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VAMPIRE MK. 30 & 31

DESCRIPTIVE AND SERVICING MANUAL

NENE 2—V.H. AUST.

ISSUED FOR THE INFORMATION
AND GUIDANCE OF ALL CONCERNED
BY COMMAND OF THE AIR BOARD

SECRETARY.

AIR FORCE HEADQUARTERS, MELBOURNE, S.C.1.

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AMENDMENT RECORD SHEET

The AMENDMENTS promulgated in the undermentioned Amendment Lists have been made in this publication.

Amendment List		Amendments Made By	Date
No.	Date		
4.L.2.	SEPT 57.	W.J. Tyce. Tech. Rdo.	1.10.57

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A.A.P.781.20:02, Vol. 1:
Installation, Operation and Maintenance Handbook for Radio Compass, A.D.F.-14

A.A.P.829:
Loading and C.G. Data

A.A.P.839:
Pilot's Notes—Vampire Mk. 30—31

A.A.P.861:
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Aeroplane Maintenance Schedule, Mk. 30-31 Vampire—Nene Part 1 and 2

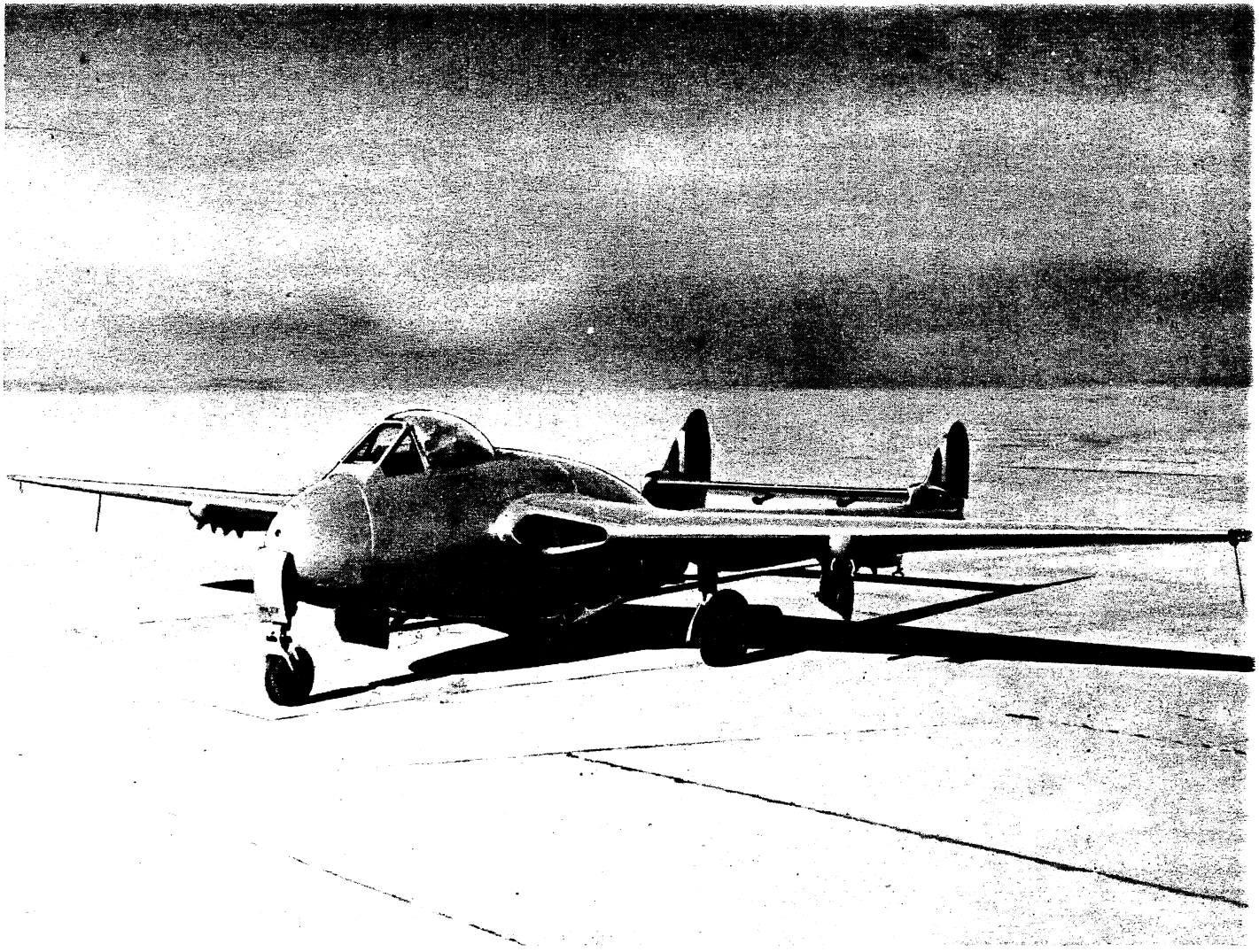
NOTE

From time to time Air Board and R.A.A.F. Technical Orders and Instructions are issued and may affect the subject matter of this publication.

The Order or Instruction is the overriding authority where it contradicts this publication and these changes will be advised by amendment list to bring publication into line.

List of Sections

(A detailed Contents List is given at the beginning of each Section or Chapter)



VAMPIRE MK. 31

INTRODUCTION

1. The VAMPIRE Mk. 30 and Mk. 31 are both mid-wing, single-engined, jet propelled single-seater fighters with twin tail booms and a tricycle landing gear. Each is powered by a Nene 2 V.H. AUST. turbo-jet engine, mounted at the rear of the fuselage. Both carry four 20 mm. guns. The Mk. 31 has provision for carrying eight Rocket Projectiles and two 1,000 lb. bombs.

2. Good all-round vision is provided by a perspex bubble-type sliding canopy which is jettisonable. A Martin Baker Mk. 2F(A) Ejector Seat is provided, and the pilot is protected by armour plate on bulkhead No. 2, a complete armour plate bulkhead forward of the instrument panel and a front windscreen of bullet-proof glass. The canopy and front windscreen are made with a dry-air sandwich to reduce frosting.

3. The flying controls are conventional in operation, the rudder pedals being of the pendulum type and adjustable fore and aft in flight. The controls are operated by means of cables and pulleys.

4. The ailerons and elevator are provided with servo tabs and, in the case of the elevator, the tab is also used for trimming, the trimming wheel being mounted on the engine control box in the cockpit. The rudder trim tabs are not servo operated, they may be adjusted on the ground to suit flying irregularities.

5. The fuselage is of oval cross-section which is tapered off into a cone shape by a metal fairing aft of the engine bulkhead. The construction is of balsa wood sandwiched between plywood sheets, and is made in two halves and joined down the top and bottom centres. The nose portion forward of the

armour-plate bulkhead No. 1 is constructed of alclad sheet.

6. The wing of the Mk. 30 aircraft is a metal cantilever structure with a channel section main spar and a false spar joined by alclad ribs and alclad skin covering. Extending aft from each wing is a metal tail boom, the front portion of which is built integrally with the wing structure. Each wing is attached to the fuselage by three bolts, two at the main spar end fittings at the (engine) No. 4 bulkhead, and one at the drag fitting at bulkhead No. 3. All attachment bolts are accessible by removing the wing root fairings.

Split flaps, dive brakes and ailerons are fitted to the wings.

The Mk. 31 aircraft is equipped with a strengthened clipped wing in order to provide for the larger loads involved due to the introduction of R.P. and Bomb Installations. The overall length of the wing is 12 inches shorter: this shortening also affects the length of the ailerons. The navigation lights and the V.H.F. radio aerial, which were positioned in the wing tip, are now installed between ribs 13 and 14.

7. The tail unit consists of metal-covered fins and rudder attached to each tail boom, with a metal cover tailplane and elevator attached between the two fins.

8. The landing gear is a tricycle undercarriage consisting of two wheels which retract outward into the wing, and the nose wheel which retracts into the nose of the fuselage. The undercarriage and nose wheel are retracted and lowered hydraulically, and are mechanically locked in both positions. The brakes on each main undercarriage wheel are pneumatically operated. A larger diameter undercarriage jack is fitted to the Mk. 31 aircraft to allow the undercarriage to be retracted at the higher "take-off" speed caused by the increased weight. However, it may be noted that the above jack is desirable also for the Mk. 30 aircraft and is now being fitted restrospectively throughout.

9. The power unit is mounted on a tubular steel structure and attached with four bolts. The unit drives a Rotol gearbox mounted on the engine bulkhead, and this auxiliary gearbox in turn drives a 2,300 watt generator, Heywood compressor and Lockheed hydraulic pump.

10. Fuel is supplied to the power unit from an immersed fuel pump mounted in a collector box built inside (but accessible from underneath) the main fuselage tank, through a low-pressure cock and filter to the fuel pumps on the right-hand side of the engine wheel case.

11. The 24-volt, 2,300-watt generator supplies current for general services through the two 12-volt accumulators mounted in front of the engine bulkhead.

12. Cold air ventilation, cabin heating and pressurising are installed.

13. The radio equipment comprises a TR-1936 V.H.F. set and an A.D.F.-14 Radio Compass. The TR-1936 radio is installed in the ammunition bay behind the pilot's seat, and is accessible through a door on the port side of the fuselage above the leading edge of the wing. The controller for the TR-1936 set is mounted in the centre of the left-hand instrument panel, and the mic-tel socket is mounted on the centre seat pressing of bulkhead No. 2. The control unit for the A.D.F.-14 is mounted on the forward end of the starboard canopy rail. The tuner is situated on the floor to the left of the pilot's seat, while the amplifier is mounted on the port ammunition bay door. The D.F. loop is installed in the nose beneath the detachable nose panel and the sense aerial is attached to the rear fairing of the sliding canopy.

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Leading Particulars

NOTE: The Leading Particulars should be read in conjunction with Fig. 1, "General Arrangement."

Name ..... Vampire Mk. 30 & 31
Type ..... Single-seater, single-engined, jet propelled mid-wing monoplane.
Duty ..... Interceptor fighter.

PRINCIPAL DIMENSIONS:

(Aircraft dimensions relative to fuselage datum except where stated.)

	Mk. 30	Mk. 31
Span	40 ft. 0 in.	— 38 ft. 0 in.
Length, overall	30 ft. 9 in.	
Height, above static ground line and over fin and rudder	6 ft. 2 in.	
Wings:		
Aerofoil Section	Thickness grading EC1240 series Camberline: Constant load up to 0.4 Chord, Linear decrease to zero at T.E.	
Chord, at fuselage side 4.68 ft. from fuselage centre line	102.17 in.	
Chord, at Tip, 18 ft. from fuselage centre line	42.79 in.	
Incidence	Zero to fuselage datum.	
Dihedral, measured on top skin at front span	1° 15'.	
Sweepback	48in 240 (11° 19').	
Tail Plane:		
Span	9 ft. 4 in.	
Chord, without elevator	34.00 in.	
Chord, including elevator	47.50 in.	
Incidence	Zero to fuselage datum.	
Fuselage:		
Width (maximum)	4 ft. 6 in.	
Height (maximum)	4 ft. 6 in.	
Length, over jet orifice fairing	19 ft. 2 in.	
Areas:		

		Mk. 30	Mk. 31
Wing, mainplane gross		266 sq. ft.	262 sq. ft.
Ailerons	(Total)	15.8 sq. ft.	15 sq. ft.
Aileron Trim Tabs, each surface 0.746 sq. ft.	(Total)	1.492 sq. ft.	1.492 sq. ft.
Flaps, each surface 10.4 sq. ft.	(Total)	20.8 sq. ft.	20.8 sq. ft.
Dive Brakes, each surface 2.96 sq. ft.	(Total)	5.92 sq. ft.	5.92 sq. ft.
Tailplane, with elevator		37.00 sq. ft.	37.00 sq. ft.
Tailplane		26.5 sq. ft.	26.5 sq. ft.
Elevator, with tab		10.5 sq. ft.	10.5 sq. ft.
Elevator		9.835 sq. ft.	9.835 sq. ft.
Elevator Tab		0.665 sq. ft.	0.665 sq. ft.
Fins, each surface 4.66 sq. ft.	(Total)	9.32 sq. ft.	9.32 sq. ft.
Rudders, with tab, each surface 2.31 sq. ft.	(Total)	4.62 sq. ft.	4.62 sq. ft.

SETTINGS AND RANGES OF MOVEMENT OF CONTROL SURFACES:

Aileron	15° 36′ up, 10° 31′ down. ± 1° 18′.
Aileron Tab	.85 in. up, 1.2 in. down.
Flaps	80° up ± 3°.
Dive Brakes	73° up ± 3°.
Elevator	19° up, 10° 20′ down. ± 1° 7′.
Elevator Tab	6° up, 18° down. Pre D.H. Aust. Mod. V.90. 8° up, 22° down. Post D.H. Aust. Mod. V.90.
Rudder	24° 36′ each way ± 1°.
Rubber Tab	Ground trim only.

LANDING GEAR:

Type	Tricycle, all wheels retracting.

MAIN UNDERCARRIAGE:

Track	11 ft. 3 in.
Brakes	Dunlop pneumatic.
Shock Absorber Units	Lockheed A.I.R. 51756 L.H., 51757 R.H. with synthetic rubber seals for oil OM-15. Inflation 350 lb./sq. in.
Wheels	Dunlop AH 9139.
Brake Units	Dunlop AH 9140.
Tube, Inner	Dunlop FC 7.

NOSE UNDERCARRIAGE:

Shock Absorber Unit	Lockheed A.I.R. 40012. Inflation 500 lb./sq. in.
Wheel	Dunlop A.H.O. 17219/9.
Tyre	Dunlop N.R.F. 30: 6.5 x 5.5 T.C.
Tyre Pressure	Inflation 60 lb./sq. in.

POWER PLANT

Engine	Rolls Royce Nene 2-V.H. Aust.
Type	Turbo jet.
Fuel	Aviation kerosene to Specification D. Eng. R.D. 2482 (Ident. No. K1/10019).
Engine Oil	Spec. D. Eng. R.D. 2490 OM-11 (Ident. No. K2/248).
Auxiliary Gear Box Oil	Spec. D.E.D. 2479/1 OEP-71 (Ident. No. K2/214).

TANK CAPACITIES:

Fuel Tanks:

Fuselage Tank		96 gall.
Wing Tanks No. 1	(2 x 52 gall.)	104 gall.
Wing Tanks No. 2, Wing Tanks No. 3, Wing Tanks No. 4	(2 x 65 gall.)	130 gall.
Wing Drop Tanks	(2 x 100 gall.)	200 gall.
TOTAL (with 2 x 100 gall. drop tanks)		530 gall.

Oil (in Power Unit Sump only)	10 pints.
Hydraulic Tank	1 gall.
De-Icing Fluid Tank, to R.A.A.F. technical requirement Spec. K22 (Ident. No. K4/10332)	3 pints.

HYDRAULIC AND PNEUMATIC PRESSURES:

Hydraulic System:

Fluid	Spec. D.T.D. 585, OM-15 (Ident. No. K2/138).
Accumulator Initial Air Pressure	1,250 lb./sq. in.
Cut-out Valve	2,400-2,500 lb./sq. in. − 100 + nil.

Pneumatic System:

At Air Compressor and Cylinder	450 lb./sq. in.
After First Reducing Valve	200 lb./sq. in.
At Each Brake	120-150 lb./sq. in.

PRESSURE HEAD SETTINGS:

Position (Pressure Head)	L/E of port fin.
Incidence	Zero to fuselage datum.
Distance from Centre-Line of Aircraft	58 in.
Distance ahead of Leading Edge	11.9 in.
Distance from top of Fin to Centre-Line of Cover	3.0 in.
Tolerance on Angular Setting	± 2 deg.

SECTION I

PILOT'S CONTROLS AND EQUIPMENT

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PILOT'S CONTROLS AND EQUIPMENT

LIST OF CONTENTS

Pilot's Controls and Equipment

Introduction

14. (i) This Section serves as a general guide to the location of all the controls, equipment and instruments in the pilot's cockpit, with the method of operating the controls wherever this is not obvious. The various main systems are covered in full in their appropriate Sections.

(ii) Some emergency controls are included in their appropriate groups, but reference must be made to Section 2 for details of their operation.

Entry to Cockpit

15. The only entry to the cockpit is when the canopy is fully open; the operating handle (Fig. 5) on the right hand coaming is rotated to open or close the canopy. When opening the canopy, the initial turn of the handle will partially operate the canopy seal lever, to warn the pilot that it must be turned OFF before opening the canopy. To open or close the hood from the outside of the fuselage, press the button on the starboard side, marked PRESS RED BUTTON TO RELEASE HOOD, and slide the canopy as desired.

Pilot's Seat

16. (i) The standard S.B.A.C. seat has now been replaced in all aircraft by the Martin Baker Mk.2F (A) Ejection Seat, a full description of which, together with servicing instructions, is given in A.P.4288 B Vol 1, Sect. 4.

(ii) Safety harness gear is fitted and movement of the lever projecting from the starboard thigh guard will permit the pilot to lean forward when required.

Cabin Seal

17. The canopy is fitted with a pneumatically-operated rubber seal, which is provided to exclude draughts and permit cabin pressurising. The seal is inflated when the canopy seal lever is moved to the ON position. The seal should only be inflated when the sliding hood is closed, and MUST be deflated before the hood is opened. The lever is situated on the starboard side of the cockpit. (Fig. 5.)

Cockpit Heating

18. Cockpit heating is provided and is controlled by a cabin blower air lever which is marked OFF-HOT-COLD, mounted on the starboard cockpit wall, to the rear of the main electrical panel. (Fig. 5.)

Cockpit Ventilation

19. An adjustable cold air ventilator is fitted on the left-hand cockpit wall, beneath the coaming. (Fig. 5.) This cold air is available if the cabin is unpressurised or if the "Ram" effect exceeds the cabin pressure.

Cabin Pressurising

20. (i) The pressurising air is supplied to the cabin from the engine impeller casing through the cabin blower air control. The air is cooled, when required, before being admitted to the cabin by passing over a radiator in the starboard cockpit wall. The pressure is automatically controlled by a Normalair Cabin Pressure Control Valve MK.11 which starts pressurising at about 10,000 ft. if the cabin blower air control is ON (Fig. 5) and (Fig. 107).

(ii) The cabin altimeter on the right-hand side of the instrument panel will show the altitude corresponding to the cabin pressure. (Fig. 5) and (Fig. 107).

Cockpit Lighting

21. The Dual System of cockpit lighting is used and consists of red lights for general cockpit and instrument illumination and ultra-violet lights for instrument panel illumination. The ultra-violet lights are controlled by one dimmer switch. The red lights are controlled by two dimmer switches, one of which operates the red light illuminating the main electrical panel, and the other operating the three remaining

red lights. The three dimmer switches are mounted on a wooden block on the port cockpit wall just below the canopy rail and forward of the pilot. (Fig. 5.)

An emergency light is fitted to the gyro-gunsight bracket, independently supplied by a small two volt accumulator and controlled by a toggle switch located on the port cockpit wall directly under the three cockpit light dimmer switches (see Fig. 6), for use in the event of electrical system failure.

Oxygen Supply

22. On aircraft (Pre D.H. Aust. Mod. V.229) a Mk. 11C regulator is fitted to the right-hand side of the instrument panel; the high pressure control cock is fitted on the oxygen regulator which controls the supply to the oxygen economiser. (Fig. 4).

A Mk. 16A Oxygen Regulator and automatic line valve are introduced on D.H. Aust. Mod. V.229. This regulator includes an aneroid controlled flow change switch which automatically changes from NORMAL to HIGH and the line valve automatically turns on the oxygen supply at 8,000 ft. altitudes in the event of the pilot failing to do so, thus providing additional safety features.

Pitot Head Heating

23. The switch is mounted on the main electrical panel (Fig. 2); when not required it should always be switched OFF.

FLYING CONTROLS AND EQUIPMENT

Control Column and Rudder Pedals

24. These are conventional in operation; the straight handle column carries the brake control lever and parking catch, gun firing trigger, camera firing switch and the R.P./Bombs release switch (Fig. 88). The Rudder Pedals are adjustable fore and aft by lifting them against the tension of the springs from one ratchet plate to another (Fig. 89).

Trim-tab Control

25. The elevator tab is the only controllable tab in the aircraft and it is controlled by a handwheel on the throttle control box. The indicator is on the top centre instrument panel on the left-hand side (Fig. 2). (For setting Ref. Para. 92.)

Wing Flaps Control

26. The operation of the wing flaps is controlled by a lever to the right of the undercarriage lever (Fig. 2). The lever has a quadrant marked FLAPS UP - NEUTRAL - DOWN, and should be manually-operated to the NEUTRAL position on the completion of an operation. Any flap angle up to 80° can be obtained by returning the lever to NEUTRAL when the desired angle is shown on the position indicator. The lever should be left in the UP position for flaps UP.

Dive Brakes

27. Above the undercarriage and flap control levers on the throttle control box (Fig. 2) is positioned the lever for operating the dive brakes. The lever quadrant is marked OFF - DIVE BRAKES - ON.

Wheel Brakes

28. The brakes are operated pneumatically and are applied by operation of the lever on the control column. Differential control is obtained by operating the rudder pedals with the control lever ON. A parking catch for locking the lever in the ON position is mounted next to the brake lever.

NOTE: The cable trunnion in the brake lever is to be assembled with anti-freeze grease, and thereafter lubricated with anti-freeze oil at each daily inspection.

Undercarriage Selector Lever

29. The undercarriage selector lever is positioned on the engine control box (Fig. 2) and has two positions only: UP or DOWN. It is held in the DOWN position by an electric solenoid plunger at the control box and cannot be raised until the aircraft is clear of the ground. There is, however, an undercarriage override switch positioned on the port cockpit wall aft of the engine control box for use in emergencies.

Undercarriage Indicator

30. The indicator is positioned on the instrument panel (Fig. 2) and the indicator lamps have dimmer screens for night flying. There is a red warning light fitted next to the R.P.M. indicator on the left-hand instrument panel.
Indications are:—

(i) Wheel units locked UP:
No lights.

(ii) Wheel units locked UP, but throttle less than ¼ open:
One RED light (next to the R.P.M. indicator).

(iii) Wheel units between UP and DOWN: Three RED lights (on the undercarriage indicator).

(iv) Wheel units locked DOWN: Three GREEN lights (on the undercarriage indicator).

When the main wheels are lowered the red lights do not go out until the DOWN lock is engaged. Ground locking devices are provided (see Fig. 11).

ENGINE AND ASSOCIATED CONTROLS

Throttle Control

31. The throttle control lever is mounted on the control box on the left of the pilot (Fig. 3). There is no position marked for maximum cruising (see Pilot's Notes). The throttle level controls a metering device in the control box of the power unit regulating the amount of the fuel which is admitted to the combustion chambers and, as the amount of fuel burned is also a governing factor for r.p.m., it is in every way like the normal hand-controlled throttle.

