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DESCRIPTION

Introduction

1. This chapter gives a general description of the fuselage structure together with the procedure for its dismantling into the main components; the structure is also extensively illustrated in A.P.4505, Vol.6.

General

2. The fuselage is approximately circular in cross section and, apart from a composite nose fairing, is of stressed skin construction throughout. Transport joints at formers 372 F, 204 F and 428 A divide the fuselage into four sections; a temporary metal tail cone completes the structure. When Mod.66 is embodied, the tail cone will be of composite material.

Note that the formers are identified by their distance, in inches, fore and aft of the front spar datum. The sections are nose fairing, front fuselage, centre section and rear fairing from front to rear respectively.

3. Except at the transport joints and elsewhere where reinforcement is necessary, the skin plating is supported by lipped - channel - section formers and top-hat, rolled-section, fore-and-aft stringers, the stringers being attached to angle plates which are riveted to the outer edge of the formers. Stressed skin plating is attached to the structure, in most cases, by flush-finished countersunk rivets.

Major components are bolted together utilising close-tolerance, reamed holes; certain bolts are torque loaded during assembly.

4. High strength aluminium-alloy or magnesium-alloy are mainly used in the structure although, as previously stated, the nose radome and tail cone are composite. Aluminium-alloy sheet plating is usually to specification D.T.D.687 or L.72, extruded bar is to D.T.D.363 and forged bar to D.T.D.683 (alternative is D.T.D.364). Magnesium alloys are to specification D.T.D.626 or 118 (sheet plating), D.T.D.88C (forgings) and D.T.D.721 (castings).

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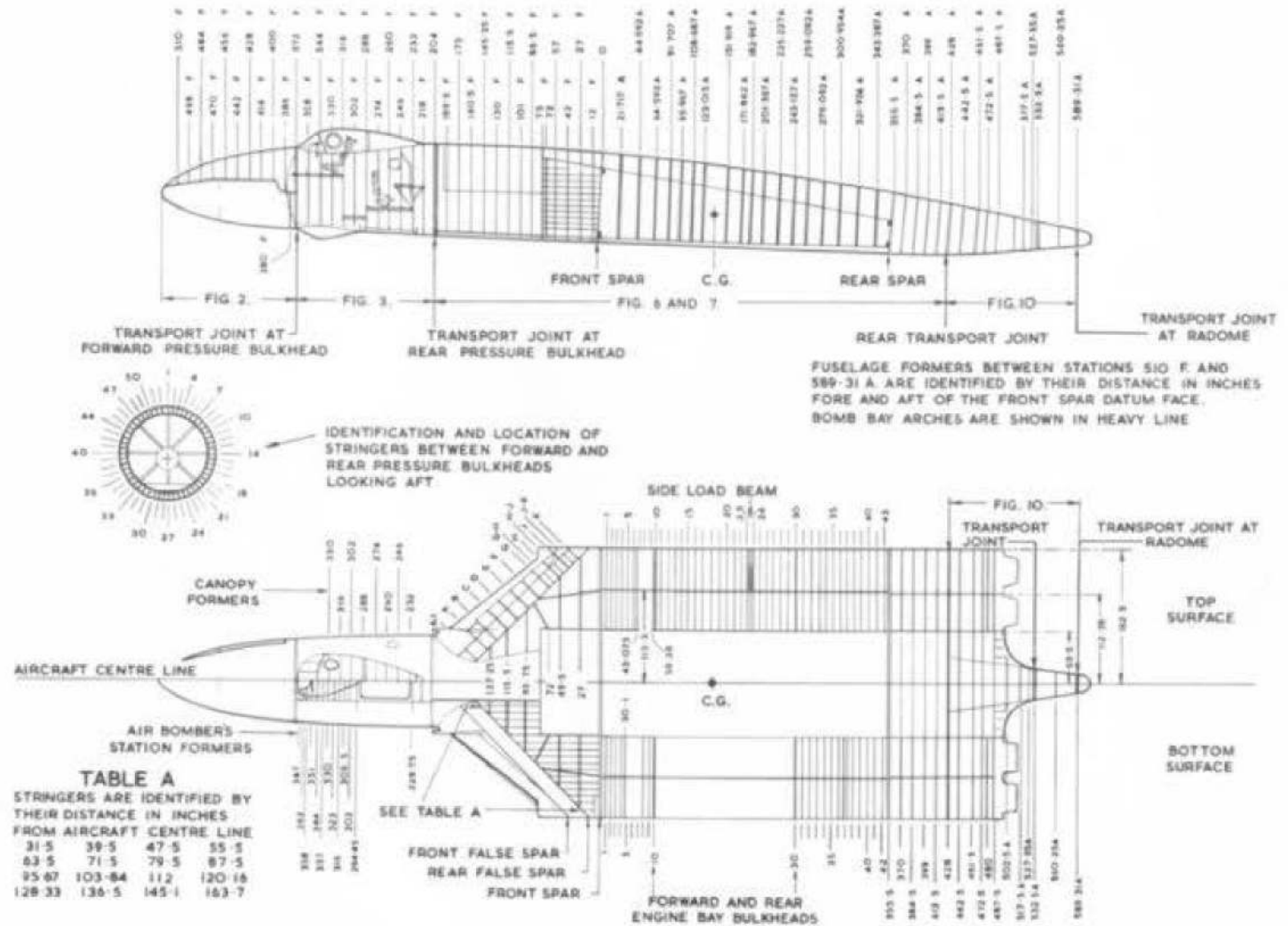


Fig. 1. Former and rib positions
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NOSE FAIRING

General (fig.2)

5. The nose fairing is in two sections: an upper portion of metal construction and a lower portion consisting of a one-piece composite moulding covering the lower two-thirds of the nose fairing.

6. The metal portion is built up of two rolled-section longerons with arc-shaped formers and channel-section stringers and, at the rear, an attachment angle to secure the nose fairing to the fuselage. Skin plating is of aluminium alloy. Metal brackets attached to the formers accommodate various items of radar equipment, flight refuelling probe and equipment and

the de-icing system for the pilots' wind-screen and air bomber's window. Release assemblies, to support the radome moulding, are mounted on the longerons.

7. Below the metal portion is the radome moulding which is of one piece sandwich construction made up of glass cloth layers and expanded rubber (this material being known as Hycar) and with an outer coating of Neoprene to prevent rain erosion. The upper edge of the moulding is bolted to a rolled-section longeron carrying steel dowels and quick release fasteners. At the rear end the radome is strengthened with an aluminium alloy semi-circular former. Two louvres,

one at each side and to the rear of the moulding, exhaust air after it has been used to cool the radar equipment mounted in the nose. The radome is located by the steel dowel pins and secured in position on the front pressure bulkhead and the longeron of the metal portion by the quick-release fasteners.

Equipment compartments

8. On the port side, at the rear of the fairing, is a light-alloy compartment, with an access door, for the stowage of emergency equipment; behind this compartment is a further light-alloy stowage for a destructor unit. A light-alloy compartment is provided on the starboard rear side for the stowage of a second destructor unit.

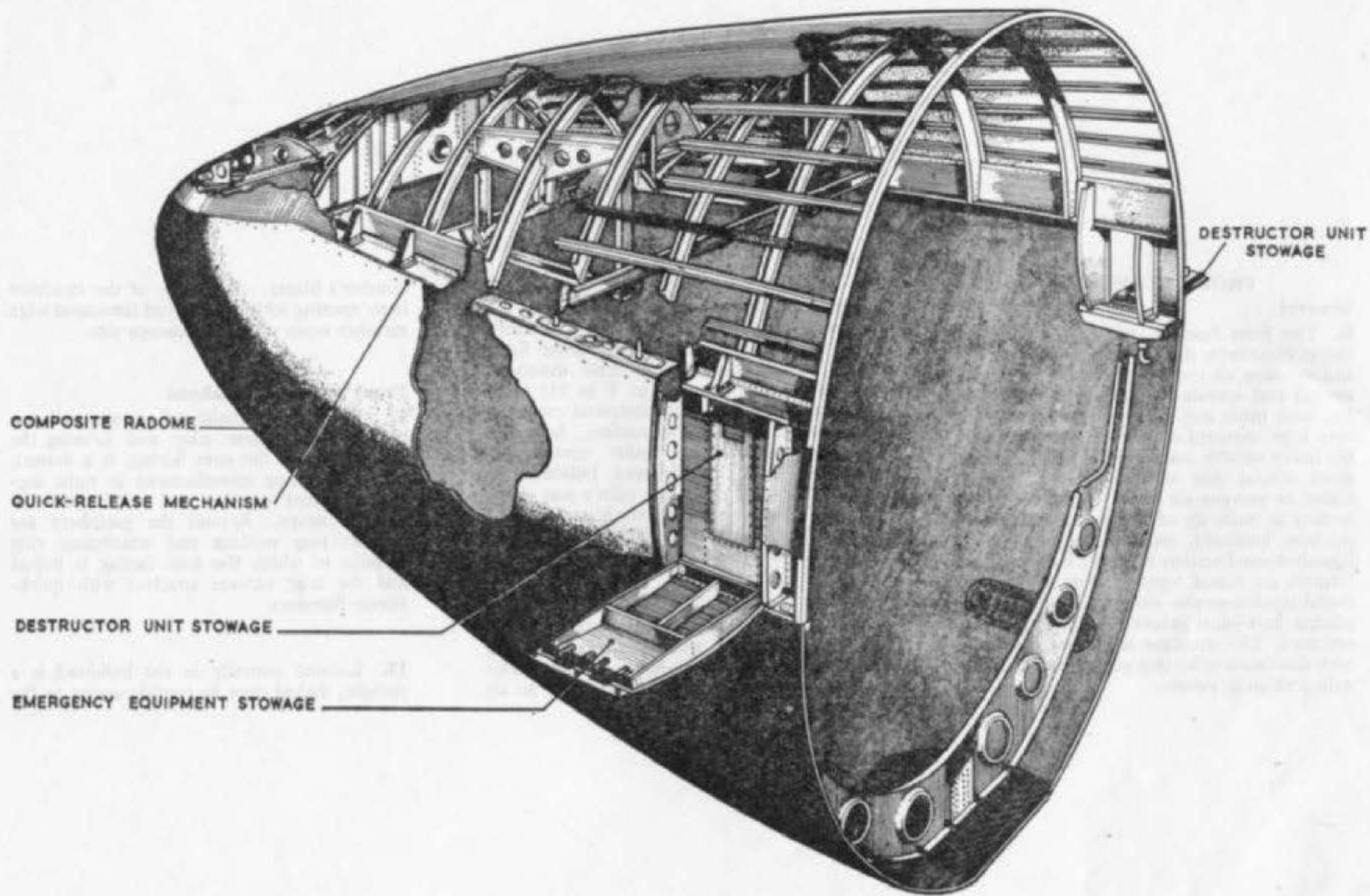


Fig. 2. Nose fairing
(◀Intro. destroyer unit stowage drain▶)



FRONT FUSELAGE

General

9. The front fuselage, which is circular in shape, constitutes the crew's pressurised cabin and contains all controls necessary to fly the aircraft and operate all services. This section has been made and must be maintained to a very high standard of efficiency to withstand the heavy variable loads upon it which become more critical due to pressurisation and is sealed to prevent air losses. Structurally the section is built up of a forward and a rear pressure bulkhead, and a series of circular, lipped-channel-section formers; bulkhead and formers are joined together with longitudinal rolled top-hat-section stringers, except at skin plating butt-joints where T-section stringers are used. The structure is covered externally with aluminium-alloy skin plating and internally with insulating panels.

10. Attached to the forward bulkhead is the nose fairing and to the rear bulkhead the nose-wheel unit mounting brackets. The crew's floor is built on two levels; the lower floor, which accommodates three crew members, extends from formers 316 in. F to 232 in. F and is of cross beam and intercostal construction skinned on the upper surface. An upper built-up structure of similar construction extending from the forward bulkhead to former 316 in. F raises the pilot's seat above the crew's floor; the upper floor is strengthened to take the reaction forces of the ejection seats mounted upon it.

11. Below the structure are cut-aways suitably re-inforced with an aluminium-alloy pressing to accommodate a flush-fitting entrance door and with channel-section longerons for an air

bomber's blister. At the top of the structure is an opening with a reinforced fabricated edge member upon which the canopy sits.

Front pressure bulkhead

12. The forward bulkhead, constructed entirely in aluminium alloy and forming the attachment for the nose fairing, is a domed, circular pressing manufactured in eight segments riveted together and reinforced with jointing straps. Around the periphery are support ring sections and attachment ring sections to which the nose fairing is bolted and the nose radome attached with quick-release fasteners.

13. Located centrally in the bulkhead is a circular, dished door to provide access to the

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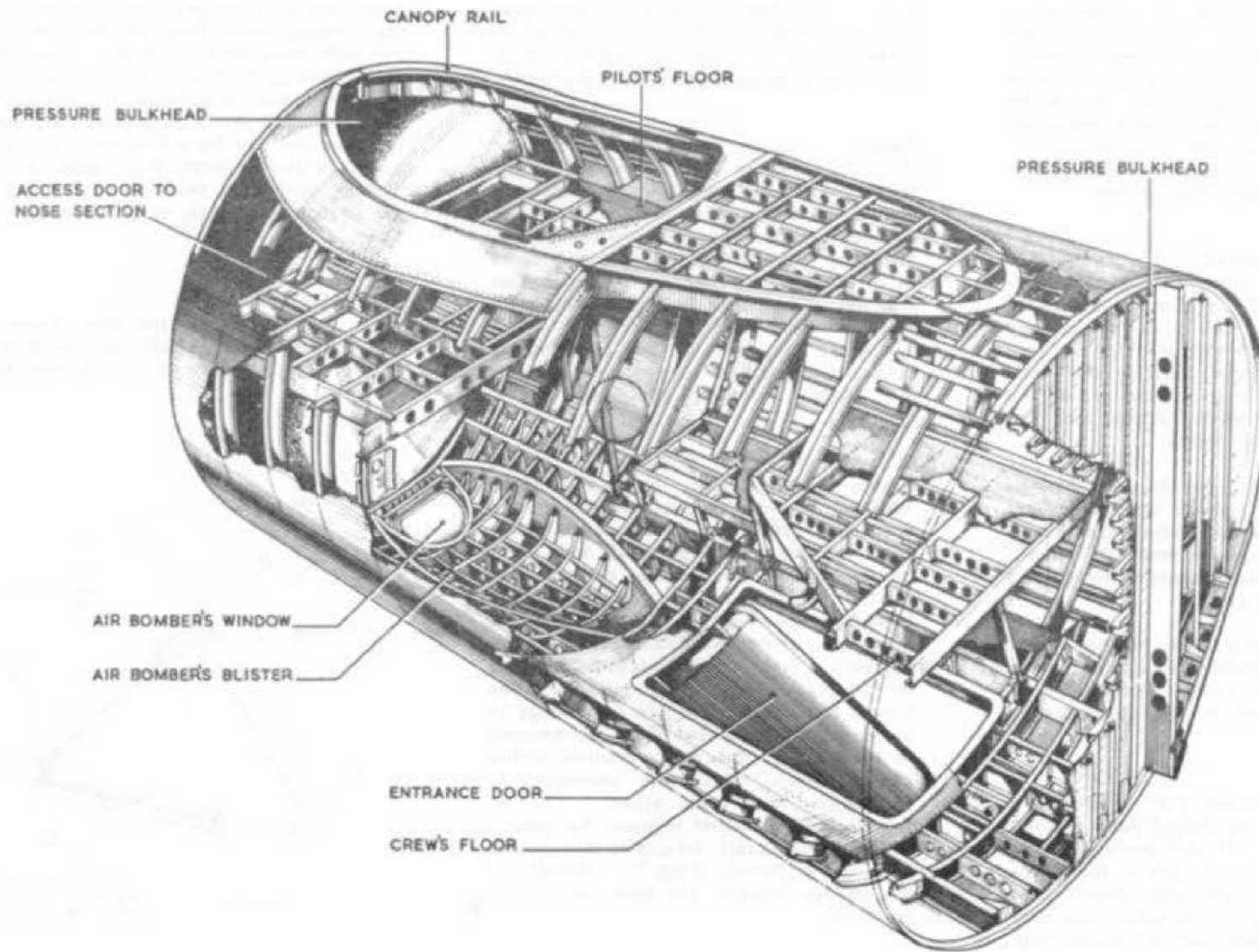


Fig. 3. Front fuselage
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inside of the nose fairing, hinged at its upper edge and held in the closed position by handwheels which fit in three clamp brackets around the door aperture. A forged magnesium-alloy ring reinforces the bulkhead at this position. Above the door is an aperture with inner and outer reinforcement rings and a mounting assembly to accommodate a combined valve unit of the air-conditioning system.

Rear pressure bulkhead

14. The rear pressure bulkhead, constructed in aluminium-alloy, consists of a flat 14 s.w.g. web plate extensively strengthened on the aft face with vertical and horizontal top-hat section stiffeners and with a reinforcing channel around the edge to cater for pressurisation load and nose-wheel reaction forces.

15. An assembly, on the rear face of the bulkhead, to which the nose-wheel mounting brackets are bolted, consists of two vertical, channel-section beams, braced with two diagonal side beams and a landing angle ring sector.

16. Flying control rods, engine control rods, and pressurisation ducts pass through the bulkhead, loss of air pressure from the cabin is prevented by gland-type seals.

Windscreen

17. Three sandwich-type windows are fitted in a light-alloy forged frame mounted directly on the forward portion of the cockpit rail. At each side of the mounting frame is a triangular direct-vision window consisting of a double glass vinyl sandwich outer panel and a Perspex inner panel. Each direct-vision window opens inward when a handle with tie-rod assembly is operated (fig.4). To prevent internal misting, a silica gel system is connected to the air space of each of the three main windows (Sect.3, Chap.8A). Electro-hydraulically-operated wipers are

provided for each of the three main windows. Attached to the windscreen base forging is a rain deflector and to the windscreen frame on each side of the centre window are the fluid de-icing spray pipes.

Canopy

18. The canopy, (fig.5), which can be jettisoned in an emergency, is of stretch-formed, double skin construction over channel-section hoops and top-hat section stringers. At former 288F position there is an intermediate pressure bulkhead constructed of a double light-alloy skin with top-hat-section stiffeners between. The space at the rear of the intermediate bulkhead provides accommodation for the dinghy stowage container (Sec.4, Chap.11).

19. Towards the forward end of the canopy are circular, toughened glass windows, one on the port and one on the starboard side, the structure at these positions being strengthened with reinforcing rings. Between the double skins of the canopy and of the intermediate bulkhead, are heat insulating layers of fibreglass contained within a waterproof septum. Four attachment forks locating in the bomb release type units and two hinged bracket arms secure the canopy in position. The release units are secured to the cockpit rail and contained within sealed boxes, which are connected to atmosphere with drain pipes. An inflatable seal is fitted between the canopy and the cockpit rail, details of this system is given in Sect.3, Chap.7. Details of the canopy release are given in Sect.3, Chap.11.

Entrance door

20. Situated in the bottom of the front fuselage is the main entrance door which is also used as the emergency escape exit for the crew members. Structurally the door consists of a pressed angle frame

strengthened with two longitudinal members, the door hinges being attached to the forward extremities of the members, and with transverse stiffeners. Inner and outer skin plating with a heat-insulating layer between completes the structure. An inflatable seal is provided between the door and the front fuselage frame and a pneumatic-operated door opening and closing system is provided. Details of the pneumatic system is given in Sect.3, Chap.7.

Air bomber's blister

21. Extending from the front pressure bulkhead to former 302F in the bottom of the front fuselage is the air bomber's

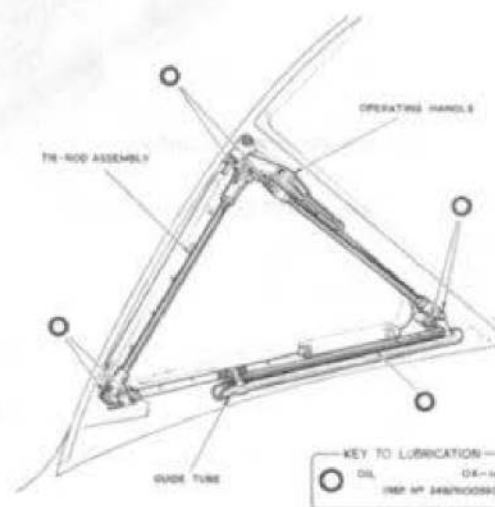
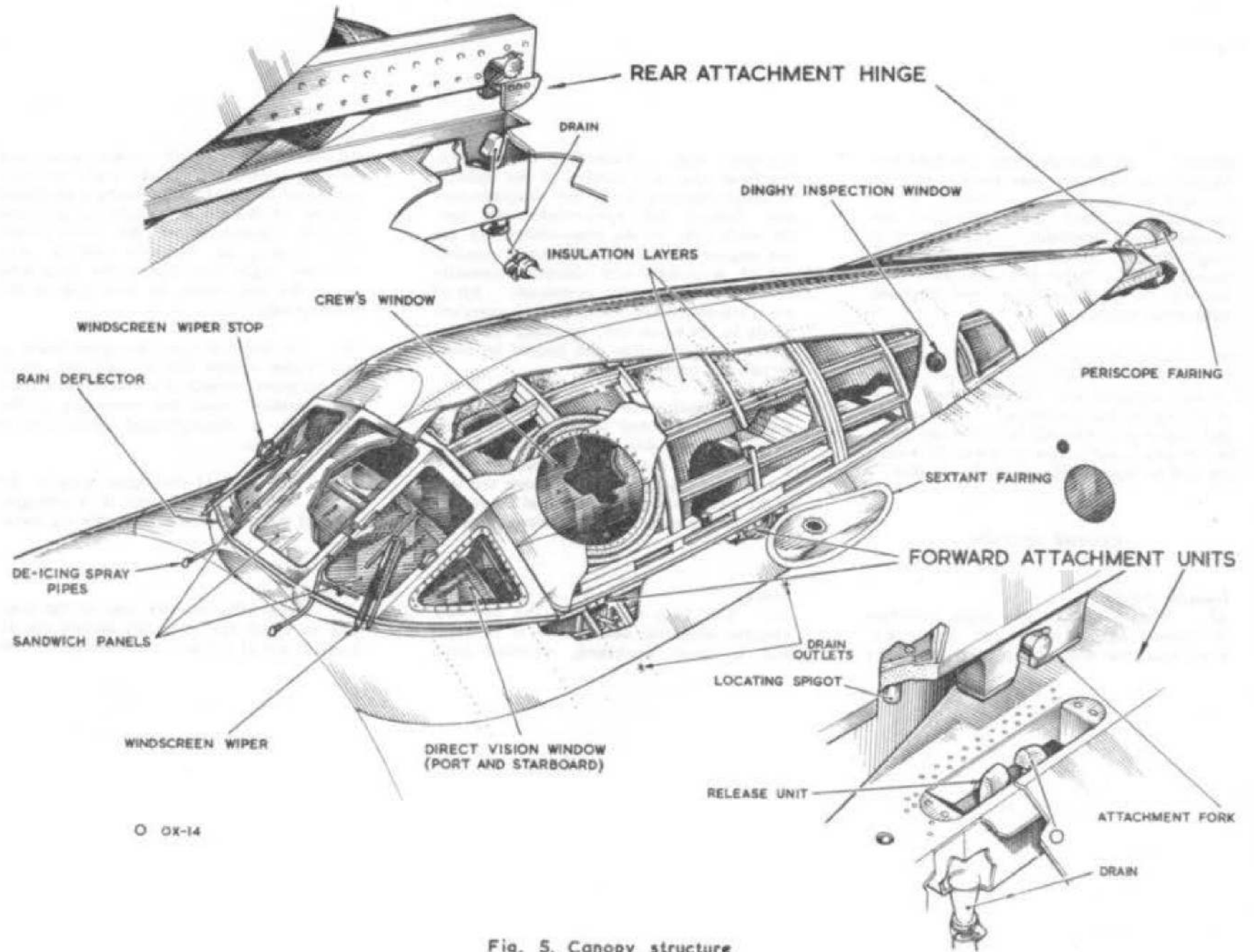


Fig.4. D.V. window mechanism

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OX-14

Fig. 5. Canopy structure
(+ drains added)
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blister. At this position the fuselage formers are cut away and reinforced with fore-and-aft longerons. Bolted to the longerons at each former position are curved frame members, reinforced with longitudinal intercostals, forming a blister shape. Inner and outer skin plating with a heat-insulating layer between covers the structure.

22. In the forward end of the blister is a laminated optically-flat window which is semi circular and inclined at an angle of 25 deg. to the horizontal. Forward of, and above the window, is a torsion member of box construction to cater for bending and twisting loads about the window.

CENTRE SECTION

General (fig.6)

23. The centre section main structure is formed by the front and rear spars, bomb bay ribs and, at the wing joints, by

transport ribs. Extending forward from the front spar is a portion of the circular fuselage housing fuel tank compartments and forming the nose-wheel unit bay. On each side of the nose-wheel bay are the engine air intake structures consisting of diaphragm ribs skinned internally to form the air intake apertures. Aft of the nose-wheel bay and fuel tank compartments is the bomb bay, centrally disposed in the centre section and formed by bomb arches and inner ribs.

24. On each side of the bomb bay the structure is divided into engine compartments by centrally disposed engine ribs whilst at the rear of these compartments are the jet pipe tunnels. Above the rear of the centre section is a dorsal fin fairing which is a pressed rib and skin assembly.

Spars

25. The front and rear spars are constructed similarly and consist of an upper and a lower machined, extruded boom

joined together with plate webs and vertical stiffeners. At each outboard extremity is fitted an accurately machined forging of the correct angle to give the desired sweepback of the main plane. The forging on the rear spar is at a different angle from that at the front spar since the rear sweep is less than at the leading edge.

26. On the rear spar the upper boom is continuous across the aircraft but, since the jet pipes extend below the lower boom and therefore break the continuity of the boom, it is strengthened with circular steel forgings.

27. The joint of the outer wing to the centre section spar booms is a straight-forward double shackle joint in each case.

Ribs

28. Inner ribs on each side of the bomb bay to which the bomb bay arches are attached, are of rolled-section boom and web

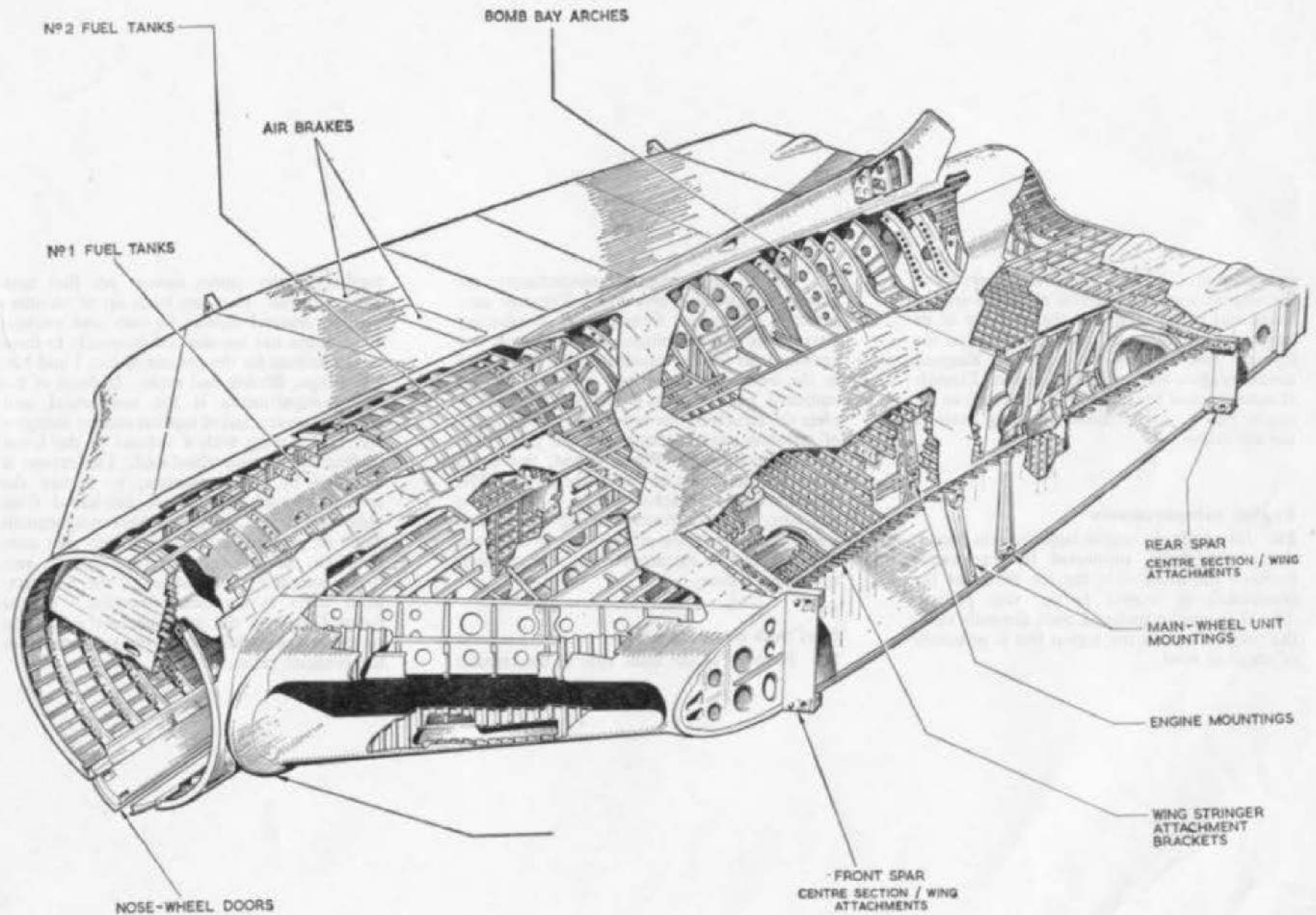


Fig. 6. Centre section (1)

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construction. The centre rib which separates the engine compartments is of rolled-section boom and plate webs over the majority of its length with a Warren girder construction for its rear portion, the vertical and diagonal members again being of rolled section. Lipped-channel-section box-brackets are riveted to the engine ribs to accommodate the drag posts of the air brakes.

