

CHAPTER 2

GROUND HANDLING AND PREPARATION FOR FLIGHT

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INTRODUCTION

1. Information on the general handling of the aircraft on the ground and on preparation for flight is given in this chapter. Auxiliary equipment for handling and servicing is listed in Sect. 4, Chap. 3 and special gear and tools are included in the Schedule of Spare Parts, Vol. 3, Part 1, of this publication.

WARNING

Before running the engine, care should be taken in choosing a suitable position and attitude for the aircraft in relation to other machines, buildings, etc., in the vicinity. An unobstructed clearance for 100 yards behind the jet pipe should be maintained. Owing to the great quantities of air drawn into the air-intakes at the front, no individual should approach to within a distance of 4 yards. It is also important to see that

the ground in the vicinity of the aircraft is free from rags, paper, light pieces of wood, etc., as they may easily be sucked in through the ducts. Where practicable, the air-intake guards should be in position for ground running; these will not impair the efficiency of the engine. It is advisable to run the engine with the aircraft nose into wind, not as a consideration for performance, but as a safeguard in the event of a wet start and subsequent fire. As the amount of current consumed during normal starting operations is considerably in excess of normal, and a battery which is not fully charged will fail to give the necessary r.p.m. for starting the engine, it is essential that the ground battery should be fully charged. The air-intake and the jet pipe blanking plates must be fitted whenever the engine is stationary, being replaced as soon as possible after any engine run and only removed at the last minute before starting (fig. 5).

GROUND HANDLING

TOWING (fig. 1)

2. In all cases of towing by tractor, the operation will be greatly simplified if an engineer is placed in the cockpit to operate the brakes. The aircraft may only be towed forward by tractor when the special towing equipment is used. The cable is attached by a shackle to the top of each main shock-absorber leg and then passes through the eyes and round the pulley on the nose wheel steering arm, Stores Ref. 26FC/9015. The maximum permissible angle for the steering arm is 20 deg. either side of the forward towing position. The aircraft may be man-handled in either direction, but rearward towing from the tail booms is prohibited.

AIRCRAFT SLINGING

3. The slinging arrangements are shown in fig. 3 which is self-explanatory.

CONTROL LOCKING

4. The gear for locking the control column and rudder pedals is stowed on the bulkhead to the left and rear of the pilot's seat. The method of fixing the locks is shown in detail in fig. 4. There is no provision for external control locking.

PREPARATION FOR FLIGHT

FUEL SYSTEM

Refuelling

9. The fuel system is described and illustrated in Sect. 8. Before filling any tank, ensure that both the high and low-pressure fuel cocks are OFF. A special spanner, Stores Ref. 26FC/9106, is used for unscrewing the filler caps. When refuelling, particular care should be taken to avoid spilling; the wing flaps should be *down* and an examination for fuel in the flap compartment should be made after each refuelling operation.

10. The filler cap for the fuselage tank is on the port side of the fuselage aft of the canopy fairing. The filler caps for the inner wing tanks are on the upper surface of each wing inboard of the tail boom front fairings; the three outer wing tanks are filled through a common filler neck outboard

UNDERCARRIAGE GROUND LOCKING

5. The method of fixing the undercarriage ground locking device is shown in fig. 5. Attention is also drawn to para. 24.

JACKING AND TRESTLING

6. The jacking and trestling arrangements are described in Chapter 3 of this Section.

COVERS AND BLANKING PLATES

7. The tail pipe and air intake blanking plates must be in position at all times when the engine is not running (*WARNING after para. 1*); if, for any reason, the stand and blanking plates are not available, substitutes should be improvised. The details of fixing the covers and blanking plates are shown in fig. 5. A canvas cover, which is provided for the canopy, is fastened by studs and tapes.

PICKETING

8. Picketing ropes should be secured to convenient points on both the main undercarriage and the nose wheel leg. Special attachment fittings are not provided. Additional ropes may be passed over the tail booms forward of the fins, care being taken to avoid damaging the light-alloy skin.

of the tail boom front fairing in each wing. The fuel tanks should be filled in the following order:—fuselage tank, port and starboard inner wing tanks and, finally, the port and starboard outer wing tanks. The wing drop tanks are filled through the filler on the front top surface of the tanks. Re-check the contents of the inner wing tanks after filling the outer wing tanks and ensure that the filler cap on the wing drop tanks makes an airtight joint.

Draining

Fuselage tank

11. To drain the fuselage tank, remove the base cover from the low-pressure fuel filter. The filter is situated in the main fuel feed line to the engine, just aft of the firewall. If necessary, the operation can be accelerated by switching ON the fuel booster pump.

Note . . .

The fuel pipes from the inner wing tanks, which incorporate self-sealing couplings, may be disconnected to prevent fuel draining from the wing tanks. The connections are accessible by removing the pipe fairing located on the wing lower surface at each root end. Unless it is specifically required that only the fuselage tank should be drained, it is recommended that the complete system be allowed to drain through this point as it will be quicker than disconnecting the fuel pipes from the wing tanks.

Wing tanks

12. Each set of wing tanks may be drained independently, by disconnecting the self-sealing pipe at the wing root and attaching a drain pipe with an adapter to lift the sealing valve. It is, however, recommended that either or both sets of wing tanks be drained together with the fuselage tank (*para. 11 Note*), so as to avoid disconnecting the fuel pipe connections at the wing root.

ATTACHMENT OF THE WING DROP TANKS (fig. 7)

13. A 100 gall. drop tank is suspended from each wing at rib No. 6. When attaching the drop tank to the wing, it is important that the tank is rigidly secured and that the fairing is a close fit to the contour of the wing. The procedure for fitting a new or replacement tank is as follows:—

- (1) Grease the bearing surface of the release hook and press the tank suspension bolt up into the release unit. This will lock the unit and secure the bolt.
- (2) Remove all rubbers from the edges of the tank fairing, but ensure that the hard rubber packing is in position around the location spigot on the front support casting.
- (3) Offer up the tank to the wing and place the washer and Aerotight nut on the suspension bolt. Tighten the nut to a torque loading of 400 to 500 lb. in. to ensure that the tank is secure to the wing.