Starting Button

32. The starter button, and interlinked starter switches are positioned at the forward end of the main electrical panel (Fig. 3). There is a ground starter socket in the port inner flap shroud for the ground starter batteries.

Fuel Tanks

33. (i) The fuel is carried in nine main tanks (one fuselage and eight wing tanks) and two drop tanks (see para. 37), one suspended under each wing. The wing tanks are connected to a fuel collector box, built inside but at the bottom of the fuselage tank, by 1 inch bore fuel pipes. The wing drop tanks are pressurised for fuel transfer, from the engine compressor casing (Fig. 96). Fuel is fed into the main fuel tank from the wing tanks but there is no control over the rate of flow.

(ii) The fuel collector box also serves as a negative "G" reservoir holding approximately four gallons of fuel, and is fitted with a gravity valve which closes on inverted flight.

NOTE: The maximum time for inverted flight is 5 seconds.

(iii) Fuel passes through the immersed fuel booster pump in the collector box, through a low pressure cock and a filter to a pair of engine driven fuel pumps located on the right-hand side of the engine wheelcase.

33A. Each wing is fitted with four flexible, self-sealing and flame-proof tanks. These are manufactured from flexsyn synthetic rubber sheet, the outside covering being glass-cloth to specification DTD.797C or 639. They are moulded to fit around the wing ribs and are supported by the tank doors.

The capacity of the four tanks is 117 gallons. All tanks are inter-connected and fitted with an external venting system. All fittings are installed in the tanks with an inner stud ring assembly and clamp ring. Inspection ports are provided to facilitate interior inspections.

Tanks number one and four are fitted with filler assemblies, tanks number two and three being filled through tank No. 4. Number one tank is fitted with anti-surge valves which prevent the fuel flowing to the outer tanks during manoeuvres.

On aircraft fitted with later type tanks anti-surge valves have been introduced in tanks numbers two and three.

Tanks number one and three are each fitted with a "Smiths" Desynn type float arm fuel gauge which transmits fuel quantities to indicators in the pilot's cockpit.

NOTE: For full particulars and repairs on above tanks, see Marston Flexible Tank Manual, Volume 1—General and Volume 2 for De Havilland Pty. Ltd. "Vampire".

Fuel Cock Control

34. The low pressure cock is controlled by a red painted lever on the underside of the control box, and the high pressure cock control is a lever mounted behind the throttle lever on the top of the control box. (Fig. 3.) There are no separate fuel cocks for the drop tanks.

Fuel Contents Gauges

35. Five fuel contents gauges are mounted below the centre instrument panel (Fig. 3). The top left and right-hand

gauges represent the contents of the inner port and starboard wing tanks respectively, the lower left and right-hand gauges the outer port and starboard set of tanks, and the centre gauge the main fuselage tank. There are no fuel contents gauges for the wing drop tanks. These gauges are only accurate when the aircraft datum is horizontal (at normal cruising speed this involves a descending flight path of about 5° to the horizontal). In *level* cruising flight (nose-up 5°) the gauges will read slightly low with a maximum error of about 20 gallons when the whole system contains about 100 gallons.

Owing to restrictions on the movement of the float arms in the tanks, with gauges showing zero or their maximum readings, datum horizontal, the actual usable contents of the tanks are indeterminate within the following limits:—

Gauge at zero — between 0 and 31 gals. available.

Gauge at max. reading — between 284 and 314 gals. available.

In later aircraft, recalibrated fuel contents gauges have been introduced. (Post Mod. V.119.)

These gauges are only accurate when the aircraft is in level cruising flight, i.e., datum line nose-up 5°.

The actual usable contents for these aircraft are as above.

Fuel Tank Venting

36. The centre and wing fuel tanks are vented direct to atmosphere via a common vent pipe which extends to the bottom of the engine bulkhead from the top of the centre fuel tank. To prevent panting of the wing fuel tanks, a slightly positive pressure is maintained throughout the system by introducing a relief valve in the fuel vent line.

Fuel Drop Tanks

37. The fuel drop tanks are pressurised from the engine compressor casing, for transferring the fuel to the centre fuselage tank. There are no controls for this, the pressure is on all the time. The lever for jettisoning the fuel drop tanks is located at the left-hand side of the pilot's seat (Fig. 4).

Oil System

38. On this engine no portion of the circulating oil system is on the aircraft. There is no oil tank, but the engine sump has a capacity of 10 pints. A relief valve limits the pressure to 40 lbs. per sq. in. and spills surplus oil into the wheelcase.

Oil Pressure Gauge

39. The oil pressure gauge, which records the main engine oil pressure, is fitted on the left-hand instrument panel (Fig. 3).

Oil Temperature Gauge

40. The oil temperature gauge, which records the oil inlet temperature, is fitted on the left-hand instrument panel (Fig. 3).

Electrical System

41. A generator driven by the engine supplies 24 volt power through two 12 volt accumulators (connected in series) for:—

Instruments and cockpit lighting.
Identification, navigation and landing lamps.
Radio.
Gyro gun-sight.
Fuel booster pump.
Undercarriage warning.
Fire extinguisher.
A.D.F. 14 Radio Compass.
Engine re-lighting.
Gun operation.

NOTE: A red warning light, on the right hand side of the top instrument panel, lights when the generator is not charging, or when the engine speed is less than 5,000 R.P.M. There will, however, be no warning light if the Ground/Flight switch is switched to ground with no ground supply trolley connected to the aircraft.

OPERATIONAL CONTROLS

Gun Control

42. The finger operated trigger which acts as firing switch for the guns is accommodated, with its safety catch, in a recess in the top front face of the control column handle.

The safety catch, the serrated knob of which is located on the top of the handle, provides for positive mechanical locking and electrical isolation of the trigger and switch. The safety catch has to be moved forward before the guns can be fired (Figs. 4 and 88). Pressure on the trigger fires all four guns.

Camera Gun Control

43. The camera gun master switch, on the main electrical panel, must be ON before the camera gun can be operated, either independently of the guns by depressing the camera switch button located directly behind the safety catch, or by depressing the gun trigger.

Gunsight and Recorder

44. The gyro gunsight, mounted in front of the pilot, can be controlled from the throttle control lever during flight manoeuvres. The gunsight switch is mounted to the rear of the main electrical panel. The gunsight recorder is controlled by the gunsight switch (Fig. 4), but is operated in a similar manner to the camera gun (i.e., by use of the switch on the control column). Two spare filaments are stowed on the starboard side of the cockpit.

NAVIGATION AND SIGNALLING CONTROLS

Radio

45. (i) The TR-1520 and I.F.F. (SCR-695-A) are no longer fitted, the TR-1520 being replaced by the TR.1936 which is installed in the ammunition bay behind the pilot's seat, accessible by the port ammunition bay door and is controlled by the control box situated mid-way up the left hand side of the instrument panel (Fig. 4). A "press to transmit" switch is also fitted, being located in the end of the throttle lever hand grip.

(ii) Lear, A.D.F. 14 Radio Compass (Fig. 109) has been introduced on all aircraft. The control unit is fitted to the forward end of the starboard canopy rail and consists of a Dimmer switch for the Tuner dial light and a Telephone selector switch for either V.H.F. or A.D.F. The Tuner is situated on the left of the pilot's seat on the cockpit floor and provides for frequency selection and volume control. The D.F. Loop is installed in the nose of the aircraft beneath the detachable nose panel and is covered by a special di-electric housing which must not, under any circumstances, be painted. The Amplifier is mounted on the inside face of the port ammunition door. The Sense aerial is attached to the rear fairing of the sliding canopy, while the compass indicator is situated at the top of the right hand side of the instrument panel. The canopy must be closed in order to make contact with the aerial.

Identification Lights

46. A selector switch for selecting RED, GREEN or AMBER is positioned on the main electrical panel (Fig. 4) with a push button for operating the downward identification lights for steady illumination or signalling.

Navigation Lights

47. The ON-OFF switch for the navigation lights on the main electrical panel has been replaced by a three position switch "ON-DIM-OFF" (Vampire Mod. No. 152) to enable the intensity of the wing tip navigation lights to be reduced and thus avoid glare which is tiring and can be of possible danger when flying at night in close formation (Fig. 4).

Landing Light

48. The switch for the one landing light, on the port wing, is situated to the rear of the main electrical panel (Fig. 2). The switch has three positions, OFF - LOW - HIGH.

Compass

49. The E2A compass is mounted in front of the pilot, to the right of the gun sight (Fig. 4).

The compass is a standby in case of failure to the G3F detector unit.

Target Towing Gear

49A. Provision is now made for Target Towing Gear on all fighter aircraft. The release handle is positioned on the left of the pilot's seat between the emergency hand pump handle and the fuel tank jettison lever.

SECTION 2

EMERGENCY CONTROLS, EQUIPMENT AND EXITS

SECTION 2

EMERGENCY CONTROLS, EQUIPMENT AND EXITS

LIST OF CONTENTS

Emergency Controls, Equipment and Exits

WARNING

AIRCRAFT FITTED WITH EJECTOR SEATS

Each seat is a potential source of danger to personnel and damage to the aircraft. If the firing mechanism of the seat should be operated while the aircraft is on the ground the seat will be ejected with resultant damage to the aircraft and injury to any person in, or leaning into, the cockpit.

Before anyone is allowed to enter the cabin it must be ensured that the safety pin has secured the safety strap over the firing handle of the seat or, during servicing operations, that the safety pin is firmly secured in the hole in the sear at the top of the ejection gun.

Introduction

50. The purpose of this Section is to describe the location of emergency controls, equipment and the exit, and also to indicate the methods by which the pilot operates this equipment (Fig. 6). The emergency controls associated with the main systems are fully covered in the Sections where the systems are described. Where an item is purely for emergency use, the details of its use and servicing will be given here. The location of the various items is shown in Fig. 6. For supplementary information, reference should be made to the Pilot's Notes.

EMERGENCY CONTROLS

Hydraulic Hand Pump

51. The hand pump is located on No. 2 bulkhead and an extension handle is provided at the left-hand side of the pilot's seat. For information concerning the possible failure of the landing gear and flaps, reference should be made to the Pilot's Notes.

Landing Gear Emergency Retraction

52. The emergency override switch is located on the left-hand cockpit wall aft of the engine control box. This switch, when operated on the ground, overrides the selector lever locking device, and allows the landing gear to be retracted in case of emergency.

Engine Re-Light Time Switch

53. A Re-Light Time Switch is fitted, on the port side of the cockpit just forward of the Windscreen arch, for re-starting the engine in the air. (See Pilot's notes and Figs. 3 and 6.)

EMERGENCY EQUIPMENT

Fire Extinguisher

54. The Graviner fire extinguisher system is operated from a button on the main electrical panel to the right of the pilot; the extinguisher must be operated when a fire in the nacelle becomes apparent as indicated by the fire warning light on the top centre instrument panel. (Refer to Pilot's Notes.) The fire extinguisher system is not operative until cabin blower air control lever is moved to OFF.

Drop Tanks Jettison

55. The lever which operates the drop tanks manual release gear is located at the left-hand side of the pilot's seat.

Crowbar

56. The crowbar used in the event of emergency is stowed in a vertical position on No. 2 bulkhead, and to the left of the pilot's seat.

Ejector Seat

57. The Martin Baker Mk. 2F(A) ejector seat enables the occupant to escape from the aircraft while flying at high speed. The seat is ejected from the aircraft by means of a cartridge operated gun which is operated by the ejector seat firing handle; fully automatic facilities are provided to separate the occupant from the seat and to open his parachute after ejection.

Harness Quick Release Lever

58. The pilot's safety harness is fitted with an automatic release which comes into operation after ejection. A lever is also fitted for manual operation in case of failure of the automatic system and also for quick release in cases of crash landing when the ejector seat is not used. (For further details refer to A.P.4288B Vol. 1, Sect. 4.)

EMERGENCY EXIT

Sliding Canopy

59. In the event of an emergency exit by ejector seat or otherwise, it will be necessary to jettison the canopy by pulling the yellow and black striped lever positioned on the starboard side of the cockpit just forward of the canopy winding handle.

SECTION 3

NOT APPLICABLE TO THIS AIRCRAFT

SECTION 3

(Not applicable to this Aircraft)

SECTION 4

INSTRUCTIONS FOR GROUND PERSONNEL

SECTION 4 — CHAPTER I

LOADING AND C.G. DATA

LIST OF CONTENTS

Loading and C.G. Data is fully covered in A.A.P. No. 829.

SECTION 4 — CHAPTER 2

GROUND HANDLING AND PREPARATION FOR FLIGHT

LIST OF CONTENTS

Ground Handling and Preparation for Flight

Introduction

60. Information on the general handling of the aircraft on the ground and on preparing it for flight is given in this chapter. Auxiliary equipment for handling and servicing is listed in Chapter 3 of this Section.

WARNING.

The position and attitude of the aircraft in relation to buildings and other aircraft is to be checked prior to running up the engine.

No person should approach closer than distance of four yards to the air intakes. The great quantity of air drawn in when the engine is running makes breathing difficult.

It is also important to see that the ground adjacent to the aircraft should be free from rags, paper, light pieces of wood, etc., while the engine is running, as they can easily be sucked in through the ducts. Care must be taken in positioning the aircraft so that the jet at the rear does not blow on any other aircraft or obstruction. This is necessary, not from a point of view of performance while the engine is running, but as a safeguard from the effect of hot gas and stones, etc., which may be blown up from the ground. It is most essential that the starter battery should be fully charged, as the amount of current consumed during starting operations is considerably in excess of the normal and a battery which is not fully charged will fail to give the necessary r.p.m. for starting the engine.

The blanking plates must be on the air intakes and tail whenever the engine is stationary. They should be replaced as soon as possible after any engine running, and only removed at the last minute before starting. The Part Nos. are as follows:—

Air Intake Blanking Plate: Part No. Y00516A (Ident No. A79/500002) & Y00517A (Ident No. A79/500003).

Tail Pipe Blanking Plate: Part No. Y00565 (Ident No. A79/500004).

GROUND HANDLING

Towing

61. (i) The aircraft may only be towed when the special towing equipment, Nose Steering Arms Part No. Y00304A, Ident No. W4G/25085 or Part No. 00Y127A, Ident No. A79/503485 are available. The towing arm is attached to the nose wheel spools and secured with two latches. The maximum permitted angle of the towing arm is 20° either side of the forward towing position.

(ii) A Special Towing Bridle, Part No. Y00413A, Ident No. W4G/25088 is available for conditions where the aerodrome surface is soft, or the aircraft bogged.

(iii) Operation of the aircraft's brakes facilitates its movement while under tow and it is therefore advisable to have a member of the ground crew in the cockpit while the aircraft is being moved.

Slinging

62. The slinging arrangement is illustrated in Fig. 13 and is self-explanatory.

Control Locking

63. The control locking gear (Fig. 10) is carried in the aircraft and is stowed in a small canvas bag attached to the forward face of bulkhead No. 2 just below the G3F compass amplifier.

Picketing

64. The aircraft must always be picketed head to wind. Eyes for the shackles are provided at the top of each main undercarriage leg. The shackles used on the towing bridle are not carried in the aircraft. The nose wheel should be picketed by a rope around the leg. Additional ropes should be passed over the booms forward of the fins.

Covers

65. (i) Ground covers are provided for the port and starboard air intakes, canopy, pitot head and tail-pipe. The pitot head cover only, is stowed in the aircraft.

(ii) Normally the air intake and jet openings are plugged when the aircraft is parked (see Warning para. 60). If the standard blanking plates are not available, substitutes should be improvised.

Jacking

66. (i) Place the adjustable jack, 5 ton (Ident No. W4G/10196) beneath the fuselage frame at rear of the nosewheel door with former W4G/25104 clear of the fuselage. Place the hydraulic jacks, 5 ton (Ident No. W4G/10015) with jacking pad (Part No. 00Y43) under the wing jacking points and raise the jacks to just take the weight.

(ii) With two men to steady the rear of the tail booms, raise the aircraft with the wing jacks until the booms can be raised by manhandling, high enough to place the tail trestles (Ident No. W4G/2554) with the boom formers (Part No. Y00258) in position, then raise the adjustable nose trestle to steady the forward end of the aircraft.

NOTE: When being raised on the wing jacks, the aircraft will be **tail** heavy with the engine installed, and **nose** heavy without the engine.

(iii) The aircraft may now be adjusted laterally and longitudinally for rigging operations. When levelling the aircraft fore and aft, care should be taken to lower one trestle when the opposite one is raised, e.g., if the nose is required to be raised, the tail trestle should be eased off first and vice-versa.

NOTE: When the aircraft is supported on jacks, wing trestles (Ident No. W4G/10812) must be in position when personnel are working on the wings or under the aircraft. See Fig. 9.

Undercarriage Locking

67. The gear for locking the undercarriage is carried in a stowage bag fitted to the right-hand gun bay door (see Fig. 104). The method of fixing is shown in Fig. 11.

Preventing Corrosion

68. The fuel float valve in the main fuselage tank is subject to corrosion if the tanks are left unfilled for any long period. To prevent this corrosion always keep the fuselage tank filled or the valve assembly liberally coated with oil (Ident No. K2/145), when the aircraft is grounded.

GENERAL PREPARATION FOR FLIGHT

WARNING: Attention is drawn to warning in para. 60.

Re-fuelling

69. (i) The fuel system is described and illustrated in Section 8. Before attempting to fill any tank make sure that the H.P. fuel cock in the cockpit is OFF. The tool, Part No. Y00162A (Ident No. A79/500016) is used for unscrewing the filler caps. When refuelling, always use the special filters and pay particular care to avoid spillage. Flaps should be down and an examination for fuel in the flap compartment should be made after each refuelling operation.

(ii) The filler cap for the fuselage tank is on the port side at the after end of the cockpit hood fairing. The filler caps for the wing tanks are in the top surface of the wing.

(iii) Fuel tanks should be filled in the order, fuselage tank, wing stub tanks, outer wing group tanks.

Draining

70. Draining of accumulated water from tanks is not necessary except in exceptional circumstances, as usual small quantities will not affect the engine. If draining is required it can be carried out as follows:—

(i) By means of a bowser, sucking the fuel from the tanks through the filler caps, or

(ii) By removing the drain plug under the collector box in the fuselage tank.

Drop tanks may be drained by removing the plugs provided for this purpose. (See Fig. 12.)

IMPORTANT: If draining fuselage tank. See para. 68.

Fitting Fuel Drop Tanks

71. Provision is made to carry the 100 gallon drop tanks suspended under each wing at rib 6. The fuel transfer and air pressure lines are of rubber hose, incorporating two glass tube connectors at the juncture of the tank to the wing (See Fig. 12), and these connections must be linked before the tank is offered up to the wing. The tank is suspended from the release gear by an eyebolt and located by fore and aft spigots.

The procedure for fitting a new or replacement tank is as follows (see Fig. 12):—

(i) Check the functioning of the release gear by attaching suitable weights to the slips and by slowly moving the cockpit handle. The slow movement enables an accurate check to be made as to where the actual release point occurs in relation to the end of travel. If the weights are not released simultaneously, the cables require adjustment; proceed as follows:—

(ii) With the jettison handle in the cockpit in the fully stowed position, and with the bomb slip in the leading edge cocked (this is most important), the cable is to be rigged with as much slack as possible (approximately 3/16" min.) consistent with being able to release when the handle is approximately 1½" at knob end from the end of its travel.

Alternative Method:

Place the cockpit handle approximately 1½" from the end of its travel and lock so that it cannot move. Then with control cable slacked right off and slip unit fully cocked, carefully tension the cable until slips release, taking care not to obtain a false reading by moving cable up and down during adjustment.

This will give the maximum possible slack and still ensure release of both slips.

(iii) Grease the bearing surface of the release hook and press the tank suspension bolt up into the release unit. This will lock the unit and secure the bolt. Ensure that the hard rubber packing is in position around the locating spigot on the front support casting. Align the tanks on the ground with the wing attachment points, connect the rubber hoses to the tank tubes and tighten the pipe clips. Offer the tank up to the wing, guiding the suspension bolt into its tube and engage the front and rear spigots with their holes in the wing skin, fit washer and stiffnut on suspension bolt, tighten nut to a torque-loading of 400-500 lbs./inch, ensuring tank is secure to the wing.

NOTE: It should now be possible for an average size man to exert his weight on the tail of the tank without movement of the latter.

(iv) Check that the tank is bearing over the whole of the front support casting and on the bearing surface of the rear spigot.

(v) Check the clearance between the tank fairing and the wing. This should be kept as small as possible with a minimum of 0.03" and a maximum of 0.30". The correct clearance can be obtained by releasing the tank from the wing and adjusting the rear spigot as illustrated in Fig. 12.

Replenishing Engine Oil Sump

72. There is no oil tank, but the engine sump has a capacity of 10 pints. The filler cap may be reached by removing the access door on the power unit cowling at the lower port side of the fuselage. Fill the sump to within half an inch of the filler orifice with oil to Spec. D.T.D.44D (Ident No. K2/116). After the initial ground run, approximately two pints of oil may be necessary to bring the oil to the correct level. When the sump has been properly replenished, put back the filler cap, slip the crossbar into its bayonet catch and lock it by screwing down the finger wheel. The sump should NOT be filled while the engine is running, and care should be taken to ensure that the cap is always fitted correctly and tightened before running the engine.

Draining

73. To drain the oil sump remove the plug on the starboard side of the sump. When refitting the plug use a new washer.

Replenishing Engine Accessories Oil Sump

74. The combined gearbox and mounting for the engine accessories, and auxiliary

drive, has a separate oil sump incorporated. This is topped up by means of a filler cap accessible from above the engine through a hand access hole provided in the top engine cowling.

A dip stick, the top of which is painted red, is provided adjacent to the filler cap. Replenish with oil O.E.P.71 to Spec. D.E.D.2479/1 (Ident No. K2/214) to the full mark on the dip stick immediately after installation and before running engine.

Draining

75. To drain the engine accessories oil sump remove the drain plug found vertically below the dip stick, and wirelock after refitting.

Hydraulic Reservoir

76. The hydraulic reservoir is located on the fuselage deck, between No. 2 and 3 bulkheads. The reservoir is filled through the filler cap which is accessible when the canopy is pushed back past the first stop. It is important that the hydraulic accumulator pressure is released before filling, to the level indicated on the reservoir window. A release valve, situated below the cockpit floor (accessible through the gun bay doors) on the left-hand side, is provided for this purpose. When removing the filler cap use tool Part No. Y00162A (Ident No. A79/500016). The fluid capacity is one gallon and only fluid to Spec. D.T.D. 585 (Ident No. K2/138) is to be used.

