Chapter 1 FUSELAGE

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WARNING

AN AIRCREW EJECTION SEAT IS FITTED TO THIS AIRCRAFT.

Before attempting to enter the cabin ensure that the instructions detailed on the LETHAL WARNING marker card at the front of the handbook have been complied with.

THIS IS VERY IMPORTANT

Introduction

1. This chapter contains a general description of the fuselage together with the lubrication and servicing information necessary to maintain it in an efficient condition. Illustrations showing the method of slinging, trestling, and dismantling it into major components, are also included.

DESCRIPTION

General

2. The fuselage is an all metal monocoque structure, built in three main portions to facilitate manufacture and transport. The front fuselage is provided with a detachable nose piece and houses the pilot's cabin, and radio equipment while the centre fuselage, which is constructed with the stub wings as an integral part, contains the engine and the fuel tanks. The rear fuselage, which is constructed with the lower portion of the fin as an integral part and is terminated by a detachable tail cone, houses the engine jet pipe and carries the hydraulically-operated air brake and arrester gear installations. The three major components of the fuselage are illustrated in fig. 2, 3, 4 and 5.

Nose piece and front fuselage (*fig. 1 & 2*)

Structure

3. The detachable nose piece is mounted on frame 3 and consists of a light alloy skin supported by frames, and houses the camera gun. The front fuselage continues from frame 3 to frame 18A, which forms the front frame of the forward transport joint. The structure consists of a number of frames and four longerons reinforced by a box-sectioned keel member extending between frames 6 and 11, the whole assembly being covered with a metal skin. The nose wheel is pivoted to the keel member at frame 8 and when retracted is enclosed in the front fuselage by fairings. The pilot's cabin is housed between frames 6 and 14, while the TACAN bay is located between frames 14 and 16 under the cabin floor, and is accessible after removing the bomb pack in the undersurface of the front fuselage. The radio bay is situated immediately forward of the transport joint. A structure attached to the forward face of frame 3 carries the forward portion of the nose ballast, and the rear portion of the nose ballast is bolted to two angle pieces that extend between frames 3 and 6 above the wheel bay.

Cabin

4. The pilot's cabin, which is protected by heavy plating and provided with an ejection seat, is enclosed by a windscreen and an electrically-operated hood. The hood slides rearwards for entry and exit and may also be jettisoned in an emergency. To enable the cabin to be pressurized, it is sealed from the remainder of the airframe by a floor extending from frame 6, which is a solid bulkhead, to a diaphragm at frame 14. Ejector seat leg restraint anchorages in the form of a pair of fork fittings are fitted to the cabin floor. Above the floor the fuselage structure is enclosed to form side walls and above these walls are shelves for controls and instruments. The centre instrument panel, together with the port and starboard side panels, are located at the forward end of the cabin above the shelves, on a structure which extends across the top of frame 8 and is stiffened by two tubular struts projecting forwards to frame 7. The gun sight is carried on a mounting located above the centre instrument panel.

Windscreen and hood

5. The windscreen consists of a flat bullet-proof centre panel and two curved transparent side panels, all three of which are held in a cast light-alloy frame secured to the cabin decking. The centre panel consists of two plates of glass between which is a layer of dry-air to prevent misting, the air being maintained in a dry state by silica gel housed in a container mounted on the forward face of frame 8 on the starboard side and connected to the bottom of the windscreen by rubber tubing. An adjustable convex type rear view mirror is attached to the top of the windscreen frame. The hood is moulded from a single sheet of transparent plastic mounted in a frame consisting of a steel arch member at the forward end and two edge members at the sides. A rack and roller assembly is bolted to each edge member and the complete hood slides in rails attached to the structure by locks, located just aft of frame 10 and forward of frame 13, and by a pivot point just aft of frame 16.

6. The cabin hood is opened and closed by an electric actuator which drives a cross-shaft carrying pinions which engage with the racks on each side of the hood. The actuator is controlled by a control box and integral clutch lever situated on the port side of the cabin just forward of frame 10. The lever is provided to disengage the actuator clutch and at the same time, deflate the hood seal so that the hood can be moved by hand. In an emergency the cabin hood may be jettisoned by the use of a control handle which projects upwards from the forward end of the cabin port shelf. Pulling this handle fires the hood jettison gun which opens the locks securing the hood side channel members and gases from the gun are utilized to jettison the hood. An interconnection between the control handle and the spring-loaded release unit ensures that the hood locks open in the event of the hood jettison gun failing to fire. In the event of the pilot being physically incapable of operating this control while the aircraft is on the ground, there is an external release ring enclosed behind a transparent break-in panel on the port side of the fuselage

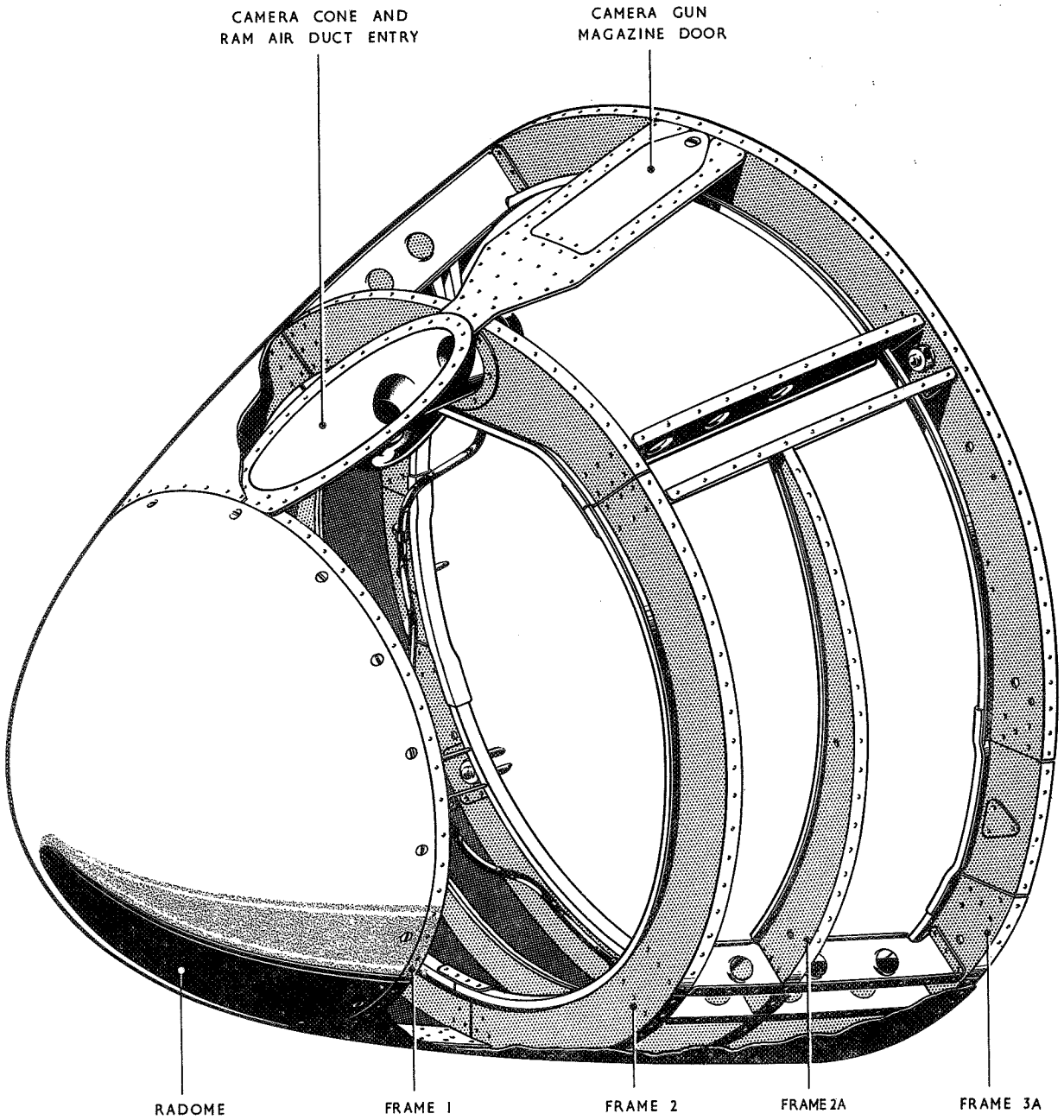

Fig. 1 Front fuselage nose piece

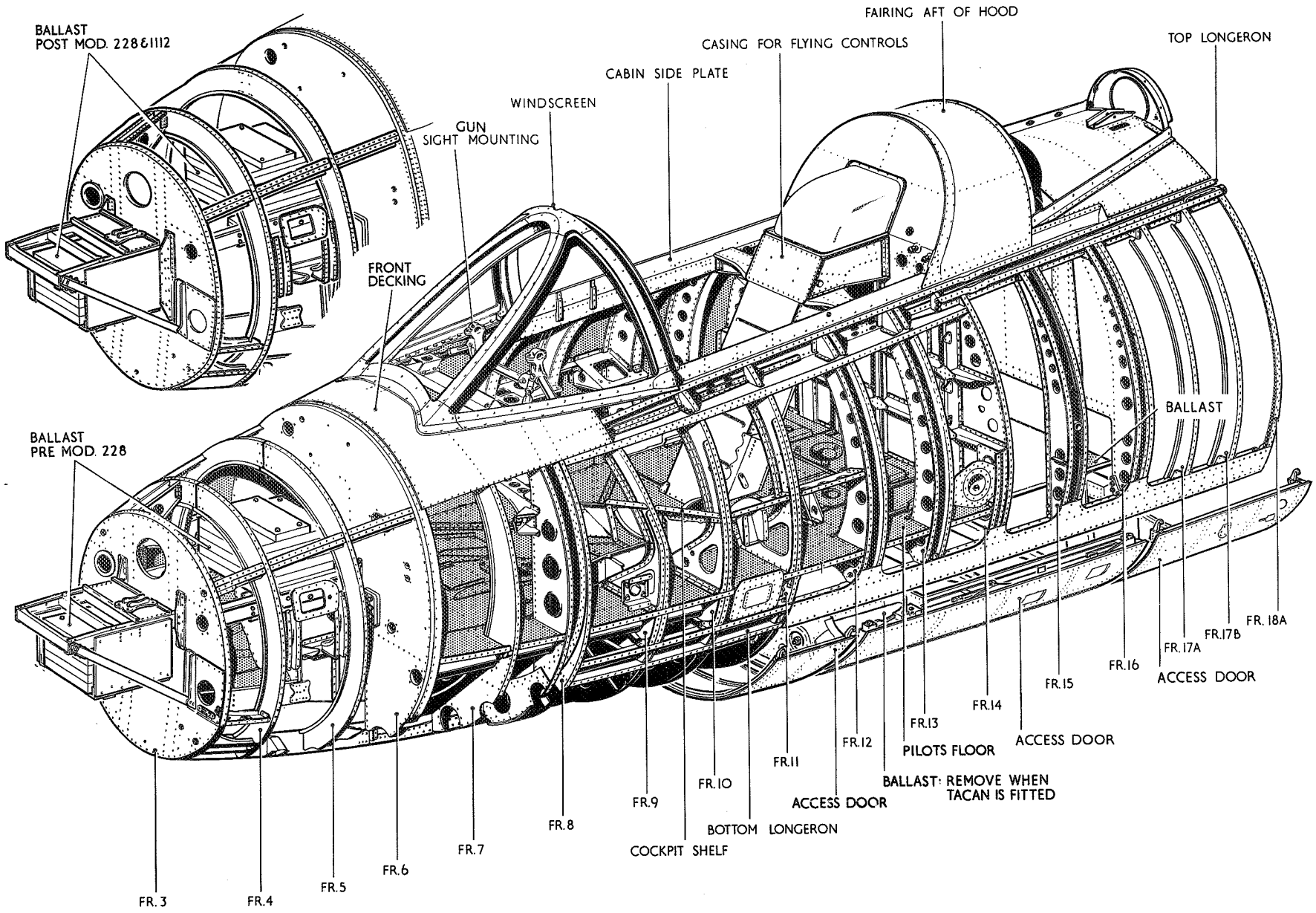

Fig.2 Front fuselage

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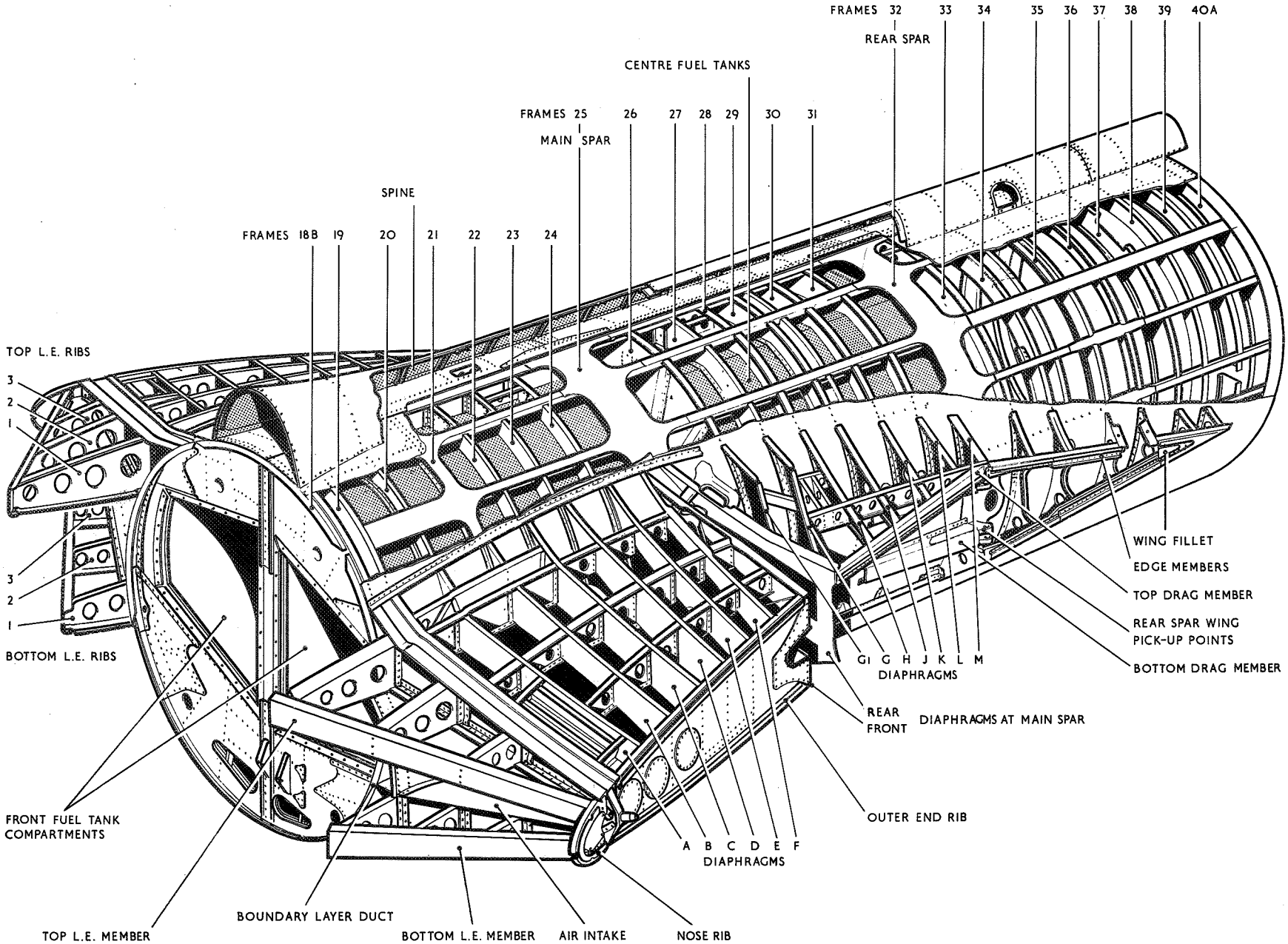

Fig. 3 Centre fuselage and stub wing (1)

below the cabin. Pulling the enclosed ring operates the spring-loaded release unit to release the locks securing the hood side channel members, deflates the hood seal and declutches the hood motor so that the hood may be lifted off by hand. Finger holes between the hood and windscreen are provided to facilitate the removal of the hood.

