

This leaf issued with A.L. No. 11
June, 1946

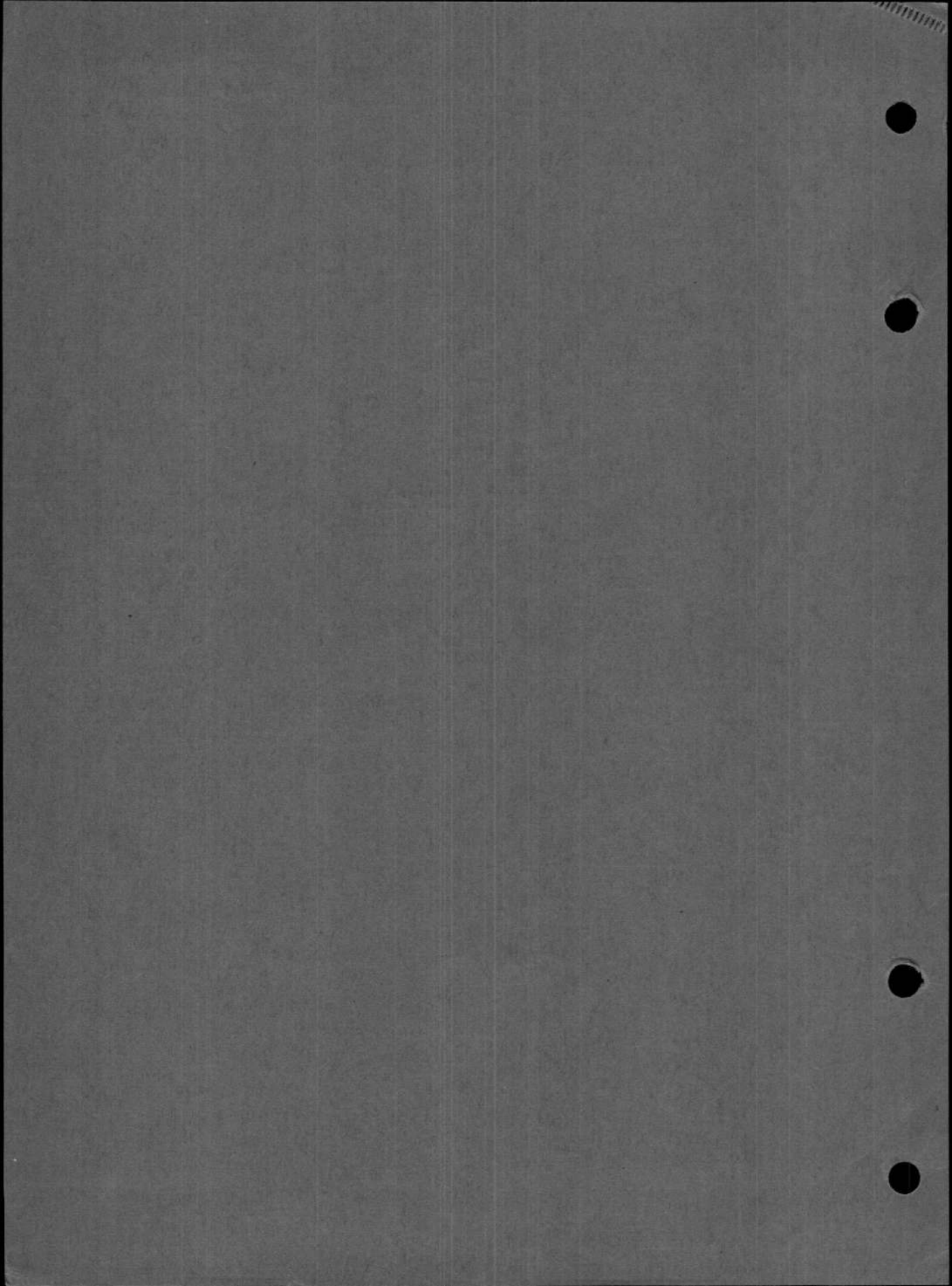
AIR PUBLICATION 4099A
Volume I Section 4

CHAPTER

3

GENERAL SERVICING

F.S./1



CHAPTER 3

GENERAL SERVICING

LIST OF CONTENTS

	PARA.		PARA.
Introduction	1	Assembling	36
Ground equipment and tools ...	2	Leakage	37
Jacking and trestling	3	Tests	38
Former stations and inspection panels	4	Pressures	39
Lubrication	5	Filling and priming the system	40
RIGGING		Operational tests	41
General	6	ENGINE CONTROLS	
Rigging sequence	7	General	42
Tail plane angle of incidence setting ...	8	Minneapolis pressure transmitter—	
Control settings—		General	43
Ailerons	9	Servicing... ..	45
Elevator	10	Pressure test	46
Elevator trim tab.	11	Filling procedure	47
Rudder	12	Charging procedure	48
ALIGHTING GEAR		A.S.I. SYSTEM	
Retracting mechanism	14	General	49
Assembling a new jack	15	PRESSURE CABIN	
Adjustment of jack	16	Cabin seal	50
Adjustment of stop bolt	17	Pressure cabin	51
Undercarriage shock-absorber strut	18	Vickers vacuum valve	52
Dismantling	19	Pressure cabin control	53
Assembling	20	Ground testing of pressure cabin without engine running—	
Leakage	21	Equipment required	54
Testing	22	Vacuum system... ..	55
Nose wheel shock-absorber strut ...	24	A.S.I. system	56
Dismantling	25	Pressurising and testing the cabin	57
Assembling	26	Warning light	58
Leakage	27	Ground testing of pressure cabin with engine running—	
Testing	28	Test procedure	60
Nose wheel self-centring unit ...	30	Ground testing of pressure cabin on repaired aircraft—	
HYDRAULIC SYSTEM		Test procedure... ..	62
General	31	Testing the drier tube	63
Thermal relief valve—			
Description	34		
Dismantling	35		

LIST OF ILLUSTRATIONS

	Fig.		Fig.
Inspection panels	1	Minneapolis transmitter	24
Lubrication diagram	2	A.S.I. pipe run	25
Undercarriage and nose-wheel lubrication	3	Pressure cabin air system	26
Miscellaneous lubrication	4	Air drier system (1)	27
Rigging diagram	5	Air drier system (2)	28
Tail unit details	6	Drier tube	29
Port aileron differential unit	7	Drier tube test	30
Assembly of controls in tail unit	8		
Details of flying control guide pulleys... ..	9		
Details of undercarriage	10		
Undercarriage shock-absorber strut	11		
Undercarriage inflation diagram... ..	12		
Nose-wheel shock-absorber strut	13		
Nose-wheel inflation diagram	14		
Self-centring unit	15		
Undercarriage and nose-wheel hydraulic system	16		
Flap hydraulic system	17		
Dive brake hydraulic system	18		
Assembly of pipes in clamp blocks	19		
Thermal relief valve	20		
Brake pneumatic system	21		
Engine controls rigging (1)	22		
Engine controls rigging (2)	23		

Introduction

1. This chapter describes certain servicing operations, and is intended to implement the Inspection Schedule, Vol. 2, Part 2 of this publication. For information and servicing notes on items of equipment not dealt with in this chapter, reference should be made to the relevant Air Publications listed at the beginning of this book. The location of the servicing panels is given in fig. 1 of this chapter, and the lists given in para. 2 include all the items of ground equipment necessary for servicing the aircraft.

Ground equipment and tools

2.

TABLE I—SPECIAL GROUND EQUIPMENT

Stores Ref. No.	Part No.	Description	Application
Sect. 26FC/ 9015 9016	Y.00304.A Y.00413.A	Towing and steering— Arm, nose steering Bridle, towing	
9000 9001	Y.0073.A Y.00152.A	Jacking— Pads, mainplane jacking Nose wheel changing trestle (hinged legs)	Use with pillar jack 4Q/1229
9013 9019 9002	K(SK)1550 K(SK)1550 Y.00118.A	Trestling — Former for use with UJT No. 3 Port Former for use with UJT No. 3 Starboard Trestles, tripod, fuselage	} Mainplane steadying at Rib 10 Supporting fuselage when mainplanes are removed
9014	Y.00258.A	Former for tail trestle, Type D		Supporting mainplanes at front and rear of booms
9020 9017	K(SK)1551 Y.00307.A	Former for nose trestle c/w U-bolts Trestle, rear fuselage	Assembling mainplane to fuselage
1075 9018	Y.00546.A Y.00323.A	Slinging— Sling, complete aircraft Sling, mainplane	
9003 9004 9005	Y.0094.A Y.0090.A Y.00102.A	Rigging— Board, incidence, mainplane Board, dihedral, mainplane Board, incidence, tailplane	Port or starboard for rib 3 or 10 Also used for boom levelling
9006 9011	Y.0075.A Y.0076.A	Board, lateral levelling Board, longitudinal levelling	Fuselage Fuselage
9021 9044 9045 9046 9047 9012	A.H.8404 Y.00519.A Y.00520.A Y.00516.A Y.00516.A Y.00110.A	Miscellaneous— Extractor, mainwheel Guard wire, air intake, port Guard wire, air intake, starboard Board, blanking, air intake, port Board, blanking, air intake, starboard Board, blanking, tail pipe	} Use when ground running } Use when aircraft is picketed

TABLE 2—STANDARD GROUND EQUIPMENT

Stores Ref. No.	Part No.	Description	Application
4Q/2573 4Q/2574 4Q/1229		Jacking— Jack, 3 ton hydraulic tripod Adapter head, 1½ in. dia., Mk. 38 Jack, 4 ton pillar hydraulic	} Mainplane jacking Nose jacking
4G/- 4G/275		Trestling— Trestle, universal jacking No. 3 Trestles, general purpose, 2 ft.	
4G/2872 4F/1509 4G/3966 4G/257 4G/2433 4G/3026 4G/3027 4G/1358 4G/4090 4G/3964	WD.5317 K(SK)1632	Miscellaneous— Sling, engine, Goblin Trolleys, pressure cabin testing Mats, mainplane, type B Pump, Oleo type A Adapter Gauge, Mk. 1 (0-600 lb./sq. in.) Gauge, Mk. 2 (0-1500 lb./sq. in.) Syringes, oil Trolleys, oxygen cylinder Stands, engine, Goblin	With type A brackets less metal beam Fuselage nose trestling Oleo leg charging Charging oleo legs with oil

Jacking and trestling

3. Particulars and diagram showing jacking operations are given in Sect. 4, Chap. 2.

Former stations and inspection panels

4. The locations of the fuselage formers and of inspection panels and doors are illustrated in Sect. 7, Chap. 1, and fig. 1 of this chapter respectively.

Lubrication

5. The lubrication details are shown in fig. 2, 3 and 4. All ball bearings are packed with anti-freezing grease before assembly, and need no further lubrication. Some bearings have felt washers fitted, to retain the grease, and these should be inspected periodically.

RIGGING

General

6. As the wings, fin and tail booms are fixed cantilever structures no adjustment to them is provided. The tail plane is a fixed structure fitted between the two fins and there is an adjustment for incidence which can be made when fitting tail plane. The only rigging operations, therefore, are those concerned with checking the diagonal measurements, the incidence and dihedral of the wings, and the control surface settings and ranges of movement. Rigging data is shown in fig. 5 and all

rigging dimensions and angles with tolerances are given in Leading Particulars.

Rigging sequence

7. The sequence of operations is as follows :

(i) Trestle the aircraft at the points marked on the forward end of the boom attachment of the wing, i.e. the main spar, and trestle the tail booms as shown in Sect. 4, Chap. 2, fig. 2.

(ii) Place the straight edge, Part No. Y0075 and Y0076 on the datum blocks in the fuselage as shown in fig. 5. Adjust trestles until the level of the straight edge is zero. Use the datum blocks for longitudinal level and in a similar manner adjust the tail trestles until the level on the straight edge reads zero.

(iii) Check the incidence angle of the wings, ribs No. 3 and 10, using incidence board, Part No. Y0094A in the position indicated in fig. 5. Check the dihedral by means of a straight edge Part No. Y0090A and clinometer on the top of the front spar, as shown in diagram.

(iv) Check the angle of the tail booms by placing straight edge, Part No. Y0090A along the top and using the clinometer.

(v) Check the incidence of the tail plane by using incidence board, Part No. Y00102A, at position shown in fig. 5. Also check that the transverse level is horizontal and that the fins are vertical in relation to the tail booms.

(vi) Check for symmetry between the wings and tail booms, wings and nose of fuselage and opposite fins by taking diagonal measurements as shown in fig. 5.

Tail plane angle of incidence setting

8. Adjustment to the tail plane incidence angle should be made at the support brackets, (fig. 6) attached to the inside of each fin. The procedure is as follows:—

(i) Remove the cover plates on the out-board side of each fin at the front and rear spar and reveal the attachment bolts.

(ii) Slacken the attachment bolt at the rear spar and the attachment bolts at the front spar, including the centre bolt holding the serrated fitting.

(iii) Slightly spring the fin and move the front spar of the tail plane one notch on the serrations UP or DOWN as necessary. With incidence board in position read off from clinometer.

Note . . One notch equals 1/3rd of a degree incidence.

(iv) Tighten up all attachment bolts and wire-lock. Replace covers.

Control settings

Ailerons

9. Lock the control column NEUTRAL ($8\frac{1}{2}$ deg. forward of the vertical, (see Sect. 4, Chap. 2), with locking tubes, Part No. Y00341 and Y00346, then proceed as follows:—

(i) Remove the nut, washer, distance piece and bolt located above the cable pulley on the control column, and attach the locking plate (Part No. Y00403), to lock the pulley sprocket in the NEUTRAL position.

(ii) Adjust tie-rods to give equal tension on the chain at the top of the control column.

(iii) Set aileron differential pulley at aileron, NEUTRAL, with $\frac{3}{16}$ in. diameter pin (fig. 7).

(iv) Couple up cables. The cable run and adjusting points are shown in Sect. 7, Chap. 4.

(v) Remove the locking pins from the aileron differential pulleys, the locking plate from the base of the control column and the control locking tube. Replace all the items removed under sub-para. (i).

(vi) Move the control column over with full range of travel and check that the tension of the chain and cable is satisfactory at NEUTRAL and full travel.

Note . . . Using the Mk. 4 tensionmeter, check that the cable tension is 70 lb. \pm 20 lb. up to first minor inspection or 70 lb. \pm 10 lb. after first minor inspection.

(vii) Check for full and free movement of aileron, 15 deg. 36 min. up, 10 deg. 30 min. down.

Note . . The gap on the aileron leading edge and the aileron shroud is 0.12 in. \pm 0.02 in. Adjustment may be effected by the addition of laminum shims on the bracket fixing bolt.

Elevator

10. To rig the elevator proceed as follows:—

(1) Lock the elevator quadrant pulley on the right and left-hand sides of the cockpit, in the NEUTRAL position with locking jig Part No. Y00600.

(2) If necessary, adjust the connecting rods from the quadrant pulleys to the levers on the control column torque tube, so that the position of the control column is nominally $8\frac{1}{2}$ deg. forward of the vertical. The position of the control column may be adjusted to suit particular requirements, but the overriding factor is that it must have unobstructed travel over the full range of movement allowed by the quadrant pulley stops.

(3) Lock the elliptical pulley, at the forward end of the tail booms, in the NEUTRAL position with a $\frac{1}{4}$ in. diameter pin. Couple up the cables from the quadrant pulleys to the elliptical pulley, and tighten to the correct tension.

(4) Lock the elevator control levers at the boom rear end with the pin Part No. Y0011. Check, with torch and mirror, that the pin is actually in the NEUTRAL hole. Couple up the cables from the elliptical pulley to the links on the control levers.

Note . . . It is important that both sets of cables should be tightened up at the same rate and that the tension, using a Mk. V tensionmeter, is 80 lb. \pm 20 lb. on the 25 cwt. scale up to the first minor inspection, and 80 lb. \pm 10 lb. after the first minor inspection.

(5) Couple up the elevator operating rod to the elevator lever and adjust so that the elevator trailing edge is in line with the tail plane.

(6) Check that the elevator has the full and free movement indicated in the Leading Particulars. It is *important* that the locking pins in the pulleys may be freely withdrawn after the cables have been tensioned.

(7) Push the control column fully forward and adjust the stop pins on the boom rear diaphragms so that they just contact the elevator control levers, then unscrew half a turn and lock. Repeat this operation with the control column fully back.

Elevator trim tab

11. The trim tab cables run from the left-hand side of the cockpit down through the left-hand boom to the elevator. The first part of the cable from the cockpit is a Teleflex control and extends to half-way down the engine rib. It is important to see that there is an equal extension from the end of the Teleflex tube for both cables before coupling up the cables to the elevator. To rig proceed as follows:—

(i) Set the elevator tab control wheel in the cockpit so that the tab indicator reads NEUTRAL.

(ii) Set the elevator tab jack on the tail plane rear spar at NEUTRAL.

(iii) Assemble chain to sprocket with an equal number of links either side of the sprocket and couple up the cables to the Teleflex controls.

(iv) Set elevator to NEUTRAL and adjust the tab connecting rod until the tab is neutral, i.e., the leading edge is straight with the leading edge of the elevator.

(v) Operate the handwheel in the cockpit and check for full movement, 0.7 in. up and down.

(vi) The elevator tab should move upwards when the cockpit control wheel is rotated forward.

Note . . It may be necessary to rig the tabs slightly out of NEUTRAL in relation to the elevator so that the aircraft cruises with the indicator in the cockpit at ZERO. To do this, adjustment should be made at the tab connecting rod only, with the indicator in the cockpit at NEUTRAL.

Rudder

12. To rig the rudder proceed as follows:—

(i) Set the rudder pedal NEUTRAL with locking tubes Y00366A (Sect. 4, Chap. 2).

(ii) Set rudder levers at tail plane NEUTRAL by putting a $\frac{3}{8}$ in. diameter pin Y0011A through the levers (fig. 8).

F.S./4

(iii) Put locking pins, Y0011 Mk. 2, $\frac{3}{8}$ in. diameter, in the oval pulleys at the forward end of the tail booms and couple up cables from the cockpit to the forward end of the tail booms.

(iv) Use a Mk. 5 tensionmeter and tension up cables so that the indicator shows 80 lb. \pm 20 lb. on the 25 cwt. scale.

Note . . After first minor inspection a tolerance of \pm 10 lb. is allowed.

(v) With locking pins in the oval pulleys connect the cables from the forward end of the tail boom to the rudder lever links as shown in fig. 9.

(vi) Tension up as in sub-para. (iv).

(vii) Couple up connecting rod E to lever C as shown in fig. 8.

(viii) Remove all locking devices and check for full travel of rudder, 19 deg. 52 min. either side of neutral. There are no rudder trim tab controls but a small servo tab is fitted to the rudder which can be set to a given angle on the ground by slackening bolt at the bottom T.E. of rudder.

(ix) It is important that the locking pins should be free to be removed after the cables have been tensioned.

(x) With full right rudder, adjust the stop pins on the boom rear diaphragms so that they just contact the rudder control levers, then unscrew half a turn and lock. Repeat this operation with full left rudder.

ALIGHTING GEAR

13. All moving parts of the undercarriage and nose wheel units should be kept clean, and properly lubricated. Before any test can be made on the alighting gear, the aircraft will have to be jacked off the ground at the main wheels and the nose wheel (Sect. 4, Chap. 2). For removal and assembling of wheel units reference should be made to Sect. 5.

Retracting mechanism

14. The length of the hydraulic jack is important and requires careful adjustment. It should be checked after any servicing on the undercarriage or retracting jack if it has affected the initial settings.

Assembling a new jack

15. To assemble a new jack screw the top end of the jack to the top undercarriage hinge lug with the appropriate bolt and connect up the flexible hydraulic pipes. Operate the hand pump to retract the jack as far as possible and release the pressure in the system by operating the pressure release valve under the cockpit floor. (See note on the port side of fuselage.) Assemble the eye end of the jack

to the lug attached to the top end of the compression leg with the appropriate bolt.

Adjustment of jack

16. It is most important that the jack be adjusted when the *undercarriage* is in the UP position, i.e., with the jack extended, so that the roller Q is $1/16\text{in.} - 3/32\text{in.}$ from the end of the slot (fig. 10).

Note . . The *nose wheel* jack is adjusted in the DOWN position.

(continued on next leaf.)

Adjustment of stop bolt

17. The stop bolt between the upper and lower links of the radius rod should be adjusted with the lock plate in the locked position. Adjust the stop bolt until the lock plate roller moves freely within the slot, and ensure that the stop faces are in contact (*fig. 10*). The points X, Y, and Z should now be in a straight line.

Undercarriage shock-absorber strut

18. The struts are oleo-pneumatic in operation and are identical except for the upper and lower torque links connecting the cylinder tube to the axle. The struts become either port or starboard according to the position of the upper and lower torque links. For removal of leg from airframe refer to Sect. 5.

Dismantling

19. To dismantle the strut for servicing or replacements proceed as follows (*see fig. 11*):—

(i) Release all air and remove the inflation valve (37); remove the filler plugs (34) and compress the strut to eject fluid.

(ii) Remove the upper hinge pin (39) and the lower hinge pin (31) and remove the upper and lower torque links (44, 43); part the links by removing the hinge pin (41).