Hydraulic Accumulator

77. The air pressure in the accumulator should read 1,250 lb./sq. in. The accumulator may be filled from an outside supply through the inflation valve, mounted on the right-hand side aft face of bulkhead No. 2. The pressure gauge should be mounted on the outside supply charging pipe or cylinder.

Pneumatic System

78. The air bottle may be filled from an outside supply through the inflation valve on the pneumatic panel, mounted on the aft face of bulkhead No. 2 (Fig. 35). The maximum pressure is 450 lb./sq. in. The pressure gauge mounted on the right-hand instrument panel has a pipe line direct to the air bottle, which records the bottle's existing pressure. The oil and water trap should be frequently drained.

Dry-Air Sandwich Windscreen and Hood

79. (i) The silica-gel container is positioned just forward of the instrument panel on the right-hand side.

(ii) When the crystals show a pink colour through the inspection window (Fig. 44), they should be replaced with "Tell-Tale" silica-gel to Spec. D.T.D.471 (Ident No. K4/10592).

(iii) It is particularly important to check that there is a free passage of air to the dry sandwich areas. During pressurisation of the cockpit, any blockage in the dry-air system will effect the cabin differential pressure and possibly cause the hood to fracture.

Windscreen De-Icing

80. The glycol tank is positioned on the right-hand stay tube of the nose wheel top structure (Fig. 100). The tank capacity is approximately three pints and glycol fluid to specification K.22 is used (Ident No. K4/10332).

SECTION 4 — CHAPTER 3
GENERAL SERVICING

LIST OF CONTENTS

General Servicing

Introduction

81. This chapter describes servicing operations and serves to implement A.A.P. 721:79/30, Vol. 4—"Aircraft Planned Servicing Schedule."

For information and servicing notes on items of equipment not dealt with in this Chapter, reference should be made to the relevant Air Publications and Australian Air Publications listed at the beginning of this book.

The location of the servicing inspection panels is given in Fig. 14, and the lists given in this Chapter include all the items of Ground Equipment necessary for servicing the aircraft.

Design characteristics connected with high speed - high altitude must be kept in mind when servicing aircraft of this type. The exterior paint finish, for instance, presents a highly efficient aerofoil surface in addition to the normal function of protection. Be careful to avoid damage to the finish, and if repairs are carried out, fill and rub down the surface to achieve a polished finish blending with that on adjacent surfaces.

For procedures and further information, see A.P. 2656A, Section 9, Chapter 2.

The efficiency of cabin sealing depends to a large extent on the manner in which each bolt or fitting which passes through into the sealed area is bonded to the cabin surround with sealing compound. Therefore, when removing these fittings during servicing, care must also be exercised to remove the old compound with approved solvent, clean thoroughly the bolts, washers, sealing plates, etc., with cleaner such as trichlorethyline. During reassembly, reprime and reseal with Bostik 1751 and 1790 in the approved manner. For tests connected with pressurised cabin, see index to this chapter.

NOTE: For further information, see A.P.1464B, Vol. 1, Part 2, Section 2.

GROUND EQUIPMENT AND TOOLS

82. TABLE 1.—SPECIAL GROUND EQUIPMENT AND TOOLS.

R.A.A.F. Ident No.	*Part No.*	*Description.*	*Application.*
		TOWING AND STEERING	
W4G/25085	Y00304A	Arm, nose steering.	
W4G/25088	Y00413A	Bridle, Towing.	
A79/503485	00Y127A	Arm, Towing Assy.	Vampire Trainer Equipment, but used as alternative to above.
		JACKING	
W4G/25138	00Y43	Pads, mainplane jacking.	
W4G/25104	00Y191A	Nose Wheel Changing Trestle (hinged legs).	Use with pillar jack W4G/10196.
		TRESTLING	
W4G/25105	Y00157A	Former for use with U.J.T. No. 3 Port.	Mainplane steadying at Rib 10.
W4G/25083	Y00158A	Former for use with U.J.T. No. 3 Starboard.	Mainplane steadying at Rib 10.
W4G/25103	Y00118A	Trestles, Tripod fuselage.	Supporting fuselage when mainplanes are removed.
W4G/25084	Y00258A	Former for Boom Trestle (W4G/2554).	Supporting mainplane at stub and rear of boom.
W4G/25100	00Y189A	Trestle, for fuselage nose.	
W4G/25086	00Y53A	Trestle, rear fuselage (at engine mountings).	Assembling mainplane to fuselage.
		SLINGING	
W4G/25091	Y00546A	Sling, complete A/c.	
W4G/25087	Y00323A	Sling, mainplane.	
		RIGGING	
W4G/25095	Y0094A	Board, incidence, mainplane.	Port and Starb'd for Ribs 3 & 10.
W4G/25094	Y0090A	Board, dihedral, mainplane.	Also used for boom levelling.
W4G/25096	Y00500A	Board, incidence, low tailplane.	Also tailplane levelling.
W4G/25092	Y0075A	Board, lateral levelling.	Fuselage.
W4G/25093	Y0076A	Board, longitudinal levelling.	Fuselage.

R.A.A.F. Ident No.	*Part No.*	*Description.*	*Application.*
W4G/25098	Y0011A	Locking Pin, elevators and rudders.	Control circuit.
W4G/25099	Y00403A	Locking Plate, aileron.	Control circuit.
W4G/24097	Y00600	Quadrant Setting Plate, elevator.	Control circuit.
		MISCELLANEOUS	
A79/500015	Y00390	Box Spanner, joint.	Main wing joints.
A79/500009	Y00181	Adaptor to Box Spanner.	Main wing joints.
A79/500012	Y00406A	Box Spanner, wheel.	Removing wheels.
A79/500013	Y00185A	Box Spanner, Port.	U/c and boom joint.
A79/500014	Y00186A	Box Spanner, Starboard.	U/c and boom joint.
A79/500002	Y00516A	Board, blanking Port.	On air intake when picketed.
A79/500003	Y00517A	Board, blanking Starboard.	On air intake when picketed.
A79/500004	Y00565A	Board, blanking tailpipe.	On when picketed.
A79/500011	Y0093	Acorn, bolt removing.	Front wing joint.
A79/500010	Y00175A	Extractor, joint bolt.	Main wing joint.
A79/500062	AH8404	Extractor, main wheel.	

83. TABLE 2. — STANDARD GROUND EQUIPMENT.

R.A.A.F. Ident No.	*Part No.*	*Description.*	*Application.*
		JACKING	
W4G/10015	—	Jack, 5 ton Hydraulic.	Mainplane jacking.
W4G/10196	—	Jack, 5 ton Pillar Hydraulic.	Nose jacking.
		TRESTLING	
W4G/2554	—	Trestle, tail type "D." Min. height, 3 ft. 11½ in. Max. height, 7 ft. 2¼ in.	Tail boom trestling.
W4G/500028	—	Trestle, tail. Min. height, 2 ft. 3 in. Max. height, 3 ft. 3 in.	Tail boom trestling.
W4G/10812	—	Trestle U.J.T. No. 3.	Wing trestling.
		MISCELLANEOUS	
W4G/25101	CAC.TH75	Sling, engine, Nene. Stand, engine, Nene.	
W4G/1358	—	Syringes, oil.	Charging Oleo legs.
W4G/1966	—	Mats, mainplane, Type B.	
W4C/257	—	Pump, Oleo Type A.	
W4C/20905	—	Adaptor Plug.	Oleo leg charging.
W4C/20971	—	Gauge Mk. 2 (0-1,500 lb./sq. in.).	
W4C/20960	—	Gauge Mk. 1 (0-600 lb./sq. in.).	
W4G/4090	—	Trolley, oxygen cylinder.	Recharging.
W4G/25109	—	Trolley, pressure cabin testing.	
—	—	Streamline Filter Trolley, Type P.M.55A.	
—	—	Air Pressure Cylinder.	Testing Canopy Seal.

Jacking and Trestling

84. Particulars of the jacking operations are given in Section 4, Chapter 2, para. 66.

Former Stations and Inspection Panels

85. The locations of the fuselage formers and of inspection panels and doors are shown in Fig. 14.

Lubrication

86. The lubrication details are shown in Figs. 15, 16 and 17.

All cable control pulleys and flying control levers in the tail unit are fitted with sealed ball races packed with anti-freezing grease (Ident No. K2 210) before assembly, and no attention is necessary.

RIGGING

87. As the wings, fin, tail plane and tail booms are fixed cantilever structures, no adjustment to them is provided. 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. 18, and all rigging dimensions and angles with tolerances are given in Leading Particulars.

NOTE: Cable turnbuckles are locked with 20 S.W.G. copper locking wire, except the rudder cable turnbuckles on Rib No. 1, Port Wing; these are locked with 20 S.W.G. soft iron locking wire.

Rigging Sequence

88. The sequence of operations is as follows:—

(i) Trestle the aircraft at the points marked JACK at the forward end of the stub boom attachment of the wing, i.e., the main spar; and then trestle the tail booms as shown in Fig. 9.

(ii) Place the levelling boards, Part No. Y0075 (Ident No. W4G/25092) and Y0076 (Ident No. W4G/25093) on the datum blocks in the fuselage, as shown in Fig. 18. Adjust trestles until the level of the levelling board is zero. Use the datum blocks for longitudinal level, and in a similar manner adjust the tail trestle until the level on the levelling board reads zero.

(iii) Check the incidence angle of the wings, ribs No. 3 and 10, using incidence board, Part No. Y0094A (Ident No. W4G/25095) in the position indicated in Fig. 18. Check the dihedral by means of a levelling board Part No. Y0090A (Ident No. W4G/25094) and clinometer on the top of the front spar, as shown in diagram.

(iv) Check the angle of the tail booms by placing levelling board Part No. Y0090A (Ident No. W4G/25094) along the top and using the clinometer.

(v) Check the incidence of the tail plane by using incidence board, Part No. Y00500A (Ident No. W4G/25096), at position shown in Fig. 18. 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. 18.

NOTE: The tail plane angle of incidence is set by the manufacturer and is not adjustable.

CONTROL SETTINGS

Ailerons

89. Lock the control column with locking gear, Part No. 00Y213A (Ident No. A79/503856), and proceed as follows:—

(i) Remove the nut, washer, distance piece and bolt located above the cable pulley at bottom of control column, and attach aileron locking plate, Part No. Y00403A (Ident No. W4G/25099), to lock the pulley sprockets in the NEUTRAL position.

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

(iii) Set aileron differential pulley at aileron, NEUTRAL, with a 2 BA bolt (see Fig. 20).

(iv) Couple up cables. The cable run and adjusting points are shown in Fig. 90.

(v) Remove locking bolts on aileron differential pulleys, the locking plate at the base of the control column and the control locking gear. Replace all 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. ± 20 lb. up to first minor inspection or 70 lb. ± 10 lb. after first minor inspection; at the same time ensure that the cable tensioners are in safety.

(vii) Check for full and free movement of aileron, 15 deg. 36 min. up, to 10 deg. 31 min. down, ± 1 deg. 18 mins.

NOTE: The gap between the aileron leading edge and the aileron shroud varies, being 0.05" at outer hinge, 0.080" at centre hinge, and 0.10" at inboard hinge, with overall tolerance 0.02". Adjustment may be effected by the addition of laminum shims on the bracket fixing bolt.

Aileron Trim Tabs

90. Servo trim tabs are fitted to each aileron, and may only be adjusted on the ground to suit the flying characteristics of the aircraft. The servo gear normal position is shown in Fig. 20, and this gives tab movements measured between the outward end of the tab and the aileron trailing edge of .85" up and 1.2" down.

Elevator

91. To rig the elevator proceed as follows:—

(i) 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 (Ident No. W4G/25097).

NOTE: Position jig plates between the fuselage and quadrant pulley, pick up tapped hole in plate with longer bolt in lieu existing bolt which passes through pulley bracket and cable guide block. Adjust position of pulley so that castle nuts on cable cleat bolts engage in 17/32" holes in jig plate.

(ii) 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 8½ deg. forward of the vertical. The position of the control column may be adjusted to suit particular requirements, but the over-riding factor is that it must have unobstructed travel over the full range of movement allowed by the quadrant pulley stops.

(iii) Lock the elliptical pulley, at the forward end of the tail booms, in the NEUTRAL position with a ¼ in. dia. pin. Couple up the cables from the quadrant pulley to the elliptical pulley, and tighten to the correct tension.

(iv) Lock the elevator control levers at the boom rear end with the pin, Part No. Y0011 (Ident No. W4G/25098). 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. ± 20 lb. on the 25 cwt. scale up to the first minor inspection, and 80 lb. ± 10 lb. after the first minor inspection.

(v) 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. Ensure that the lock nut at the lower end of this combined operating rod and mass balance is secure to avoid any chance of fouling the rudder links.

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

(vii) 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.

NOTE: Bolts in elevator control lever at rear of booms must point outwards from the centre of each boom.

Elevator Trim Tab

92. 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 tailplane 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 the elevator to NEUTRAL and adjust the tab connecting rod until the tab has a ⅜" droop from the neutral position; i.e., until the tab trailing edge is three-eighths in. below the trailing edge of the elevator.

(v) Operate the handwheel in the cockpit and check for full measurement (Pre Mod. V.90) 6° (0.34") UP and 18° (1.0") DOWN and (Post Mod. V.90) 8° (0.5") UP and 22° (1.25") DOWN from the neutral position. The elevator tab should move upwards when the cockpit control is turned clockwise.

NOTE: It may be necessary to rig the tab slightly, either more or less than the ⅜ in. dimension to the

elevator, so that the aircraft cruises with the indicator in the cockpit at ZERO. To do this, adjustment should be made on the tab connecting rod only, with the indicator in the cockpit at ZERO.

Rudder

93. To rig the rudder, proceed as follows:—

(i) Using control locking gear Part No. 00Y213A (Ident No. A79/503856) set rudder pedals in NEUTRAL position and lock. Refer to Fig. 10.

(ii) Set rudder levers at tail plane NEUTRAL by putting a $\frac{3}{8}$" diameter pin, Y0011A (Ident No. W4G/25098), through the levers (see Fig. 21).

(iii) Insert a $\frac{1}{4}$" diameter pin to lock the elliptical 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. ± 20 lb. on the 25 cwt. scale.

NOTE: After first minor inspection a tolerance of ± 10 lb. is allowed.

(v) With the locking pins in the elliptical pulleys, connect the cables from the forward end of the tail boom to the rudder lever links. (See Fig. 22.)

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

(vii) Couple up connecting rod to rudder control lever. (See Fig. 21.)

(viii) Remove all locking devices and check for full travel of rudder, 24 deg. 36 min. either side of neutral. There are no rudder trim tab controls, but a small tab is fitted to each rudder which can only be adjusted as required on the ground by slackening the bolt which is located at the base of the 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.

NOTE: Bolts in rudder control lever at rear of boom must point outwards from the centre of each boom.

Repeat this operation with full left rudder.

MASS BALANCING

General

94. The movable control surfaces are mass-balanced to prevent flutter or vibration. Accuracy of balance is vital to the safety of the aircraft, and should be checked as described below if it is suspected that it may have been affected by repairs or other causes.

(a) Ailerons.

Each aileron, complete with servo tab, but without connecting rod, should be balanced separately in position on the wing, and each should be nose heavy.

With the aileron approximately horizontal, suspend a check weight on the trailing edge 10.13 in. aft of the centre hinge pin. With the aileron free to float, it should then balance within ± 2 deg. of horizontal with a weight of from 19.5 to 25.5 ozs.

If adjustment is required, remove the plug from the outboard balance tube and adjust lead as required. Re-assemble, re-install and re-check. For further details, see Repair Manual, Part 3, Chapter 6.

(b) Elevator.

The elevator, complete with tab but less tab connecting rod, and supported at the torque tube ends, should balance with chord line horizontal within an angular tolerance of ± 2 deg. by a downward load of between 4 lbs. 5 ozs. and 4 lbs. 17 ozs. suspended from (elevator) centre line on the trailing edge.

(c) Rudder.

The rudder, complete with fittings, but not attached to aircraft, is to be supported at top hinge and end of torque tube.

In this horizontal position and free to pivot, balance must be obtained within an angular

tolerance of ± 2 deg. by applying an upward load (spring balance) of between 22 ozs. to 30 ozs. at the trailing edge rivet nearest to the tab.

LANDING GEAR

General

95. 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 landing gear, the aircraft will have to be jacked off the ground at the main wheels and the nose wheel (see Fig. 9). For removal and assembly of wheel units reference should be made to Section 5.

Retracting Mechanism

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

NOTE: To centre the bottom end eye of radius rod in fork end on the compression leg, it may be necessary to assemble shims between the hinge pick-up J and the end fitting L. It is important that shims MUST be fitted under one fitting only as required. (See Fig. 23.)

Installing a New Jack

97. To install a new jack, screw the top end of the jack to the top lug (P in Fig. 28) 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 fork end of the jack piston to the lug attached to the top end of the compression leg with the appropriate bolt.

Adjustment of Jack

98. It is most important that the jack be adjusted when the main undercarriage is in the UP position; i.e., with the jack extended, so that the roller Q is 1/16th inch to 3/32nd inch from the end of the slot. (See Fig. 28.)

NOTE: The nose wheel jack is adjusted in the DOWN position.

Adjustment of Stop Bolt

99. The stop bolt between the upper and lower links of the radius rod should be adjusted with the lock plate in the locked position (undercarriage down).

Adjust the stop bolt until the lock plate roller moves freely within the slot, and ensure that the stop faces are in contact. (See Fig. 28.) The points X, Y and Z should now be in a straight line.

Adjustment of Eye Bolt

100. The adjustment to the length of the radii rod by screwing out the eye bolt (see Fig. 23) must be made to suit the UP position of the main and nose undercarriages. The main wheel and wheel retaining nut should be just clear of the skin and stringers at the top of the wheel-well (1/16" to 0.1" is ample). This is most readily checked with the wheel removed.

UNDERCARRIAGE SHOCK-ABSORBER STRUT

WARNING: No screws, nuts, etc., are to be removed from an inflated strut; high pressures are involved and negligence can result in serious accident.

Dismantling should only be necessary after lengthy service or accidental damage. Release air pressure through the inflation valve (see Item 37, Fig. 26) at base of strut.

NOTE: For detail regarding removal of U/C leg from airframe, see Section 5, para. 171.

101 to 104. For detailed description of the main undercarriage strut including the instructions for dismantling, servicing and testing, reference is directed to A.P.1803C, Vol. 1, Sect. 2, Chap. 10, Appendix 1.

NOTE: The struts fitted to the aircraft are exact in every detail to those described in the A.P. except for the sealing rings which are made of synthetic rubber to enable mineral oil to be used in the strut. The hydraulic fluid to be used is OIL OM-15 (D.T.D.585) and *not* Oil OF-4 (Lockheed 22) as mentioned in the A.P.

Inflation (of Main Stock-Absorber Strut)

105. Diagram showing the undercarriage inflation curve is given in Fig. 27.

Leakage—Main Shock-Absorber Strut

106. The possible causes of air and fluid leakage from the strut are given in A.P.1803 C, Vol. 1, Sect. 2, Chap. 10, Appendix 1, with the exception of the following:—

(i) It is possible for the gland or sealing rings to become set and/or grow on the plunger tube after periods of storage or non-use, often resulting in an oil leak when the strut is first compressed. To rectify this, the following procedure is to be carried out if the oleos have not functioned for three (3) months:—

(a) Inflate the undercarriage struts to 30 to 150 lb./sq. in.;

(b) Reciprocate the undercarriage struts 5 to 10 times;

(c) Wipe the plunger tube, removing all oil. (There should be no further leakage);

(d) Inflate struts to normal working pressure.

Reciprocation of the undercarriage struts on aircraft may be achieved by rocking the aircraft from the wingtip. This need not be a vigorous operation, as just enough movement is necessary to cause the plunger tube to travel 1 to 2 inches.

Nose Wheel Shock-Absorber Strut

107 to 110. For a detailed description of the nose wheel shock absorber strut including the instructions for the dismantling, servicing and testing,reference is directed to A.P.1803C, Vol. 1, Sect. 6, Chap. 1.

Leakage. Nose Wheel Shock-Absorber Strut

111. The possible causes of air and fluid leakage from the strut are given in A.P.1803C, Vol. 1, Sect. 6, Chap. 1, with one addition which is covered in para. 106 (i).

Inflation. Nose Wheel Shock-Absorber Strut

112. A diagram showing the nose wheel inflation curve is given in Fig. 33.

Nose Wheel Self-Centring Unit

113. For dismantling the self-centring unit, reference should be made to Fig. 34.

HYDRAULIC SYSTEM

General

114. (i) The hydraulic system is described in Sect. 9 and illustrated in Figs. 36-41.

(ii) 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.

(iii) Clean fluid only to Specification DTD. 585 (Ident No. K2/138) should be used for filling or topping up, and the filter in the reservoir should always be in position during the operation.

(iv) 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.

(v) All air should be vented from the system and the reservoir should be kept topped up to ensure efficient running; when making reconnections, pipe connections must be wire locked with 20 g. gal. iron wire.

Components

115. Lockheed components are used in this aircraft, the part numbers and details for dismantling and servicing will be found in the Air Publication as follows:—

A.P.1803B, Vol. 1.	
Accumulator Pressure Release Valve	AIR.40018
Cut-out Valve	AIR.40020
Dive Brake Jack	AIR.40022
Dive Brake Selector, Flap Selector, Undercarriage Selector	AIR.40272
Flap Jack	AIR.40008
Hydraulic Accumulator	AIR.40016
Non-Return Valve for Ground Operation of Dive Brakes	AIR.40504
Nosewheel Jack	AIR.40542
Non-Return Valve between Valve and Undercarriage Selectors	AIR.34126
Pump, Hydraulic, Mk. 6 —N37J/263	AIR.8000
Undercarriage Jack,	AIR.41192
A.P.1803P, Vol. 1.	
Hand Pump	UMC.501
Non-Return Valve	UMC.703
Non-Return Valve at Dive Brakes Selector	UMC.706

TESTS

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. 37.)

Pressure

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

	lb./sq. in.
Hydraulic Accumulator Air Pressure	1,250
Accumulator Oil Pressure....	2,500-2,600
Thermal Relief Valve Pressure	3,000

121. Before proceeding with operational tests, the following procedure should be adopted:—

(i) Jack up the aircraft (see Fig. 9).

(ii) Inflate the hydraulic accumulator to 1,250 lb./sq. in. air pressure, and inspect 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.

Functioning Tests

122. After carrying out the preparations described in para. 121, proceed with the main test, as follows:—

(i) Connect test rig pump to ground test coupling points on the left-hand side of the engine bulkhead (see Sect. 5), and run the pump for 2 minutes, holding the accumulator release valve open.