Engine compartments

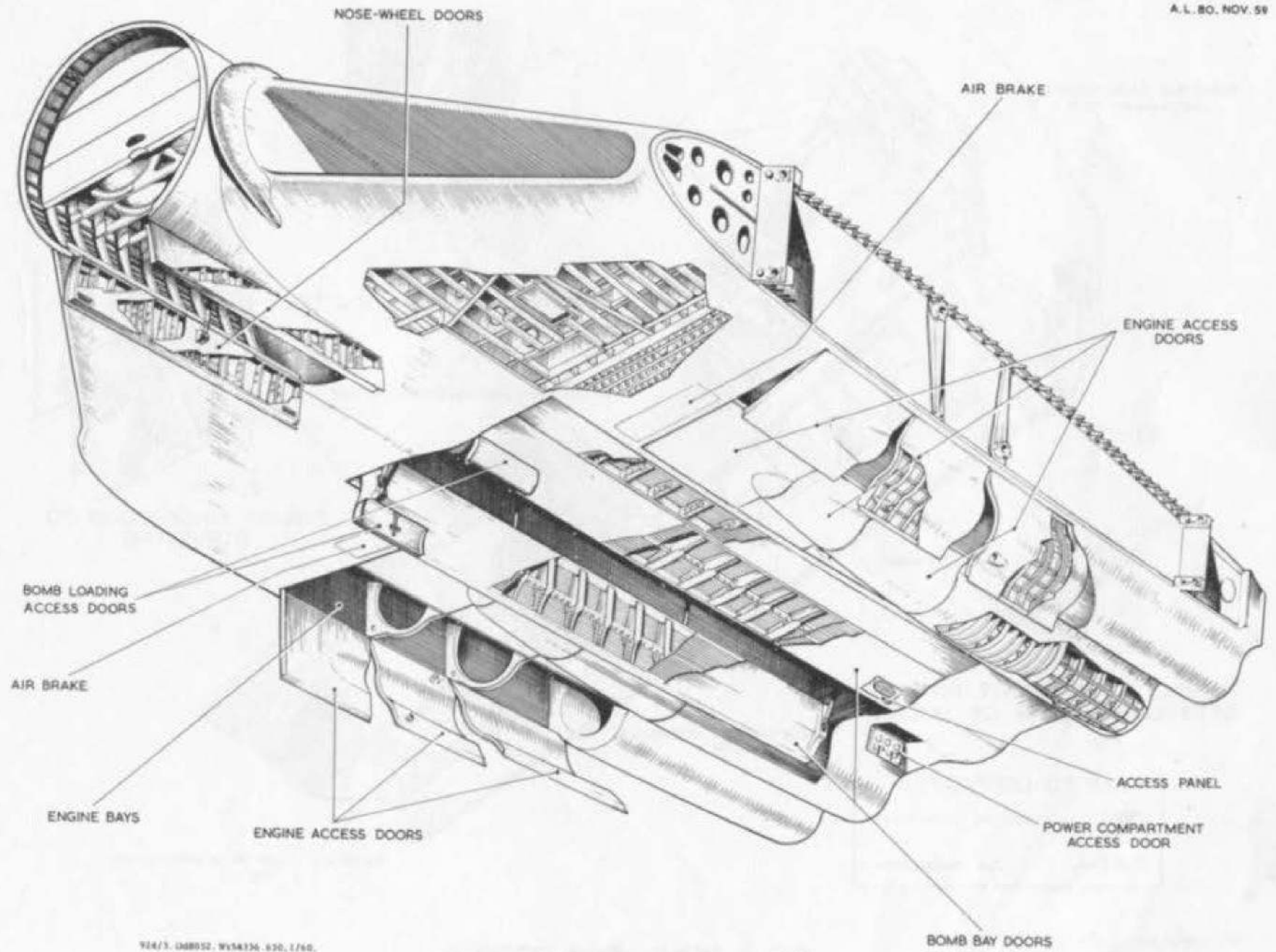
29. Internally the engine bays are skin plated, the plating being supported by intercostals between the main ribs; the top flange of the intercostals is riveted to the skin plating. The skin plating material used depends upon the temperature in the region but is primarily of stainless steel.

30. Below each engine compartment are hinged, removable access doors. They are constructed of curved formers and reinforcing intercostals and are hinged to the bomb bay outboard rib for the inboard engine doors, and to the outboard engine bay outer rib for the outboard engine doors. Double skins complete the structure, the inner skin plating being of stainless steel sheeting and the outer skin of aluminium-alloy. When closed, the doors complete the profile of the centre section. The hinges consist of brackets bolted to the engine bay ribs, the door formers being attached to the brackets by quick-release pins so designed that they can be extracted when it is required to remove a door.

Fuel tank compartments

31. Forward of the front spar in the circular

portion of the centre section are fuel tank compartments. They are built up of circular-shaped, channel-section formers and pressed diaphragms and are skinned internally to form compartments for the fitment of No. 1 and No. 2 bag-type, flexible fuel tanks. In front of the tank compartments is the nose-wheel unit housing constructed of top-hat section stringers and skin plating with a cut-out in the lower surface for the nose-wheel unit. The cut-out is bounded by two longerons, to restore the section strength, which are fabricated from plate web extrusions; nose-wheel compartment doors of pressed frame and double skin construction, manufactured in two separate sections, complete the contour of the compartment when in the closed position. At the forward end of the compartment is a light transport angle which forms the attachment for the pressure cabin.



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FIG. 7. CENTRE SECTION (2)
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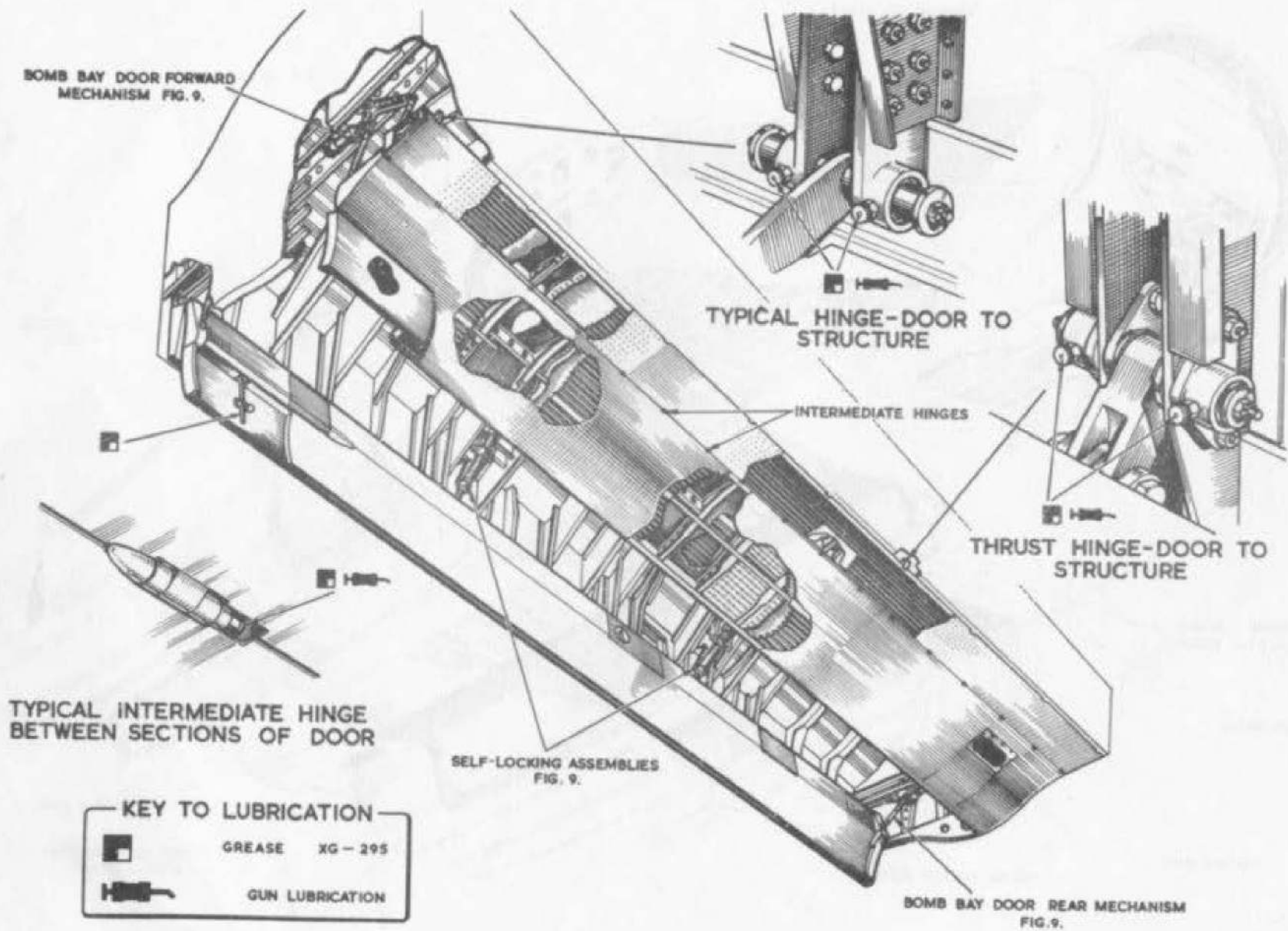


FIG. 8. BOMB BAY DOORS RESTRICTED

Bomb bay

32. The bomb bay, a single compartment occupying the full length of the fuselage between the front and rear spars, consists of a series of arch shaped members some of which carry the bomb stores. The arch members vary in construction and, in general, those which are disposed where the loading is greatest are of light-alloy web with manipulated extruded booms. The remainder are of built-up box section. Between the arches longitudinal intercostals are fitted where extra strength is required by the loading. Skin plating over this region is attached to top-hat rolled section stringers which extend from front to rear of the section.

Bomb bay doors

33. Enclosing the bomb bay is a pair of hydraulically-operated bomb doors which fold when opened. Each bomb door consists of two half-portions, the division being longitudinal, joined together by centrally-disposed hinge assemblies. The halves are each constructed from two long beam members, made from plate web and extruded section, transverse pressed profile ribs, and fore-and-aft intercostals and are covered with a corrugated skin assembly of an inner and outer skin with corrugations between to give increased stiffness to the doors. Hinged access doors are fitted at the forward end of the inner bomb doors to allow examination of

the bomb load on a returned aircraft and also to facilitate bomb loading when certain types of carriers are used. Twelve micro switches, Downmic Type C1831Y, are employed for bomb door position indication, jettison relay and to connect the electrical supply to the bomb door seal system unimatic valves. Four of these switches, mounted two to port and two to starboard by the inner bomb door to outer bomb door hinge, function to operate the bomb door position indicator. The remaining eight switches, mounted in pairs, are secured at the port and starboard sides on the forward face of the forward bomb door jack beam and the port and starboard sides on the aft face of the rear



Fig. 9. Bomb bay door mechanism

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◀ bomb door jack bulkhead. One switch of each pair functions in the normal stores circuit and the additional switch of each pair functions in the special stores circuit. ▶

REAR FUSELAGE

General (fig. 10)

34. The rear fuselage is constructed almost entirely of light-alloy pressings and forms the support to carry the jet pipe detachable end caps, the composite tail cone radome and the power flying control units.

35. Fuselage circular formers, attached by light-alloy pressed diaphragms to the inner rib of each compartment, form the centre of the structure. To support the fin assembly, the formers are strengthened with a longitudinal top-hat section longeron; manipulated beams are bolted to attachment angles on the port and starboard sides of the formers.

36. Extending outboard from the engine ribs are spectacle-shaped, pressed formers to which the jet pipe end caps are attached. The skin plating is supported by transverse, top-hat section stringers, except at

the skin plating joints where T-section is used, the stringers being secured by attachment brackets to the formers and diaphragms.

37. A triangular-shaped fairing of light alloy, between the fuselage and jet pipes, completes the structure. Provision is made on each side of the fairing for the mounting of the tail navigation lights. In the starboard side is a light alloy, box-shaped compartment housing the brake-parachute installation, details of which are given in Sect. 3, Chap. 13.

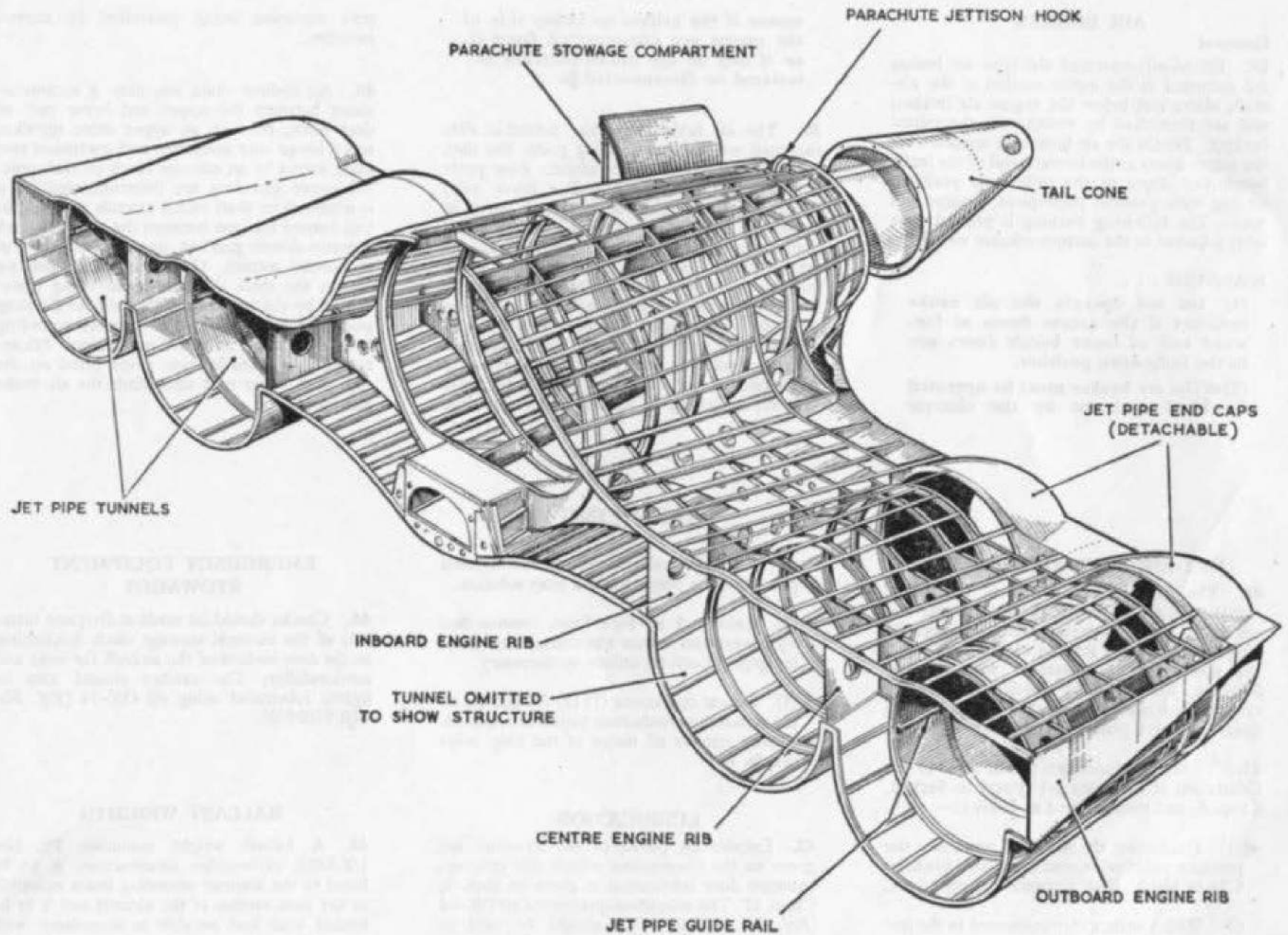


Fig. 10. Rear fuselage

(◀Addition of parachute stowage and tail cone▶)

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AIR BRAKES

General

38. Electrically-operated slat-type air brakes are mounted in the centre section of the aircraft, above and below the engine air intakes, and are controlled by switches in the pilots' cockpit. Should the air brakes be opened with the access doors at the forward end of the inner bomb bay doors in the fully-open position, fouling with possible consequent damage will occur. The following warning is printed on a label adjacent to the cockpit selector switch:

WARNING . . .

- (1) Do not operate the air brake switches if the access doors at forward end of inner bomb doors are in the fully open position.
- (2) The air brakes must be operated by hand and not by the electric

motor if the brakes on either side of the motor are disconnected from it, or if any of the micro-switches are isolated or disconnected.▶

39. The air brakes comprise rotatable slats mounted on box-section drag posts, the slats being of honeycomb construction. Four posts are provided, an upper and a lower pair, which when extended or retracted move in opposition in spool-type rollers attached to the main structure ribs on either side of the air intake tunnel. Each pair is bolted at its outer ends to a tube which braces the post together to form a twin-post unit, each unit mounting a single slat, hinged for part rotation and operated by push-pull tubes, lever and cam follower housed in each post. This mechanism is functioned by drag post travel, the cam follower travelling in its cam track and drag

post extension being controlled by micro-switches.

40. An endless chain assembly is accommodated between the upper and lower pair of drag posts, between an upper drive sprocket and a lower idler assembly, and comprises two cams joined by an adjuster block on each post. All upper sprockets are interconnected by a common drive shaft which extends spanwise in ball-jointed sections between the sprockets and a motor-driven gearbox, mounted centrally in the centre section. Operation of the gearbox rotates the shaft this movement being transmitted by the sprockets and chains to the drag posts which are extended or retracted according to the direction of sprocket rotation. Micro-switches operated by cam strips fitted on the top, port, inner unit strut limit the air brake movement.

SERVICING

- (3) Check for leaks between the windscreen panel and the frame using a soap solution.
- (4) Reconnect all pipe lines, remove test equipment and replace test connection blanking pipe. Lock all unions as necessary.
- (5) Repeat operations (1) (2) (3) and (4) to the remaining windscreen panels as required. Finally remove all traces of the soap solution.▶

LUBRICATION

43. Lubrication points of the structure are given on the illustrations within this chapter; entrance door lubrication is given in Sect. 3, Chap. 11. The minimum quantity of oil OX-14 (Ref. No. 34B/9100590) should be used to lubricate the hinges and catches of the direct vision windows and the canopy mechanism.

EMERGENCY EQUIPMENT STOWAGES

44. Checks should be made at frequent intervals of the external stowage catch mechanism in the nose section of the aircraft for wear and serviceability. The catches should also be lightly lubricated using oil OX-14 (Ref. No. 34B/9100590).

BALLAST WEIGHTS

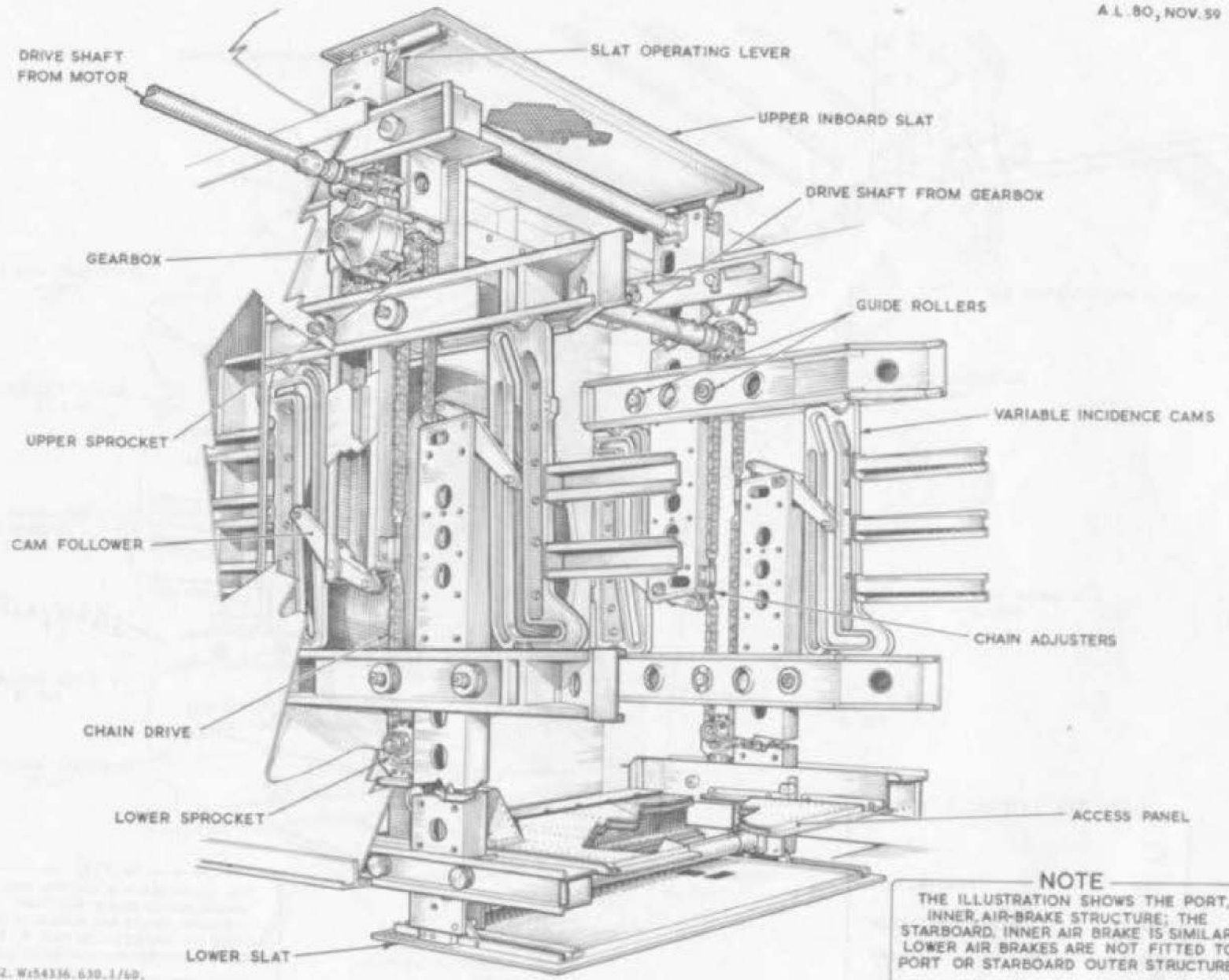
45. A ballast weight container Pt. No. 1/Z.8401, of wooden construction, is to be fitted to the scanner mounting beam assembly in the nose section of the aircraft and is to be loaded with lead weights in accordance with the instructions contained in loading and C.G. data, Sect. 2, Chap. 3.

DRY-AIR SANDWICH PANELS

41. The three centre panels of the pilots' windscreen are of sandwich construction and are to be pressure tested should leakage be suspected; internal misting of the windows is the most obvious symptom. Misting may, however, be caused by a defective silica gel system which should be checked as described in Sect. 3, Chap. 8 prior to testing the windscreen.

42. To test a windscreen panel, refer to the illustration of the silica gel system in Sect. 3, Chap. 8, and then proceed as follows:—

- ◀(1) Disconnect the silica gel container; the pressure relief valve, and the related bladder. Clip or blank off all disconnected pipe lines.
- (2) With a manometer connected to the test point, apply a pressure not exceeding $\frac{1}{2}$ p.s.i. to the windscreen inter-space.



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FIG. II. AIR BRAKE STRUCTURE
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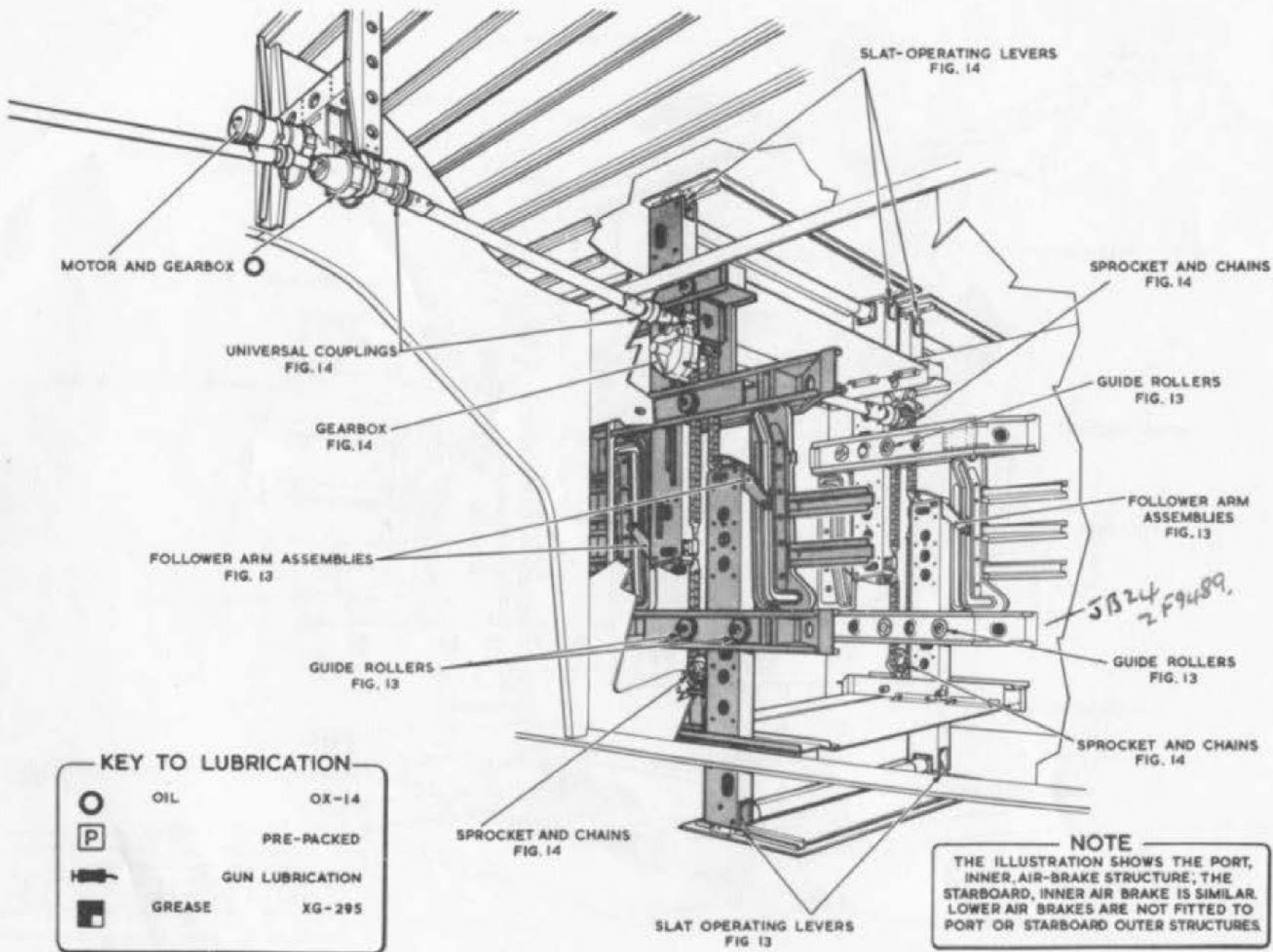


FIG. 12. AIR BRAKES - LUBRICATION (I)
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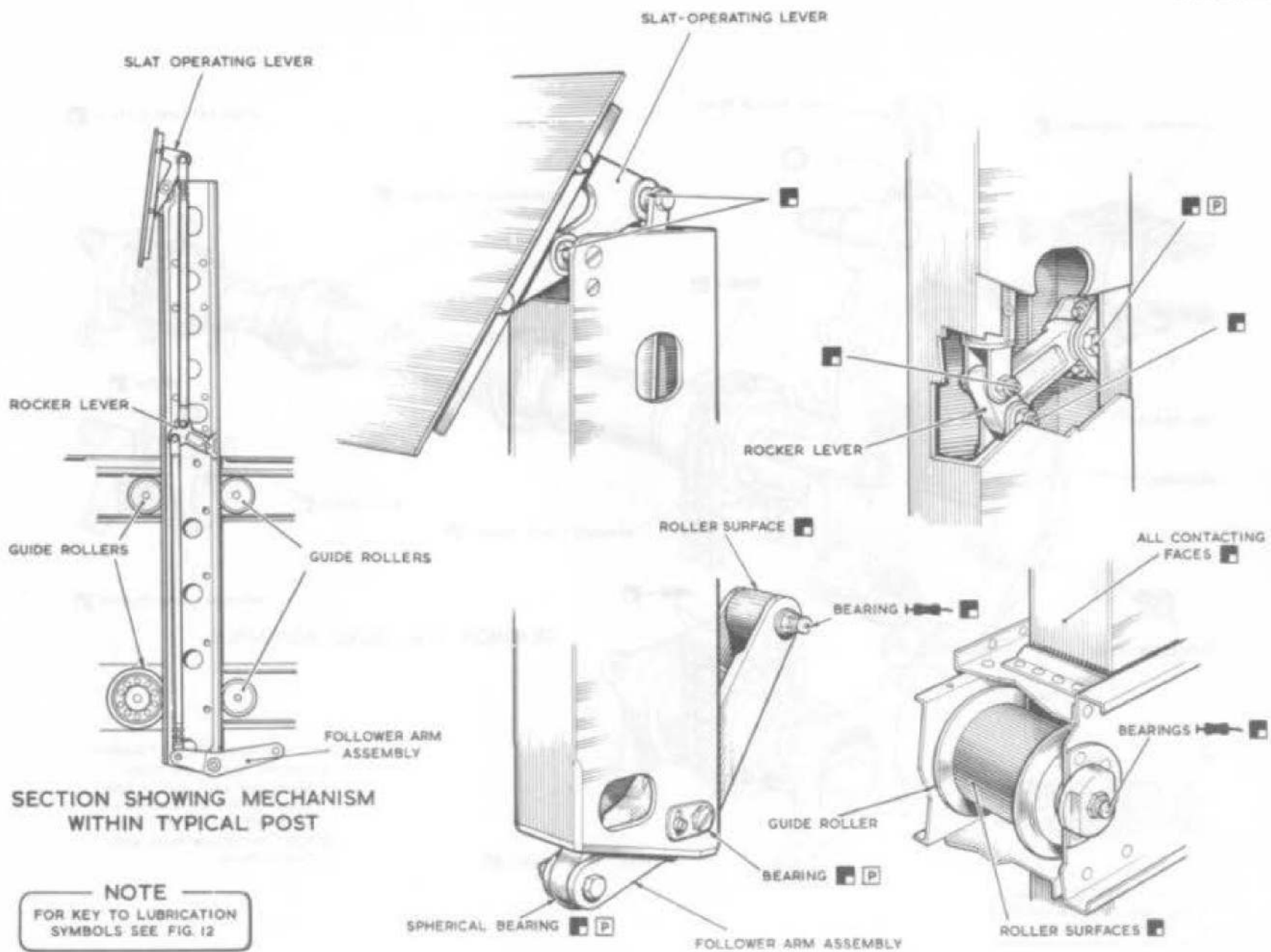
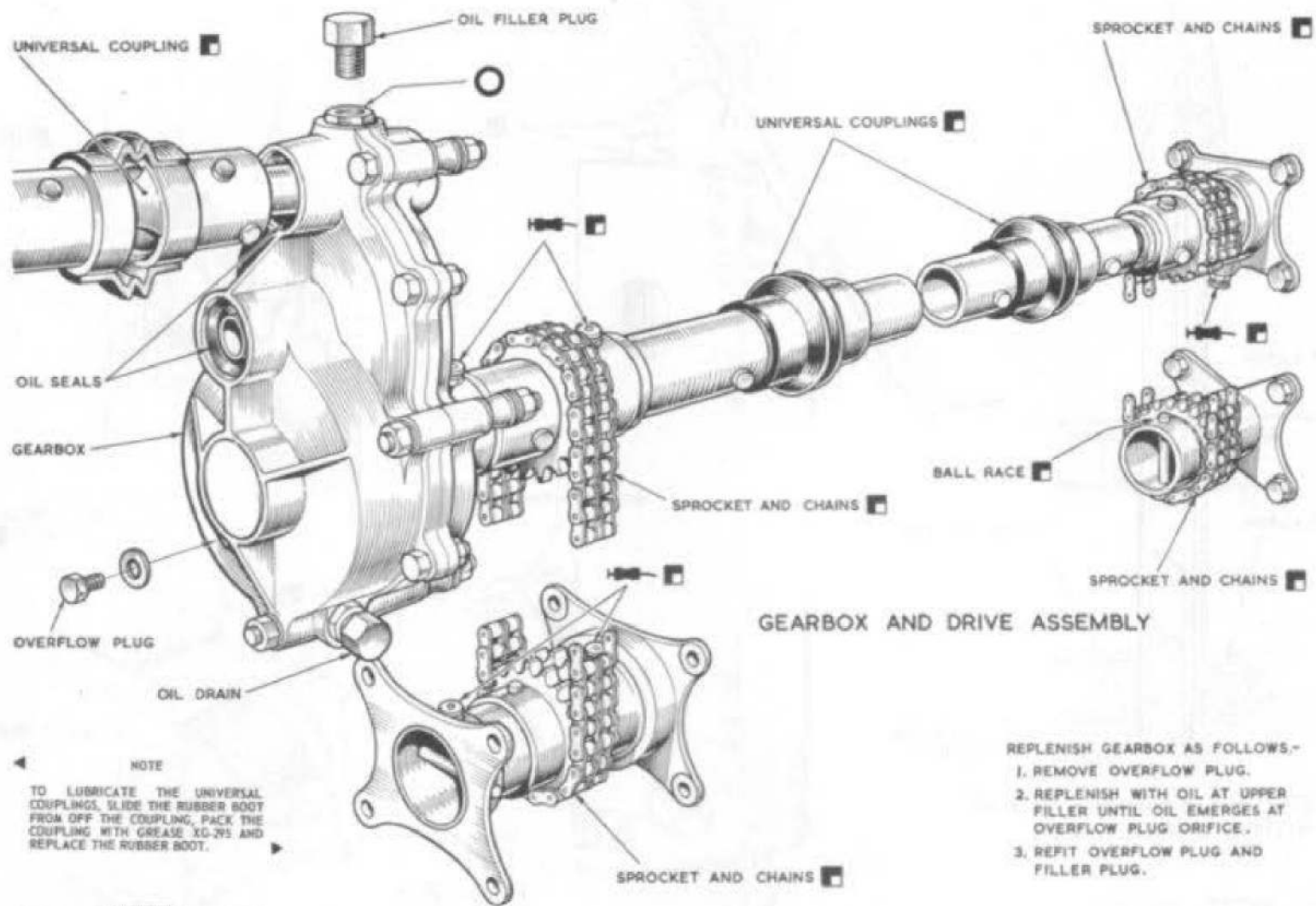


Fig. 13 Airbrakes - lubrication (2)

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NOTE

TO LUBRICATE THE UNIVERSAL COUPLINGS, SLIDE THE RUBBER BOOT FROM OFF THE COUPLING, PACK THE COUPLING WITH GREASE XG-295 AND REPLACE THE RUBBER BOOT.