(iii) Relieve one end of the parallel pin (26) by shallow drilling; drive out the pin and drive the axle (25) out of the plunger tube (15).

(iv) If necessary, unscrew the plug retainer (27) and extract the plug (28) from the bore of the axle; the plug is tapped $\frac{1}{4}$ in. B.S.F. so that it can be withdrawn by means of a bolt.

(v) Remove the countersunk screw (35) and the retaining ring (2) and extract the dowels (3) from the fluid head (1); the dowels are tapped 2 BA so that they can be withdrawn by means of a bolt or dowel extractor.

(vi) Compress the strut so that the piston butts on the fluid head and push the fluid head and the plunger tube assembly out of the cylinder tube.

(vii) Remove the grub screw (33) and, using a suitable spanner inserted in the two slots provided in the piston, unscrew the piston (7) from the plunger tube (15) and remove the piston bush (8).

(viii) Push the separator (14) out of the plunger tube.

(ix) If it is necessary to remove the flutter plate (10), hold the flutter plate retainer (12), unscrew the nut (9) and tap the retainer out of the piston head; collect the flutter plate and spring (11).

(x) Unscrew the four screws (36) and remove the wiper retainer (23), felt washer (22) and seal (21). Unscrew the seal retainer (20) and remove the seal (19); two slots are formed in the seal retainer for the reception of a suitable spanner. Unscrew the bush retainer (17) and remove the main bearing bush (16); two slots are formed in the bush retainer for a suitable spanner.

Assembling

20. The following is the procedure for assembling a shock-absorber strut using new parts as required. Where drilling and reaming is necessary, the notes on the illustration should be carefully followed:—

(i) Fit the seal (13) on the separator (14), and insert the separator in the plunger tube (15), from the axle end, plain face foremost.

(ii) Mount the spring (11) on the spring retainer (12) followed by a flutter plate (10), plain face foremost; fit the spring retainer in the piston head, screw on the nut (9) and lock by means of a centre punch mark. The dished face of the flutter plate must face the piston head.

(iii) Place the piston bush (8) in position on the plunger tube; screw the piston (7) into the plunger tube, fit the grub screw (33) and lock by peening metal into the screw-driver slot.

(iv) Place the main bearing bush (16) in the cylinder tube (6) so that the flange on the bush butts on the shoulder in the tube; screw the bush retainer (17) firmly down on the bush.

(v) Insert the plunger tube in the cylinder tube, guiding it carefully past the main bearing bush.

(vi) Fit the seal (4) on the fluid head (1) and insert the head in the cylinder tube so that the dowel holes and filler plug holes coincide; drive the dowels (3) into position, place the retaining ring (2) over the dowels and secure the ring to one dowel by means of the countersunk screw (35); lock the screw by peening metal into the screwdriver slot. If new dowels are used they must be filed flush with the tube before fitting the retaining ring and the threads in one dowel must be cleared for the countersunk screw.

(vii) Place the seal (19) on the bush retainer in the cylinder tube and screw the seal retainer (20) into position so that it bears lightly on the shoulder in the tube. Fit the seal (21) round the felt washer (22) and place the assembly in position on the seal retainer; position the wiper retainer on the end of the cylinder tube and fit the screws (36) with a spring washer under each screw head.

(viii) Fit the seal (24) on the air head portion of the axle (25); drive the axle into the plunger tube so that the pin holes coincide, fit the pin (26), rivet over at each end and file flush with the tube.

(ix) If the plug (28) has been removed from the axle, fit the seal (29) on the plug and insert the plug in the axle; screw the plug retainer (27) firmly down on the plug and secure by means of a split pin.

(x) Assemble the upper torque link (44) on the appropriate cylinder tube boss and fit the upper hinge pin (39); check for freedom of movement. Assemble the lower torque link (43) on the appropriate axle boss and fit the lower hinge pin (31); check for freedom of movement. Connect the two links by means of the torque link hinge pin (41).

(xi) Screw the inflation valve (37) into the axle and fit the filler plugs (34); these components should not be locked until the strut has been tested.

Leakage

21. The following are possible causes of air and fluid leakage from the strut :—

(i) Air leakage past the plug retainer (27) in the axle will be due to a faulty seal (29) on the plug (28); air leakage from the abutment of the plunger tube and axle will be due to a faulty seal (24) on the air head portion of the axle; air leakage from the inflation valve (37) may be due to a faulty gasket under the valve body, a faulty seat in the valve body or a faulty insert in the valve body.

(ii) Air and fluid leakage from the inflation valve, when the valve is depressed, may be due to a worn or damaged seal (13) on the separator (14) or to a scored plunger tube; shallow scratches in the tube may be polished out.

(iii) Leakage of fluid between the felt washer (22) and the plunger tube may be due to a faulty seal (19) or to scores on the plunger tube.

(iv) Leakage of fluid from the fluid head (1) may be due to a faulty seal (4), damaged filler plug seats in the fluid head or to faulty filler plugs (34).

Testing

22. The following tests should be applied to the strut. The pressure at which fluid is pumped into the strut should not exceed 200 lb. per sq. in.

(i) Extend the strut and remove the filler plugs.

(ii) Inflate the air chamber to a pressure of 7 atmospheres (103 lb./sq. in.).

(iii) With the strut in a vertical position, pump in fluid to Specification D.T.D.585, Stores Ref. 34A/159, through one filler plug hole, allowing air to escape through the other hole, until full.

(iv) Replace one filler plug, release the air in the air chamber, remove the inflation valve and continue to pump in fluid until full.

(v) Remove the filler plug and compress the strut; replace the filler plug and continue to pump in fluid until full and the strut fully extended.

(vi) Remove the charging connection and compress the strut to eject surplus fluid.

(vii) Replace the filler plug and the inflation valve; lock the filler plugs with wire and the inflation valve by means of the locking plate and setscrew.

(viii) Extend the strut by inflating to 29.5 atmospheres (434 lb./sq. in.) and compress the strut in a test fixture; check for air and fluid leakage, the former by applying fluid to the air head joints and the inflation valve.

(ix) Allow the strut to stand for 12 hours in the fully extended position, inflated as in (viii); during this time there should be no leakage or drop in pressure.

(x) With the strut extended and inflated to 10 atmospheres (147 lb./sq. in.), compress the strut in a test fixture to check the stroke and final air pressure, which should be 9.0 in. \pm 0.06 in. and not less than 42 atmospheres (617 lb./sq. in.), respectively. When the load on the axle is released, the axle should return to the fully extended position.

Note . . The load applied to the axle during tests (viii) and (x) should not exceed 12,000 lb.

23. A diagram showing the undercarriage inflation curve is given in fig. 12.

Nose wheel shock-absorber strut

24. The nose wheel shock absorber is oleo-pneumatic in operation and consists of a plunger tube which is free to move in a cylinder tube. The plunger tube has a piston on the end which slides in the cylinder tube, and the cylinder tube has a floating piston which separates the oil from the air. For dismantling from airframe see Sect. 5.

Dismantling

25. To dismantle the strut refer to fig. 13 and proceed as follows:—

(i) Release all air and remove the screw (20), locking plate (27) and the inflation valve (25); remove the filler plugs (1) and compress the shock absorber to eject fluid.

(ii) Remove the locking wire and, using a tubular key spanner inserted in the two slots provided in the wiper retainer (16), unscrew the retainer from the seal retainer (23) and collect the wiper (17) and seal (15).

(iii) Remove the grub screw (13) and, using a tubular key spanner inserted in the four slots provided in the seal retainer (23), unscrew the retainer from the cylinder tube (2); slide the seal retainer off the plunger tube and withdraw the plunger tube (19) from the cylinder tube.

(iv) Remove the grub screw (24) from the piston (5); grip the piston below the rings between soft jaws in a vice and, using a bar inserted through the bush (21), unscrew the plunger tube from the piston; if necessary remove the piston rings (6).

(v) Remove the bolt (3) from the piston head and collect the flutter plate (7) and spring (8).

(vi) Replace the inflation valve in the plunger tube; hold the tube in a vertical position on a soft base on the bench and apply sufficient air pressure to the valve to force the separator (18) out of the plunger tube.

(vii) If it is necessary to remove the bearing ring (9) which is a driving fit in the seal retainer (23), tap out the dowel (10) and drive the ring out of the retainer; this operation will damage the ring, therefore, a new ring will be required on assembly.

Assembling

26. The following is the procedure for assembling a nose wheel shock absorber using new parts as required; where drilling or reaming is necessary the notes on the illustration should be carefully followed:—

(i) Mount the spring (8) and the flutter plate (7) on the bolt (3); insert the bolt through the piston (5), from the inside, fit the nut and secure with the split pin. The dished face of the flutter plate must face the holes in the piston.

(ii) Fit the seal (12) on the separator (18) and insert the separator in the plunger tube (19), reduced diameter foremost.

(iii) Screw the plunger tube into the piston, so that it butts on the step in the piston head, fit the grub screw (24), lock by peening metal into the screwdriver slot and file flush. Fit the piston rings (6) on the piston and insert the piston and plunger tube in the cylinder tube (2).

(iv) If the bearing ring (9) has been removed from the seal retainer (23), fit a new bearing ring in accordance with the instructions given in the illustration (*see fig. 13*); a tube of approximately the same outer diameter as the ring will be required when driving the ring into position.

(v) Fit the seals (11, 14) on the seal retainer, pass the retainer over the plunger tube and screw it into position in the cylinder tube; when screwed home the cylinder tube should be butting on the seal retainer. Fit the grub screw (13) and lock by peening metal into the screwdriver slot.

(vi) Place the wiper (17) surrounded by the seal (15) in the recess in the seal retainer, screw the wiper retainer (16) into position and lock with wire.

(vii) Screw the inflation valve (25) into the plunger tube; fit the locking plate (27) round the valve and secure the plate with the spring washer and screw (20). Screw the grease nipple (22) into the plunger tube and temporarily fit the filler plugs (1) in the cylinder tube.

Leakage

27. The following are possible causes of air and fluid leakage from the shock absorber.

(i) Leakage of air from the inflation valve may be due to a faulty jointing washer (26), a faulty seat in the valve body (25) or a faulty or damaged insert in the valve body.

(ii) Leakage of fluid and air, when the valve is depressed, may be due to a worn or damaged seal (12) on the separator (18) or to a scored plunger tube; shallow scratches in the tube may be polished out.

(iii) Leakage of fluid between the wiper (17) and the plunger tube (19) may be due to a worn or damaged seal (14) in the seal retainer (23) or to a scored plunger tube (19); damage to the chromium plate on the tube will cause damage to the seal and, therefore, leakage of fluid from the fluid chamber.

(iv) Leakage of fluid between the abutment of the cylinder tube (2) and the seal retainer (23) will be due to a faulty seal (11) on the seal retainer.

Testing

28. The following tests should be applied to the shock absorber. The pressure at which fluid is pumped into the shock absorber should not exceed 200 lb./sq. in.

(i) Extend the shock absorber and remove the filler plugs.

(ii) Inflate the air chamber to 7 atmospheres (103 lb./sq. in.).

(iii) With the shock absorber in a vertical position pump in fluid to Specification D.T.D. 585, Stores Ref. 34A/159, through one filler plug hole, allowing air to escape through the other hole, until full. Replace one filler plug, release the air in the air chamber, remove the inflation valve and continue pumping fluid until full.

(iv) Remove the filling connection and compress the shock absorber to eject surplus fluid; the maximum end load when ejecting fluid must not exceed 1,000 lb.

(v) Replace the other filler plug and the inflation valve and lock the filler plugs with wire and the valve by the locking plate.

(vi) Extend the shock absorber by inflating to 34 atmospheres (500 lb./sq. in.) and fully compress in a test fixture; check for air and fluid leakage, the former by applying fluid to the inflation valve and jointing washer.

(vii) Allow the shock absorber to stand for 12 hours in the fully extended position inflated as in (vi); during this time there should be no leakage or drop in pressure. Check the pressure by the Turner inflation adaptor.

(viii) With the shock absorber fully extended and inflated to 5 atmospheres (74 lb./sq. in.) compress fully in a test fixture to check

the stroke and final air pressure which should be 3.17 in. \pm 0.03 in. and not less than 40 atmospheres (590 lb./sq. in.), respectively. When the load is released, the plunger tube should return to the fully extended position.

Note . . The load applied to the shock absorber during tests (vi) and (viii) should not exceed 24,780 lb.

29. A diagram showing the nose wheel inflation curve is given in fig. 14.

Nose wheel self-centring unit

30. For dismantling the self-centring unit reference should be made to fig. 15.

HYDRAULIC SYSTEM

General

31. The hydraulic system is described in Sect. 9 and illustrated in fig. 16, 17 and 18 of this Section. There is no emergency lowering system for the undercarriage.

32. Scrupulous cleanliness is essential in all servicing operations on the system, as a small piece of swarf or other foreign matter might render the system inoperative. Clean fluid only (of the type specified in the Leading Particulars) should be used for filling or topping up, and the filter in the reservoir should always be in position during the operation. Fluid containers must be perfectly clean and should be swilled out with a small quantity of clean fluid before being used for filling the reservoir or for collecting fluid when draining the system. All air should be vented from the system and the reservoir should be kept topped up to ensure efficient running.

33. Lockheed components are used on this aircraft and details for dismantling and general servicing, other than those contained in the following paragraphs, will be found in A.P.1803B, Vol. I. The following are the principle hydraulic components:—

Dive brake selector valve	}	A.I.R.40272
Flap selector valve		
Undercarriage selector valve		
Hand pump	U.M.C.501	
Hydraulic accumulator	A.I.R.40016	
Accumulator pressure release valve	A.I.R.40018	
Non-return valve for the operation of the dive brakes	A.I.R.40504	

Thermal relief valve	....	....	U.M.C.632
Flap jack	....	....	A.I.R.40008
Undercarriage jack	....	....	A.I.R.40010
Nose wheel jack	....	....	A.I.R.40542
Dive brake jack	....	....	A.I.R.40022
Automatic cut-out valve	....	....	A.I.R.40020

Thermal relief valve

Description

34. The thermal relief valve (see fig. 20) consists of a valve body (6) and two valve caps (1, 10) which are screwed on to the body and sealed by gaskets (4, 7). The valve body is bored to receive a sleeve (5) fitted with a seal (3), the sleeve being loaded by a spring (8) which abuts on a washer (11) on the valve cap (10). The sleeve has a seat for a ball (2) and is counterbored to receive a push rod (9), one end of which is in contact with the ball and the other end housed in the bore of the valve cap (10). The push rod is formed with a shoulder and this end of the rod is drilled and cross-drilled to allow fluid to escape when the valve is open. To ensure correct assembly in the system the word INLET is clearly marked on the valve cap (1).

Dismantling

35. Hold the valve body (6) with an open-ended spanner and unscrew the two valve caps (1, 10). Remove the ball (2), push rod (9), spring (8), and washer (11) and push the sleeve (5) out of the bore of the valve body.

Assembling

36. Fit the seal (3) on the sleeve (5) (see illustration) and insert the sleeve in the valve body (6). Position the ball (2) on the sleeve, place a new gasket (4) on the valve body and screw the valve cap (1) firmly down on the gasket. Place the push rod (9) in the bore of the sleeve, position the spring (8) in the valve body, place the washer (11) over the push rod and fit the valve cap (10) with a new gasket (7) under it.

Leakage

37. Leakage between the valve body and the valve caps will be due to faulty gaskets (4, 7). Leakage from the outlet connection may be due to foreign matter between the ball and its seat, a damaged ball or seat, or worn or damaged seal on the sleeve or to a scored valve body.

Tests

38. **WARNING.**—Before disconnecting the pipes or removing any units, it is important that the pressure in the system should be released by operating the release valve situated underneath the cockpit floor (see fig. 16.)

Pressures

39. The following pressures are correct and should be aimed at when testing :—

Hydraulic accumulator		
air pressure	....	1,300 lb./sq. in.
Accumulator oil pressure	....	2,600 lb./sq. in.
Thermal relief valve pressure		3,000 lb./sq. in.

Filling and priming the system

40. Before proceeding with the operational tests the following procedure should be adopted,

(i) Jack the aircraft as described in the illustration in Sect. 4, Chap. 2.

(ii) Inflate the hydraulic accumulator to 1,300 lb./sq. in. air pressure and test for leaks.

(iii) Fill the hydraulic reservoir until fluid runs through the vent pipe.

(iv) Set control levers in cockpit as follows :—

Undercarriage and flaps	UP
Dive brakes	OFF

(v) Work hand pump until all jacks are fully operated.

(vi) Set control levers in cockpit as follows :—

Undercarriage and flaps	DOWN
Dive brakes	ON

(vii) Work hand pump until all jacks are fully operated.

Note . . . During operation of dive brakes the non-return valve in the hand pump pressure line must be held open.

(viii) Top up hydraulic reservoir to the level indicated on window.

Operational tests

41. After carrying out the preparations described in para. 40, proceed with the main tests as follows :—

(i) Connect a hydraulic servicing trolley Stores Ref. 4F/1684 to test points on the left-hand side of the firescreen (see Sect. 5) and run the pump for 2 minutes, holding the accumulator release valve open.

(ii) Check pressure of the hydraulic accumulator from the gauge attached and, if necessary, adjust cut-out valve to operate at 2,600 lb./sq. in.

(iii) Wire-lock the adjuster bolt, after setting the cut-out valve. The valve should not cut in for at least 1 minute after cutting out.

(iv) With the test trolley running at between 1,400—1,500 r.p.m., operate the flaps 3 times checking the indicator in the cockpit. The operational time for the flaps are :—DOWN—15-20 seconds, UP—20-23 seconds.

(v) Select flaps DOWN and move lever to NEUTRAL when indicator records 30 deg. movement.

(vi) Leave pump running for 3 minutes during which time the flaps should not move.

(vii) With test trolley running operate the dive brakes 3 times checking operational times; the times for ON and OFF should be 0.5 to 1 second.

(viii) With the test trolley running, operate the undercarriage 5 times checking indicator lights in cockpit and operational times. The times should be UP $\frac{1}{2}$ or DOWN—2 to 3 seconds.

(ix) With undercarriage and flaps UP $\frac{1}{2}$ and dive brakes OFF, stop test trolley and release accumulator pressure.

(x) Disconnect pump pressure line at the test point on the firescreen and restart pump, collecting oil flowing from pump in a clean container. When flow ceases, stop pump and reconnect pressure line.

(xi) Select undercarriage and flaps DOWN and using hand pump until pump handle is immovable, set dive brakes ON and maintain pressure on hand pump for 2 minutes, during which time dive brakes should not move.

(xii) Refill hydraulic reservoir and run engine pump for 2 minutes on test trolley holding accumulator release valve open.

(xiii) With the accumulator pressure released, stop engine pump and finally top up reservoir to level line shown on window.

(xiv) Run test trolley and operate undercarriage and flaps 5 times.

ENGINE CONTROLS

General

42. The setting of the engine controls is fully illustrated in fig. 22 and 23. Fig. 22 shows the setting for the first 50 aircraft and fig. 23 for the 51st and subsequent aircraft. The arrangement of the engine controls is illustrated in Sect. 8. Teleflex controls are used from the

control box in the cockpit to the fireproof bulkhead, and, from there to the engine, tie controls are by chain and sprocket with the rods connecting to levers on articulated tubular shafts. Servicing instructions for Teleflex controls are given in A.P.1464D, Vol. 1, Part 2, Sect. 2, Chap. 3.

Important note . . .

After setting the high-pressure fuel cock control, the following check must be carried out with the engine running :—Pull back the high-pressure fuel cock lever $\frac{1}{4}$ in. past the position at which it is normally arrested by the safety gate, and check that there is no discharge of fuel from the dump valve. Failure to comply with this requirement will render the aircraft unserviceable until rectified by re-setting the control.

Minneapolis transmitter

43. The pressure transmitter, type A1 (*see fig. 24*) located on the top of the fireproof bulkhead, is used in conjunction with the fuel and oil instrument panel gauges and transfers the pressure from the engine through a liquid-filled compartment in the transmitter on these gauges. The fuel or oil, the pressure of which is to be measured, fills one side of the transmitter, while the other side is filled with fluid (Stores Ref. 34B/119). The two fluids are separated by a flexible diaphragm located between the two halves of the transmitter. Increase or decrease in fuel or oil pressure is immediately conveyed by movement of the diaphragm to the special fluid and recorded by the cockpit pressure gauge.

44. It will be noted that the transmitter bears an engraved arrow on the back of the case; the transmitter must be mounted with the arrow pointing upwards within 10 deg. of the vertical axis. Also the four hexagonal distance pieces must not be removed or loosened, as the flange screws securing these pieces to the case are set to a definite torque, and leaks may occur if disturbed. Before installing a pressure gauge ensure that the grey or brass-coloured non-return valve stamped B on the hexagon is in the fitting at the pressure gauge.

Servicing

45. When making a routine inspection of the fuel or oil lines, ensure that the transmitter and its connections are thoroughly tight. If the gauge reads other than zero without pressure being applied at the transmitter, the system should be thoroughly checked for leaks, as this condition is indicative of a loss of special

RESTRICTED

fluid. The pressure transmitting lines between the instrument and the transmitter should be checked to see that no sharp bends, kinks or loose cleats can give rise to line failure through vibration. During extremely cold weather, trouble may be experienced with the pressure gauge due to congealing of engine oil in the line between the engine and the oil pressure transmitter. To overcome this difficulty, remove the plug E and add a little fluid, Stores Ref. 34B/119, to the line.