(ii) With pressure gauge in position on hydraulic accumulator, run pump to check and, if necessary, adjust cut-out valve to operate at 2,500 lb./sq. ins. + 100 — 000 lbs./sq. ins.

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

(iv) Using test rig running at between 1,400 and 1,500 R.P.M., operate the flaps 3 times, checking the indicator in the cockpit. The operational times for 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 rig 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 rig running, operate the undercarriage 5 times, checking indicator lights in cockpit and operational times. The times should be UP OR DOWN, 2 to 3 seconds.

(ix) With undercarriage and flaps UP and dive brakes OFF, stop engine pump and release accumulator pressure.

(x) Disconnect pump pressure line at the test coupling on the fireproof bulkhead and restart pump, collecting oil flowing from pump in a clean container for re-use. 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 lever 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 rig, 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 engine pump and operate undercarriage and flaps 5 times.

ENGINE CONTROLS

General

123. There are two main engine controls: the throttle which varies the fuel flow to the burners (and consequently the engine R.P.M.), and the high pressure shut-off cock for stopping the engine. A low pressure shut-off cock is also fitted to isolate the fuel tank during servicing. (See Figs. 94 and 95.)

A micro switch, mounted on starboard rear face of engine bulkhead, is functioned by an adjustable cam lever on the throttle cross tube and ensures that the engine cannot be started unless the throttle is fully closed. The throttle linkage actuates one other micro switch, mounted on the lower rear face of the bulkhead, which is an integral part of the undercarriage circuit. (For adjustment, see para. 125.)

Control Linkage

124. Teleflex controls are used from the control box mounted on the port cockpit wall to the engine bulkhead, and from there to the engine and fuel cock by an assembly of cross tubes and push rods mounted on the rear face of the bulkhead.

Servicing instructions for Teleflex controls are given in A.P.1464 D., Vol. I, Part 2, Section 2, Chapter 3. For servicing controls on engine, see the Nene Handbook.

Control Rigging

125. (a) The throttle needle valve on the engine is adjusted as detailed in the Nene Handbook, and must be fully closed when the throttle control lever in the cockpit is $\frac{1}{8}$" from its closed position. The cam lever actuating the starter circuit micro switch is adjusted to close this switch when the throttle lever is closed, and the U/c warning switch is adjusted to close when the throttle is quarter-closed. Micro switch adjustment is achieved by loosening off the 2 B.A. bolts which clamp the cam arms to the cross tubes.

(b) The high pressure fuel cock control setting is shown on Fig. 95.

(c) When adjusting the control settings, check for freedom of movement and excessive backlash.

Fuel Booster Pump and Neg. "G" Valve

126. The two components are integral with the fuel collector box in the base of the main fuel tank. The box serves as the negative "G" reservoir containing fuel for approx. 5 seconds (max.) inverted flight. For detailed description and instructions, for maintenance and testing refer to A.P.4343D, Vol. 1, Sect. 7, Chap. 16.

Attachment of B.P. and Valve

127. Viewed from underneath, the outer (oval) ring of aerotight nuts retains the reservoir complete with pump and valve, which may be removed as a whole.

A drain bolt and plug are fitted in this ring of nuts to facilitate fuel drainage.

The next circle (of 2 B.A. bolts) retains the pump, type B.P.3 Mk. 3, complete with Neg. "G" valve B.P.23 Mk. 1. The pump only may be removed by undoing the next inner circle (of 12 studs), and this also gives access to the gauze filter screen. Two extraction holes, drilled and tapped $\frac{1}{4}$ B.S.F., are provided to assist in breaking the joint between the pump and the mounting ring.

NOTE: Before removing tank components ensure that tank is empty, disconnect pump motor electrical supply leads by unscrewing breeze type socket.

Upon reassembly, use approved jointing compound on joint washers and relock all pipe connections. Use the jointing compound sparingly as any excess squeezed out around the edge of the joint may cause the inverted flight valves to stick open.

Valves

128. (a) Neg. "G" Valve.
Is fully automatic in action, the seven clack valves fitted around the pump ensure an uninterrupted supply of fuel to the engine under all conditions of flight, including violent negative "G" effects and short periods of inverted flight.

(b) Non-Return Valve in Pump.
In the lower pump body casting, and situated on top of the fuel delivery outlet, is a non-return valve which closes when the pump is functioning, and forms part of the delivery line. When the pump is stationary, the valve drops open, allowing a free flow of fuel from the tank into the delivery line.

A.S.I. SYSTEM

General

129. The pressure and static pipes leaving the pitot head (see Fig. 54) 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. 2 wing rib and main spar 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.

NOTE: (a) On early aircraft static pressure pipe lines are identified at each joint with letter "S" stamped on union nuts and ¼" yellow band each end of pipes. Pitot pressure lines are plain. On later aircraft the static pipes are identified by two narrow yellow bands and the pitot pressure pipes by one narrow and one broad yellow band. In future any pipes fitted or replaced in aircraft must be identified by the later markings.

(b) For testing after installation, see Para. 138.

Removal of Pitot Head

130. Remove pitot head bracket by disconnecting the clamp bolt, and removing the six attaching screws to the fin. Disconnect electrical lead at the terminal block attached to the access door in the top fin rib. Then disconnect the outer sleeves from the static and pressure pipes.

CABIN PRESSURISING

Canopy Seal

131. 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 lbs./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 atmosphere.

Pressure Cabin

132. Pressure is supplied from the engine impeller casing and is passed to a non-return valve which is located on the rear of No. 2 bulkhead. The air is then passed to a cabin blower air control valve marked OFF - HOT - COLD, which is 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 control.

Vacuum System

133. This system is no longer applicable to Mk. 30 and 31 aircraft (Post Vampire Mod. No. 175).

Pressure Cabin Control

134. The pressure in the cabin is automatically regulated by a Mk. 11 Pressure Cabin control valve, fitted on the forward face of 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 3 lb./sq. in. Incorporated in the valve is a switch which operates a warning lamp should the cabin pressure fall ½ lb. below the normal for any altitude.

Two further valves are incorporated in the unit: an outward relief valve set to relieve at 3.1 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.

For further details, see A.P.1275A, Vol. I, Section 10.

GROUND TESTING OF PRESSURE CABIN

The pressures in the following tests are given for the Mk. 11 Cabin Pressure Control Valve only.

Requirements

135. (1) Cabin to be pressurised to 3.00 lb./sq. in.

(2) Cabin to maintain a pressure of 3.00 lb./sq. in.

(3) Check that "NOMALAIR" valve cracks at 3.10 to 3.20 lb./sq. in.

(4) Check time for pressure to drop from 3.00 to 1.50 lb./sq. in. Time should not be less than 20 seconds.

Equipment Required

136. The following test equipment is required:—

Petrol motor rig complete with airflow measuring device or electric motor rig.

Air pressure bottle with attachments to pressurise canopy seal. Pressure supply to be regulated to between 45 and 10 lb./sq. in.

Pressurising and Testing Cabin (without Engine Running)

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

(i) Shut and lock the sliding canopy.

(ii) Remove the detachable nose panel and connect the test rig air supply line to the charging point on the door of the armour bulkhead.

(iii) Connect the mercury "U" tube flexible pipe to the connection adjacent to the canopy seal vent on the armour bulkhead. Connect the pressure bottle to the inlet side of the pressure reducing valve in the canopy seal line. To accomplish this, disconnect the canopy seal line from the branch pipe off the cabin pressure pipe and connect the air pressure line. Blank off the branch pipe.

(iv) Blank off the atmospheric vent on the "NORMALAIR" Cabin Pressure Control valve and turn the canopy seal three-way cock to the "ON" position.

(v) Commence to pressurise cabin to satisfy requirement No. 1.

(vi) Maintain the required pressure of 3 lb./sq. in. with an airflow into the cabin of not more than 14 cu. ft./min. to satisfy requirement No. 2. Check "NORMALAIR" valve for leaks. Detect leaks by placing hands over the two gauze covered exists and check that the cabin pressure gauge corresponds with the Mercury "U" tube on the test rig.

(vii) Raise the cabin pressure to 3.10 to 3.20 lb./sq. in. and check that "NORMALAIR" valve cracks at this pressure.

(viii) Drop the cabin pressure to 3 lb./sq. in. and when this pressure is steady, check the time it takes to drop to 1.5 lb./sq. in. The minimum time should be 20 seconds.

(ix) At completion of test, turn the canopy seal cock "OFF," disconnect the test rigs from the aircraft and remove the blank from the "NORMALAIR" valve atmospheric vent. Reconnect canopy seal line to the branch pipe on the cabin pressure pipe.

Test A.S.I. System

138. The usual checks of the A.S.I. lines and instruments should be made with the cabin pressurised and unpressurised (refer to Instrument Instruction No. 1.21/1).

Warning Light

139. At the completion of the pressure cabin ground tests, remove the tube from the cabin control valve, and test that the pressure warning light electrical circuit operates by removing the terminal cover on the control 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.

Pressurising and Testing Cabin (with Engine Running)

140. (i) First Test.

With engine turning over at 6,000-6,500 R.P.M. and the cockpit control "ON" it should be possible to pressurise the cabin from ZERO to 3.0 lb./sq. in., with a tolerance of $+\frac{1}{2}$ and $-\frac{1}{4}$ lb./sq. in., in a maximum time of 3 minutes, and to maintain this pressure indefinitely.

Procedure:—

(1) Blank off "NORMALAIR" valve vent pipe.

(2) Close and secure canopy.

(3) Turn canopy seal cock "ON."

(4) Position cockpit control at "OFF."

(5) Start engine and as soon as R.P.M. is steady at 6,000-6,500 R.P.M., place cockpit control at "ON" and check time to build up to 3.00 lb./sq. in.

(6) Check that pressure is maintained equally with the cockpit control in the "HOT" or "COLD" position.

(7) Turn control lever to "OFF" and allow cabin pressure to leak away, taking the time for the pressure to drop to 1.5 lb./sq. in. This time should exceed a minimum of 20 seconds.

(ii) Second Test.

With engine at full r.p.m. (12,300) pressure in cabin must not exceed 1.0 lb./sq. in. Proceed as follows:—

(1) Control valve NOT blanked off.

(2) Close and secure canopy.

(3) Put canopy seal cock ON.

(4) Position cockpit control at OFF.

(5) Start engine, and as soon as r.p.m. is steady at (approx.) 3,500 r.p.m. place blower control lever at COLD and then raise speed to maximum of 12,300 r.p.m., when pressure should not rise above 1.0 lb./sq. in.

(6) To release pressure, put cockpit control OFF and allow cabin pressure to leak away.

Pressurising and Testing Cabin on Repaired Aircraft (without Engine running)

141. The test described in para. 137 is only applicable to aircraft receiving a periodical inspection, but if the non-return valve (Fig. 42) has been replaced or structural repairs of the cabin have been effected, then the following tests should be carried out:—

(1) Close and secure the canopy.

(2) Connect the test rig air supply line to the cabin pressure line at a convenient point between the non-return valve and the engine impeller casing, such a point being obtained by removing the cabin air pressure pipe from the impeller casing and attaching it to the test rig air supply.

(3) Connect the mercury "U" tube and air pressure line to their respective points. (See para. 137 (iii).)

(4) Remove the existing "NORMALAIR" pressure control valve and instal a special proof test safety valve set at 4 lb./sq. in. in its place.

(5) Maintain a pressure of 5 lb./sq. in. in the canopy seal.

(6) Inflate the cabin to a pressure of 4 lb./sq. in. and maintain for 1 minute.

(7) Shut off the air supply, and take the time for the cabin differential pressure to fall from 3.0 to 1.5 lb./sq. in. If this time is less than 20 seconds inflate the fuselage to approx. 2 lb./sq. in. and examine all possible sources of leaks. Minor leaks should be stopped as detailed in A.P.1464B, Vol. 1, Part 2, Sect. 4, Chap. 6.

(8) After completion of test, turn the canopy seal cock "OFF," remove test rigs from the aircraft and replace the special proof tested "NORMALAIR" valve with the standard type. Reconnect the canopy and cabin pressure lines to their respective positions.

Testing the Drier Tube

142. To test the drier tube it is required to have means to supply air pressure at 2.75 lb./sq. in. and suction at 0.5 lb./sq. in. at the top of the drier tube and a 12 in. mercury tube (see Figs. 44, 45), 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, 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 air-tight.

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

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

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

NOTE: If indicator has turned pink, the tube should be refilled before testing, with activated "Tell-Tale" silica gel R.A.A.F. (Ident No. K4/10590 or K4/10592).

SECTION 5

REMOVAL ASSEMBLY AND DISMANTLING OPERATIONS

SECTION 5

REMOVAL, ASSEMBLY AND DISMANTLING OPERATIONS

LIST OF CONTENTS

Removal, Assembly and Dismantling Operations

Introduction

143. The chief purpose of this Section is to describe and illustrate the removal and assembly of the principal components of the aircraft. Where there is any special assembly instruction it is covered with a note either in the text or on the illustration. The recommended sequence of operations is given, although, in some cases, it will be obvious that it is not essential to adhere rigidly to the order given. Assembly instructions, unless otherwise stated, should be in the reverse order to that given for removal. Access panels are shown in Fig. 14, and the jacking and trestling arrangements are illustrated in Fig. 9.

GENERAL INSTRUCTIONS

Engine Cowling

144. For the removal of the engine cowling (see Fig. 46), proceed as follows:—

(i) Remove the top cowling panel by unscrewing the forty-seven screws located around the engine bulkhead, rear cone and top wing fillets.

(ii) Remove the bottom cowling panel by unscrewing the fifty-four screws around the engine bulkhead, rear cone and bottom wing fillets, and finally releasing the Dzus fasteners at the centre of either end.

(iii) Remove the rear cone cowling by unscrewing four screws at top and bottom, port and starboard sides on No. 1 rib, the four bolts on each rear cone support, and unscrewing the breeze (identification light) socket located on starboard lower face of rear cowl front former.

NOTE: When replacing cowling it is advisable to reassemble the top cowl before the bottom cowl, then any items dropped can be easily recovered.

Engine Removal and Installation

145. The engine must be removed and installed in accordance with the Schedule laid down in A.A.P.721/30, Vol. 4, Part 5, with reference to Fig. 47 if necessary.

Engine Mounting Eyebolts

146. Under normal engine removal procedure, as covered in para. 145, it should not be necessary to disturb the engine mounting frame: if however the mounting frame is disturbed it will be necessary to rig it correctly when refitting it to the fireproof bulkhead.

To accomplish this, laminum shims may be fitted between the mounting eyebolts and the fireproof bulkhead until a clearance of not less than .25" is obtained between the jet pipe and the jet pipe fairing. Add or withdraw shims until this figure is obtained.

When the correct alignment is obtained check with a micrometer the total thickness of laminum shims on each of the four eyebolts and replace exactly with solid steel or dural shims or washers. File these if necessary to obtain actual thickness which should not exceed .15". It is essential that faces of shims are parallel and flat after filing.

Assemble the shims with Duralac and tighten the eyebolt nuts on the upper and lower spar tubes to a torque loading of 490 ± 50 in./lb. and 325 ± 30 in./lb. respectively.

NOTE: The clearance of .25" between jet pipe and fairing is a minimum for new or reconditioned aircraft and will change during service due to a general settling of parts. No action need be taken unless actual chafing is imminent.

Removal of Canopy

147. There are two methods by which the sliding canopy can be removed.

(1) Disconnect the dry air polyvinyl pipe from sliding canopy and seal the pipe connections. Wind the canopy back until it comes in contact with the spring loaded stop on the left hand side, depress the stop and continue winding the canopy back until the stop is contacted a second time. Again depress the stop and wind until the rack leaves the pinion; then withdraw the canopy.

(2) Wind the canopy back to any position up to the stop so that it is in the unlocked position. Pull the yellow and black jettison handle, located on the right hand side of the cockpit forward of the crank handle (Fig. 5): this will unlock the canopy latches and lift the canopy clear of the rails.

NOTE: The jettison gear should on no account be operated from the cockpit during functional tests or re-setting unless a second person is available to apply a restraining load on the re-setting cable and jettison lever to prevent damage being caused by the powerful jettison springs.

Refitting Canopy

148. To refit the canopy after being removed by method (1), turn the winding handle so that the marked teeth on the pinion and idler gear coincide. The gears become visible when the right hand ammunition door is opened. Place the canopy into the ends of the latches and push it forward until the rack contacts the idler gear. Turn the winding handle to bring the canopy forward to the closed position. Refit the dry air pipe.

To refit the canopy after jettisoning or removal by method (2), turn the winding handle so that the marked teeth coincide. Move the right hand canopy latch until its red painted arrow is in line with the corresponding one on the canopy. Align the left hand latch with the right and drop the canopy and latches into the canopy rails with the jettison gear in the released position. This should ensure that the painted lines on the canopy and latches and on the two gears all coincide.

Reset the jettison gear by pulling on the cable which is accessible through the left hand ammunition door. (Refer to NOTE:— para. 147).

Wind the handle hard forward (do not lock the pin in the hole) and then release it to find its own position. Set the locking plate using the vernier adjustment to give one diameter clearance between the centre of the hole and the centre line of the locating pin.

With the canopy locked forward the clearance between the wind screen and the front edge of the canopy is not to exceed .3 inch with a pressure of 3 lb./sq. in. in the cockpit.

The clearance between the angle plate which is attached to the fairing at the rear of the opening, and the angle piece on the canopy (see Fig. 50) must be .1" + .000" — .070" and overlap .3". As access to this area is restricted, a good method of checking is to pack "plasticine" into the space between the top of the fuselage and the angle plate. Fill to a length of approximately two inches, and allow plasticine to come around and over the edge of the angle. Ensure that the material is packed in to avoid displacement.

Moisten the angle on the canopy with oil or water so that it will not adhere to, and distort, the plasticine. Slide the canopy forward along the rails and register the amount of clearance from the impression left on the plasticine.

Packing of suitable thickness may be used under the angle plate if required.

Canopy Rails

149. For removal of the canopy rails the procedure is as follows:—

(i) Remove the pivot bolt from the left and right-hand latch operating levers and withdraw the lever through the rails.

(ii) Disconnect the canopy seal air line at No. 2 bulkhead on the right-hand rail. Seal off open end.

(iii) Remove canopy latches.

(iv) Disconnect the electric cable clips under left-hand stiffening member.

(v) Disconnect the dry air tube clips under left-hand stiffening member.

(vi) Remove woodscrews in left and right rail external fairing.

(vii) Remove countersunk bolts locating canopy rail and sealing bracket to fuselage. The countersunk heads will be found inside the channel section of the canopy rail. The nuts are located on the underside of the stiffening member.

(viii) Remove the rails.

Windscreen

150. The removal of the windscreen assembly is effected as follows:—

(i) Remove gunsight with recorder and E2A compass.

(ii) Disconnect the polyvinyl pipes to the front dry air sandwich screen and seal the pipe connection.

(iii) Disconnect the top centre instrument panel from the front screen bracket, removing two round-head bolts from the top corners of the panel and the top four hexagon bolts from the gunsight bracket.

(iv) Remove five 4BA bolts from the left and right-hand gusset plates at junction of seal bracket and canopy

rail.

(v) Remove countersunk screws at base of front and side screen fairing.

(vi) Remove the windscreen assembly.

Windscreen Front Panel

150A. The removal of the windscreen front panel is effected as follows:—

(i) Disconnect polyvinyl pipe to dry air sandwich screen, and seal the pipe connection.

(ii) Remove the glazing plate at lower end of front panel.

(iii) Remove the two access panels in windscreen front fairing plate.

(iv) Remove the four 2BA bolts attaching the right and left hand tie bars at top and bottom.

(v) Remove the tie bars.

(vi) Remove the front panel.

Draining Fuel Tanks

151. The main fuselage tank is accessible through the ventral compartment, and the wing tanks through detachable panels in the underside of the wings. The main and wing tanks are drained through a plug in the collector box at the base of the main tank. Alternatively, tanks may be drained by means of a bowser, sucking the fuel from the tanks through the filler caps. It is not possible to drain individual wing tanks separately, but each set of wing tanks may be drained by disconnecting the feed line at the inboard tank and depressing the spring-loaded valve. A drain plug is provided in the wing drop tanks.

Main Fuselage Tank—Removal and Installation

152. (1) The main tank is removed as follows:—

(i) Jack up the aircraft at least 6 inches above the ground (See Fig. 9).

(ii) Remove the engine top cowl.

(iii) Remove the gun bay doors (See Sect. 12).

(iv) Remove the guns (See Sect. 12).

(v) Remove the accumulators (See Sect. 6).

(vi) Drain the tank (See para. 151).

(vii) Using suitable overhead tackle, take weight of engine off mountings.

(viii) Remove the split pins, nuts and bolts from the diagonal bracing struts and remove struts.

(ix) Remove the two clips from the support plate brackets and remove the support plate assembly.

(x) Disconnect vent pipes.

(xi) Disconnect wing drop tank fuel pipes and unscrew adaptor (Part No. 00P125) (Ident No. A79/501960).

(xii) Disconnect all fuel pipes at the sump and seal off open ends.

(xiii) Disconnect the bonding and fuel contents gauge lead.

(xiv) Support the tank and release the turnbuckles on the retaining straps.

(xv) Remove the tank.

(xvi) Coat float valve assembly with oil (Ident No. K2/145).

(2) The procedure for the installation of the tank is a reversal of the removal procedure. Since the tank is a close fit to the bay it is important to check that there are no sharp edges or projections likely to cause damage to the tank covering. Attention must also be paid to the requirements of Vampire Mod. No. 164 which introduces improved sealing between the filler neck of the fuselage fuel tank and fuselage structure, to prevent seepage of fuel into the tank bay from overfilling. Before installing the tank a new rubber sealing ring must be affixed to the metal sealing ring at the filler neck mounting in the following manner.

(i) Remove the metal sealing ring from around the filler neck assembly. This operation will free the earthing socket.

(ii) Thoroughly clean the metal sealing ring.

(iii) Apply an even coat of Bostik K3/436 to the mating surfaces of the metal ring and the new rubber sealing ring. After 15-20 minutes, place the rubber sealing ring centrally on the metal sealing ring and apply an even pressure all around until the joint is set.

NOTE: It will be necessary to distort the rubber sealing ring to clear

the earthing socket.

(iv) Fit the sealing ring assembly to the tank, replace the washers and secure with new nuts, ensuring that the ¼ inch hole in the metal ring coincides with the drain hole in the base ring.

(v) Using an approved jointing compound, attach the earthing socket to the appropriate bolts.

(vi) Ensure that the filler neck locating block in the fuselage is free from all traces of the old rubber sealing ring and its adhesive. Thoroughly clean the surface of the block.