NOTE

FOR KEY TO LUBRICATION SYMBOLS SEE FIG. 12

REPLENISH GEARBOX AS FOLLOWS:-

1. REMOVE OVERFLOW PLUG.
2. REPLENISH WITH OIL AT UPPER FILLER UNTIL OIL EMERGES AT OVERFLOW PLUG ORIFICE.
3. REFIT OVERFLOW PLUG AND FILLER PLUG.

Fig.14 Air breaks - lubrication (3)

(Lubrication altered)
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BOMB DOOR SETTING

46. The bomb doors when set correctly should follow the general contour of the aircraft, and the gap between the seals of the inner bomb doors, in the closed position must be $0.1 \begin{matrix} +0.054 \\ -0.014 \end{matrix}$ in. The tolerance is

increased to $+0.130$ in. at the forward end
 -0.030

of the bomb doors where the hinged access doors are situated. Assuming the bomb door jacks are set correctly as described in para.48, adjustments to obtain correct setting are made on the adjustable links of the bomb door self-locking strut. Details of the method of setting these components are given in later paragraphs.

47. Fore-and-aft, the doors are not adjustable, but for checking purposes the manufacturer's interchangeability dimension may be used as a reference. Clearance between the forward end of the bomb doors and the front spar seal structure is $0.741 \begin{matrix} +0.040 \\ -0.010 \end{matrix}$ in., and between the rear end of the bomb doors and the rear spar seal structure is $0.814 \begin{matrix} +0.040 \\ -0.010 \end{matrix}$ in.

BOMB DOOR JACK ADJUSTMENT

48. Installation of bomb door jacks (Part No.A.7897Y Mk.A and B) is a reversal of the removal procedure described in para.59, the fork ends being adjusted to suit the aircraft pick-up points. The manufacturer's nominal pin centre setting for the closed position is 16 in., but a tolerance of ± 0.25 in. is allowed for setting purposes. To adjust the jacks when setting:-

- (1) Select bomb doors OPEN on the cockpit selector switch and place the selector switch guard (Ref.No. 26DC/95054) in position.
- (2) Disconnect the bomb door self-

locking struts from the outer bomb door and secure them to a point where operation of the jacks will not cause damage to the aircraft.

- (3) Attach the bomb door slinging equipment to the brackets provided as described in the key to fig.22, sub.para.(3), (4) and (5).
- (4) Disconnect the bomb door jack from the bomb door mechanism lever.
- (5) Remove the selector switch guard and select doors CLOSED. If one door is being set, ensure that equipment cannot foul the door being operated and that all personnel stand clear of the area.
- (6) Remove fuses 101, 102 and 159 in the port and starboard fuselage fuse and relay panels 3P and 4P.
- (7) Remove the locking wire securing the locknuts and spanner grip on the jack fork-end, adjust the fork-end as necessary.
- (8) On completion of adjustment, reverse the procedure described in sub para. (1) to (7) to complete assembly.

OUTER BOMB DOOR LINK ADJUSTMENT

49. The links are installed to suit the pick-up points on the aircraft. The manufacturer's nominal pin centre setting is 10.45 in. but for setting purposes the fork-ends may be adjusted within normal safety limits. To adjust the fork-ends:-

- (1) Select bomb doors CLOSE, check the amount of adjustment required.
- (2) OPEN the bomb doors to give a gap of 18 to 24 in. between the inner bomb doors. Remove fuses 101, 102 and 159 from fuse and relay panels 3P and 4P.

NOTE...

It is necessary to open the bomb doors to remove the link to bomb door attachment pin.

- (3) Disconnect the greasing tube from the link to bomb door attachment pin, remove the pin retaining plate and the pin.
- (4) Release the link locknuts, adjust link length as necessary and connect the link to the bomb door.
- (5) Replace the fuses removed in sub-para.(2), select bomb doors CLOSE. Check accuracy of adjustment.
- (6) When adjustment is satisfactory select bomb doors OPEN and remove the fuses as laid down in sub-para.(2).
- (7) Check the link fork-ends for safety and tighten the locknuts. Fit the link attachment pin securing plate and fit the greasing tube.
- (8) Fit the fuses, select bomb doors CLOSE, check alignment of the locking strut eye-end with the bomb door attachment points and adjust, if necessary, as laid down in para.51.

INNER BOMB DOOR LINK ADJUSTMENT

50. The links are installed to suit the pick-up points on the aircraft. The manufacturer's nominal pin centre setting is 20.22 in., but for setting purposes the links may be adjusted within normal safety limits. To adjust the links:-

- (1) Select bomb doors OPEN and place the bomb door selector switch guard in position.
- (2) Release the locknuts of the adjustable links.

- (3) Adjust the links, as necessary, by turning the barrels with a 3/16 in. tommy bar.

- (4) Check for safety, tighten the locknuts.

BOMB DOOR SELF-LOCKING STRUT ADJUSTMENT

51. The self-locking struts (Part No. A8485Y) are installed to suit the pick-up points on the aircraft. The maximum pin centre dimension permitted is 33.24 to 33.74 in. Jack travel dimension is 16.96 to 16.84 in. To adjust the struts:-

- (1) Select bomb doors CLOSE and place the bomb door selector switch guard in position.

- (2) Remove the locking wire from the eye-bolts, locknuts and spanner grips.

- (3) Remove the pins connecting the eye-bolts to the bomb doors.

- (4) Slacken the locknuts and spanner grips, adjust the eye-bolts of each strut until the attachment pins can be inserted to pick up the eye-bolts and the bomb door attachment points.

- (5) Remove the attachment pins and shorten each locking strut by 1½ turns of the eye-bolt. Fit the attachment pins.

- (6) Tighten the locknuts and spanner grips, check for safety and wire-lock the eye-bolts, locknuts and spanner grips.

ADJUSTMENT OF THE POWER COMPARTMENT ACCESS DOOR CATCHES

52. To adjust the catches on the power compartment access door:-

- (1) Adjust the hooks of the catches until the ends of the operating levers are approximately ¼ in. clear of the door surface when the hooks are fully engaged on their securing rods. The handle is set to ¼ in. clear of the skin so that the final movement to skin line will pull the door in and take up any play in the mechanism and flexibility in the structure.

- (2) Wire-lock the catches.

- (3) Close the door (para.53).

- (4) Apply a weight of approximately 56 lb. on each catch and check that the door does not protrude below the fuselage skin line.

METHOD OF CLOSING THE POWER COMPARTMENT ACCESS DOOR

53. To close the power compartment access door:-

- (1) Lock the forward and rear catches.

- (2) Check the security of the forward catch by releasing the aft catch and attempting to open the door.

- (3) Check the security of the aft catch by reversing the procedure in sub para.(2).

- (4) If the door remains closed in both cases, engage and lock the catches.

ENTRANCE DOOR

Functional check and adjustments

54. When servicing operations are carried out which necessitate the removal and subsequent assembly of a main entrance door and, when fitting a replacement door, the following checks are

considered necessary. Refer to fig.15 and proceed as follows:-

- (1) Check that the weather seal and pressure seal in the door aperture are not damaged and show no sign of deterioration.

- (2) Check that the hinge pins move freely in the bushes of the hinge brackets and the door hinge arms.

- (3) Offer the door to the aircraft and complete the hinge assembly by inserting the hinge pins. Washers included in this assembly, are to be fitted, one on each side of the door hinge arms.

- (4) Ensure that the pneumatic system ground isolation cock is closed, disconnect and remove the door operating jacks. This enables the door to be moved, through its full operating range, by hand, without interference.

- (5) Using a soft pencil, establish, and mark on the outer skins the longitudinal centre line of the door at its trailing edge and the fuselage just aft of the entrance door aperture.

- (6) Move the door, by hand, through its operating range to check for full and free travel.

NOTE . . .

If the lock-pins engage in their respective housings during this check and the centre lines on the door and fuselage coincide, it can be assumed that the door alignment is satisfactory. Should difficulty be experienced in closing and locking the door, the cause must be investigated and rectified.

- (7) Check for malalignment of components or pre-stop interference:-

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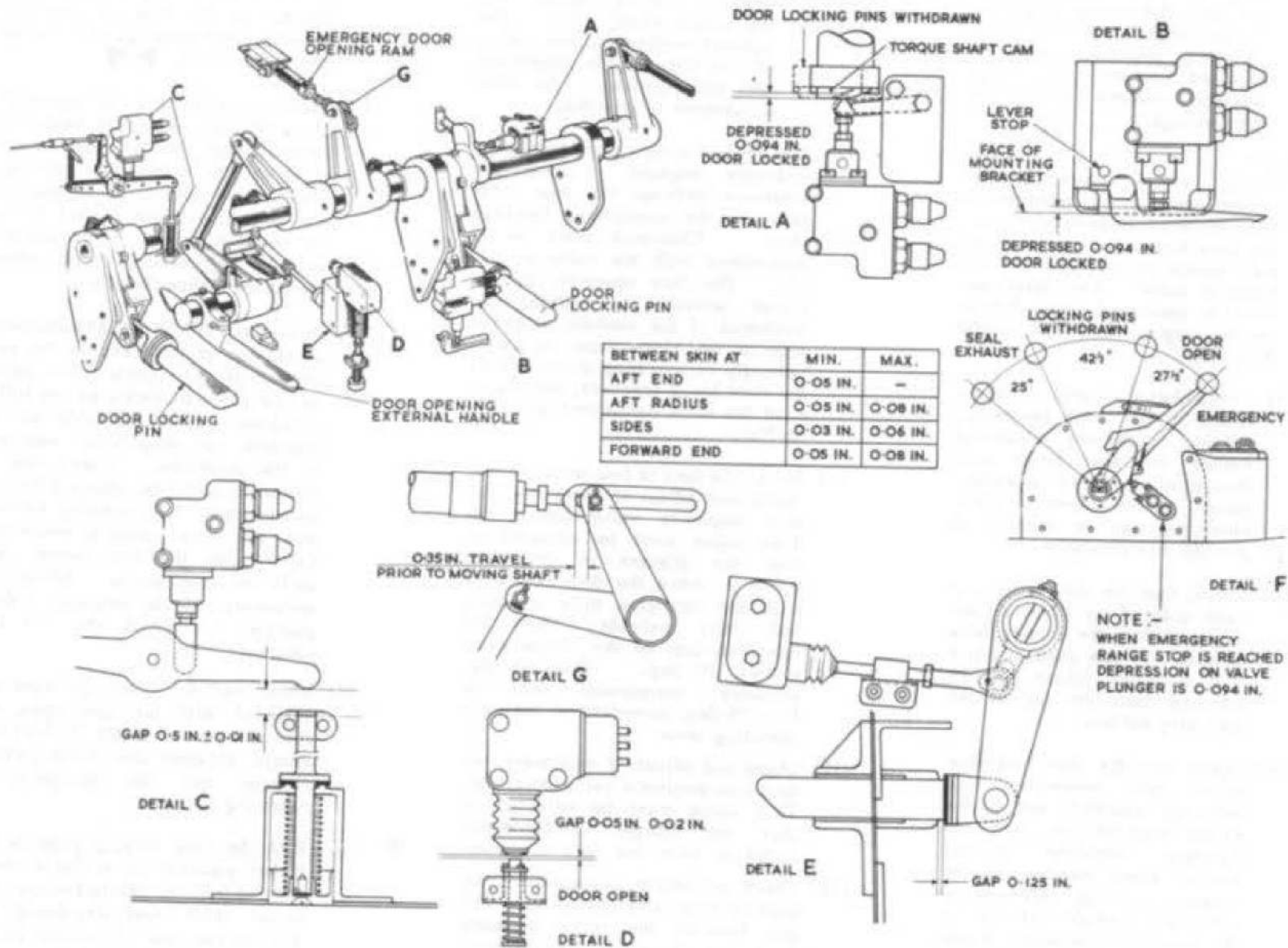


Fig. 15. Entrance door mechanism adjustment.

(4 Detail G added)

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- (a) If the centre lines on the door and fuselage do not agree, one hinge bracket must be shimmed out until the correct alignment is achieved. Shims, up to 20 s.w.g. maximum, are to be inserted behind the hinge bracket towards which the door swings.

NOTE . . .

Should either hinge bracket require shims, it is necessary to raise the fuselage inner skin, i.e., the area forward of the door, to gain access to the hinge bracket securing bolts. Particular care must be exercised when drilling out the pop rivets which secure this skin.

- (b) Check that the apertures, in the former at the hinge assembly, provide sufficient clearance around the door hinge arms throughout the door operating range. The edges of these apertures may be dressed to provide this clearance.
- (c) Check that the door stops, at each side of the door, do not engage before the door is fully closed. If this does occur, a thin slice of rubber may be removed from the top of the door stop buffers.
- (d) Check that the door lock-pins enter their respective lock housings smoothly and to the extent required, i.e., until the lock-pin shoulder sealing washer abuts the face of the lock-pin housing, this can be observed through cut-outs in the inner fuselage skin. A gap between the washer and the housing face indicates inadequate penetration, this may be

caused by a foul in the system or incorrect adjustment of the connecting rod between the internal opening handle and the torque shaft lever. The nominal setting for this rod is 48.5 in. between the attachment bolt hole centres. No other adjustment is provided.

- (8) With the door in the closed position - lock-pins engaged - check the clearance between the door outer skin and the surrounding fuselage skin. Clearance must be in accordance with the table on fig. 15. The door assembly can be moved laterally by varying the thickness of the washers at either side of the hinge arms, or longitudinally by inserting shims behind the door hinge brackets, bearing in mind the shim limitations given in op.7(a).
- (9) Whilst the door is free to be moved, check and adjust if necessary, the door sequence valve (detail A). This valve must be adjusted so that the plunger is depressed 0.094 in. when the door is closed with the lock-pins fully engaged, and fully extended when its operating cam on the torque shaft rotates 10 deg. This 10 deg. movement corresponds with the first 25 deg. movement of the main operating lever.
- (10) Check and adjust, if necessary, the door seal sequence valve (detail B). This valve must be adjusted so that the plunger is depressed 0.094 in. when the door is closed.
- (11) Check and adjust, if necessary, the door closing valve (detail C). The gap between the valve operating lever and the end of the external push-button plunger must be 0.5 ± 0.01 in.

- (12) The micro switch (detail E) must be adjusted so that, when the lock-pins are withdrawn and held 0.125 in. from the locked position, the lights, on the rear of the door opening lever housing, will change from green to red. ▶◀

- (13) Ensure that the door is supported (para.69) and move the operating lever through its full range to the stop at the emergency position. Check and adjust, if necessary, the sequence valve (detail F) in the lever housing. The plunger must be depressed 0.094 in. when the lever reaches the stop.

- (14) On aircraft with Mod.1283 embodied, adjust the stop screw, on the external opening handle pivot tube, so that the door lock-pins are fully withdrawn when the stop screw contacts the stop block secured to the structure. Check that a clearance of 0.1 in. exists between the internal door opening handle and the door opening sequence valve when the stop screw contacts the stop block. Adjust, if necessary, on the sequence valve plunger to obtain the 0.1 in. clearance.

- (15) Micro switch (detail D) must be adjusted with the door open, so that a gap of 0.005 ± 0.02 in. exists between the micro switch plunger and the spring-loaded operating plunger.

- ◀ (16) With the door locking pins in the locked position check that a clearance of 0.35 in. exists between the torque shaft lever attachment pin and the rear end of the slot in the torque shaft operating pneumatic ram (detail G). Adjust, if necessary. ▶

ary, on the end of the pneumatic ram.

- (17) Fit the door operating jacks to the aircraft and remake the pneumatic connections.
- (18) Connect the door to the operating jacks and open the pneumatic system isolation cock. The door may now be operated by the pneumatic system.
- (19) If the inner skin has been raised op.(7), item (a), secure to the original contour with the appropriate pop rivets. Reference must be made to Vol.6, of this publication for information regarding rivets and sealing.
- (20) Ensure that all locking devices are positively locked.
- (21) Finally a cabin pressure test must be carried out in accordance with Sect.3, Chap.8A of this Book.

Sequence checks

55. A complete functional check should be made, operating the door from inside and outside the aircraft. Operation of the components may be observed by a person stationed inside the aircraft adjacent to the torque shaft. Proceed as follows:-

- (1) Ensure that the air cylinder, serving the door system, is fully charged.
- (2) Plug in a ground electrical supply.
- (3) Ensure that all loose equipment is removed from the vicinity of the door.
- (4) Close the door, from inside the aircraft, using the cable control in

the crew's floor. The following sequence of operations must occur.

- (a) The lever at the end of the cable will rotate and depress the plunger of the door closing valve (detail C) admitting a flow of air to the UP side of the operating jacks.
 - (b) The door closes and the lock-pins engage. Door seal sequence valve (detail B) operates, when the lever is moved upwards by the door, and air is admitted to the door seal.
 - (c) Micro switch (detail D) is tripped by the spring-loaded plunger being pushed upwards by the door, followed by micro switch (detail E) being tripped by the lock-pin lever link connection. These two micro switches govern the flow of current to the indicators, two lamps on the lever housing and a magnetic indicator (doll's eye) on the pilots' centre panel. The lamps will change from red to green and the indicator will show black.
- (5) Open the door from inside the aircraft as for an emergency, by operating the control lever through its full range. Move the lever slowly and the following will occur:-
- (a) As the lever is moved through the first 25 deg. the cam lever on the port side of the torque shaft will rotate, allowing the plunger of the sequence valve (detail A) to extend and exhaust the air from the door seal.

- (b) The next 42.5 deg. of lever movement withdraws the door lock-pins, allowing the door to drop under gravity. The micro switches (detail D and E) are tripped changing the lamps on the lever housing from green to red and the pilots' doll's-eye indicator to white.
- (c) When the lever is moved the final 27.5 deg. the plunger on the sequence valve (detail F) is depressed and air from the pneumatic system is admitted to the DOWN side of the operating jacks to open the door, necessary to open the door against the force of the slip-stream, when the aircraft is in flight.

NOTE...

Door movement, on the ground, is slow due to the air supply having to pass through a restrictor.

- (6) Close the door from outside the aircraft using the push-button control in the undersurface just aft of the door aperture. The sequence of operations is the same as in para.55(4).
- (7) Open the door from outside the aircraft using the external control handle adjacent to the push-button (6). This handle turns the torque shaft and the sequence in para.55, (5) (a) and (b) will occur.

BOMB DOOR MICRO SWITCH SETTING

56. Whenever servicing is carried out which entails the adjustment of the bomb door operating jacks, the bomb door micro switches must be checked and adjusted, if necessary, as follows:-

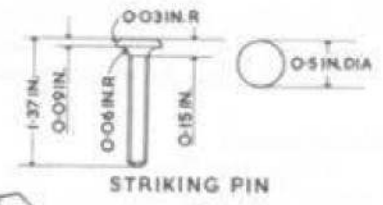
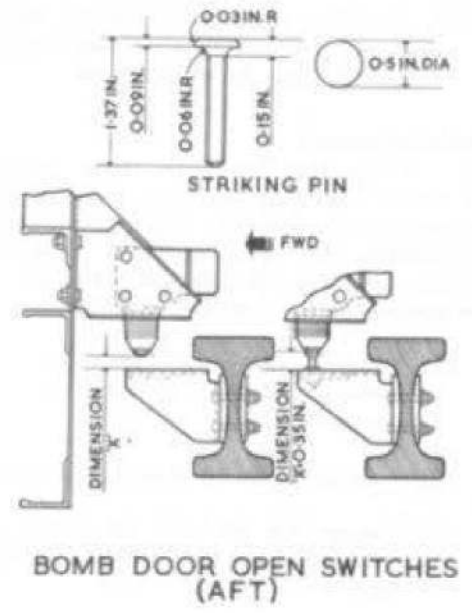
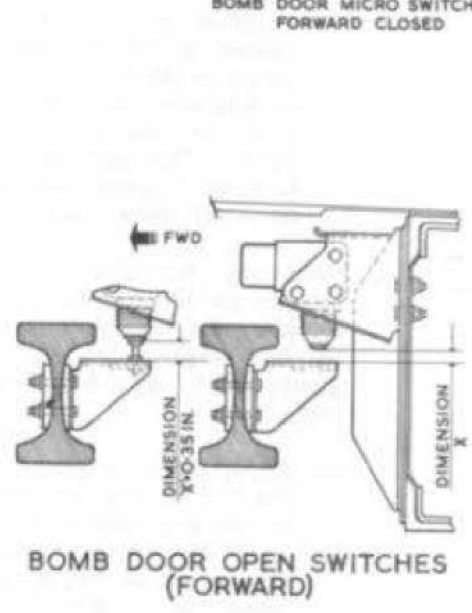
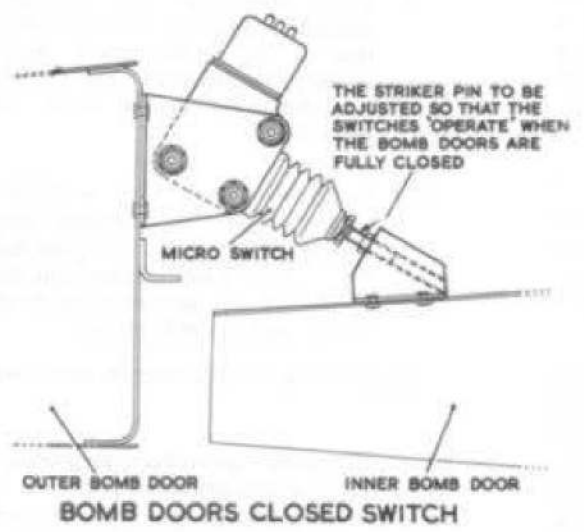
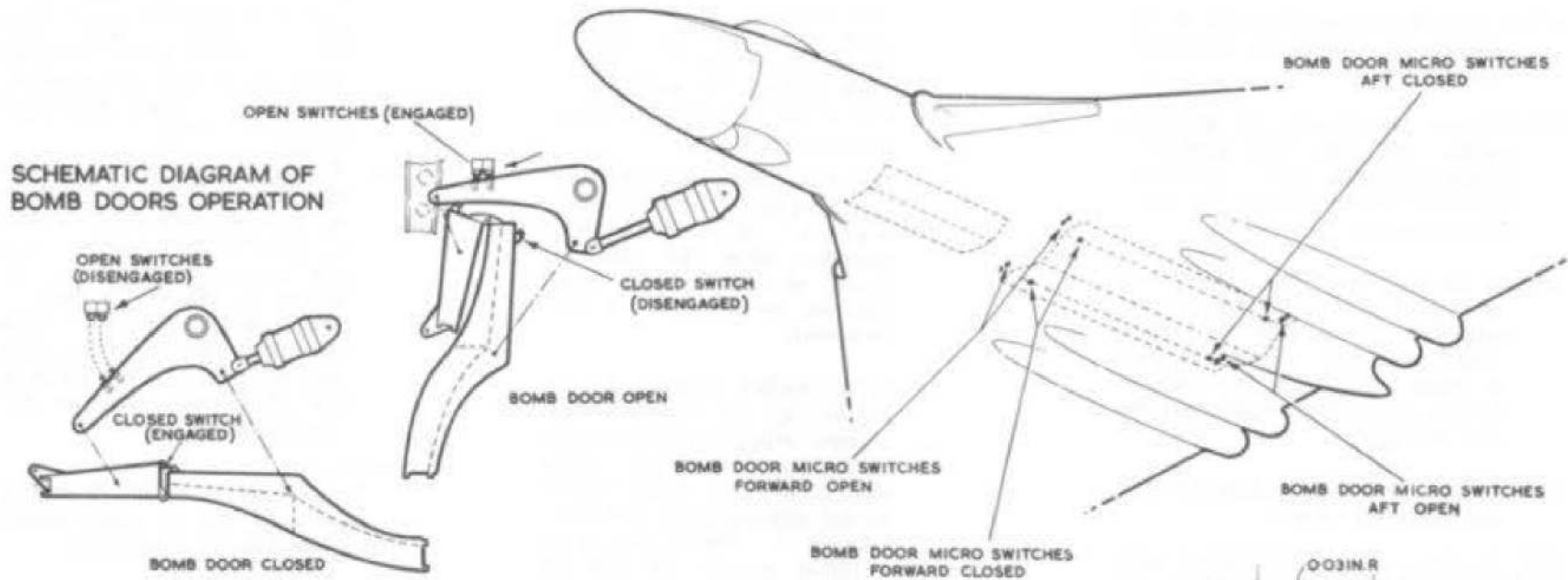


Fig. 15A. Bomb door micro switch setting
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- (1) Close the bomb doors.
- (2) Locate and remove the eight micro switch striker pins from the mounting brackets on the forward and rear bomb door operating levers.
- (3) Open the bomb doors, measure and note the distance between the end of each micro switch plunger and the top face of the respective striker pin mounting bracket (dimension X fig.15A).
- (4) Close the bomb doors and fit the striker pins to their respective mounting brackets.
- (5) Adjust each striker pin so that the measurement from the striking surface of the pin to the top surface of the striker pin bracket is the measurement obtained in item (3) plus 0.35 in. Tighten the striker pin locknuts.

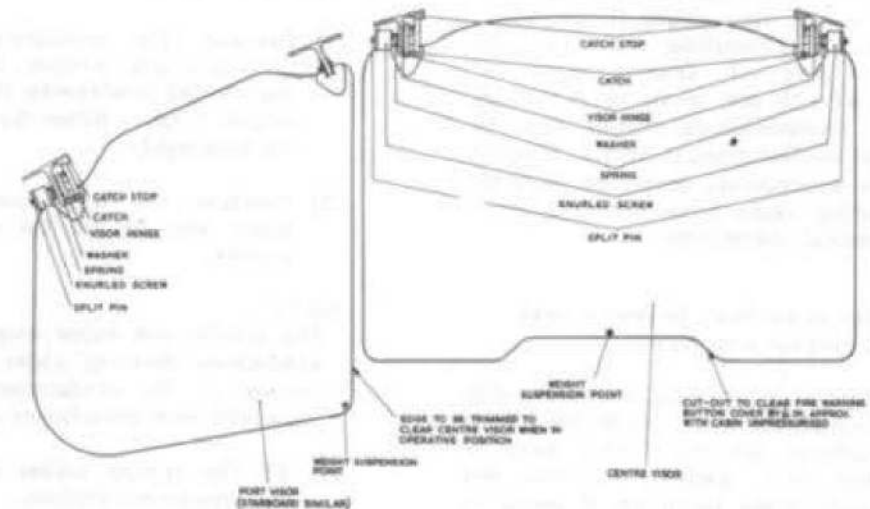
NOTE...

In the event of the striker pin being too short to permit the correct setting, a pin can be manufactured to the dimensions given in fig.15A.

- (6) Adjust the bomb doors closed micro switch striker pins until the micro switches just operate, then unscrew the striker pins a further 0.125 in. Tighten all the striker pin locknuts.

General

58. The procedure for dismantling the fuselage into its main components is given pictorially on the removal illustrations. Only the dismantling operations are given

**Fig.15B. Fitting anti-glare visors**

- (7) Open the bomb doors and check that the eight bomb-doors-open micro switches do not bottom.
- (8) Carry out a bomb door function check to ensure that the micro switch setting is satisfactory.

FITTING ANTI-GLARE VISORS

57. The pilots' anti-glare visors are retained in the stowed and operative positions, with the knurled screw fully loosened, by pins on the catch mating with dimples drilled on the visor hinge adjuster. The stowed position is flat against the inside of the canopy and the operative position is tight against the

coaming. Two dimples, 1/8 in. dia. drilled diametrically opposite for each of the two positions must be drilled deep enough to retain the visors in the operative position and support the visors in the stowed position with a weight of 10½ oz. on the port and starboard visors and 21 oz. on the centre visor, suspended at the points shown in fig.15B. When fitting replacement visors, the bottom of the centre visor must be cut as shown in fig.15B to clear the fire warning button cover by approximately 1/32 in. all round, with the cabin unpressurised. The top of the centre visor must also be trimmed on assembly to clear the compass. The in-board edges of replacement outer visors must be trimmed on assembly to clear the centre visor when in the down position.

