Chapter 2 MAIN PLANES

(Completely revised)

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

DESCRIPTION AND OPERATION

General

1. Each main plane *(fig. 1)* consists of an inboard and an outboard section of similar, construction, having a main spar of built-up I-section to which a rear false spar of channel section is jointed by light-alloy ribs and a light-alloy sheet covering. The skin is strengthened by spanwise extruded light-alloy stiffeners.

Inboard section

2. The inboard section, from No. 1 rib at the root end to No. 7A rib at the outboard end, houses the main undercarriage, engine air-intake duct and the four flexible bag-type fuel tanks. The stub boom is built integrally with this section and hinge brackets for the flap and dive brake, are mounted on a false spar. The flap and dive brake hydraulic jacks are mounted in the trailing edge and the jack for

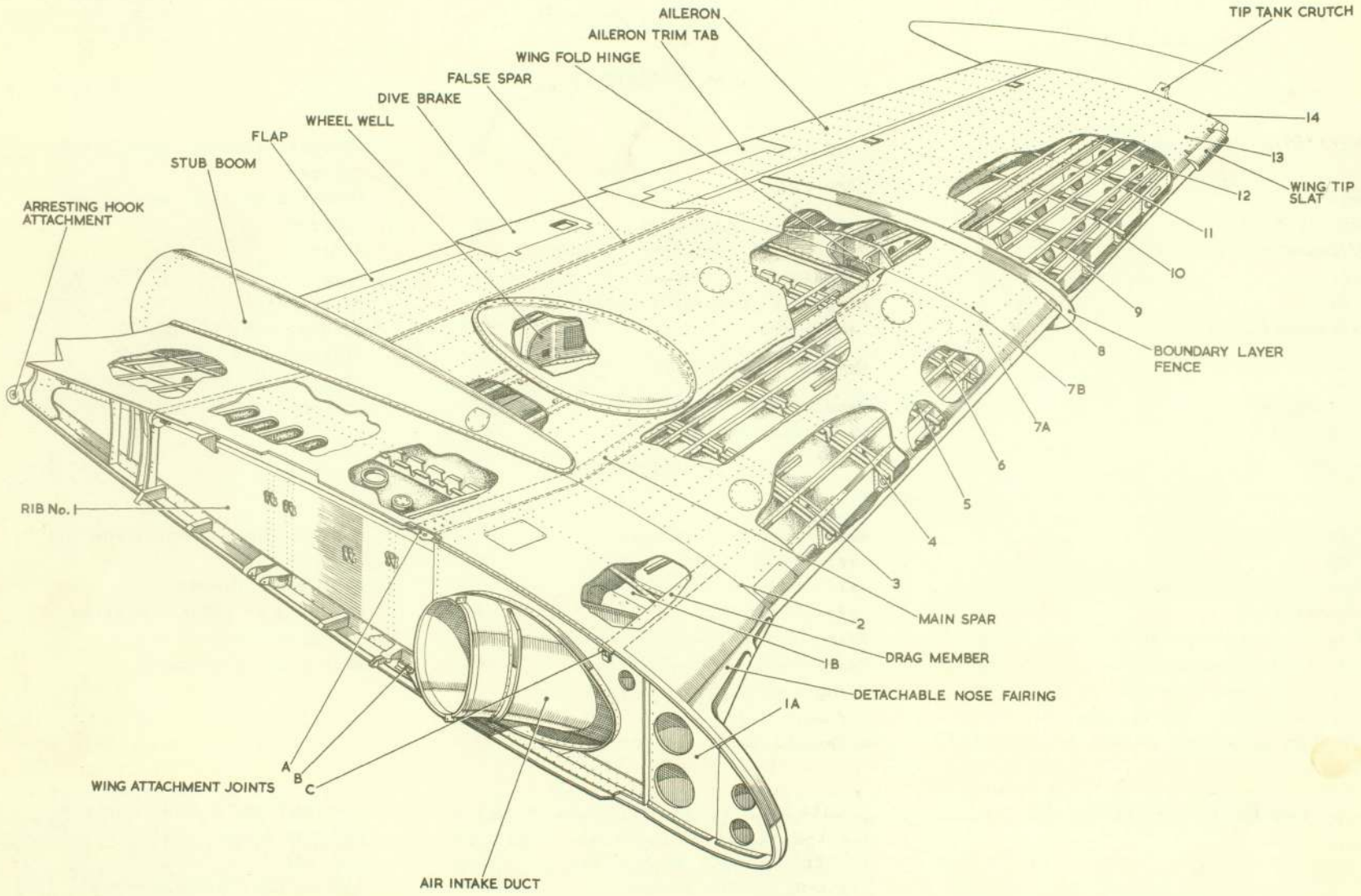


Fig. 1 Main plane structure

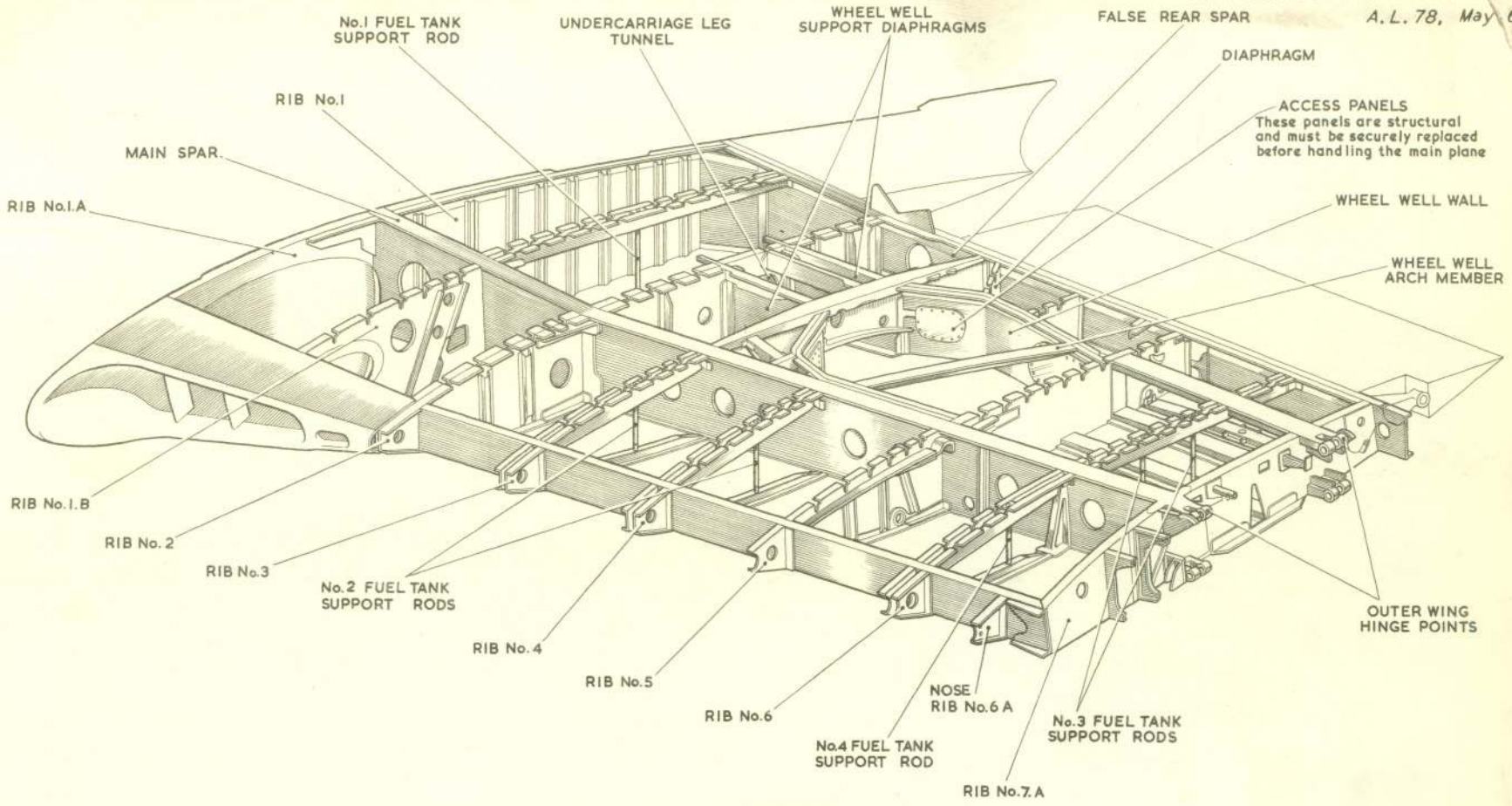


Fig. 2. Ribs

the arresting gear is on the inboard side of the root end rib. The hinge for the arresting gear A-frame is situated immediately aft of the hydraulic jack.

Outboard section

3. The outboard section, rib No. 7B to 14, folds upwards on a chordwise axis through 144 deg. This section carries the wing-tip tank, wing-tip slat, the wing-fold jack and the aileron, the hinges of which are attached to the false spar. A boundary layer fence, which begins on the underside leading edge and ends at the aileron shroud plate on the upper skin, is mounted at rib No. 8.

Spars

4. The main spar web is a light-alloy sheet pressing in two sections (inboard and folding sections), each consisting of two parts joined together by a lap joint for the inboard section, and butt strap for the folding section. The spar booms and light-alloy forgings, which are machined to taper in plan and elevation, are riveted to the flanges of the spar web to which light-alloy extruded stiffeners are riveted for further strengthening. The false spar is a simple light-alloy channel section pressing, with top and bottom booms riveted to the flanges.

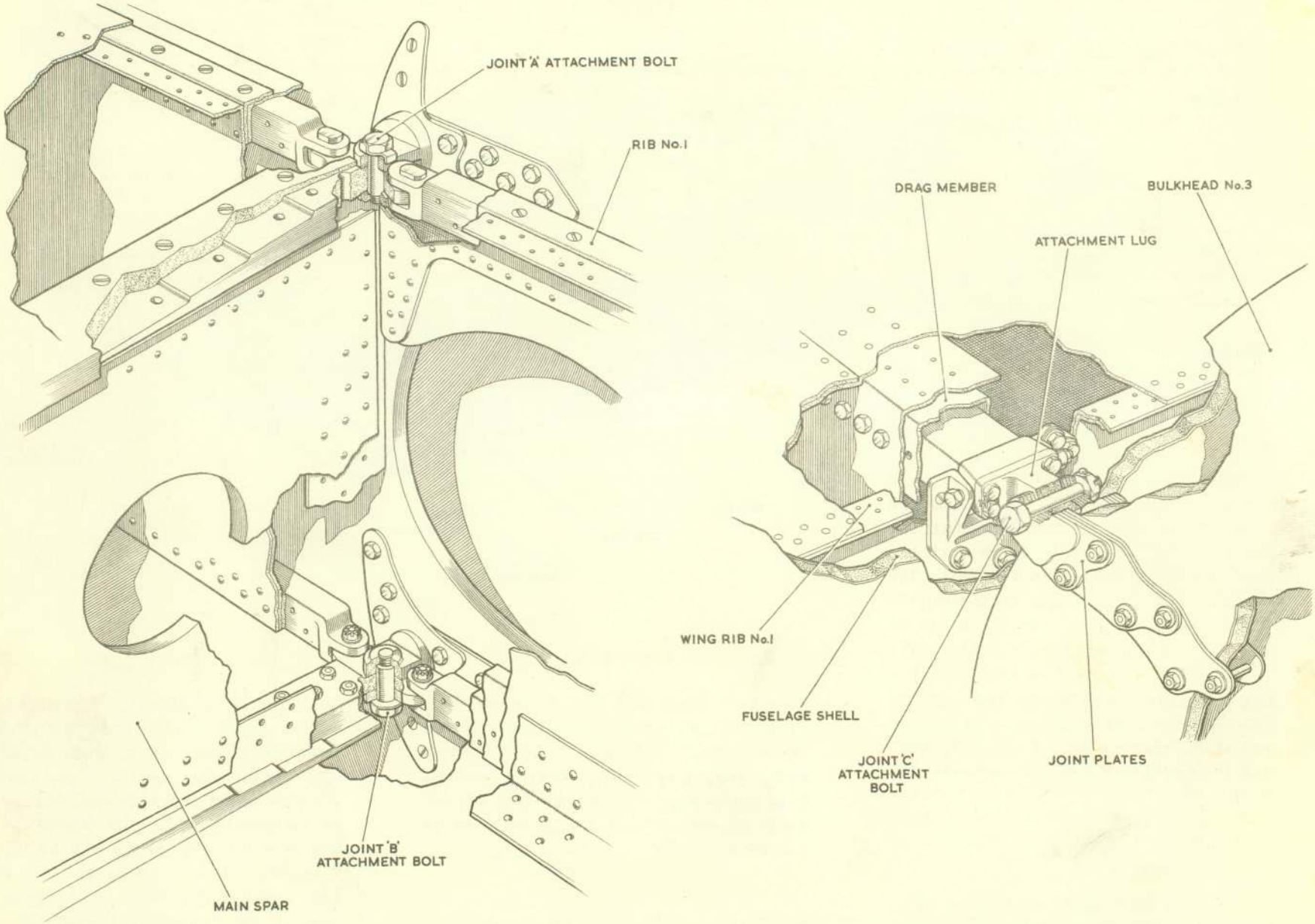


Fig. 3 Main plane attachment joints (starboard)

Ribs

5. Ribs No. 1 to 7A *(fig. 2)* are typical of all ribs, some of which are strengthened to carry the undercarriage, R.P. posts, flaps, dive brakes, wing-fold jacks and wherever there is a concentrated load.

