Chapter 2 MAIN PLANES

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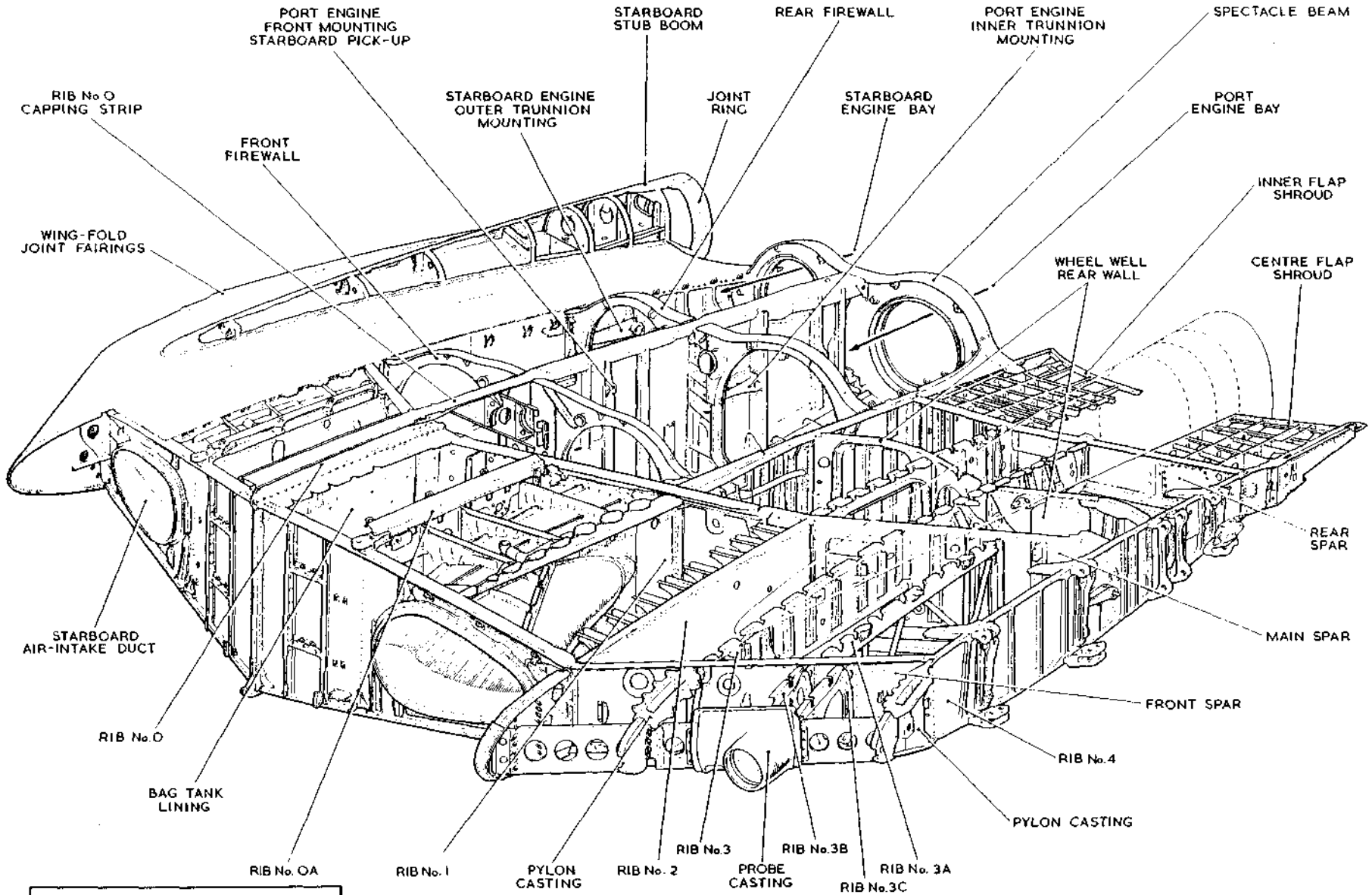


SEA VIXEN FAW Mk 1 AIRCRAFT	
AIR DIAGRAM 7604/MIN.	
ISSUE 2	PREPARED BY MINISTRY OF AVIATION FOR PROMULGATION BY ADMIRALTY

Fig. 1 Centre-section structure

« Probe casting, and note ribs No. 3B and 3C added »

RESTRICTED

DESCRIPTION

General

1. The main plane consists of a centre section and two wings. The ribs of the main plane are numbered from rib No. 0 on the longitudinal centre-line of the aircraft, to rib No. 13 at the wing-tip.

2. The centre-section structure is built up with prefabricated ribs of light alloy about a front, main, and rear spar, the whole structure being covered mainly by pre-formed heavy gauge light-alloy skinning. In certain applications, titanium alloy is used for some parts of the ribs. The skins between the front and rear spars have their internal surfaces machined to conform with the spar and rib contours, span-wise stringers being bolted, Reduxed, or riveted to the skin.

3. Each wing is of similar construction to the centre section, but the main spar extends for approximately one-third of the span of the wing. Each wing is hinged at rib No. 4 and is hydraulically folded upwards and over the centre section.

Centre section (fig. 1)

4. The centre section extends between rib No. 4 port and rib No. 4 starboard. Housed within the centre section itself, and aft of the main spar, are the two engine bays, separated by rib No. 0, and bounded on their outboard sides by rib No. 1 port and starboard respectively. Each engine bay is divided into three fireproof compartments (Sect. 4, Chap. 5) by a front and rear fire-wall, the compartments being forward, ◀between and aft of these two firewalls; the top halves of the firewalls are detachable to permit engine removal and replacement.

5. Access to the engines and accessories is gained by hinged panels on the top and bottom of the engine bays; when open, the panels may be removed completely by extracting the quick-release Pip-pin hinges.▶

6. Each engine is supplied with air through its own air-intake (fig. 2), located at the side of the fuselage where the leading edge of the centre section joins it; the upper and lower leading edges of the intakes have hot air routed through them for thermal de-icing (Sect. 3, Chap. 9). A hinged vertical door on the inboard side of each air-intake opens during flight to provide an air bleed passage, thus preventing boundary layer break-away which would cause compressor stall.

7. Both engine jet pipes protrude through a spectacle beam, and are shrouded by a single fairing which projects beyond the trailing edge line between the tail booms.

8. The port and starboard trailing edge shrouds aft of the rear spar are separated by the engine bays, and each port and starboard shroud is divided by a stub boom at rib No. 3 position. An inner and centre flap, joined together by a U-plate which passes under the stub boom, are located in each shroud.

◀**9.** Fuel tanks are located between the front and main spars; No. 1 bag tank between rib No. 0 and 0a, No. 1a bag tank between rib No. 1 and 2, and No. 2 integral tank between rib No. 2 and 4. At the leading edge rib No. 3 and 4, pylon castings are fitted to provide the attachment points for light store pylons. The main undercarriage units retract inward into wheel wells located aft of the main spar and between rib No. 1 and 4.▶

Centre-section spars

10. The centre-section front and main spars, which provide mounting points for the engine air intakes, extend from rib No. 0 to rib No. 4. The cut-outs in the spars are strengthened by T-sectioned half-rings which are bolted round the periphery of each hole (fig. 1). The construction of both spars from rib No. 0 to rib No. 2 consists of light-alloy T-sectioned top and bottom booms and a light-alloy web with a vertical stiffener. From rib No. 2 to

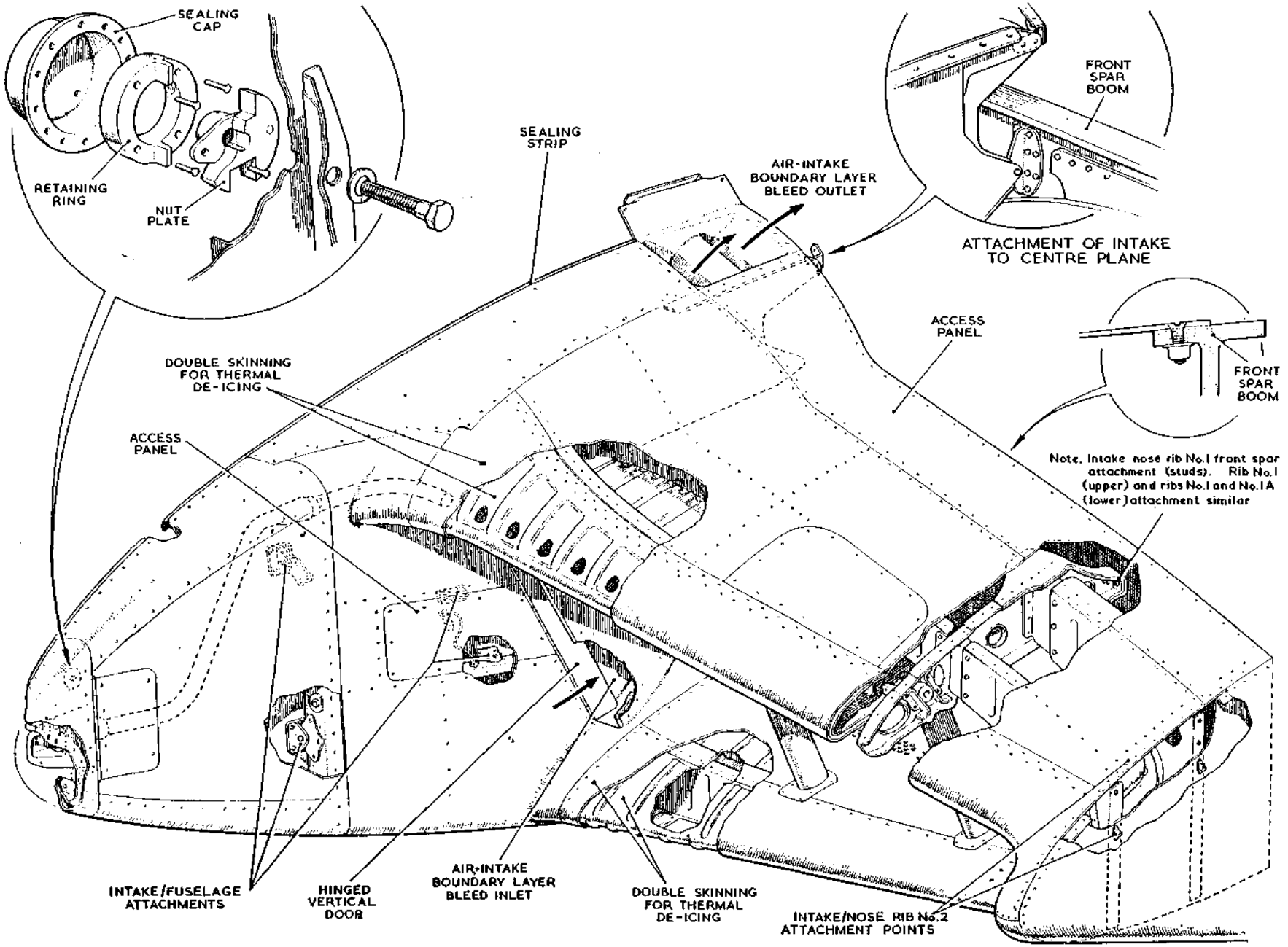


Fig. 2. Engine air-intake structure, port

◀ANTI-ICING HOLES ADDED—MOD. 846▶

rib No. 4, the top and bottom spar booms are L-sectioned and are bolted to a light-alloy web.

11. The centre-section rear spar runs from rib No. 1 to rib No. 4, and has a light-alloy web enclosed between L-sectioned light-alloy booms, the web being stiffened with Z-sectioned vertical members.

Centre-section ribs

12. The description of each rib given below refers to its general structure excluding handed differences.

13. Rib No. 0. This extends from the aft face of the front spar to the front face of the spectacle beam:-

(1) Front spar to main spar. From the front spar rear face to the main spar front face the rib consists of two corrugated diaphragms sandwiched between the port and starboard centre bag tank linings. The top portion of the rib is carried above the centre top skin, and terminates in a T-sectioned boom running fore and aft; fixed to this portion of the rib are the hinges for the upper port and starboard access doors (electrical equipment). The lower part of the rib diaphragm is riveted to a bottom edge boom.

(2) Main spar to spectacle beam. Aft of the main spar a single tubular bracing member runs from the top boom of the main spar to the bottom boom of rib No. 0 on the front face of the forward firewall. The remainder of rib No. 0 consists of a top and bottom T-section boom terminating at the spectacle beam; between the booms is a titanium alloy web stiffened by top hat and Z-section stringers. Forming the division between the port and starboard engine bays, the web of rib No. 0 acts as a firewall between the two engine fire compartments. Just aft of the front firewall position, are two of the four front engine mounting pick-up points, one on either side of the rib web. The starboard throttle terminal pulley mounting is located aft of the rear firewall on the starboard side of the rib web, just forward of the engine rear trunnion mounting member; the large cable drum of the flap system is positioned right aft on the port side. The casting for the flap jack pivot point is adjacent to the aft end of the top boom and the arresting hook attachment forging is on the aft end of the bottom boom. The top boom of rib No. 0 from the main spar to the spectacle beam is protected from damage by a capping strip riveted along its top surface.

14. Rib No. 0a. This rib is in two halves which are bolted together to from an aperture for the air intake. The composite rib is attached between the rear face of the front spar and the front face of the main spar. Bolted to an attachment angle on the surface of the top skin is a fore-and-aft stiffener web, at the aft end of which is located a fuselage pick-up point (Sect. 3, Chap. 1).

15. Rib No. 1. This rib runs from the front spar to the trailing edge.

(1) From the front spar rear face to the main spar front face, an air-intake passes through the rib web. There are two booms riveted at the top and the bottom of the rib web, each comprising an auxiliary boom to which the centre-section skin is riveted, and an L-sectioned boom which continues right aft to the trailing edge. A diagonal rib is riveted round the contour of the air intake and the webs of the front spar and rib No. 1.

(2) Aft of the main spar the rib web is of commercial titanium stiffened by vertical Z and top hat section members. The front firewall position, front engine mounting, rear firewall position, port engine outer trunnion mounting and spectacle beam are aft of the main spar in this region.

16. Rib No. 2. This rib runs from outboard of the air-intake aperture to the trailing edge.

(1) Between the front spar and the main spar it comprises a light-alloy web between two light-alloy L-sectioned booms, stiffened by vertical top hat sectioned members. This

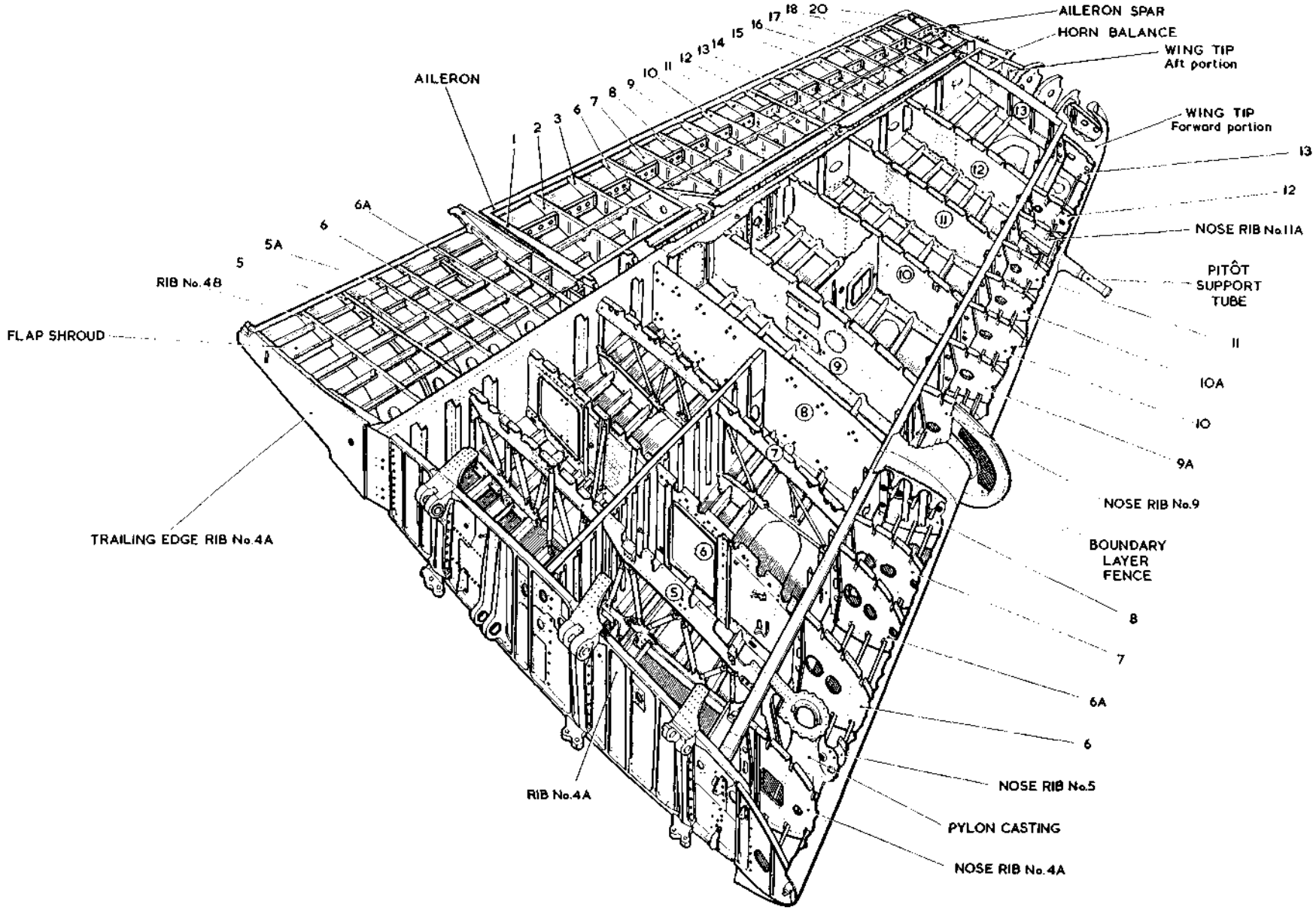


Fig.3. Wing structure

part of the rib forms the inboard end of No. 2 fuel tank.

(2) From the rear face of the main spar to the front face of the wheel well rear wall, rib No. 2 is constructed as an arch rib running up the rear face of the main spar, along the underside of the top skin and down the front face of the wheel well rear wall. The arch is constructed with two flanged rib pressings, riveted together with a reinforcing plate and strap riveted and bolted along the inside of the rib.

(3) Between the wheel well rear wall and the front face of the rear spar the rib consists of a light-alloy web with a top and bottom L-section boom braced with vertical light-alloy stiffeners.

17. Rib No. 3. This rib runs from the leading edge to the front face of the rear spar. The leading edge of rib No. 3 has a built-in pylon casting.

(1) From the front spar to the main spar the rib has a single light-alloy web, stiffened by vertical Z-stringers and riveted at the top to an L-sectioned boom. The web is approximately two thirds the depth of the rib and is riveted on its lower edge to the bottom boom, which is of cruciform section and has the lower portion of the rib riveted to its lower edge.

(2) From the main spar to the wheel well rear wall, rib No. 3 carries on its outboard face the pick-up points for the undercarriage hydraulic jack anchorage, the undercarriage forward sidestay and the reverse motion lever bracket (Sect. 3, Chap. 5). The top and bottom booms are of T-section light alloy and are bolted to a light-alloy machined web. This section of the rib is about two thirds the depth of the wing to allow for the accommodation of the shock-absorber strut on retraction of the main undercarriage.

(3) Between the wheel well rear wall and the rear spar, a machined web is bolted between the top boom and the cruciform section bottom boom, to which the lower portion of the rib is bolted. The wing-fold hydraulic jack mounting posts are located on rib No. 3 at this point.

18. Rib No. 3a. This rib extends between the front and main spars only and strengthens the main spar at the wheel well.

19. Rib No. 4. A casting for the suspension of a pylon forms the leading edge of the rib; from aft of the leading edge to the front face of the rear spar the web and booms are machined integrally in a single piece; between the front and main spar, rib No. 4 forms the outboard end of No. 2 fuel tank. The wing fold actuating mechanism is on the outboard face of rib No. 4.

Stub booms (port and starboard)

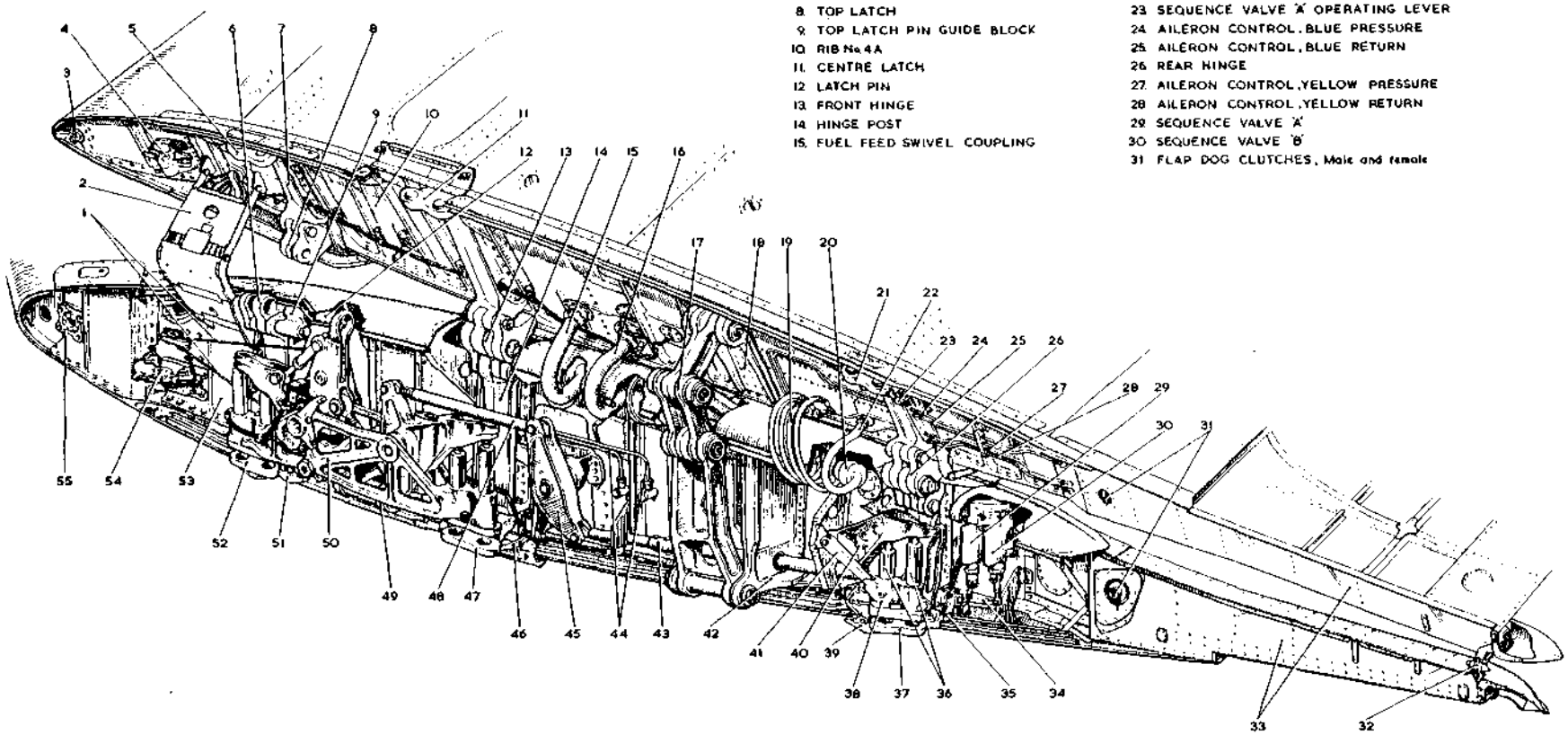
20. Each stub boom, located at rib No. 3, is an integral part of the centre section, and comprises a framework of castings and diaphragms attached to the top and bottom surfaces of the centre section, the whole structure being covered with a light-alloy skin and terminating in a joint ring for the attachment of its respective tail boom. Datum spigots are provided on the inboard face of each stub boom to allow for boom alignment.

Wing-fold joint fairings (fig. 14 and 15)

21. When the wing is spread, the wing fold gap is closed by fairings extending from just aft of the leading edge to the trailing edge; hinged and removable access doors are located in the bottom fairings. Inspection windows are located at the front and rear latch pin positions in the bottom outboard fairing to enable the latch pin protrusion to be checked visually; the centre latch pins may be checked by lowering the adjacent access door.

Wing structure

22. Each wing extends from rib No. 4a at the wing-fold joint to rib No. 13 at the wing tip. The front and rear spars run from rib No. 4a to rib No. 13, but the main spar terminates at rib No. 8; the three wing spars are built up from L-section booms and



1. MANUAL LOCK OPERATING CABLES
2. FOLDING TROUGH
3. SPIGOT
4. TELEFLEX BELL-CRANK COMPENSATOR
5. FRONT BOTTOM LATCH
6. TOP LATCH
7. LATCH POST
8. TOP LATCH
9. TOP LATCH PIN GUIDE BLOCK
10. RIB No.4A
11. CENTRE LATCH
12. LATCH PIN
13. FRONT HINGE
14. HINGE POST
15. FUEL FEED SWIVEL COUPLING
16. FUEL VENT SWIVEL COUPLING
17. WING-FOLD LINKAGE
18. LINK SUPPORT POST, Outboard
19. HYDRAULIC HOSES, Aileron control circuit
20. SWIVEL COUPLING, Fuel recirculating system
21. REAR LATCH
22. FUEL RECIRCULATION PIPE
23. SEQUENCE VALVE 'A' OPERATING LEVER
24. AILERON CONTROL, BLUE PRESSURE
25. AILERON CONTROL, BLUE RETURN
26. REAR HINGE
27. AILERON CONTROL, YELLOW PRESSURE
28. AILERON CONTROL, YELLOW RETURN
29. SEQUENCE VALVE 'A'
30. SEQUENCE VALVE 'B'
31. FLAP DOG CLUTCHES, Male and female

32. SHROUD HINGE
33. TRAILING EDGE RIB No.4 and No.4A
34. CAM ASSEMBLY LEVERS
35. SEQUENCE VALVE LEVER
36. REAR LATCH PINS
37. REAR LATCH
38. REAR LATCH PINS GUIDE BLOCK
39. STRIKER ARM, Micro switch
40. REAR LATCH PINS LEVER
41. SUPPORT STRUT
42. LINK SUPPORT POST, Inboard
43. CONNECTING-ROD
44. HYDRAULIC PIPE RUNS, Latch pins mechanism operating jack
45. ROCKER LEVER
46. STRIKER ARM, Micro switch.
47. CENTRE LATCH
48. CONNECTING-ROD
49. LATCH PINS MECHANISM OPERATING JACK
50. LATCH PINS MECHANISM
51. STRIKER ARM, Micro switch
52. FRONT BOTTOM LATCH
53. RIB No.4
54. TELEFLEX CABLE TENSION REGULATOR
55. ECCENTRIC BUSH ASSEMBLY

Fig. 4. Wing-fold and latch pin mechanism

light-alloy web, the latter being stiffened with vertical members. Rib No. 4a and rib No. 8 form the ends of the wing integral tanks (tanks No. 3 and 4) which lie between the front, main and rear spars.

23. A boundary layer fence, reinforced internally with foamed resin in the edge member and with aluminium honeycomb between the side members, is fitted between ribs No. 8 and 9, and extends aft to the main spar on the top surface. The nose and main ribs are of the diaphragm type except main ribs No. 5 and 7, which have tubular struts between the top and bottom booms; some of the tubular struts have quick-release connections to permit full access to the No. 3 and 4 fuel tanks.

24. At nose rib No. 5, a pylon casting is fitted to provide the attachment point for a heavy store pylon. Aft of the rear spar, the trailing edge shroud extends from rib No. 4a to 7, and accommodates the outer flap, and from rib No. 7 to the wing tip the aileron is fitted. Both wing and aileron are covered with a light alloy skin.