(vii) Prior to installing the tank to the fuselage, apply an even coat of Bostik K3/436 to the top surface of the rubber sealing ring and to the under-surface of the filler neck locating block. It is important that the coated surfaces are brought together between 15 to 20 minutes after applying the adhesive. The installation of the fuel tank must be timed to enable this requirement to be met.

NOTE: The rubber sealing ring must be compressed between the locating block and sealing metal ring around the complete circumference in order to obtain a satisfactory sealed joint.

Inboard Wing Tank

153. For removal of the inboard wing tank, the procedure is as follows:—

(i) Remove the pipe fairing located on the wing lower surface at the root end.

(ii) Drain the tank (see para. 151).

(iii) Remove the four countersunk screws from the filler located in the top skin of the wing.

(iv) Remove the screws from the tank panel and lower the panel from the tank which is to be removed.

NOTE: (a) It is important to drain the tanks before removing the tank panels, as the latter afford support for the tanks. There are no tank straps.

(b) When replacing tank doors, reference must be made to Fig. 79 to ensure that bolts, which are numbered to indicate difference, are returned to correct positions.

(c) It is essential, when attaching the filler assembly to the top skin of the wing, to fit the 14 s.w.g. aluminium washer between the skin and the filler neck assembly. Assemble washer with Plastic Hermetite, on both surfaces, to prevent fuel seeping through from the filler neck to the top surface of the tank in cases of over filling.

(v) Disconnect the fuel contents gauge lead and bonding.

(vi) Disconnect the fuel pipes and seal off open ends.

(vii) Disconnect the vent pipes.

(viii) Lower tank from wing.

Leading Edge Wing Tank

154. For removal of the leading edge wing tank, the procedure is as follows:—

(i) Drain the tank (see para. 151).

(ii) Remove the screws from the tank door in the underside of the wing and remove the door (see notes after para. 153 (iv)).

(iii) Disconnect the bonding from fuel and vent pipes.

(iv) Disconnect the fuel pipes from the inboard and outboard wing tanks and seal off open end.

(v) Disconnect the vent pipe and seal off open end.

(vi) Remove the tank.

Outboard Wing Tanks

155. For removal of the outboard wing tanks, the procedure is as follows:—

(i) Drain the tanks (see para. 151).

(ii) Remove the screws from the tank door in the underside of the wing and remove the door (see notes after para. 153 (iii)).

(iii) Disconnect the bondings from the fuel, vent and fuel pressure pipes.

(iv) Disconnect the fuel contents gauges lead from wing tank No. 3.

(v) Disconnect the fuel and vent pipes and seal off the open ends.

(vi) Remove the four countersunk screws from the filler on wing tank No. 4, located in the top skin of the wing.

(vii) Remove the tanks.

NOTE: When replacing tanks refer to "para. 153 note (C)."

Wing Drop Tanks

156. When fitting the drop tank to the wing, the following precautions should be taken:—

(i) Apply a liberal amount of French chalk to the rubber seating on front tank support before raising the tank.

(ii) The tank should not be fitted to the wing until the paint on the wing is thoroughly dry.

(iii) The washers on either side of the rear peg mounting may be positioned either under the peg flange or casting as required.

(iv) Ensure that wing seats only on the front rubber bearing strip and the flange on the rear locating peg. No other contact must be evident between the top fairing and wing profile.

(v) The suspension bolt must not be overtightened as interference with the action of the release gear will be caused. A torque loading of between 400 to 500 lb./in. is desirable.

NOTE: For details, see para. 71.

Removal

(vi) Drain the tank (see para 151).

(vii) Support the tank, remove stiffnut and washer from the suspension bolt and carefully lower tank to the ground. Disconnect the fuel hoses from the glass break tubes and remove tank. To release the suspension bolts, operate jettison lever in the cockpit.

Wing

157. To remove the wing from the fuselage, proceed as follows:—

(i) Remove engine cowling (see para. 144).

(ii) Remove the top and bottom wing root fairings.

(iii) Remove the engine (see para 145).

(iv) Drain the tanks and remove the inboard wing tank (see paras. 151 and 153).

(v) Drain and remove the wing drop tank if fitted (see paras. 151 and 156).

(vi) Jack up the aircraft and position trestles (see Fig. 9), with an additional support just aft of the boom to wing joint. Place a strap weighted with approximately 100 lb. over the boom to prevent any springing that may occur.

(vii) Release the pressure from the hydraulic accumulator (see Warning before para. 120, Sect. 4, Chap. 3).

(viii) Release the air pressure from the pneumatic system.

(ix) Remove inspection cover at boom rear end and insert control locking pin (see Sect. 4, Chap. 3, para. 93 (ii)).

(x) Lock the control column NEUTRAL and the aileron sprocket at the bottom of the column (see Sect. 4, Chap. 3, para. 89).

(xi) Remove the inspection cover at the boom to wing joint and disconnect the flying control cables, also the electrical leads and A.S.I. pipes if applicable (see para 164).

(xii) Disconnect the flying control cables at No. 1 wing rib and coil up the cables, also remove the bolt from the Teleflex conduit clamp block (port side only).

(xiii) Disconnect the tail boom from the wing (see para. 164).

(xiv) Disconnect the Teleflex control and master switch electrical lead, breeze socket and circuit breaker on No. 1 wing rib (port side only).

(xv) Disconnect hose (Part No. L002021A) (Ident No. A79/500-907) and remove the clips from the fire extinguisher leads and disconnect at the flame switch on No. 1 wing rib. Coil up leads.

(xvi) Disconnect the breeze socket at connection C10 and C11 on junction box located on firewall (starboard side only).

(xvii) Disconnect hydraulic and pneumatic pipes at unions on No. 1 wing rib. Seal off open ends.

(xviii) Disconnect the fuel vent pipe at No. 1 wing rib, also A.S.I. lines at unions No. 1 wing rib (port side only).

(xix) Remove the inspection cover forward of the main wheel well and disconnect the turnbuckle on the wing drop tank manual release cable.

(xx) Disconnect the air intake duct in the centre tank bay by releasing the large jubilee clip. Turn back the rubber seal.

(xxi) At this stage, flood attachment bolts with a good penetrating oil, and allow to soak for about an hour.

(xxii) The trestling should now be checked for correct alignment, before attempting to remove bolts. This is a very important point to watch, as serious discrepancy will cause scoring of bolts. It can be checked by trying to turn the bolts without any undue pressure, and adjustments should be made until this is obtained.

(xxiii) When satisfactory alignment has been achieved, remove bolts, taking care not to disturb the wing. Use spanner Part No. Y00390 (Ident No. A79/500015), and bolt extractor Part Y00175A (Ident No. A79/500010) for joints A and B, and acorn Part No. Y0093 (Ident No. A79/500011) for drag-joint C.

NOTE: It is important that the same operator remains on the wing to check the top bolt for freedom (Joint A) and to remove the bolt, and that he should remain in one position.

(xxiv) Remove the wing by man-handling on to trestles, and sling the wing if required, as in Fig. 51.

Replacing the Wing

158. With the introduction of varying marks of Vampire fighter aircraft and the progressive stages to which wings have been modified, confusion is likely to arise as to the correct standard to be observed when effecting replacement of mainplanes on these aircraft. It is, therefore, necessary to refer to "INTERCHANGEABILITY OF MAINPLANES"—Vampire Instruction No. 12 before proceeding as follows:—

(i) Offer up the wing to the fuselage, and line up the holes. Any discrepancy in alignment can be felt with the finger, and can be corrected by adjusting the wing and fuselage trestles.

(ii) As when removing the wing, it is important not to disturb the wing after alignment has been obtained. Once again, to ensure this, it is important that the same operator remains on the wing to check the alignment of the top hole (Joint A) and to refit bolt, and that he should remain in one position throughout the operations.

(iii) When re-assembling bolts, anti-seize grease must be used; it should be applied to both fittings and bolts.

NOTE: New wing-fuselage attachment bolts must always be fitted when re-assembling the existing or replacement wing. The used bolts may be re-conditioned by cadmium plating, providing they are not damaged by scores or other surface damage.

Ailerons

159. For removal of the ailerons, proceed as follows:—

(i) Open inspection cover in underside of wing at aileron inboard end, and remove elliptical covers at top and bottom surface of wing trailing edge.

(ii) Disconnect the aileron connecting rod at the pulley.

(iii) Disconnect the aileron tab operating rod at the tab.

(iv) Remove horizontal attachment bolt at inboard hinge fitting.

(v) Support aileron and remove the vertical hinge bolts.

NOTE: For rigging instructions, see Sect. 4, Chap. 3, para. 89.

Flaps

160. For removal of the flaps, they should be placed in the DOWN position before proceeding as follows:—

(i) Release pressure from the hydraulic

accumulator (see Warning preceding para. 120, Sect. 4, Chap. 3).

(ii) Disconnect link from position indicator transmitter (starboard side only).

(iii) Remove bolt at upper end of connecting rod to torque tube, inner and outer flaps.

(iv) Remove hinge pin and distance collar from jack fork-end to bracket at outer flap (see Fig. 52).

(v) Support flaps and remove hinge pins.

Rubbing Strips on Flaps

160A. The "LINATEX" rubber used on the outer flap shrouds has been replaced by a "HYCAR" rubber strip. This change has been brought about because "LINATEX" was not adequately resistant to kerosene and cases of the strips coming off have been reported.

When fixing the "HYCAR" rubber strip to the outboard flap shroud and the smooth black "NEOPRENE" strip to the inboard flap, Bostik 1754 is to be used. The application of Bostik 1754 should be made with a brush to both, thoroughly clean, surfaces and allowed to dry for 15 minutes before bringing them together.

NOTE: If "HYCAR" rubber strip is not available it is permissible to use ⅜" "LINATEX" rubber strip, on the outer flap shrouds only. In such cases "PLIOBOND" adhesive must be used.

Adjustment to Flaps

161. The setting of the flaps on assembly is important in order to establish correct clearance in the UP position. Adjustment is controlled by adjusting the operating jack. Proceed as follows:—

(i) Commence on inner and outer flap of one hand, ascertaining that flap hinges and torque tube are correctly assembled and free to move their full travel, and that flap jack of opposite hand is disconnected or free to extend.

(ii) Extend jack ram fully by selecting DOWN with accumulator charged.

(iii) With jack ram disconnected from flap, loosen lock nut and screw fork end of jack ram out so as to make ram the greatest possible length while still retaining a number of turns of the thread.

(iv) Assemble hinge pin and distance collar connecting jack fork end to outer flap bracket.

(v) Select flaps UP until ram is fully retracted and makes contact with jack body internally.

(vi) Examine clearance of inner and outer flap trailing edges from wing shroud.

(vii) Reduce this clearance to 0.1" by progressively shortening jack ram length, each time repeating the above procedure. Tighten lock nut on final adjustment.

(viii) Adjust inner and outer flaps of other hand similarly.

Dive Brakes

162. For removal purposes the dive brakes must be in the open position, which may be achieved by one man depressing the trigger on the dive brake manually-operated non-return valve on bulkhead No. 2, and another man selecting dive brake ON and operating the hand pump.

(i) Release pressure from hydraulic accumulator (see Warning preceding para. 120, Sect. 4, Chap. 3).

(ii) Remove inspection panel at underside of wing.

(iii) Disconnect jack ram from bracket on dive brake.

(iv) Support the component and remove the two hinge pins (see Fig. 53).

Adjustment to Dive Brakes

163. The setting of the dive brakes on assembly is important in order to establish correct clearance in the closed position. Adjustment is controlled by adjusting the operating jack. Proceed exactly as for the adjustment of the flaps, para. 161. The correct setting for the dive brakes in the closed position is illustrated in Fig. 53.

Tail Booms

164. For removal of tail boom proceed as follows:—

(i) Trestle the aircraft (see Fig. 9), with an additional support just aft of the wing to boom joint.

(ii) Place a strap weighted with approximately 100 lb. over the boom to prevent any springing that may occur.

(iii) Remove tail end fairing and inspection covers at wing to boom joint

and at boom rear end, including covers on the fin.

(iv) Insert rudder and elevator locking pin in boom rear end (see Sect. 4, Chap. 3, para. 93 (ii)).

(v) Remove the rudder, elevator and tail plane (see paras. 165, 166 and 167, if two booms are to be removed. If removing a single boom, remove the rudder, disconnect the elevator from the fin, support and uncouple one end of the tail plane. For rigging instructions, see Sect. 4, Chap. 3, para. 87.

(vi) Disconnect elevator and rudder cables from link fittings at boom rear end, also elevator assister bungee (starboard side only).

(vii) Disconnect the elevator trim cables at forward hand holes in boom (port side only).

(viii) Remove guards from trim pulleys in fin (port side only; see Fig. 21).

(ix) Disconnect elevator and rudder turnbuckles at wing to boom joint.

(x) Disconnect A.S.I. pipes at wing to boom joint (port side only).

(xi) Disconnect pitot head cable and navigation lights at terminal block, wing to boom joint (port side only).

(xii) Remove the split pins, nuts and twenty-two bolts at the wing to boom joint, using special spanner Y00185 (Ident No. A79/500013).

(xiii) Withdraw the flying control cables and bungee from the boom.

Rudder

165. To remove the rudder, proceed as follows:—

(i) Remove the rear boom fairing (on the left-hand fairing, disconnect the electrical lead to the navigation lamp).

(ii) Remove the bolts securing the rudder pedestal to the rudder operating lever.

(iii) Remove the horizontal bolt at the top hinge.

(iv) Withdraw the rudder.

NOTE: The above instructions apply to both rudders.

Tail Plane

166. For removal of the tail plane, position weighted straps over both booms (see para. 164 (ii)), and proceed as follows:—

(i) Remove the fin to tail plane fairings.

(ii) Remove inspection covers on outboard face of each fin, disclosing the tail plane attachment bolts.

(iii) Remove inspection cover on tail plane upper surface, and disconnect elevator trim cables from the sprocket chain.

(iv) Remove elevator (see para. 167).

(v) Support the tail plane.

(vi) Remove the tail plane attachment bolts, four each, port and starboard.

Elevator

167. To remove the elevator, proceed as follows:—

(i) Remove the fin to tail plane fairings.

(ii) Remove rear fairings from tail booms.

(iii) Remove inspection cover on outboard face of each fin, and disconnect the elevator operating lever from the elevator control rod.

(iv) Remove the split pins, castellated nuts and washers from the torque shaft half-bearings in the fin shroud (port and starboard).

(v) Remove inspection cover on elevator upper surface and disconnect elevator tab push rod.

(vi) Move elevator into UP position and remove split pins and castellated nuts from the two hinge fittings.

(vii) Move elevator into DOWN position, support the component and withdraw the two hinge bolts.

Nose Wheel Unit

168. For removal of the nose wheel unit (see Fig. 29), proceed as follows:—

(i) Release the pressure in the hydraulic accumulator (see Warning note before para. 120, Sect. 4, Chap. 3).

(ii) With the unit in the DOWN position, jack up the aircraft and position trestles (see Fig. 9).

(iii) Remove the detachable nose. The locking bolt, which is located in the front centre of the panel, is released by pushing down and turning to a locked position. The panel is then pulled forward and raised off the locating pegs.

(iv) Remove nose wheel fairing attached to leg, by removing 4 pivot pins.

(v) Remove the gun spout fairing panels, port and starboard, by releasing Dzus fasteners (Fig. 104).

(vi) Remove the fixed nosing. The attachment screws are located at the lower portion of the periphery at No. 1 bulkhead and the front floor panel; the screw heads are covered by paint filling.

(vii) Remove support link O and radius rod link hinge bolts on leg (Fig. 29).

(viii) Disconnect hydraulic jack P at leg.

(ix) Remove the $\frac{1}{4}$" bolts located in the end bearings E, support the leg and withdraw the main hinge tube.

NOTE: For adjustment after assembly, see as for main wheel unit, Sect. 4, Chap. 3, paras. 96-100.

Radius Rod — Nose Wheel

169. For removal of the radius rod, carry out the detail set down in para. 168, operations (i) to (vi) inclusive, then (see Fig. 29):—

(i) Remove cold air pipe and non-return valve mounted above ballast weight.

(ii) Remove large ballast weight secured to armour plate.

(iii) Remove micro switch wiring from radius rod.

(iv) Disconnect hydraulic jack "P" (see Fig. 29) at pick-up bearing.

(v) Remove 4BA screw, split pin, castellated nut, and bolt from lock link "N".

(vi) Remove split pins, castellated nut and shims, support radius rod and withdraw bolts and distance tubes from bottom bracket "B" located on No. 1 bulkhead.

NOTE: During reassembly, primer and sealing compound MUST be used in attaching components to the armour plate, which is part of the cabin sealing arrangement. Cabin sealing procedure is outlined in AP.1464B and is important.

Shock-Absorber — Nose Wheel Removal

170. (i) With the nose wheel unit in the DOWN position, jack up the aircraft and position trestles (see Fig. 9).

(ii) Un-pin and remove pivot bolt attaching wheel fork to lower end of shock-absorber strut (see Fig. 32).

(iii) Swing fork and wheel clear to enable withdrawal of strut.

(iv) Unscrew and remove lock cap, spring and lock plunger (item 15, Fig. 32), which passes through base of nose wheel barrel and engages in slot of shock-absorber strut.

(v) Unscrew shock-absorber strut and withdraw from barrel.

NOTE: The shock-absorber strut is screwed in hand tight, and during reassembly it is important that the slotted end of shock-absorber barrel is **in line** with the bottom of the lock plunger. A tolerance of .05" proud only is allowed at this point.

Reassembly operations are the reverse of removal operations; grease nipples and lock plunger are to be charged with grease K2/65 during assembly. With lock plunger in position, the lower end of shock-absorber strut should be turned to bring the inflation valve to the rear of the leg.

Wheel and Axle — Nose Wheel

171. For removal of the wheel and axle (see Fig. 30), proceed as follows:—

(i) Jack up the nose of the aircraft (see Fig. 9) so that the wheel is free of the ground.

(ii) Remove split pin, castellated nut and end cap, and withdraw tie rod (see Fig. 30).

(iii) Support the wheel and push out the axle tube.

Main Undercarriage Leg

172. For removal of the main wheel unit see Fig. 23, and proceed as follows:—

(i) Release the pressure in the hydraulic accumulator (see Warning Note before para. 120, Sect. 4, Chap. 3).

(ii) With the unit in the DOWN position, jack up the aircraft (see Fig. 9).

(iii) Disconnect the pneumatic brake line W at the top of the leg.

(iv) Disconnect the micro-switch X lead (port leg only).

(v) Disconnect the lock-link from leg by removing pin Y.

(vi) Remove the bolt connecting the hydraulic jack P to the leg.

(vii) Remove the wire-locked bolts located in the bearings Q at either side of the undercarriage diaphragm, using special spanners, Part No. Y00185A (Ident No. A79/500013) and Y00186A (Ident No. A79/500014).

(viii) Lift out of bearing.

(ix) Seal off open end of pneumatic pipe.

NOTE: For instructions regarding adjustments after assembly, see Sect. 4, Chap. 3, paras. 96-100.

Radius Rod — Main Wheel.

173. For removal of radius rod, see Fig. 23, and proceed as follows:—

(i) Release the pressure in the hydraulic accumulator (see Warning Note before para. 120, Sect. 4, Chap. 3).

(ii) With the compression leg in the DOWN position, jack up the aircraft (see Fig. 9).

(iii) Disconnect the Teleflex cables M at the top of the latch plate.

(iv) Remove the bolt connecting the hydraulic jack P, to the top operating sleeve.

(v) Disconnect the lock link from the compression leg T.

(vi) Remove the wire-locked bolts located in the end bearings L at either side of the undercarriage diaphragm.

Main Wheel — Removal

174. (i) Jack up the aircraft (see Fig. 9).

(ii) Release brake.

(iii) Remove split pin retaining castellated nut to axle.

(iv) Remove castellated nut, using special spanner (Ident No. A79/500012).

(v) Using wheel extractor tool (Ident No. A79/500062), withdraw the wheel from the axle.

NOTE: As pin fit in nut is very close, it is advisable to retain nut on end of axle from which it was removed.

Wheel Doors

175. The nose wheel and main wheel doors are removed as follows:—

(i) Nose Wheel Door:

(a) Remove the port fairing under the nose; this fairing is attached by Dzus fasteners.

(b) Disconnect the lower end of the radius rod E from the door (see Fig. 31).

(c) Remove the door hinge pins.

(ii) Main Wheel Door:

(a) Disconnect retracting frame at the door.

(b) Disconnect micro switch electrical lead at terminal block on Rib 5.

(c) Remove the hinge pins.

NOTE: To check clearances and fit of main undercarriage doors after rework in this area, it is advisable to remove landing wheels (see para. 174) to facilitate checking and to stop actuation of closing mechanism. If necessary, adjust catch on wheel door (see detail "X", Fig. 58).

Main Wheel Door Fixed Fairing

176. To remove the fixed fairing, proceed as follows:—

(i) Release nuts from eyebolt attachments at bottom of oleo leg.

(ii) Release screws in the clip and saddle at top of oleo leg.

(iii) Remove fairing.

NOTE: When assembling a repaired or new fixed fairing, ensure that item fairs in with wing skin when closed; adjust by adding or removing packing washers AS 470G

at pick up points on leg.

Fairings are trimmed on assembly to aircraft, to give .050" gap all round between profile and wing skin.

Main Undercarriage Door Mechanism

177. For removal of the door mechanism, proceed as follows:—

(i) Release the two bolts from the Teleflex box (see detail "N", Fig. 28) located on the latch plate.

(ii) Release the clamp blocks located on the bottom surface of the wheel well and wing rib No. 3.

(iii) Withdraw the slide tube and plunger from the barrel located in the forward wall of the wheel well (see Fig. 23).

Adjustment to Main Undercarriage Door Mechanism

178. For adjustment to door mechanism after the installation of conduits refer to Figs. 24 and 25.

Hydraulic Jacks

179. Before removing the hydraulic jacks, jack aircraft clear of the ground, and release the pressure from the hydraulic accumulator (see Warning Notes before para. 120, Sect. 4, Chap. 3), then proceed as follows:—

(i) Remove the cover plate Part No. D003189-90 (Port and Starboard) from shell bottom of stub boom near the top of the compression leg, remove cover plate Part No. D00382IND from bottom skin immediately in front of compression leg.

(ii) Remove micro-switch bracket Part No. G001829-30 (Port and Starboard) complete with micro-switch, remove bolt connecting the bottom of radius rod to pick-up fitting, the top of the compression leg may now be swung outboard to enable the bottom bolt of the hydraulic jack to be removed.