REMOVAL AND ASSEMBLY

in detail since installation is a reversal of the removal procedure. Where differences do occur they have been included in the keys to the removal illustrations.

SEALING COMPOUNDS**General**

59. General notes on the method of sealing are given in the following para-

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graphs and in some instances details are included on the dismantling illustrations. Full details of sealing technique and correct mixing of sealing compound Araldite AV.121 are given in A.P.4505, Vol.6. Pressurisation checks must be carried out as described in Sect.3, Chapter 8A, when windscreen, periscope or sextant mounting seals have been disturbed during removal operations.

Preparation of surfaces forming a seal
60. To prepare a surface:-

- (1) Remove old sealing compound with trichlorethylene (Ref.No.33C/547). Surfaces forming a seal must be free from grease, moisture and small loose particles of metal or any other contaminates.
- (2) Primer SXH.41A does not have to be removed from new components prior to assembly as it is approved for use with Bostik sealing compounds.

Windscreen sealing

61. Only Bostik 1222 sealing compound is to be used to fill the gap between the window frame and the centre and side window outer glass layers. Bostik 1764 adhesive is used to stick the rubber seals to the window frames and clamps. Great care must be taken to ensure that the Bostik 1764 is thoroughly dry before the window is installed as the Bostik solvent will damage the window.

Transport joints

62. Surfaces must be bolted together before the sealing mixture loses its tackiness. Bolts must be dipped in the sealing mixture before assembly.

WINDSCREEN INSTALLATION

63. To fit a windscreen to its frame

proceed as follows:-

- (1) Prepare the windscreen frame (para.60) and secure the rubber seal to the windscreen frame using Bostik 1764. Allow the Bostik to dry thoroughly.
- (2) Position the windscreen in the frame and fit all the attachment screws.

NOTE...

The windscreen wiper stops and the windscreen de-icing spray pipes are secured to the windscreen frame by the windscreen attachment screws.

- (3) Fit the sponge rubber washers to the attachment screws.
- (4) Ensure that the sealing washer is secured to the windscreen clamping frame with Bostik 1764.
- (5) Position the clamping frame over the windscreen and secure it in position by tightening the attachment screws sufficiently to retain the windscreen in position.
- (6) Position the windscreen to give a clearance of 0.03 to 0.07 in. between the top and sides of the windscreen outer glass layer and the windscreen frame.
- (7) Proceed to finally tighten the attachment screws. Overtightening on one side of the window must be avoided, the screws must be tightened evenly, a small amount at a time until the final tightness is achieved.
- (8) Check the contour of the windscreen to the windscreen frame. If the outer glass layer is too thick it will be necessary to remove the windscreen and secure shims to

the Vinyl interlayer using Araldite 121N.

- (9) Finally, seal the gap between the windscreen outer glass layer and the windscreen frame using Bostik 1222, fit the windscreen wipers and connect the windscreen de-misting system.

PRESSURE CABIN WINDOW INSTALLATION

64. The pressure cabin circular windows are fitted with a glazing compound between the window Vinyl interlayer and the mounting frame. This glazing compound is Araldite 121N the mixing instructions of which are given in A.P.4505, Vol.6. To fit a replacement window proceed as follows:-

- (1) Remove, completely, the old glazing compound and degrease the mounting frame.
- (2) Cover the faces and edge of the Vinyl interlayer and the edge of the outer glass layer with a thin even film of grease XG-295.
- (3) Apply an even layer of Araldite glazing compound, thicker than is eventually required, to the mounting frame.
- (4) Apply a fillet of Araldite in the angle formed by the Vinyl interlayer and the toughened glass. Ensure that the fillet does not impair the retaining ring seating.
- (5) Press the window firmly into the frame until the glazing compound is exuded all round the edges internally and externally and the outer glass layer is flush with the pressure cabin outer skin.
- (6) Bolt the window in position using

the retaining ring. Tighten the bolts sufficiently to retain the window in the position given in op.(5).

- (7) Remove all exuded glazing compound from the edges and allow the glazing compound layer to harden for a minimum period of 6 hours.
- (8) Remove the window, inspect glazing compound surface and if necessary fill indentations ensuring that the flush finish of the surface is retained. Allow filling to harden.
- (9) Remove the grease applied in item (2) and fit the window complete with the retaining ring and the small retaining clamp, at the top of the window, to the frame, using the retaining screws, nuts and washers. Excessive tightening must be avoided, the nuts need little more than nipping-up.
- (10) Finally apply a liberal coating of Bostik 1222 around the inside glass layer edge, the retaining ring and the securing nuts. Fill the gap between the outer glass layer and the pressure cabin skin with Bostik 1222.

WARNING...

Bostik 1222 only must be used, no other sealing compound must be allowed to come into contact with the window.

AIR BOMBER'S WINDOW INSTALLATION

65. The air bomber's window is fitted with a glazing compound, Araldite 121N, between the window Vinyl interlayer and the mounting frame. The mixing instructions for the glazing compound is given in A.P.4505, Vol.6. To fit a replacement window proceed as follows:-

- (1) Remove, completely, the old glazing compound from the mounting frame and thoroughly degrease the frame.

NOTE...

Great care must be exercised when removing the glazing compound to prevent damage being done to the mounting frame.

- (2) Temporarily fit the window complete with clamping frame and check that a clearance of 0.03 to 0.11 in. exists between the outer glass layer and the window frame. Trim, if necessary, the window frame flange to obtain this clearance. Remove the window.
- (3) Protect the anchor nuts, in the vicinity of the mounting frame, with pieces of transparent adhesive tape, to prevent the glazing compound from entering the threads of the nuts.
- (4) Cover the faces and edge of the outer glass layer with a thin even coat of grease XG-295.
- (5) Apply an even layer of mixed Araldite compound, thicker than is eventually required, to the mounting frame.
- (6) Apply a fillet of Araldite in the angle formed by the Vinyl interlayer and the toughened glass. Ensure that the fillet does not impair the clamping frame seating.
- (7) Press the window firmly into the frame until the glazing compound is exuded all round the edges internally and externally and the outer glass layer is flush with the pressure cabin outer skin.
- (8) Bolt the window in position using

the clamping frame and nine bolts at the positions shown in fig.15C. Tighten the bolts sufficiently to retain the window in the position given in op.7.

- (9) Remove all the exuded glazing compound, leave the window in position to allow the glazing compound to harden for a minimum period of 6 hours.
- (10) Remove the window carefully, inspect the glazing compound surface and, if necessary, fill indentations ensuring that the flush finish of the surface is retained. Allow the filling to harden.
- (11) Remove the grease applied in op. (4) and fit the window complete with clamping frame and tighten the retaining screws sufficiently to retain the window in position.
- (12) Position the window to give the clearance, all round, given in item

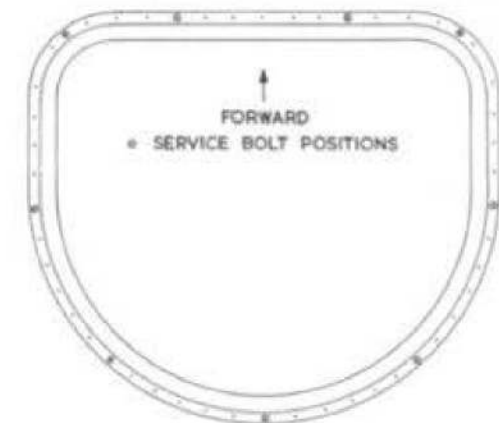


Fig.15C. Air bomber's window service bolting

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(2) and tighten the retaining screws. Excessive tightening must be avoided, the screws need little more than nipping-up.

- (13) Fit the front cover strip.
- (14) Finally apply a liberal coating of Bostik 1222 to the edge of the Vinyl interlayer and the clamping frame anchor nuts. Fill the gap between the outer glass layer and the window frame with Bostik 1222.

WARNING...

Bostik 1222 only must be used, no other sealing compound must be allowed to come into contact with the window.

CANOPY WINDOW INSTALLATION

66. The canopy circular window is fitted with a glazing compound, Araldite 121N, between the window Vinyl interlayer and the mounting frame. Mixing instructions for the glazing compound is given in A.P.4505, Vol.6. To fit a replacement window proceed as follows:-

- (1) Remove, completely, the old glazing compound from the mounting frame and degrease the mounting frame.

NOTE...

Great care must be exercised to prevent damage being done to the mounting frame when removing the old glazing compound.

- (2) Temporarily fit the window and retaining ring to the mounting frame on the canopy, bolt the window in position. The position of the window is governed by the inhibitor cartridge which must be fitted in its mounting clip with the collar on the cartridge bearing

against the clip and the tubing connected to the window. The inhibitor connection on the port window faces forward and on the starboard window faces to the rear.

- (3) Check that a clearance of 0.03 to 0.18 in. exists between the outer glass layer of the window and the surrounding external skin panel. Trim the external skin panel, if necessary, to obtain this clearance. Remove the window.
- (4) Cover the outer face and the edge of the Vinyl interlayer and the edge of outer glass layer with a thin even coat of grease XG-295.

- (5) Apply an even layer of Araldite compound, thicker than is eventually required, around the window aperture.
- (6) Apply a fillet of Araldite compound in the angle formed by the Vinyl interlayer and the inner glass layer. Ensure that the fillet does not impair the seating of the retaining ring.
- (7) Press the window firmly into the frame, in the position calculated in op.(2), until the glazing compound is exuded all round the window edges, internally and externally. The outer glass layer outer surface must not be more

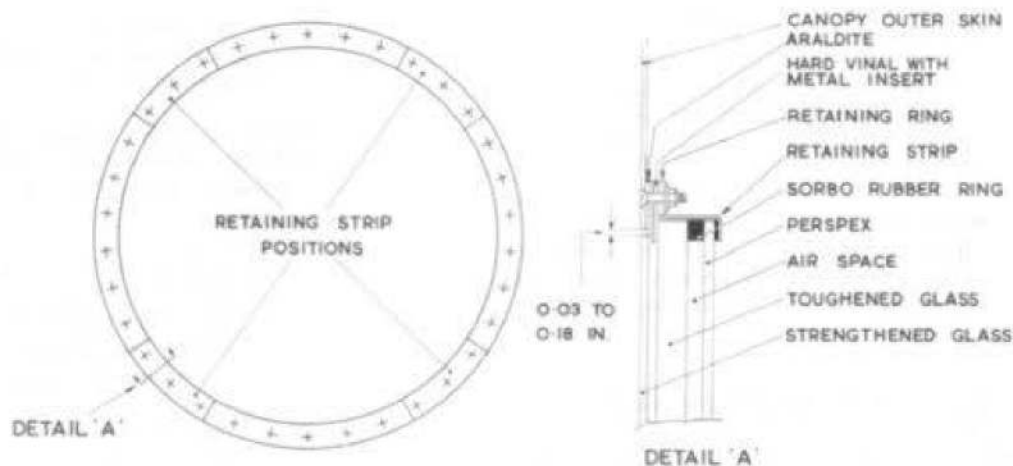


Fig.15D. Canopy window

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than 0.025 in. above or below the outer skin line.

- (8) Secure the window in position using the retaining ring, the securing screws, washers and nuts. Tighten the screws just sufficiently to retain the window in position.
- (9) Remove all the exuded compound and leave the window in position for at least six hours to allow the glazing compound to harden.
- (10) Remove the window carefully, inspect the glazing compound surface and, if necessary, fill any indentations, ensuring that the flush finish of the surface is retained. Allow the filling to harden.
- (11) Remove the grease applied in op.(4) and fit the window and retaining ring to the canopy in the position calculated in op.(2). Fit the 34 2 B.A. screws in the holes and place the four retaining strips in position (fig.15D).
- (12) Fit the washers and nuts to the retaining screws and tighten. Excessive tightening must be avoided, the screws need little more than nipping up.
- (13) Apply a liberal coating of Bostik 1222 to the edge of the Vinyl inter-layer and over the window retaining nuts.
- (14) Fit the inhibitor cartridge in the mounting clip and connect the tube to the connector on the window. Secure the tubing to the window connector by five complete turns of 22 s.w.g. locking wire (Ref.No. 30A/3339).
- (15) Fit the sun blind and anti-flash screen.

- (16) Fill the gap between the outer glass layer and the canopy outer skin with Bostik 1222.

WARNING . . .

Bostik 1222 only must be used, no other sealing compound must be allowed to come into contact with the windows.

FITTING A DOOR SEAL

67. The entrance door inflatable seal is retained in position with fore and aft, side and corner angle-section clamping strips. The clamping strips are secured to the door frame with 4 B.A. mushroom-head screws and anchor nuts. Should any section of the clamping strip be removed or any part of the seal disturbed, the adhesive bond between the clamping angle and the seal is destroyed and must be replaced before any attempt is made to operate the door seal inflation system. To fit an inflatable seal or replace the bond in any section disturbed proceed as follows:-

- (1) Thoroughly clean and dry the clamping angle and seal mating surfaces. Bostik cleaner No.6104 is recommended for use in preparing these surfaces.
- (2) Apply an even film of rubber-resin adhesive, (Ref.No.33H/72) to the clamp surface of the angle and the mating surface of the seal. Information on the use of adhesives is given in A.P.1464E, Vol.1, Part 2, Sect.4, Chap.6.
- (3) When the adhesive is dry - normally in 15 to 20 min. - locate the seal in the door frame. Simple, locally manufactured, U-clamps may be used to retain the seal in position.
- (4) Locate the clamping angle sections,

one each side, fore and aft and at the four corners, ensuring that pressure is applied in such a manner that no air pockets are formed between the mating faces.

- (5) Fit all clamping angle securing screws and tighten evenly, ensuring that no stretch or ripple is introduced in any part of the seal.

REMOVAL PROCEDURES

General

68. Removal procedures for the nose radome, nose metal fairing, canopy, wind-screen, periscope heads, front fuselage, bomb doors and rear fuselage are provided in the keys to illustrations, fig.16 to 23 inclusive.

Entrance door

69. During operations involving removal of the entrance door operating jacks, the following instructions must be noted. The door must not be allowed to open, when the jacks are removed, further than the

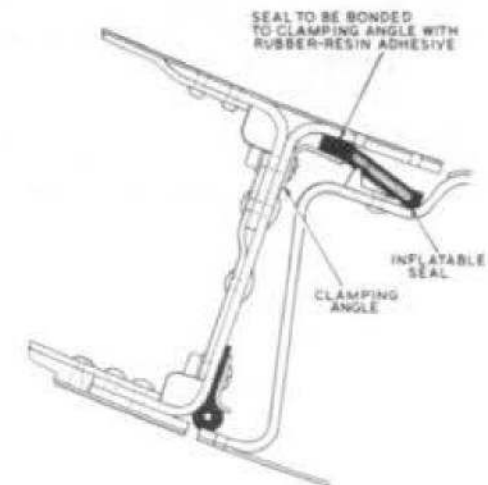


Fig.15E. Entrance door seal

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distance normally allowed by full extension of the jacks, otherwise damage could result to the skin plating of the structure forward of the hinges. Where possible, it is advised that only one of the jacks be removed at any one time. Failing this, a locally made restraining device, either a strut or rope, must be used.

Periscope sextant mountings

70. Sextant mountings are easily removed by disconnecting an electrical cable and removing the screws securing them to the fuselage. When the mountings are installed, four Langite seals are provided with each mounting, two of which are stuck to the mounting. The other two must be stuck to the fuselage with orange shellac, (Ref.No.33A/172), before the mountings are installed.

Bomb door jack

71. To remove a bomb door jack:-

- (1) Select bomb bay doors CLOSED.
- (2) Remove fuses 101, 102 and 159 situated in the port and starboard fuselage fuse and relay panels 3P and 4P.
- (3) Enter the bomb bay through the access doors at the forward end of the bomb doors and disconnect the

swivel link block from the bracket securing it to the bomb door mechanism structure.

- (4) Disconnect and blank off the hydraulic pipes leading to the swivel link block. Release the connections slowly.
- (5) Remove the bolt connecting the bomb door jack to the bomb door mechanism lever.
- (6) Remove the taper pins and bolts locking the spacer bushes and bearings to the bomb door jack attachment pin.
- (7) Remove the bomb door jack attachment pin using an extractor (Ref. No.26DC/95058).

NOTE . . .

After installation of the bomb door jack, bleed the circuit as described in Sect.3, Chap.6.

Bomb door mechanism lever removal

72. To remove a bomb door mechanism lever:-

- (1) Select bomb doors OPEN and place the bomb door selector switch guard in position.
- (2) Disconnect the bomb door jack fork-

end and the adjustable links from the bomb door mechanism lever.

- (3) Remove the taper pins and bolts locking the spacer bushes and bearings to the lever attachment pin.
- (4) Remove the lever attachment with an extractor (Ref.No.26DC/95058).

Canopy window removal

73. To remove the circular window from the cabin canopy proceed as follows:-

- (1) Remove the sun blind and the anti-flash screen from the runners on each side of the window.
- (2) Remove the locking wire securing the inhibitor tubing to the connection on the window. Remove the inhibitor from its mounting clip.
- (3) Remove the nuts and washers from the 34 2 B.A. screws securing the window to the canopy.
- (4) Remove the four window retaining strips and the window retaining ring.
- (5) Remove the 34 2 B.A. screws and remove the window from the canopy frame.

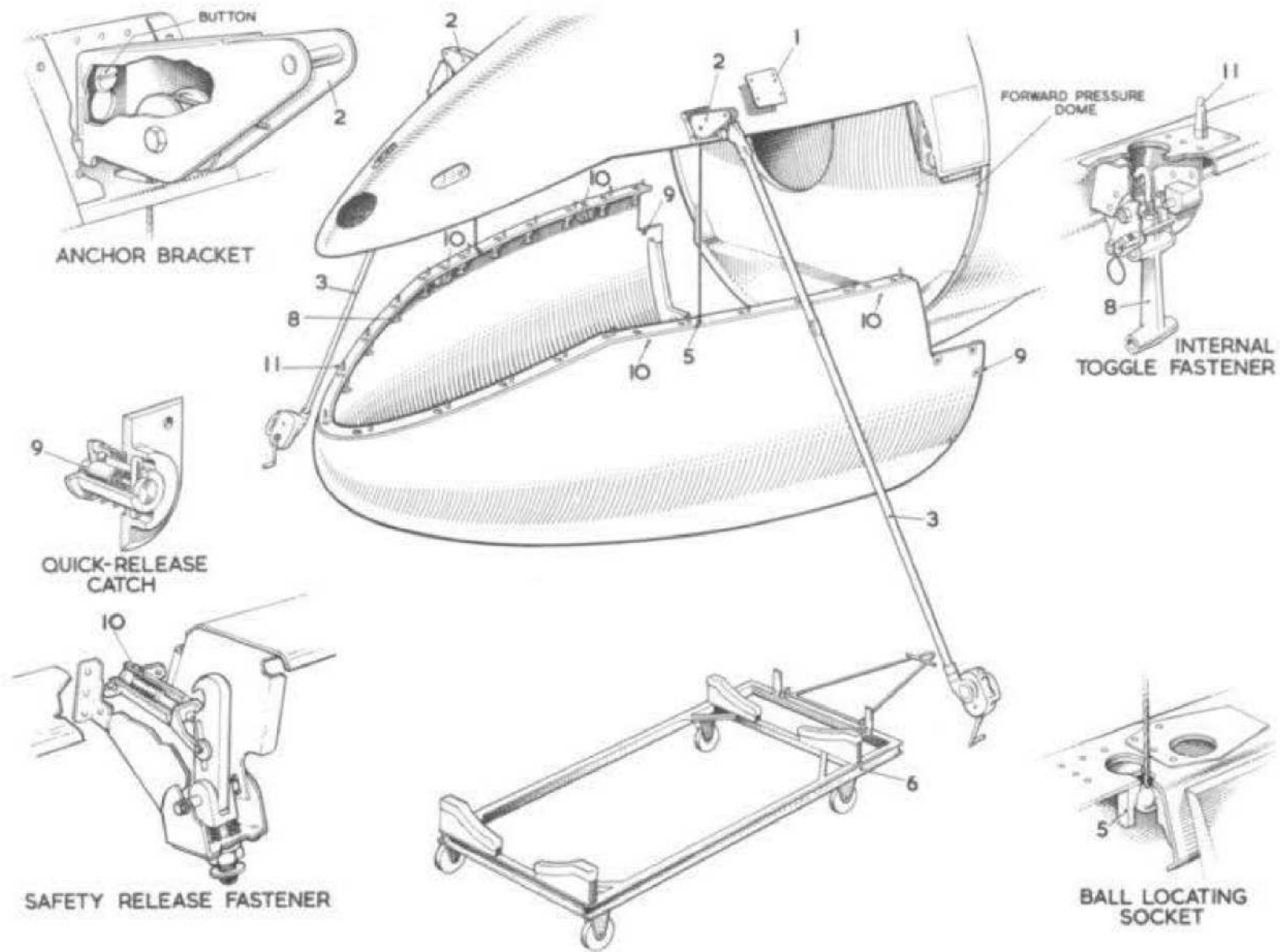


Fig.16. Removal of nose radome.

RESTRICTED

KEY TO FIG.17

NOSE METAL FAIRING REMOVAL

1. Ensure that all electrical supply is off.
 2. Discharge the storage cylinder of the door closing pneumatic system.
 3. Remove the nose radome (Sect.3, Chap.1, fig.16).
 4. Discharge and remove the H2S scanner air storage cylinder.
 - (5) Drain and remove the pilots' windscreen and air bomber's window de-icing system tank.
 - (6) Disconnect the following services on, or forward of, the front pressure bulkhead. Blank off all pipes.
 - (a) Electrical and radar plugs.
 - (b) De-icing system air pressure supply.
 - (c) H2S scanner pneumatic system
 - (d) Cabin pressurisation system, static pipes.
 - (e) Calculator static pipe.
 - (f) Flight refuelling system pipes.
 - (g) Pilots' windscreen de-icing spray pipes.
 - (h) Air bomber's window de-icing, and de-icing drain pipes.
 - (7) Disconnect the cabin pressurisation system combined valve unit, by unscrewing the sleeve connecting the end cap of the combined valve unit to the shroud unit on the decompression valve. Push the sleeve back on the shroud to complete the division of the unit.
 - (8) Remove the plug screws on the longitudinal centre line of the fairing top skin at formers 414F. and 470F. and attach lifting sling (Ref.No.26DC/95121).
 9. Discharge and remove the flight refuelling probe nitrogen purge system storage cylinder.
 10. Remove the flight refuelling probe.
- NOTE...
Items 9 and 10 are applicable only to aircraft with Mod.39 embodied.
11. Prepare a trolley to carry the nose fairing after removal.
 12. Attach a crane to the lifting sling and take the weight of the nose fairing, remove the nuts from the studs attaching the nose fairing to the front fuselage.
 13. Remove the nose fairing from the front fuselage and lower it on to the trolley.

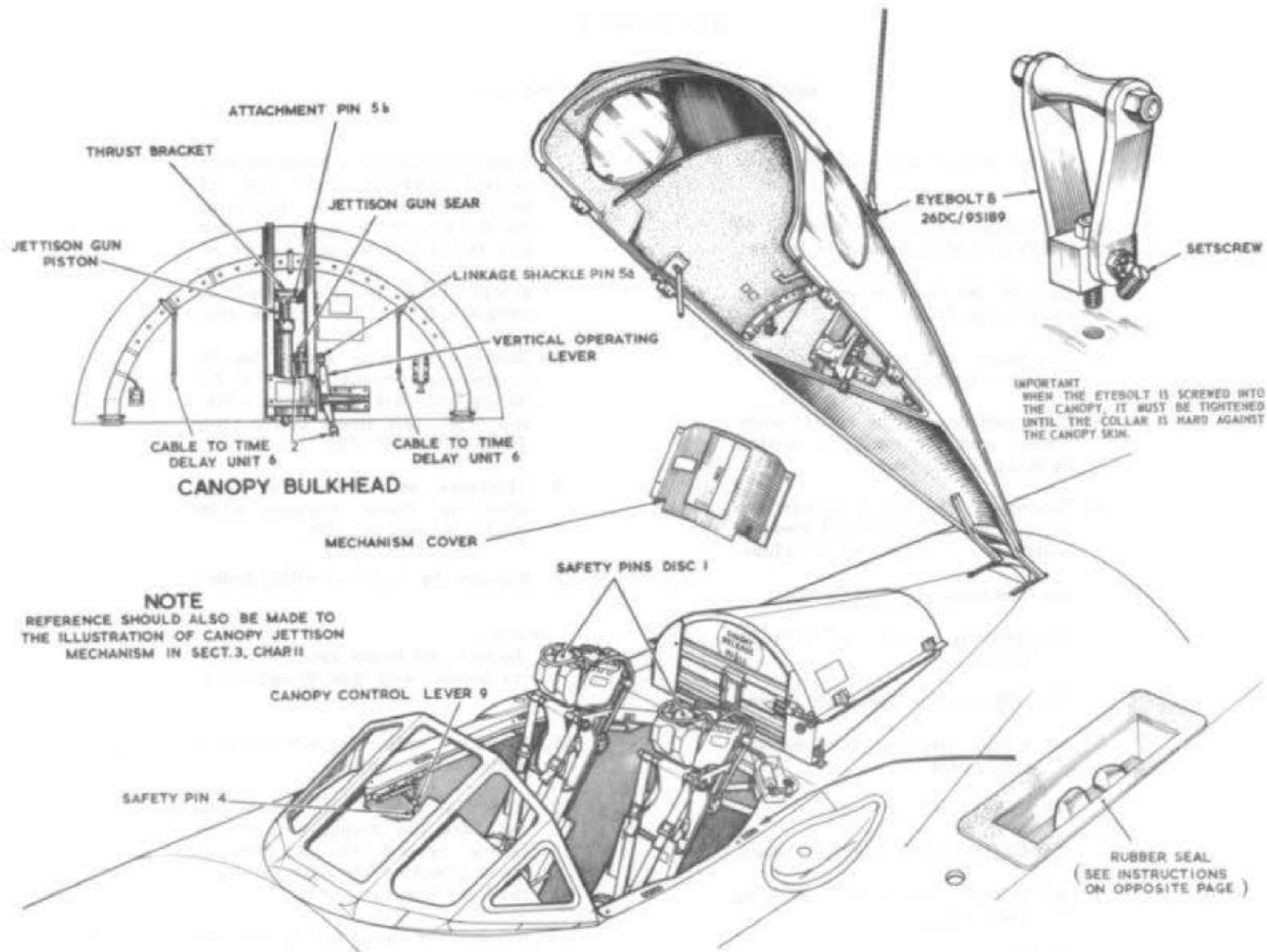


Fig.18. Canopy removal
(* B.C. Mod. 0125 *)
RESTRICTED

KEY TO FIG.18

CANOPY REMOVAL

To remove the canopy proceed as follows:-

- (1) Ensure that the safety pins are fitted in the main gun sear and time delay unit of each ejection seat.
- (2) Ensure that the Pip pin has been removed from the vertical operating lever on the canopy mechanism and the attached safety pin inserted into the jettison gun sear.
- (3) Discharge the contents of the air storage cylinders using an adapter, (Ref.No. 4G/4131), at the test points in the pneumatic system.
- (4) Ensure that the safety pins are removed from the canopy control lever gate on each side of the cockpit.
- (5) Remove the canopy jettison gun as follows:-
 - (a) Remove the split pin, collar and shackle pin securing the vertical operating lever to the jettison gun sear. **DO NOT REMOVE THE JETTISON GUN SEAR SAFETY PIN.**
 - (b) Remove the attachment pin attaching the jettison gun piston to the thrust bracket.
 - (c) Lift the linkage into the jettison gun channel and carefully manoeuvre the jettison gun until it can be lifted upward from the channel and removed.
- (6) Disconnect the cables at their point of attachment to the check pin on the time delay unit of each seat.

- (7) Push down the quadrant lever on the side of the time delay mechanism to just below the bottom of the guard and disconnect the canopy control valve operating cable. This will prevent a tradesman working in the cockpit from accidentally pulling the cable and moving the valve to the operative position without realising he has done so when the pneumatic system is empty. Charging the system with the valve in the operative position could result in damage to the canopy release mechanism if the Pip-pins were in position in the pilots' canopy control handle quadrants.

NOTE...

When the cable to the quadrant lever on the side of the time delay mechanism is connected, always ensure that the quadrant lever fork-end is returned to its position just above the base of the guard to prevent the cable eye-end springing off.

- (8) Replace the set screw in the upper side of the canopy with a canopy lifting eyebolt, (Ref.No. 26DC/95189). Attach the lifting equipment to the eyebolt.
- (9) Operate the canopy control lever on either side of the cockpit. This frees the canopy from the attachments and it can now be removed.

Detailed instructions on setting the canopy jettison mechanism is given in Sect.3, Chap.11. When fitting a canopy observe the following:-

1. Fit the canopy and check the gap between the canopy and the cockpit rail. If the gap is 0.01 in. or less no further action is necessary and the assembly of the canopy can proceed. If the gap is in excess of 0.01 in., seals must be secured to the cockpit rail around the release unit apertures, the thickness of seal used is dependent on the gap. The seals are as follows:-

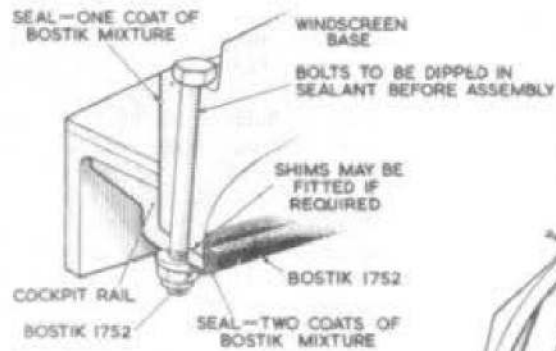
Ref.No. 26DC/8254	1/64 in.thick
Ref.No. 26DC/8255	1/32 in.thick
Ref.No. 26DC/8256	1/16 in.thick
Ref.No. 26DC/8253	3/16 in.thick

2. Where seals are secured to the cockpit rail, french chalk must be sprinkled on the seals prior to fitting the canopy.
3. When the canopy is installed ensure that the fork-end on the vertical operating lever mates correctly with the spigots on the operating cross shaft and check that the canopy pneumatic control valve is in the exhaust position before charging the pneumatic system.

WARNING...