Bomb package

7. The bomb package consists of a removable structure designed to fit flush in the underside of the front fuselage just forward of the radio bay, with the underside of the package continuing the fuselage line. The package is fitted with four small pylons for the carriage of practice bombs and is supported in the fuselage by six spherical ended mounting spigots, which project downwards, three on each side, from the fuselage bottom longerons to engage with sockets integral with the package. Special fittings in formers A and E are provided for the fitment of ballast bars when TACAN is not installed. For further information on the bomb package refer to Sect. 7, Chap. 4.

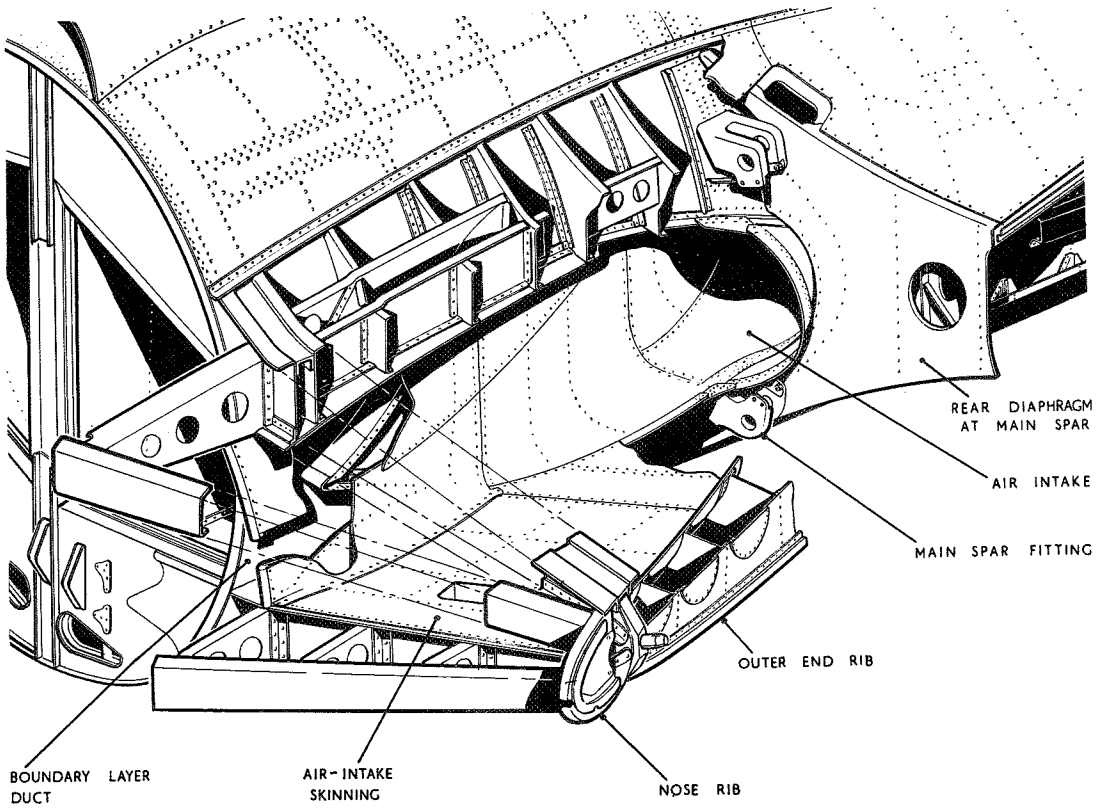

Fig. 4 Centre fuselage and stub wing (2)

Radio mountings

8. The radio bay is situated in the front fuselage, where it extends aft from frame 16 to frame 19. This bay also contains certain components of the aircraft electrical system. The mountings consist of an upper and lower structure, each supporting anti-vibration mounting racks for the transmitter-receivers and associated equipment. For a full description of the radio installation reference should be made to Sect. 6.

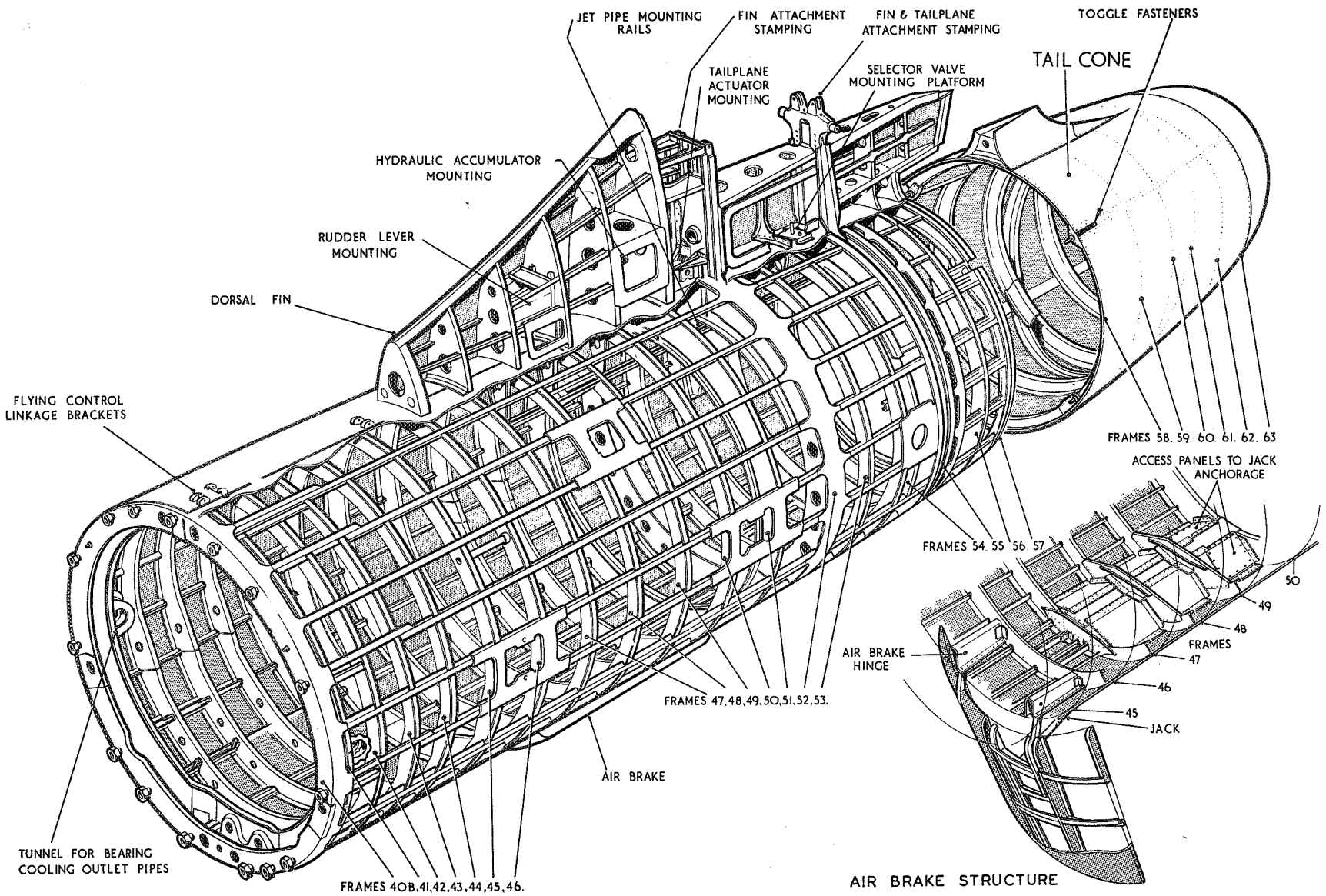

Fig.5 Rear fuselage

Forward transport joint fittings

9. The front and centre fuselage structures are assembled together at a butt joint formed by the flanges of frames 18A and 18B, which are bolted together, and by special attachments at the four longerons. These attachments consist of large threaded fittings, bolted to the front fuselage longerons, which extend aft through frame 18A to engage with special captive nuts carried on spigots projecting forward through frame 19 of the centre fuselage from fittings bolted to stringers C and H. The special nuts are locked to the spigots with nickel-alloy wire when assembled to the front fuselage fittings.

Centre fuselage and stub wings (*fig.* 3 & 4)

Structure

10. The centre fuselage extends from frame 18B to frame 40A, both of these frames forming transport joints. It is a monocoque structure consisting of a number of frames and stringers covered with a light-alloy skin, at the top of which is a spine member enclosing the flying controls. Frames 19, 25 and 32 are of heavier construction than those of the remaining frames and continue outward to form the nose, main and rear spars of the stub wings which are an integral part of the centre fuselage structure. The stub wing consists of these three spars, together with a number of ribs and diaphragms which are covered externally by a light-alloy skin and internally by the air intake and boundary layer ducting. The spars contain high-tensile steel fittings to which the outer wings are attached.

Fuel tank compartment

11. The structure between frames 19 to 25 and frames 26 to 32 of the centre fuselage is double-skinned and divided by diaphragms to form compartments in which the front and centre flexible bag type fuel tanks are supported. For a full description of the fuel tank installation, reference should be made to Sect. 4, Chap. 2.

Engine compartment

12. The engine is located between frames 31 and 46, being mounted at frames 34 and 40A, with the engine-driven accessories gearbox attached to the lower port side of frame 32. A diaphragm at frame 37 engages with the engine to form a firewall and to divide the engine compartment into two zones for cooling purposes. For further details of the engine installation, reference should be made to Sect. 4, Chap. 1.

Rear transport joint fittings

13. The centre and rear fuselage structures are assembled together at frames 40A and 40B by special attachments at fifteen points between these frames. These attachments consist of large threaded fittings bolted to the stringers of the centre fuselage and extending aft through frame 40A to engage with special captive nuts carried on fittings bolted to the stringers of the rear fuselage, which project forward through frame 40B. When assembled these special nuts are locked together with nickel alloy wire and the gap between the two frames is covered by a fairing strap.

Rear fuselage and tail cone (*fig.* 5)

Structure

14. The rear fuselage extends from frame 40B *(rear transport joint)* to frame 57. It consists of a number of frames and stringers covered with a light alloy skin to form a monocoque structure, at the top of which is a spine member enclosing the flying controls. Frames 52 and 55 are of heavier construction than the remaining frames and extend upwards to form the major framework of the lower fin structure, which is integral with the rear fuselage. The lower fin structure consists of the above-mentioned major frames together with a dorsal fin extending forward to the spine member and an anti-buffet fairing extending aft below the rudder. The upper portion of the fin, which carries the rudder, is attached to the lower part by fittings incorporated at the top of frames 52 and 55, while the tail plane is pivoted on a fitting at frame 55 and anchored at the leading edge to the tail plane actuator in the lower fin structure *(Sect. 3, Chap. 3)*. A small bumper block type tail skid is attached to the bottom of frame 55 to take the loads should the tail strike the ground during landing or take-off. The bottom skin between frames 47 to 50 is cut away and the gap so formed is reinforced and boxed in by side members and a top skin to form a housing for the hydraulic air brake jack. The jack is anchored on a bolt extending between fittings bolted to the aft ends of the side members and extends forward in the housing to engage with the air brake flap which is attached by two extended hinges to channel fittings located between frames 45 and 46 on each side of the aircraft. The tail cone, which is detachable, is secured to the rear fuselage by four toggle fasteners together with locating spigots. It extends from frame 58 to frame 63 and consisting of six frames covered with a light-alloy skin stiffened by butt straps. The tail cone terminates in a stainless steel tail piece, a duct of which engages with the jet pipe. A small tail fairing is incorporated at the top of the tail cone between frames 58 and 61. A fitting at the bottom of the fuselage just aft of frame 51 is provided for the attachment of the arresting hook, and the release mechanism is located between frames 56 and 57. The removal of the arresting hook is described in Sect. 3, Chap. 5, which also details the proceedure for charging the hydraulic damper unit.

15. Paragraph not applicable.

16. Paragraph not applicable.

Air brake flap

17. This structure consists of a series of curved formers attached to a channel sectioned centre rib with a hinge rib on either side and a curved nosing at the forward end. The lower surface of the structure is completely covered with a light-alloy skin, but its upper surface is only covered at the forward and centre portion. Each hinge rib carries an arm of the extended hinges, which engage with fittings incorporated in the rear fuselage. The centre rib incorporates the anchorage fitting to which the operating jack is attached. The complete assembly is carried under the rear fuselage on hinge fittings as described in para. 14. The air brake embraces the fuselage when in the UP position.

Jet pipe mounting

18. The jet pipe is rigidly secured to the engine at its forward end and extends aft to terminate at the end of the tail cone. The pipe is supported at frame 55 by blocks, attached to each side of the pipe, which engage with adjustable mounting slides secured to the fuselage structure. These blocks move along the slides to allow for expansion of the pipe. A rail incorporated at the top of the fuselage between frames 48 and 56 is provided to facilitate jet pipe assembly and removal, small rollers on the pipe running along this rail during these operations. For further details of the jet pipe installation, reference should be made to Sect. 4, Chap. 1.

Arresting hook

18A. The arresting hook consists of a tubular strut which is provided with a hook at one end and a fork-end at the other. The unit is attached by its fork-end to a bell crank lever which pivots in a fulcrum bracket in the bottom of the fuselage in the region of frame 51. The other end of the bell crank lever is attached to the eye-end of a pneumatic damper unit, the cylinder of which is anchored to fittings attached to structure forward of the bell crank lever assembly. When in the 'up' position, the arresting hook lies along the undersurface of the rear fuselage, where it is held in that position by a stirrup on the hook strut which engages with an electro-magnetic release unit mounted in the bottom of the fuselage between frames 56 and 57. A control switch in the cabin, when operated, energizes the release unit solenoid coil so that the release unit jaws open to free the stirrup. The arresting hook then swings down on its pivot in the fulcrum bracket under the influence of the damper unit, which also holds it down in the extended position and prevents any tendency for it to rebound. Leaf springs, attached to the bell crank pivot bolt and to the arresting hook strut, permit sideways movement of the strut to an extent which is limited by the length of the slotted holes by which the leaf springs are attached to the strut. The arresting hook is returned to the 'up' position and the stirrup inserted into the jaws of the release unit by hand. Indication of the hook being lowered is given by the illumination of a warning lamp in the cabin which is controlled by a microswitch in the fuselage, located adjacent to the forward end of the hook strut and operated by the strut. Manual return of the arresting hook to the 'up' position releases the hook microswitch, extinguishing the lamp, and also relocks the release unit to retain the hook in the raised position. *When returning the hook to the 'up' position, it is important to ensure that the electrical supply is OFF before any attempt is made to insert the stirrup into the jaws of the release unit.* For further details of the operation of the electro-magnetic release unit, together with circuit diagrams, reference should be made to Sect. 5, Chap. 1, Group D8. The removal of the arresting hook is described in Sect. 3, Chap. 5. For further details of the arresting hook damper, reference should be made to A.P.1803E, Vol. 1, Sect. 7, Chap. 4.

