ± 0.1 s.	Introduced by Mod ESA 47 to Type 5 Mk 1
8, Mk 1	4BSB Mk 2	0.4 s. ± 0.1 s.	Same as Type 2, Mk 2 except for delay (Introduced by Mod No ESA 4).
8, Mk 2	4BSB Mk 2	0.4 s. ± 0.1 s.	Introduced by Mod No ESA 24 to Type 8, Mk 1
11, Mk 1	4BSC Mk 2	0.6 s. ± 0.1 s.	The same as Type 2, Mk 2 except for delay.
11, Mk 2	4BSC Mk 2	0.6 s. ± 0.1 s.	Introduced by Mod No ESA 20 to Type 11, Mk 1.
12, Mk 1	4P1 and 2, 4PA 1 and 2, Mk 1	0.6 s. ± 0.1 s.	Introduced by Mod ESA 34 to Type 1, Mk 1 (reduced delay).
13, Mk 1	9B1 Mk 2	0.4 s. ± 0.05 s.	Seal and seal retainer fitted under end cap.
14, Mk 2	9B Mk 2 and 9B2 Mk 2	0.3 s. ± 0.05 s.	Seal and seal retainer fitted under end cap.

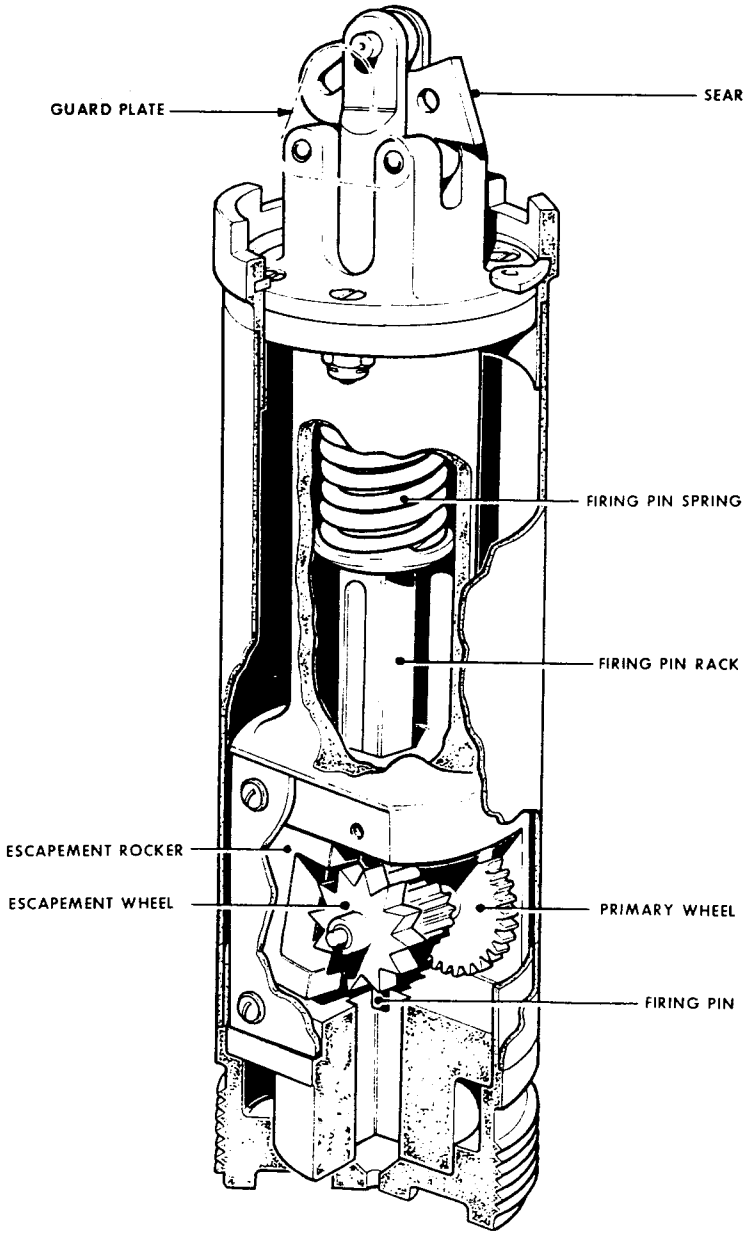

Fig 1 Type 1 Breech time-delay unit

DESCRIPTION

2 The time-delay mechanism (fig 1) is contained in a housing tube and consists of a spring-loaded firing pin, with an integral rack which is in engagement with a train of gears, regulated by an escapement wheel and rocker assembly. The mechanism is contained in a tubular body reduced in diameter for the firing pin and flanged at the top to secure the end cap. The gear train and escapement mechanism are secured by a cover plate integral with which are the gear spindle bearings, the plate is secured by four 4BA round headed screws and shakeproof washers. The body is closed at the top by the end cap, integral with which is a bridge piece, each arm of the bridge being fitted with a roller and secured to the body by four 4BA countersunk screws and nuts. The mechanism is retained in the housing tube by a circlip.

OPERATION