(iii) Disconnect both hydraulic hose-lines from the jack, and drain the fluid into a clean container, the removal of the jack may now be completed by removing the top bolt, eject the fluid from the jack by moving the piston in and out by hand, fit blanking connections to the hose ends and the open ports of the jack.

NOTE: When jacks are removed from the aircraft for replacement or transportation, it is essential that all hydraulic fluid is ejected, and the piston rod pushed into the jack and secured in that position.

Hydraulic Reservoir

180. For access to the reservoir for removal purposes, the canopy should be jettisoned (see para. 148 and Fig. 50).

Removal of Hydraulic Reservoir

181. For the removal and draining operations, proceed as follows:—

(i) Release the pressure from the hydraulic accumulator (see Warning Note before para. 120, Sect. 4, Chap. 3).

(ii) Using a hydraulic test rig, connect the suction line to the outboard ground test coupling point on the firewall, leaving the pressure line uncoupled. Start the test rig, and direct the oil flowing from the pressure side of the test rig pump into a clean container. When the flow of oil has ceased, stop the test rig and disconnect the suction line from the ground test point.

(iii) Disconnect the hand pump pressure line in the gun bay. Operate the hand pump and drain the fluid from the pressure line into a clean container until the reservoir is dry.

(iv) Disconnect the pipes at the reservoir and seal off open ends.

(v) Disconnect the turnbuckles at the two retaining straps, and remove the tank.

(vi) Re-connect the hand pump pressure line.

Oxygen Bottles

182. The removal procedure is as follows:—

(i) Open ammunition doors, disconnect and remove radio.

(ii) Turn off control valve located on the right-hand side of No. 2 bulkhead.

(iii) Disconnect the pipe lines at the

bottles.

(iv) Disconnect turnbuckles on the two retaining straps.

(v) Remove the bottles and seal off open ends.

NOTE: Bottles bearing the same test date markings should be used to obviate need to remove top bottle to check underneath bottle (see A.G.I. 5/19).

Compressed Air Reservoir

183. The removal procedure is as follows:—

(i) Remove gun bay doors.

(ii) Remove port and starboard ammunition chutes to inboard guns.

(iii) Uncouple pipes to pressure gauge, brake distributor unit, and air compressor.

(iv) Remove eight panel mounting bolts, and withdraw pneumatics assembly complete with reservoir.

Auxiliary Gear Box — Removal

184. (i) The gear box, with auxiliaries and auxiliary drain pipes (see Fig. 106) attached, may be removed independently of the engine.

(ii) Remove top engine cowl panel (see para. 144), disconnect services sufficiently to clear assembly. Generator leads may be folded away, but canopy seal, port fuel pressurising and cabin blower air lines must be removed and sealed off (where necessary) with suitable caps.

(iii) Loosen off the two wing nuts on top of drive shaft housing and swing housing cover to one side. Remove the shaft retaining nut and large circlip and withdraw the splined shaft clear of the engine. Secure with a piece of tie wire or string.

(iv) Arrange temporary support to take weight (90 lbs.) of assembly, remove split pins, nuts from the four $\frac{3}{8}$" dia. bolts which secure the assembly to the mountings.

(v) Withdraw bolts, catching adjuster pieces which drop clear as bolts are removed, lift auxiliary gear box clear.

(vi) Additional points in removal and reassembly:

(a) Mark bolts and adjuster fittings to (as far as possible) reassemble in original positions.

(b) Attitude of gear box is manipulated with male and female adjusters, and lock nut to centre the drive shaft for correct meshing at top and bottom of shaft.

(c) Upon reassembly, line up and wire lock adjusters, repin $\frac{3}{8}$" nuts, tighten shaft entry gland, replace housing cover, remove blanking caps, reconnect service lines and cables, check oil level.

Minimum Packing Dimensions

185. The minimum packing dimensions for the various components will be found in Fig. 55.

SECTION 6

ELECTRICAL AND RADIO SERVICING

SECTION 6 — CHAPTER 1

GENERAL SERVICES ELECTRICAL INSTALLATION

LIST OF CONTENTS

General Services Electrical Installation

Introduction

186. This Section contains diagrams giving the location of the various electrical components, and wiring of the various services; notes on circuit functioning, and access to components.

A Junction Box System of wiring is used in this aircraft, and inter-connections between junction boxes, and between junction boxes and bulkheads, are contained in polyvinyl conduits with Breeze plugs or sockets at each end. The installation also includes cable loom assemblies, consisting of Breeze sockets with loose "cel" covered P.V.C. cables attached, these being connected directly or through convenient terminal blocks to adjacent equipment.

The Generator, Accumulator, and Positive and Negative Feeder wiring diagram for this aircraft is shown on figs. 59 and 60. All other General Services circuits are shown on figs. 61 to 74 inclusive, and figs. 77 and 77A.

A Location Diagram giving the location of the general services Junction Boxes, Terminal Blocks, and equipment is shown on fig. 57.

Junction Boxes—General

187. The junction boxes are referenced numerically, i.e., J.B.1, J.B.2; except where they appertain to specific services; i.e. R.P. and Bombs Junction Box, Gyro Compass Junction Box (Post Vampire Mod. 143—D.H. Aust. Mod. V.202 only).

Multi-pin plugs on junction boxes are denoted by a label showing plug number, the number being prefixed by the letter "C," which indicates that a P.V.C. conduit of the same number connects to that plug; i.e. Conduit C11 connects to Plug C11.

Junction Box 1

(Wiring Diagram shown on Fig. 77)

187A. This junction box is the main electrical switch panel, and is fitted on the starboard side of the cockpit next to the pilot's seat.

All the general services circuit breakers are mounted in the box, together with Starter Circuit Safety, Ignition Isolating, Generator Field, Identification Lights, Navigation Lights Dim/Bright, and Landing Light control switches, and push-button switches to operate the following services:—Starter, Identification Light Signalling, Fire Extinguisher, and Ammeter Testing.

Also mounted on the box are the Emergency Fuel Pump Warning Light, a Fuel Pump Ammeter Test Socket, a Resistance Unit for the Fuel Pressure Warning Light, a Resistance and Rectifier Unit for the Generator Warning Light, a main positive and negative feeder terminal block, interconnecting terminal blocks for various services, and wiring plugs.

All those circuit breakers which are protected by metal guard rails on the inboard face of the junction box are intended to be switched "ON" (down) and left in this position indefinitely.

Junction Box 2

(Wiring Diagram shown on Fig. 77A)

187B. This junction box is mounted at the top of the rear face of the fireproof bulkhead, and contains two Generator Warning Light circuit breakers, a negative feeder tei minal block, four inter-connecting terminal blocks for various services, and wiring plugs. Affixed to the inside face of the lid is a wiring diagram of the box.

The two Generator Warning Light circuit breakers are intended to be switched "ON" (down) and left in this position indefinitely.

R.P. and Bombs Junction Box

(Wiring Diagram shown on Fig. 77A)

187C. This junction box is mounted on the starboard side of the cockpit floor immediately below junction box 1, and is the main armament services switch panel containing R.P. and Bomb circuit breakers, together with R.P. Selection, Bomb Distributor, Bomb Selection and Bomb Fuzing control switches. It is fitted only on Vampire Mk. 31 aircraft.

Also mounted on the box are four relays for R.P. and Bomb firing and G.G.S. caging, a main feeder terminal block, one other terminal block for firing button supply, and wiring plugs.

The two circuit breakers are intended to

be switched "ON" (inboard) and left in this position indefinitely.

Gyro Compass Junction Box

(Post Vampire Mod. 143-D.H. Aust. Mod. V.202 only) (Wiring Diagram shown on Fig. 77A)

187D. This junction box is mounted on the starboard side of the cockpit floor adjacent to the pilot's seat and immediately aft of the R.P. and Bombs junction box and contains Torque Switch, Relays, Condenser Unit, Fuzes, one interconnecting terminal block, and one wiring plug.

Three-phase A.C. power is fed to the Gyro-Compass circuit from this junction box, which also provides facilities for visual indication of an A.C. power supply failure from the Type 100A inverter. The Power Failure Warning Light is located on the blind-flying instrument panel.

Starter Panel

(See Fig. 61)

188. The Rotax Starter Panel Type U.0618 (or U.0803) is mounted in the port flap shroud, and contains the equipment necessary for starting the engine, viz.: Time Switch, Overspeed Relay, Starter Relays, and Resistance Units. (See para. 199 for operation.)

Circuit Breakers

189. Apart from the circuit breakers already referred to in Junction Boxes 1 and 2, and in the R.P. and Bombs Junction Box, there are two other circuit breakers fitted in the aircraft, one being the Battery Main circuit breaker mounted on the port No. 1 rib and the other the Emergency Starting circuit breaker (Post Vampire Mod. 183—D.H. Aust. Mod. V.214 only) mounted on the port flap shroud No. 1 rib.

It is intended that both these circuit breakers be switched "ON" and left in this position indefinitely.

Fuses

190. There are only four fuse boxes fitted in this aircraft: these are the Generator Main Fuse box located on the voltage regulator panel in the starboard flap shroud, the Turn and Slip Indicator Fuse Box (Post Vampire Mod. 175—D.H. Aust. Mod. V.191 only) located on the lower portion of the left-hand instrument panel, and the two Gyro Compass fuse boxes located on bulkhead No. 2 (Pre Vampire Mod. 143—D.H. Aust. Mod. V.202 only) or in the Gyro Compass junction box (Post Vampire Mod. 143).

Ground/Flight Switch

191. This switch is mounted on the port No. 1 rib and is operated by a Teleflex cable connected to a lever on the port cockpit wall, aft of the throttle box. It enables the general services to be tested with external accumulators.

Under normal operating circumstances the switch must be placed in the FLIGHT position before starting the engine. However, on aircraft which have had Vampire Mod. 183 (D.H. Aust. Mod. V.214) embodied, the engine may be started with this switch at GROUND. (Refer to Starter Circuit, para. 199 for details of this emergency starting facility.)

The prime functions of the Ground/Flight Switch are for ground testing and starting from an external supply source.

Terminal Blocks

192. Terminal blocks are provided at convenient points throughout the aircraft. They are not numbered in themselves, but their position is shown on the location diagram, and indicated on circuit wiring diagrams.

Bulkhead Plugs

193. The plugs are double-ended and are used to take wiring through metal panels as at firewalls and bulkheads. Any plug attached to either of the pressure bulkheads (Nos. 1 and 2) is of the fixed-pin type, so as to ensure effective pressure cabin sealing.

Bonding

194. Metal fittings, pipes, metal-braided cables, fuel and oil tanks are bonded together and to the main structure. When re-fitting bonding clips, ensure that the surfaces to be bonded together are free from oil, grease or rust. Any point which has had protective treatment removed for bonding purposes must be treated with paint to suit surrounding colour after connection has been made.

Normally, hinged joints are considered as effective links for bonding purposes on control surfaces. Vampire Mod. 64, however, introduced bonding of ailerons, elevators and rudders on Vampire aircraft.

Circuits

195. The service performed by each circuit is indicated by letter or letters; e.g., UV — Ultra-Violet Lighting, G.S. — Gyro Gunsight.

Generally the circuit wires are identified by numbers starting from the positive side of the system, and changing progressively only when the wiring passes through any unit of equipment (excluding terminal blocks, plugs, and sockets). All coding is carried out by using these numbers as suffixes to the service letters. The circuit wires which connect directly to negative or earth potential points (negative side of system) are all identified with letter code "E."

Interpretation of Circuit Diagrams

196. These diagrams have been simplified and straightened out as much as possible, and include all detail for fault location. All circuit diagrams should be read in conjunction with the Positive and Negative Feeder System Diagram and/or the Location Diagram. Functional interpretation of circuits is self-evident owing to the straight-line system of drawing employed. All General Service circuit and Feeder diagrams show Positive at the top of the sheet and Negative at the bottom.

Circuit Functioning

197. The following paragraphs are intended to explain the various features of interest about the functioning of the various General Service circuits. Notes on maintenance and adjustment of standard equipment are given in AP.1095 and/or AP.4343.

CIRCUIT DIAGRAMS

Positive and Negative Feeders, Generator and Accumulator Circuit: "GA" and "E"

(See Figs. 59 and 60)

198. The maintenance details for the 2,300-watt D.C. Type "KX-B" Generator, Type "F" Voltage Regulator, Type "D" Cut-out, and Type "C" Accumulators are given in AP.1095 and/or AP.4343.

The generator (which must be of the 8,000 r.p.m. type) is mounted at the top forward end of the engine and is driven by an auxiliary gear-box. It is connected via a shielded cable containing four 50A cables (two positive and two negative) and one 7A cable to a Type "W" No. 2 Suppressor mounted on the voltage regulator panel in the starboard flap shroud. Also mounted on this panel are the voltage regulator, cut-out, and the generator main fuse.

A power failure warning light is mounted on the top centre instrument panel, and glows in the event of power failure—i.e., generator failing to excite, cut-out not closing, etc.

A generator field switch is mounted on the top of the main electrical panel and is normally wire-locked "ON" with light tie-wire.

A voltmeter test socket is mounted on the voltage regulator panel and is connected across the "G+" and "G—" terminals of the voltage regulator. When a voltmeter is connected it will read generated line volts.

A test socket is fitted in the port flap shroud, this socket being used for normal ground testing purposes. When this socket is being used the ground/flight switch must be in the GROUND position.

Two 12-volt Type "C" accumulators, connected in series, are located forward of bulkhead No. 4 in the gun bay, and receive regulated charge from the generator. The accumulators are accessible through the gun bay doors.

Positive supply passes from the generator and/or accumulators to the load circuit breakers in the main electrical panel via a system of positive feeders.

Negative sections of the general services system are either interconnected by the negative feeders which are "grounded" to the aircraft structure at various earthing terminals throughout the aircraft, or are directly connected to convenient earthing points.

Starter Circuit: "SA"

(See Fig. 61)

199. An electric starter motor is fitted and is controlled by an automatic system which is operated by a push-button on the main electrical panel.

A micro switch located on the engine bulkhead is operated when the throttle is closed and is connected in series with the starter push-button, which ensures that the engine cannot be started unless the throttle is fully closed.

When the starter push-button on Junction Box 1 is pressed it sets the Time Switch mechanism in operation and closes a set of contacts.

The closing of these contacts supplies current to the Overspeed Relay which in turn allows the coil of the No. 1 Starter Relay to be energised, thus supplying reduced voltage to the starter through the Resistance Unit. The closing of these contacts in the Time Switch also operates the Contactor Relay Switch mounted on the port No. 1 rib, thus energising both Boost Coils (Pre Vampire Mod. 151—D.H. Aust. Mod. V.189 only) or both High Energy Ignition Units (Post Vampire Mod. 151—D.H. Aust. Mod. V.189 only), both Igniter Fuel Valves (Pre Vampire Mod. 151—D.H. Aust. Mod. V.189 only), and the Priming Pump (Pre Vampire Mod. 151—D.H. Aust. Mod. V.189 only) on the engine. After a period of 1.0 to 3.5 seconds has elapsed, a second set of contacts in the Time Switch is automatically closed, and this operates the No. 2 Starter Relay, thereby shorting the Resistance Unit, and thus supplying full voltage to the Starter Motor. After a period of approximately 30 seconds has elapsed, a third set of contacts in the Time Switch automatically opens, thus cutting the supply to the starting equipment. If the trip speed is attained before 30 seconds has elapsed, the Overspeed Relay contact is opened, thus de-energising the Starter Relays and the Contactor Relay, and therefore removing the starting equipment from the circuit.

A booster pump is also fitted and is controlled by an interlinked S.C. SAFETY switch on the main electrical panel. The circuit is protected by a circuit breaker on the inboard face of the main electrical panel. The pump is of the submerged type and is located in the fuselage fuel tank.

A Fuel Pressure Warning Switch is fitted on the engine and causes the warning light on the top centre instrument panel to glow when the fuel delivery pressure falls below $3\frac{1}{4} \pm \frac{1}{4}$ lb./sq. in. The switch is fed by a circuit breaker on the main electrical panel.

An ignition isolating switch is provided on Junction Box 1 to enable "false" starts to be made to check the functioning of engine components without actually igniting the fuel.

Upon the introduction of Vampire Mod. 151 (D.H. Aust. Mod. V.189), the re-light push-button switch on the top of the main electrical panel is deleted and replaced by a "Venner" Time Switch located on the port canopy rail, the operation of which, in the event of a "flame-out" during flight, automatically provides ignition for re-lighting for a period of 30 seconds.

Vampire Mod. 183 (D.H. Aust. Mod. V.214) makes provision for starting an aircraft in which the batteries may not be in a fully charged condition. This is accomplished by the addition of a circuit breaker and push-button switch in the port flap shroud connected in series in a link wire between the positive terminal of the starter socket and the positive terminal of the test socket, thereby providing a positive supply from the ground battery to the aircraft electrical system when the push-button is pressed.

In the event of the aircraft batteries not being in a fully charged condition, if Vampire Mod. 183 (D.H. Aust. Mod. V.214) has been embodied, the following emergency starting procedure can be adopted:—

(1) Select Ground/Flight Switch to "GROUND."

(2) Press "EMERGENCY STARTING BUTTON" in the port flap shroud. (Button must be kept pressed for complete duration of starting cycle).

(3) Carry out normal starting routine.

(4) After engine is running, select Ground/Flight Switch to "FLIGHT."

Turn and Slip Indicator Circuit: "TS"

(See Fig. 62)

200. This circuit is introduced by Vampire Mod. 175 (D.H. Aust. Mod. V.191) and is fed from a fuse box located on the lower portion of the left-hand instrument panel. Two d.c. positive supply leads connect to the indicator via a "Q" type Relay located adjacent to the fuse box, and are connected in such a manner that should a fault cause one fuse to "blow" the circuit is automatically connected to the second d.c. supply.

G3F Gyro Magnetic Compass, Gyro Horizon Circuits: "GC"

(See Figs. 63 and 63A)

201. Vampire Mods. 62 and 76 (D.H. Aust. Mods. V.102 and V.159) introduced the G3F gyro magnetic compass (in lieu of the Magnesyn Compass) and the Mk. 3 gyro horizon and these will be retrospectively installed in all aircraft. These circuits are fed from a circuit breaker on the top of the main electrical panel.

Upon the introduction of Vampire Mod. 143 (D.H. Aust. Mod. V.202) facilities are provided for the detection and indication of a failure of a.c. power supply from the Type 100A Inverter to the Gyro Compass and Gyro Horizon circuits.

Magnesyn Compass Circuit: "DR"

(See Fig. 71)

202. This equipment is replaced by the G3F Gyro Compass on the introduction of Vampire Mod. 62 (D.H. Aust. Mod. V.102) (refer para. 201). The circuit is fed from a circuit breaker on the top of the main electrical panel.

G.S.A.P. Camera Circuit: "CG"

(See Fig. 63A)

203. D.H. Aust. Mod. V.227 introduces the AN-N6 G.S.A.P. Gun Camera (in lieu of the G45B Camera) and will be retrospectively installed in all aircraft. The circuit is fed from a circuit breaker on the top of the main electrical panel. The G.S.A.P. Camera is mounted on the nose.

Camera Gun Circuit: "CG"

(See Fig. 71)

204. The G45 Camera Gun is replaced by the AN-N6 G.S.A.P. Gun Camera on the introduction of D.H. Aust. Mod. V.227 (refer para. 203). This circuit is fed from a circuit breaker on the top of the main electrical panel. The Camera Gun is mounted in the nose and provision for fitment of a footage indicator is made on the right-hand instrument panel, and a stowage is provided on the forward end of the main electrical panel for the footage indicator cable. The footage indicator wedge plate will be deleted on the introduction of Vampire Mod. 143 (D.H. Aust. Mod. V.202).

Flap Position Indicator Circuit: "F"

(See Fig. 64)

205. This circuit is fed from a circuit breaker located on the inboard face of the main electrical panel.

Oil Thermometer Circuit: "OA"

(See Fig. 64)

206. This circuit is fed from a circuit breaker located on the inboard face of the main electrical panel. The oil thermometer is located on the port side of the engine wheel-case, and records the oil inlet temperature, which must not exceed 80°C.

Downward Identification Light Circuit: "J"

(See Fig. 65)

207. This circuit is fed from a circuit breaker located on the inboard face of the main electrical panel. There are three Downward Identification Lights, located in the engine rear cone cowl, and colored Red, Green, and Amber. To gain access to the filaments, remove the screws securing the perspex window and unscrew lamp glass.

Landing Light Circuit: "LL"

(See Fig. 65)

208. This circuit is fed from two circuit breakers located on the inboard face of the main electrical panel, one being in the landing light filament circuit and the other in the control circuit. The lamp selector switch is on the top of the same panel.

Adjustments can be carried out by slackening the screws holding the lamp panel. For instructions on making adjustments and for other servicing notes, refer to AP.4343E, Vol. 1, Sect. 7, Chapter 3.

Cabin Pressure Warning Circuit: "PW"

(See Fig. 65)

209. This circuit consists of a cabin pressure control valve and a warning light, and is controlled by a circuit breaker on the main electrical panel.

When the cabin pressure is more than $\frac{1}{2}$ lb./sq. in. below the normal controlled cabin pressure, the warning light will glow. The control valve is mounted in the nose and the warning light on the right-hand instrument panel.

Gun Firing Circuit: "GF"

(See Figs. 66 and 66A)

210. Fig. 66 is applicable to Mk. 30 aircraft only (no provision for R.P. and Bomb Firing) and Fig. 66A is applicable to Mk. 31 aircraft only (provision for R.P. and Bomb Firing). This circuit is fed from three circuit breakers on the inboard face of the main electrical panel, two of which provide positive supply to the operating relay/s for the guns; the third being the control circuit breaker which provides positive supply to the firing switch which is an integral part of the control column.

The G45B or G.S.A.P. Camera and/or the Gyro Gunsight Camera Recorder function simultaneously with the guns when the firing button is pressed.

A micro-switch mounted in the nose and actuated by the nosewheel mechanism, prevents inadvertent operation of the guns while the nosewheel is in the down position.

Undercarriage Lever Lock Circuit: "UL"

(See Fig. 66)

211. This circuit is fed from a circuit breaker on the inboard face of the main electrical panel, and consists of a solenoid-operated plunger on the engine control box connected in series with a micro-switch on the engine control box and a micro-switch on the port undercarriage compression leg (contacts closed only when weight of aircraft is not on the wheels).

Prime function of this circuit is to prevent accidental "UP" selection of the undercarriage while the aircraft is on the ground. A switch labelled "U/C EMERGENCY RETRACTION" on the port cockpit wall permits the undercarriage to be retracted on the ground, in case of emergency, by overriding the micro-switch on the compression leg.

