TL.122-56/07
#4849

Date: 9/7/56
Issue: 1

C-100 MK. 5 AIRCRAFT

BASIC AIRCRAFT ORIGINS - 'CO-ORDINATES'

'AIRCRAFT AND LOCAL SYSTEM'

CODE (1)	IDENTITY	DESCRIPTION	AIRCRAFT SYSTEM Y_F	X_F	Z_F	LOCAL SYS.	LOCAL X	LOCAL Y	LOCAL Z
	A-1	Aircraft	0.000	0.000	0.000				
	A-2								
	A-3								
	A-4								
	$A\text{-}5_F$	Fuselage	0.000	0.000	0.000				
	A-6	Canopy	0.000	103.750	20.72				
	$A\text{-}7_W$	Wing	75.000	274.467	-20.34				
	$A\text{-}7_F$	Wing C/S	0.000	274.467	-20.34				
	A-8	Nacelle	52.500	144.500	0.000				
	$A\text{-}8_J$	Jet Pipe							
	$A\text{-}9_{VE}$	Vert. Emp.	0.000	561.410	0.000	Rud.	-9.00	-41.09	0.00
	$A\text{-}9_{HE}$	Hor. Emp.	0.000	613.2363	46.0009	Rud.	39.00	8.89	0.00
	$A\text{-}10_{ELV}$	Elevator	0.000	613.2363	46.0009	Rud.	39.00	8.89	0.00
	$A\text{-}11_{AIL}$	Aileron	192.8608	318.3724	-15.3265	W	117.3221	43.7591	0.00
	$A\text{-}12_{RU}$	Rudder	0.000	602.822	7.380	VE	0.00	41.241	8.282
	$A\text{-}13_{DB}$	Dive Brake	83.5979	329.3669	-21.3268	W	8.6097	54.9069	0.00
	$A\text{-}14_{MUC}$	Main A/C	65.000	294.2288	-22.0579				
	$A\text{-}15_{NUC}$	Nose U/C	0.000	70.4750	-19.2900				
	$A\text{-}16_{FT}$	Fuel Tank	314.3559	162.2953	- 7.8042	W	239.53	-112.4614	-2.9449
	A-16								
	$A\text{-}17_{RP}$	Rocket Pod	354.3079	274.8031	- 5.7059	W	279.6912	- .0471	0.00
	A-17								
	$A\text{-}18_{FLAP}$	Flap O/W	84.5889	337.7733	-21.4950	W	9.6021	63.3148	0.00
	$A\text{-}19_{FLAP}$	Flap C/S	0.000	332.030	-27.530				
	$A\text{-}20_{ENG}$	Orenda	52.500	211.120	.350				
	$A\text{-}20_{ENG}$	Series 11							

(1) See Sht. 3 for Axis Direction (N.A.C.A. Standard).

AERODYNAMIC DATA
C-100 MK 5 AIRCRAFT

TAIL y

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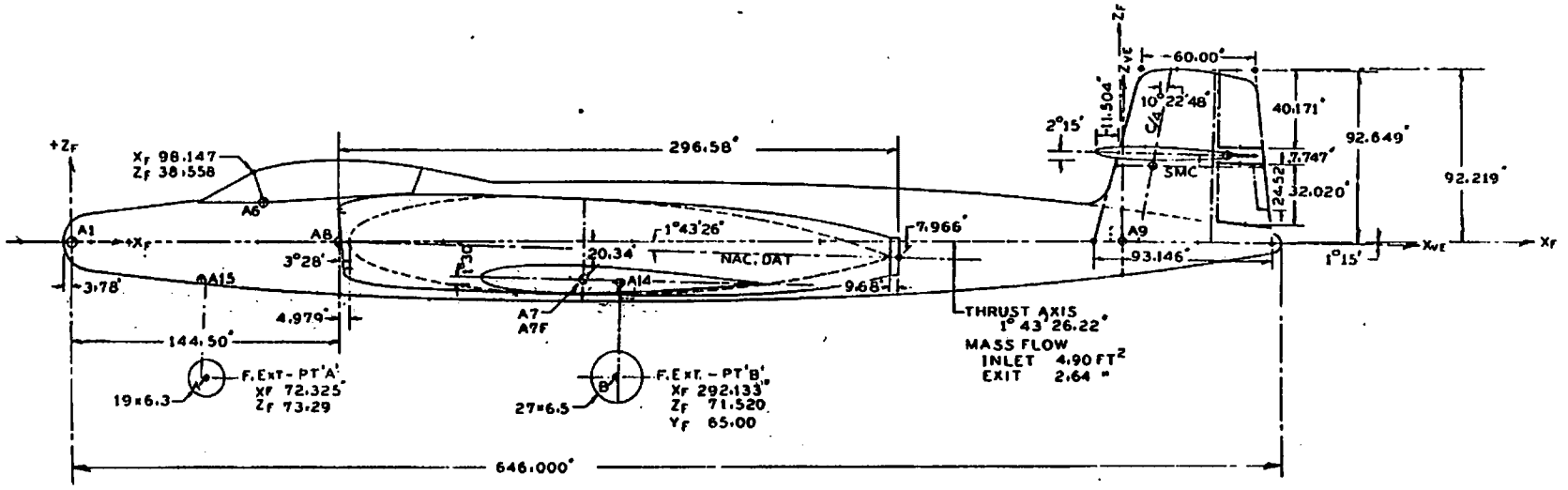
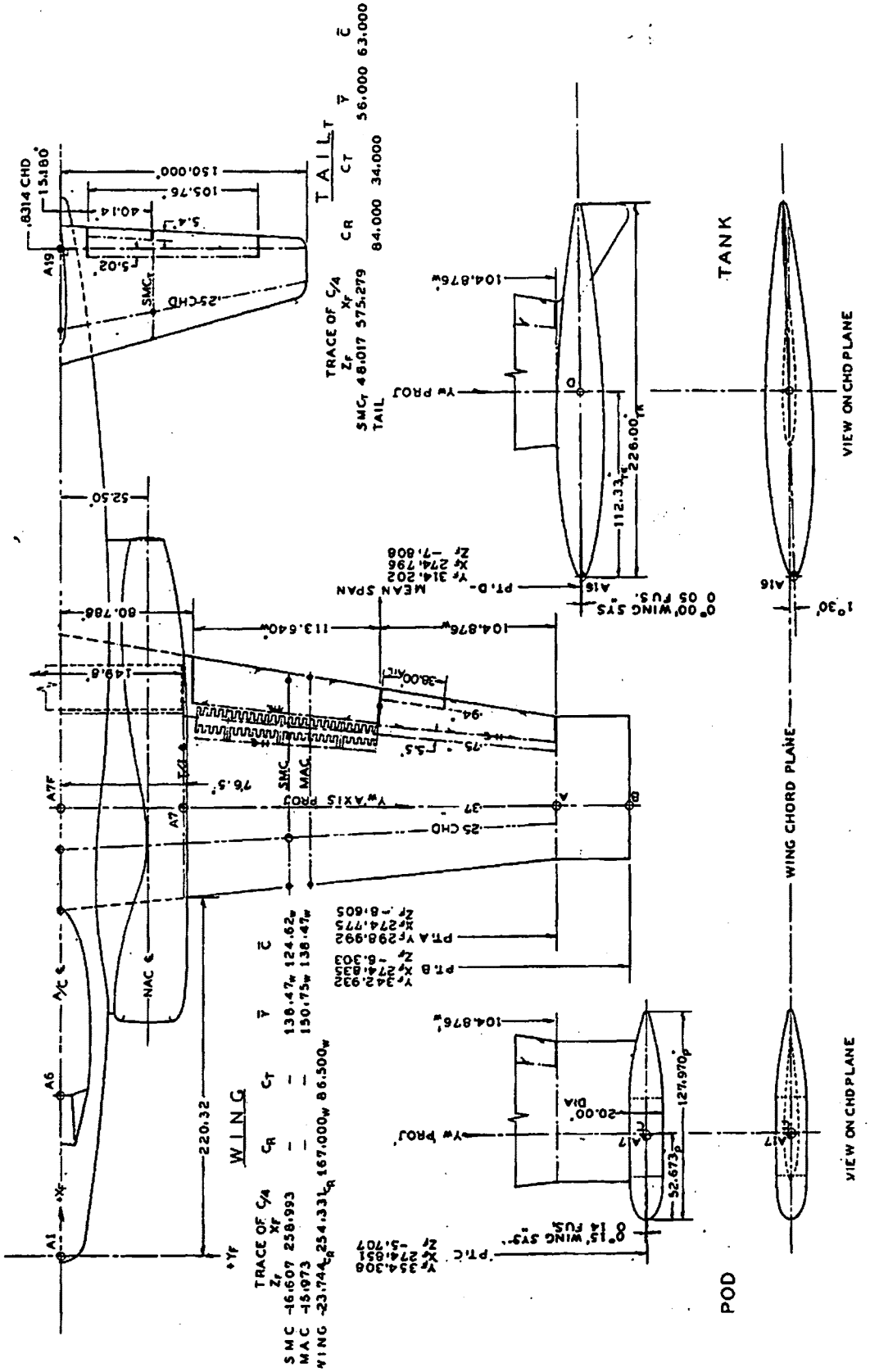
SMC					42.982	76.570
TAIL			93.146	60.00		



AERODYNAMIC DATA
C-100 MK 5 AIRCRAFT

NACA DIREC$_N$ AXIS
STANDARD IN THIS REPORT



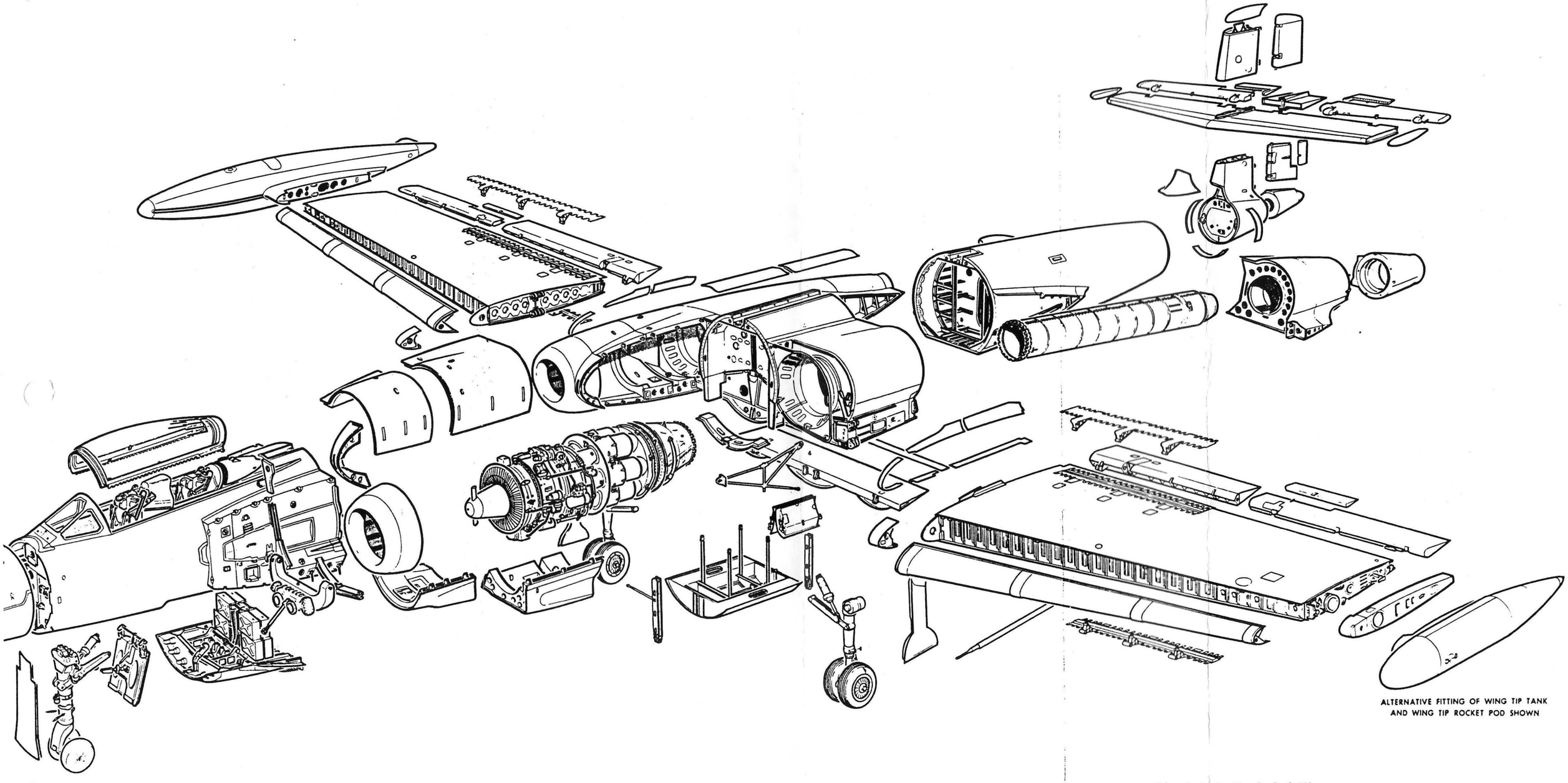


Fig. 1-1-1 Exploded View

4849 - 2

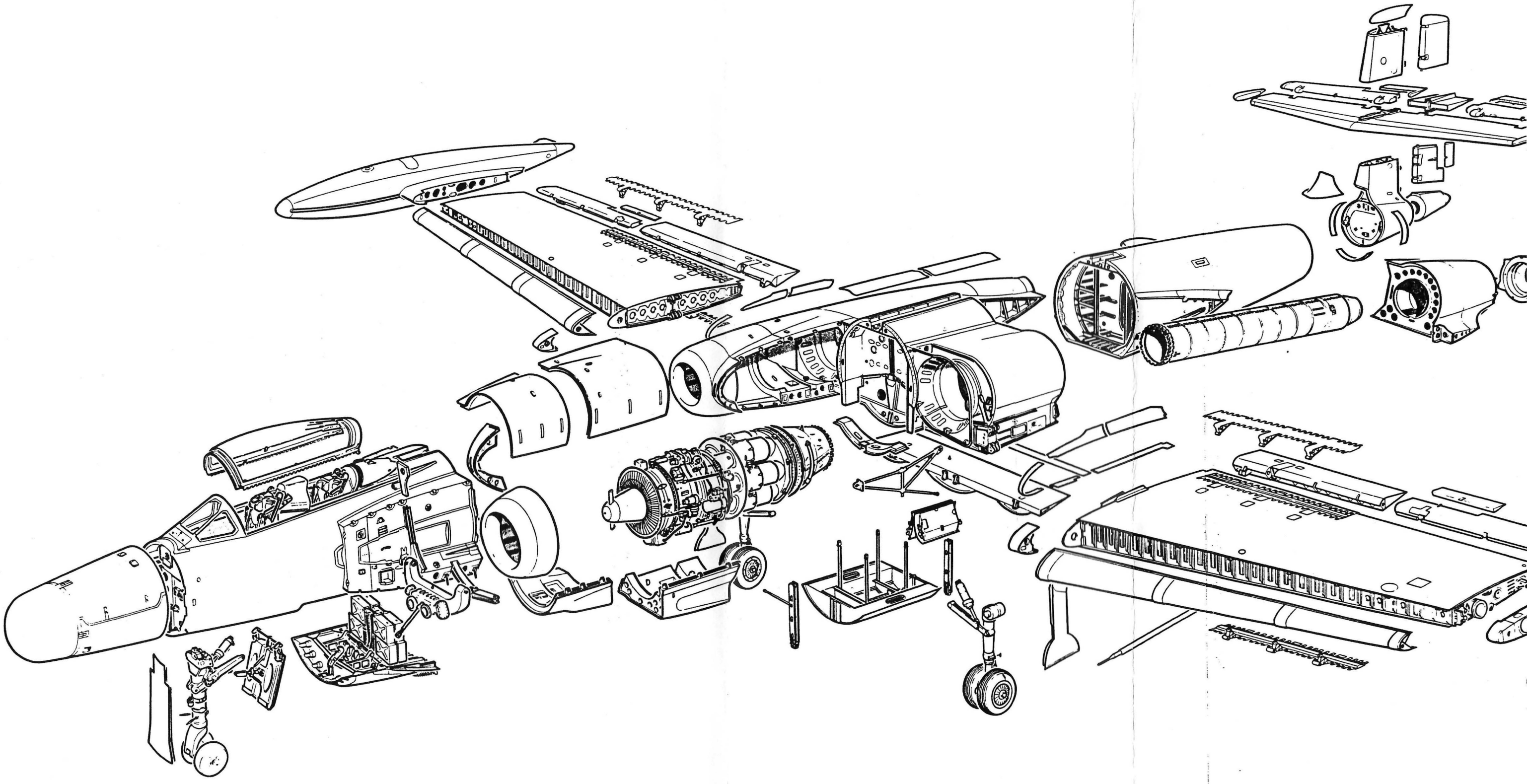


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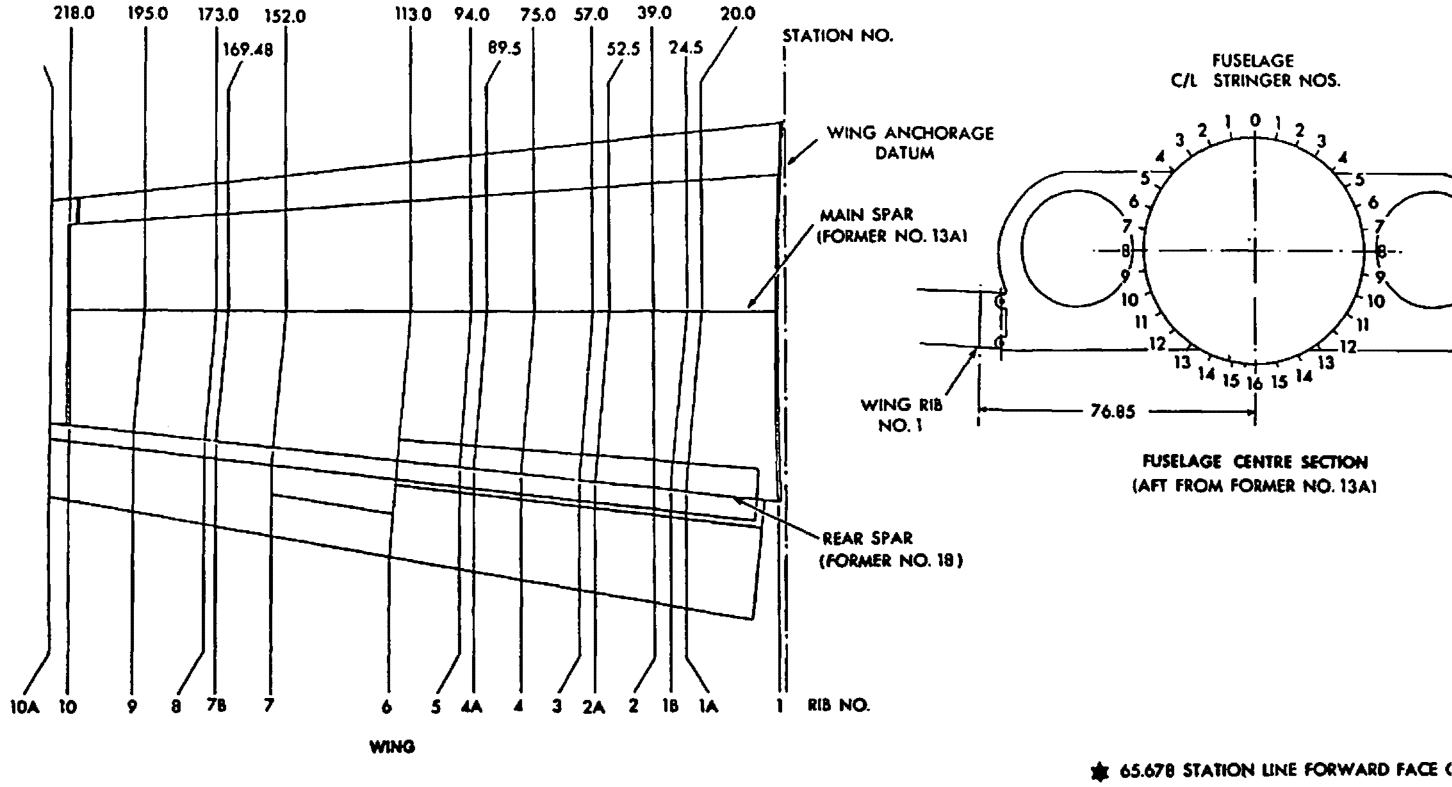
Fig. 1-1-1 Exploded View



★ 65.678 STATION LINE FORWARD FACE
★ 81.90 STATION LINE AFT OF ARMOUR PL
★ 91.75 DATUM LINE OF BULKHEAD

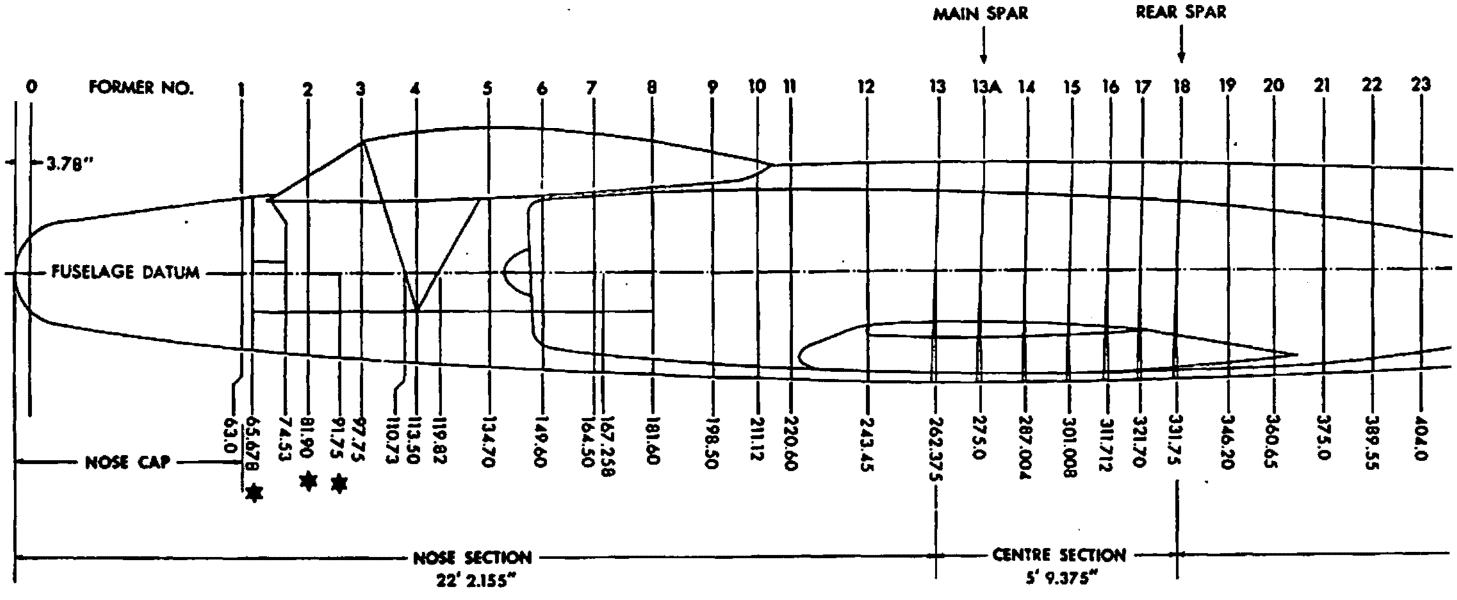


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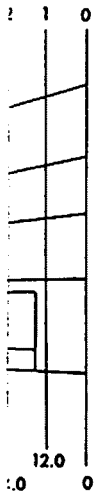
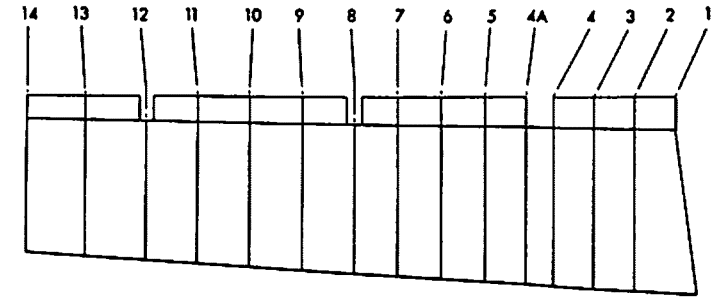
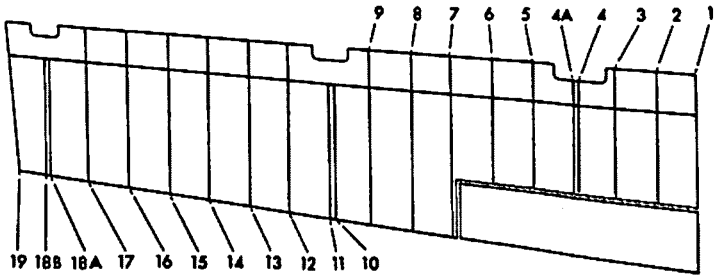
Fig. 1-1-2 Station Diagram

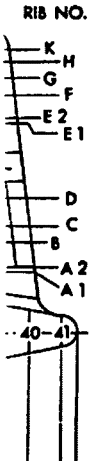


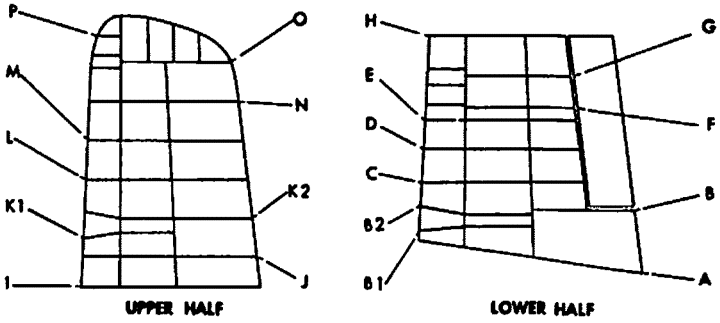


FLAP

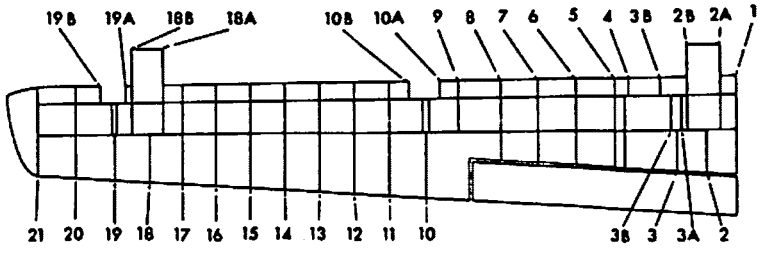


AILERON





RUDDER



ELEVATOR

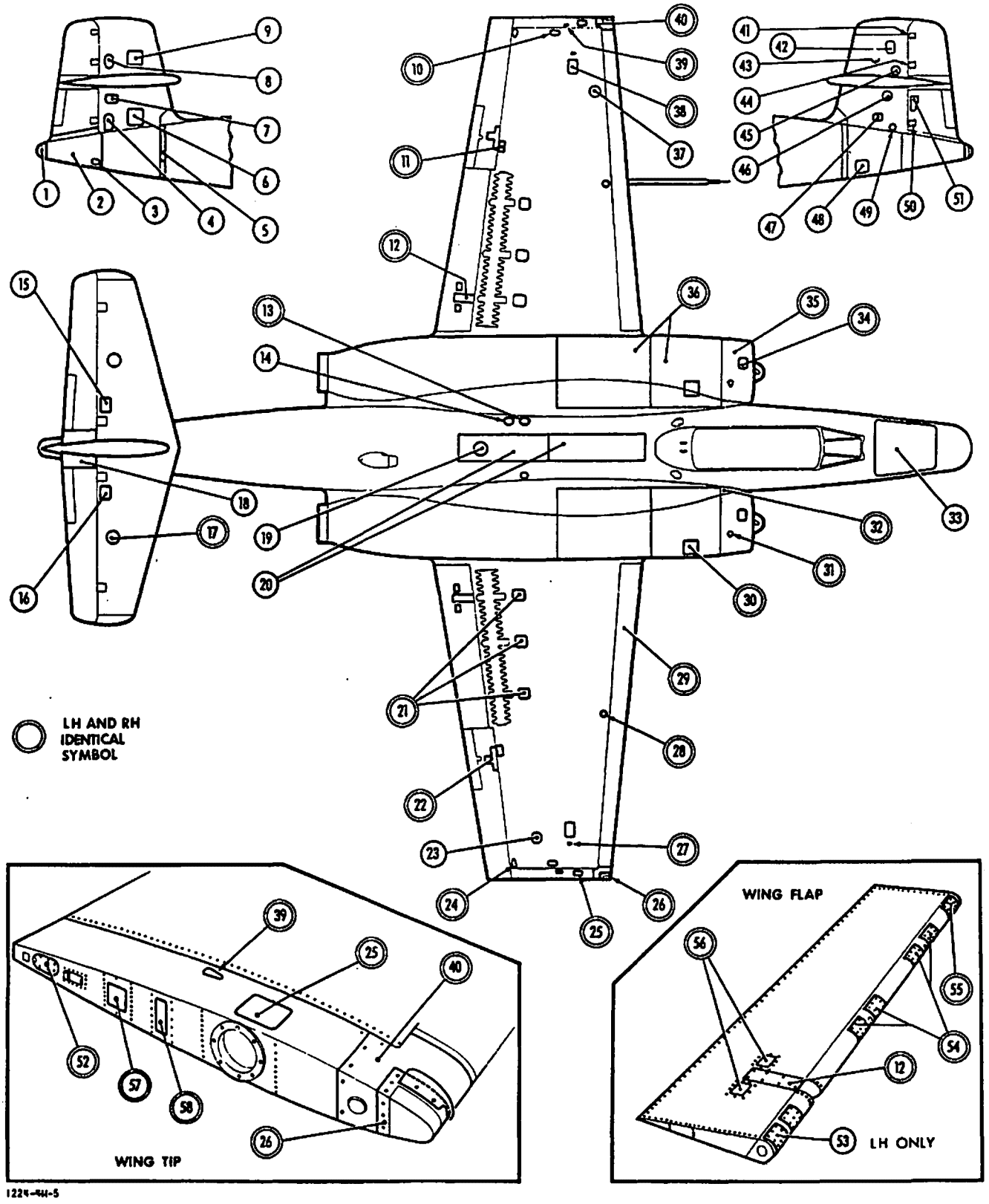


Fig. 1-2-16 Access Panels - Upper Surfaces

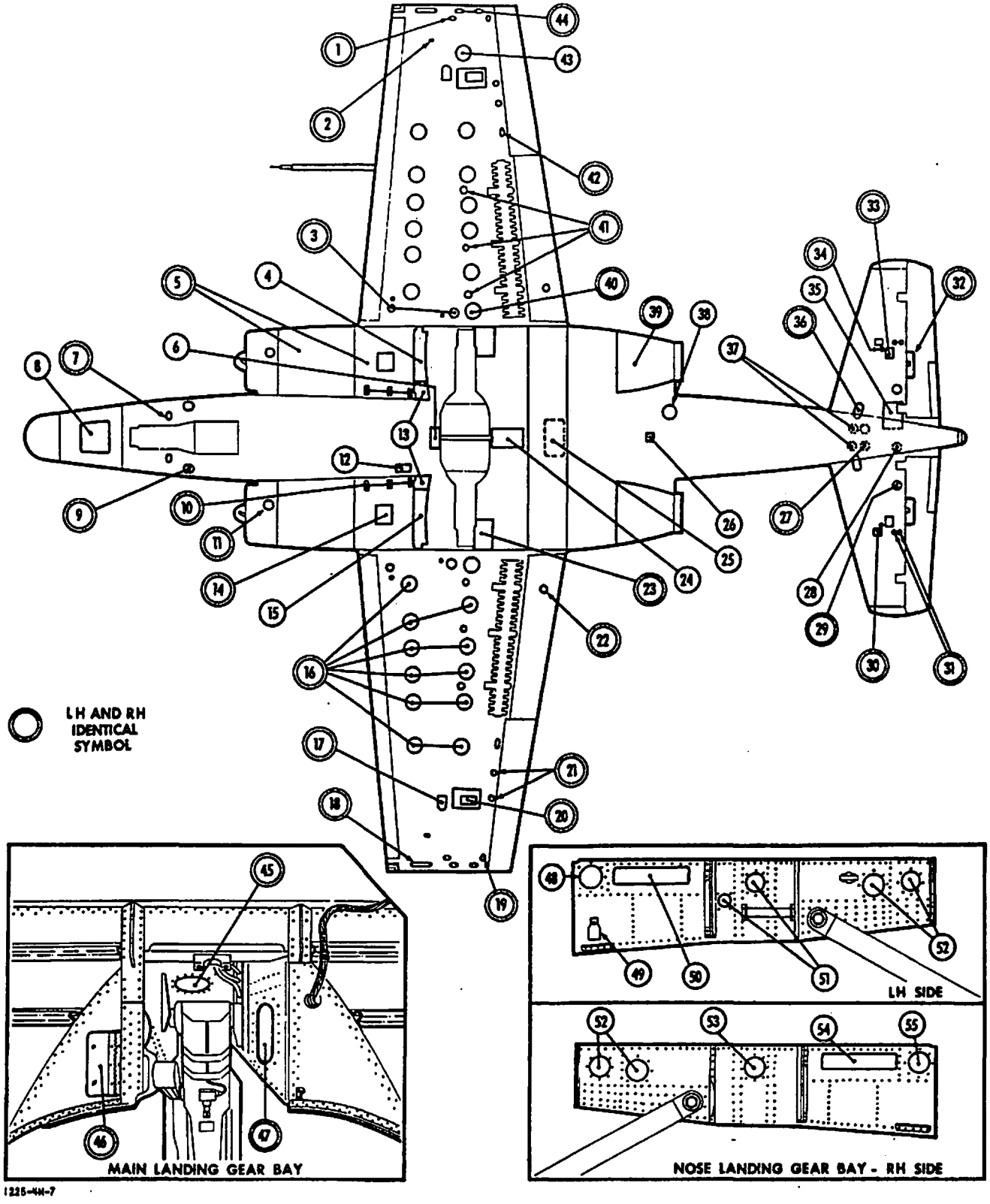


Fig. 1-2-17 Access Panels - Lower Surfaces

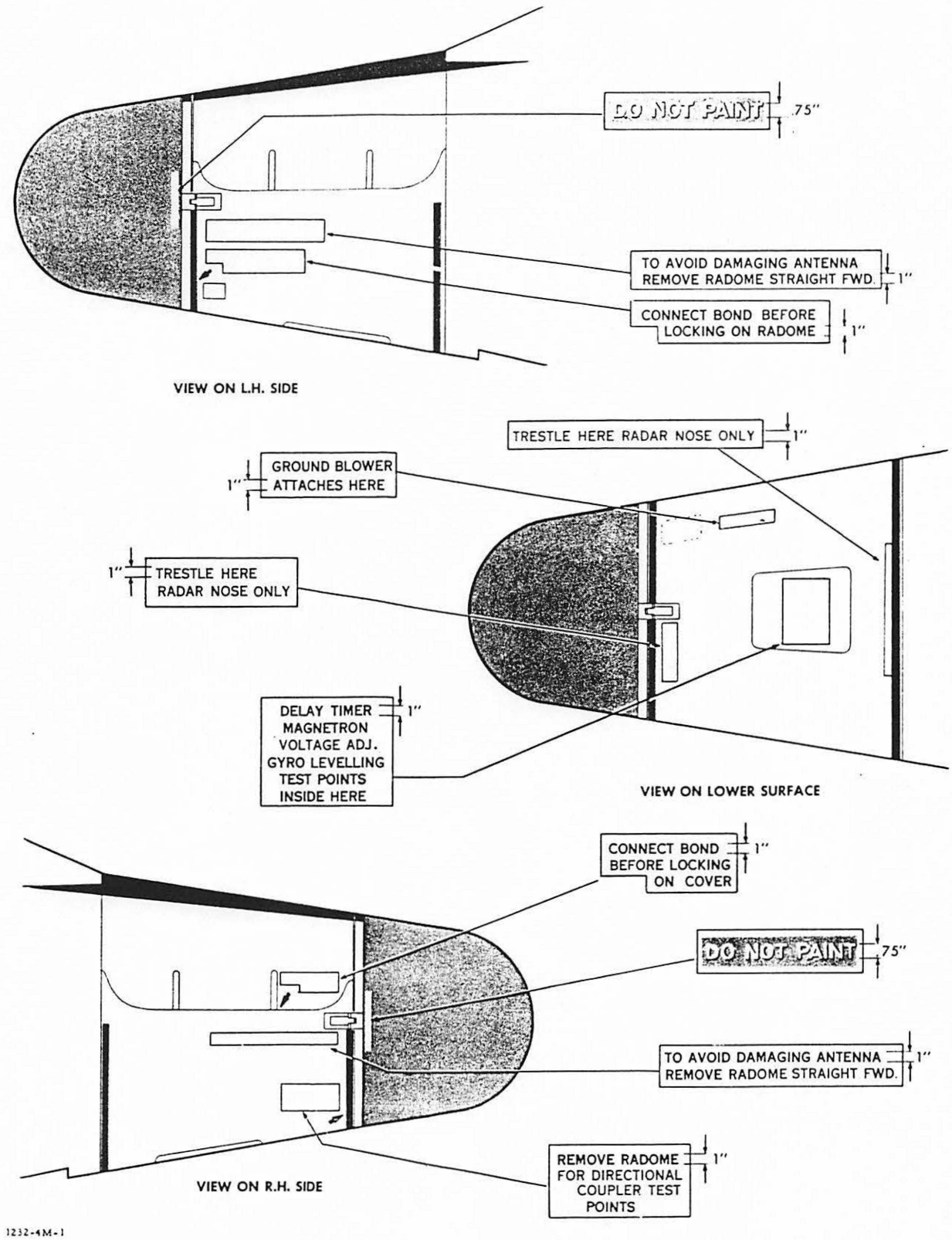


Fig. 1-2-23 External Markings - Radar Nose

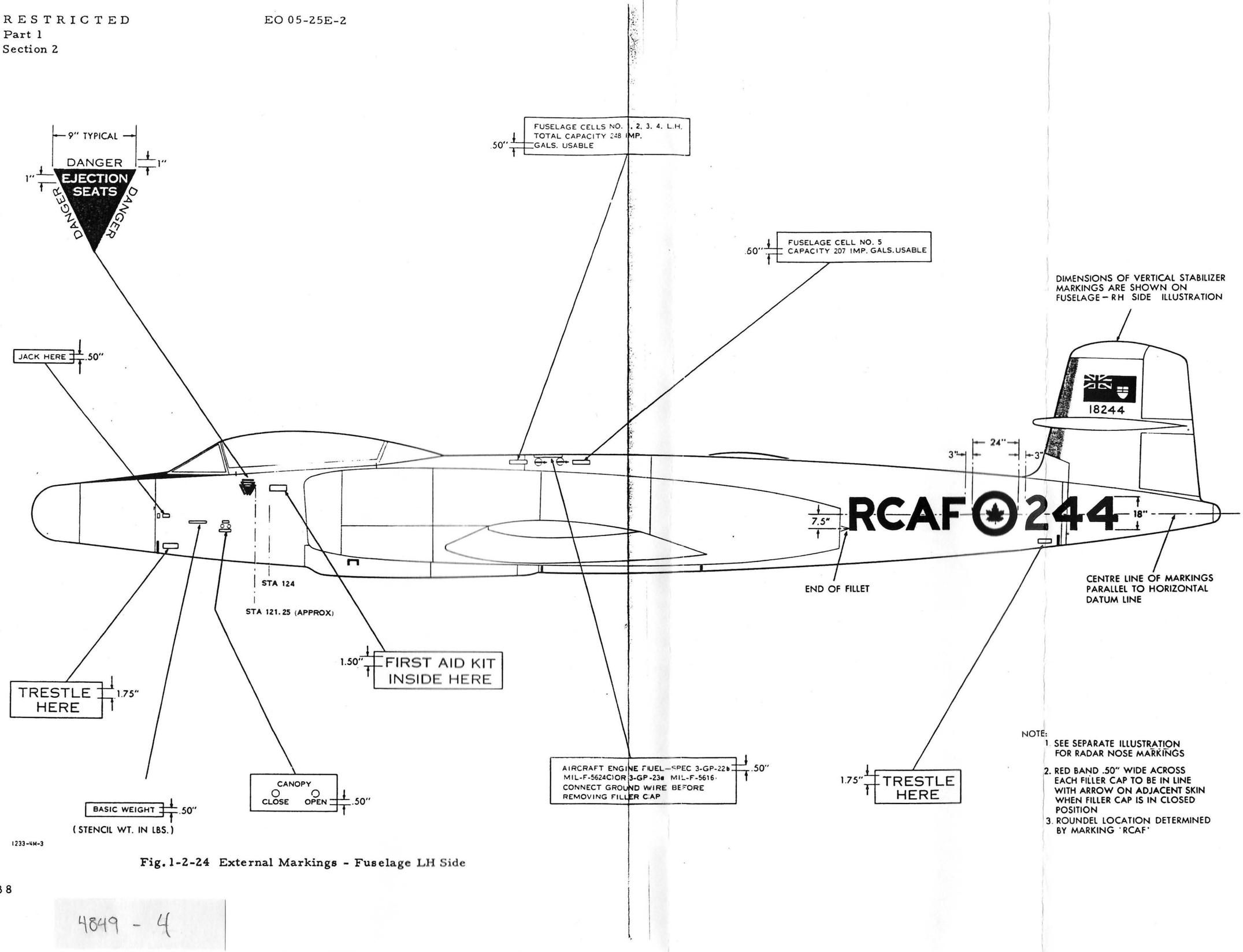
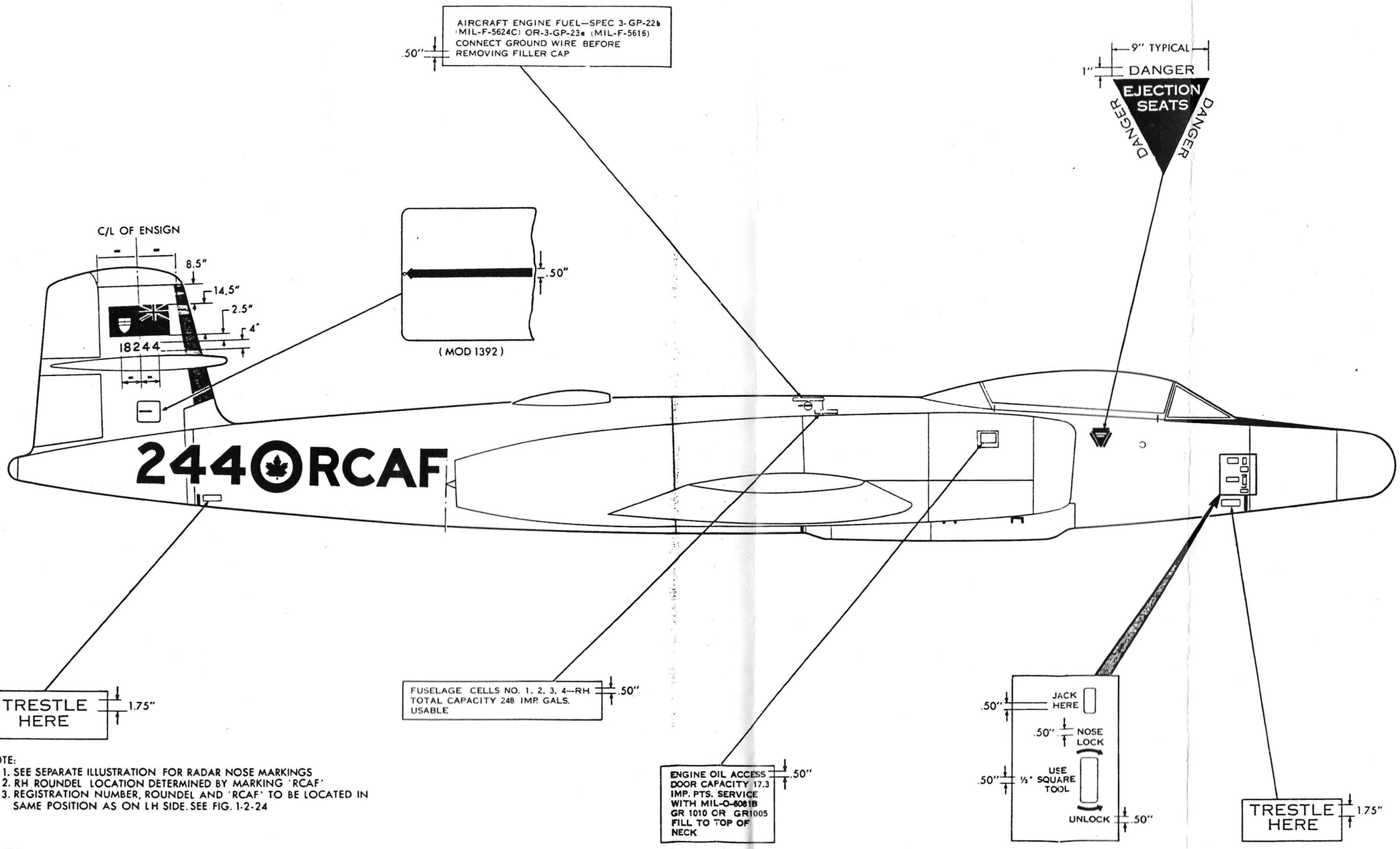


Fig. 1-2-24 External Markings - Fuselage LH Side



NOTE:
1. SEE SEPARATE ILLUSTRATION FOR RADAR NOSE MARKINGS
2. RH ROUNDEL LOCATION DETERMINED BY MARKING 'RCAF'
3. REGISTRATION NUMBER, ROUNDEL AND 'RCAF' TO BE LOCATED IN SAME POSITION AS ON LH SIDE. SEE FIG. 1-2-24

1234-4M-3

Fig. 1-2-25 External Markings - Fuselage RH Side

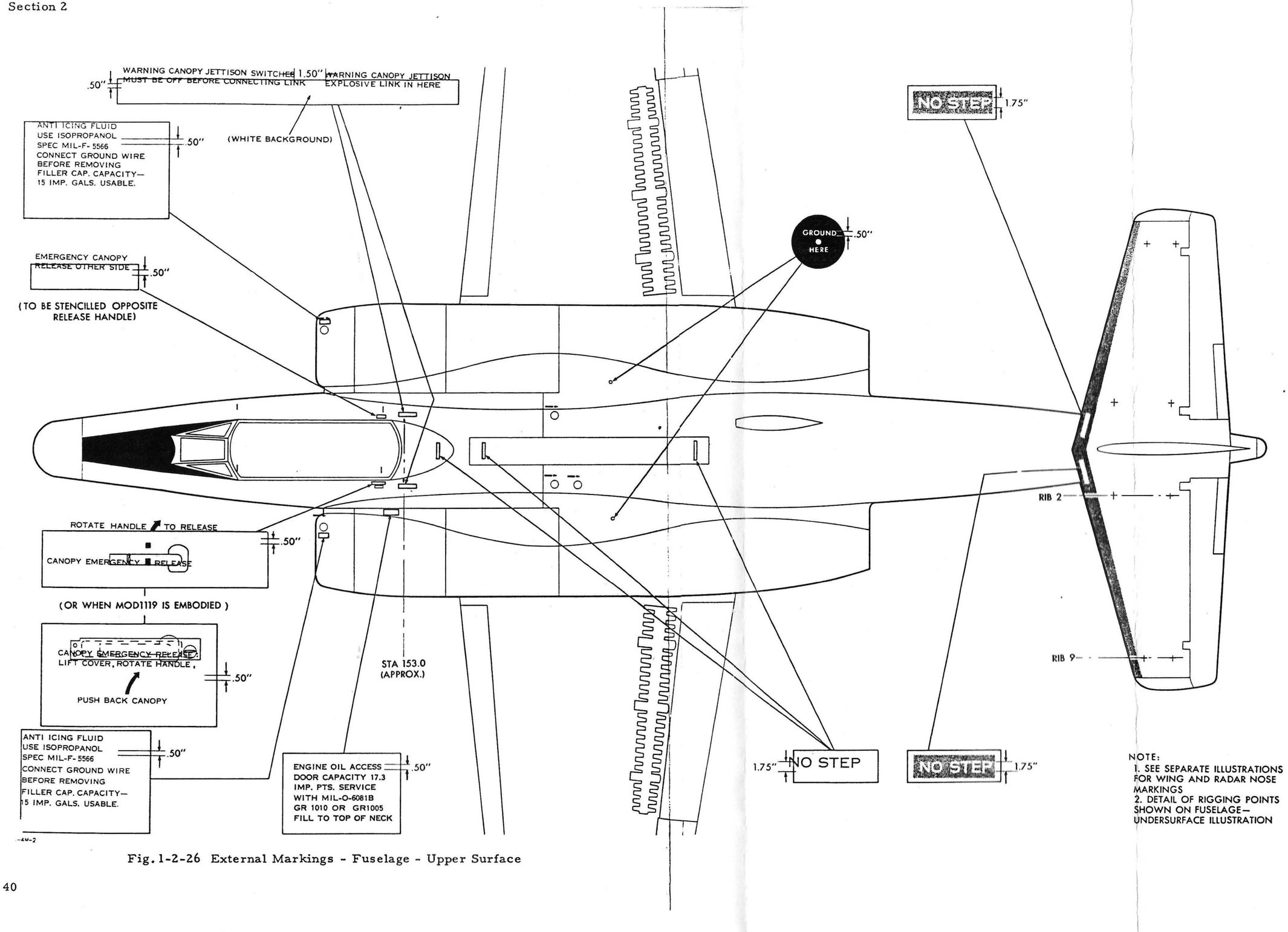
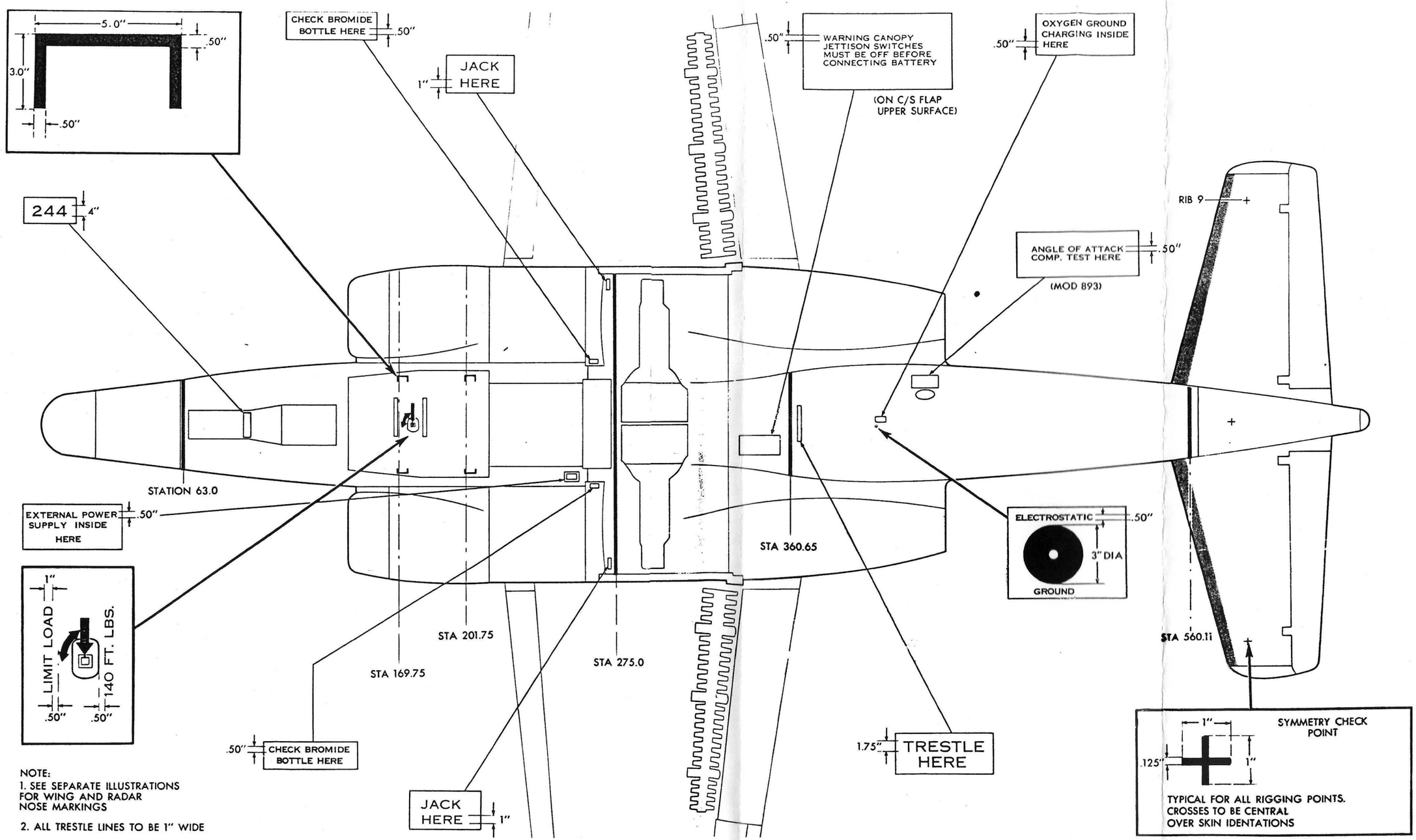


Fig. 1-2-26 External Markings - Fuselage - Upper Surface



NOTE:
1. SEE SEPARATE ILLUSTRATIONS FOR WING AND RADAR NOSE MARKINGS

2. ALL TRESTLE LINES TO BE 1" WIDE

1236-4M-2

Fig. 1-2-27 External Markings - Fuselage - Undersurface

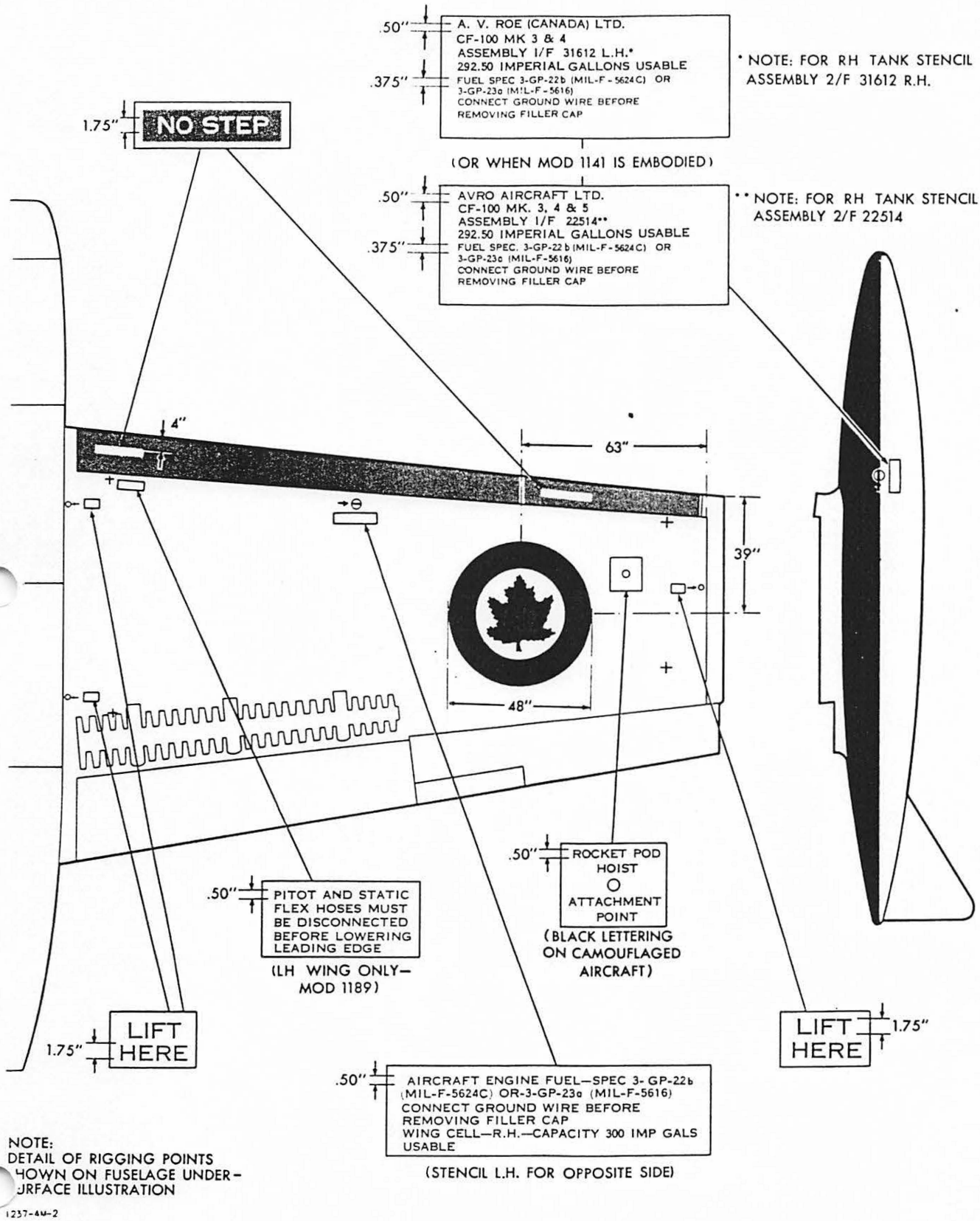


Fig. 1-2-28 External Markings - Wing - Upper Surface

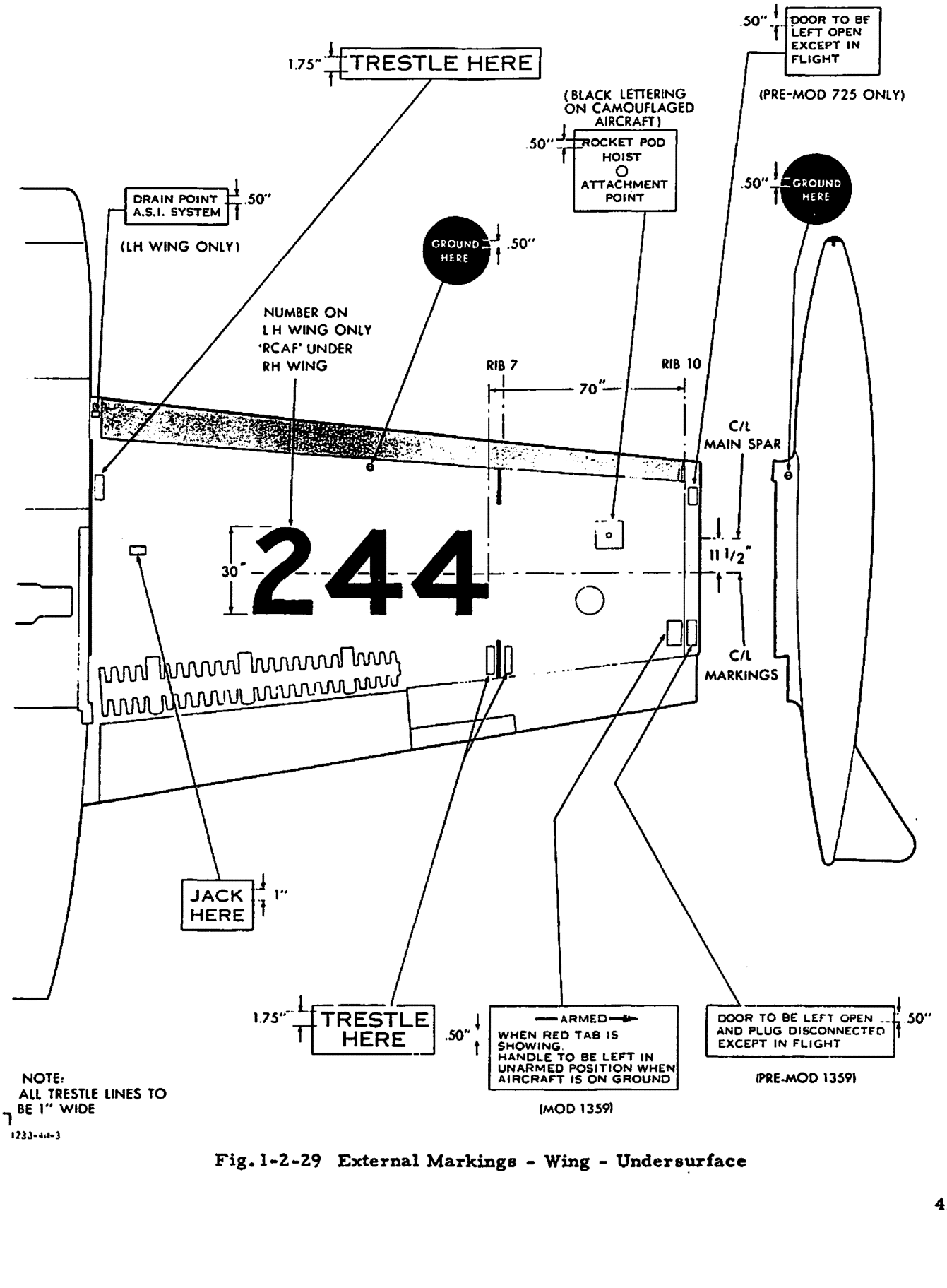


Fig. 1-2-29 External Markings - Wing - Undersurface

PART 2

AIRFRAME GROUP

SECTION 1

STRUCTURE

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LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Cont'd)

PART 2

AIRFRAME GROUP

SECTION 1

STRUCTURE

DESCRIPTION

FUSELAGE

1 The fuselage is divided into three major components, the nose section, centre section and rear centre section.

2 For reference, the fuselage is measured along the longitudinal datum line from nose to tail, any point being called a station. Former 1 is at station 63, i.e., 63 inches behind the theoretical tip of the nose and former 34F at the rear end of the rear centre section is at station 560.11, i.e., 497.11 inches behind former 1. The nacelles and centre-section outer structure use the same station numbers as the fuselage sections to which they attach. The stringers are also numbered starting at zero at the top centre, to the right and left.