Aileron (fig. 27)

25. Each aileron is built up round a single spar with nose and main ribs riveted to it; spanwise Z-section stringers are slotted into the rib profiles and are riveted to the ribs and

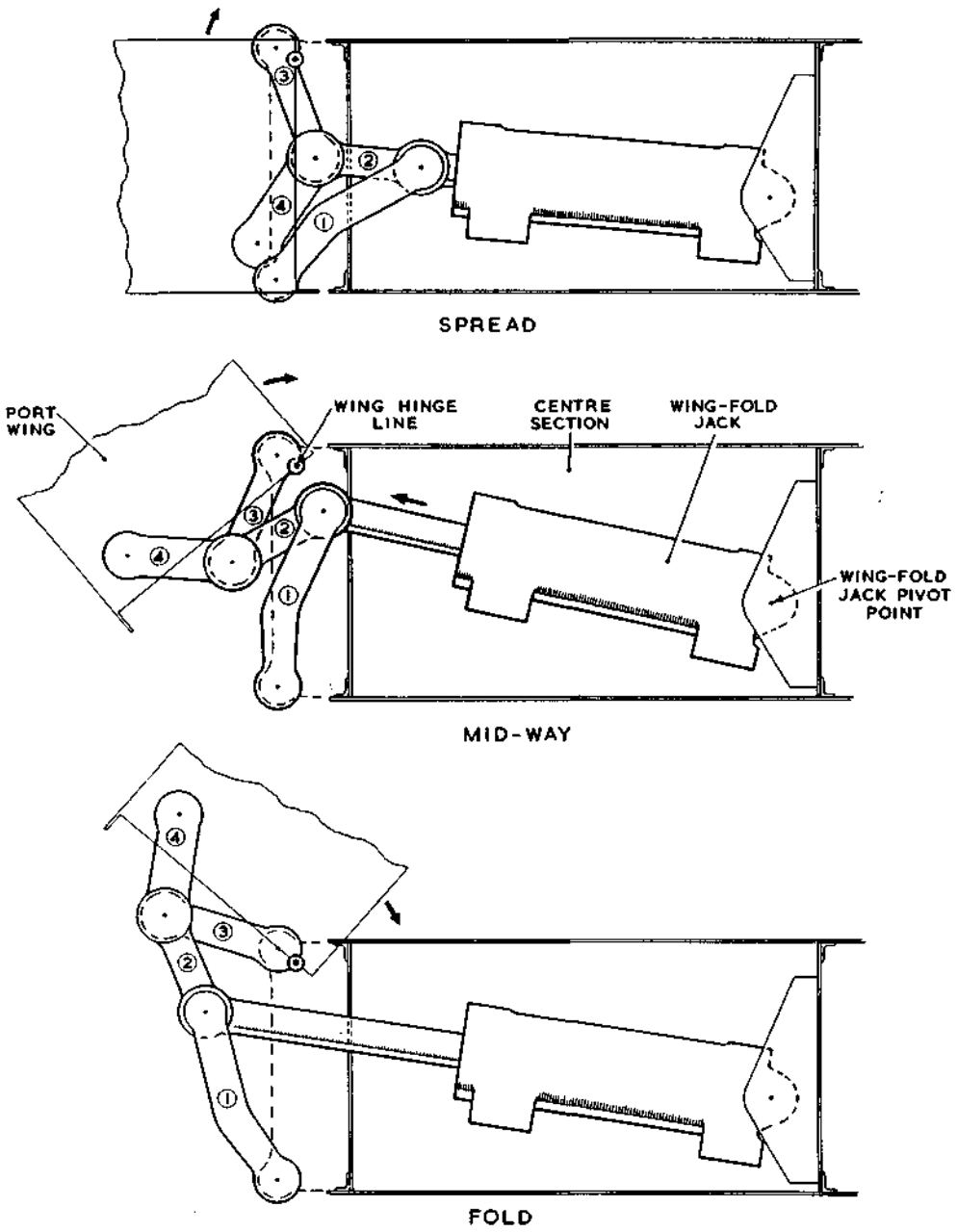


Fig. 5. Wing-fold linkage

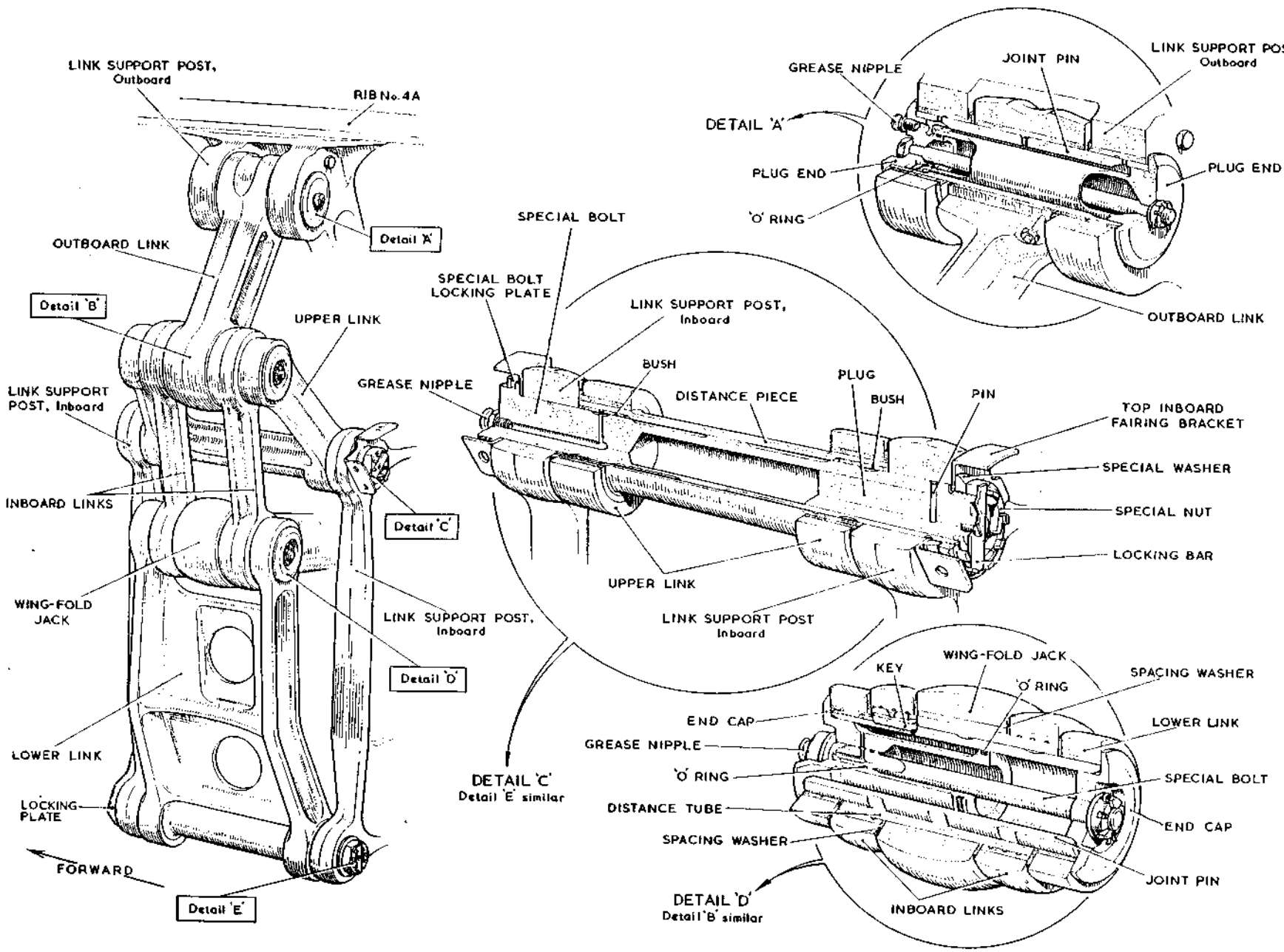


Fig. 6. Wing-fold linkage, port

◀DETAIL AMENDED—MOD. 996▶

the light-alloy skin. A shielded horn balance is located at the outboard end.

26. Each aileron is attached to the rear spar at three pick-up points (rib No. 9, 11 and 13), and is operated by a hydraulic control unit in the wing between ribs No. 9 and 10. For a full description of the mechanical operation of the aileron control circuits refer to Chap. 4. There are no aileron tabs.

Flaps (Fig. 32)

27. Each assembly (port and starboard) consists of an inner, centre and outer flap; the inner and centre flap being joined by a U-plate which passes under the stub boom. Each flap is built up of a number of nose and main ribs preformed from light-alloy sheet and located fore and aft of a main spar; spanwise stringers stiffen the ribs forward of the spar, and a number of vertical diaphragms are located spanwise between the ribs aft of the spar, the whole structure being covered by light-alloy skinning. Located at each flap end rib are the pick-up points between the flaps and their torque and operating tracks. A recessed step is provided in the top surface of the starboard inner flap and provides access to the top of the centre section when the flaps are down.

28. Where the trailing edges of the centre and outer flap meet, they are machined so as to interlock when the wings are spread; the assembly is fitted with an override lock (fig. 31). The trailing edges of the centre and outer flaps are saw-toothed in profile on their upper surface trailing edge to pick up on the trailing edge of the flap shroud.

29. Two flap hooks are located on the top surfaces of the inner flap, so that when the flap is in the up position, they pick up on roller-carriers in the flap shroud and prevent the trailing edge being sucked down in flight.

30. Roller brackets, located on the top surface of each centre and outer flap, pick up on hooks in the flap shroud and, in conjunction with the saw-toothed trailing edges of the centre and outer flaps, align the flaps with the shroud trailing edge as they are coming to the up position.

Wing-fold mechanism (Fig. 7 and 8)

31. Each wing folds about two hinges (8 and 12) on its rib No. 4. The wings are folded by jacks (Fig. 5) which also actuate the wing-fold mechanism through sequence valves Each jack is located transversely in a bay aft of the wheel well rear wall and operates through a linkage (Fig. 6) on the outboard face of rib No. 4.

32. Two selector levers (Fig. 13) on a console to the right of the pilot, are labelled LOCK-UNLOCK, SPREAD-FOLD. The wing lock and wing spread selector levers are mechanically locked in the LOCK and SPREAD position respectively by a trip lever and pawl, these being disengaged by a solenoid which is energised by a supply from a micro switch (Sect. 5, Chap. 1); the micro switch is operated by the initial movement of the LOCK-UNLOCK lever towards the unlock position, the switch receiving a supply only if the flaps are in the fully up position.

33. An override plunger is located aft of the two selector levers. When this plunger is depressed and turned clockwise through 90 deg. it self-locks in this position and mechanically operates the trip lever and pawl to the unlock position, which allows the wing-fold levers to be operated when an electrical supply is not available on the aircraft.

WARNING

The override plunger must never be used when spreading the wings without first ensuring that all flaps (inner, centre, and outer) are mechanically locked in the fully up position, and that the locking slider *(Fig. 34)* on rib No. 4a has sprung fully out. Failure to observe this precaution when using the override plunger in spreading the wings may result in structural damage to the flap high speed shaft assembly.

34. The wing-fold selector levers themselves have an interlocking de-

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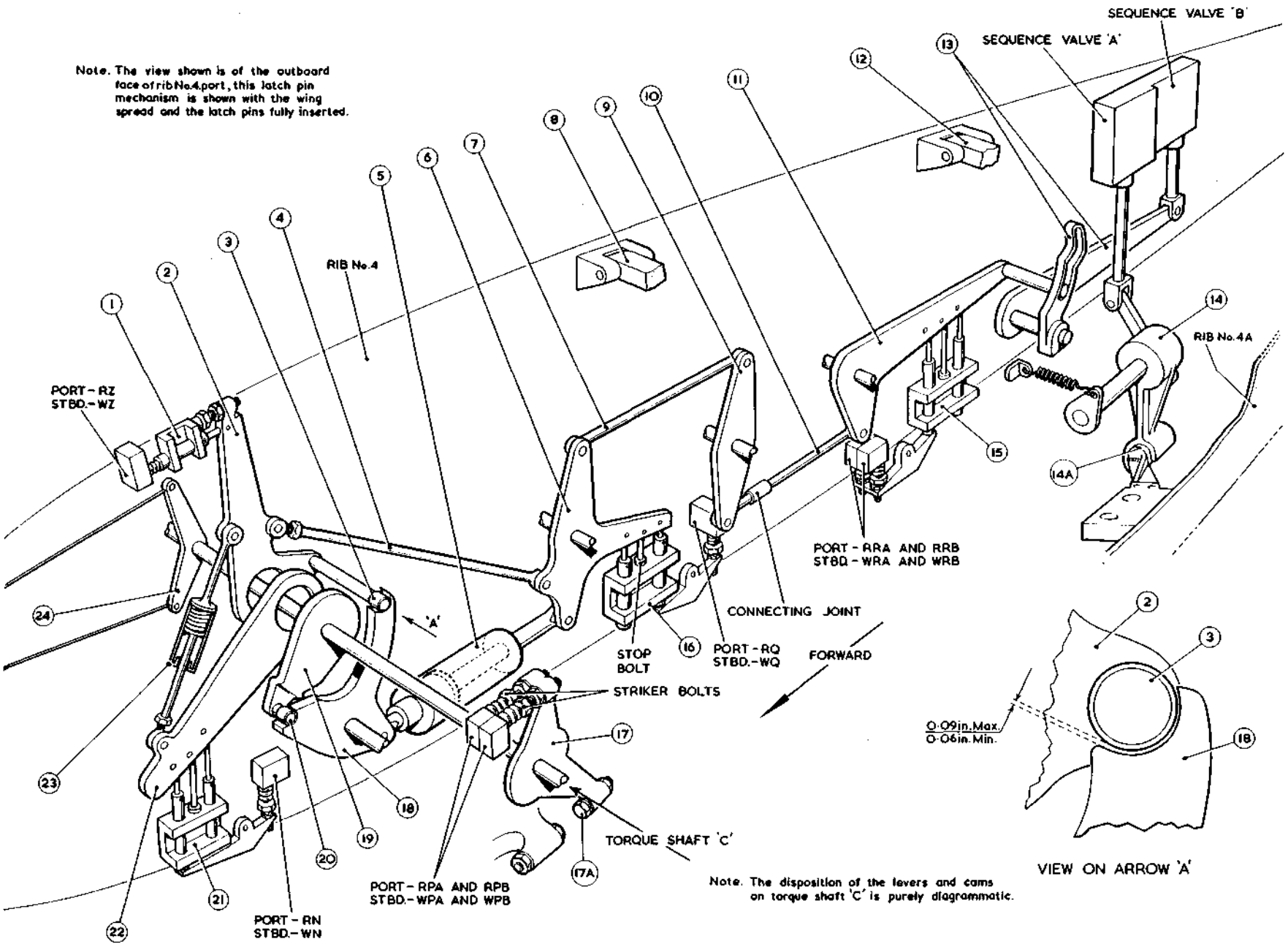


Fig. 7 Wing-fold mechanism (diagrammatic)-spread

KEY TO FIG. 7 AND 8 PORT WING-FOLD MECHANISM (DIAGRAMMATIC)

1 TOP LATCH
2 TOP LATCH PIN LEVER
3 ROLLER
4 CONNECTING-ROD
5 LATCH PIN JACK
6 CENTRE LATCH PINS LEVER
7 CONNECTING-ROD
8 FRONT HINGE (WING)
9 ROCKER LEVER
10 CONNECTING-ROD
11 REAR LATCH PINS LEVER
12 REAR HINGE (WING)
13 CAM ASSEMBLY LEVERS (SEQUENCE VALVE B)
14 SEQUENCE VALVE LEVER (SEQUENCE VALVE A)
14a STRIKER, SEQUENCE VALVE LEVER
15 REAR LATCH
16 CENTRE LATCH
17 LOCK STOP AND SWITCH STRIKER LEVER
17a LOCK STOP BOLT
18 LOCKING CAM
19 MANUAL LOCK LEVER
20 MANUAL LOCK LEVER ROLLER
21 FRONT BOTTOM LATCH
22 FRONT BOTTOM LATCH PINS LEVER
23 SPRING STRUT
24 MANUAL LOCK CABLE LEVER

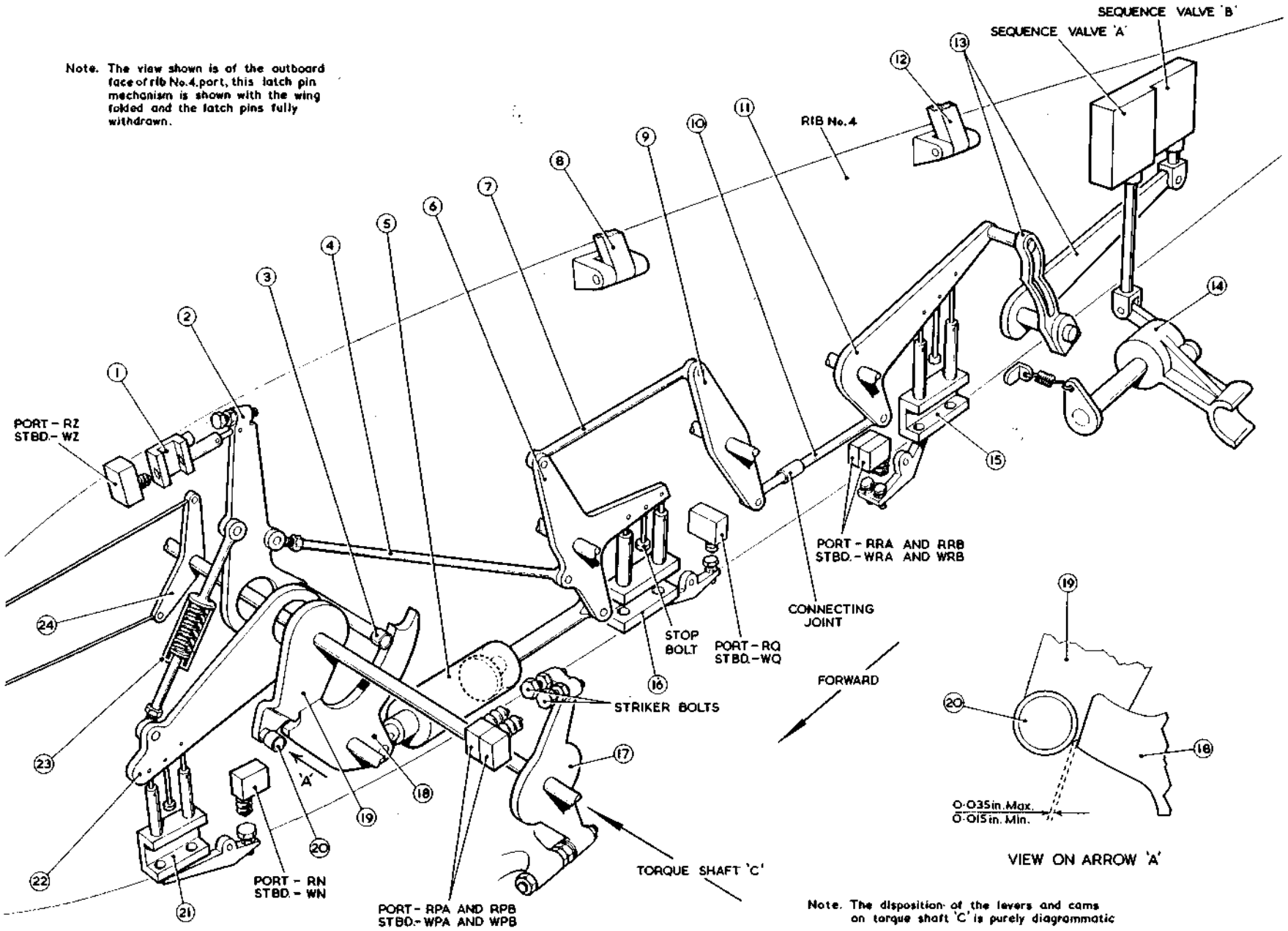
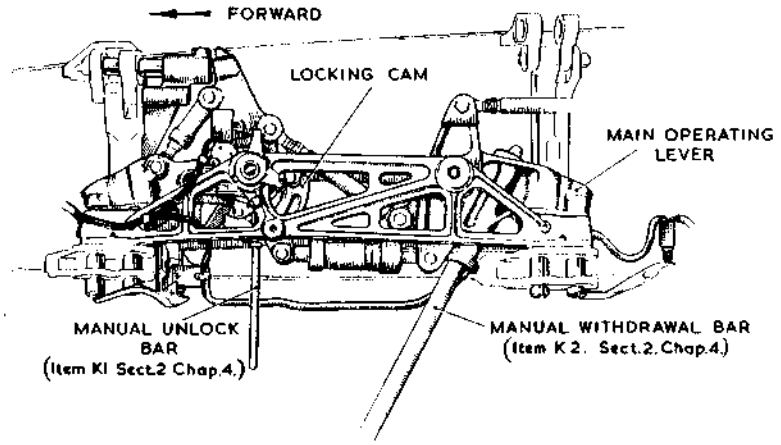
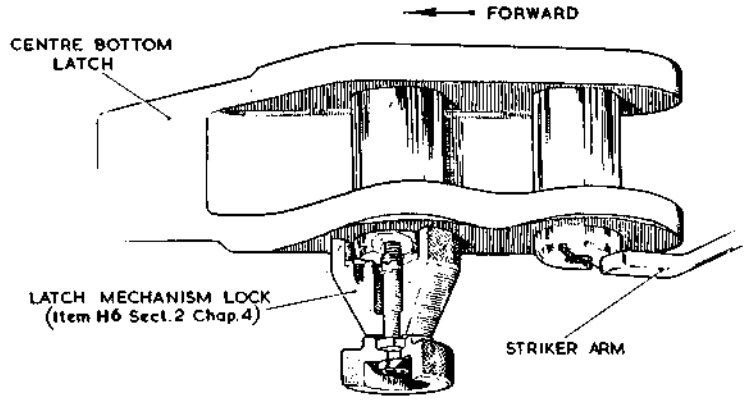


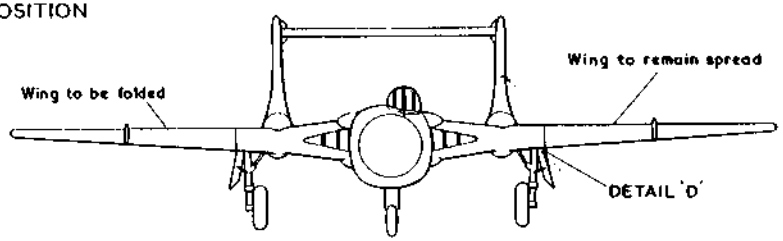
Fig. 8 Wing-fold mechanism (diagrammatic) fold



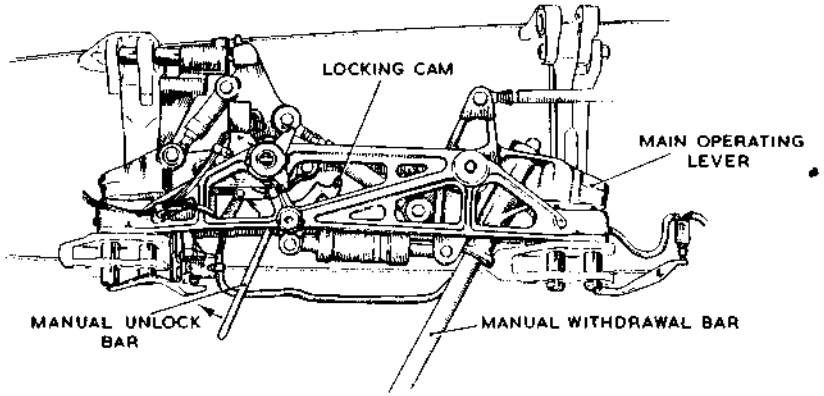
1. LATCH PIN MECHANISM IN THE SPREAD POSITION
Lock lever in cockpit in lock position



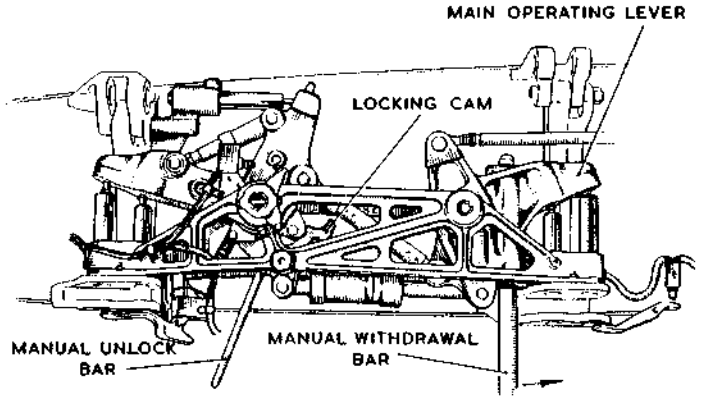
DETAIL 'D'
WINGFOLD MECHANISM LOCK



LOCK TO HOLD ONE WING SPREAD
Power or manual wing folding



2. LOCK LEVER IN COCKPIT SELECTED TO UNLOCK
Locking cam moved clear of roller



3. LATCH PINS SHOWN WITHDRAWN

Fig. 9 Latch pins manual withdrawal

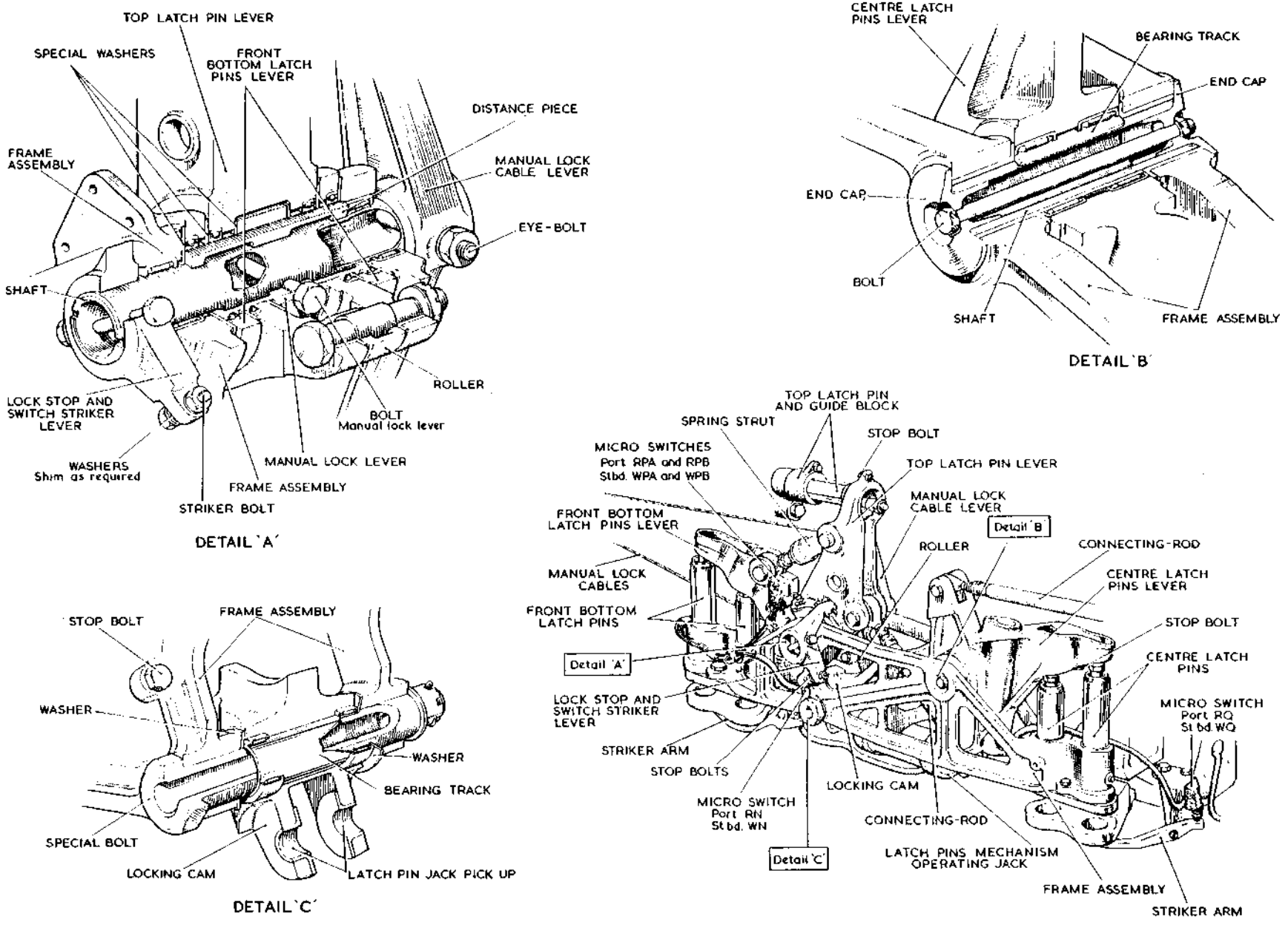


Fig.10. Wing-fold latch pin mechanism details, port

vice (fig. 13) which consists of a metal shuttle sliding laterally in a bush located in the casting between the selector lever pulleys. This ensures that lever selection is by a set sequence only; wing FOLD cannot be selected unless the lock lever is in the UNLOCKED position, and LOCK cannot be selected with the wing fold lever in the FOLD position. In addition, another mechanical lock (para. 36), on the wing fold mechanism at each rib No. 4, holds the lock lever on the console panel in the UNLOCKED position when FOLD has been selected and the wing fold mechanism is set in motion.

35. The latch pin mechanism and the wing fold mechanism function in two separate operations, both of which are fully automatic once FOLD or SPREAD has been selected; both port and starboard wing-fold mechanisms are the same. The method of folding and spreading the wings together with the mechanical operations involved, is given below. For information on the hydraulic circuits for the jacks and sequence valves, reference should be made to Sect. 3, Chap. 6, and for the manual operation (manual wing fold) of the locking cam (18) and the centre latch pins lever (6), reference should be made to Sect. 2, Chap. 1; electrical circuits are given in Sect. 5, Chap. 1.

36. With an electrical supply connected to the aircraft and, before the wings can be folded, the lock lever, on the console panel to the right of the pilot must be selected to UNLOCK; this changes a wing and radome unlocked indicator, located on the same console panel (Sect. 1, Chap. 1, fig. 3) from black to white, and also lights a lamp on the centralized warning panel. The lever movement is transmitted by cables to the manual lock cable lever (24 in fig. 7 and 8) at rib No. 4 and rotates the torque shaft, manual lock lever (19), lock stop and switch striker lever (17), and moves the manual lock lever roller (20) clear of the locking cam (18).