Pressure test

46. Disconnect the pipe at the transmitter end of the line, using a spanner to hold the adapter while the union nut is unscrewed. Care should be taken in this operation as the transmitter casing is a fragile casting and damage will occur if unnecessary force is used. Make up a 12 in. length of rubber tube and pass one end over the flared end of the pipe, securing this end with a Jubilee clip. Insert a Schrader valve in the other end of the rubber tube, and also secure with a Jubilee clip. Seal the top of non-return valve "D" (see fig. 24) making an airtight joint, then proceed as follows:—

(i) Fill the line through the Schrader valve with clean dry air from a pressure supply fitted with a pressure gauge. Charge to 25 lb./sq. in.

(ii) Check the joints in the system for leaks, using a brush and soapy water.

(iii) The pressure gauge should indicate no drop in pressure with the circuit sealed over a period of one hour.

(iv) When the test is considered satisfactory, remove the rubber tube from the pipe and connect the line to the transmitter.

Filling procedure

47. Before preparing to fill the transmitter system the following precaution should be observed:—

Clean charging equipment is essential.

If the filling tank has been used for other purposes it must be thoroughly cleaned by using a suitable solvent, and finally rinsed in fluid, Stores Ref. 34B/119.

The pressure transmitter will be received with the lock nut A tightened. Loosen the nut and screw it off the threaded portion of the stem. Push the knob B inward and turn it clockwise (approximately half-turn) until it is felt to be firmly in place against the diaphragm; this procedure will maintain the valve in its

central position during the charging process. Fit a flexible pipe from connection D so that the free end rests in a clean receptacle placed on the cockpit floor. Connect the pipe from the filling tank to the transmitter as shown in fig. 24.

Charging procedure

48. The system is now ready for the charging procedure as follows:—

(i) Operate the pump on the filler tank and unscrew the valve.

(ii) Force the fluid through the system until air bubbles cease to appear at the end of the overflow pipe. Do not exceed 25 lb./sq. in. on the tank gauge as excessive pressure will distort the diaphragm disc.

(iii) Remove the overflow pipe and the filler pipe and fit blanking caps to the two connections.

(iv) Turn the knob B anti-clockwise and pull out to full extent, then tighten the lock nut A.

The system is now ready for use.

A.S.I. SYSTEM

General

49. The pressure and static pipes leaving the pressure head (see fig. 25) in the port fin are clipped in the fin shroud, and continue through the boom to two drain traps forward of the wing to boom joint. Clamps located on No. 1 wing rib carry the pipes to drain traps which protrude through the cockpit floor below the pilot's seat. The drain trap comprises a vertical tube containing a screwed plug in its lower end which may be removed for drainage purposes. Access to the drain traps is obtained by removing the hand hole cover adjacent to the wing to boom joint, and through the holes in the bottom of No. 2 bulkhead; in the latter case the drain plugs will be found above the air reservoir.

PRESSURE CABIN

Cabin seal

50. The cabin seal is maintained by pressure taken from the impeller casing of the engine. A pipe is led from the impeller casing through a pressure reducing valve and a non-return valve to a Vickers three-way cock, located on the right-hand side of the cockpit below the canopy jettison lever. The pressure is reduced to 5 lb./sq. in. The cabin seal is inflated by turning the cock to ON which permits air to flow to the seal. The seal is deflated by

turning the cock to OFF which opens the circuit to the suction side of the vacuum pump.

Pressure cabin

51. It will be found that some aircraft are fitted for pressurising the cabin by a cabin supercharger mounted on the engine (*see Sect. 5*). A lever located on the right-hand side of the cockpit forward of the canopy jettison lever, operates an oil clutch which brings the supercharger in and out of action as required. The supercharger is fed by air drawn from an opening in the leading edge of the port wing outboard of the engine air intake, thence through ducts and an air filter positioned below the supercharger. From the supercharger air is passed to a felt-lined silencer and a non-return valve which is located at the rear of No. 2 bulkhead. The air is then passed to a manual control valve marked HOT and COLD, the control valve being attached to the air cooler on the right-hand side of the cockpit. The degree of heat may be regulated by moving the control lever to intermediate positions provided by slots in the cooler control.

Vickers vacuum valve

52. When the cabin air pressure is high a Vickers vacuum valve located on the rear face of No. 1 bulkhead automatically reduces the negative pressure supplied to the "blind flying" panel by the vacuum pump, and has the reverse effect when the cabin pressure is low.

Pressure cabin control

53. The pressure in the cabin is automatically regulated by a Westland control valve, fitted on the forward face of the bulkhead No. 1. The valve operates so that the variation between internal and external pressure is not appreciable until the pressurising height is attained. At this predetermined height the valve progressively regulates the cabin pressure up to a maximum of $2\frac{3}{4}$ lb./sq. in. Incorporated in the valve is a switch, which operates a warning lamp should the cabin pressure fall $\frac{1}{2}$ lb. below normal for any altitude. Two further valves are incorporated in the unit; an outward relief valve set to relieve at 3 lb./sq. in. if the main regulating valve fails, and an inward relief valve which operates when the external pressure exceeds the internal pressure, as would occur in a power dive.

Ground testing of pressure cabin without engine running

Equipment required

54. The following equipment is required:—
Petrol motor rig, Stores Ref. 4F/NIVE/18

or an electric motor rig complete with an air flow measuring device to drawing J.16285; vacuum rig with attachments to pressurise the canopy seal. Before commencing the following tests, remove the top nose cowling.

Vacuum system

55. The functioning of the vacuum system should first be checked with the cabin unpressurised, the minimum depression should not be less than 4.2 in. Hg. and the maximum not more than 5.0 in. Hg. With the system complying with these requirements, the cabin should be pressurised by increments of 0.5 lb. to 3 lb./sq. in. and reduced by the same amount with the suction side of the vacuum rig connected to the suction line on the engine vacuum pump. The depression measured at the instruments should remain within the limits of 4.2 in. and 5.0 in. Hg.

A.S.I. system

56. The usual checks on the A.S.I. lines should be made with the cabin pressurised and unpressurised.

Pressurising and testing the cabin

57. To pressurise the cabin, proceed as follows:—

- (i) Close the canopy.
- (ii) Connect the test rig air supply line to the charging point on the door of No. 1 bulkhead (*see fig. 26*).
- (iii) Connect the mercury U tube and vacuum rig pressure line to their respective points on No. 1 bulkhead.
- (iv) Blank off Westland valve atmospheric vent.
- (v) Turn cabin seal cock to ON.
- (vi) Start the vacuum rig maintaining pressure in canopy seal to 5 lb./sq. in.
- (vii) Start the air supply rig and pressurise the cabin to 2.75 lb./sq. in. maintaining this pressure with an air flow into the cabin of not more than 28 cu. ft. per minute. Check the Westland valve for leaks. Leaks may be detected by placing the hands over the gauze covered exits, which are around the periphery of the body and at the end of the unit. Check that the cabin pressure gauge corresponds with reading on the mercury U tube. Access to the Westland valve is obtained by removing the inspection cover at the starboard side of the nose.
- (viii) Raise cabin air pressure to 3 lb./sq. in. and check that Westland valve relieves at this pressure. This is indicated by a passage of air through the gauze at the end of the valve body.

RESTRICTED

(ix) It is desired to keep the leak rate as low as possible and, with the cabin pressurised to $2\frac{3}{4}$ lb./sq. in., it should take not less than 20 seconds for the pressure to drop to $1\frac{3}{4}$ lb./sq. in. If the leakage rate is greater than this, the cabin seal and the control cable seals should be examined and, if necessary, cleaned and repacked with grease.

(x) At completion of test, turn the canopy seal cock to OFF, remove test rigs from the aircraft and remove blank from Westland valve atmospheric vent. Reconnect vacuum pump suction line to engine vacuum pump.

Warning light

58. At the completion of pressure cabin ground test remove the tube from the Westland valve and test that the pressure warning light electrical circuit operates by removing the terminal block cover on the Westland valve and bridging the terminals; the warning light should glow. In flight the warning light will glow when the cabin pressure drops $\frac{1}{2}$ lb./sq. in. below the normal pressure for any altitude.

Ground testing of pressure cabin with engine running

59. With the engine turning over at 4,000 r.p.m. it should be possible to pressurise the cabin from zero to $2\frac{3}{4} + \frac{1}{4}$ or $-\frac{1}{4}$ lb./sq. in. in a maximum time of 3 minutes and to maintain the pressure indefinitely.

Test procedure

60. 1st test:—

(i) Blank off Westland valve atmospheric vent.

(ii) Close the canopy.

(iii) Turn canopy seal cock ON.

(iv) Position supercharger control lever to OFF.

(v) Start the engine, and as soon as r.p.m. is steady at 4,000 r.p.m. turn the supercharger lever to ON and check time to build up to 2.75 lb./sq. in.

(vi) Check that pressure is maintained with cockpit control in HOT or COLD position.

(vii) To release pressure put blower lever and canopy seal cock to OFF and allow the pressure to leak away.

F.S./8

61. 2nd test:—

(i) Westland valve NOT blanked off.

(ii) Close the canopy.

(iii) Put canopy seal cock ON, with supercharger lever OFF.

(iv) Start engine and as soon as r.p.m. is steady at 3,000 r.p.m. turn the supercharger lever ON.

(v) Raise engine speed to maximum (10,000) r.p.m. when cabin pressure should not rise above 1 lb./sq. in.

(vi) Release pressure in cabin and canopy seal.

Ground testing of pressure cabin on repaired aircraft

Test Procedure

62. The test described in para. 57 is only applicable to aircraft receiving a periodical inspection, but if the non-return valve (see fig. 26) has been replaced or structural repairs to the cabin have been effected, then the following test should be carried out:—

(i) Close the canopy.

(ii) Connect the test rig air supply line to the aircraft blower line at a convenient point before the non-return valve. Such a point could be obtained by removing the supercharger silencer.

(iii) Connect the mercury U-tube and vacuum rig pressure line to their respective points on No. 1 bulkhead.

(iv) Blank off Westland valve atmospheric vent.

(v) Remove the gauze filter and circlip from Westland valve.

(vi) Turn cabin seal cock ON.

(vii) Start the vacuum rig, maintaining pressure in canopy seal at 5 lb./sq. in.

(viii) Start the air supply rig and pressurise the cabin to 3.66 lb./sq. in., holding the Westland relief valve on its seating by applying hand pressure to the head of the valve. Maintain pressure for one minute. Examine all possible sources for leaks (see para. 57 (vii) and (ix)). For the method of stopping minor leaks refer to A.P.1464B, Vol. 1, Part 2, Sect. 4, Chap. 6.

(ix) Replace gauze filter and circlip in Westland valve.

(x) Carry out the procedure as outlined in para. 57 and 58, also checking the operation of the cabin air control lever. Ensure that the non-return valve operates instantly when supercharger lever is turned to OFF.

Testing the drier tube

63. To test the drier tube on the 51st and subsequent aircraft, available means are required to apply air pressure at 2.75 lb./sq. in. and suction at 0.5 lb./sq. in. at hose connection A on top of the drier tube, (see fig. 29), and a 12 in. mercury U-tube; then proceed as follows:—

(i) Remove the blanking cap from the stowage beside the drier tube.

(ii) Remove the hose from the connection A and screw it on the blanking cap stowage.

(iii) With the blanking cap, seal the drier tube and remove it from the aircraft.

(iv) Connect up air pressure pipe to drier tube at connection A with the mercury U-tube interposed (see fig. 30), blank off the open

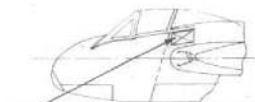
end of the drier tube, by fixing a rubber tube and plug as shown, and apply pressure at 2.75 lb./sq. in. The complete assembly must be airtight.

(v) Remove rubber tube and plug from lower end of drier tube and check that the outlet valve opens at 0.4 to 0.6 lb./sq. in. pressure, but is airtight below 0.3 lb./sq. in. pressure.

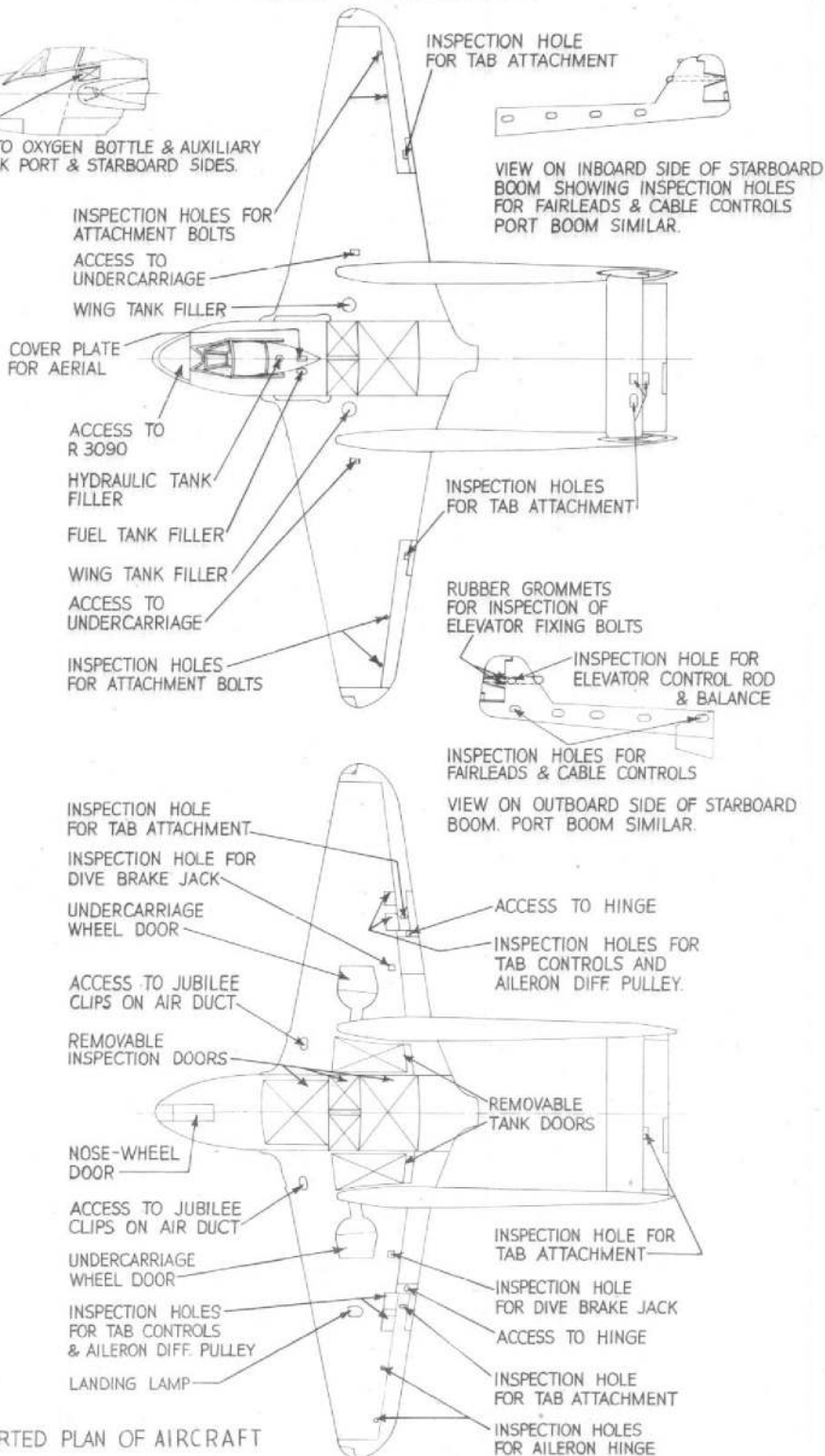
(vi) Connect up vacuum pipe in place of pressure pipe at connection A with mercury U-tube interposed and test that inlet valve opens at 0.6 lb./sq. in. suction and is airtight below 0.3 lb./sq. in. suction.

(vii) Disconnect vacuum pipe and mercury U-tube and re-install drier tube in aircraft.

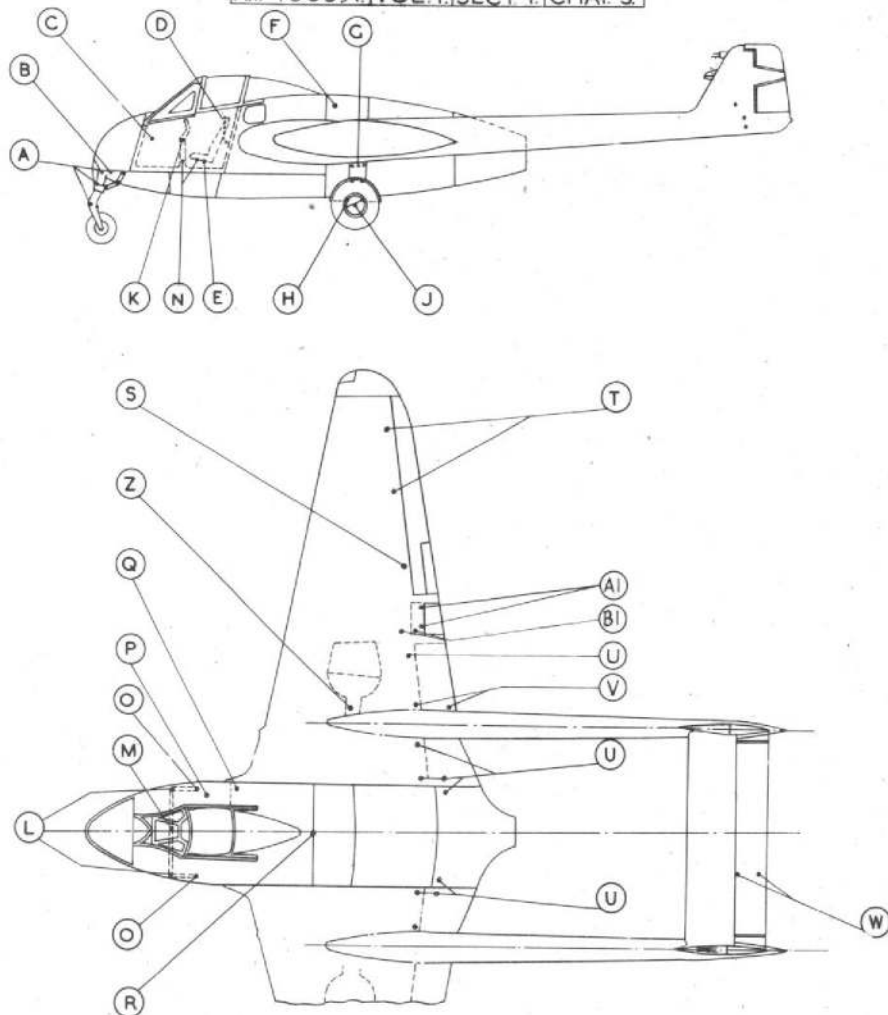
(viii) Pinch the hose connection to the windows, remove plug and, keeping the hose pinched, re-connect the drier tube at point A.



ACCESS TO OXYGEN BOTTLE & AUXILIARY FUEL TANK PORT & STARBOARD SIDES.