SERVICING

General

19. In general, the only servicing required to the fuselage itself is that described in para. 20. Otherwise the servicing is confined mainly to the systems and accessories which are contained in the fuselage and which are dealt with in their respective chapters.

20. A regular examination of the fuselage structure must be carried out to ensure that no damage, such as buckling of the skin, corrosion or loosening of nuts, rivets, etc., has occurred. If any damage is found it must be rectified in accordance with authorised procedure before the next flight. It is also necessary to check that all the detachable access panels and hinged doors are securely locked and flush with the surrounding structure. *This is very important as many of these are stress bearing panels and the safety of the aircraft is dependent upon their correct fitment.* Extreme care must therefore, always be taken, during fitting or removal, to ensure that they are not damaged or distorted in any way. The drain holes at the bottom of the fuselage aft of frames 37 to 40A, 50, 52, 53, 56 and in the tail cone should be inspected frequently to ensure freedom from obstruction.

Note . . .

Any alteration in contour will give rise to a shock-wave, resulting in a vast increase in drag and corresponding loss in performance.

Windscreen dry-air sandwich

21. The procedure for examining the air drier of the windscreen dry-air sandwich installation is contained in Sect. 2, Chap. 2.

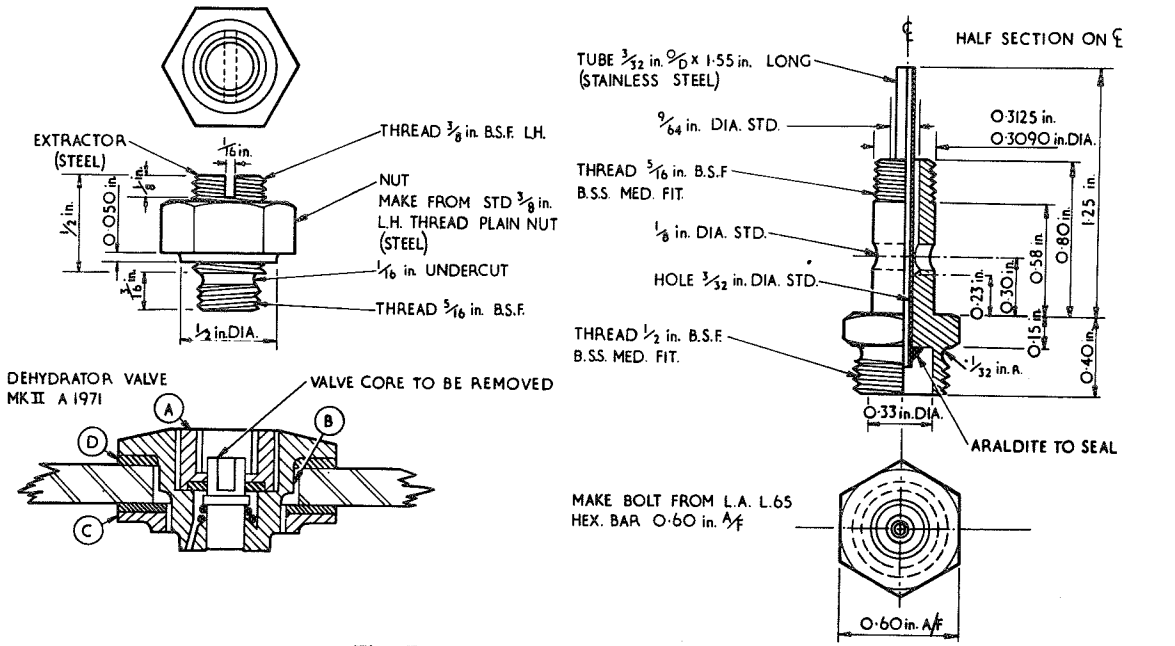

Fig. 5a. Extractor and special bolt

Demisting of internally misted windscreen *(fig. 5a)*

21A. In the event of the windscreen becoming misted up internally the following S.T.N./Hunter/54 procedure may be adopted as a possible means of demisting :—

(1) Make up an extractor consisting of a screw and nut as shown in fig. 5a.

(2) Empty the air drier of silica gel crystals and leave empty while demisting.

(3) Remove the banjo bolt, banjo, 2 rubber washers and 1 L.A. washer from the windscreen (*Sect. 2, Chap. 2, fig. 3*).

(4) Fit a $\frac{5}{16}$ inch internally toothed shakeproof washer, reduced to $\frac{1}{2}$ inch outside diameter, on the $\frac{5}{16}$ inch dia. threaded portion of the extractor so that it lies in the undercut.

(5) Screw the extractor R.H. thread end tightly into the valve assembly part (A) by means of the screwdriver slot in the L.H. threaded portion. Then tighten the nut (*L.H. thread*) hard on to the shakeproof washer so that the extractor locks to the valve. Gently turn the nut anticlockwise so that the valve assembly (B) completely unscrews from its nut (C) inside the windscreen, leaving this nut adhering to the glass by its rubber washer.

(6) Remove the rubber washer (D) from the valve assembly and lightly clamp the valve assembly in a vice on diameter (B).

(7) Unlock and unscrew the extractor from the valve assembly.

(8) Using a $\frac{1}{16}$ inch drill, drill out the three punch marks $\frac{1}{32}$ inch deep locking the thread on part (A).

(9) Fit the extractor to the valve [as in sub-para. (4) and (5)] and extract part (A) from the assembly.

(10) Remove the valve stem and its surrounding spring.

(11) Reassemble part (A) to the valve assembly and make three new centre punchings to lock it as before.

(12) Procure a short length of very flexible rubber tubing of $\frac{1}{2}$ inch maximum outside diameter and taking care not to disturb the valve assembly nut (C) on the inside of the windscreen, insert it through the hole left by the valve assembly and secure it to avoid displacement.

Note . . .

The end of the rubber tube must not butt hard up to the opposite face of the windscreen glass.

(13) Pass warm dry air at 150°F. maximum and $\frac{1}{2}$ lb/in² pressure through the tube until the windscreen is completely demisted. Continue for one further hour.

(14) Immediately the instructions in sub-para. (13) have been completed the dehydrator valve assembly, now minus the valve stem and spring, is to be refitted to the windscreen, after checking the rubber washer (D) for serviceability and replacing if necessary. The valve assembly should be carefully offered up to the windscreen and gently screwed into the nut (C) on the inside of the windscreen and then tightened using the extractor. Care must be taken not to overtighten, otherwise it could crack the glass.

(15) Refit the banjo bolt and three washers (*2 rubber and one light alloy*) complete with the tube and air drier, which must be filled with fresh silica gel crystals, immediately the instructions in sub-para. (14) are completed. (*Sect. 2, Chap. 2, fig. 3*).

(16) If the valve stem and spring have been removed previously, make up a special bolt to the dimensions shown in fig. 5a.

(17) Operation as in sub-para. 2.

(18) Replace the existing banjo bolt (*Sect. 2, Chap. 2, fig. 3*) with the special bolt and connect an air line to the bolt head using an A.G.S. connector.

(19) Pass warm dry air at 150°F. maximum and $\frac{1}{2}$ lb/in² pressure through the special bolt until the windscreen is completely demisted. Continue for one further hour.

(20) Remove the air line and special bolt and refit the banjo bolt and 3 washers (*2 rubber and one light alloy*) complete with the tube and air drier, which must be filled with fresh silica gel crystals, immediately the instructions in sub-para. (19) are completed (*Sect. 2, Chap. 2, fig. 3*).

Lubrication

22. The lubrication points for the hood mechanism together with the types of lubricant to be used are given on fig. 10.

Bolts securing drag members rear ends to frame 32.

22A These should be examined periodically as follows. After removing the access panels over the port and starboard main plane rear spar pin joints; check that the eight 2 B.A. bolts and their nuts, lying immediately inboard of the pin joint and securing the flanges of the top and bottom drag members, are in place. If any are missing, fulfil a loose article check in the main wheel, and engine bays. Tests have shown that there is no significant loss of strength due to the loss of a bolt or nut and the fitment of new parts can be postponed to the next engine removal; when all eight bolts and nuts should be replaced by new parts.

22B. All eight bolts, nuts and washers should be changed for new parts at each major servicing or partial reconditioning as follows:– Fit new bolts Pt.No. A.25/5C with the bolt heads inboard, new washers Pt.No. SP/15/C and new nuts Pt.No. A.27/CP. Do not overtighten the nuts; if the bolt head or nut is at an angle to the surface, the fixture is satisfactory providing one corner of the bolt head or of the nut is bearing on the metal. Peen the bolt tails over the nuts.

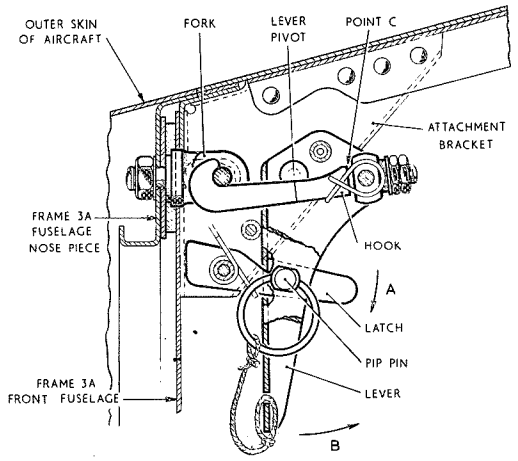

Fig. 6 Typical fastener for fuselage nose piece

REMOVAL AND ASSEMBLY

General

23. The separation of the fuselage at its transport joints and the removal of various components, together with the method of slinging and trestling, is described in the following paras. and shown in the illustrations contained in this chapter. In general, the assembly of the units is a reversal of the removal, but where there is any special feature peculiar to assembly, it is covered in the description.

Removal of nose piece (*fig. 6*)

24. The nose piece is a quickly detachable unit held in position by four fasteners and four locating dowels. To release the fasteners, gain access through the nose-wheel bay, remove the pip pin passing through the lever and latch, and move the latch in the direction of the arrow A to free the lever, which should then be pulled in the direction of arrow B, thus freeing the hook from the fork of the nose piece. The nose piece may now be withdrawn from the front fuselage. On initial assembly, the attachment nuts should be tightened so that they grip the rubber washer without compression. After assembly, a slight gap between the shoulder of the hook and trunnion should be apparent at point C when the lever is locked home; the attachment nuts should then be adjusted if necessary. After assembling the nosepiece to the front fuselage, the four hooks *(painted white)* must be checked through the viewing aperture in the lever to ensure that they have been engaged correctly with the nose piece forks.

25. *Paragraph not applicable*

Removal of tail cone

26. The tail cone is attached to the rear fuselage by four locating dowels and toggle fasteners. The procedure for the removal of the tail cone is described in Sect. 4, Chap.1

Replacement of windscreen front panel

27. Before a windscreen front panel is replaced after removal, all old sealing strips and compound must be removed and the frame cleaned. Attach new sealing *(Ref. 26FX-8418)* with Bostic C, ensuring that the bead seats firmly in the corner of the frame. *(On some aircraft, there is a step between side and bottom frame members. In such circumstances, sealing strip (26FX-8418) should be fitted around the side and top members only, and sealing strip (26FX-8419) at the bottom.)* When the Bostic C is dry, prime the surface of the sealing strip with Boscolite primer No. 9252 and, after this has dried, apply a generous layer of Boscoprene No. 2100. Assemble seal *(26FX/398)* to front panel. *No jointing or sealing compound is to be used between the seal and windscreen.* When the Boscoprene 2100 is partly dry, bed the windscreen in and secure by fitting the finishers. There must be a clearance of 0·05 in. between the edge of the finishers and the edge of the top layer of the front panel. If clearance is insufficient, file the finisher. If it is excessive, fit a new finisher. The finisher attachment screws should be coated with Heldite before assembly.

◀ **Note . . .**

It is important that no sealing compound or jointing compound is permitted to come into contact with the Perspex or laminated glass. To obviate crazing due to contact with solvent vapour given off by the adhesive mask the perspex quarterlights. After replacement of panels, pressure test the cabin in accordance with the instructions given in Sect.3, Chap.8. ▶

Replacement of windscreen quarter lights

28. The procedure for the replacement of the windscreen quarter lights is the same as that for the replacement of the front panel *(para. 27)* except that no sealing strip is fitted to the frame and that Bostic Glazing Compound or Bostic Sealing Compound No. 1222 is used instead of Boscoprene for bedding the panel in.

Removal of front fuselage

29. The procedure for removing the front fuselage from the centre fuselage is as follows :—

(1) *Render the aircraft electrically safe (Sect. 5, Chap. 1).*

(2) Remove the bomb pack.

(3) Remove the aircraft batteries.

(4) Jack and trestle the aircraft *(as shown in Sect. 2, Chap. 4)* with the exception of the front fuselage jack, but with the addition of the trestling for the front fuselage *(fig. 7)* and the centre fuselage *(fig. 8)*.

(5) Remove the radio sets and mounting structure *(Sect. 6, Chap. 1 and 2)*. Unclip and stow all radio cables and connectors which extend between the transport joints.

(6) Unclip, disconnect and stow all electrical cables which extend between the two transport joints.

(7) Dissipate the pressure in the hydraulic system and drain the system *(Sect. 3, Chap. 6)*. Unscrew the unions of the pipes connecting the front and centre fuselage systems and remove the pipes. Blank off open ends of pipes to prevent the ingress of dirt, etc.

(8) Remove the bonding leads, disconnect and remove the pipes of the pitôt installation between the front and centre fuselage. Blank off the open ends of the pipes to prevent the ingress of dirt, etc.

(9) Disconnect the cable and break rod assemblies of the engine controls at the transport joints.

(10) Remove the detachable hood fairing at the forward section of the spine and disconnect the three flying control tubes.

(11) Uncouple the cabin pressurizing pipes connecting the front and centre portions of the fuselage. These pipes should be tied up to support their weight to avoid damage at the forward end.

(12) Remove the stub wing fairings.

(13) Remove the four forward external retaining nuts securing the stub wing nosing to the front fuselage.

(14) Remove the four set screws and streamline spacers from the boundary layer ducts in the air intakes.

(15) Attach the slinging gear and bracing struts to the front fuselage *(fig. 7)* and take the weight on the sling.

(16) Remove the nuts and bolts attaching the front fuselage to the centre fuselage.

(17) The front fuselage may now be swung clear, complete with trestles.