3 When the sear is withdrawn the firing pin descends under spring pressure, the rate of descent being controlled by the escapement wheel and rocker. After the appropriate delay has elapsed the firing pin rack disengages from the primary wheel and is free to descend under spring pressure to strike the cap of the primary cartridge.

SERVICING

TABLE 2 SPECIAL TOOLS AND EQUIPMENT

Nomenclature (1)	Part No. (2)	Reference No. (3)	Remarks (4)
Tools			
Tool, lifting	MBEU 1321	27L/1046921	For lifting firing pin to insert and remove sear
Spanner, special ejection gun firing unit	MBEU 7202	27L/7002505	For removing and refitting time-delay firing unit to ejection gun
Gauge, striker protrusion	MBEU 3669 or MBEU J/9126	27L/1046905 or 27L/7154659	For checking firing pin protrusion

TABLE 3 MATERIALS

Nomenclature (1)	UK Joint Service Designation (2)	NATO Code No (3)	Specification (4)
Oils and greases			
▶ Oil, anti-freeze	OM-12	O-142	DEF STAN 91-47/1
Grease, anti-freeze	XG-293	G-395	DEF STAN 91-52/1 ◀
Paints, dopes and varnishes			
Varnish, seaplane	-		BC 3 x 17

RESETTING THE MECHANISM

4

CAUTION...

On every occasion that the mechanism is removed from the housing tube the following operations are to be done BEFORE the mechanism is replaced in the tube, otherwise the teeth of the primary wheel and the firing pin may sustain damage.

4.1 Gently rotate the primary wheel until the detent plunger engages the detent of the primary wheel. When in this position the red dot on the primary wheel will be approximately in line with the arrow engraved on the outside of the body (fig 2).

4.2 Using a lifting tool pull up the firing pin and insert the sear.

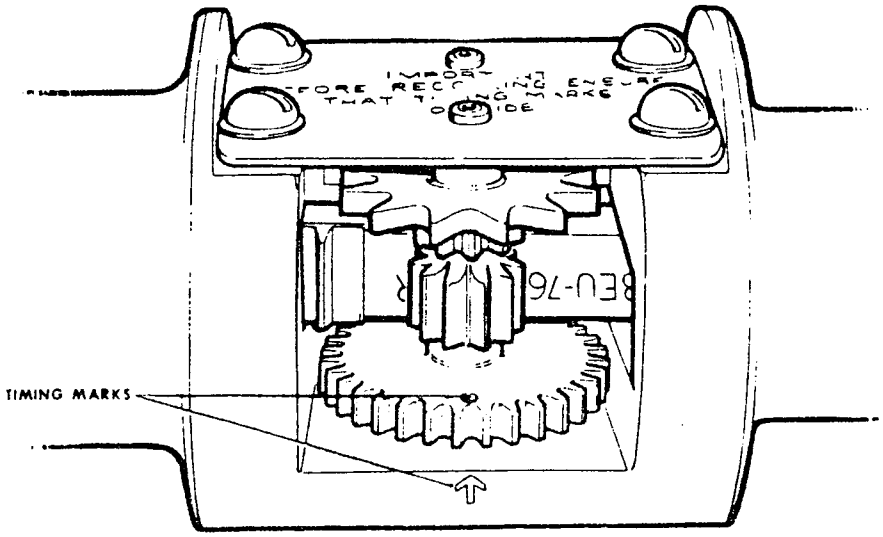

Fig 2 Resetting the mechanism

TIMING THE UNIT

5 The timing tests to be carried out prior to dismantling the unit are detailed in AP109T-0101-12 Chap 6.

DISMANTLING THE UNIT

CAUTION...