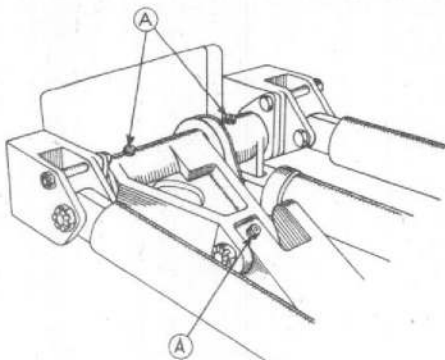
INVERTED PLAN OF AIRCRAFT



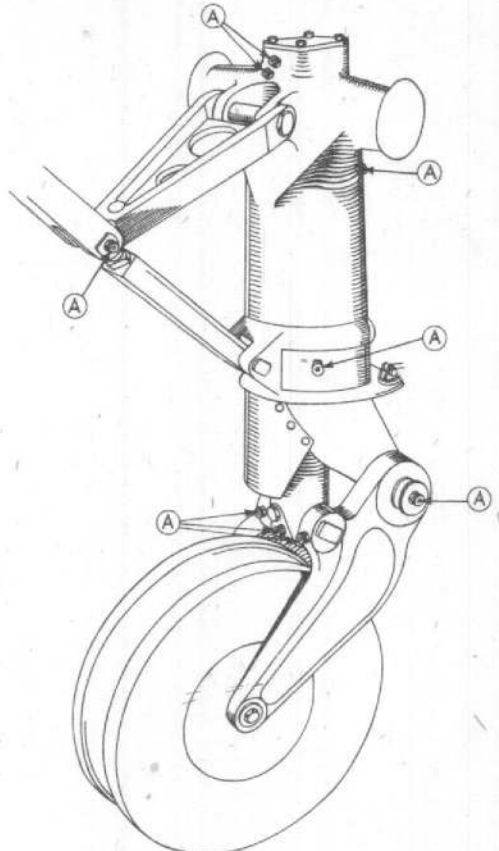
- | | |
|---|--|
| (A) NOSE WHEEL. 12 GREASE NIPPLES [RECT] | (N) ELEVATOR CON ROD (2 BALL RACES) • PORT & STARB |
| (B) NOSE WHEEL DOOR HINGE • | (O) ELEVATOR PULLEY BALL RACE • PORT & STARB |
| (C) PENDULUM RUDDER PEDALS • | (P) CANOPY UNIVERSAL CONTROL JOINTS • |
| (D) TELEFLEX CONTROLS 6 GREASE NIPPLES [RECT] | (Q) CANOPY SPROCKETS [RECT] |
| (E) SEAT RAISING GEAR. SEALED BALL RACE | (R) THROTTLE CONTROL SHAFTS. 4 BALL RACES |
| (F) MINNEAPOLIS TRANSMITTER. FLUID STORES REF 34A/119 | (S) SERVO TAB SEALED BALL RACE |
| (G) RADIUS ROD • (PORT & STARB'D) 4 POINTS | (T) AILERON HINGE POINTS, SEALED BALL RACES |
| (H) WHEEL FAIRING HINGES • (PORT & STARB'D) 10 POINTS | (U) FLAP HINGES SEALED BALL RACES |
| (J) HUB GREASE [RECT] 1/2 LEG 6 GREASE NIPPLES [RECT] | (V) FLAP JACK ATTACHMENT [RECT] |
| (K) CONTROL COLUMN • 2 BALL RACES | (W) ELEVATOR TRIM CONTROL SEALED BALL RACE |
| (L) ELEVATOR LEVER BALL RACE • PORT & STARB'D | (Z) U/C STRUT D.T.D. 585 |
| (M) BEARING SLEEVE ON CONTROL COLUMN • | (AI) DIVE BRAKE HINGES • |
| | (BI) DIVE BRAKE JACK HINGES [RECT] |

NOTE:-- ALL CABLE CONTROL PULLEYS & FLYING CONTROL LEVERS IN TAIL UNIT SEALED BALL RACES

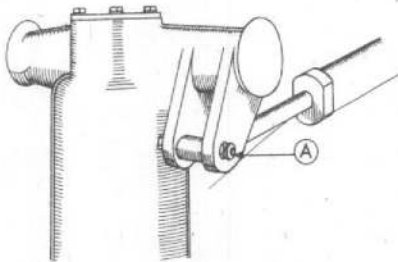
- [RECT] GREASE ANTI-FREEZING
 • OIL LUBRICATING ANTI FREEZING



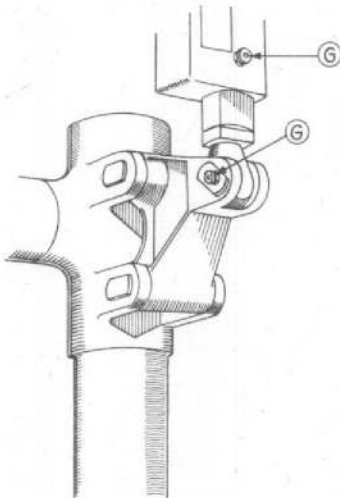
NOSE WHEEL RADIUS ROD HINGE



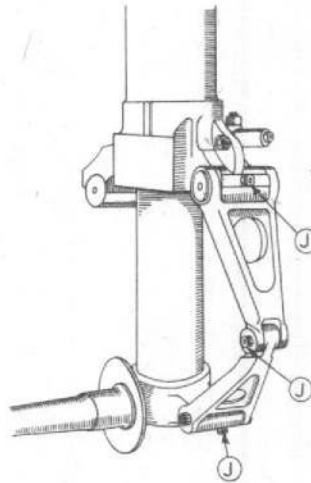
NOSE WHEEL UNIT



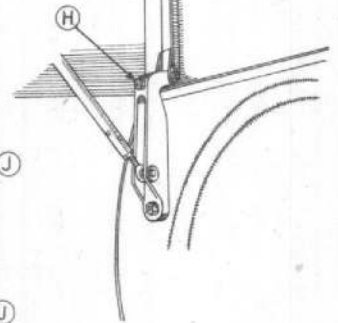
NOSE WHEEL JACK HINGE



UNDERCARRIAGE HINGE



UNDERCARRIAGE COMPRESSION LEG



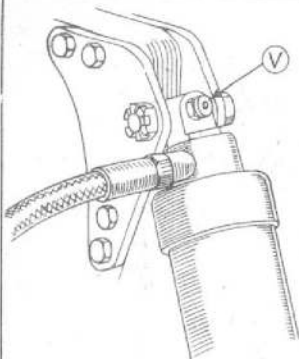
UNDERCARRIAGE WELL DOOR

FOR LUBRICATION DIAGRAM SEE FIG. 2.

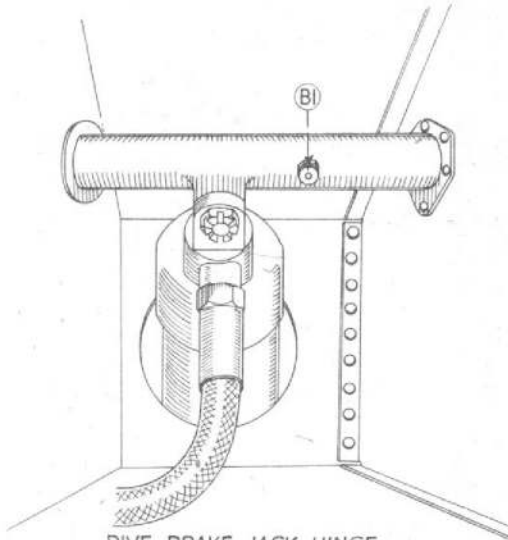
FIG. 3

UNDERCARRIAGE & NOSE WHEEL LUBRICATION.

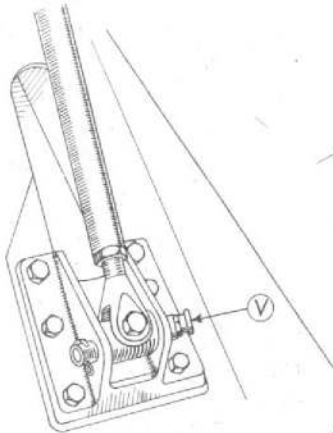
FIG. 3



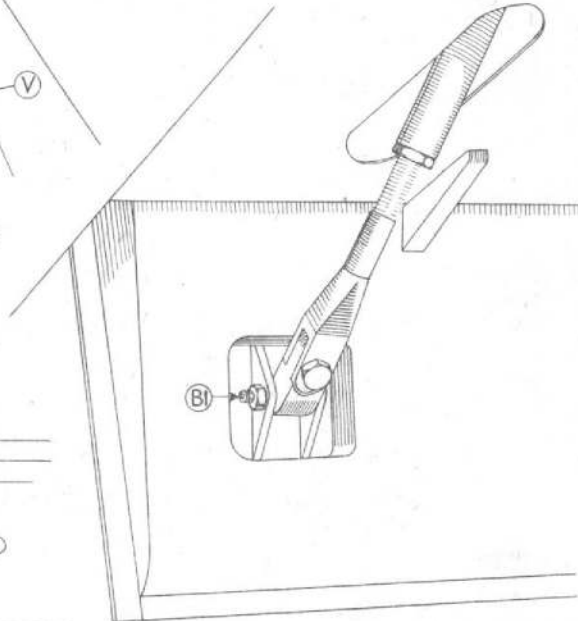
FLAP JACK HINGE



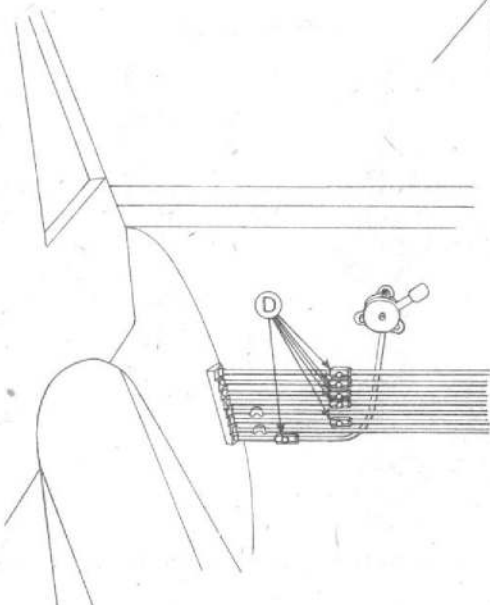
DIVE BRAKE JACK HINGE



FLAP JACK PISTON HINGE



DIVE BRAKE JACK PISTON HINGE



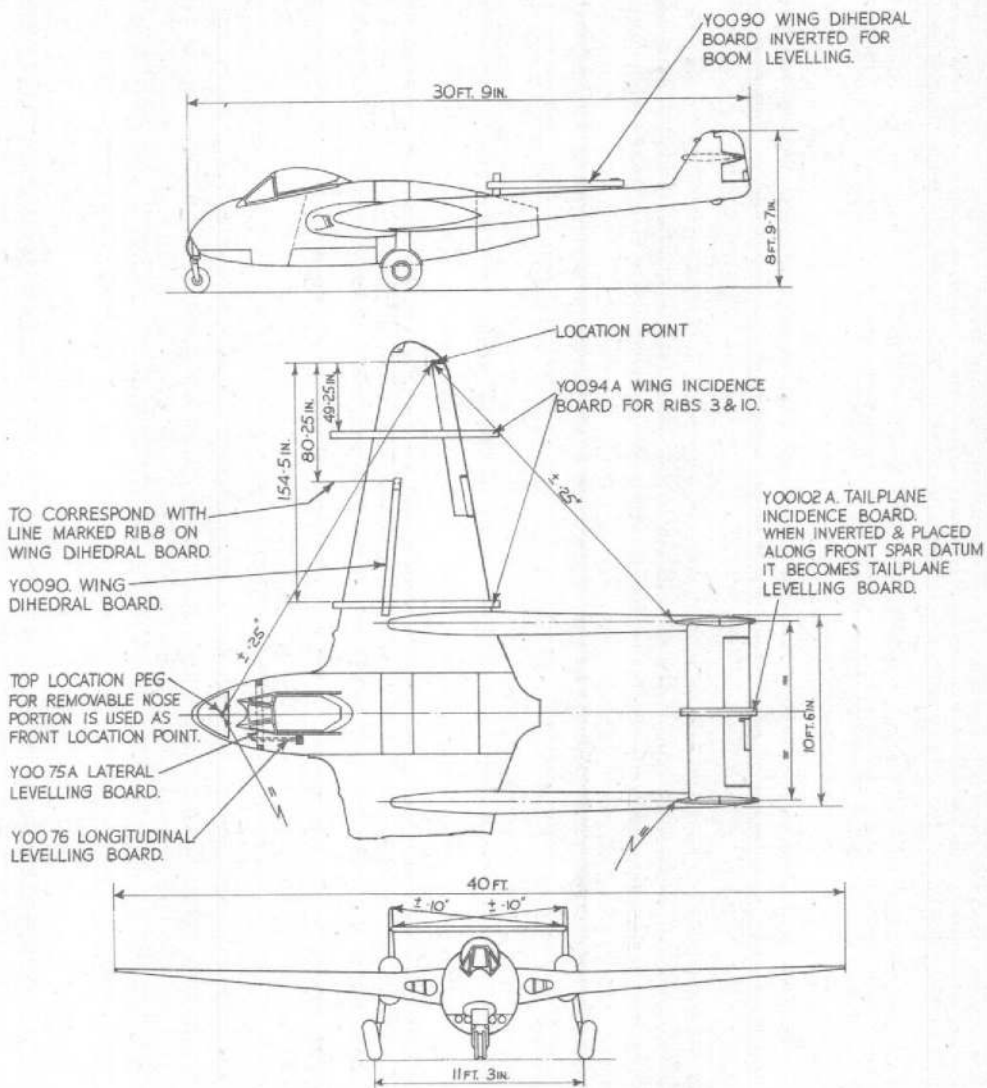
TELEFLEX ENGINE CONTROLS

FOR LUBRICATION DIAGRAM SEE FIG. 2.

FIG.
4

MISCELLANEOUS LUBRICATION.

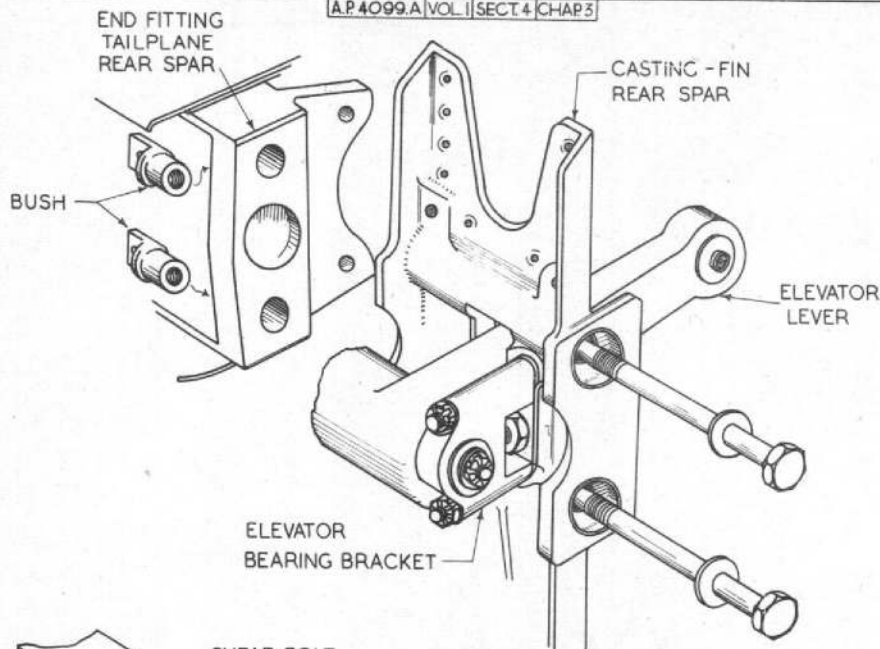
FIG.
4



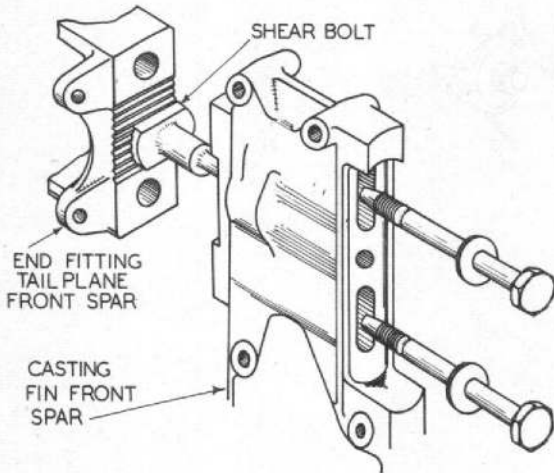
MAINPLANE INCIDENCE, ZERO AT FUSELAGE DATUM $\pm 15'$
 DIHEDRAL ON TOP SURFACE OF FRONT SPAR $1^\circ 15' \pm 15'$
 DIHEDRAL BOARD READS HORIZONTAL WHEN IN POSITION
 TAILPLANE INCIDENCE, NEUTRAL. $\pm 15'$
 LOCATION POINTS FOR RIGGING BOARDS ARE PAINTED
 ON AIRFRAME.

CONTROL SURFACE MOVEMENTS.

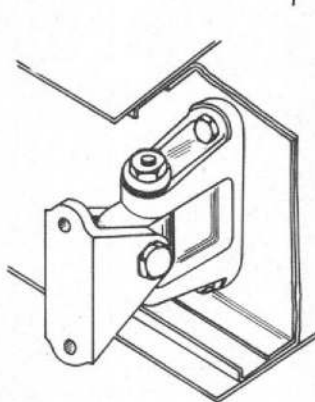
AILERON	15° 36' UP 10° 30' DOWN (3.0 IN. UP 2.0 IN. DOWN)
TAB	5° 30' UP 8° 30' DOWN
RUDDER	19° 52' EACH WAY (5-70 IN.)
TAB	GROUND TRIM ONLY
ELEVATOR	19° 12' UP 12° 48' DOWN (5.6 IN. UP 3.75 IN. DOWN)
SERVO TAB	12° TRIM UP AND DOWN
FLAPS	80° DOWN (29.3 IN.)
DIVE BRAKE	73° UP (12.18 IN.)



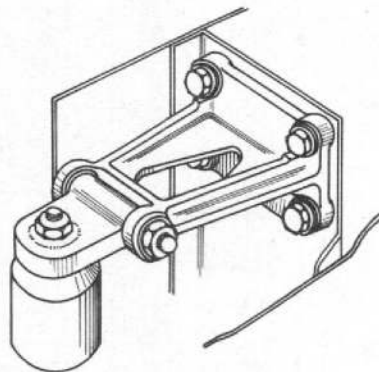
REAR JOINT TAIL PLANE TO FIN



FORWARD JOINT TAILPLANE TO FIN



INNER ELEVATOR HINGE



RUDDER TOP HINGE

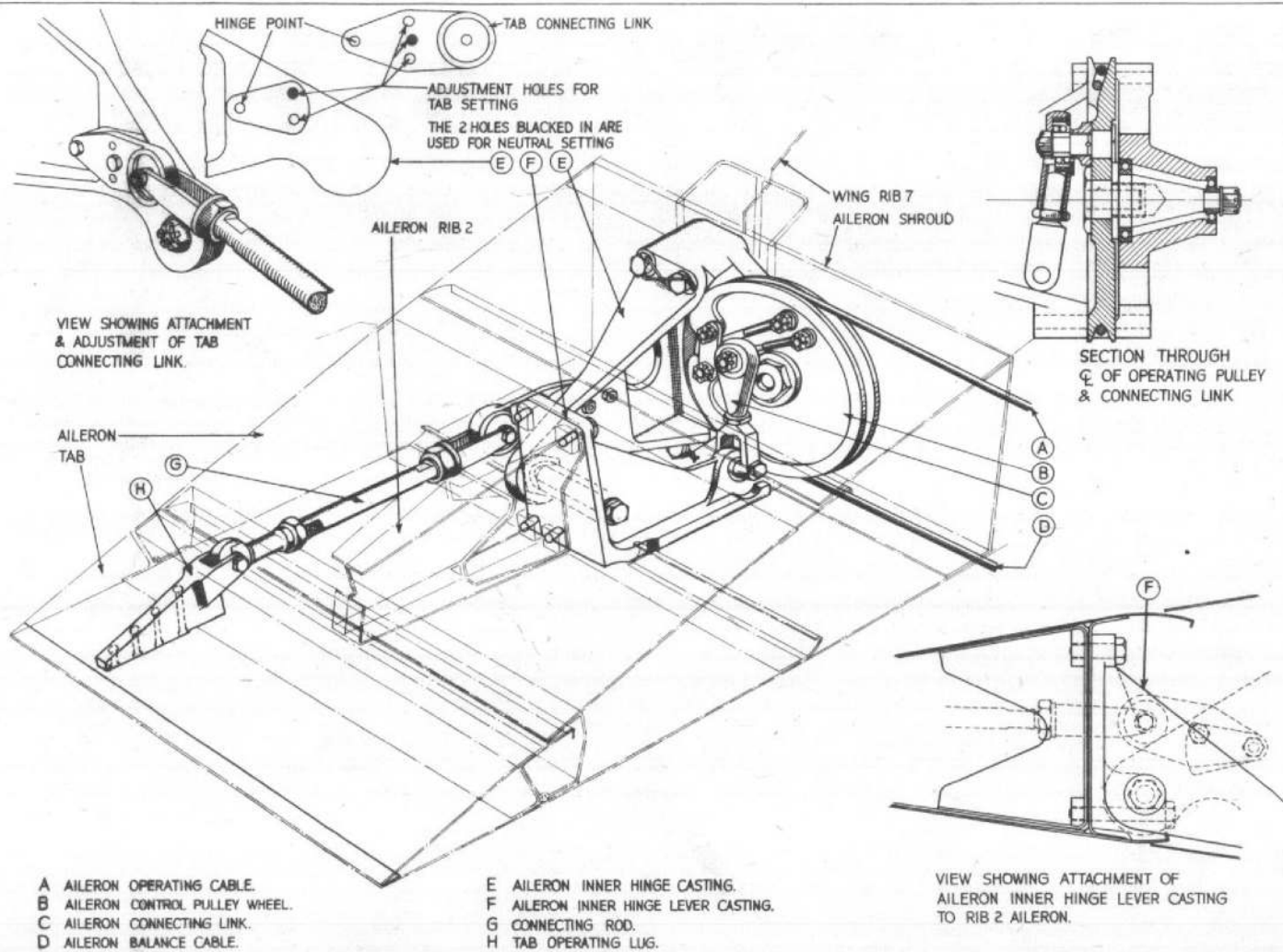
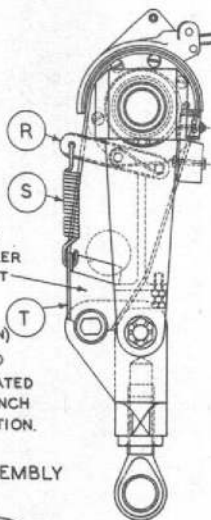
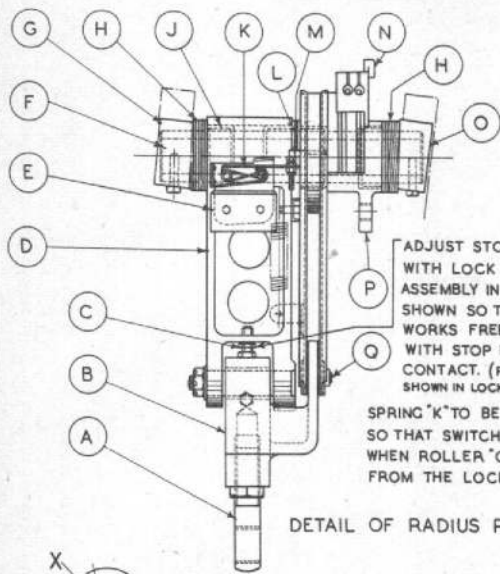