Attachment points

6. The top and bottom main spar end fittings are secured to the cross tubes on No. 4 bulkhead by special bolts *(joints A and B fig. 3)*. A third joint is made at No. 3 bulkhead by a drag member, built into the leading edge of the main plane, and tie straps on the bulkhead *(joint C fig. 3)*.

Aileron

7. Each aileron comprises a single channel-section spar to which the trailing edge ribs and nose fairing are attached, the whole frame-work being covered with light-alloy skin. The leading edge fits closely to the curved shroud plate, between the three hinges securing each aileron to the main plane, and carries the mass-balance weights. The inboard trailing edge of each aileron is recessed to accommodate the trim tab, which, for the port wing, may be electrically-operated in the event of failure of the servodyne *(Sect. 3, Chap. 4)*. Each tab is hinged at three points to the aileron.

Flap

8. Each split trailing edge flap consists of two sections, independently hinged on either side of the main plane and interconnected by a torque tube assembly, and a panel which is shaped to the contour of the tail boom.

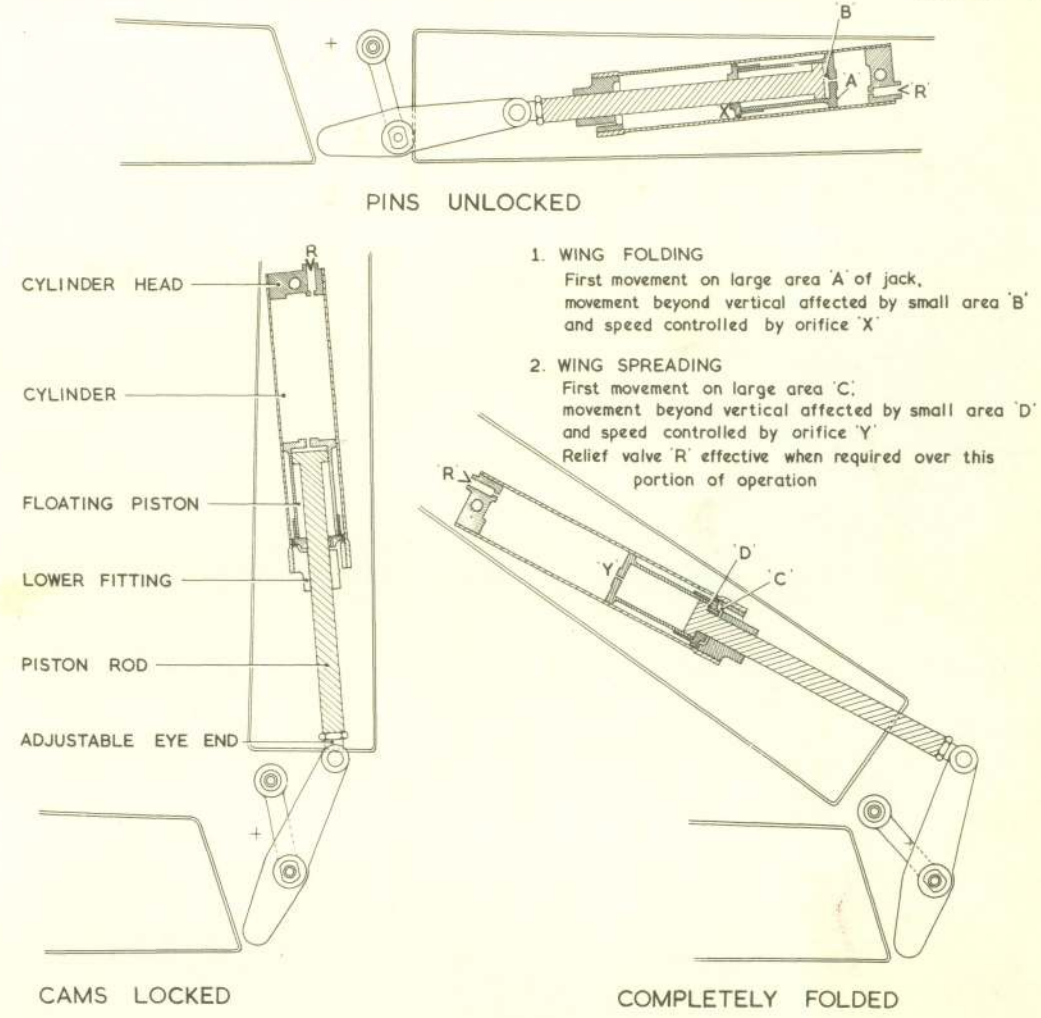


Fig. 4 Wing fold jack movements

Dive brakes

9. The dive brake surfaces, each consisting of ribs attached to a central channel-section spar and covered with a light-alloy skin, are positioned immediately outboard of each flap. Each dive brake is hinged at two points about its centre of pressure and has two rectangular holes to eliminate buffeting under certain operating conditions.

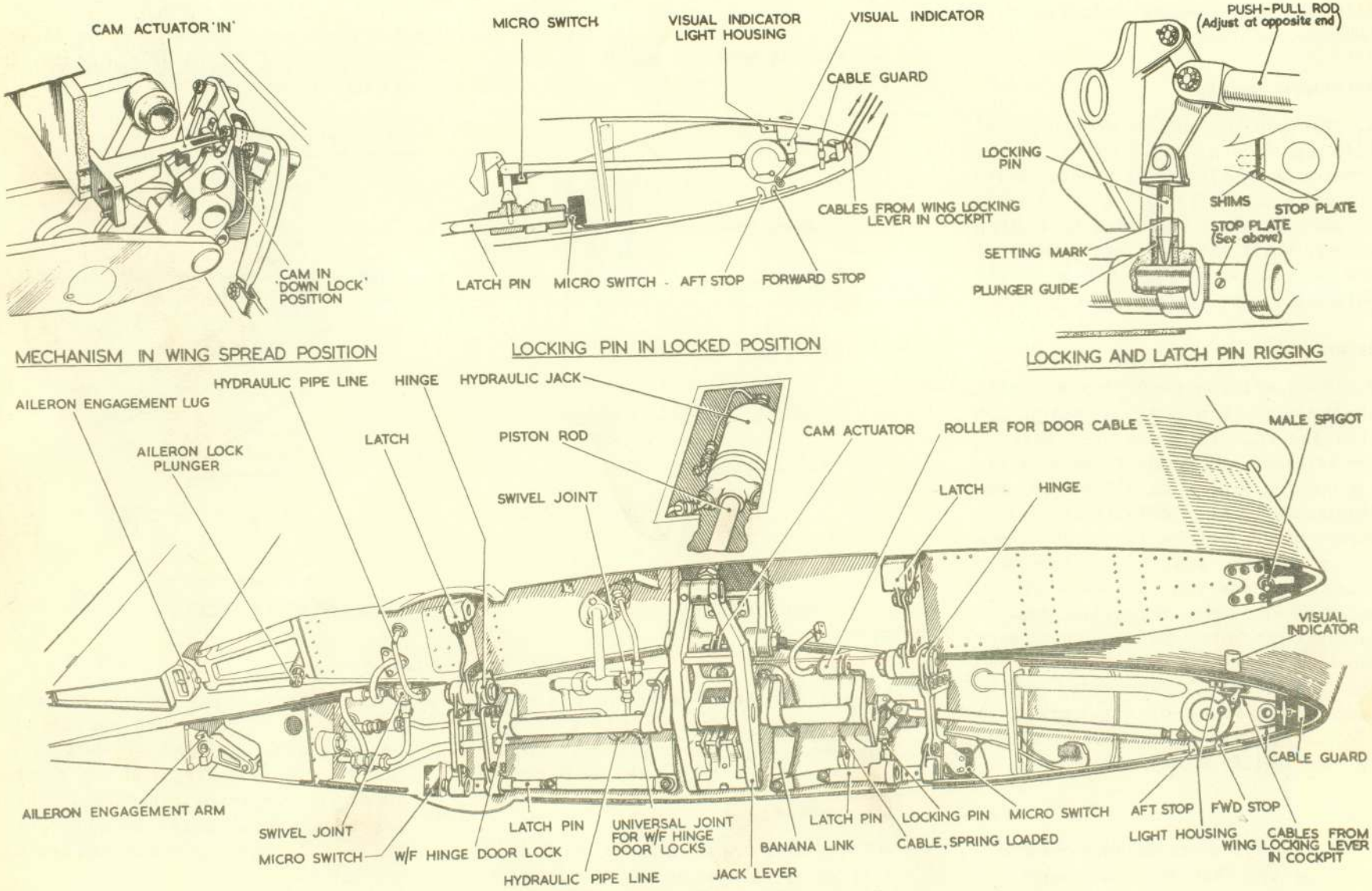


Fig. 5 Wing fold mechanism (1)

Wing fold

10. The outboard section of a main plane may be folded by operating a hydraulic jack which is mounted in a reinforced structure between ribs No. 8 and 9. The fluid flow inside the jack ensures that there will be no variation in rate of movement when the outboard section passes the vertical in either direction *(fig. 4)*.

11. The sequence of operations for folding the wings is as follows:-

(1) Select the wing-lock lever to UNLOCKED.

(a) The heel of the wing-lock lever contacts a pin *(refer to Chap. 6 of this Section)* to free the trip lever from the wing folding lever. At the same time, the movement of the wing locking lever rotates a pulley on each rib No. 7A, which is attached to the locking pin by connecting-rod linkage. Each pulley carries a small lever which presses up a RED visual indicator *(fig. 5)* above the surface of the leading edge, this indicator being illuminated by the action of a microswitch at the forward latch pin head.