Whenever it is necessary to hold the unit in a vice for dismantling, the housing is not to be held by the threaded portion. The housing is to be protected by soft wood clamps and the vice jaws must not be overtightened.

6 Dismantle the unit (fig 3) as follows:

6.1 Remove the sear and allow unit to operate. Remove the circlip and withdraw unit from housing tube.

6.2 Remove the four round head screws and shakeproof washers; remove the cover plate.

6.3 Remove the escapement wheel and rocker.

6.4 Remove the four nuts, washers and countersunk bolts; remove end cap and spring.

6.5 Remove the firing pin by rotating the primary wheel with the thumb.

Note...

Do not attempt to force out the firing pin.

6.6 Remove the primary and secondary wheels.

6.7 Remove the detent plunger and spring.

ASSEMBLING THE UNIT

CAUTION...

Whenever it is necessary to hold the unit in a vice for assembly the housing is not to be held by the threaded portion. The housing is to be protected by soft wood clamps and the vice jaws must not be overtightened.

7 Re-assemble, lightly lubricating with oil OM-12, as follows:

7.1 Fit the detent plunger and spring, lightly lubricating the plunger.

7.2 Fit the primary and secondary wheels (fig 4).

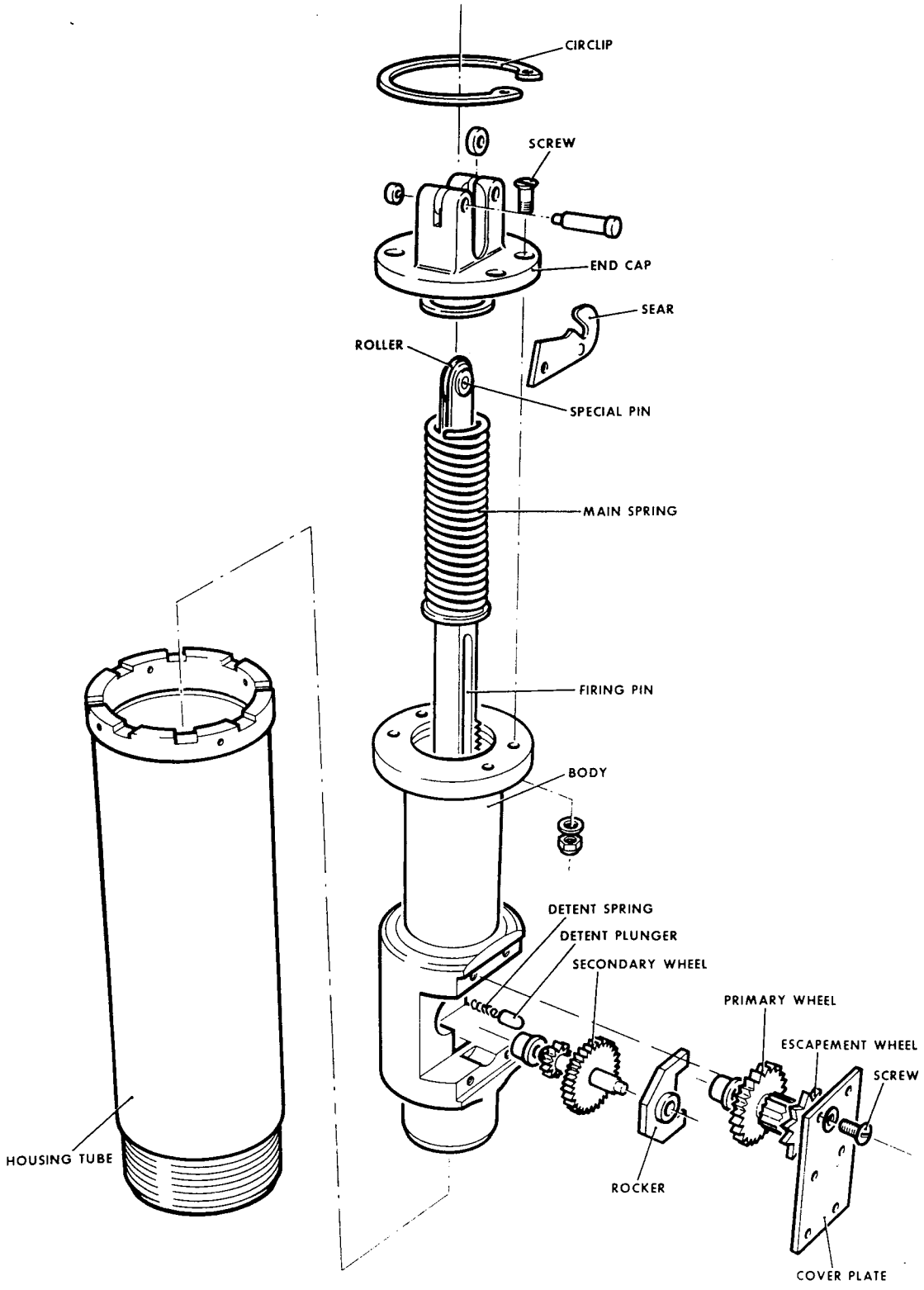

Fig 3 Breech time-delay unit - exploded view

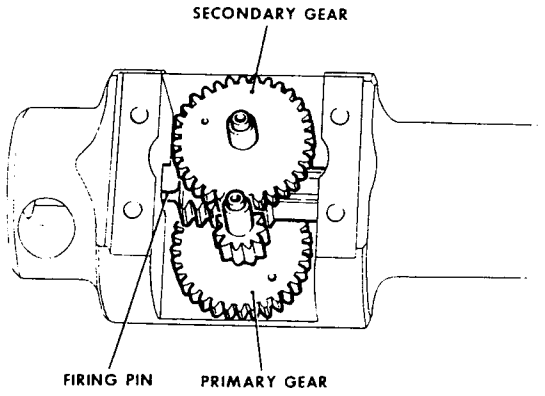

Fig 4 Assembling the unit (1)

7.3 Lubricate the firing pin stem and rack and fit to the unit, engaging the teeth with the teeth of the primary wheel (fig 4).

Note...

Do not force the firing pin assembly through the gears. Engage the teeth and wind the assembly through by rotating the primary wheel with the thumb.