FIG. 7

PORT AILERON DIFFERENTIAL UNIT. (STARBOARD SIMILAR)

FIG. 7

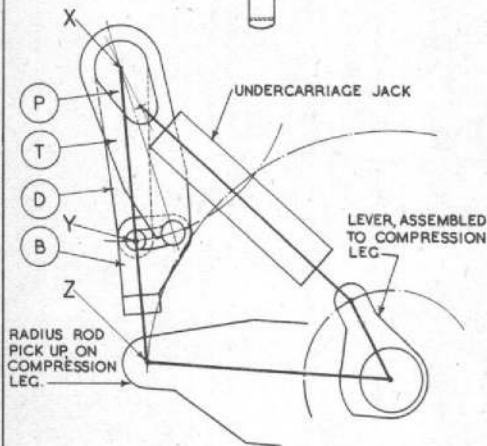


- A EYEBOLT
- B LOCK LINK
- C STOP BOLT
- D UPPER LINK
- E MICRO SWITCH
- F BEARING TUBE
- G REAR END FITTING
- H SPRING WASHER
- J NEEDLE ROLLER BEARING
- K SPRING (MICRO SWITCH)
- L WASHER
- M SPIGOT
- N TELEFLEX WRAPPED BOX
- O FRONT END FITTING
- P LUG FOR JACK
- Q ROLLER
- R LEVER
- S SPRING
- T LOCK PLATE

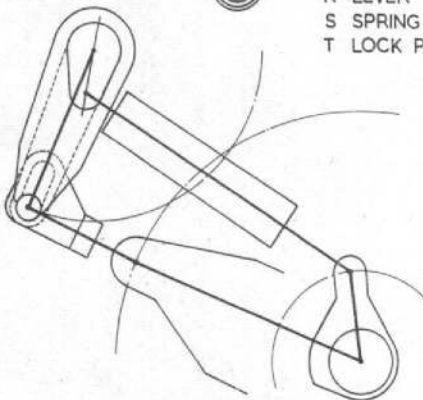
ADJUST STOP BOLT WITH LOCK PLATE ASSEMBLY IN POSITION SHOWN SO THAT ROLLER WORKS FREELY IN SLOT WITH STOP FACES IN CONTACT. (ROLLER SHOWN IN LOCKED POSITION)

SPRING "K" TO BE ADJUSTED SO THAT SWITCH IS OPERATED WHEN ROLLER "Q" IS $\frac{3}{4}$ INCH FROM THE LOCKED POSITION.

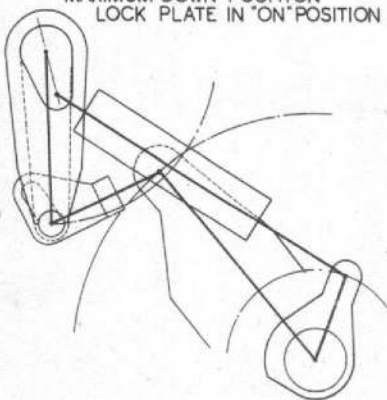
DETAIL OF RADIUS ROD ASSEMBLY



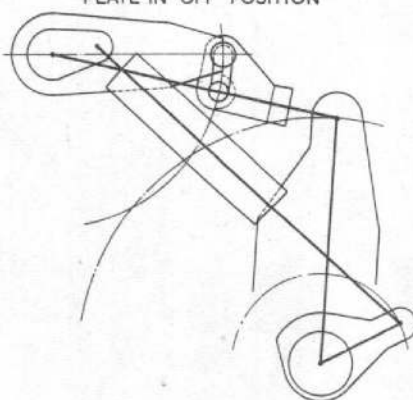
MAXIMUM DOWN POSITION
LOCK PLATE IN "ON" POSITION



MOVEMENT SHOWING
LOCK PLATE IN "OFF" POSITION



MOVEMENT SHOWING
LOCK PLATE IN "OFF" POSITION



MAXIMUM UP POSITION SHOWING
LOCK PLATE BACK TO "ON" POSITION

DIAGRAM OF UNDERCARRIAGE MOVEMENTS

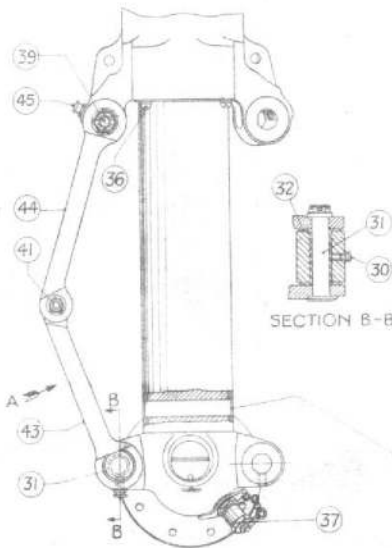
DISMANTLING SHOCK-ABSORBER STRUT

- 1 RELEASE ALL AIR, AND REMOVE THE INFLATION VALVE (37) REMOVE THE FILLER PLUGS (34) & COMPRESS THE STRUT TO EJECT FLUID.
- 2 REMOVE THE UPPER HINGE PIN (39) & THE LOWER HINGE PIN (31) & REMOVE THE UPPER & LOWER TORQUE LINKS (44) (43), PART LINKS BY REMOVING HINGE PIN (41)
- 3 RELIEVE ONE END OF THE PARALLEL PIN (26) BY SHALLOW DRILLING: DRIVE OUT THE PIN & DRIVE THE AXLE (25) OUT OF THE PLUNGER TUBE (15)
- 4 IF NECESSARY, UNSCREW PLUG RETAINER (27) & EXTRACT THE PLUG (28) FROM THE BORE OF THE AXLE, BY MEANS OF 1/4 B S F BOLT.
- 5 REMOVE COUNTERSUNK SCREW (35) AND RETAINING RING (2) EXTRACT DOWELS (3) FROM FLUID HEAD (1) WITHDRAW DOWELS WITH DOWEL EXTRACTOR OR 2BA BOLT
- 6 COMPRESS THE STRUT SO THAT THE PISTON BUTTS ON THE FLUID HEAD & PUSH THE FLUID HEAD AND PLUNGER TUBE ASSEMBLY OUT OF CYLINDER TUBE.
- 7 REMOVE GRUB SCREW (33) REMOVE PISTON (7) FROM PLUNGER TUBE REMOVE PISTON BUSH (8)

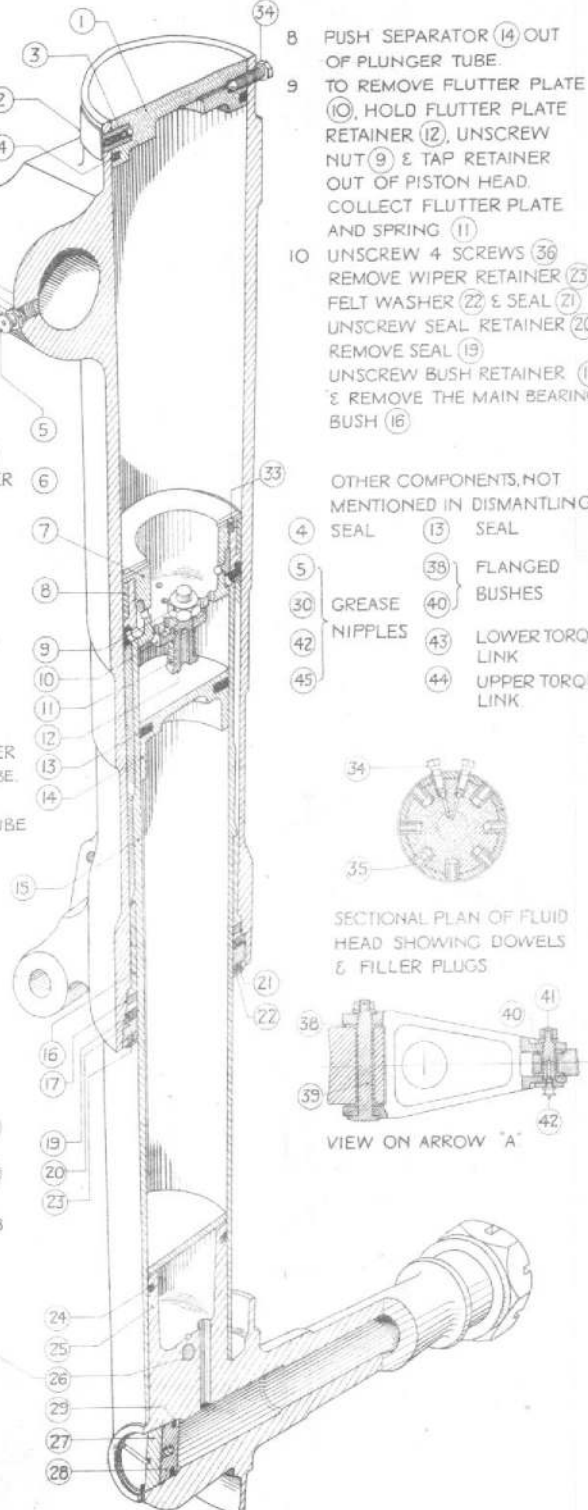
- 8 PUSH SEPARATOR (14) OUT OF PLUNGER TUBE.
- 9 TO REMOVE FLUTTER PLATE RETAINER (10), HOLD FLUTTER PLATE RETAINER (12), UNSCREW NUT (9) & TAP RETAINER OUT OF PISTON HEAD. COLLECT FLUTTER PLATE AND SPRING (11)
- 10 UNSCREW 4 SCREWS (36) REMOVE WIPER RETAINER (23) FELT WASHER (22) & SEAL (21) UNSCREW SEAL RETAINER (20) REMOVE SEAL (19) UNSCREW BUSH RETAINER (17) & REMOVE THE MAIN BEARING BUSH (16)

OTHER COMPONENTS, NOT MENTIONED IN DISMANTLING

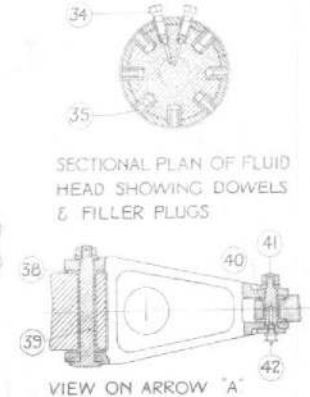
- | | | | |
|----|----------------|----|-------------------|
| 4 | SEAL | 13 | SEAL |
| 5 | GREASE NIPPLES | 38 | FLANGED BUSHES |
| 30 | | 40 | |
| 42 | | 43 | LOWER TORQUE LINK |
| 45 | | 44 | UPPER TORQUE LINK |



SECTION B-B

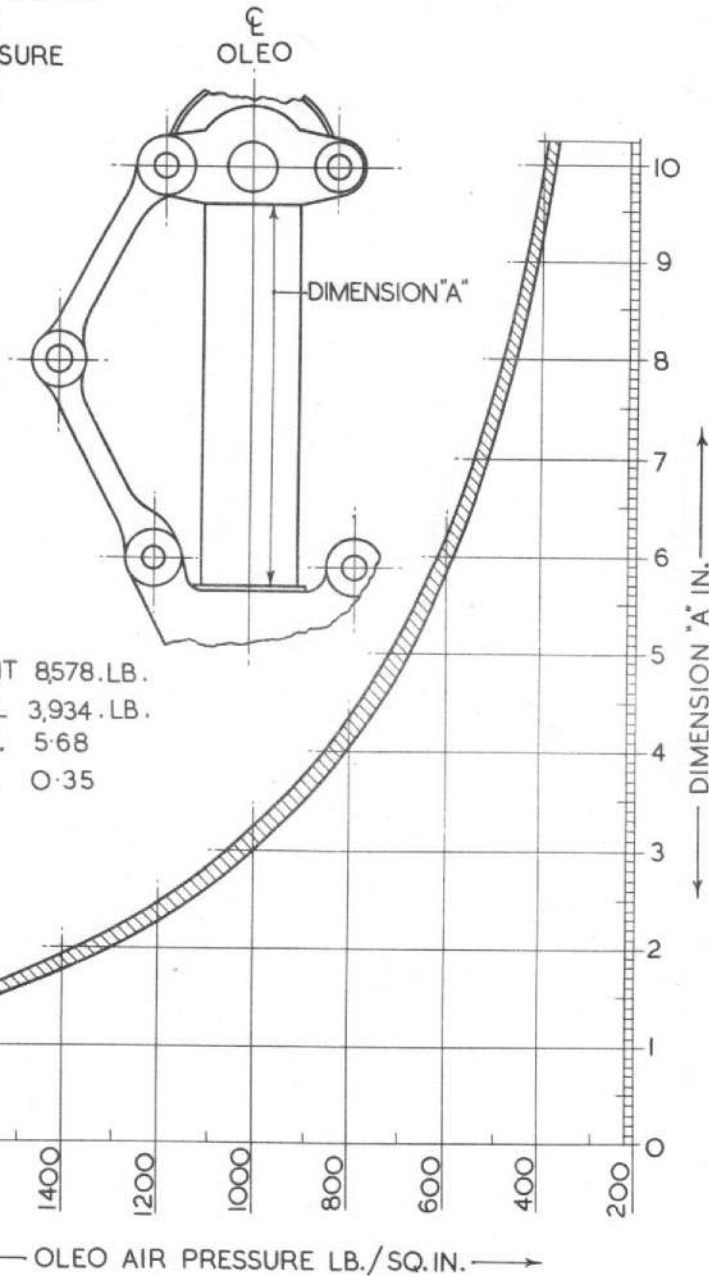


SECTIONAL PLAN OF FLUID HEAD SHOWING DOWELS & FILLER PLUGS



VIEW ON ARROW "A"

MAIN UNDERCARRIAGE
 A.I.R. 40014-5
 NOMINAL PRESSURE
 400LB. / SQ. IN.



TAKE-OFF WEIGHT 8578.LB.
 LOAD PER WHEEL 3,934.LB.
 DIMENSION "A" IN. 5.68
 TOLERANCE IN. 0.35

FIG. 12

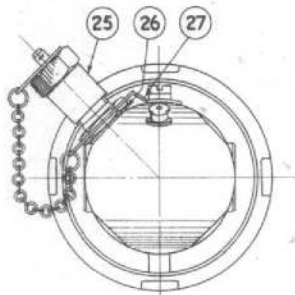
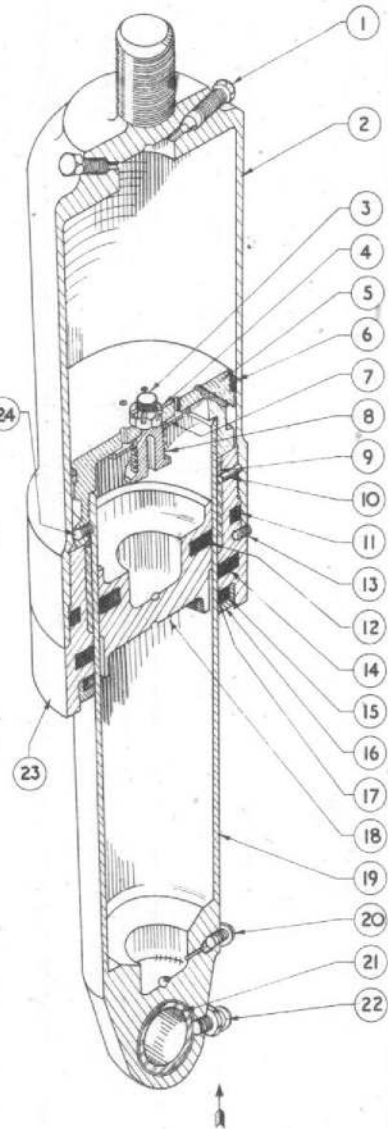
UNDERCARRIAGE INFLATION DIAGRAM

FIG. 12

DISMANTLING

SHOCK ABSORBER STRUT.

- 1 RELEASE ALL AIR AND REMOVE SCREW (20) LOCKING PLATE (27) AND INFLATION VALVE (25) REMOVE FILLER PLUGS (1) AND COMPRESS THE SHOCK ABSORBER TO EJECT FLUID.
- 2 REMOVE LOCKING WIRE, WITH TUBULAR KEY SPANNER, UNSCREW WIPER RETAINER (16) FROM SEAL RETAINER (23) REMOVE WIPER (17) AND SEAL (15)
- 3 REMOVE GRUB SCREW (13) WITH TUBULAR KEY SPANNER UNSCREW SEAL RETAINER (23) FROM CYLINDER TUBE (2) SLIDE SEAL RETAINER OFF PLUNGER TUBE & WITHDRAW PLUNGER TUBE (19) FROM CYLINDER TUBE.
- 4 REMOVE GRUB SCREW (24) FROM PISTON (5) GRIP PISTON BELOW RINGS BETWEEN SOFT JAWS IN A VICE. USING A BAR INSERTED THROUGH BUSH (21) UNSCREW PLUNGER TUBE FROM PISTON IF NECESSARY REMOVE PISTON RINGS (6)
- 5 REMOVE BOLT (3) FROM PISTON HEAD AND COLLECT FLUTTER PLATE (7) & SPRING (8)
- 6 REPLACE INFLATION VALVE IN PLUNGER TUBE HOLD TUBE IN VERTICAL POSITION ON A SOFT BASE ON BENCH AND APPLY SUFFICIENT AIR PRESSURE TO THE VALVE FORCING SEPARATOR (18) OUT OF THE PLUNGER TUBE.
- 7 IF IT IS NECESSARY TO REMOVE BEARING RING (9) WHICH IS A DRIVING FIT IN THE SEAL RETAINER (23) TAP OUT DOWEL (10) & DRIVE THE RING OUT OF THE RETAINER. THIS OPERATION WILL DAMAGE THE RING THEREFORE A NEW RING WILL BE REQUIRED ON ASSEMBLY.



VIEW ON ARROW SHOWING INFLATION VALVE.