Removal of rear fuselage

30. The procedure for removing the rear fuselage from the centre fuselage is as follows :—

(1) *Render the aircraft electrically safe (Sect. 5, Chap. 1).*

(2) Trestle the aircraft, except the rear fuselage *(as shown in Sect. 2, Chap. 4)*, with the trolley under the rear fuselage *(fig. 9)* and trestles under the centre fuselage.

(3) Pull out the spring loaded bearing cooling outlet pipe and turn to engage the retaining pin against the skin plating.

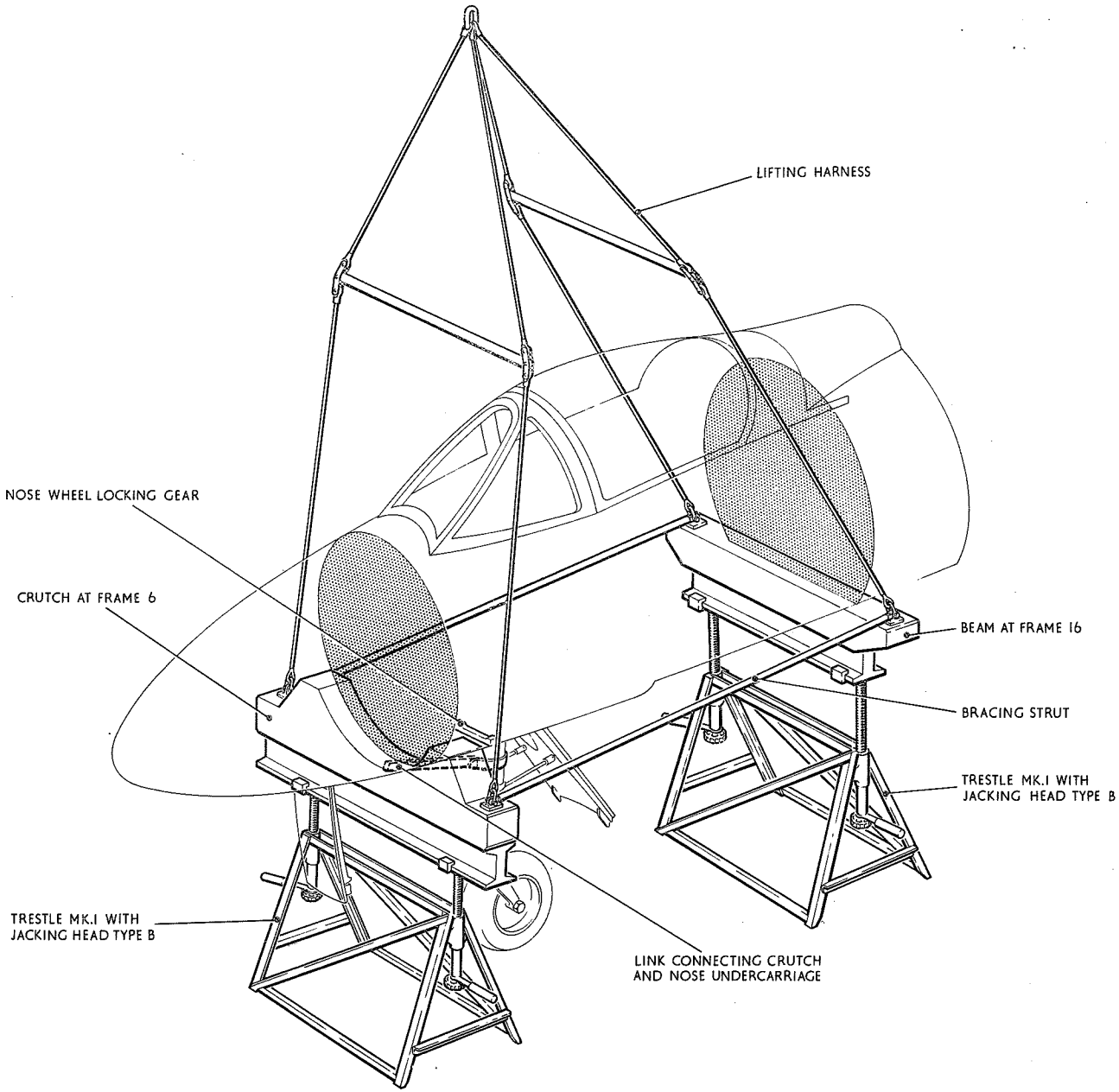

Fig. 7 Slinging and trestling front fuselage

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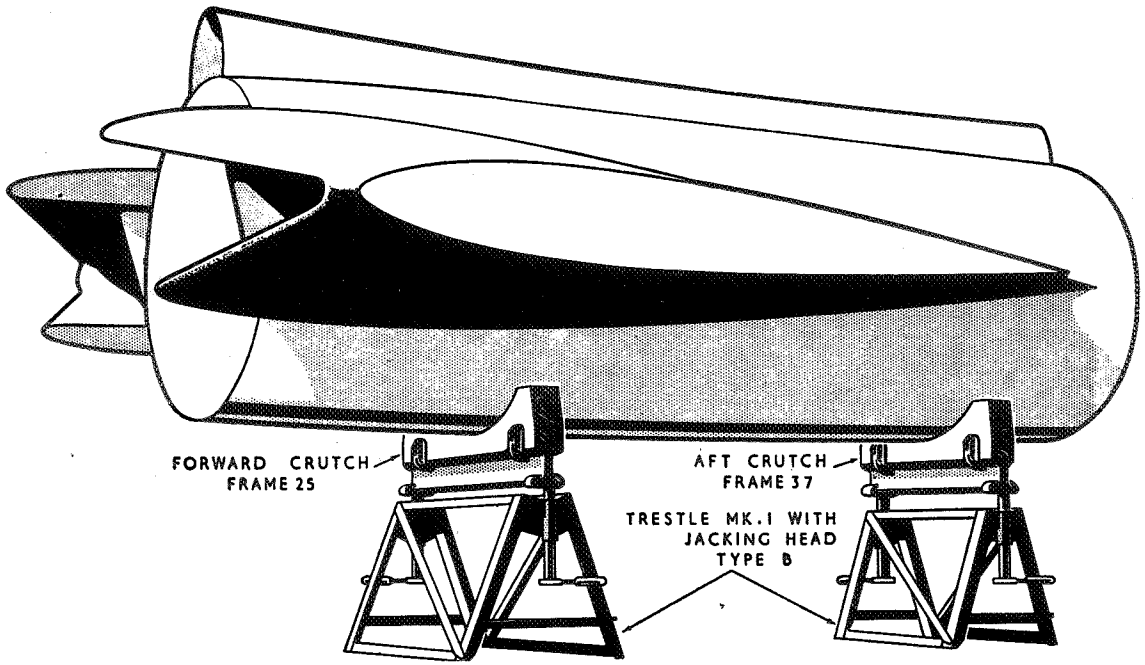


Fig. 8 Trestling centre fuselage

(4) Pull out the engine drain pipe and turn anti-clockwise to engage in the retaining slot.

(5) Remove the port and starboard access panels to the jet pipe coupling.

(6) Unfasten the access doors on the engine casing and loosen the stirrup nut, raise the stirrup and slide the keeper plate downward to release. Close the access doors.

(7) Remove the detachable spine above the rear transport joint and disconnect the flying control rods.

(8) Dissipate the hydraulic pressure and then disconnect the hydraulic couplings in the spine, blank off the open ends and stow in position.

(9) Remove the rear transport joint butt strap.

(10) Disconnect the electrical cables.

(11) Disconnect the hydraulic couplings around the transport joint.

(12) Ensure that the rear fuselage is adequately supported and unscrew the nuts securing the centre to the rear fuselage. The nuts should be undone in opposing pairs and not one by one all the way round.

The rear fuselage is now free from the engine and centre fuselage and may be carefully withdrawn.

Note . . .

Before assembly of the rear fuselage to the centre fuselage, the attachment spigots (Ref. 26FX/721, Part No. F181010) should be checked for tightness, using the special tool (Ref, 26FX/95223, Part No. B.200521). Any retightening of the spigots will necessitate re-peening of the spigot securing nut.
During assembly of the rear fuselage to the centre fuselage, ensure that the chains of the blanking caps for the hydraulic couplings pass under the trunnion bolt of the butt strap.

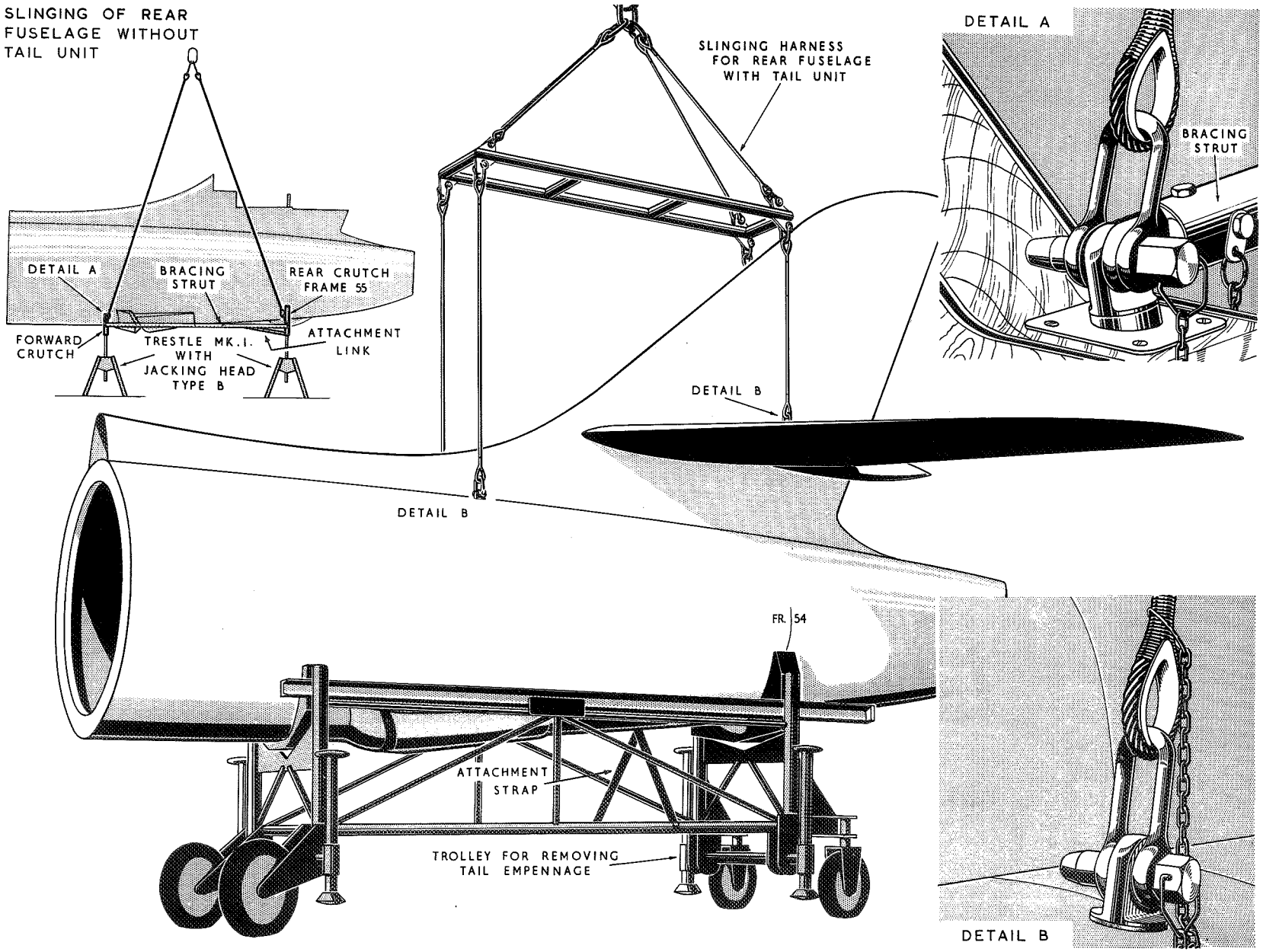
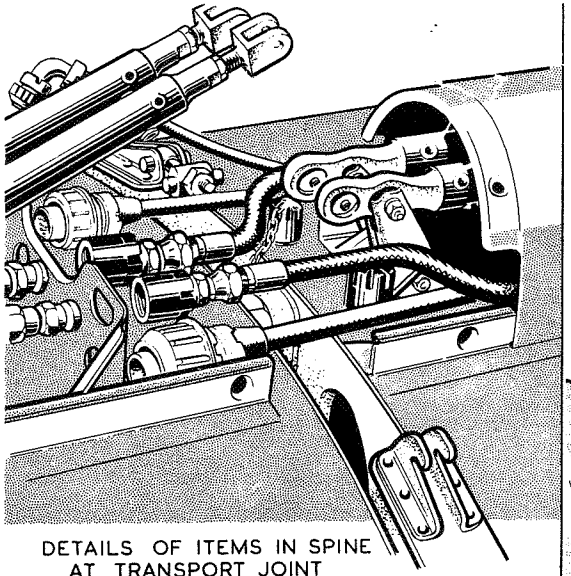
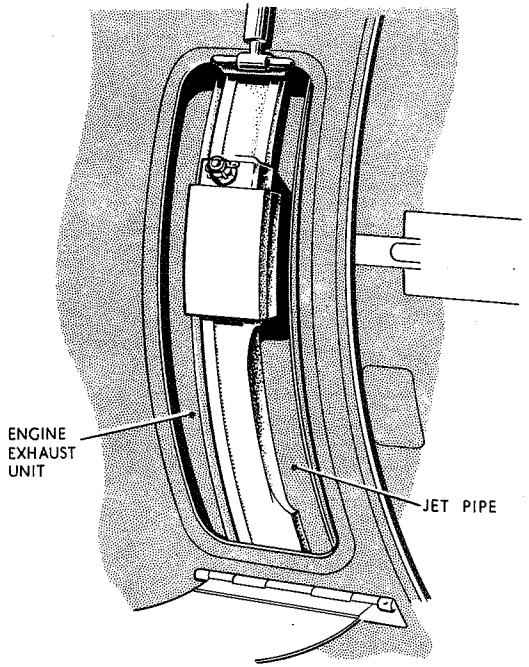