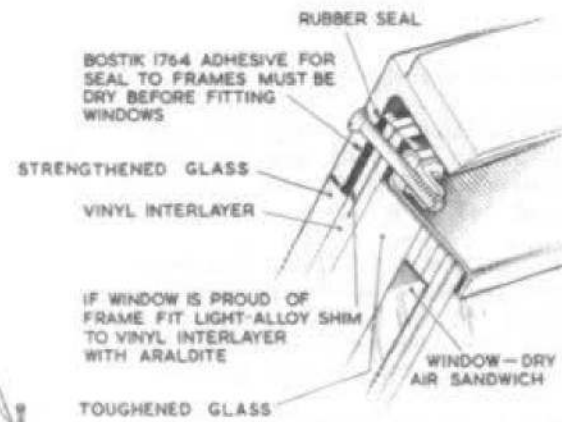
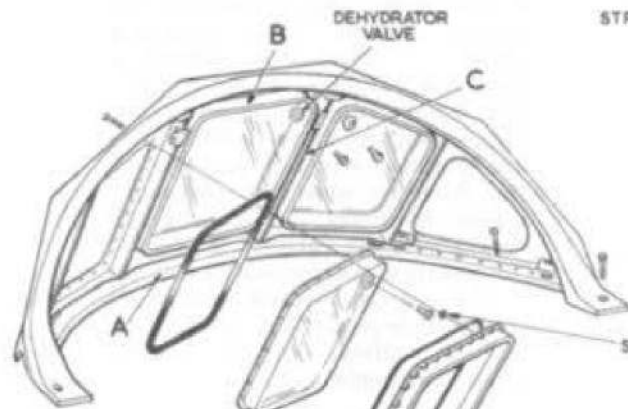
On installation of a canopy it is important that the release cables are connected to the time delay unit of each seat. After installation of the canopy and prior to charging the pneumatic system an inspection must be carried out to ensure that the control valve is in the fully exhausted position. This position is indicated by the lining up of the white lines on the valve lever and on the bottom guard plate.

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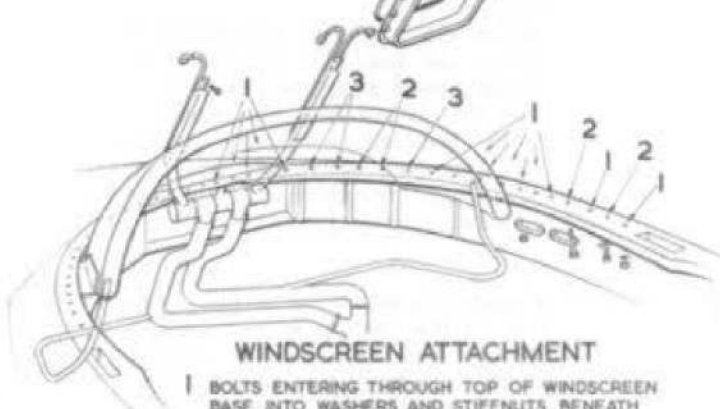


SEALING MIXTURE — EQUAL PROPORTIONS OF BOSTIK 1752 AND 1790

SECTION AT A

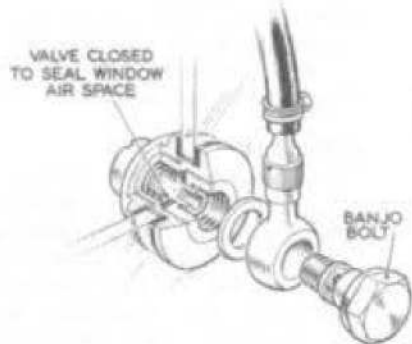


SECTION AT B

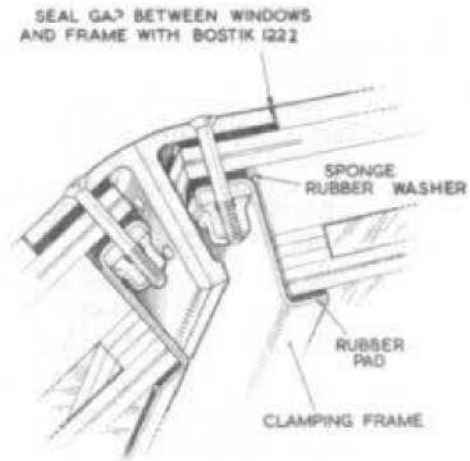


WINDSCREEN ATTACHMENT

- 1 BOLTS ENTERING THROUGH TOP OF WINDSCREEN BASE, INTO WASHERS AND STIFFNUTS BENEATH COCKPIT RAIL.
- 2 BOLTS ENTERING BENEATH COCKPIT RAIL, INTO WASHERS, CAGE NUTS OR WIRE INSERTS IN WINDSCREEN BASE — ALL WIRE-LOCKED.
- 3 AS 2 — WITHOUT WASHERS.



DEHYDRATOR VALVE



SECTION AT C

Fig. 19. Removal of windscreen.

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KEY TO FIG.19

REMOVAL OF WINDSCREEN

To remove the windscreen:-

- 1 Disconnect and remove the windscreen wipers.
- 2 Remove the direct vision window by sliding it from the hinge tube to provide access to the bolts connecting the windscreen to the cockpit rail.
- 3 Disconnect the windscreen silica-gel de-misting system.
- 4 Disconnect the windscreen thermal de-misting system.
- 5 Disconnect and remove the windscreen de-icing spray pipes.

- 6 Remove all bolts connecting the windscreen to the cockpit rail.
- 7 Move the windscreen from the front fuselage handling it with great care.

To remove a window:-

The centre and side windows are released by removing the screws, picking up with the anchor nuts on the windscreen clamping frame, and removing the clamping frame, sealing washers and windscreen from the windscreen frame.

Access to the bottom of the windscreen is through panels in the coaming.

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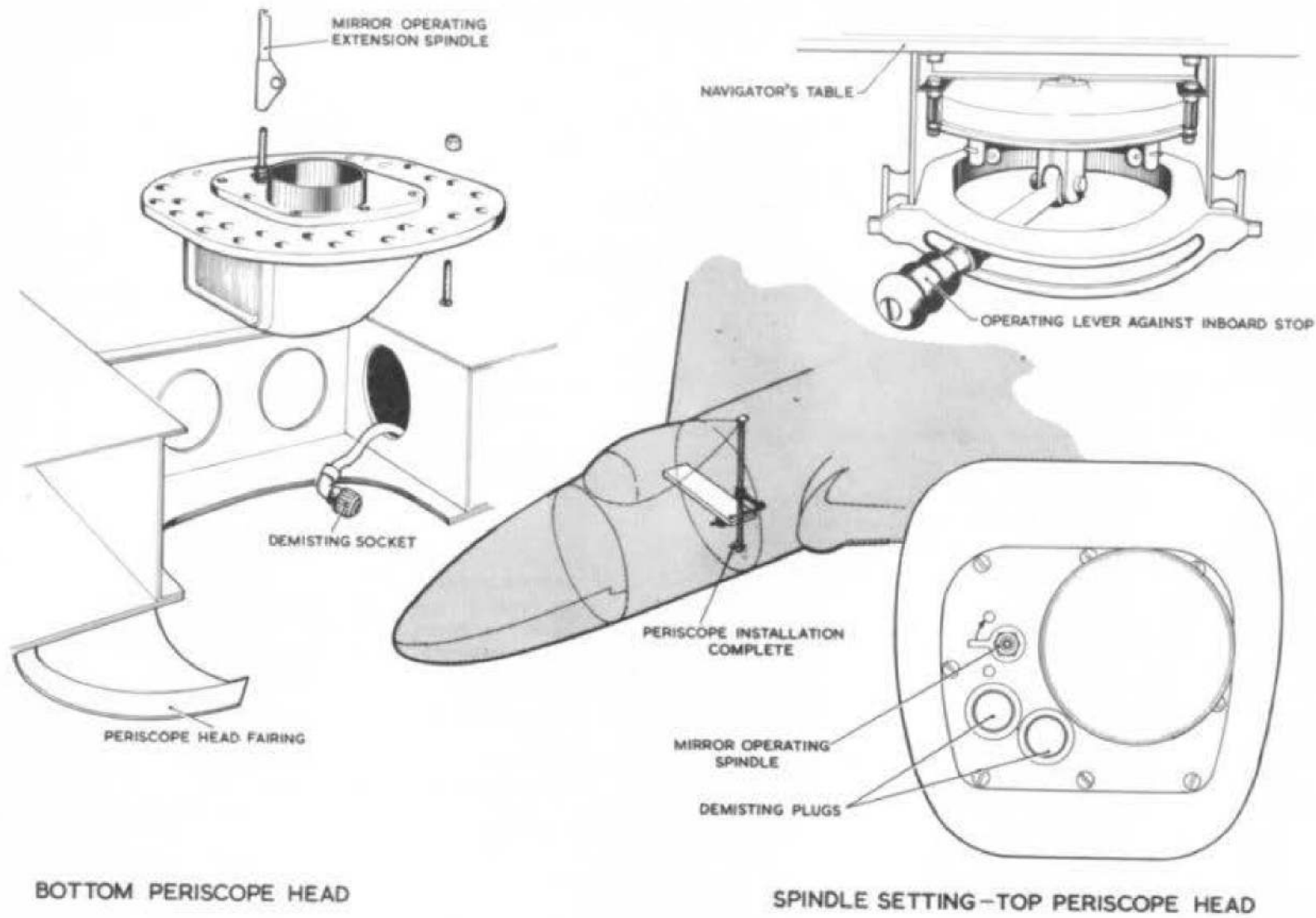


Fig. 20. Removal of periscope heads

RESTRICTED

KEY TO FIG.20

REMOVAL OF PERISCOPE HEADS

To remove the periscope heads:-

1. The periscope tube must be dismantled and removed in sections in accordance with the procedure in Book 2, Sect.5, Chap.2, Group 5.
2. Remove the periscope head fairings.
3. Disconnect the mirror operating extension spindles by sliding them off the mirror operating spindles after releasing the nuts and bolts on the levers at the top and bottom of the extension spindles.
4. Ensure that the de-misting plugs are disconnected.
5. Remove the nuts and screws connecting the heads to the fuselage skin.

NOTE . . .

When installing the heads, the mirror operating extension spindles must be installed in the following manner.

1. Position the operating lever, situated on the underside of the navigator's table, against the inboard stop.
2. Connect the mirror operating extension spindles to the mirror operating spindles.
3. Looking up for the top sighting head, down for the bottom, rotate the spindles in a clockwise direction for the top head and anti-clockwise for the bottom, to their stops.
4. Tighten the nuts and bolts on the levers at the bottom of the extension spindles.

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NOTE -

- 1 ENGINE AND PARKING BRAKE CONTROL RODS (7F) DISCONNECTED FORWARD OF THE REAR PRESSURE BULKHEAD AND WITHDRAWN AFTER REMOVAL OF THE REAR BULKHEAD SEALS THROUGH THE BULKHEAD WHEN THE FUSELAGE IS LIFTED FROM THE CENTRE SECTION.
- 2 ALL CONNECTIONS NOT ANNOTATED ARE ELECTRICAL, RADIO OR RADAR (7C).

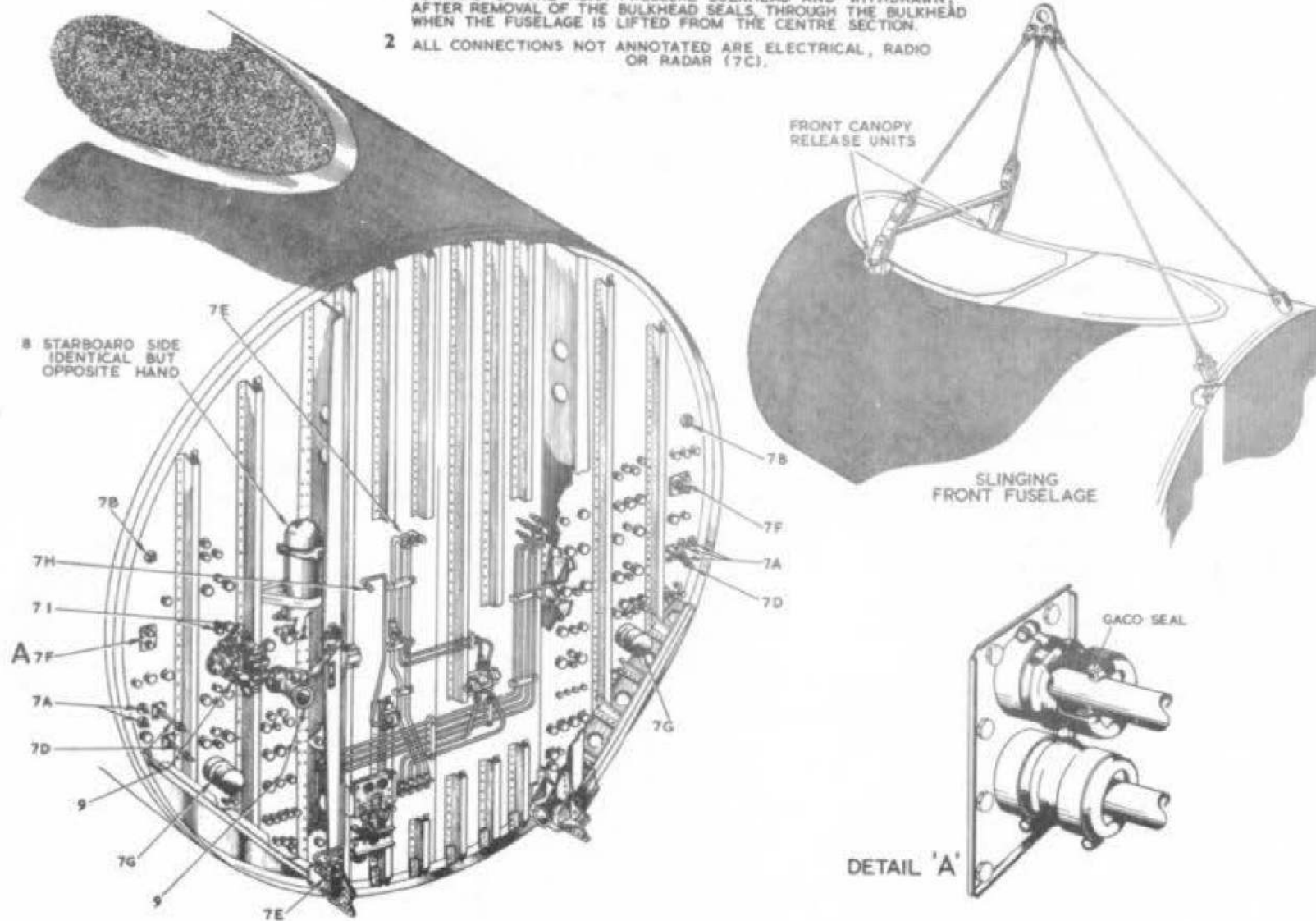


Fig. 21. Removal of front fuselage

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KEY TO FIG.21

REMOVAL OF FRONT FUSELAGE

To remove the front fuselage:-

1. Check that all removable equipment is taken from the fuselage.
2. Ensure that all electrical services are off.
3. Discharge any oil from the hydraulic brake accumulators (Sect.2, Chap.2)
4. Discharge the following services:-
 - (a) Oxygen system (Sect.3, Chap.10).
 - (b) Emergency air system (Sect.3, Chap.7).
 - (c) Entrance door pneumatic system (Sect.3, Chap.7).
 - (d) Hydraulic brake accumulator air (Sect.3, Chap.6).
 - (e) T4 bombsight pneumatic system (Sect.3, Chap.7).
5. Jack the aircraft as illustrated in Sect.2, Chap.4.
6. Remove the nose-wheel unit (Sect.3, Chap.5).
- (7). Disconnect the following services forward, on or aft of the rear face of the rear pressure bulkhead. Blank off all pipes.
 - (a) Pitot head pipes.
 - (b) Oxygen system.
 - (c) Electrical, radar and radio.
 - (d) Flying controls.
 - (e) Hydraulic and brake systems.
 - (f) Engine, emergency air and parking brake controls.
 - (g) Flight refuelling pipes.
 - (h) Emergency air.
 - (i) Ventilated suit system.
- (8). Disconnect and remove fire extinguishers.

- (9). To disconnect the air conditioning system, remove the clamp connecting the expansion joint to the non-return valve on the rear pressure bulkhead, and the clip connecting the ducting to the ram air valve.
10. Attach the crew nacelle sling (Ref.No.26DC/95007) to the following attachment points.

Forward	The two front release units, part of the canopy front attachment assemblies.
Aft	Two threaded lifting blocks situated on the rear pressure bulkhead between stringers 4 and 5, and 49 and 50.
11. Hook the sling to a crane and raise the crane hook until the sling is taut.
12. Prepare front fuselage trolley (Ref.No.26DC/95024).
13. Remove all nuts and bolts connecting the front fuselage to the centre section.
14. Move the front fuselage from the centre section and lower gently on to the trolley.

NOTES:-

- (1) When the front fuselage is installed and the air-conditioning unit is connected to the rear bulkhead duct, a new seal must be used at the joint.
- (2) When the gaco seals, on the engine control rods at the rear pressure bulkhead are assembled it is important that they are assembled as shown in detail A.

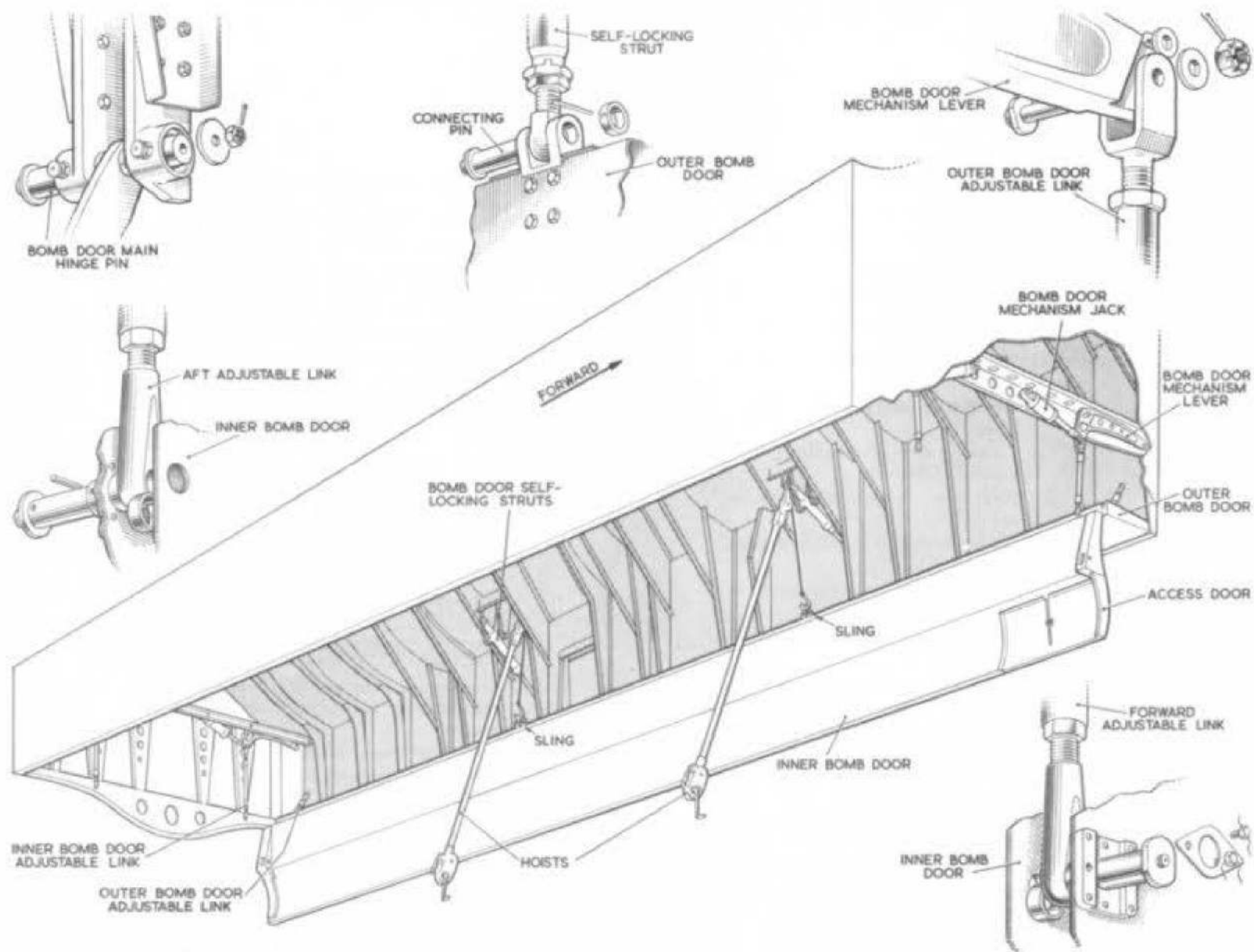


Fig.22. Bomb door removal.

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KEY TO FIG.22

BOMB BAY DOOR REMOVAL

To remove the port bomb bay doors:-

1. Select bomb doors open; when the doors are fully open place the bomb door selector switch guard (Ref.No. 26DC/95054) in position.
2. Remove the pins connecting the self-locking struts to the outer bomb bay door, secure the locking struts to the nearest point to prevent interference with removal operations.
3. Place the hooks at the upper end of two hoists (refer to Sect.2, Chap.4) on the brackets provided adjacent to the locking strut mounting.
4. Thread a sling (Ref.No.26DC/95073) through each locking strut attachment point on the outer bomb door, using the locking strut attachment pin.
5. Place the hoist cable hooks in the slings at each position and rotate the hoist handle until the cable is taut.
6. Remove the pins connecting the bomb door adjustable links, at the forward and rear ends of the bomb bay, to the inner bomb door.
7. Remove the pins connecting the outer bomb door adjustable link, at the forward and rear ends of the bomb bay, to the bomb door mechanism lever.
8. Lower the doors by carefully operating the hoists, until the main hinge pins are accessible.
9. Remove all hinge pins, except those at the extreme forward and rear hinges.
10. Place padding between the outer surfaces of the inner and outer bomb door.
11. Prepare a trolley and position it below the doors.
12. Remove the remaining main hinge pins and carefully lower the doors on to the trolley.
13. Repeat this operation to remove the starboard bomb bay doors.

NOTE . . .

Refer to Sect.3, Chap.1, para.46 for bomb door setting procedure which follows their installation.

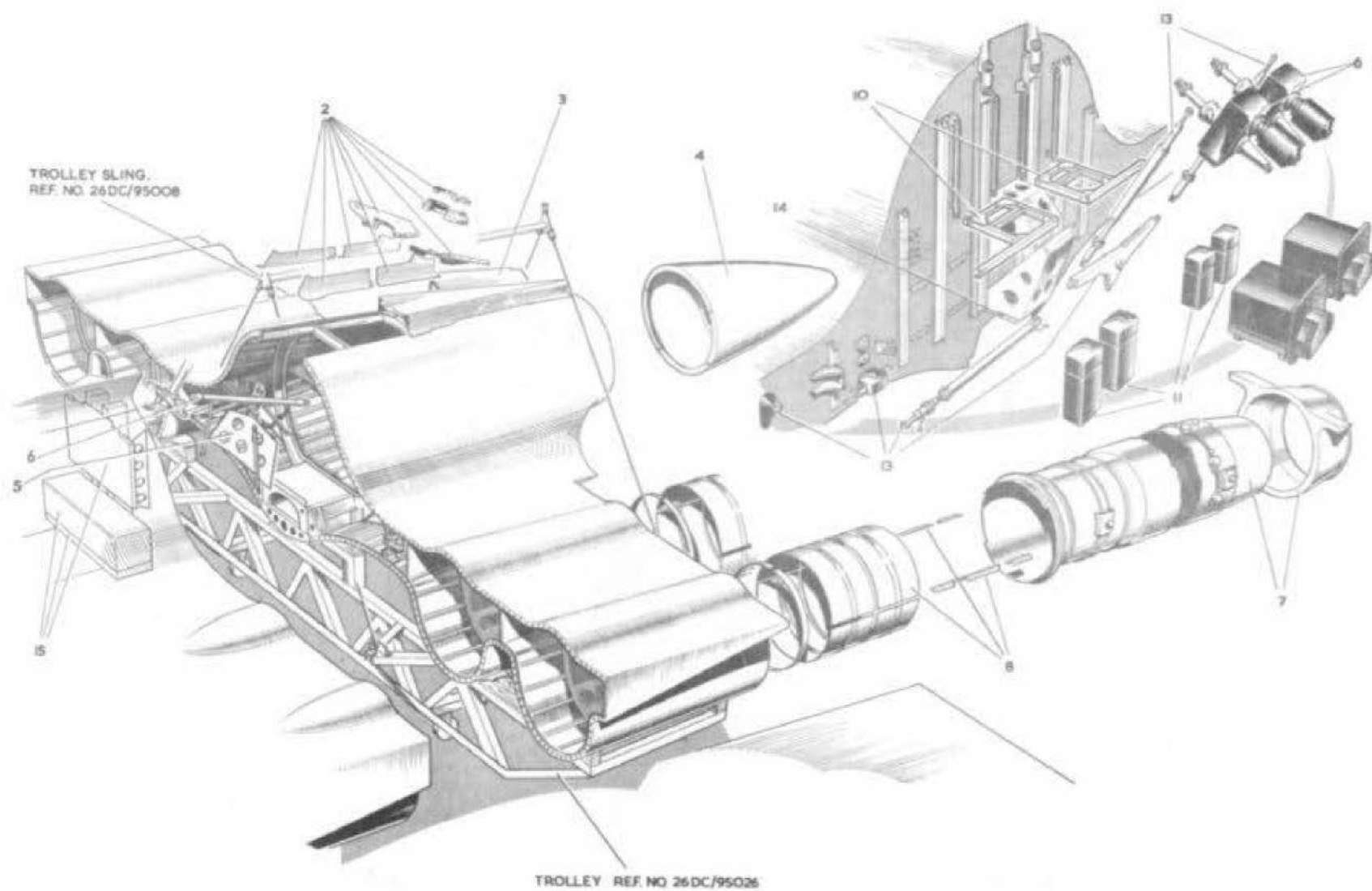


Fig. 23. Rear section removal
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KEY TO FIG. 23

REAR SECTION REMOVAL

To remove the rear fuselage:-

1. Ensure that all electrical services are off.
- (2) Open all access panels and remove the split detachable and external detachable fairings at the rudder base.
- (3) Remove the brake parachute (Sect.3, Chap.13).
- (4) Remove the tail end detachable cone.
- ◀ (5) Remove the rudder spring control rod guard. ▶
- (6) Remove the rudder power units (Sect.3, Chap.4).
- (7) Remove the jet pipe end caps and the jet pipes (Sect.4, Chap.1).
- (8) Remove the jet pipe guide rails and the jet pipe tunnel skins between formers 413 A and 442 A.
- 9 Disconnect and unclip all electrical, radio and radar leads from the rear fuselage. Coil the leads clear of the rear fuselage.
- (10) Remove the radio mountings from the rear fuselage.
- (11) Remove the port and starboard J.P.T. control amplifiers and the datum setting resistances.
- 12 Remove the drip tray from under the rudder bottom hinge.
- (13) Disconnect the rudder control rods from the torque lever port side aft

of former 428A. remove the control rod, power unit input rods and lever and the auto-stabilizer unit from the rear fuselage.

- (14) Remove the rivets securing the rudder control lever bottom hinge box to the rear fuselage.
- (15) Remove the 96V. battery box and tray, and the contactor panel on the forward face of former 428A.
- 16 Remove the port and starboard inner elevators (Sect.3, Chap.2).
- 17 Remove the rudder (Sect.3, Chap.3).
- 18 Place the rear fuselage trolley (Ref.No.26DC/95026) beam rails (Ref.No.26DC/95027) and two U.J.T. No.8 in position under the rear fuselage (Sect.2, Chap.4, fig.4).
- 19 Raise the trolley until it is just taking the weight of the rear fuselage and remove all the transport joint nuts and bolt.

NOTE . . .

The transport joint bolts vary in length and it should be noted from which positions the bolts are removed.

- 20 Move the rear fuselage aft, away from the centre fuselage sufficient to permit attachment of the trolley sling (Ref.No.26DC/95008).
- 21 Attach the trolley sling to a crane and remove the trolley complete with rear fuselage from the trestles.

AIR BRAKE OPERATING MECHANISM

Actuator removal

74. To remove the air brake actuator situated in the bomb bay roof between bomb arches 44.592F and 64.592F proceed as follows:-

- (1) Isolate, electrically, the air brakes system by removing 28-volt fuses 97 and 181 from panels 3P and 4P respectively and the 112 volt fuses 383 and 406 from panels 18P and 19P respectively.
- (2) Disconnect the electrical plug connections from both actuator motors.
- (3) Remove the drive shaft, port and starboard, connecting the actuator to the gearboxes (para.76).
- (4) Suitably support the actuator. Remove the split pins, the slotted nuts and the washers from the eight 2 B.A. bolts securing the actuators to the beam between bomb arches 44.592 F and 64.592 F.
- (5) Remove the eight 2 B.A. bolts and lower the actuator from the aircraft.

Gearbox removal

75. To remove the air brakes gearbox, mounted on the inboard face of rib 63.5 between bomb arches 44.592 F and 64.592 F, proceed as follows:-

- (1) Extend the air brakes to the HIGH DRAG position and isolate, electrically, the air brakes system by removing the 112-volt fuses 383 and 406 from panels 18P and 19P respectively and the 28 volt fuses 97 and 181 from panels 3P and 4P respectively.
- (2) Remove the main drive shaft which connects the air brakes actuator to the gearbox (para.76).

- (3) Remove the 5/16 in. B.S.F. stiff-nuts and the 3/8 in. plain washers from the five double-threaded shoulder bolts which secure the gearbox to rib 63.5. These stiff-nuts and washers are located on the outboard face of rib 63.5.

- (4) Withdraw the gearbox to clear the splined drive connecting the gearbox to the top sprocket and shaft assembly on rib 63.5.

NOTE...

After removing the gearbox care must be exercised to ensure that damage is not caused to the threads of the double-threaded shoulder bolts.

Drive shaft removal

Main drive shaft

76. To remove the main drive shaft which connects the air brake actuator to the gearbox on rib 63.5 proceed as follows:-

- (1) Extend the brakes to the HIGH DRAG position and isolate electrically, the air brakes system as given in para.74(1).
- (2) Remove the split pins, 1/4 in. B.S.F. slotted nuts and washers from the two taper pins securing the drive shaft to the gearbox on rib 63.5. Remove the two taper pins.
- (3) Remove the split pins, 1/4 in. B.S.F. slotted nuts and saddle washers from the three taper pins securing the end fitting to the inboard end of the drive shaft. Remove the three taper pins.
- (4) Remove the split pin, 1/4 in. B.S.F. slotted nut and saddle washer from the taper pin securing the inboard ball joint to the drive shaft end fitting. Remove the taper pin.
- (5) Push the drive shaft inboard end fitting into the drive shaft, to dis-

engage the adapter from the actuator splined drive.

- (6) Pull the drive shaft inboard to disengage the outboard adapter from the splined drive of the gearbox.