(b) As the wing-lock lever moves,

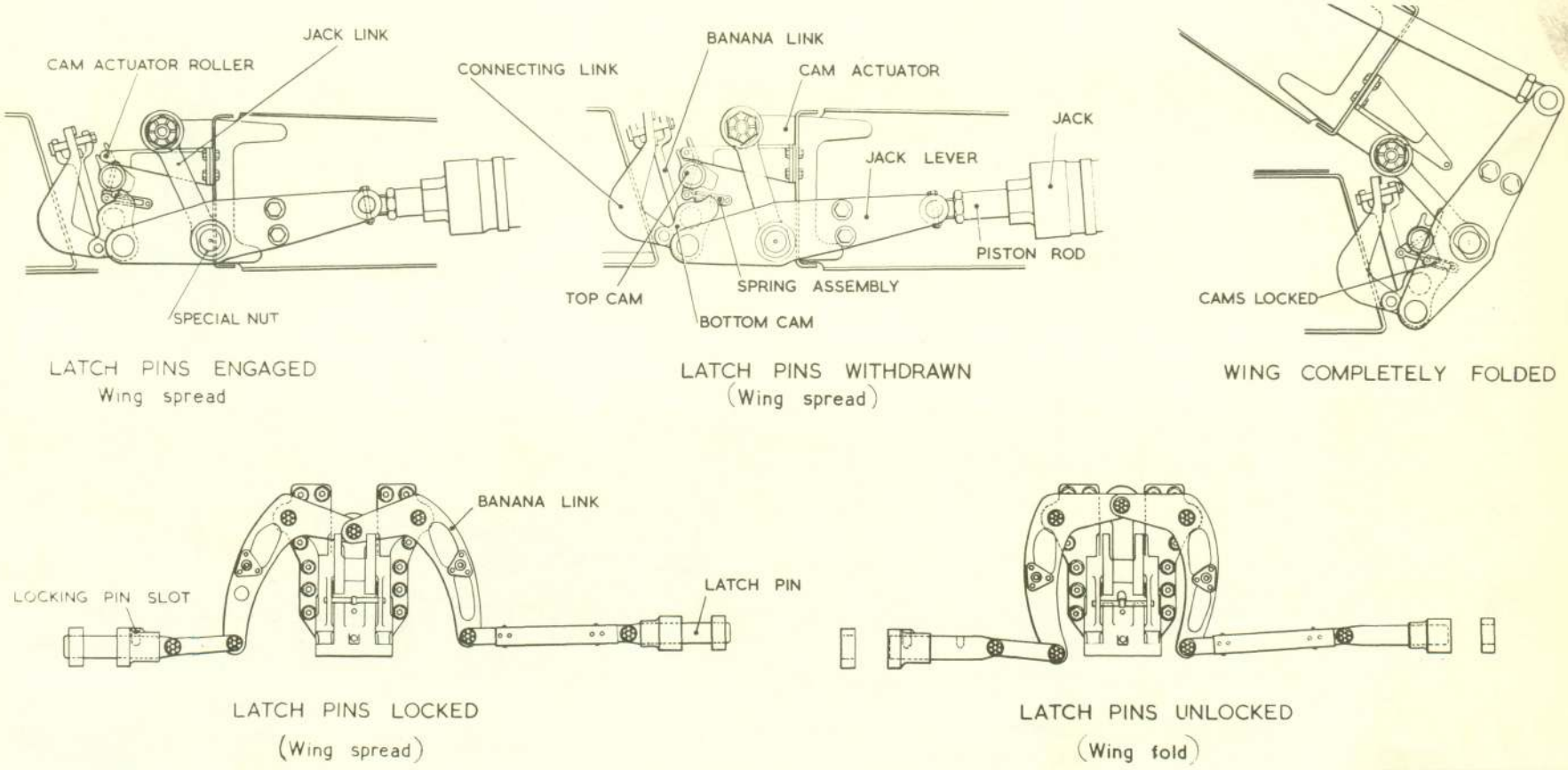


Fig. 6 Wing fold mechanism (2)

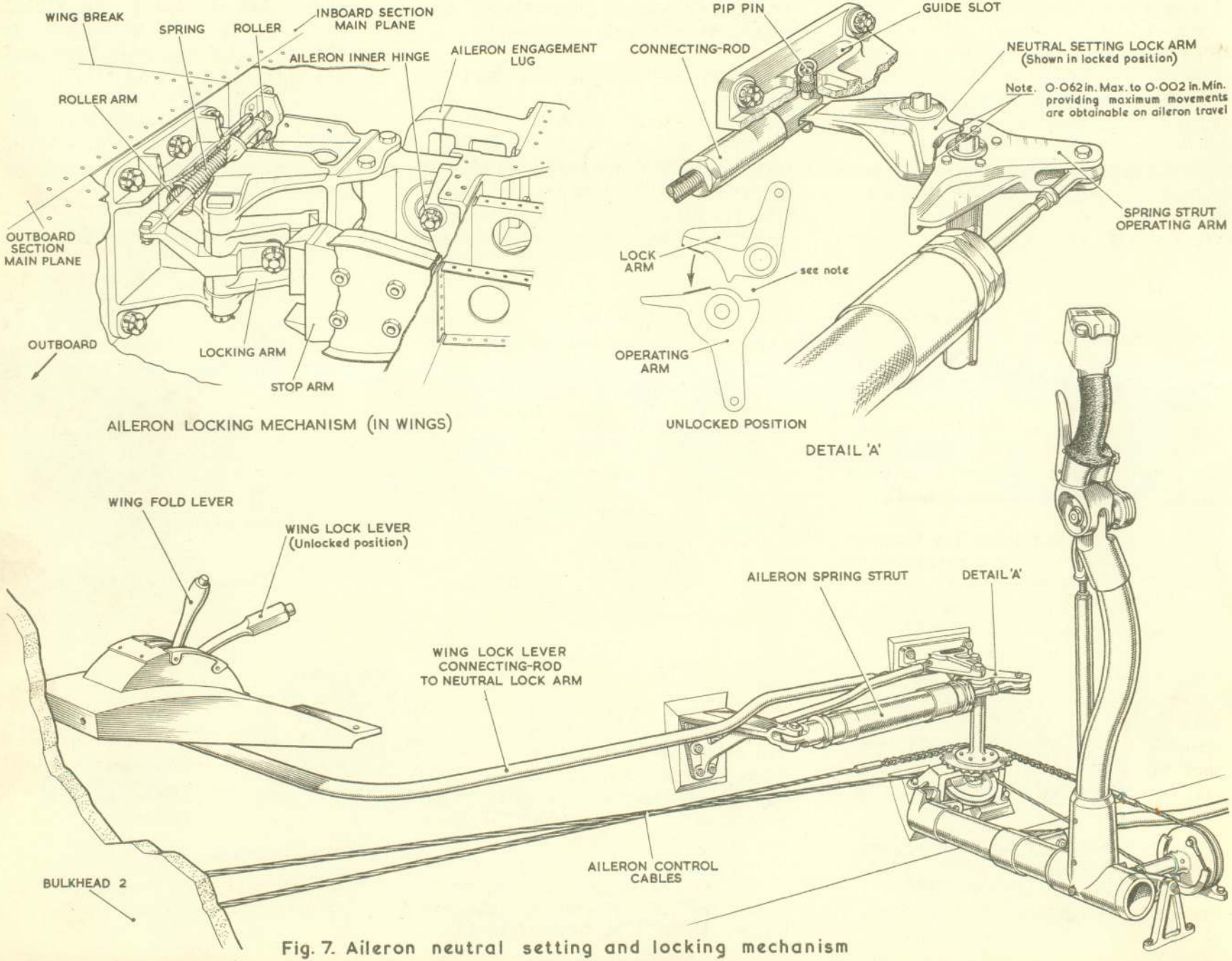


Fig. 7. Aileron neutral setting and locking mechanism

YB 0302-B/1

a connecting-rod engages a lock arm with an operating arm to set the ailerons in neutral *(fig. 7)*.

(2) Select the wing-fold lever to FOLD.

(a) This allows fluid to the outboard ends of the hydraulic jacks and extends the piston rods, thereby rotating the outboard sections into the *fold* position.

(b) The initial outward movement of the jack piston rods cause the jack levers to rotate the bottom cams of their mechanical locks and the connecting links upwards *(fig. 6)*. The top of each connecting link is attached to the intersection of the two banana links, which therefore close together and withdraw the latch pins *(fig. 6)*.

(c) The movement of the banana links is converted to a rotational movement on the door latch torque tubes by the universal joint attachment between the torque tubes and banana links. The door lock levers are thereby rotated clear of the door catches *(fig. 11)*. The magnetic indicators, immediately aft of the throttle control box in the cabin, now show WHITE to indicate that the wing will commence to fold.

(d) As the piston rods extend further, the outboard sections are rotated upwards, the cam actuator rollers being released from the hooks of the top cams as the outboard sections reach the vertical.

(e) As each outboard section commences to fold, the ailerons are automatically held in the neutral position by the action of a spring-loaded roller arm which protrudes from the trailing edge of rib No. 7B *(fig. 7)*. The roller arm extends as the wing breaks and engages the locking arm into the stop arm, and therefore locks the aileron in the neutral position. When the wing is fully folded, the top and bottop cams are returned to the locked position by the spring assembly.

(f) After the wings have been folded, jury struts must be fitted as detailed in Sect. 2, Chap. 1.

Wing spread

12. Remove the jury struts and select the wing locking lever to UNLOCK and the wing-fold lever to SPREAD. The reverse to the sequences given in para. 10 and 11 now take place:-

(1) Hydraulic fluid is admitted to the inboard ends of the wing-fold jacks and retracts the piston rods, thereby rotating the outboard sections from the folded position. As described in para. 10, the fluid flow in the hydraulic jacks controls the rate of rotation when the outboard sections pass the vertical.

(2) As the wings reach the fully spread position, the banana links open and engage the latch pins with the latches on the outboard section. When the latch pins are fully home, microswitches are actuated which in turn operate the cabin indicators. Only when both indicators show BLACK should the locking lever be moved to the LOCK position.

(3) The wing-fold doors are returned to the closed position by a spring-loaded cable and locked by the engagement of the door lock levers with the door catches.

(4) When the wings are again spread, the rollers come into contact with the trailing edges of rib No. 7A on each inboard section, and the roller arms are forced into the structure of the outboard sections, thereby withdrawing the locking levers from the stop arms and allowing normal operation of the ailerons.

(5) Correct alignment of the ailerons and aileron operating housings is ensured by the mating of an engagement spigot on each rib No. 7A with an engagement lug on each rib No. 7B.

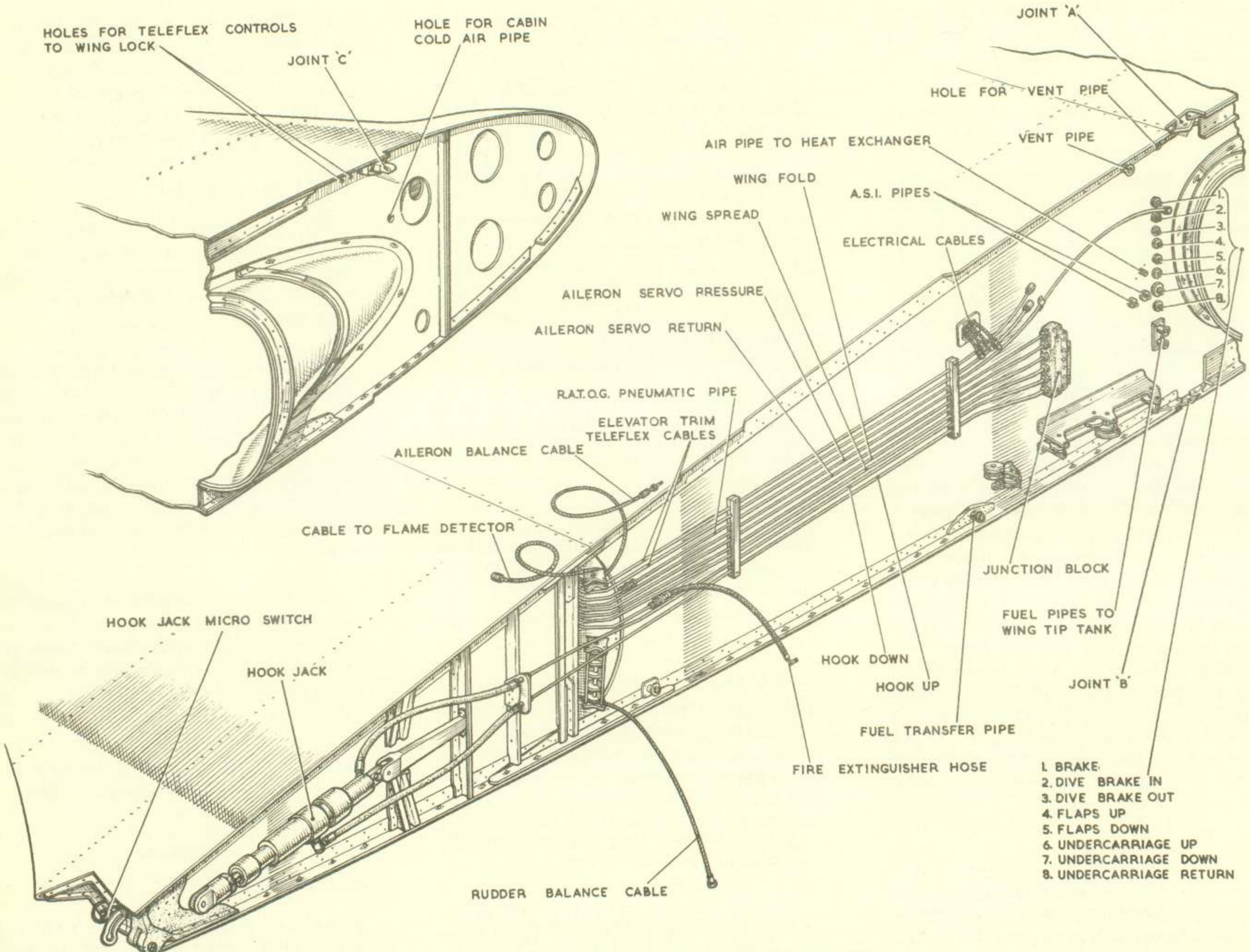
Note...
In the event of hydraulic failure, the wings may be folded manually (Sect. 2, Chap. 1).