Folding the wings

37. When the wing-fold selector lever is selected to FOLD, hydraulic pressure is directed to the forward end of the latch pin jack (5). As the centre latch pins lever (6) is directly connected to the top latch pin lever (2), the latch pins will not withdraw until the locking cam (18) has been disengaged from the roller (3) by movement of the jack body. The locking cam now comes up against a stop on the manual lock lever (19), which is thereby held in the UNLOCK position and prevents further movement of the latch pin jack body; the hydraulic pressure continues to extend the jack ram and operate the three latch pins levers (2), (6) and (11), to withdraw the latch pins.

38. The front bottom latch pins lever (22) does not move at this stage because a spring strut (23) is in compression and is holding lever (22) down. As the latch pins at (1), (16) and (15) are withdrawing, the spring strut becomes fully extended and eventually acts as a solid connecting-rod between latch pins levers (2) and (22) withdrawing the latch pins from (21).

39. When all the latch pins at (1), (16), (15) and (21) have been withdrawn the wing is ready to be hydraulically folded. This is accomplished when the roller on the rear latch pins lever (11) moves the cam assembly levers (13) and operates sequence valve B, which directs hydraulic pressure to the inboard end of wing-fold jack (fig. 5) and the wing now folds up and over the centre section.

40. As the wing-fold joint breaks, a striker (14a in fig. 7) releases a spring-loaded sequence valve lever (14) and pre-sets sequence valve A for spreading the wings.

Note . . .

Do not touch the sequence valve lever.

Spreading the wings

41. When wings SPREAD is selected, hydraulic pressure is applied to the ram-end of the wing-fold jack. When the wings are spread, the striker (14a) is contacted, and operates sequence valve 'A', which allows hydraulic pressure to the latch pin jack. The movement of the jack operates sequence valve 'B' through the cam assembly (13), and cuts off the supply to the wing-fold jack.

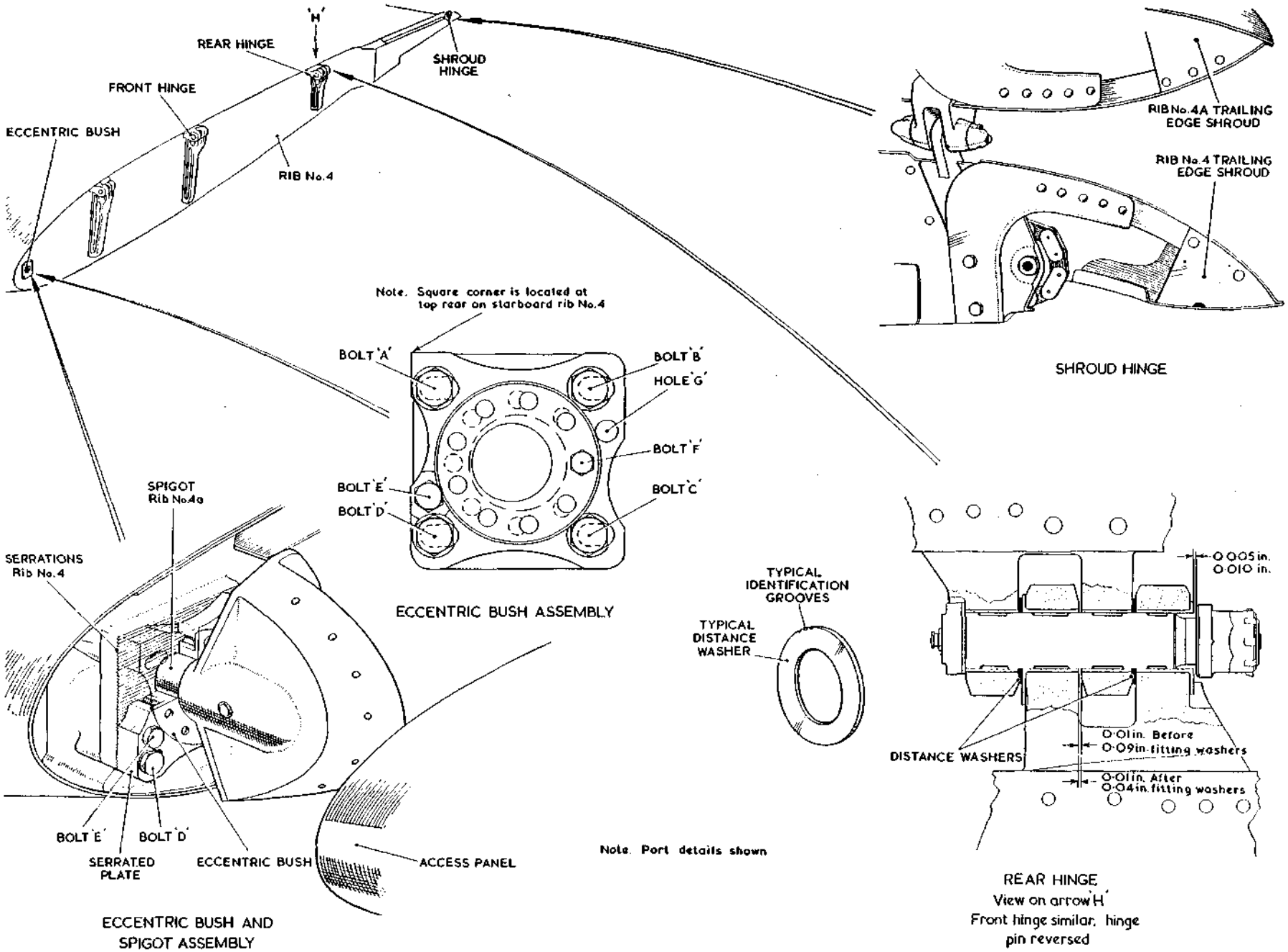


Fig. 11. Wing-fold details (1)

NEW HINGE BOLT—MOD. 976

Pressure continues to be applied to the latch pins jack (5) to engage the latch pins in the latches (Items 5, 11 and 21 in fig. 4) and the roller (Item 3 in fig. 7 and 8) in the dwell of the locking cam (18).

42. After the wings have spread, the lever in the cockpit should be selected to LOCK, thus moving the roller of the manual lock lever (19) into position to prevent any movement of the locking cam (18). At the same time it changes the wing and radome unlocked indicator from white to black and extinguishes a lamp on the centralized warning panel.

Wing fold (manual)

43. Under some circumstances it may be necessary to fold the wing manually if hydraulic and electrical power are not available. Detailed instructions for carrying this out are given in Sect. 2, Chap. 1.

Light and heavy store pylons

◀**44.** Three housings, at rib No. 3, 4 and 5, are provided on each main plane for the attachment of pylons to carry a variety of stores. The two inboard housings accommodate light store pylons, and the outer housing a heavy store or Bull Pup pylon. The heavy store pylons to Mod. 5007 standard, fitted to early aircraft, can only carry pylon fuel tanks. Later aircraft, with heavy store pylons to Mod. 5008 (starboard) and 5009 (port) standard, can carry the stores detailed in Table 1 and 2 of Book 2, Cover 2, Sect. 7, Chap. 8.▶

SERVICING

Main plane components

◀**45.** Particular care must be taken to prevent corrosion of the magnesium alloy components at the wing-fold, probe mounting and air intake. The castings must be treated as described in Sect. 3, Chap. 1. Zinc shims are fitted between steel fittings and magnesium alloy parts when Mod. 1134 is embodied, and the rocker lever mounting has a drain hole when Mod. 1213 is embodied. The points shown on fig. 40 and 41 must be lubricated at the periodicity detailed in Vol. 5, and pockets in the wing-fold castings must be filled with grease, XG-295.▶

46. The rigging and servicing of the flying controls are described in Sect. 3, Chap. 4. The procedure for checking the rigging of the main plane and the location of access panels and drain holes is given in Sect. 2, Chap. 4.

Wing fold (one wing)

47. During servicing operations it may be advantageous to fold one wing only, and a lock (item H6, Sect. 2, Chap. 4), can be fitted to the forward pin of the centre latch of the wing which is not to be folded; access to the latch pin is shown in fig. 14 and the pin itself in fig. 12. The lock holds the pin mechanism for that wing in the spread position and allows power or manual operation of the opposite wing. The access door for the rear latch pin cannot be closed until the lock is removed. Full information is given in Sect. 2, Chap. 1.

WARNING . . .

Wing folding or spreading must always be carried out using a Mk. 4B hydraulic rig (item H22, Sect. 2, Chap. 4) or running the starboard engine at a minimum of 30% of the maximum r.p.m. If the hydraulic system has been broken down or has not been operated for 10 days or more, the wing-fold circuit must be primed as follows:—

(a) Ensure that the wing fold selector is in the position corresponding to the attitude of the wings, i.e. wings folded—selector to FOLD, wings spread—selector to SPREAD.

(b) Using a Mk. 4B hydraulic rig or the starboard engine, pressurise the Green system to the off-load pressure.

(c) Select wings to FOLD, if not already folded.

(d) With wings folded, top up the reservoir using item H9, Sect. 2, Chap. 4.

(e) Select wings to SPREAD.

(f) Repeat (c), (d) and (e) twice.

(g) Finally, to complete priming procedure, select wings to fold and top up reservoir.

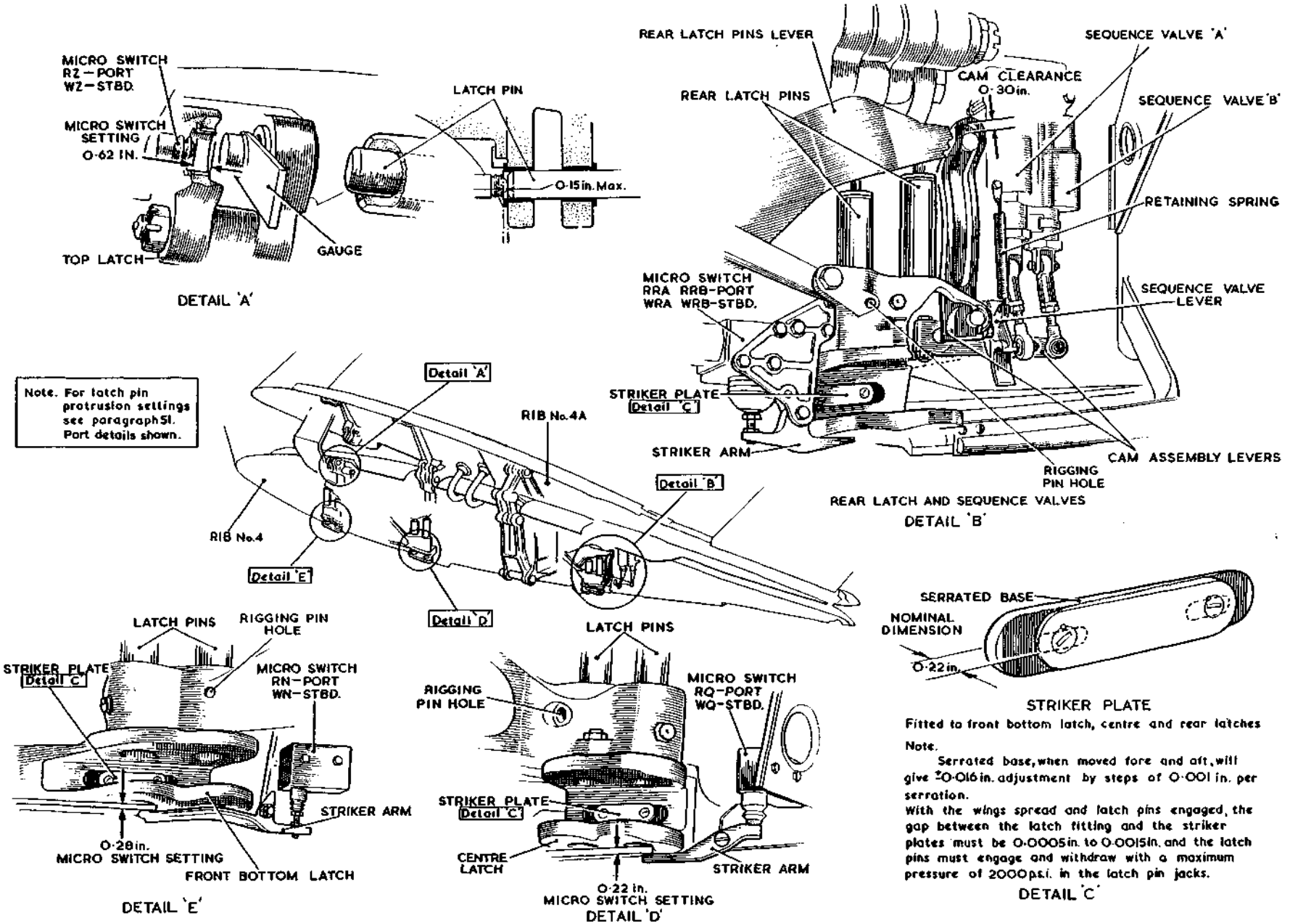


Fig. 12. Wing-fold details (2)

Latch pin mechanism adjustment (fig. 7 and 8)

48. It is assumed that the frame assembly, lever mountings, etc., are already installed on rib No. 4, with the exception of the rear latch pins lever (11), rocker lever (9), and the connecting-rods (7) and (10).

(1) Disconnect the latch pin jack (5) from the centre latch pins lever (6) which operates the pins at the centre latch (16); also disconnect the spring strut (23) between the top latch pin lever (2) and the front bottom latch pins lever (22). Ensure that the roller (3) is clear of the top face of the locking cam (18) in the fully locked position (fig. 7) by adjusting the length of the connecting-rod (4).

(2) Insert the latch pins into the centre latch (16) and assemble to the centre latch pins lever.

(3) Unlock the mechanism in the mounting frame and operate by hand to the fully unlocked position. Insert the rigging pin (Item F5, Sect.2, Chap. 4) through the guide block of the centre latch (fig. 12, detail D). Extend the latch pin jack (5 in fig. 8) fully on its internal stop and adjust the ram end until the other end of the jack can be connected to the locking cam (18), which must be on its unlocked stop against the manual lever (19). Reconnect the ram end to the centre latch pins lever (6) and add or subtract washers under the head of the lock stop bolt (17A) until the dimension at arrow A is satisfied (Fig. 8).

(4) Remove the rigging pin and close the latch pins mechanism operating jack (5) by hand pump (hydraulic ground rig) until the stop bolt on the centre latch pins lever (6) butts on the guide block of the centre latch pins. Shorten the connecting-rod (4) until the roller (3) on the top latch pin lever butts on the top face of the locking cam. Lengthen the connecting-rod (4) by a quarter turn of the adjuster barrel.

(5) Operate the mechanism by hand pump (hydraulic ground rig) to the fully unlocked position, and check the position of the centre latch pins in the centre latch by inserting a rigging pin, correcting if necessary by readjusting the length of the latch pins mechanism operating jack.

(6) Insert the front top latch pin into the top latch pin guide block and assemble the pin to the top latch pin lever.

(7) With the mechanism still in the fully unlocked position, insert the latch pins into the front bottom latch (21) and assemble to the front bottom latch pins lever (22); raise the front bottom latch pins lever and insert a rigging pin through the guide block of the front bottom latch (21) and the rear latch pin (of the front pair). With the plunger of the spring strut (23) fully extended (by its internal spring) adjust the length of the spring strut to suit the centres between the top latch pin lever and the front bottom latch pins lever, then assemble to (2) and (22) and remove the rigging pin.

(8) Assemble the rocker lever (9), rear latch pins lever (11) and connecting-rod (10) on the wing (the connecting joint in this connecting-rod must be disconnected to insert the rear portion of the connecting-rod through each inboard link support post).

(9) Insert the latch pins into the rear latch pins guide block and assemble them to the rear latch pins lever; insert a rigging pin through the rear latch pins guide block and the front pin (of the rear pair). Next, assemble the connecting-rod (7) to the top of the rocker lever (9), adjust the length to suit the centres between the rocker lever and the centre latch pins lever and assemble to the centre latch pins lever.

(10) Remove all the rigging pins and rig the wing lock control circuit (para. 54) and the wing-fold control circuit (para. 55). Ensure that the sequence valves are correctly adjusted (para. 52).

(11) Check the operation of the mechanism by hydraulic power. Check the engagement of the latch pins in the latches (para. 51). Wire-lock the

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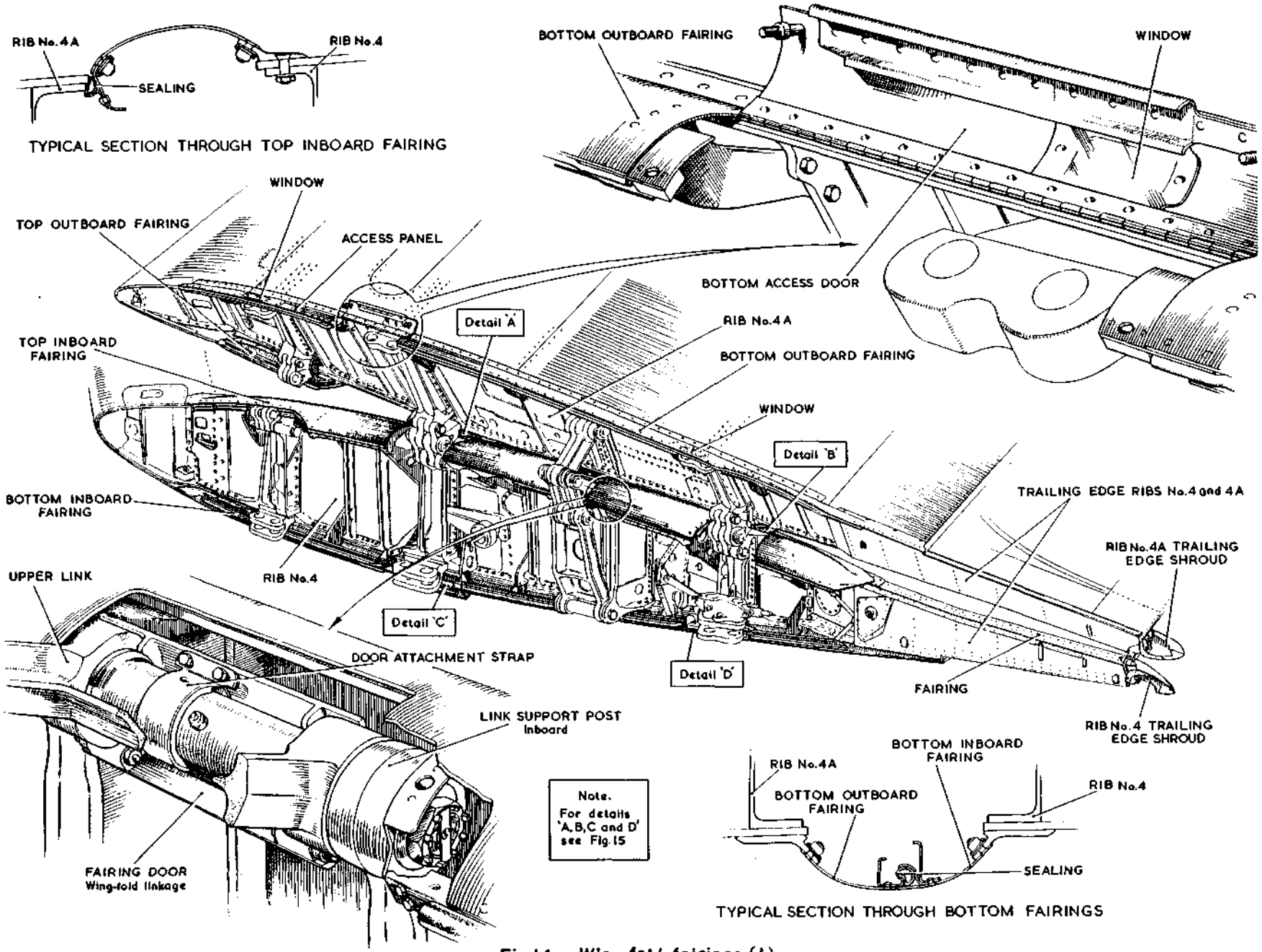

Fig.14. Wing-fold fairings (1)

Adjustment of sequence valve A and B (fig. 12)

52. When either sequence valve is being serviced all hydraulic pressure must be released from the wing fold hydraulic system (Sect. 3, Chap. 6). When a wing has been removed from the centre section, the wing-fold jack and linkage should be secured (or isolated) in such a manner as to avoid damage to rib No. 4, should the jack ram be inadvertently moved under hydraulic power. When the wing is attached to the centre section and the sequence valves are known to be out of adjustment, the wing should be folded or spread manually (Sect. 2, Chap. 1), with all hydraulic pressure released from the system.

53. When the adjustments in para. 48 have been completed, the sequence valves can be adjusted. If the wing is removed or folded, the wing fold mechanism may be in any position for the adjustment of valve A, as the valve is dependent for its operation upon a roller and bracket located on rib No. 4a of the wing.

(1) Disconnect the sequence valve A connecting-rod end from the sequence valve lever and check that the total travel of the valve is 0·65 in. With the sequence valve lever swung out to the limit of its stop (with the wing folded or removed, the tension spring should automatically hold the valve lever in this position) and, with the sequence valve out to the limit of its internal stop, offer up the end of the connecting-rod to the sequence valve fork end so that the bolt slides freely through the assembly.

(2) Remove the bolt from the assembly again, swing the connecting-rod end out of the sequence valve fork end, lengthen the connecting-rod end by one complete turn and reassemble to the sequence valve lever; check that the connecting-rod threads are in safety through the hole in the female shank, and that the sequence valve lever has a minimum range of movement of 72 deg.

Note . . .

When the locknut on the connecting-rod of the forward sequence valve A is being finally wire-locked, care must be taken that the locking wire is well clear of the slotted nut securing the sequence valve lever on its shaft.

(3) With the wing-fold mechanism in the fold position, disconnect the rear sequence valve B connecting-rod end from the cam assembly levers. Check that the dimension between the roller of the rear latch pin lever and the cam assembly is 0·30 in. (detail B, fig. 12).

(4) Check that the total travel of the valve is 0·65 in. then press it up to the limit of its internal stop; offer up the end of the connecting-rod to the sequence valve fork end so that the bolt slides freely through the assembly. Remove the bolt from the assembly again, swing the connecting-rod end out of the sequence valve fork end, shorten the connecting-rod end by one complete turn then reassemble to the sequence valve fork end. Check through the hole in the female shank, that the connecting-rod threads are in safety.

Note . . .

The valve travel after adjustment will be approximately 0·55 in.

Wing lock control rigging (fig. 7 and 8)

54. With the wing fold mechanism on rib No. 4 at the spread position and with the manual lock lever roller (20) hard on its stop on the locking cam (18) rig the wing lock control circuit in the following manner:—

(1) Select LOCK with the lever on the pilot's right-hand console.

(2) With the operating cable runs connected (25, 26, 27 and 28 in fig. 13), tension each cable run to 20 lb., ensuring that the manual lock lever roller (20 in fig. 7 and 8) is still bearing hard on the locking cam (18).

(3) Select UNLOCK with the lever on the right-hand console in the cockpit and, with the wing-fold mechanism on rib No. 4 at the fold position, check that there is a clearance of 0·015 in. min. to 0·035 in. max. between the roller on the manual lock lever (19) and the locking cam.

(4) Check the operation of the circuit for freedom and ease of movement.

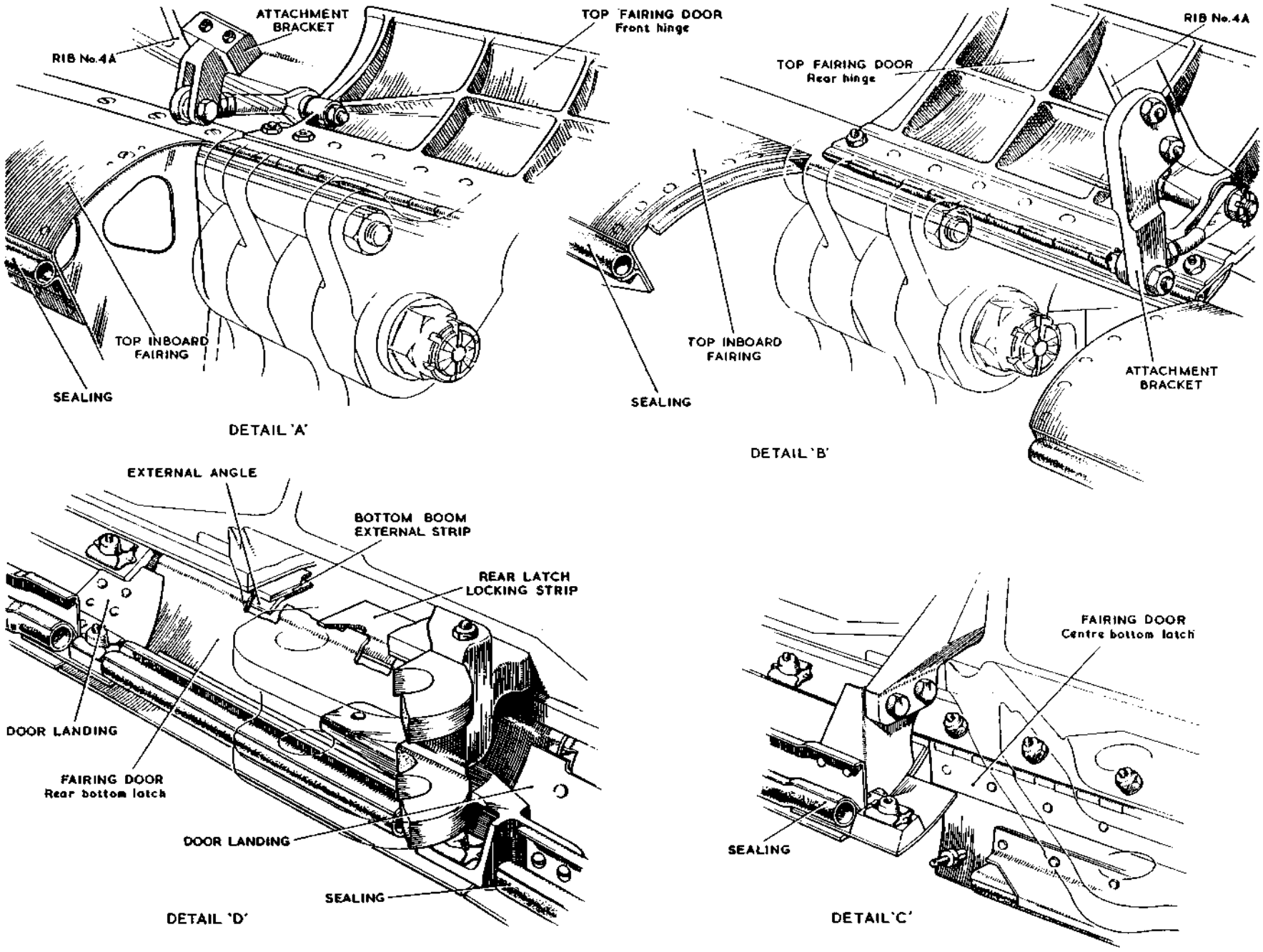

Fig. 15. Wing-fold fairings (2)

(5) In conjunction with an electrician adjust the micro switch (fig. 13), so that an initial movement of cam lock/unlock lever of 0.13 in. from the LOCKED position (measured at the gate) operates the solenoid and moves the trip lever and pawl clear of the wing fold lock/unlock and wing spread/fold cable operating pulleys.

Wing fold control rigging

55. With all hydraulic pressure released from the GREEN hydraulic system, proceed in the following manner :-

(1) Select SPREAD with the lever on the pilot's right-hand console in the cockpit.

(2) Remove the inspection panel on the starboard wheel well rear wall just outboard of the rib No. 1 position; pull out the plunger of the hydraulic selector valve to its fullest extent (wings spread position).

(3) With the operating cable runs (29 and 30 in fig. 13) coupled up, and assuming the travel of the plunger in the hydraulic selector to be set correctly (total travel 0.75 in), adjust and tension the cable runs to 20 lb. so that the $\frac{1}{4}$ in. B.S.F. bolt and the plunger operating link to the cable pulley can be freely assembled.

(4) Check the operation of the circuit for freedom and ease of movement.