OTHER COMPONENTS NOT MENTIONED IN DISMANTLING

- | | |
|--------------|----------------------|
| (4) NUT | (22) GREASE NIPPLE |
| (11) } SEALS | (26) JOINTING WASHER |
| (12) } | |
| (14) } | |

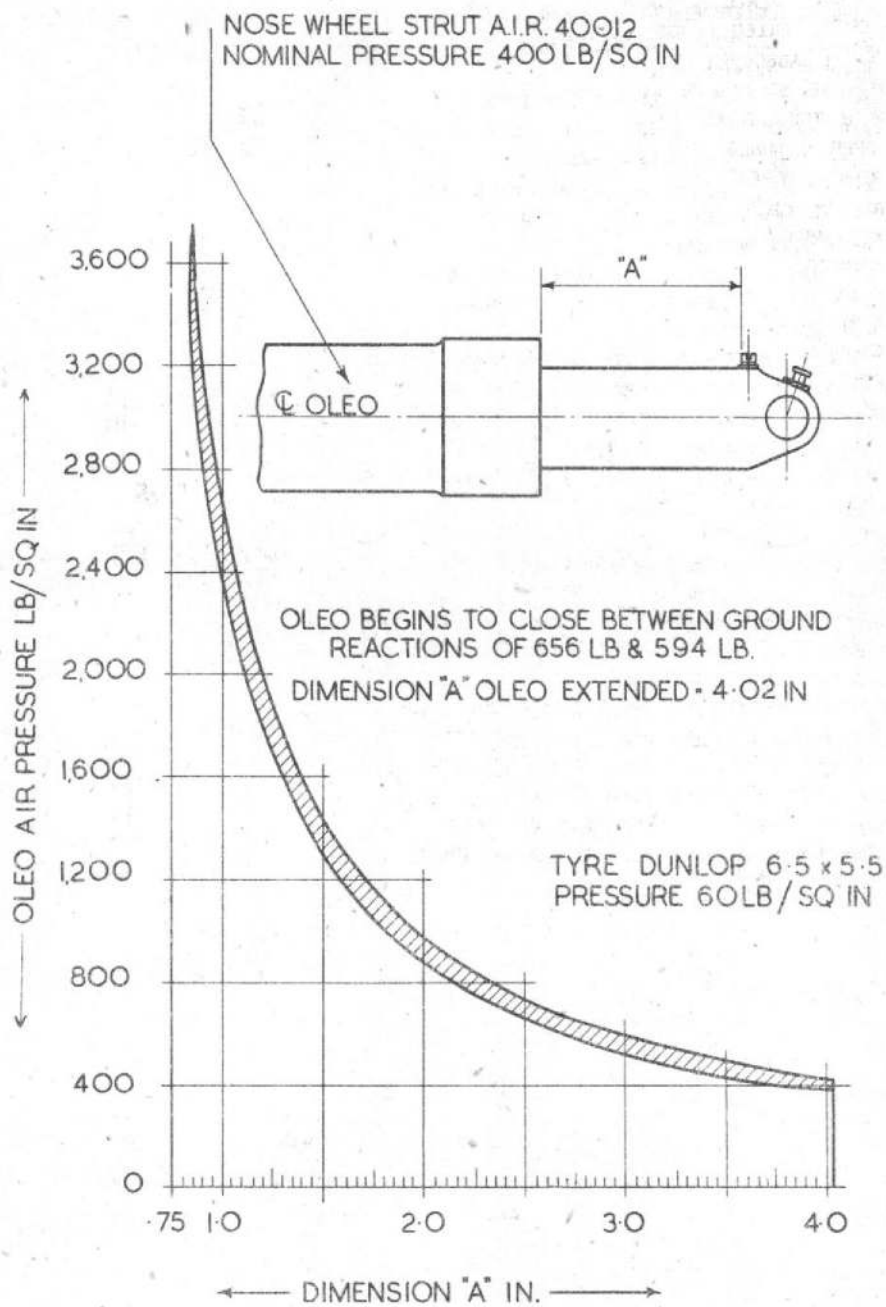


FIG
14

NOSE WHEEL INFLATION DIAGRAM

FIG
14

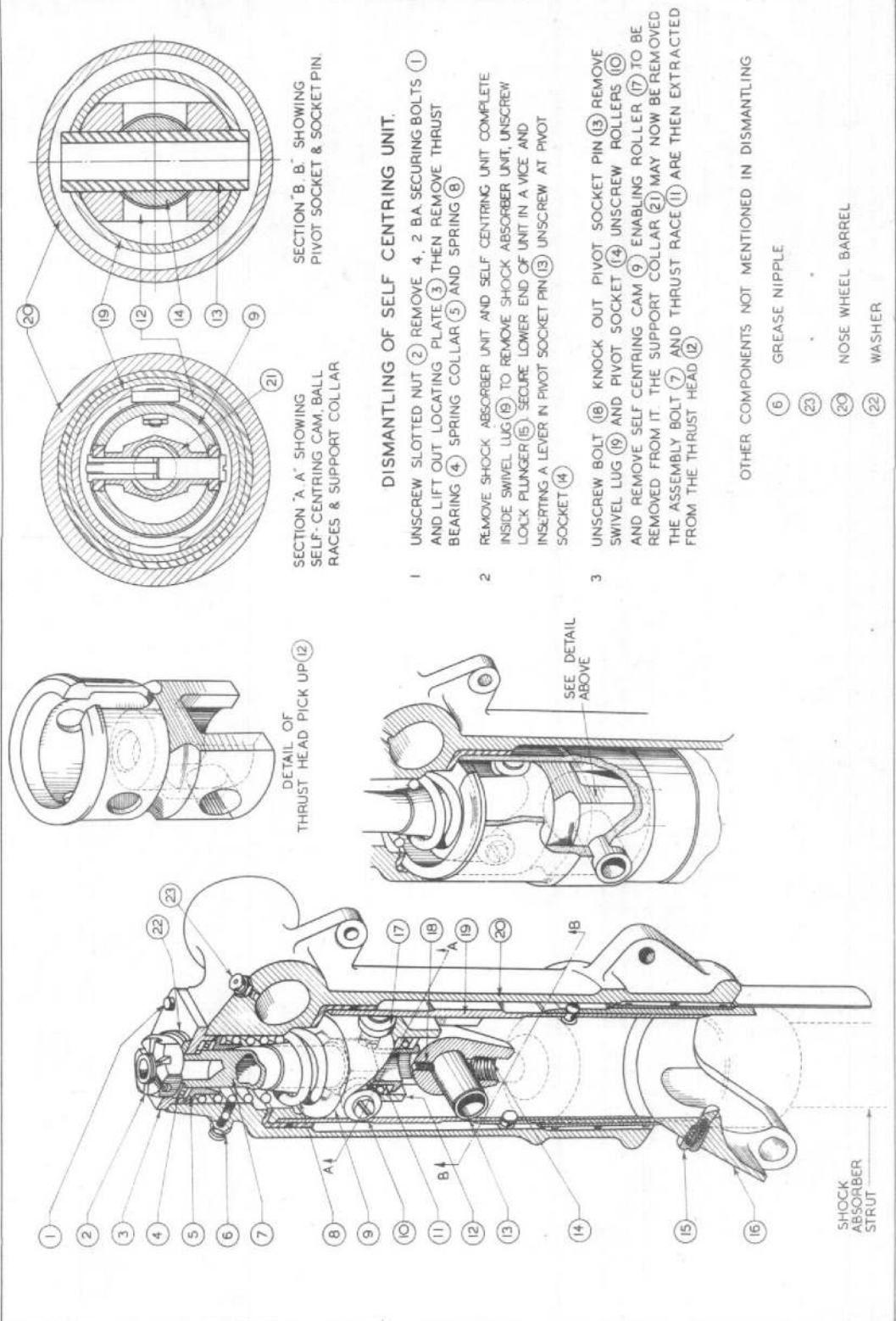
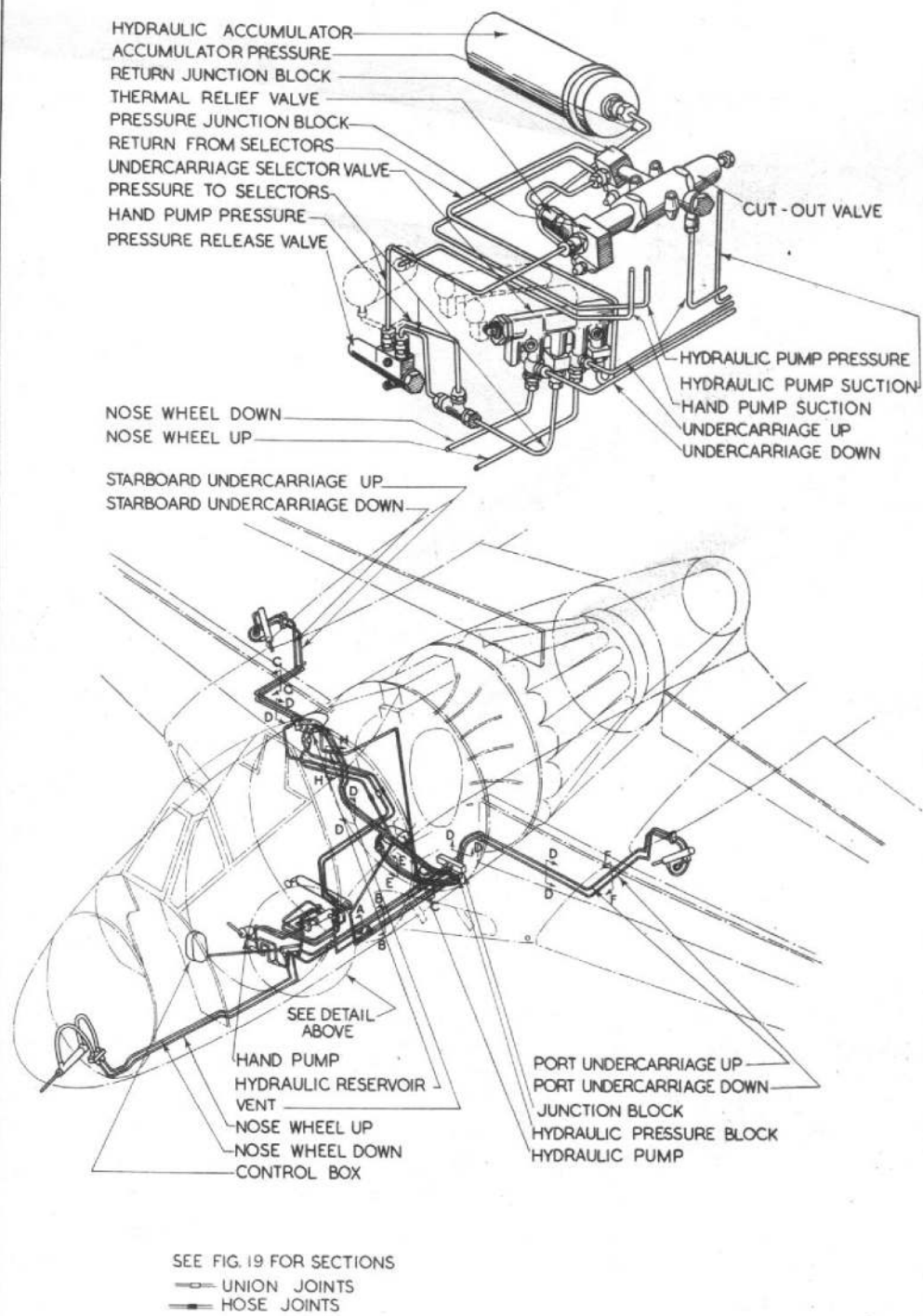


FIG 15

SELF CENTRING UNIT

FIG 15



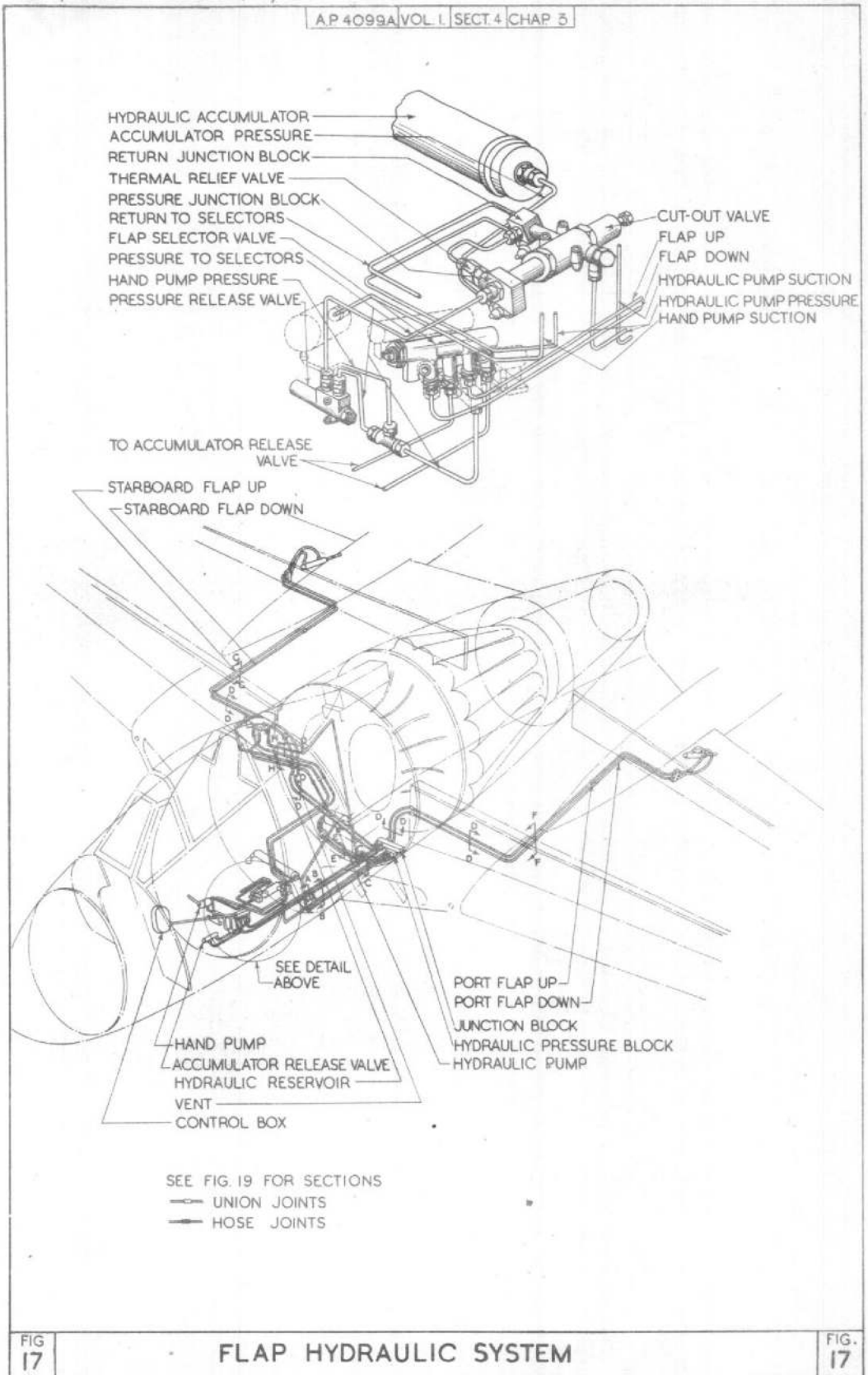
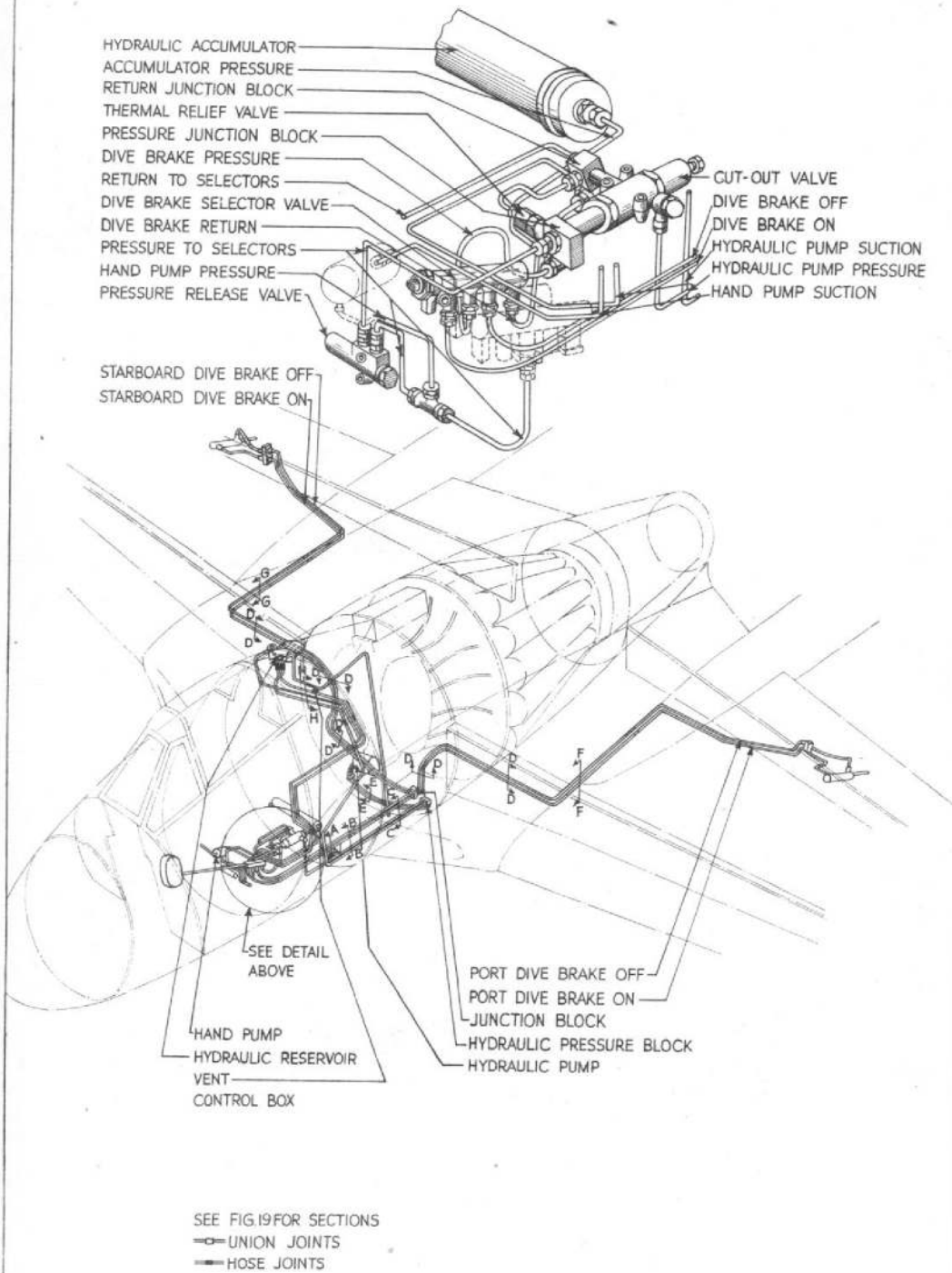
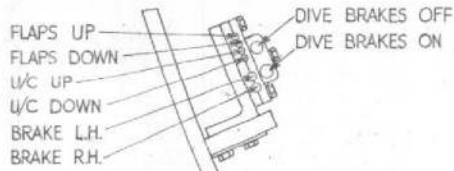


FIG 17

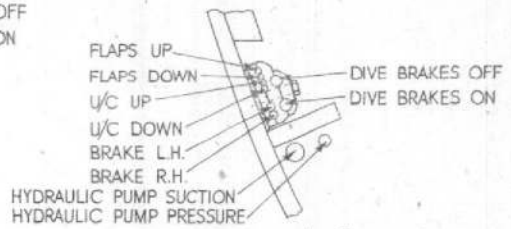
FLAP HYDRAULIC SYSTEM

FIG. 17

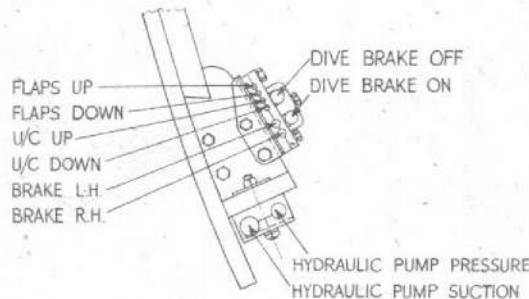




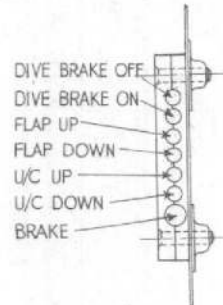
SECTION "A-A"



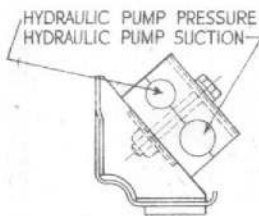
SECTION "B-B"



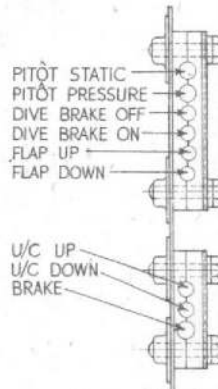
SECTION "C-C"



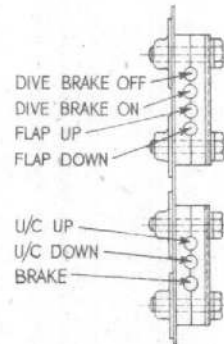
SECTION "D-D"



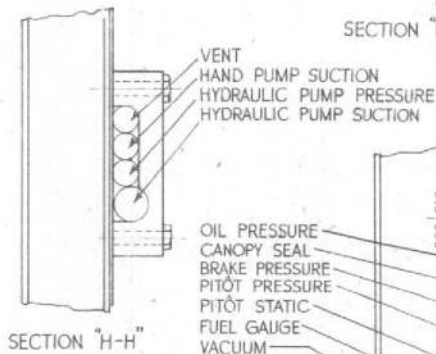
SECTION "E-E"



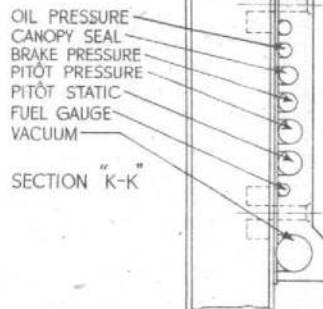
SECTION "F-F"



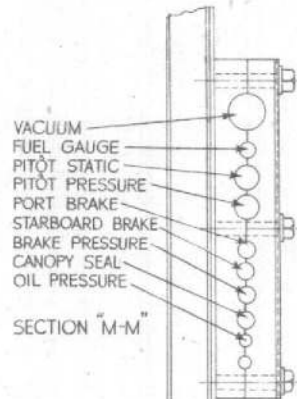
SECTION "G-G"