SERVICING

Main plane components

13. The main plane components require little servicing except lubrication of

VE 0302-9/1



VE 0302-10/1

Fig. 8 Main plane to fuselage attachment (1)

RESTRICTED

the control surface and wing-fold hinges at the periods detailed in Vol. 5 and the points illustrated in Sect. 2, Chap. 4. The rigging and servicing of the flying controls is described in Chap. 4 of this Section. The procedure for checking the rigging of the main plane and the locations of access panels and drain holes is given in Sect. 2, Chap. 4.

Rigging the wing fold locking mechanism *(fig. 5)*

14. To rig the wing fold locking mechanism proceed as follows:-

(1) With wings folded, disconnect the latch pins from the banana links at the latch pins.

(2) With wings spread, the wing-tip tanks full and the inspection panels under the latch pins removed, check that the latch pins are push fits into their housings; to achieve this, shimming behind the stop plates is permitted.

WARNING

When spreading the wings with the latch pins disconnected, do not continue pumping after the wings have passed T.D.C., otherwise damage will be caused to the latch pin links, etc.

(3) Fold the wings.

(4) Check and adjust the rear latch pin microswitches as required. This is achieved by placing 18 S.W.G. plates between the rear latch pin housings and the microswitch plungers, depressing the plungers approximately 0.1 in. by moving the microswitch bodies, and tightening the microswitches in these positions.

Note...

Ensure that the contacts are as square as possible.

(5) Insert the front latch pins into their housings, and align the holes in the latch pins with those in the housings. Adjust the microswitches to complete the circuit.

(6) Temporarily connect the latch pins, and spread the wings. If the magnetic indicators change to BLACK, adjust the eye ends of the jack piston rods, turn by turn, until the indicators stay WHITE, then adjust one turn back to give a BLACK indication, these operations will ensure that all latch pins have correct penetration through their respective housings and, in particular, that the front latch pins are in line with the locking pin holes. It will be necessary to fold and spread the wings between each alteration of the settings of the jack piston rod eye ends.

(7) Fold the wings, and release the accumulator pressure *(Chap. 6)*.

(8) Disconnect the front latch pins, and line up the locking pin holes with the holes in the housings.

(9) With the wing locking lever in the UNLOCK position, adjust the cable, which runs to the bottom of the cable pulley on each rib No. 7A, so that the pulley is hard up against the aft pulley stop. Similarly, with the wing locking lever in the LOCK position adjust the remaining cable with the pulley on the forward stop; in this position, the visual indicator should be flush with the top surface of the wing skin.

(10) Check the loading of the Teleflex and 5 cwt. cable runs; this should not exceed 22 lb. measured at the top of the wing locking lever in the cockpit. Should load be excessive, investigate the cause and rectify as required; the usual defects associated with Teleflex controls will apply, i.e. kinked conduit, lack of lubrication, tight bends, loose joints, movement of conduit, etc.

(11) With the wing locking lever in the UNLOCK position and the locking pin microswitches moved clear, adjust the push-pull rods between the pulleys and the locking pin link plates to give a dimension of 1.250 in. ± 0.050 in. from the bases of the plunger guides to the lower faces of the locking pin plates; in this position, 0.150 in. clearance will exist between the ends of the tapers on the locking pins and the outside diameters of the latch pins. Ensure that the forks ends of the push-pull rods are in line; and adjust the microswitches as required by the addition or removal of washers.

VE 0302-11/1

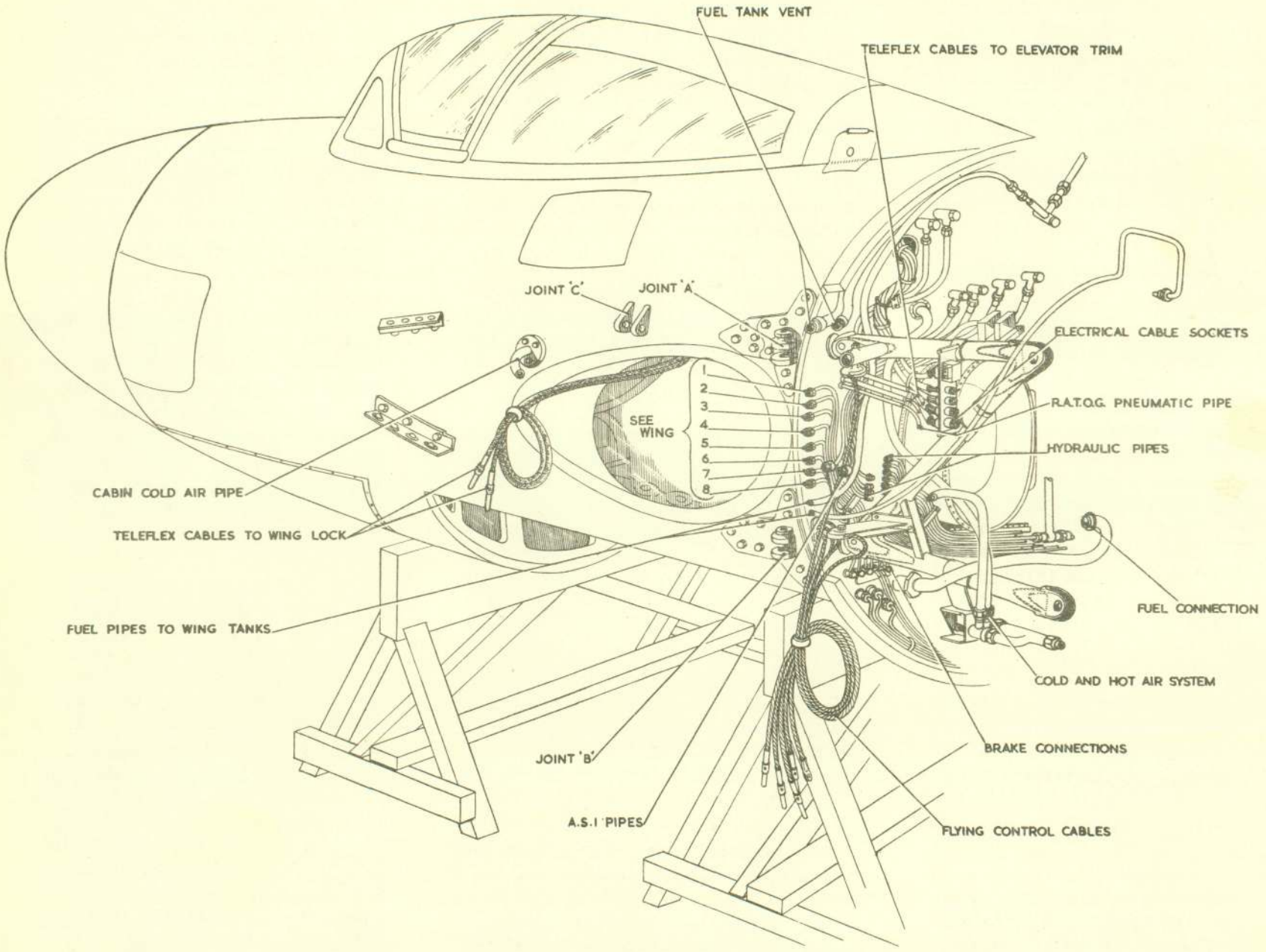


Fig. 9 Main plane to fuselage attachment (2)

Note...
The length of each pin, from the lower face of the locking pin plate to end of the taper, should be 1.450 ± 0.0075 in.

(12) Re-connect and split pin all connections which have been disturbed, then inspect and make a functional test.

Wing fold door roller-ramp adjustment

15. Damage to the wing-fold doors may result if the clearance between the roller on the door and its ramp on the outer wing is excessive. Before folding the wing, whenever the doors, rollers or ramp have been disturbed, it must be ensured that the gap between the roller and ramp does not exceed 0.015 in. with the wing in the spread position. To obtain this it may be necessary to increase the thickness of the shim which is situated between the ramp and the wing rib *(fig.11)*. It may also be necessary to taper the shim so as to get the flush fit required between the ramp and the wing top skin.

REMOVAL AND ASSEMBLY

16. The following paragraphs give the recommended procedure for the removal of the major components of the main plane. Ensure that disconnection points are sealed with blanking caps to prevent the ingress of foreign matter. Assembly is the reverse of removal unless otherwise stated. If necessary, the wing tip slats *(fig.1)* may be trimmed to provide clearance for the strakes of the wing tip tanks *(fig.18)*.

Main plane complete *(fig.8 and 9)*

Note...
The three main plane attachment bolts of each wing unit should be treated with penetrating oil at least one hour before extraction.

17. The main plane must be locked in the spread position, then the engine cowlings, tail cone fairings and fuselage tank removed in accordance with Sect.4, Chap.2. With the aircraft suitably trestled *(Sect.2, Chap.4)*, release the pressures in the hydraulic and pneumatic systems *Sect.3, Chap.6 and 7)*, then proceed as follows:-

(1) Remove the upper and lower wing root fairings and the inboard nose sections of the air-intake ducts.

(2) Disconnect the fire extinguisher bottles, wing tank fuel connections, fuel tank vents and the drop tank transfer and pressurising connections at No.1 rib.

(3) Operate the cabin control levers, so that the three hydraulic selector valves on No.2 bulkhead are set in the mid-position, then disconnect the hydraulic pipe unions from No.1 rib.

(4) Disconnect all electrical and aerial lead connections at their sockets or at the junction blocks on the engine mounting, then disconnect the bonding connection.

Note...
The access panel to the cold air unit must be removed before the radio, aerial and fuel contents leads are disconnected.

(5) Disconnect the wing lock Teleflex control cables at rib No.1 to enable the cables to be withdrawn through their conduits when the main plane is removed.

(6) Uncouple the R.A.T.O. equipment and brake lines at No.1 rib.

(7) Select the flaps DOWN, and disconnect all flying control cables at the turnbuckles on the false spar, and the aileron trim at No.1 rib.

(8) Remove the bolts securing the arresting hook hydraulic jack to the A frame and the A frame to the rear cone hinge bolts. Remove the A frame and hook.

(9) *On the port wing only:-* Uncouple the two A.S.I. unions, cabin air supply pipes and ground/flight master switch at No.1 rib. Disconnect the elevator trim control Teleflex cables at the aft face of the rear false spar, and uncouple the two conduit connectors aft of the No.4 bulkhead, so that the cables may be withdrawn through their conduits on No.1 rib when the main plane is removed.