NOSE SECTION (Fig 2-1-1)

3 The nose section structure consists of 13 formers numbered from 1 to 13, covered by aluminum alloy skins. The structure is reinforced by stringers and a canopy decking is built up around the cockpit areas. L-section longerons, to which both the cockpit floor and outer skins are attached, are externally reinforced at their rear ends by heavy tapered members. These have box ends which form part of the transport joint to the centre section. The bulkhead in front of the pilot's cockpit is of armour plate and mounts the hinges and locking mechanism for the radar nose. The cabin is pressurized and all joints and attachments in the cabin area are sealed with sealing compound, on assembly.

4 Under the cockpit floor, the lower nose structure is recessed to accommodate the nose landing gear when retracted. The gun bay and the rocket bay are formed in the area between former 5 and former 13. A trough located at the top of the nose section behind the cockpits houses flying controls, electrical cables and piping. An air scoop for gun gas scavenging is mounted at each side of the control trough. Fuel cell bays for left and right-hand fuel cells Nos. 1, 2 and 3 are built into the upper structure above the rocket bay.

5 The following removable components are attached to the nose section structure:

(a) Radar nose.

(b) Gun package.

(c) Front windshield.

(d) Rear windshield.

(e) Canopy and rails.

(f) Ejection seat guide rails.

(g) Nose landing gear, mounting and fairing door.

(h) Engine mounting beams.

(j) Nos. 1, 2 and 3 right and left-hand fuel cells.

(k) Cockpit furnishings.

(m) Rocket bay fairing.

(n) Front nacelle fairings.

ROCKET BAY FAIRING (Fig 2-1-13)

6 At the rear of the gun package (see Part 8 Sect 5), a fairing is fitted to enclose the rocket bay and complete the contour of the underside of the fuselage. The fairing is located fore and aft by front and rear roller guide assemblies. The fairing is attached to the aircraft structure by four steel support tubes. The lower end of each support tube is bolted to the fairing and the upper end is bolted to a support bracket on the roof of the rocket bay. The length of each support tube may be adjusted by screwing the upper fork end, or the lower rod-end, in or out.

RADAR NOSE (Fig 2-1-8)

7 The radar nose houses radar equipment and extends from station 3.78 to station 63. It is hinged to the left-hand side of the nose section and is retained in the closed position by a locking mechanism which is accessible through an access panel on the right-hand side of the nose section. A removable top fairing and an unpainted Fibreglas radome are attached by toggle latches to the radar nose structure. Mod 1312 introduces a ballasted radar nose which, when necessary, can be used in lieu of the radar nose carrying the radar equipment.

CENTRE SECTION (Fig 2-1-2)

8 The centre-section structure consists of seven formers, numbered from 13 to 18, covered by aluminum alloy skins. Front and rear spars, complete with wing attachments, are built integral with formers 13A and 18. No. 4 right and left-hand fuel cells and the auxiliary tank are located between the spars.

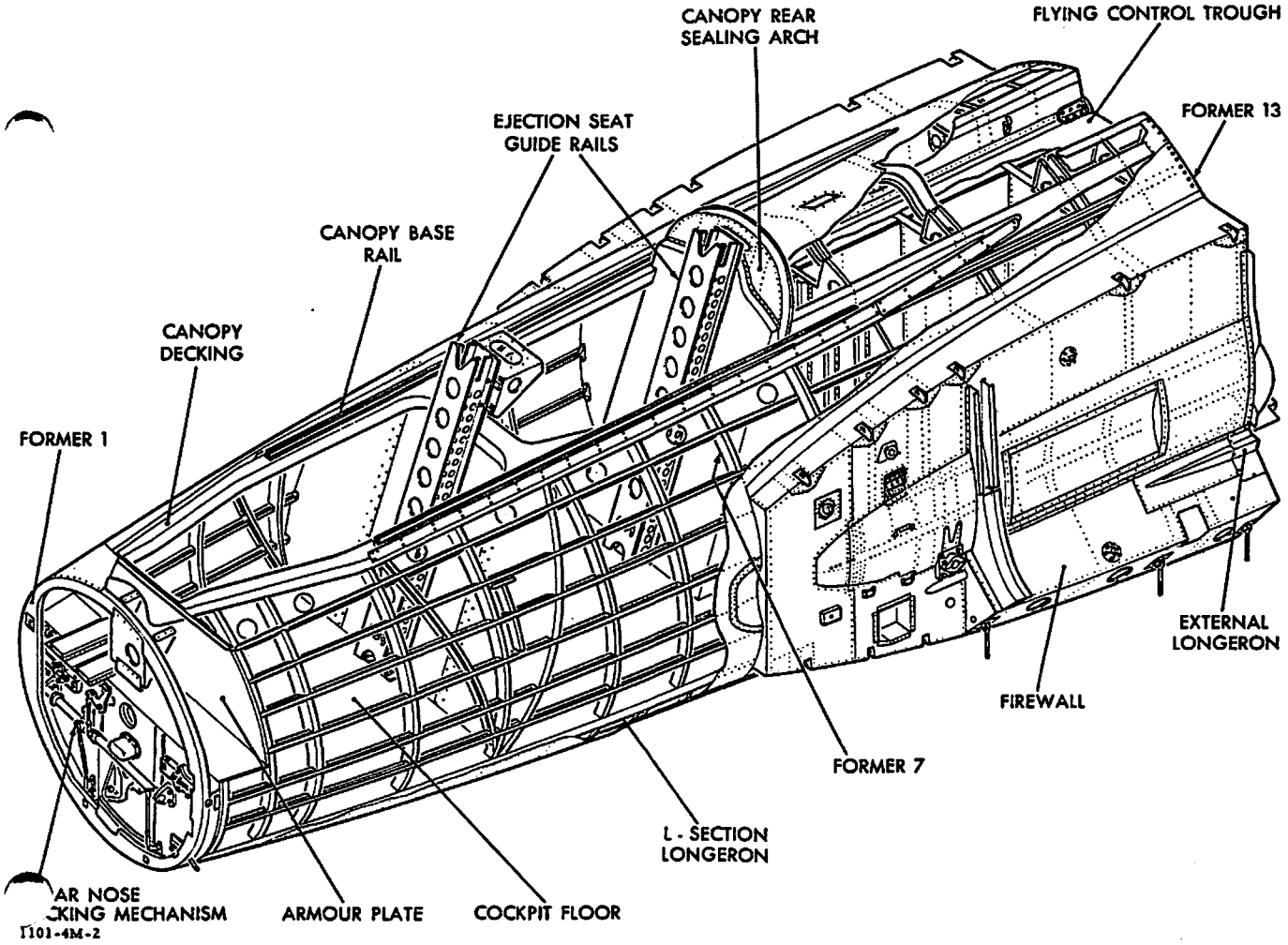


Fig.2-1-1 Nose Section Structure

9 On each side of the formers, forming part of the centre-section structure, are the jet pipe tunnels. The main landing gear bays are located in the bottom of the centre section and the continuation of the trough for the flying controls is in the top of the structure.

10 The following removable components are attached to the centre-section structure:

(a) Main landing gear, attachments and fairing doors.

(b) Tubular engine mounts.

(c) No. 4 right and left-hand fuel cells and the auxiliary tank.

(d) Centre-section flap and attachment fittings.

REAR CENTRE SECTION (Fig 2-1-3)

11 The rear centre section consists of 17 formers, numbered from 18 to 34F, covered by aluminum alloy skins. External longerons reinforce the structure at the forward end, forming part of the transport joint to the centre section. Two attachment lugs are fitted at former 34F, for attaching the rear section.

12 At the forward end, provision is made for the installation of radio and other equipment. At the top forward end, the continuation of the trough for the flying controls ends at former 20. When Mod 890 is embodied, air extractor ducts are incorporated on the LH and RH side aft of former 32 to prevent pressure build-up in the rear centre section.

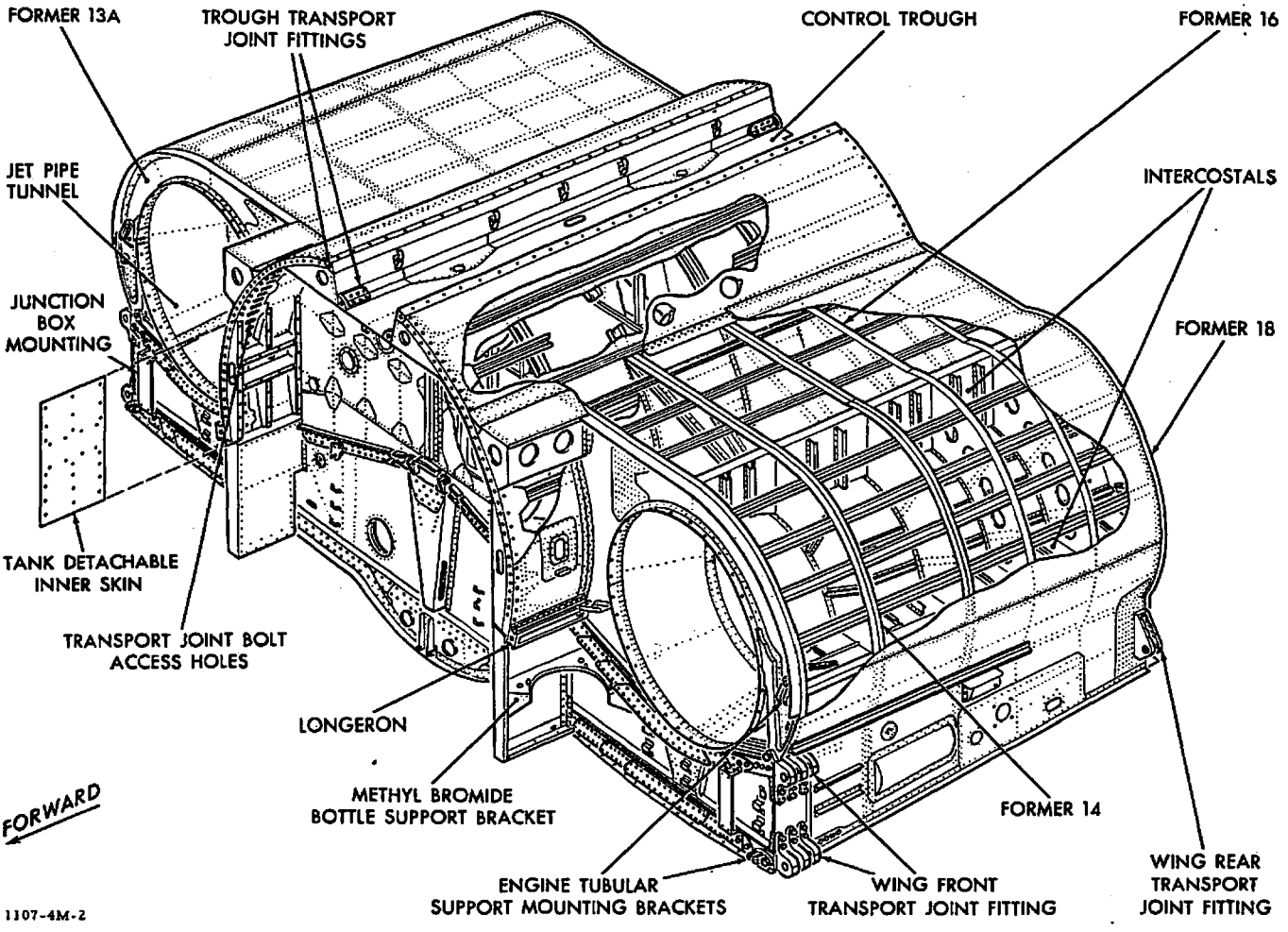


Fig. 2-1-2 Centre-Section Structure

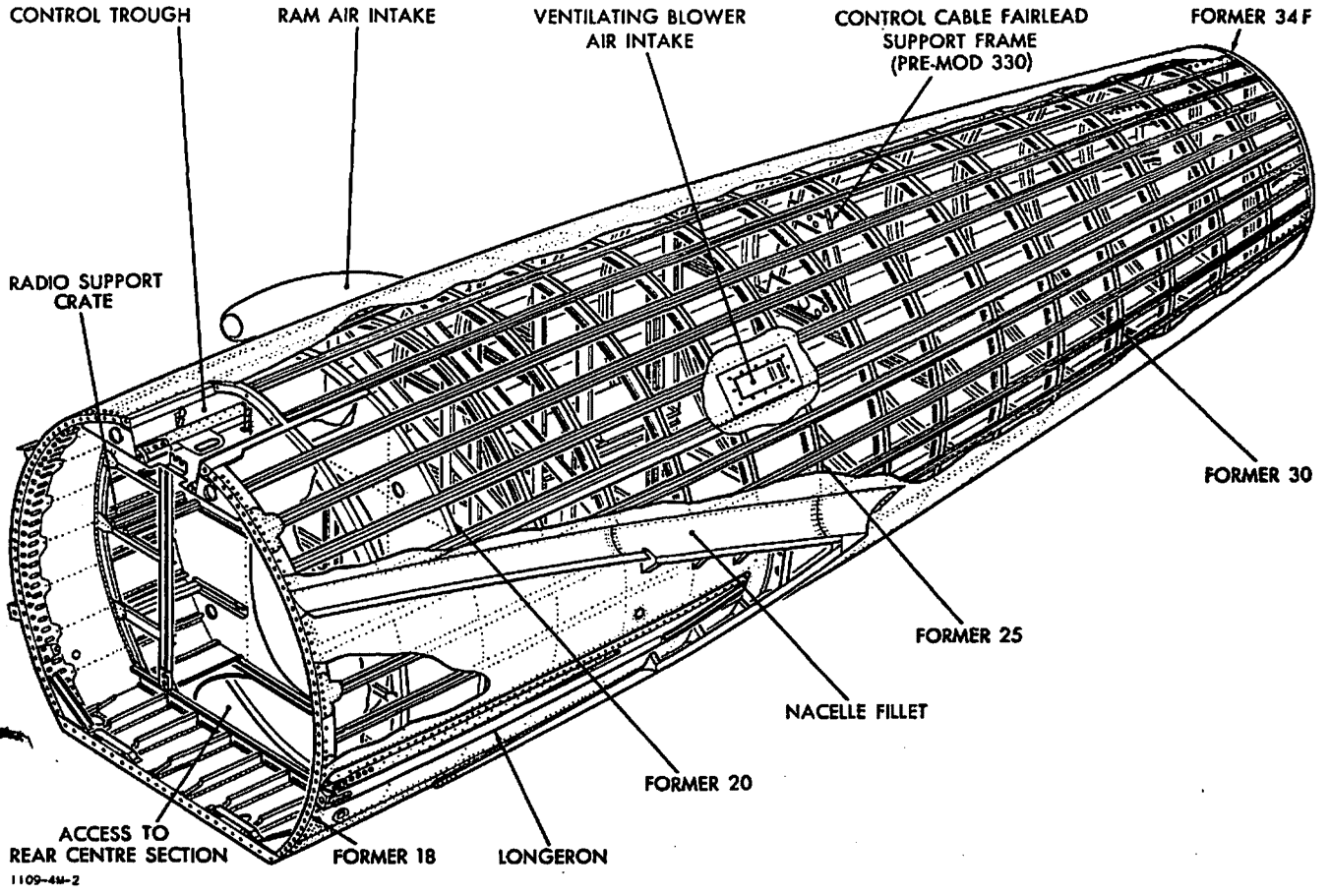


Fig. 2-1-3 Rear Centre-Section Structure

13 Access to the interior of the structure is gained through an opening in the bottom of the forward end, normally covered by the battery stowage and the centre-section flap.

14 The following removable components are attached to the rear centre-section structure:

(a) Rear nacelles and fairings. See Part 5 Sect 3.

(b) Ram air intake. See Part 4 Sect 1.

(c) Transport joint fittings for the rear section.

(d) Battery and stowage.

EMPENNAGE

The empennage is divided into three major structures, the rear section and the horizontal and vertical stabilizers.

16 For reference, the horizontal stabilizer ribs are numbered from 1 to 10 to the right and left of the centre rib, which is numbered zero. The lower vertical stabilizer is built integral with the rear section of the fuselage. For reference, rib 1 is at station 12 or 12 inches from the aircraft centre line and rib 10 is at station 120, or 120 inches from the centre line. Both upper and lower vertical stabilizers are given reference stations in alphabetical order from the aircraft datum line.

REAR SECTION (Fig 2-1-4)

17 The rear section structure consists of eight formers, numbered from 34A to 41, covered by aluminum alloy skins. The front three formers form the structure for the lower vertical stabilizer, while the remaining five are contained in the detachable tail cone.

18 Attachment fittings for the lower rudder

are on the rear face of former 36 and the horizontal stabilizer attachment fittings are at the top of formers 34A, 35 and 36. Two attachment lugs and two attachment links are fitted at the transport joint.

19 The following removable components are attached to the rear section structure:

(a) Attachment links at the transport joint.

(b) Lower rudder attachment fittings.

(c) Horizontal stabilizer attachment fittings.

(d) Tail cone.

(e) Tail picketing eye.

(f) Lower rudder and trimmer tab.

HORIZONTAL STABILIZER (Fig 2-1-5)

20 The horizontal stabilizer structure consists of two sweptback main spars and a centre sub-spar, spaced by 21 ribs and covered by aluminum alloy skins reinforced with top-hat section stringers. Profile ribs are fitted to the top and bottom surfaces at the centre of the horizontal stabilizer. These are used to locate the joints to the rear section and vertical stabilizer and for skin attachment.

21 The following removable components are attached to the horizontal stabilizer structure:

(a) Elevators and trimmer tabs.

(b) Trailing edge fairing.

(c) Horizontal stabilizer tips.

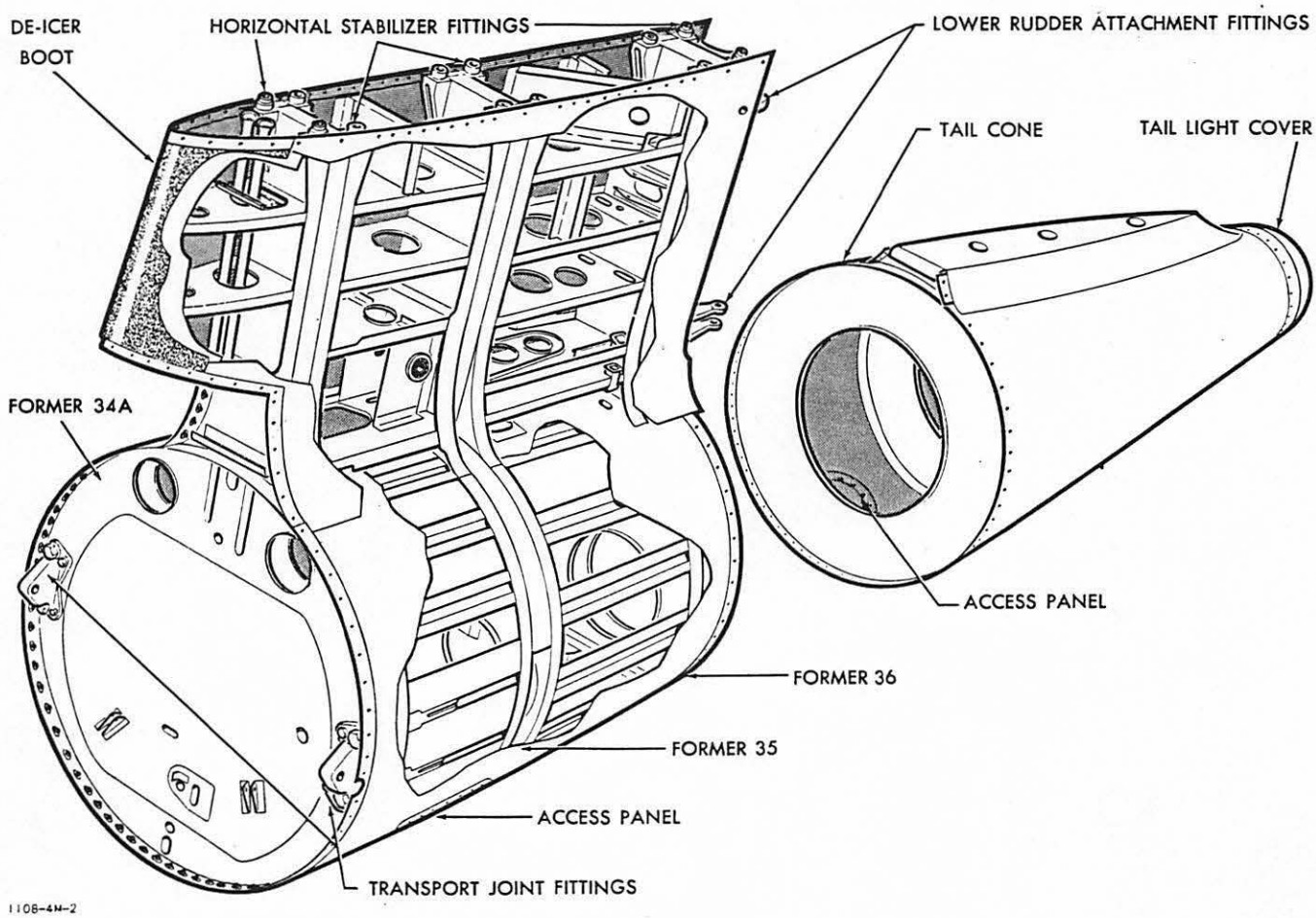


Fig.2-1-4 Rear Section Structure

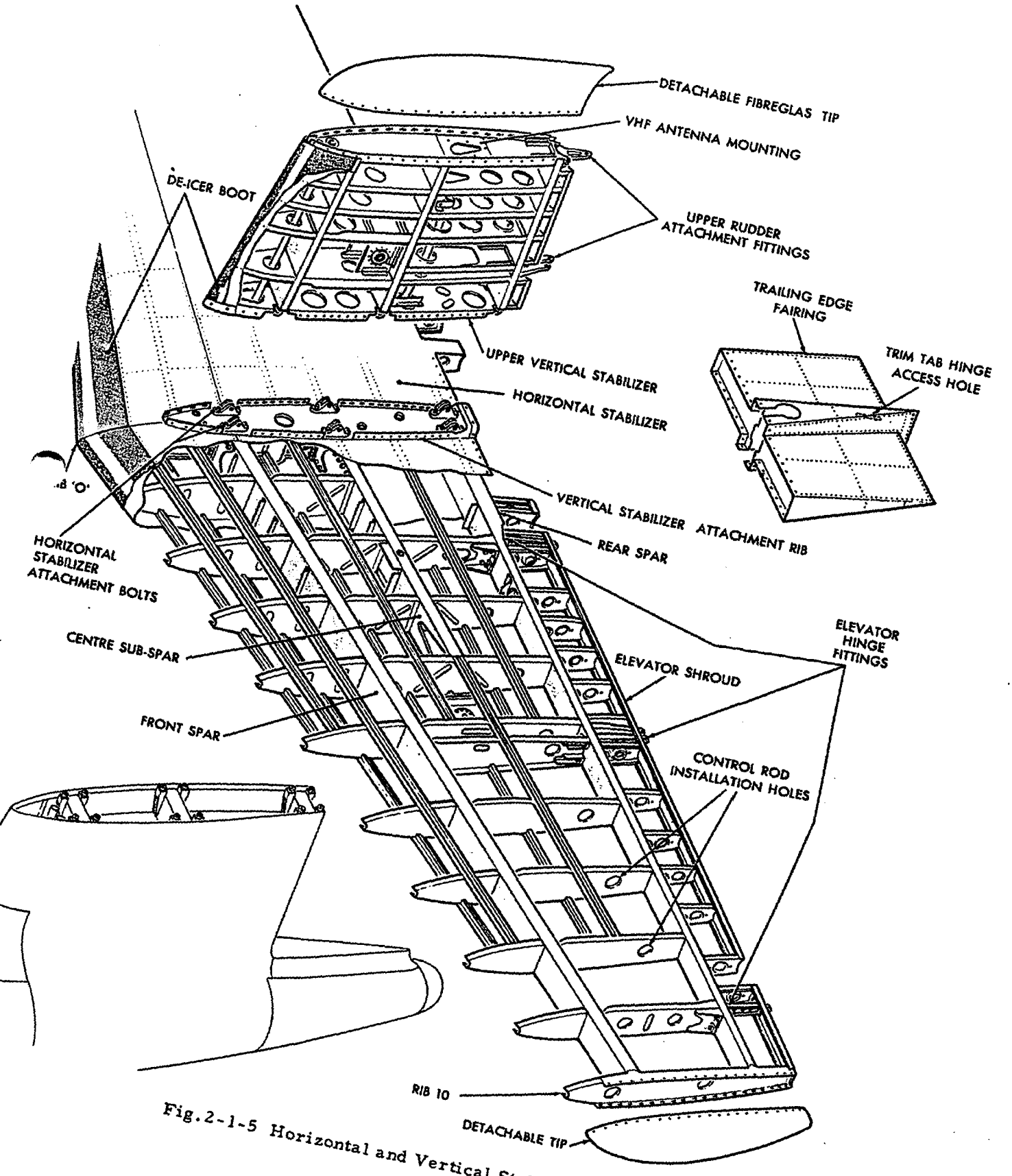


Fig.2-1-5 Horizontal and Vertical Stabilizers

(d) Elevator attachment fittings.

(e) Attachment fittings for the vertical stabilizer.

VERTICAL STABILIZER (Fig 2-1-5)

22 The vertical stabilizer structure consists of three vertical spars, spaced by ribs and covered by aluminum alloy skins. The following removable components are attached to this structure;

(a) Upper rudder attachment fittings.

(b) Upper rudder.

(c) Vertical stabilizer tip.

WING (Fig 2-1-6)

23 The wings are similarly constructed in right and left-hand components. The wing structure consists of three spars and 14 ribs, covered by aluminum alloy skins and stiffened by top-hat section stringers. Ten ribs are spaced between the front and centre spars to form a front torsion box, when skinned. Fourteen ribs are spaced between the centre and rear spars to form a rear torsion box.

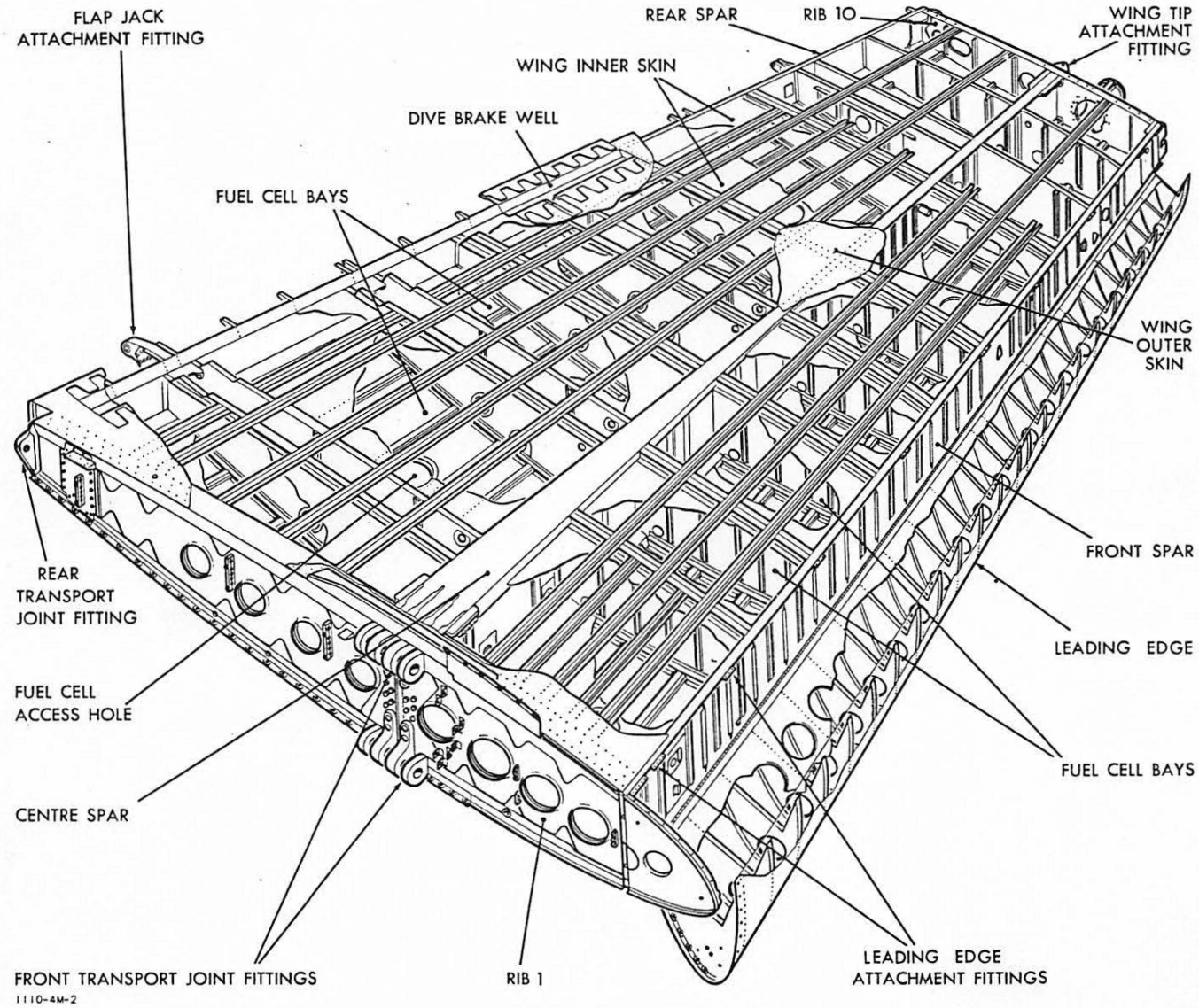


Fig. 2-1-6 Wing Structure

24 The ribs are numbered outwards from the root and are also given station numbers for reference. Rib 1, which is 76.85 inches from the centre line of the aircraft, is at station 1.85, or 1.85 inches from the wing root and rib 10 is at station 218, or 218 inches from the wing root.

25 The 12 wing fuel cells are located between the ribs, six forward and six aft of the centre spar.

26 The wing front transport joint fittings are attached to the inboard end of the centre spar and the rear transport joint fitting is attached to the inboard end of the rear spar.

27 The leading edge of the wing is hinged about the bottom edge of the front spar.

28 The wing is fitted with a detachable tip attached to wing rib 10 and the outer rib of the tip is numbered 10A. Fittings are attached to the wing and wing tip for the installation of a rocket pod. It is necessary to remove the wing tip to install a wing tip fuel tank.

29 The following removable components are attached to the wing structure:

(a) Wing tip (when wing tip tank is not fitted).

(b) Upper and lower dive brakes and attachment fittings.

(c) Wing flap and attachment fittings.

(d) Aileron, tab and attachment fittings.

(e) Wing leading edge.

(f) Wing tip tank or rocket pod (when fitted).

REMOVAL AND INSTALLATION

OPENING THE RADAR NOSE (Fig 2-1-7)

30 To open the radar nose, proceed as follows:

(a) Remove the access panel on the right-hand side of the nose section and fit a suitable tool to the squared end of the locking mechanism torque tube.

(b) Steady the radar nose and rotate the tool counter-clockwise to release the locks.

(c) Swing the nose carefully open to the limit of the steady bar and lock the steady bar with the Pip-pin provided.

RADAR NOSE (Fig 2-1-8)

31 To remove the radar nose which weighs approximately 657 pounds, proceed as in para 30 and then as follows:

(a) Release the four latches and remove the radome straight forward until clear.

(b) Release the two latches on each side of the top fairing and lift the fairing vertically until the locating pins are clear of the radar nose structure.

(c) Disconnect the electrical cables from the radar shelf, forward of the armour plate and stow on the radar nose.

(d) Disconnect and blank off the two pneumatic hoses at the armour plate.

(e) Disconnect the bonding leads between the radar nose and the nose section.

(f) Release the steady bar from the steady bar attachment fitting.

(g) Use suitable equipment (see Part 1 Sect 2) to lift the radar nose clear of its hinge fittings and remove it from the aircraft.

32 The installation procedure is the reverse of that given for removal. If a new radar nose is being fitted, ensure that:

(a) Skin clearances are within limits shown in fig 2-1-7.

(b) The latches are adjusted so that no undue force is required to fasten them by hand.

NOTE

To obtain the degree of adjustment required in (a) and (b), the nose section hinge and latch fittings may be shimmed to a maximum of 0.15 inch.

(c) When Mod 999 is embodied, the radar nose locking mechanism and electrical connectors do not foul the nose wheel steering flexible hydraulic hoses.

FRONT WINDSHIELD REMOVAL (Fig 2-1-9)

33 To remove the front windshield assembly, which weighs approximately 152 pounds, proceed as follows:

(a) Remove the front ejection seat. See Part 2 Sect 3 or 3A.

(b) Lock the flying controls in neutral.

(c) Remove the front instrument panel. See Part 6 Sect 1.

(d) Release the left and right-hand instrument panels. See Part 6 Sect 1.

(e) Remove the radar gunsight and mounting.

(f) Cover the interior and exterior surfaces of the glass panels with paper attached with masking tape.

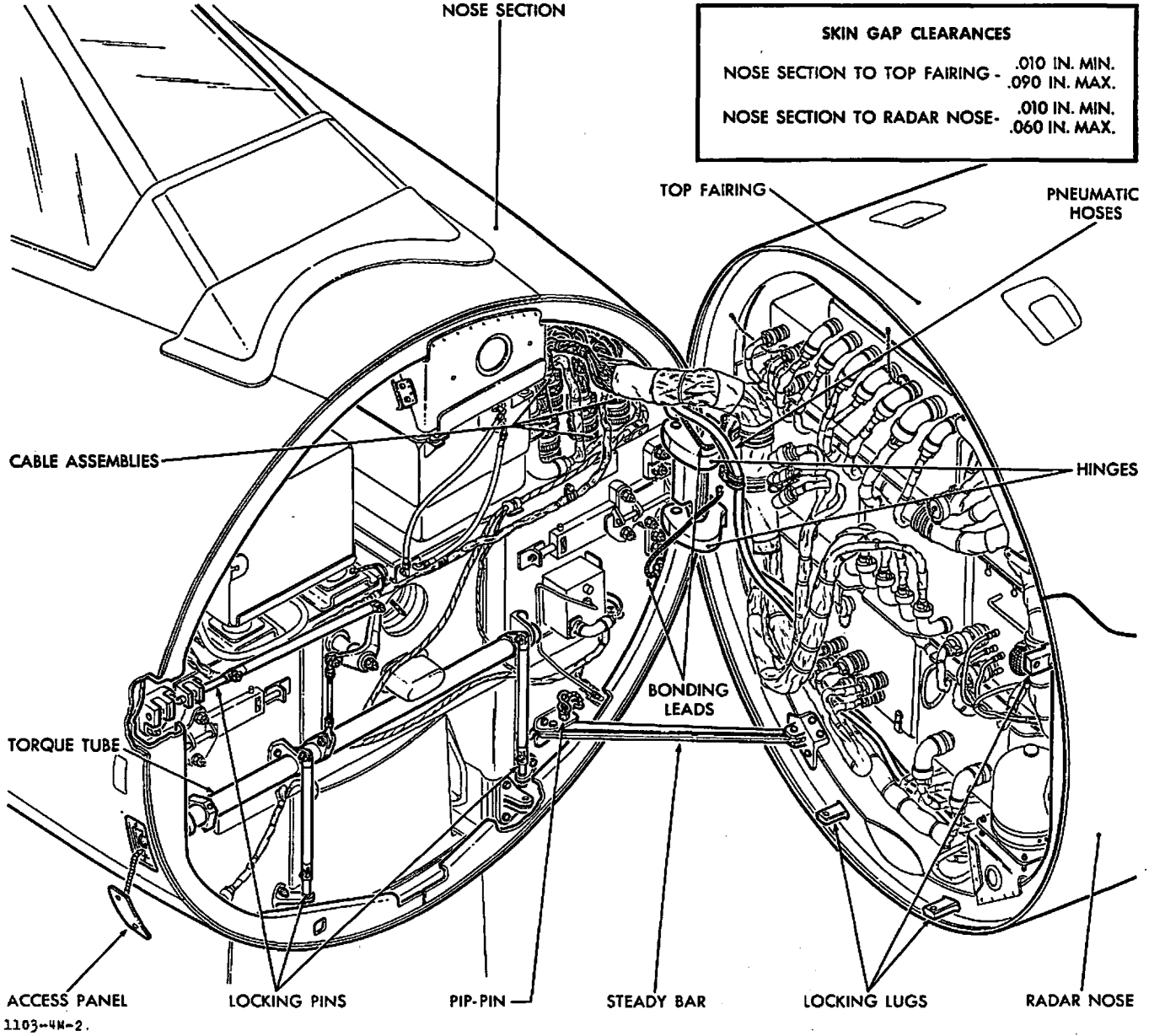


Fig. 2-1-7 Opening the Radar Nose

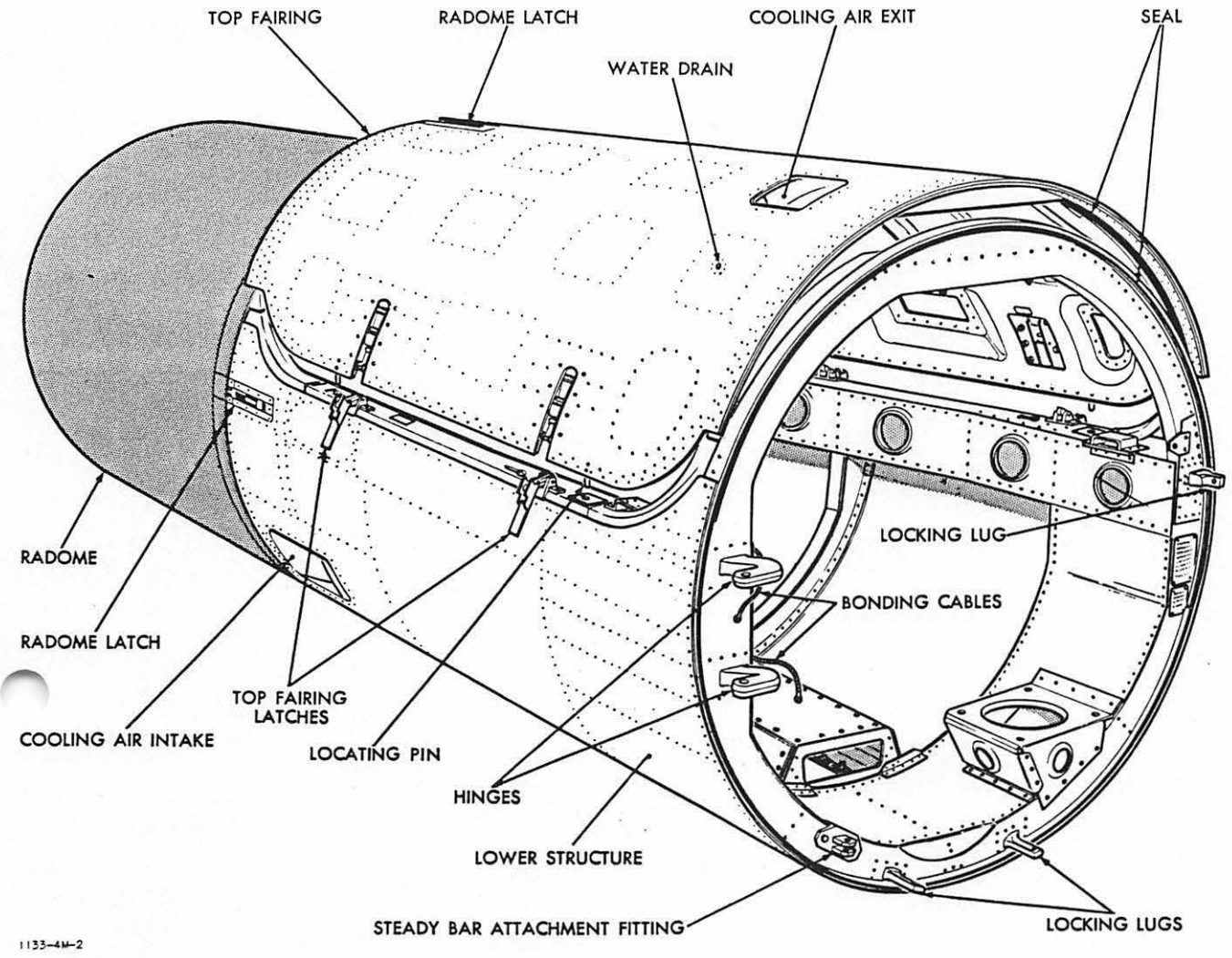


Fig.2-1-8 Radar Nose

(g) Remove the stand-by compass and micro-switches from the windshield together with clips and electric cables.

(h) Remove the canopy and canopy rails. See Part 2 Sect 2.

(j) Remove the access panels from the undersurface of the canopy decking on both sides of the cockpit.

(k) Remove the canopy seal from the retaining channel at the windshield and canopy locking until it is clear of the working area. Use caution with this operation taking care not to stretch the seal.

(m) Remove the spring retaining block, packing, canopy seal fairing and channel. See fig 2-1-9.

(n) Disconnect the cables from the windshield electrical heating elements at the terminals on the forward end of the windshield centre panel and, when Mod 876 is embodied, from the windshield side panels.

(p) Remove and retain the nuts and washers from the four front bolts and remove the bolts. Break the locking wire and remove the eight side bolts and two coarse threaded bolts attaching the windshield base casting to the nose section, retaining the saddle washers (if fitted).

NOTE

The side bolts may not be locked with wire, in which case they will be protruding through and locked by the Rosan self-locking inserts (type R206SB-8) fitted in the windshield base casting. When Mod. 1351 is embodied, the eight side bolts are replaced by studs screwed into Rosan self-locking inserts (type R206SB-8L) fitted in the windshield base casting. The studs are secured to the underside of the canopy decking with nuts and washers.

(q) Free the windshield assembly from the canopy decking.

NOTE

If sealant solvent Ref. 33G/584 is used to soften the sealing compound before removal, take great care that it does not damage the sealing of the structure immediately below the windshield.

(r) Carefully remove the windshield assembly from the aircraft.

(s) Remove all sealing compound from the canopy decking.

FRONT WINDSHIELD INSTALLATION (Figure 2-1-9)

34 Before a new windshield is fitted to an aircraft, check that Mod. 1351 has been embodied. The windshield base casting should be fitted with eight Rosan self-locking inserts (type R206SB-8L), identified by the slots at the end of the thread. The front sealing arch should be fitted with two Helicoil self-locking inserts (type 3585-5CN-15/32), identified by the red colour and the lock coil near the centre of the insert. If a side stud is replaced, ensure that the 0.55 inch threaded end is screwed into the windshield base casting. Care should be taken to prevent damage to the side studs during windshield installation. The windshield should first be installed without sealing compound to ensure that it fits correctly. Windshields embodying RS2300 are issued in undrilled condition and should be redrilled to suit existing holes on installation. Where the front bolts do not align with the corresponding bolt holes, reference should be made to EO 05-25D-3 for further instructions. Instructions on the preparation and application of sealing compound are outlined in Part 4 Sec 1. To install a windshield proceed as follows:

(a) Cover the interior and exterior faces of the glass panels with paper attached with masking tape.

(b) Seal the attachment bolt and stud holes at the underside of the canopy decking to prevent sealing compound from dripping through.

(c) Apply adhesive sealant Ref. 33G/43 to the canopy decking and front fairing.

(d) Fit the windshield in position so that the side studs are in alignment with the holes in the canopy decking.

(e) Remove the sealing from the side stud holes and lower the windshield into position. Fit the nuts, washers and saddle washers to the studs, below the decking on each side. Additional packing washers may be required on the two forward studs.

(f) Fit the two coarse threaded bolts to the front sealing arch.

(g) Fit the four front bolts through the armour plate. It is mandatory to fit washers attached to repaired windshields under head of the attachment bolts, fit and tighten the nuts.

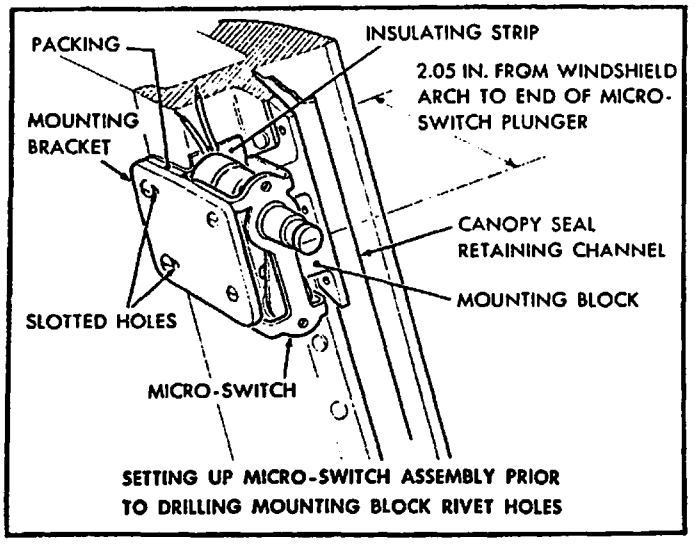
NOTE

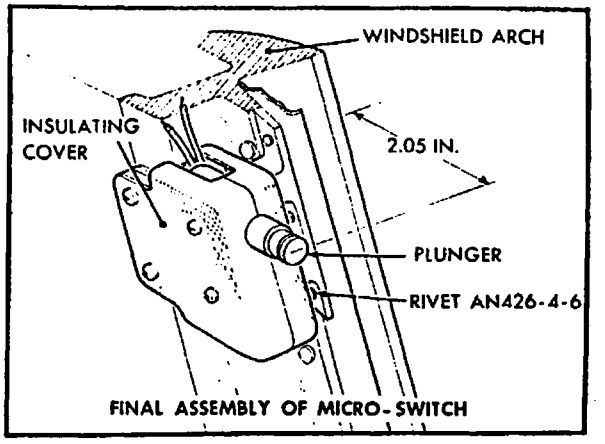
All the attachment bolts and studs should be fitted with adhesive sealant Ref. 33G/43 around their heads. Access to the bolts and studs is gained through the lower face of the canopy decking.

(h) Seal the inboard joint between the windshield and canopy decking with a bead of adhesive sealant Ref. 33G/43, using a hand pressure gun.