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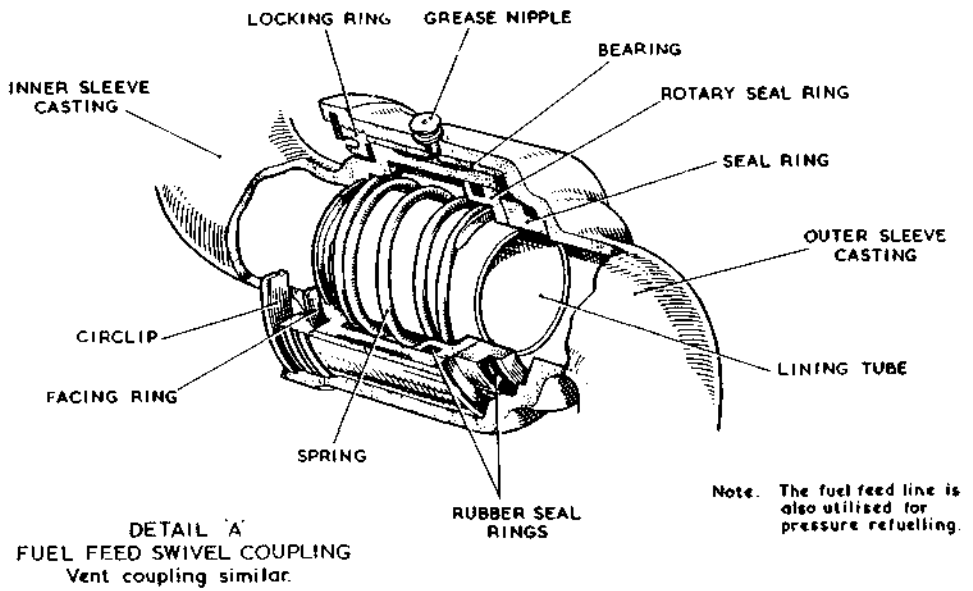
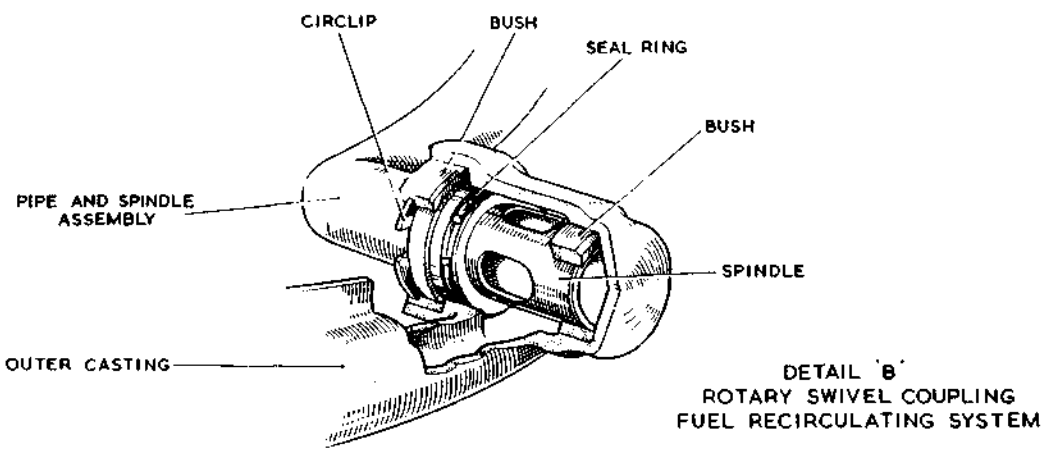


DETAIL 'A'
FUEL FEED SWIVEL COUPLING
Vent coupling similar.



DETAIL 'B'
ROTARY SWIVEL COUPLING
FUEL RECIRCULATING SYSTEM

Fig.16. Wing-fold fuel swivel couplings

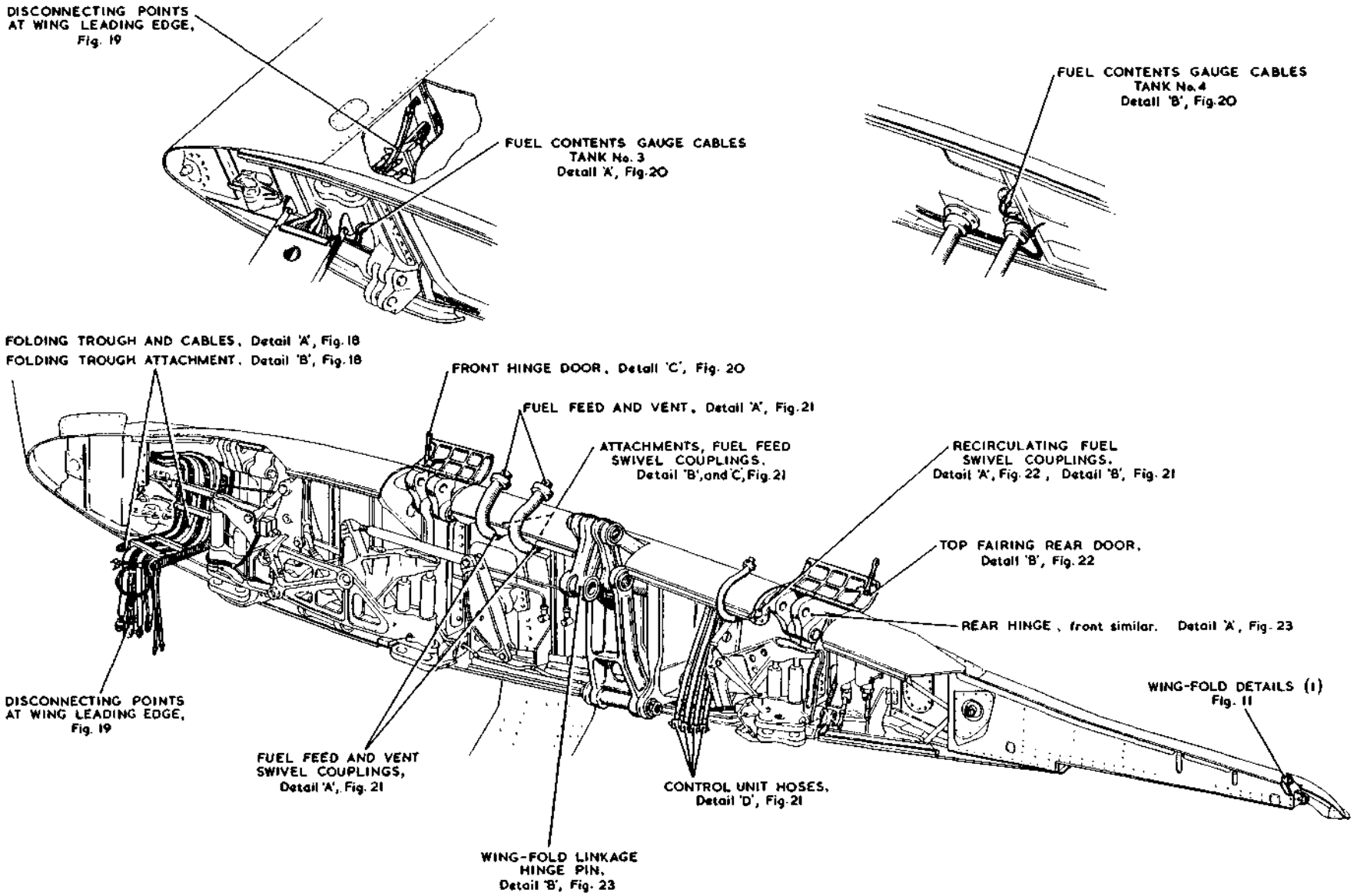
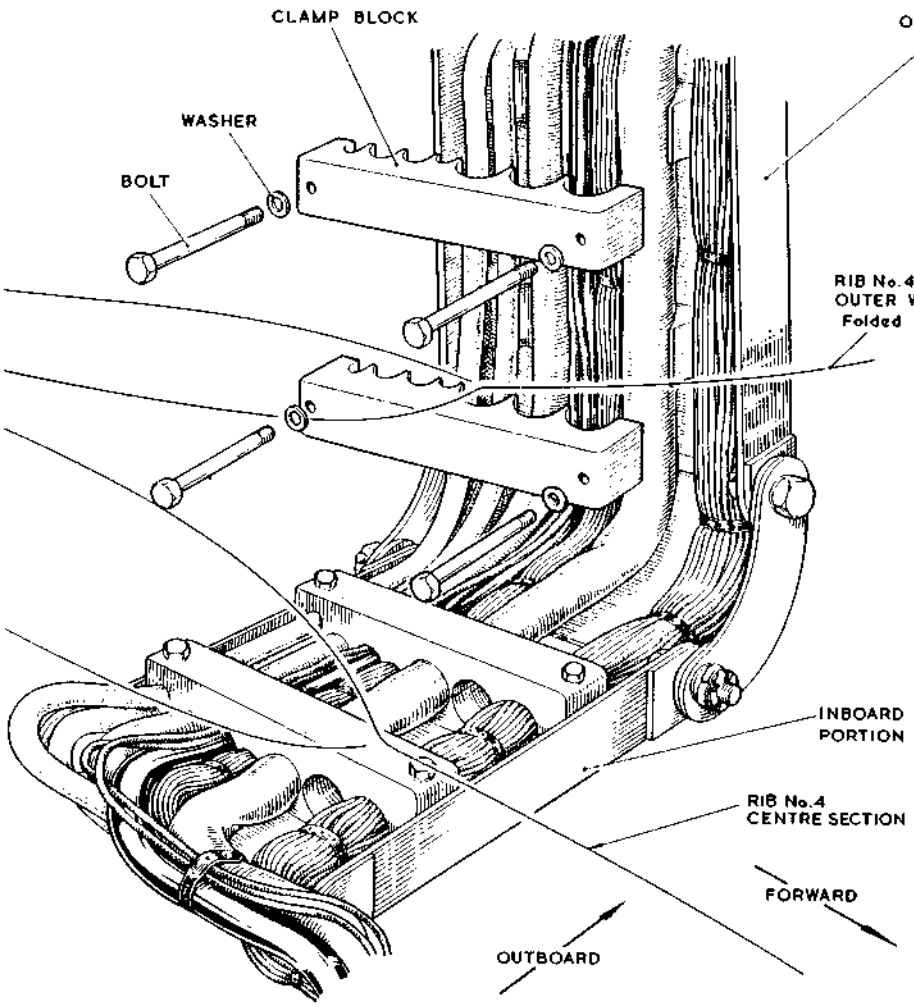
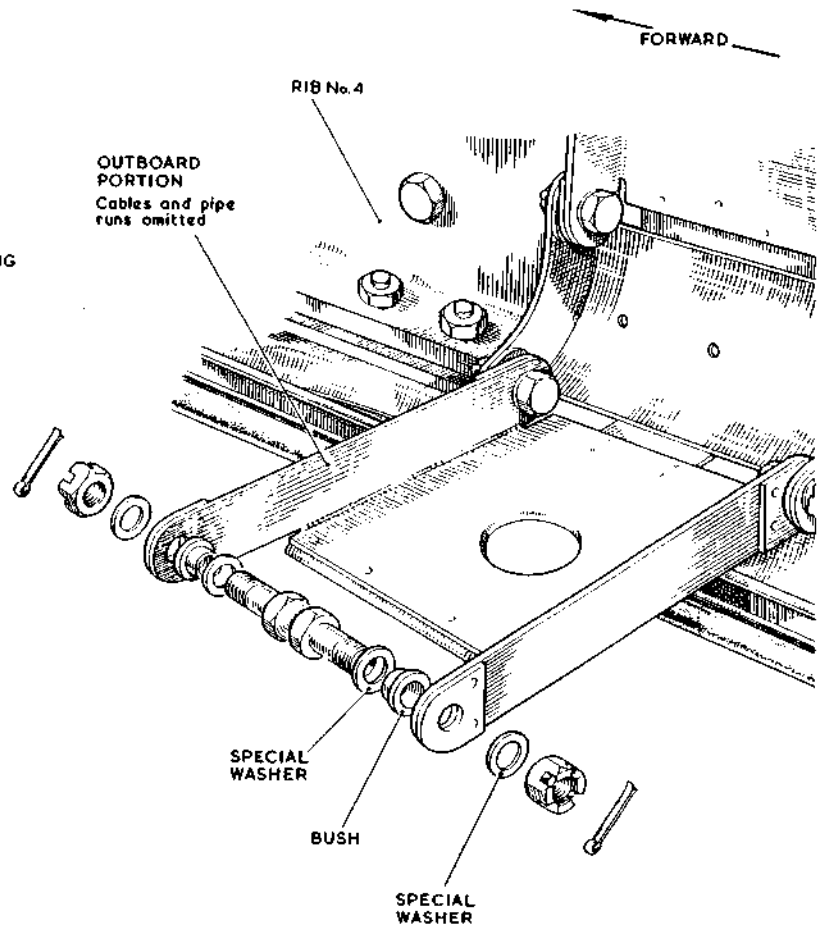


Fig.17. Wing-fold break points (1)

RESTRICTED

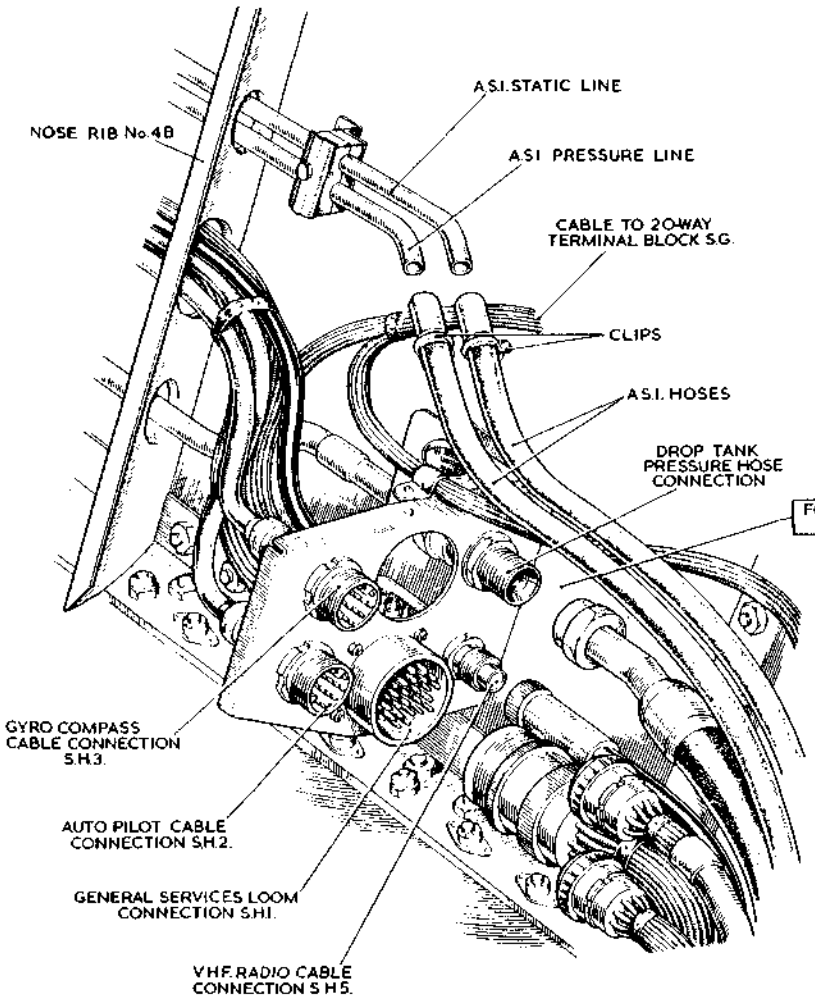


DETAIL 'A'
FOLDING TROUGH



DETAIL 'B'
DETACHMENT OF TROUGH
From Rib No.4A

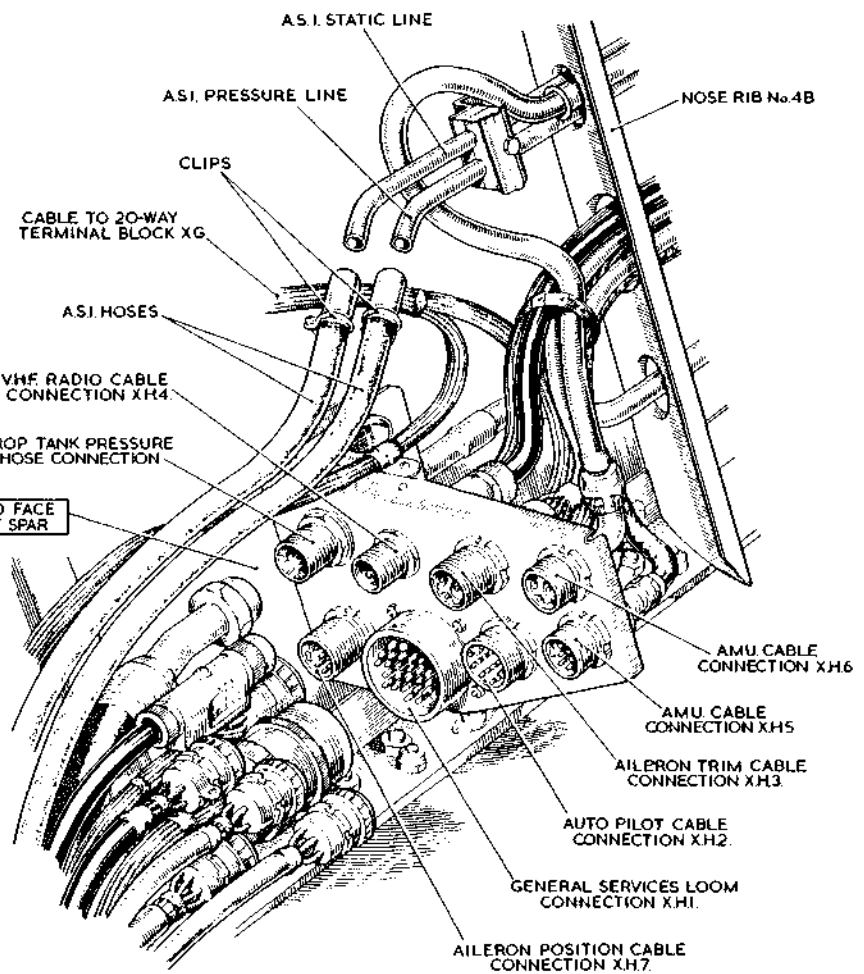
Fig.18. Wing-fold break points (2)



DETAIL 'A'

DISCONNECTION POINTS IN WING LEADING EDGE OUTBOARD OF RIB No.4A, Port

Wing in folded position.



DETAIL 'B'

DISCONNECTION POINTS IN WING LEADING EDGE OUTBOARD OF RIB No.4A, Starboard

Wing In folded position.

Fig.19. Wing-fold break points (3)

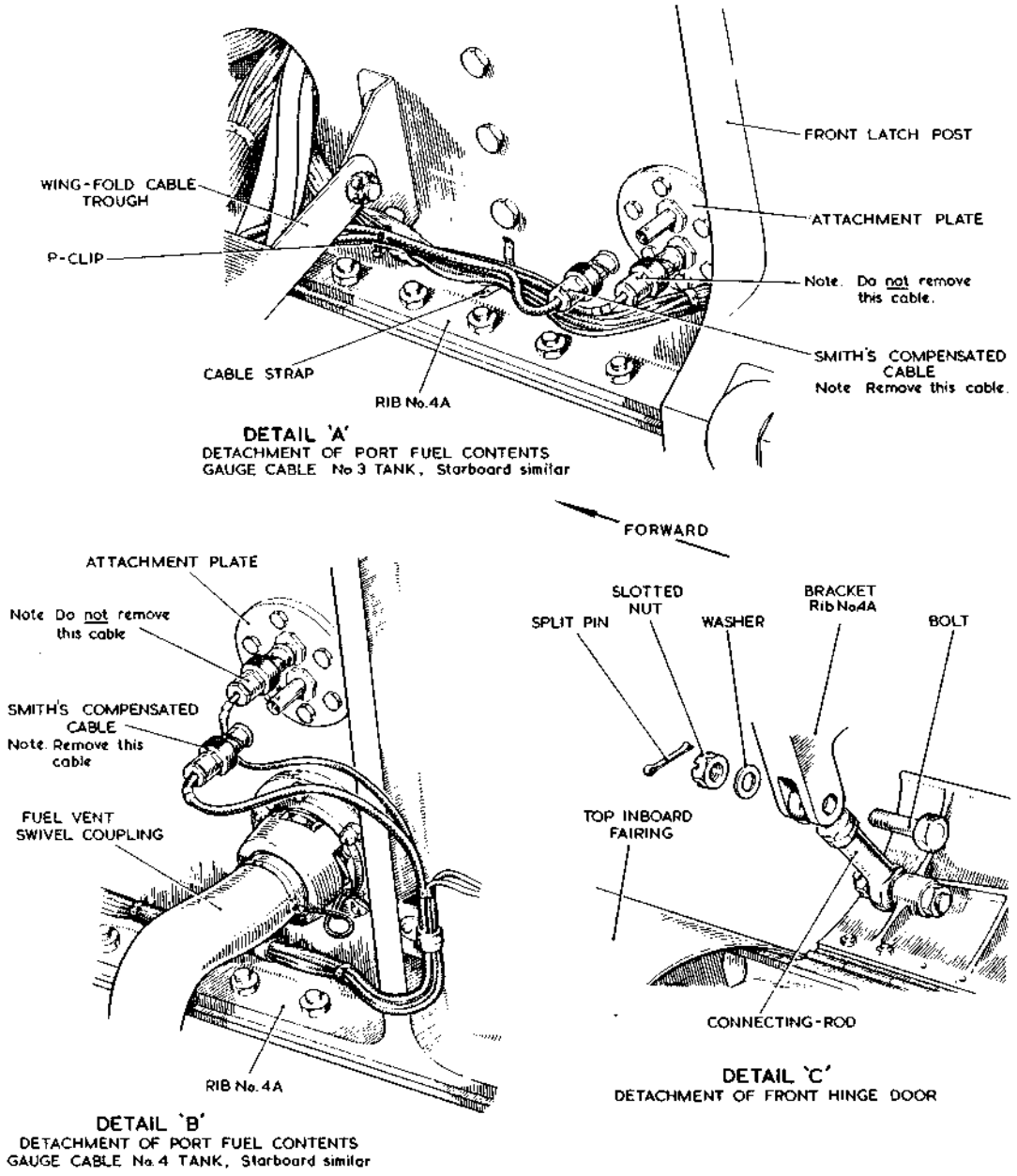


Fig.20. Wing-fold break points (4)

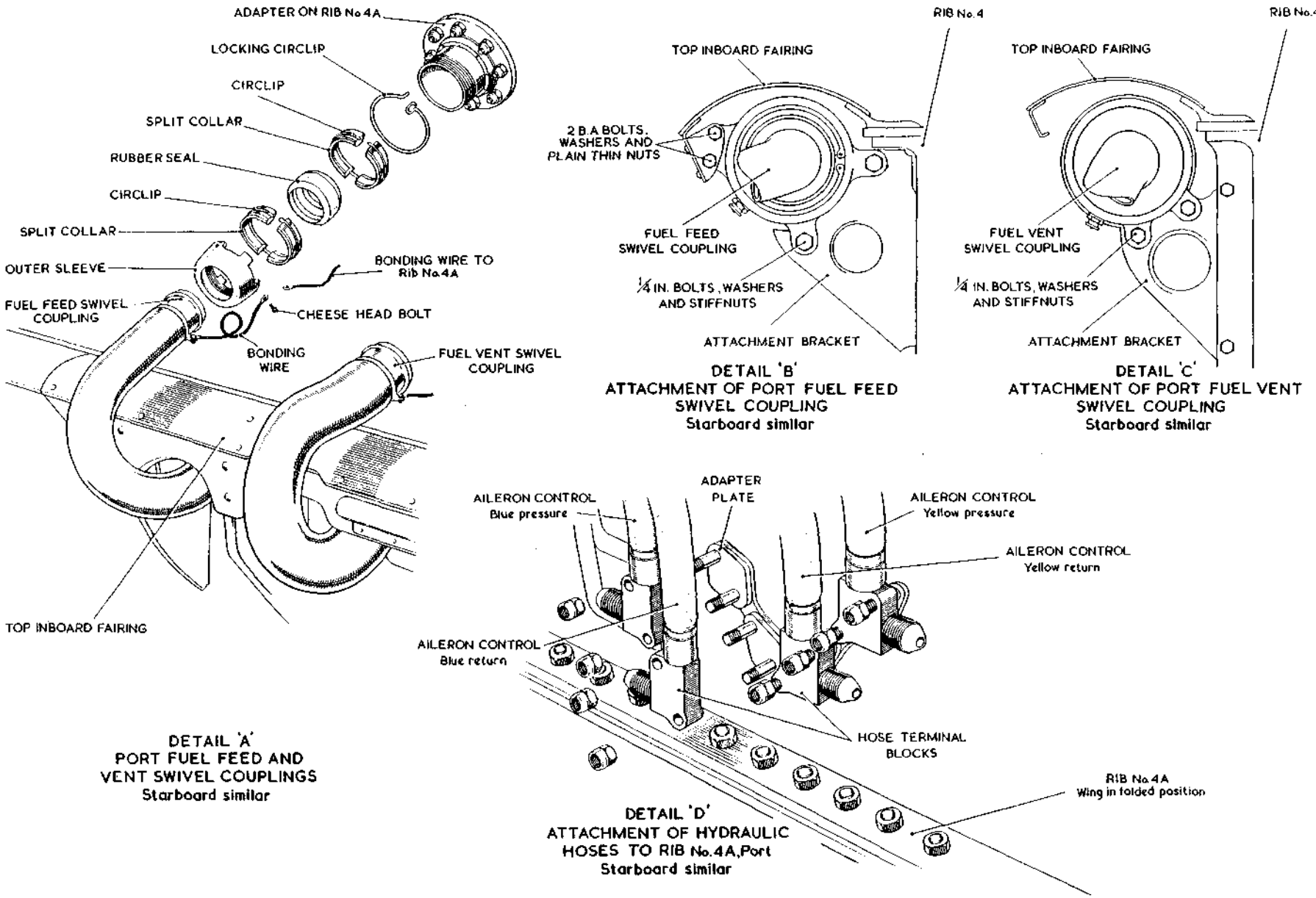
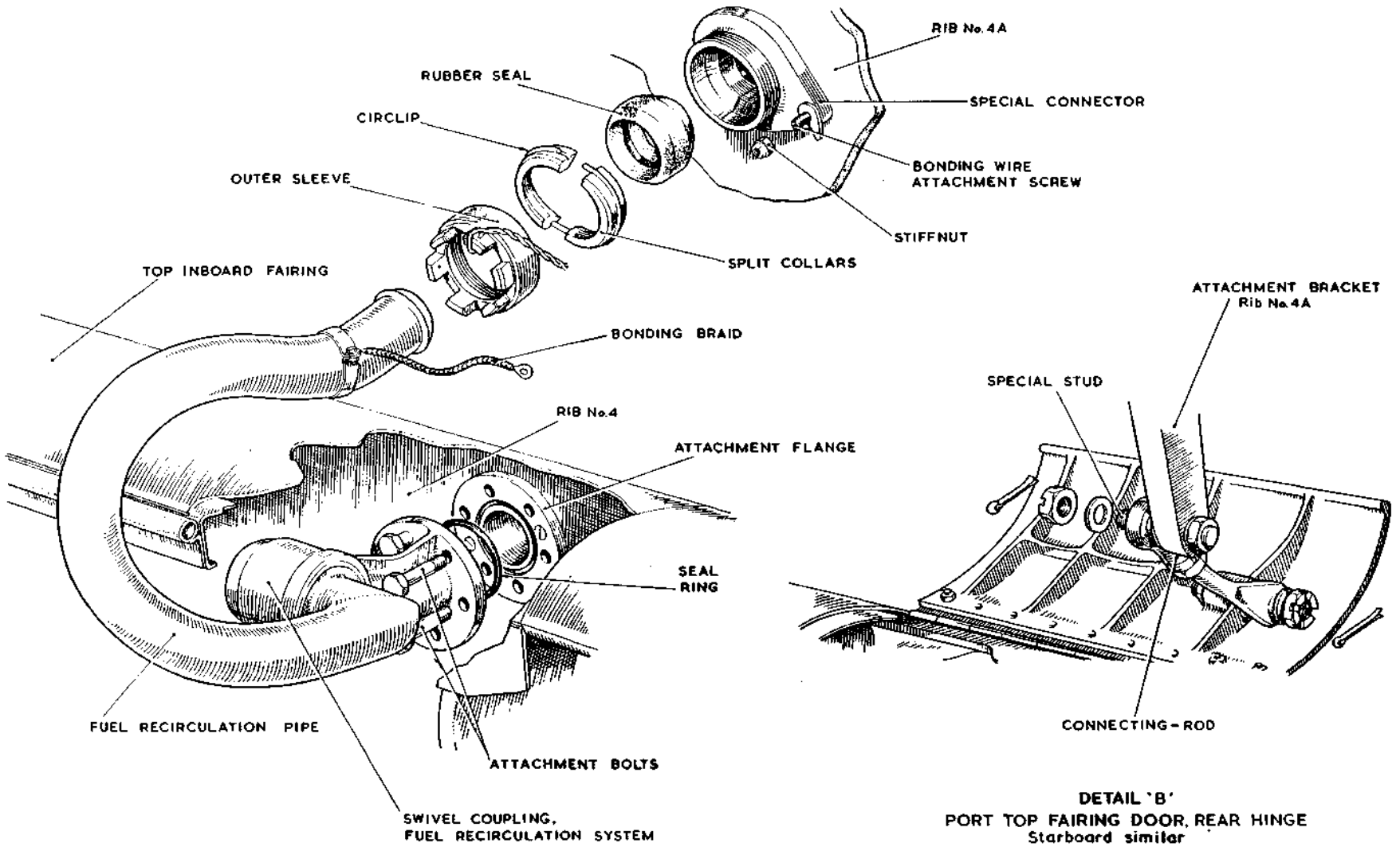


Fig.21. Wing-fold break points (5)

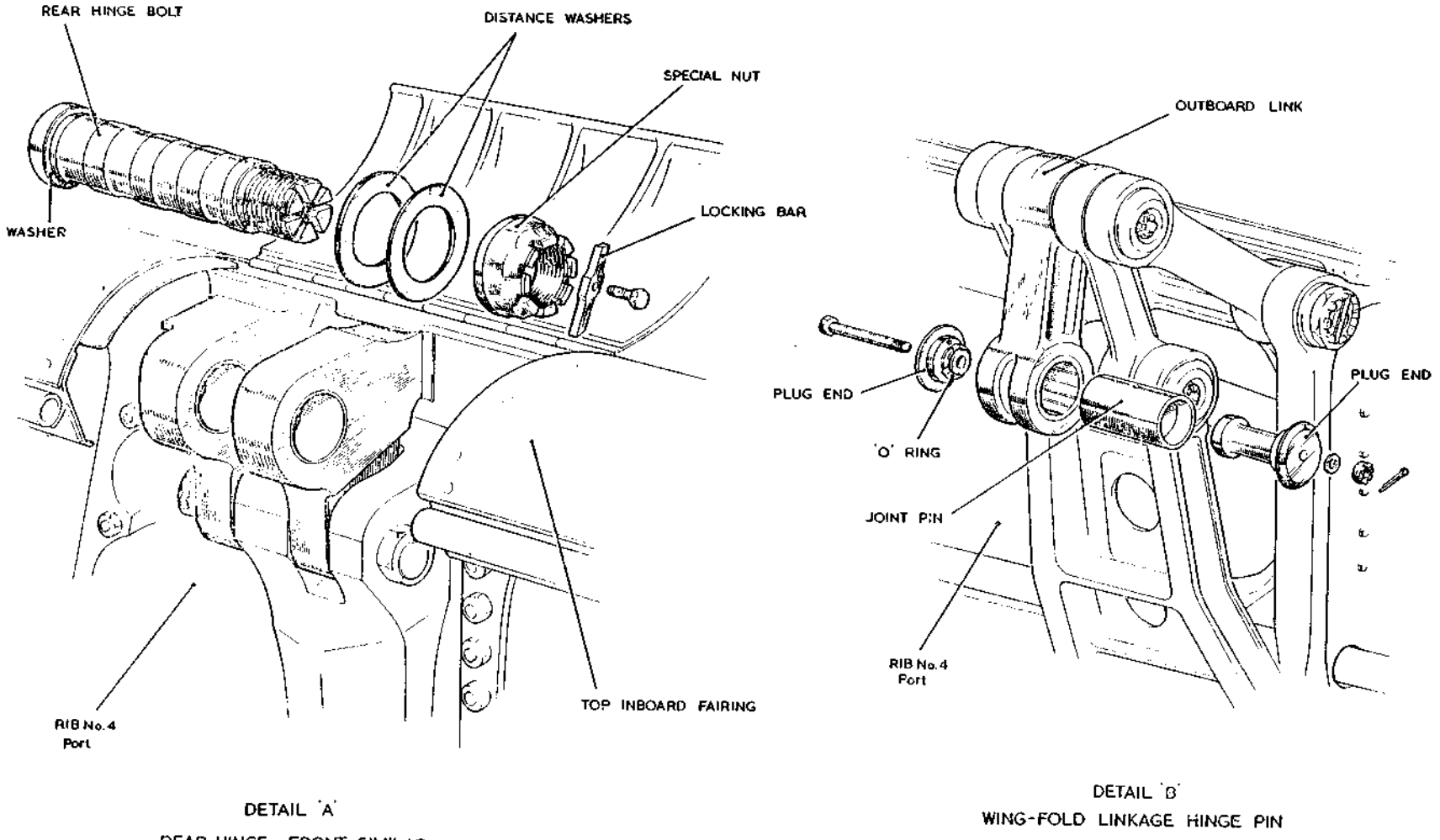


DETAIL 'A'
DETACHMENT OF PORT FUEL RECIRCULATION SWIVEL COUPLINGS
Starboard similar

DETAIL 'B'
PORT TOP FAIRING DOOR, REAR HINGE
Starboard similar

Fig. 22. Wing-fold break points (6)

◀ANNOTATION AMENDED▶



DETAIL 'A'
REAR HINGE, FRONT SIMILAR

DETAIL 'B'
WING-FOLD LINKAGE HINGE PIN

Fig. 23. Wing-fold break points (7)

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REMOVAL AND INSTALLATION

General

56. The following paragraphs give the recommended procedure for the removal and installation of a wing, an aileron and a complete set of flaps. Installation is the reverse of removal unless otherwise stated.