VE 0302-13/1

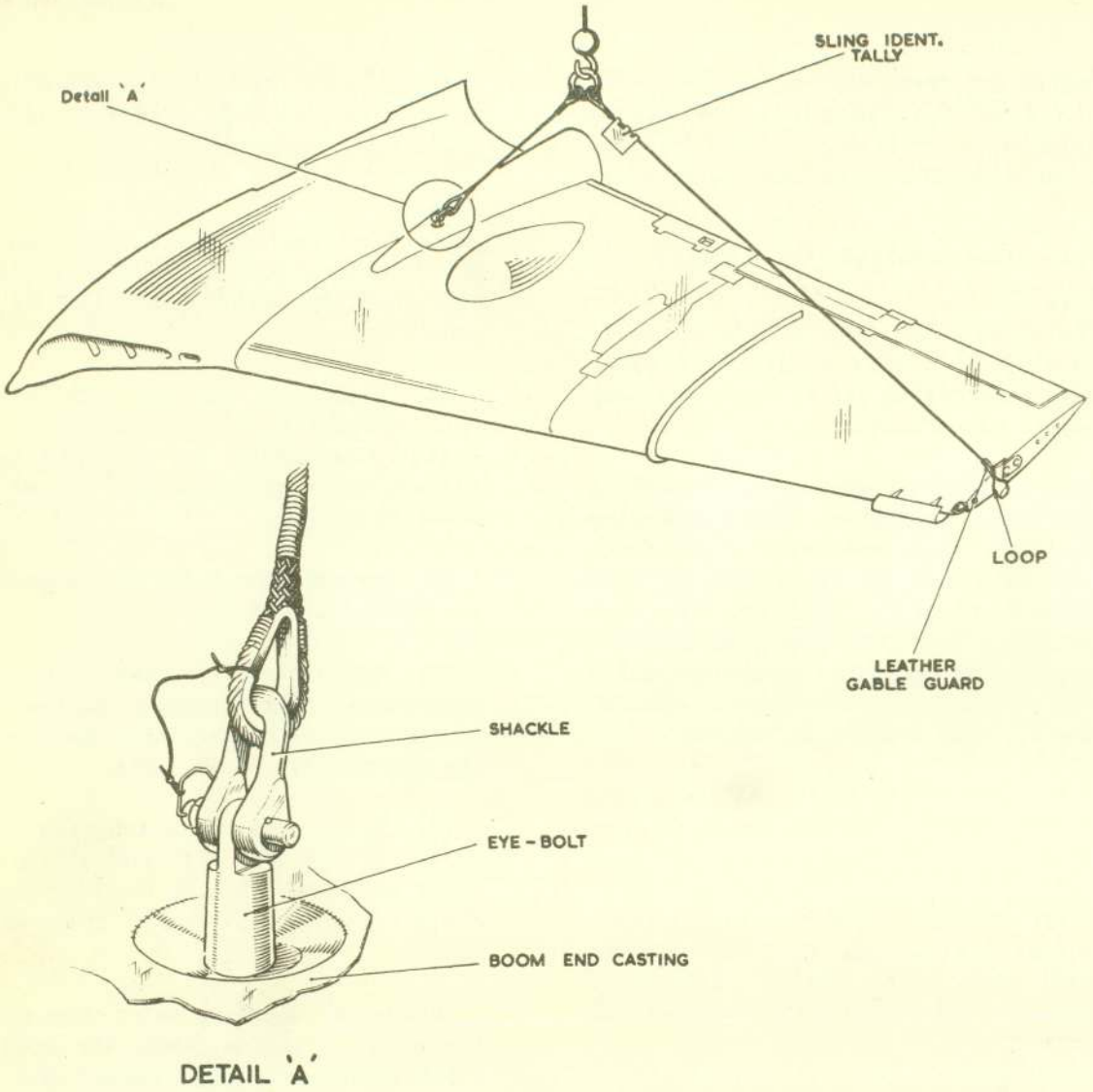


Fig. 10 Slinging of main plane complete

(10) *On the starboard wing only:-* Disconnect the generator cooling duct and fuel pressure vent pipe connection at No. 1 rib.

(11) Withdraw the bolts from the strap securing the intermediate section of the air-intake duct and release the two large Jubilee clips from the rubber joint at the engine. Slide the rubber joint over the duct, then remove the duct.

(12) The tail plane and both booms must be adequately supported against spring, if only one main plane is being removed. Chap. 3 of this section describes the methods of trestling, disconnecting the cables, pipes and electrical leads and detaching the boom from the main plane stub.

(13) After ensuring that all pipes, cables, ducts, electrical and radio leads at the main plane to fuselage joint have been disconnected and tied clear, adjust the trestles so that the main attachment bolts are free to turn in their housing without having to use excessive force.

Note...
It is important that the man detailed for the checking of the attachment bolts should remain on the wing unit for their extraction.

(14) Withdraw the bolts from the joints A, B and C using the special tools, Items K3, 6, 19 and 20 listed in Sect. 2, Chap. 4.

(15) The main plane may now be manhandled on to the trestles or slung *(fig. 10)* as follows:-

(a) Remove the wing-tip tank and the cover plate at the boom end casting.

(b) Fit the eyebolt to the boom end casting and connect the short strop of the sling *(Sect. 2, Chap. 4, Item E1)* to the eyebolt by inserting the quick-release pin into the shackle.

(c) Fit the loop of the long strop of the sling over the lower tip tank pick-up casting, ensuring that the leather cable guard on the strop lies on the main plane edge to prevent chafing.

(d) The main plane may now be slung clear of the trestles.

18. Before a main plane is assembled to the fuselage, the following procedures should be carried out:-

(1) Lubricate the Teleflex cables *(Sect. 2, Chap. 4)* and thread them through the conduits before the main plane is offered up to the fuselage. Insert the fuel contents gauge and aerial leads through rib No. 1 in a similar manner.

(2) Ensure that only new or reconditioned bolts are used, and that bolts and mating holes in the attachment lugs have been carefully examined before inserting the bolts. The bolts must be clean and lightly smeared with grease, XG-273.

(3) Align the attachment lugs accurately, then insert the bolts carefully and screw them in finger-tight to the full depth of the fork end to test for concentricity. Under no circumstances should any extreme force be used to drive the bolts home. It is advisable to detail one man to insert these bolts.

(4) During assembly check the main plane to fuselage clearance. After assembly check the rigging and symmetry of the main plane in accordance with the instructions in Sect. 2, Chap. 4.

Note...
When fitting a new main plane, reference must be made to Vol. 6, Pt. 1, Chap. 3 for additional fitting instructions.

Outboard section, main plane spread

19. Drain and remove the wing-tip tank *(Sect. 4, Chap. 2)* and, with the aircraft suitably trestled *(Sect. 2, Chap. 4)*, proceed as follows:-

(1) Select the wing locking lever to UNLOCKED.

(2) Ensure that the pressure in the hydraulic system has been fully exhausted.

(3) Select the wing fold lever to FOLD.

(4) Open the doors on the under-surface of the main plane wing fold *(fig. 11)* and, using the special tool *(Item K10, Sect. 2, Chap. 4)*, withdraw the latch pins.

(5) Open the doors on the top surface of the main plane wing fold, and remove the split pin and cotter pin from the fork end at the door catch.

Note...
The door catch is spring-loaded to 4½ lb., and great care must be taken to lower the cable gently to the cable guard after removing the pins.

(6) Open the doors fully.

(7) Uncouple the electrical cables at the junction boxes on rib No. 7B and at the junction boxes inside the main plane.

(8) Uncouple the hydraulic, fuel and air lines at the swivel joints.

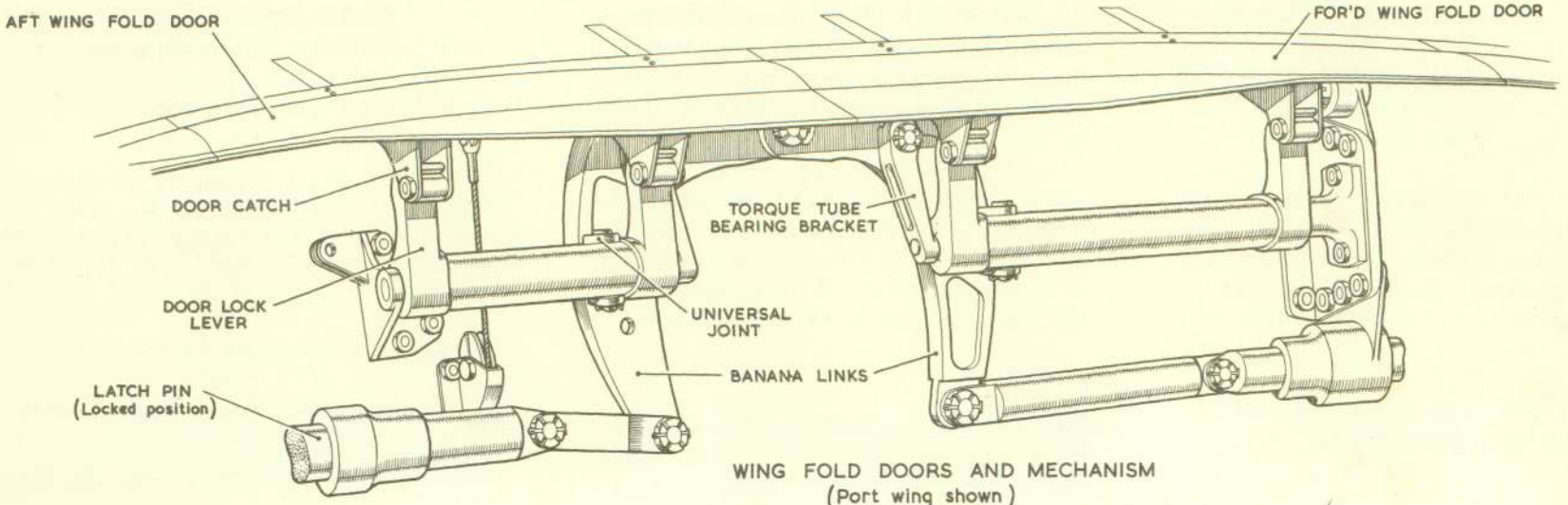
(9) Remove the access plate from the under-surface of the main plane at ribs No. 8 and 9 to give access to the wing fold hydraulic jack.

(10) Remove the split pins and washers from the jack lever and withdraw the pin from the piston rod.

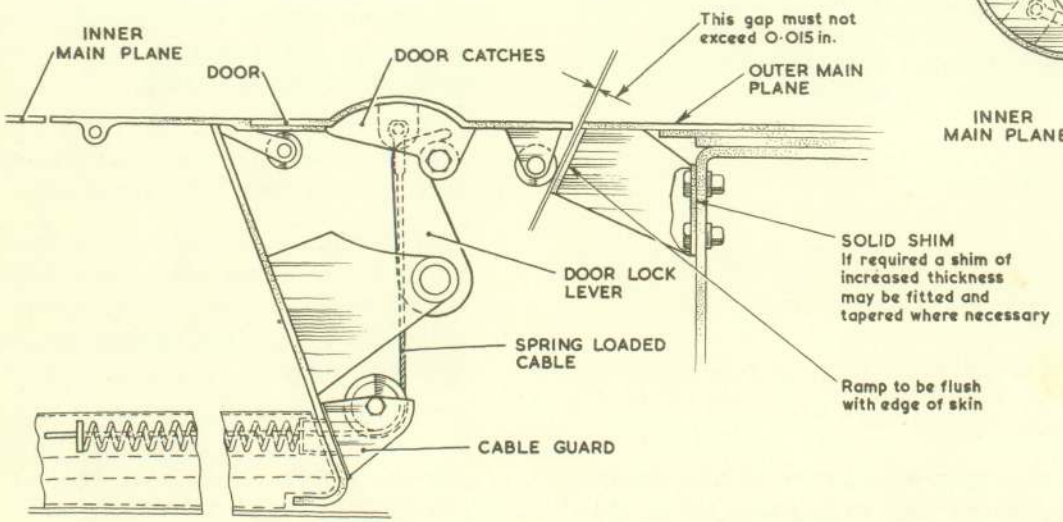
(11) Adjust the trestles so that the bolts at the three hinge joints may be turned without undue force. Remove the split pins, nuts and washers and withdraw the bolts.

(12) Withdraw the outboard section of the main plane horizontally until the cam actuator roller is free of the top cam.