(j) Seal the outboard joint between the windshield and the nose section skin with smoothing compound EC 1328 taking care not to block the drain hole at each side of the windwhield arch.

(k) Clean off all excess sealing compound from the windshield and surrounding area.





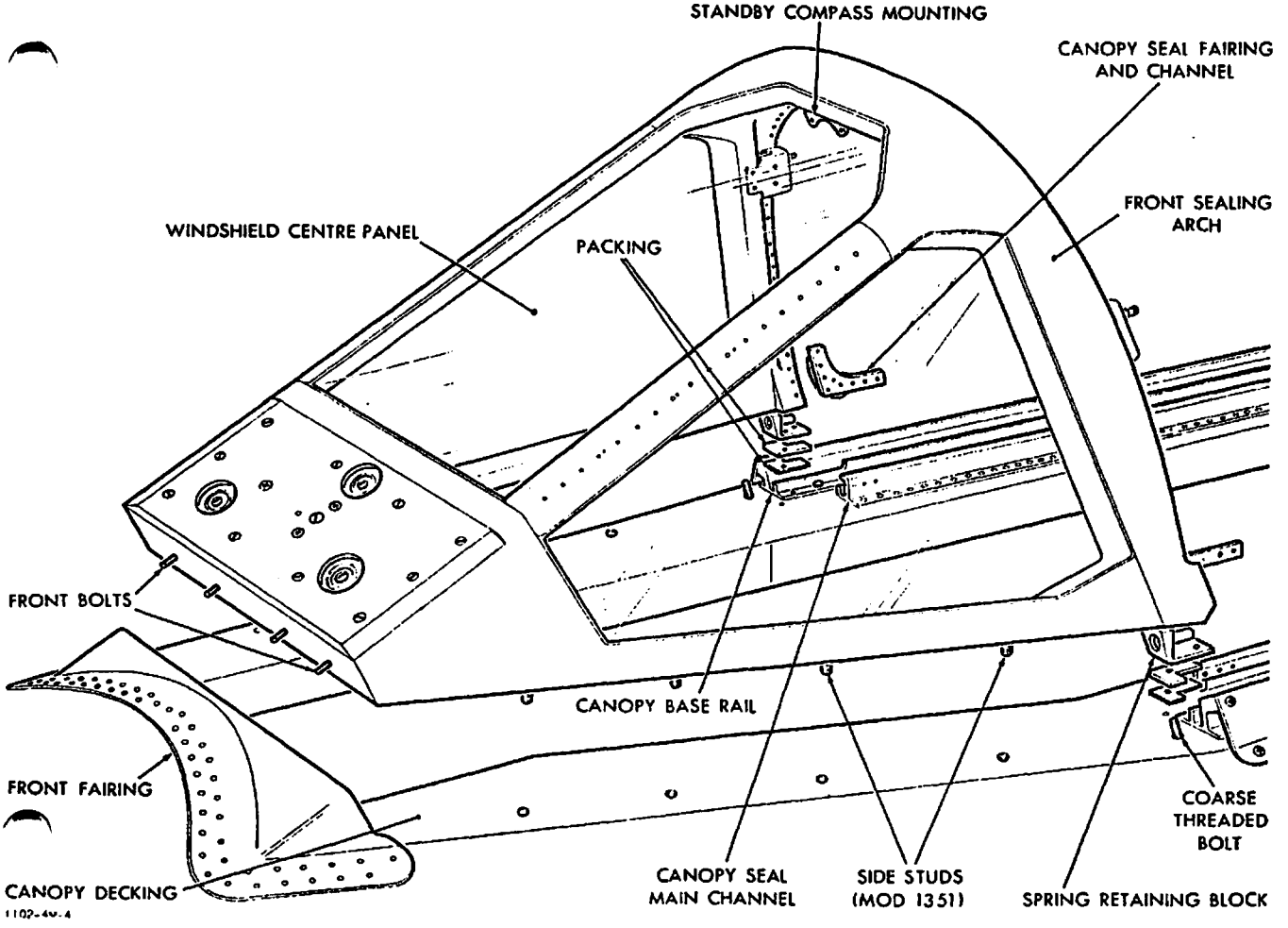


Fig.2-1-9 Front Windshield Installation

(m) Refit the spring retaining block, packing and the canopy seal fairing and channel, using sealant on the faying surfaces.

(n) Refit the canopy rails. See Part 2 Sect 2.

(p) Slide the canopy on to the canopy rails and leave the canopy in the open position.

(q) If a new windshield has been fitted, drill the canopy seal retaining channel at the windshield arch and rivet the mounting block for each canopy 'closed' micro-switch assembly. To install a micro-switch assembly (see fig 2-1-9), proceed as follows:

(1) Remove the screws and insulating cover from the micro-switch.

(2) Fit the two screws through the round holes in the mounting bracket and the micro-switch body. Position the micro-switch mounting block so that the screws pick up the tapped holes and tighten the screws.

(3) Fit the two screws through the slotted holes in the micro-switch mounting bracket and position the packing piece and insulating strip correctly, in that order, on the screws.

(4) Position the micro-switch assembly inside the windshield and fit the screws in the tapped holes in the windshield.

(5) Adjust the position of the micro-switch assembly to obtain the 2.05 inch dimension shown in fig 2-1-9 and tighten the screws to clamp the assembly securely to the windshield.

NOTE

The free play in the micro-switch plunger must be taken up when setting this dimension.

(6) Temporarily fit the canopy seal in the seal retaining channel.

(7) Pull the canopy forward by hand, taking care not to damage the canopy seal, until the micro-switch buffer is approximately 1/8 inch from the micro-switch plunger.

(8) Check that the buffer and plunger are in alignment. If necessary, reposition and adjust the micro-switch assembly, maintaining the 2.05 inch dimension shown in fig 2-1-9, then push the canopy clear of the front cockpit.

(9) Remove the canopy seal clear of the windshield arch.

(10) Using a No.30 drill, drill the two holes through the canopy seal retaining channel to align with the rivet hole at each end of the micro-switch mounting block.

(11) Remove and dismantle the micro-switch assembly.

(12) De-burr the holes in the mounting block and the canopy seal retaining channel; countersink the holes at the outer side of the retaining channel to suit rivets AN426-4-6.

(13) Rivet the mounting block to the seal retaining channel and repeat the drilling and riveting sequence to pick up the centre hole in the mounting block.

(14) Assemble the insulating cover, mounting bracket, packing piece and insulating strip to the micro-switch and screw the assembly to the windshield arch and mounting block, using machine truss head screws, tooth lockwashers and plain washers.

NOTE

It may be necessary to elongate the holes in the insulating cover during this operation.

(15) Re-check the 2.05 inch dimension. Clip the micro-switch electrical leads to the windshield.

(r) Refit the canopy seal. See Part 3 Sect 2.

(s) Complete the installation of the canopy. See Part 2 Sect 2.

(t) Check the clearance between the canopy and the canopy seal. See Part 3 Sect 2.

(u) Check the operation of the canopy. See Part 2 Sect 2.

(v) Pressure test the cockpit and repair any leaks.

(w) Refit the access panels under the canopy decking.

(x) Connect the electrical leads to the terminals at the lower end of the windshield centre panel and, when Mod 876 is embodied, to the windshield side panels.

(y) Remove the masking tape and clean the glass panels of the windshield.

(z) Refit the front instrument panel.

(aa) Refit the right and left-hand instrument panels.

(ab) Refit and re-harmonize the radar gunsight and mounting.

(ac) Replace the front ejection seat. See Part 2 Sect 3 or 3A.

(ad) Refit and swing the stand-by compass; reclip the compass light lead to the windshield.

REAR WINDSHIELD (Fig 2-1-10)

35 To remove the rear windshield assembly proceed as follows:

(a) Actuate the canopy to the fully open position.

(b) Disconnect the two electrical connectors from the compass loop and the connector from the 'bail out' signal light.

(c) Support the compass loop mounting bracket and remove the four bolts attaching the bracket to the pilot's ejection seat guide rail.

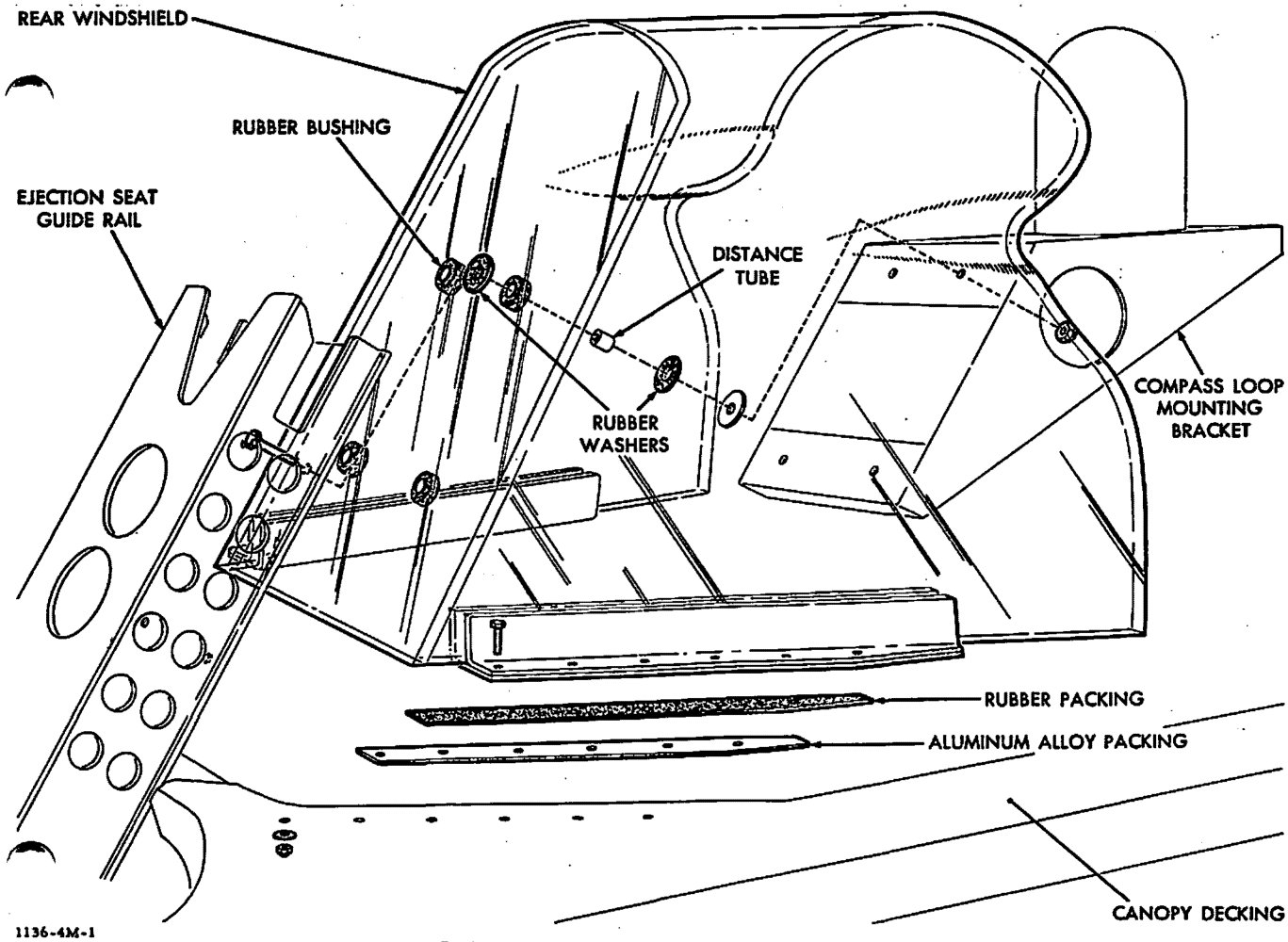


Fig. 2-1-10 Rear Windshield Installation

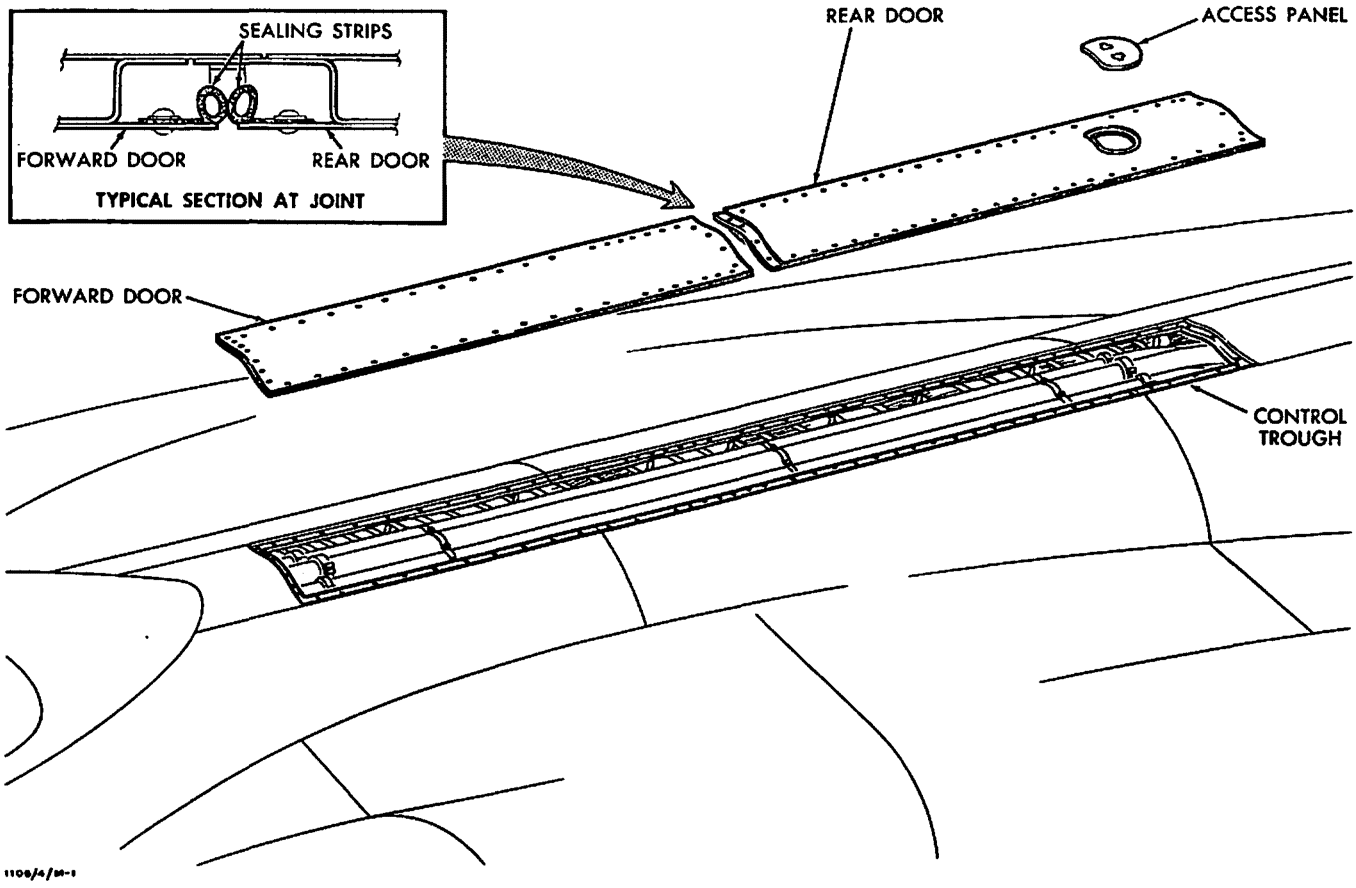


Fig. 2-1-11 Control Trough Doors

(d) Remove the compass loop together with the mounting bracket.

(e) Remove the twelve bolts which attach the windshield to the canopy decking.

(f) Remove the rear windshield complete and retain the aluminum alloy and rubber packing strips.

36 The installation procedure is the reverse of that given for removal. Adjust the aluminum alloy packing between the windshield and the canopy decking to obtain a clearance of 0.125 to 0.25 inch between the top centre of the canopy front arch and the rear edge of the windshield.

CONTROL TROUGH DOORS (Fig 2-1-11)

37 To remove the control trough doors, proceed as follows:

(a) Remove the screws which secure the doors to the fuselage.

(b) Remove the screws which join the doors.

(c) Remove the access panel from the rear door.

(d) Use the access hole for a grip and lift the rear door clear of the trough.

(e) Remove the forward door.

38 The installation procedure for the control trough doors is the reverse of that given for removal.

LOWERING THE BATTERY STOWAGE (Fig 2-1-12)

39 To lower the battery stowage, proceed as follows:

(a) Lower the flaps.

(b) Disconnect the centre-section flap jacks by removing the Pip-pins.

(c) Fit the flap jury strut and ensure that the red banner is visible.

(d) Remove the battery stowage service strut and fit it to the underside of the rear centre section.

(e) Support the battery stowage and release the two Hartwell catches.

(f) Swing the right-hand panel clear of the access hole.

(g) Lower the battery and stowage until the service strut can be engaged with the top eye-bolt if battery servicing only is to be carried out, or with the lower eye-bolt if access to the rear centre section is desired.

40 The raising procedure is the reverse of that given for lowering. Check that the battery and support tray move unrestricted into position. The flap jury strut should be correctly stowed with its banner rolled and retained by the spring clip. If a new battery stowage is fitted, two men are required; one inside the rear centre section and one outside, to carry out the following procedure:

(a) Raise the battery stowage.

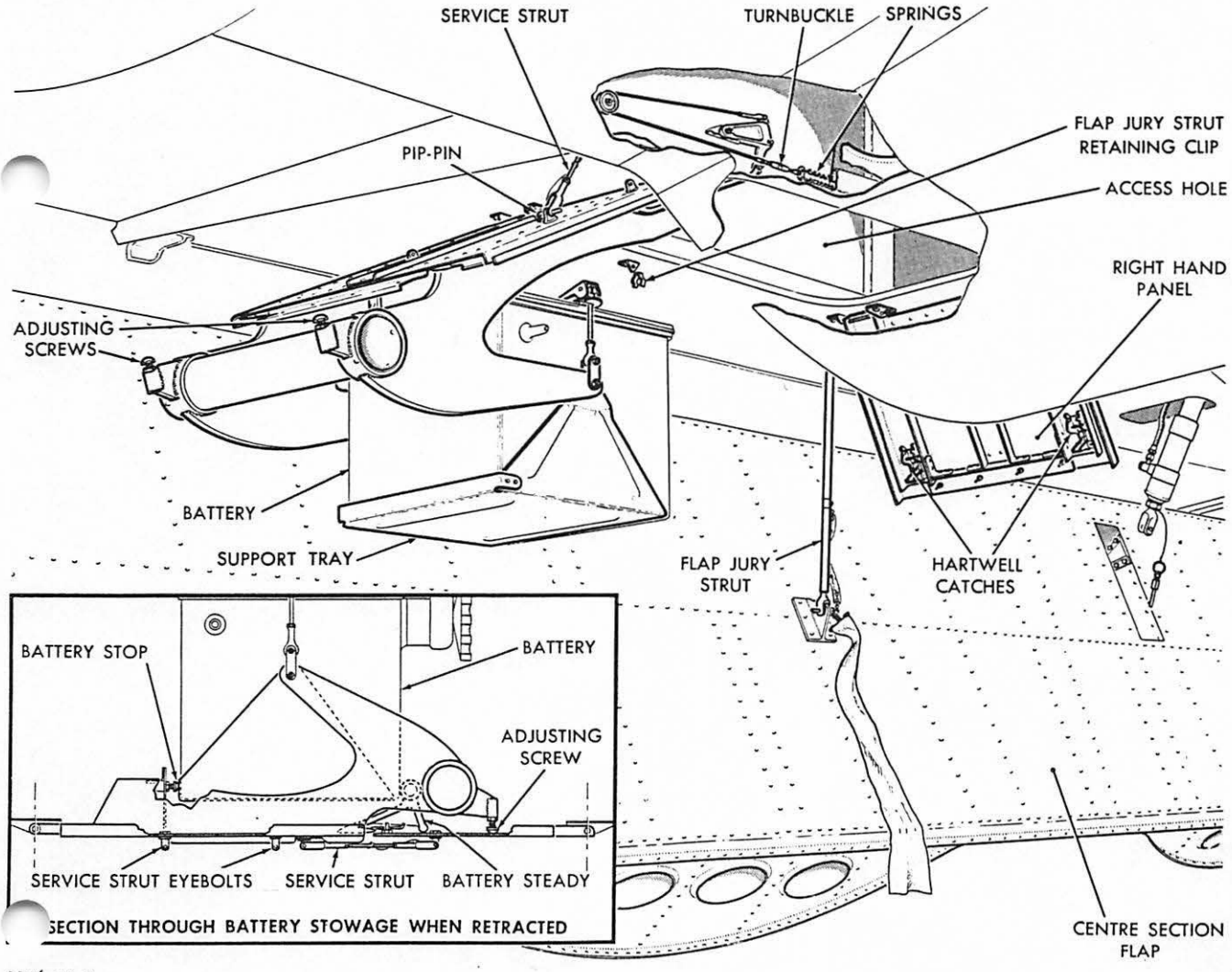


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Fig.2-1-12 Battery Stowage

(b) Install the battery (see Part 7 Sect 2) and adjust the battery stops and adjusting screws to make contact with the support tray flange and the right-hand panel respectively.

(c) Lower and raise the stowage. Check the adjustment and ensure that the battery steady, hinged to the stowage, bears against the battery.

(d) If further adjustment is necessary, re-adjust the battery stops and/or the adjusting screws and repeat step (c).

NOTE

With the battery stowage raised, the cable is tensioned until the springs extend 3.8 inches from the free length. The stowage must be restrained when raising without a battery installed.

ROCKET BAY FAIRING REMOVAL
(Fig 2-1-13)

41 To remove the rocket bay fairing, proceed as follows:

(a) Remove the gun package. See Part 8 Sect 5.

(b) Remove the nuts from the bolts attaching the support tubes to the roof of the rocket bay.

(c) Support the fairing and remove the bolts.

(d) Lower the fairing.

ROCKET BAY FAIRING INSTALLATION
(Fig 2-1-13)

42 To install the rocket bay fairing, proceed as follows:

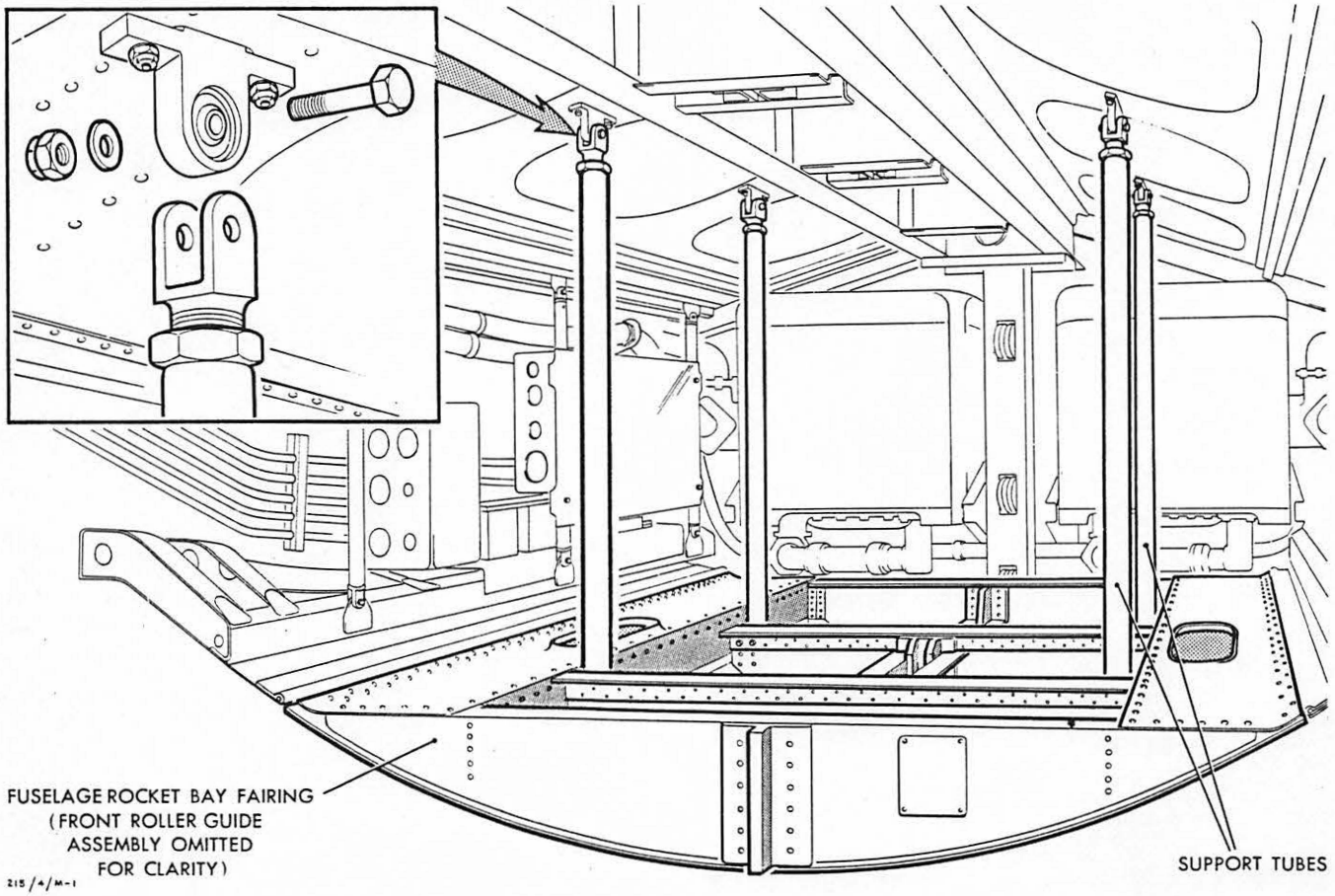


Fig. 2-1-13 Rocket Bay Fairing

(a) Slacken off the locknuts which lock the rod ends and fork ends in the support tubes.

(b) Check that there are no tools or other loose objects in the rocket bay.

(c) Support the fairing in position beneath the rocket bay.

NOTE

If a new rocket bay fairing is installed, the front roller guide assembly strut may require a slight adjustment to prevent the fairing being jammed between the rollers or to ensure that the rollers bear evenly on the fairing.

(d) Temporarily fit the bolts to the fork ends and support brackets.

(e) Adjust the fork ends as necessary until the profile of the fairing is flush with the profile the fuselage.

NOTE

A maximum skin clearance of 0.1 inch should be maintained between the fairing and the surrounding structure.

(f) Rotate each support tube until the rod end and the fork end are safely engaged an equal number of threads.

NOTE

The fork end and the rod end both have RH threads. Rotating the support tube with the locknuts slackened off has no effect on the overall length of the tube assembly.

(g) Tighten the locknuts to secure the rod ends and fork ends.

(h) Fit and tighten the nuts on the bolts at the upper ends of the support tubes.

(j) Check that the lower ends of the support tubes are securely attached to the fairing.

EMPENNAGE REMOVAL (Fig 2-1-14)

43 The empennage, weighing approximately 1055 pounds, can be removed complete as follows:

(a) Support the aircraft approximately in rigging position. See Part 1 Sect 2.

(b) Lower the flaps.

(c) Disconnect the centre-section flap and lower the battery stowage. See para 39.

(d) Remove the large access panel from the left-hand side of the rear section.

(e) Remove the transport joint fairings between formers 34F and 34A.

(f) Remove the vertical stabilizer fillet.

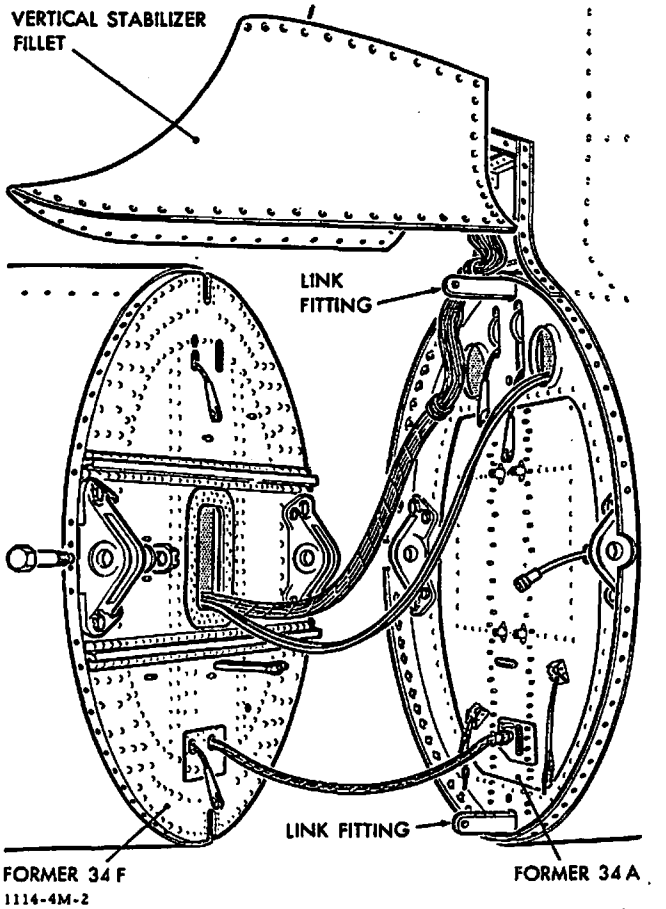


Fig.2-1-14 Rear Section Transport Joint

(g) Ensure that the Ground/Flight switch is OFF.

(h) Wire the hydro-booster control lever in the off position.

(j) Disconnect and blank off the two hydraulic pipes at the rear face of former 34A.

(k) Disconnect the electrical connections from the terminal blocks on the forward face of former 34F.

(m) Fit the external control locks to the empennage.

(n) Slacken the elevator and rudder control cables at the turnbuckles in the rear centre section.

(p) On aircraft not fitted with elevator auto-trim, remove the stops from the elevator trimmer cables in the rear centre section and the elevator trimmer cable fairleads on the control cable support frame at former 27.

(q) Disconnect the trimmer control cables at the turnbuckles in the rear centre section.

(r) Disconnect the two elevator control cables at their connections just forward of former 34F.

(s) Remove the trimmer pulley guards at the forward face of former 34F.

(t) Slacken the yaw damper control cable and disconnect the rudder and the yaw damper control cables from the vertical lever in the rear section. See Part 2 Sect 4.

(u) Attach the correct sling and support the weight of the unit, using suitable lifting equipment. See Part 1 Sect 2.

(v) Remove the bolts which attach the top and bottom link fittings at the transport joint, forward of former 34F in the rear centre section.

(w) Remove the cotter pins and nuts from the horizontal transport joint bolts, through the access holes in former 34A and tap out the bolts.

(x) Swing the empennage gently backwards sufficiently to enable the VHF antenna bulkhead connector to be unscrewed from the rear face of former 34F. Pull through the disconnected cables. Coil and stow the cables on the face of former 34A and remove the empennage clear of the aircraft.

EMPENNAGE INSTALLATION (Fig 2-1-14)

44 The empennage may be installed completely assembled or by units, as detailed in the following paragraphs:

(a) Support the aircraft approximately in rigging position. See Part 1 Sect 2.

(b) Attach the correct sling to the rear section and support it so that formers 34F and 34A are about a foot apart. The tail cone should be removed.

(c) Uncoil the cables from the face of former 34A and insert them through their correct openings in former 34F.

(d) Fit the trimmer pulley cable guards.

(e) Bring the faces of formers 34F and 34A together sufficiently to enable the VHF antenna to be connected to the bulkhead connector, the hydraulic pipes to be inserted into their respective holes and the slack taken up on electrical cables. Continue movement carefully, guiding the top and bottom links which are attached to the rear section, through into the fittings in the rear centre section.

(f) Fit the two horizontal transport joint bolts, but do not tighten.

(g) Fit the attachment bolts to the top and bottom links, in the rear centre section.

(h) Tighten the horizontal transport joint bolts.

(j) Remove the blanking unions and connect the two hydraulic pipes at the rear face of former 34A.

(k) Connect the rudder control and the yaw damper control cables to the vertical lever in the rear section.

(m) Connect the elevator control cables just forward of former 34F in the rear centre section.

(n) Connect the trimmer control cables at the turnbuckles in the rear centre section.

(p) Fit the fairleads, cable stops and pulley cable guards which have been removed.

(q) Connect the electrical cables to the terminal strips on the forward face of former 34F.

(r) Check all locking.

(s) Engage the hydro-boosters. See Part 2 Sect 4. Bleed and test the hydro-booster hydraulic circuit. See Part 3 Sect 1.

(t) Adjust and tension the control cables and check for correct functioning and ranges of movement. See Part 2 Sect 4.

Fit the transport joint fairings and the rtical stabilizer fillet.

(v) Attach the tail cone. See para 47.

(w) Replace the rear section access panel.

(x) Raise the battery stowage and reconnect the centre-section flap.

REAR SECTION INSTALLATION

45 To install a rear section, proceed as outlined in para 44(a) through (r). The rear section weighs approximately 325 pounds. The links are not supplied with a new rear section, so new links must be obtained, or the old links must be refitted. Ensure that the rear attachment bolt of the top link is torque loaded to 660 - 780 inch-pounds.

TAIL CONE (Fig 2-1-4)

46 To remove a tail cone proceed as follows:

(a) Remove the access panel on the right-nd side of the tail cone.

(b) Ensure that the Ground/Flight switch is OFF.

(c) Disconnect the two wires of the electrical cable assembly from the terminal block in the tail cone and remove the attaching clip.

(d) Remove the three screws which attach each side of the lower rudder fillet to the rear section.

(e) Support the cone and remove the screws which secure it to the rear section.

(f) Remove the cone from the aircraft by working it from side to side and pulling rearwards.

47 The installation procedure is the reverse of that given for removal. If a new tail cone is fitted, check the clearance between the tail cone and lower rudder. See fig 2-1-15. The maximum permissible step between the tail cone skin and the skin of the rear section is 0.03 inch.

UPPER RUDDER REMOVAL (Fig 2-1-15)

48 To remove an upper rudder, which weighs approximately 39 pounds, proceed as follows:

(a) Remove the trailing edge fairing. See para 51.

(b) Remove the two bolts, nuts and saddle washers which attach the universal joint to the upper rudder.

(c) Remove the hinge access panels.

(d) Disconnect the control rod from the upper rudder lever.

(e) Remove the lower hinge bolt and release the bonding.

(f) Support the weight of the rudder at its leading edge, remove the upper hinge bolt and release the bonding.

(g) Carefully pivot the rudder clear of the hinge fittings.

(h) Lift the rudder clear of the universal joint and remove it from the aircraft.

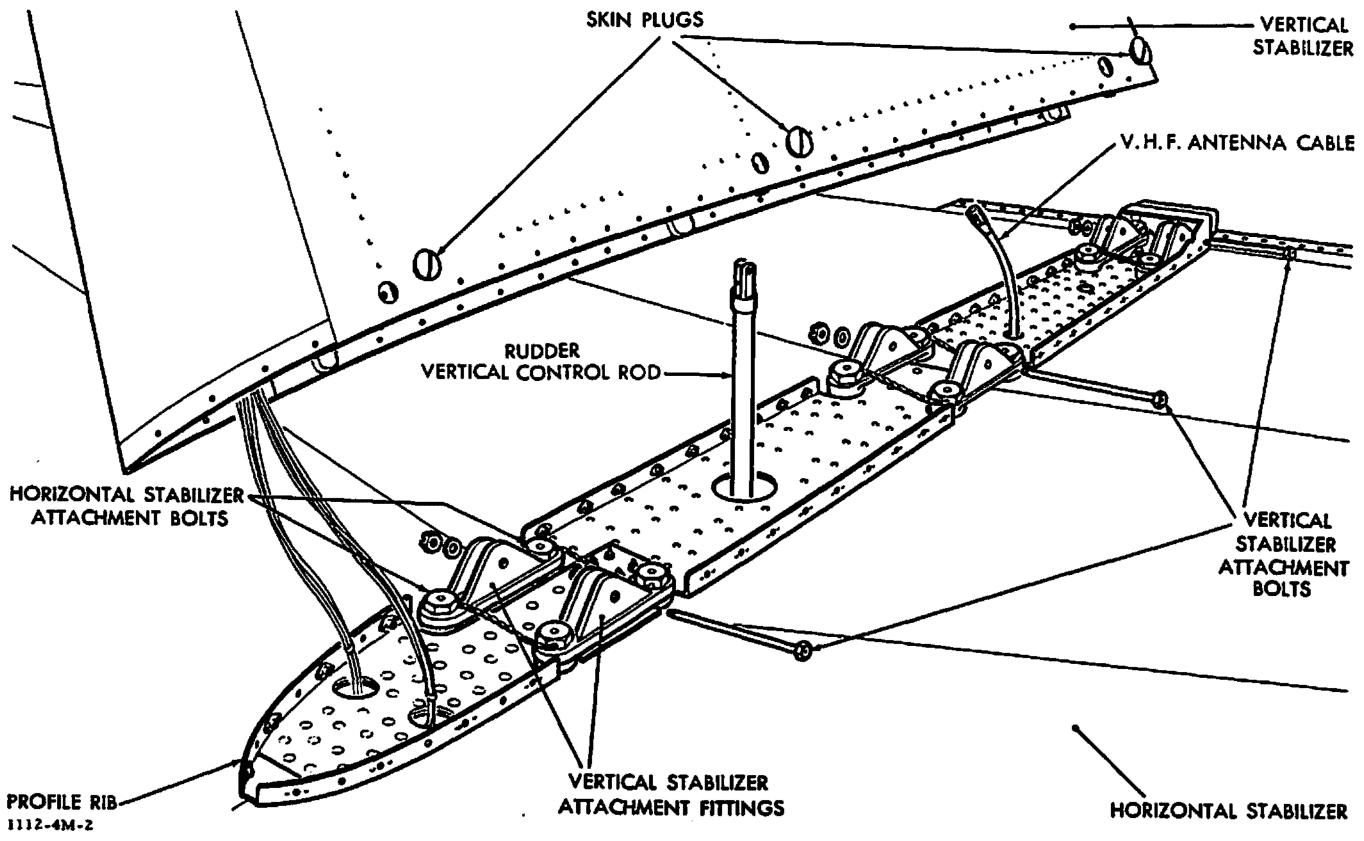


Fig. 2-1-16 Vertical Stabilizer Attachment

VERTICAL STABILIZER (Fig 2-1-5 and 2-1-16)

55 The vertical stabilizer, which weighs approximately 55 pounds, should be removed as follows:

(a) Remove the trailing edge fairing. See para 51.

(b) Remove the upper rudder. See para 48.

(c) Detach the vertical stabilizer tip by removing the attaching screws around its edge.

(d) Remove the elevator hydro-booster access panel and remove the clip which attaches the VHF cable assembly to the horizontal stabilizer.

(e) Detach the VHF antenna from the top rib of the vertical stabilizer.

(f) Pull the VHF antenna clear of the vertical stabilizer, until the cable elbow connection can be reached and disconnected. Remove the elbow connection from the cable. Sufficient slack cable is provided in the rear section for this purpose.

(g) Disconnect the electrical cables from the forward face of former 34F and pull through the conduit situated in the leading edge of the vertical stabilizer.

(h) Disconnect the de-icer boot electrical cables at the terminal block in the horizontal stabilizer.

(j) Remove the access panel to the rudder control upper bellcrank, on the right-hand side of the vertical stabilizer.

(k) Disconnect the rudder vertical control rod at the upper bellcrank.

(m) Remove the screws from around the base of the vertical stabilizer.

(n) Remove the six screwed skin plugs at the base of the vertical stabilizer.

(p) Remove the three vertical stabilizer attachment bolts.

(q) Lift the vertical stabilizer until it is clear of the rudder control rod, pull the VHF cable assembly out of its conduit and remove the vertical stabilizer from the aircraft.

56 The installation procedure is the reverse of that given for removal. If new stabilizer attachment fittings are installed, the fittings must be drilled and reamed as outlined in para 59.

HORIZONTAL STABILIZER REMOVAL

57 Before removing the horizontal stabilizer, the vertical stabilizer attachment fittings should be clearly marked at their relevant positions. If this precaution is not carried out it will be necessary to install new fittings in accordance with para 59. To remove the horizontal stabilizer, which complete with elevators weighs approximately 612 pounds, proceed as follows:

(a) Support the aircraft approximately in rigging position. See Part 1 Sect 2.

(b) Remove the transport joint fairing between formers 34F and 34A.

(c) Remove the tail cone from the rear section. See para 46.

(d) Lower the flaps.

(e) Disconnect the centre-section flap and lower the battery stowage. See para 39.

(f) Remove the rear section access panel.

(g) Disconnect the electrical cables from the de-icer boot relays and the VHF antenna.

(h) On aircraft with elevator auto-trim, disconnect the electrical cables from the trim tab limit switches (Pre-mod 1088) and trim tab position transmitter. Remove the clipping from the cables and pull clear of the horizontal stabilizer.

(j) Disconnect the electrical cables to the elevator hydro-booster release unit at the terminal block positioned in the lower vertical stabilizer on the rear of rib D.

(k) Remove the vertical stabilizer. See para 55.

(m) Wire the hydro-booster control lever in the off position.

(n) Remove the circular access panel at the rear of the left-hand side of the rear section.

(p) Disconnect and blank off the two hydraulic pipes just below the horizontal stabilizer.

NOTE

The pipe fairlead in the horizontal stabilizer should be removed if it is necessary to move the pipes during disconnection.

(q) Slacken the elevator control cables at the turnbuckles in the rear centre section.

(r) Disconnect the two elevator control cables immediately forward of former 34F.

(s) Remove the elevator pulley cable guards on the rear face of former 34A.

(t) Disconnect the elevator trimmer control cables at the turnbuckles in the rear centre section.

(u) On aircraft not fitted with elevator auto-trim, remove the fairleads and cable stops from the elevator trim cables in the rear centre section.

(v) Remove the elevator trimmer cable pulley guards on the front faces of formers 34F, 34A and 36.

(w) Remove the elevator trimmer cable fairlead from the lower part of the rear section, just forward of former 36.

(x) Attach guide cords to the disconnected elevator and trimmer control cable ends, to facilitate reassembly.

(y) Remove the horizontal stabilizer attachment screws from the top of the rear section.

(z) Support the horizontal stabilizer with the correct sling and suitable lifting equipment. See Part 1 Sect 2.

(aa) Identify and remove the twelve attaching bolts together with the vertical stabilizer attachment fittings. See fig 2-1-17.

(ab) Ensure that all the clips have been disconnected and lift the horizontal stabilizer just clear of the rear section.

(ac) Pull the elevator and trimmer control cables through the rear section, untie the guide cords and attach them to the top of the rear section.

(ad) Coil and tie the disconnected control cables loosely to the horizontal stabilizer.

(ae) Pull the VHF antenna cable assembly down through the horizontal stabilizer.

(af) Lift the horizontal stabilizer until it is clear of the rudder vertical control rod and remove it from the aircraft.

HORIZONTAL STABILIZER INSTALLATION

58 To install the horizontal stabilizer, proceed as follows:

(a) Support the aircraft approximately in rigging position. See Part 1 Sect 2.

(b) Use the correct sling and suitable lifting equipment to support the horizontal stabilizer above the rear section.

(c) Lower the horizontal stabilizer carefully over the vertical rudder control rod, until it is approximately six inches above the rear section.

(d) Attach the elevator and trimmer control cables to the guide lines and pull them through the rear section.

(e) Pass the VHF antenna cable assembly through the horizontal stabilizer.

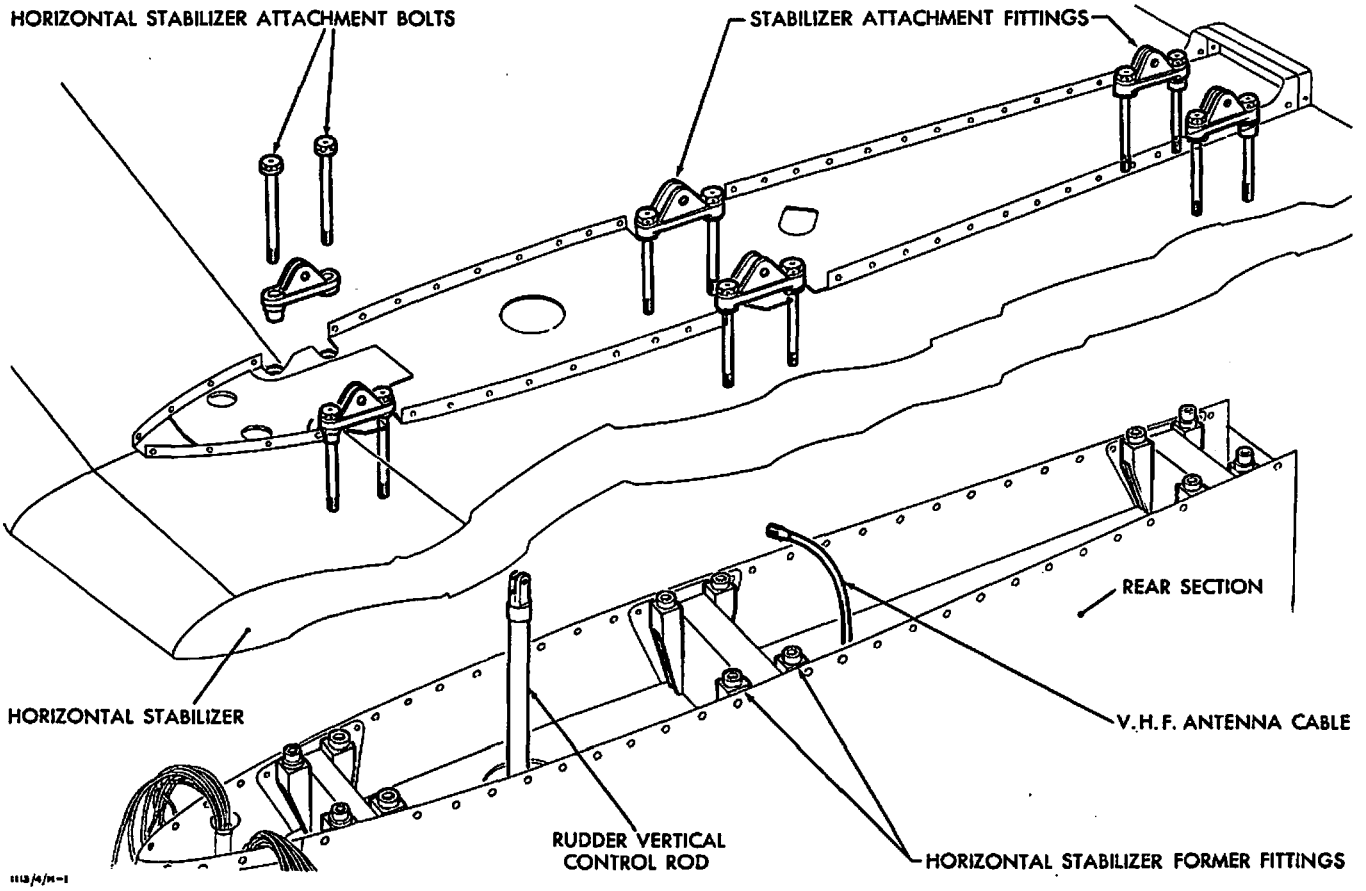


Fig. 2-1-17 Horizontal Stabilizer Transport Joint

(f) Lower the horizontal stabilizer on to the rear section and guide the lower profile rib inside the skin of the rear section.

(g) Ensure that the horizontal stabilizer is securely seated on the attachment fittings on the rear section and place the stabilizer attachment fittings in position. See fig 2-1-17.

(h) Install the attachment fittings in the same position from which they were removed, as follows:

(1) Fit the twelve main attachment bolts and align the stabilizer fittings with the drill and setting jig. See fig 2-1-18.

NOTE

If the drill and setting jig is not available, alignment of the stabilizer may be obtained by the use of two pins approximately 7 inches long, one 0.374 inch diameter and the other 0.3117 inch diameter. The pins should be tapered for about 1 inch at the end to give a lead in.

(2) When using the drill and setting jig, fit two 0.3125 inch slip bushes and two short 5/16 inch pins to locate the rear fittings.

(3) Fit 0.375 inch slip bushes and 3/8 inch pins to locate the centre and front fittings.

(4) Torque load the front four bolts to 150 ± 10 foot-pounds, the centre four bolts to 220 ± 10 foot-pounds and the rear four bolts to 75 ± 10 foot-pounds.

NOTE

If a new horizontal stabilizer is fitted, the six stabilizer attachment fittings must be renewed and the pilot holes in the attachment fittings must be drilled and reamed with the aid of a special drill and setting jig as outlined in para 59.

(j) Lock the attachment bolts with wire N995NC51.

(k) Fit the attachment screws around the top of the rear section.

(m) Ensure that the elevator control cables are on the pulleys on the rear face of former 34A and fit the pulley cable guards.

(n) Connect the two elevator control cables forward of former 34F and tighten the turnbuckles.

(p) Ensure that the elevator trimmer control cables are on the pulleys on the front faces of formers 34F, 34A and 36 and fit the pulley cable guards.

(q) Install the vertical stabilizer. See para 56.

(r) Lead through, clip and connect up the electrical cables to the de-icer boot relays and VHF antenna.

(s) On aircraft fitted with elevator auto-trim, connect up the trim tab travel limit switches (Pre-mod 1088) and the trim tab position transmitter.

(t) Connect the electrical cables to the elevator hydro-booster release unit at the terminal block positioned in the rear section on rib D.

(u) Connect the elevator trimmer cable turnbuckles in the rear centre section and fit the fairleads.

(v) Fit the elevator trim cable stops, on aircraft not fitted with elevator auto-trim.

(w) Remove the blanking unions, connect the two hydraulic pipes just below the horizontal stabilizer and refit the fairlead in the horizontal stabilizer.

(x) Fit the trailing edge fairing. See para 52.

(y) Check all connections and locking.

(z) Adjust and tension the controls. See Part 2 Sect 4.

(aa) Engage the hydro-boosters. See Part 2 Sect 4. Bleed and test the hydro-booster hydraulic circuit. See Part 3 Sect 1.

(ab) Check the elevator and elevator trimmer controls for correct functioning and range of movement.

(ac) Fit the transport joint fairings between formers 34F and 34A.

(ad) Fit the access panels and the vertical stabilizer fillet.

(ae) Fit the tail cone to the rear section.

(af) Raise the battery stowage and reconnect the centre-section flap.

USING THE DRILL AND SETTING JIG - STABILIZER FITTINGS (Fig 2-1-18)

59 It is necessary to use the drill and setting jig to position, drill and ream the new stabilizer fittings when the horizontal stabilizer is changed. The jig weighs approximately 71 pounds. The following procedure for locating the jig and drilling and reaming the stabilizer fittings, details the drilling and reaming of the centre, rear and front fittings, in that order. Proceed as follows:

(a) Complete the procedure detailed in para 58 (a) to (g).

(b) Fit, but do not tighten, the twelve main attachment bolts.

(c) Position the jig on the stabilizer fittings with the 0.075 inch feeler to the rear.

NOTE

The new stabilizer fittings have pre-drilled pilot holes, 5/16 inch diameter for front and centre fittings and 1/4 inch diameter for rear fittings.

(d) Insert the 0.3125 inch slip bushes into the front holes of the jig, fit the lock screws and push the long 5/16 inch locating pin through the jig and front fittings.

(e) Locate the rear of the jig by inserting the two 1/4 inch pins through the jig and rear fittings.

(f) Raise the rear of the jig by inserting the 0.075 inch feeler tabs between the rear locating pins and the jig.

NOTE

The rear holes in the jig are larger than the 1/4 inch diameter pins but provided that the 0.075 inch feelers have been inserted correctly, the pins will retain the jig firmly.

(g) Adjust the centre fittings so that the holes are vertically in line with the holes in the jig.

NOTE

There is a clearance of 0.031 - 0.041 inch between the attachment bolts and all six stabilizer fittings. Spigots at the front ends of the front fittings and at the rear ends of the rear fittings locate in the horizontal stabilizer. See fig 2-1-17. The centre fittings are located by the attachment bolts and must be aligned as closely as possible to the jig holes so that the fitting holes, after reaming, will be concentric with the pilot holes within 0.03 inch.

(h) Torque load the front, centre and rear fitting attachment bolts to the values specified in para 58(h)(4).

(j) Install a 0.3593 inch slip bush in each of the jig centre holes, fit the lock screws and drill through the centre fittings with a 23/64 inch drill.

(k) Remove the lock screws and the 0.3593 inch slip bushes, replace with two 0.375 inch slip bushes and ream the centre fittings to 0.375 - 0.377 inch. After reaming, insert the two 3/8 inch locating pins through the bushes and stabilizer fittings to locate the centre of the jig.

(m) Remove the feelers and 1/4 inch pins from the rear fittings.

(n) Install a 0.2969 inch slip bush in each of the jig rear holes and drill through the rear fittings with a 19/64 inch drill.