Inboard drive shaft

77. To remove the drive shaft connecting the sprocket and shaft on rib 63.5 to the sprocket and shaft assembly on the engine centre rib proceed as follows:-

- (1) Extend the air brakes to the HIGH DRAG position and isolate, electrically, the air brakes system as given in para.74(1).
- (2) Relieve the tension from the drive chains by undoing the turnbuckles with which they are connected to the air brake legs.
- (3) Remove the split pins, 5/16 in. B.S.F. slotted nuts and saddle washers from the two taper pins securing the drive shaft inboard ball joint to the sprocket shaft at rib 63.5. Remove the taper pins.
- (4) Remove the split pins, 5/16 in. B.S.F. slotted nuts and washers from the two taper pins securing the outboard adapter to the outboard ball joint. Remove the taper pins.
- (5) Remove the split pin, 2 B.A. slotted nut and washer from the taper pin securing the sprocket shaft to the bearing cap on the inboard face of the engine centre rib. Remove the taper pin.
- (6) Remove the split pins, 1/4 in. B.S.F. slotted nuts and plain washers from the two taper pins securing the adapter to the sprocket shaft at the inboard face of the engine centre rib. ▶

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- ◀ (7) Push the adapter into the sprocket shaft on the engine centre rib until the adapter clears the outboard ball joint.
- (8) Pull the drive shaft outboard until the inboard adapter is clear of the sprocket shaft at rib 63.5. Remove the drive shaft from the aircraft.

Outboard drive shaft

78. To remove the drive shaft connecting the sprocket and shaft assembly on the engine centre rib to the sprocket and shaft assembly on rib 162.5 proceed as follows:-

- (1) Extend the air brakes to the HIGH DRAG position and isolate electrically, the air brakes system as given in para.74(1).
- (2) Remove the split pin, ¼ in. B.S.F. slotted nut and plain washer from the taper pin securing the ball joint, at the inboard end of the drive shaft, to the adapter secured to the sprocket shaft at the engine centre rib. Remove the taper pin.
- (3) Remove the split pin, ¼ in. B.S.F. slotted nut and plain washer, from the taper pin securing the ball joint, on the outboard end of the shaft, to the adapter, secured to the sprocket shaft on rib 162.5. Remove the taper pin.
- (4) Remove the split pins, ¼ in. B.S.F. slotted nuts and saddle washers from the two taper pins securing the adapter to the sprocket shaft at rib 162.5. Remove the taper pins.
- (5) Push the adapter into the sprocket shaft at rib 162.5 until the adapter clears the ball joint on the outboard end of the drive shaft.
- (6) Pull the drive shaft outboard until the ball joint, on the inboard end of

the drive shaft, clears the adapter secured to the sprocket shaft at the engine centre rib. Remove the shaft from the aircraft.

Actuator assembly

79. Fitting an air brake actuator to the beam between bomb arches 44-592 F and 64-592 F is the reverse of the removal sequence in para.74.

Gearbox assembly

80. Prior to fitting a replacement gearbox to rib 63.5 the five double-threaded shoulder bolts, used to secure the gearbox to the rib, must be fitted in the attachment holes in the periphery of the gearbox casing. The bottom attachment bolt, Ref.No.26DC/5572, the two centre and two top attachment bolts, Ref.No.26DC/5573, are all secured to the gearbox using 3/8 in. plain washers, Ref.No.28W/9419466 and 3/8 in. B.S.F. stiffnuts Ref.No.28M/10292. The gearbox must first be fitted, temporarily, to the rib with the drive shafts and adapters assembled and the positions of the drive shaft attachment taper pins determined. The method of determining the position and the drilling and reaming of the taper pin holes is given in para.81 and 82. On final assembly ensure that the two dowel bolts (para.84, op.(1)) locate correctly in the two holes in the gearbox casing. Of the five gearbox attachment bolts the bottom bolt is secured to the rib using a 3/8 in. plain washer, Ref.No.28W/9419489, and a 5/16 in. B.S.F. stiffnut, Ref.No.28M/10291. The two centre attachment bolts must have a 3/8 in. plain washer, Ref.No.28W/9419489, between the shoulder of the bolt and the rib and two 5/16 in. plain washers, Ref.No.28W/9419488, under the 5/16 in. B.S.F. attachment stiffnuts, Ref.No.28M/10291. The two top attachment bolts are secured to the rib using a 5/16 in. plain washer, Ref.No.28W/9419488 and a 5/16 in. B.S.F. stiffnut, Ref.No.28M/10291.

Drive shaft assembly

Main drive shaft

81. To fit a replacement main drive shaft, which connects the actuator to the gearbox on rib 63.5, the actuator must be fitted to the aircraft and the gearbox temporarily fitted to rib 63.5. Refer to fig.24 and proceed as follows:-

- (1) Assemble the ball joint Ref. No.26DC/11318 to the outboard end of the drive shaft, ensuring that the jaws of the ball joint are positioned in line as shown in fig.24. Mark off, to the dimensions given in fig.24, the position of the taper pin which secures the ball joint to the shaft end adapter. Drill and ream the hole to suit the taper pin Ref.No.26DC/8047, fit the taper pin, saddle washer, Ref.No.28W/18749, ¼ in. B.S.F. slotted nut, Ref.No.28M/1011467 and a 1/16 in. split pin.
- (2) Assemble the ball joint Ref. No.26DC/11318 to the adapter, Part No.3/F8792, which fits in the inboard end of the drive shaft. Ensure that the jaws of the ball joint are positioned in line as shown in fig.24. Mark off, to the dimensions given in fig.24, the position of the taper pin securing the ball joint to the adapter. Drill and ream the hole to suit the taper pin, Ref.No.26DC/9753, and temporarily fit the taper pin.
- (3) Assemble the splined adapter, Ref.No.26DC/1724, to the inboard end of the inboard ball joint. Mark off, to the dimensions given in fig.24, the position of the taper pin which secures the adapter to the ball joint. Drill and ream the hole to suit the taper pin, Ref. No.26DC/8047, and fit the taper pin, saddle washer, Ref.No.28W/18749, ¼ in. B.S.F. slotted nut, ▶

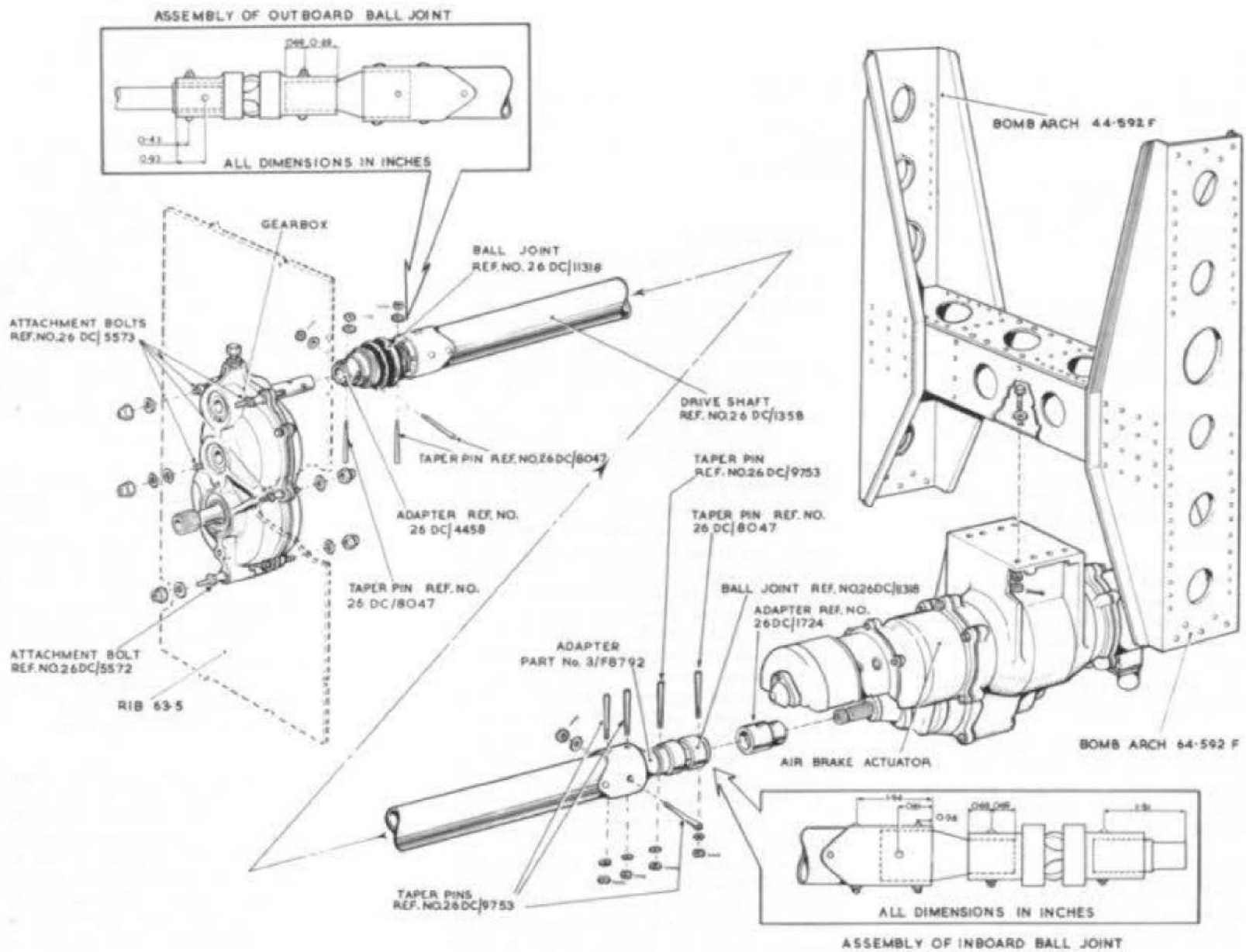


Fig. 24 Air brakes drive mechanism (I)

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Ref.No.28M/1011467, and 1/16 in. split pin.

- (4) Fit the adapter, Part No.3/F8792, into the inboard end of the drive shaft to give a measurement of 48.67 in. between the centres of the inboard and outboard ball joints. Ensure that the jaws of the inboard ball joint are positioned in line as shown in fig.24. Drill and ream the three taper pin holes through the drive shaft and adapter, from the pre-drilled pilot holes in the shaft outer sleeve, to suit the taper pins, Ref.No.26DC/9753.
- (5) Fit the adapter, Ref.No.26DC/4458, to the outboard end of the outboard ball joint. Remove the taper pin fitted in op.(2) and push the adapter, Part No.3/F8792, into the drive shaft. Install the drive shaft in the aircraft engaging the adapter, Ref.No.26DC/4458, with the gearbox drive and, by pulling the adapter, Part No.3/F8792 out of the drive shaft engage the splined adapter, Ref.No.26DC/1724 with the actuator drive. Temporarily fit the two taper pins which secure the adapter, Part No.3/F8792 to the shaft and the taper pin which secures the ball joint to the adapter.
- (6) Mark the exact location of the drive shaft adapter on the gearbox drive.
- (7) Remove the drive shaft and the gearbox from the aircraft to a bench and assemble the drive shaft to the gearbox in the position determined in op.(6).
- (8) Mark off, to the dimensions given in fig.24, the position of the two taper pins which secure the outboard ball joint and the adapter to

the gearbox drive. Drill and ream the holes to suit the taper pins, Ref.No.26DC/8047.

- (9) Deburr all the holes and remove the swarf.
- (10) Pack the ball joints with grease XG-295 and fit the dust covers.
- (11) Fit the gearbox to rib 63.5 as given in para.80.
- (12) Install the drive shaft as given in op.(5).
- (13) Fit the three taper pins, Ref. No.26DC/9753, which secure the adapter in the inboard end of the drive shaft. Fit saddle washers, Ref.No.28W/14996, 1/4 in. B.S.F. slotted nuts, Ref.No.28M/1011467, and 1/16 in. split pins.
- (14) Secure the outboard ball joint and adapter to the gearbox with two taper pins, Ref.No.26DC/8047, saddle washers, Ref.No.28W/18749, 1/4 in. B.S.F. slotted nuts, Ref. No.28M/1011467, and 1/16 in. split pins.

Inboard drive shaft

82. To fit a replacement inboard drive shaft, which connects the top shaft and sprocket assembly on rib 63.5 to the top shaft and sprocket assembly on the engine centre rib, refer to fig.25 and fig.26, details A and B and proceed as follows:-

- (1) Fit the adapter, Part No.4/F9577, on the inboard end of the inboard ball joint, Ref.No.26DC/11318. Mark off and drill two 3.25 mm. diameter holes, diametrically opposite, through the adapter and the ball joint to the dimensions given in fig.25. Countersink the two holes on the adapter, externally, and rivet the adapter to

the ball joint using two 1/8 in. dia. rivets, Ref.No.26DC/10695.

- (2) Fit the ball joint complete with adapter on the inboard end of the inboard drive shaft, Ref.No.26DC/4449, and fit a ball joint, Ref. No.26DC/11318, on the outboard end of the drive shaft.
- (3) Position the ball joints to give a measurement of 30.818 in. between the centres of the ball joints. Ensure that the jaws of the ball joints are lined up as illustrated in fig.25.
- (4) Mark off, to the dimensions given in fig.25, the positions of the two taper pins which secure the inboard ball joint to the drive shaft end adapter. Drill and ream the holes to suit the taper pin, Ref. No.26DC/1456, at the inboard position and taper pin, Ref.No. 26DC/9610, at the outboard position. Temporarily fit the taper pins.
- (5) Mark off, to the dimensions given in fig.25, the position of the two taper pins which secure the outboard ball joint to the drive shaft end adapter. Drill and ream the holes to suit the taper pin, Ref. No.26DC/9610, at the inboard position and the taper pin, Ref. No.26DC/1456, at the outboard position. Temporarily fit the taper pins.
- (6) Engage the inboard ball joint with the shaft, Ref.No.26DC/4460, of the top shaft and sprocket assembly on rib 63.5.
- (7) Engage the outboard ball joint with the adapter, Ref.No.26DC/4456, fitted in the inboard end of the shaft of the top shaft and sprocket

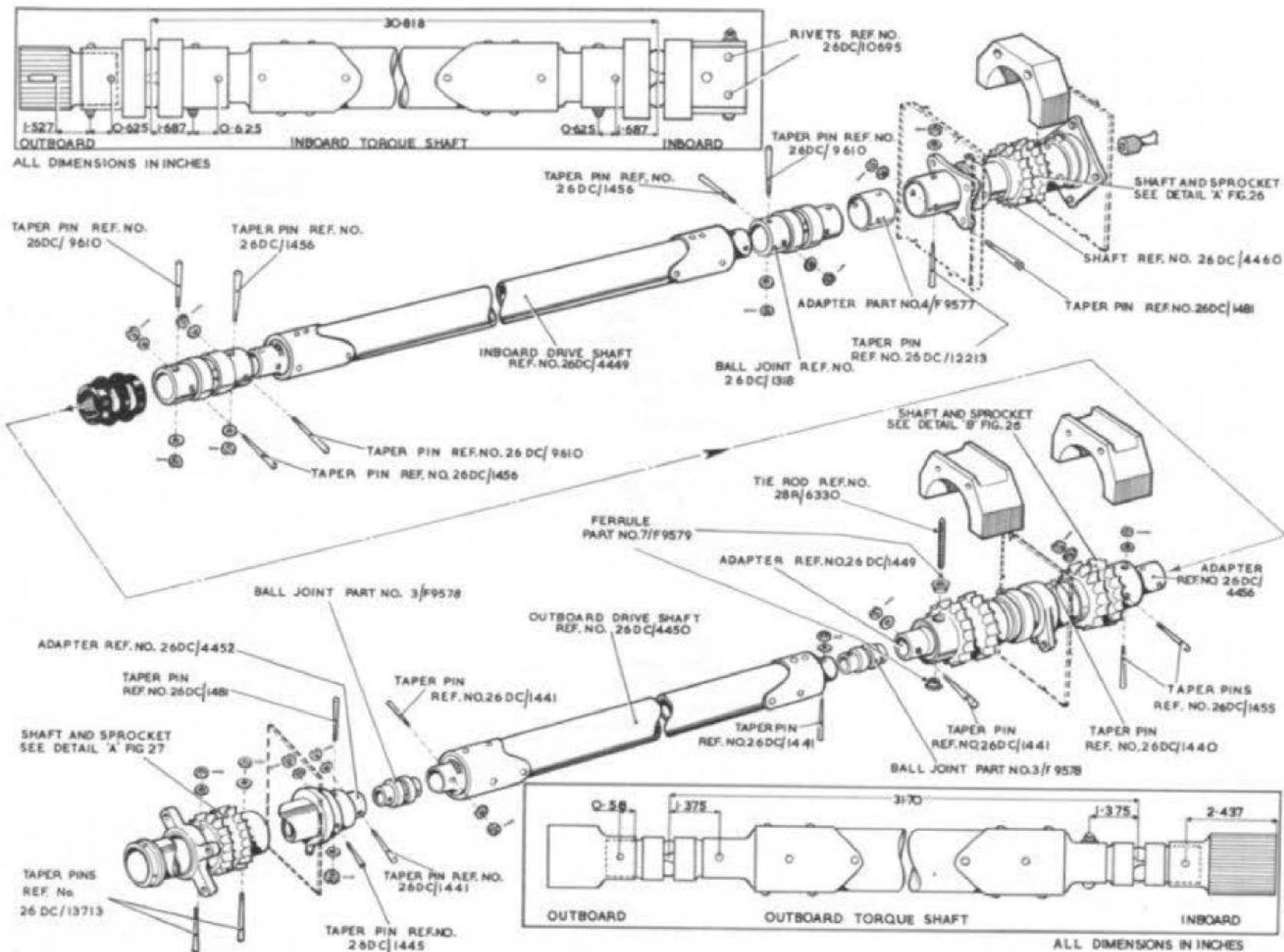


Fig. 25. Air brakes drive mechanism (2)

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assembly on the engine centre rib. This is achieved by removing the two taper pins securing the sprocket and adapter to the shaft and the taper pin securing the shaft to the bearing sleeve, pushing the adapter into the shaft, lining up the inboard drive shaft and pulling the adapter out to engage it in the ball joint.

NOTE...

Ensure that the inboard drive shaft is lined up with the shaft and sprocket assemblies as shown in fig.25.

- (8) Temporarily fit the taper pins removed in op.(7) and position the adapter, Ref.No.26DC/4456, so that the taper pins are disposed centrally in the adapter slots.
- (9) Mark off, to the dimensions given in fig.26, detail B, the position of the taper pins which secure the outboard ball joint to the adapter. Drill and ream the holes through the ball joint and the adapter to suit the taper pins, Ref.No.26DC/9610, in the outboard position and, Ref.No.22DC/1456, in the inboard position.
- (10) Mark off, to the dimensions given in fig.26, detail A, the position of the taper pins which secure the inboard ball joint to the shaft of the shaft and sprocket assembly at rib 63.5. Drill and ream the holes to suit the taper pins, Ref. No.26DC/1481, in the outboard position and, Part No.2/SS4280, in the inboard position.
- (11) Remove the taper pins fitted in op.(8), push the adapter into the shaft and remove the inboard drive shaft.
- (12) Deburr all the holes and remove the swarf.
- (13) Fit the inboard drive shaft as given in op.(6) and (7).
- (14) Fit the taper pin, Ref.No.26DC/1440, which secures the sprocket shaft to the bearing assembly on the inboard face of the engine centre rib; fit saddle washer, Part No.20/SS3703, 2 B.A. slotted nut, Ref.No.28M/13121, and 1/16 in. split pin.
- (15) Fit the two taper pins, Ref. No.26DC/1455, which secure the sprocket, the socket and the adapter to the shaft of the shaft and sprocket assembly at the engine centre rib. Fit ¼ in. plain washers, Ref.No.28W/9418921, ¼ in. B.S.F. slotted nuts, Ref. No.28M/1011467, and 1/16 in. split pins.
- (16) Fit the two taper pins, Ref.No. 26DC/9610, in the outboard position and, Ref.No.26DC/1456, in the inboard position, which secure the outboard ball joint to the adapter. Fit saddle washer, Ref.No.28W/14996, 5/16 in. B.S.F. slotted nut, Ref.No.28M/13122, to the outboard taper pin and saddle washer, Ref.No.28W/14996, ¼ in. B.S.F. slotted nut, Ref.No.28M/1011467, to the inboard taper pin and insert 1/16 in. split pins.
- (17) Fit the two taper pins, Ref.No. 26DC/1481, in the outboard position and, Part No.2/SS4280, in the inboard position, which secure the inboard ball joint to the shaft of the shaft and sprocket assembly on rib 63.5. Fit a saddle washer, Part No.19/SS3703 ¼ in. B.S.F. slotted nut, Ref.No.28M/1011467, to the outboard taper pin and a saddle washer, Part No.23/SS3703, a 5/16 in. B.S.F. slotted nut, Ref.

No.28M/13122, to the inboard taper pin and insert 1/16 in. split pins.

Outboard drive shaft

83. To fit a replacement outboard drive shaft, which connects the top shaft and sprocket assembly at the engine centre rib to the top shaft and sprocket assembly at rib 162.5, refer to fig.25, fig.26, detail B, and fig.27, detail A, and proceed as follows:-

- (1) Fit a ball joint, Part No.3/F8794, to the shaft end adapter at each end of the outboard drive shaft. Position the ball joints in line as shown on fig.25 and to give a measurement of 31.7 in. between the centres of the ball joints.
- (2) Mark off, to the dimensions given in fig.25, the position of the taper pin which secures the ball joint to the shaft outboard end adapter. Drill and ream the hole to suit the taper pin, Ref.No.26DC/1441. Temporarily fit the taper pin.
- (3) Mark off, to the dimensions given in fig.25 the position of the taper pin which secures the ball joint to the shaft inboard end adapter. Drill and ream the hole to suit the taper pin, Ref.No.26DC/1441. Temporarily fit the taper pin.
- (4) Engage the inboard ball joint, with the adapter fitted in the outboard end of the shaft, of the top shaft and sprocket assembly on the engine centre rib.
- (5) Engage the outboard ball joint with the adapter fitted in the inboard end of the shaft of the top shaft and sprocket assembly at rib 162.5. This is achieved by removing the taper pin which secures the adapter

to the shaft and the taper pin which secures the adapter and bearing sleeve to the shaft. After removing the taper pins push the adapter into the shaft, line up the drive shaft and pull the adapter out of the shaft to engage the outboard ball joint on the drive shaft. Temporarily fit the two taper pins removed to facilitate this operation.

- (6) Position the drive shaft with the jaws of the ball joints in line as shown on fig.25.
- (7) Mark off, to the dimensions given in fig.27, detail A, the position of the taper pin which secures the outboard ball joint to the adapter. Drill and ream the hole to suit the taper pin, Ref.No.26DC/1441. Spot face the small diameter hole in the adapter 0.625 in. dia. x 0.03 in. deep. Temporarily fit the taper pin.
- (8) Mark off, to the dimensions given in fig.26, detail B, the position of the taper pin which secures the inboard ball joint to the adapter. Drill and ream the hole to suit the taper pin, Ref.No.26DC/1441. Spot face the small diameter hole in the adapter 0.625 in. dia. x 0.03 in. deep.
- (9) Remove the taper pin temporarily fitted in op.(5) and (7). Push the adapter into the shaft at rib 162.5 and remove the drive shaft.
- (10) Deburr all the holes and remove the swarf.
- (11) Fit the drive shaft as given in op.(4) and (5).
- (12) Fit the taper pin, Ref.No.26DC/1445, which secures the bearing sleeve on rib 162.5 to the shaft, and a saddle washer, Part No.24/

SS3703, a 1/4 in. B.S.F. slotted nut, Ref.No.28M/1011467, and a 1/16 in. split pin.

- (13) Fit the taper pin, Ref.No.26DC/1481, which secures the adapter to the shaft at rib 162.5 and a saddle washer, 19/SS3703, a 1/4 in. B.S.F. slotted nut, Ref.No.28M/1011467, and a 1/16 in. split pin.
- (14) Fit the taper pin Ref.No.26DC/1441, which secures the outboard ball joint to the adapter, and a 1/4 in. plain washer, Ref.No.28W/9418921, a 1/4 in. B.S.F. slotted nut, Ref.No.28M/1011467, and a 1/16 in. split pin.
- (15) Fit the taper pin, Ref.No.26DC/1441, which secures the inboard ball joint to the adapter, and a 1/4 in. plain washer, Ref.No.28W/9418921, a 1/4 in. B.S.F. slotted nut, Ref.No.28M/1011467, and a 1/16 in. split pin.

Sprocket and shaft assemblies

Rib 63.5 - top

84. To fit a replacement top sprocket and shaft assembly at rib 63.5 refer to fig.26, detail A, and proceed as follows:-

- (1) Assemble the bearing cap, Ref. 26DC/4461, the bearing sleeve, Ref.No.26DC/1462, and the bearing Ref.No.2A/9500427. Secure the assembly, grease nipple at the top, to the outboard face of rib 63.5 using 1/4 in. B.S.F. bolts, Ref. No.28D/1011030, in the fore and aft positions and, dowel bolts, Ref.No.26DC/1465, in the top and bottom positions. Fit 1/4 in. plain washers, Ref.No.28W/9418920, and 1/4 in. B.S.F. stiffnuts, Ref.No.28M/7002430.
- (2) Assemble the bearing cap, Ref. No.26DC/1454, the bearing sleeve, Ref.No.26DC/1461, and bearing,

Ref.No.2A/9500427. Secure the assembly, grease nipple at the top, to the diaphragm outboard of rib 63.5 using 1/4 in. B.S.F. bolts, Ref. No.28D/1011030, 1/4 in. plain washers, Ref.No.28W/9418921 and 1/4 in. B.S.F. stiffnuts, Ref.No.28M/10290.

- (3) Fit the sleeve, Ref.No.26DC/9103, in the shaft end adapter, Ref. No.26DC/4459, and fit the adapter into the shaft, Ref.No.26DC/4460.
- (4) Position the sprocket, Ref.No. 26DC/9162 and the shaft end adapter on the inboard end of the shaft, to the dimensions given in fig.26, detail A.
- (5) Mark off, to the dimensions given in fig.26, detail A, the positions of the two taper pins which secure the sprocket, the shaft end adapter and the sleeve to the shaft. Drill and ream the outboard hole to suit the taper pin, Ref.No.26DC/1455 and, the inboard hole to suit the taper pin, Part No.1/SS4280.
- (6) Remove the sprocket from the shaft.
- (7) Insert the shaft through the outboard bearing assembly, fit the sprocket on the shaft and insert the shaft in the inboard bearing assembly.
- (8) Secure the sprocket, the shaft end adapter and the sleeve to the shaft by temporarily fitting the taper pins.
- (9) Position the shaft as shown in fig.26, detail A, and mark off the position of the taper pin which secures the shaft to the outboard bearing sleeve. Drill and ream the hole to suit the taper pin, Ref. No.26DC/1440.
- (10) From the two existing holes, positioned fore and aft, on the inboard

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- bearing sleeve, drill using a 3.80 mm. drill to a depth of 0.4 in. into the shaft end adapter.
- (11) Remove the taper pins fitted in op.(8) and remove the shaft from the bearing assemblies. As the shaft is withdrawn remove the sprocket from the shaft.
 - (12) Remove the shaft end adapter from the shaft.
 - (13) Open up the two holes, drilled in the shaft in op.(10), using a 4.90 mm. drill.
 - (14) Tap a 2 B.A. thread in each of the holes drilled in the shaft end adapter in op.(10).
 - (15) Spot face the small diameter holes in the sprocket, the outboard hole to 0.625 in. dia. x 0.03 in. deep, the inboard hole to 0.75 in. dia. x 0.03 in. deep.
 - (16) Deburr all the holes and remove swarf.
 - (17) Assemble the shaft, the sprocket, the shaft end adapter and the sleeve as given in op.(7).
 - (18) Fit the taper pins, Ref.No.26DC/1455, outboard and, Part No.1/SS4280 inboard, which secure the sprocket, the shaft end adapter and the sleeve to the shaft. Fit a 5/16 in. plain washer, Ref.No.28W/9419403, and a 5/16 in. B.S.F. slotted nut, Ref.No.28M/13122, on the inboard taper pin and a ¼ in. plain washer, Ref.No.28W/9418921 and a ¼ in. B.S.F. slotted nut, Ref.No.28M/1011467 on the outboard taper pin; fit 1/16 in. split pins.
 - (19) Fit the taper pin, Ref.No.26DC/

1440, securing the shaft to the outboard bearing sleeve. Fit a saddle washer, Part No.20/SS3703, a 2 B.A. slotted nut, Ref.No.28M/13121, and a 1/16 in. split pin.

- (20) Secure the inboard bearing sleeve and the shaft, to the shaft end adapter with bolts, Part No.12/F9312, being inserted into the tapped holes op.(10), (13) and (14). Lock the bolts together using 22 s.w.g. locking wire, Ref. No.30A/3339, the locking wire must pass round the circumference of the bottom of the bearing sleeve.
- (21) Lubricate the bearings with grease XG-295.

Rib 63.5 - bottom

85. To fit a replacement bottom sprocket and shaft assembly at rib 63.5 refer to fig.26, detail C, and proceed as follows:-

- (1) Position the sprocket, Ref.No.26DC/1433, on the shaft, Ref.No.26DC/1483, and mark off the position of the taper pin. Drill and ream the hole to suit the taper pin, Ref.No.26DC/1440. Spot face the small diameter hole 0.625 in. dia. x 0.03 in. deep and temporarily fit the taper pin.
- (2) Assemble the bearing sleeve, Ref.No.26DC/1461, the bearing cap, Ref.No.26DC/1482, and the bearing, Ref.No.2A/9500427, on the inboard end of the shaft and bearing sleeve, Ref.No.26DC/1461, the bearing cap, Ref.No.26DC/1454, and the bearing, Ref.No.2A/9500427, on the outboard end.
- (3) Position the complete assembly between rib 63.5 and the diaphragm outboard of rib 63.5. Secure the bearing assemblies to the structure, grease nipples at the top, using

¼ in. B.S.F. bolts, Ref.No.28D/1011030, ¼ in. plain washers, Ref.No.28W/9418921, and ¼ in. B.S.F. stiffnuts, Ref.No.28M/10290.

- (4) Mark off, to the dimensions given in fig.26, detail C, the positions of the taper pins which secure the bearing sleeves to the shaft. Drill and ream the holes to suit the taper pins, Ref.No.26DC/1440.
- (5) Remove the nuts, washers and bolts securing the bearing assemblies to the structure and remove the complete assembly.
- (6) Remove the bearing assemblies and the sprocket from the shaft. Deburr all the holes and remove the swarf.
- (7) Fit the sprocket on the shaft and secure in position with the taper pin, Ref.No.26DC/1440, 2 B.A. plain washer, Ref.No.28W/9419402, a 2 N.A. slotted nut, Ref.No.28M/13121; and a 1/16 in. split pin.
- (8) Assemble the bearing assemblies on each end of the shaft and fit the taper pins, Ref.No.26DC/1440, saddle washers, Part No.20/SS3703, 2 B.A. slotted nuts, Ref.No.28M/13121, and 1/16 in. split pins.
- (9) Fit the complete assembly to the aircraft securing the bearing assemblies to the structure as detailed in op.(3).
- (10) Lubricate the bearing assemblies with grease XG-295.

