

SECTION 5

REMOVAL, ASSEMBLY AND DISMANTLING OPERATIONS

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INTRODUCTION

1. This Section deals with the removal, assembly and dismantling operations of the principal components of the aircraft. In the majority of cases only the removal operations are described as the assembly will be mainly the reversal of this procedure. Where this is not the case, the fact is noted either in the text or on the illustration. The recommended sequence of operations is given, although, in some cases, it will be clear that it is not essential to adhere rigidly to the order given.

2. The access panels and the jacking and trestling arrangements are shown in Sect. 4, Chap. 3. A list of special ground equipment and tools will also be found in Sect. 4, Chap. 3, and in the Vol. 3, Part 1 of this publication.

ASSEMBLY OF FUEL TANKS

3. The fuel tanks, particularly the flexible wing tanks, are a close fit in their respective bays. When installing the tanks, therefore, it is important to examine the interior of the bays for any sharp edges or other

projections likely to cause damage to the tank coverings. If all the wing tanks are to be installed, it is recommended that No. 1 tank be fitted first and the remainder in numbered sequence.

HYDRAULIC JACKS

4. Before attempting to remove a jack, refer to Sect. 4, Chap. 3, and release the pressure from the hydraulic accumulator. Disconnect the "down" line when the selector lever is in the DOWN position and vice versa. Drain the fluid from the pipe lines into a clean container and fit blanking plugs to the hose ends. The removal procedure for the various jacks is dealt with in the illustration of the particular component to which they relate.

HYDRAULIC RESERVOIR

5. Access for the removal of the reservoir is gained by jettisoning the canopy (fig. 7). The procedure for draining and subsequent removal of the reservoir is as follows:—

- (1) Release the pressure from the hydraulic accumulator.

- (2) Drain the main and hand pump compartments of the reservoir. The main compartment is drained, by attaching the suction line of a test rig to the outboard ground test coupling on the firewall, and directing the flow from the pressure side of the test rig into a clean container.
- (3) The hand pump compartment is drained, by disconnecting the hand pump pressure line in the gun bay. Operate the hand pump and direct the fluid into a clean container.
- (4) Disconnect the four pipe unions from the reservoir and seal the open ends.
- (5) Disconnect the reservoir straps and remove the component.
- (6) Re-connect the hand pump pressure line in the gun-bay and refit the blanking plug to the ground test coupling on the firewall.

PACKING PRINCIPAL COMPONENTS

6. The minimum packing dimensions for the various major components of the

aircraft will be found in fig. 18. Approximate weights of components, given for ground handling purposes only, are as follows :—

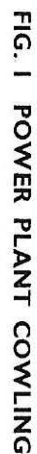
<i>Item</i>	<i>Weight (lb.)</i>
Fuselage, bare structure, including fixed armour plate	792
Fuselage, with all equipment, dry	2,338
Engine cowling	137
Power plant, including all equipment aft of firewall	1,807
Fuselage fuel tank	102
Main wheel unit, including radius rod, wheel and tyre	209
Nose wheel unit, including radius rod, wheel and tyre	100
Main plane, with tanks, dry	1,168
Tail boom and fin	145
Canopy	48

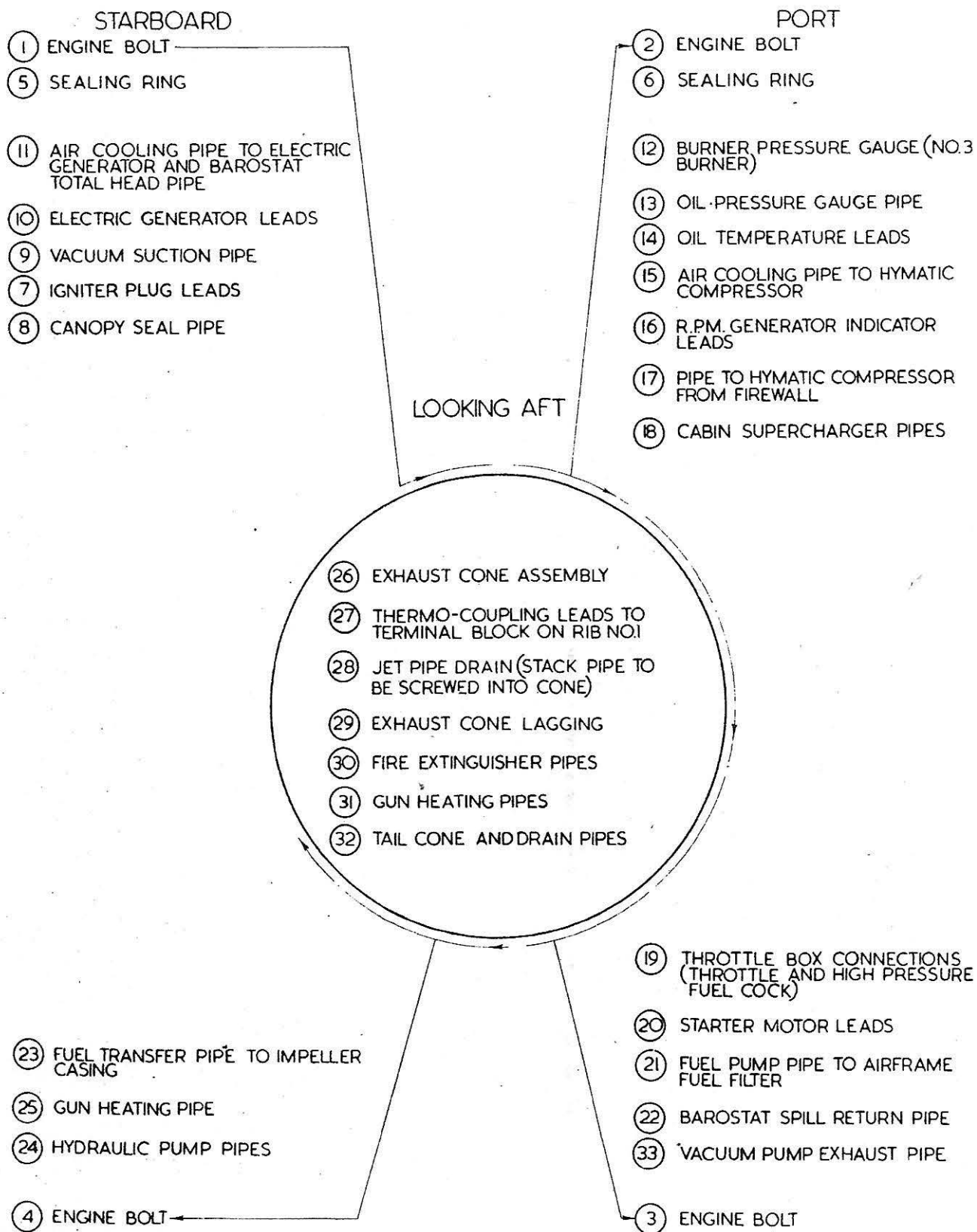
POWER PLANT COWLING REMOVAL (FIG. 1)

1. Remove the cover plates and release the toggle fasteners on the upper and lower-middle cowlings and remove the cowlings.
2. Disconnect the electric conduit at the plug and socket at rib No. 1.
3. Remove the rear cone fairing by unscrewing the four countersunk securing screws on the top and bottom sides of rib No. 1.
4. Open the upper and lower inspection doors and remove the doors complete with the centre-hinge extension, by unscrewing the two countersunk securing screws.
5. Remove the upper and lower cowl support rings if the power plant is to be removed.

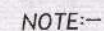
Note . . .

In order to obtain the correct tension on the toggle fasteners when assembling the cowlings, each fixing hook must be adjusted on its rod so that it is just possible to disengage the hook from its link by pulling the toggle lever with the finger. The hook must then be screwed on to the rod one complete turn and locked. It should now only be possible to disengage the hook by applying slight leverage behind the toggle-lever, using an 8 in. screwdriver. The use of anything but hand force to relock the fasteners is prohibited. When all the fasteners of an individual panel have been adjusted, check the tension of each fastener independently, with the remaining fasteners closed.





KEY TO FIG. 2



1. FOR THE APPLICATION OF THE POWER PLANT SLING REFER TO FIG. 3.
2. FOR THE SEQUENCE OF ASSEMBLY AND REMOVAL OPERATIONS REFER TO A.P.4174A, VOL. I.
3. WHEN USING A MOBILE CRANE IT IS ADVISABLE TO STATION IT CLOSE TO THE BOOM AND IN THE SAME FORE-AND-AFT DIRECTION AS THE AIRCRAFT.