Note . . .

The tank should not show any movement when an average man exerts his weight on the tail of the tank.

- (4) Check that the tank is bearing on the wing over the whole area of the front support casting and on the bearing surface of the rear spigot.
- (5) Check the clearance between the tank fairing and the wing over the area which is covered by the hard rubber. This area is defined in operation (7). The clearance should be 0.03 to 0.18 in.
- (6) The correct clearance can be obtained by releasing the tank from the wing and adjusting the rear spigot as illustrated.
- (7) Select the required number of $\frac{1}{64}$ in. thick by 10 in. long hard rubber strips to fill the 0.03 to 0.18 in. gap between the tank fairing and the wing. The strips should be packed on both sides of the tank fairing so that the forward end of each strip is approximately $10\frac{3}{4}$ in. aft of the forward location spigot.
- (8) Check that the sponge rubber can now be fitted between the wing and the tank fairing over the areas not covered by hard rubber. The sponge rubber must not interfere with the fit of the tank to the wing.
- (9) Release the tank from the wing and affix the hard and sponge rubbers in position using Bostik "B." Ensure that no adhesive is left on the surface contacting the wing, and apply french chalk to all the rubbers before re-assembling the tank to the wing.
- (10) Re-assemble the tank to the wing as in operation (3) and at the same time make the hose connections in the fuel transfer and air pressure lines at the glass break tubes.

Note . . .

This operation will be made easier if a 2 B.A. bolt (about 7 in. long) with a suitable washer is screwed into the tapped end of the eye-bolt as illustrated. This will support the tank at a convenient distance from the under-surface of the wing to give access for the hose connections. When the tank has been finally secured to the wing remove the 2 B.A. bolt and washer.

Drop tanks release gear check

14. To ensure the correct setting of the slip release gear it is important that,

immediately prior to the assembling of the tanks, the following checks should be made:—

- (1) Check the operating lever in the cockpit for full and free movement.
- (2) Attach a suitable weight to the tank suspension bolt and press the bolt up into the release unit.
- (3) Check that the release unit is properly cocked by pressing a finger on the test plunger attached to the bottom of the release unit. The pin point of the indicator should be felt projecting through the plunger when the unit is cocked.
- (4) Check that the position of the spring-balanced lever, to the rear of the release unit, is in the same position relative to the wing spar on each wing. Adjust the release cable adjusters (if necessary) to obtain this condition and to take up all slack in the cables. After this adjustment, it is important that the linkage in the release unit can move freely.
- (5) Pull up the operating lever in the cockpit and check that both weights are released simultaneously.
- (6) Adjust the stop bolt on the operating-lever torque tube in the cockpit, so that the moment of release occurs when the distance between the bolt and the stop is approximately $\frac{3}{16}$ in.

OIL SYSTEM (fig. 6)

Replenishing the oil sump

15. The oil system is self-contained within the power unit, the supply is obtained from a small wet sump of $1\frac{1}{2}$ gall. capacity. The filler cap is accessible by opening the engine starboard upper cowling. The dipstick, which is accessible by opening the engine starboard lower cowling, must be removed before filling, to allow air to escape from the system. The oil should be poured in slowly until the indicated level on the dipstick is obtained; a few minutes should be allowed for the oil to settle before reading the dipstick.

Note . . .

It is important that the level of the dipstick is carefully observed when filling; an over-filled sump would result in the accessory gears running submerged, causing leakage and possible damage.

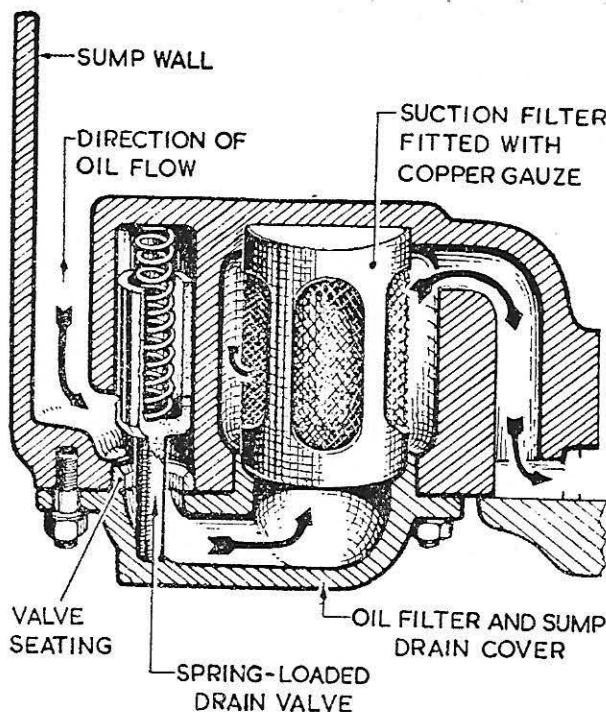


Fig. 1. Oil filter and sump drain

Draining

16. To drain the oil sump, remove the cast cover from beneath the suction filter element on the starboard side of the oil sump and withdraw the element; during this operation a small quantity of oil will escape. Depress the spring-loaded drain valve, adjacent to the filter element, and allow the oil to drain away. After cleaning and replacing the filter element, the mating surfaces of the cover and the sump must be cleaned and the joint re-made with the approved jointing compound.