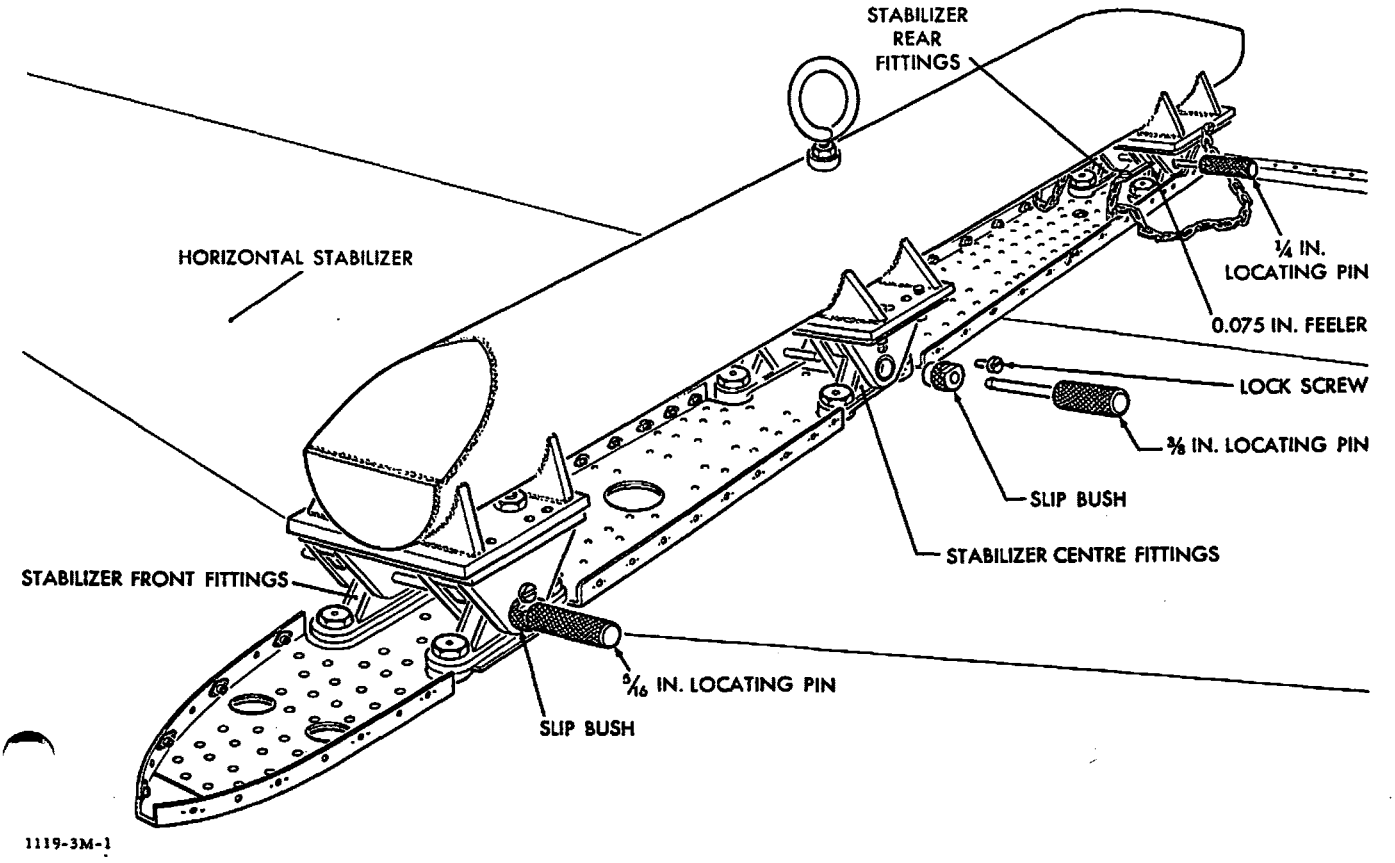


Fig.2-1-18 Vertical Stabilizer Drill and Setting Jig

(p) Remove the 0.2969 inch slip bushes, replace with the two 0.3125 inch slip bushes and ream to 0.3125 - 0.3145 inch. After reaming, insert the two short 5/16 inch locating pins to locate the rear of the jig.

(q) Remove the long 5/16 inch locating pin and the 0.3125 inch slip bushes from the front holes in the jig, replace with 0.3593 inch slip bushes and drill the front fittings with a 23/64 inch drill.

(r) Remove the 0.3593 inch slip bushes, replace with two 0.375 inch slip bushes and ream the front fittings to 0.375 - 0.377 inch.

(s) Remove all the locating pins and slip bushes from the jig and remove the jig from the empennage.

(t) Clean off swarf from the fittings and deburr the finished holes.

(u) Proceed with the installation of the horizontal stabilizer as detailed in para 58(j) to (af).

ELEVATOR (Fig 2-1-19)

60 Each elevator, which weighs approximately 68 pounds, should be removed as follows:

(a) Disconnect the control rod at the elevator lever.

(b) Remove the panel giving access to the idler lever at the leading edge of the elevator.

(c) Disconnect the elevator trimmer screw jack at the idler lever in the elevator leading edge.

(d) Support the elevator at each end of the leading edge.

(e) Release the bonding leads and remove the bolts which attach the inner and outer hinge brackets to the horizontal stabilizer.

(f) Release the bonding lead and remove the centre hinge bolt.

(g) Remove the elevator rearwards from the aircraft, complete with the inboard and outboard hinge fittings.

61 The installation procedure is the reverse of that given for removal. Ensure that the bonding lead is connected to the elevator lever. When Mod 1519 is embodied, the bonding leads at the elevator centre hinge, at the inboard and outboard hinge swivel brackets and at the centre hinge elevator control rod, are assembled between two washers under the bolt head. The bonding leads at the inboard and outboard hinge are assembled between two washers under the nut. See fig 2-1-19. If a new elevator is being fitted check the clearances shown on fig 2-1-19. The maximum that the elevator skin line may be below the horizontal stabilizer skin line is 0.12 inch, measured on the top or bottom surface. Check the elevator and trimmer controls for correct functioning and range of movement. See Part 2 Sect 4.

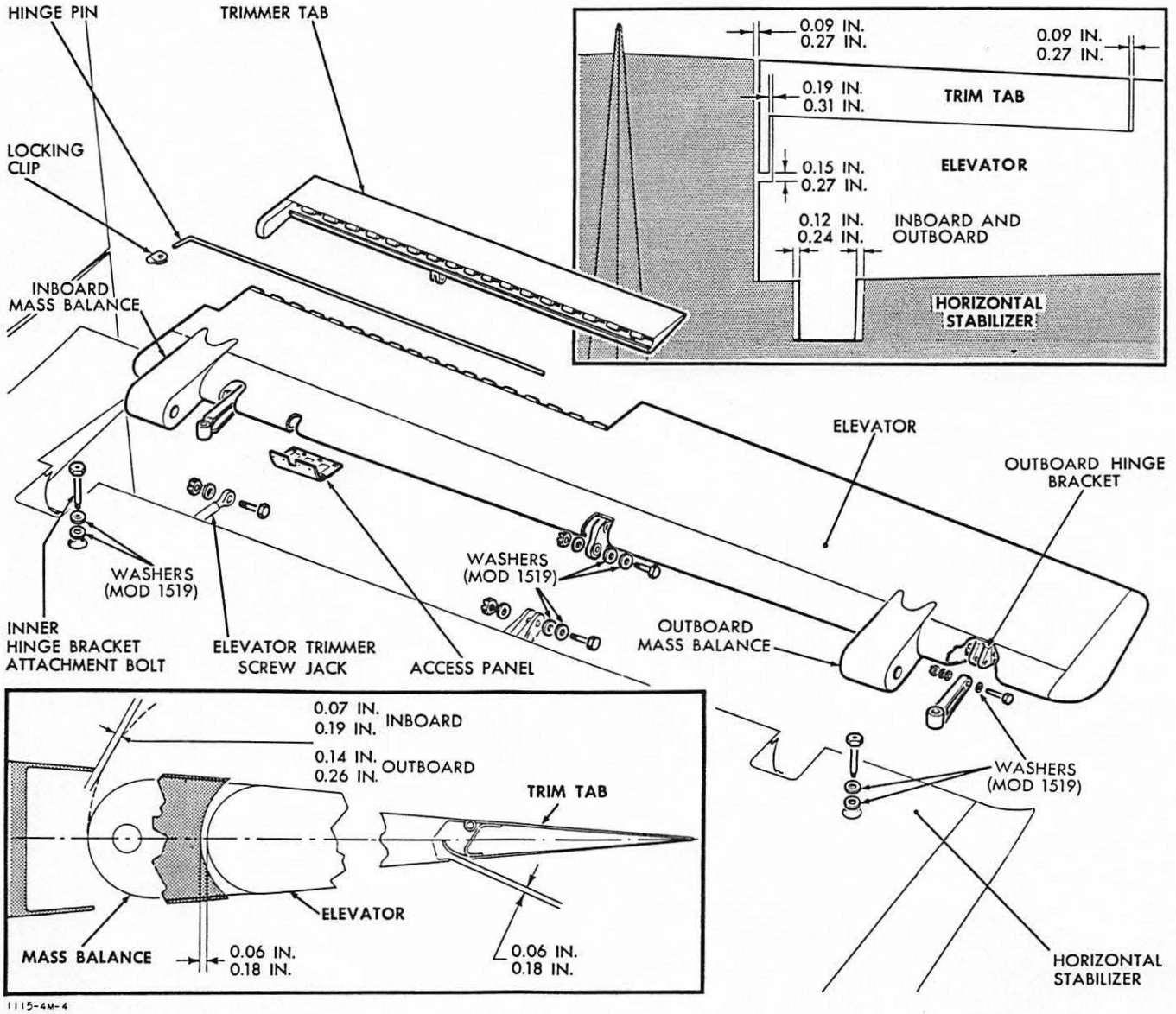


Fig.2-1-19 Elevator and Trimmer Tab

ELEVATOR TRIMMER TAB (Fig 2-1-19)

62 Each elevator trimmer tab should be removed as follows:

(a) Remove the locking clip at the inboard end of the trimmer tab hinge pin.

(b) Disconnect the control rod from the tab.

(c) Support the tab and withdraw the hinge pin.

(d) Remove the tab from the elevator.

63 The installation procedure is the reverse of that given for removal. Lightly grease the hinge pin with grease, Specification 3-GP-683a Ref 34A/192, before meshing the hinge halves. If a new trimmer tab is being fitted, check the clearances shown on fig 2-1-19. Check the elevator trimmer controls for correct functioning and range of movement. See Part 2 Sect 4.

AILERON (Fig 2-1-20)

64 Each aileron, which weighs approximately 95 pounds, should be removed as follows:

(a) Remove the access panel and disconnect the dummy jack from the idler lever.

(b) Remove the fairing and disconnect the hydro-booster from the aileron lever.

(c) Remove the access covers at the inboard and outboard hinge points.

(d) Remove the two bolts which attach the centre hinge fitting to the aileron.

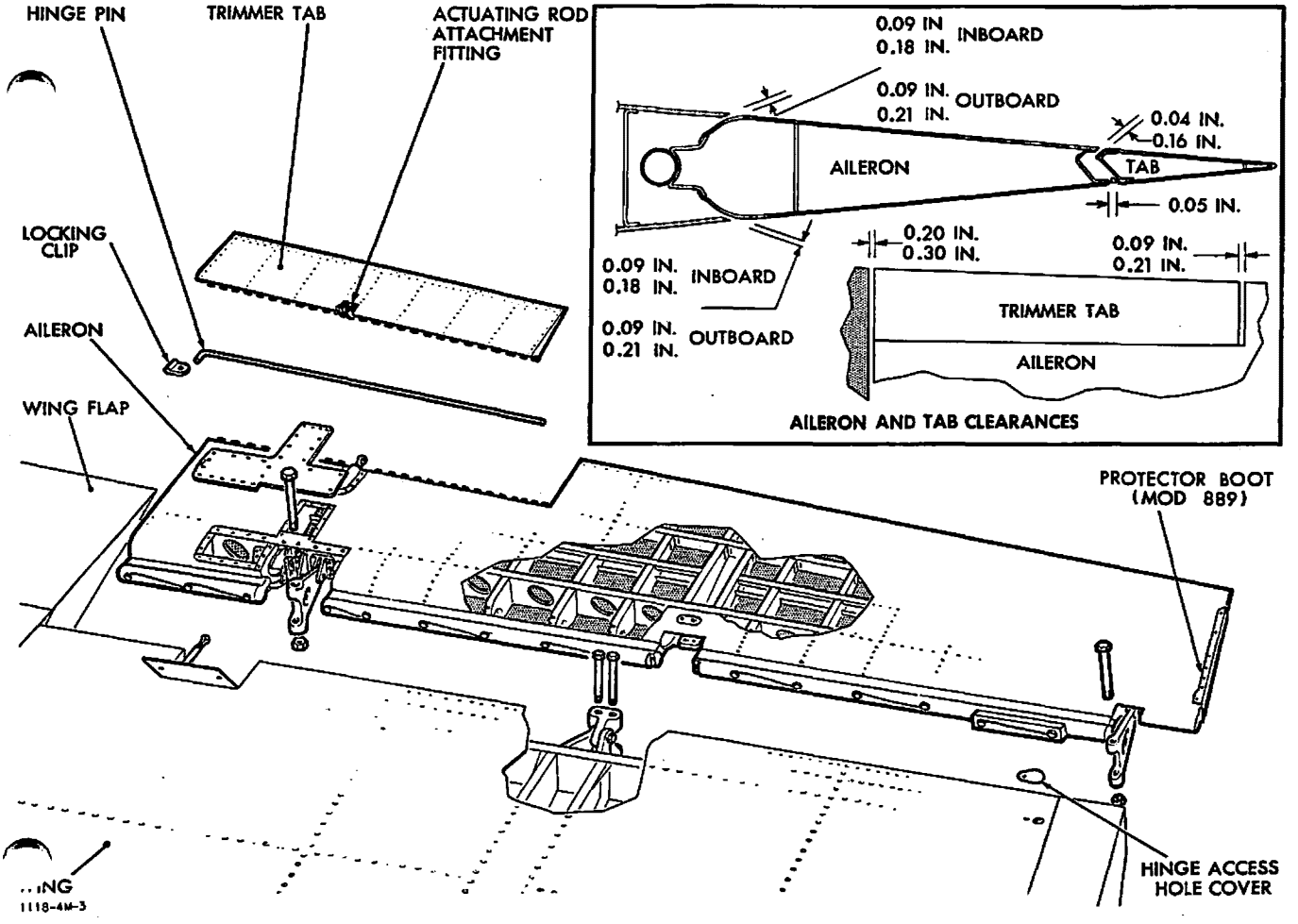


Fig. 2-1-20 Aileron and Servo Tab

(e) Support the aileron at each end.

(f) Remove the inboard and outboard hinge fitting attachment bolts.

(g) Remove the aileron rearwards from the aircraft complete with the inboard and outboard hinge fittings.

65 The installation procedure is the reverse of that given for removal. If a new aileron is fitted, check the clearances shown in fig 2-1-20. The aileron shroud clearances must be checked with the aileron neutral and no fuel or pressure in the aircraft fuel tanks. The clearance at full up or down travel is 0.06 inch minimum. Check the aileron and trimmer tab for correct functioning and range of movement. See Part 2 Sect 4.

AILERON SERVO TAB (Fig 2-1-20)

66 Each aileron servo tab should be removed as follows:

(a) Remove the hinge bolt which secures the actuating rod to the tab leading edge attachment fitting.

(b) Remove the locking clip, support the tab and withdraw the hinge pin.

(c) Pull the tab rearwards until the actuating rod is clear of the tab leading edge attachment fitting.

67 The installation procedure is the reverse of that given for removal. Lightly lubricate the hinge pin with grease, Specification 3-GP-683a Ref 34A/192, before meshing the hinge halves. If a new servo tab is fitted, check the clearances shown on fig 2-1-20. Check the tab for correct functioning and range of movement. See Part 2 Sect 4.

DIVE BRAKE REMOVAL (Fig 2-1-21)

68 Each dive brake, which weighs approximately 28 pounds, should be removed as follows:

(a) Extend the dive brakes and select the Ground/Flight switch to the OFF position to prevent inadvertent closing of the dive brakes.

(b) Remove the access panels on the top surface of the wing and disconnect the three dive brake jacks at the idler levers in the wing.

(c) Fully extend the dive brakes manually and disconnect the links at the brackets on the dive brakes.

(d) Remove the internal wrenching bolts from the trunnion fittings at each hinge.

(e) Withdraw the dive brakes carefully from the wing. Remove and identify the trunnion brackets and packing at each of the three hinges.

DIVE BRAKE INSTALLATION (Fig 2-1-21)

69 All dive brakes are installed in a similar manner, as follows:

(a) Fit the dive brake to the wing with the trunnion brackets in position.

(b) Fit the shims between the trunnion brackets and the wing structure to align the dive brake with the wing recess. All end play must be taken up. If new dive brakes are fitted, the fingers must be trimmed to obtain the clearances shown on fig 2-1-21.

(c) Ensure that there is a clearance of 0.03 inch to 0.13 inch around the edges of the dive brakes when they are closed.

(d) Connect the links to the brackets on the dive brakes.

(e) Connect the dive brake jacks to the idler levers.

(f) Close the dive brakes and ensure that they are flush with the wing.

NOTE

To obtain a uniform setting of each dive brake finger within the wing recess, fingers may be bent individually to within 0.035 inch above or below the wing skin.

(g) Check the dive brake operation and range of movement. See Part 2 Sect 4.

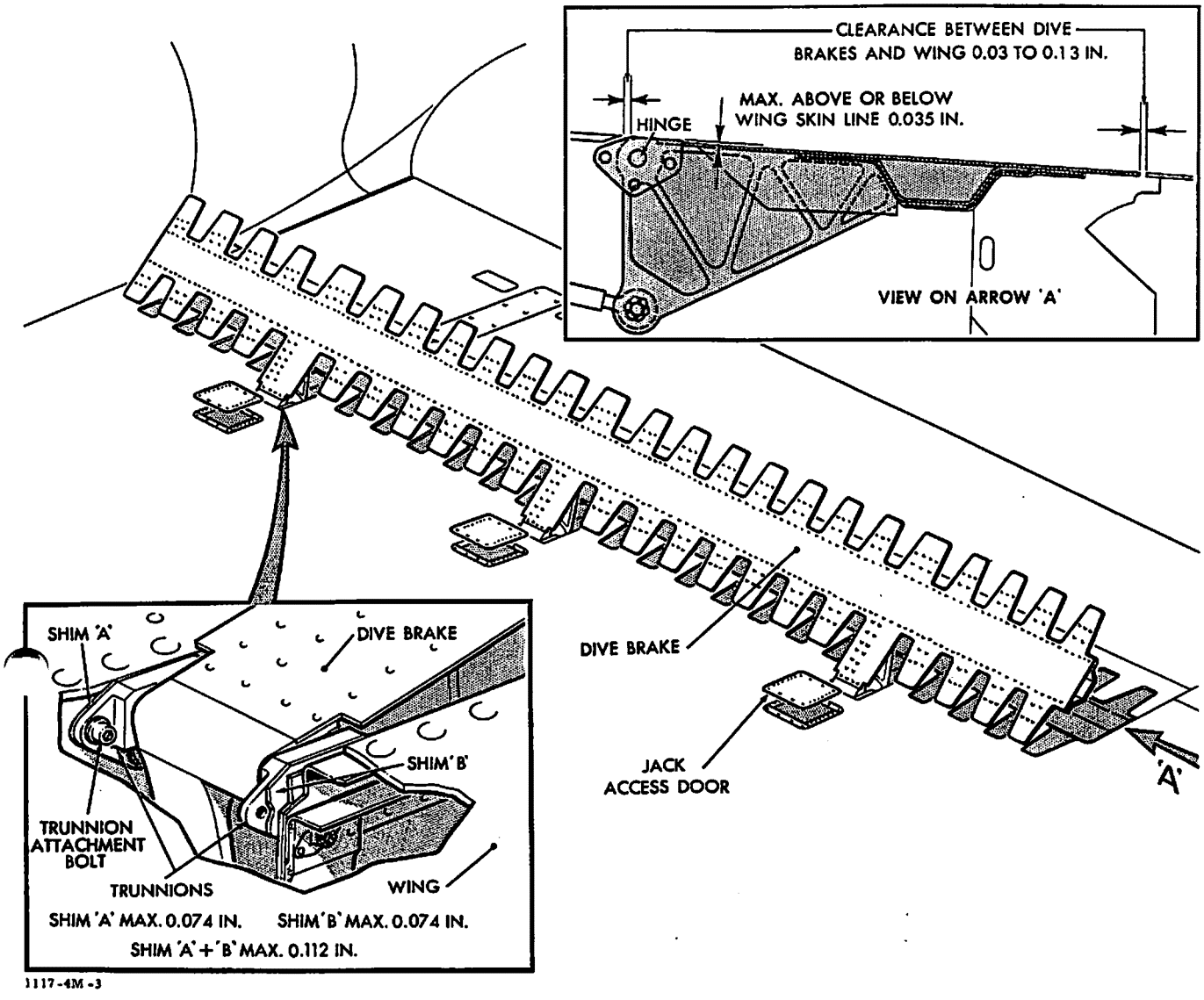


Fig. 2-1-21 Dive Brakes

WING FLAP REMOVAL (Fig 2-1-22 or 2-1-23)

70 To remove a wing flap, each of which weighs 53 pounds, proceed as follows:

(a) Lower the flaps.

(b) If Mod 974 is not embodied, extend the dive brakes.

(c) Select the Ground/Flight switch OFF.

(d) On a left-hand flap, remove the access panel from the leading edge at the inboard end.

(e) On a left-hand flap, disconnect the flap position transmitter arm and wire the 25° position micro-switch rollers in the up position.

(f) Remove the panel which covers the flap jack.

(g) When Mod 974 is embodied, remove the hinge access panels from the leading edge of the flap.

(h) Support the flap and disconnect the jack piston rod from the wing.

(j) Remove the clips from the flexible hydraulic pipes, disconnect the pipes at the flap jack and blank off the pipelines and jack connections.

(k) Push the flexible pipes clear of the flap, through the fibre fairleads in the nose ribs of the flap.

(m) Remove the inboard hinge bolt.

(n) When Mod 974 is embodied, support the flap and remove the centre and outboard hinge bolts.

(p) If Mod 974 is not embodied, break the locking wire and remove the two internal wrenching bolts at the centre and outboard hinges, gaining access through the lower dive brake wells.

(q) Remove the flap rearwards from the aircraft.

WING FLAP INSTALLATION (Fig 2-1-22 or 2-1-23)

71 To install a wing flap, proceed as follows:

(a) If Mod 974 is not embodied, assemble the flap to the aircraft and, gaining access through the lower dive brake wells, fit the two internal wrenching bolts at the centre and outboard hinges. Wirelock the bolts with wire AN995C41.

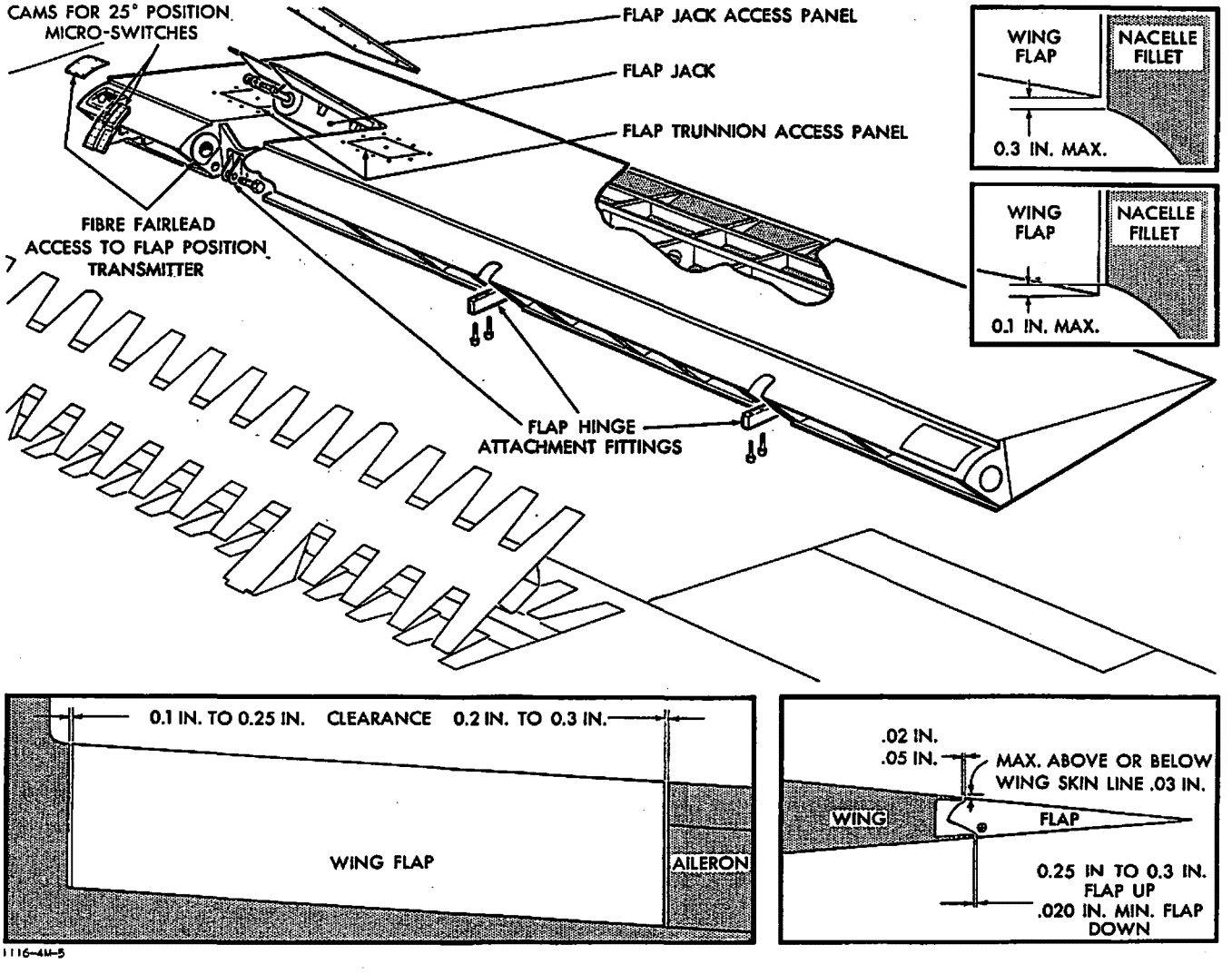


Fig.2-1-22 Wing Flap

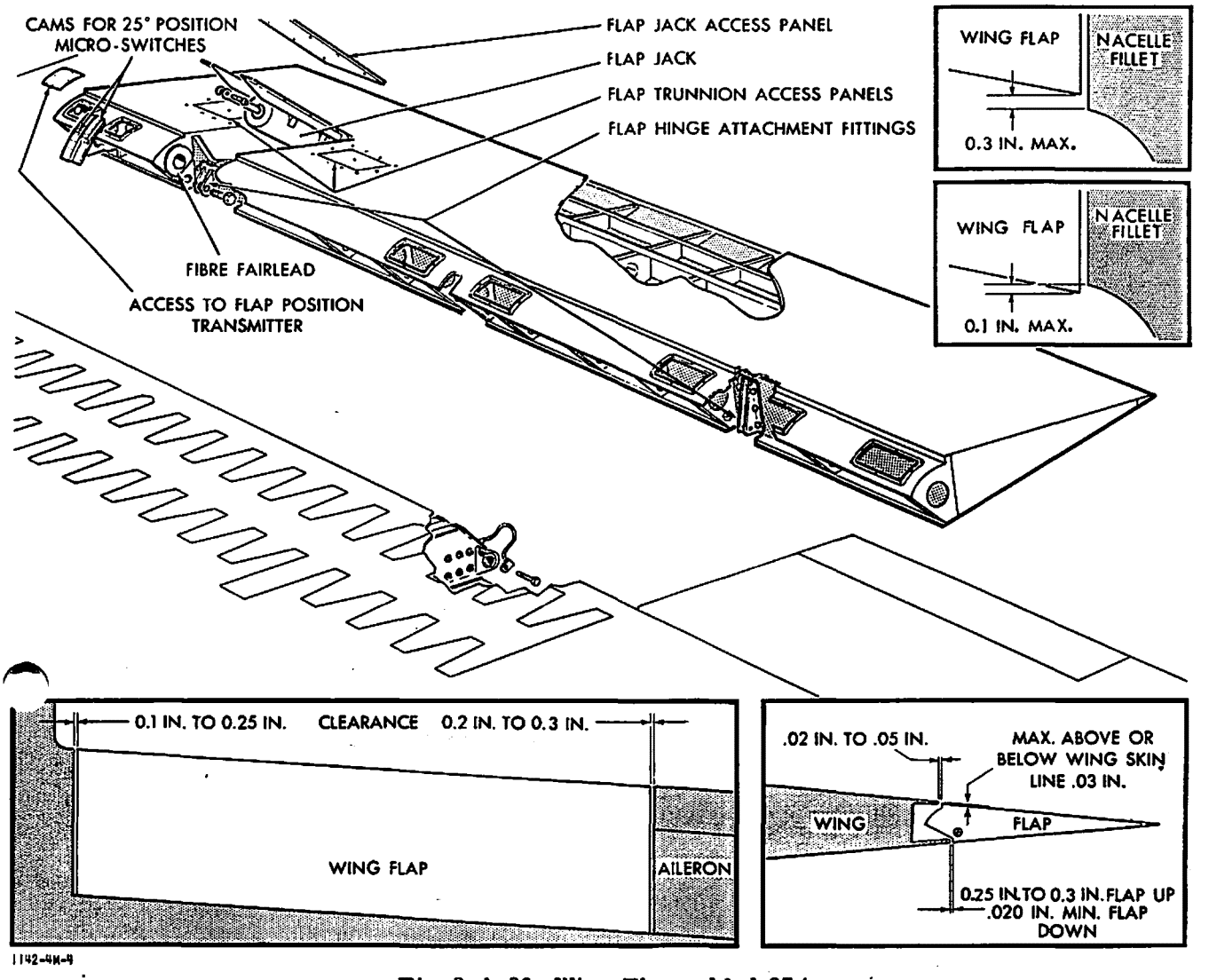


Fig. 2-1-23 Wing Flap - Mod 974

(b) When Mod 974 is embodied, offer up the flap and fit the centre and outboard hinge bolts.

(c) Fit the flap inboard hinge bolt.

(d) Ensure that there is sufficient clearance around the edges of the flap. Examine the lower skin at the leading edge of the flap for evidence of fouling. Remove the flap and trim the wing skin where necessary in order to obtain adequate clearance. Assemble the flap.

(e) Remove the blanking unions, connect the hydraulic pipes to the flap jack and clip them in position.

(f) Support the flap and connect the jack piston rod to the wing fitting.

NOTE

If a new flap or a new flap jack has been fitted, ensure that the jack piston rod-end fitting has been extended sufficiently to prevent the flap from fouling the wing skin, in the fully up position. A step between the skin surfaces of the wing flap and the nacelle fillet is permissible to a maximum of 0.15 inch.

(g) Check the flap clearances. See fig 2-1-23.

(h) On a left-hand flap, connect the flap position transmitter arm and remove the wire from the 25° position micro-switch rollers.

(j) Bleed and test the flap hydraulic circuit. See Part 3 Sect 1.

(k) Check the operation and range of movement of the flap. See Part 2 Sect 4.

(m) Fit the flap jack access panel.

(n) When Mod 974 is embodied, fit the flap hinge access panels.

(p) On a left-hand flap, check the operation of the flap position transmitter and replace the access panel.

CENTRE-SECTION FLAP REMOVAL (Fig 2-1-24)

72 To remove the centre-section flap which weighs approximately 72 pounds, proceed as follows:

(a) Lower the flaps.

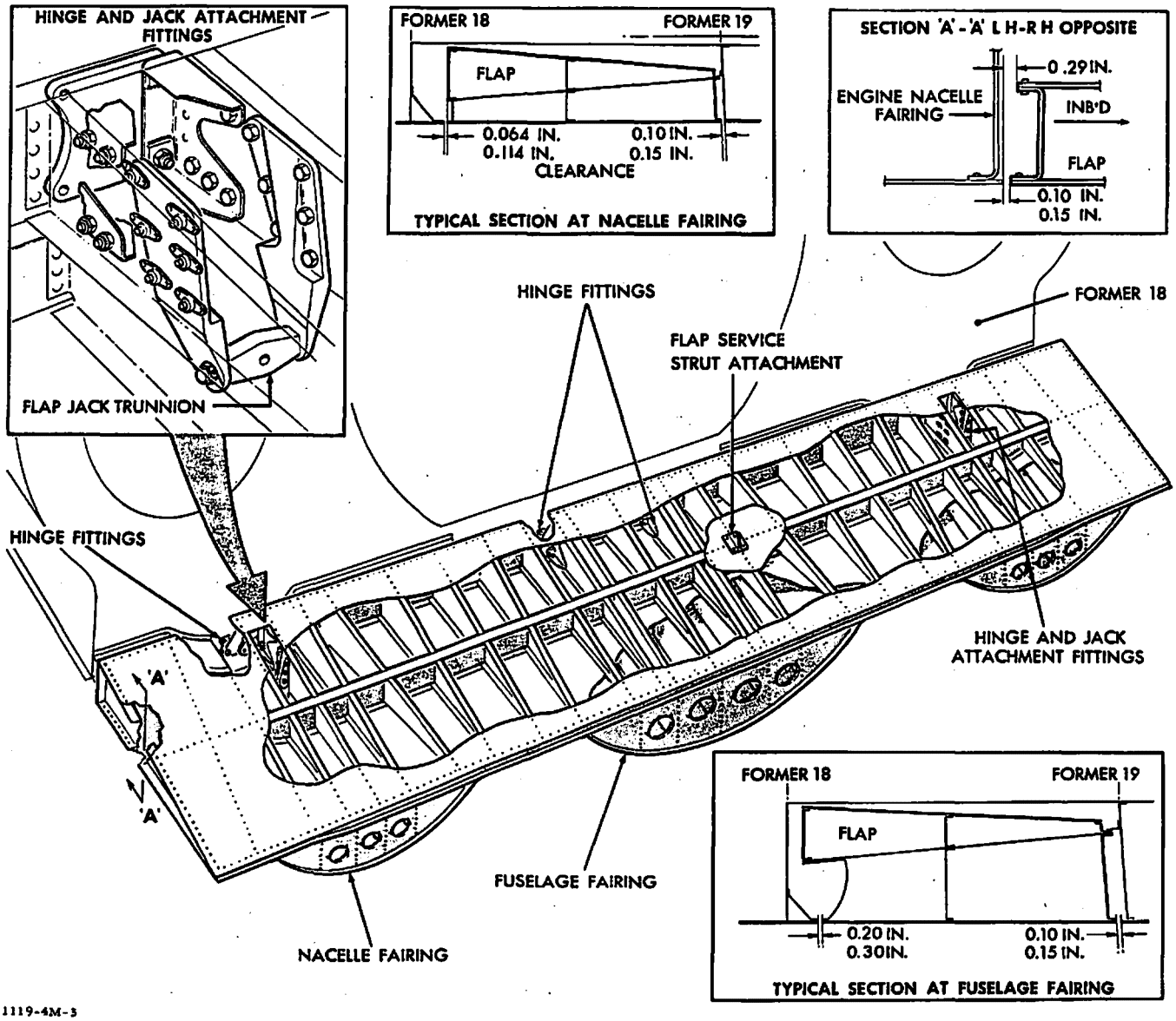


Fig.2-1-24 Centre-Section Flap

(b) Support the centre-section flap and remove the Pip-pins which secure the jack piston rods to the flap trunnions.

(c) Disconnect the bonding from the outboard hinge brackets.

(d) Support the flap and remove the four hinge bolts.

(e) Remove the flap from the aircraft.

CENTRE-SECTION FLAP INSTALLATION (Fig 2-1-24)

73 The installation procedure is the reverse of that given for removal. If a new flap is being fitted, proceed as follows:

(a) Support the flap in position and fit the four hinge bolts. Connect the bonding at the outboard hinge brackets.

(b) Raise the flap by hand and trim the edges of the flap top skin to obtain the correct clearances with the fuselage and nacelle fairings.

NOTE

When trimming the skin edges ensure that 0.25 inch minimum edge distance from centre line of rivets is maintained.

(c) Raise the flap fully and check the clearances between the flap bottom skin and the undersurface of the fuselage and nacelle fairings.

(d) With the flap fully raised, check that the upper forward edge of the flap does not foul brackets and pipes on former 18.

(e) Fit the Pip-pins to connect the flap jacks to the flap.

(f) Connect a hydraulic ground test rig (see Part 3 Sect 1) and slowly retract the flap. Check that in the fully up position the flap is flush with the fuselage skin.

NG TIP (Fig 2-1-25)

74 To remove a wing tip proceed as follows:

(a) If Mod 1359 is not embodied, release the rear access door and disconnect the rocket pod electrical circuit between the wing and the wing tip. When Mod 1040 is embodied, disconnect the rocket pod navigation light cables from the terminal block located above the rocket pod disconnect mounting bracket on rib 10.

(b) When Mod 1359 is embodied, ensure that the handle of the electrical disconnect unit is in the unarmed position. See Part 8 Sect 6.

(c) Remove the rocket pod, if fitted. See Part 8 Sect 7.

(d) Release the rocket pod pneumatic jettison assembly from the wing tip. See Part 8 Sect 6.

(e) Remove the fairing strip from the leading edge between the wing and wing tip.

(f) Release and swing clear the access covers at the wedge housing attachment bolt position and remove the attachment bolts.

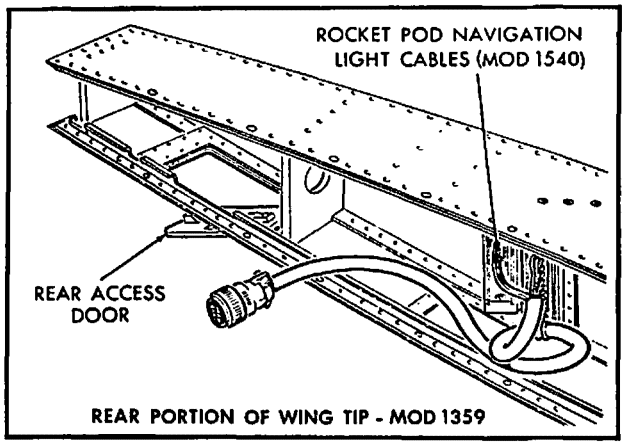
(g) Remove the screws from the upper and undersurface of the wing which attach the wing tip to rib 10.

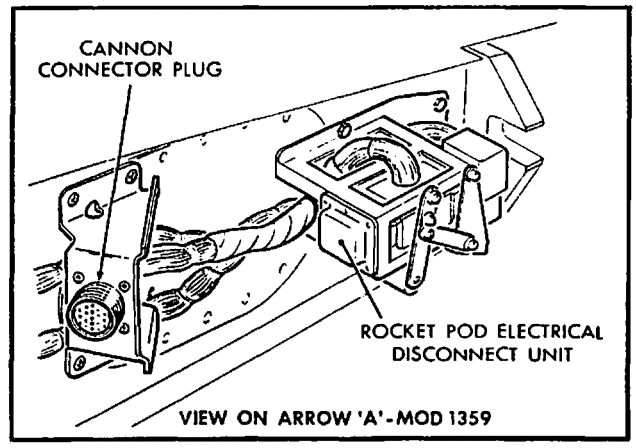
(h) Remove the wing tip outwards clear of the tip tank and rocket pod attachment fittings and swing up and over to rest on top of the wing.

(j) When Mod 1359 is embodied, disconnect the rocket pod electrical circuit Cannon plug mounted on a bracket on rib 10 forward of the electrical disconnect unit.

(k) Disconnect the navigation light cable connector and remove the wing tip from the wing.

75 The installation procedure is the reverse of that given for removal. When Mod 1359 is embodied and a wing tip is to be installed following a wing tip tank removal, refit the rocket pod electrical disconnect unit assembly to each wing rib 10. See Part 7 Sect 11 and Part 8 Sect 6. If a new wing tip is being fitted, check that the clearance between the wing tip and the wing skin is 0.09 inch to 0.2 inch.





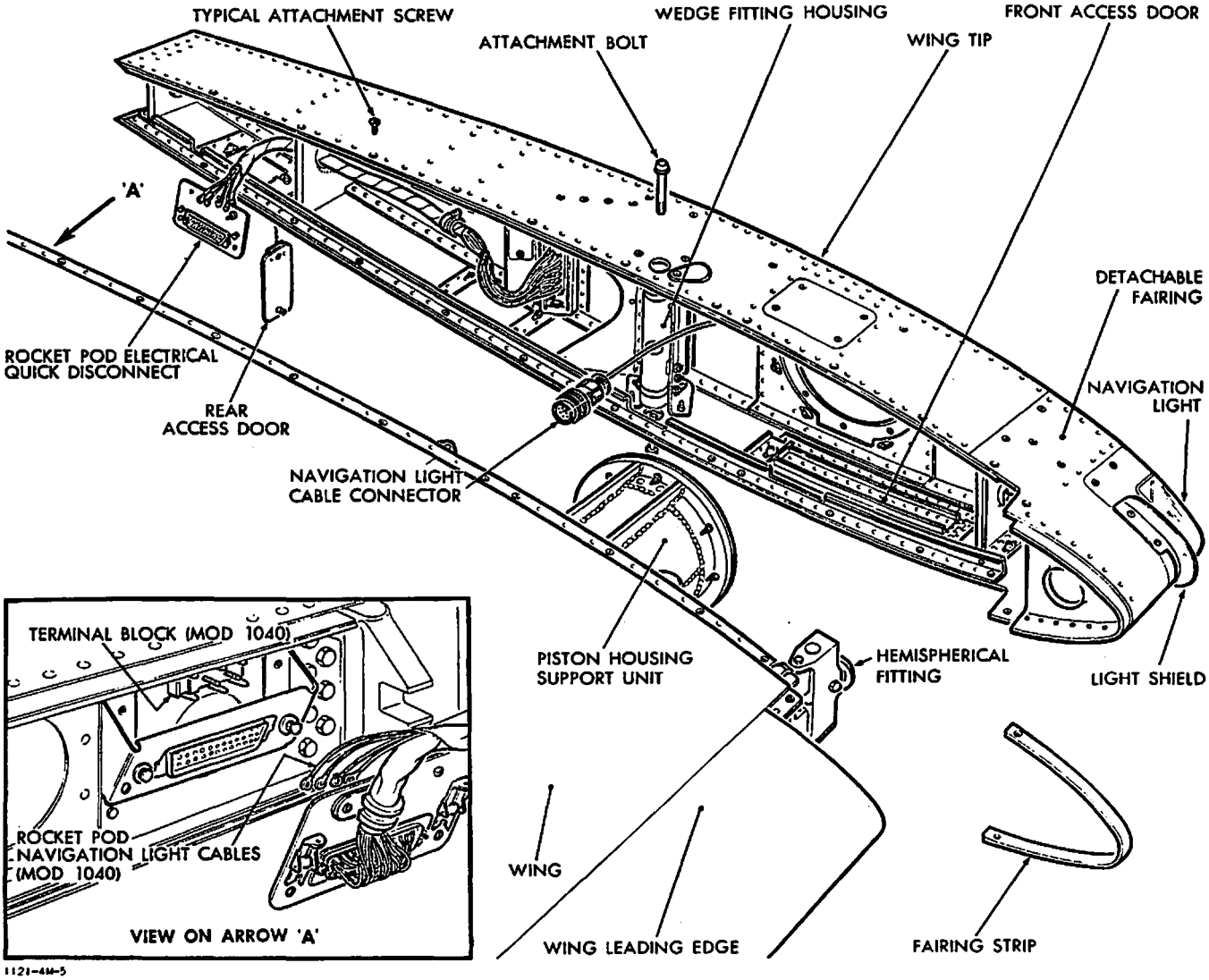


Fig. 2-1-25 Wing Tip Attachment

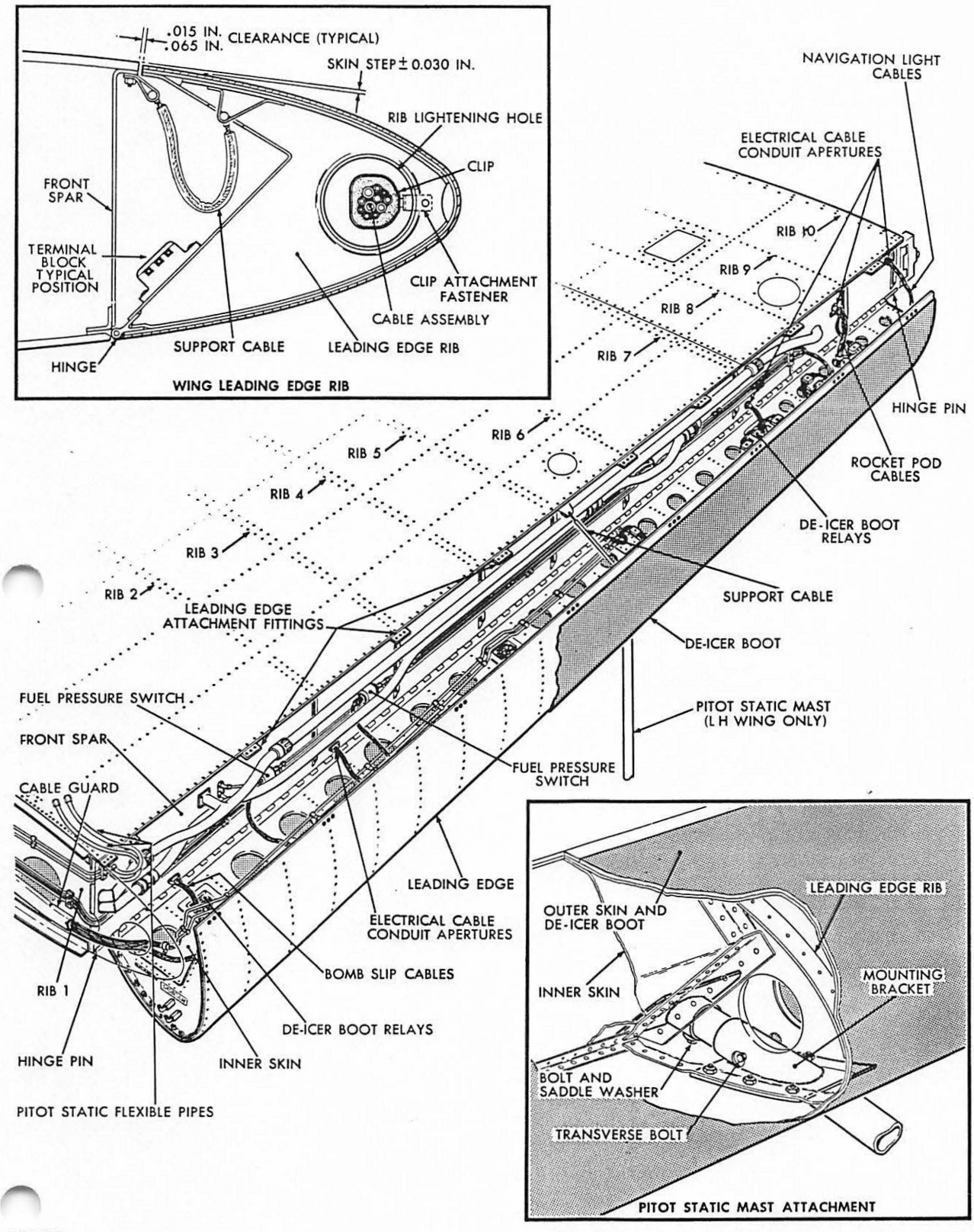


Fig.2-1-26 Wing Leading Edge Installation

WING LEADING EDGE REMOVAL (Fig 2-1-26)

76 To remove the wing leading edge which weighs approximately 130 pounds, proceed as follows:

(a) Remove the wing tip tank or rocket pod, if fitted.

(b) Remove the engine lower front and lower rear cowlings. See Part 5 Sect 3.

(c) Remove the fairing strips from around the leading edge at wing ribs 1 and 10.

(d) On a left-hand wing leading edge, identify, disconnect and blank off the pitot static flexible pipes from the water traps mounted on leading edge rib 1.

(e) Remove the screws attaching the leading edge to the wing attachment fittings and allow the leading edge to swing downwards to the full extent of the support cable.

(f) Remove the round access panel and the aileron hydro-booster access panel from the lower surface of the wing between ribs 7 and 9.

(g) Remove the access panel to the wing tip tank LP air control valve from the upper surface of the wing between ribs 8 and 9.

(h) Remove the wing tip, if fitted. See para 74.

(j) Release the electrical cables from the fuselage to the leading edge by removing the connector plugs from junction box E4 mounted on former 13A for left-hand leading edge or junction box E5 for right-hand leading edge and remove the cable guard and clips from inboard of wing rib 1. Coil and stow the cables in the leading edge.

(k) Disconnect the connector plugs from the two fuel pressure switches and disconnect the bomb slip cables from the two terminal blocks situated on the leading edge between wing ribs 1 and 3.

(m) Remove the connector plug from the wing fuel tank dual servo unit mounted on the front spar between wing ribs 6 and 7.

(n) Disconnect the hydro-booster release unit micro-switch cables from the terminal block on rib 7B and pull the cables through the conduit to the leading edge. Coil and stow the cables in the leading edge.

(p) From the left-hand wing leading edge, disconnect the five landing light cables from the terminal block situated in the leading edge between wing ribs 7 and 8.

(q) From the right-hand wing disconnect the five flux valve cables from the Sperry junction box mounted in the leading edge between ribs 7 and 8.

(r) On a left-hand wing, disconnect the electrical cables to the wing tip tank LP air control valve and the wing camera at the terminal blocks between wing ribs 8 and 9.

(s) On a right-hand wing, disconnect the electrical cable to the LP air control valve at the terminal block between wing ribs 8 and 9.

(t) Disconnect the five cables from the two terminal blocks on the forward edge of wing rib 10 and pull the cables through the conduit to the leading edge. Coil and stow in the leading edge.

(u) After removing the transparent cover, disconnect the wing tip rocket firing cables which pass through the upper conduit on wing rib 10 from the four terminal strips and using an access aperture, pull the cables through the first portion of the conduit. From the leading edge pull the cables through the second portion of the conduit and stow them in the leading edge. To facilitate the cable ends to run smoothly through the conduit, wrap the ends together with tape.

(v) Support the leading edge and disconnect the leading edge support cable from the wing.

(w) Remove the leading edge hinge pins from inboard and outboard of the wing and rotate the pins while withdrawing to assist extraction. The leading edge hinge pins are equal in length and butt together in the hinge between ribs 5 and 6. Sufficient length is left at each end to allow the pins to be grasped on removal.

(x) Check that all bonding and electrical cables are free from the wing and fuselage.

(y) Remove the leading edge from the wing and to prevent permanent distortion and sag, support it in three places spaced evenly along its length and ensure that the de-icer boots are adequately protected. Stow the hinge pins in the wing half of the hinge.

WING LEADING EDGE INSTALLATION
(Fig 2-1-26 and 2-1-27)

77 To install a wing leading edge, proceed as follows:

(a) Remove the hinge pins; clean and lightly grease the hinge halves with grease, Specification 3-GP-683a Ref 34A/192.

(b) Offer the leading edge up to the wing and support in position with the hinge halves meshed and aligned.

NOTE

An insulating strip will be found between the sliding contacts of the sensing element variable stabilizing resistor of the de-icing system on a new wing leading edge. The insulating strip should be removed prior to installing the wing leading edge. The resistor is located adjacent to the inboard de-icer boot relay.

(c) Fit short temporary pins in each end of the hinge.

(d) Attach the support cable.

(e) With one temporary pin removed from the hinge, 'wind in' one section of the hinge pin. Repeat this operation for the remaining section of the hinge pin.

NOTE

To facilitate insertion, the hinge pins should be well greased, using grease Specification 3-GP-683a Ref 34A/192 prior to fitting. If a pin seizes while 'winding in', a light blow on the end of the pin should overcome the stoppage.

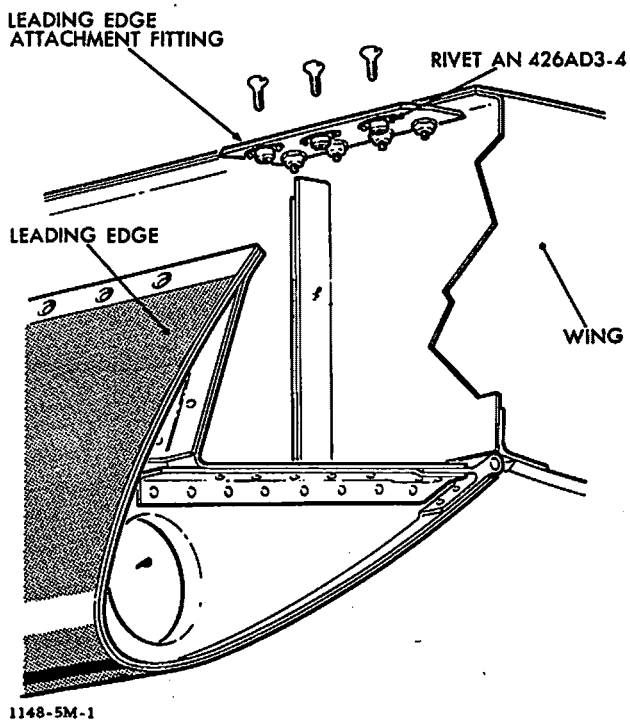


Fig. 2-1-27 Leading Edge Attachment Fitting

(f) Check that the hinge pins butt together in the hinge between ribs 5 and 6.

(g) If a new leading edge is being fitted, proceed as follows:

(1) Remove the screws and nuts from the eight leading edge attachment fittings on the wing. Remove and discard the fittings.

(2) Drill through one of the inner pilot holes in each replacement leading edge attachment fitting to suit AN509-10R11 screws.

NOTE

New leading edge attachment fittings have pilot holes drilled for wing attachment only. Holes are not drilled for leading edge anchor nuts.

(3) Attach each leading edge attachment fitting firmly in the correct location, chamfer uppermost, by one screw and AN365-1032 nut and drill the three remaining holes in each fitting to match the holes in the wing.

(4) Fit an additional screw and nut to hold each fitting firmly in position.

(5) Close the leading edge and using wing contour boards at station 19.5 and station 206.5, trim the leading edge skin to obtain the correct contour and the correct clearance with the wing skin. See fig 2-1-26.

(6) Drill a hole to suit an AN509-10R11 screw in each end attachment fitting and one centre fitting through the appropriate pilot holes in the new leading edge and secure temporarily with screws.

(7) Drill through the remaining leading edge pilot holes and the attachment fittings.

(8) Countersink the holes in the leading edge to suit AN509-10R11 screws.

(9) Mark the positions of the attachment fittings in relation to the wing and remove the fittings.

(10) Fix AN366F-1032 anchor nuts for the attachment of the leading edge in position on the attachment fittings with screws. Drill and countersink the fittings, attach the anchor nuts with AN426-AD3-4 rivets and remove the screws.

(11) Deburr drilled holes in the attachment fittings and the leading edge and fit the attachment fittings to the wing.

(h) On a left-hand wing, fit the pitot static mast. See para 79.

(j) Connect the electrical cables between the leading edge and the wing and carry out functional tests on the electrical circuits affected.