FIG. 2 POWER PLANT BREAK POINTS

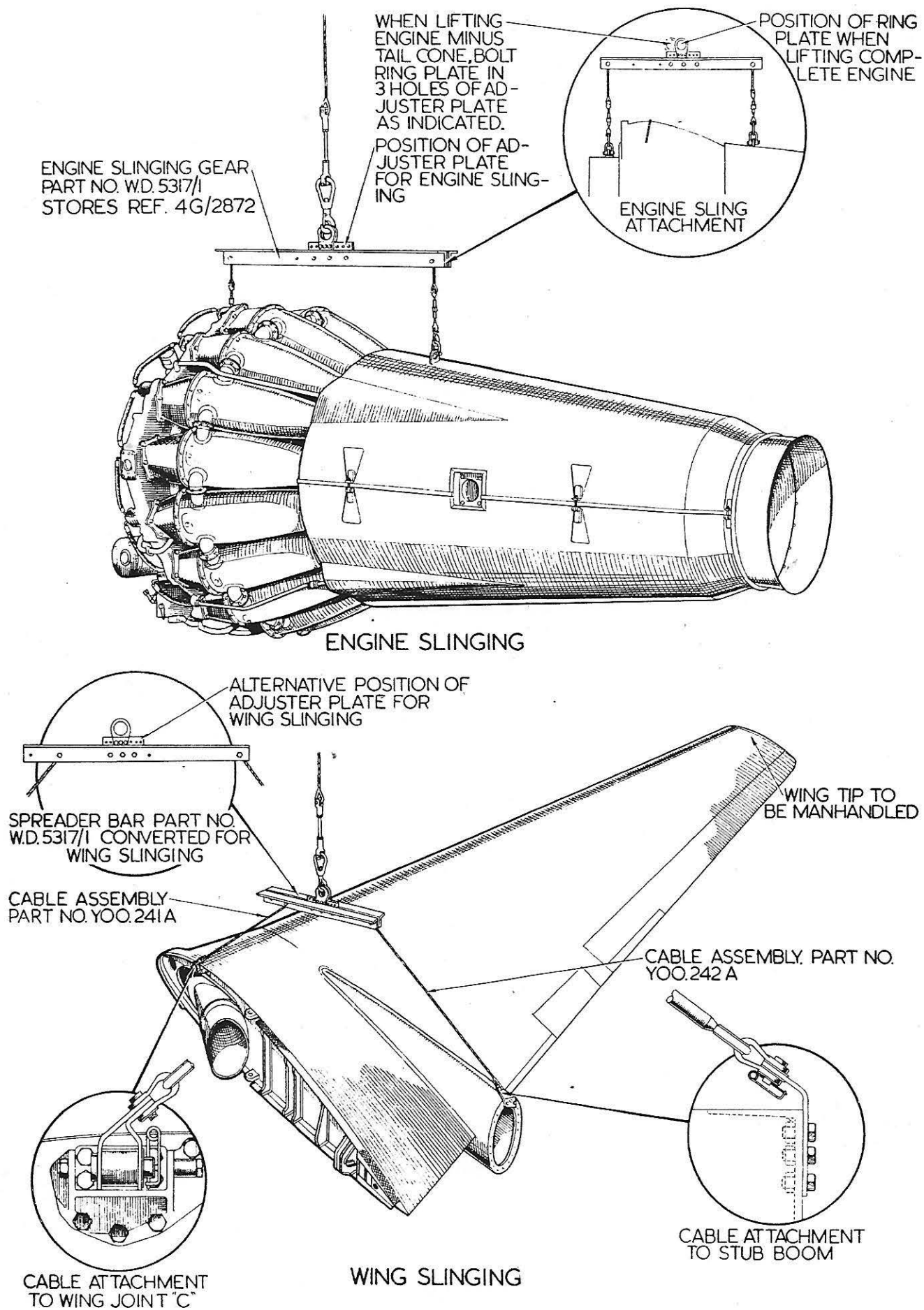


FIG. 3 POWER PLANT AND WING SLING

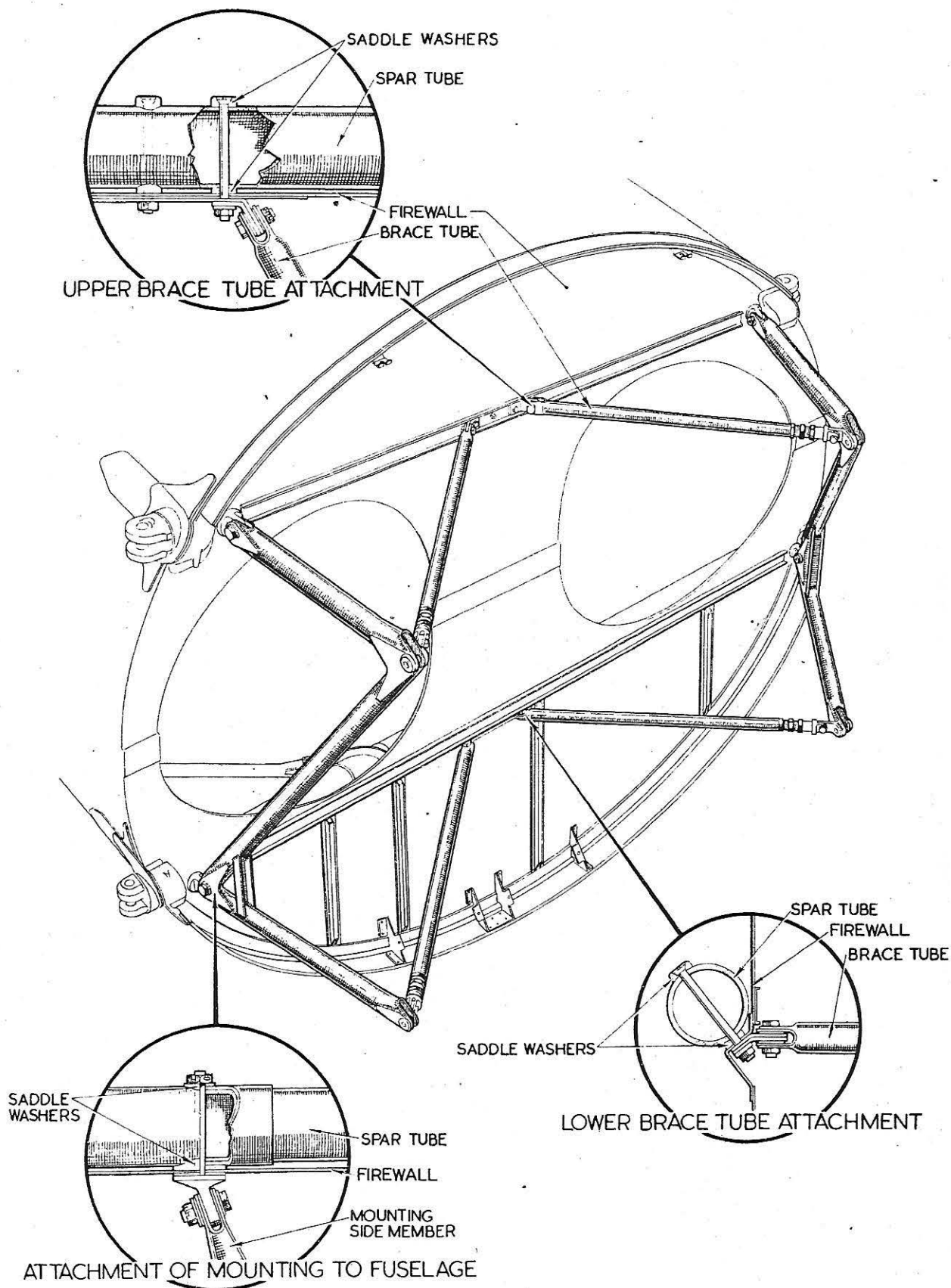


FIG. 4 ENGINE MOUNTING

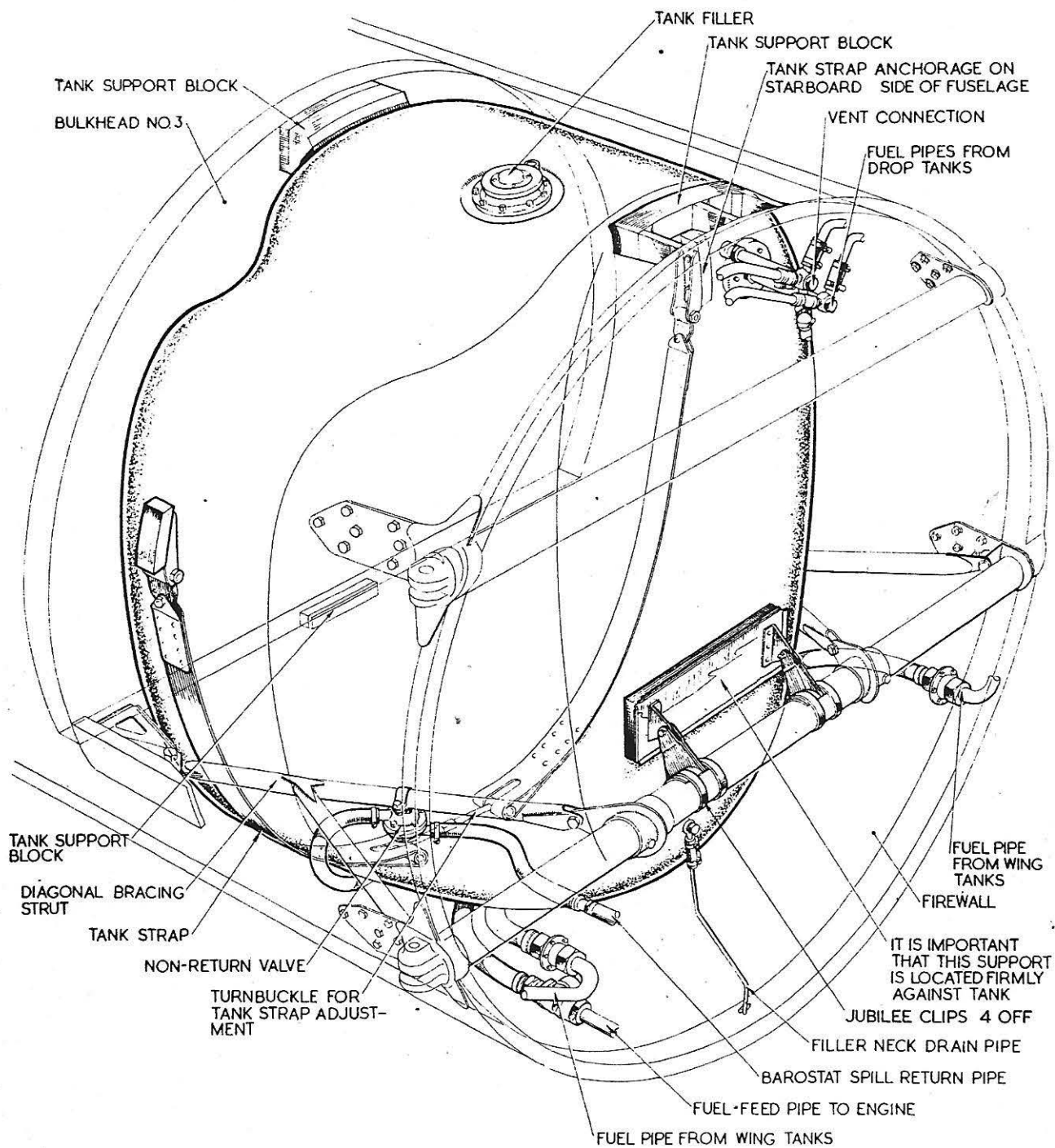


FIG. 5 FUSELAGE TANK

FUSELAGE TANK REMOVAL (FIG. 5)

1. Jack the aircraft clear of the ground as described in Sect. 4. Chap. 3.
2. Remove the gun-bay doors and guns (*Sect. 12*).
3. Remove the accumulators (*Sect. 6*).
4. Drain the tank (*Sect. 4, Chap. 2*).
5. Remove the diagonal bracing struts at the base of the tank.
6. Remove the gun-heater tube on the starboard side of the fuselage.
7. Disconnect the electrical leads to the fuel gauge tank unit on the lower starboard side of the tank, and the leads to the immersed fuel booster pump.
8. Disconnect the fuel feed pipe to the engine at the firewall, and the feed pipes from the wing tanks to the centre tank at the firewall, also the barostat spill return pipe from the non-return valve.
9. Disconnect the two vent pipes from the tee-piece adapter on the rear of the firewall, also the two drop tank fuel transfer pipes from the tee-piece adapter adjacent to the vent connections and unscrew the adapters from the tank.
10. Release the four Jubilee clips securing the rear support bracket to the lower cross shaft on bulkhead No. 4.
11. Release the trunnions from the turnbuckles on the tank straps and lower the tank vertically from the fuselage.

Note . . .

Refer to para. 3 of the main text before installing the tanks.

WING TANK REMOVAL (FIG. 6)

Note . . .

Before any wing tank can be removed, the respective wing fuel system must be drained (Sect. 4, Chap. 2), since all the tanks in each wing are interconnected and the tank panels afford the only support for the tanks. The procedure for the removal of the port and starboard wing tanks is similar. Refer to para. 3.

No. 1 tank

1. Ensure that the tank is empty ; remove the countersunk screws from the tank panel and remove the panel.
2. Remove the short rear bottom wing root fairing and the lower front engine cowling.
3. Disconnect the electric leads from the fuel gauge unit.
4. Support the tank and remove the hose connections from the two outboard tank adapters, the vent connection at the top inboard end of the tank, and the fuel feed connection at the self-sealing coupling.
5. Lower the tank from the wing.