Hydraulic system

17. The hydraulic reservoir is situated immediately under the cockpit canopy to the rear of the pilot's seat. Before filling, the canopy must be wound fully back, and the filler cap must be removed, using the special spanner, Stores Ref. 26FC/9106. The reservoir, which has a capacity of one gallon, should be filled to the level indicated on the window at the forward end of the reservoir, when the accumulator pressure is released. Care should be taken to avoid spilling any fluid.

18. A gauge coupling, for testing the initial air pressure in the hydraulic accumulator, is mounted on the rear face of bulkhead No. 2 at the bottom left-hand side. The initial air pressure in the accumulator should be 1,250 lb./sq. in.

PNEUMATIC SYSTEM

19. The air bottle may be filled from an outside supply through the charging block on the pneumatic panel at the rear of bulkhead No. 2 (*Chap. 3*). The pressure in the bottle is recorded by the centre indicator on the brake pressure gauge in the cockpit. The oil-and-water trap, adjacent to the charging connection, should be drained on daily servicing. For further information on the pneumatic system refer to Sect. 9.

OXYGEN SYSTEM (fig. 8)

20. The two interconnected oxygen bottles are charged through a filter and charging point, which is integral with a shut-off valve, located on the forward face of bulkhead No. 3. The supply from the bottles passes through a filter at bulkhead No. 2, and thence, by a pipe clipped under the canopy rail, to the oxygen control cock and pressure regulator on the right-hand instrument panel. From the regulator, a pipe is led back under the canopy rail to the oxygen economiser located in a horizontal position on bulkhead No. 2, to the right of the pilot's seat. Access to the charging point is gained through the starboard ammunition door.

DE-ICING SYSTEM (fig. 8)

21. The de-icing system is controlled by a regulator and a hand-operated pump. A three pint reservoir is housed in the nose

of the fuselage, and access for filling is gained by removing the nose top fairing. The reservoir is vented to atmosphere by a pipe leading to the bottom of No. 1 bulkhead. The regulator, situated adjacent to the pump, controls the delivery of fluid from the pump to the de-icing spray mounted at the base of the windscreen.

A.S.I. SYSTEM

22. The A.S.I. system is illustrated in fig. 9, which is self-explanatory. Access to the port boom drain traps is obtained by removing the hand-hole cover adjacent to the port wing to boom joint and, to the fuselage drain traps through the holes in the bottom of bulkhead No. 2; in the latter case, the drain plugs are situated above the pneumatic air bottle. The pressure head is electrically heated and controlled by an ON-OFF switch on the pilot's electrical panel.

CAMERA INSTALLATION

23. The installation details of the G.45 ciné camera are described in Sect. 12.

WHEEL DOORS

24. As the wheel doors of the main undercarriage are spring-loaded in both the up and down positions, it is *very important* to ensure that they are left in the down position after carrying out any work on the undercarriage or wheel doors.