Undercarriage Position Indicator Circuit: "U"

(See Fig. 67)

212. This circuit is fed from a circuit breaker on the inboard face of the main electrical panel. In the event of trouble in this circuit, check the micro-switch connections; renew a micro-switch if the plungers or contacts have become corroded. The only servicing required for the indicator will be replacement of the filament lamps.

Vampire Mod. 173 (D.H. Aust. Mod. V.210) introduces a flashing undercarriage warning light instead of the steady warning light and warning horn, and will be installed in all aircraft retrospectively.

Fuel Gauges Circuit: "S"

(See Fig. 68)

213. This circuit is fed from a circuit breaker on the inboard face of the main electrical panel. The tank transmitter units operate on a 5-wire system and are fitted through the base of the tank, access to wing tank units being through an inspection hole in the tank door. Access to the fuselage tank unit is via the gun bay doors.

When a fuel tank has been changed, ensure that the wire securing the float arm has been removed. (See also para 35.)

Pyrometer Circuit: "XT"

(See Fig. 69)

214. This circuit is fed from a circuit breaker on the inboard face of the main electrical panel. It is a means of measuring the jet pipe temperature. For complete details of installation, maintenance, and testing, refer to AP.1275A.

Oil Pressure Indicator Circuit: "OA"

(See Fig. 69)

215. This circuit is fed from a circuit breaker on the inboard face of the main electrical panel. The oil pressure gauge is mounted on the left-hand instrument panel, and indicates the main oil pump pressure.

Cockpit Red Lighting and U/V Lighting Circuit: "T" and "UV"

(See Figs. 67 and 70)

216. These circuits are fed from two circuit breakers on the inboard face of the main electrical panel.

The Dual System of cockpit lighting is used, and consists of four red lights and four ultra-violet lights, the lights being controlled by three dimmer switches mounted on the port cockpit wall just below the canopy rail and forward of the pilot. A cockpit-type lamp is fitted under the ammunition compartment floor for illuminating the gun bay.

SCR-695-A Radio Detonator Supply, Fire Extinguisher and Warning Light Circuits: "Q" and "FA"

(See Fig. 70)

217. These circuits are fed from two "Klixon" circuit breakers mounted inside the main electrical panel, one supplying the SCR-695-A Radio Detonator and Fire Extinguisher Bottle, and the other supplying the Fire Warning Light.

The "Klixon" circuit breakers are of the automatic reset type.

Subsequent modification action (D.H. Aust. Mod. V.219) deletes the SCR-695-A Radio wiring and this equipment will eventually be removed from all aircraft.

In the event of fire, the Flame Switches (mounted around the engine) are automatically operated and cause the Fire Warning Light on the top centre instrument panel to glow.

A micro-switch is connected in series with the fire extinguisher bottle, the switch being actuated by the Cabin Air Control Unit (contacts closed when air control unit lever is in "OFF" position). Cabin Air Con-

trol MUST BE "OFF" before pressing fire extinguisher button on top of main electrical panel.

Gyro Gunsight and Recorder Circuit: "GS"

(See Figs. 72, 72A and 75)

218. This circuit consists of a Mk.4B or 4E Gunsight, Mk2D Camera Recorder, Type 22 Voltage Regulator, and a Type "P" No. 1 and Type "F" No. 2 Suppressor, and is fed from a circuit breaker on the top of the main electrical panel.

For further details of functioning and maintenance of standard equipment, refer to AP.1095 and/or AP.4343, AP.1275E (Gunsight), AP.1355D (Recorder).

Emergency Fuel Pump Circuit: "PE"

(See Fig. 72)

219. This circuit is fed from a circuit breaker on the top of the main electrical panel, and consists of a solenoid-operated valve on the engine connected in parallel with the emergency fuel pump warning light on the top of the main electrical panel, so that the lamp glows when the solenoid is operating.

Navigation Lights Circuit: "N"

(See Fig. 73)

220. This circuit is fed from a circuit breaker on the top of the main electrical panel.

The lamps are mounted in the port and starboard wing tips, and are easily accessible through the access panel on the undersurface of the mainplane. The tail lamp is withdrawn by releasing the screws securing the lamp to the port tail boom so that the screws securing the lamp housing to the mounting are revealed. Release these screws and withdraw lamp and holder from the mounting.

Vampire Mod. 152 (D.H. Aust. Mod. V.198) introduces a dimmer switch and resistance unit to enable the navigation lights to be dimmed as a safety precaution during close formation flying and this modification is being retrospectively embodied in all aircraft.

R.P.M. Indicator Circuit: "RA"

221. For wiring diagram of this circuit, see Fig. 73.

Pitot Head Circuit: "P"

(See Fig. 73)

222. This circuit is fed from a circuit breaker on the top of the main electrical panel. It is essential that this service should be switched "OFF" when not required.

Emergency Cockpit Lighting Circuit: "EM"

(See Fig. 73)

223. This circuit consists of a 2.4 V.—1.2 AH. accumulator, a Type "B" general purpose switch, and a cockpit floodlight.

The accumulator is mounted on the port side of the cockpit, forward of the instrument panel; the light is fitted to the gyro-gunsight bracket, and the switch is located on the port cockpit wall, directly under the three cockpit light dimmer switches.

The life of the accumulator is dependent upon the care taken, and good servicing will ensure long and trouble-free life.

For maintenance details, see AP.4343 Vol. 1, Sect. 3, Chapter 3.

R.P. and Bomb Firing Circuit: "RP" and "B"

(See Fig. 74)

224. This circuit is only applicable to Mk.31 aircraft and is fed from two circuit breakers on the R.P. and Bombs Junction Box.

D.H. Aust. Mod. V.221 makes provision for firing the rockets singly as well as in pairs and salvo and this modification is being retrospectively embodied in all aircraft.

Access to Components

225. The position of the main components can be ascertained from the Location Diagrams (Figs. 57 and 58). The table below gives the means of access to components where such means are not readily apparent.

Component	Access
STARTER CIRCUIT:	
Boost Coils (when fitted) ..	Top of port and starboard rib No. 1. (Remove top engine cowl.)
High Energy Units (when fitted)	Top of engine starboard side. (Remove top engine cowl.)
Starter Panel	Bottom of engine port side. (Remove bottom engine cowl.)
	Port Flap Shroud. (Flaps must be DOWN.)

External Starter Socket ..	Port Flap Shroud. (Flaps must be DOWN.)
Emergency Starting Button	Port Flap Shroud. (Flaps must be DOWN.)
Throttle Safety Switch ..	On lower rear face of Fireproof Bulkhead. (Remove bottom engine cowl.)

GENERATOR CIRCUIT:

Voltage Regulator Panel ..	Starboard Flap Shroud. (Flaps must be DOWN.)

G3F COMPASS CIRCUIT: (Post Vampire Mod. 62):—

Detector Unit	In starboard wing between ribs Nos. 10 and 11, accessible through access door in undersurface of wing.
Inverter Unit	At rear of nosewheel housing accessible through cover plate.
Control Panel	On starboard side of cockpit floor forward of instrument panel.
Supply Suppressor	Adjacent to control panel.

MAGNESYN COMPASS CIRCUIT: (Pre Vampire Mod. 62):—

Master Compass	Same as G3F Compass Detector Unit.
Inverter, Supressor and Distribution Box	On panel on cockpit floor forward of instrument panel.
Junction Box	On front spar of starboard wing, accessible through access door on undersurface of wing.

FLAP POSITION INDICATOR CIRCUIT:

Flap Transmitter	Starboard wing inner stub boom rib. (Flaps must be DOWN.)

GUN FIRING CIRCUIT:

Gun Firing Relays	On underside of ammunition box floor, acccessible through gun bay doors.
Gun Safety Switch	On underside of the mudguard in the nose.

UNDERCARRIAGE POSITION INDICATOR CIRCUIT:

Throttle Micro Switch	On lower rear face of Fireproof Bulkhead. (Remove bottom engine cowl.)
Uplock Switches	One on wheel door (port and starboard.) Two on underside of mudguard in nose. One in wheel well (port and starboard).
Downlock Switches	One on each diaphragm (port and starboard). One on underside of mudguard in nose.
Leg Lock Switches	One on U/C Radius Rod (port, starboard, nose).
Flashing U/C Warning Light Relay. (Post Vampire Mod. 173 — D.H. Aust. Mod. V.210 only)	On starboard side of cockpit floor forward of instrument panel adjacent to bulkhead No. 1.

PYROMETER CIRCUIT:

Voltage Compensator	On starboard side of cockpit floor forward of instrument panel.
Cold Junction Compensator	On voltage regulator panel in starboard flap shroud. (Flaps must be DOWN.)

EMERGENCY FUEL PUMP CIRCUIT:

Pump Valve Solenoid	At front of engine on starboard side.

NAVIGATION LIGHTS CIRCUITS:

Resistance Units (Post Vampire Mod. 152 — D.H. Aust. Mod. V.198 only)	Port cockpit wall forward of instrument panel just below rudder pedal support structure.

R.P.M. INDICATOR CIRCUIT:

R.P.M. Generator	At front of engine on starboard side of wheel-case.

R.P. AND BOMBS FIRING CIRCUIT:

Relay and Resistance Unit ..	On lower rear face of fireproof bulkhead. (Remove bottom engine cowl.)
R.P. Single Firing Relay (Post D.H. Aust. Mod. V.221 only)	Adjacent to Relay and Resistance Unit on fireproof bulkhead.
R.P. Cables Safety Break	Wheel well (port and starboard).
Bomb Distributor	On port side of cockpit floor adjacent to bulkhead Nc. 2.

GYRO GUNSIGHT AND RECORDER CIRCUIT:

Recorder	On top of Mk. 4B Gyro Gunsight in cockpit.
Recorder Suppressor	On cockpit floor, under pilot's seat.
Voltage Regulator Panel ..	On forward face of bulkhead No. 2.

SECTION 6 — CHAPTER 2

RADIO INSTALLATION

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RADIO INSTALLATION

General

226. The following Radio sets are fitted:
V.H.F. Communications Equipment—TR1936.
A.D.F. Radio Compass — Lear ADF14 (Post Vampire Mod. 226 — D.H. Aust. Mod. V.154 only).
I.F.F. Equipment — SCR-695-A (Pre D.H. Aust. Mod. V.219 only).

This chapter contains notes covering the location and details of mountings for all sets.

V.H.F. Communications Equipment—TR1936

(See Figs. 64 and 75)

227. This equipment is fed from a circuit breaker on the inboard face of the main electrical panel and consists of a Transmitter/Receiver located in the ammunition compartment, a Type 295 Controller mounted on the left-hand instrument panel, a press-to-transmit switch on the throttle twist grip, and an Aerial Type 226/1 mounted on the underside of the port wing tip.

The Transmitter/Receiver is accessible through a door on the port side of the fuselage. To facilitate its removal, the mounting tray support may be withdrawn by releasing the plunger on the forward side.

A.D.F. Radio Compass—Lear ADF14 (Post Vampire Mod. 226—D.H. Aust. Mod. V.154 only)

(See Figs. 76 and 109)

228. This equipment is fed from a circuit breaker on the top face of the main electrical panel and consists of an Amplifier Unit located on the inside of the port ammunition compartment access door, a Tuner Unit mounted on the port side of the cockpit floor adjacent to the pilot's seat, an Automatic Loop located in the nose of the aircraft, an Indicator mounted on the top of the right-hand instrument panel, a Sense Antenna mounted on the rear metal fairing of the sliding hood, and a Tuner Dial Lamp Dimmer Switch mounted on the starboard canopy rail adjacent to the VHF/ADF Telephone Selector Switch.

The spring contacts on the sliding hood for the Sense Antenna lead-in must be kept clean and free from corrosion.

I.F.F. Equipment—SCR-695-A

(See Figs. 65 and 75)

229. This equipment will be deleted retrospectively from all aircraft on the introduction of D.H. Aust. Mod. V.219.

If fitted, this equipment is fed from a circuit breaker on the inboard face of the main electrical panel and consists of a Receiver located in the nose of the aircraft, two Control Units mounted on the R.H. instrument panel, "G" Band Manual and Automatic switches on the L.H. instrument panel, and an Aerial Type 90 or 93 mounted on the underside of the starboard wing. (NOTE: The I.F.F. Aerial is to be mounted with the rounded edge to the rear.)

The mounting for the SCR-695-A Receiver in the nose is of the standard type.

SECTION 7

DESCRIPTION OF STRUCTURE

SECTION 7 — CHAPTER 1

FUSELAGE

LIST OF CONTENTS

Fuselage

General

230. The fuselage is constructed of balsa wood sandwiched between ply skins, with four bulkheads interposed throughout its length (see Fig. 78). The fuselage is oval in section, tapering in plan and elevation from bulkhead No. 3 to nose. It is built in two halves and joined along the top and bottom centre lines. The forward face of No. 1 bulkhead is armour-plated and carries the nose wheel unit bracing structure. The cockpit, access to which is gained by a retractable footstep in the port side of the fuselage, is enclosed between bulkheads Nos. 1 and 2 by a canopy. Bulkheads Nos. 3 and 4 are reinforced by plate fittings and steel tubes for the wing attachment fittings. Bulkhead No. 4 also carries the engine mounting (see Fig. 48) and the Auxiliary Gear Box.

Detachable Nose Panel

231. A detachable nose panel is fitted, which gives access to the AN-N6 G.S.A.P. camera and also the Loop installation of the A.D.F.14—"Lear" Radio Compass.

Doors

232. Two removable gun bay doors covering the ventral bay provide access to the centre fuel tank and the 20 mm. guns (see para. 320, last item).

Canopy

233. The canopy is a "tear-drop" design, made of moulded Perspex with a light alloy frame. It is made to slide fore and aft by a winding handle on the right-hand side of the cockpit. The windscreen and side panels are of the Triplex dry air sandwich type.

Covering

234. The fuselage outer skin is covered with mercerised cotton fabric to Spec. D.T.D. 407 or F8 or mercerised linen fabric to Spec. D.T.D. 540.

SECTION 7 — CHAPTER 2

MAIN PLANE

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Mainplane

General

235. The mainplane is a cantilever structure tapering in plan and elevation. It comprises a channel-section main spar running the whole length of the wing, with a false spar at the trailing edge to which the dive brakes, flaps and aileron hinges are attached. The structure forward of the main spar is constructed as a unit and the whole assembly is riveted to the spar. The skins are aluminium alloy sheets riveted to the spar, ribs and stringers; the main stringers are located parallel to the front spar (see Figs. 79, 80, 81 and 82).

Provision is made to house one fuel tank at the inboard end of each wing, the two outboard fuel tanks are housed between ribs 5 and 9, and the leading edge tank between ribs 2 and 5. Access is obtained through three detachable doors in the underside of each wing. An undercarriage diaphragm, which is fabricated as a separate structure, is assembled to the wing outboard of the inboard wing tank bay. An air intake duct is located in each wing, protruding at the root end rib. Navigation lights are housed in the all metal wing tips, which are attached to the wing end rib by means of countersunk screws into anchor nuts. The retractable landing light is mounted in the port wing, and the G3F compass in the starboard wing.

The V.H.F. radio aerial is mounted in the port wing tip.

Attachment Points

236. (i) There are three wing-to-fuselage attachment points, one at the top and bottom of the front spar, and the other, which is a drag member, is bolted to a channel section member forward of the front spar (see Figs. 83 and 84).

(ii) The wing-to-boom attachment point is provided by an L-section forging riveted to the end of a stub boom which is built into the wing.

Spars

237. The main spar is a channel-section light-alloy pressing comprised of three lengths which are butt-jointed, strapped and riveted together at the web. Top and bottom light-alloy booms, diminishing in depth toward the wing tip, are riveted to the spar flange. At the spar root end the top and bottom booms are "stepped" to receive the shanks of the wing attachment fittings, which are shaped accordingly. The spars are further strengthened by numerous extrusions riveted to the web. The false spar at the rear is built in a similar manner indicated above, with the exception that the top and bottom booms are omitted.

Drag Member

238. The drag member is a light alloy pressing with a reinforcing channel attached to the top edge, into which a fitting is attached by four bolts through the member and a bolt through a fitting on rib No. 1A. A lug is attached to the channel fitting by four wire-locked bolts; the lug is received between two joint plates attached to bulkhead No. 3 (see Fig. 84).

Ribs

239. The ribs are light-alloy pressings with flanged edges and lightening holes. Details of the heavy and light ribs are given in Figs. 79, 80 and 81.

Ailerons

240. The ailerons are constructed of light alloy, with a single spar to which the main ribs and nose ribs are attached (see Fig. 85). The component is covered with alclad sheet. There are three hinge attachments to the mainplane rear false spar.

Flaps

241. The inner and outer flaps, interconnected by a torque tube, are all metal in construction, with reinforced ribs to which the hinge attachment fittings are located. (See Fig. 52.)

Dive Brakes

242. The dive brakes are of all-metal construction, with a single light alloy spar and pressed ribs. The two hinges are located on reinforced ribs, while the jack ram is attached to a casting, bolted to the skin. (See Fig. 53.)

SECTION 7 — CHAPTER 3
TAIL UNIT

LIST OF CONTENTS

Tail Unit

General

243. The tail unit is built up on the end of twin booms. The fins, which are integral with the booms, support the interposed tail plane and the twin rudders. A servo trim-tab, operated from the cockpit, is provided on the elevator, but the trim-tabs located at the base of each rudder may only be adjusted when the aircraft is on the ground. Detachable fairings are fitted at the intersections of the fin and tail plane, and are attached with roundhead and countersunk screws. Rear end fairings, which are detachable, are fitted to the booms by countersunk screws. The tail lamp is fitted only in the port fairing. (Figs. 19 and 87.)

Tail Boom

244. Each tail boom is a metal oval-section structure, with ten light alloy diaphragms spaced along the length and reinforced with longitudinal stringers (see Fig. 86). The boom-to-wing joint diaphragm is an L-section forging, while the rear end diaphragm is riveted to a fitting on the spar of the fin. Access to flying control cables is provided by hand holes covered by screwed panels in either side of the boom.

Fin

245. The fin is constructed of a light alloy channel section spar, pressed ribs and L-shaped stringers riveted to the skin. The lower end of the spar is riveted to the tail boom attachment fitting on the rear diaphragm of the tail boom. The spar houses the top rudder hinge bracket, which is attached by four wire-locked bolts. The bracket for the pitot head is attached to the port fin by six countersunk screws. (See Fig. 87.)

Rudders

246. The two separate rudders are built up from a rudder post tube and a channel section spar, to which are attached light alloy flanged ribs, the whole being covered with a light alloy metal skin. An integral rudder balance weight is accommodated in the rudder horn, and a linked rudder balance weight is provided inside the boom rear end cone fairing. The top hinge is mounted on the rudder spar, and the bottom hinge is provided by a spigot at the end of the rudder post tube (see Fig. 87).

Tail Plane

247. The tail plane is constructed of front and rear light-alloy channel-section spars, with nose and main ribs and transverse stringers. The component is covered by alclad sheet riveted to spars, ribs, and stringers; the tail plane angle of incidence is not adjustable. Two hinges for attaching the elevator are located on the rear spar (see Fig. 87).

Elevator

248. The elevator comprises a single channel-section spar with light-alloy ribs and a built-in torque tube, the ends of which bear spigots for location in end hinges which are mounted in the fin shroud. Two hinge fittings are also positioned on the spar. Suitably reinforced ribs are employed to carry the external balance weights (see Fig. 87).

SECTION 7 — CHAPTER 4

FLYING CONTROLS

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Flying Controls

General

249. The flying control system is operated by chain and cable, with tie rods on the control column, chain on the elevator trim tab jack, and push rods and levers for rudder and elevator controls in the boom rear end. The elevator trim system is operated by Teleflex control from a cockpit hand wheel to a mid position on No. 1 wing rib, thence by cables to the trim tab jack. The control locking positions for rigging are shown in Fig. 10.

Control Column

250. The control column is a vertical tubular dural member, incorporating at its lowest end a traverse torque tube, to either end of which a double-ended lever is attached (see Figs. 88 and 89). The lower ends of the levers are located in fittings at floor level, permitting fore and aft movement about these points, thus providing the elevator control. An inertia weight projecting forward on the port side is attached to the outer torque tube on the control column. Aileron control is provided by a single column grip extension piece, hinged at the top of the column, accommodating a parking brake lever, and also gun, camera and RP/Bombs firing switches, the RP/Bombs switch being operative on Mk.31 aircraft only.

Aileron Controls

251. The aileron control is connected to a sprocket, which is in turn connected by tie rods and chains to an elliptical sprocket at the bottom of the column. The elliptical sprocket is integral with a quadrant to which the operating cable ends are bolted. Pulleys located either side of the cockpit carry the cables from the quadrant through the bulkheads to a pulley assembly positioned on the face of No. 1 wing rib (see Fig. 22). The top pulley of the assembly changes the direction of the cable and conducts it to an aileron differential wheel located on the rear face of the false spar. Two pulleys, located on the left and right-hand sides of the aft face of No. 4 bulkhead, carry the balance cable to the differential wheel through pulleys on the face of No. 1 wing rib. The position of the turnbuckles for adjustment is shown in Fig. 90.

Aileron Tabs

252. Servo trim tabs are fitted to both ailerons, and may only be adjusted on the ground to suit the flying characteristics of the particular aircraft. The tab trailing edge may be raised by adjusting the length of its connecting rod, or by altering the setting of the tab connecting link (see Sect. 4, Chap. 3, para. 90).

Elevator Controls

253. (i) The control column transverse torque tube (see para. 250) is connected, through levers and connecting rods, to quadrant pulleys located on the left and right-hand sides of the cockpit. Cables are bolted to the quadrants, and pass through the bulkheads to pulley assemblies positioned on the left and right-hand No. 1 wing ribs (see Fig. 22). Cable direction is then changed to the aft face of the false spars, which bear elliptical pulley assemblies positioned on the tail boom centre lines. The elliptical pulleys provide a lower gear ratio at small control angles and a progressively higher gearing at increasing control column movement. The cables are bolted to this assembly and are carried through fairleads to the lever assemblies in the boom rear ends, and the lever movement is transmitted to the elevator via lead-filled control rods, connected to a lever at each end of the elevator torque shaft (see Sect. 4, Chap. 3, para. 91).

(ii) A bungee cord is located on the light frame fitting at the starboard boom-to-wing joint, and stretches to the elevator control lever in the boom rear end. Its function is to assist control stability.

(iii) Cable adjustment points are shown in Fig. 91.

Elevator Tabs

254. A servo tab is fitted which is also under the pilot's control. The tab movement is provided by a hand wheel, actuating Teleflex controls to which cables are attached. Trim pulleys are positioned on No.

1 wing rib and on the false spar for changing direction for the cables to the port boom. The cables are carried by fairleads to pulleys in the rear end of the boom, then into the tail plane to a chain on the trim jack. A connecting rod transmits movement from the jack to the tab.