No. 2 tank

1. Remove the countersunk screws securing the tank panel and remove the tank panel.

2. Remove the circular inspection plate in the lower wing surface, aft of the spar and outboard of rib No. 2, and disconnect the fuel pipe, Part No. P.001919, from the hose connection projecting through the spar web.
3. Disconnect the vent pipe and fuel transfer hose connection at the outboard end of the tank.
4. Lower the front end of the tank first, to allow the tank adapters to slide from the openings in the spar web.

No. 3 tank

1. Remove the panel in the rear of the wheel-well diaphragm near rib No. 5 and the vent connection cover-plate on the wing upper surface at rib No. 7.
2. Disconnect the rear fuel balance pipe from the tank adapter projecting through rib No. 5, access to which is through the diaphragm panel.
3. Disconnect the vent pipe hose at the top of the tank from the fixed vent pipe, and loosen the clip securing the vent hose to No. 4 tank. Access for this is through the cover-plate in the wing upper surface.

4. Remove the countersunk screws securing the tank panel and remove the panel. The tank panel supports both No. 3 and No. 4 tanks.
5. Disconnect the electric leads from the fuel gauge tank unit.
6. Disconnect the hoses from the two fuel balance adapters on No. 4 tank and loosen the hose connection to No. 2 tank.
7. Lower the tank and manipulate the fuel transfer adapter from the hose connection to No. 2 tank and the vent connection from the hose to No. 4 tank.

No. 4 tank

1. Remove the countersunk screws securing the tank panel and remove the tank panel. The panel supports both No. 3 and No. 4 tanks.
2. Remove the vent connection cover-plate on the upper wing surface at rib No. 7 and remove the vent connection hose.
3. Disconnect the two fuel balance adapters from the hoses to No. 3 tank and lower the tank.

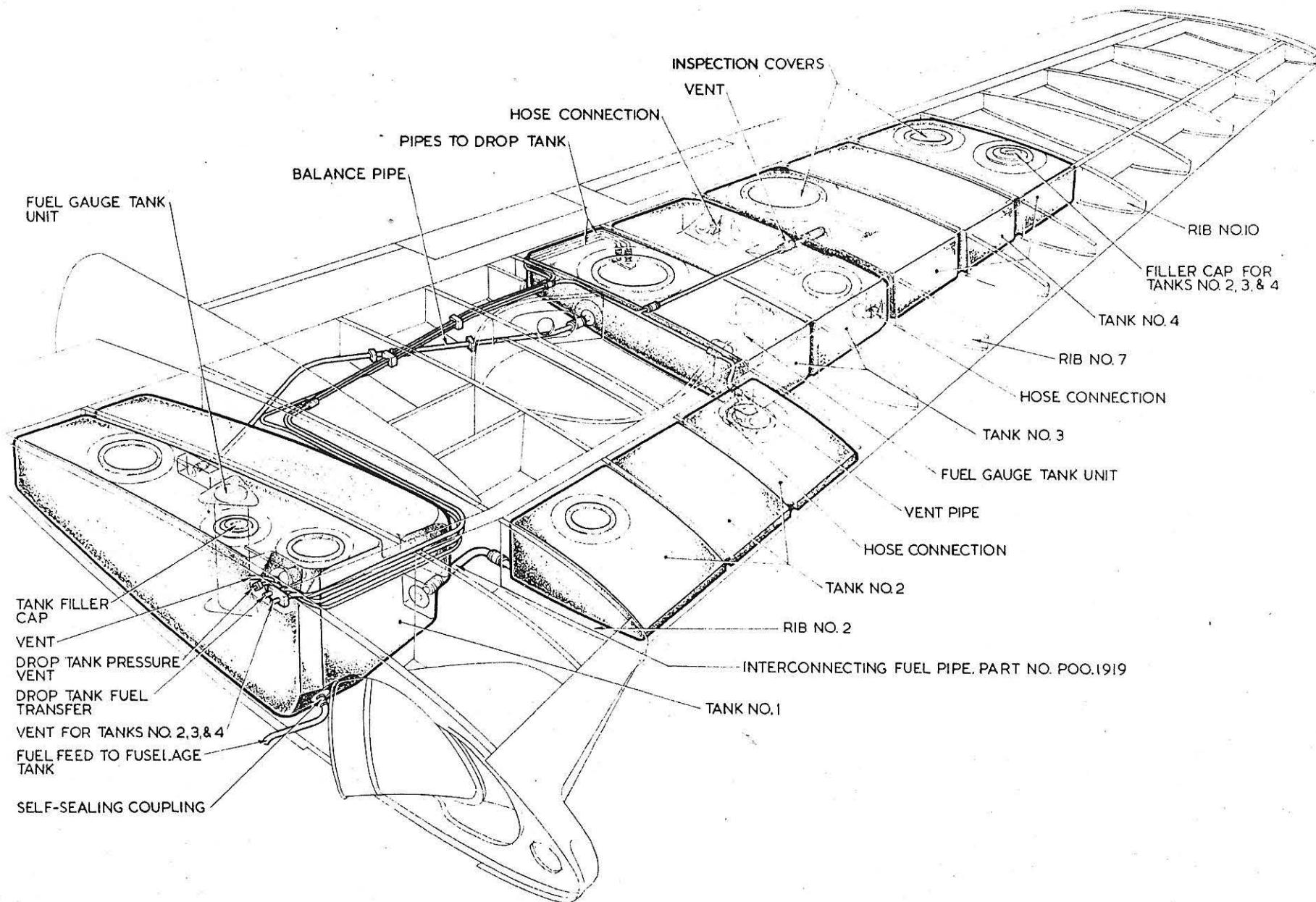


FIG. 6 WING TANKS

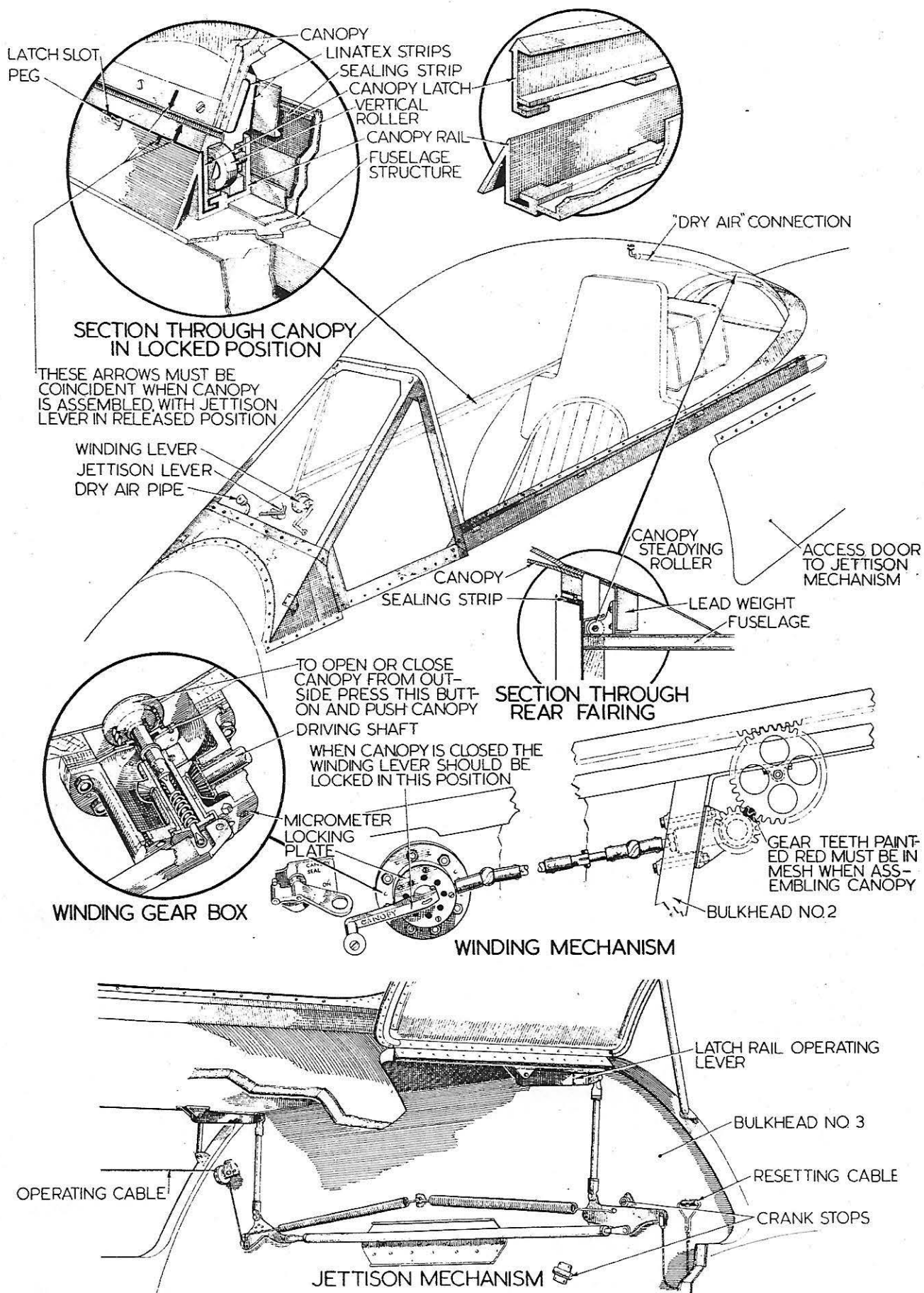


FIG. 7 CANOPY AND WINDSCREEN

CANOPY REMOVAL AND ASSEMBLY (FIG. 7)

Removal

1. Disconnect the "dry air" pipe from the sliding canopy and seal the pipe and the windscreen connection.
2. Open the canopy about $1\frac{1}{2}$ turns on the winding handle in the cockpit, pull the jettison lever and remove the canopy.

Note . . .

Two men should be employed to operate the jettison gear. One to pull the jettison lever in the cockpit and the other to maintain a counter pressure on the canopy-resetting cable. This damps the action of the jettison springs and so prevents possible damage to the jettison mechanism on the forward face of bulkhead No. 3.

Assembly

Note . . .

Before assembly, all burrs, etc., must be removed from the canopy rails and latches to ensure that the canopy will jettison under load. The latches, rails and rollers should be lubricated with anti-freezing grease.

1. Slide the canopy on to the latch and line up the two red arrows on the starboard side as indicated in fig. 7.
2. Set the pinion and idler gear so that the marked teeth are in mesh.
3. With the jettison lever in the released position, that is, with the latch pegs at the rear end of the rail slots, lower the canopy and latch on to the rail so that the red arrows and the red mark on the rail coincide.
4. Reset the canopy jettison mechanism by pulling the resetting cable on the port side of bulkhead No. 3. The arrow on the latch will move forward the length of the slot movement. The latch pegs should now be at the forward ends of the rail slots.
5. Wind the canopy to the fully closed position and ensure that the winding handle is approximately in the position indicated in fig. 7, so that when opening the canopy from inside, the initial movement of the handle will partially turn OFF the canopy seal cock lever (Sect. 1).
6. The micrometer locking plate for the winding handle should be adjusted so that the handle requires a moderate force in order to engage in the plate when the canopy is closed. Any setting on the lock plate can be obtained by removing the five fixing screws and rotating the plate as required.
7. Connect the "dry air" flexible pipe to the canopy.