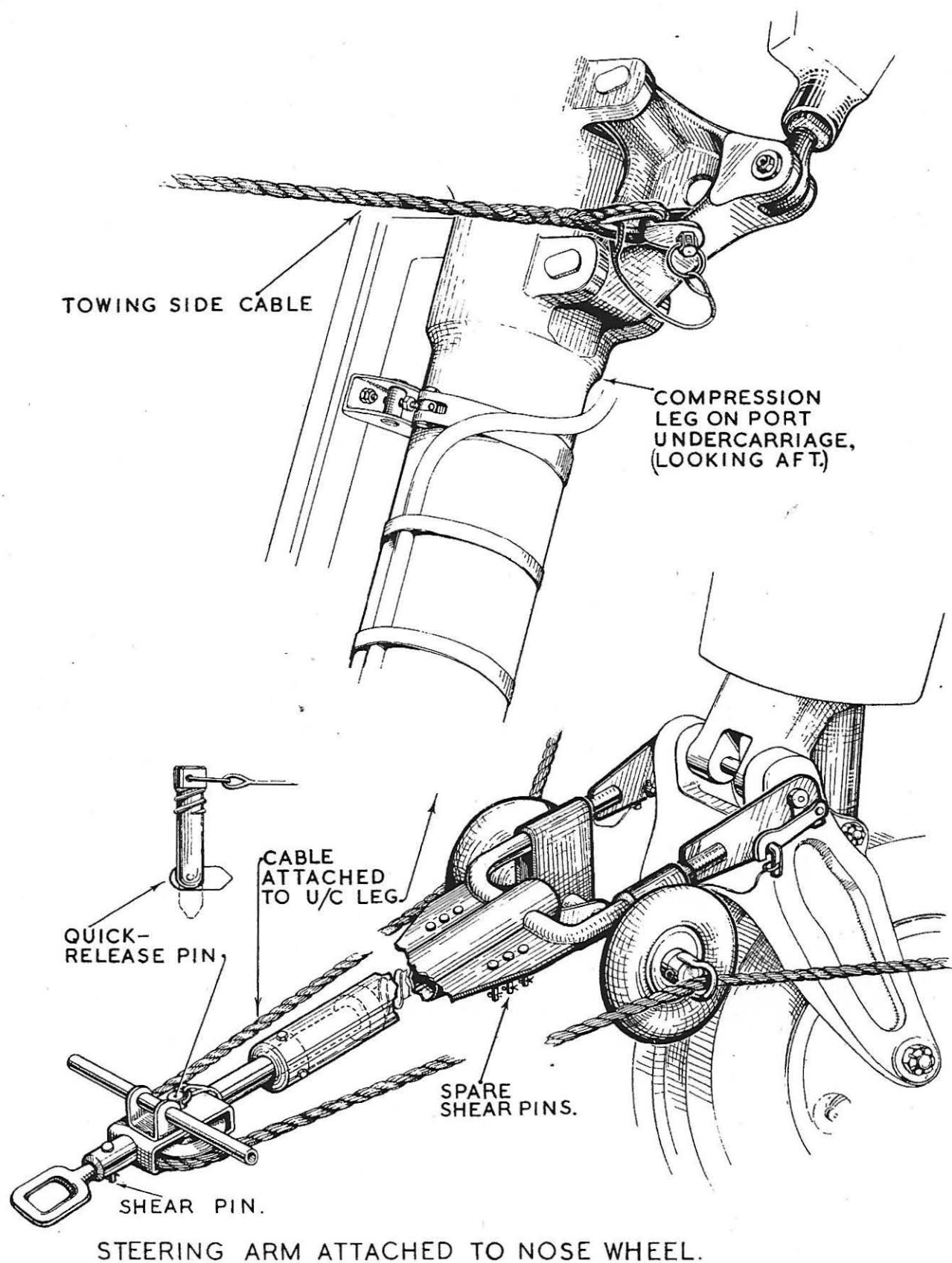
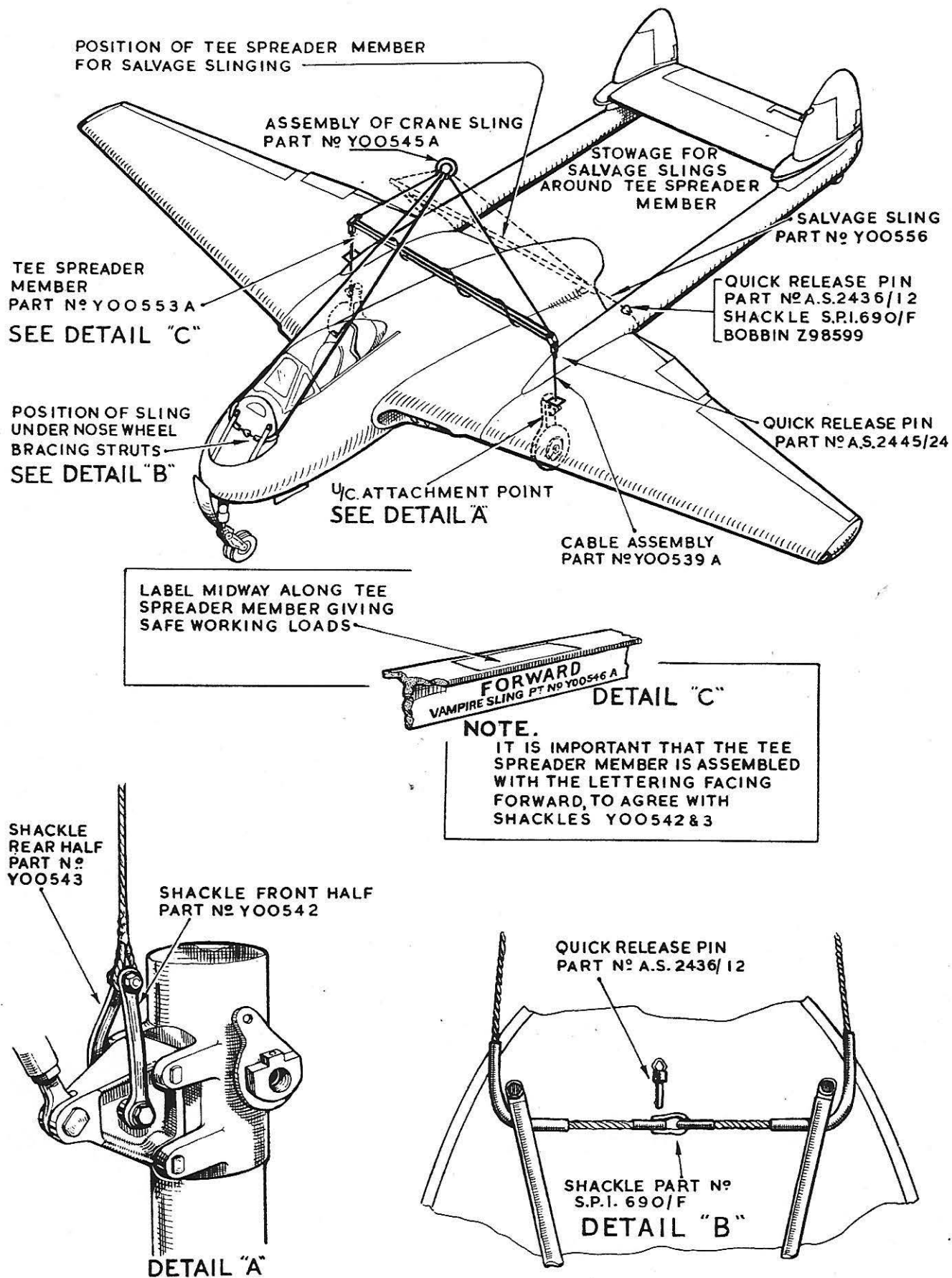