Wing removal (Fig.16)

57. The wing should be placed in the folded position prior to being removed. There are two ways of removing a wing, (1) with the aircraft on jacks (land based aircraft), and (2) with the aircraft resting on its wheels (carrier-borne aircraft). The latter instance is given below.

◀ **Note...**

Before folding the wing, check the alignment of the wing and centre-section leading edges. The normal maximum permissible step is 0.10 in., but concessions have been granted on some assemblies allowing a step of 0.25 in. ▶

58. Before commencing the removal of the wing, the pylon tank (if fitted) must be drained and removed, and the wing fuel tanks (No.3 and 4) must also ◀be drained (Sect.2, Chap.2). Aboard▶ ship, sufficient fuel should be drained from the No.2 tank to prevent fuel spillage by surge when the fuel feed rotary joint between rib No.4 and 4a is disconnected. The wing may be power or manually folded, according to the circumstances under which the wing removal is being made. The power folding condition is given below and information on manually folding a wing is given in Sect.2, Chap.1.

59. With the aircraft securely chocked fore and aft, proceed as follows :-

(1) Place the brake selector lever (located approximately halfway along under the left-hand cockpit ◀coaming) at the PARK position.▶

(2) If the wing not being removed is required to be left in the SPREAD position, open the centre latch pins access door (Fig.14, detail C) in the fairing under the wing-fold joint of the wing not required to be folded, and screw the lock (Item H6, Sect.2, Chap.4) into position on the front latch pin block; this will hold the wing-fold mechanism, and thus the wing, in the spread position.

(3) Select UNLOCK with the wing fold lock lever in the cockpit and then select FOLD; when the wing to be removed has reached its fully folded position release all hydraulic pressure from the hydraulic systems, with the exception of the RED system which must be left charged to provide operating pres-◀sure for the brakes PARK circuit.▶

(4) Remove the two clamp blocks locating the hoses and electrical cable runs in position in the outboard portion of the folding trough at the leading edge (Fig.18). Remove the $\frac{1}{4}$ in. bolts, washers and bushes which secure the trough to rib No.4a.

(5) Remove the access panels forward of the front spar adjacent to rib No.4a (port and starboard) to gain access to the disconnection points (Fig.19). Through the access holes outboard of each rib No.4a, slacken off the clip on each static and pressure line of the A.S.I. run, ease the hoses clear of their respective pipelines and blank off all ends with approved blanks.

(6) In conjunction with an electrician and a radio tradesman, disconnect the following as applicable :-

Port leading edge :
- Gyro compass
- Autopilot
- General services
- V.H.F.
- Drop tank pressure hose

Starboard leading edge :
- Air mileage unit sockets (two)
- Aileron trim indicator run
- Autopilot
- V.H.F.
- General services
- Aileron position indicator run
- Drop tank pressure hose

then, together with the A.S.I. lines and drop tank pressure hose, ease the pipelines and cable runs out of rib No.4a.

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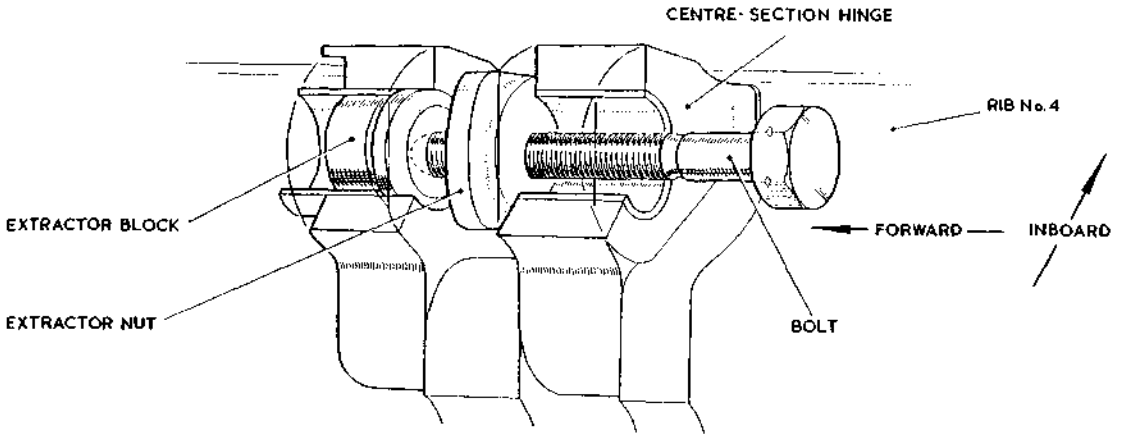
Note...
The Smith's compensated fuel contents gauge wiring runs of No.3 and 4 tanks must be disconnected at the adaptors on rib No.4a (Fig.20, detail A and B) and the eight P-clips and the cable straps removed.

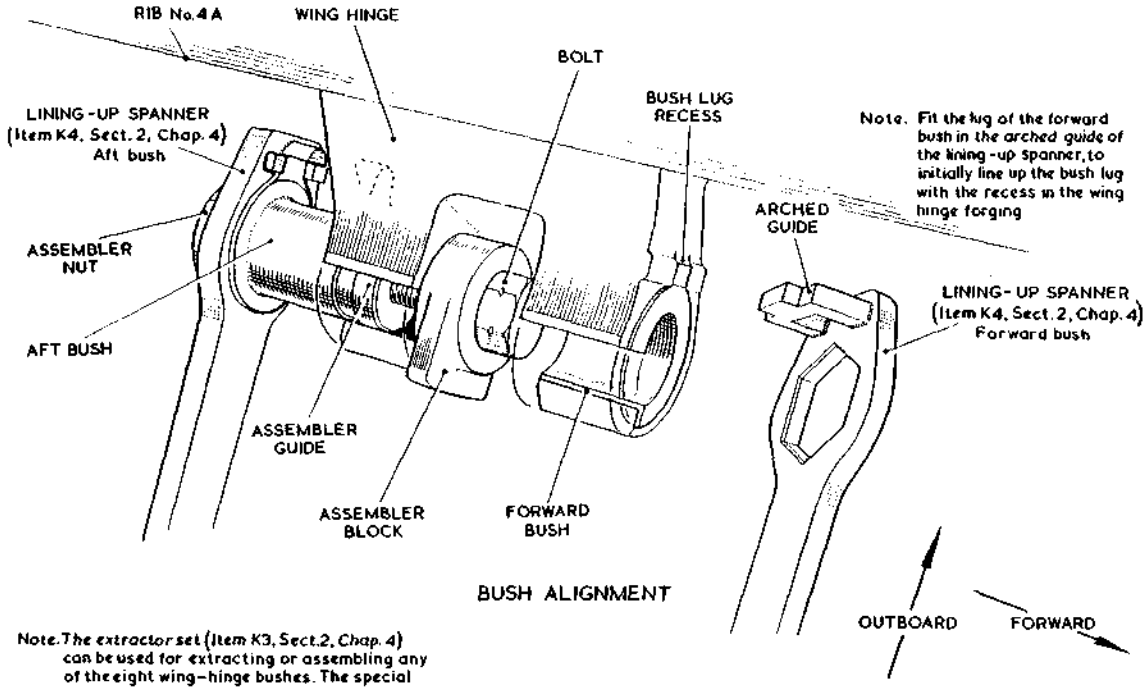
(7) Remove the $\frac{1}{4}$ in. B.S.F. bolt from the connecting rod and attachment block on rib No.4a of the front hinge door just forward of the front hinge bolt, and ensure that the connecting rod is laid clear.

(8) At each fuel feed and fuel vent hinge joint on rib No.4a, disconnect the two bonding wires from the outer sleeve by removing each 4 B.A. cheese-head bolt (Fig.21).

(9) At each adapter (where each pipe casting joins rib No.4a) remove the locking circlip from its groove in the sleeve, slide it over the sleeve and on to the pipe casting. Using one of the special spanners described in A.P.4511, Vol.1 and 6, Sect.5, unscrew the outer sleeve and pull it back clear of the assembly; remove the circlip holding the split collars together and remove each half of the split collar; move each pipe clear of its rubber seal and adapter and rotate the swivelling fuel pipe castings away from rib No.4a. Blank off the pipe castings and the adapter on rib No. 4a in an approved manner.



BUSH EXTRACTION



BUSH ALIGNMENT

Note. *The extractor set* (Item K3, Sect.2, Chap.4) can be used for extracting or assembling any of the eight wing-hinge bushes. The special spanner is used for the extension wing front and rear hinge bushes only

Fig.24. Hinge pin bush extraction

◄ Item Nos. added ►

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Note...
To move the pipe end clear of the flanged sleeve, it will be found necessary to remove the two $\frac{1}{4}$ in. B.S.F. bolts which secure each rotary joint drum assembly to its bracket on rib No.4 and to utilize the 10 deg. included angle movement afforded by the rubber seal in the assembly of each pipe casting at rib No.4.

WARNING...
Check that all hydraulic pressure is released from the flying control circuit (Sect.3, Chap.6).

(10) Slacken off the union nuts of the four hydraulic pipes on rib No.4a at their junction with the flexible hydraulic hoses of the aileron control circuit; this must be done before slackening off and removing the ◀ eight $\frac{1}{4}$ in. B.S.F. bolts securing the ▶ hose terminal blocks on rib No.4a. Blank off the hydraulic pipe ends with approved blanks.

◀(11) At the fuel recirculation▶ system hinge joints on rib No.4a (Fig.22, detail A), remove the 2 B.A. bolts which screw into anchor nuts, securing the rotary hinge joint attachment flange to the rib web. Remove the rotary joint casting by swivelling it away from rib No.4; the seal ring should be eased gently out of its groove and stowed in a safe place until required. Blank off the apertures in both the rotary joint casting and in rib No.4.

◀(12) At the fuel recirculation▶ system hinge joint at rib No.4a, remove the bonding clip and bonding wire from the recirculation pipe; unscrew the outer sleeve from the bulkhead adapter on rib No.4a and slide it back clear of the split collar and circlip assembly. Remove the circlip from the split collar and remove the two halves of the split collar; the pipe may now be manipulated away from its rubber seal at rib No.4a. Blank off the apertures in both the rotary joint casting and in rib No.4.

(13) Disconnect the connecting rod of the top fairing rear door by slackening off the 5/16 in. B.S.F. nut securing the connecting rod to the door, and remove the $\frac{1}{4}$ in. B.S.F. slotted nut and washer from the special stud that secures the connecting rod end to the attachment bracket on the wing, and slide the connecting rod end off the stud and ensure that the arm is clear so that it will not foul as the wing is lifted away from the centre section.

(14) Disconnect the shroud hinge bracket at the trailing edge between ribs No.4 and 4a by removing the 1/16 in. split pin and nut from the special bolt and withdrawing the bolt from the hinge.

◀(15) Fit the wing-fold jury strut▶ (Item G1, Sect.2, Chap.4) between the wing and centre section (a full description of this is given in Sect. 2, Chap.1), and lengthen the strut to take the weight of the wing off the wing-fold linkage; this will allow the hinge pin (Fig.23, detail B) to be withdrawn.

(16) At the wing-fold linkage, remove the $\frac{1}{4}$ in. B.S.F. nut, washer and bolt that retains the plug ends in their location in the joint pin, extract the plug ends and withdraw the hinge pin; pull the outboard link clear of the link support post on rib No.4a. The wing-fold jack and linkage should be secured in such a manner as to avoid damage to rib No.4 if the jack ram is inadvertently moved under hydraulic pressure.

(17) Fit the sling (Item E3, Sect.2, Chap.4), to the wing and take up the slack, until all three cables of the sling are tight enough to be almost taut; then manually support the wing and remove the jury strut (Item G1, Sect.2, Chap.4).

◀ **Note...**
The rear leg of the sling is adjustable to allow for an on or off jacks attitude, varying C.G. positions of the wing (aileron/flaps on or off), and because the cables have a manufacturing tolerance of ± 0.5 in. It is suggested that the adjustment plates of each sling be marked to show the hole to be used for each condition when this has been found by using the sling.▶

(18) Unlock each hinge bolt special nut by removing the 2 B.A. locking bolt and the locking bar which locks

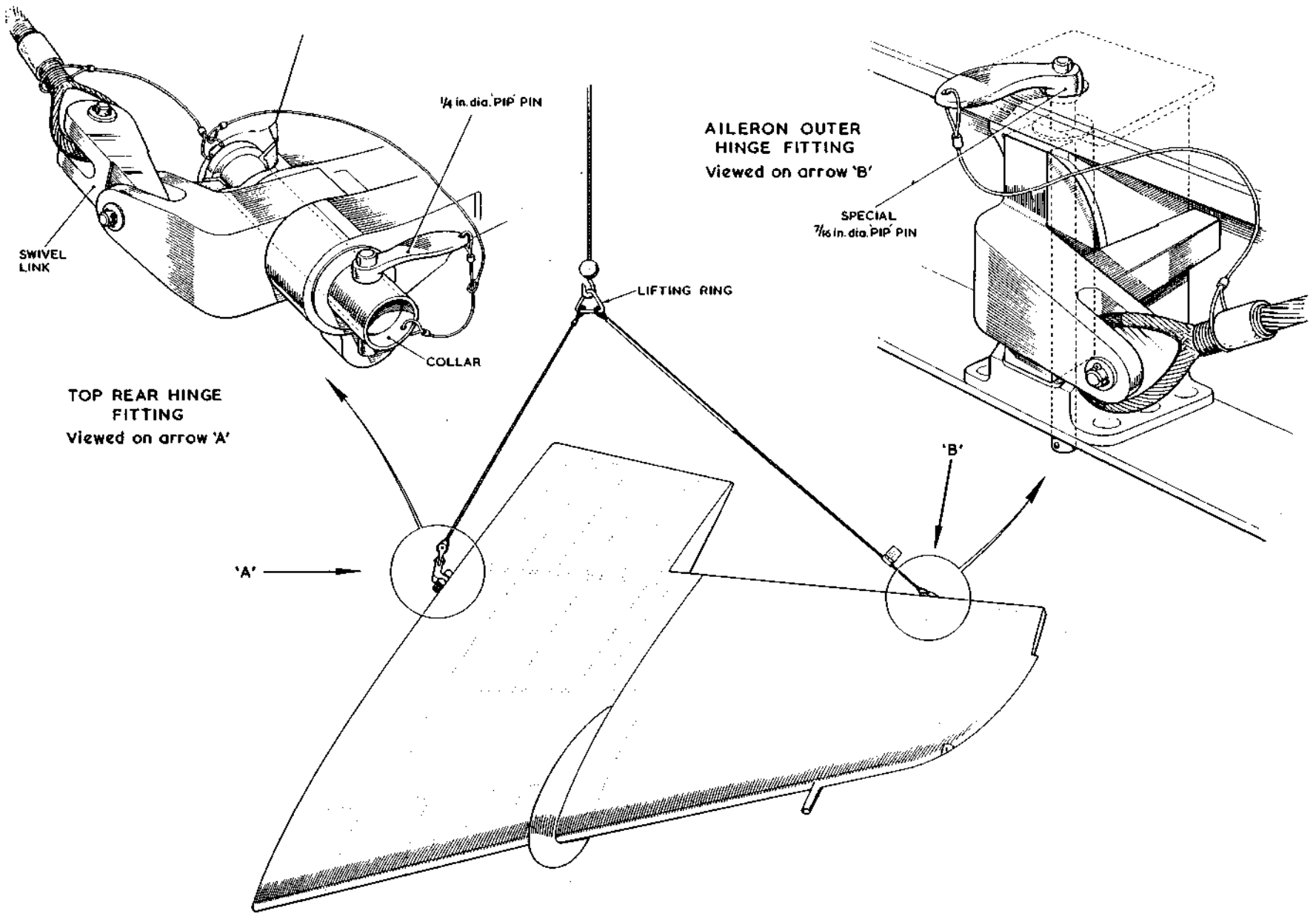

Fig. 25. Wing transport and stowage sling

each special nut integrally to its respective hinge bolt.

◀(19) Support the wing manually, and remove the rear hinge bolt and insert an aluminium slave pin 0.030 in. undersize, i.e. 1.155 in. dia. This pin should enter freely if the sling and crane are correctly adjusted. Remove the forward hinge bolt then the slave pin. Note the location of each distance washer to ensure correct re-assembly.▶

WARNING...

◀Care must be taken when removing the hinge bolts to ensure that there are no excessive loads on the bolts that will cause wing-jump when a bolt is removed. If wing-jump does occur serious damage can be done to the hinge fittings.▶

(20) Lift the wing clear of the centre section, taking care to guide the wing fittings clear of the centre section, wing-fold fairings and doors.

(21) With personnel stationed at the trestles to move them into line with rib No.5 (inboard former - Item D5, Sect.2, Chap.4) and rib No.11 (outboard former - Item D4, Sect.2, Chap.4), lower the wing on to the trestles. Owing to the attitude of the wing in the slung position, it will need to be guided to its final location on the trestles, the wing tip settling down last of all on the trestle at rib No.11.

(22) The wing transport and stowage sling is used for moving a wing to a stowage position. Attachment points are shown in Fig.25. The sling for fitting a wing to an aircraft is shown in Fig.26.

◀ WING INSTALLATION

Preparation

60. Before the wing is installed inspect the hinge bolts and bushes in the wing and centre section hinge fittings. They must be free from scores and their diameters must be within the limits laid down in A.P.4647 , Vol.6.

61. Fit new bushes as detailed in A.P.4647 , Vol.6, using the extractor and assembly tools, and aligning spanners (Item K3 and K4, Sect.2, Chap.4) shown in Fig.24.

62. Ensure that the top wing-fold fairing doors are secured in the fully open position, or are removed, to clear the wing when it is offered up.

Installation

63. Install the wing as follows :-

(1) Fit the sling and offer up the wing to check the sling adjustment (for future reference, note the hole in the adjustment plates that is used under the particular conditions).

(2) Insert the hinge bolts using a bullet (Item G25, Sect.2, Chap.4) lubricated with grease, XG-295, at the same time fit the distance washers in the positions noted on removal.

(3) Check the clearances (Fig.11). If necessary, a selection of distance washers is available to obtain the correct clearances.

(4) Lock the hinge bolt nuts with the locking plates, and fit and wire-lock the 2 B.A. bolts.

(5) Fit the jury strut (Item G1, Sect.2, Chap.4), and lengthen it until the wing-fold link hinge pin can be fitted.

(6) Remove the sling.

64. Assemble the remainder of the wing-fold components in the reverse order to that of removal. Lubricate moving parts on assembly, and finally lubricate all grease nipples, except those on pre mod.834 swivel couplings, using grease, XG-295.

65. Complete the installation as follows :-

(1) Prime the wing fold and aileron hydraulic pipelines, ensure that the area is clear of obstructions, and that the lock (para.59 (2)) is removed and the access door secured.

(2) Carry out the wing fold, flying control and flap functional tests (Sect.3, Chap.4 and Chap.6).▶

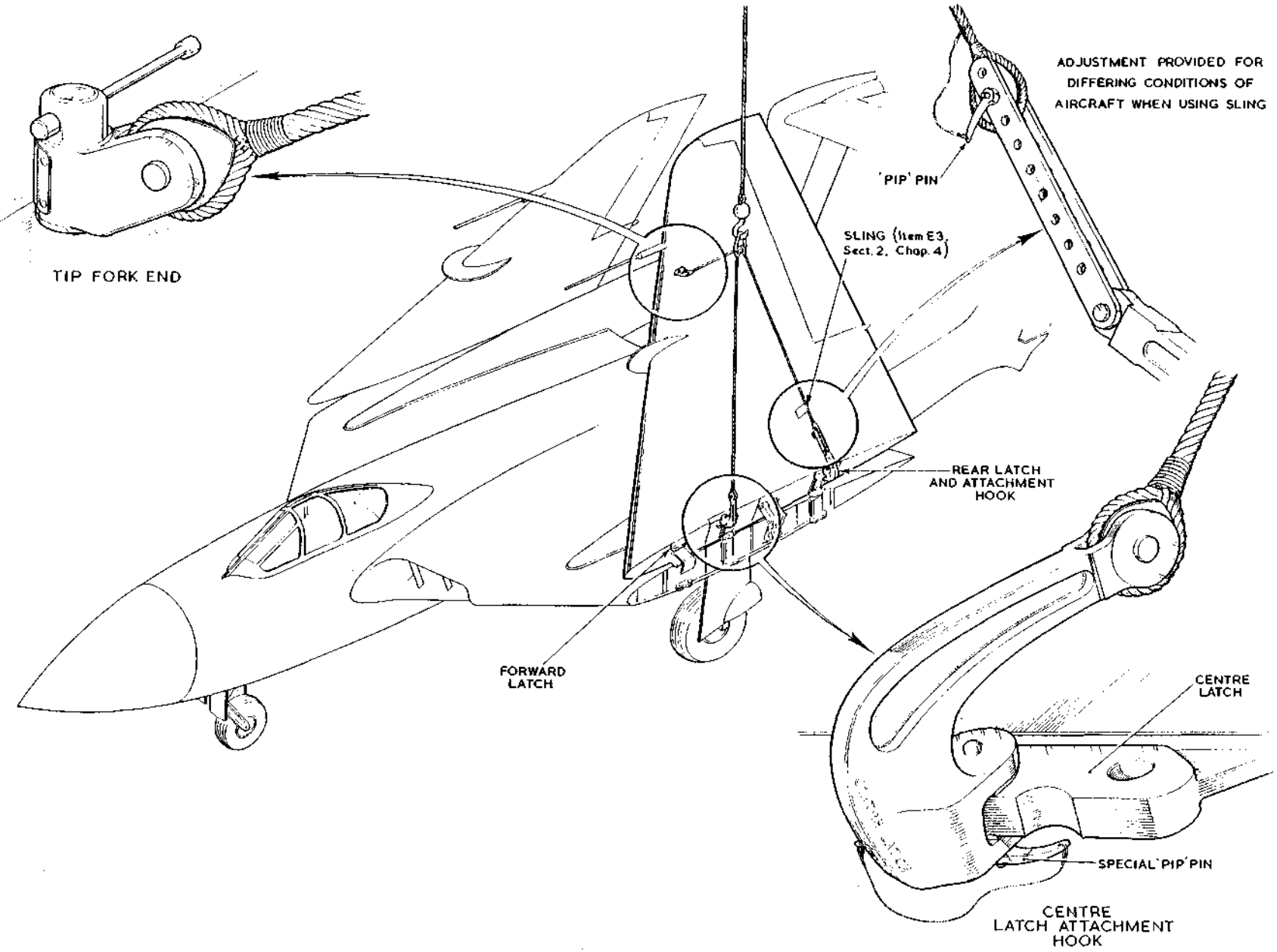

Fig.26. Wing slinging

◀ Detail of adjustment added ▶

(3) Carry out the relevant electrical, instrument, radio, and radar checks (Sect. 5 and 6).

Fitting a new wing

66. Fitting a new wing is described in A.P.4647, Vol.6.

Aileron removal (Fig.27)

67. The removal procedure, except for handed differences at assembly points, is the same for both port and starboard ailerons.

(1) Release all hydraulic pressure from the flying control circuit (Sect. 3, Chap.6), ensuring that the ailerons are in the neutral position when the hydraulic pressure has been exhausted.

(2) Open the hinged panel on the undersurface of the wing shroud at the inner hinge position. Support the aileron and remove the slotted nut, seals, and special bolt that secures the control unit ram eye-end to the aileron inner hinge bracket.

(3) Remove the slotted nut and special washer from the centre hinge bolt and knock the bolt up with a dural drift; as there is a gap between the centre hinge link top bush and the top bush in the wing bracket casting, it will be necessary to stop the centre hinge link on the aileron from attempting to rise as the hinge bolt is knocked up through the assembly.

(4) Remove the slotted nut and special washer from the outer hinge bolt, and the slotted nut from the aileron inner hinge bolt.

(5) In conjunction with an electrician disconnect the bonding cable and the formation keeping light electrical cables between the aileron and the wing (Sect. 5, Chap.1.)

(6) Support the aileron, remove the outer and inner hinge bolts and manoeuvre the aileron clear of the wing.

(7) Refit the bolts in the inner hinge, the control unit ram eye end and the centre and outer wing bracket castings, with their respective seals, washers and nuts.

WARNING...
The control unit ram should be secured in such a manner as to avoid damage to the surrounding structure should the ram be inadvertently moved under hydraulic pressure.

Aileron installation (Fig.27)

68. When an aileron is installed the following precautions must be observed:-

(1) When installing an aileron, the aileron inner hinge bolt and control unit ram bolt must be inserted from the outboard side of a port aileron, and from the inboard side on a starboard aileron. Both bolts must be assembled with grease, XG-295.

(2) The felt seal between the aileron top surface and the aileron top shroud must be inspected for security and serviceability.

(3) The aileron must be manoeuvred into position with the trailing edge raised and the outboard hinge bolt assembled first, the inboard hinge bolt is then assembled into position; of the three hinge bolts that were taken out to remove the aileron, the centre hinge bolt must be refitted last. Ensure that the bonding and formation keeping light electrical cables (Sect. 5, Chap. 1) are refitted between the aileron and the wing.