Fig.9 Slinging and trestling rear fuselage

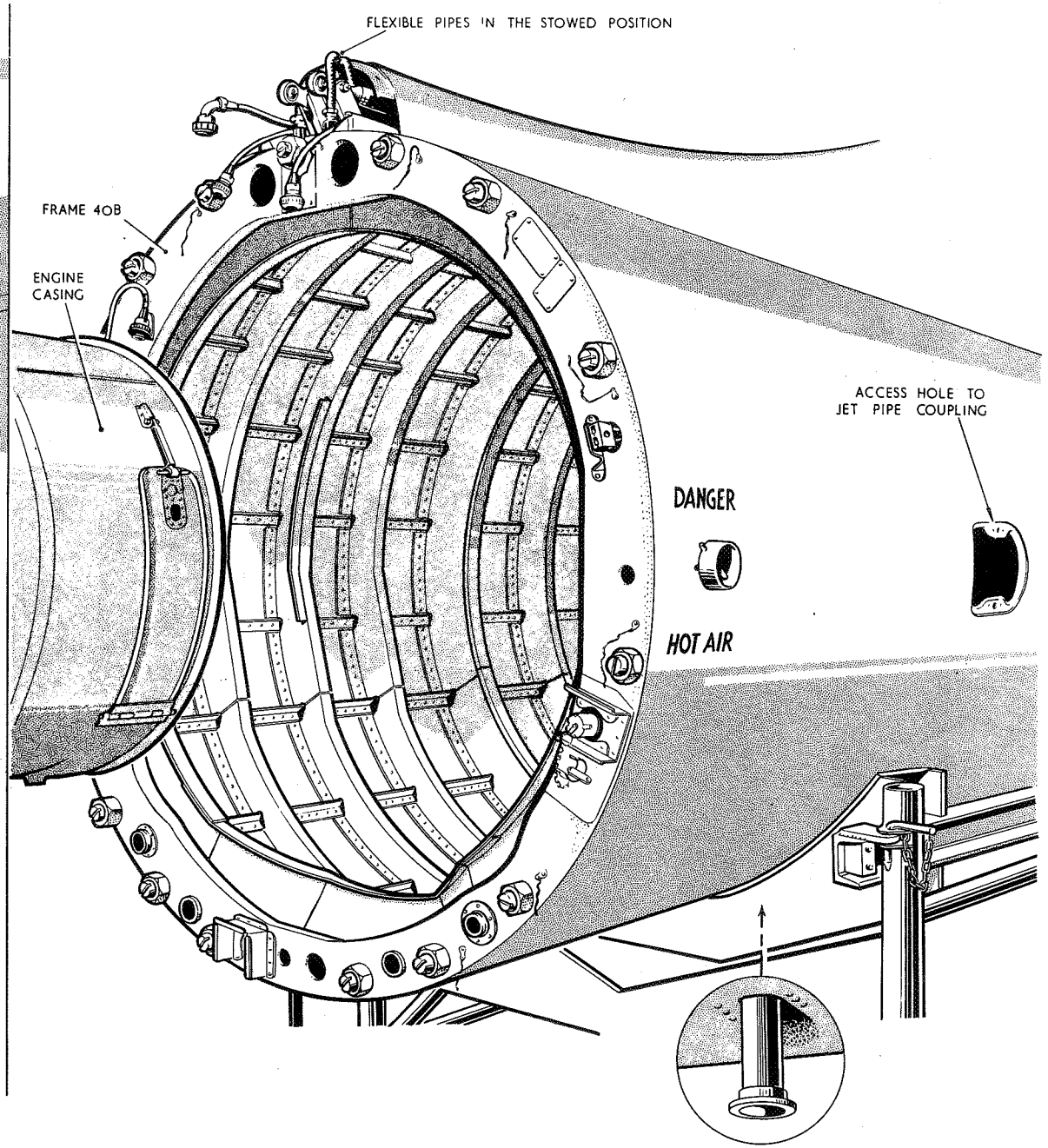
RESTRICTED



DETAILS OF ITEMS IN SPINE AT TRANSPORT JOINT

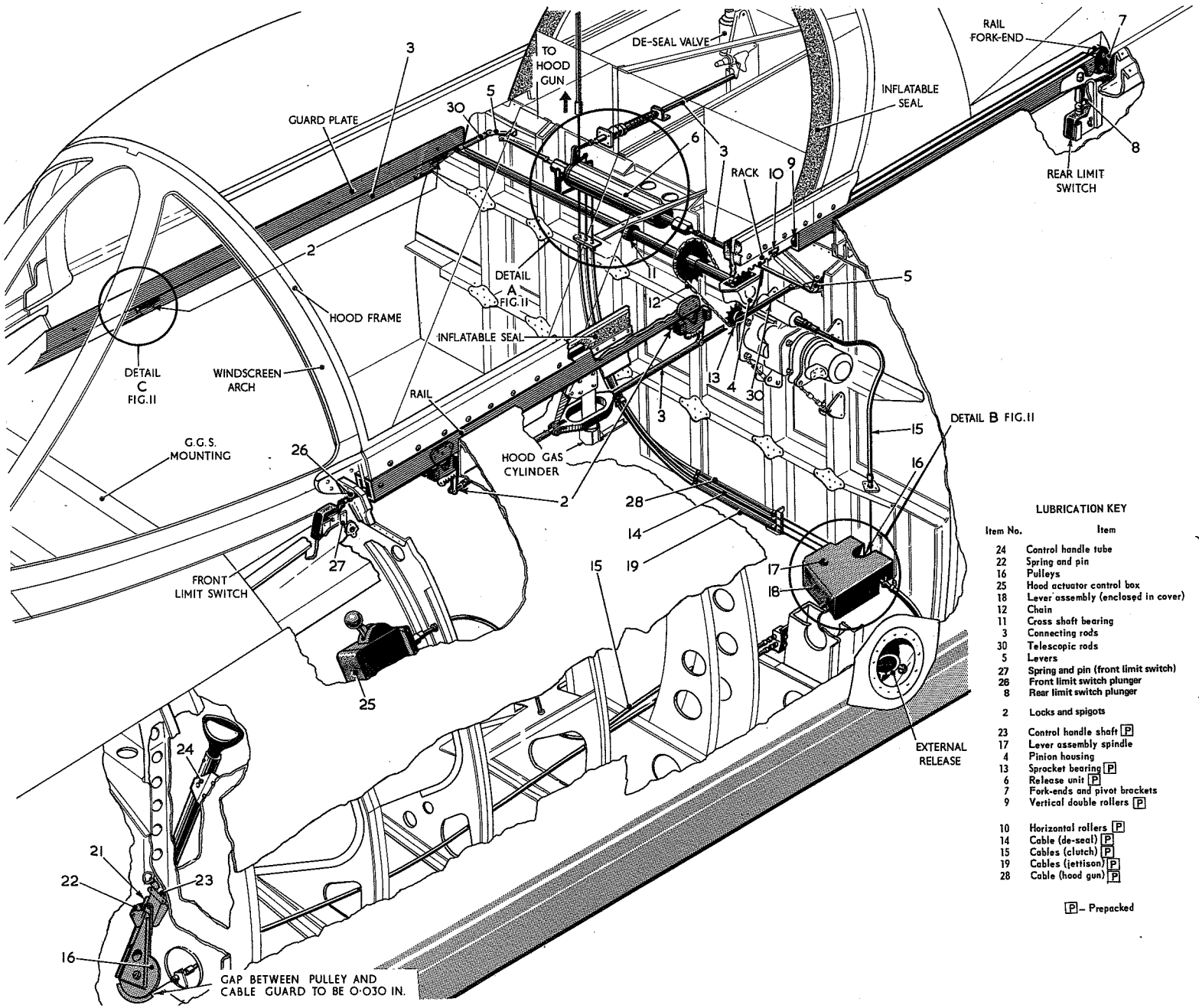


DETAIL OF JET PIPE COUPLING



15780–22504

Fig. 9A Removing rear fuselage



LUBRICATION KEY

Item No.	Item	
24	Control handle tube	Oil OX-14 ○
22	Spring and pin	
16	Pulleys	
25	Hood actuator control box	
18	Lever assembly (enclosed in cover)	
12	Chain	
11	Cross shaft bearing	
3	Connecting rods	
30	Telescopic rods	
5	Levers	
27	Spring and pin (front limit switch)	
26	Front limit switch plunger	
8	Rear limit switch plunger	
2	Locks and spigots	Grease XG-287 □
23	Control handle shaft [P]	Grease XG-273 ◣
17	Lever assembly spindle	
4	Pinion housing	
13	Sprocket bearing [P]	
6	Release unit [P]	
7	Fork-ends and pivot brackets	
9	Vertical double rollers [P]	
10	Horizontal rollers [P]	Grease XG-273 ◣
14	Cable (de-seal) [P]	
15	Cables (clutch) [P]	
19	Cables (jettison) [P]	
28	Cable (hood gun) [P]	

[P]– Prepacked

21941–22424 /11

Fig. 10 Sliding hood, jettison mechanism and controls (1)

◀ Lubricant symbol corrected ▶

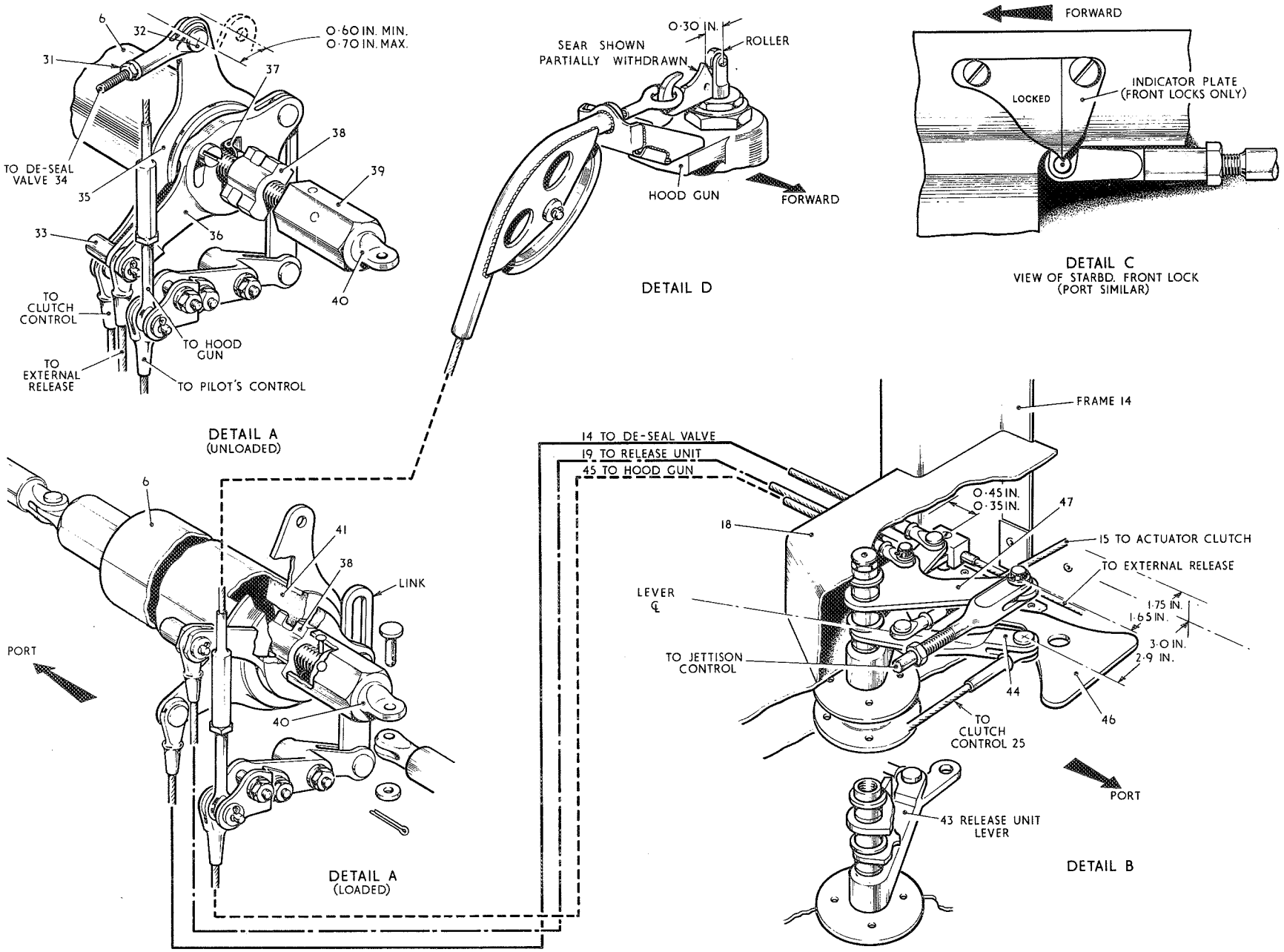


Fig. 11 Sliding hood jettison mechanism and controls (2)

T.P.22574

WARNING

AN AIRCREW EJECTION SEAT IS FITTED TO THIS AIRCRAFT.
Before attempting to enter the cabin ensure that the instructions detailed on the LETHAL WARNING marker card at the front of the handbook have been complied with.

THIS IS VERY IMPORTANT

Removal of sliding hood

Note . . .

Special precautions such as positioning foam rubber or other soft material over the U.H.F. aerial, should be taken during the removal and replacement of the hood to prevent inadvertent contact with the aerial and resultant damage to the hood.

31. To remove the sliding hood, together with the hood rails and without operating the hood jettison mechanism, proceed as follows:–

(1) Render the aircraft electrically safe *(Sect. 5, Chap. 1)*, and check that the safety pin has been fitted in the hood gun sear.

(2) Move the port and starboard inter-connecting rods aft by using the hood lock opening tool *(Part No. A.236181)* as shown in fig. 12, thus causing the hood locks to open fully.

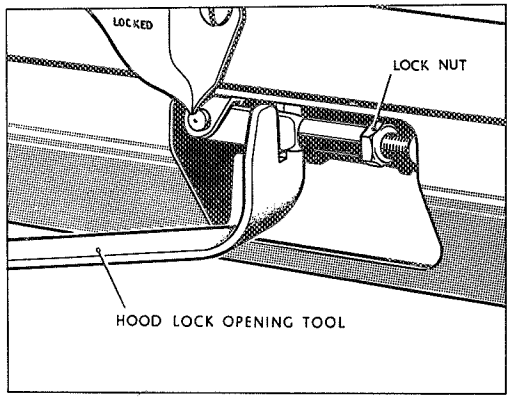


Fig. 12 Hood lock opening tool

(3) Without handling the perspex shell, and taking care not to allow the hood to run on its rails, and not to damage the seals or rail housings, raise the hood and rails at the forward end through approximately 25 deg. to disengage the rail fork ends from the rear pivot brackets. Lift the hood and rails clear of the structure.

Hood lock adjustment

32. The adjustment of the connecting rods to the hood locks should be carried out as follows:–

(1) Disconnect the forward end of the telescopic connecting rods (30) and load the release unit.

(2) Disconnect the forward connecting rods at the forward locks.

(3) Disconnect the centre connecting rods at the rear locks.

(4) Close the hood locks and by viewing through the lock recesses or through the inspection hole in the locks ensure that the lock hood and sear are fully engaged as shown in fig.13.

(5) With the levers from the hood cylinders held fully forward adjust the forward connecting rods until the holes in the forward hood lock levers are in line with the holes in the connecting rods, *unscrew* one half turn, tighten the lock-nuts and assemble the pins.

(6) With the levers from the hood cylinders still held fully forward adjust the centre connecting rods until the holes in the rear hood lock levers and the connecting rods are in line, tighten the lock-nuts and assemble the pins.

(7) Still holding the levers from the hood cylinders forward to fully close the locks adjust the telescopic connecting rods until the holes in the rods are in line with the rear hole in the centre rods and connect. Unscrew the sliding fitting at the aft end of the telecopic connecting rods one half turn, using the spanner flats provided and re-tighten the lock-nuts.

(8) Check again that the lock hooks and sears are fully engaged, if not, re-adjust until this condition is obtained.

Note . . .

It is most important that the hood locks be kept scrupulously clean as any small particle of swarf, etc., lodging on the face of the hook may prevent the sear lever from full engagement giving a false impression of the locked condition. The lock can be examined by shining a light downwards into the lock recess while operating the lock from open to shut.