FIG. 2 TOWING



AIRCRAFT SLING COMPLETE 26FC/1075

FIG. 3 AIRCRAFT SLINGING

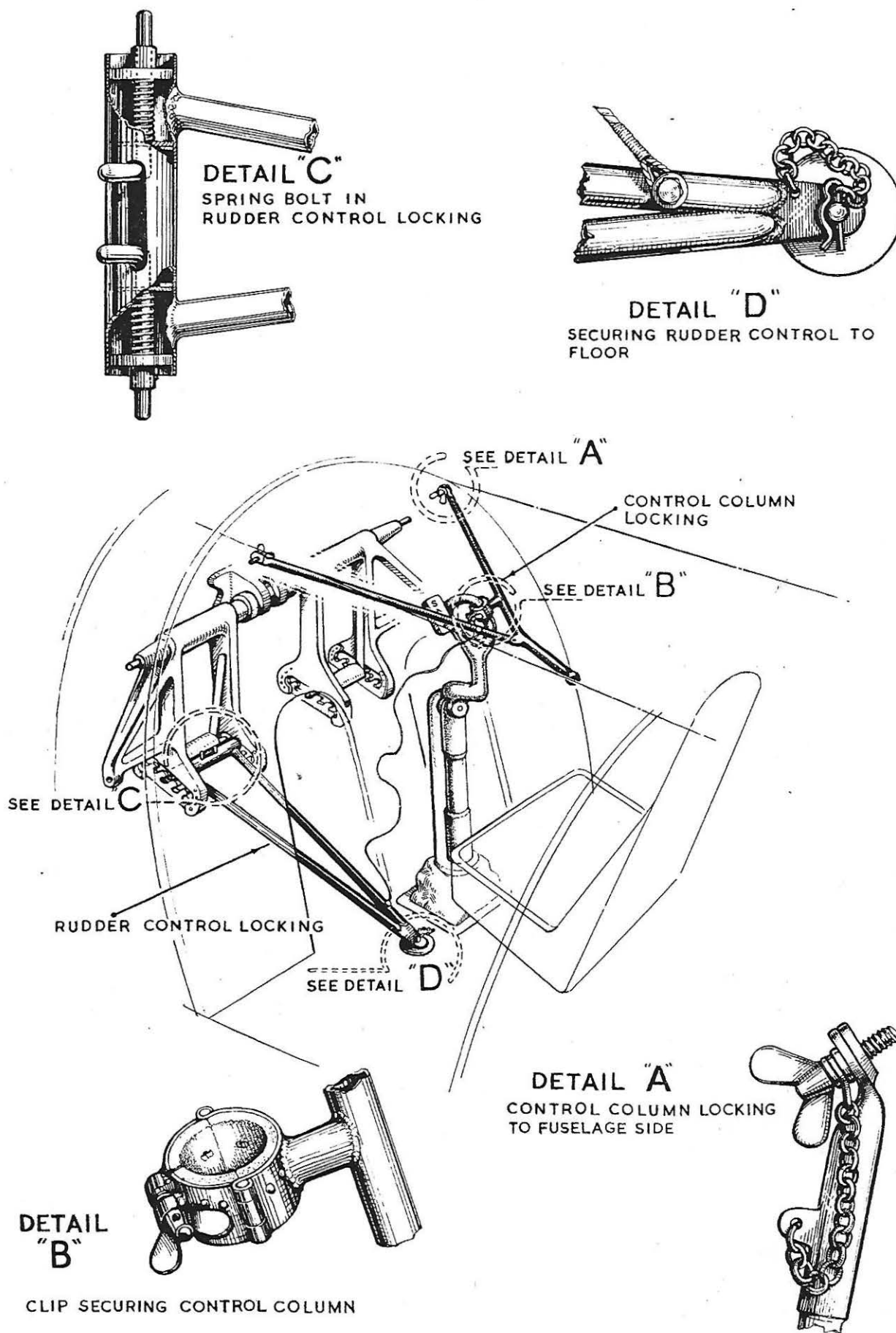


FIG. 4 COCKPIT CONTROL LOCKS

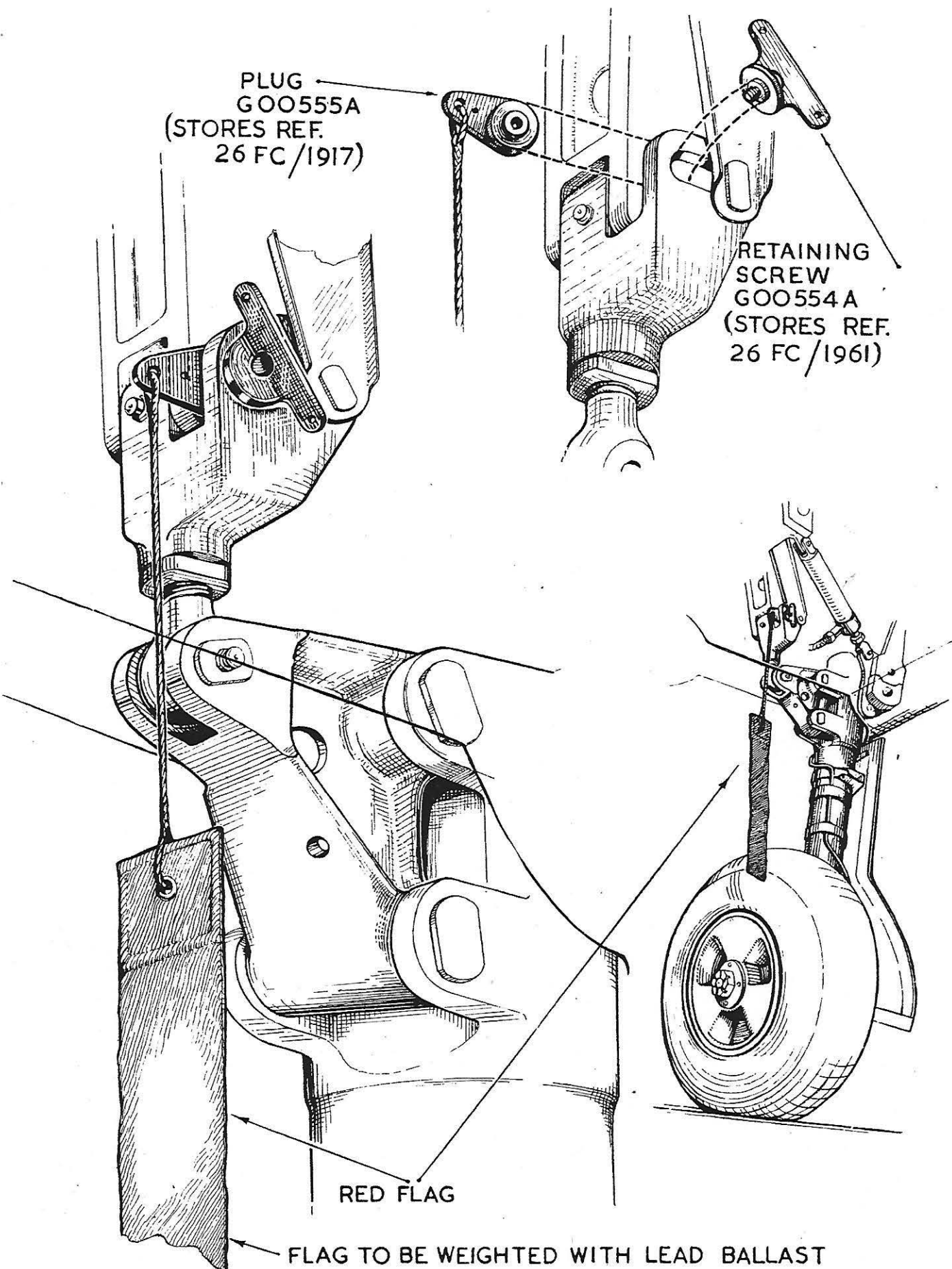
PLUG
GOO555A
(STORES REF.
26 FC /1917)