WINDSCREEN REMOVAL

1. Remove the canopy and the gyro gun sight and mounting.
2. Disconnect the "dry air" pipe from the centre panel of the windscreen and seal the pipe end and windscreen connection.
3. Remove the top-centre instrument panel and the detachable plates on the corners of the windscreen fairing.
4. Remove the two 2 B.A. bolts which are made accessible by removing the detachable plates.
5. Remove the countersunk screws from the front and side screen glazing panels.
6. Remove the five 4 B.A. bolts, port and starboard, from the gusset plate at the junction of the seal bracket and the canopy rail.
7. Remove the windscreen assembly.

AILERON REMOVAL AND ASSEMBLY (FIG. 8)

Removal

1. Remove the small elliptical access panels above and below the centre and outboard hinges, also the inspection plates from each side of the inboard hinge on the lower surface.
2. Remove the tab connecting rod from the adjustable quadrant.
3. Remove the bolt from the connecting link at the inner hinge lever casting.
4. Remove the inboard horizontal hinge bolt.
5. Support the aileron and remove the centre and outboard vertical hinge bolts.

Assembly

Do not use force to line up the hinge brackets. Shims, up to a total thickness of $\frac{1}{8}$ in., should be used between the rear spar and the hinge castings to give correct alignment.

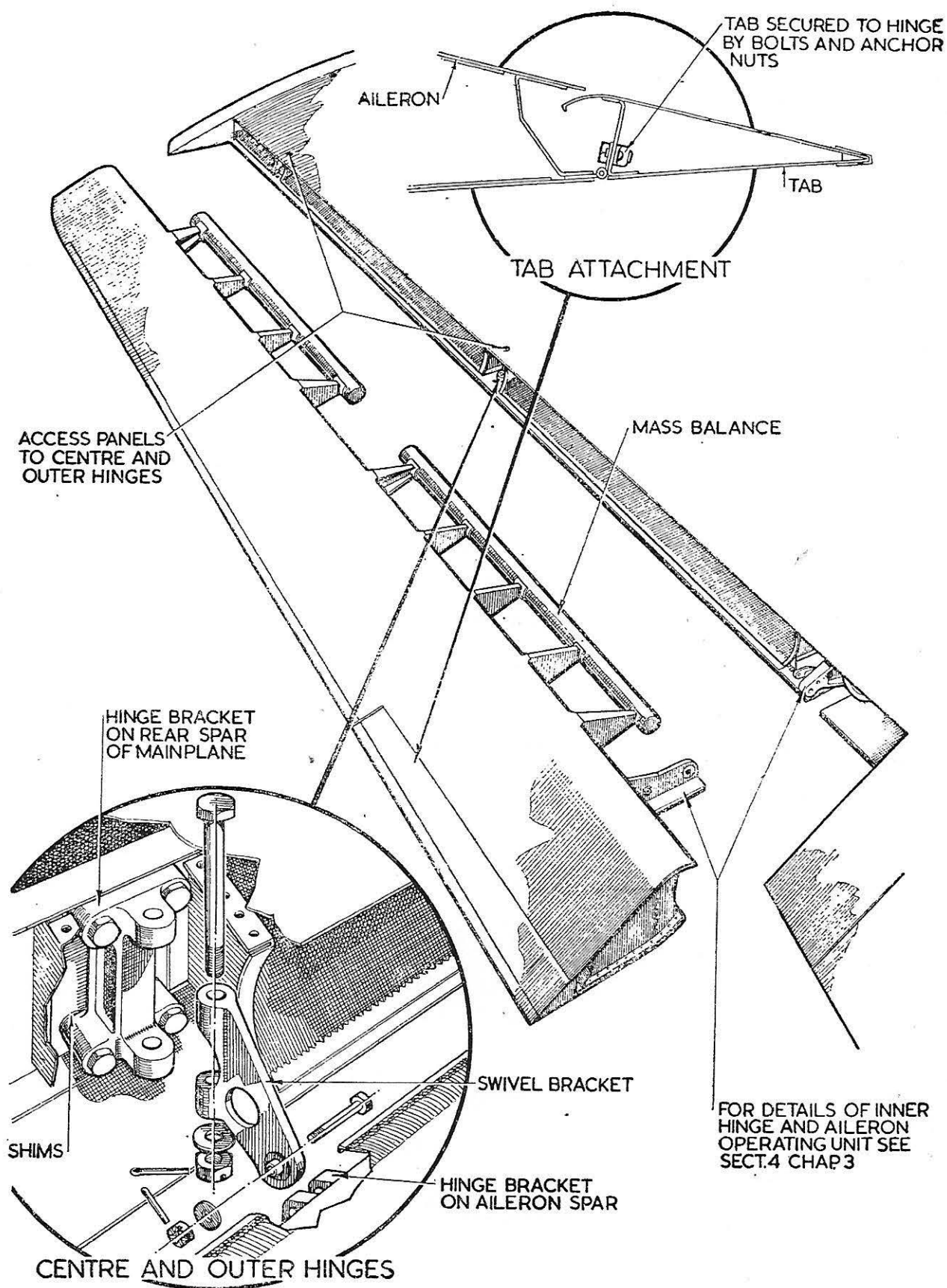
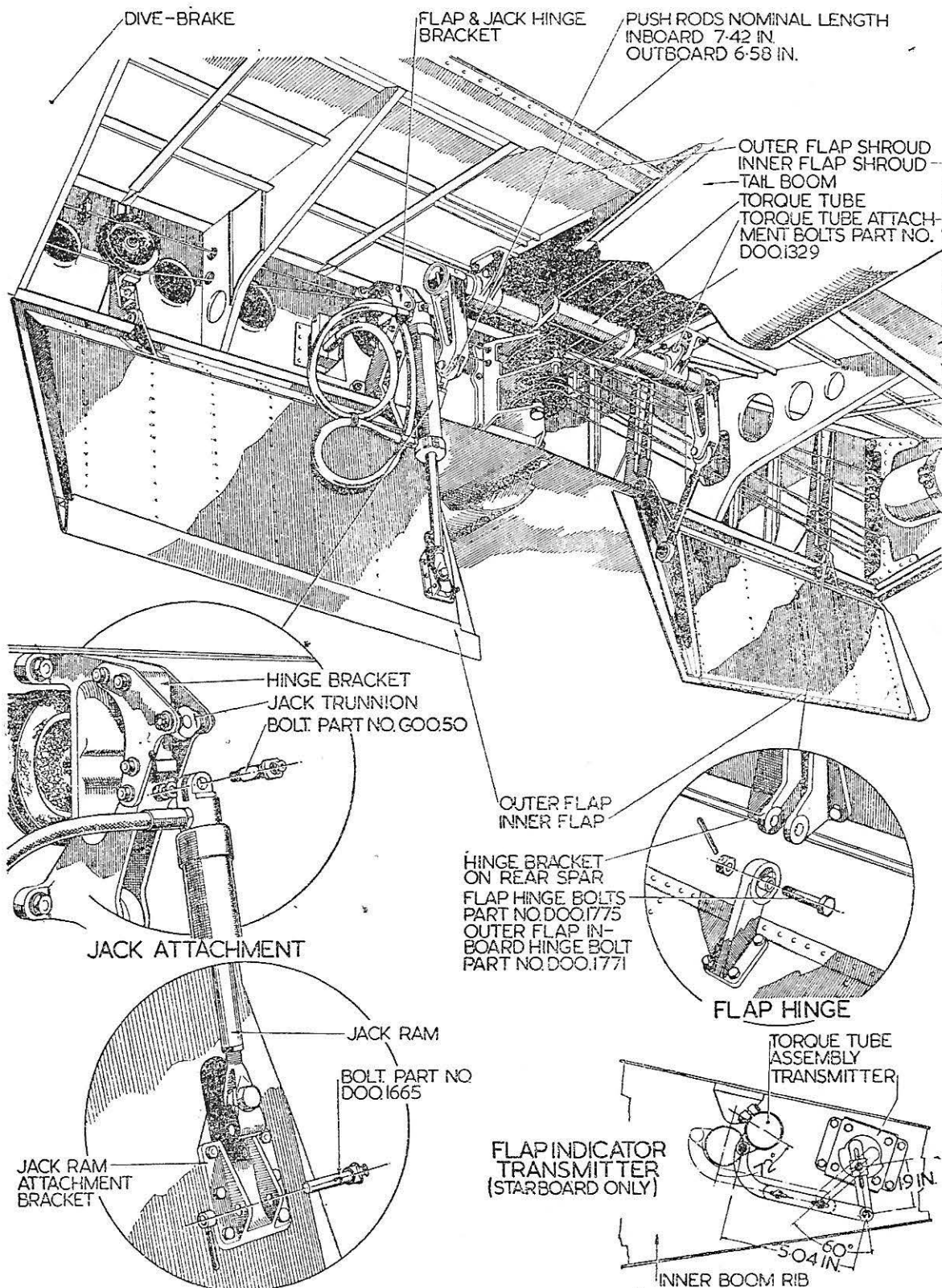


FIG. 8. AILERON



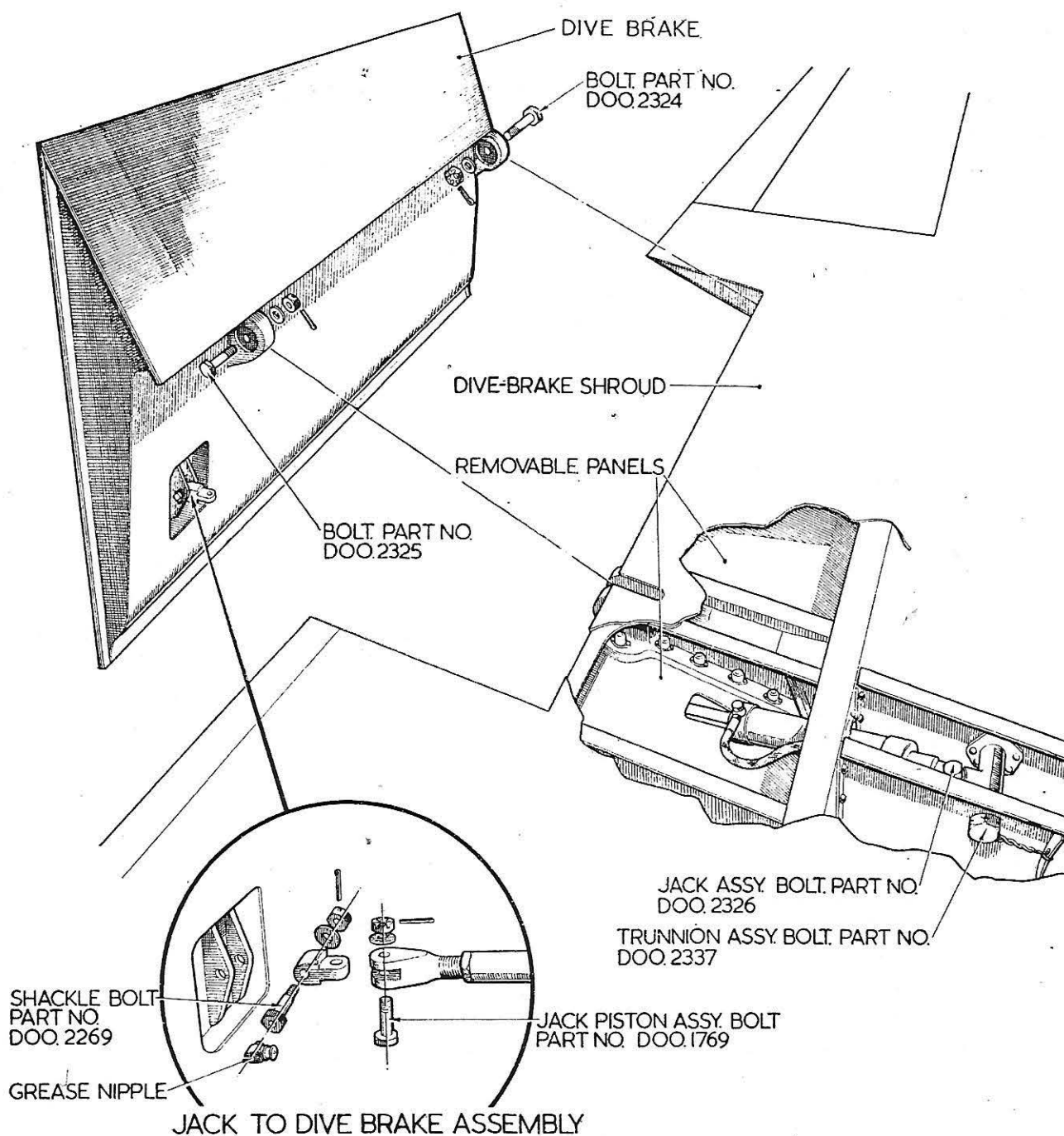
1. Extend the flap jack, and release the hydraulic pressure.
2. Disconnect the jack piston tube from the casting on the outer flap by removing special bolt, Part No. D.001665.
3. Disconnect the torque-tube push-rods from the inner and outer flaps.