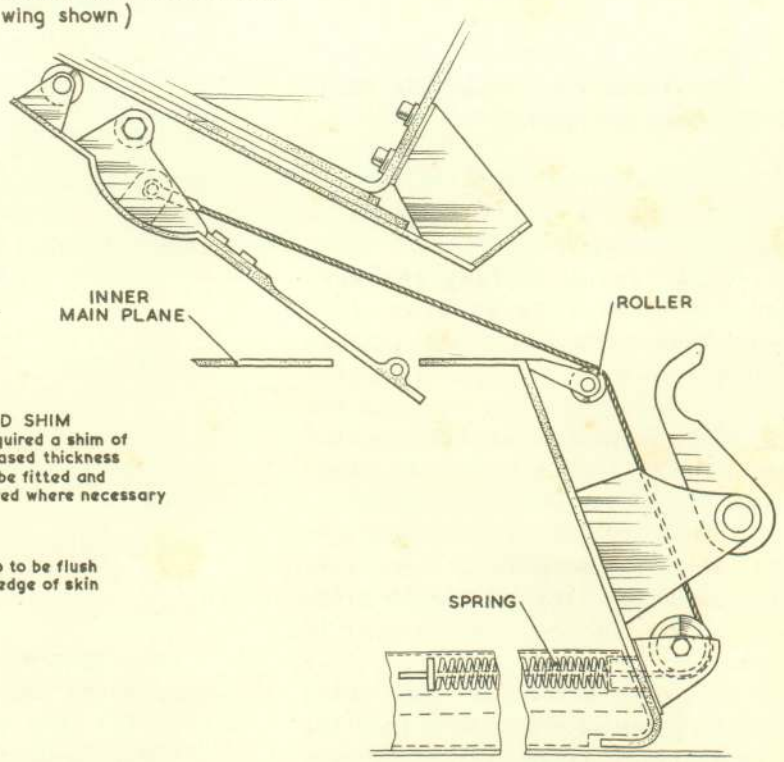
(13) Sling the outboard section as follows:-



WING FOLD DOORS AND MECHANISM
(Port wing shown)



SECTION OF DOOR MECHANISM
(Wings spread)



SECTION OF DOOR MECHANISM
(Wings folded)

Fig.11 Fastening of wing fold doors

(a) Fit the shackle and 7/8 in. B.S.F. bolt to the front inboard wing fold attachment fitting *(fig.12, detail A)* and the 5 ft.8 in. strop of the sling *(Sect.2, Chap.4, Item E5)*.

(b) Fit the shackle and 5/8 in. B.S.F. bolt to the rear inboard wing fold attachment fitting *(fig.12, detail B)* and the 5 ft.10 in. strop of the sling.

(c) Fit the loop of the remaining strop round the lower arm of the tip tank crutch. Ensure that the leather strop guard rests on the main plane edge to prevent chafing.

(d) Attach the sling to a crane hook and lift the section clear of the trestles.

Notes on assembly...

(1) When re-assembling the main plane, care must be exercised in aligning the outboard to the inboard section, so that the cam actuator roller picks up the top cam and the hinge bolts may be inserted in the forward and aft hinges without undue force.

(2) With the wing fold lever selected to SPREAD and with hydraulic power on, the jack piston rod must be adjusted so that the end pin is free to turn. When attaching the piston rod to the jack lever, ensure that the two special pins, which lock the piston rod attachment bolt, are correctly assembled with their countersunk heads positioned in the countersunk recesses in the jack lever (Mod.N.403). *Lock the pins with washers and split pins.*

(3) The special tool (Sect.2, Chap.4, Item K2) *must be used when assembling the fuel lines.*

Outboard section main plane folded

20. Drain and remove the wing-tip tank *(Sect.4, Chap.2)*, trestle the aircraft *(Sect.2, Chap.4)* then proceed as follows:-

(1) Remove the forward and aft panels at the wing fold doors from the upper surface of the main plane.

(2) Select the wing fold lever to FOLD, attach the jury struts *(Sect.2 Chap.1)* and release the pressure from the hydraulic system.

(3) Disconnect the hydraulic and fuel transfer air lines at the aft swivel connections and remove the swivel connection complete with bracket.

(4) Remove the aft access panel anchor nut bracket from rib No.7A.

(5) Disconnect the hydraulic and fuel lines from the forward swivel connection.

(6) Remove the forward access panel anchor nut from bracket on rib No.7A.

(7) Uncouple the electrical and radio cables from the junction boxes on rib No.7A, and from inside the outboard section of the main plane.

(8) Fit the sling *(Sect.2, Chap.4, Item E6)* as follows:-

(a) Fit the special shackle and 7/8 in. B.S.F. bolt to the lower inboard front latch fitting and the 6 ft. strop of the sling *(fig.12, detail C)*.

(b) Fit the special shackle and 5/8 in. B.S.F. bolt to the lower inboard rear latch fitting and the 5 ft. 9 in. strop of the sling *(fig.12, detail D)*.

(c) Fit the loop of the remaining strop over the upper arm of the tip tank crutch. Ensure that the leather strap guard rests on the main plane edge to prevent chafing *(fig.12, detail E)*.

(d) Adjust the crane or hoist to take the weight and allow the hinge bolts to be turned easily.

(9) Withdraw the pin from the spring-loaded cable at the door catches and lower the cable gently to the guard at the pulley *(fig.11)*.

(19) Remove the split pins, washers and shackle pins from the jack lever and withdraw the pin from the piston rod.

(11) Remove the split pins, nuts and bolts from the three hinge joints.

(12) Remove the jury strut and lift the outboard section clear.

VE 0302-17/1

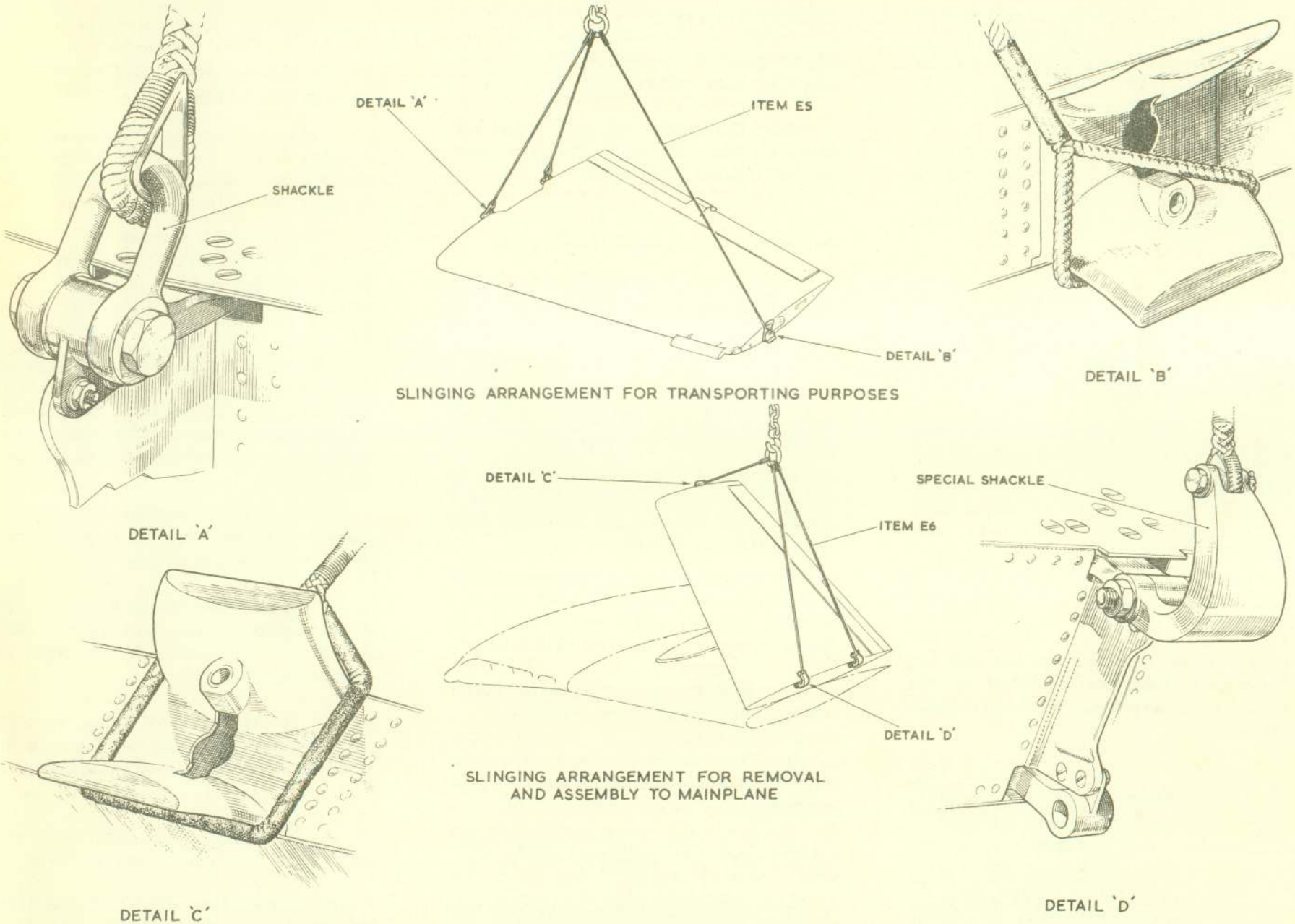


Fig. 12 Slinging of outboard section of main plane

VE 0902-18/1

Notes on assembly of a new section

The following checks *must* be carried out:-

(1) Ensure that the wing fold mechanism is in the fully folded position.

(2) Adjust the piston rod eyebolt, with the piston rod fully extended, to align with the jack lever holes. Screw the eyebolt 1/4 turn into the piston rod. Insert the joint pin. Ensure that the special nuts (fig.6) of the jack link bolt are tightened only sufficiently to still allow the jack link to rotate freely.

(3) Carry out a functional test of the wing fold system. If satisfactory, lock the piston rod eyebolt. Ensure that the two special pins, which lock the piston rod attachment bolt, are correctly assembled with their csk/hds. positioned in the csk. recesses in the jack lever (Mod.N.403). *Lock the pins with washers and split pins.*

(4) Check the wing fold doors for flush fitting and adjust as necessary with the serrated plates at the door catches.

(5) Check that a maximum of 0.2 in. of the shank of the locking pin is visible when the wings are SPREAD and LOCKED.

(6) Ensure that the clearances between the inboard and outboard wing sections are within the limits shown in fig.18.

Aileron *(fig.13)*

21: Remove the ailerons as follows:-

(1) Remove the cover plates from the wing surfaces above and below the three hinges.

(2) Withdraw the screws from the lower hinged shrouds and remove the shrouds.

(3) Withdraw the two attachment bolts from the inboard hinge brackets.

(4) Disconnect the trim tab connecting rod from the tab bracket.

(5) Support the aileron and withdraw the attachment bolts from the centre and outboard vertical hinge brackets.

(6) Before assembling a new aileron, the detachable portion of the engagement lug must be removed by unscrewing the torque bolt *(fig.14)*. The aileron must then be assembled to the main plane by temporarily fitting the hinge bolts, commencing at the outboard hinge and fitting the inboard hinge bolts last. If difficulty is experienced in fitting the two inboard hinge bolts, it will be due to the inside face of the engagement lug bearing against the aileron engagement arm. In this instance, the aileron must be removed, and the engagement lug removed from the aileron ensuring that the existing laminated aluminium shims are retained with their respective bolts. An appropriate and *equal* number of shims must be removed from each bolt until the aileron inboard hinge bolts can be fitted without difficulty. If, on the other hand, it is found that all aileron hinge bolts fit easily, disconnect the drop link from the engagement arm, and check if there is any clearance between the arm and the engagement lug inside face, using a feeler gauge. In this way, the additional shims that may be required between the lug and the aileron, at *each* of the six bolt positions, may be determined. On final assembly of the detachable portion of the engagement lug, ensure that the two special pins and 1/16 in. shims (top and bottom) are fitted between the mating faces. The hinge bolts should always be replaced on the same assembly from which they were taken.

Note...
A minimum mating surface area of 75%, checked by blueing, must be finally obtained between the contacting faces of the engagement arm of the drive shaft and the engagement lug on the aileron.

The torque bolt must be tightened to a torque of 270 lb. in. to 330 lb. in. and the bolt wire-locked with 18 S.W.G. locking wire. Rigging instructions for the aileron are given in Chapter 4 of this Section.