(k) Connect the wing tip navigation light plug and fit the wing tip. See para 75.

(m) Check that all bonding and locking has been completed.

(n) Close the leading edge and fasten with screws along the upper surface.

(p) On a left-hand wing, connect the pitot static flexible pipelines to the water traps at the inboard end of the leading edge and test the pitot static system in accordance with Part 4 Sect 6.

(q) Refit all panels and replace the engine cowlings and fairings.

PITOT STATIC MAST (Fig 2-1-26)

78 To remove the pitot static mast (LH wing only), proceed as follows:

(a) Disconnect the heater cables from the terminal blocks in the leading edge, adjacent to the mast root end.

(b) Release the locating bolt and saddle washer from inside the mast and remove the transverse bolt which secures the mast to the mounting bracket.

(c) Disconnect the two pipes from the elbow fittings in the leading edge and remove the mast complete with the pressure head.

(d) If it is necessary to remove the pressure head and pipes from the mast, remove the four screws from the sleeve on the front portion and withdraw the pressure head and pipes complete with the three fairleads which are clamped on the piping within the pitot static mast.

79 The installation procedure is the reverse of that given for the removal. After installation test the pitot static system. See Part 4 Sect 6. Also check the pressure head electrical circuit. See Part 7 Sect 7.

WING REMOVAL (Fig 2-1-28)

80 To remove a wing, which weighs approximately 2500 pounds, the aircraft must be placed on firm level ground to facilitate the use of an adjustable wing cradle and jacks. It is important that the aircraft be supported in a rigid position and that any overhead slinging arrangement be avoided. Any deviation from the foregoing will cause a 'jamming' of the split sleeve inserts, with subsequent damage to the transport joint fittings. To remove the complete wing, proceed as follows:

(a) Drain and remove the wing tip tank, if fitted. See Part 5 Sect 2.

(b) Remove the rocket pod, if fitted. See Part 8 Sect 6.

(c) Drain the wing fuel tank. See Part 5 Sect 2.

(d) To gain access to the rear transport joint fitting, lower the centre-section flap, disconnect the flap jacks and fit the flap jury strut.

(e) Relieve all pressure in the hydraulic system and release the air pressure in the reservoir. See Part 3 Sect 1.

(f) Place the hydro-booster control lever in the off position.

(g) Select the Ground/Flight switch OFF and disconnect the aircraft battery.

( ) Remove the upper and lower fairings at the wing root.

(j) Remove the engine lower front and lower rear cowlings. See Part 5 Sect 3.

(k) Position the nose jack and a jack under the wing not being removed. See Part 1 Sect 2.

(m) Position a jack under the centre-section front spar jacking point (see Part 1 Sect 2) just inboard of the wing transport joint fittings on the wing being removed.

(n) Jack the aircraft up until the wheels are clear of the ground and the aircraft is approximately in rigging position. See Part 1 Sect 2.

(p) Position and adjust the tail steady.

(q) Disconnect and blank off the following pipes at the wing transport joints:

(1) Wing tank fuel vent pipe.

( ) Wing tank fuel delivery pipe.

(3) Wing tip tank fuel delivery pipe.

(4) Six hydraulic pipes forward of the front transport joint.

(5) On the left-hand wing, two pitot static system pipes.

(6) The wing tip tank fuel pressurization pipe and six hydraulic pipes situated behind the rear transport joint.

(r) Disconnect the wing electrical cables on the forward face of former 13A at junction box E4 for a left-hand wing and E5 for a right-hand wing.

(s) On a left-hand wing disconnect the electrical cables from the flap position indicator transmitter and pull through to the fuselage.

(t) Disconnect the electrical cables from the terminal block mounted on wing rib 1 between the front and rear spars.

(u) Slacken the aileron control cables at one of the turnbuckles at the wing quadrant (see Part 2 Sect 4) and disconnect the cables at the rear face of the centre-section nacelle.

(v) Remove the cable guard from the aileron cable guide pulleys and pull the cables through to the wing.

(w) Position a wing cradle under the wing and adjust the screw jacks evenly to take the weight of the wing.

NOTE

'Jamming' of the transport joint split sleeves will result if too much or too little weight is taken by the wing cradle.

(x) Remove the nut from the rear transport joint bolt and tap the bolt out.

(y) Remove the taper bolt from the bottom front transport joint using a special extractor.

(z) Remove the collar, the locating pin and the aircraft sling fitting from the top front transport joint and remove the taper bolt.

(aa) Remove the circlips from the sleeves

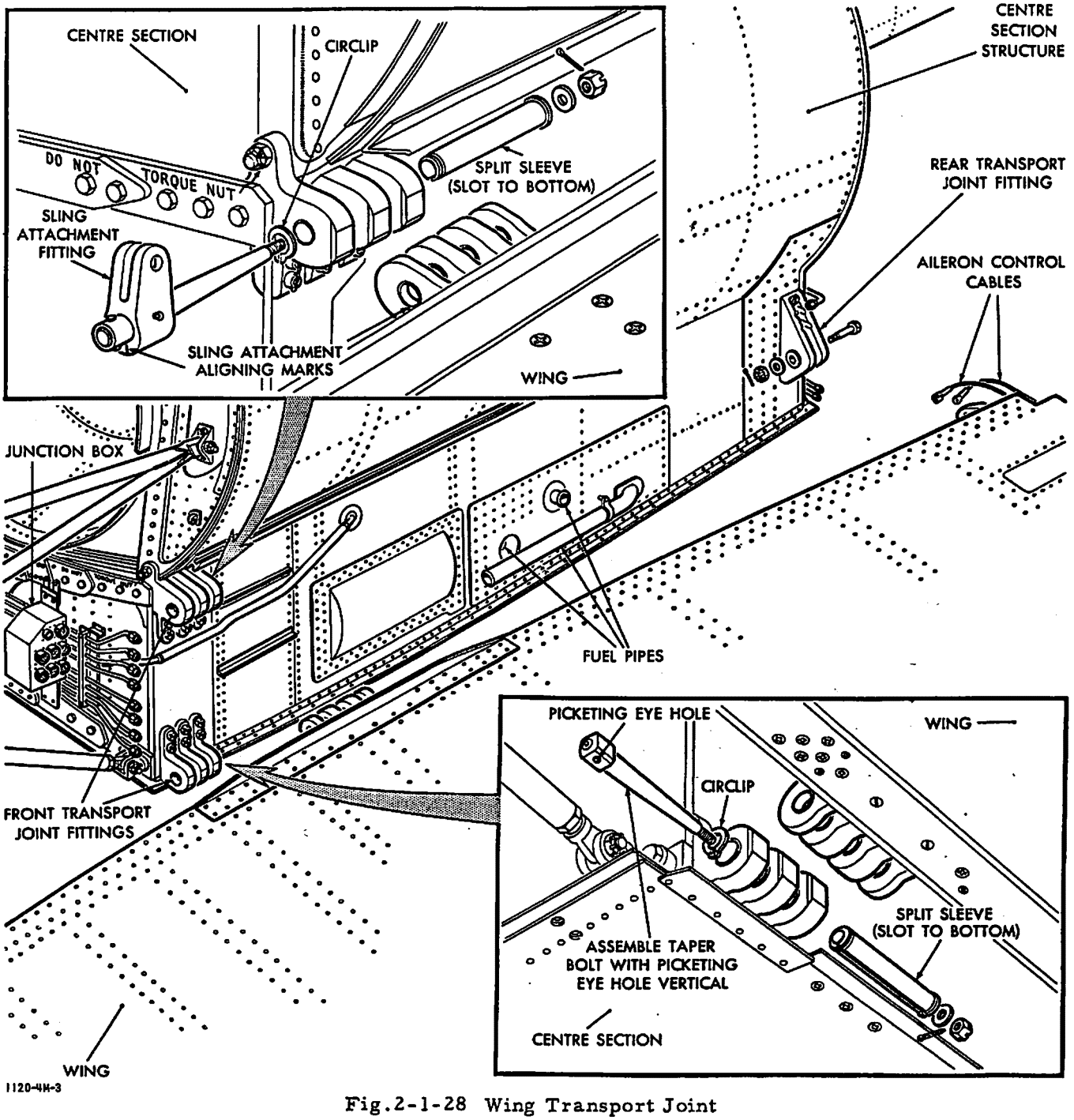


Fig.2-1-28 Wing Transport Joint

and drive out the sleeves using a suitable shouldered drift.

(ab) Ensure that all pipes, bonding and electrical cables are disconnected. Move the wing and cradle outwards taking care not to foul disconnected cables and piping.

WING INSTALLATION (Fig 2-1-28)

81 Prior to installing a wing, check that a 0.002-0.004 inch feeler gauge can be inserted under the head of the pin joint bolt at former 13A (see fig 2-1-28) or under the shoulder of the nut. If a self-locking type nut is in use, the bolt

should be peened to prevent the nut from coming off. If a castellated nut is fitted, it must be retained by a cotter pin. The pin joint bolt must not be torque-loaded. To install a wing, proceed as follows:

(a) Jack the aircraft approximately into rigging position as outlined in para 80(k) to (p).

(b) Support the wing in a cradle and adjust the screw jacks to align the wing and centre-section transport joint fittings.

(c) Grease the fittings and move the wing in towards the centre section until the transport joint fittings mesh; at the same time guide the wing tank fuel delivery pipe through the centre section.

NOTE

It should not be necessary to use undue force when meshing the transport joint fittings. If the wing flap is fitted it should be allowed to drop down to its full extent to facilitate the meshing of the rear transport joints.

(d) 'Feel' the alignment of the transport fittings and adjust the cradle screw jacks to obtain the fine degree of alignment required. Check alignment by inserting the special alignment pins for the front transport fittings and the special 'bullet' for the rear transport joint.

NOTE

When fitting the wing to the centre section, variations up to a maximum of 0.150 inch are permissible in the vertical plane at the rear transport joint between the wing rear pick-up fitting and the rear transport joint fitting on the centre section.

(e) Check that the Du-lite or Phosphate anti-corrosive film on the transport joint bolts and split sleeves is unbroken.

NOTE

Transport joint bolts and split sleeves must be replaced if the Du-lite or Phosphate coating has deteriorated or been damaged.

(f) Apply a light film of oil to the split sleeves and transport joint bolts keeping the threads of the bolts free of oil. This will ensure a correct torque reading.

(g) Remove the lower front fitting alignment pin and insert the split sleeve with the split to the bottom, circlip recess to the front.

(h) Repeat operation (g) for the upper front fitting and fit the circlips.

(j) Insert the bottom front taper bolt with the picketing eye vertical and to the front.

(k) Assemble the aircraft sling fitting, collar and locating pin to the top front taper bolt.

(m) Insert the top front taper bolt with the aligning mark on the sling fitting aligned with the corresponding mark on the wing transport joint front fitting.

(n) Insert the rear transport joint fitting bolt by following the special aligning 'bullet' through from the rear of the meshed fittings.

NOTE

The rear transport joint fitting bolt should not be torque loaded.

(p) Torque load the front transport joint bolts to 480 - 690 inch-pounds. The torquing of the bolts must be obtained by tapping the head of the tapered bolt with a soft faced hammer while the nut is being tightened. This will ensure that the sleeve is expanded to its full diameter. If the tapping routine is not carried out, the nuts may slacken off in service.

NOTE

If when torquing the front attachment bolts the cotter pin holes do not align within the normal torque range, a maximum of 1100 inch-pounds is permissible. The nuts must not be backed off to gain alignment.

CAUTION

Ensure that the washers are concentric with the bolts and do not foul the shoulders as a false torque reading can be obtained with the washers out of alignment.

(q) Remove the blanking unions and connect up the following pipes at the wing transport joints:

(1) Wing tank fuel vent pipe.

(2) Wing tank fuel delivery pipe.

(3) Wing tip tank fuel delivery pipe.

(4) Six hydraulic pipes forward of the front transport joint.

(5) The wing tip tank fuel pressurization pipe and six hydraulic pipes situated to the rear of the rear transport joint.

(r) On a left-hand wing, remove the blanking unions and connect up the pitot static pipes.

(s) Connect the electrical cables to the terminal block positioned on wing rib 1 between the front and rear spars.

(t) On a left-hand wing, connect up the electrical cables to the flap position indicator transmitter.

(u) Remove the wing cradle and tail steady, lower the aircraft and remove the jacks.

(v) Connect the aileron control cables and replace the cable guard to the guide pulleys.

(w) Adjust and tension the aileron controls. See Part 2 Sect 4.

(x) Connect the aircraft battery, pressure test and flow test the fuel system. See Part 5 Sect 2.

(y) Connect the centre-section flap to the flap jacks.

(z) Engage the hydro-boosters. See Part 2 Sect 4.

(aa) Bleed and test the hydraulic system. See Part 3 Sect 1.

(ab) Check the aileron and flap for correct functioning and range of movement.

(ac) Function test the pitot static system. See Part 4 Sect 6.

(ad) Ensure that all bonding and locking is completed.

(ae) Replace the engine cowlings, wing root fairings, fuselage fairing and panels.

NOTE

On assembly of the forward wing root fairings ensure that screws AN509-10R8 are used in the vicinity of the lower rear cowling. Screws of longer length will cause damage to the skin of the lower rear cowling.

(af) Re-check the torque loading on the transport joint bolts after the first test flight.

LOWERING A WING LEADING EDGE

82 To lower a wing leading edge, proceed as follows:

(a) Remove the engine lower rear cowling. See Part 5 Sect 3.

(b) Remove the fairing panels at the front of the wing transport joint.

(c) Remove the fairing strip between the leading edge and the wing tip.

(d) When Mod 1189 is embodied, identify and disconnect the pitot static flexible hoses from the water traps mounted on leading edge rib 1.

(e) Support the leading edge and remove the screws which attach its top edge to the wing.

(f) Lower the leading edge until its weight is taken by the support cable.

83 The procedure for raising the leading edge is the reverse of that given for lowering. If the pitot static hoses have been disconnected, pressure test the pitot static system as described in Part 4 Sect 6.

SYMMETRY AND RIGGING DIMENSIONAL CHECKS

GENERAL

84 A symmetry and rigging check of the aircraft (see fig 2-1-29 and 2-1-30) must be carried out at all major overhaul periods and when any of the following occur:

(a) Structural or skin distortion considered sufficient to cause distortion of the airframe.

(b) If undesirable flying characteristics cannot be rectified by normal corrective measures.

(c) Before and after large repairs are carried out.

(d) After replacement of major components.

85 Following the installation of any control surface, the rigging and range of movement checks should be carried out in accordance with procedures detailed in Part 2 Sect 4. For test procedures of systems disconnected and connected during the removal and installation of aircraft structural components, refer to the relevant sections of this Engineering Order.

DISMANTLING THE AIRCRAFT FOR SHIPPING

GENERAL

86 Before removing the nose section and/or rear centre section, the fuel system must be drained (see Part 5 Sect 2) and the aircraft must be jacked up as outlined in Part 1 Sect 2. The nose section, centre section or rear centre section must also be supported at the locations specified in the relevant removal procedure.

87 The procedure for removing a wing is outlined in para 80. The breakdown of the complete aircraft is illustrated in Part 1 Sect 1.

88 If the aircraft is not to be completely dismantled for shipping and a replacement major component is to be fitted, it will be necessary to retain all serviceable items which will not be supplied with the replacement major component. See EO 05-25E-4.

89 All components and parts removed should be adequately protected and labelled. Small parts such as nuts, bolts, clips, etc., should be placed in linen bags and tied in the area from which they were removed. Engines should be inhibited in accordance with EO 10B-10-9 and all disconnected piping and ducting must be blanked off to prevent the ingress of foreign matter. The instructions for the storage of fuel cells are detailed in EO 110-20-2A.

90 Slings are available for all the major components of the aircraft. Before using the slings, check the loading limitations and other instructions noted in Part 1 Sect 2.

REAR CENTRE SECTION REMOVAL
(Fig 2-1-33)

91 The sequence of operations necessary to remove a rear centre section is broken down into separate paragraphs to clarify the procedure. To remove the rear centre section, proceed as follows and as detailed in para 92 through 94:

(a) Observe the instructions outlined in para 86 through 90.

(b) Lower the flaps.

(c) Relieve the pressure in the hydraulic system and wire the hydro-booster control lever in the off position. See Part 3 Sect 1.

(d) Release the air pressure in the hydraulic reservoir. See Part 3 Sect 1.

(e) Ensure that the Ground/Flight switch is OFF, lower the battery stowage (see para 39) and remove the battery. See Part 7 Sect 2.

(f) Remove the empennage. See para 43.

(g) Remove the jet pipe from each engine. See Part 5 Sect 1.

(h) Remove the rear nacelles. See Part 5 Sect 3.

(j) Remove the centre-section flap. See para 72.

(k) Remove the large access panel from the underside of the centre section behind the main wheel bays and remove the auxiliary tank. See Part 5 Sect 2.

(m) Inside the auxiliary tank bay, remove the transport joint access panels forward of former 18.

(n) In the rear centre section, remove all the removable electrical and radio equipment complete with mounting trays from between formers 19 and 20.

(p) Remove the oxygen cylinders. See Part 4 Sect 4.

WARNING

Spontaneous combustion and explosion will result if oxygen makes contact with oil or grease. Keep oil and grease away from all oxygen equipment and ensure that hands and clothing are clean.

(q) Remove the hydro-booster accumulator. See Part 3 Sect 1.

(r) Remove the control trough doors. See para 37.

92 Disconnect piping, ducting and control cables as follows:

(a) In the control trough, disconnect, unclamp and remove the three long air conditioning ducts.

(b) In the control trough, disconnect the RH fuel vent pipe from the rear of the auxiliary tank vent flapper valve.

(c) In the rear centre section, disconnect the RH fuel vent pipe to the auxiliary tank vent flapper valve at the welded T-connection beside former 20. Remove the clamps and the pipe.

(d) In the rear centre section, disconnect the LH fuel vent pipe to the fuselage tank at the connection beside former 19.

(e) In the control trough, disconnect the LH fuel vent pipe from the rear of fuselage cell 3 vent flap valve. Remove the clamps and the pipe.

(f) Disconnect and remove the short fuel vent pipe shown on fig 2-1-31.

(g) At the lower rear face of the centre section, disconnect the waste fuel drain pipe from each engine at the union between the flap inboard and outboard hinges. Unclip the inboard sections of pipe from the centre section.

(h) Disconnect the hydro-booster accumulator air charging pipe from the bulkhead elbow union on the lower rear face of the centre section, LH side. Unclip and remove the pipe.

(j) Disconnect two pitot static pipes from the bulkhead elbow unions on the lower rear face of the centre section, LH side.

(k) Disconnect three hydraulic pipes from the bulkhead elbow unions under the rear centre section floor, LH side.

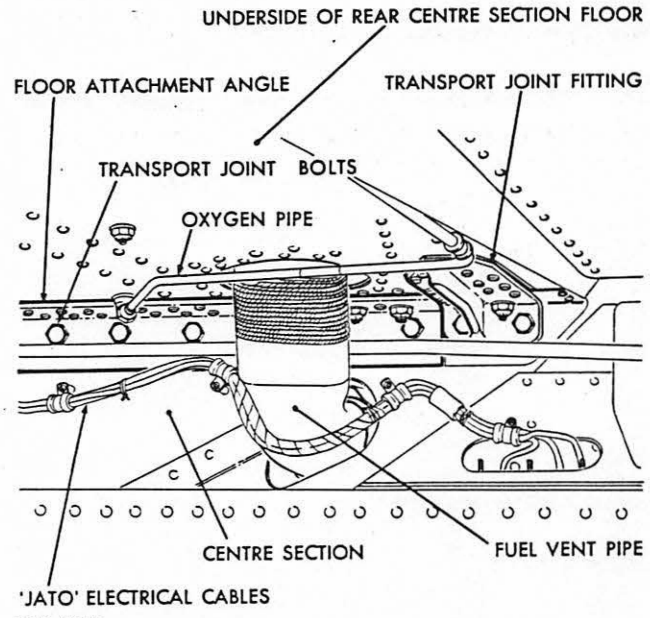


Fig. 2-1-31 Rear Centre-Section Floor Transport Joint

(m) Disconnect the oxygen pipe from the bulkhead elbow union at the upper side of the rear centre-section floor.

(n) Disconnect and remove the short oxygen pipe which is routed into the control trough at the rear of former 18.

(p) If Mod 1024 is not embodied, disconnect, unclip and remove the wing tip tank pressurization pipes, which are routed through each side of the rear centre section, from the water trap on the rear face of the centre section. See Part 3 Sect 2.

(q) When Mod 1024 is embodied, disconnect, unclip and remove the wing tip tank pressurization pipe from the LH connection of the water trap on the rear face of the centre section and from the RH connection of the electro-magnetic shut-off valve in the rear centre section. Disconnect and remove the short pipe routed from the water trap to the electro-magnetic shut-off valve. See Part 3 Sect 2.

(r) Disconnect and remove the short LP air pipe from the filter to the pressure regulating valve on the rear face of the centre section.

(s) Slacken the turnbuckles and disconnect the rudder and elevator cables at the forward end of the rear centre section. See Part 2 Sect 4.

(t) Disconnect the elevator trimmer cables (aircraft without auto-trim) and the rudder trimmer cables at the turnbuckles in the rear centre section.

(u) Remove the cable guards and pulleys from the elevator and rudder flying control and trimmer cables at former 20.

(v) Remove the fairlead from the trimmer cables at the control trough transport joint.

(w) Pull the trimmer cables forward into the control trough. Coil and stow the cables forward of the transport joint.

NOTE

The elevator and rudder flying control cables cannot be withdrawn because of the swaging on the cables. They must be guided through the forward end of the rear centre section during removal.

(x) Remove the hydro-booster access panel on the underside of each wing and slacken one turnbuckle on the control run to each aileron.

(y) Disconnect the aileron cables at the connections adjacent to the centre-section flap outboard hinges.

(z) Remove the cable guards and pulleys from the aileron cables at each side of rear centre section former 18.

(aa) Pull the aileron cables through inside the rear centre section. Coil and stow the cables beside the balance wheel.

93 Remove the electrical cables as follows:

(a) Commencing at the point where the two cable assemblies from the control trough enter the rear centre section, work rearwards disconnecting and unclipping the branches from the cable assemblies.

(b) Ensure that all the cables have been disconnected, then pull the cable assemblies through from the rear centre section into the control trough. Coil and stow the cable assemblies forward of the transport joint.

(c) In the rear centre section, disconnect the cable assemblies from connector panels E67 and E68. Remove the cable connectors as necessary to allow the cable to pass through the lightening holes in former 18 when the rear centre section is removed.

(d) Disconnect the JATO cables from the ball terminals adjacent to the centre-section flap outboard hinges.

(e) Unclip the JATO cables from the rear face of the centre section and pull the cables through into the rear centre section.

(f) Disconnect the cables from JATO resistor panel E36. Unclip the cables from the rear face of the centre section.

(g) Coil and stow the loose JATO cables behind former 19.

94 Position the rear centre section sling and raise the hoist to take the weight of the rear centre section. Fit an additional steady trestle under the sling strap at former 21 and proceed as follows:

(a) Check that all pipes, ducting, control cables and electrical cables have been disconnected.

(b) At the control trough, remove the two bolts from the transport joint.

(c) At each side of the fuselage, break the locking wire and remove the bolt from the longeron transport joint.

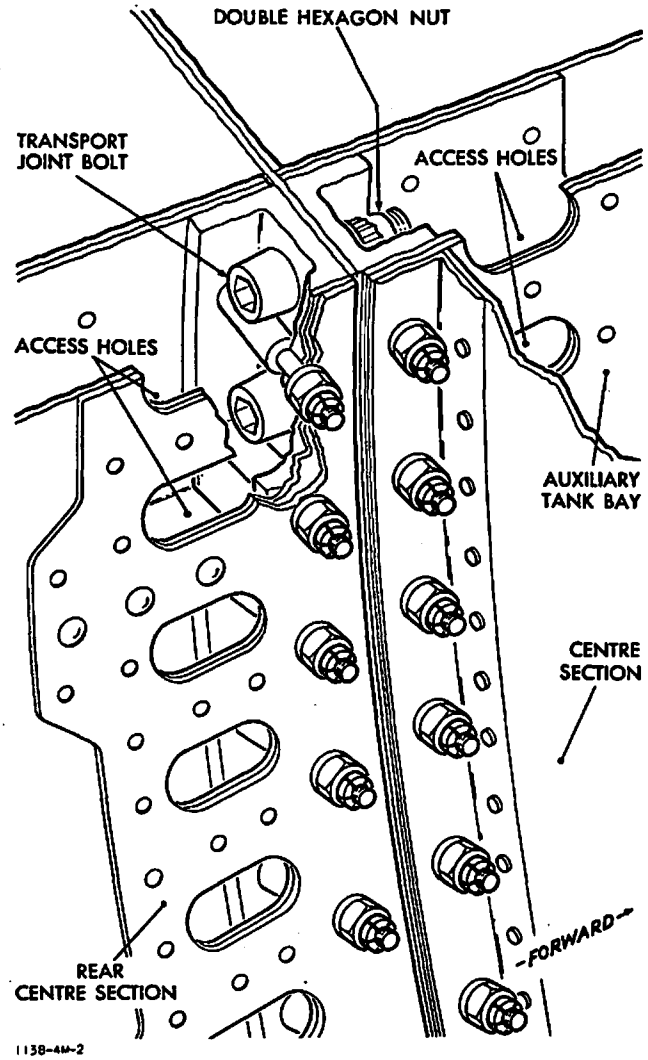


Fig.2-1-32 Transport Joint at Former 18

(d) Working from inside the auxiliary tank bay and inside the rear centre section, remove the transport joint bolts from around former 18 (see fig 2-1-32) using a special wrench.

(e) Under the rear centre section floor, remove the transport joint bolts from the floor attachment angle and the transport joint fitting at each end of the angle. See fig 2-1-31.

(f) Lower the trestles from under the rear centre section.

(g) Carefully sling the rear centre section clear of the centre section. At the same time:

(1) Guide the LH waste fuel drain pipe clear of the three disconnected hydraulic pipes.

(2) Guide the disconnected elevator and rudder cables and the electrical cables disconnected from connector panels E67 and E68, through the forward end of the rear centre section.

(h) Coil the rudder and elevator cables as shown on fig 2-1-33.

NOSE SECTION REMOVAL (Fig 2-1-34)

95 The sequence of operations necessary to remove a nose section is broken down into separate paragraphs to clarify the procedure. To remove a nose section proceed as follows and as detailed in para 96 through 98:

(a) Observe the instructions outlined in para 86 through 90.

(b) Ensure that the ground locks are fitted to the main landing gear jacks.

(c) Remove the ground lock from the nose landing gear jack and retract the nose landing gear (see Part 3 Sect 1) or remove the nose landing gear. See Part 2 Sect 5.

(d) Lower the flaps.

(e) Relieve the pressure in the hydraulic system and wire the hydro-booster control lever in the off position. See Part 3 Sect 1.

(f) Release the air pressure in the emergency air bottles and in the hydraulic reservoir. See Part 3 Sect 1.

(g) Ensure that the Ground/Flight switch is OFF, lower the battery stowage (see para 39) and remove the battery. See Part 7 Sect 2.

(h) Remove the upper and lower cowlings from both engines. See Part 5 Sect 3.

(j) Remove both engines, accessories gearboxes, engine forward mounting beams and engine rear mounting beams. See Part 5 Sect 1.

(k) Remove the fire cones. See Part 5 Sect 1.

(m) Remove the fire extinguisher bottles. See Part 4 Sect 5.

(n) Remove the canopy and canopy rails. See Part 2 Sect 2.

(p) Remove the ejection seats. See Part 2 Sect 3 or 3A.

(q) Remove the control trough doors. See para 37.

(r) Remove the radar nose. See para 31.

(s) Remove the gun package. See Part 8 Sect 5.

(t) Remove the rocket bay fairing. See para 41.

(u) Remove the panel from the underside of the rocket bay at former 13A, as follows:

(1) Remove the nuts which secure the panel to the roller guide assembly.

(2) Remove the screws which secure the panel to the underside of the fuselage.

(v) Remove the fuel collector tanks. See Part 5 Sect 2.

(w) Remove the fuselage fuel cells No. 3 LH and RH. See Part 5 Sect 2.

(x) Inside the No. 3 fuel cell bays, remove the transport joint access panels.

(y) Remove the longeron transport joint access panel on each side of the nose section.

96 Disconnect piping, ducting and control cables as follows:

(a) Disconnect the electrical connector from the crossfeed valve and remove the fuel crossfeed pipe, which is routed across the forward face of former 13A, complete with the crossfeed valve and T-connections.

(b) At the RH rear corner of the rocket bay, disconnect six hydraulic pipes.

(c) At the LH rear corner of the rocket bay, remove the fairlead nearest former 13A and disconnect:

(1) Six hydraulic pipes.

(2) One HP air pipe.

(3) Two pitot static pipes at the forward ends of the bulkhead T-connections.

(d) Disconnect the three air conditioning ducts at each end of the control trough. Remove the clamps and the ducts.

(e) In the control trough, disconnect, unclamp and remove the fuel vent pipe between cells No. 1 and 4 LH and RH.

(f) In the control trough, disconnect the oxygen pipe from the union at the rear of the transport joint.

(g) Slacken the turnbuckles and disconnect the rudder and elevator cables at the forward end of the rear centre section.

(h) Disconnect the aileron cables at the turnbuckles above the balance wheel on the rear face of the centre section.

(j) Disconnect the elevator trimmer cables (aircraft without auto-trim) and the rudder trimmer cables at the turnbuckles in the rear centre section.

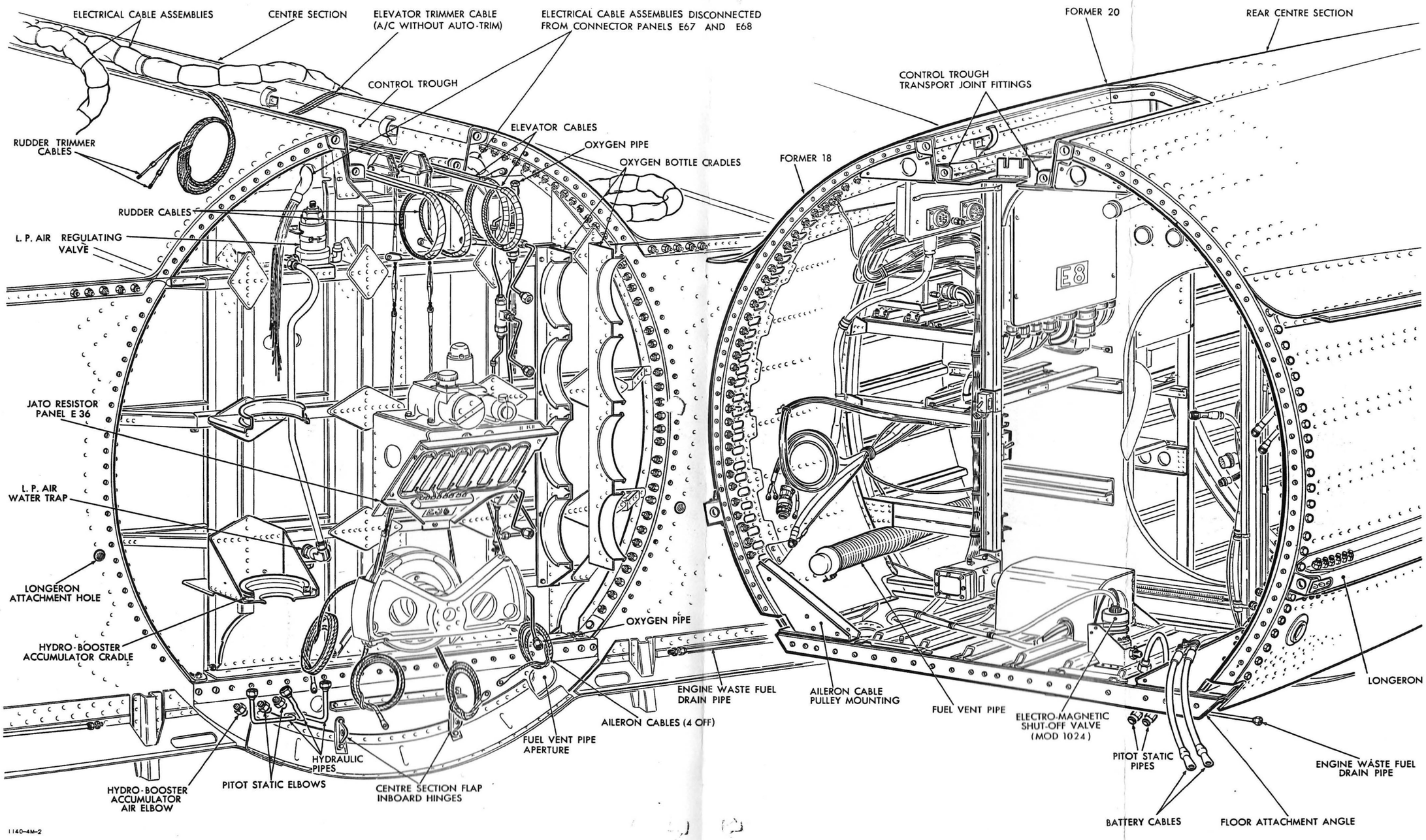


Fig. 2-1-33 Rear Centre Section Removal

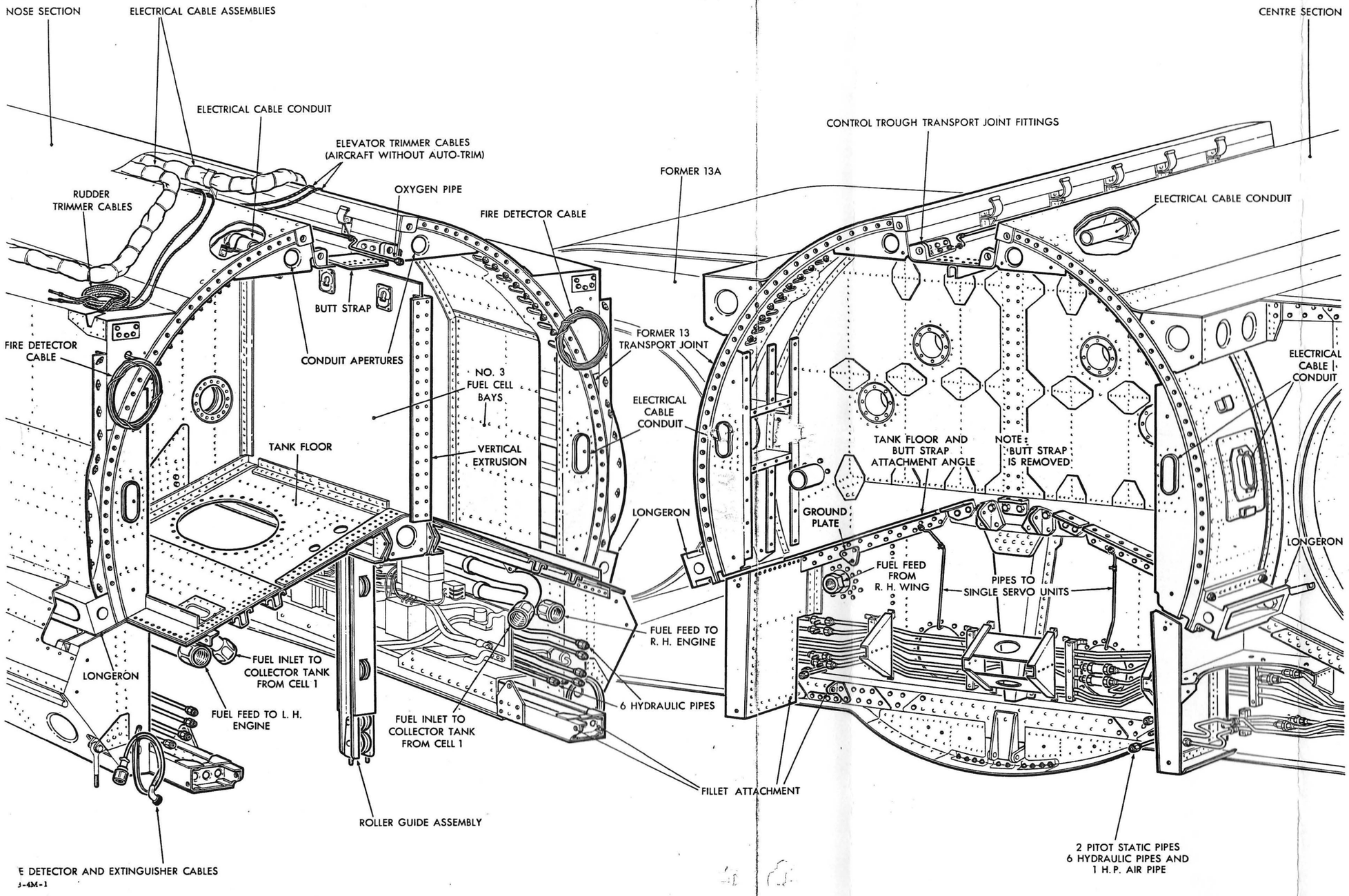


Fig. 2-1-34 Nose Section Removal

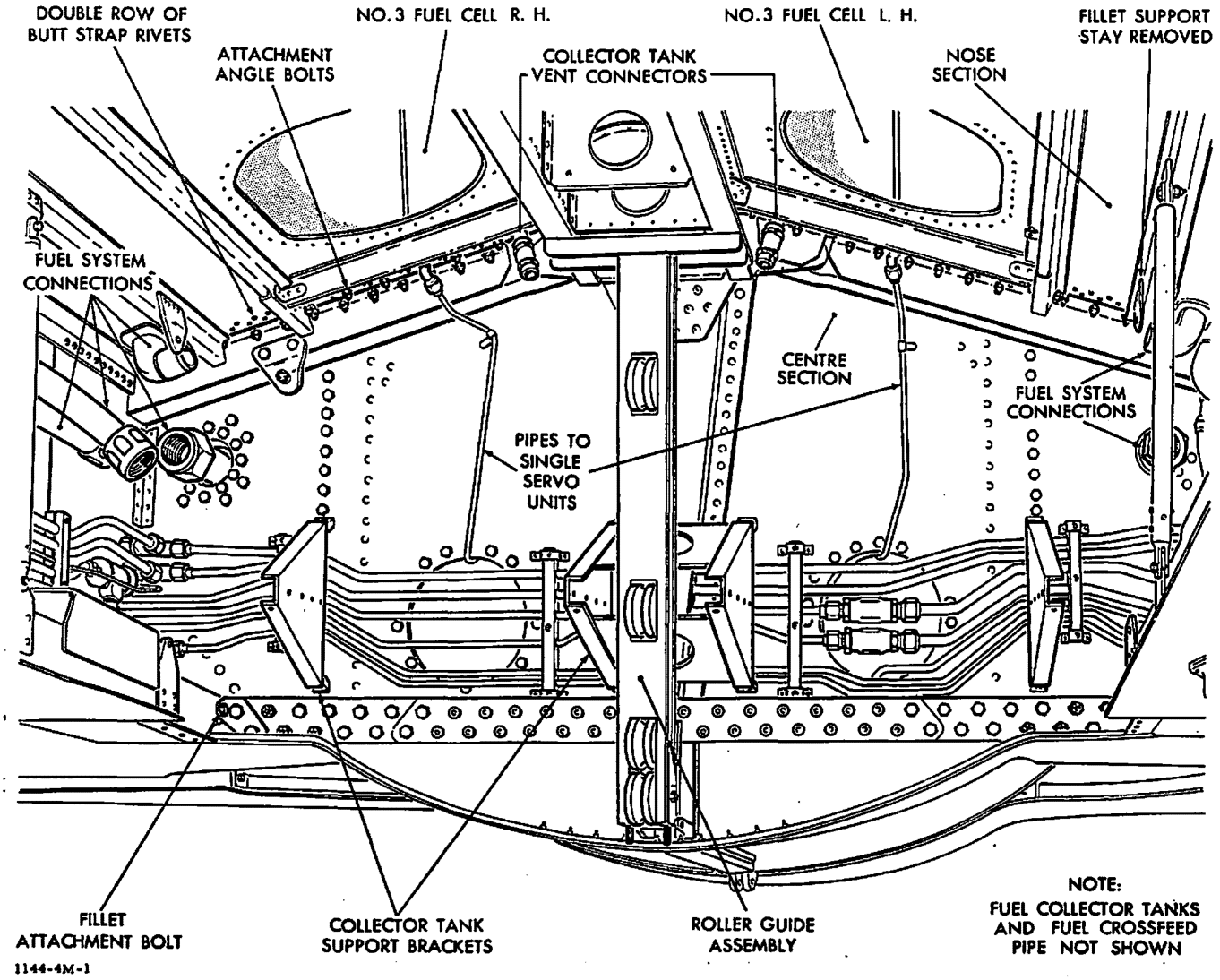


Fig. 2-1-35 Transport Joint in Rocket Bay

(k) At the forward end of the gun bay, remove the cable guards from the layshaft inboard quadrants and disconnect the aileron, elevator and rudder cables. See Part 2 Sect 4.

(m) Remove the pulley guards, pulleys and fairleads and remove the aileron, elevator and rudder cables between the layshaft and the rear centre section.

(n) Remove the pulley guards, pulleys and fairleads and withdraw the elevator trimmer cables (aircraft without auto-trim) and the rudder trimmer cables from the rear centre section. Coil and stow the cables forward of the transport joint.

97 Disconnect the electrical cables and conduits as follows:

(a) In the control trough, disconnect the cables from the auxiliary tank and fuselage tank dual servo units.

(b) Disconnect the two cable assemblies which are routed along the control trough to the rear centre section as outlined in para 93(a) and (b).

(c) At each side of the centre section above the longeron transport joint, commence at the electrical cable conduit and disconnect and unclip all the cables which enter the conduit from the outside of the fuselage.

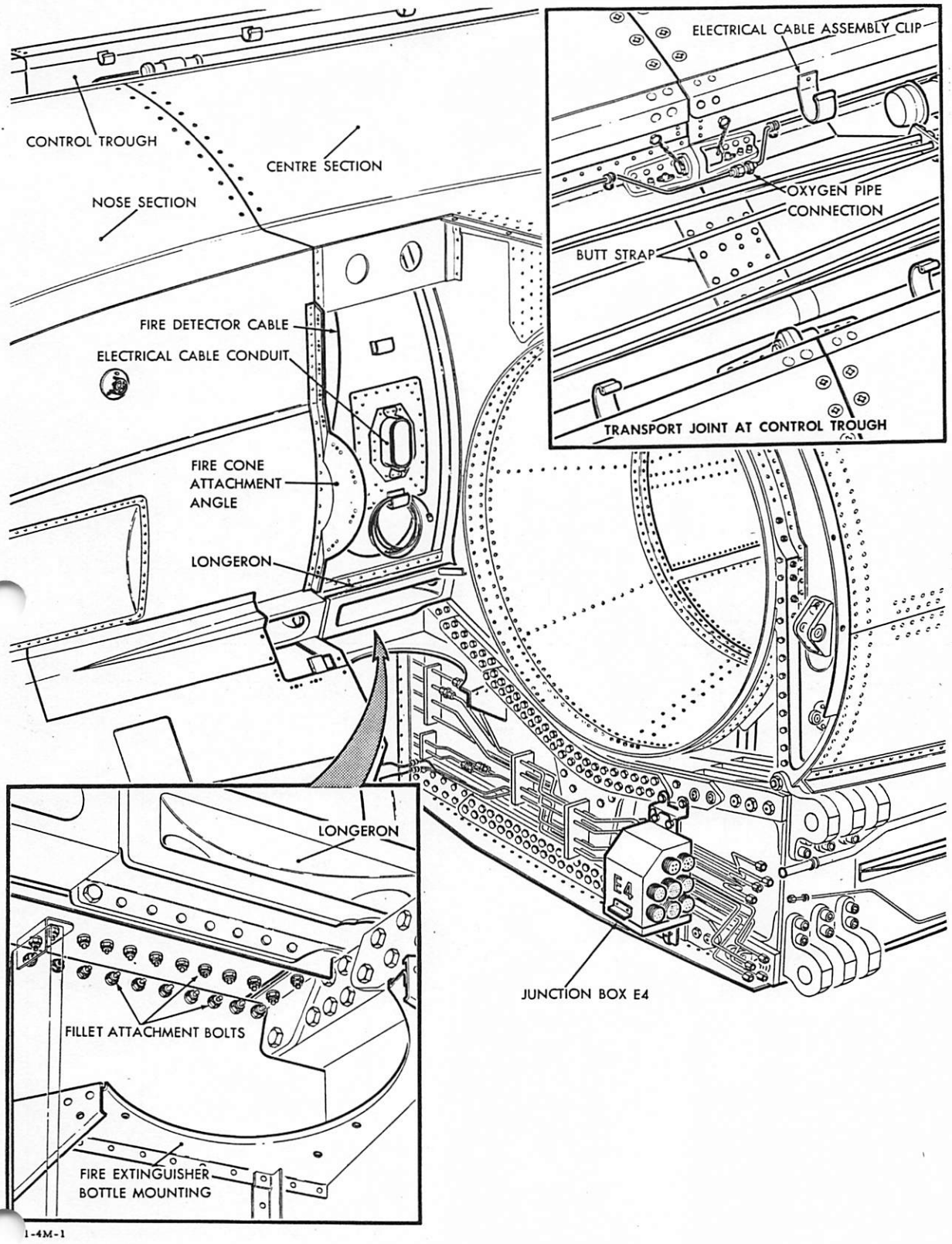


Fig. 2-1-36 Transport Joint Details at Formers 13 and 13A

(d) In the rear centre section, disconnect the cables from connector panels E67 and E68. Remove the connectors and arrange the cables so that they may be pulled through the conduits to the nose section.

(e) At the forward upper end of the gun bay, remove relay box E12.

(f) At each side of the gun bay, withdraw the cable assemblies one at a time from the conduit which is routed aft to the side of the centre section.

(g) Remove two rivets and withdraw the conduit elbow from the centre section to gain access to the transport joint bolts.

(h) At the forward upper end of the gun bay, withdraw the cable assembly from the conduit which is routed along each side of the control trough to the rear centre section.

(j) Inside the No. 3 fuel cell bays, unclamp and slide the connecting sleeve clear of the conduit at each side of the control trough.

(k) In the rocket bay, disconnect the cables from the ground plate at the RH side of former 13A.

(m) At the centre section front spar under each jet pipe tunnel, disconnect and unclip the cables which are routed between former 13A and the end of the nose section fillet to the nose section.

(n) Pull the cables through to the nose section and stow in the rocket bay.

98 Complete the removal of the nose section as follows:

(a) Position a steady trestle under each side of the centre section at former 18.

(b) Position a steady trestle under the nose section former at the forward end of the gun bay.

(c) Lower the nose jacks and fit the nose section sling. Raise the hoist until the sling takes the weight of the nose section.

(d) Remove the rivets from one side of the butt strap at the transport joint in the control trough. See fig 2-1-36.

(e) Break the locking wire and remove the bolts from the control trough transport joint fittings. See fig 2-1-36.

(f) Inside the No. 3 fuel cell bays, remove the rivets which attach each side of the vertical extrusion to former 13A.

(g) Inside the No. 3 fuel cell bays, remove the rivets and bolts which secure the butt strap to the nose section tank floor and to the attachment angle on former 13A. The butt strap, which is fitted across the full width of the fuselage, cannot be withdrawn until the nose section is removed from the centre section.

(h) At each side of the rocket bay above the fire extinguisher bottle mounting, remove 20 fillet attachment bolts and two bolts through the tank floor attachment angle. See fig 2-1-36.

(j) In the rocket bay at the rear of the roller guide assembly, remove the two bolts

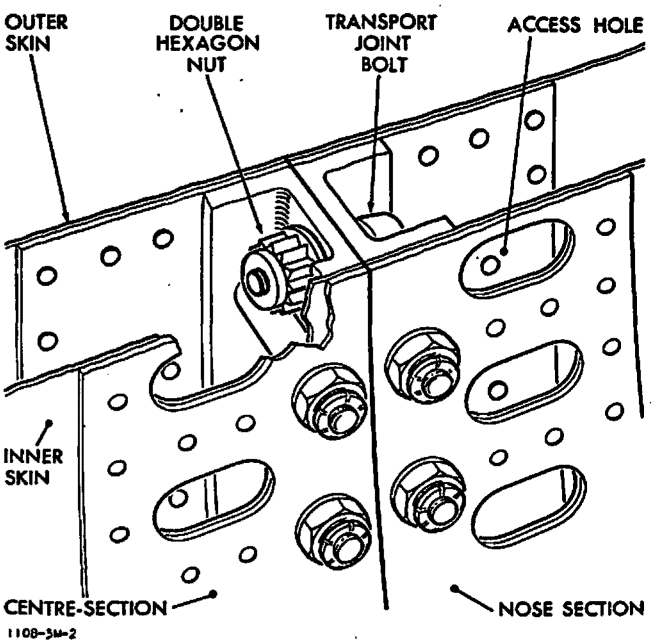


Fig.2-1-37 Transport Joint at Former 13

which secure the tank floor to the bracket on former 13A.

(k) At each side of the rocket bay, remove two bolts from the end of the nose section fillet. See fig 2-1-34 and 2-1-35.

(m) Inside the No. 3 fuel cell bays remove the transport joint bolts from around former 13 (see fig 2-1-37) using a special wrench.

(n) Remove the bolt from the longeron transport joint at each side of the nose section.

(p) Check that all pipe connections have been fully disconnected and that all bonding, electrical cables and control cables are clear of the transport joint.

(q) Lower the trestles from under the nose section.

(r) Carefully sling the nose section forward, guiding the nose section tank floor through the centre-section structure, until clear.

NOTE

As the nose section moves forward the butt strap released in (g) must be held against former 13A, to prevent fouling as the nose section is swung clear of the centre section.

(s) Lower the nose section into a nose section shipping cradle. See Part 1 Sect 2.

NOTE

Since the nose section sling is attached to the nose jacking pads, it will be necessary to remove the jacking pad attachment plates from the shipping cradle before the nose section is lowered. The nose section should then be lowered into the cradle, secured at former 18 and further lowered until the nose jacking pads rest on the forward end of the cradle. The sling is then removed and the attachment plates are refitted to the cradle to secure the jacking pads.

PART 2

AIRFRAME GROUP

SECTION 2

CANOPY

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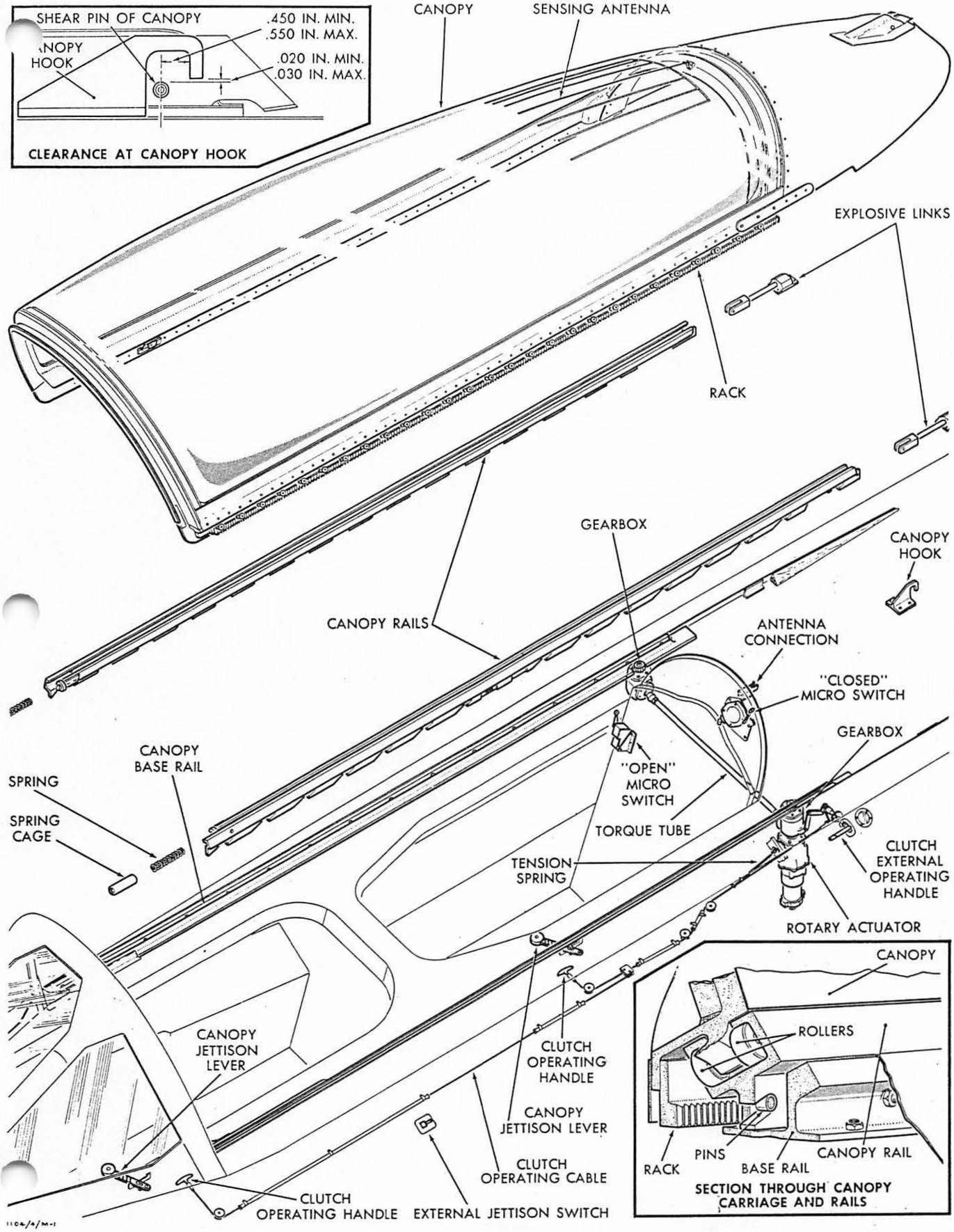

FIG. 2-1 CANOPY INSTALLATION

PART 2

AIRFRAME GROUP

SECTION 2

CANOPY

DESCRIPTION AND OPERATION

General

1 The canopy, which covers both cockpits, is mounted on rails along which it normally slides, and with which it can be jettisoned.