Engine centre rib - top

86. To fit a replacement sprocket and shaft assembly at the top on the engine centre rib refer to fig.26, detail B, and proceed as follows:-

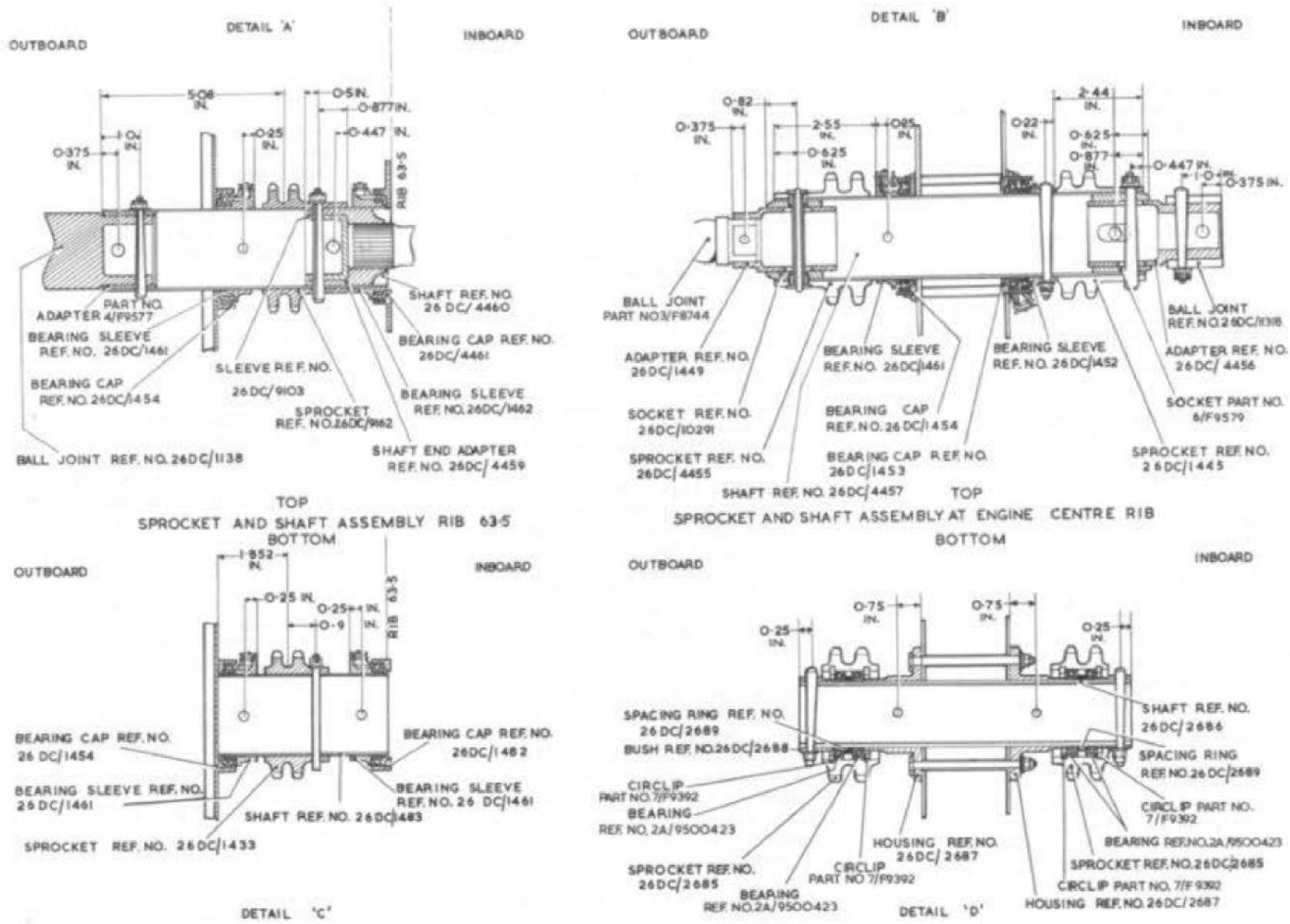


Fig. 26. Air brakes sprocket and shaft assemblies (1)

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(1) Assemble the sprocket, Ref.No. 26DC/1445 and the splined socket, Part No.6/F9579, to the inboard end of the shaft, Ref.No.26DC/4457.

(2) Mark off, to the dimensions given in fig.26, detail B, the position of the two taper pins which secure the sprocket and the splined socket to the shaft.

NOTE...

The red lining up mark on the end of the splined socket must line up with the centre of the small diameter end of the taper pin hole nearest to it.

(3) Drill and ream the two holes to suit the taper pins, Ref.No.26DC/1455. Spot face the small diameter holes in the sprocket 0.625 in. dia. x 0.03 in. deep. Remove the sprocket and splined socket from the shaft.

(4) Assemble the sprocket, Ref.No. 26DC/4455, and the splined socket, Ref.No.26DC/10291, to the outboard end of the shaft.

(5) Mark off, to the dimensions given in fig.26, detail B, the position of the ferrules which secure the sprocket and the splined socket to the shaft.

NOTE...

The red lining up mark on the end of the splined socket must line up with the centre of one of the ferrule holes.

(6) Drill and ream the holes to suit the ferrules, Part No.7/F9579. Spot face the holes in the sprocket 0.875 in. dia. x 0.03 in. deep. Remove the sprocket and splined socket from the shaft. Deburr the holes and remove the swarf.

(7) Fit the sprocket and splined socket to the outboard end of the shaft and fit the splined adapter, Ref.No. 26DC/14449, into the socket. Ensure that the red lining up marks on the socket and the adapter coincide and that the slots in the adapter line up with holes drilled and reamed in op.(6).

(8) Fit the ferrules in the holes drilled and reamed in op.(6) and fit the tie rod, Ref.No.28R/6330; lock the tie rod by riveting over the ends.

(9) Assemble the bearing sleeve, Ref.No.26DC/1452, the bearing cap, Ref.No.26DC/1453, and two bearings, Ref.No.2A/9500427, to the inboard face of the rib. Assemble the bearing sleeve, Ref. No.26DC/1461, the bearing cap, Ref.No.26DC/1454, and one bearing Ref.No.2A/9500427 on the outboard face of the rib. Ensure that a spacer, Part No.6F/8796, is fitted between the bearings in the inboard assembly. Secure the bearing assemblies to the rib with ¼ in. B.S.F. bolts, Ref.No.28D/12814, ¼ in. plain washers, Ref.No.28W/9418921, and ¼ in. B.S.F. stiff-nuts, Ref.No.28M/10290.

(10) Fit the shaft through the bearing assemblies inserting it from the outboard side.

(11) Assemble the sprocket, the splined socket and the splined adapter, Ref.No.26DC/4456, to the inboard end of the shaft. Ensure that the red lining up marks on the socket and the adapter coincide and that the slots in the adapter line up with the holes drilled and reamed in op.(3). Temporarily fit the taper pins.

(12) Set the shaft in position to the dimensions given in fig.26, detail B. Mark off the position of the taper pins which secure the shaft to the bearing sleeves.

(13) Drill and ream the holes through the bearing sleeves and the shaft to suit the taper pins, Ref.No. 26DC/1440.

(14) Remove the taper pins and parts fitted to the shaft in op.(11), and remove the shaft from the bearing assemblies.

(15) Deburr the holes and remove the swarf.

(16) Fit the shaft in the bearing assemblies and assemble the parts to the shaft as in op.(1) and (11). Temporarily fit the taper pins which secure the parts to the shaft and also the taper pin which secures the shaft to the inboard bearing sleeve.

NOTE...

The fitting of the washers, nuts, and split pins to the three inboard taper pins is carried out after assembly of the inboard drive shaft as detailed in para.82.

(17) Fit the taper pins, Ref.No.26DC/1440, which secure the shaft to the outboard bearing sleeve, fit a saddle washer, Part No.20/SS5703, a 2 B.A. slotted nut, Ref.No.28M/13121, and a 1/16 in. split pin.

(18) Lubricate the bearing assemblies with grease XG-295.

Engine centre rib - bottom

87. To fit a replacement sprocket and shaft assembly at the bottom on the

◀ engine centre rib refer to fig.26, detail D, and proceed as follows:-

- (1) Secure the housings, Ref.No. 26DC/2687, one on the outboard face and one on the inboard face of the engine centre rib, using ¼ in. B.S.F. bolts, Ref.No.28D/12638, ¼ in. plain washers, Ref. No.28W/9418921, and ¼ in. B.S.F. stiffnuts, Ref.No.28M/10290. The bolts are fitted with the head outboard.
- (2) Fit the shaft, Ref.No.26DC/2686, through the housings.
- (3) Assemble the sprocket, Ref.No. 26DC/2685, two bearings, Ref.No. 2A/9500423, a spacer ring, Ref.No. 26DC/2689, two circlips, Part No. 7/F9392, and the bush, Ref.No. 26DC/2680 on each end of the shaft.
- (4) Mark off, to the dimensions given in fig.26, detail D, the position of the taper pins which secure the shaft to the housings and the bushes to the shaft.
- (5) Drill and ream the holes to suit the taper pins, Ref.No.26DC/8046. Spot face the small diameter holes in the housings and the bushes, 0.437 in. dia. x 0.04 in. deep.
- (6) Remove the parts fitted in op.(2) and (3), deburr the holes and remove the swarf.
- (7) Assemble the parts as in op.(2) and (3) and fit the taper pins securing the shaft to the housings and the bushes to the shaft, fit 2 B.A. plain washers, Ref.No. 28W/9419402, and 2 B.A. stiffnuts, Ref.No.28M/10288.

Rib 162.5 - top

88. To fit a replacement sprocket and shaft assembly at the top on rib 162.5 refer to fig.27, detail A, and proceed as follows:-

- (1) Assemble the bearing sleeve, Ref. No.26DC/4453, the bearing cap, Ref.No.26DC/1438, and the bearing, Ref.No.2A/9500427, to the inboard face of rib 162.5 with the grease nipple at the bottom. Secure the bearing assembly in position using four ¼ in. B.S.F. bolts, Ref. No.28D/1011030, four ¼ in. plain washers, Ref.No.28W/9418921, and ¼ in. B.S.F. stiffnuts, Ref.No.28M/10290.
- (2) Assemble the bearing sleeve, Ref.No.26DC/1436, the bearing cap, Ref.No.26DC/1439, and the bearing, Ref.No.2A/9500427, to the outboard face rib 162.5 with the grease nipple at the bottom. Secure the bearing assembly in position using four ¼ in. B.S.F. bolts, Ref.No.28D/1008145, four ¼ in. plain washers, Ref.No.28W/9418921, and ¼ in. B.S.F. stiffnuts, Ref.No.28M/10290.
- (3) Fit the shaft, Ref.No.26DC/4454, in the bearing assemblies, fit the sprocket on the shaft during this operation.
- (4) Line up the outboard end of the shaft with the outboard edge of the outboard bearing sleeve. Mark off, and drill 4.90 mm. four holes, as shown in fig.27, detail A, for the rivets which secure the shaft to the bearing sleeve.
- (5) Position the sprocket and mark off the position of the taper pins, which secure the sprocket to the

shaft, to the dimensions given in fig.27, detail A. Drill and ream the holes to suit the taper pins, Part No.2/SS4189. Spot face the small diameter holes in the sprocket 0.687 in. dia. x 0.03 in. deep.

- (6) Fit the adapter, Ref.No.26DC/4452, in the inboard end of the shaft. Position the adapter and mark off, to the dimensions given in fig.27, detail A, the position of the taper pins which secure the adapter to the shaft and the adapter and the shaft to the inboard bearing sleeve.
- (7) Drill and ream the holes to suit the taper pin, Ref.No.26DC/1481, which secures the adapter to the shaft and taper pin, Ref.No.26DC/1455, which secures the adapter and the shaft to the inboard bearing sleeve.
- (8) Remove the adapter from the inboard end of the shaft.
- (9) Remove the nuts, washers and bolts which secure the outboard bearing assembly to the rib. Remove the shaft complete with the outboard bearing assembly, as the shaft is withdrawn remove the sprocket from the shaft.
- (10) Remove the outboard bearing assembly from the shaft.
- (11) Deburr all the holes and remove the swarf.
- (12) Fit the outboard bearing assembly on the shaft and rivet the bearing in position using four 3/16 in. dia. rivets, Ref.No.28Q/1952.
- (13) Fit the shaft to the aircraft. As ▶

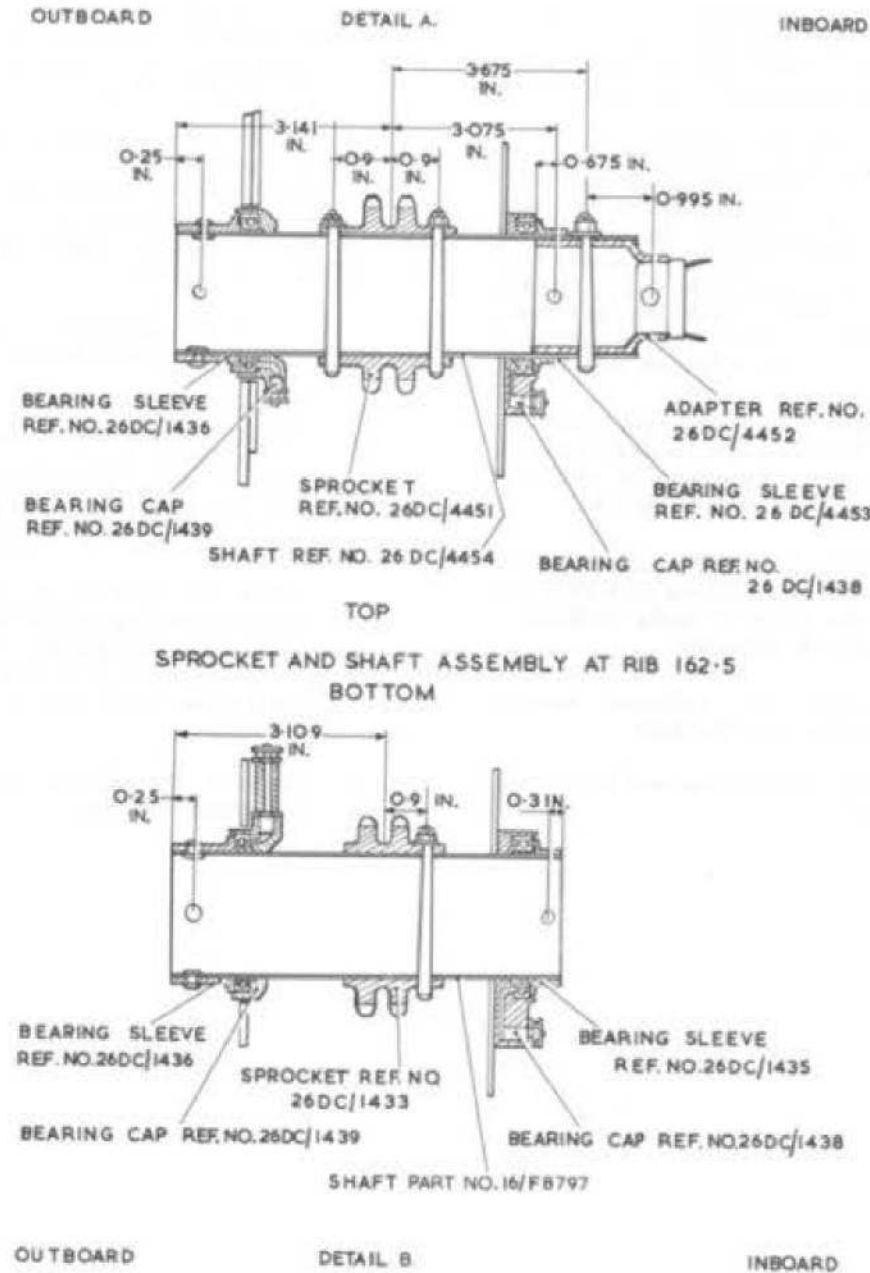


Fig.27. Air brakes sprocket and shaft assemblies (2)

the shaft is being inserted from the outboard face of rib 162-5 fit the sprocket over the shaft.

- (14) Engage the shaft in the inboard bearing assemble and secure the outboard bearing assembly to rib 162-5 as detailed in op.(2).
- (15) Secure the sprocket to the shaft using the taper pins, Part No.2/SS4189, 1/4 in. plain washers, Ref.No.28W/9418921, 1/4 in. B.S.F. slotted nuts, Ref.No.28M/1011467, and 1/16 in. split pins.
- (16) Fit the adapter to the inboard end of the shaft and temporarily fit the taper pins given in op.(7).

NOTE...

Fitting the washers, nuts and split pins to the two taper pins on the inboard end of the assembly is carried out after the assembly of the outboard drive shaft detailed in para.83.

- (17) Lubricate the bearing assemblies with grease XG-295.

Rib 162-5 - bottom

89. To fit a replacement sprocket and shaft assembly at the bottom on rib 162-5 refer to fig.27, detail B, and proceed as follows:-

- (1) Assemble the bearing sleeve, Ref.No.26DC/1435, the bearing cap, Ref.No.26DC/1438, and the bearing, Ref.No.2A/9500427, to the inboard face of rib 162-5. Secure the assembly, grease nipple at the bottom, using 1/4 in. B.S.F. bolts, Ref.No.28D/1011030, 1/4 in. plain washers, Ref.No.28W/9418921, and 1/4 in. B.S.F. stiffnuts, Ref. No.29M/10290.
- (2) Assemble the bearing, Ref.No. 26DC/1436, the bearing cap, Ref.No.26DC/1439, and the

- bearing, Ref.No.2A/9500427, to the outboard face of rib 162-5. Secure the assembly, grease nipple at the top, using four ¼ in. B.S.F. bolts, Ref.No.28D/1008151, four ¼ in. plain washers, Ref.No.28W/9418921 and four ¼ in. B.S.F. stiffnuts, Ref.No.28M/10290.
- (3) Fit the shaft, Part No.16/F8797, through the outboard bearing assembly and fit the sprocket, Ref.No.26DC/1433, to the shaft. Fit the shaft through the inboard bearing assembly.
- (4) Line up the outboard edge of the shaft with the outboard edge of the outboard bearing sleeve. Mark off, to the dimensions given in fig.27, detail B, the position of the four rivets which secure the shaft to the outboard bearing sleeve. Drill the four holes 4.90 mm. and temporarily secure the shaft to the bearing sleeve.
- (5) Mark off, to the dimensions given in fig.27, detail B, the position of the taper pin which secures the shaft to the inboard bearing sleeve. Drill and ream the hole to suit the taper pin, Ref.No.26DC/1440, temporarily fit the taper pin.
- (6) Position the sprocket and mark off, to the dimensions given in fig.27, detail B, the position of the taper pin which secures the sprocket to the shaft. Drill and ream the hole to suit the taper pin, Ref.No.26DC/1440. Spot face the small diameter hole in the sprocket 0.625 in. dia. x 0.03 in. deep.
- (7) Remove the taper pin fitted in op.(5) and remove the nuts, washers and bolts securing the outboard bearing assembly to the rib.
- (8) Remove the shaft complete with the outboard bearing assembly and as the shaft is being withdrawn, remove the sprocket.
- (9) Remove the outboard bearing assembly from the shaft.
- (10) Deburr all the holes and remove the swarf.
- (11) Fit the outboard bearing assembly on the shaft and rivet it in position using four 3/16 in. diameter rivets, Ref.No.28Q/1952.
- (12) Fit the shaft and outboard bearing assembly to rib 162.5. Insert the shaft from the outboard face of the rib. Fit the sprocket on the shaft and fit the shaft through the inboard bearing assembly.
- (13) Secure the outboard bearing assembly to the rib as given in op.(2).
- (14) Secure the shaft to the inboard bearing sleeve using the taper pin, Ref.No.26DC/1440, a saddle washer, Part No.20/SS3703, a 2 B.A. slotted nut, Ref.No.28M/13121, and a 1/16 in. split pin.
- (15) Secure the sprocket to the shaft using the taper pin, Ref.No.26DC/1440, a saddle washer, Part No.20/SS3703, a 2 B.A. slotted nut, Ref.No.28M/13121, and a 1/16 in. split pin.
- (16) Lubricate the bearing assemblies with grease XG-295.

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Chapter 1A FUSELAGE (MK.1A)

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DESCRIPTION

General

1. This chapter describes, the rear fuselage fitted to Mk.1A aircraft to accommodate the additional airborne equipment, the recommended procedures for the removal and assembly of the rear fuselage sections and the counterpoise plates and splitters. For information on the remainder of the fuselage reference should be made to Chapter 1 of this section.

REAR FUSELAGE

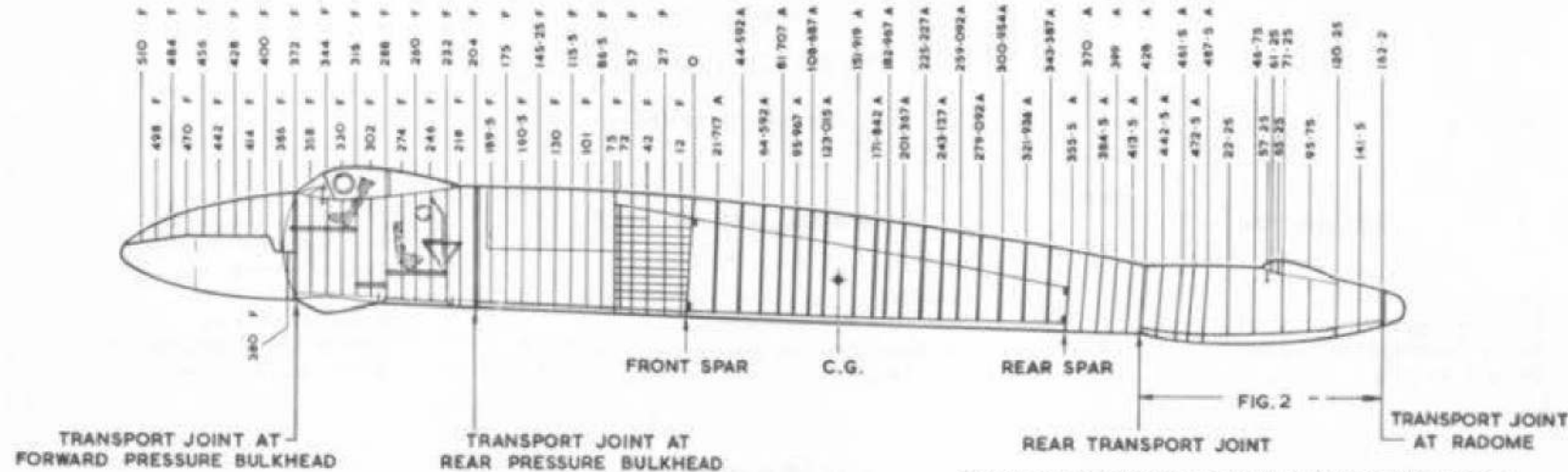
2. The rear fuselage (fig.2) which is

in three sections - centre, port and starboard - is constructed almost entirely of light alloy pressings and carries the jet pipe detachable end caps, the additional airborne equipment and the tail cone radome.

3. Circular formers, attached to triangular section light alloy longerons and box section light alloy cross beams, form the centre structure. Note that the formers aft of former 487-5A are identified by their distance in inches aft of that

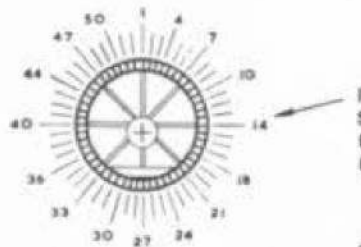
former. A bulkhead, included in the structure at former 487-5A, forms part of the support structure for the rudder power units and divides the structure into fore and aft sections. The forward section, between transport former 428A, and the bulkhead, contains the tail bumper structure, the rudder control system and a servicing platform accessible through an aperture in the underside. The aft section, the airborne equipment compartment (Sect. 3, Chap.16), incorporates additional reinforcing for the roof structure to accommodate lifting hoists for the installation and

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FUSELAGE FORMERS BETWEEN STATIONS 510 F AND 487.5A, ARE IDENTIFIED BY THEIR DISTANCE IN INCHES FORE OR AFT OF THE FRONT SPAR DATUM FACE. FORMERS AFT OF 487.5A, ARE IDENTIFIED BY THEIR DISTANCE IN INCHES AFT OF THAT FORMER'S DATUM FACE

BOMB BAY ARCHES ARE SHOWN IN HEAVY LINE



IDENTIFICATION AND LOCATION OF STRINGERS BETWEEN FORWARD AND REAR PRESSURE BULKHEADS LOOKING AFT

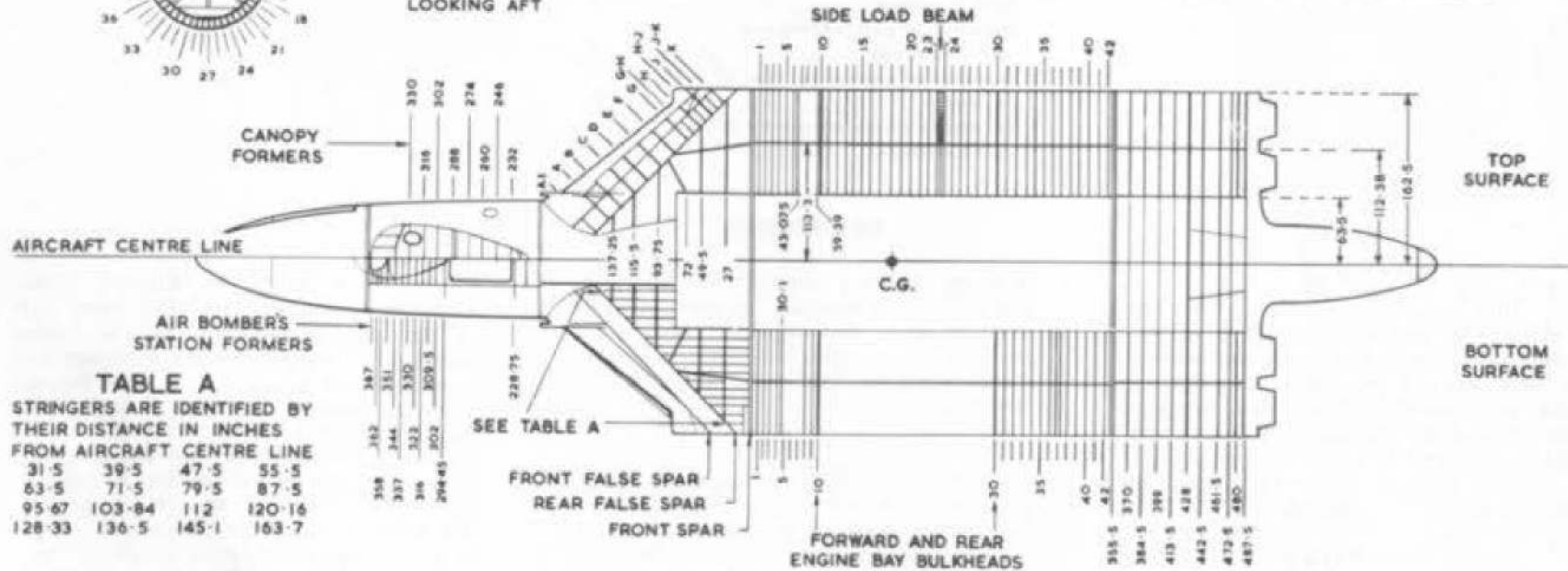


TABLE A
STRINGERS ARE IDENTIFIED BY THEIR DISTANCE IN INCHES FROM AIRCRAFT CENTRE LINE

31.5	39.5	47.5	55.5
63.5	71.5	79.5	87.5
95.67	103.84	112	120.16
128.33	136.5	145.1	163.7

Fig. 1. Former and rib positions.

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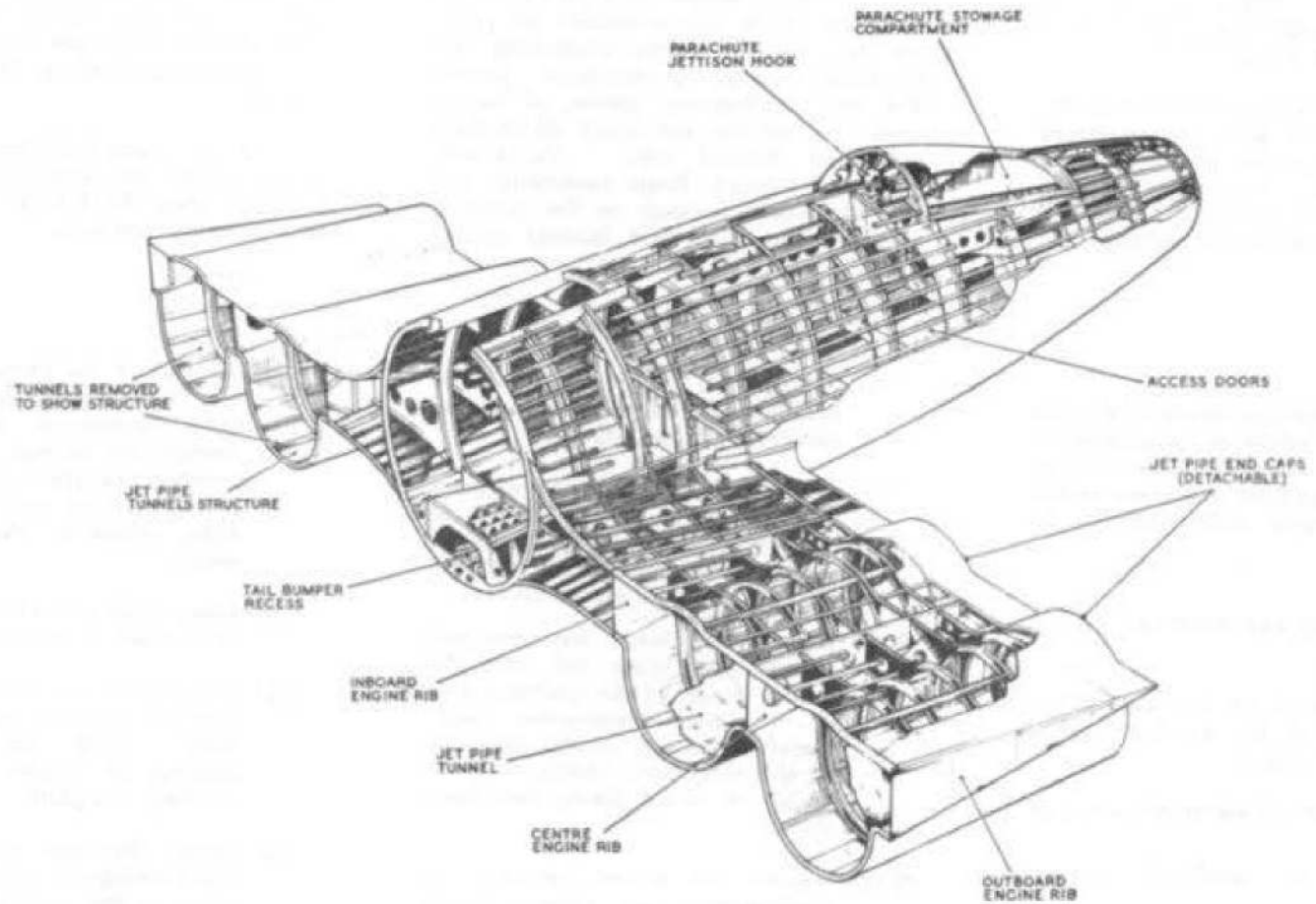


Fig. 2. Rear fuselage.
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removal of the E.C.M. equipment through the three large doors provided in the underside.