4. Support each flap in turn and remove the hinge bolts.

Note...

On assembly the gap between the flap and dive brake must be within 0.05 in. and 0.15 in. Both components may be trimmed if necessary.

FIG. 9. SPLIT FLAP REMOVAL



1. Select DIVE BRAKES ON, depress the non-return valve and operate the hand pump.
2. Remove the 2 B.A. mushroom-headed screws securing the two panels to the underside of the dive-brake shroud, and remove the panels. This will give access to the hinge bolts.
3. Disconnect the jack-ram from the dive-brake shackle by removing the vertical bolt.
4. Support the dive brake and remove the two hinge bolts.

FIG. 10. DIVE BRAKE REMOVAL

WING TO FUSELAGE REMOVAL AND ASSEMBLY (FIG. 11)

Note . . .

Before proceeding with the removal of the wing attachment bolts it is very important to check that the trestling is correctly aligned. This is done by ensuring that it is possible to turn the bolts without using any undue force. It is recommended that the bolts be treated with penetrating oil about one hour before extraction.

Removal

1. Release the fluid pressure from the hydraulic accumulator and the air pressure from the pneumatic system.
2. Drain the wing tanks ; also drain and remove the wing drop tank if fitted.
3. Trestle the aircraft and remove the power plant (fig. 2), tail booms (fig. 12) and the cowl support rings from No. 1 ribs.
4. Disconnect the rudder, aileron and elevator controls from the fuselage control cables.
5. Disconnect the hydraulic and pneumatic pipes at rib No. 1.
6. Break the electrical connections to the Ground/Flight master switch and remove the switch and Teleflex control box from No. 1 rib (port wing).
7. Remove the air inlet pipe to the cabin blower air cleaner on rib No. 1 (port wing).
8. Disconnect the A.S.I. pipes at the junction on rib No. 1 (port wing).
9. Disconnect the flexible main-bonding strip on rib No. 1 below the coupling points for the hydraulic pipes.
10. Disconnect the vent pipes and fuel transfer pipes from the drop tank and the wing tanks at rib No. 1.

11. Disconnect plugs C.9 (port wing) or plugs C.10, C.11 (starboard wing) from junction box No. 2. The cables on the port wing for the fire extinguishers, flame switches and downward identification lamps must be disconnected from the terminal blocks on the port top strut of the engine mounting. The cables on the starboard wing for the thermo-couples and flame switches must be disconnected from the terminal block on the starboard top strut.
12. Disconnect the air-intake duct in the fuselage tank bay by releasing the large Jubilee clip. Turn back the rubber seal.
13. Disconnect the Teleflex cable from the drop tank jettison gear at the lever in the cockpit.
14. Check the wing attachment bolts for freedom as instructed, and remove bolts from joints A and B using spanner Part No. Y.00390 and bolt extractor Part No. Y.00175, and from joint C using extractor Part No. Y.0093. It is important that the operator should remain in the same position on the wing between checking the top bolt for freedom (joint A) and its removal.
15. Remove the wing by man-handling on trestles and attach sling as illustrated in fig. 3.

Assembly

The assembly of the wing is a reversal of the detail given above. Very accurate alignment of the bolt holes in joints A, B and C is essential and it is important that the bolts should be smeared with anti-freezing grease before assembly. Before offering the wing to the fuselage, thread the free end of the Teleflex cable from the drop tank release gear into the fuselage conduit as shown in fig. 11.

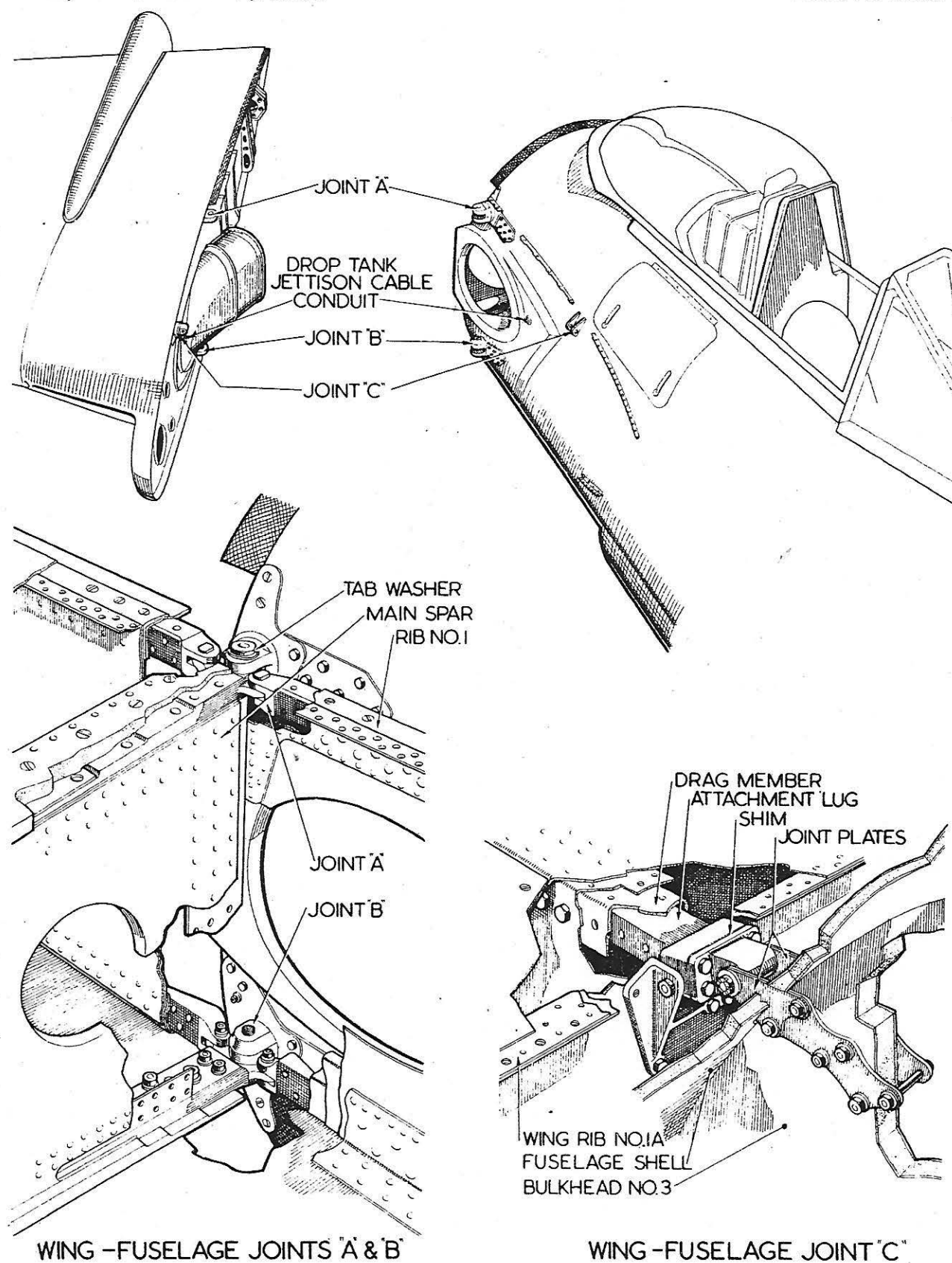
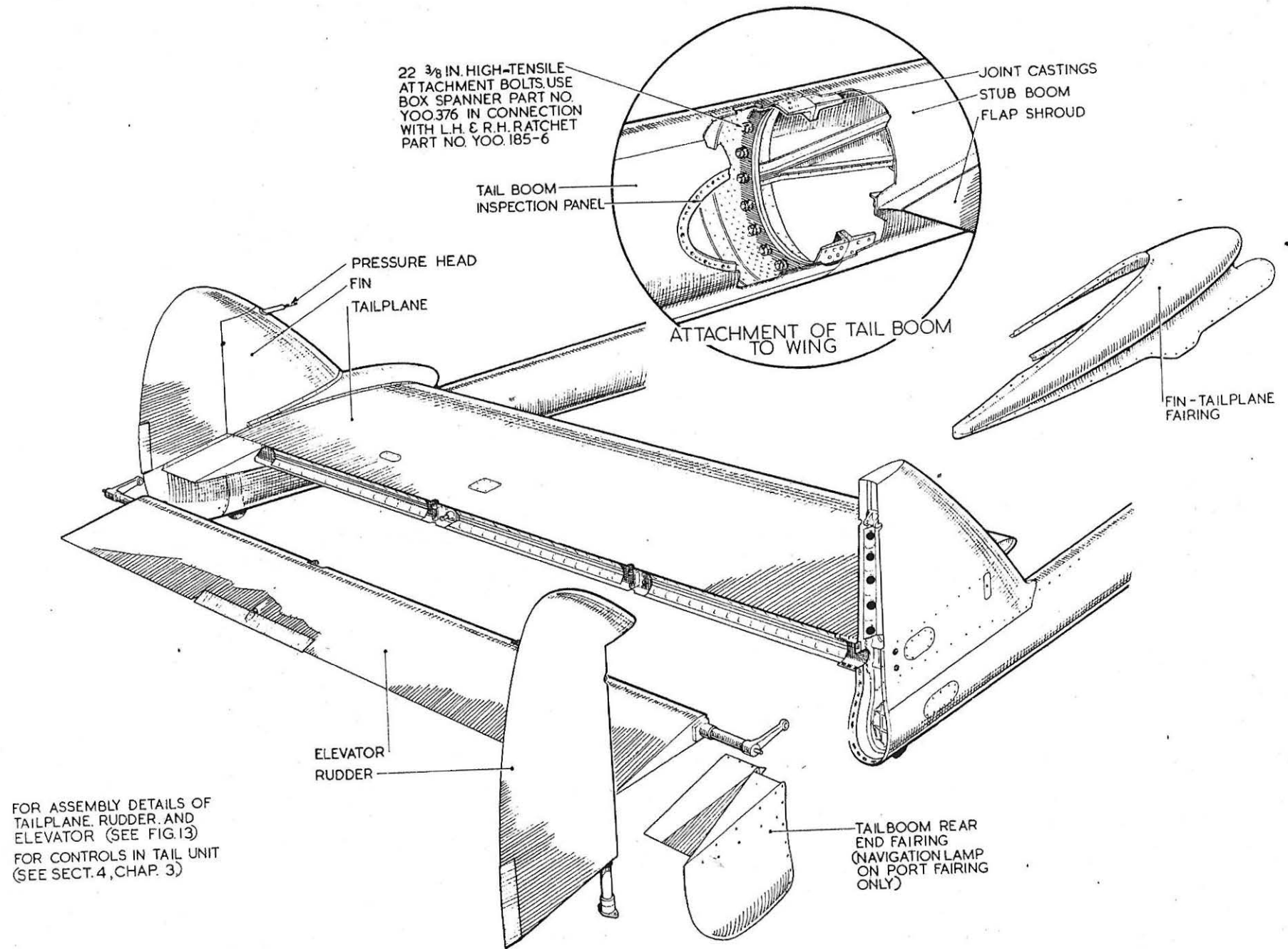