2 The canopy is normally electrically operated, but controls are provided so that the canopy drive can be disengaged and the canopy pushed open by hand.

3 A jettison system is provided, so that the canopy may be jettisoned in flight.

Canopy Normal Operation

4 The canopy is electrically operated and is controlled from outside the cockpit by a pair of push-buttons fitted to the lower left hand side of the nose section skin, and from inside the cockpit by a toggle switch on the pilot's left-hand console. The external buttons are spring loaded and must be pressed until the canopy is fully opened or closed. The toggle switch is spring loaded to a centre off position and must be held in either the OPEN or CLOSE positions. The operation of the canopy seal is described in Part 3 Section 2, and the operation of the electrical system is described in Part 8 Section 1.

5 A rotary actuator is connected to a gearbox which is fitted to the upper left hand side of the gun bay. This gearbox is interconnected by a torque tube to a similar gearbox on the right hand side of the gun bay. A pinion at the top of each gearbox protrudes through the canopy decking and engages with a rack fitted to each side of the canopy, to open and close the canopy.

6 The rotary actuator retains the canopy in the open, closed or intermediate positions. Micro-switches fitted to the cabin rear sealing arch control the rotary actuator at the canopy fully opened and closed positions.

Canopy Emergency Operation

7 A cable operated clutch is fitted to disengage the rotary actuator from the gearbox in case of electrical failure. The canopy may then be opened or closed by hand.

8 The clutch can be disengaged either by a handle on the left side of each cockpit, or by a handle fitted to the outside skin aft of the rear cockpit, on the left hand side.

9 When the clutch is disengaged, the spring loaded drive shaft of the rotary actuactor is depressed and disconnected from the gearbox. The clutch can only be engaged by using the external handle.

Canopy Jettison System

10 The canopy may be jettisoned from either cockpit, by pulling the canopy jettison lever backwards. An explosive link is fitted to the rear end of each canopy rail. The link keeps a spring, fitted to the forward end, in compression. When the jettison lever is operated, the explosive charge is electrically fired to destroy the links. The springs then expand and force the canopy rails backwards. In moving backwards, serrated teeth on the canopy rails ride on pins in the canopy base rail, causing the canopy to lift. At the same time, a shear pin fitted to the rear end of the canopy engages with a hook on the fuselage. Air pressure then pivots the canopy upwards and backwards about the shear pin, which breaks, and the canopy is blown clear of the aircraft.

11 The canopy jettison system may be operated

from outside the cockpit by external switches, one of which is fitted to each side of the nose section.

MAINTENANCE AND SERVICING

Lubrication

12 The canopy operating mechanism should be lubricated as detailed in Part 1 Section 3.

Explosive Link Life

13 The life of the explosive links is six months from the date of fitting to the aircraft.

Safety Precautions

14 Both the canopy jettison controls and the rotary actuator clutch controls must be witness locked at all times. If the witness wire of an internal clutch control is broken, check that the external control handle is still witness locked to ensure that the clutch is fully engaged, before the wire is replaced.

REMOVAL AND INSTALLATION

Canopy Removal

15 To remove the canopy, proceed as follows:

(a) Ensure that the Ground/Flight switch is OFF.

(b) Break the wire, and operate the external clutch handle to disengage the clutch.

(c) Slide the canopy fully open.

(d) Fit the canopy sling.

(e) Disengage the micro-switch on the cabin rear sealing arch.

(f) Slide the canopy clear of its rails and use suitable lifting equipment to remove it from the aircraft.

Canopy Installation

16 The procedure for installing the canopy is the reverse of that given for removal. When canopy has been installed, engage the rotary-actuator clutch, witness lock the operating handle and check the canopy for correct operation. Ensure that the sensing antenna engages correctly when the canopy is closed. If a new canopy has been fitted, check the clearance between the hook and the shear pin when the canopy is closed, as shown on figure 2-1, and pressure test the cabin.

Engaging the Rotary Actuator Clutch

17 To engage the clutch, proceed as follows:

(a) Ensure that the operating handle in each cockpit is held in position by the spring tension of the operating cable, and that each handle is wired in position by one strand of 28 SWG (.0148 inch) tinned copper wire.

(b) Operate the external clutch handle so that it is in line with the handle fairing.

(c) Wire the handle to the fairing with one strand of 28 SWG (.0148 inch) tinned copper wire.

(d) Check the electrical operation of the canopy.

Explosive Link Removal

18 To remove an explosive link, proceed as follows:

(a) Disconnect the battery.

(b) Disconnect the link electrical connection, at the top of the gun bay,

(c) Fit the special spring-compressing tool to the forward end of the canopy rails and compress the spring.

(d) Remove the fairing strip which covers the outboard side of the link.

(e) Remove the bolt which attaches the link to the rail.

(f) Remove the four screws which attach the rear end of the link to the canopy decking and remove the link from the aircraft.

CAUTION

The explosive link is wired directly to the battery so it is possible to jettison the canopy even when the Ground/Flight switch is OFF.

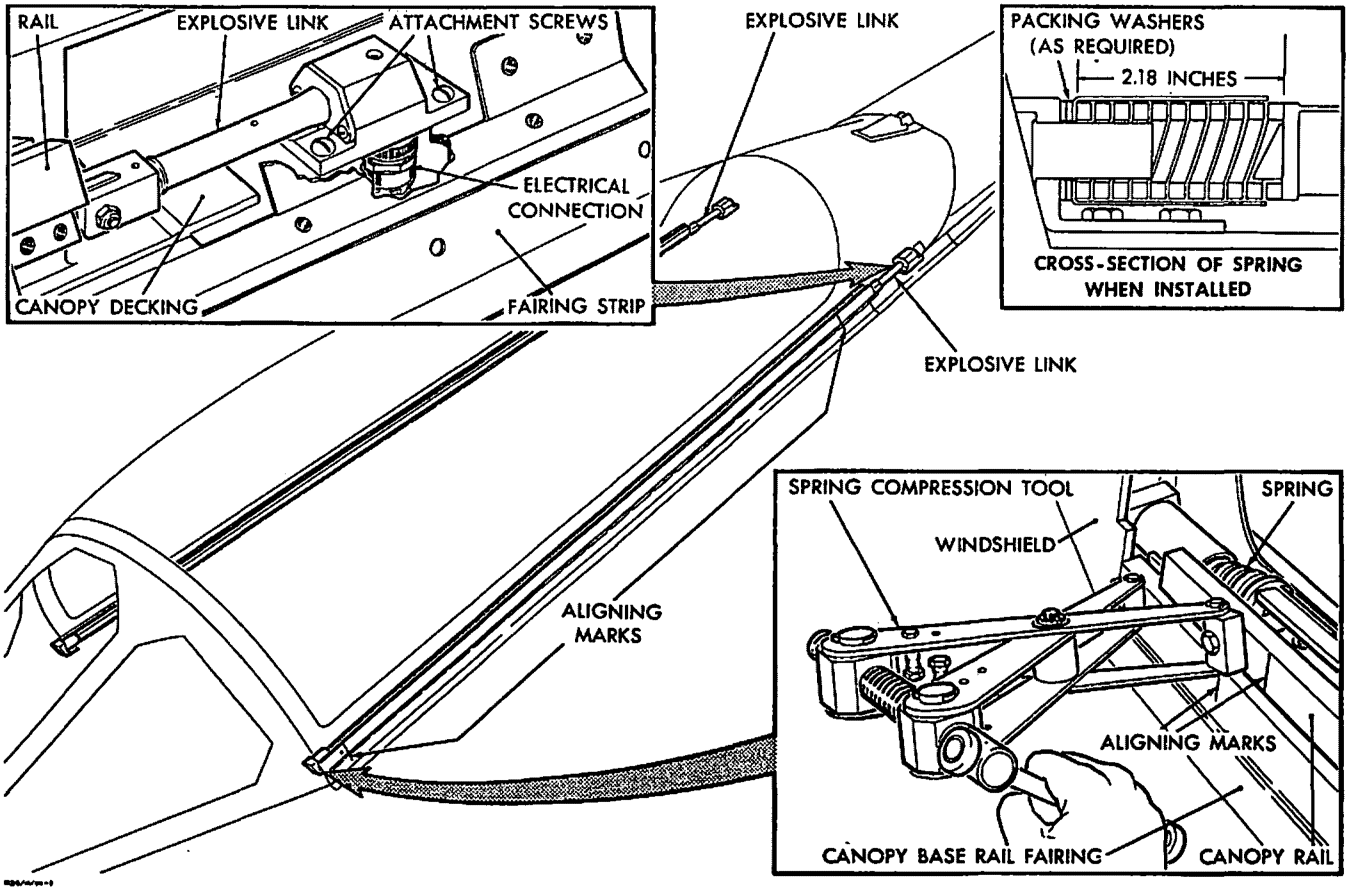

FIG. 2-2 FITTING THE CANOPY RAILS

Canopy Rail Removal

19 To remove a canopy rail, proceed as in paragraph 18 and then as follows:

(a) Slowly release the spring compression; remove the tool from the aircraft.

(b) Lift the rail rearwards and upwards and remove it from the aircraft.

(c) Remove the spring assembly from the aircraft.

Canopy Rail Installation

20 To install a canopy rail, proceed as follows:

(a) Fit the canopy rail into the base rail.

(b) Attach the explosive link to the canopy decking by the four screws.

(c) Bolt the forward end of the link to the canopy rail.

(d) Check that the marks on the canopy rail are coincident with, or not more than 0.08 inch behind the marks on the fairing.

NOTE

The forward end of the link can be adjusted to achieve this effect.

(e) Remove the explosive link.

(f) Remove the rail and fit the spring assembly to the forward end.

(g) Fit the spring compressing tool and compress the spring until the marks on the canopy rail and canopy base rail fairing are coincident.

(h) Check that the compressed length of the spring is 2.18 inches. Packing washers may be fitted to get this measurement.

(j) Refit the explosive link, using

sealing compound between the link and the canopy cking.

(k) Ensure that both jettison handles are wired in the forward position with one strand of .022 inch diameter tinned copper wire.

(l) Connect the electrical lead to the link.

(m) Replace the fairing strip.

(n) Reconnect the battery.

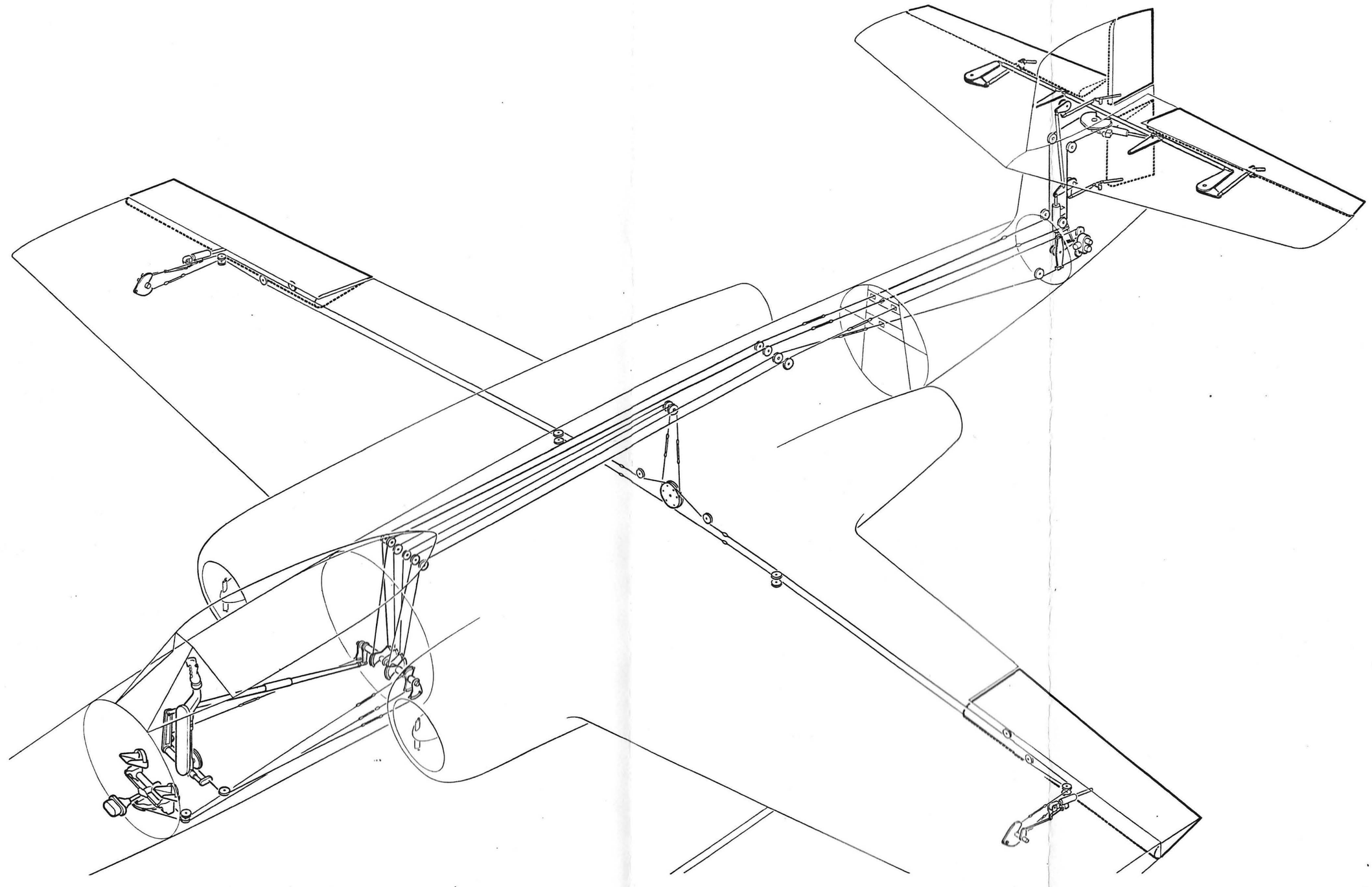

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FIG. 4-1 FLYING CONTROLS SCHEMATIC DIAGRAM

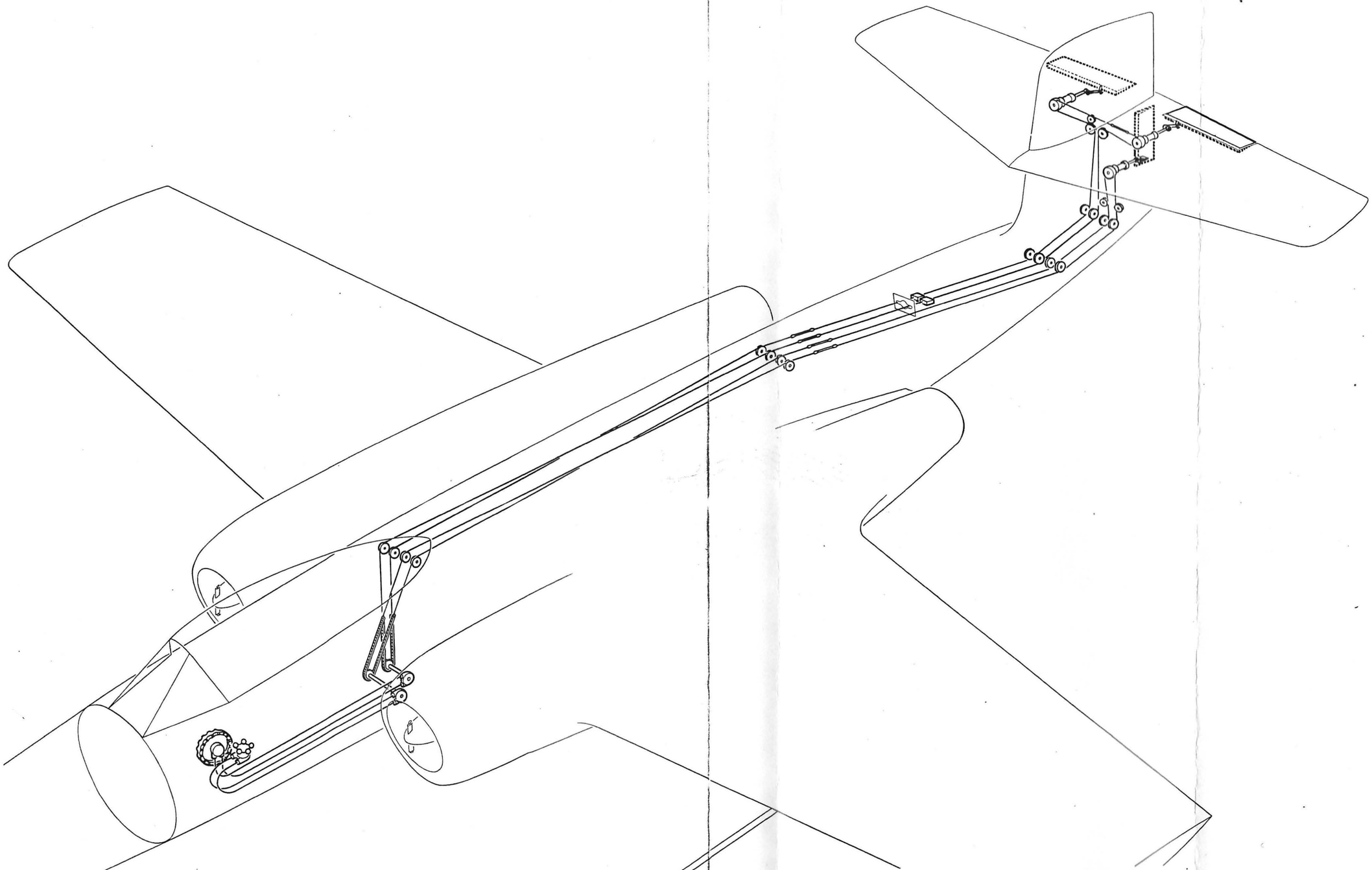


FIG. 4-2 TRIMMER CONTROLS SCHEMATIC DIAGRAM

ELEVATOR CONTROLS

23 Control of the elevators is effected by a fore and aft movement of the control column. This motion is transferred via an operating lever and a connecting rod, to a lever on the outboard end of the RH outer layshaft. Two control cables attached to a double sided quadrant on the inboard end of the RH outer layshaft transmit the motion to an elevator quadrant installed in the horizontal stabilizer. See fig 2-4-12. An elevator quadrant lever attached to the elevator quadrant shaft transfers the movement via the servo control valve operating rod, to the hydro-booster assembly. The hydro-booster jack cylinder eye end is attached to the elevator linkage in the horizontal stabilizer. Movement of the hydro-booster jack cylinder moves the elevator linkage to operate the elevators.

24 On aircraft fitted with auto-pilot, the two control cables from the layshaft transmit motion to a vertical lever and quadrant assembly located in the rear centre section. Two more cables then transmit motion to the elevator quadrant in the horizontal stabilizer. See fig 2-4-23.

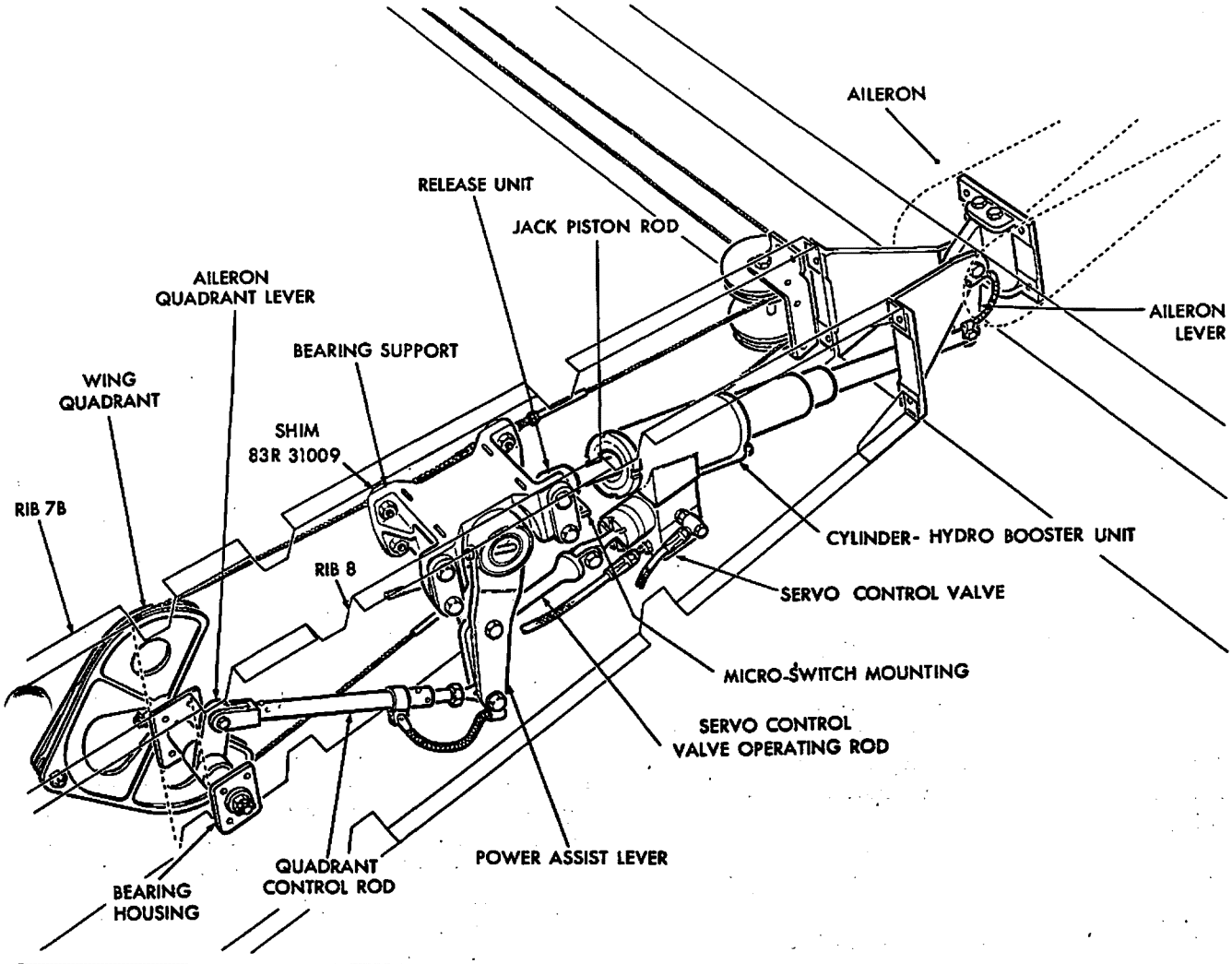
ELEVATOR VERTICAL LEVER AND QUADRANT ASSEMBLY - AIRCRAFT WITH AUTO-PILOT (Fig 2-4-14 and 2-4-23)

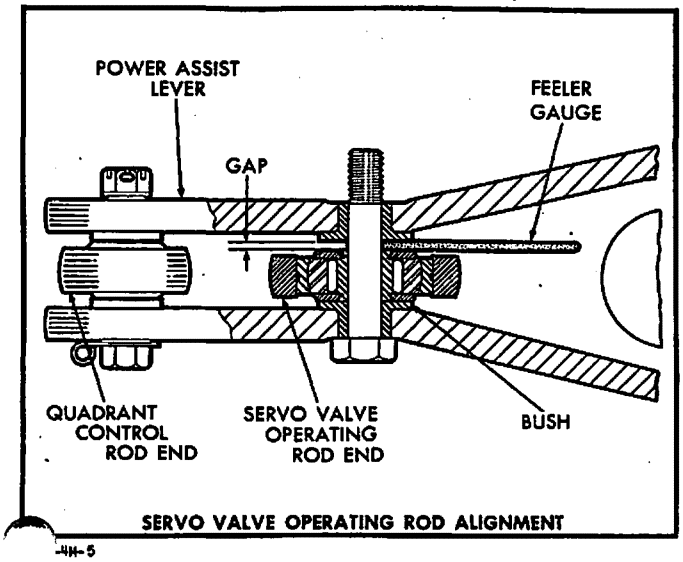
25 The elevator vertical lever and quadrant assembly comprises two separate parts, an auto-pilot quadrant and a vertical lever, which are mounted on a common shaft bolted to two support brackets between formers 29 and 30. The elevator cables are connected to the vertical lever as described in para 24. The auto-pilot quadrant is connected by cables to the elevator auto-pilot servo unit. A connecting plate is fitted between the vertical lever and the quadrant to transmit rotary movement from the quadrant to the vertical lever. Two striker brackets fitted to an arm on the vertical lever protrude through a cutout in the quadrant and two micro-switches are mounted on the outboard face of the quadrant in alignment with each striker bracket. The cutout is shaped and the micro-switches are positioned so that the front striker bracket will contact either front micro-switch before the rear striker bracket will contact either rear micro-switch.

26 When the aircraft is in flight with the auto-pilot engaged and auto-trim selected ON, the elevators are controlled by the servo unit which operates the quadrant as required to maintain the aircraft in the correct attitude. If there is no load on the elevators, the striker brackets remain centred within the cutout in the quadrant. As soon as a load is applied to the elevators and is transmitted forward through the cables to the vertical lever and quadrant, the connecting plate between the vertical lever and the quadrant flexes and the striker brackets move towards one side of the cutout. When the elevator out-of-trim load exceeds a pre-determined figure, the front striker bracket moves sufficiently to contact one of the front micro-switches and operate the auto-trim servo unit. The trim tabs move to counteract the load on the elevators until the connecting plate straightens sufficiently for the striker bracket to move out of contact with the micro-switch. Should the auto-trim system fail to function correctly and allow an excessive out-of-trim load to be placed upon the elevators, the connecting plate will flex further and the rear striker bracket will contact one of the rear micro-switches to illuminate a warning light on the pilot's instrument panel. For information on the electrical operation of the elevator auto-trim system see Part 7 Sect 6.

RUDDER CONTROLS

27 Movement of the rudder bar rotates the turntable cable quadrants to which are secured two rudder control cables. These cables extend to the LH console around two pulleys in a bracket secured to the cockpit floor. The cables pass aft to the double-sided quadrant on the outboard end of the LH outer layshaft. At the inboard end of the LH outer layshaft, a second double-sided quadrant transfers the layshaft motion to a second pair of cables, which run aft through the rear centre section to the rudder vertical lever in the rear section. The spindle of the rudder vertical lever is bearing mounted in a bracket attached to former 34A. See fig 2-4-15 and 2-4-39.





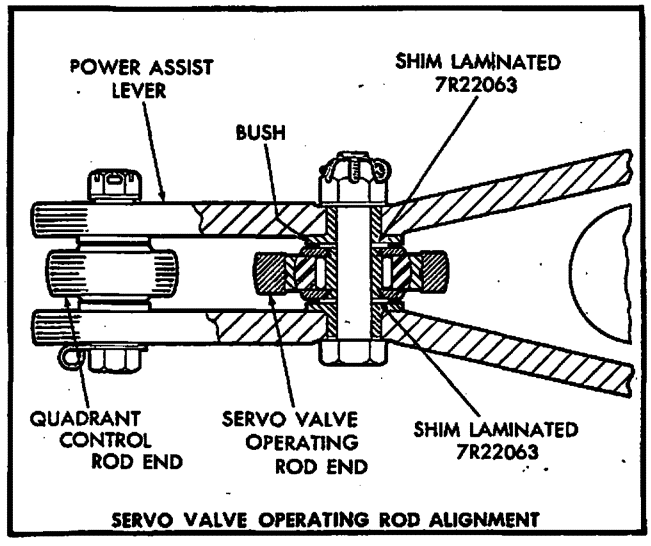


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Fig. 2-4-10 Aileron Control Linkage

28 Movement of the vertical lever is transferred to the hydro-booster jack, via a booster operating lever and a servo control valve operating rod. The hydro-booster jack cylinder fork end is connected to the bottom bellcrank in the rudder push-pull rod linkage. The linkage transmits any motion of the hydro-booster jack cylinder to the top and bottom rudders.

YAW DAMPER SERVO UNIT (Fig 2-4-39)

29 On aircraft without auto-pilot, the operation of the yaw damper servo unit is described in Part 7 Sect 6. On aircraft with auto-pilot, the operation is described in Part 6 Sect 2.

30 An electrical control assembly for the yaw damper servo unit is installed in the rear centre section. The servo control unit is secured to the forward face of former 35 and linked to the rudder vertical lever by the end fittings of two servo control cables. For details of the electrical operation of the yaw damper components, refer to Part 7 Sect 6 for aircraft without auto-pilot, or Part 6 Sect 2 for aircraft with auto-pilot.

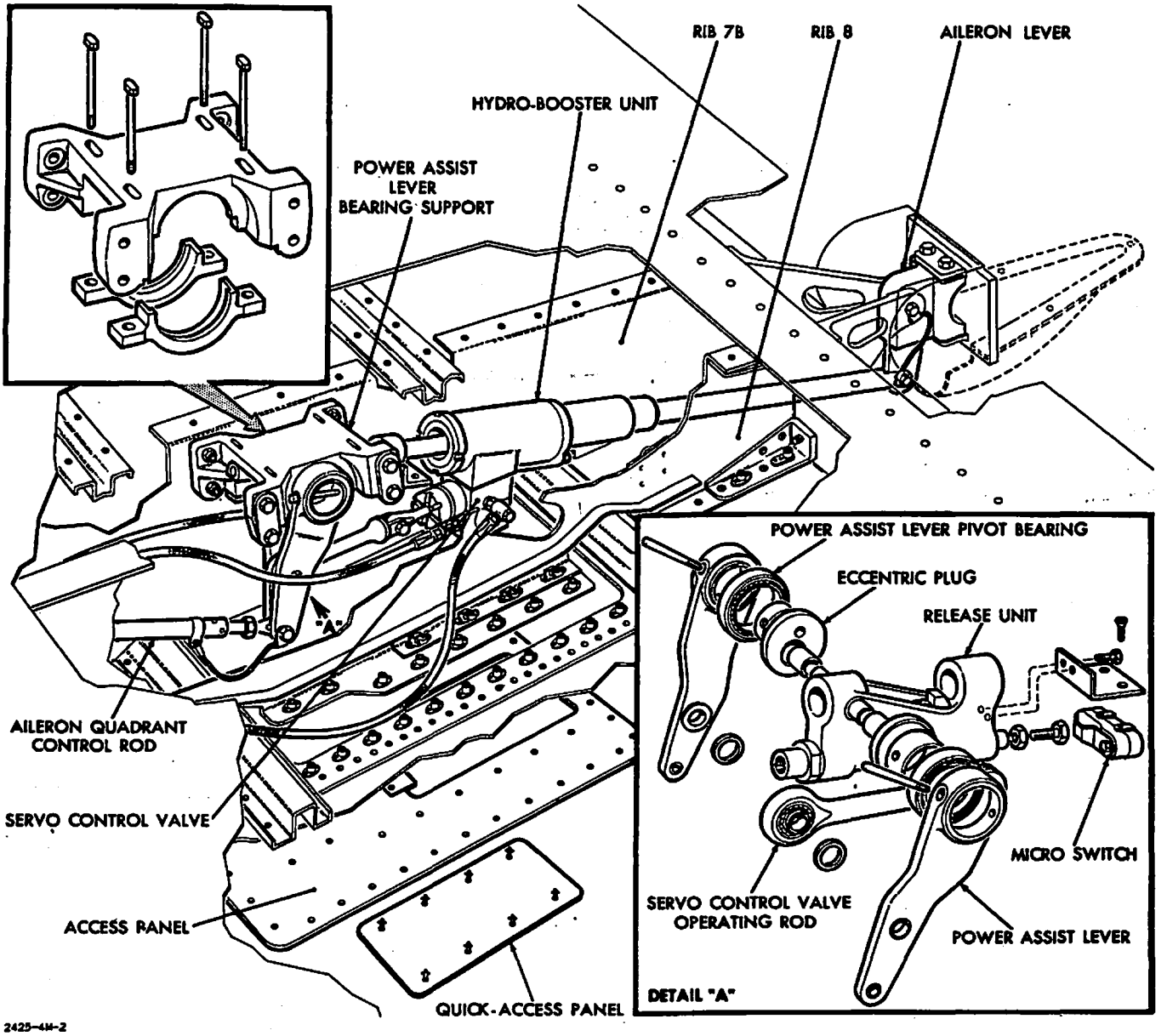

Fig. 2-4-11 Aileron Hydro-booster Installation

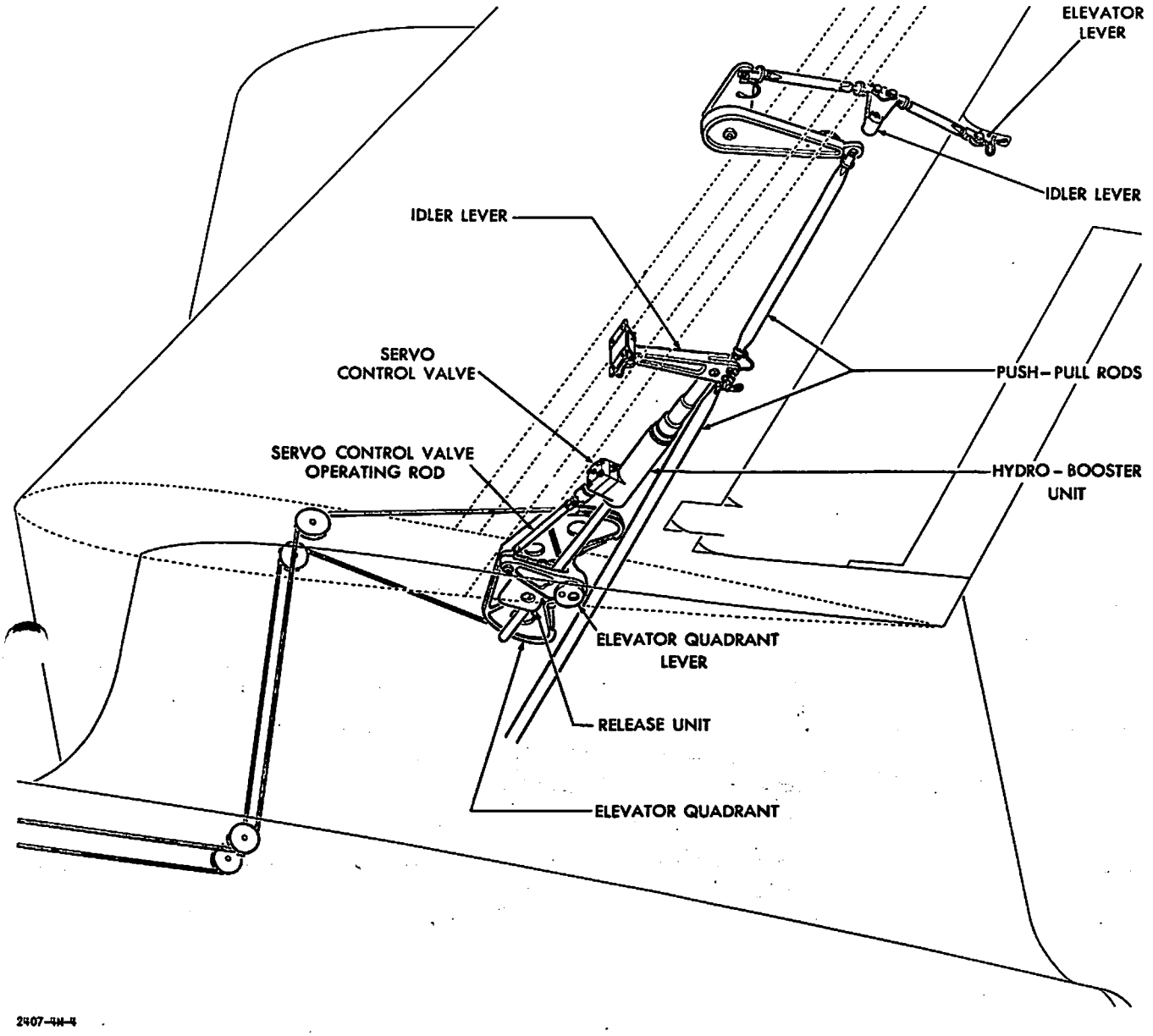

Fig. 2-4-12 Elevator Control Linkage

CONTROL LOCKS

31 The flying controls hydro-booster hydraulic circuit provides a positive lock for the control surfaces when the aircraft and engines are stationary. By repeated movement of the cockpit controls the hydraulic pressure may be lowered until the pressure operated by-pass valves located in the return lines close. This causes fluid to be trapped in the hydro-booster jack cylinders on both sides of the pistons, hydraulically locking the units. See Part 3 Sect 1.

32 The hydro-boosters must not be used to lock the controls for periods of more than 24 hours. External locks on the control surfaces must be used for parking over this period. See Part 1 Sect 2.

SERVO TRIM (Fig 2-4-46)

33 The degree of servo present in the ailerons is determined by the distance between the fixed centre of the control surface hinge point and the point at which the dummy jack

brakes levers are linked to three hydraulic jacks. The hydraulic services operating the dive brakes are controlled from the LH console in the cockpit.

RIGGING PROCEDURE

GENERAL

54 Before proceeding to rig the flying controls, place the aircraft in rigging position. See Part 1 Sect 2. For the purpose of the following instructions, it is assumed that the aileron, elevator and rudder surfaces, trimmer tabs, control linkages and operating mechanisms have been installed; that the hydro-boosters have been installed and connected to the appropriate control linkages and that hydraulic power is available. It is also assumed that the relevant control cables have been connected, but not fully tensioned. See para 55 for correct cable tensions.. For identification of cable routes see fig 2-4-1 to 2-4-4. To avoid repetitive instructions it is assumed that all turnbuckles are in safety and locked and that all bolts, nuts, washers, locknuts and bonding leads in the control linkages are correctly fitted and locked on completion of any rigging adjustment. It is also assumed that all covers, access panels and equipment removed for purposes of accessibility are correctly replaced and secured on completion of rigging procedure. For details of location of access panels see Part 1 Sect 2. The locations of rigging and contour boards are illustrated in Part 2 Sect 1. For the permissible amount of play in the flying control components see Part 2 Sect 7.

CABLE TENSIONS

55 Control cables are to be correctly tensioned after any adjustment affecting the cable circuits. Check cable tensions on bare sections of cable at hangar temperature using an accurately calibrated tension meter. When control cable tensions have been adjusted, the affected control surface must be checked for freedom and range of movement. See fig 2-4-35. To obviate the problems encountered due to changes in temperature, the cables referred to in (b), (d) and (e) below, must be tensioned in accordance with the temperature compensating graph. See fig 2-4-17. However, to tension cables during extreme summer heat sufficiently to maintain tension at -56°F at an altitude of 40,000 ft, would be impractical and cause control binding and possible failure. Unit engineering personnel are to ensure that discretion is used and under no circumstances allow the cable tensions to exceed the graph reading. Before tensioning cables to the tensions indicated on the graph, the aircraft must be hangar soaked for 24 hours. Tension cables as follows:

(a) Aileron control cables (5/32 inch diameter) from control column to balance wheel 30-35 lb.

(b) Aileron control cables (5/32 inch diameter) from balance wheel to wing quadrant. See fig 2-4-17.

(c) Rudder control cables (5/32 inch diameter) from rudder bar to layshaft 45-50 lb.

(d) Rudder control cables (5/32 inch diameter) from layshaft to rudder quadrant. See fig 2-4-17.

(e) Elevator control cables (5/32 inch diameter) from layshaft to elevator quadrant. See fig 2-4-17.

(f) Auto-pilot and yaw damper control cables (1/8 inch diameter) 45-50 lb.

(g) Elevator trimmer control cables (1/16 inch diameter) - aircraft with auto-trim 40-45 lb.

(h) Elevator trimmer control cables (1/16 inch diameter) - aircraft without auto-trim 20-25 lb.

(j) Rudder trimmer control cables (1/16 inch diameter) 20-25 lb.

RANGES OF MOVEMENT OF CONTROL SURFACES

56 For details of the ranges of movement of control surfaces see fig 2-4-35.

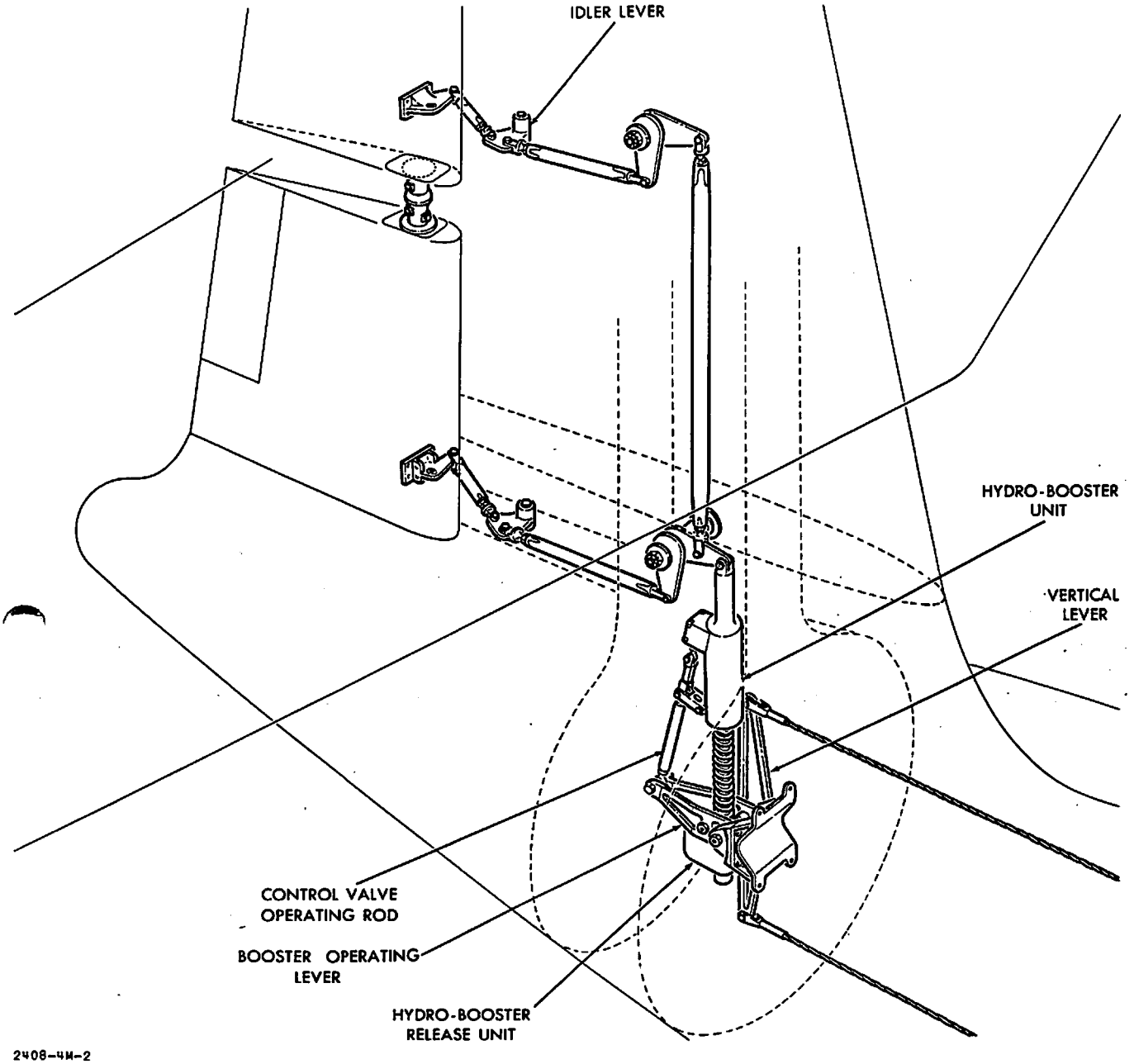

Fig. 2-4-15 Rudder Control Linkage

RANGES OF MOVEMENT OF COCKPIT CONTROLS

57 For information on the ranges of movement of cockpit controls see fig 2-4-34.

ENGAGING THE HYDRO-BOOSTERS

58 The procedure for engaging the hydro-boosters is as follows:

(a) Set each cockpit control to the full travel in one direction.

(b) Select the hydro-booster control lever to the on position and maintaining approximately 1000 psi hydraulic pressure in the hydro-booster circuit (see Part 3 Sect 1), move each control to the full travel in the opposite direction.

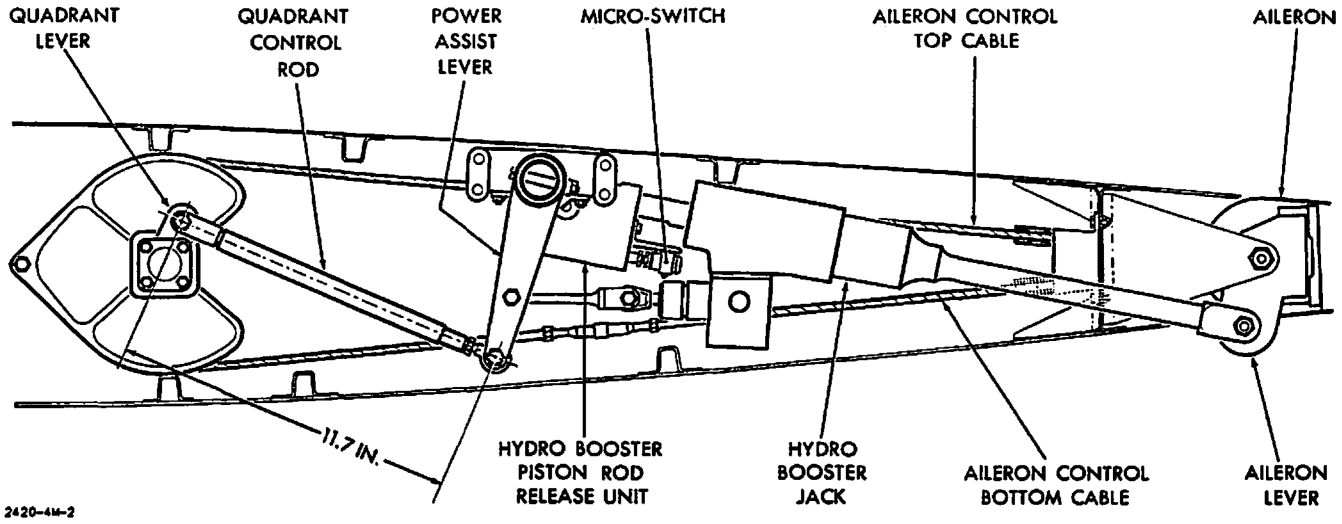

Fig. 2-4-25 Aileron Controls Rigging Dimensions

AILERON AUTO-PILOT SERVO UNIT

65 The procedure for rigging the aileron auto-pilot servo unit is as follows:

(a) Set the ailerons to neutral.

(b) Adjust and tension the auto-pilot servo unit control cables to 45-50 lb.

(c) Check the aileron controls for correct functioning and freedom of movement.

(d) Carry out a test in accordance with Part 6 Sect 2.

ELEVATOR TRIMMER CONTROLS - AIRCRAFT WITHOUT AUTO-TRIM

66 The procedure for rigging the elevator trimmer controls on aircraft not fitted with auto-trim is as follows:

(a) Turn the elevator trimmer handwheel until the pointer registers on the full nose down mark.

(b) Position and tighten the stop on the RH cable against the fairlead on former 27.

(c) Turn the elevator trimmer handwheel until the pointer registers on the full nose up mark.

(d) Position and tighten the stop on the LH cable against the fairlead on former 27.

(e) Set the pointer to zero and the trimmer controls in the horizontal stabilizer to neutral. See dimension 'F' in fig 2-4-44.

(f) Tension the cables to 20-25 lb.

(g) Adjust the trim tab connecting rods at the forward end only, to bring the trim tabs neutral.

NOTE

No adjustment is permitted at the rear end of the connecting rods. If a rod has been inadvertently adjusted at the rear end, the rod end bearing must be screwed into the rod to the full extent and the locknut torque loaded to 60-85 inch-pounds. The forward end of the rod can be identified by the single inspection hole for the forward rod end bearing.

(h) Check the trim tab travel. See fig 2-4-35.

NOTE

If the trim tab movement is too much in one direction and not enough in the other, adjust on the trim tab connecting rod and compensate by adjusting the jack rod end bearing in the opposite direction.

ELEVATOR TRIMMER CONTROLS - AIRCRAFT WITH AUTO-TRIM

67 The procedure for rigging the elevator trimmer controls on aircraft fitted with auto-trim is as follows:

(a) Carry out the check detailed in para 61(a) and set the trimmer control cables in the horizontal stabilizer to neutral. See dimension 'F' in fig 2-4-44.

(b) Tension the cables connecting the auto-trim servo unit with the trimmer screw jacks to 40-45 lb.

(c) Adjust the trim tab connecting rods at the forward end only, to bring the trim tabs neutral.

NOTE

No adjustment is permitted at the rear end of the connecting rods. If a rod has been inadvertently adjusted at the rear end, the rod end bearing must be screwed into the rod to the full extent and the locknut torque loaded to 60-85 inch-pounds. The forward end of the rod can be identified by the single inspection hole for the forward rod end bearing.

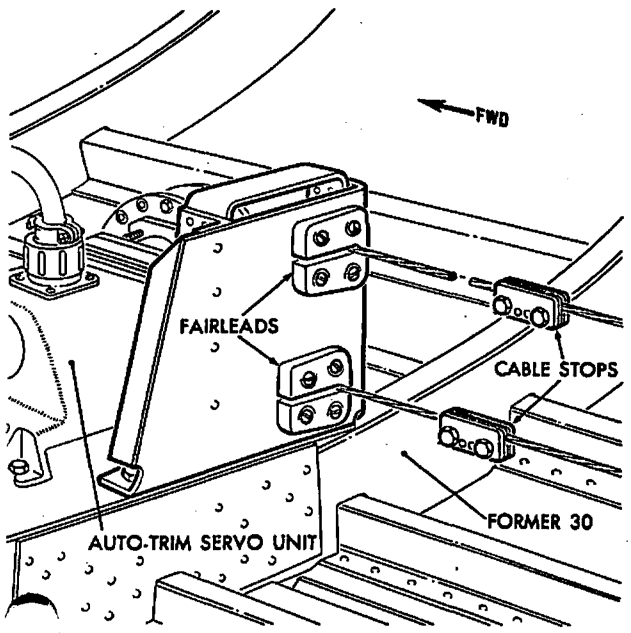

Fig. 2-4-26 Elevator Auto-trim Cable Stops - Mod 1088

(d) If Mod 1088 is not embodied, adjust the tab travel limit switches at the RH screw jack to give the correct range of tab movement. See Part 7 Sect 6 and fig 2-4-35.

(e) When Mod 1088 is embodied, adjust the cable stops (see fig 2-4-26) to give the correct range of tab movement. See fig 2-4-35.

NOTE

When Mod 1088 cable stops are fitted instead of limit switches, the auto-trim servo unit clutch slips when full trim tab travel is reached in either direction. The clutch must not be allowed to slip for more than 90 seconds.

(f) Adjust the tab position transmitter at the LH screw jack until the indicator in the front cockpit corresponds to the tab position.

(g) Carry out a test in accordance with Part 7 Sect 6.

NOTE

If the trim tab movement is too much in one direction and not enough in the other adjust on the trim tab connecting rod and compensate by adjusting the jack rod end bearing in the opposite direction.

RUDDER TRIMMER CONTROLS

68 The procedure for rigging the rudder trimmer controls is as follows:

(a) Set the trimmer control pointer to neutral.

(b) Tension the cables in the rear centre section to 20-25 lb to bring the screw jack drum to the neutral position. See fig 2-4-43.

(c) Adjust the trim tab connecting rod to bring the trim tab to neutral.

(d) Check the trim tab travel. See fig 2-4-35.

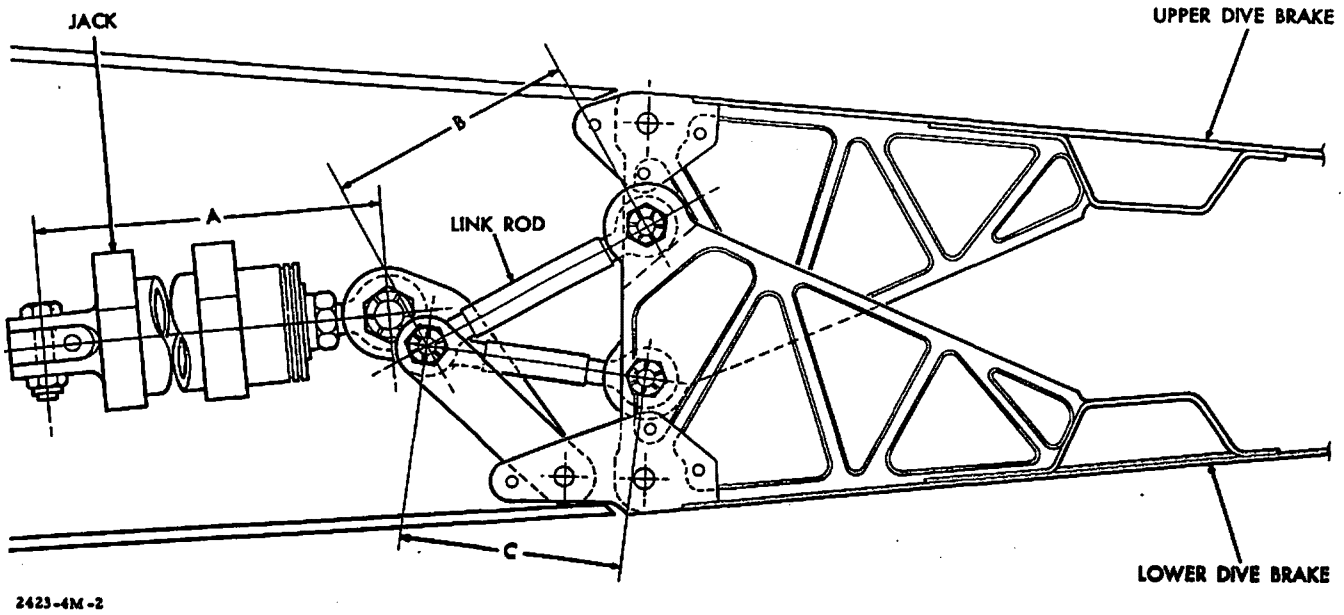

Fig. 2-4-27 Dive Brakes Rigging Dimensions

AILERON SERVO CONTROLS

69 The procedure for rigging the aileron servo controls is as follows:

(a) Set the aileron in neutral.