4. Aft of the rudder, a box-shaped stowage houses the brake parachute and, forward of this, the parachute jettison hook and associated mechanism is attached to the fuselage structure by a drag beam assembly. When installed the parachute is faired off by a single forward hinged door (Sect.3, Chap.13A).

5. Manipulated beams, bolted to attachment angles on the port and starboard sides of the formers, are attached to the inboard engine ribs. Extending outboard from the engine ribs are spectacle shaped pressed formers to which the jet pipe end

caps are attached. The skin plating is supported by top-hat section stringers, except at the skin plating joints where T-section is used, the stringers being secured with attachment brackets to the formers and diaphragms.

AERIAL COUNTERPOISE PLATES

6. Slung below and between the tunnel structure of the two starboard jet pipes are two vertical beams supporting two horizontal aerial counterpoise plates. The two counterpoise plates, of honeycomb construction, are faired off on each side and forward end. To provide additional support, hinge assemblies and the attachment fairings on the outboard side and the attachment fairings on the

inboard side of the counterpoise plates are secured to the jet pipe tunnel structure curvature. The attachment fairings are secured with screws to attachment angles riveted to the structure curvature. The hinges and the slotted holes for the attachment screws of the outboard fairing permit movement due to structural flexing during flight. The fairing secured to the front end of the forward counterpoise plate and the jet pipe tunnel curvature, incorporates an air intake which provides a flow of cooling air along the jet pipe fairing skin.

7. It is essential that ballast and socket plates are installed in the rear fuselage when the E.C.M. units are not mounted in the aircraft.

General

8. The rear fuselage consists of three sections each of which is independently removed from the aircraft. The removal and assembly procedures are given in the following paragraphs, with reference to fig.3, 4 and 5.

REAR FUSELAGE REMOVAL

Starboard section

9. The procedure for removal of the starboard section of the rear fuselage is as follows, refer to fig.3.

- (1) Ensure that all electrical power is off.
- (2) Remove the starboard inboard elevator.
- (3) Remove the bolts securing the rear end of the rear counterpoise plate to the jet pipe end caps.
- (4) Remove the jet pipe end caps and jet pipes (Sect.4, Chap.1).

REMOVAL AND ASSEMBLY

- (5) Remove the jet pipe guide rails and jet pipe tunnel skins between formers 413A and 442.5A.
- (6) Remove the screws and spacers that secure the outboard fairing of the rear counterpoise plate to the Z-channel mounted on the outboard jet pipe curvature (detail D).
- (7) Remove the hinge rod stop and remove the hinge rod from the bottom hinge on the outboard side of the rear counterpoise plate. Locknuts, fitted on the rear end of the hinge rod, enable it to be pulled or turned during this operation.
- (8) Remove the screws securing the counterpoise plate inboard fairing to the Z-channel member on the inboard jet pipe curvature (detail C).
- (9) Disconnect the aerial cable from the aerial or blanking assembly

mounted in the forward end of the rear counterpoise plate. The cable connector is accessible through an access panel in the counterpoise plate adjacent to the aerial. Care must be exercised when releasing the aerial connector.

- (10) Remove the aerial from the counterpoise plate if necessary.
- (11) Remove the rear counterpoise plate from the splitter by removing the bolts along the approximate longitudinal centre line of the counterpoise plate.
- (12) Detach the rear splitter from the rear fuselage by removing the bolts securing the splitter to the angle mounted along rib 112.38 (detail F). When the splitter is being removed, it must be moved aft as well as down to follow the contour of the aerial cable which passes through it.

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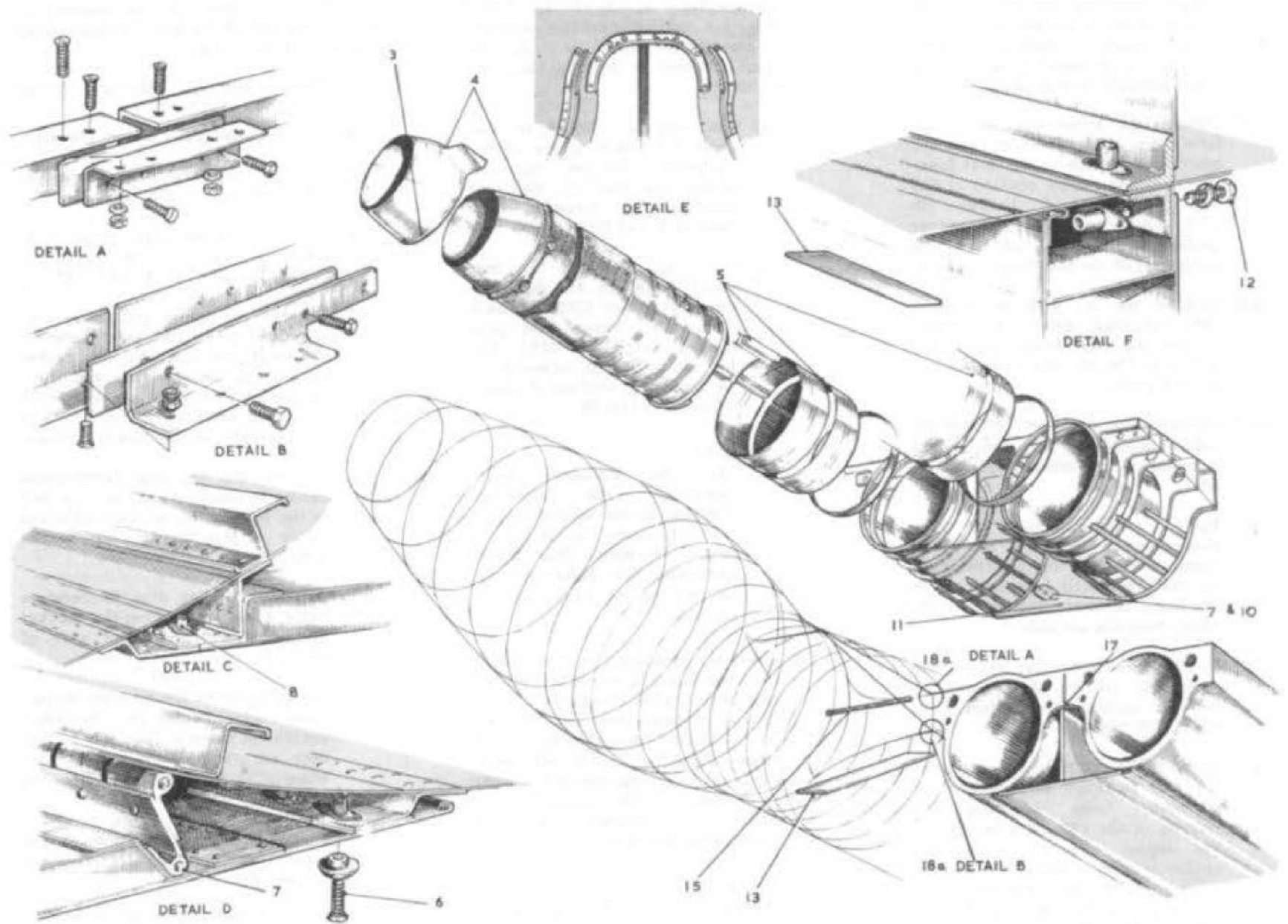


Fig.3. Removal of starboard section of rear fuselage.

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NOTE...

After removing the splitter, the cable must be marked by a warning pennant or another suitable method to prevent the cable being accidentally bent or damaged.

- (13) Remove the upper and lower surface skins at the joint between the starboard section of the rear fuselage and the centre section of the rear fuselage, i.e., between rib 63.5 and stringer 72 on the upper surface and between rib 63.5 and stringer 118 on the lower surface.
- (14) Remove the jet pipe temperature cable fairlead, which is mounted in the jet pipe tunnel skin, adjacent to the jet pipe terminal box access panel.
- (15) Release the jet pipe temperature cable conduit clip from the bracket mounted on the inboard side of rib 63.5.
- (16) Partly withdraw the jet pipe temperature cables, into the centre section of the rear fuselage, so that they will be clear of the starboard section when it is withdrawn from the aircraft.
- (17) Remove the bolts that secure the removable section of former 428A to the undersurface skinning at rib 112.38 (detail E).
- (18) Support the starboard section of the rear fuselage and remove the transport bolts securing the formers of the starboard section to the angles on rib 63.5 of the centre section of the rear fuselage. Also remove the transport bolts securing the starboard section to the aircraft centre section at former 428A with the exception of the bolts through the detachable

section of former 428A on the undersurface at rib 112.38 (detail E), this portion remains attached to the aircraft centre section. As each position is reached also disconnect:-

- (a) The vertical bolts in the upper and lower joints of the starboard section to the centre section of the rear fuselage at former 428A (details A and B).
- (b) The clips securing the rear aerial cable to rib 63.5 adjacent to former 428A, the skin above the inboard jet pipe adjacent to former 428A, and the aircraft skin adjacent to the removable section of former 428A at rib 112.38.

NOTE...

As the transport bolts, securing the starboard section to the aircraft centre section, vary in length it must be noted from which position the bolts are removed so as to assist assembly.

- (19) Ease the starboard section away from the aircraft, ensuring that the rear aerial cable clears the cut-out in the undersurface skinning adjacent to the removable section of former 428A. If the aft aerial cable is not being removed it must be secured to the aircraft centre section to prevent its being damaged or distorted.

NOTE...

This section of the rear fuselage will have to be manhandled as ground handling equipment is considered unnecessary.

Port section

10. The procedure for the removal of the port section of the rear fuselage is as follows. Refer to fig.4.

- (1) Ensure that all electrical power is off.
- (2) Remove the port inboard elevator.
- (3) Remove the jet pipe end caps and jet pipes (Sect.4, Chap.1).
- (4) Remove the jet pipe guide rails and the jet pipe tunnel skins between formers 413A and 442.5A.
- (5) Remove the upper and lower surface skins at the joint between the port section and the centre section of the rear fuselage, i.e., between rib 63.5 and stringer 71 on the upper surface and rib 63.5 and stringer 117 on the lower surface.
- (6) Remove the jet pipe temperature cable fairlead, which is mounted in the jet pipe tunnel skin adjacent to the jet pipe terminal box access panel.
- (7) Release the jet pipe temperature cable conduit clip from the bracket mounted on the inboard side of rib 63.5.
- (8) Partly withdraw the jet pipe temperature control cables into the centre section of the rear fuselage so that they are clear of the port section when it is being removed from the aircraft.
- (9) Support the port section of the rear fuselage and remove the following:-
 - (a) The bolts securing the formers of the port section to the centre section of the rear fuselage at rib 63.5.

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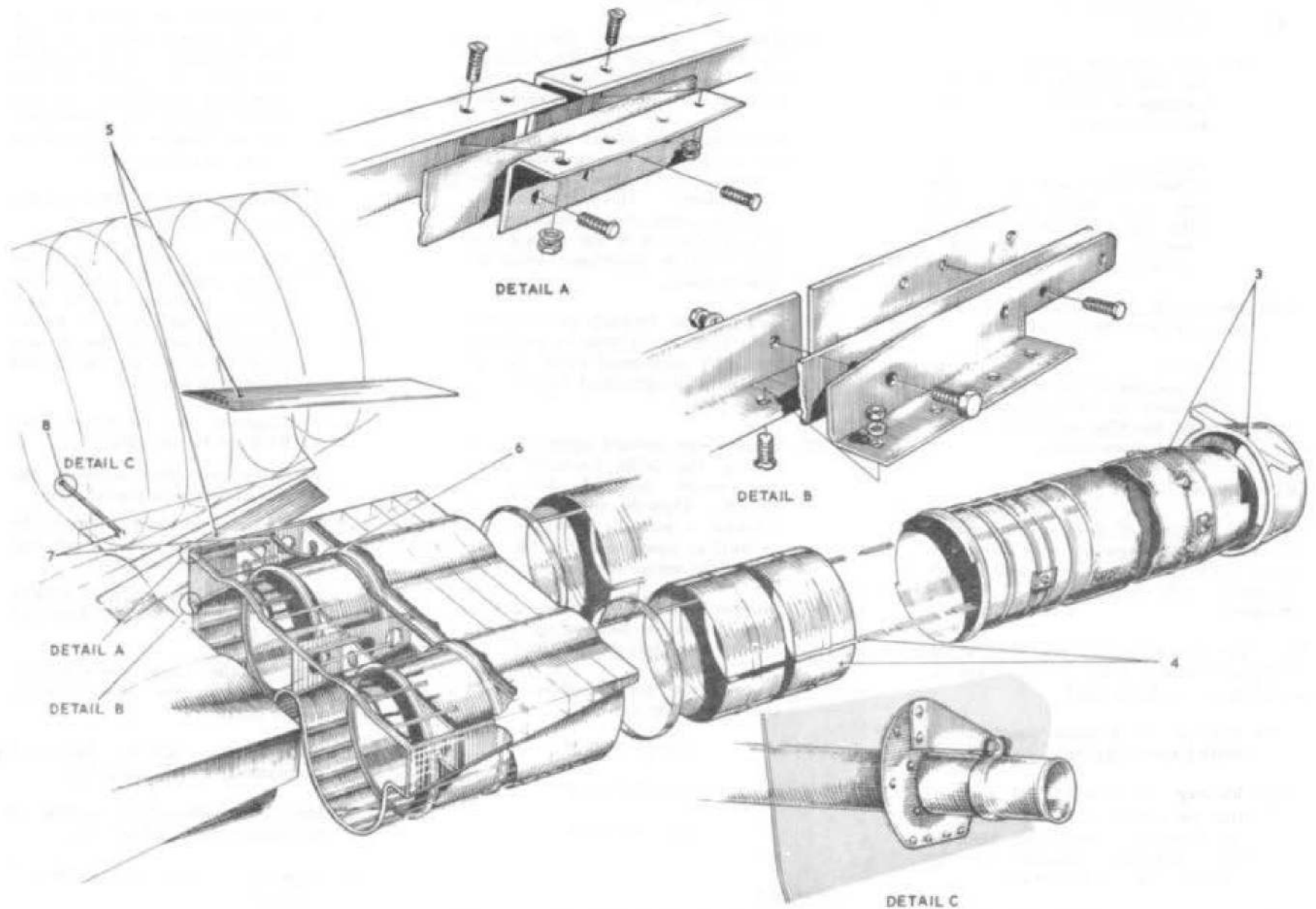


Fig. 4. Removal of port section of rear fuselage.
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- (b) The bolts securing the port section of the rear fuselage to former 428A at rib 63.5 (details A and B).
- (c) The transport bolts securing the port section of the rear fuselage to former 428A of the aircraft centre section.

NOTE...

These bolts vary in length so it is recommended that the bolt positions be noted to assist in subsequent assembly.

- (10) Remove the port section of the rear fuselage from the aircraft.

NOTE...

This section of the rear fuselage will have to be manhandled as ground handling equipment is not considered necessary.

Centre section

NOTE...

Prior to the removal of the centre section of the rear fuselage the port and starboard sections must be removed in accordance with para.9 and 10 of the chapter.

- 11. The procedure for the removal of the centre section of the rear fuselage is as follows. Refer to fig.5.

- (1) Remove the forward counterpoise plate forward fairing.
- (2) Remove the screws and spacers that secure the outboard fairing of the forward counterpoise plate to the Z-channel mounted on the outboard jet pipe curvature.
- (3) Remove the hinge rod from the bottom hinge on the outboard side of the forward counterpoise plate.

Locknuts, by which the rod can be turned or pulled are fitted on the rear end of the rod.

- (4) Remove the screws that secure the inboard side of the counterpoise plate to the fairing on the inboard jet pipe skin curvature.
- (5) Disconnect the aerial cables from the aerals or blanking assemblies mounted in the forward counterpoise plate. The cable connections are accessible through access panels adjacent to the aerals and care must be exercised when releasing them.
- (6) Remove the forward counterpoise plate from its splitter by removing the bolts positioned along the approximate longitudinal centre line of the plate.
- (7) Remove the forward splitter by removing the bolts securing it to the angle mounted along rib 112.38. When the splitter is being removed it must be moved forward as well as down to follow the contour of the aerial cables.
- (8) Remove the aerial cable guards from around the base of the rudder control lever bottom hinge box.
- (9) Remove the aerial cables in the following order:-

- (1) 11/T.4507
- (2) 12/T.4507
- (3) 13/T.4507

WARNING...

The shape of the cables is very important and great care must be exercised when handling them.

The attachment points of the cables are as follows:-

- (a) Connectors on former 461.5A in the centre section of the rear fuselage. It is important that the 4B.A. bolts in the connector mountings are removed before the connectors are broken, otherwise the cables may be distorted.
- (b) Fairlead on the rudder control lever bottom hinge box.
- (c) Fairlead at the access panel in the starboard side of the centre section of the rear fuselage just aft of former 428A. Remove the access panel at the same time as the fairlead is released.
- (d) Clips at the junction of rib 63.5 and former 428A.
- (e) Clips over the centre of the inboard jet pipe tunnel.
- (f) Fairlead on former 428A at the position taken by the aft end of the forward splitter.
- (g) Clips on the splitter attachment angle running along the rib 112.38.
- (10) Remove the three main access doors below the rear fuselage centre section.
- (11) Remove the E.C.M. equipment canisters (Sect.3, Chap.16).
- (12) Drain the water/glycol system, if necessary (Sect.3, Chap.16).
- (13) Remove the tail radome (Sect.3, Chap.16).
- (14) Remove the brake parachute (Sect.3, Chap.13A).

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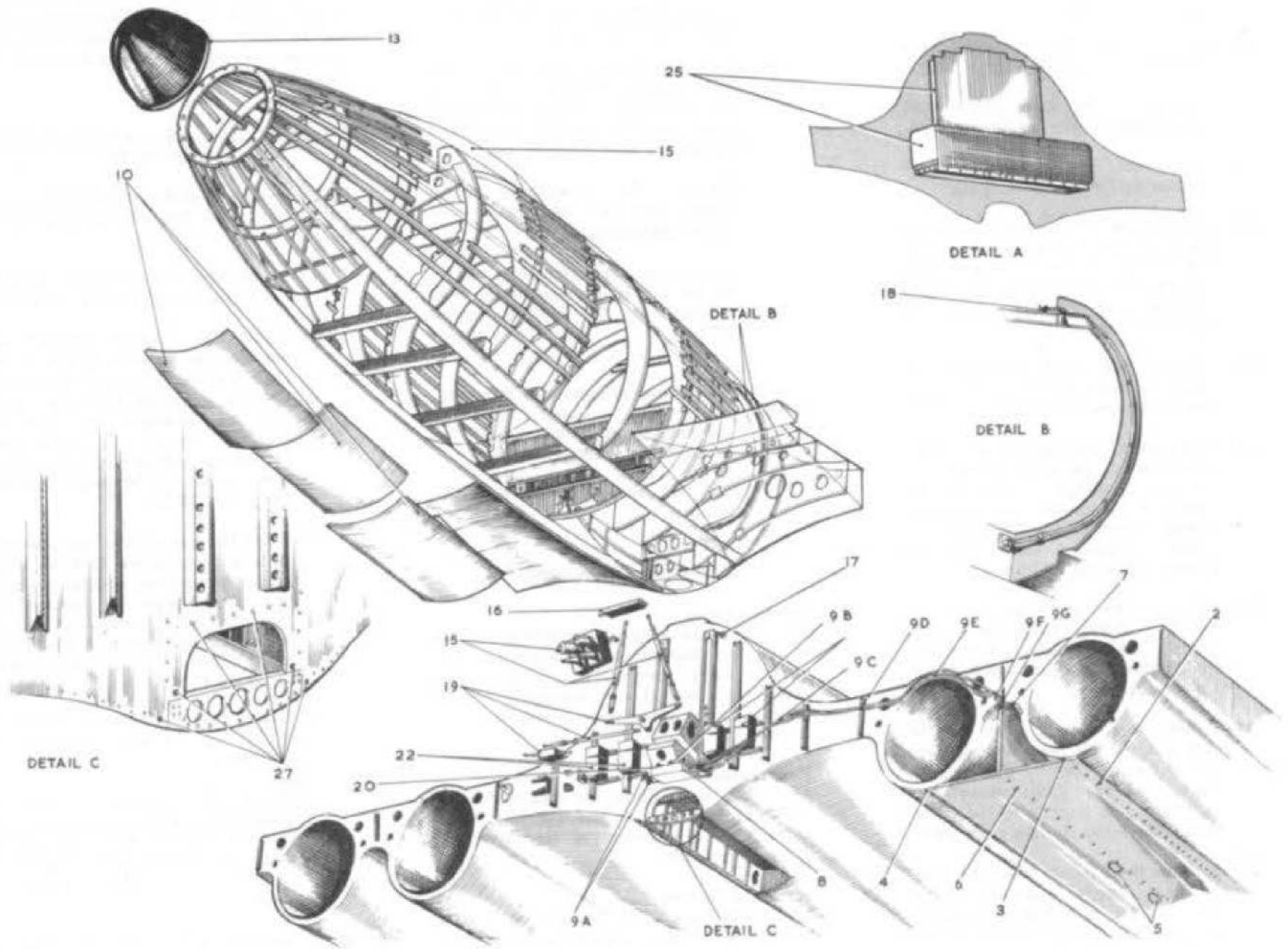


Fig. 5. Removal of centre section of rear fuselage.

(4 Op. numbers altered)

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- (15) Remove the rudder power units and the rudder (Sect.3, Chap.4 and Sect.3, Chap.3A).
- (16) Remove the drip tray mounted beneath the rudder bottom hinge.
- (17) Disconnect the water/glycol tank pressurisation pipe at former 428A.
- (18) Disconnect the fin aerial switch pressurisation pipe (detail B).
- (19) Remove the rudder control rod in-board of the torque lever on the port side of the fuselage, also remove the lever from the rudder control lever hinge box, and the auto-stabiliser unit.
- (20) Remove the rivets securing the rudder control lever bottom hinge box to the rear fuselage.
- (21) Disconnect and unclip all electrical, radio, and radar cables from the rear fuselage. Coil all the cables to clear the rear fuselage during removal. Remove the cable support rods between formers 428A and 442.5A.
- (22) Remove the port and starboard J.P.T. control amplifiers and datum setting resistances from the centre section bulkhead at former 428A.
- (23) Remove the access panel on the port side of the rear fuselage just aft of former 428A. This access panel and the panel removed in op.(9)(c) give access to the transport bolts in the trailing edge stubs.
- (24) Remove the window launching compartment access panel and remove the window launching equipment, if fitted, to gain access to the lower transport bolts.
- (25) Remove the 96-volt battery box and tray and the contactor panel on the forward face of the bulkhead at former 428A (detail A).
- (26) Position the rear fuselage trolley (Ref.No.26DC/95446) under the rear fuselage. Raise the support beams until the weight of the rear fuselage is just taken by them.
- (27) Remove the attachment bolts around the tail bumper box at former 428A (detail C).
- (28) Remove the transport bolts securing the centre section of the rear fuselage to the aircraft centre section.
- NOTE...**
The transport bolts vary in length, so it must be noted from which position the bolts are removed so as to assist during assembly.
- (29) Move the rear fuselage from the aircraft.

REAR FUSELAGE ASSEMBLY

Centre section

12. The assembly of the centre section of the rear fuselage to the aircraft centre section is a reversal of the procedure given in para.11. Assembly of the splitters and counterpoise plates is given in para.15.

Port section

13. The assembly of the port section of the rear fuselage to the aircraft centre section is a reversal of the procedure given in para.10.

Starboard section

14. The assembly of the starboard section of the rear fuselage to the aircraft centre section is a reversal of the pro-

cedure given in para.9. Prior to fitting the starboard section, ensure that the aerial cables to the counterpoise plates are in position along former 428A, and that care is taken to avoid damaging the aerial cables.

ASSEMBLY OF COUNTERPOISE PLATES AND SPLITTERS

15. To assemble the counterpoise plates and splitters to the aircraft proceed as follows:-

- (1) Secure the forward aerial cable to the angle mounted along rib 112.38.
- (2) Raise the forward splitter into position, as it is being raised feed the two aerial cables through the splitter ensuring that the cables are not damaged nor have excessive bends put into them. Secure the splitter with the attachment bolts to the angle mounted along rib 112.38.
- (3) Raise the rear splitter into position, as it is being raised feed the aerial cable through the splitter ensuring that the cable is not damaged nor has excessive bends put into it. Secure the splitter, with the attachment bolts, to the angle mounted along rib 112.38.
- (4) Check that a clearance of 0.01 to 0.020 in. exists between the splitters.
- (5) Raise the forward counterpoise plate into position, secure it to the forward splitter with the screws along the approximate longitudinal centre line of the counterpoise plate.
- ◀(6) Secure, with the screws, the counterpoise plate to the fairing on ▶

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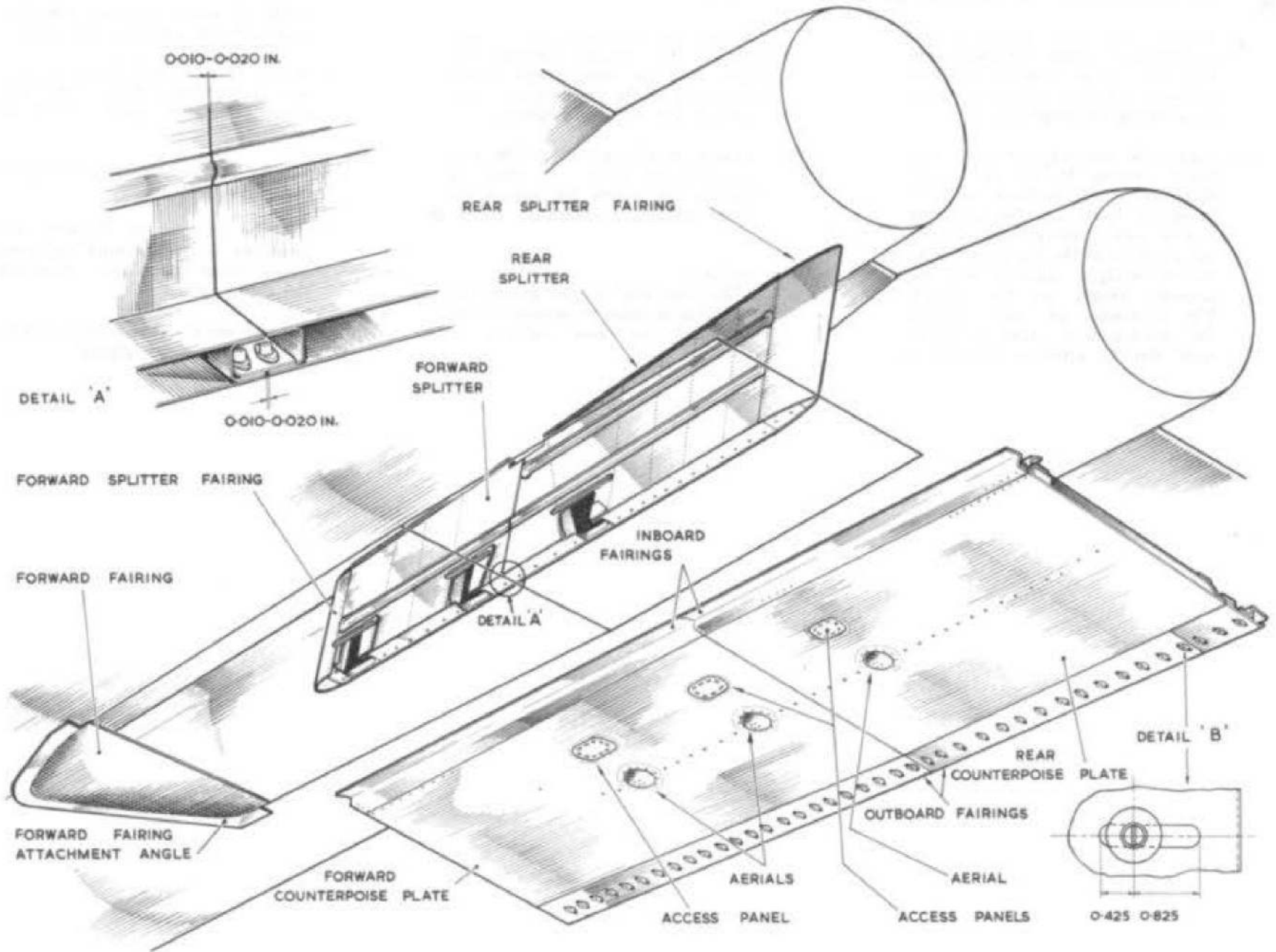


Fig. 6. Assembly of counterpoise plates and splitters.

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◀ the inboard jet pipe curvature skin. ▶

- (7) Engage the half hinge of the counterpoise plate outboard side with the hinge assembly on the outboard jet pipe curvature skin, by inserting the hinge rod.
- (8) Secure the counterpoise plate outboard fairing to the Z-channel attached to the outboard jet pipe curvature skin. The securing screws and spacers must assume the position in the fairing slots as shown on fig.6, detail B with the aircraft weight on the ground. The clearance on each side of the spacers is to allow for movement due to structure flexing in

flight.

- (9) Secure the butt strap to the rear end of the forward counterpoise plate and the joint plates to the rear ends of the counterpoise plate inboard and outboard fairings.
- ◀ (10) Repeat op.(5) to (8) on the rear counterpoise plate. After inserting the hinge rod secure the hinge rod stop in position. ▶

NOTE...

The rear end of the inboard Z-section member is secured to the inboard jet pipe end-cap by screws.

- (11) Check that a clearance of 0.010 to 0.020 in. exists between the forward and rear counterpoise plates.
- (12) Secure the forward flange of the rear counterpoise plate to the butt strap and joint plates fitted in op.(9).
- (13) Fit the forward counterpoise plate front fairing.
- (14) Fit the aerials or blanking assemblies to the forward and rear counterpoise (para.16). Connect the aerial cables.
- (15) Fit the aerial cable access panels to the counterpoise plates.



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