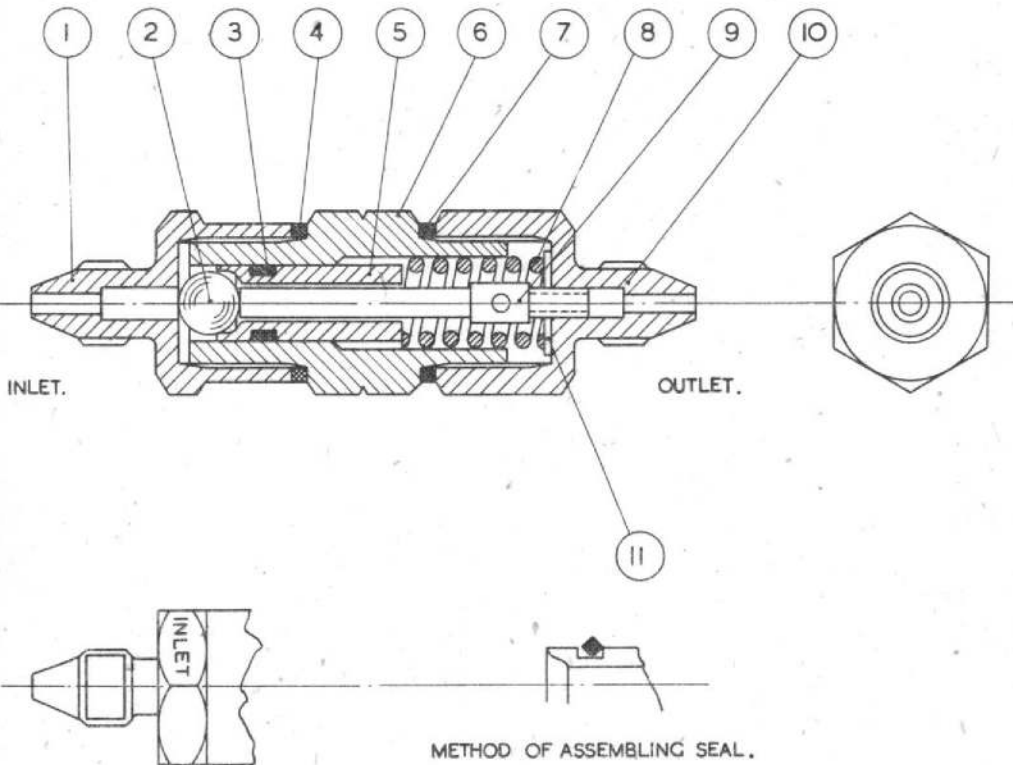
SECTION "H-H"



SECTION "K-K"

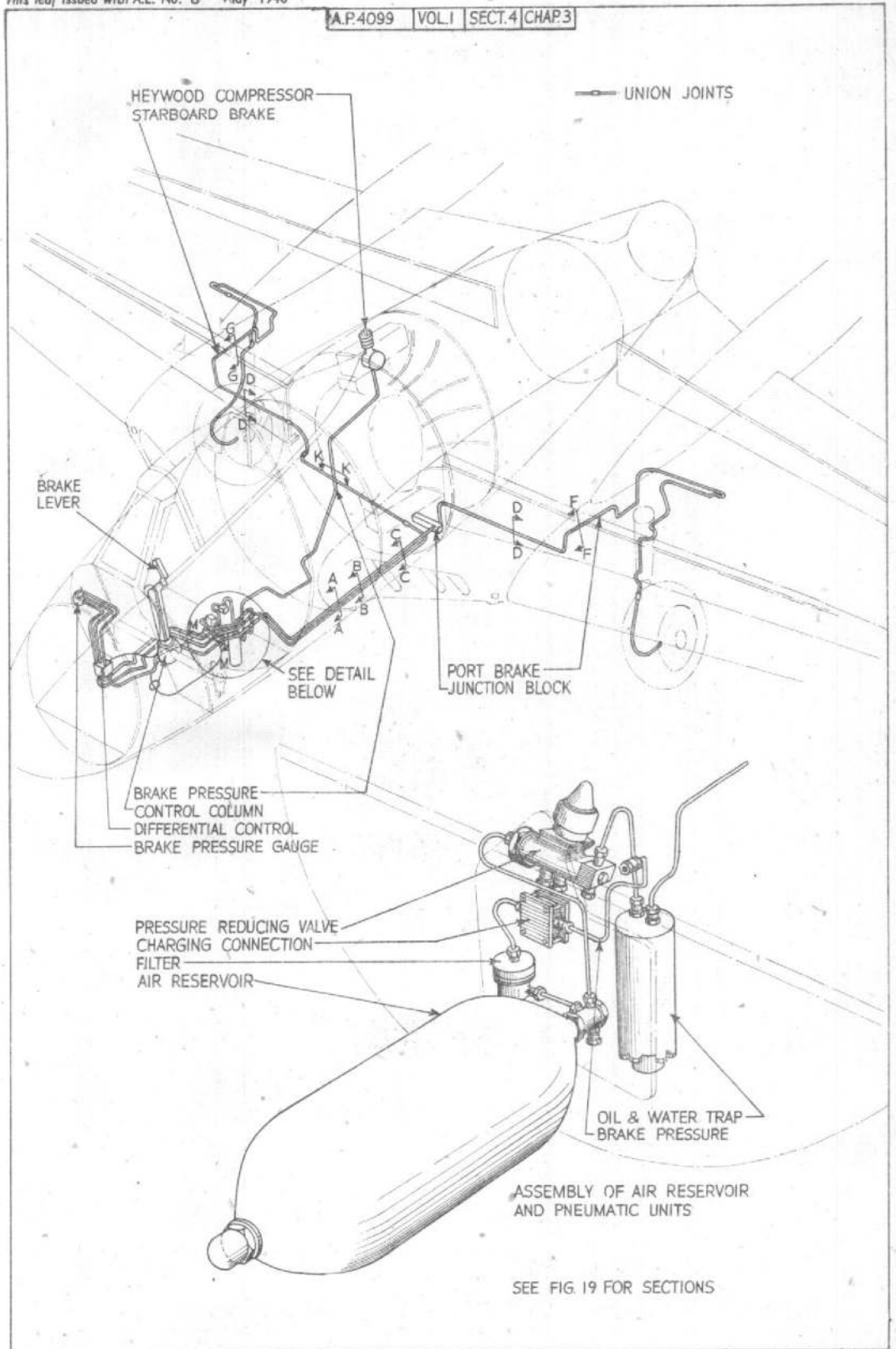


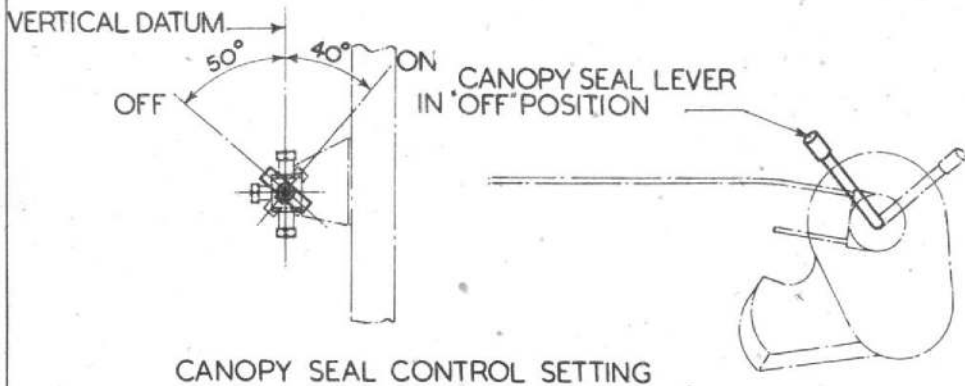
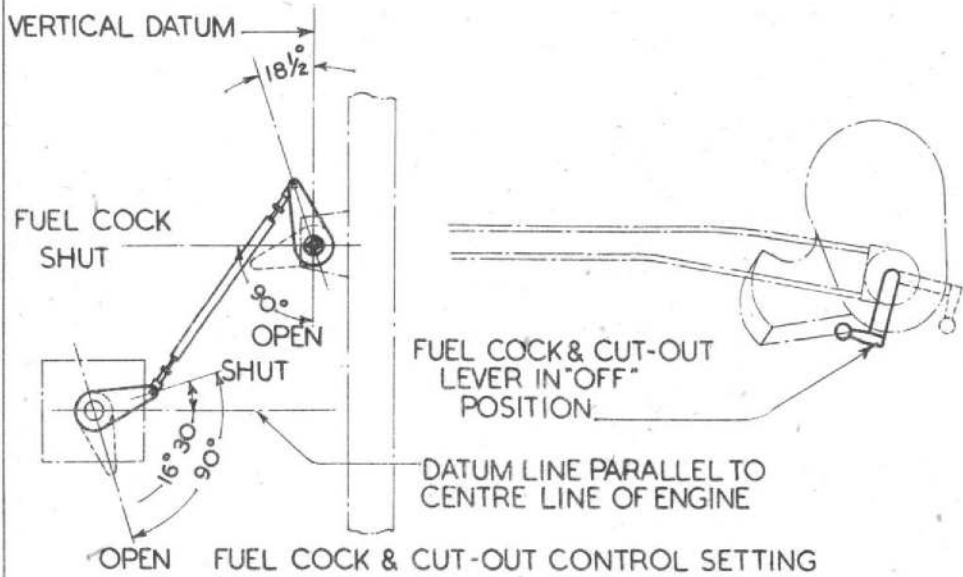
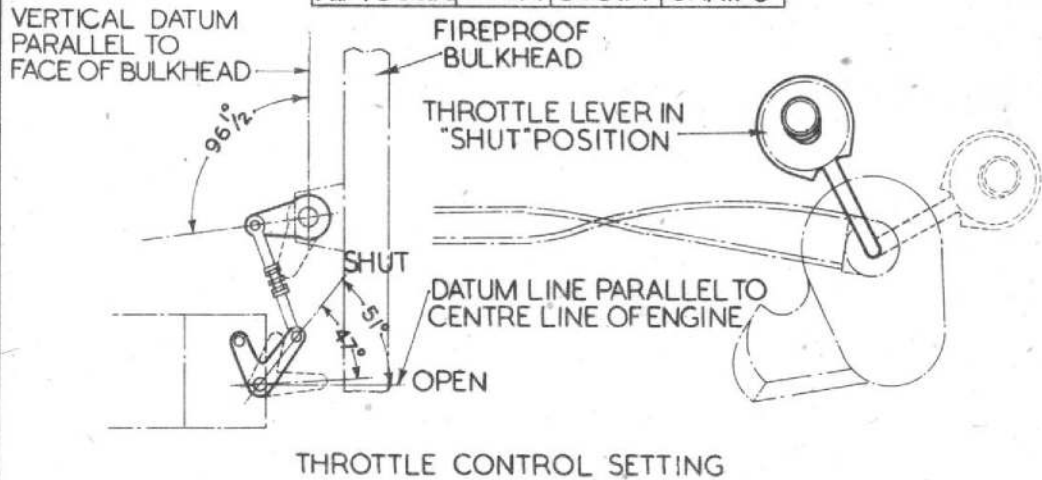
SECTION "M-M"



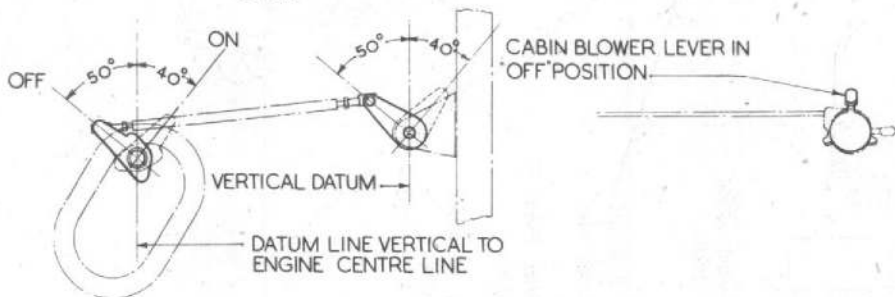
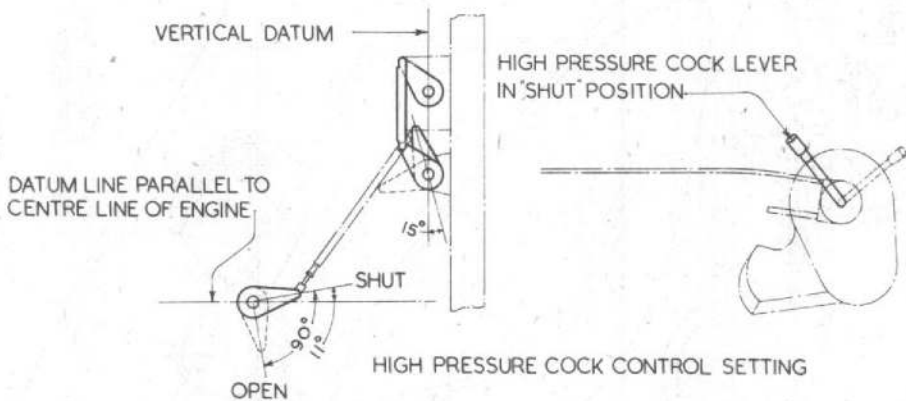
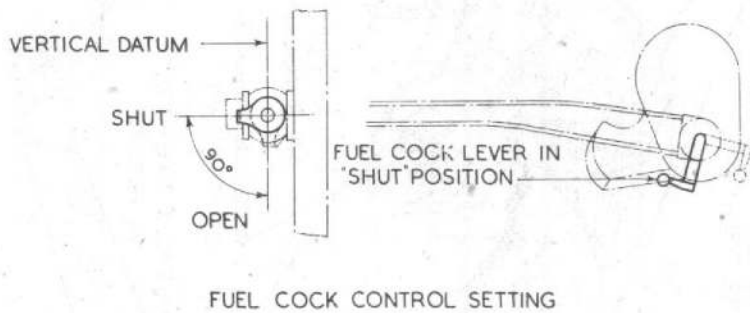
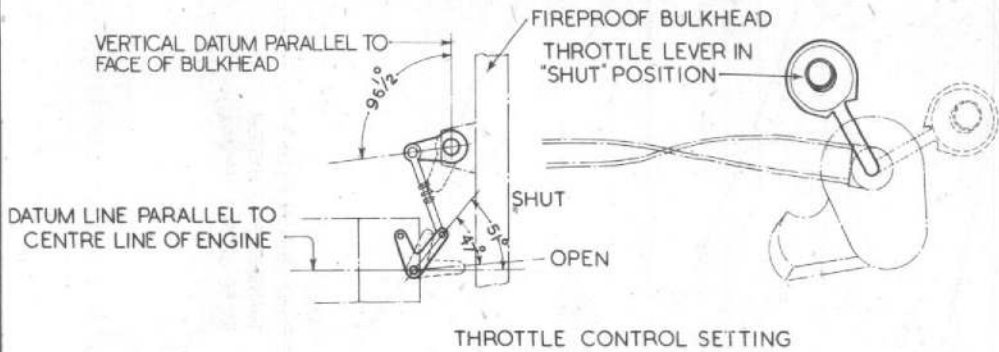
DISMANTLING OF THERMAL RELIEF VALVE.

- 1 HOLD THE VALVE BODY (6) WITH AN OPEN ENDED SPANNER & UNSCREW THE TWO VALVE CAPS.
- 2 REMOVE THE BALL (2) PUSH ROD (9) WASHER (11) AND SPRING (8)
- 3 PUSH THE SLEEVE (5) OUT OF THE BORE OF THE VALVE BODY.



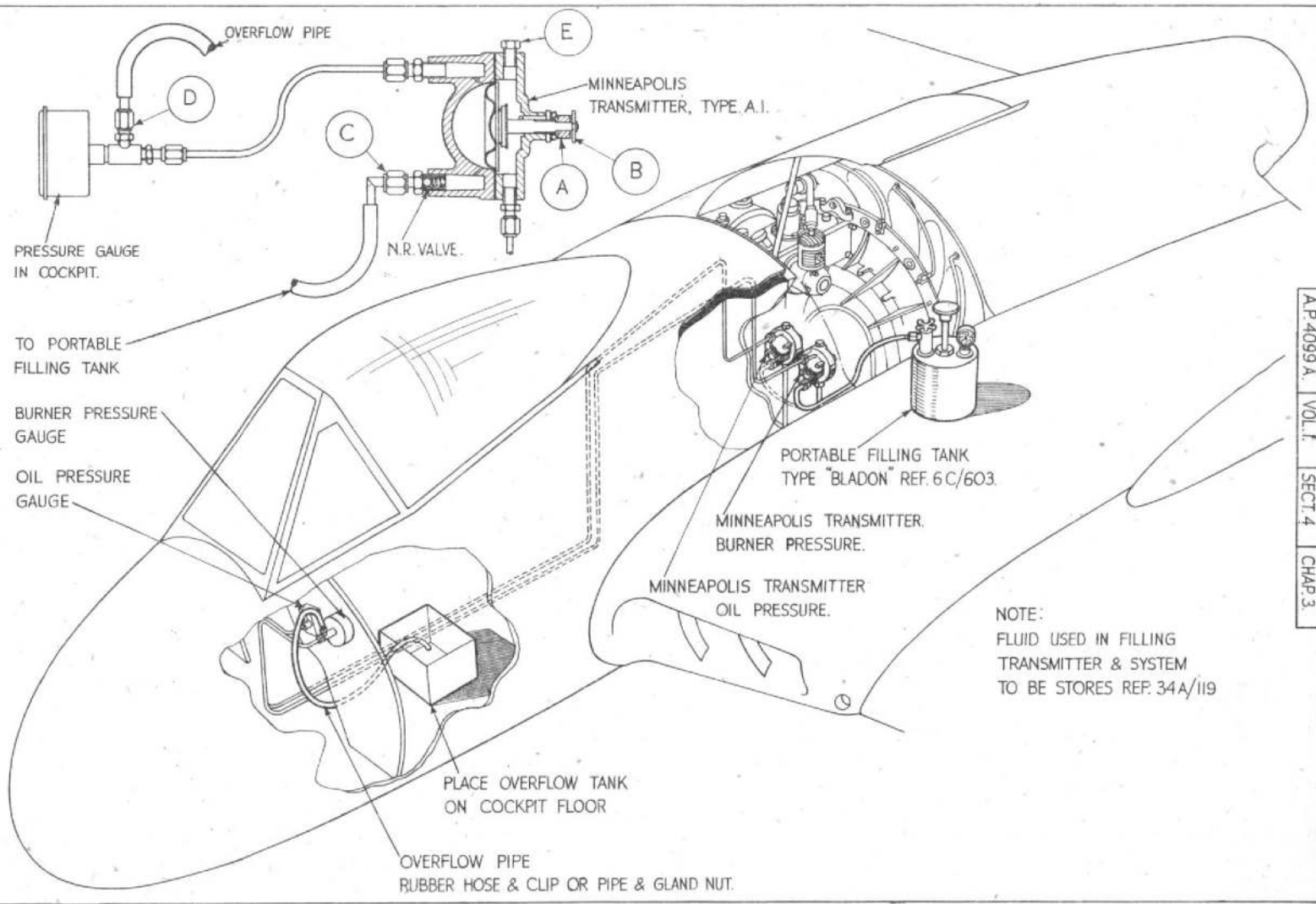


THIS DRAWING APPLIES TO FIRST 50 AIRCRAFT ONLY



CABIN BLOWER CONTROL SETTING
THIS DRAWING APPLIES TO 51ST & SUBSEQUENT AIRCRAFT ONLY

FIG. 24



MINNEAPOLIS TRANSMITTER.