(b) Adjust the dummy jack until the centre of its rod end bearing coincides with the centre line of the aileron hinge.

(c) Adjust the connecting rod between the servo tab and the idler lever to bring the tab to neutral.

(d) Check the servo travel on the ailerons using the gauge detailed in para 64 and in accordance with the range of movement shown in fig 2-4-35.

DIVE BRAKES (Fig 2-4-27)

70 The procedure for rigging the dive brakes is as follows:

(a) Disconnect the hydraulic jacks from the dive brake levers, to allow the full extension of the upper and lower brakes.

(b) Disconnect the upper dive brake link rods.

(c) Adjust the link rods to drawing dimensions plus two turns. See fig 2-4-27 and 2-4-28.

(d) Disconnect the lower dive brake link rods and adjust to drawing dimensions plus two turns.

(e) Connect the dive brake jacks and link rods and test the dive brakes in the closed position.

(f) Adjust the link rods until the dive brakes lie in the trough without pressure contact on the bottom of the trough when the jacks are under a pressure of 1200 psi max. If the dive brakes have been bearing on the bottom of the trough, check the dive brake jack eye ends for damage or distortion. Ensure that the dive brakes bottom evenly in the closed position.

NOTE

Premature bottoming of a dive brake can produce excessively high link loads which may overstress the links. To offset the possibility of damage the operating pressure should not exceed 1200 psi during dive brake rigging.

(g) With the dive brakes open, check the settings of each brake with an inclinometer placed at No. 2 hinge. See fig 2-4-29 for settings and ranges of movement.

POSITION	A JACK RETRACTED	A MAX. STROKE	B	C
Inner	14.10 in	18.48 in	5.68 in	5.06 in
Centre	14.10 in	18.25 in	5.28 in	4.69 in
Outer	14.10 in	17.86 in	4.81 in	4.29 in

Fig. 2-4-28 Dive Brakes - Linkage Settings

(h) When the brakes are open, the jacks should bottom evenly and the brakes should not be bowed.

NOTE

Maximum asymmetric condition between the upper and lower dive brakes must not exceed one degree. Maximum twist on any one dive brake must not exceed one degree.

FLAPS

71 The procedure for rigging the flaps is as follows:

(a) Pressurize the hydraulic system to 2000-2100 psi and select flaps up. See Part 3 Sect 1.

(b) Place an inboard contour board on each wing at station 19.5 and adjust the flap jacks, if necessary, to align the flaps with the contour boards.

CAUTION

The inboard roller assembly for the flap 25° position micro-switch in the LH wing trailing edge will drop below the cam on the flap shroud if the LH flap is lowered beyond the normal travel when the jack is disconnected. To prevent damage to the roller assembly, the roller must be guided on to the cam as the flap is raised. Access is obtained through the inboard panel on the flap shroud.

(c) With the ailerons in neutral, check that the trailing edge of each flap aligns with the trailing edge of the aileron and the nacelle fillet. A tolerance of 0.10 inch above or below is allowed between the flap and the aileron and 0.15 inch between the flap and the nacelle fillet.

(d) Check that the centre-section flap is flush with the underside of the fuselage. If necessary, lower the flap and adjust the flap jacks sufficiently to bring the flap flush in the up position.

(e) Check the down position of the wing and centre-section flaps. See fig 2-4-30.

LOAD TESTING - FLYING CONTROLS

72 Load testing of controls is mandatory and must be carried out after any work has been completed on the aileron, rudder and elevator controls. A 'Chatillon' spring scale having a 0-15 lb range is acceptable for recording the breakout force measured at the control column. This spring scale should be treated as a precision instrument and its use confined to the load testing of flying controls. It should be tested for correct calibration every 30 days. Load testing must be carried out on the controls as follows:

(a) Select the hydro-booster control lever to the off position.

(b) Place the control column in the neutral position.

(c) Attach the test scale to the forward face of the trigger grip at the top of the control column.

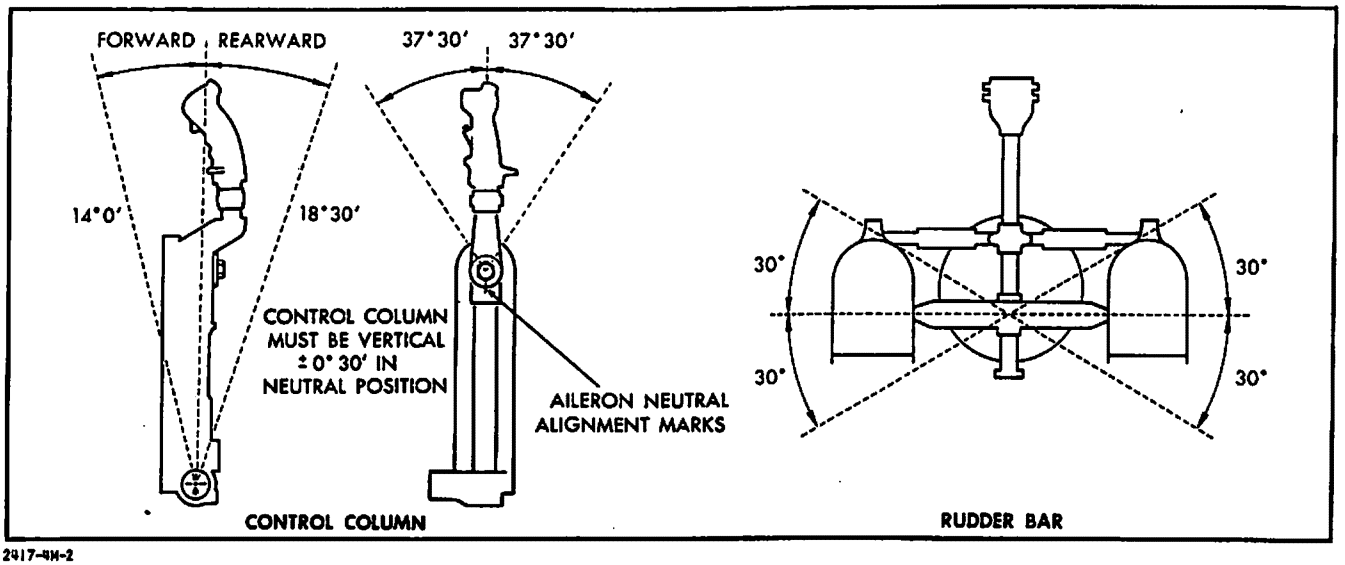

Fig. 2-4-34 Ranges of Movement of Cockpit Controls

AILERON CABLES - LAYSHAFT TO BALANCE WHEEL - REMOVAL

79 To remove the aileron cables, proceed as follows:

(a) Remove the control trough doors. See Part 2 Sect 1.

(b) Remove the air conditioning ducting.

(c) Remove the cable fairleads and cable retaining pins at the pulleys.

(d) Remove the hydro-booster access panel from each wing lower surface and slacken each pair of aileron control cables at the turnbuckles beside the wing quadrant.

(e) Lower the flaps and battery stowage to gain access to the rear centre section.

(f) Disconnect the cables at the turnbuckles above the balance wheel.

(g) If auto-pilot is fitted, slacken the turnbuckle connecting the auto-pilot servo unit cables and disconnect the cables from the auto-pilot quadrant on the balance wheel.

(h) Remove the gun package to gain access to the inboard ends of the layshaft; remove the cable guards and disconnect the front set of cables from the layshaft inboard quadrants.

(j) Remove the pulleys above the layshaft assembly.

(k) Identify and remove the front set of cables from the control trough.

(m) Remove the spigot nut and withdraw the balance wheel and auto-pilot quadrant (if fitted) from the spigot and cable guard.

(n) Identify and disconnect the rear set of cables from the balance wheel i.e., the cables nearest the bulkhead.

(p) Temporarily refit the balance wheel and the auto-pilot quadrant (if fitted).

AILERON CABLES - LAYSHAFT TO BALANCE WHEEL - INSTALLATION

80 Install the aileron cables as follows:

(a) Remove the balance wheel and the auto-pilot quadrant (if fitted).

(b) Connect the rear set of cables to their attachment points in the front grooves of the balance wheel i.e., the grooves nearest the bulkhead.

(c) Fit the balance wheel and the auto-pilot quadrant (if fitted) to the spigot mounting.

(d) Position the front set of cables in the control trough. Attach them to the aileron

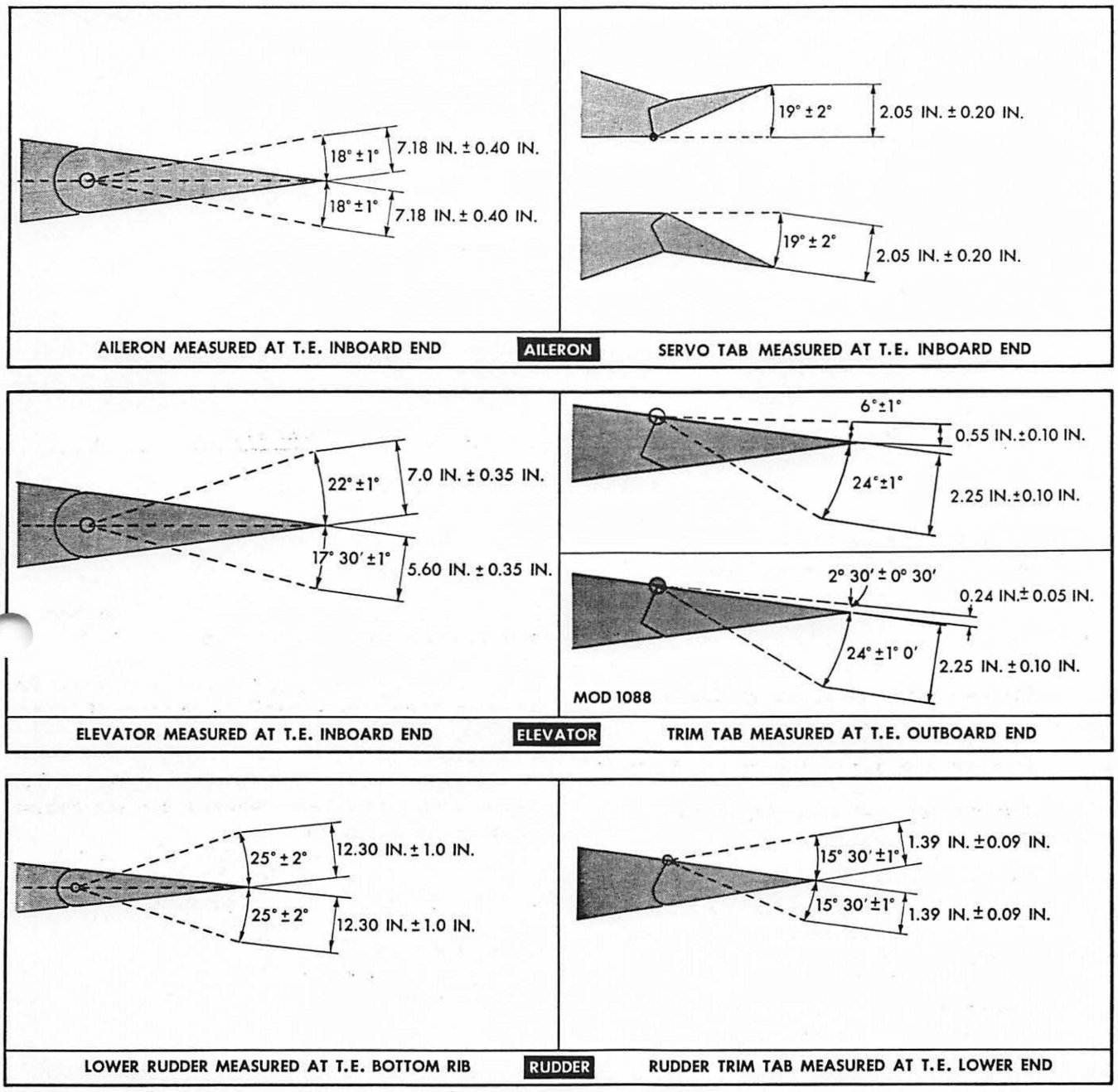

Fig. 2-4-35 Ranges of Movement of Control Surfaces

quadrants situated at the inboard ends of the layshaft assembly and fit the cable guards.

(e) Refit the pulleys above the layshaft assembly.

(f) Connect the front and rear set of cables at the turnbuckles above the balance wheel.

(g) Check that the cables are not crossed throughout their run and replace the fairleads and pulley cable retaining pins.

(h) Pin-lock the layshaft assembly in neutral. See fig 2-4-21.

(j) Adjust and tension the front and rear

When the landing gear is selected up, hydraulic pressure supplied to the underside of each operating jack piston releases the jack internal lock and operates the micro-switch lever. Simultaneously, the hydraulic pressure to the up-lock jacks is released allowing the latches to spring into the locked position.

13 When the operating jacks contract, they fold the radius rods until the legs are fully retracted. As the legs are retracting, the inner wheel retaining nuts contact the door-operating beams and close the fairing doors. The spring-loaded up-lock latches ride over the up-lock pins as the retraction is completed.

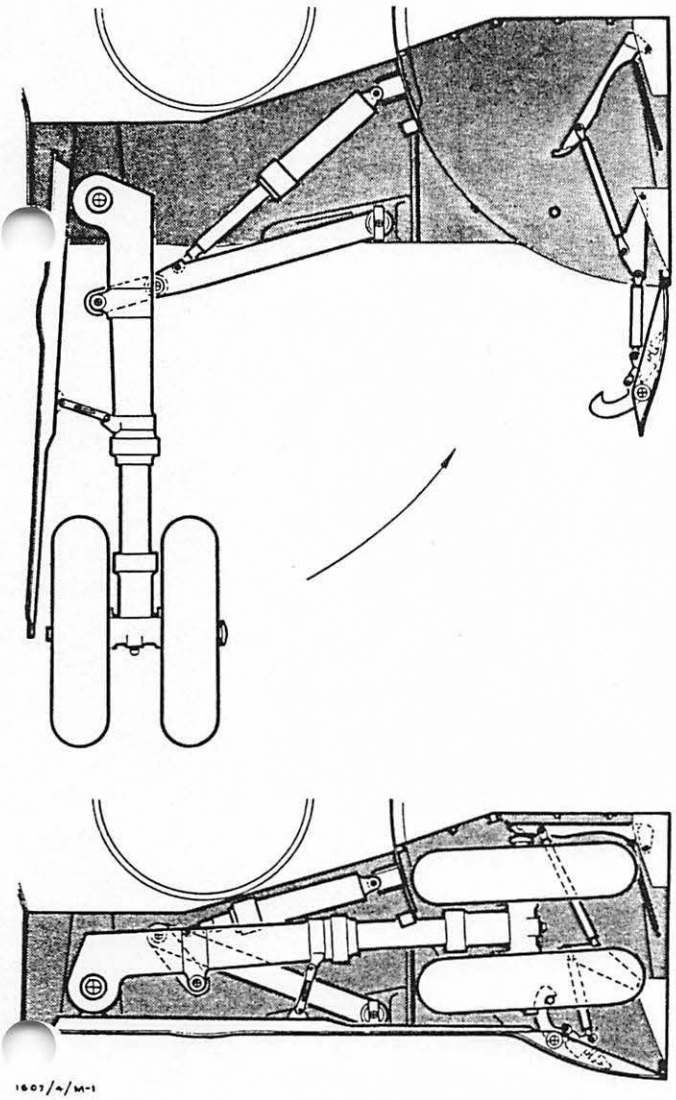

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Fig.2-5-3 Main Landing Gear Operation

14 When the landing gear is selected down, a pressure sequence valve ensures that hydraulic pressure is first supplied to the up-lock jacks (see Part 3 Sect 1) to unlock the latches. After the latches are unlocked, hydraulic pressure is supplied to the down sides of the operating jacks to extend the landing gear. As the landing gear is lowered, the spring-loaded door operating beams lower the fairing doors, which are locked open by an over-centre lock formed by the tie rods and idler lever. When the operating jacks are fully extended, the radius rods are straight and the jack internal down-locks are engaged.

SAFETY LOCK

15 An automatic safety lock is incorporated in the twin push-button selector switch, to prevent the landing gear from being selected up when the weight of the aircraft is on the wheels. The lock is disengaged by a solenoid which is operated by a micro-switch on each main leg shock absorber. See Part 7 Sect 5. Each switch is controlled by a shock absorber actuated lever and is closed only when the shock absorber is fully extended. For emergency operation, the safety lock can be overridden by applying a force of 40 pounds to the UP selector button.

NOSE LANDING GEAR (Fig 2-5-4)

16 The nose landing gear is fitted between two longitudinal diaphragms in the bottom of the nose section and retracts rearwards. When it is retracted, it is completely covered by a leg fairing which is attached to the landing leg and by a fairing door (see fig 2-5-5) which is hinged from the aft face of former 6. A spring-loaded pick-up arm on the forward face of the door is connected by a push rod to the door locking mechanism.

17 The nose landing gear comprises a landing gear leg and a retracting strut assembly to which is attached an operating jack. The landing leg incorporates a liquid spring type shock absorber. The top of the shock absorber is attached to the leg by a pin which passes through both the leg and the shock absorber. The pin is retained by a spring clip which is accessible through an aperture in the outer cylinder of the leg. This aperture is covered by an access

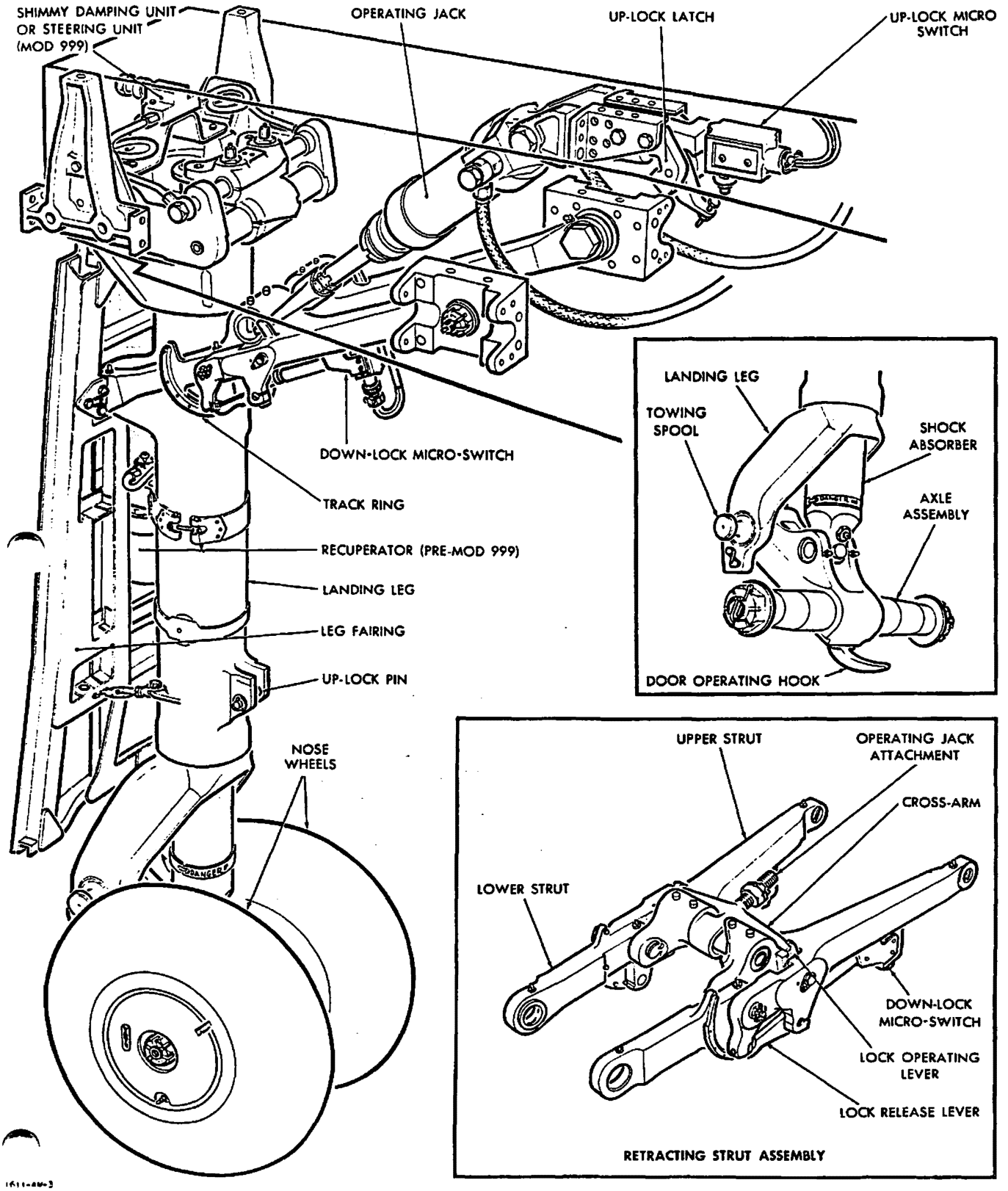

Fig.2-5-4 Nose Landing Gear

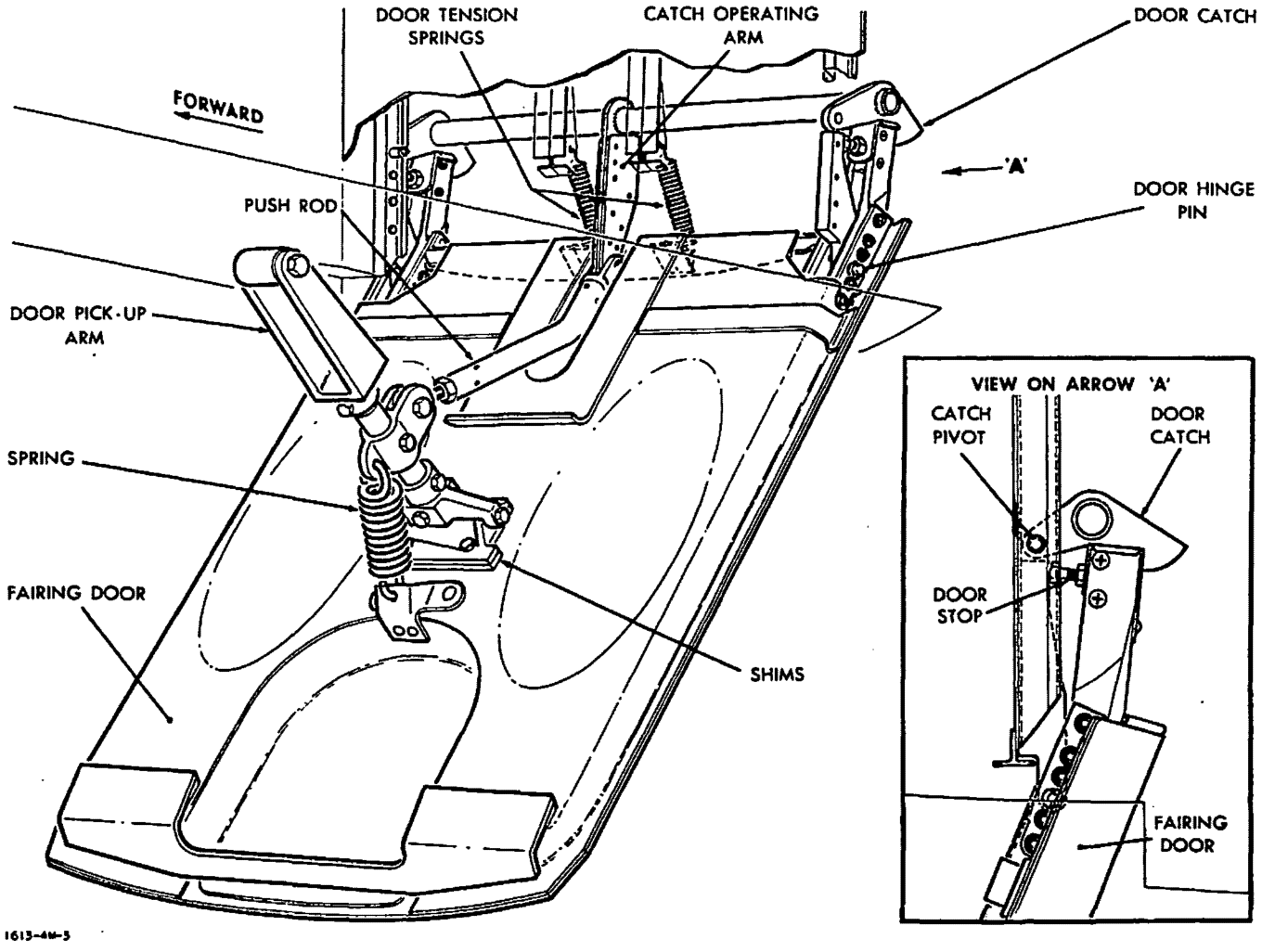

Fig. 2-5-5 Nose Landing Gear Fairing Door

MAINTENANCE AND SERVICING

GENERAL

24 The landing gear should be kept clean and free from dirt and excess grease, especially on the sliding portions of the legs. For details of the lubrication necessary during service refer to Part 1 Sect 3. The landing gear should be inspected after a heavy landing as detailed in Part 2 Sect 7.

JUDDER AND WALKING

25 Whenever an inspection is carried out following a report of judder and/or walking, the results of all checks must be recorded. The report shall include whether the dimensions, mechanical action, wear, etc., determines a component serviceable or unserviceable. The results of all checks should be recorded on a form similar to fig 2-5-6. When landing gear judder and/or walking is reported or suspected, proceed as follows:

(a) Check the shock absorbers for the correct charging pressure and re-charge as necessary. See para 26 through 38.

(b) Check and record all tire pressures. See Part 1 Sect 1.

(c) Check and record Maxaret tire wear and Maxaret tire contact length. See Part 2 Sect 6A or 6B.

(d) Extract the cotter pin and unscrew the main wheel retaining nut. Partially withdraw the wheel to allow rotation of the Maxaret unit. Do not withdraw the wheel from the brake friction plates.

(e) Operate the foot motors in the cockpit to pressurize the brake system.

(f) Rotate the Maxaret unit by hand and bring it to a sudden stop. The indicator rod of the Maxaret unit should move rapidly outwards and then return to its original position. Simultaneously with the outward movement of the indicator rod the brake unit piston rods should actuate, indicating release of the brakes.

NOTE

The friction of the two felt wipers which bear on the Maxaret unit fly-wheel is sufficient in some cases to prevent the unit from rotating freely. This condition which is termed 'continually running on' is not indicative of unserviceability.

(g) Release the brake foot motors.

(h) Repeat step (c) through (g) for the other three main wheels.

(j) Remove the wheel friction plates and pads. See Part 2 Sect 6, 6A or 6B.

(k) Measure the free lengths of the piston rod return springs. The length of the springs for 180° brake assemblies should be 3.90 to 3.985 inches and the length of the springs for 90° brake assemblies should be 4.375 to 4.50 inches.

(m) Check the friction plates for wear and distortion and the friction pad assemblies for wear, chipping, contamination etc., as detailed in Part 2 Sect 6, 6A or 6B and EO 15-45DG-2. Renew defective parts.

(n) Check the main landing gear for accumulative play. See Part 2 Sect 7.

(p) Reassemble as detailed in Part 2 Sect 6, 6A or 6B and EO15-45DG-2, EO15-45DC-2 and EO 15-45DF-2.

(q) Re-check the Maxaret tire contact length. See step (c).

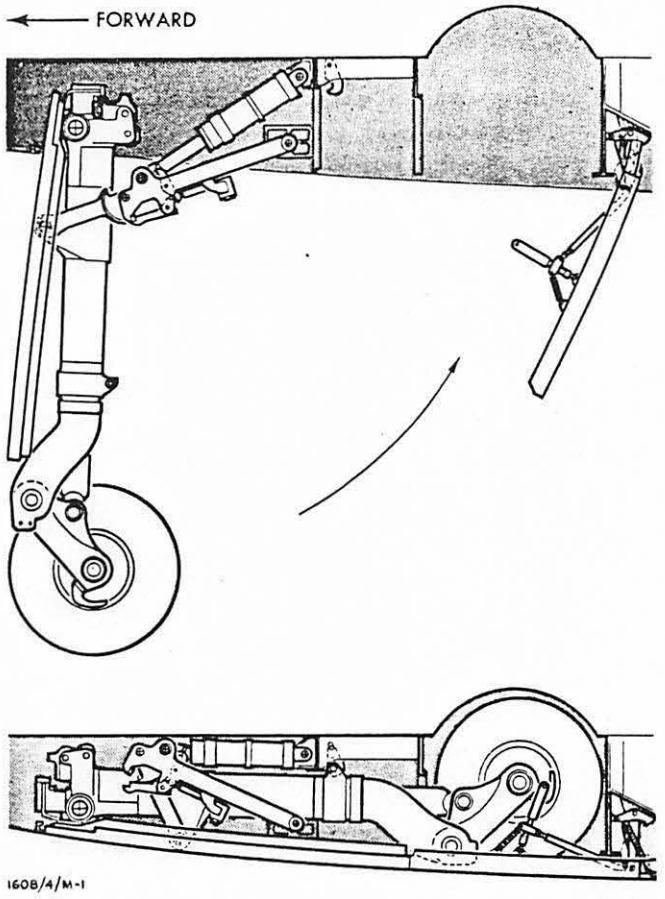

Fig.2-5-7 Nose Landing Gear Operation

(r) Bleed the brake foot motors and check the foot motors for freedom and correct functioning.

CHECKING SHOCK ABSORBER EXTENSION

26 A loss of oil through the glands will not be directly apparent, owing to the construction of the shock absorbers. The effect of such a loss and/or the effect of a low charging pressure, will be excessive closing of the shock absorbers under static load. An abnormally slight closing will indicate that the charging pressure is too high.

27 To check the landing leg shock absorber extension when the aircraft is ready for flight, proceed as follows:

(a) Allow sufficient time for the temperature of the shock absorber to reach that of the ambient air.

(b) Ensure that the aircraft is evenly loaded.

(c) Rock the aircraft to minimize the effects of friction.

(d) Check the measurements as shown in fig 2-5-8.

28 A difference of two inches between right and left main shock absorbers is permissible, providing the dimensions are still within the required limits. If the limits are exceeded the shock absorbers must be re-charged. When Mod 999 is embodied, more efficient nose wheel steering will be obtained if the nose landing gear leg extension is maintained between 8.50 and 9.25 inches.

USING THE CHARGING PRESSURE INDEX (Fig 2-5-9)

29 To allow both nose and main shock absorbers to be checked or charged at widely varying temperatures, the charging pressure index is provided. This index gives the pressure to which a unit must be charged, at a given temperature, to maintain a nominal pressure of 1500 psi at the anticipated operating temperature.

30 Deviations of less than 11°C (20°F) below or 22°C (40°F) above the nominal ambient air temperature may be disregarded. The following examples are given to clarify the use of the charging pressure index. For further instructions, see paras 31 through 37.

(a) If the shock absorber temperature is 15°C (60°F) and the outside air temperature is -23°C (-10°F), the charging index will indicate that the shock absorber should be charged to 8500 psi.

(b) If the shock absorber temperature is 15°C (60°F) and the outside air temperature is -40°C (-40°F), it will be necessary to lower the temperature of the shock absorber to a figure which will allow a charging pressure from the index to be used. In this particular case, the temperature of the shock absorber should be reduced to 4°C (40°F) and the charging index will then indicate a charging pressure of 9000 psi.

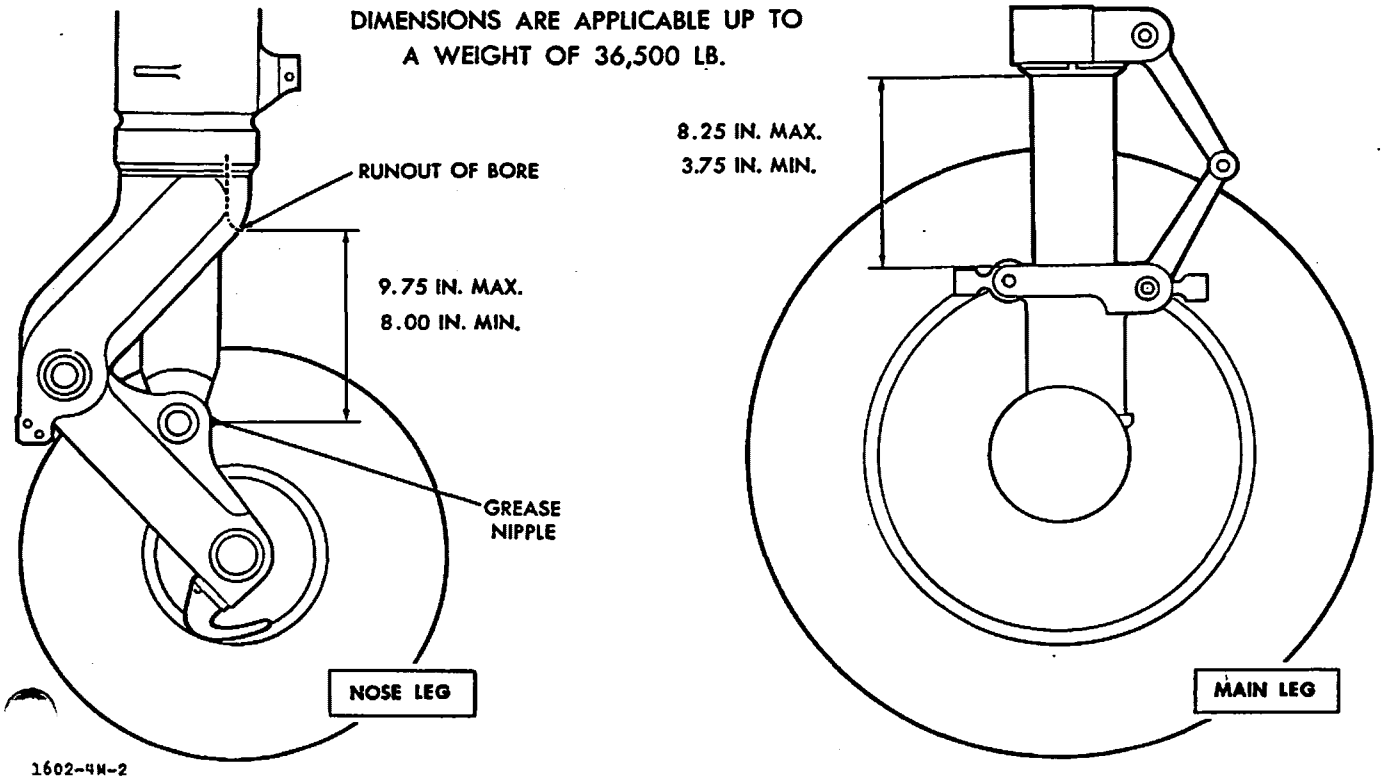

Fig. 2-5-8 Checking Shock Absorber Extension

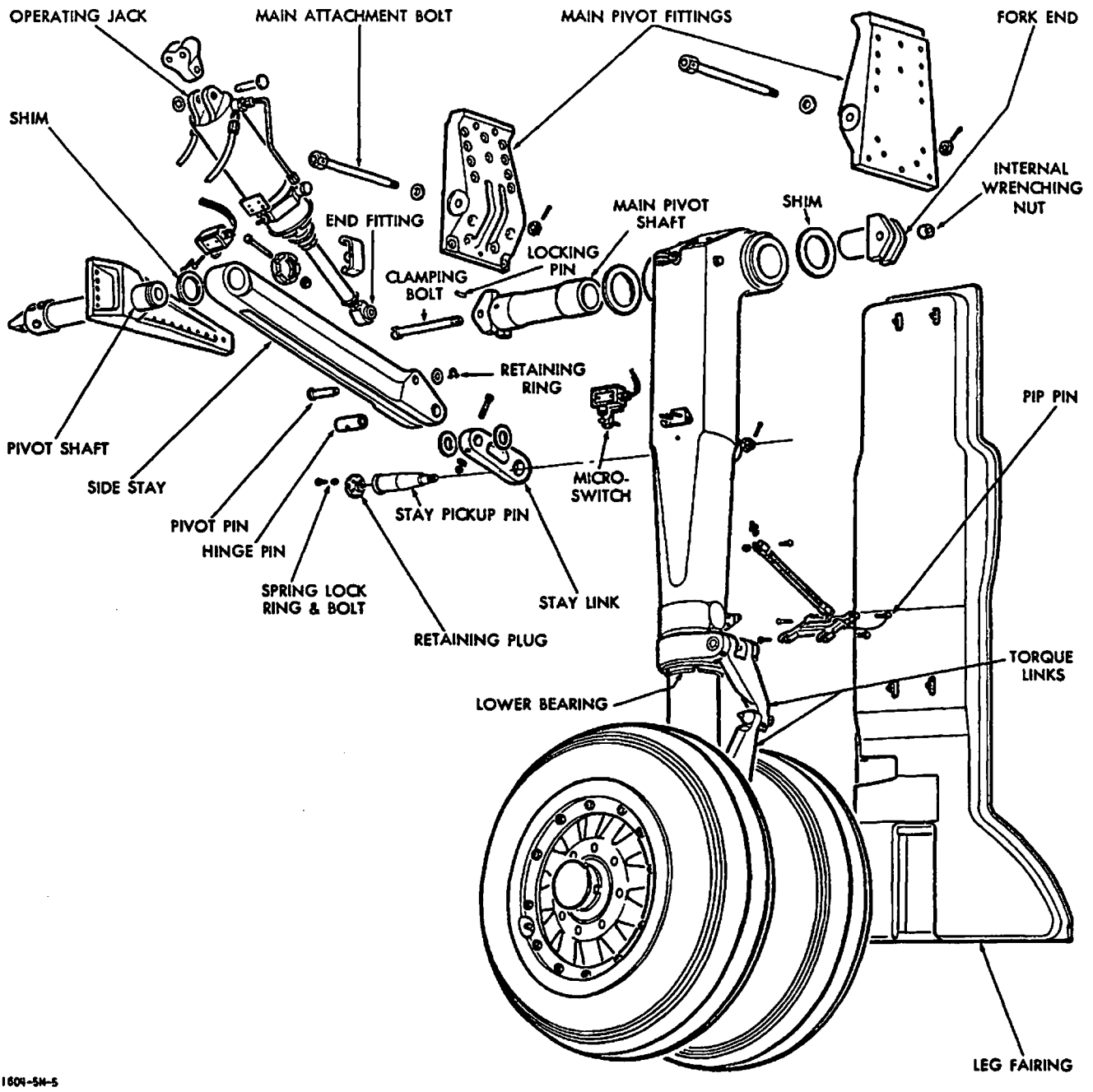

Fig. 2-5-10 Main Landing Gear - Removal of Components

(d) Remove the micro-switch from its bracket and tie the assembly clear of the strut.

(e) Relieve the pressure in the hydraulic system and release the air pressure in the reservoir. See Part 3 Sect 1.

(f) Fit the wheel covers.

(g) Disconnect and blank off the flexible brake-supply lines at the top of the leg well.

(h) Disconnect the stay link from the landing leg as detailed in para 43.

(j) Remove the wheel covers and support

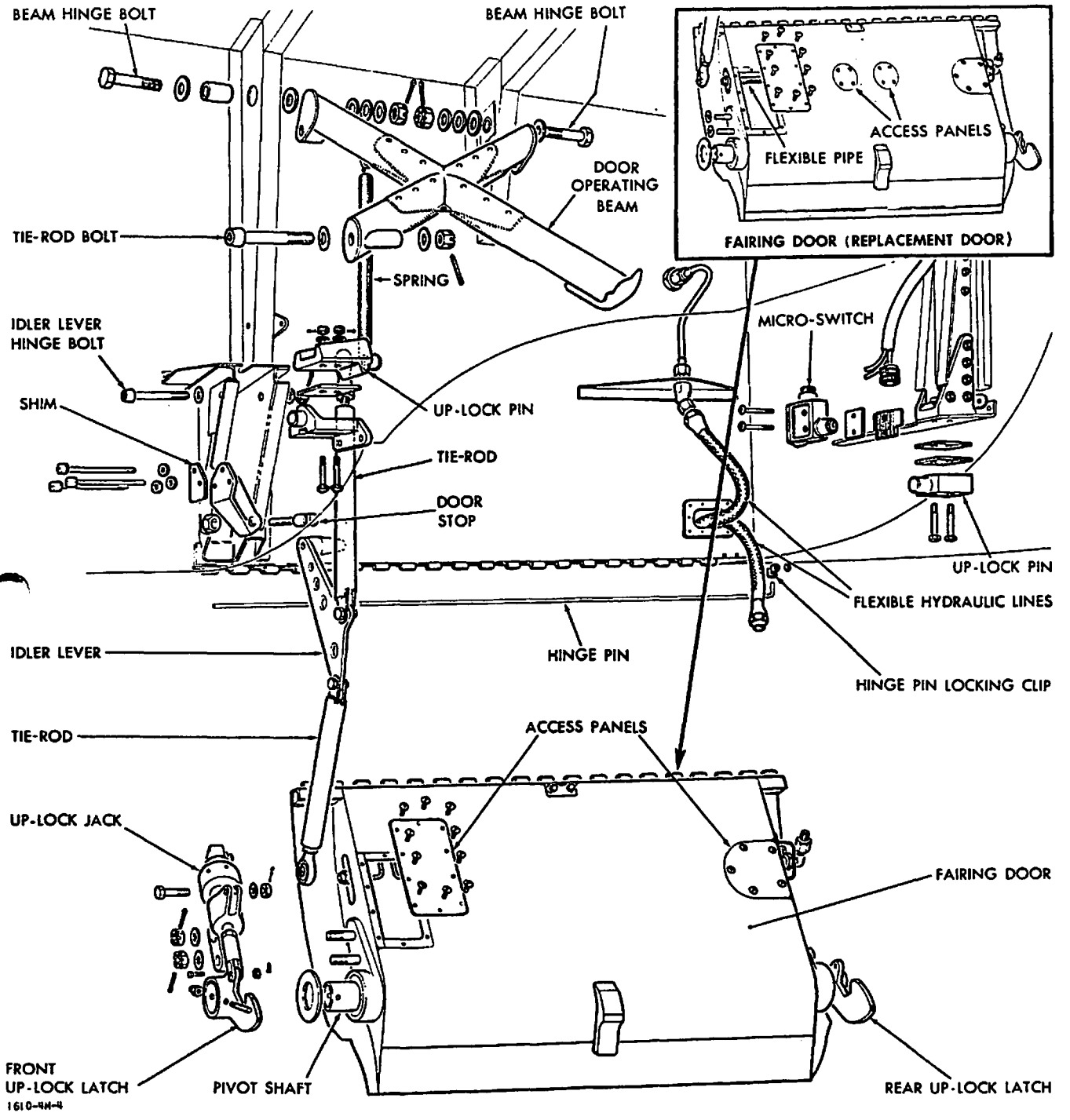

Fig. 2-5-11 Main Landing Gear Fairing Door Removal

MAIN LANDING GEAR UP-LOCK LATCHES REMOVAL (Fig 2-5-11)

48 To remove the latches from a fairing door, proceed as follows:

(a) Remove the up-lock jack as detailed in para 47.

(b) Remove the threaded taper pin which attaches the front latch to the pivot shaft.

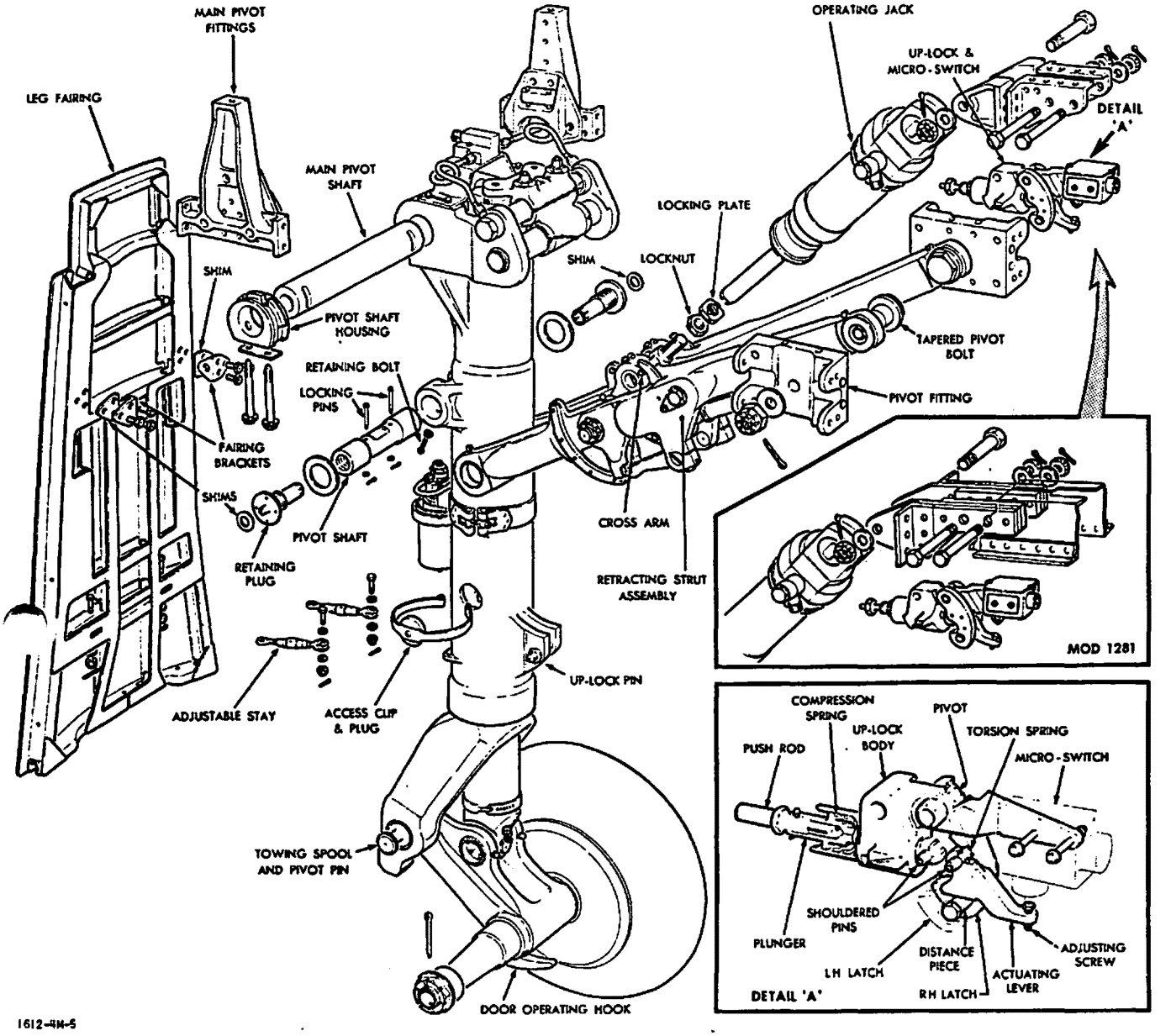

Fig.2-5-12 Nose Landing Gear - Removal of Components

(f) Remove the retaining bolt, support the retracting strut assembly and slide out the pivot shaft.

(g) Remove the top pivot bolt access panels.

(h) Remove the nuts, support the retracting strut assembly and tap out the two tapered pivot bolts.

(j) Remove the retracting strut assembly from the aircraft.

NOSE LANDING GEAR LEG FAIRING REMOVAL (Fig 2-5-12)

53 To remove the leg fairing, proceed as follows:

(a) Break the locking wire and remove the three screws which secure each fairing bracket.

(b) Support the fairing and disconnect the two adjustable stays.

(c) Remove the fairing from the aircraft. Retain and note the number of shims fitted at each fairing bracket.

NOSE LANDING GEAR LEG REMOVAL (Fig 2-5-12)

54 To remove the landing leg which weighs approximately 320 pounds, complete with wheels, proceed as follows:

(a) Remove the leg fairing as detailed in para 53.

(b) Disconnect the operating jack, as detailed in para 51.

(c) If Mod 999 is embodied, disconnect the two hydraulic flexible lines from the banjo fittings on the shimmy damper steering unit and blank off. Disconnect the electrical cable for the steering angle limiting micro-switch at the terminal strip on the RH side of the nose landing gear well at bulkhead 4 and unclip the cable.

(d) Disconnect the retracting strut assembly from the leg as detailed in para 52(e) and (f).

(e) Support the weight of the leg.

(f) Remove the four bolts which attach the main pivot shaft to the fittings on the fuselage.

(g) Lower the leg to the ground, move it clear of the aircraft and support it on suitable packing.

(h) Remove the main pivot shaft housings and withdraw the main pivot shaft.

NOSE LANDING GEAR SHOCK ABSORBER REMOVAL (Fig 2-5-13)

55 To remove the shock absorber, proceed as follows:

(a) Remove the retaining plate and retaining pin from the bottom of the shock absorber.

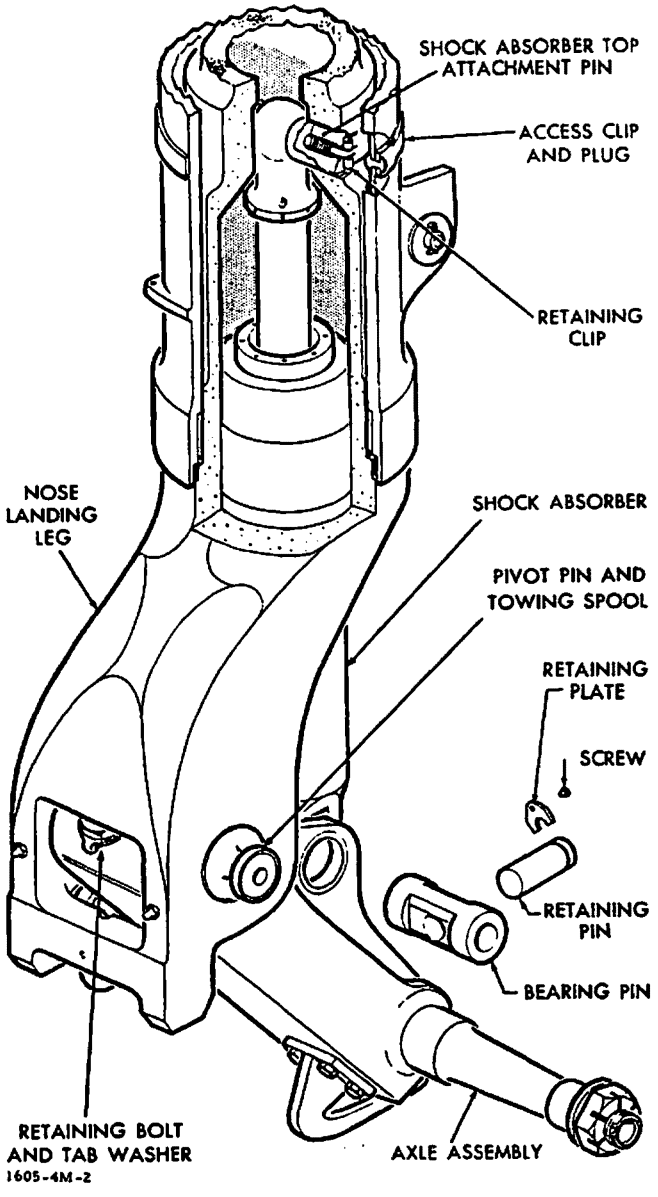

Fig. 2-5-13 Nose Landing Gear Shock Absorber Removal

(b) Remove the bearing pin.

(c) Release the retaining bolt locating the pivot pin and remove the pivot pin complete with the towing spools from the axle assembly and nose landing leg.

(d) Remove the axle assembly.

(e) Break the locking wire and rotate the access clip and plug clear of the access hole.