RETAINING
SCREW
GOO554A
(STORES REF.
26 FC /1961)

RED FLAG

FLAG TO BE WEIGHTED WITH LEAD BALLAST

FIG. 5 UNDERCARRIAGE GROUND LOCKING



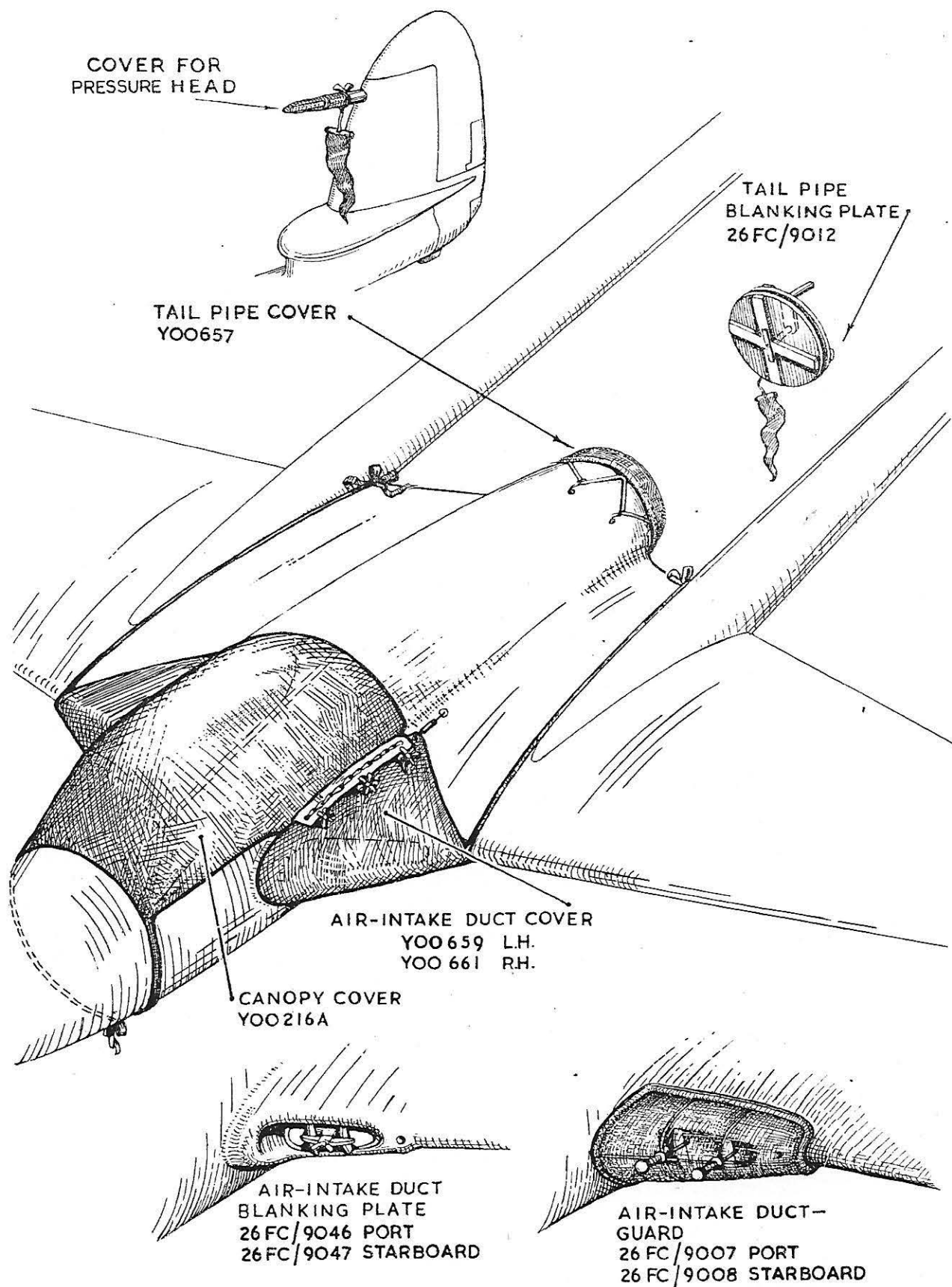
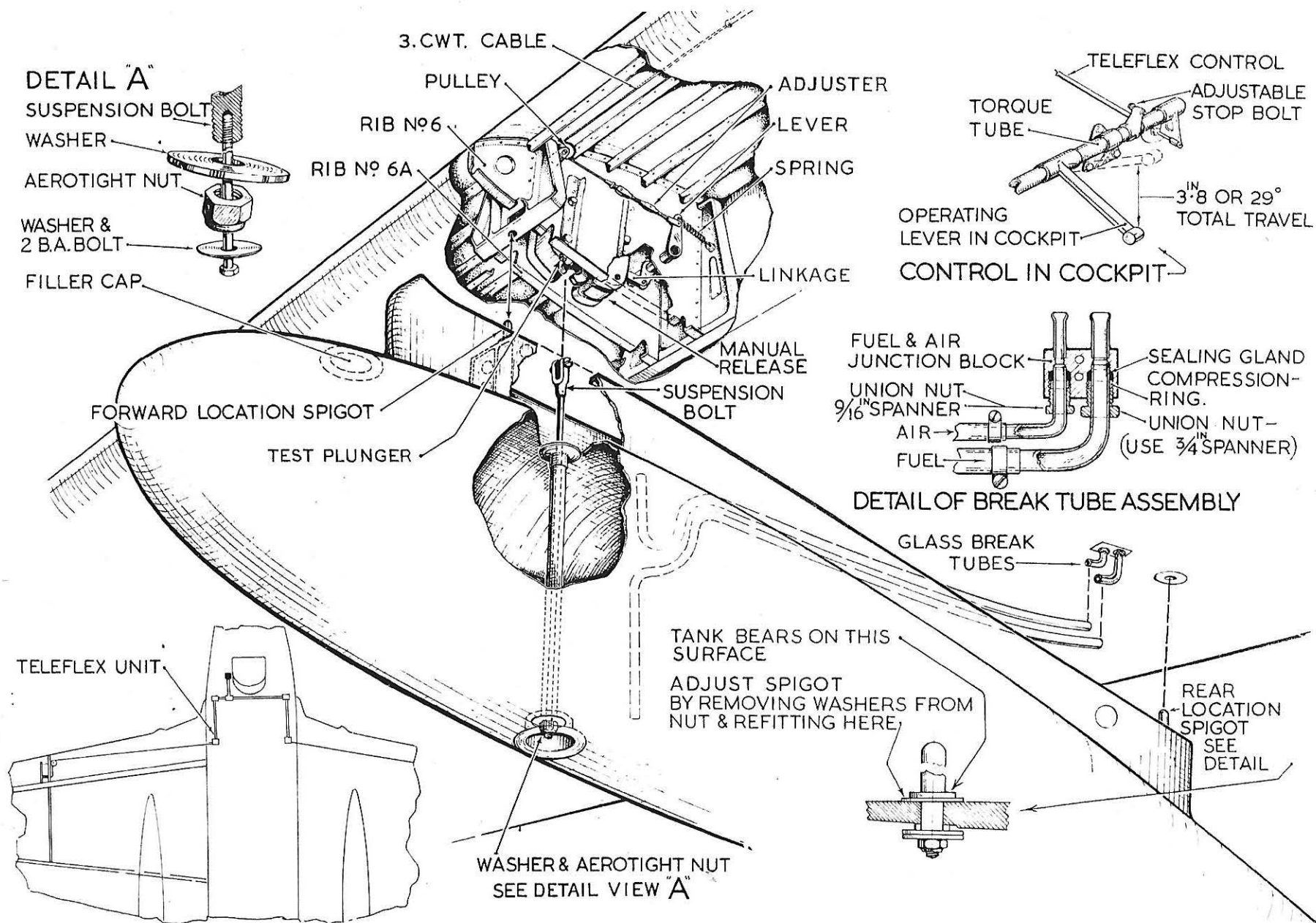