(4) After the aileron has been installed, the ailerons must be moved throughout their full range to ensure full and free movement (Sect. 3, Chap. 4). If the bushes and shims have not been disturbed, the clearances should be correct.

Installing a new aileron

69. When a new aileron is fitted, transfer the hinge links to the new aileron if they are serviceable, then install the aileron, and adjust and check the clearances as follows:-

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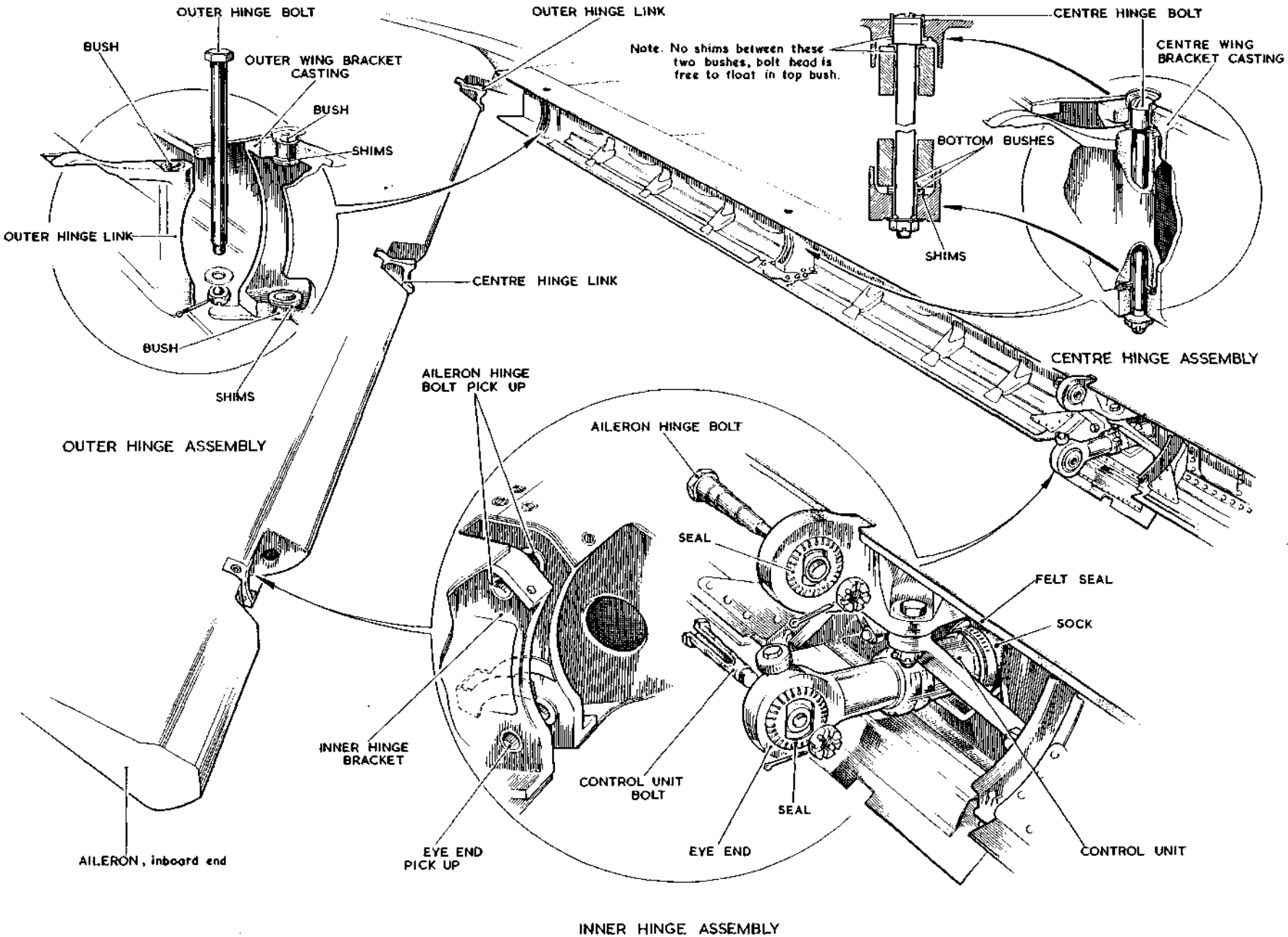

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185 3

Fig. 27 Aileron assembly, port

◀Sock and bearing seals - mod. 781 and 1171▶

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◄(1) Strip back the felt seal.

(2) Fit the aileron using only the inner and outer hinge bolts and check the clearances given in Fig.28.

◄ (3) Adjust the shims under the ► flange of both bushes of the outer hinge assembly to align the aileron.
◄ Then shim under the flange of the ► bottom bush of the centre hinge accordingly.

(4) Fit the aileron temporarily and make a final check of the clearances, taking particular note of the in and out-of-wind tolerances.

(5) Remove the aileron, taking note of the disposition of the shims, fix the felt strip using Bostik No. 1754, (Ref. No. 33H/111), and then refit the aileron and complete the locking.

(6) Check the aileron for full and free movement (Sect.3, Chap.4).

Flaps - removal and installation

70. Before attempting to fit a new flap, release all the pressure from the flap hydraulic system and couple up a hand pump rig to the flap up and down lines (Sect.3, Chap.6). The removal and installation of each individual flap and the fitting of a new inner, centre, or outer flap is given below. The fitting of a new U-plate and the flap interlock plates is given in A.P.4647 , Vol.6. All moving parts are to be assembled with grease, XG-295.

Inner flap removal (Fig.29)

71. To remove an inner flap proceed as follows :-

(1) Put the flaps in the mid-travel position.

(2) Mark with pencil lines the relative positions of the inner and centre flap to that of the U-plate and remove the 2 B.A. countersunk bolts securing the clamping strips, rubber strips and U-plate in position and remove the U-plate.

(3) Draw a pencil line across the surfaces of the flap arm and the leading edge bracket (detail 2) to locate the serrations of the leading edge bracket and the flap arm when reassembling the flap.

(4) Support the flap and, taking note of the disposition of the shims, remove the special bolt from the swinging link (detail 6).

(5) Note the position and number of the shims in relation to the flap arm and its flap arm pick-up casting (detail 7) and withdraw the bolt.

(6) Remove the bolt securing the flap arm to the leading edge bracket (detail 2); there is no nut fitted to this bolt as it screws into a tapped bush.

(7) Remove the inner flap from the aircraft, taking care to break the serrated joints cleanly to avoid burring them.

Inner flap installation (Fig.29)

72. The assembly is the reverse of removal. The dimensions laid down in Sect.3, Chap.4 should be obtained without any adjustments at all, providing the same flap goes back as it came off (shims and serration settings, etc., as before) and that the flap operating mechanism has not been disturbed. Should any adjustments be necessary, reference should be made to the flap adjustment table (key to Fig. 29). Should any microswitch adjustments be necessary, reference must be made to Sect.5, Chap.1.

Fitting a new inner flap (Fig.29)

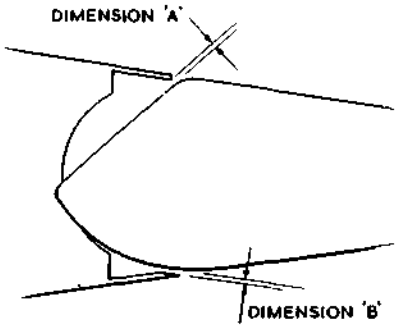
73. The inner flap is assembled primarily by one bolt at flap track 1 (detail 6) and two bolts at flap track 2 (detail 2 and 7). Adjustment is available at nine points to align the flap in the up position and in its travel path on the flap tracks; two of these points consist of adjustable roller carriers in the flap shroud (detail 8). The rigging adjustments and check points of the various components, together with their locations, are given in the key to Fig.29. Rigging dimensions are given in Sect.3, Chap.4, and clearances in Fig.35 of this chapter.

WARNING...

If at any time the swinging link (detail 5), flap arm adjustable head (detail 3), or flap arm (detail 1) are removed from the aircraft, ensure that the ball joint

SECTION		PORT		ST'B'D.	
		DIM. 'A'	DIM. 'B'	DIM. 'A'	DIM. 'B'
'A'	'A'	0·13 in.	0·19 in.	0·12 in	0·19 in.
'B'	'B'	0·20 in.	0·22 in.	0·20 in.	0·20 in.
'C'	'C'	0·29 in.	0·26 in.	0·26 in.	0·29 in.
'D'	'D'	0·23 in.	0·30 in.	0·23 in.	0·20 in.

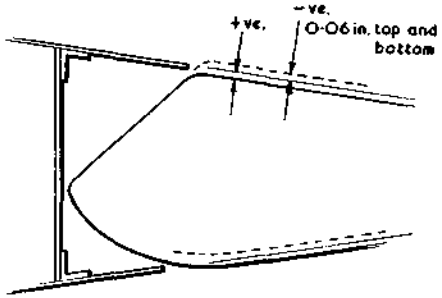
All above dimensions are +0·06 in.
−0·02 in.



INTO- AND OUT-OF-WIND TOLERANCES

0·08 in. is allowed over lengths of less than 2ft. if surfaces are both positive or negative. With 0·08in. positive on one surface, the opposite surface can be 0·03 in. max. negative. *Negative – into wind, positive – out of wind.*

Note. On final assembly the into- and out-of-wind tolerances are the major consideration



		Port	St'b'd.
Top	Min.	0·215 in.	0·20 in.
	Max.	0·335 in.	0·32 in.

		Port	St'b'd.
	Min.	0·49 in.	0·37 in.
Bottom	Max.	0·61 in.	0·49 in.

		Port	St'b'd.
	Min.	0·23 in.	0·18 in.
	Max.	0·35 in.	0·30 in.

Between balance weight and mainplane

		Port	St'b'd.
	Min.	0·22 in.	0·24 in.
Top	Max.	0·34 in.	0·36 in.

		Port	St'b'd.
	Min.	0·18 in.	0·195 in.
	Max.	0·30 in.	0·315 in.

		Port	St'b'd.
Bottom	Min.	0·52 in.	0·47 in.
	Max.	0·64 in.	0·59 in.

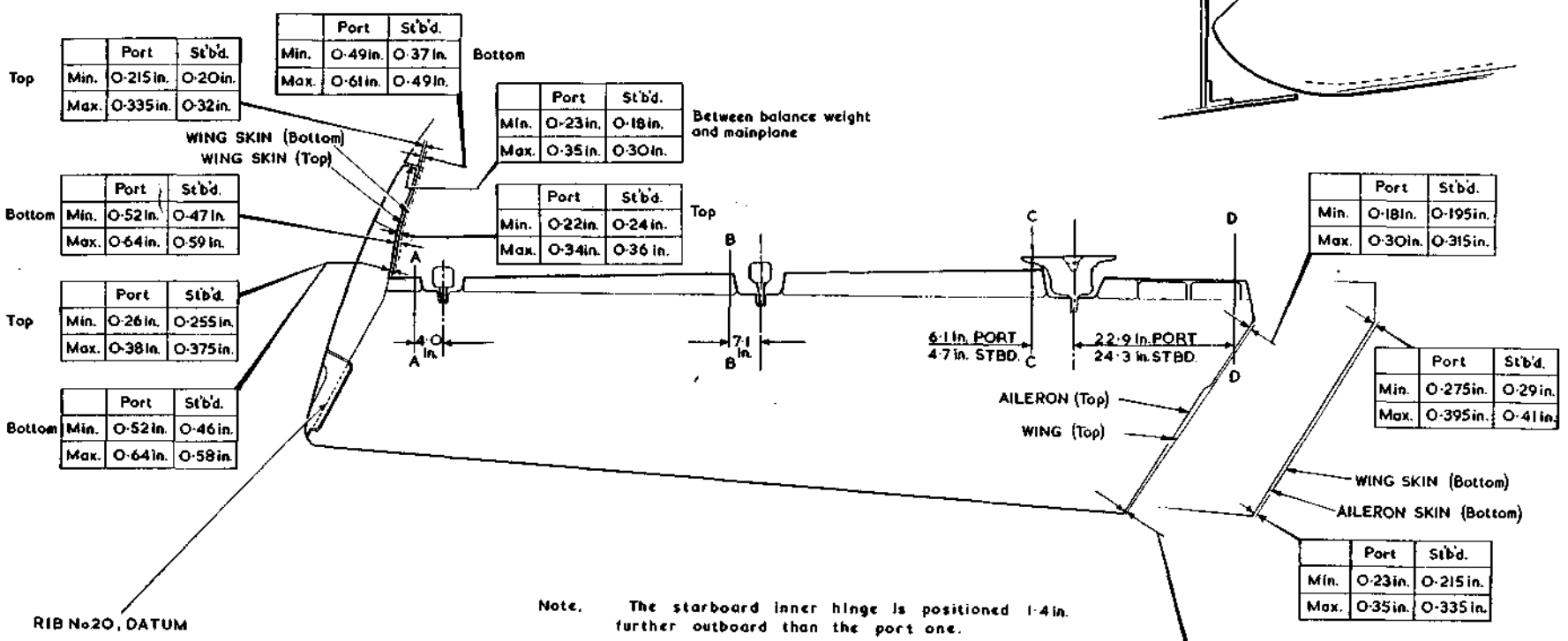
		Port	St'b'd.
	Min.	0·26 in.	0·255 in.
Top	Max.	0·38 in.	0·375 in.

		Port	St'b'd.
	Min.	0·275 in.	0·29 in.
	Max.	0·395 in.	0·41 in.

		Port	St'b'd.
Bottom	Min.	0·52 in.	0·46 in.
	Max.	0·64 in.	0·58 in.

		Port	St'b'd.
	Min.	0·23 in.	0·215 in.
	Max.	0·35 in.	0·335 in.

		Port	St'b'd.
	Min.	0·18 in.	0·27 in.
	Max.	0·30 in.	0·39 in.



Note. The starboard inner hinge is positioned 1·4 in. further outboard than the port one.

All dimensions are taken when the aileron is in the neutral position.

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Fig. 28 Aileron clearances

pillar is not withdrawn from its spherical joint, otherwise the rubber seal may be trapped and damaged.

74. A new inner flap should be fitted as follows :-

(1) Operate the flaps to the mid-travel position.

(2) Remove the U-plate and inboard flap as detailed in para.71. There is no need to take note of the positions of the mating serrations or dispositions of the shims, because the final settings will be different when a new flap is fitted owing to the manufacturing tolerances which occur; thus the setting at any adjustment point, unless otherwise stated, is always neutral for initial assembly of a new flap.

(3) With the flap mechanism in the mid-travel position, slacken off flap track 1 and 2 operating bogie chains at their tie-rods (these are accessible at the mid-travel break of the fairlead tubes).

(4) Detach the chains from flap track 1 and 2 operating bogies and pull the chains clear of their tracks.

(5) Position the swinging link (detail 5) as low as possible on its serrations.

Note...
For trial and final assembly, the cap nut must only be lightly tightened.

(6) Place the adjustable head (detail 3) as low as possible on its serrations. The horizontal serrations allow vertical adjustment at this point; both the horizontal and vertical serrations are load carrying but there is no lateral adjustment possible with vertical serrations.

(7) Assemble the new flap to the flap arm, ensuring that there is an equal thickness of shims between each bush of the flap arm pick-up casting (detail 7), and that the flap is assembled to the leading edge bracket (detail 2) with the adjustment at the leading edge bracket in the mid-position. With the shims equally disposed (detail 7), the flap arm and leading edge bracket (detail 2) should mate naturally in the mid-position, and there must be no vertical play in the flap arm (detail 7) ◀on final assembly, with nut finger tight.▶

Note...
The shims (detail 7) and the serrations (detail 2) must be altered simultaneously, because the alteration of one directly affects the other.

(8) Offer up the inboard end of the flap to the swinging link (details 5 and 6) and ensure, when assembling, that there is equal thickness of shims between each bush of the swinging link and swinging link pick-up casting; locate the swinging link bolt into position.

Note...
It may be found necessary to reduce the thickness of an individual shim (detail 6) to obtain a good fit without end-float on final adjustment.

(9) With the microswitch striker bolt on the flap screwed right in, manually push the flap up and down the tracks and check for freedom of movement. When the flap is assembled, the operating bogie at flap track 2 is made to move along its track in a curved path (detail 4); if the operating bogie is incorrectly adjusted it may jam sideways in the track, this can be relieved by adjusting with the shims at detail 2.

(10) Where the flap hooks (detail 8) pick up on each roller in the shroud, the dimension between the roller and flap hook throat may be set to approximately 0.05 in. for initial adjustment to allow the flap to be pushed into the up position. Since the roller is part of an adjustable roller carrier, adjustments are made by means of an adjustable screw. It is essential that the beak portion of the hook profile of each flap hook (detail 8) passes right over the roller in the flap fully up position.

(11) Using the table of adjustments (key to Fig.29), align the flap to the plan and profile of the wing, the shims (detail 1) may also be used to align the flap laterally. Ensure that

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there is no excessive friction between the flap trailing edge and the flap shroud as the flap reaches the fully up position.

(12) It is now necessary to remove the flap from the airframe to reconnect the driving chains to the operating bogies. Draw a pencil line across the surfaces of the flap arm and the leading edge bracket (detail 2) to locate the serrations of the leading edge bracket and the flap arm when reassembling the flap; remove the bolt.

(13) Note the disposition of the shims in relation to the flap arm and its flap arm casting (detail 7) then support the flap and withdraw the bolt.

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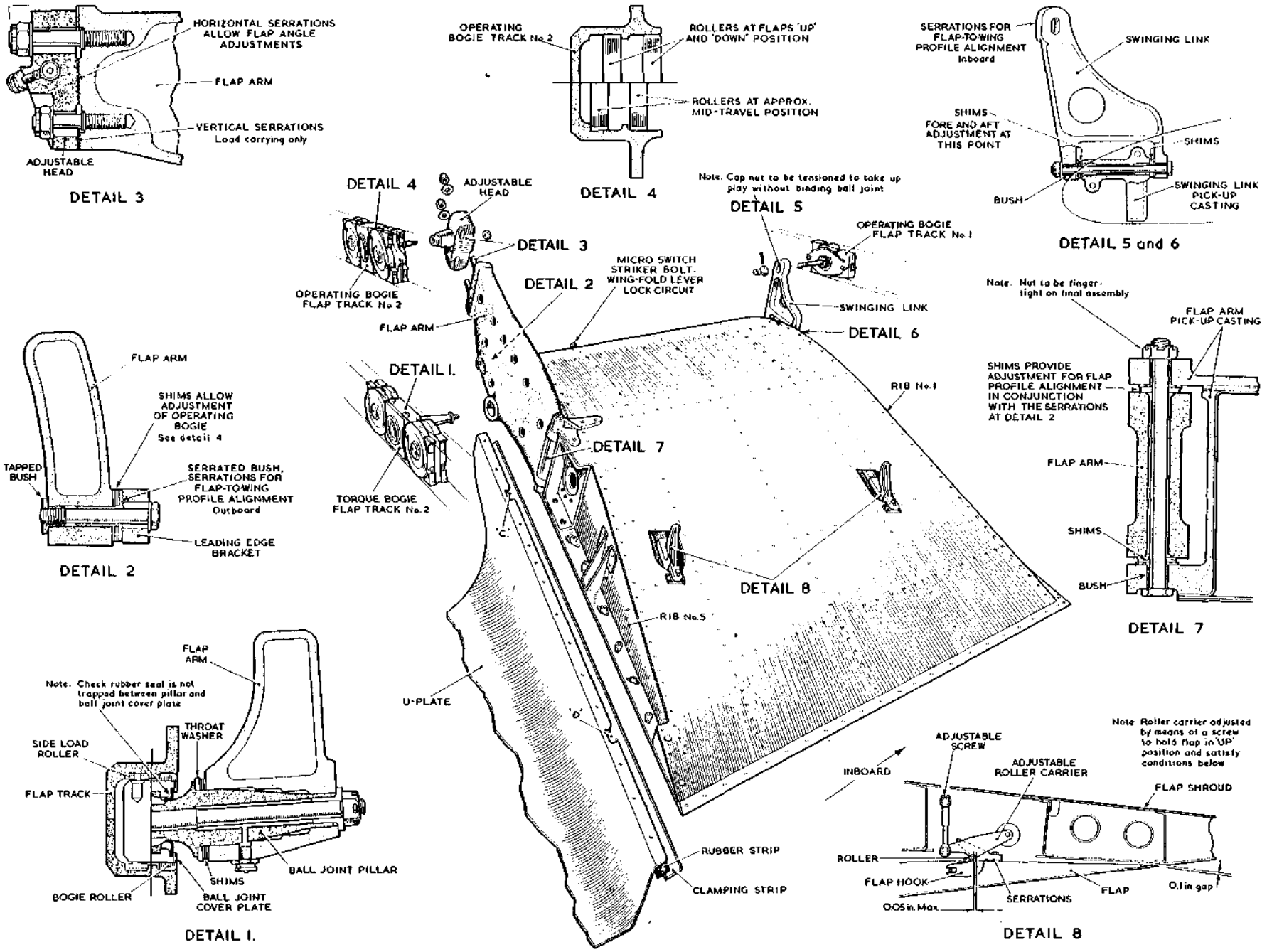

Fig. 29. Inner flap, port

◀Clearances added to Detail 8▶

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Key to fig. 29. (INNER FLAP, adjustment and check points)

Detail No.	Location	Type of adjustment and check points	Effect	Para.
1	Flap arm	Shims	Causes the flap arm to move inboard or outboard at this point.	74
2	Flap arm attachment at L.E. of flap	(a) Serrations (Three different bushes are available, Mod. 939, to allow for variations in alignment)	(a) Provide vertical adjustment for flap to wing profile alignment and should initially be mated at the mid-position. Their position must only be altered in conjunction and simultaneously with the shims at detail 7.	71 73 74
		(b) Shims	(b) Provide lateral adjustment for the operating bogie in its track.	
3	Flap arm adjustable head	Serrations (horizontal) Note . . . *The vertical serrations do not provide any adjustment.*	Allows the front end of the flap arm to be raised or lowered, pivoting the flap at its ball joint pillar which revolves in a torque bogie, thus raising or lowering the trailing edge. For initial fitment of a new flap, the head should be assembled so as to give the flap maximum droop at the trailing edge. One serration is equal to $\frac{1}{8}$ in. movement at the trailing edge.	74
4	Operating bogie, flap track 2	Bogie rollers	Operating bogie follows a curved path, starting and finishing as far OUT on the track as possible and traversing IN to the track at approximately mid-travel position. For adjustment see detail 2.	74
5	Top of swinging link	Serrations	Allows the inboard end of the flap to be raised or lowered, for alignment with the wing profile. For initial assembly, place link as low as possible on its serrations.	74
6	Bottom of the swinging link	Shims	Fore and aft adjustment of the flap at this point. Initially shims should be displaced equally fore and aft.	71 73 74
7	Flap arm	Shims	Provide vertical adjustment for wing profile alignment and should initially be displaced equally top and bottom. They must be altered in conjunction and simultaneously with the leading edge bracket serrations, i.e. with detail 2.	71 73 74
8	(a) Top surface of flap, two thirds chord	(a) Serrations on flap hook mountings	(a) Allow fore and aft adjustment of each flap hook so as to obtain the dimension between the roller in the flap shroud and the throat of the flap hook.	73 74
	(b) Flap shroud	(b) Adjustable roller carriers	(b) If the flap trailing edge droops, pull up no higher than the gap shown in detail 8 by the roller carrier. If the flap trailing edge does not droop, adjust the roller to make contact on the hook to strain down the trailing edge by this amount.	

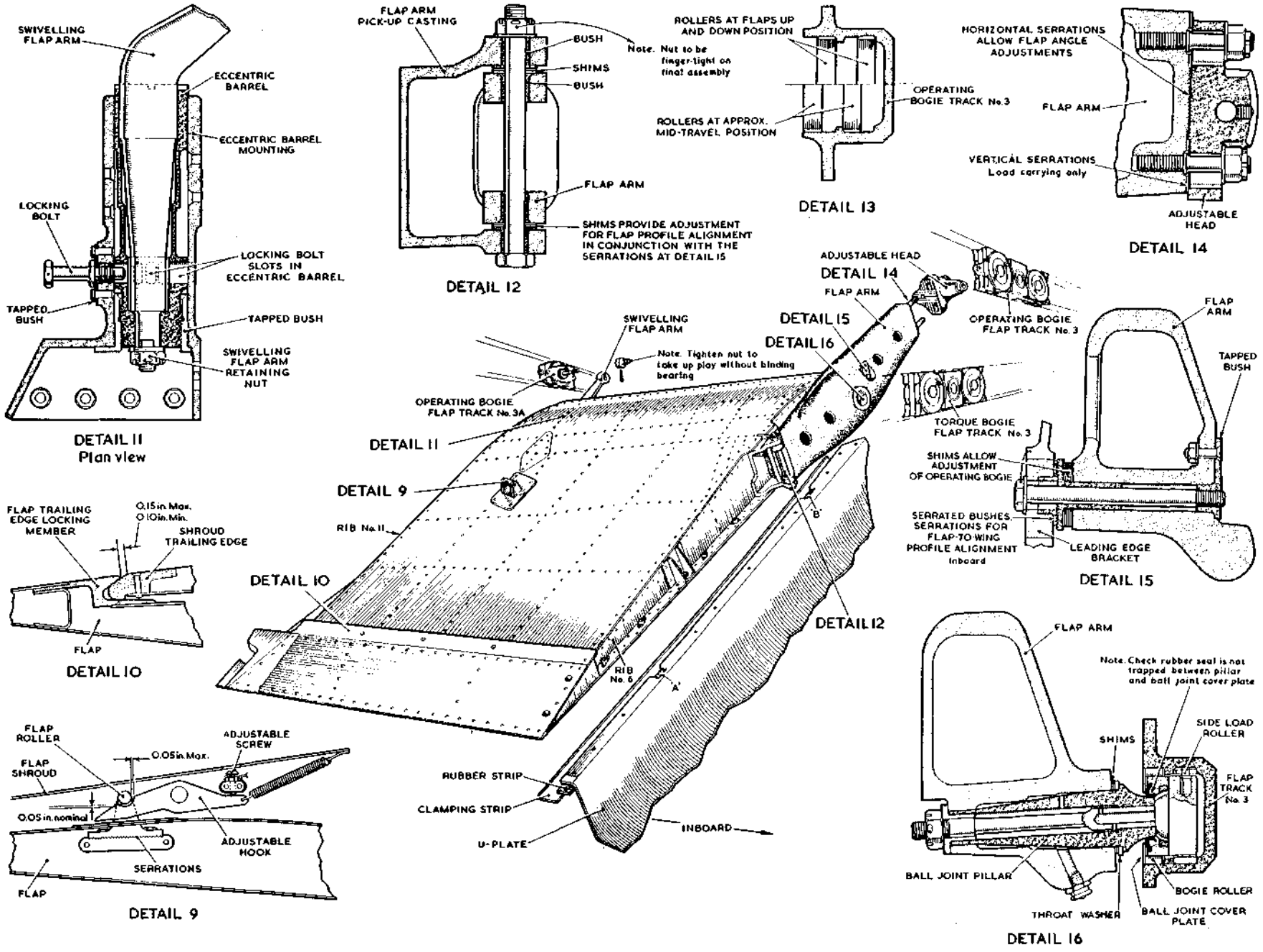

Fig. 30. Centre flap, port

◀ NOTE AT OPERATING BOGIE TRACK NO. 3A ▶

Key to fig. 30. (CENTRE FLAP, adjustment and check points)

Detail No.	Location	Type of adjustment and check points	Effect	Para.
9	(a) Top surface of flap two thirds chord	(a) Serrations on roller mounting	(a) These are used to move the roller fore and aft and so obtain the vertical dimension between the roller and the back of the hook with the flap fully UP.	77 78
	(b) Flap shroud	(b) Adjustable hook	(b) An adjustable stop bolt is used to obtain the horizontal dimension between the flap hook and roller with the flaps fully UP.	
10	Trailing edge	Saw tooth	Locates the flap in the UP position. Obtain the dimension given in fig. 30.	
11	Outboard leading edge	Swivelling flap arm located in an adjustable eccentric barrel	Rotating the eccentric barrel causes the flap to move inboard or outboard, up or down, at this point. Fore and aft adjustment is obtainable at this point by screwing the eccentric barrel in or out.	75 77 78
12	Flap arm	Shims	Provide vertical adjustment for wing profile alignment and should initially be displaced equally top and bottom. The shims must be altered in conjunction and simultaneously with the leading edge bracket serrations, i.e. with detail 15.	75 77 78
13	Operating bogie flap track 3	Bogie rollers	Operating bogie follows a curved path, starting and finishing as far IN on the track as possible and traversing OUT to the track approximately mid-travel position. For adjustment see detail 15.	78
14	Flap arm adjustable head	Serrations (horizontal) Note . . . *The vertical serrations do not provide any adjustment.*	Allows the front end of the flap arm to be raised or lowered pivoting the flap at its ball joint pillar which revolves in a torque bogie, thus raising or lowering the trailing edge. For initial fitment of a new flap, the head should be assembled so as to give the flap maximum droop at the trailing edge. One serration is equal to $\frac{1}{8}$ in. movement at the trailing edge.	77 78
15	Flap arm attachment at L.E. of flap	(a) Serrations (Three different bushes are available to allow for variations in alignment)	(a) Provide vertical adjustment for flap to wing profile alignment and should initially be mated at the mid-position. Their position must only be altered in conjunction and simultaneously with the shims at detail 12.	75 77 78
		(b) Shims	(b) Provide lateral adjustment for the operating bogie in its track.	
16	Flap arm	Shims	Causes the flap arm to move inboard or outboard at this point.	77 78