Flap *(fig.15)*

22. The flaps must first be lowered and the inner and outer sections removed, as a unit, as follows:-

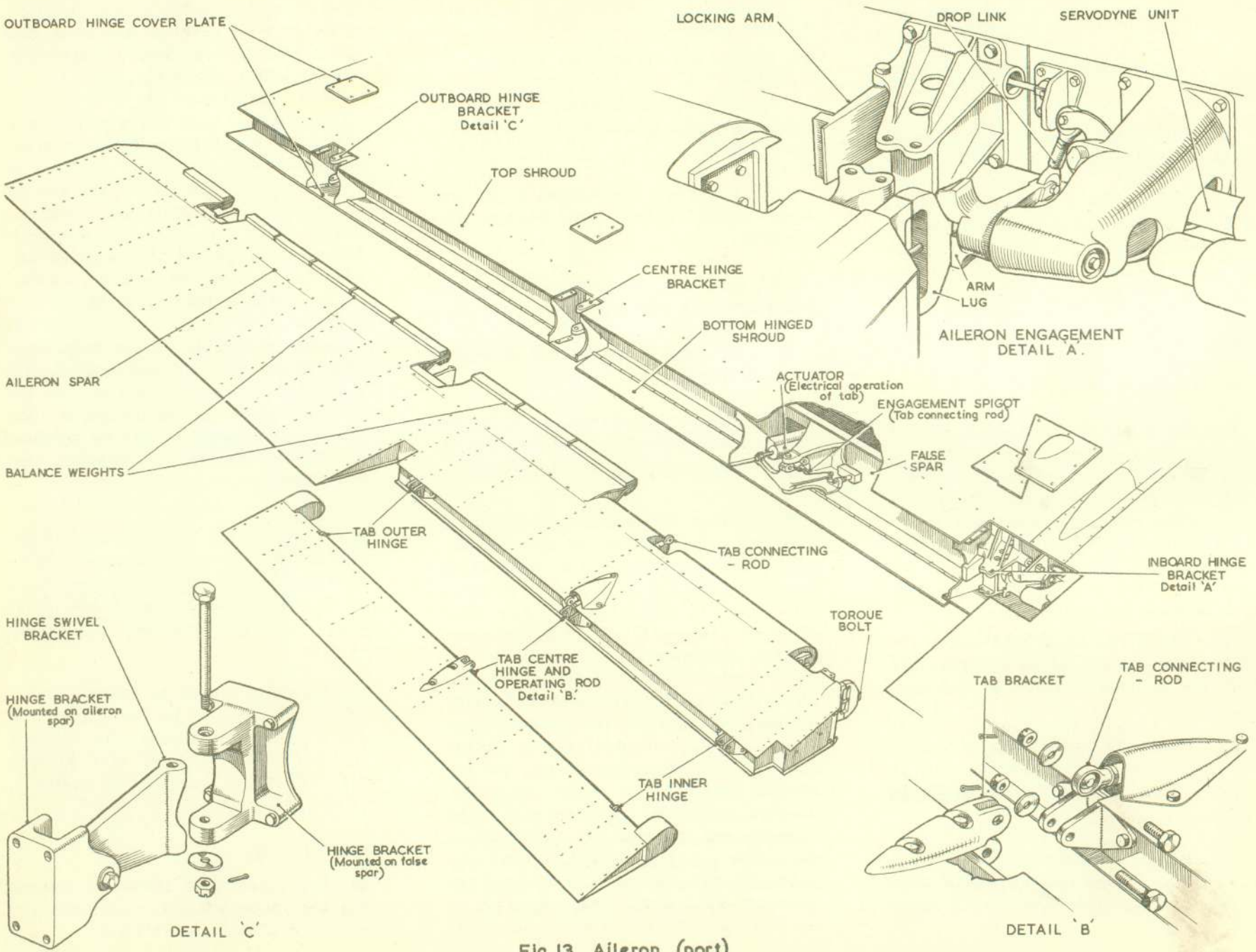


Fig.13 Aileron (port)

RESTRICTED

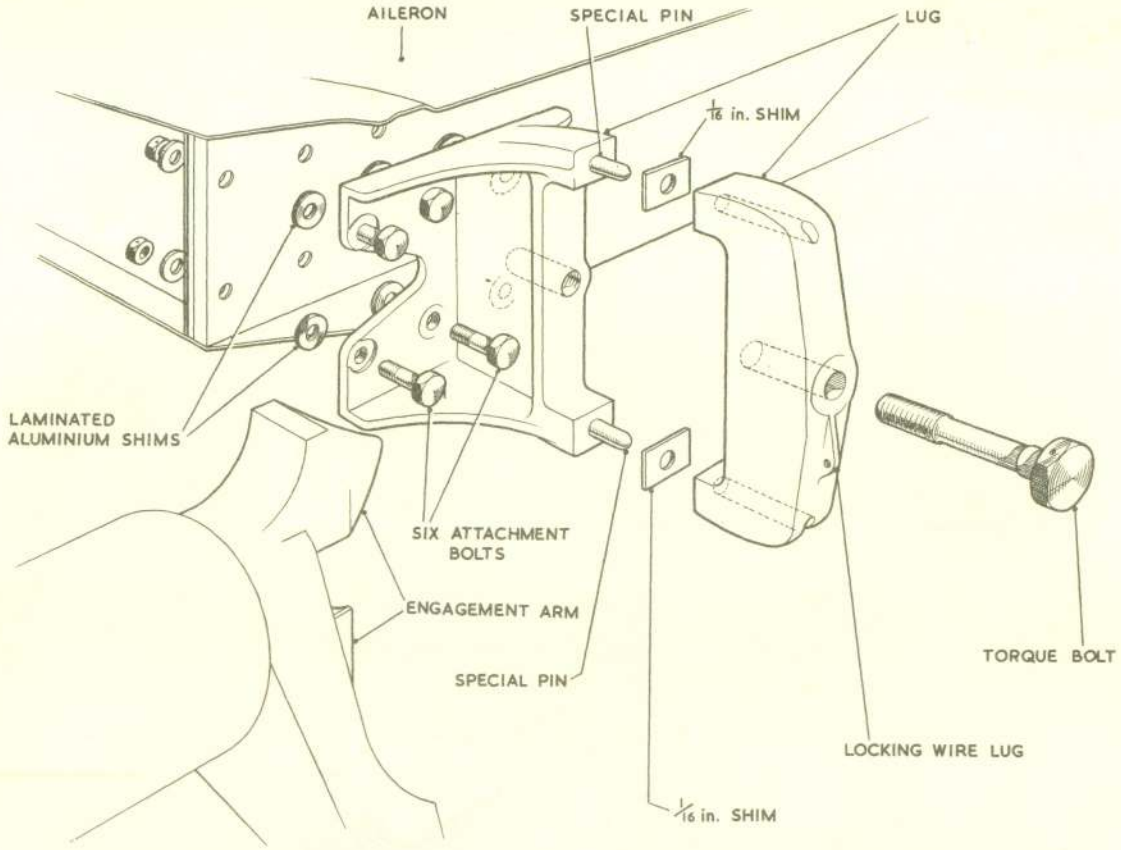


Fig.14 Aileron engagement arm and lug

(1) Withdraw the special bolt, as shown, and remove the jack piston rod from its attachment bracket.

(2) Disconnect the inner and outer torque tube connecting links.

(3) Support the flap and withdraw the four hinge bolts.

23. When re-assembling the flaps, reference must be made to Chap. 4 of this section for rigging instructions, and the following points noted:-

(1) The two hinge bolts must clear the boom-flanges by 0.05 in. to 0.1 in. If necessary the flange must be pared down to obtain this clearance.

(2) With the flaps fully *down*, the clearance between the leading edge of the centre panel and the bottom of the boom must be 0.25 in. min. to 1.5 in. max. and the clearance on the rest of the boom must be 0.05 in. min. to 0.15 in. max. The flanges of the stub boom must be dressed to line up with the centre panel of the flap.

(3) The procedure for assembling a new flap, or a new section of a flap, is as follows:-

(a) Remove the flap centre panel.

(b) Remove the jack and tie the hydraulic pipes to the shroud so as to permit unrestricted flap retraction.

(c) Remove the inner flap adjustable torque tube connecting link.

(d) Adjust the outer flap torque tube connecting link, to the maximum length that is consistent with an unrestricted flap retraction by hand, by commencing with the link extended beyond the length required and gradually shortening it.

(e) Check that there is a clearance of 0.005 in. to 0.015 in. between the torque tube arm and the stringer in the flap bay. This can be observed through the boom from the inner flap bay.

(f) Check that the connecting link does not foul the torque tube arm lower face in the fully *up* position. This can be checked with plasticine, and if there is a foul, the base of the torque tube arm fork end may be recessed with a round file at the lower corner to a max. depth of 0.05 in.

(g) Replace the inner flap torque tube connecting link and carefully adjust it until the *up* position of the inner flap just synchronises with the up position of the outer flap, operating the retraction by hand on the outer flap. *This adjustment is most important.*

(h) Check the inner flap connecting link for fouling as in sub-para. (f), and lock the adjustable eye ends.

(i) Refit the flap centre panel and check that the clearances shown in fig. 18 can be obtained. If the required clearance cannot be obtained between the centre panel and the boom, shims may be fitted between the flanges of the panel and the adjacent flaps.

(j) Refit the jack and carry out functional tests as described in Chap. 6, making final adjustments as described in Chap. 4 of this Section.

Dive brakes *(fig. 16)*

24. Set the dive brakes to the OUT position, then remove as follows:-

(1) Withdraw the special bolt and remove the jack piston rod fork-end from its attachment bracket.

(2) Remove the circular access panel from the underside of the main plane immediately outboard of the dive brake.

(3) Withdraw the split pin, nut and washer and remove the outboard hinge bolt.

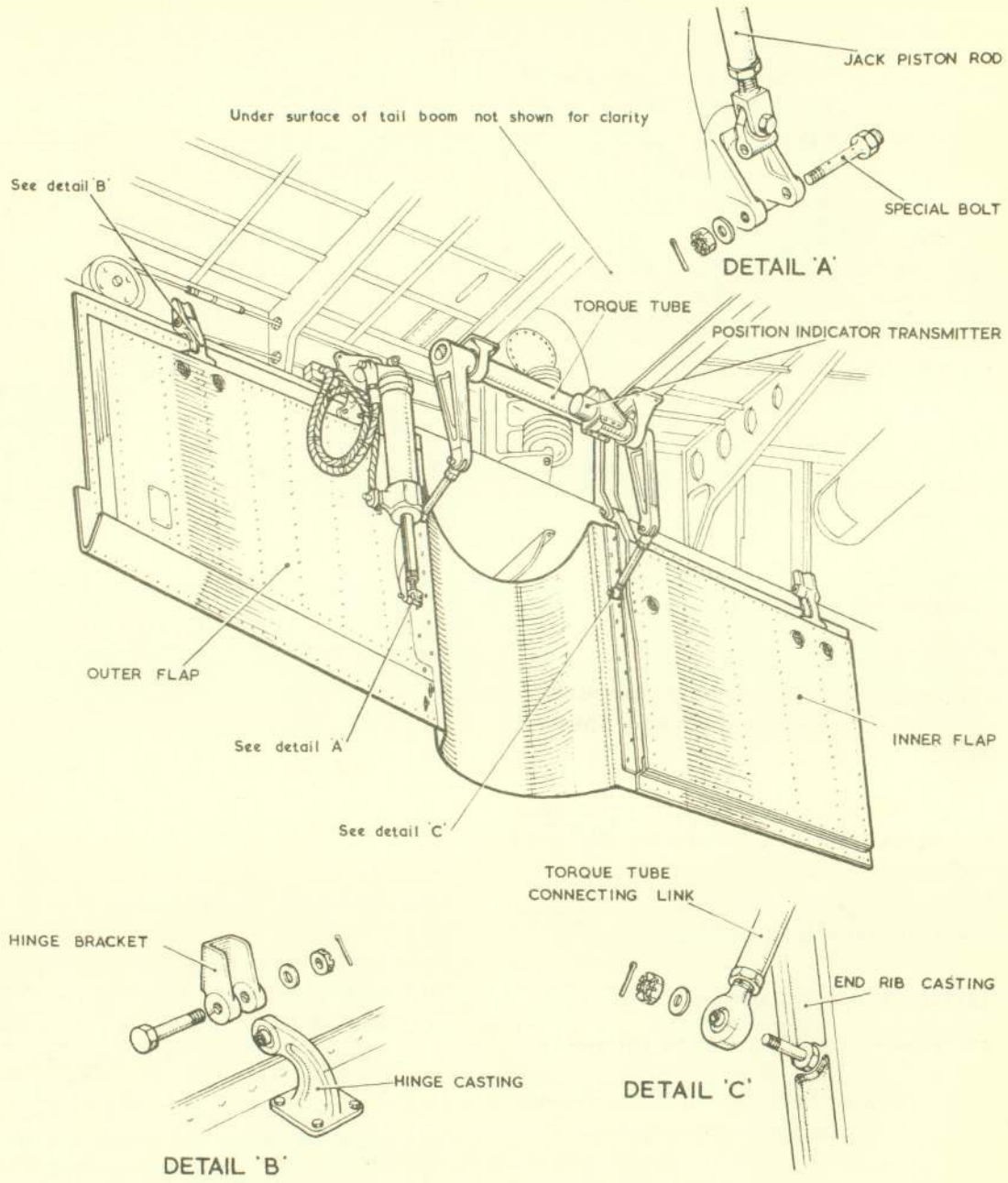


Fig. 15 Flaps (port)

VE 0302-22/1

(4) With the dive brake supported, remove the inner hinge bolt and withdraw the dive brake.