FIG. II WING TO FUSELAGE ATTACHMENT

FIG. 12 TAIL UNIT



TAIL UNIT REMOVAL (FIG. 12)

1. Remove the panels from the booms at the boom-to-wing joints.
2. Insert the rudder and elevator locking pins in the boom rear ends ; lock the control column and insert the locking pins in the pulley assemblies on each rear spar (*Sect. 4, Chap. 3*).
3. Disconnect the rudder and elevator control cables at the turnbuckles at the boom-to-wing joints.
4. Disconnect the elevator trim control cables at the turnbuckles in the port boom only.
5. Disconnect the A.S.I. pipes at the port wing-to-boom joint.
6. Disconnect the pressure head heater and navigation lamp cables at the terminal blocks near the port wing-to-boom joint.
7. Support the booms with trestles and remove the twenty-two special bolts securing each boom, to the boom extension on the wing.

Note . . .

When dismantling only one boom, it is important that the remaining parts of the aircraft should be adequately supported and weighted against spring.

REMOVAL OF RUDDERS, ELEVATOR AND TAIL PLANE (FIG. 13)

Rudders

Note . . .

The operations for the removal of the port and starboard rudders are similar in all respects.

1. Remove the fin/tail plane fairing and the boom rear-end fairing.
2. Remove the split pins, nuts and two special bolts securing the rudder post to the lower-hinge pedestal.
3. Support the rudder and remove the split pin, nut and horizontal bolt from the upper rudder hinge and remove the rudder.

Elevator

1. With the fin/tail plane fairing, boom rear-end fairing and the rudders removed, disconnect the elevator operating rod from the operating lever on the elevator (Sect. 4, Chap. 3).
2. Remove the inspection covers from the tail plane at the port centre elevator hinge and disconnect the elevator tab push rod.
3. Remove the split pins, nuts and bearing brackets from the outboard hinges on the fin joint assembly, port and starboard.
4. Support the elevator in the " up " position and remove the split pins and nuts from the two vertical bolts on the centre-hinge brackets.
5. Support the elevator in the " down " position and remove the two centre bolts from above, then lower the elevator.

Tail plane

Note . . .

The removal of the tail plane can only be accomplished after the removal of the elevator and rudders.

1. Remove the inspection panel from the top surface of the tail plane, disconnect the elevator trim cables from the sprocket chain, and withdraw the cables from the tail plane.
2. Remove the detachable cover plates from the outboard surface of the fin, disclosing the tension bolts which secure the tail plane.
3. Unscrew and remove the two tension bolts on each side of the tail plane front spar.
4. Unscrew and remove the two tension bolts on each side of the rear spar.
5. Support the tail plane and spring the fins apart slightly, then lower the unit.

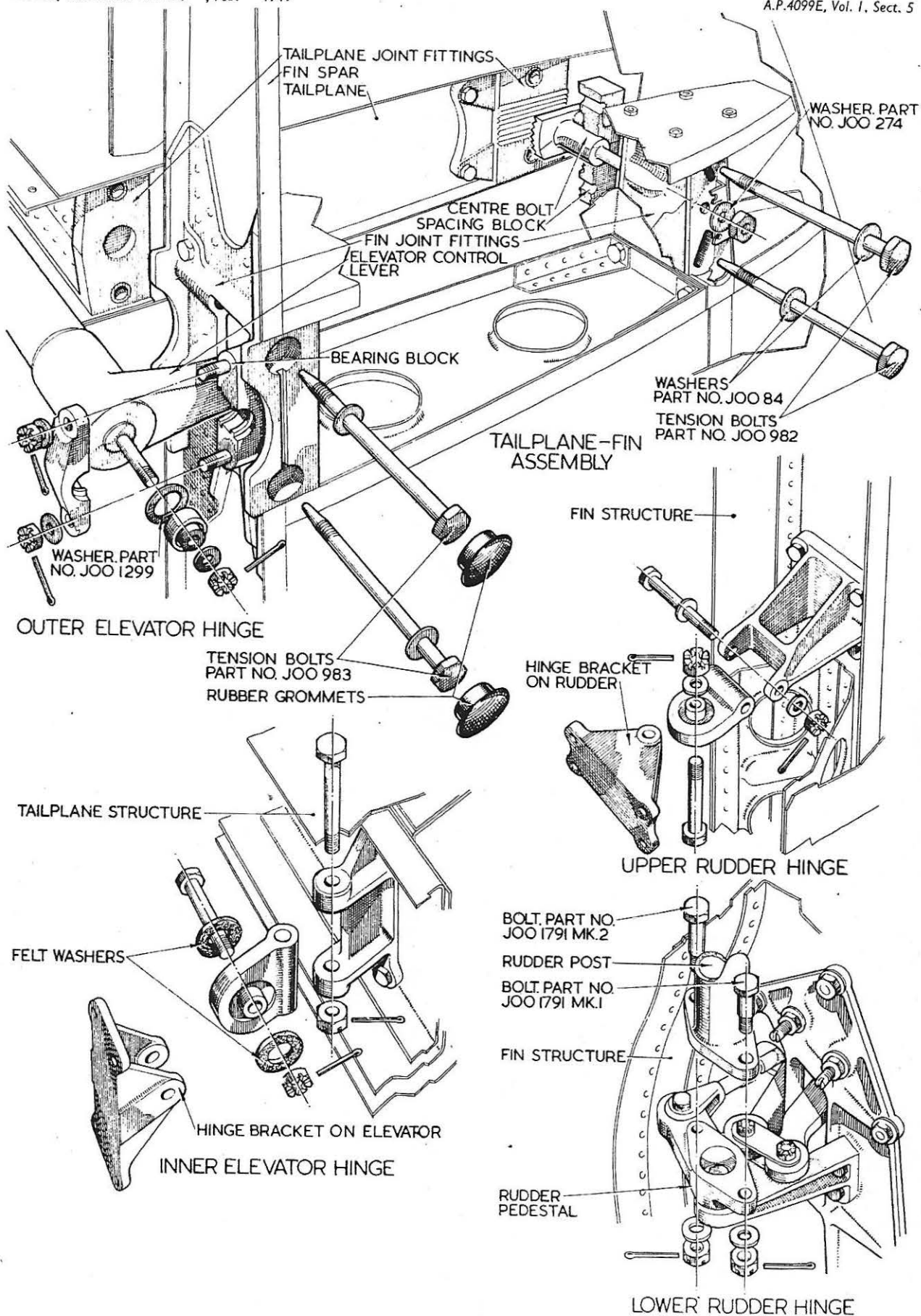


FIG. 13 TAIL UNIT DETAILS

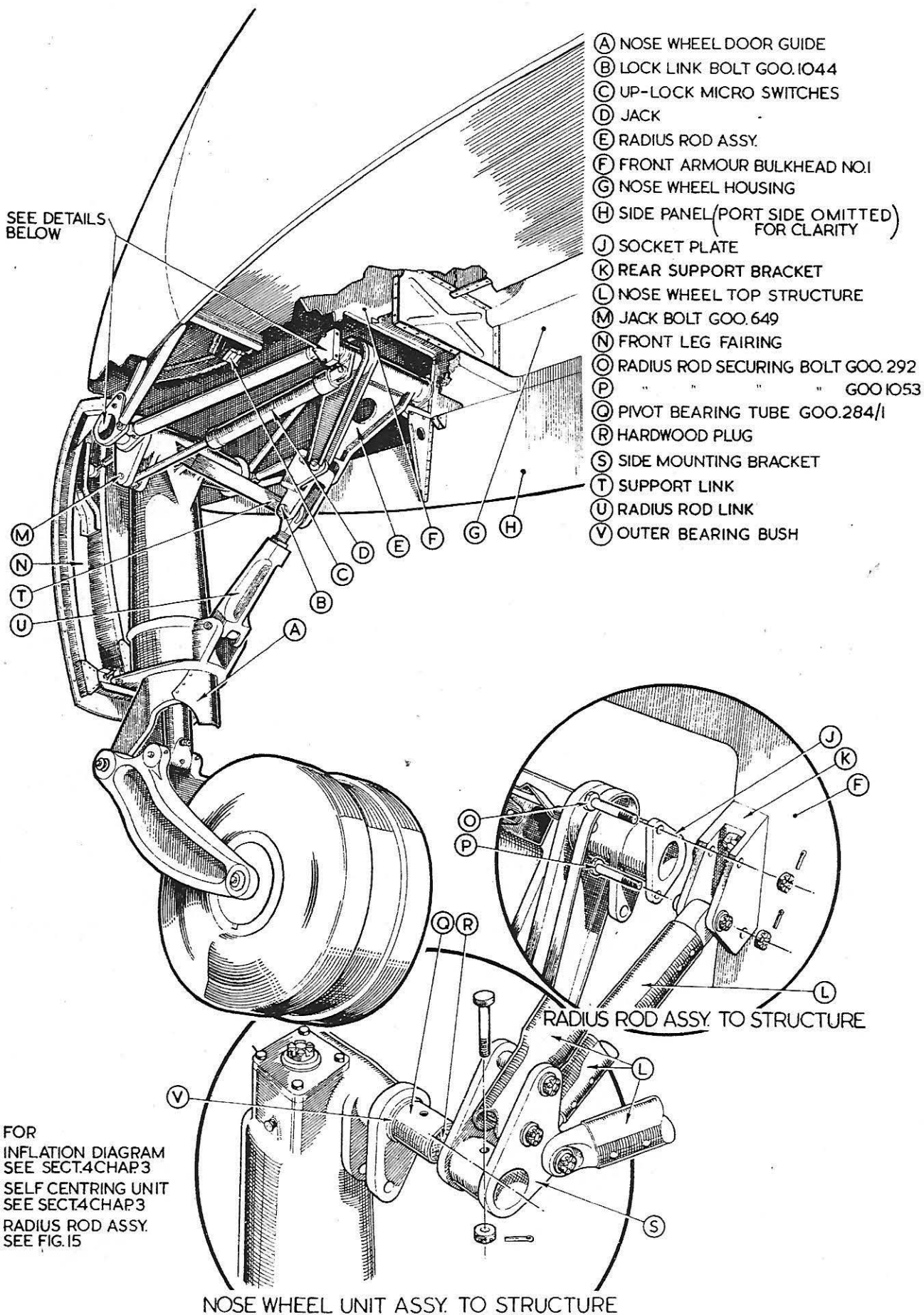


FIG. 14 NOSE WHEEL

REMOVAL OF NOSE WHEEL AND NOSE WHEEL UNIT (FIG. 14)

Nose wheel

1. Jack the aircraft so that the nose wheel is clear of the ground (*Sect. 4, Chap. 3*).
2. Remove the tie-rod and end caps from the axle tube.
3. Support the wheel and tap out the axle tube.