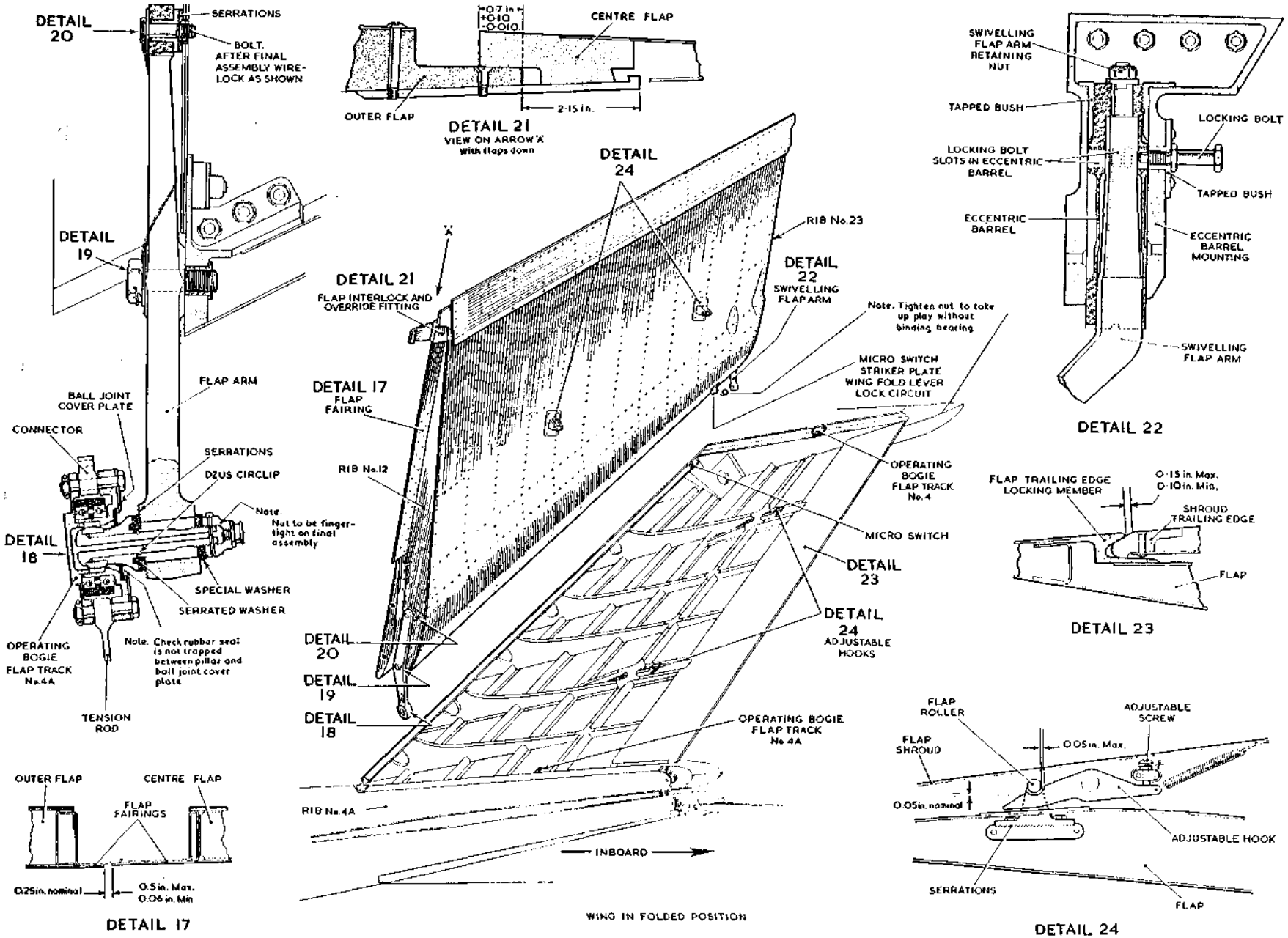

Fig. 31. Outer flap, port

◀ NOTE AT DETAIL 22 ▶

Key to fig. 31. (OUTER FLAP, adjustment and check points)

DETAIL NO.	LOCATION	TYPE OF ADJUSTMENT AND CHECK POINTS	EFFECT	Para.
17	Flap fairing		Closes the gap between the centre and outer flap with the wings spread.	
18	Operating bogie, flap track 4a.	Serrations	The flap may be moved fore or aft at this point relative to the aircraft.	82
19	Rib No. 12, inboard leading edge	Pivot point of flap arm	Must be slackened off when any adjustment is made of the serrations at detail 20.	79 81 82
20	Rib No. 12, inboard leading edge	Serrations	Movement of the arm at this point alters the flap to wing profile alignment.	79 81 82
21	Interlocking trailing edge between centre and outer flap	Override arm	Prevents outer flap trailing edge disengaging from the interlocking trailing edge under flight conditions.	
22	Outboard leading edge	Swivelling flap arm located in an adjustable eccentric barrel	Rotating the eccentric barrel causes the flap to move inboard or outboard, up or down, at this point. Fore and aft adjustment is obtainable at this point by screwing the eccentric barrel in or out.	79 81 82
23	Trailing edge	Saw tooth	Locates the flap in the UP position. Obtain the dimension given in this detail.	
24	(a) Top surface of flap, two thirds chord	(a) Adjustable roller carrier	(a) Fore and aft adjustment of hook must ensure that roller is 0.05 in. from back of hook when flaps are up.	81 82
	(b) Flap shroud	(b) Adjustable hook	(b) Vertical adjustment of hook must ensure that roller is 0.05 in. from the bottom of hook when flaps are up.	

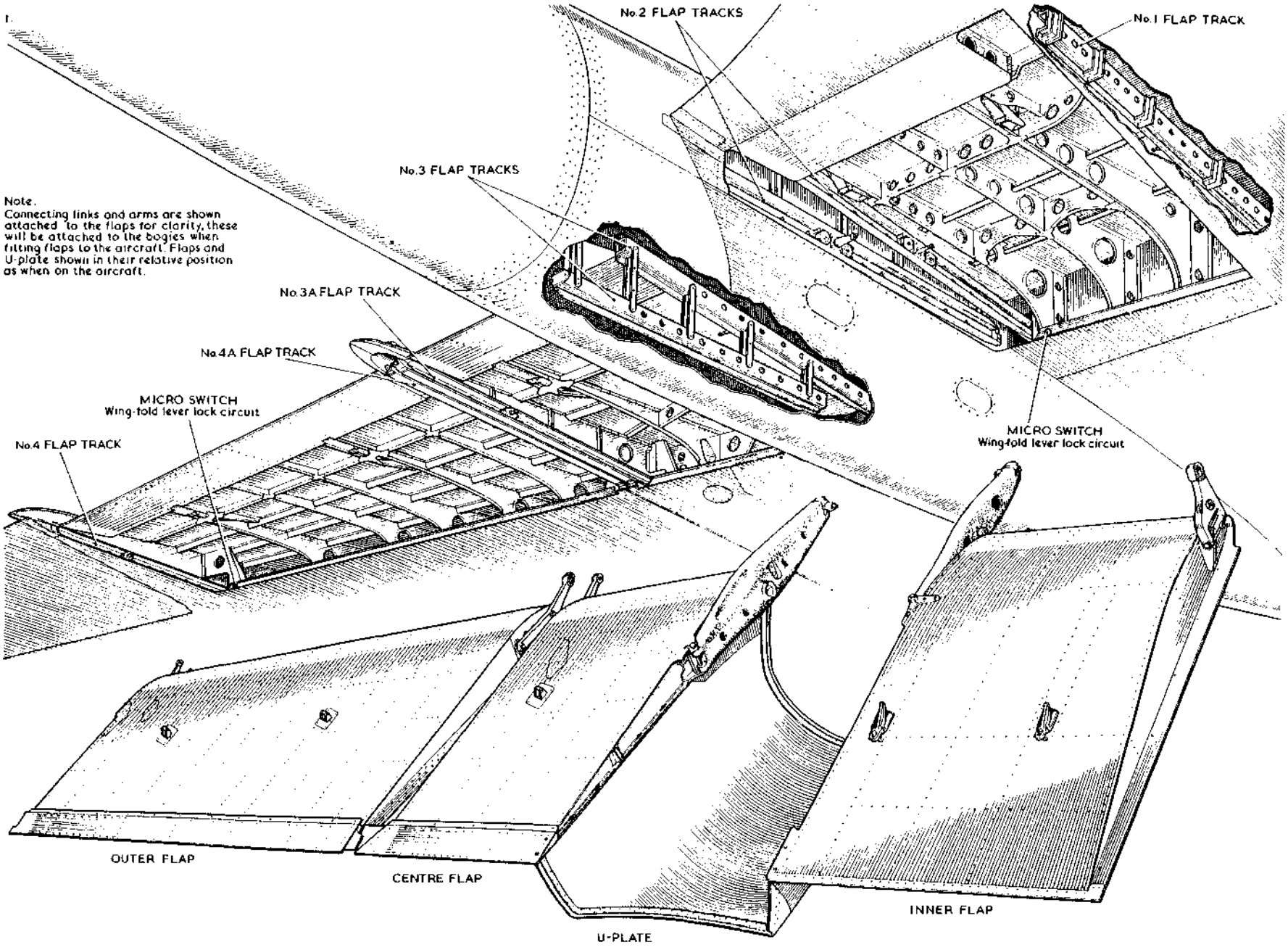

Fig.32. Flap arrangement, port

(14) Observing the disposition of the shims, remove the special bolt from the swinging link (detail 6) and lower the flap from the aircraft.

(15) Reconnect the driving chains to the operating bogies and tension the chains correctly (Sect. 3, Chap. 4). When the chain tie-rod is locked, ensure that the ends of the locking wire are bent over at the centre of the tie-rod so that they will not foul as the chain moves.

(16) Refit the flap to the aircraft.

(17) By means of the hand pump, operate the flaps to the fully up position and check that the rigging pins (Item F5, Sect. 2, Chap. 4) fit easily through No. 1 and 2 bogie sprockets and gearboxes, readjusting the turnbuckles as necessary.

(18) Refit the U-plate.

(19) Remove all rigging pins and carry out functional tests as described in Sect. 3, Chap. 6. In conjunction with an electrician and with the flap in the fully up position adjust the striker bolt so that 0.04 in. movement of the flap operates the microswitch. For information on the electrical circuit refer to Sect. 5, Chap. 1.

Centre flap removal (fig. 30)

75. A centre flap should be removed as follows:-

(1) Position the flaps at mid-travel. Mark with pencil lines the relative positions of the inner and centre flaps to that of the U-plate, remove the 2 B.A. countersunk bolts securing each clamping strip, rubber strip and U-plate and remove the U-plate; put the flaps fully up.

(2) Manually unlock the wing-fold lock mechanism and manually withdraw the latch pins (Sect. 2, Chap. 1); with a hand pump rig coupled up to the wing-fold jack (Sect. 3, Chap. 6) pump the wing up and over the vertical until it is fully folded. Position the flaps at mid-travel.

(3) With a pencil, mark a datum line on the surfaces of the flap arm and the leading-edge bracket (detail 15) and remove the bolt securing the flap arm to the flap leading-edge bracket.

(4) Support the flap and note the position of the shims in relation to the flap arm and flap arm pick-up casting (detail 12), then remove the slotted nut and washer from the vertical bolt securing the rear of the flap arm to the flap arm pick-up casting and withdraw the bolt.

(5) With a pencil, mark two datum lines, one circumferential on the eccentric barrel where it enters the eccentric barrel mounting (detail 11) and one longitudinally on the eccentric barrel and eccentric barrel mounting;

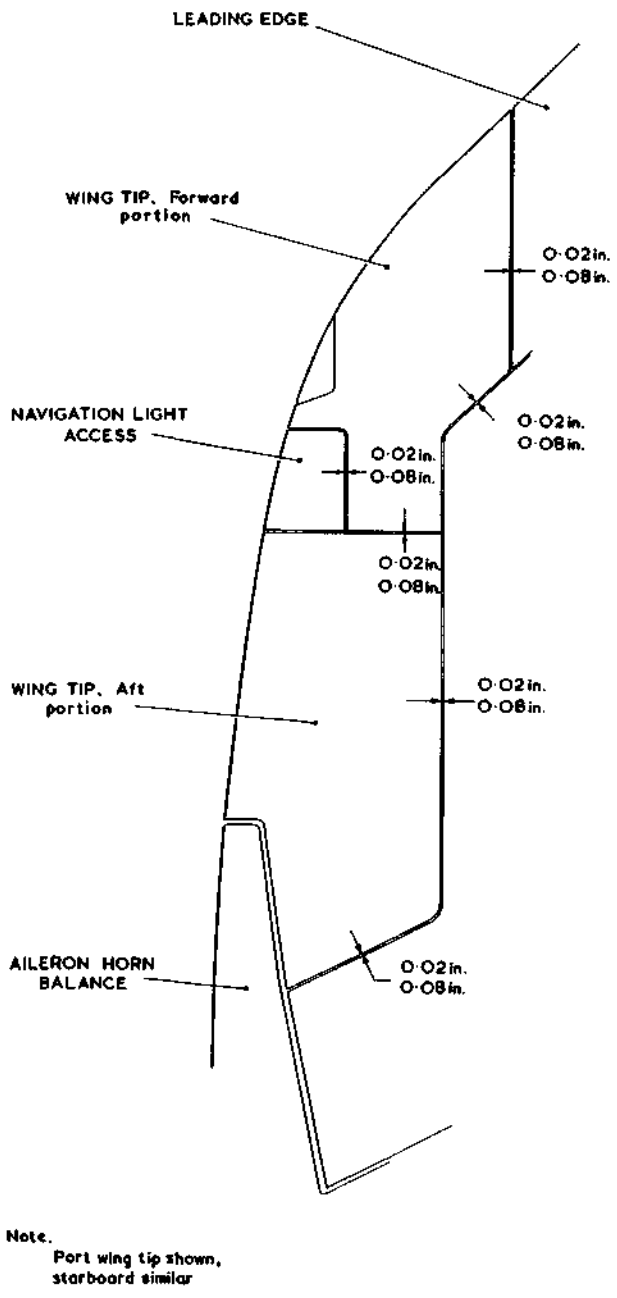

Fig.33. Wing tip clearances

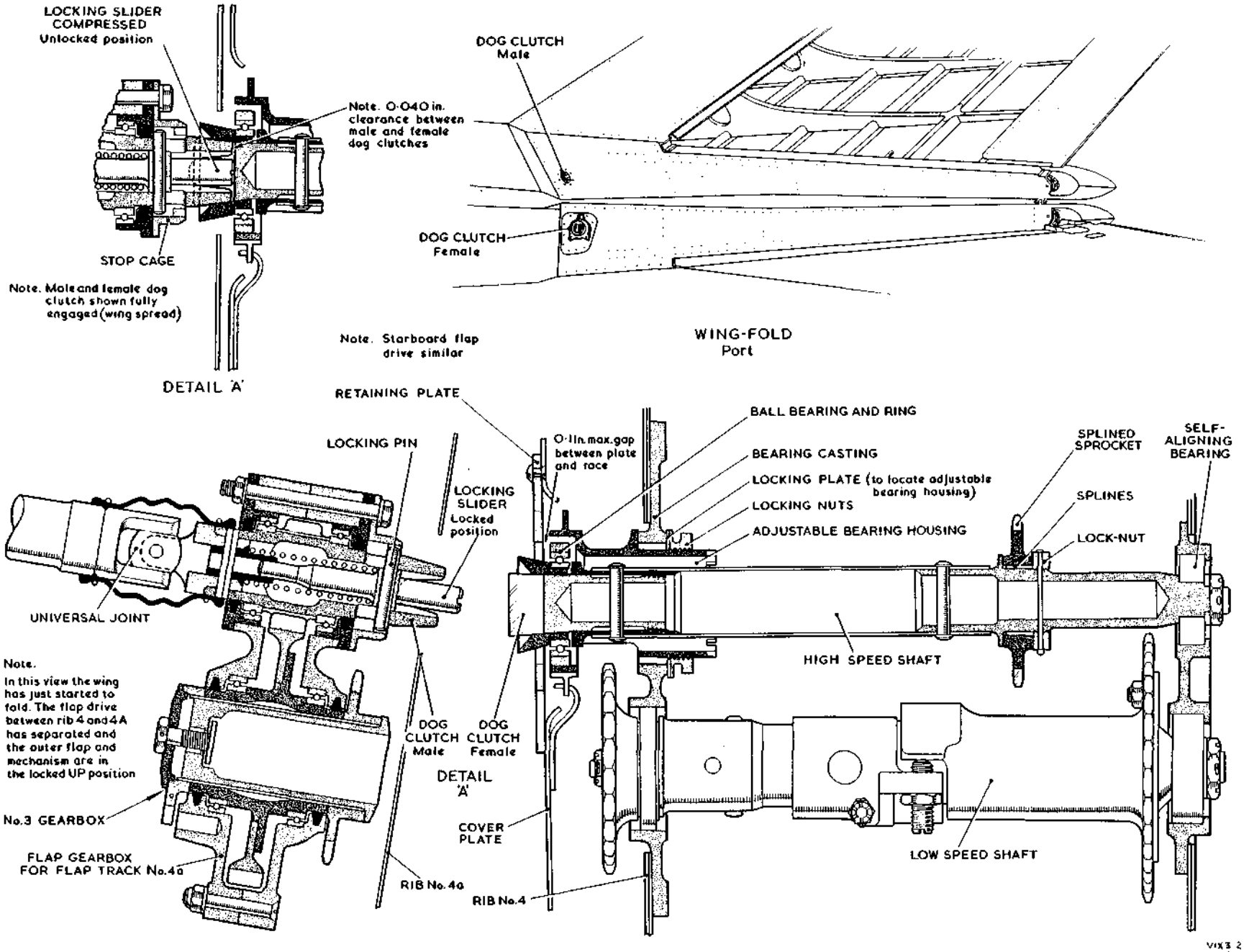

Fig.34 Flap drive alignment, port wing-fold

◄ Locking and retaining plates - mod. 943 and 1384 ►

the circumferential pencil mark will give the position of the eccentric barrel fore and aft and the longitudinal pencil line will locate the barrel radially in its final position. Remove the locking wire from the locking bolt which locates the eccentric barrel in position and remove the locking bolt. Unscrew the eccentric barrel with a C-spanner. The threads of the eccentric barrel must be protected from damage whilst it is clear of the flap. The flap can now be removed from the aircraft.

Centre flap installation

76. The installation is the reverse of removal. The dimensions and clearances laid down in Fig. 30 and Fig. 35 should be obtained without any adjustments at all, provided that the same flap goes back as it came off (shims and serration settings, etc., as before) and that the flap operating mechanism has not been disturbed. Should any adjustments be necessary, reference should be made to the key at fig. 30.

Fitting a new centre flap (Fig. 30)

77. The centre flap is assembled primarily by two bolts at flap track 3, (details 12 and 15) and a swivelling flap arm and eccentric barrel assembly at flap track 3a (detail 11). Adjustment is available at six points to align the flap correctly in its up position and in its travel path on the flap tracks; one of these points consists of an adjustable hook in the flap shroud (detail 9). The rigging adjustments and check points of the various components, together with their locations, are given in the key to fig. 30. Dimensions and clearances are given in Fig. 30 and 35, and flap movement in Sect. 3, Chap. 4.

WARNING...

If at any time the swivelling flap arm attachment to the operating bogie (flap track 3a), flap arm adjustable head (detail 14) or flap arm (detail 16), are removed from the aircraft, ensure that each ball joint pillar is not withdrawn from its spherical joint, otherwise the rubber seal may be trapped and damaged. It is essential that there is no vertical play of the flap arm (detail 12) after it has been finally assembled.

78. A new centre flap should be fitted as follows:-

(1) Operate the flaps to mid-travel position.

(2) Remove the U-plate and centre flap as detailed in para. 75. There is no need to take note of the positions of the mating serrations, shims or setting of the rotating eccentric barrel, because the final settings will be different when a new flap is fitted owing to the manufacturing tolerances which occur; thus the shim and serration settings when fitting a new flap are always set initially to neutral.

(3) With the flap mechanism in the fully down position, slacken off flap track 3 and 3a operating bogie chains at their tie-rods, (these are accessible above the forward end of their respective bogie tracks), disconnect the chains from the bogies and pull the chains clear of their tracks.

(4) Position the adjustable head (detail 14) as low as possible on its serrations. The horizontal serrations allow vertical adjustment at this point; both the horizontal and vertical serrations are load carrying, but there is no lateral adjustment possible with the vertical serrations.

(5) Offer up the flap to the flap arm and assemble the bolt (detail 12) with an equal number of shims between the head of each bush of the flap arm pick-up castings and the flap arm.

(6) Assemble the bolt holding the flap arm to the flap leading-edge bracket in the mid-position (detail 15). With the shims equally disposed, (detail 12), the flap arm and leading-edge bracket (detail 15) should mate naturally in the mid-position as shown.

Note...

The shims (detail 12) and serrations (detail 15) must be altered simultaneously because the alteration of one directly affects the other.

(7) At the outboard leading edge of the flap, remove the locking bolt so as

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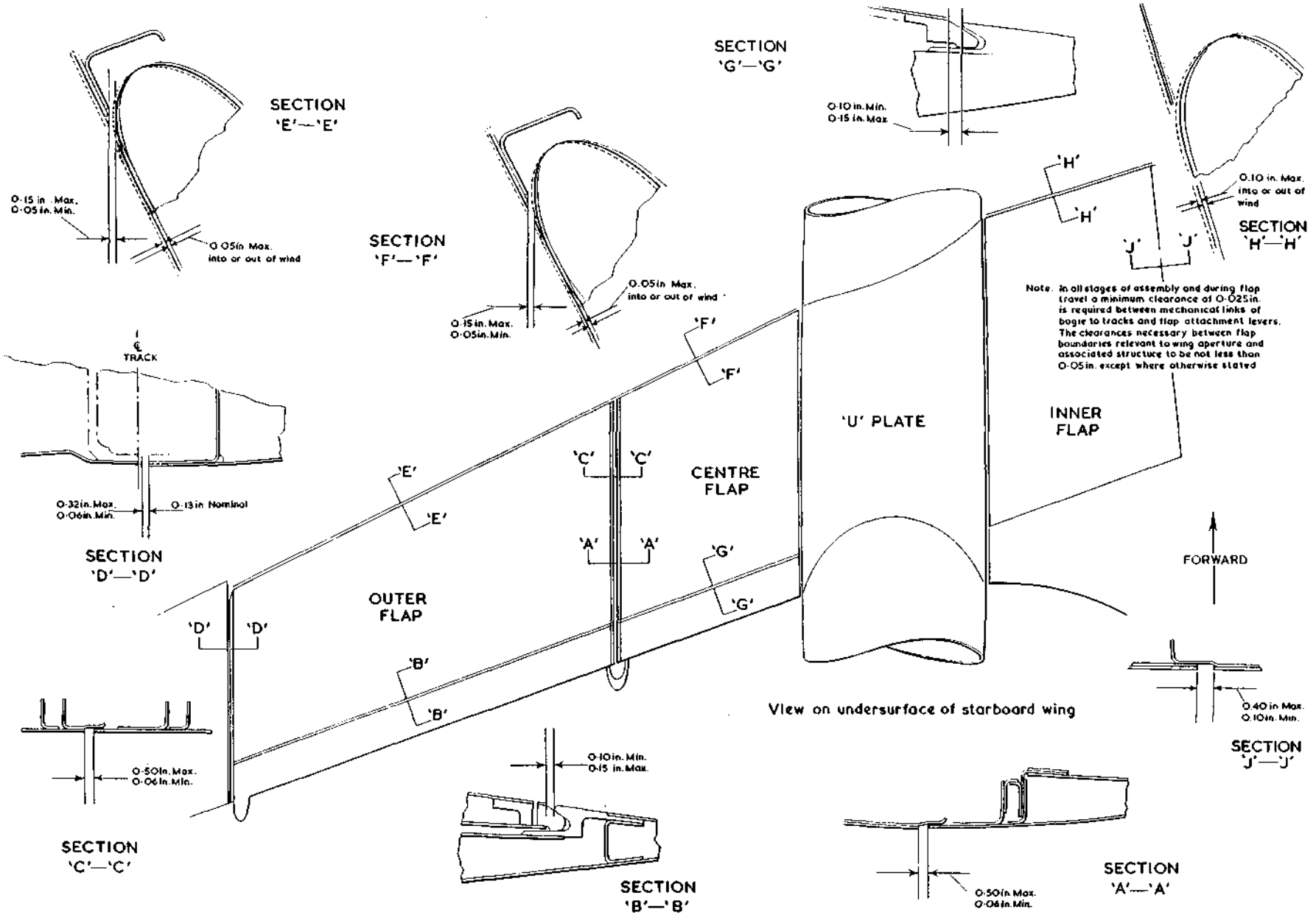

Fig. 35. Flap clearances

◀ Sections 'H'-'H' and 'J'-'J' added, 'E'-'E' corrected ▶

not to foul the swivelling flap arm eccentric barrel when the flap is offered up (detail 11).

(8) Hold the swivelling flap arm eccentric barrel assembly (detail 11) at the correct angle to enter the eccentric barrel mounting at the flap leading edge between flap ribs No. 10 and 11 and feed the swivelling flap arm eccentric barrel assembly into position. Using a C-spanner, screw the eccentric barrel home into position in the casting and provisionally lock in this position.

(9) The flap adjustment points (details 11, 12, 14 and 15) are now all set for starting the alignment of the flap.

(10) Manually push the flap up and down the tracks and check for freedom of movement. When the flap is assembled, the operating bogie at flap track 3 is made to move along its track in a curved path (detail 13). If the operating bogie is incorrectly adjusted it may jam sideways in the track; this can be relieved by adjusting with the shims at detail 15.

(11) Where the flap roller (detail 9) picks up on the adjustable hook in the shroud, the dimension between the flap roller and the flap hook throat may be set to approximately 0.05 in. for initial adjustment to allow the flap to be pushed into the up position. These dimensions may be obtained by adjusting the hook up or down with the adjustable screw and moving the flap roller on its serrations in a fore and aft direction.

(12) Using the table of adjustments in the key to fig. 30, align the flap trailing edge locking member to the dimension data given in Sect. 3, Chap. 4 and align the flap itself to the profile and plan of the wing under-surface (the shims at detail 16 and the eccentric barrel may be used to align the flap laterally).

(13) It is now necessary to remove the flap from the airframe to reconnect the driving chains to the operating bogies. Draw a pencil line across the surfaces of the flap arm and flap leading-edge bracket (detail 15) and, with a pencil, mark two datum lines (one circumferential on the eccentric barrel where it enters the eccentric barrel mounting and one longitudinally on the eccentric barrel and eccentric barrel mounting). The circumferential pencil mark will give the position of the eccentric barrel fore and aft and the longitudinal pencil line will locate the barrel radially on its final position.

(14) Support the flap and, taking note of the disposition of the shims, remove the bolt securing the rear end of the flap arm to the flap arm pick-up casting (detail 12), and the bolt from the flap arm and flap leading edge bracket (detail 15).

(15) Ensure that the locking bolt which locates the eccentric barrel in position is removed and unscrew the eccentric barrel from its housing.

(16) Remove the flap from the aircraft.

(17) Reconnect the driving chains to the operating bogies and tension the chains correctly (Sect. 3, Chap. 4). When the chain tie-rod is locked ensure that the ends of the locking wire are bent over at the centre of the tie-rod so that they will not foul as the chain moves.

(18) Refit the flap to the aircraft.

(19) Operate the flaps to the fully up position and check that rigging pins (Item F5, Sect. 2, Chap. 4) fit easily through No. 3 and 4 operating sprockets and gearboxes, re-adjusting turnbuckles as necessary.

(20) Remove all rigging pins, refit the U-plate and carry out functional checks as described in Sect. 3, Chap. 6.

Outer flap removal (fig. 31)

79. The outer flap should be removed in the following manner :-

(1) Fold the wings or wing, as required.