7.4 Rotate the body and lightly lubricate the primary and secondary wheel bearings.

7.5 Lubricate the teeth of the escapement wheel and fit, engaging with the teeth of the secondary wheel.

7.6 Refit the escapement rocker (fig 5).

CAUTION...

- Care is to be taken when assembling the Type 5, Mk 1 and Mk 2 and Type 8, Mk 1 and Mk 2 units that the escapement rocker is inserted with the smaller of the two collars facing downwards, adjacent to the secondary wheel.

7.7 Lubricate the spindle ends and replace the cover plate; secure with the four round/head screws and shakeproof washers.

7.8 Fit the spring and end cap, secure with the four (4) BA countersunk bolts, washers and stiffnuts.

7.9 Lightly lubricate the sear roller.

7.10 Ensure the timing marks are approximately in line; fig 2, exercise the gears over their complete range several times.

7.11 Re-cock the unit, and insert the sear.

7.12 Repeat the exercising movement in the cocked position.

7.13 Test the unit in accordance with AP109T-0101-12 Chap 6.

7.14 Replace unit in housing tube and secure with the circlip.

CANOPY JETTISON SYSTEM FAILURE - PRECAUTION

8 An investigation into the failure of an aircraft canopy jettison system to fire revealed that the firing body of the firing unit was not screwed fully home into the breech, possibly due to the threads having been damaged when clamped in a vice. During Bay Servicing and before loading, firing unit housings and body threads are to be examined, and any damage rectified, as detailed in AP109C-0206-5F.

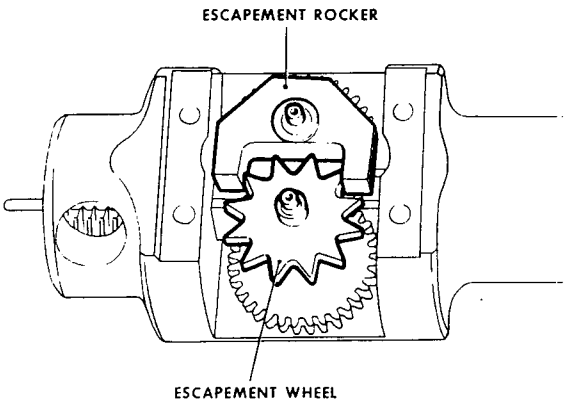

Fig 5 Assembling the unit (2)

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