Nose wheel unit

1. With the aircraft jacked up as described in *Sect. 4, Chap. 3*, and the undercarriage down, release the fluid pressure from the hydraulic accumulator.
2. Remove the quick-release upper nose fairing and the front leg fairing.
3. Remove the main nose fairing by unscrewing the 2 B.A. countersunk screws around the lower periphery of bulkhead No. 1. The screw heads will be covered with paint filling.
4. Disconnect the hydraulic jack-ram from the lever arm on the leg casting by removing bolt, Part No. G.00649.
5. Remove the bolt, Part No. G.001044 to release the support link and the radius rod link from the lock link.
6. Remove the split pins, castellated nuts and bolts securing the pivot bearing tube to the side mounting brackets, and tap out the pivot bearing tube.
7. Lower the nose wheel from its mounting structure.

REMOVAL OF NOSE WHEEL RADIUS ROD (FIG. 15)

1. With the nose fairings removed (*as described in the nose wheel unit removal, fig. 14*). disconnect the radius rod link and the support link from the lock link by removing bolt, Part No. G.001044 (*fig. 14*).
2. Disconnect the fork end of the hydraulic jack from the locking-plate lug by removing bolt, Part No. G.0050.
3. Disconnect the electric leads from the radius rod micro switch.
4. Disconnect the radius rod socket plates from the rear support brackets by removing bolts, Part No. G.00292 and G.001053 (*fig. 14*).
5. Lower the radius rod unit from its mounting.

Note . . .

The nominal pin centre length of the radius rod link is 7.4 in. When assembling the unit, it is inadvisable to depart appreciably from this dimension; the adjustment procedure is contained in Sect. 4, Chap. 3.

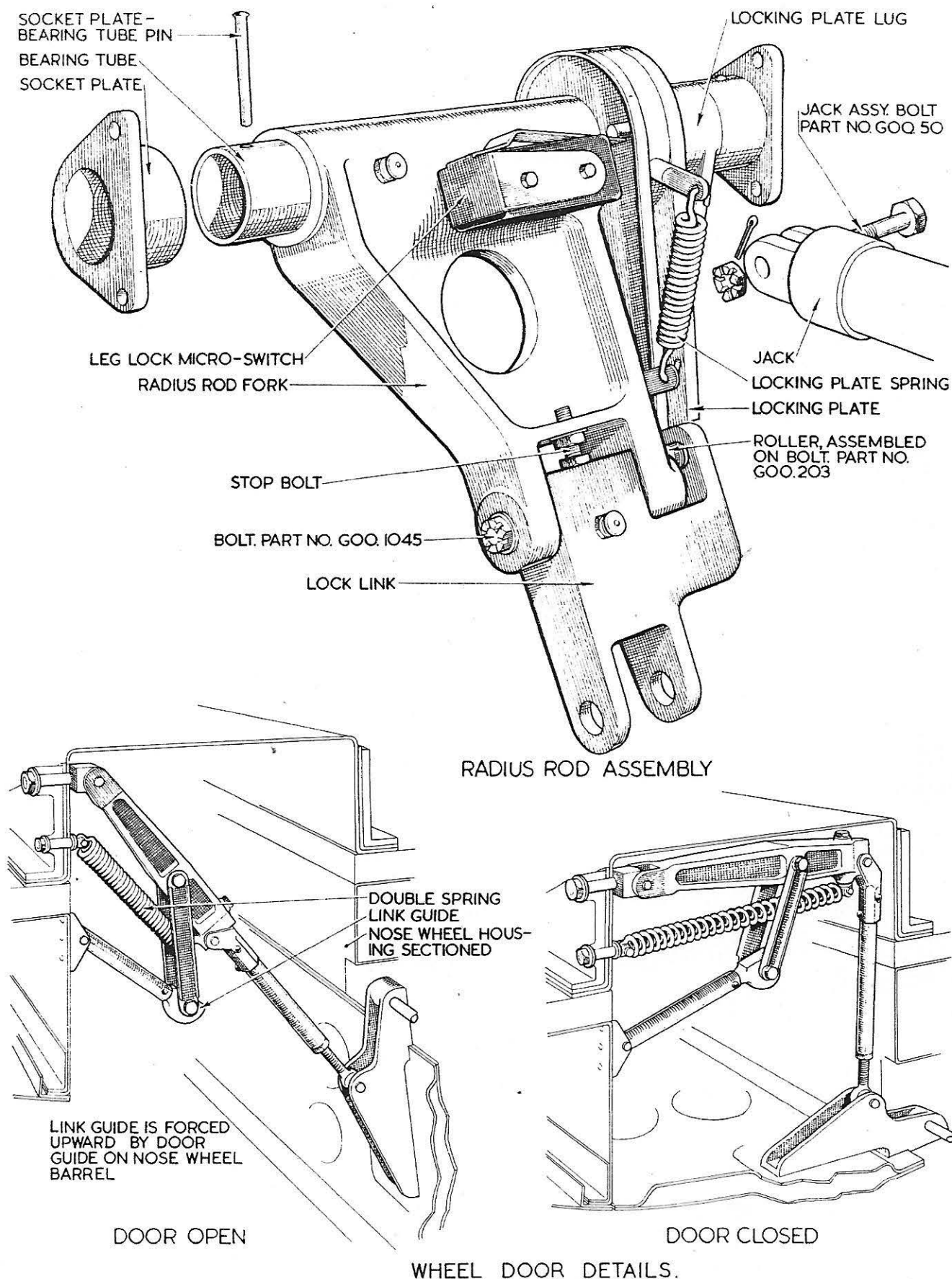


FIG. 15 NOSE WHEEL UNIT DETAILS

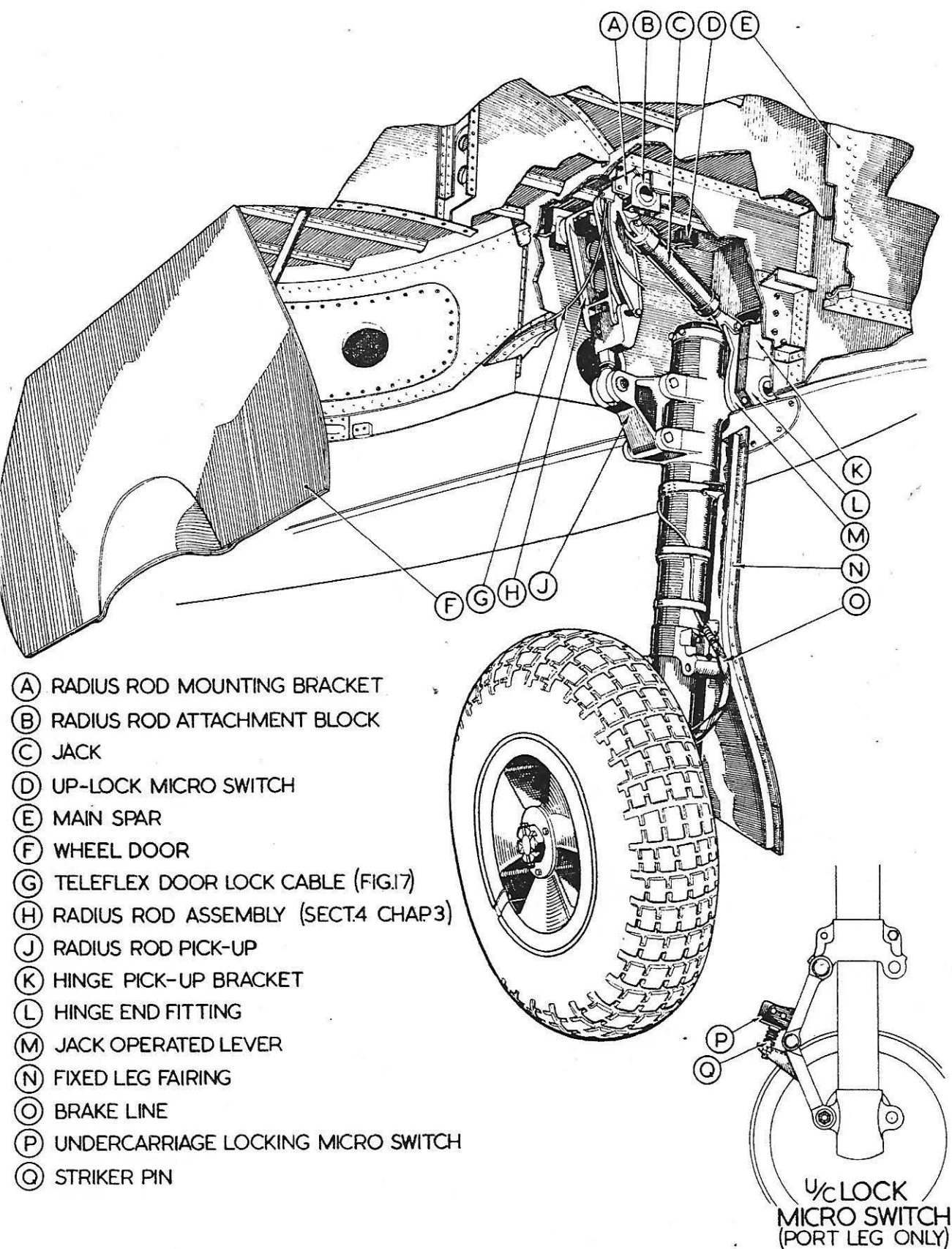


FIG. 16 MAIN WHEEL UNIT

REMOVAL AND ASSEMBLY OF MAIN WHEEL UNITS AND REMOVAL OF RADIUS RODS (FIG. 16)

Removal of main wheel unit

1. Jack the aircraft as described in Sect. 4, Chap. 3, and with the main wheel units down, release the hydraulic pressure from the accumulator and the air pressure from the pneumatic system.
2. Remove the wheel leg fairing and the small detachable fairing from the undersurface of the wing adjacent to the leg.
3. Disconnect the pneumatic hose from the union at the top of the leg fairing. On the port leg only, disconnect the electrical lead to the undercarriage lock micro switch.
4. Disconnect the radius-rod eye-bolt from the radius-rod pick-up casting.
5. Remove the split pin and nut from the bolt through the jack-ram fork end, and swing the main wheel unit inboard to give clearance for the removal of the bolt.