(9) Check that the indicator plates are correctly adjusted for the hood locked position *(fig. 11, detail C)*.

Note . . .

It is most essential that the lock lever is not moved during this operation. It may be necessary, when fitting a new indicator plate, to re-set the tip of the plate slightly to lie not less than 0.040 in. from the head of the pin. The point should also be trimmed back, if need be, so that the appearance of the indicator pointer and pin is in accordance with fig. 11, detail C.

WARNING

The perspex of spare hoods has a protective coating of latex (Perspex protective lacquer I.C.I. F.962–5005) to prevent damage during transit and storage. The coating should be removed very carefully to avoid damage to the surface of the perspex. Tools or sharp instruments must not be used. Rubbing with the thumb will usually cause the coating to lift locally, the remainder may then be pealed off. In some cases of prolonged storage where the coating has become hard, application of warm soapy water may prove beneficial, or in extreme cases, a small quantity of methylated spirits may be used

Assembly of hood

33. The hood should be assembled to the aircraft as follows:–

(1) Check that the lubrication of the hood rollers, rack, lock spigots, fork ends and pivot brackets has been satisfactorily effected.

Note . . .

Ensure that the seals are in position on the hood lock spigots and the metal discs and sealing tapes on the gas gun cylinders before attempting to fit the hood.

(2) Ensure that the hood rails are correctly engaged at the rear end as far aft as possible before lowering the assembly to engage the rail spigots in the locks, thus eliminating the possibility of damage to the lock housings.

(3) When the hood/rail assembly has been lowered to the aircraft, and before closing the locks, de-clutch the hood motor and move the hood to the forward position. Lift the hood slightly at the rear end, so that the racks on the hood are clear of the drive pinions, then push the hood forward to contact the windscreen frame. This will ensure that when the hood is lowered again the rack on each side will engage correctly with pinions and will not be one tooth out on one side, as can happen if this procedure is not adopted.

(4) Move the hood to the rear position again and (*without handling the perspex shell*) press down the hood rails at the forward locks. Check that the locks are fully engaged by examination of the indicators. The mark in the centre of the pin must line up with the mark on the indicator plate.

Microswitch adjustments *(fig. 10)*

34. Adjust the front limit switch plunger (26) so that the sliding hood comes to rest within 0·10 in. max. of the hood fully forward position when power operated. Push the hood rearward until the tail end of the rack meets the inner face of the rail fork-end, then move the hood forward leaving a gap of 0·35 in. to 0·50 in. and set the rear limit switch to just contact the plunger (8) and tighten the switch in place. Finally, check the functioning of the electrically-operated hood winding system.

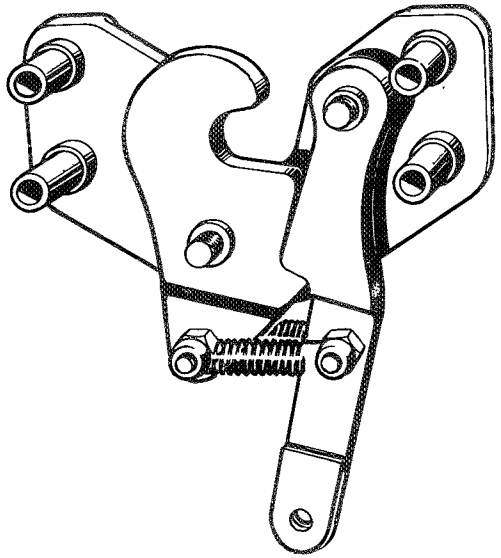


Fig. 13 Hood lock in closed position

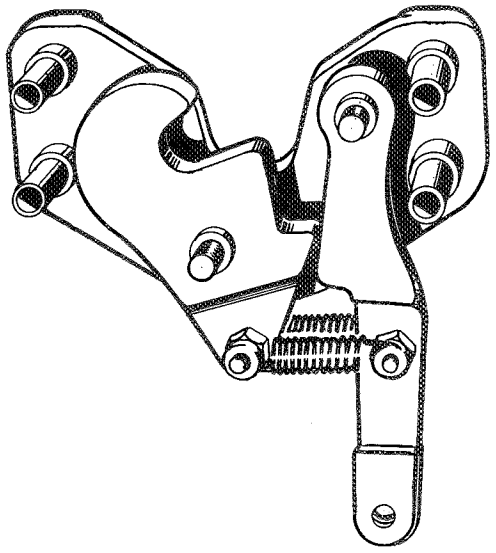


Fig. 14 Hood lock in open position

Unloading the loading release unit *(fig. 11)*

35. To unload the release unit hold the release lever (36) in the loaded position and turn the coupling (39) *anti-clockwise* to the full extent. To load the release unit rotate the coupling (39) in an *anti-clockwise* direction to allow the 'H' nut (38) to enter the hole (37) in the lever (36) and continue rotation, with the lever (36) in the unloaded position, until the nut (38) is flush with the outer face of the lever (36). If the lever (36) will not now turn to the loaded position, rotate the coupling further, in the same direction, until the lever can be freely moved upward to the loaded position *(a minimum upward movement of 25° is necessary). No further rotation of the coupling in this direction is permissible.*

Note . . .

It is important that the lever (36) is retained in this loaded position throughout the rest of the reloading operation to prevent accidental release and possible injury to personnel. Load the unit by rotating the coupling (39) in a *clockwise* direction to the full extent of its travel, to fully compress the spring of the unit, then *unscrew* the coupling one half turn. When the red lines $\frac{1}{8}$ in. wide on the lever (36) and on the release unit body (6) should be aligned. If necessary re-paint taking care not to apply paint to hood de-seal lever (35).

WARNING

The release unit, shown in both loaded and unloaded positions in fig. 11, is loaded when the painted red line on the lever (36) and on the body of the release unit correspond and the spindle (40) is fully extended to the port side.

Adjusting the hood de-seal connecting rod *(fig. 11)*

36. Adjust the connecting rod (34) from the lever (35) to the de-seal valve so that the movement of the jettison lever (36) from loaded to the release position produces a travel of from 0·60 in . to 0·70 in . on the de-seal connecting rod lever (35) Remove pin (32) and set the de-seal lever (35) touching the striking pin (33) with the lever (36) in the unloaded position Push the connecting rod (34) fully rearward and adjust it so that the pin holes of the connecting rod and de seal leve line up Shorten the rod by one turn and re-insert th p'n 32) and tighten the locknut (31) Finally check that the free travel required is obtained

Adjusting hood jettison mechanism (Pilot's release) *(fig. 11)*

37. With the release unit unloaded, adjust the cable to the hood gun so that the peak of the sear is 0·30 in . from the centre line of the roller as shown in fig. 11. With the release unit loaded and the sear inserted in the firing pin, adjust the cable from the release unit to the lever (47) until the centre of the pin connecting the cable from the hood jettison handle to the lever (47) is 1·65 in. to 1·75 in. from the face of frame 14 *(as shown in fig. 11)*. With the jettison handle in its lowest position and maintaining the position of the lever (47), adjust the fork end connecting the cable from the jettison handle to the lever (47) until all slack in the cable is taken up. On aircraft Pre-Mod. 378 check that the operating lever of the gyro gun sight automatic retraction micro-switch is engaged with the latch (21).

Note . . .

The adjusters at each end of the outer casing of this cable are used solely for the purpose of installing the cable in the straightest possible run.

The maximum load applied to the jettison handle to complete the jettison operation must not exceed 55 lb .

Setting of lever (36) for external release cable *(fig. 11)*

38. Adjust the cable (fig. 10, item 19) to the operating lever (36) so that the lever has a minimum travel of 25° and the release unit is released just before the pin on the shackle of the external release cable at lever (43) enters the hole in the catch plate (46).

Setting of lever (43) for external release cable *(fig. 11)*

39. This lever must be set with the pin centre for the external release cable 0·35 in . to 0·45 in . from the face of the port outboard stiffener on frame 14 *(as shown on fig. 11)*.

Setting of lever (44) for hood actuator control and de-seal valve *(fig. 11)*

40. Adjust the cables to lever (44) so that the lever is set with the centre of the pin connecting the cable from the hood actuator control box to the lever 2·90 in . to 3·0 in from the face of frame 14, as shown on fig. 11, at the same time ensuring that adjustments previously made to other units are not upset.

Testing hood jettison mechanism *(fig. 15)*

41. The hood jettison mechanism should be tested as follows:—

(1) Check that the safety pins are fitted into the sears of the hood and seat firing units.

(2) Unload the hood and seat firing units.

(3) Remove the hood as detailed in para. 31. Hold the inter-connecting rods in the fully aft position (beyond the hood lock opening position) by means of pieces of wood wedged between the rear of the gas gun cylinders and connecting rod yokes as indicated.

(4) Remove the P.V.C. tape securing the discs in position over the hood jettison guns under the hood rail housings *(port and starboard)*, remove the discs and retain for later fitment.

(5) Assemble the test union body and washer in place of the firing body on the hood firing unit. Connect the test rig to the union and couple up a low-pressure trolley, Mk. 2 to the rig.

(6) With the test rig release valve closed, run the trolley equipment to charge the trolley air container fully and set the output pressure control valve to give a pressure of 90 lb/in² in the line to be used.

(7) Place a 2 in. by 1 in. piece of hardwood of approximately 3 feet in length across the cabin so that it lies over the pistons of the hood gas gun cylinders, then quickly open the release valve on the rig and check that the pistons of the gas gun cylinders have extended.

(8) Release pressure, remove the wooden wedges and return the pistons to their normal position

(9) Replace the discs over the hood jettison guns *(port and starboard)* and secure by P.V.C. adhesive tape.

(10) Remove the test equipment. Refit the hood. Re-load the firing units and replace the firing body and lock. Replace the safety pins in the sears of the firing unit.

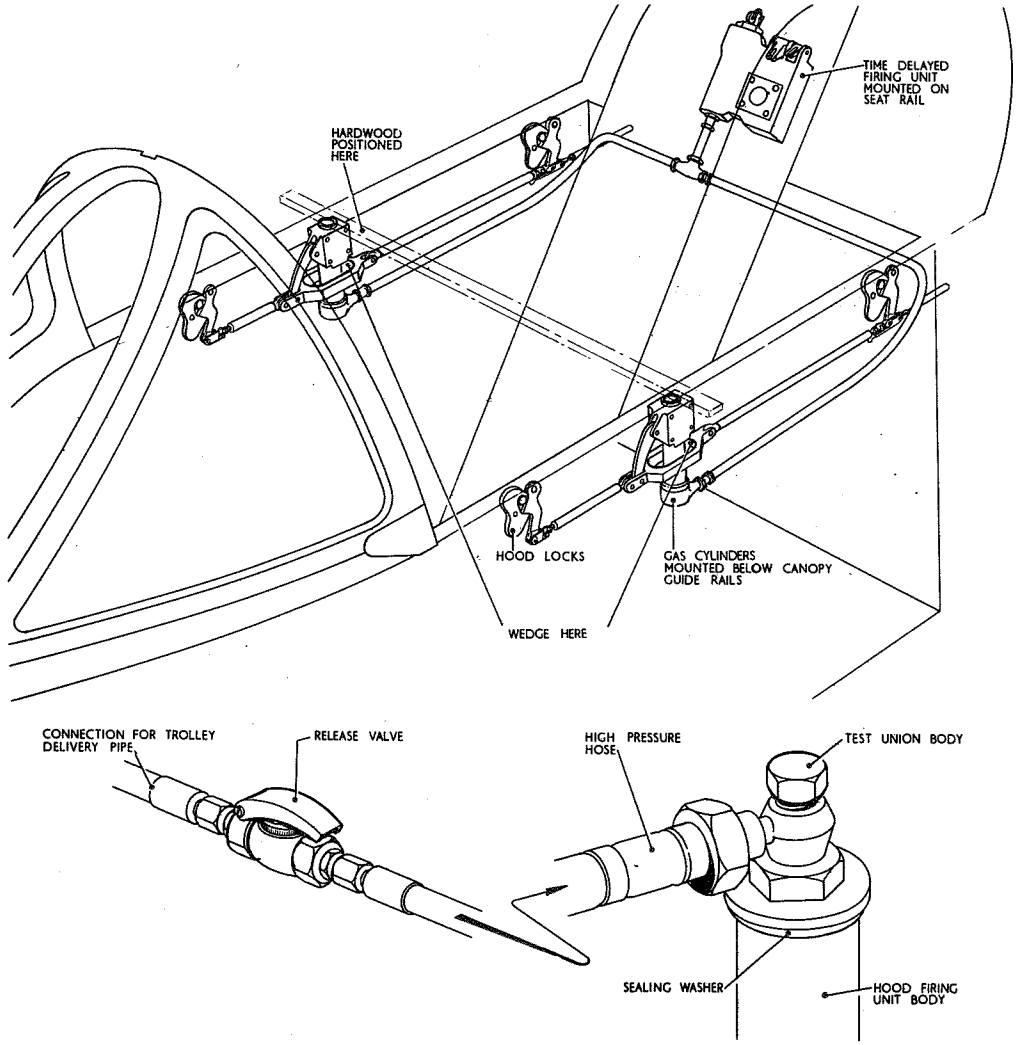


Fig. 15 Testing hood jettison mechanism

Removal of air brake (fig. 16)

42. Jack up the aircraft *(described in Sect. 2, Chap. 4)* and retract the undercarriage. After ensuring that the area below the air brake is free from obstruction, select air brake OUT on the throttle twist grip, and operate the hydraulic handpump until the air brake is fully extended. The air brake can now be removed as follows :—

(1) Select air brake IN to release the hydraulic pressure from the jack.

(2) Ensure that the check chain is securely attached to the aircraft structure and to the jack body.