25. When re-assembling, the clearances *(fig. 18)* must be obtained, and the dive brakes must be rigged in accordance with the instructions given in Chap. 4 of this Section.

Aileron tab (starboard)

26. Remove the starboard tab as follows:-

(1) Remove the control shroud panel over the connecting-rod coupling.

(2) Withdraw the split pin from the nut at the eye end of the connecting-rod and remove the nut and special bolt.

(3) Withdraw the split pins from the three hinge pins, remove the nuts and washers then the hinge pins.

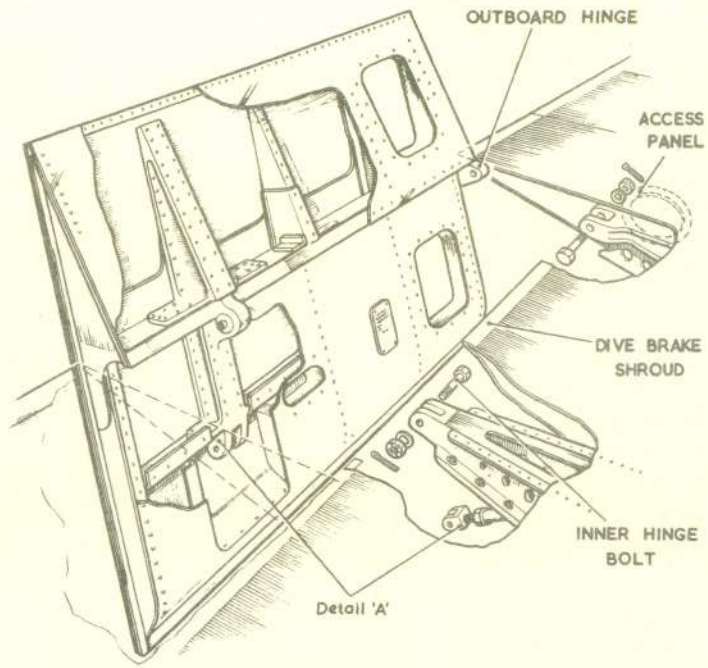
(4) Lift off the tab.

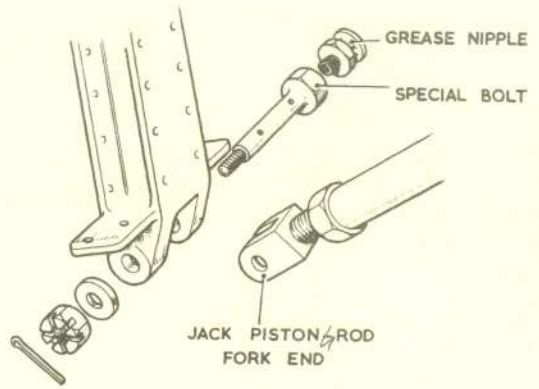
Aileron trim tab (port)

27. Remove the port tab as follows:-

(1) Remove the control shroud panel over the connecting-rod coupling.

(2) Withdraw the split pin and nut at the eye end of the connecting-rod and remove the nut and special bolt.





DETAIL 'A'

Fig. 16 Dive brake (port)

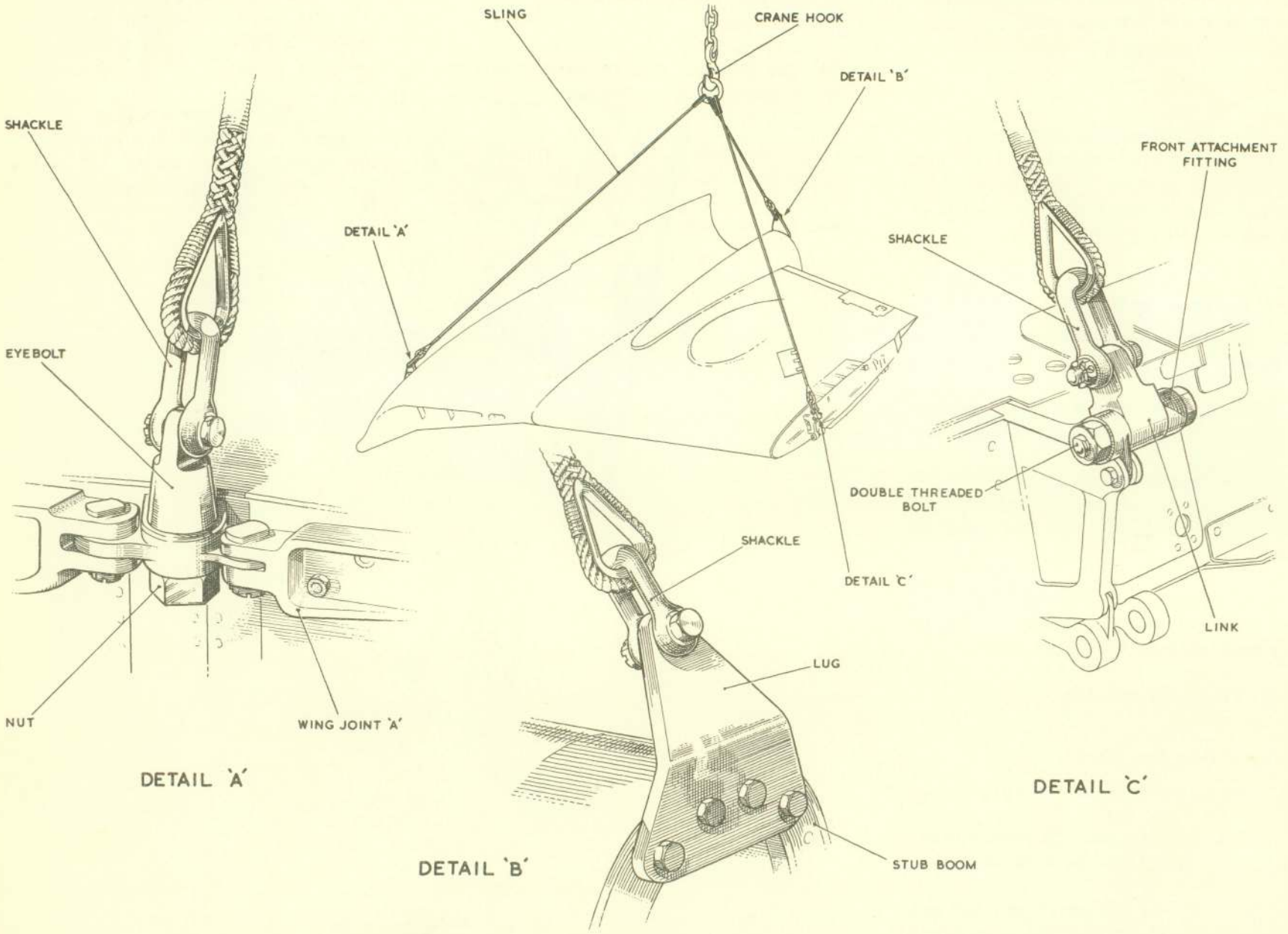


Fig. 17 Slinging of inboard section of mainplane

(3) Remove the six countersunk screws from the tab hinge.

(4) Lift off the tab.

28. When re-assembling both tabs the clearances *(fig.18)* must be obtained and the tabs rigged in accordance with the instructions given in Chap.4 of this Section.

Slinging of inboard section of main plane

29. The inboard section may be slung for transporting as follows:-

(1) Fit the 7 ft.5 in. strop of the sling *(Sect.2, Chap.4, Item E4)* to the wing joint A using the eyebolt, nut and 3/8 in. shackle *(Fig.17)*.

(2) Fit the 7 ft.11 in. strop of the sling to the rear face boom attachment, using the lug which is secured to the boom former by four 3/8 in. B.S.F. nuts and bolts and the 3/8 in. shackle *(fig.17)*.

(3) Fit the remaining strop to the wing fold inboard top hinge fitting, using the double ended 7/8 in.B.S.F. bolt with its associated nuts, link and 3/8 in. shackle.

(4) Fit the sling to a crane or hoist.

VE 0302-25/1

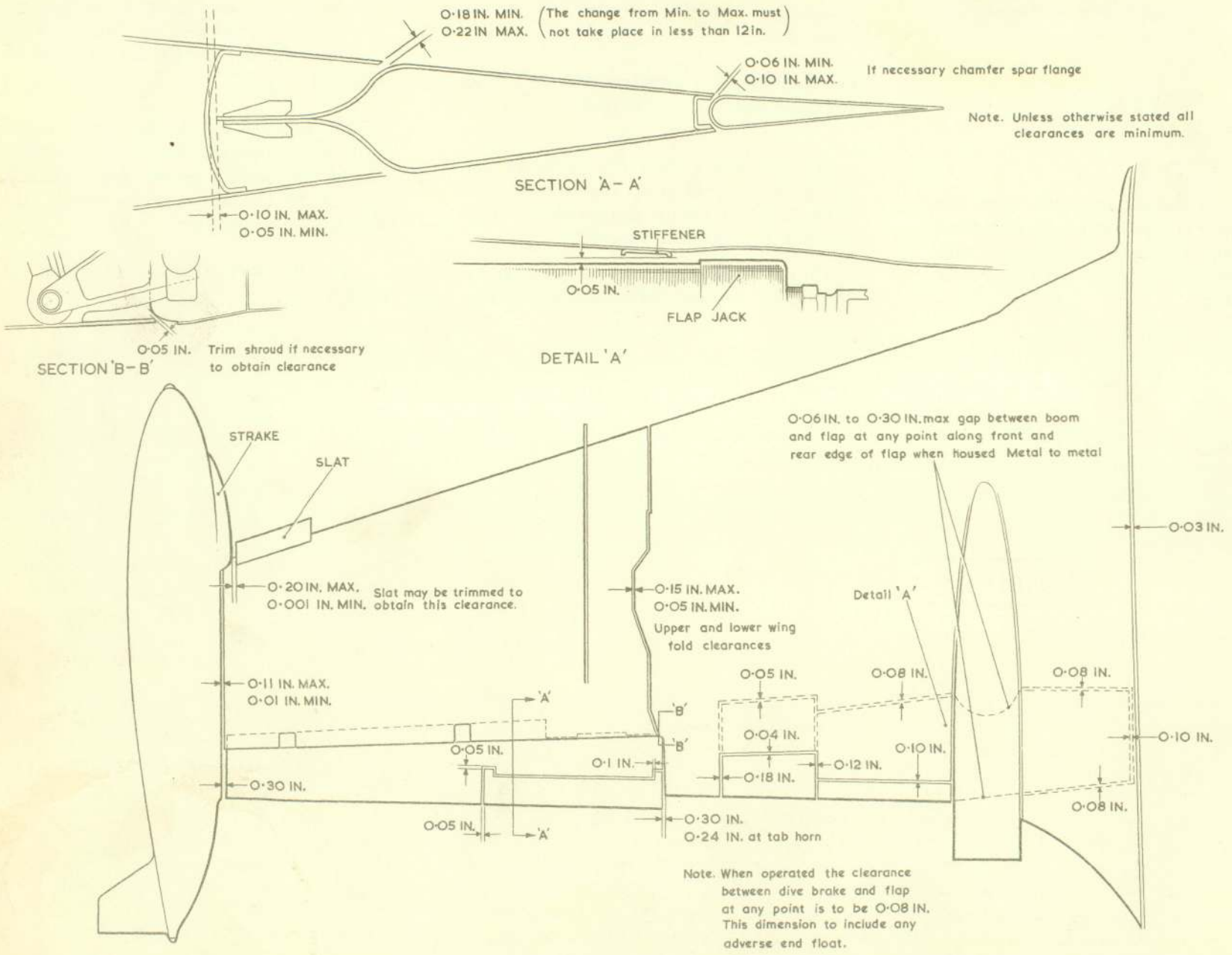


Fig. 18. Main plane clearances

A.P. 970-26/1