Note . . .

Careful positioning of the lifting jack is necessary to permit this movement of the wheel unit.

6. Support the unit, and using ratchet spanners, Part No. Y.00185/6, left and right-hand respectively, release the four attachment bolts from the hinge end fittings and lower the fittings together with the main wheel unit.

Assembly of main wheel unit

This is the reversal of the above procedure.

Details of the various adjustments and retraction tests are given in Sect. 4, Chap. 3.

Radius-rod removal

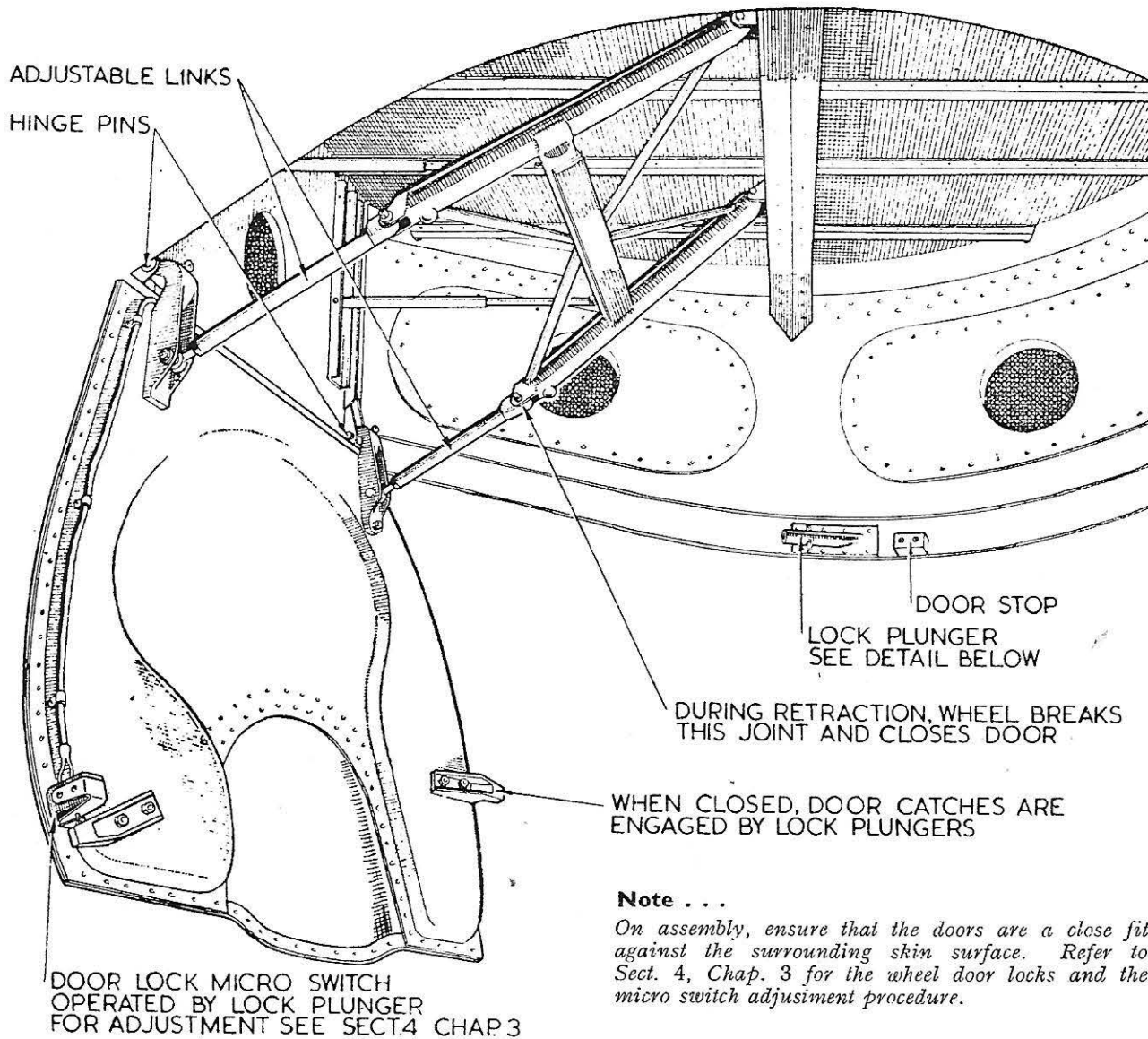
Note . .

A detailed illustration of the main wheel radius-rod is given in Sect. 4, Chap. 3.

1. After releasing the hydraulic and pneumatic pressures, and removing the leg fairing and the small detachable fairing from the undersurface of the wing, disconnect the radius-rod eye-bolt from the radius-rod pick-up casting.
2. Disconnect the fork end of the hydraulic jack ram from the lever on the main wheel unit. The wheel and leg fairing must be removed and the unit pushed inboard to give clearance for the bolt removal.
3. Remove the bracket, securing the pneumatic pipe union, from the radius-rod rear attachment block.
4. Remove the two door lock plungers from the end of the Teleflex cables in the wheel well (Sect. 4, Chap. 3).
5. Remove the two bolts from each attachment block and lower the radius-rod unit, at the same time withdrawing the Teleflex cables from the conduits to the door lock plungers.

Note . . .

It is not possible to disconnect the hydraulic jack from the radius-rod lug until the radius-rod unit has been lowered from the wing recess.



WARNING

As the main wheel doors are spring-loaded in both the "up" and "down" positions it is very important to ensure that they are left in the fully "down" position on the completion of any work on the undercarriage or doors.

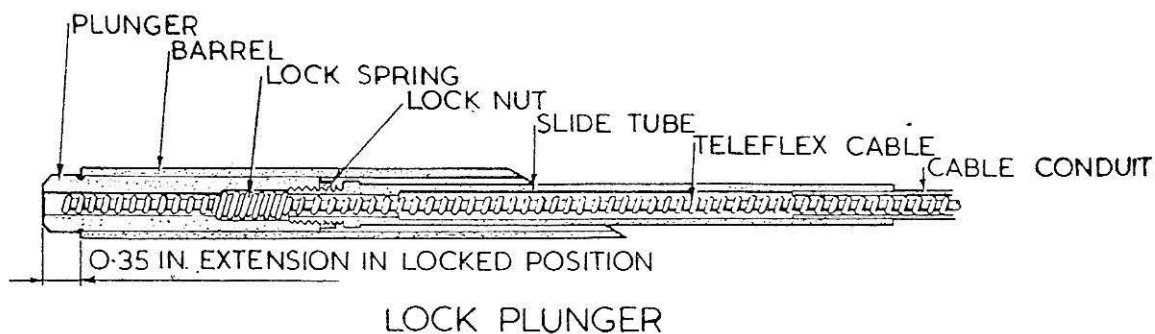


FIG. 17. WHEEL DOOR MECHANISM

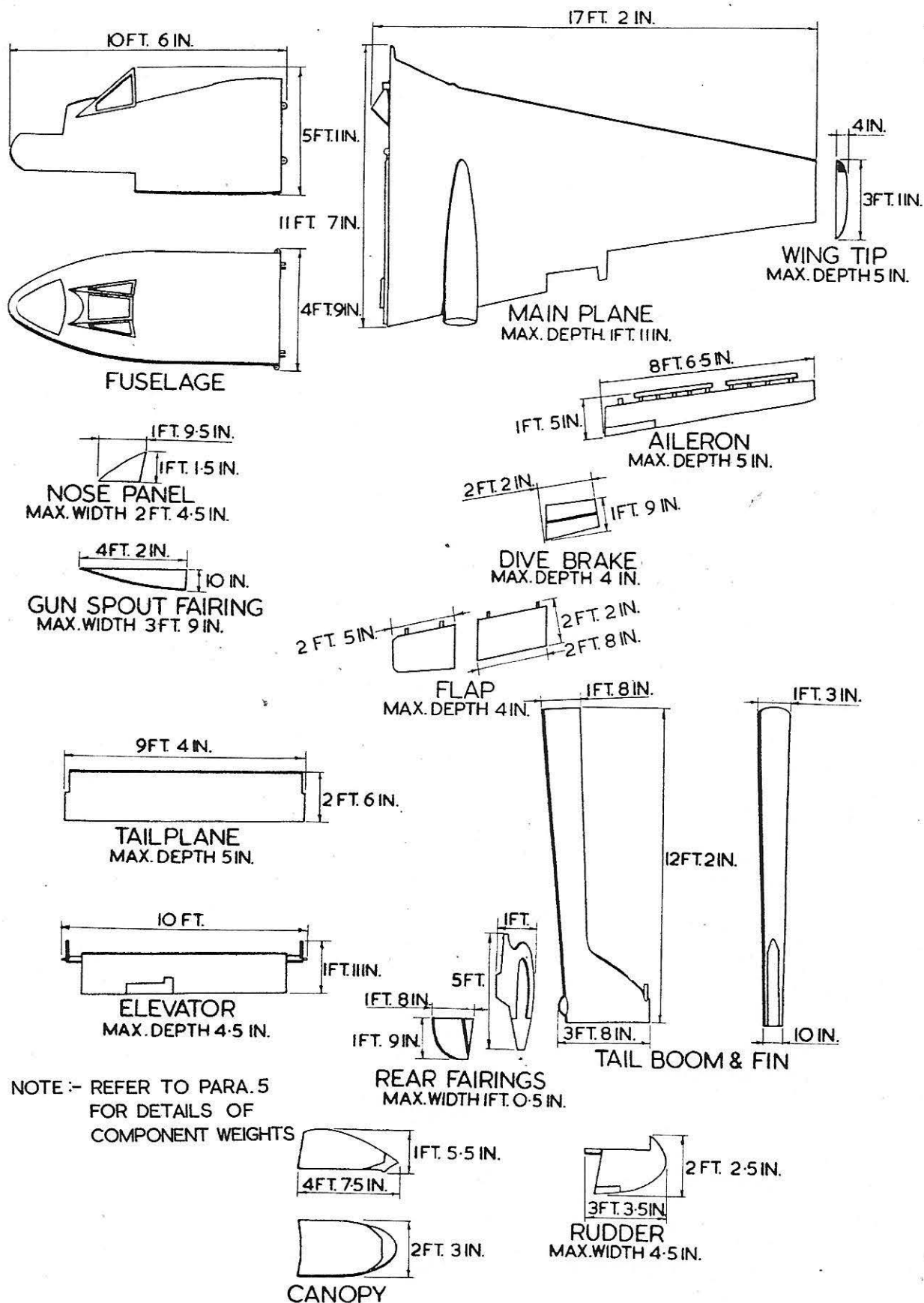


FIG. 18 MINIMUM PACKING DIMENSIONS

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