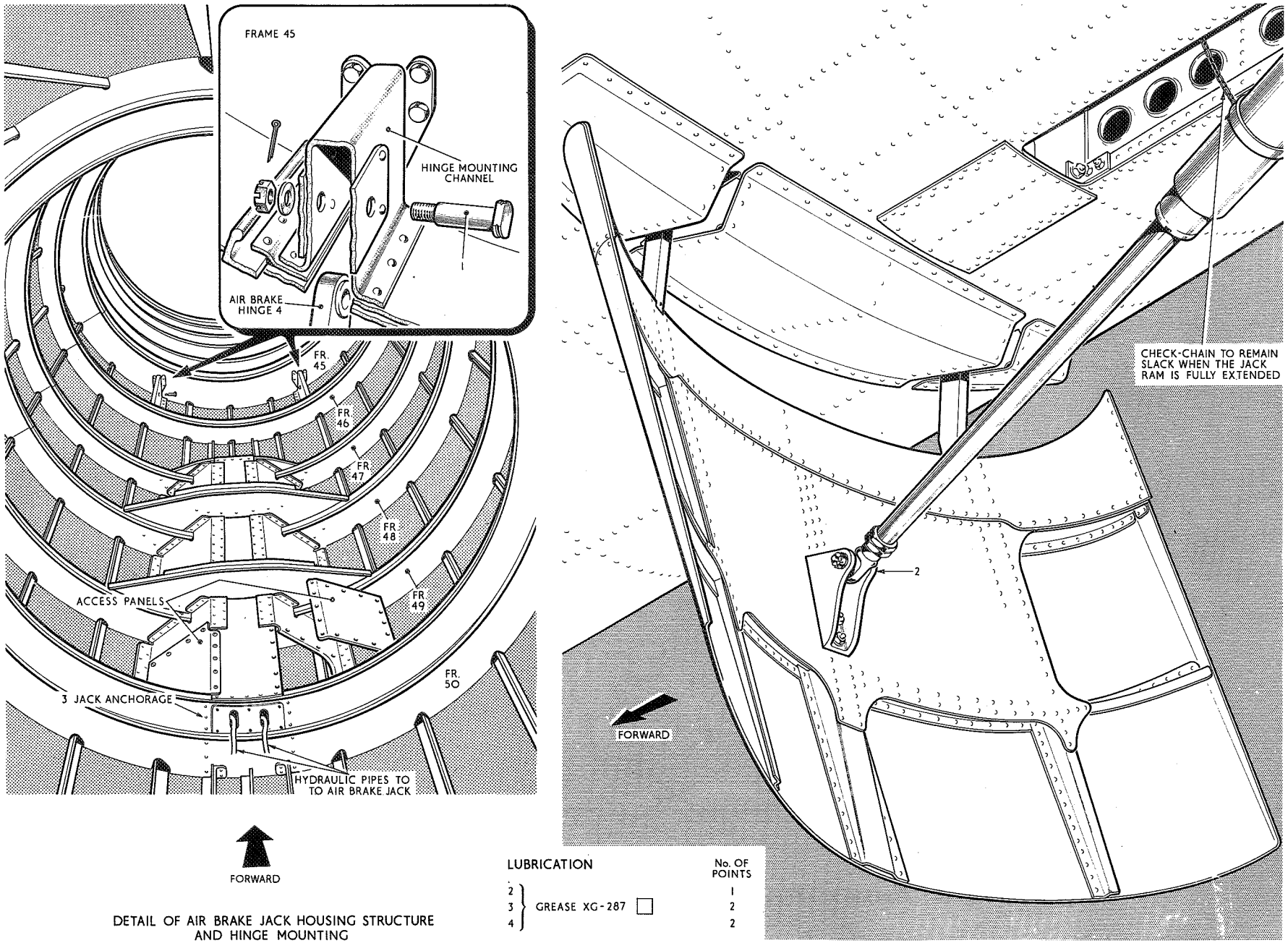
(3) Remove the jet pipe *(described in Sect. 4, Chap. 1).*

(4) Remove the split pin, slotted nut and washer from the pivot bolt (2) and withdraw the bolt.

(5) Support the air brake, and from the inside of the rear fuselage, remove the two pivot bolts (1). The air brake can now be removed.

Fitting the airbrake

43. When fitting the airbrake it is important that the operating jack should be correctly set in accordance with Sect. 3, Chap. 4.



DETAIL OF AIR BRAKE JACK HOUSING STRUCTURE AND HINGE MOUNTING

LUBRICATION		No. OF POINTS
2	GREASE XG-287 ☐	1
3		2
4		2

Fig. 16 Removing the air brake

⟨ Lubricant changed to XG-287 ⟩

14433–22423/1

Loose bolts in air intakes

44. The bolts securing the detachable panels in the air intakes *(fig.17)* are to be checked at regular intervals for tightness. Ensure that the panels are held firmly against the aircraft structure and that all bolt heads seat firmly on the panels (the bolts are not thread-bound).

45. The assembly of the attachments was affected by STI/Hunter/408. The incorporation of the STI cannot be physically checked without disassembly but if disassembly is necessary, because of defects or for any other reason, ensure that the following requirements are complied with:–

(1) The bolts at A screw into anchor nuts AGS 2007/C/1 mounted on the leading edge members *(fig.3)*. Check that 18 s.w.g. packing pieces are present between the anchor nuts and the structure; if not, remove the anchor nuts and make up packing pieces (shaped to suit) from L.72 aluminium alloy sheet and fit. Use rivets AS 164/306 (3/32 in. dia. x 3/8 in. long) for securing the anchor nuts, which are to be renewed.

(2) Bolts A are to be AS 1242-2C.

(3) Bolts B are to be AS 1242-1C fitted with nuts A 27-C-P, peened to lock. Tighten and re-peen if found loose.

(4) Bolts C are to be A 25-2C fitted with washers SP 16-C.

(5) All other bolts are to be AS 1242-1C.

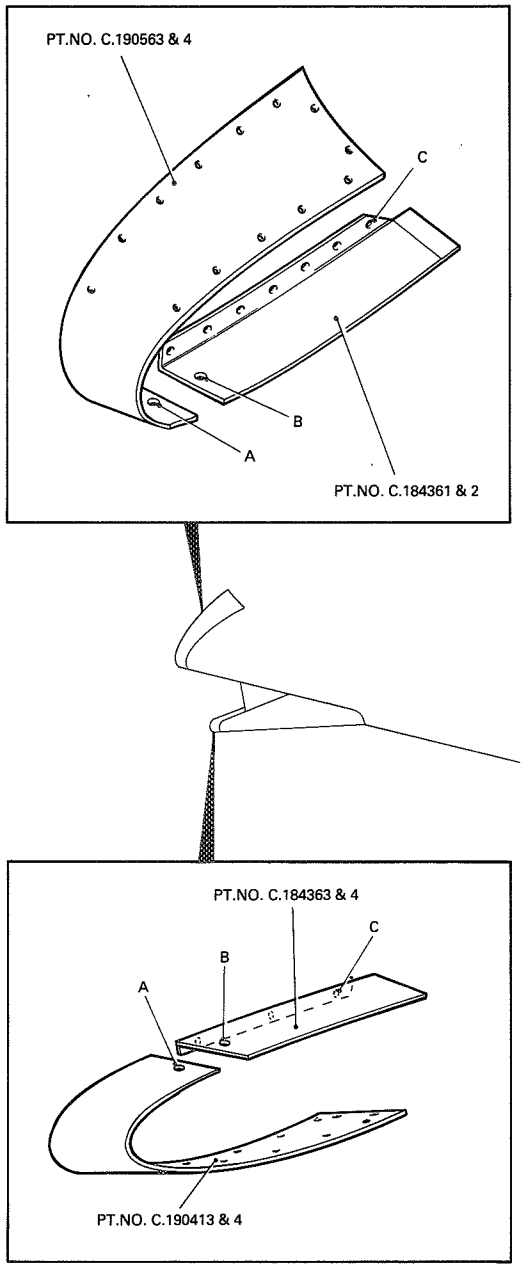


Fig. 17 Panels in air intakes

APPENDIX 1 - P R MK.II FUSELAGE

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

Introduction

1. This appendix contains information peculiar to the P R Mk. 11 fuselage.

DESCRIPTION

General

2. The detachable nose piece houses three F.95 reconnaissance cameras and the intervalometer.

Nose piece and front fuselage (fig. 1 and 2)

Nose piece structure (fig. 1)

3. The fuselage nose piece houses the vertical/forward-facing camera installation and encloses the sideways facing camera and intervalometer installations which are located on mountings attached to the forward face of frame 3. Forward of frame 1, the nose piece extends to terminate in a window through which the front camera focuses when installed facing forward. A downward vision window between frames 1 and 2 enables the front camera to be used in the alternative vertical position, but only when fitted with a 12 in. lens. Two further windows, one on the port and the other on the starboard side of the structure are provided for the focusing of the two sideways facing cameras.