FIG. 24

RE-EXAM

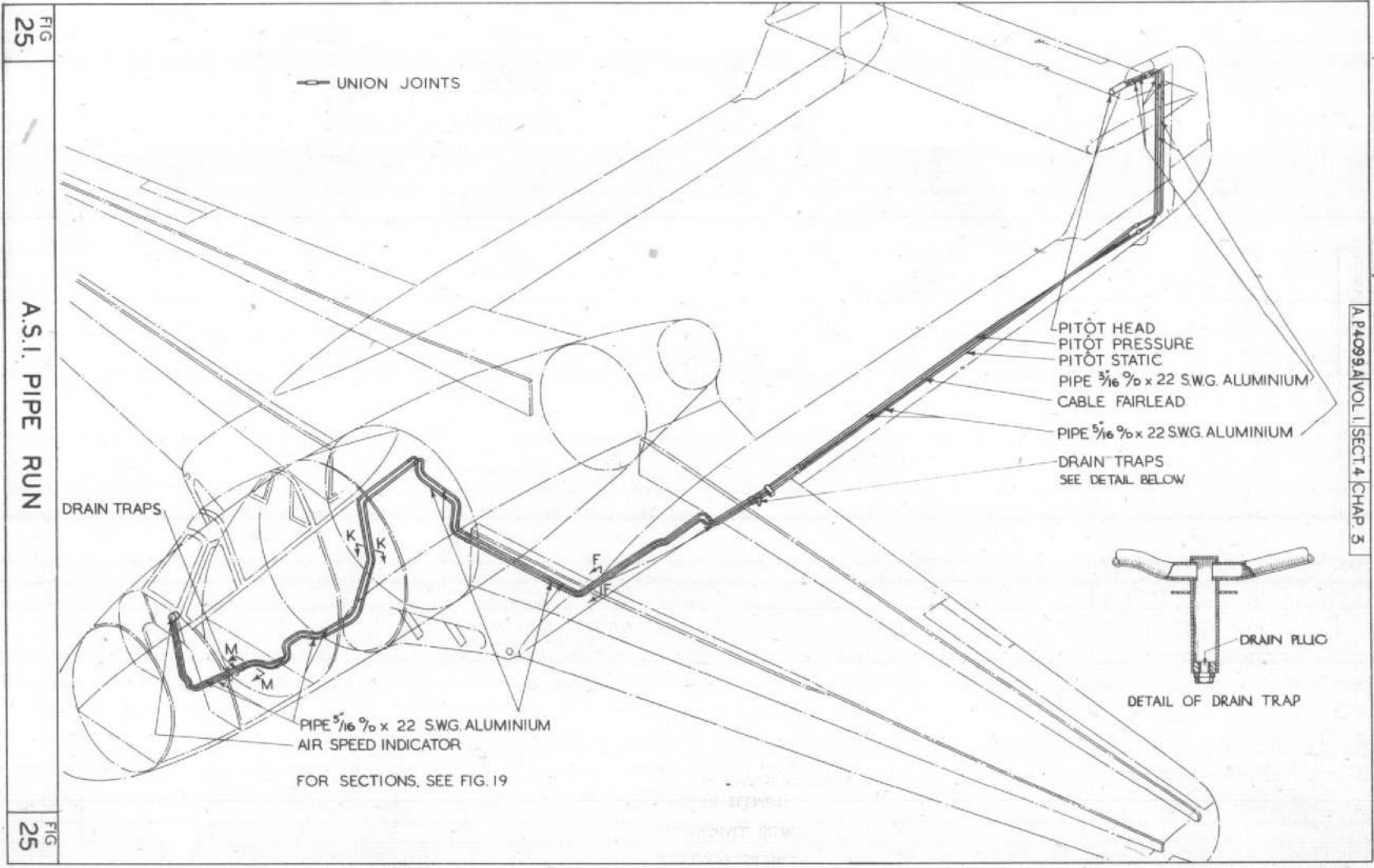


FIG 25

A.S.I. PIPE RUN

FIG 25

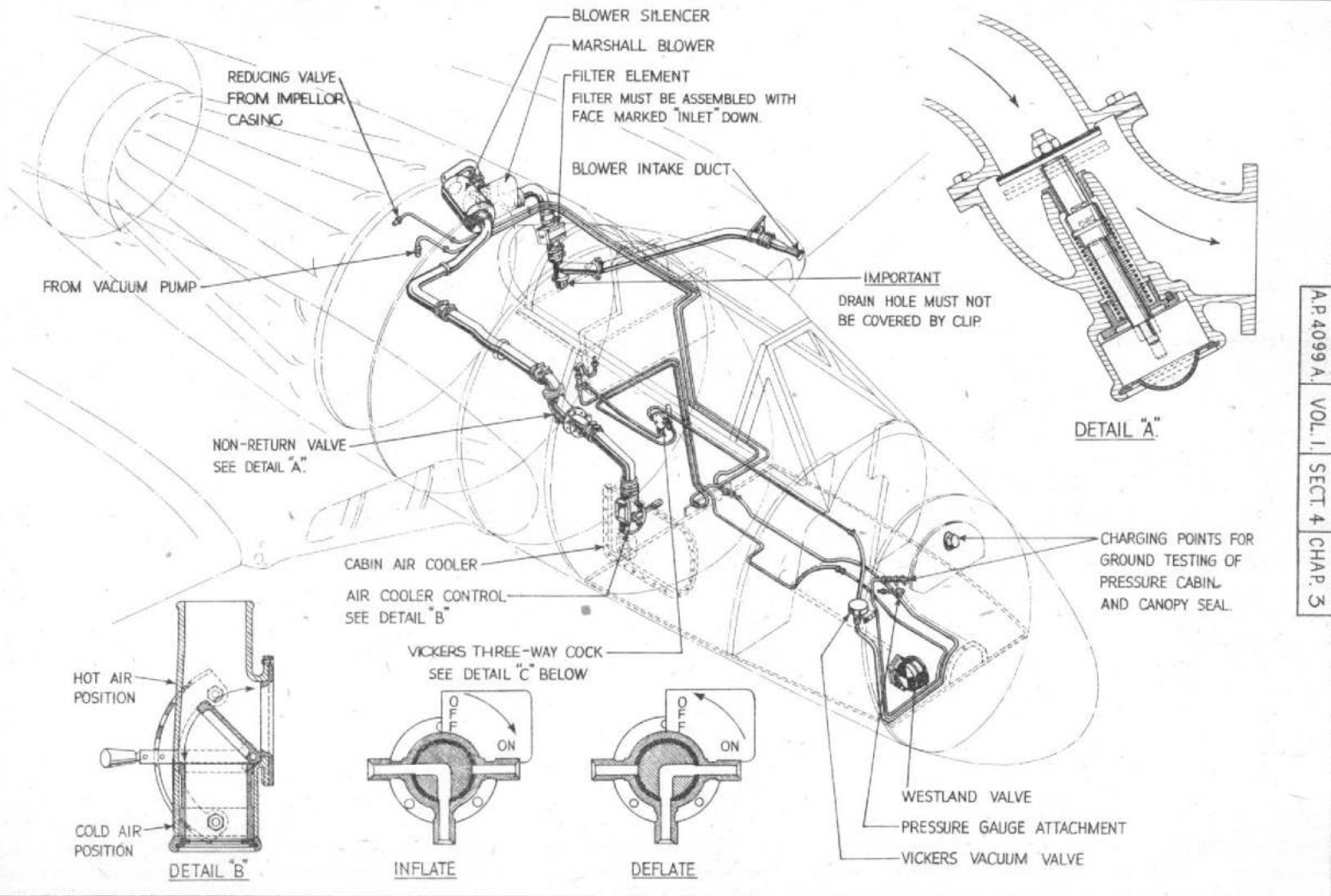
G587 M12219 6/46 325 C.D.S. LTD. G.P.S.

FOR SECTIONS, SEE FIG. 19

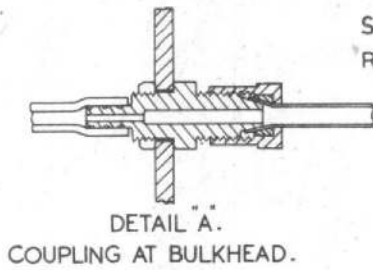
FIG. 26

PRESSURE CABIN AIR SYSTEM.

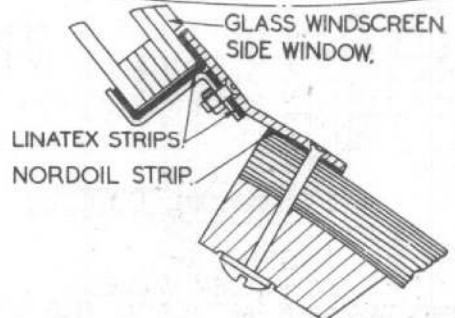
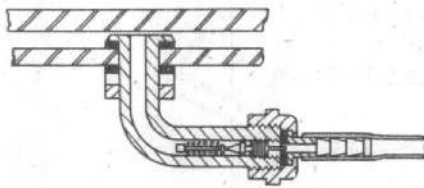
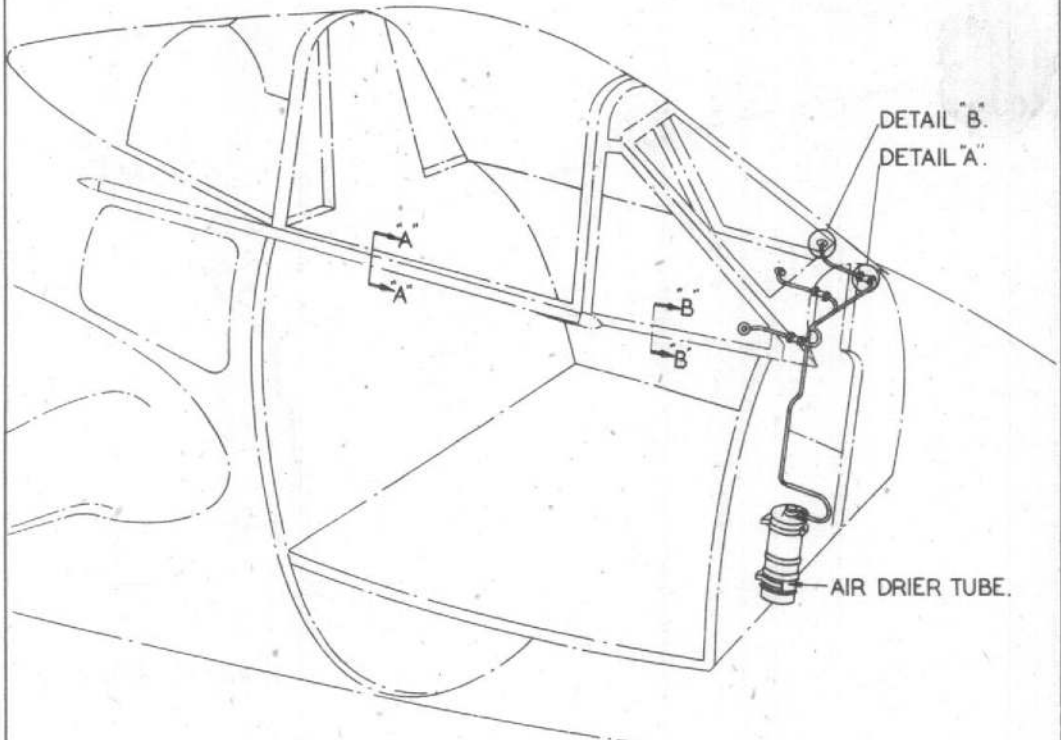
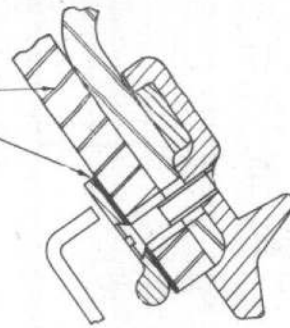
FIG. 26



AP 4099 A VOL. I SECT. 4 CHAP. 3



SLIDING CANOPY.
RUBBER STRIP.

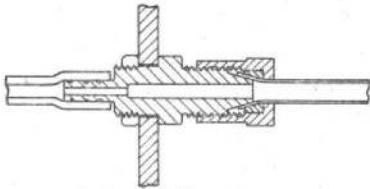


THIS DRAWING APPLIES TO THE FIRST 50 AIRCRAFT ONLY.

FIG
27

AIR DRIER SYSTEM (I)

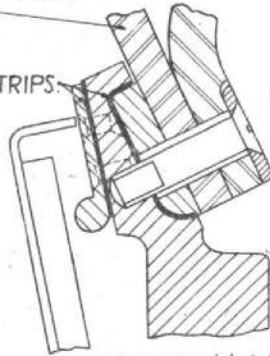
FIG
27



DETAIL 'A'
COUPLING AT BULKHEAD.

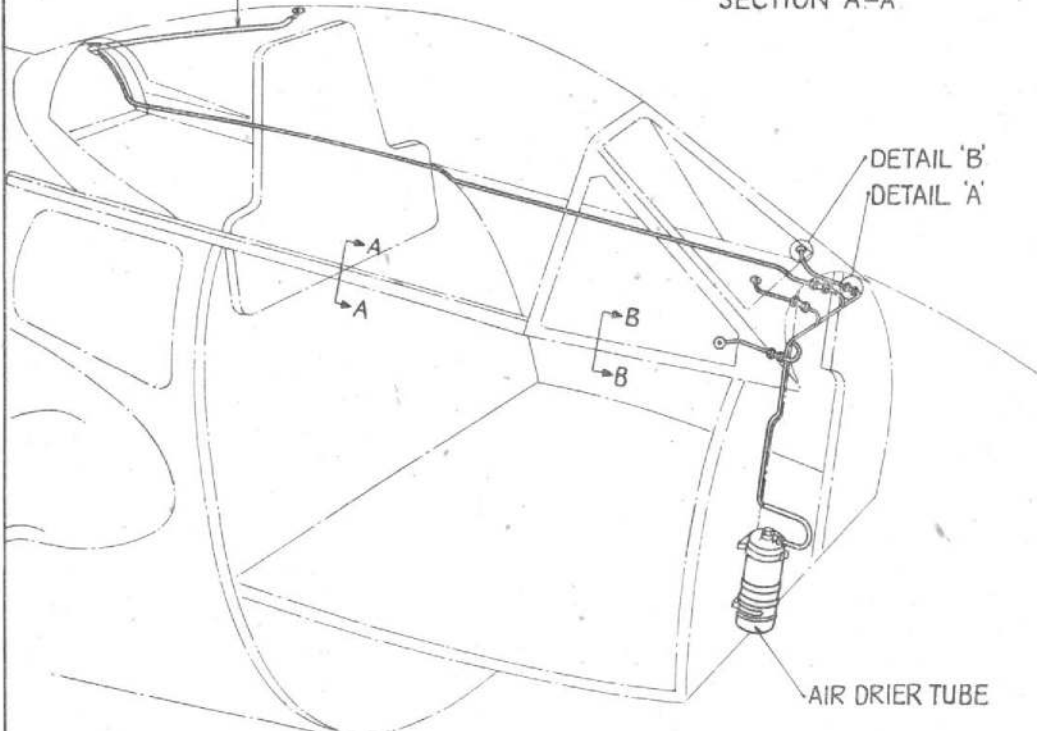
PERSPEX SLIDING
CANOPY.

LINATEX STRIPS.



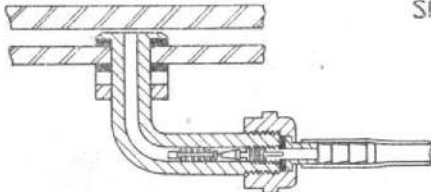
SECTION 'A-A'

FLEXIBLE TUBING



DETAIL 'B'
DETAIL 'A'

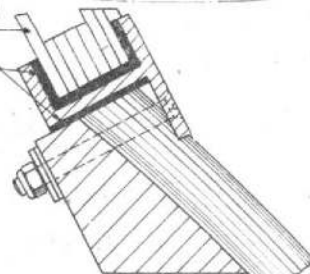
AIR DRIER TUBE



DETAIL 'B'
SCHRADER VALVE

GLASS WINDSCREEN
SIDE WINDOW

LINATEX STRIPS



SECTION 'B-B'

THIS DRAWING APPLIES TO THE 51ST
AND SUBSEQUENT AIRCRAFT ONLY.

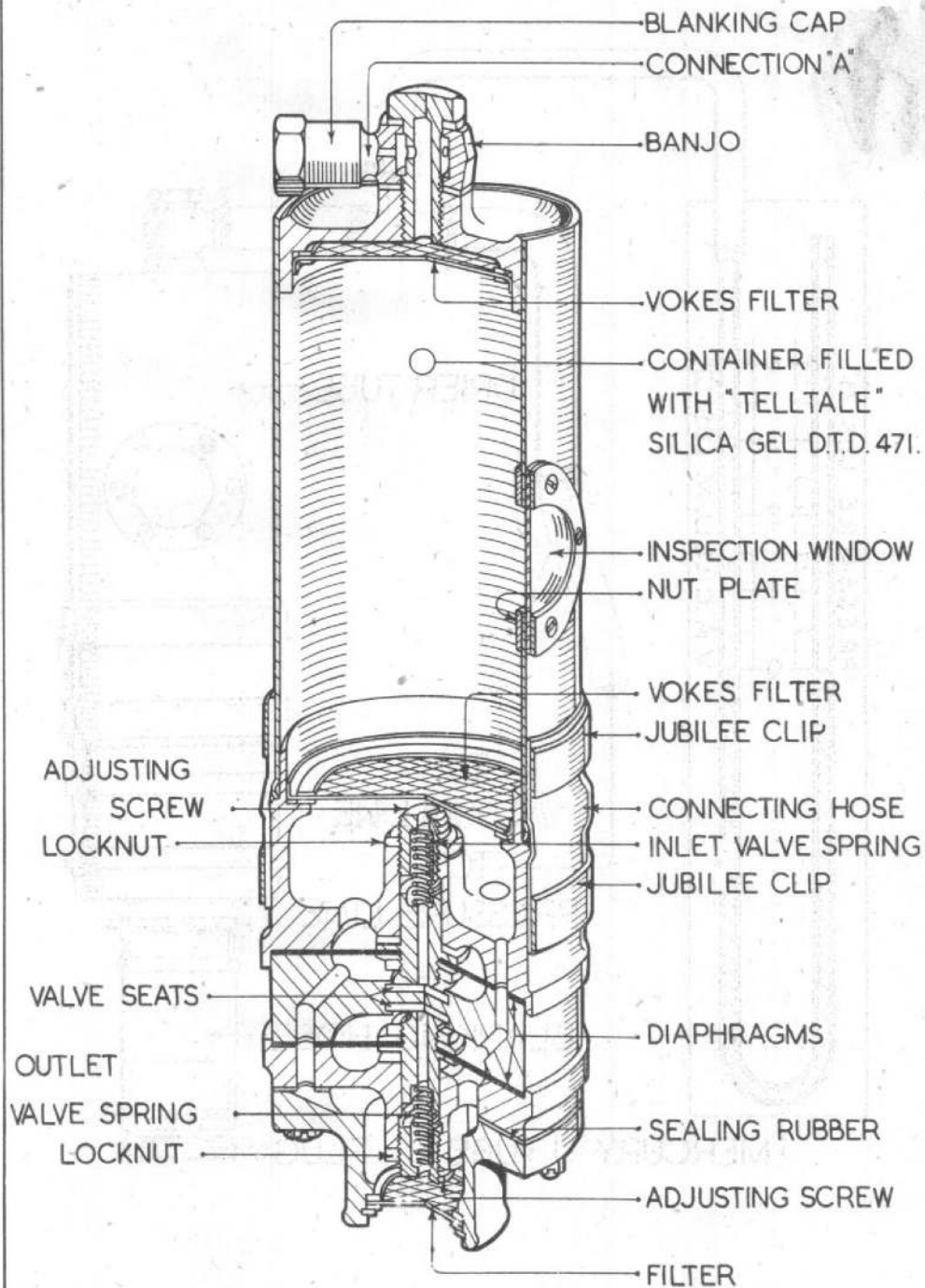


FIG 29

DRIER TUBE

FIG 29

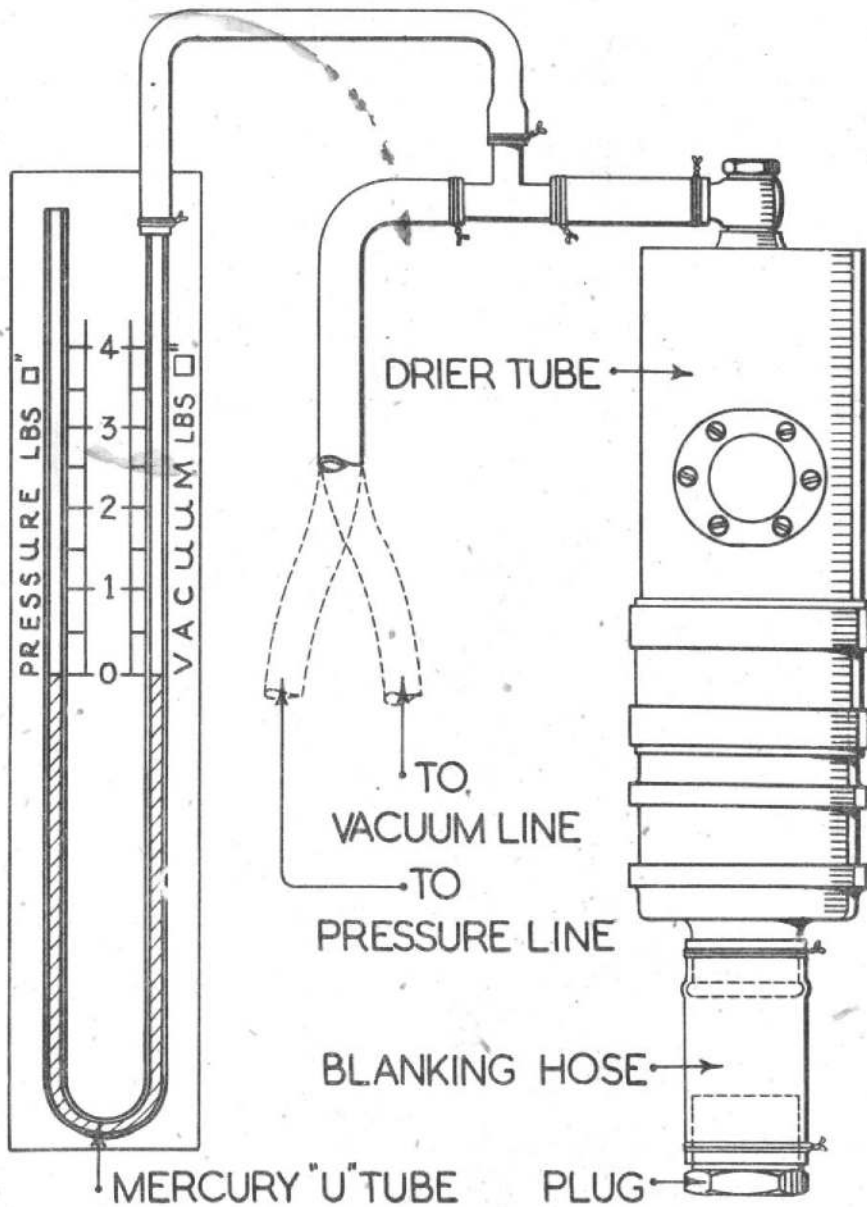


FIG 30

DRIER TUBE TEST

FIG 30

This file was downloaded
from the RTFM Library.

Link: www.scottbouch.com/rtfm

Please see site for usage terms,
and more aircraft documents.