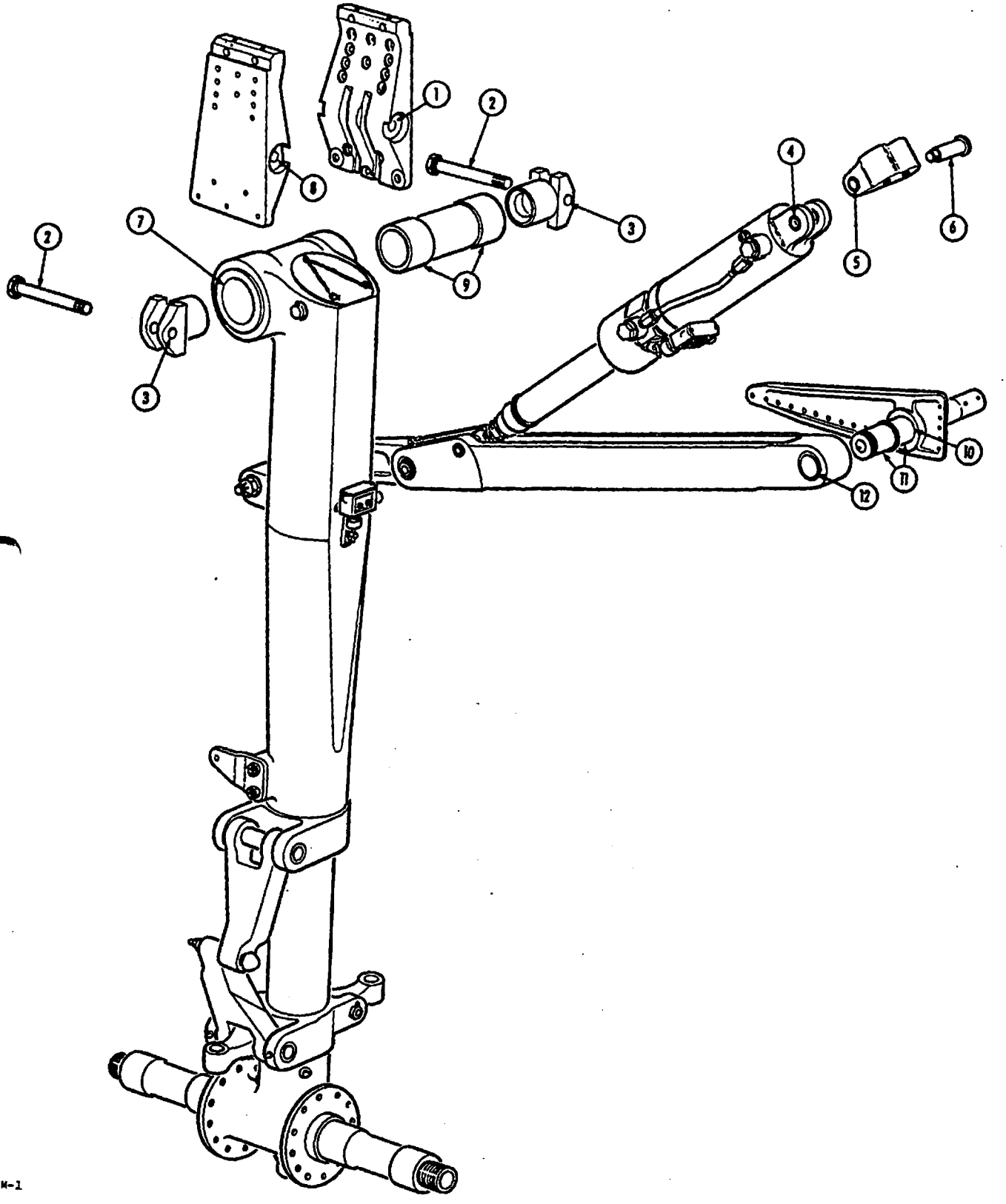

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Fig. 2-7-15 Main Landing Gear

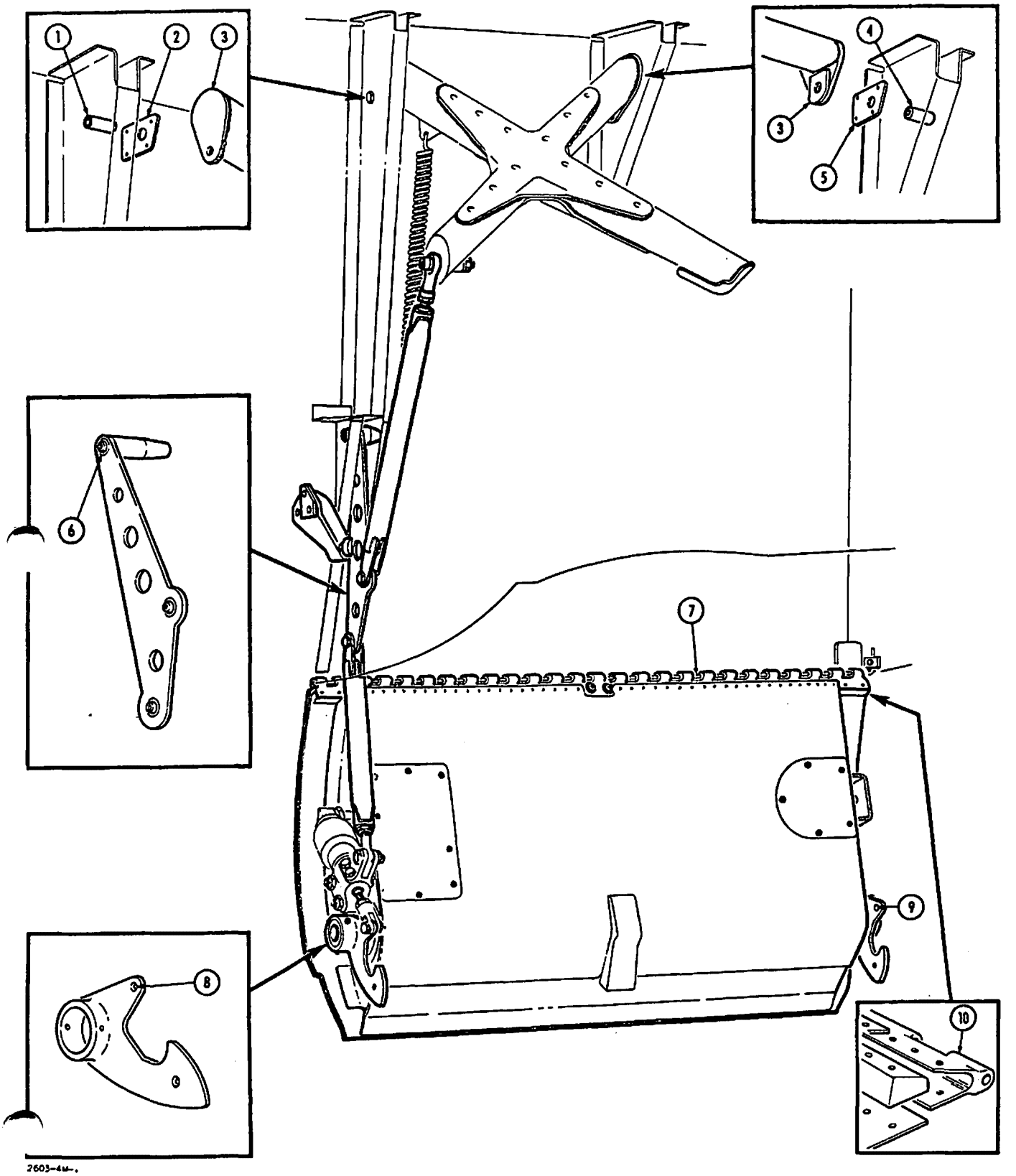

Fig. 2-7-16 Main Landing Gear Door Mechanism

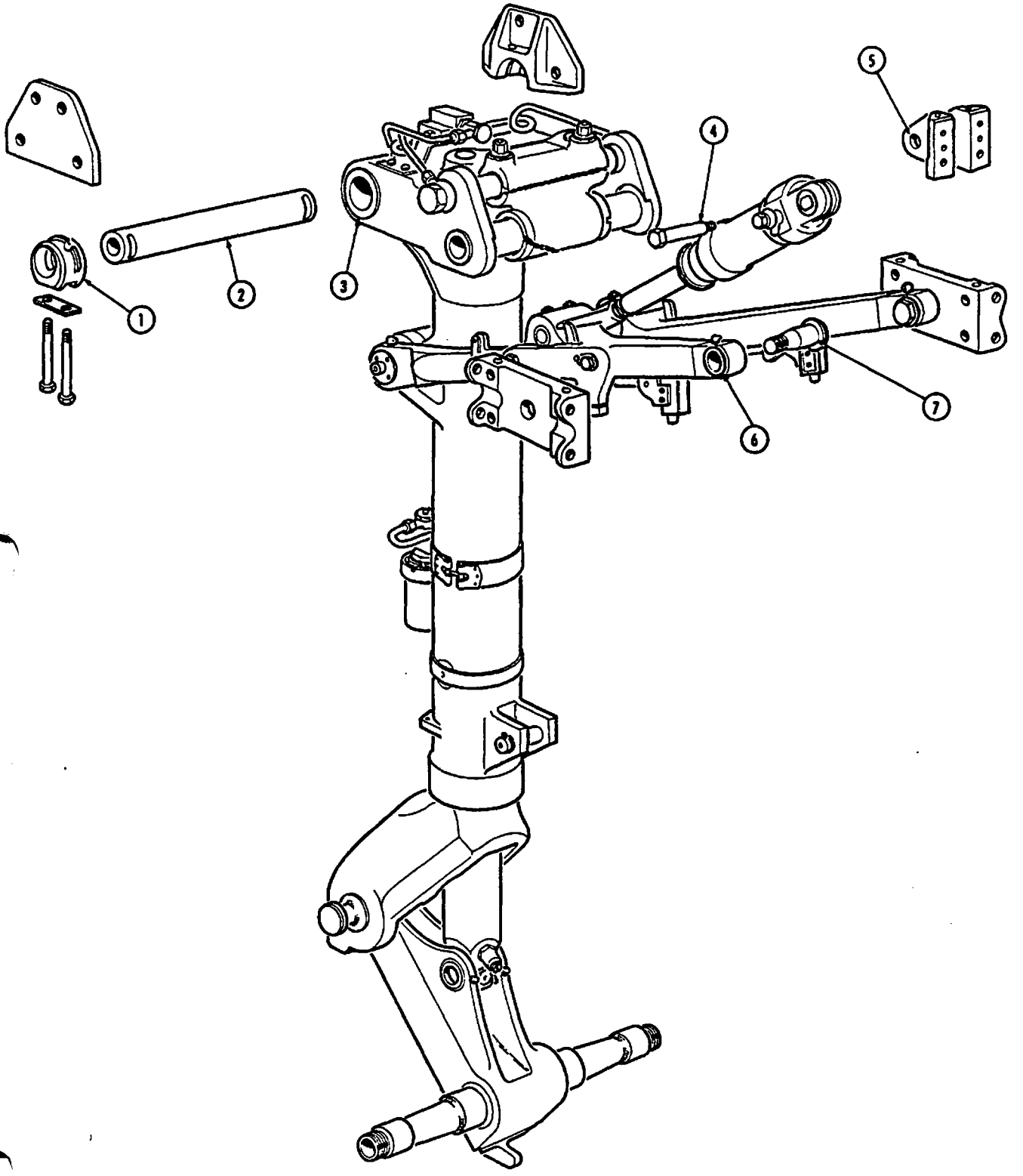

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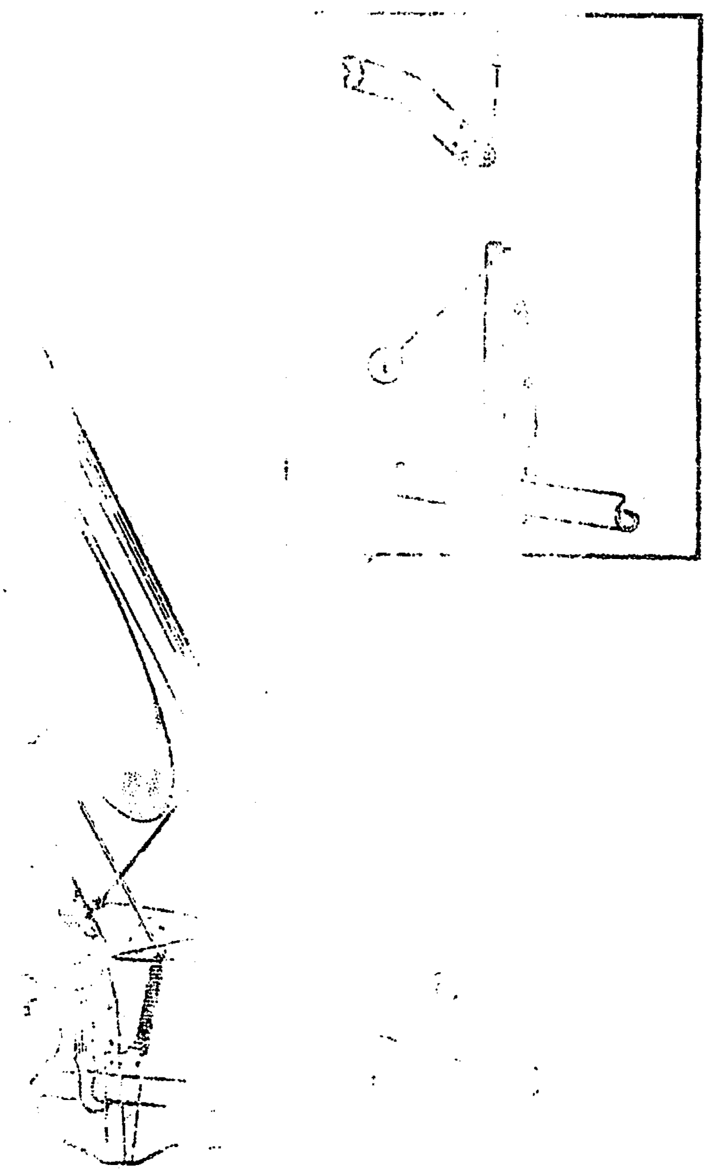
Fig. 2-7-17 Nose Landing Gear



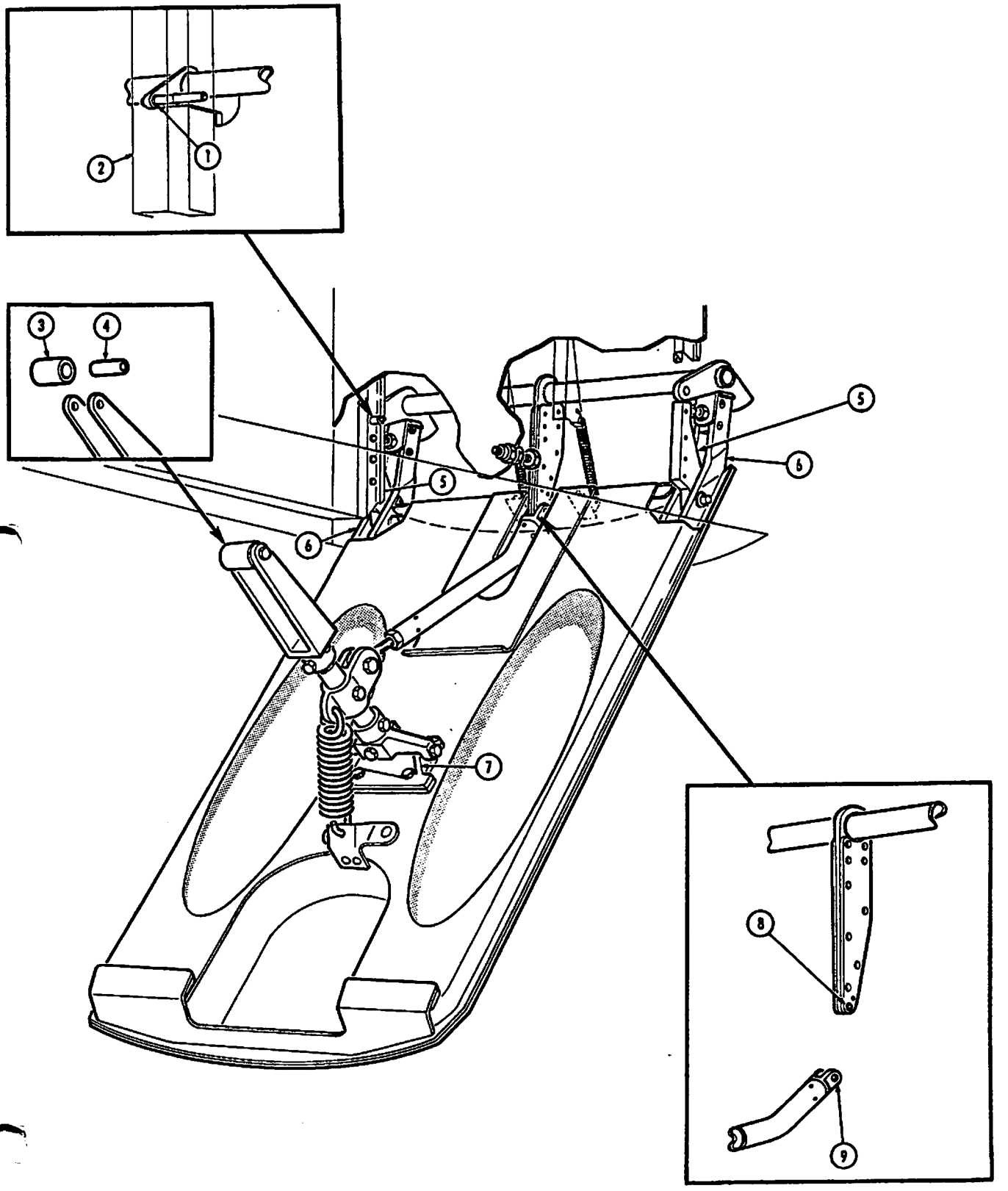


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Fig. 2-7-18 Nose Landing Gear Door Mechanism

pitot static system in accordance with Part 4 Sect 6.

(p) Replace the leading edge fairing strip, nose fairing and upper and lower gap fairings to the wing extension and rib 10.

(q) Refit all panels and replace the engine cowlings and fairings.

PITOT STATIC MAST (Fig 2-1-27)

87 To remove the pitot static mast (LH wing only) proceed as follows:

(a) Disconnect the heater cables from the terminal blocks in the leading edge, adjacent to the mast root end.

(b) Release the locating bolt and saddle washer from inside the mast and remove the transverse bolt which secures the mast to the mounting bracket.

(c) Disconnect the two pipes from the elbow fittings in the leading edge and remove the mast complete with the pressure head.

(d) If it is necessary to remove the pressure head and pipes from the mast, remove the four screws from the sleeve on the front portion and withdraw the pressure head and pipes complete with the three fairleads which are clamped on the piping within the pitot static mast.

88 The installation procedure is the reverse of that given for removal. If the pressure head has been removed from the pitot static mast, the pressure head must be re-installed with the fin portion vertical within one degree. After installation, test the pitot static system (see Part 4 Sect 6) and check the pressure head electrical circuit. See Part 7 Sect 7.

WING REMOVAL (Fig 2-1-28)

89 To remove a wing which weighs approximately 2,900 pounds, the aircraft must be placed on firm level ground to facilitate the use of an adjustable wing cradle and jacks. It is important that the aircraft be supported in a rigid position and that any overhead slinging arrangement be avoided. Any deviation from the foregoing will cause a 'jamming' of the split sleeve inserts, with subsequent damage to the transport joint fittings. To remove the complete wing, proceed as follows:

(a) Drain and remove the wing tip tank, if fitted. See Part 5 Sect 2.

(b) Drain the wing fuel tank. See Part 5 Sect 2.

(c) To gain access to the rear transport joint fitting, lower the centre-section flap, disconnect the flap jacks and fit the flap jury strut.

(d) Relieve all pressure in the hydraulic system and release the air pressure in the reservoir. See Part 3 Sect 1.

(e) Place the hydro-booster control lever in the off position.

(f) Select the Ground/Flight switch OFF and disconnect the aircraft battery.

(g) Remove the upper and lower fairings at the wing root.

(h) Remove the engine lower front and lower rear cowlings. See Part 5 Sect 3.

(j) Position the nose jack and a jack under the wing not being removed. See Part 1 Sect 2.

(k) Position a jack under the centre-section front spar jacking point (see Part 1 Sect 2) just inboard of the wing transport joint fittings on the wing being removed.

(m) Jack the aircraft up until the wheels are clear of the ground and the aircraft is approximately in rigging position. See Part 1 Sect 2.

(n) Position and adjust the tail steady jack.

(p) Disconnect and blank off the following pipes at the wing transport joints:

(1) Wing tank fuel vent pipe.

(2) Wing tank fuel delivery pipe.

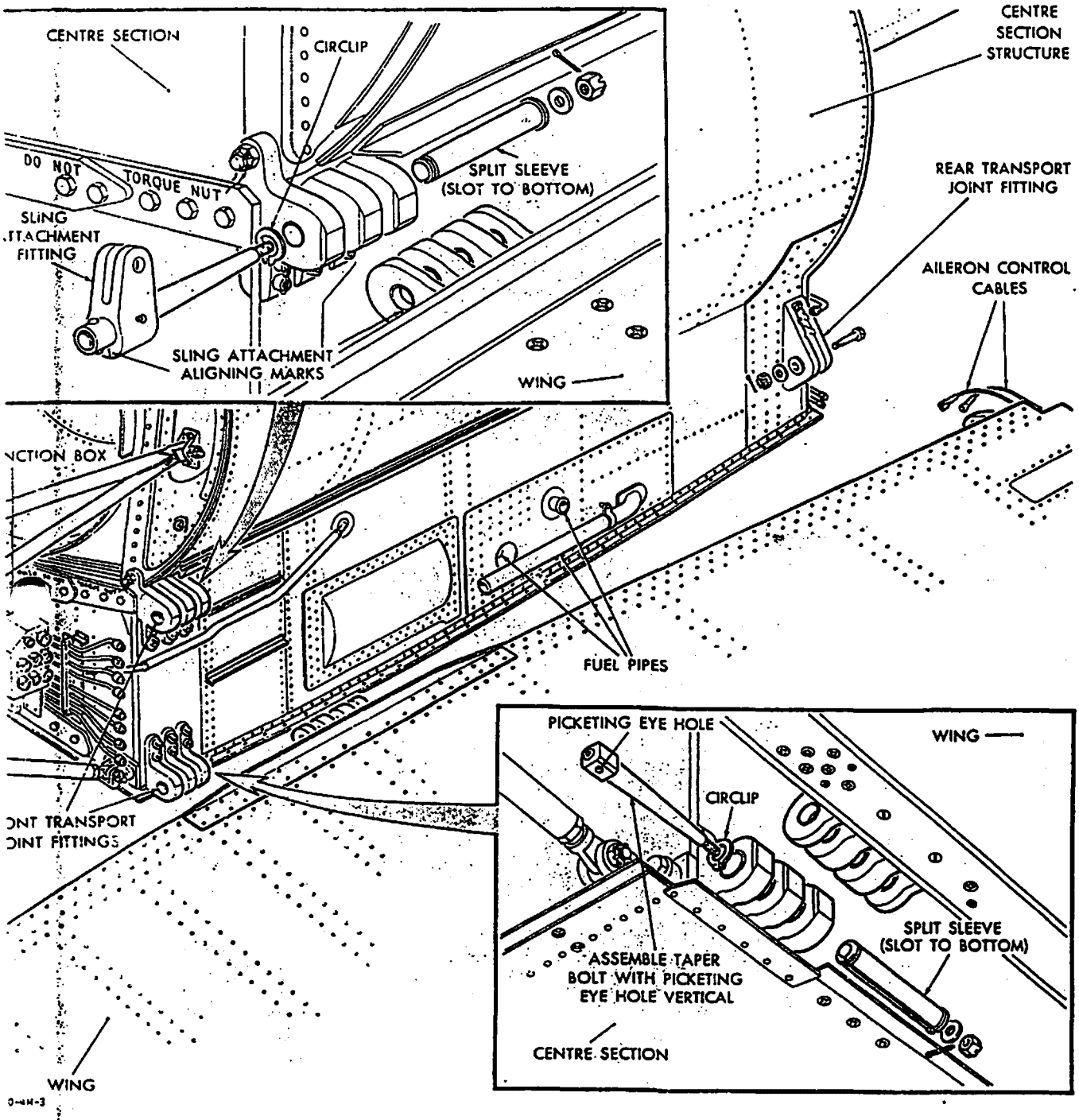


Fig.2-1-29 Wing Transport Joint

) Wing tip tank fuel delivery pipe.

Six hydraulic pipes forward of the transport joint.

) On the left-hand wing two pitot static system pipes.

(6) The wing tip tank fuel pressurization pipe and six hydraulic pipes situated behind the rear transport joint.

(q) Disconnect the wing electrical cables on the forward face of former 13A at junction

box E4 for a left-hand wing and E5 for a right-hand wing.

(r) On a left-hand wing disconnect the electrical cables from the flap position transmitter and pull through to the fuselage.

(s) Disconnect the electrical cables from the terminal block mounted on wing rib 1 between the front and rear spars.

(t) Slacken the aileron control cables, one of the turnbuckles at the wing quadrant (see Part 2 Sect 4) and disconnect the cables at the rear face of the centre-section nacelle.

(u) Remove the cable guard from the aileron cable guide pulleys and pull the cables through to the wing.

(v) Position a wing cradle under the wing and adjust the screw jacks evenly to take the weight of the wing.

NOTE

"Jamming" of the transport joint split sleeves will result if too much or too little weight is taken by the wing cradle.

(w) Remove the nut from the rear transport joint bolt and tap the bolt out.

(x) Remove the taper bolt from the bottom front transport joint using a special extractor.

(y) Remove the collar, the locating pin and the aircraft sling fitting from the top front transport joint and remove the taper bolt.

(z) Remove the circlips from the sleeves and drive out the sleeves using a suitable shouldered drift.

(aa) Ensure that all pipes, bonding and electrical cables are disconnected. Move the wing and cradle outwards taking care not to foul disconnected cables and piping.

CAUTION

The use of a steel bar or a similar tool is not to be used as a lever during wing removal. Extensive damage has been caused through this practice.

WING INSTALLATION (Fig 2-1-29)

90 Prior to installing a wing, check that a 0.002 - 0.004 inch feeler gauge can be inserted under the head of the pin joint bolt at former 13A (see Fig 2-1-29) or under the shoulder of the nut. If a self-locking type nut is in use, the bolt should be peened to prevent the nut from coming off. If a castellated nut is fitted, it must be retained by a cotter pin. The pin joint bolt must not be torque-loaded. To install a wing, proceed as follows:

(a) Jack the aircraft approximately into rigging position as outlined in para.89 (j) to (n) incl.

(b) Support the wing in a cradle and adjust the screw jacks to align the wing and centre-section transport joint fittings.

(c) Grease the fittings and move the wing in towards the centre section until the transport joint fittings mesh; at the same time guide the wing tank fuel delivery pipe through the centre section.

NOTE

It should not be necessary to use undue force when meshing the transport joint fittings. If the wing flap is fitted it should be allowed to drop down to its full extent to facilitate the meshing of the rear transport joints.

(d) "Feel" the alignment of the transport fittings and adjust the cradle screw jacks to obtain the fine degree of alignment required. Check the alignment by inserting the special alignment pins for the front transport fittings and the special "bullet" for the rear transport joint.

NOTE

When fitting the wing to the centre section, variations up to a maximum of 0.150 inch are permissible in the vertical plane at the rear transport joint between the wing rear pick-up fitting and the rear transport joint fitting on the centre section.

(e) Check that the Du-lite or Phosphate anti-corrosive film on the transport joint bolts and split sleeves is unbroken.

NOTE

Transport joint bolts and split sleeves must be replaced if the Du-lite or Phosphate coating has deteriorated or been damaged.

(f) Apply a light film of oil to the split sleeves and transport joint bolts keeping the threads of the bolts free of oil. This will ensure a correct torque reading.

(g) Remove the lower front fitting alignment pin and insert the split sleeve with the split to the bottom, circlip recess to the front.

(h) Repeat operation (g) for the upper front fitting and fit the circlips.

(j) Insert the bottom front taper bolt with the picketing eye vertical and to the front.

(k) Assemble the aircraft sling fitting, collar and locating pin to the top front taper bolt.

(m) Insert the top front taper bolt with the aligning mark on the sling fitting aligned with the corresponding mark on the wing transport joint front fitting.

(n) Insert the rear transport joint fitting bolt by following the special aligning 'bullet' through from the rear of the meshed fittings.

NOTE

The rear transport joint fitting bolt should not be torque loaded.

(p) Torque load the front transport joint bolts to 480-690 inch-pounds. The torquing of these bolts must be obtained by tapping the head of the tapered bolt with a soft faced hammer while the nut is being tightened. This will ensure that the sleeve is expanded to its full diameter. If the tapping routine is not carried out the nuts may slacken off in service.

NOTE

When torquing the front attachment bolts, a maximum of 1100 inch-pounds is permissible to align the cotter pin holes. The nuts must not be backed off to gain alignment.

CAUTION

Ensure that the washers are concentric with the bolts and that they do not foul the shoulders as a false torque reading can be obtained with the washers out of alignment.

(q) Remove the blanking unions and connect up the following pipes at the wing transport joints:

(1) Wing tank fuel vent pipe.

(2) Wing tank fuel delivery pipe.

(3) Wing tip tank fuel delivery pipe.

(4) Six hydraulic pipes forward of the front transport joint.

(5) The wing tip tank fuel pressurization pipe and six hydraulic pipes situated to the rear of the rear transport joint.

(r) On a left-hand wing, remove the blanking unions and connect up the pitot static pipes.

(s) Connect the electrical cables to the terminal block positioned on wing rib 1 between the front and rear spars.

(t) On a left-hand wing, connect up the electrical cables to the flap position indicator transmitter.

(u) Remove the wing cradle and tail steady, lower the aircraft and remove the jacks.

(v) Connect the aileron control cables and refit the cable guard to the guide pulleys.

(w) Adjust and tension the aileron controls. See Part 2 Sect 4.

(x) Connect the aircraft battery, then pressure test and flow test the fuel system. See Part 5 Sect 2.

(y) Connect the centre-section flap to the flap jacks.

(z) Engage the hydro-boosters. See Part 2 Sect 4.

(aa) Bleed and test the hydraulic system. See Part 3 Sect 1.

(ab) Check the aileron and flap for correct functioning and range of movement.

(ac) Function test the pitot static system. See Part 4 Sect 6.

(ad) Ensure that all bonding and locking is completed.

(ae) Replace the engine cowlings, wing root fairings, fuselage fairing and panels.

NOTE

On assembly of the forward wing root fairings ensure that screws AN509-10R8 are used in the vicinity of the lower rear cowling. Screws of longer length will cause damage to the skin of the lower rear cowling.

(af) Re-check the torque loading on the front transport joint bolts after the first test flight.

LOWERING A WING LEADING EDGE

91 To lower a wing leading edge, proceed as follows:

(a) Remove the engine lower rear cowling. See Part 5 Sect 3.

(b) Remove the fairing panels at the front of the wing transport joint.

(c) Remove the fairing strip between the leading edge and the wing extension.

(d) Identify and disconnect the pitot static hoses from the water traps mounted on leading edge rib 1.

(e) Support the leading edge and remove the screws which attach its top edge to the wing.

(f) Lower the leading edge until its weight is taken by the support cable.

92 The procedure for raising the leading edge is the reverse of that given for lowering. Test the pitot static system as described in Part 4 Sect 6.

SYMMETRY AND RIGGING DIMENSIONAL CHECKS

GENERAL

93 A symmetry and rigging check of the aircraft (see fig 2-1-30 and 2-1-31) must be carried out at all major overhaul periods and when any of the following occur:

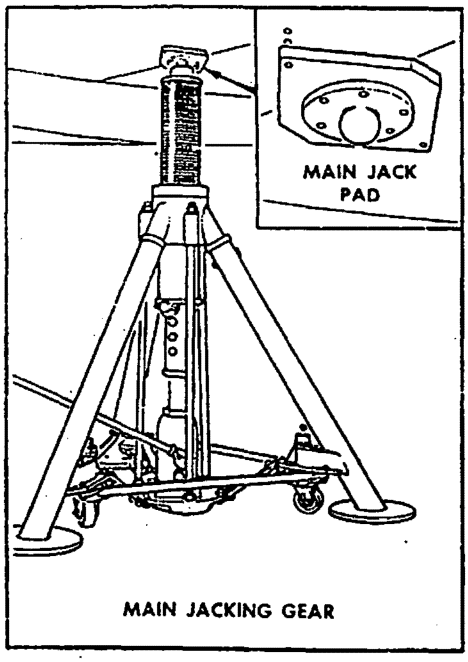
(a) Structural or skin distortion considered sufficient to cause distortion of the airframe.

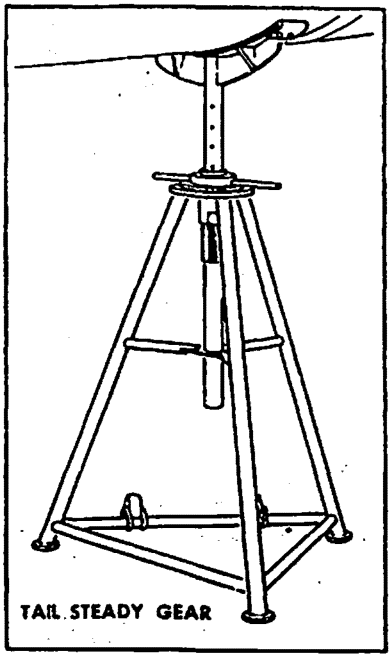
(b) If undesirable flying characteristics cannot be rectified by normal corrective measures.

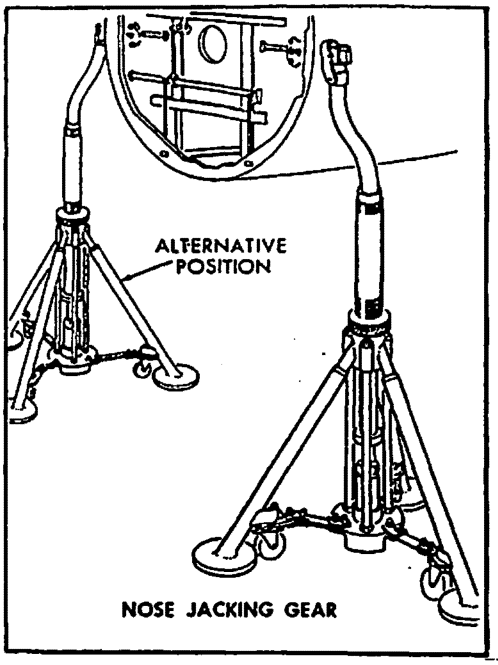
(c) Before and after large repairs are carried out.

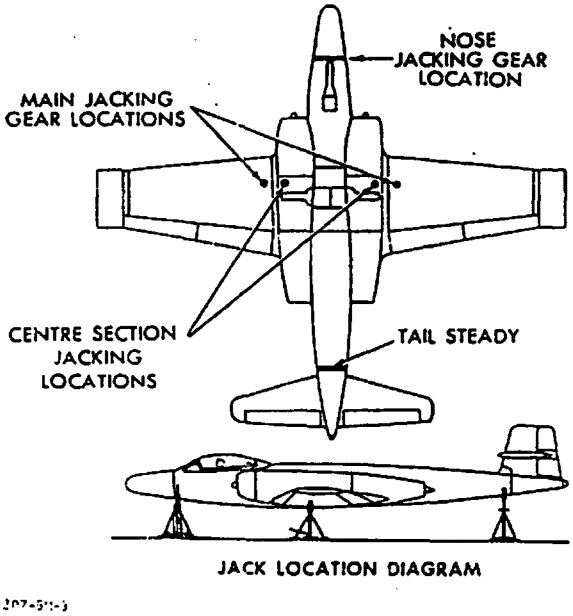
(d) After replacement of major components.

94 Following the installation of any control surface, the rigging and range of movement checks should be carried out in accordance with procedures detailed in Part 2 Sect 4. For test procedures of systems disconnected and connected during the removal and installation of aircraft structural components, refer to the relevant sections of this Engineering Order.









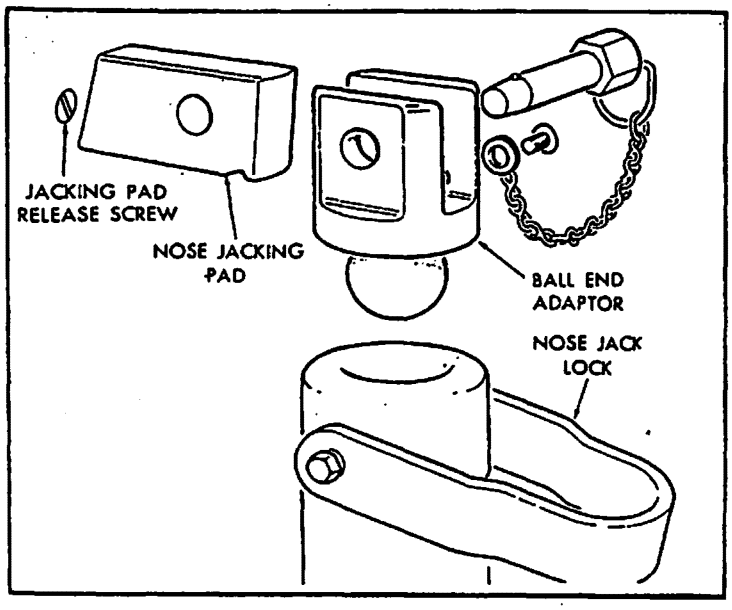


Fig. 1-2-9 Jacking

Raise all three jacks simultaneously.

When the aircraft has been raised to desired height, lock the jacks and place the steady trestle under the rear centre section, in line with the leading edge of the horizontal stabilizer.

Raise the tail steady trestle until it just aches the rear centre section at one of the rmers. Insert the locking pin.

Use wing steady trestles if extensive ork is to be carried out.

CAUTION

Do not use the tail steady trestle as a fulcrum point for jacking the aircraft.

NG FOR WING CHANGE (Fig 1-2-11)

If a wing is to be changed, the main cking point under the wing cannot be utilized d the aircraft must be jacked at the centre- ction jacking point adjacent to the wing being moved. The procedure for jacking the air- aft prior to a wing removal is as follows:

) Carry out the procedure for jacking the rcraft as detailed in para 17(a) to (f) omitting e main jack from the wing being removed.

) Remove the engine lower rear cowling ljacent to the wing being removed.

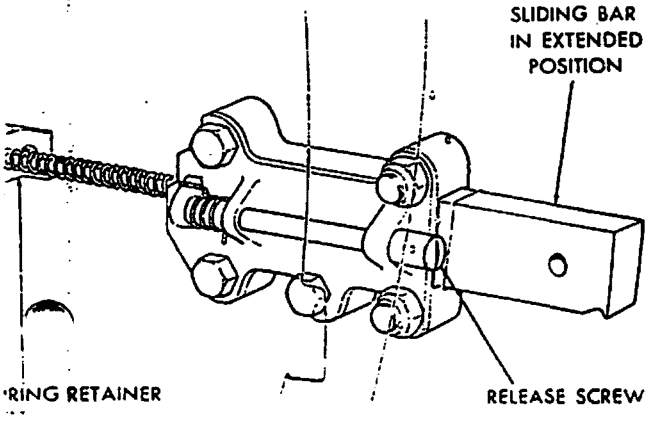


Fig. 1-2-10 Nose Jacking Pad

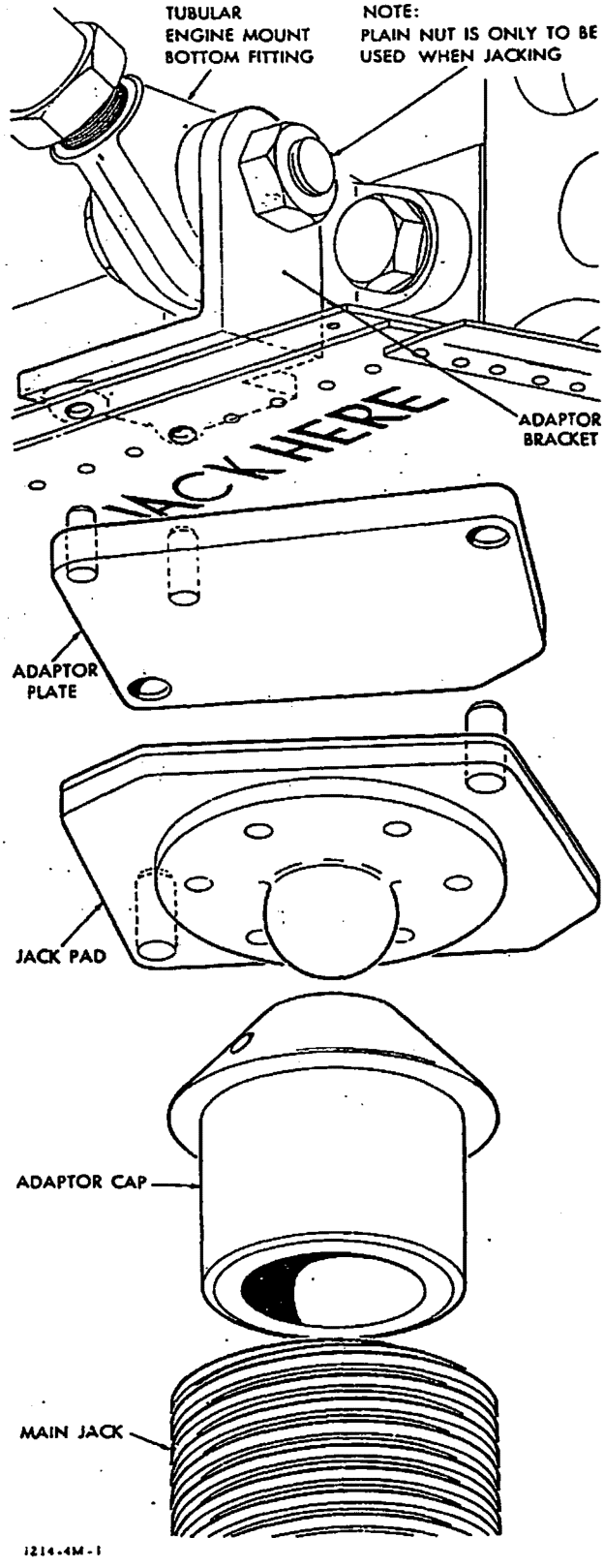


Fig. 1-2-11 Centre-section Jacking

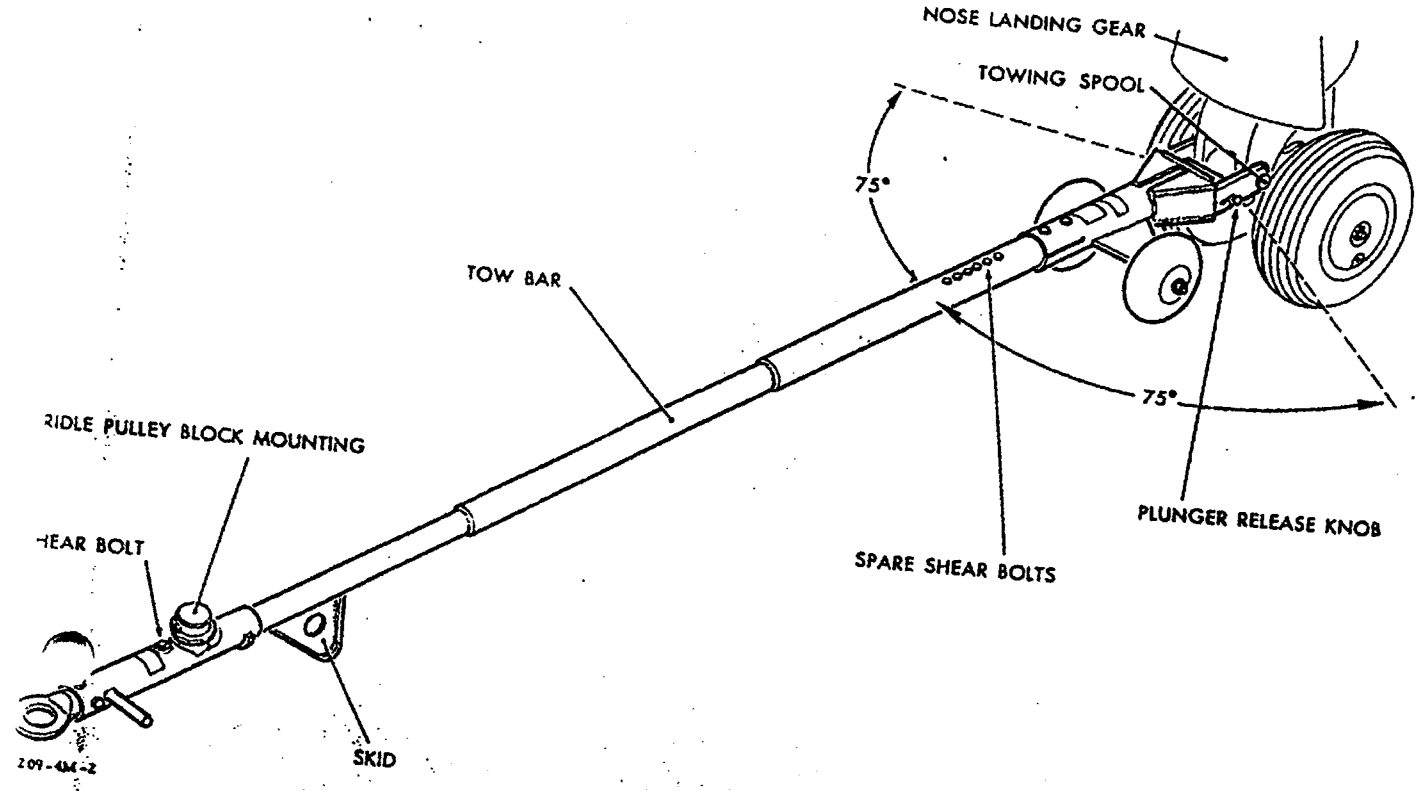


Fig. 1-2-3 Towing

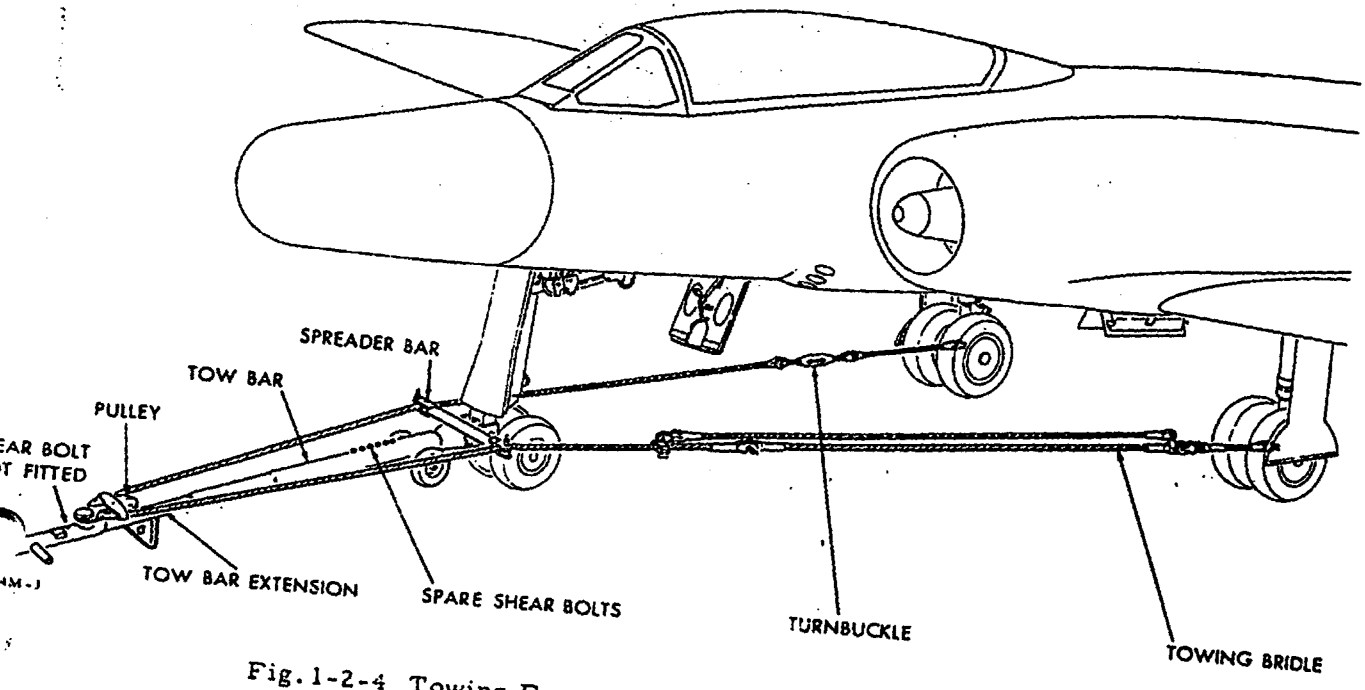


Fig. 1-2-4 Towing Forward Under Adverse Conditions

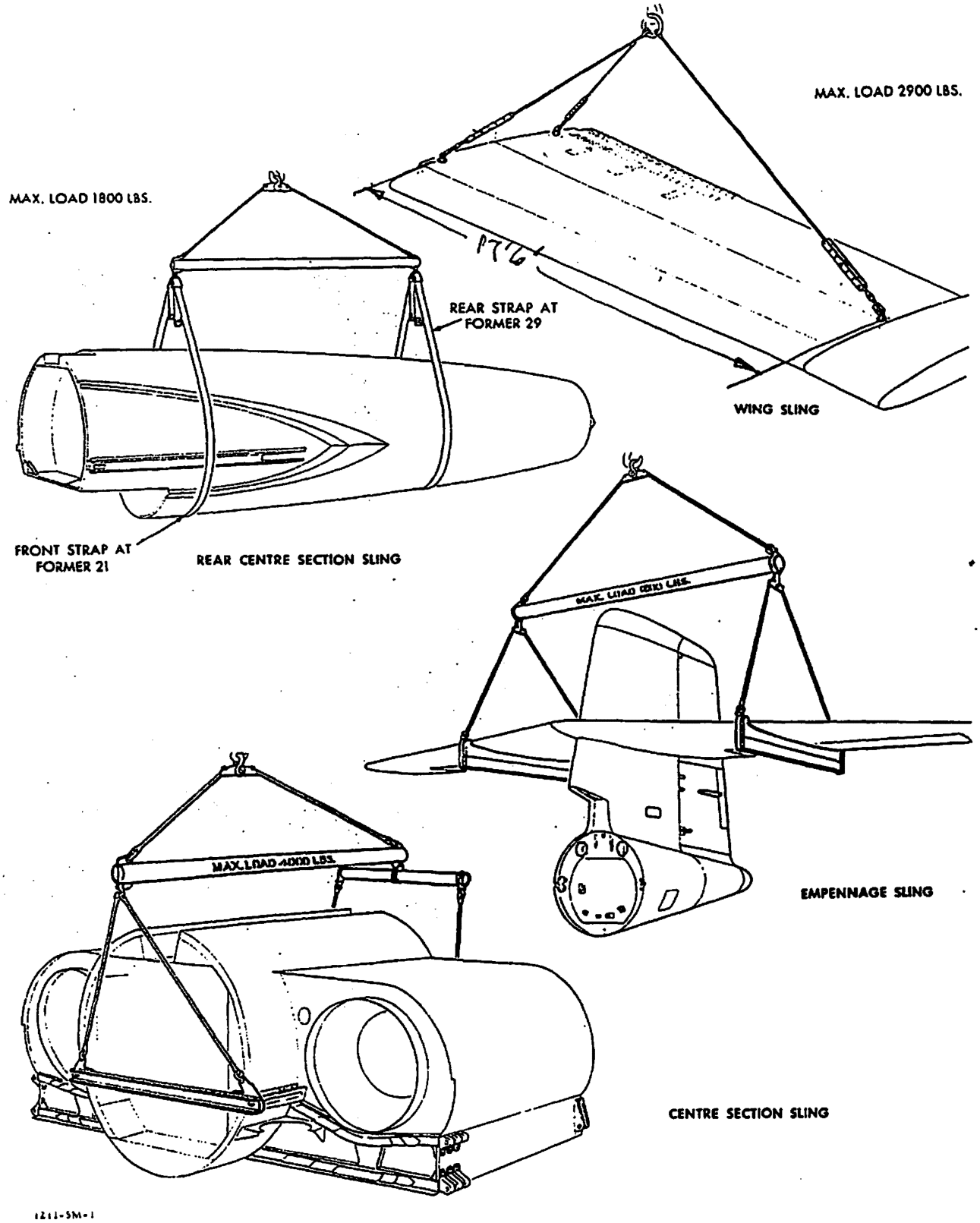


Fig. 1-2-16 Slings for Major Components

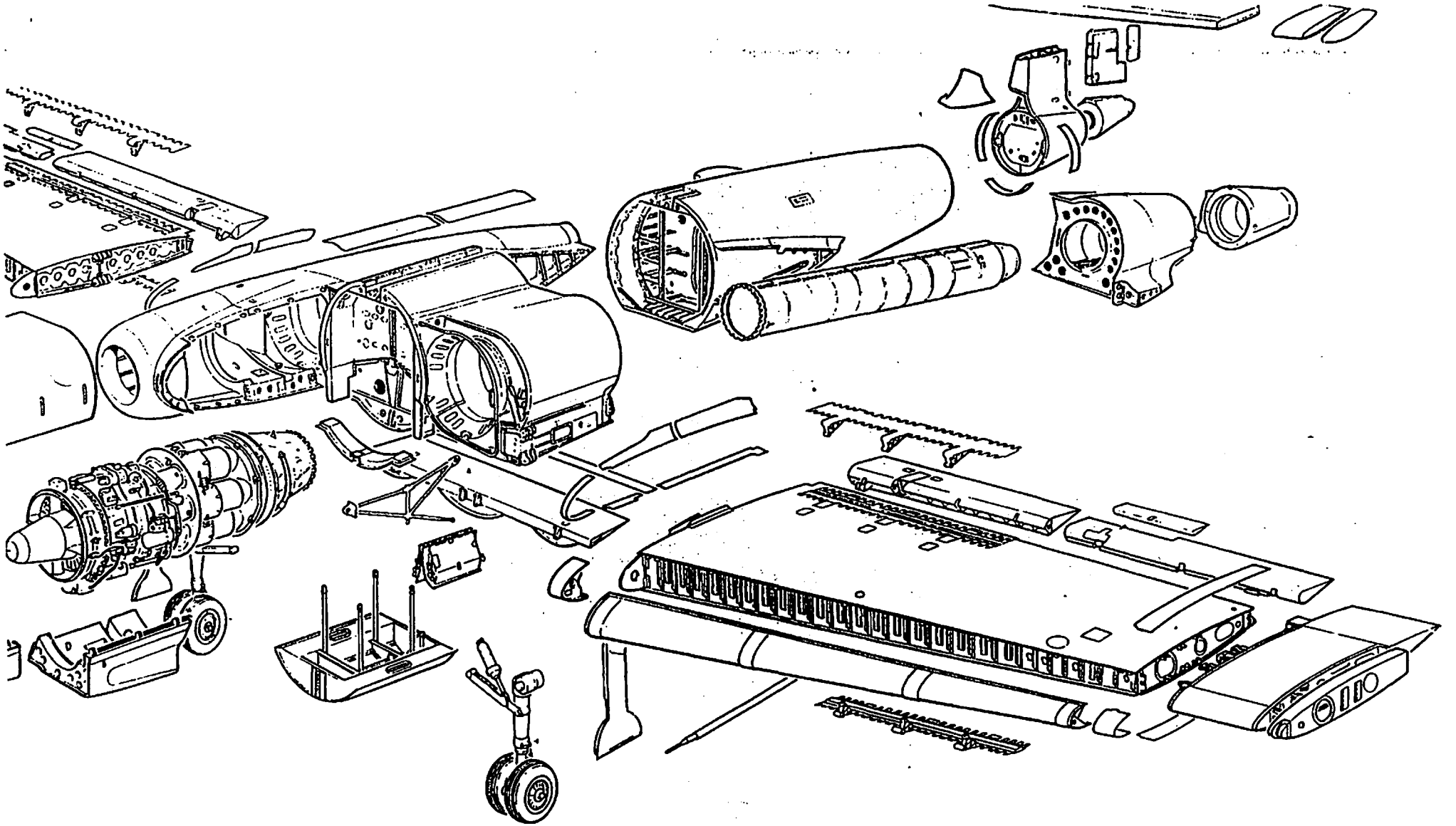


Fig. 1-1-1 Exploded View