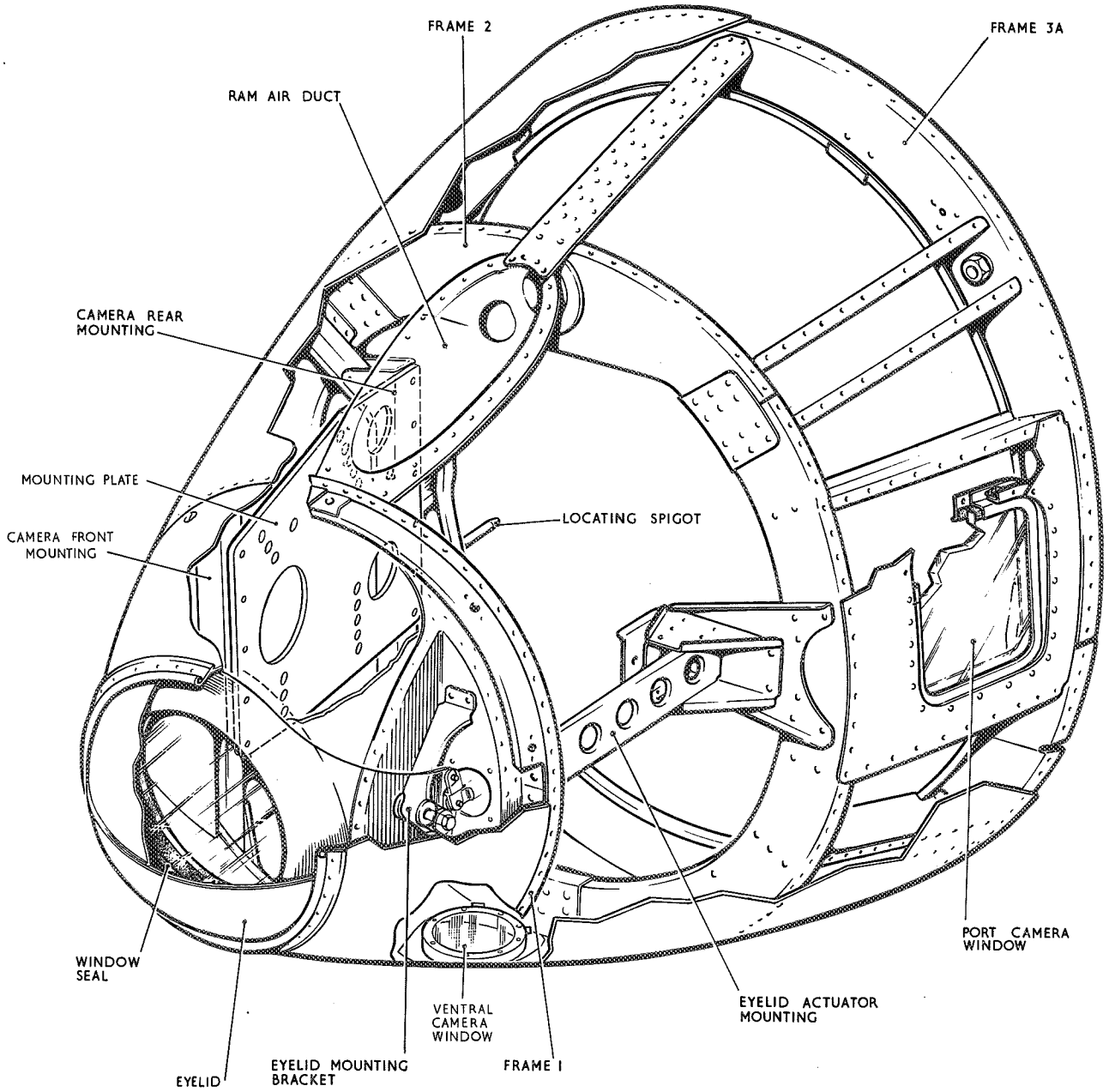


Fig.1 Front fuselage nose piece

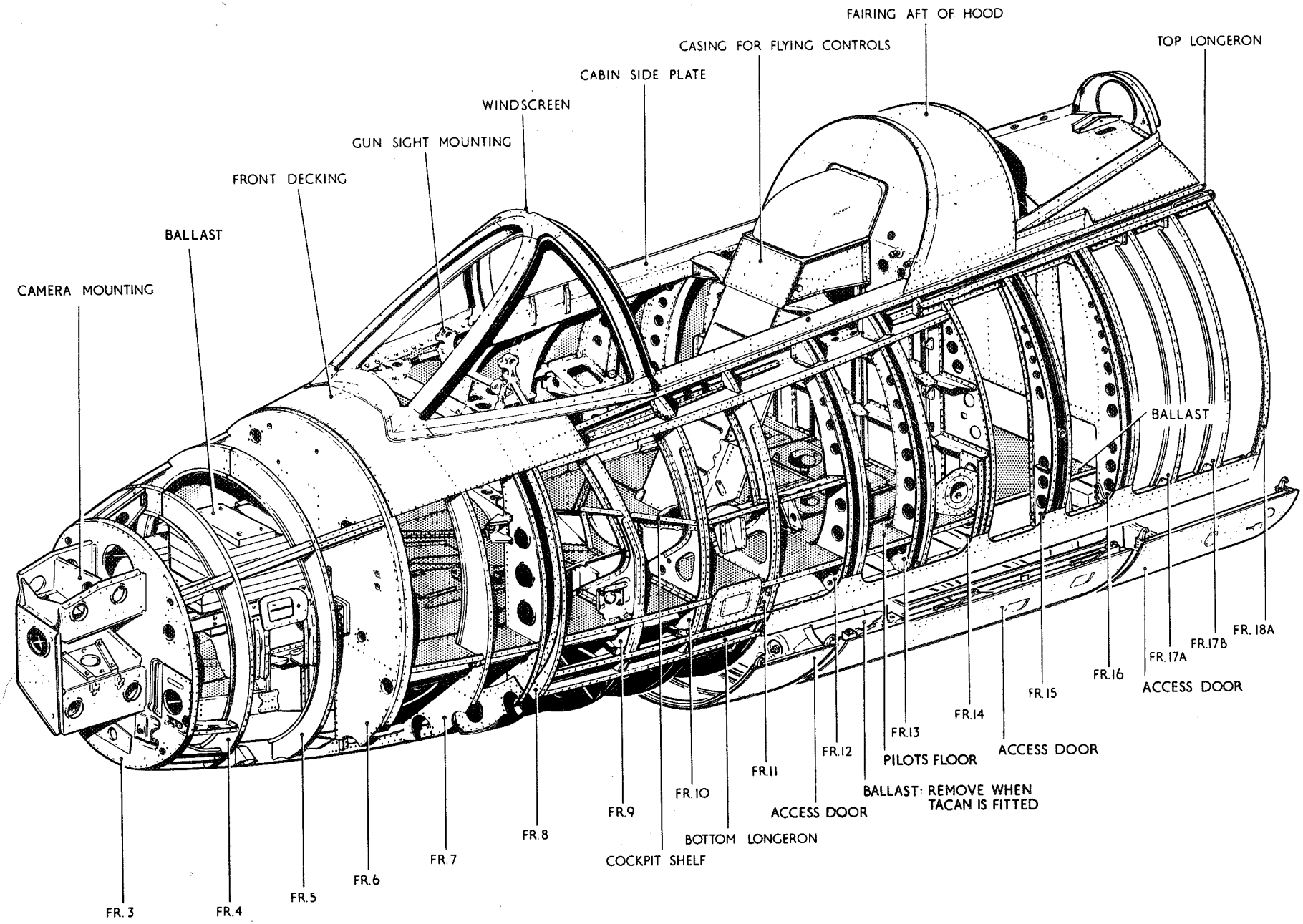


Fig.2 Front fuselage

15787–22506

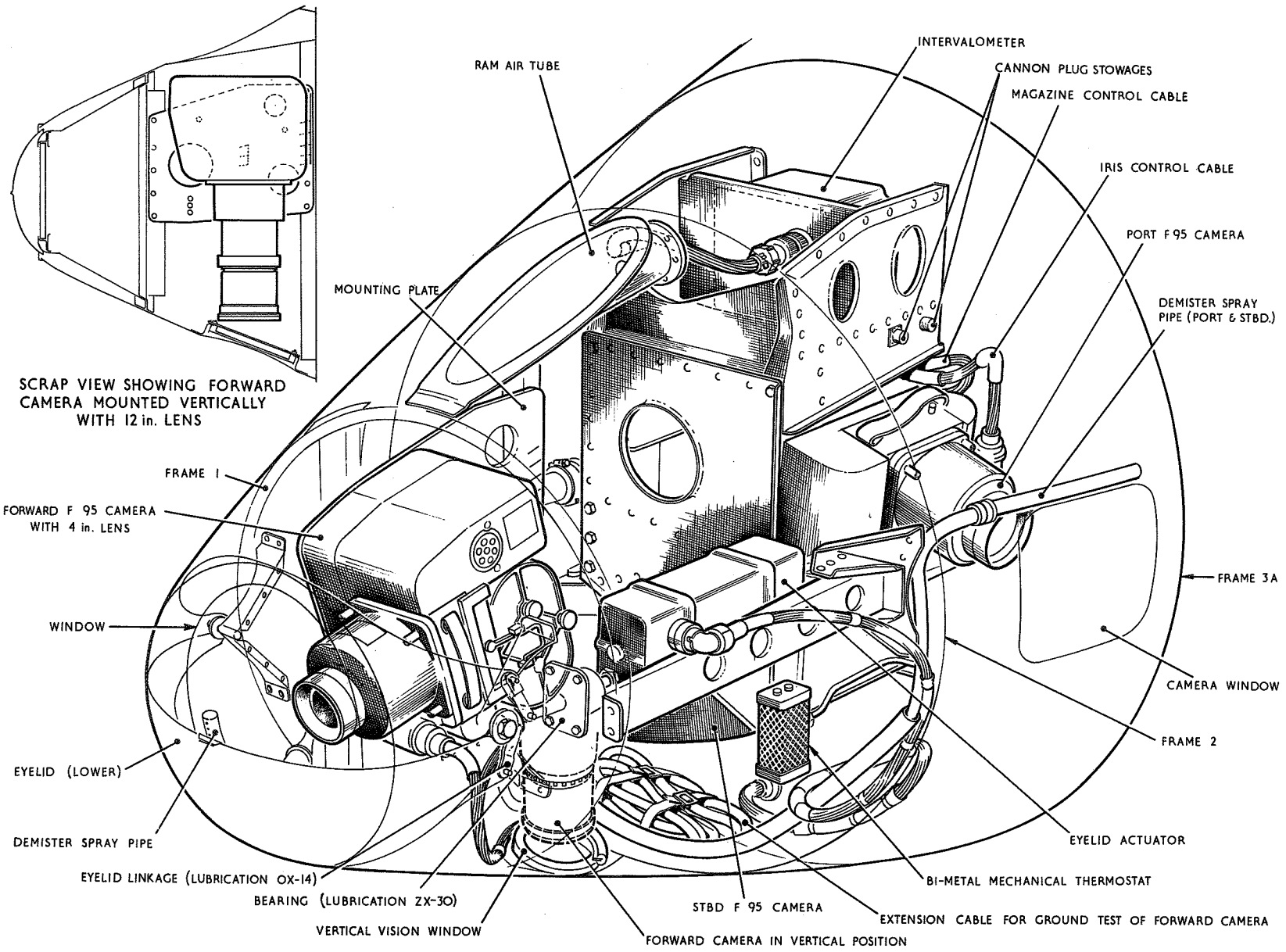


Fig.3 Camera installation

◀Lubrication detail corrected▶

18926–22471

Camera mountings (fig. 3)

4. A vertical plate, bolted to structure attached to frames 1 and 2 on the starboard side of the nose piece, forms the mounting for the front camera. Two rows of holes in the mounting plate provide for alternative fore and aft location of the camera in a forward facing direction to suit the focal length of the lens to be used and the angle of depression required. Two further holes in the mounting plate enable the camera when fitted with a 12 in. lens to be installed vertically. Another mounting plate supported on channel sectioned members attached to frames 1 and 2 on the port side of the structure, accomodates an electrical actuator which operates, through suitable linkage forward of frame 1, eyelids which normally enclose the forward facing camera window. The mountings for the sideways-looking cameras and the intervalometer are described in para. 6.

Camera windows (fig. 3)

5. The forward-facing camera window is located in the extreme nose of the structure forward of frame 1. Eyelids forward of the window complete the fairing of the nose piece and protect the window from foreign matter when the camera is not being operated. The eyelids are opened and closed by means of an electrical actuator which is itself controlled from the camera electrical circuit (*Sect. 5, Chap. 1*). The sideways-facing camera windows are located in the nose piece skin between frames 2 and 3A, port and starboard, the vertical window is located between frames 1 and 2; no eyelids are provided for covering these windows. All four windows are provided with spray pipes for de-misting purposes, these being fed with warm air which is tapped off the engine, this warm air also maintains a reasonable working temperature in the camera bay to prevent the cameras freezing. The supply pipe feeding the window sprays is connected to the heating supply pipe in the front fuselage at frame 3. This connection is automatically broken when the nose piece is removed from the remaining structure, and is automatically reconnected again when the nose piece is reassembled to the aircraft. A hot air valve situated between frames 4 and 5 on the starboard side of the front fuselage in conjunction with the Bi-metal control unit automatically controls the amount of warm air flowing to the camera bay. When the temperature of the camera bay exceeds $20 \pm \frac{5}{0}$ deg centigrade the Bi-metal control unit or mechanical thermostat (*fig. 4*) completely closes the hot air valve (*fig. 5*).

Front fuselage structure

6. Frame 3, which forms the attachment point of the nose piece, accommodates the mountings for the two sideways-facing cameras and the intervalometer on the forward face of the frame. The mountings are contained in a box-like structure attached to the frame, and the whole assembly is reinforced by webs and support members. The sideways-facing cameras are positioned one above the other in the mounting structure and are located there by wedge plates to which they are held in engagement by keeper plates suitably tensioned by wing nuts. The intervalometer is mounted above the sideways-facing cameras in the mounting structure.

(Continued overleaf)

Bi-metal control unit (fig. 4)

7. The Bi-metal control unit (mechanical thermostat) consists of two opposed bi-metal strips which change shape depending upon variation in the temperature of the surrounding air and an air jet the effective area of which is controlled by the movement of the bi-metal strips. The bi-metal strips are joined at one end by a distance piece, the whole assembly being free to pivot on a hinge pin. A beam assembly, loaded against the bi-metal assembly by a torsion spring, incorporates a plunger adjusted to seat on the jet through which air flows from the chamber above the diaphragm in the hot air control valve (*fig. 5*). At its free end the bi-metal assembly bears against an adjustment screw in the beam carrying the plunger. The adjustment screw enables the unit to be set to the required operating temperature. The unit is enclosed by a mesh cover retained in position by two end plates. The operation of the unit is explained in para. 8.

Hot air valve (fig. 5)

8. The valve consists of three castings, the largest of which houses a diaphragm operated disc valve. A filter and restrictor incorporated in the head of the hollow valve stem allow the passage of a limited flow of air to the top of the diaphragm. The diaphragm cover is threaded to take a union for the control pipe to the bi-metal control unit (*fig. 4*), while the underside of the diaphragm is vented to atmosphere. The valve seating is sandwiched between the main body of the valve and the inlet connection. The valve is spring loaded to the open position, and in this condition offers no restriction to the flow of hot air from the camera heating pipe connection on the engine. The air which passes through the valve stem escapes through the control pipe and the open jet in the bi-metal control unit (*fig. 4*). As the temperature in the camera bay rises, the control jet in the bi-metal control unit is progressively restricted by the expansion of the bi-metal strips. This creates a rising back pressure in the control pipe which acts on the top of the diaphragm, off loading the spring pressure and moving the valve down to restrict the flow of hot air. If the temperature rises sufficiently to close the control jet completely, the pressure above the diaphragm is sufficient to move the valve right down on its seating to cut off the supply of hot air.

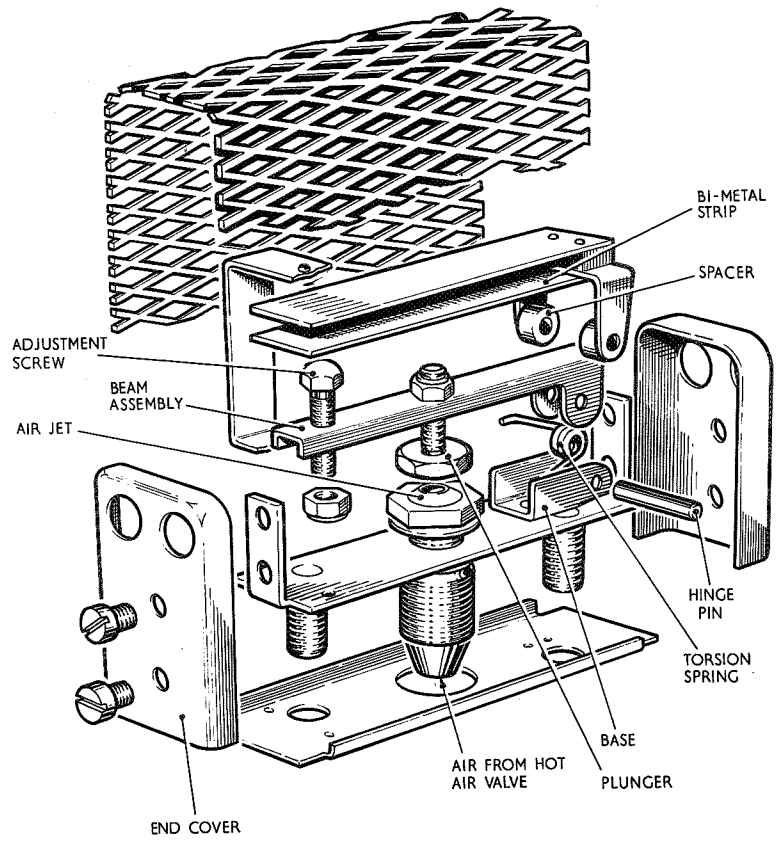


Fig. 4 Bi-metal control unit—mechanical thermostat

SERVICING

Testing the camera heating bi-metal control unit

9. To test the camera heating bi-metal control unit proceed as follows :—

(1) Remove the nose piece as described in para. 10.

(2) Remove the end cover from the bi-metal control unit.

(3) Apply an air pressure of 75 lb/in^2 to the camera heating pipe at the engine connection (*Sect. 4. Chap 1, fig. 7*).

(4) With a thermometer close to the bi-metal unit, alternatively warm and cool the unit with a hot/cold air blower and note the temperature at which the valve closes to prevent air flowing to the camera bay. The valve should close at $20 \pm \frac{5}{0}$ deg centrigrade.
(5) If necessary use the adjuster on the end of the bi-metal control unit beam to obtain the correct closing temperature. Lock the adjuster after adjustment.
(6) Remove the thermometer, hot/cold air blower and replace the end cover. Refit the nose piece.
(7) Disconnect the air pressure supply from the camera heating pipe, re-connect the camera heating pipe to the engine connection, and after tightening, lock the coupling nut with stainless steel locking wire.

Removal of nose piece

10. The nose piece is a quickly detachable unit held in position by four fasteners and four locating dowels. Before releasing the fasteners, unscrew the electrical connector from the socket located in the nose wheel bay at the bottom of frame 3.

Dismantling the bi-metal control unit (fig. 4)

11. The dismantling of the bi-metal control unit is obvious but care must be taken to :—

(1) Ensure, when unsoldering the bi-metal assembly at the hinge pin, that solder is not allowed to run between the spacers and the hinge pin.
(2) If it is necessary to remove the adjusting screw and the plunger from the beam assembly, note the position of the adjusting screw and its locknut, and the position of the plunger and its locknut, so that they can be assembled to the correct adjustments.

Assembly of the bi-metal control unit (fig. 4)

12. During assembly of the bi-metal control unit ensure :—

(1) That the adjusting screw and plunger are assembled to the beam so that the adjustments noted at para. 11 are correct.
(2) Assemble the torsion spring, beam, spacers and bi-metal assembly with the hinge pin to the base and lightly solder the bi-metal assembly to the hinge pin ends, taking care that the spacers are free from solder.

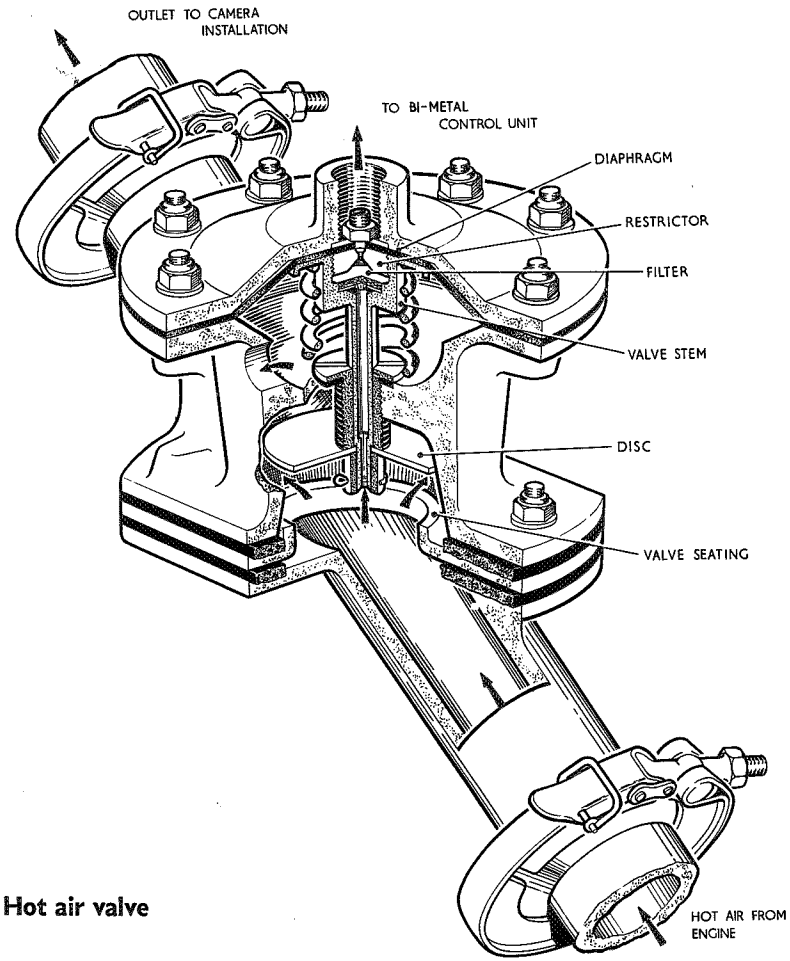


Fig. 5 Hot air valve

Dismantling and assembly of the hot air valve (fig. 5)

13. The dismantling of the hot air control valve is obvious. During assembly the sealing washers are to be lightly coated with sealing compound and care must be taken to ensure that the valve seat is offset towards the outlet connection as valve seating is not concentric with the valve spindle.