FIG. 6 COVERS AND BLANKING PLATES

FIG. 7 DROP TANK ATTACHMENT



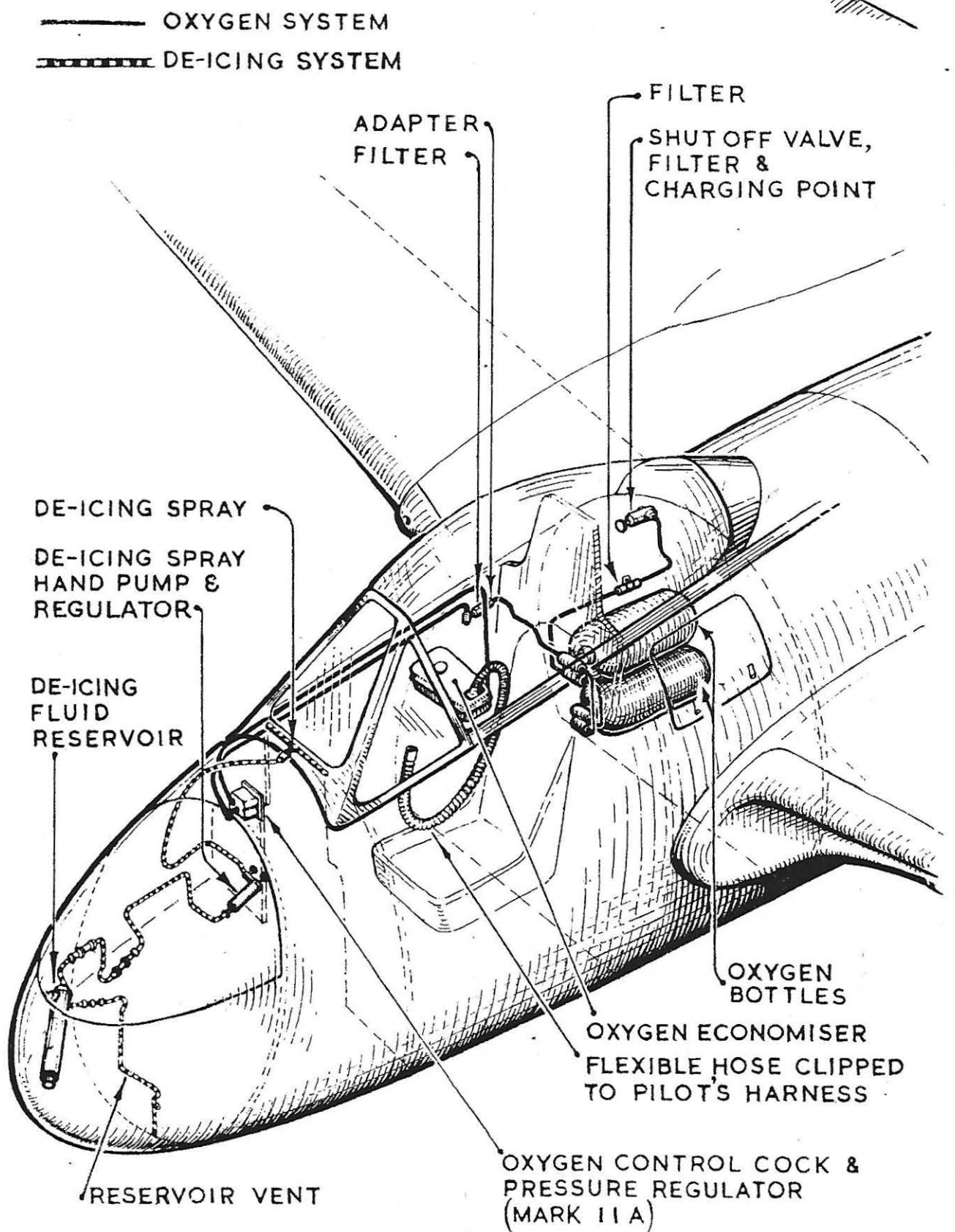


FIG. 8 OXYGEN AND DE-ICING SYSTEMS

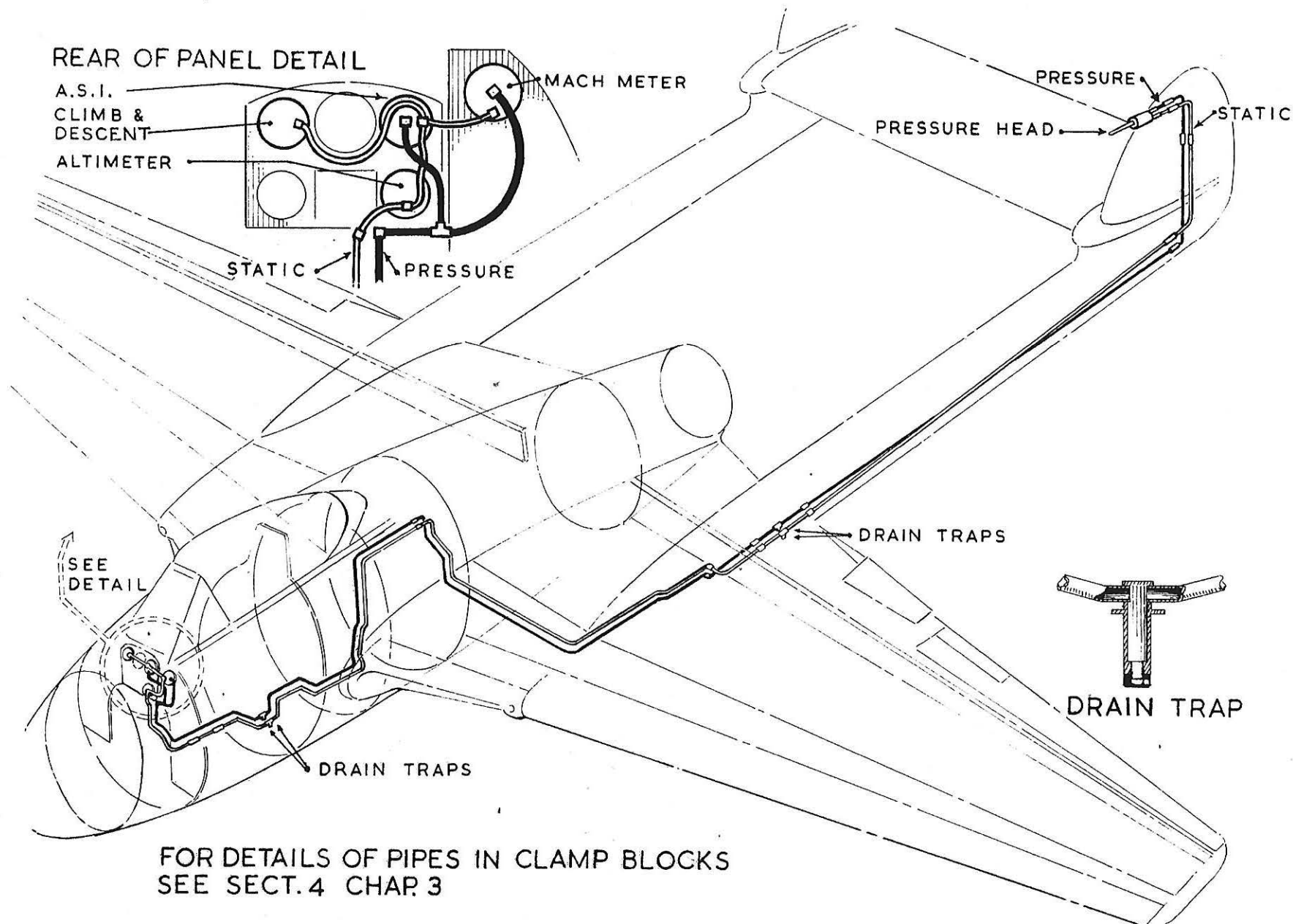


FIG. 9 ASI PIPE RUN

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