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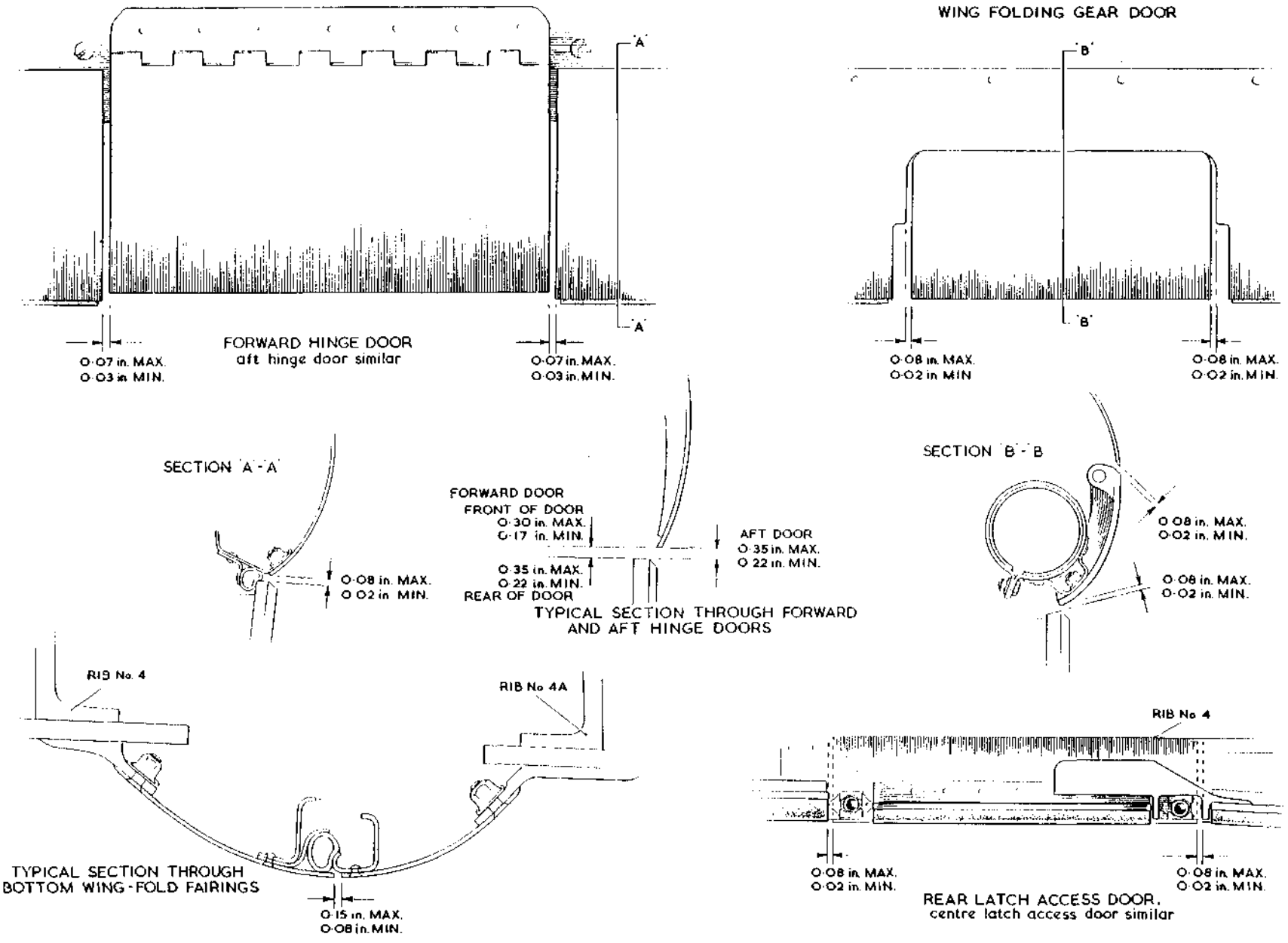

Fig. 36 Wing fold fairing clearances

Note...
The outer flap can only be removed with the wing folded.

(2) Hold in the locking slider on the gearbox at flap track 4a (Fig. 34).

(3) Pull the flap clear of the trailing edge and flap hooks (fig. 31) and support the flap with the trailing edge raised high enough to gain access to the attachment points at flap tracks 4 and 4a; release the locking slider.

(4) With a pencil, mark a datum line on the surfaces of the flap arm and adjacent structure to locate the serration position at the aft end of the flap arm (detail 20) and remove the bolt.

(5) Remove the bolt (detail 19), taking care that the flap arm is broken cleanly from the serrations (detail 20), so that the serrations do not burr.

(6) With a pencil, mark two datum lines, one circumferential on the eccentric barrel (detail 22) where it enters the eccentric barrel mounting and one longitudinally on the eccentric barrel and eccentric barrel mounting, the circumferential pencil mark will give the position of the eccentric barrel fore and aft and the longitudinal pencil line will locate the barrel radially in its final position. Remove the locking wire from the locking bolt which locates the eccentric barrel in position and remove the locking bolt. Unscrew the eccentric barrel with a C-spanner. The threads of the eccentric barrel must be protected from damage whilst it is clear of the flap. The flap can now be removed from the aircraft.

◀ Outer flap installation

80. The installation is the reverse of removal. The dimensions and clearances laid down in Fig. 31 and Fig. 35 should be obtained ▶ without any adjustment at all, providing the same flap goes back as it came off (serrations and eccentric barrel settings as before) and that the flap operating mechanism has not been disturbed. In conjunction with an electrician, and with the flap in the fully up position, check that 0.04 in. movement of the flap operates the microswitch which is located in the flap shroud adjacent to the flap outboard leading edge. For further information refer to Sect. 5, Chap. 1. Should any flap adjustments be necessary, reference should be made to the key to Fig. 31.

Fitting a new outer flap (Fig. 31)

81. The outer flap is assembled primarily by two bolts at flap track 4a (details 19 and 20) and a swivelling flap arm and eccentric barrel assembly (detail 22) at flap track 4. Adjustment is available at five points to align the flap correctly in its up position. The rigging adjustments and check points of the various components together with their locations are given in the key to Fig. 31. Rigging dimensions ◀ are given in Sect. 3, Chap. 4, and clearances in Fig. 31 and 35 of this chapter. ▶

WARNING

If at any time the swivelling flap arm attachment (flap track 4) or the flap arm at flap track 4a is disturbed at the operating bogies, ensure that the pillars are not withdrawn from their spherical joints, otherwise the rubber seal may be trapped and damaged

82. The procedure for fitting a new outer flap is as follows :-

(1) Operate the flaps mechanism to the mid-travel position.

(2) Remove the flap as detailed in para. 79. There is no need to take notes of the disposition of the serrations or the setting of the eccentric barrel assembly, because the final settings will be different when a new flap is fitted owing to the manufacturing tolerances which occur; thus the adjustment settings of the flap are always initially set to neutral.

(3) Position the flap arm at its mid-travel position on the serrations at the operating bogie (detail 18).

(4) At the outboard leading edge of the flap at rib No. 23 ensure that the eccentric barrel locking bolt is screwed far enough out to avoid fouling the eccentric barrel when the flap is offered up.

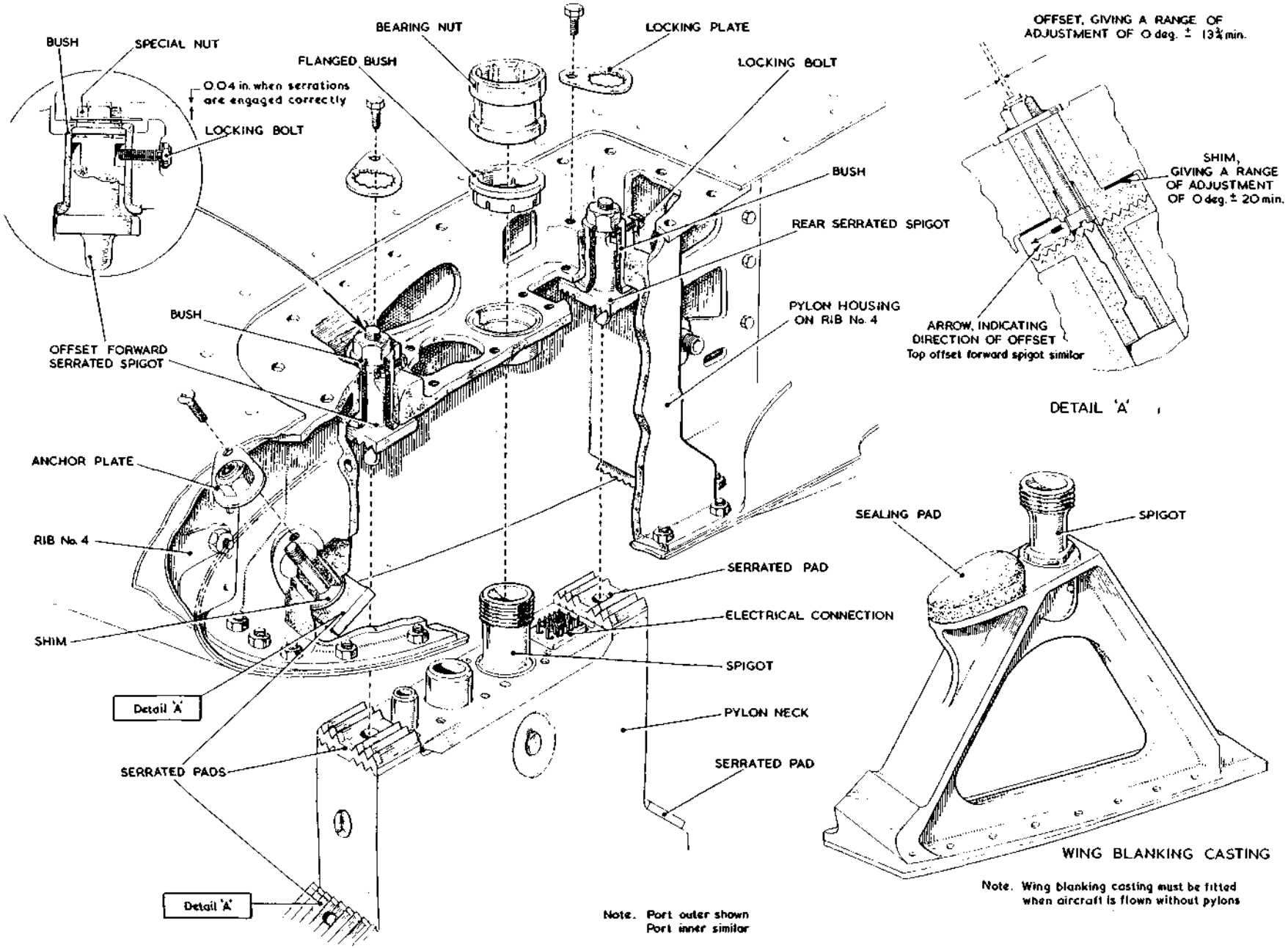

Fig.37. Light store pylon installation

◄ Serrated spigot projection added ►

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(5) Hold the swivelling flap arm eccentric barrel assembly (detail 22) at the correct angle to enter the eccentric barrel mounting at the flap outboard leading edge at rib No. 23 and feed the swivelling flap arm eccentric barrel assembly into position. Using a C-spanner, screw the eccentric barrel into the eccentric barrel mounting.

(6) Assemble the flap arm to the inboard end of the flap (details 19 and 20) ensuring that the serrations (detail 20) are in the mid-position.

(7) Hold in the locking slider on the gearbox at flap track 4a.

(8) ▶◀Manually push the flap into its fully up position on the wing so that the flap rollers engage with the adjustable hooks in the shroud (detail 24).

(9) Using the table of adjustments ◀ in the key to fig. 31, align the flap ▶ trailing edge to the dimension given in Fig. 31, and align the flap itself to the profile and plan of the wing undersurface. With the flap fully up, the locking slider must come out to its fully locked position, locking the flap at the up position.

(10) With the locking slider held in, manually check the flap for freedom of movement throughout its entire range, and adjust on the serrations and the adjustable screw (detail 24) to obtain the dimensions shown at the flap roller and adjustable hook. Leave the flap fully up in its locked positioned.

◀ CAUTION... ▶
Should the locking slider not spring out when the new flap is pushed fully up to the locked position, then adjustment to obtain this must be made at the serrations (detail 18) and the eccentric barrel thread (detail 22).

(11) Check that the male dog clutch at rib No. 4a will mate correctly with the female dog clutch at rib No. 4 when the wing is spread. For adjustment of the driving end see para. 83.

(12) With the wing spread, carry out functional checks as described in Sect. 3, Chap. 4. In conjunction with an electrician and, with the flap in the fully up position, check that 0·04 in. movement of the flap operates the microswitch which is located in the flap shroud adjacent to the flap outboard leading edge. For further information refer to Sect. 5, Chap. 1.

Flap drive at wing fold (Fig. 34)

◀ **83. When the wing is folded, the outer flap drive shaft is disconnected by the male and female dog clutch at the wing-fold break between rib No. 4 and 4a, and the outer flap is locked in the up position by the locking pin in the male dog clutch engaging in the stop cage.**

84. When the wing is spread, the locking slider is depressed and the locking pin is held out of engagement with the stop cage, thus allowing the outer flap mechanism to operate freely. The female dog clutch revolves in a ball-bearing and ring assembly which is fitted in a bearing housing with a limited vertical adjustment. The bearing housing is positioned centrally in the bearing casting with the gap in the flange central on the cover plate bracket. The bearing housing is retained by a locknut, and, post mod. 943, is positively located by a locking plate bolted to the bearing casting. The female dog clutch is aligned radially by disengaging the splined sprocket on the high speed shaft; see Sect. 3, Chap. 4 for the rigging instructions. ▶

Fitting a new U-plate

85. Instructions for fitting a new U-plate are given in Vol. 6.

Light store pylon

86. Information on the removal and installation of the light store pylons is given in A. P. (N)1023 (10), Section B. It should also be noted that the nuts on top of the serrated spigots must be turned fully anti-clockwise before the pylon is offered up, using the special spanner (Item K74, Sect. 2, Chap. 4), and then turned clockwise until the spigots butt firmly, after the bearing nut has been tightened. The

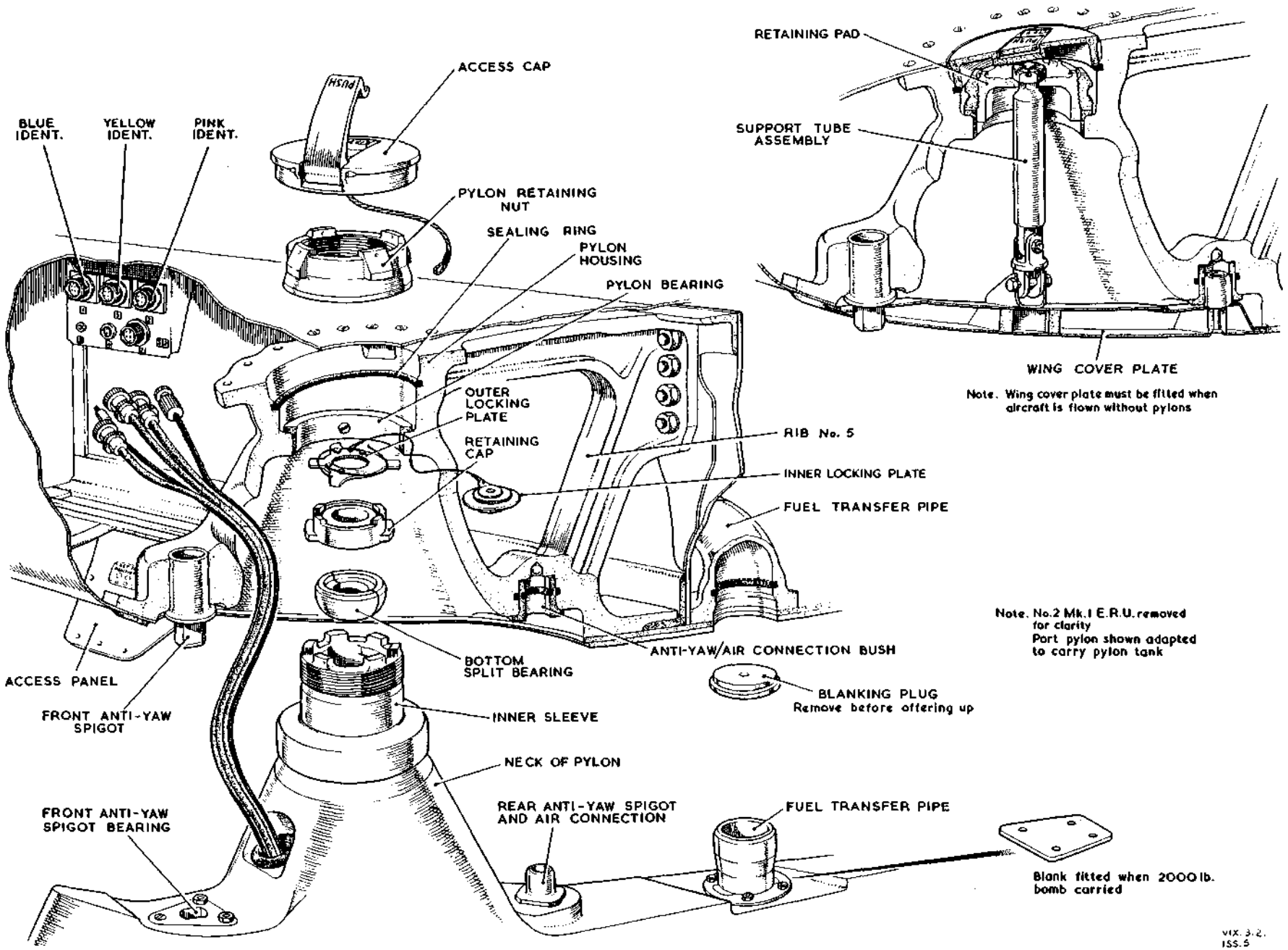

Fig. 38 Heavy store pylon installation

◀Blanking plate - mod. 5135▶

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◀ end of the spigot will project approximately 0·04 in. when the serrations are correctly engaged. Use only the special spanner (Item K74) for tightening the spigot nuts. A clearance of 0·031 in. must be maintained between the main plane skin and the nose and tail cappings.

87. The spanners, adapters, and torque loadings to be used are given in Table 1, Sect. 7, Chap. 8.

Heavy store pylon.

88. Information on the removal and installation of the heavy store pylons is given in A.P.(N)1023 (10), Section A.

89. The spanners, adapters and torque loadings to be used are given in Table 2, Sect. 7, Chap. 8. ▶

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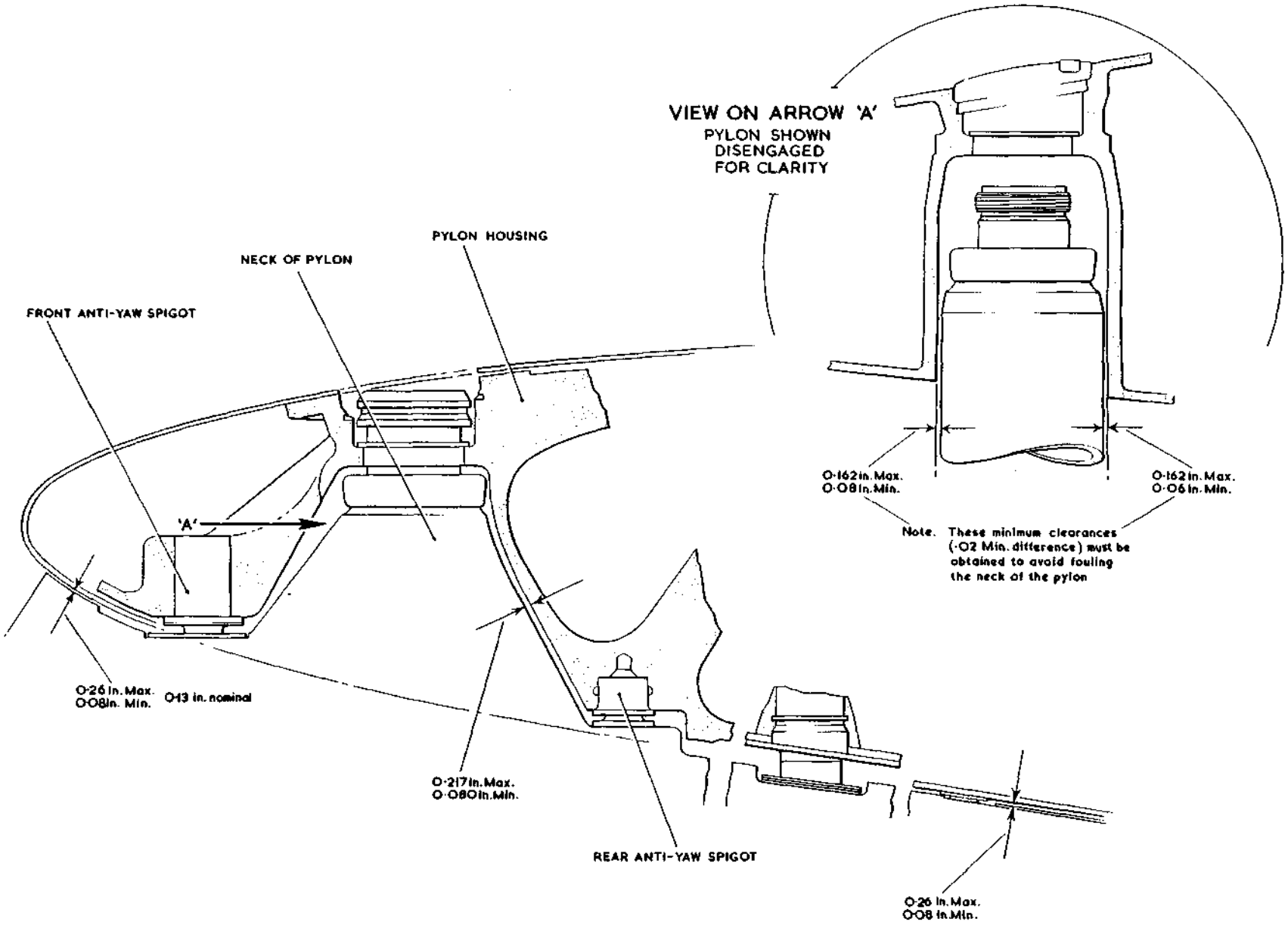

Fig. 39 Heavy store pylon clearances

◀ Clearances amended ▶

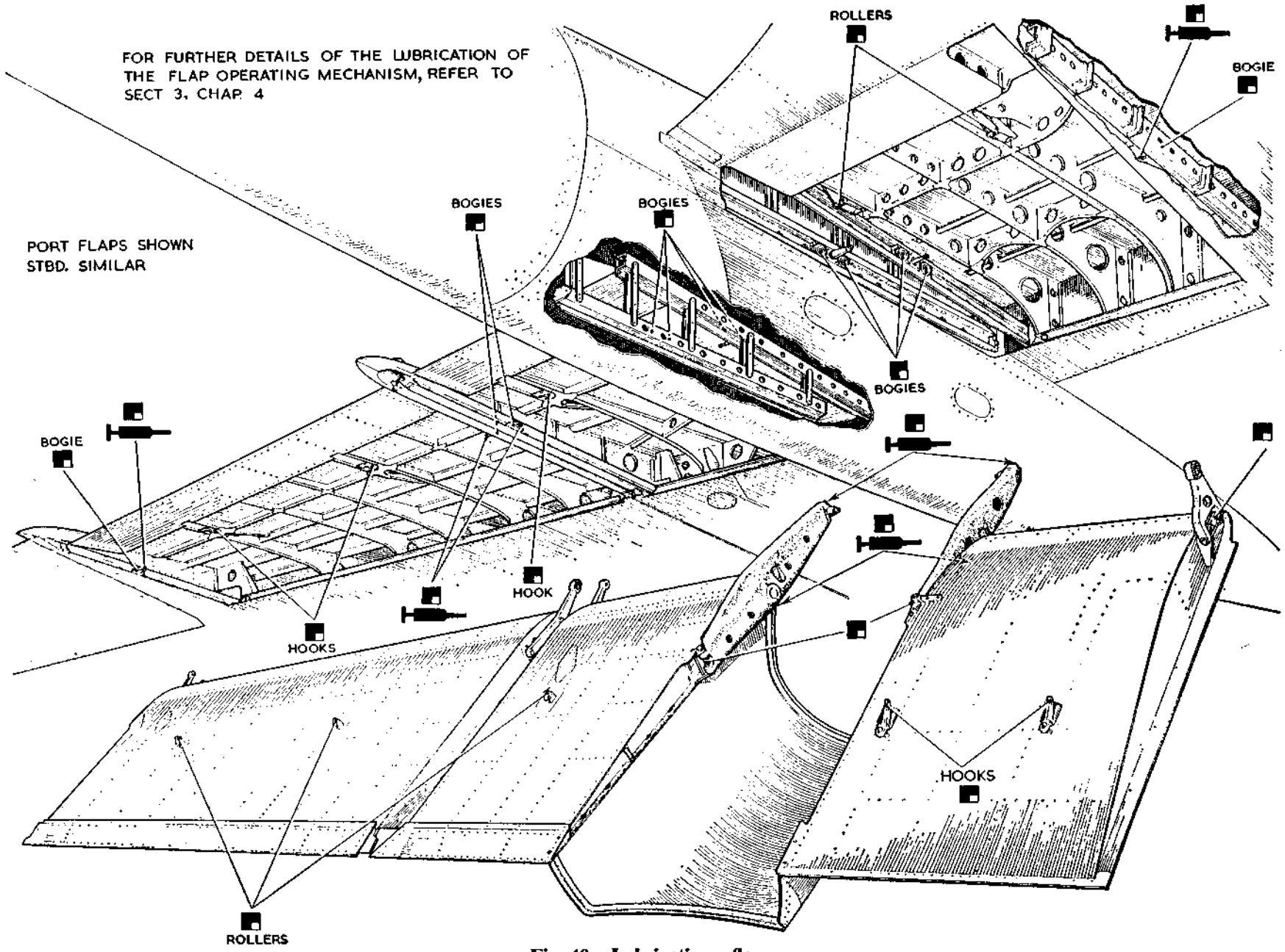

Fig. 40. Lubrication—flaps

◀SYMBOL AMENDED▶

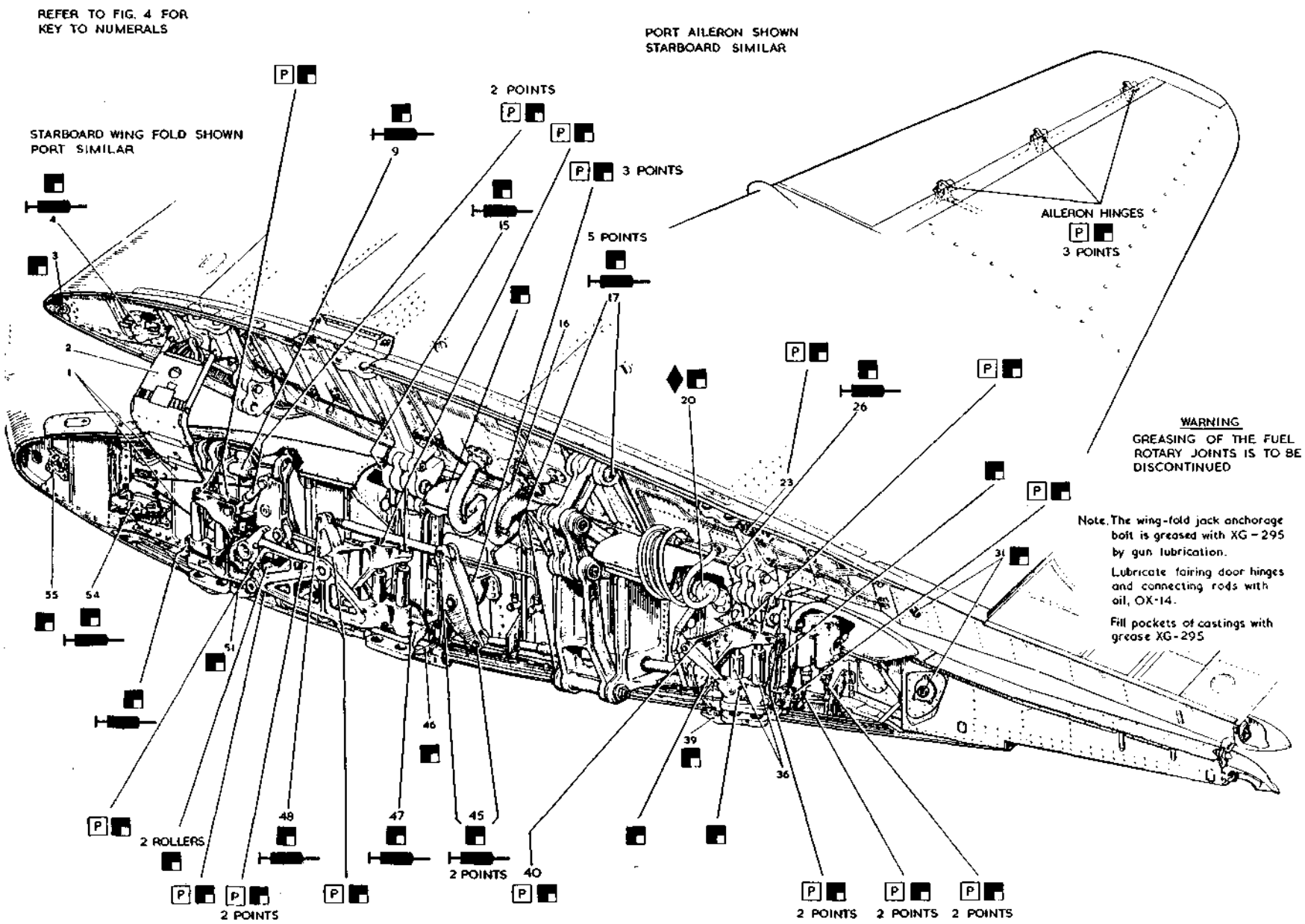

Fig. 41. Lubrication—wing-fold mechanism and ailerons

◀ ADDITION TO NOTE ▶