254A. With the elevator in the neutral position, the clearance between the top and bottom shrouds and the elevator should be .08" plus or minus .02", this may vary with the elevator in other positions down to .002" which is the minimum clearance allowed.

If necessary the rivets in the bottom shroud may be filed to ensure the minimum clearance of .002" with the elevator in the fully raised position.

Rudder Controls

255. The rudder controls consist of pendulum-type rudder pedals which are located on a layshaft forward of the control column. The pedals can be adjusted independently for reach by lifting them against the tension of a spring. The run of the cables (see Fig. 92) to the rudder control lever in the boom rear end is similar to that of the elevator cables (see para. 253).

Rudder Tabs

256. Trim tabs are fitted, but they are not servo operated. They may be adjusted on the ground to correct flying irregularities by unscrewing a wire-locked bolt that passes through an elongated hole in a bracket at the base of the tab, and turning the tab to the desired position.

SECTION 7 — CHAPTER 5

LANDING GEAR

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Landing Gear

General

257. The landing gear comprises a tricycle undercarriage, with two main undercarriage units (one under each wing) and a fully castoring nose wheel unit incorporating a self-centring mechanism.

The nose wheel unit retracts backwards and the main units retract outwards under hydraulic power, and are enclosed automatically by doors which are linked to the struts.

Main Wheel Unit (Airdraulic Strut)

258. (i) The airdraulic strut comprises a plunger tube which is free to move in a cylinder. At the lower end of the plunger tube is fitted a hollow axle which is bolted to the tube, and the tube is plugged with the air head, which includes an inflation valve. The upper end of the plunger tube is threaded to receive a piston which is locked by a grub screw. The piston wall is formed with a groove, and a hole is drilled through the piston into the groove, allowing a passage for the fluid to a space between the plunger tube and the cylinder tube. The piston head accommodates the flutter plate and a spring, and also has ten holes, six of which are covered and uncovered by the flutter plate, while four are outside the range of the plate. Inside the plunger tube and below the piston is a sealed floating separator which isolates the fluid and air (see Fig. 26).

(ii) The cylinder tube is a forging incorporating at its upper end four lugs to which another forging is bolted to receive the eyebolt of the lower link of the radius rod. Bosses are provided in the lower end of the tube for accommodation of the torque links, the lower ends of which are located on the axle fitting (see Fig. 26).

Nose Wheel Unit

259. (i) The construction and operation of the nose wheel shock absorber unit is similar to that of the main strut, with the exception of the spring-loaded self-centring cam located internally at the top of the unit.

(ii) The self-centring device, while allowing a castoring action during taxi-ing, also ensures that the wheel is in the correct position for retraction (see Fig. 29).

The Radius Rod Assembly

260. The radius rod unit (see Fig. 23) comprises an upper link which is free to rotate on a tube located in end bearings, and a lug for the jack attachment incorporated in the lock-plate assembly. The fork end of the upper link receives the lock link, at the top of which a stop bolt is located, and should coincide with the face of a similar bolt in the upper link. The lower end of the lock-plate is drilled to receive a roller which is free to move in the kidney-shaped slot of the lock link. The lock link incorporates an adjustable eyebolt for attachment to the strut (see Fig. 28).

Radius Rod Locking Mechanism

261. The down and up positions are held by a mechanical latch. The initial movement of the jack moves lock-plate against the action of the spring until the lock-plate is in line with the upper and lower links. With unit in the unlocked position, movement of the jack ram now causes the radius rod to hinge and retract the unit, when the spring snaps the lock-plate into the locked position (see Fig. 28).

Undercarriage DOWN Indicator Switch

262. Movement of the lock-plate assembly is imparted to the micro-switch through a spigot M, which is in contact with a leaf spring K (see Fig. 28). It will be noted that the micro-switch is in circuit at the lock down and locked up positions, and only changes over when the leg is unlocked; this attitude is indicated by red lights in the undercarriage indicator.

Undercarriage UP Indicator Switches

263. A micro-switch located above the retracting gear is brought into circuit by full retraction of the unit, which depresses an adjustable button impinging on the micro-switch leaf springs, and, at the same time, a micro-switch located on the undercarriage wheel door is brought into circuit, being actuated by a Teleflex controlled door lock plunger on the wheel well wall, thus extinguishing the red lights in the undercarriage indicator, which indicates that the undercarriage and wheel door are in the locked up position. A throttle lever micro-switch is in circuit with the up switches, and is brought into operation when the undercarriage is retracted and the throttle retarded. A red light appears on the left-hand instrument panel, warning the pilot that the undercarriage is in an unsafe position for landing.

Undercarriage Lever Lock

264. Inadvertent operation of the undercarriage is impossible while the weight of the aircraft is on the struts. To obtain these conditions, a lever lock and two micro-switches are used, one switch being operated by the port undercarriage torque links, the other by the undercarriage selector lever.

Due to the weight of the aircraft, the torque links assume an acute angle, leaving the micro-switch in the normal position, so breaking the circuit. The undercarriage selector lever is locked by a solenoid-operated plunger which is in the extended position when the coil is de-energised, thus preventing any use of lever. As soon as the weight is removed from the struts, the torque links open, depress the micro-switch and close the circuit, and when the undercarriage selector lever commences to move it operates a micro-switch on the engine control box, thus completing the circuit and energising the solenoid, which withdraws the plunger and allows the selector lever to complete its movement.

Landing Wheel Assembly (Main Wheels)

265. The wheels are Dunlop, Part No. AH.9139, with tyres and tubes as shown in the Leading Particulars, mounted on ball and roller bearings on a tubular steel axle.

Nose Wheel Assembly

266. The nose wheel, Dunlop Part No. A.H.O. 17219/IX, is mounted in a similar manner to the main wheels, but the axle tube is supported at either end in a fork-shaped forging which is pivotally mounted on the lower end of the shock-absorber unit. The axle and fittings are located by end caps which are connected by a tie rod (see Fig. 30).

Brakes

267. For pneumatic system employed for operating the brakes, see Sect. 9 and Figs. 35 and 98.

SECTION 8

ENGINE INSTALLATION

SECTION 8

ENGINE INSTALLATION

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Engine Installation

Introduction

268. The aircraft is powered with a Rolls Royce Nene 2-VH(AUS.) turbo jet engine. The engine consists of a single stage compressor supplying air to the nine combustion chambers which discharge the products of combustion through the blades of a turbine wheel, the purpose of which is to drive the compressor and the various accessories required for aircraft services. After leaving the turbine wheel, the gas discharges at a very high velocity to the rear, thus forming a propulsive jet. For further details, see the Nene Descriptive & Servicing Manuals.

Engine Cowlings

269. The engine cowling (see Fig. 46), of light alloy panels reinforced with channelling, etc., flush riveted in position, is in three sections, namely, top and bottom cowls and the rear cone. These completely cover the engine and form a continuation of fuselage lines ending at the jet orifice.

Panels and cone are secured in position with countersunk bolts engaging anchor nuts attached to the underside of taped landings.

The bottom cowl includes auxiliary air intakes, and the tail cone includes downward identification lights. Access panels are provided for engine maintenance.

Engine Bearer Frames

270. The engine bearer frames are tubular steel structures, bolted to the main structure at the rear of the fuselage (see Fig. 47).

Starting System

271. The electrical equipment on the engine for starting comprises a compound starter motor, a torch igniter feed pump, a solenoid valve and a high voltage sparking plug in each of the two torch igniters.

Ground batteries are used for starting.

Engine Accessories

272. The following accessories (see Fig. 106) are fitted:—

A Rotol Auxiliary gearbox which drives a 2,300 watt generator, Heywood compressor and a Lockheed hydraulic pump is mounted on the engine bulkhead and driven by a rigid splined shaft from the top front of the engine. A starter motor is mounted on the right-hand side of the wheel case. Two Lucas fuel pumps (upper and lower) are mounted on the right-hand side of the wheel case. The starter, etc., are shown on Fig. 47.

Cooling air for the Heywood compressor and for the generator is withdrawn from inside the cowling and through the ducts in the rear of the wing root fairings.

Fuel System

273. The fuel system is shown diagrammatically in Fig. 96, and the fuel and air system in Fig. 107. The fuel is contained in nine tanks, eight of which are housed in the wings, and the other (centre) tank in the fuselage between bulkheads Nos. 3 and 4.

In the wing tanks, the fuel outlets are located slightly above the tank bottoms (this is unavoidable since the tanks occupy the full depth of the wing and protruding sumps would be aerodynamically unacceptable); consequently, some "dead" fuel, lying below the tank outlets, and therefore unusable, is inevitable under normal flight conditions. The amount "lost" in this way varies, as follows, with the aircraft's fore and aft attitude, being a minimum when the datum is horizontal:—

Aircraft Attitude.	Dead Fuel.
Datum horizontal	16 galls.
„ 5° Nose-up	20 galls.
„ 8° Nose-up	35 galls.

An additional tank may be carried under each wing, and these are pressurised, for fuel transfer, by air supplied from the engine compressor casing through reducing valves set at 3¼ lb./sq. in. The jettisonable tanks are of metal construction, having a capacity of 100 gal. each.

Flow to Engine-Driven Fuel Pump

274. Fuel is fed from an immersed fuel booster pump in the main collector box at the bottom of the centre tank, to the fuel pumps located on the right-hand side of the wheel case. A low pressure fuel cock and a fuel filter are fitted between the fuel tank and the engine-driven fuel pumps.

Fuel Booster Pump

275. The submerged fuel boost pump, which incorporates an inverted flight valve, is electrically driven and self-contained. The pump maintains an uninterrupted supply of fuel to the engine driven pumps under all conditions of fuel temperature, rate of climb, altitude, positive and violent negative "G" manoeuvres, also inverted flight. The fitment of the fuel booster pump is necessary owing to the difficulty involved in restarting the engine after a stoppage in the air, particularly at high altitudes (see Fig. 96).

Engine Controls

276. The engine controls, apart from electrical starting equipment, comprise throttle and two fuel cocks. These are operated by Teleflex controls and push rods as indicated in Figs. 93 and 94.

Lubricating System, Engine

277. The engine lubricating system is self-contained, and details will be found in the Nene Servicing and Descriptive Manuals.

Lubricating System, Accessories Gearbox

278. The auxiliary gearbox for the engine accessories is lubricated independently of the engine, having its oil sump incorporated in the assembly mounted on the engine bulkhead.

SECTION 9

HYDRAULIC AND PNEUMATIC SYSTEM

SECTION 9

HYDRAULIC AND PNEUMATIC SYSTEMS

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HYDRAULIC SYSTEM

PNEUMATIC SYSTEM

Hydraulic and Pneumatic Systems

HYDRAULIC SYSTEM

Introduction

279. The hydraulic system, which is of the Lockheed "high pressure" type, operates the landing gear, flaps and dive brakes. A circuit diagram is shown in Fig. 97, and three piping illustrations in Figs. 33, 34 and 35. The system is described in the following paragraphs.

Power Circuit

280. An engine driven pump supplies power to the selector valves through an automatic cut-out valve and a hydraulic accumulator. When the accumulator is charged to 2,500/2,600 lb./sq. in., the automatic cut-out valve closes and diverts the fluid through the circuit to the reservoir. The selector unit is comprised of three sections, controlling the landing gear, the flaps and dive brake circuits. When the selector valves are at NEUTRAL the fluid is bypassed through the automatic cut-out valve back to the reservoir at low pressure. A non-return valve located in the hand-pump circuit prevents the fluid from the engine-driven pump from entering the hand-pump delivery line. Two coupling points located on the left-hand side of the engine bulkhead permit the use of a rig for ground test purposes.

Reservoir

281. The reservoir, which is filled with fluid to specification DTD.585, Ident K2/138, is divided into two unequal compartments by a baffle plate, the upper part of which is perforated. The hand pump supply is taken from the bottom of the larger compartment, while the engine driven pump receives its supply of fluid from the bottom of the smaller compartment. The fluid returning from the system enters the larger compartment and, when this is full, passes through the holes in the baffle plate to the smaller compartment. Therefore an ample reserve of fluid is always present for hand pump operation.

Landing Gear Circuit

282. The circuit is controlled by one section of the selector valve, which has two settings, UP and DOWN; a neutral setting is not provided. Fluid under pressure is directed to the jacks and back to the reservoir through the selector valve.

Flaps Circuit

283. The flap selector valve provides three settings, UP, NEUTRAL and DOWN. The valve is manually returned to NEUTRAL when it is desired to set the flaps in an intermediate position suitable for take-off. Returning the valve into this position allows the pressure to pass to both sides of the jack ram and maintain it in this setting.

Emergency (Hand Pump) Circuit

284. In the event of failure of the engine pump circuit, the flaps and landing gear may be lowered by setting the respective selector levers to DOWN, and operating the hand pump. The dive brakes can only be operated by the hand pump when the aircraft is on the ground, and the manual control valve located on bulkhead No. 2 is held in the open position.

Dive Brake Circuit

285. Two settings only are provided by the dive brake selector valve, OFF and ON. The fluid under pressure passes to the jacks through a non-return valve, and is returned through the selector valve to the reservoir.

PNEUMATIC SYSTEM

General

286. The pneumatic system is used solely for providing pressure for operating the wheel brakes. A diagrammatic arrangement is shown in Fig. 98, and a piping illustration with reservoir connections in Fig. 38. Full descriptions and details of servicing components are shown in A.P.2337, Vol. I.

Supply System

287. The Heywood air compressor driven by the auxiliary gear box mounted on the engine bulkhead supplies air to the reservoir. A Hymatic RV10 relief valve set at 600 lb./sq. in. is provided adjacent to the compressor to protect the system if freezing occurs, but the reservoir is charged to a maximum pressure of 450 lb./sq. in. The maximum pressure is controlled by a regulator valve mounted at the side of the

reservoir, which relieves at 450 lb./sq. in. The reservoir may be charged on the ground by a compressed air bottle, a connection for which is provided on the pneumatic panel on the rear face of bulkhead No. 2. Access to the pneumatic panel is obtained by opening the gun bay doors. (See Figs. 38 and 98.)

NOTE: If fitting a new compressor as a replacement to existing unit, ensure that internal oil sealing ring (if fitted) is removed and discarded.

NOTE 2: The earlier aircraft are fitted with the SH6/2A type of compressor, but later aircraft have the SH6/5B type fitted; these compressors are similar in construction with the following exception: the SH6/2A type is fitted with filter type S.F.1 fitted over the cylinder head, while the SH6/5B type is fitted with a filter type S.F.2A connected to the cylinder head intake elbow by a short length of hose.

Reservoir

288. The air reservoir located below the cockpit floor comprises a cylindrical shell with hemispherical ends. Integral with each end is a boss into which is threaded a screwed connection for receiving the inlet pipe and delivery pipes to the regulator, filter and gauge. It will be found necessary to drain the reservoir periodically.

Filter

289. The air filter located on the pneumatic panel is connected into the system on the output side of the reservoir, and prevents any moisture passing from the charging point reaching the reducing valve or brake differential unit. The filter element is a thick felt pad sandwiched between perforated metal discs. The inlet pipe is connected to the side of the filter and the outlet pipe to the top cover, while the plug in the bottom is for drainage purposes.

Oil and Water Trap

290. The oil and water trap is mounted on the pneumatic panel, and separates the air from fluids which may enter the system. The trap should be drained at daily inspection or at the conclusion of any long flights. The drain plug is a spring-loaded threaded pin with a conical end, which forms a seal when screwed into the hole in the bottom of the body. A knurled wheel forms the opposite end of the plug. The trap is drained by disconnecting at the trap the line from the compressor and connecting up a compressed air bottle, as the trap must be drained while under pressure in order to remove all deposits of oil sludge. The knurled wheel is turned and held until all fluid has drained; the wheel should then be returned to the closed position.

Pressure Regulator

291. The compressor delivers the air to the reservoir through the oil and water trap and pressure regulator which is mounted on the clip retaining the reservoir. The maximum pressure in the reservoir is controlled by the regulator which by-passes the delivery to atmosphere when a pressure in excess of 450 lb./sq. in. has been reached.

Pressure Reducing Valve

292. The reducing valve mounted on the pneumatic panel incorporates screwed connections for the inlet and outlet pipes. It is a pressure balanced valve set to reduce the pressure to 200 lb./sq. in. for delivery to the brake differential unit.

Brake Differential Unit

293. The differential unit is mounted on top of the nose wheel well in the cockpit and is connected to the brake lever on the control column by a cable. A lever on the rudder pedal layshaft is linked on to a connecting rod on the differential unit, and operates the valves to provide differential braking when manoeuvring the aircraft on the ground.

Access to the unit is obtained by opening the inspection cover located on bulkhead No. 1.

SECTION 10

(SEE SECTION 6)

SECTION 10

(See Section 6)

SECTION II

EQUIPMENT INSTALLATIONS

SECTION II

EQUIPMENT INSTALLATIONS

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Equipment Installation

Oxygen System

294. The two interconnected oxygen bottles (see Fig. 99) are supplied with oxygen through a filter and ground charging point, integral with the control valve, located on the forward face of bulkhead No. 3. The supply from the bottles, led through a master control valve wirelocked in the ON position and situated on the rear face of bulkhead No. 2, passes through a filter, thence by a pipe clipped under the canopy rail to the oxygen pressure regulator Type 11c on the right-hand instrument panel. From the regulator, a pipe is led under the canopy rail to the oxygen economiser located in a horizontal position on bulkhead No. 2, to the right of the pilot's seat. Access to the control valves is obtained by opening the starboard ammunition door.

De-Icing System

295. The de-icing system is controlled by the operation of a hand pump (see Fig. 100).

D.H. Aust. Mod. V.229 introduces a Mk. 16A Oxygen Regulator and automatic line valve in place of the regulator type 11C.

De-Icing System

295. The de-icing system is controlled by the operation of a hand pump (see Fig. 100).

The cylindrical three-pint de-icing reservoir is located on the right-hand stay tube of the nose wheel top structure, and access for filling purposes is obtained by removing the top nose inspection cover. A pipe is led from the top of the tank to an adaptor on No. 1 bulkhead, thence by clips on the right-hand side of the cockpit to a hand pump located at the bottom of the right-hand instrument panel. A manually operated regulating valve (adjacent to the hand pump) in the supply line from the pump to the base of the windscreen, controls the rate of the de-icing fluid delivered to the windscreen by the hand pump. The de-icing reservoir is vented to atmosphere by a pipe leading from the tank to the bottom of No. 1 bulkhead. Glycol fluid to Specification K22 is used (Ident No. K4/10332).

SECTION 12

ARMAMENT INSTALLATIONS AND SERVICING

SECTION 12

ARMAMENT INSTALLATIONS AND SERVICING

LIST OF CONTENTS

Armament Installations and Servicing

DESCRIPTION OF EQUIPMENT

Introduction

296. This chapter describes the gun, rocket projectile and bomb installations, together with notes on servicing and removal operations. The following Air Publications deal fully with specific components:—

Armament Electrical Equipment	AP.1095B Vol. 1
Bomb Carriers	AP.1664A Vol. 1 & 2
Gun Firing Gear . ..	AP.4343X Vol. 1
Gyro Gun Sight . ..	AP.1275E
Gyro Gunsight Recorder	AP.1275E
Hispano Guns	AP.1641F
Rocket Projectiles ..	AP.4343X Vol. 1

Certain abbreviations are used in this chapter, their meanings are hereby quoted:—

B.F.M. .	Belt feed mechanism.
P.I, P.O.	Left hand inner and outer respectively.
S.I, S.O.	Right hand inner and outer respectively.

Guns

297. The aircraft is armed with four No. 2 Mark 5 20 mm. Hispano guns (Ident No. E7G/786) fitted with No. 3 Mark 1 front mounting units (Ident No. E7G/787). The guns are positioned in the underside of the fuselage, the outboard guns being situated approximately 9½ ins. further rearward than the inboard guns. The guns are belt fed by the Mark 5 belt feed mechanism (Ident No. (L.H.) E7G/983 or E7G/924, (R.H.) E7G/984 or E7G/925). (See Fig. 101.)

Front Mountings

298. These are of the ball and socket type, fitted with inner and outer eccentrics (see Fig. 103); a dashpot unit is provided to accommodate the front mounting piston of the gun.

(i) Outer Eccentric.

The outer eccentric is machined with 24 V-shaped grooves spaced at 15 deg. intervals around the periphery. These grooves run fore-and-aft in relation to the gun, and a locking stud is fitted at the bottom of the mounting to lock the outer eccentric in the sighting position.

(ii) Inner Eccentric.

The inner eccentric is locked to the outer eccentric by a spring-loaded locking tab which engages one tooth of the inner eccentric and one tooth of the outer eccentric locking rims.

(iii) Gun Adjustment.

Gun adjustment for harmonization purposes is effected by unlocking the inner and outer eccentrics, and rotating them independently with two spanners (Ident No. D1E/35209 and D1E/35210 respectively) until the gun is correctly aligned. The eccentrics are then relocked.

(iv) All "V" shaped grooves in the outer eccentric are to be packed with high melting point grease (Ident No. K2/66).

Rear Mountings

299. These mountings work on the "swinging link" system, and consist of an inverted U-shaped bracket pivoted at its apex (see Fig. 103), the lower end of which accommodates the round spring-loaded quick-release plungers of the slide assembly rear mounting. This slide assembly rear mounting is bolted to the locking shoulder of the gun, which, being thus supported, is capable of free reciprocal movement when recoil takes place.

Ammunition Bins

300. (i) Two ammunition bins (see Fig. 102) are provided above the guns forward of bulkhead No. 3. Each bin is partitioned to form a fore and aft compartment, and each compartment has a vertical duct down which the belt runs to its gun. The forward bins feed the inner guns and the rear bins the outer guns. Each compartment has provision for approximately 150 rounds of ammunition.

(ii) An ammunition loading diagram is positioned on the bottom of each bin. Access to the two bins is obtained by means of two doors, which are hinged along the top edges and can thus be secured in the open position by means of a strut attached to each door.

In the closed position, both doors are secured by two quick-release fasteners. The ammunition is retained in the bin by means of a tubular quick-release frame, which must be removed before the aircraft can be re-armed.

Feed

301. The ammunition passes over rollers in the ammunition bins, which are built into the airframe (see Fig. 102), through vertical fixed chutes, and then on into detachable chutes, and turns through 180 deg. for the inboard guns or 150 deg. for the outboard guns, finally entering the feed opening of the belt feed mechanism (referred to henceforth as the B.F.M.). The detachable feed chutes are secured in position with a pin which passes through two lugs on the clip feed unit. Each B.F.M. must be provided with a clip feed unit, in addition to a link chute extension, in order to fix the feed chutes to the B.F.M. feed openings. The detachable feed chutes are provided with a flap in order that the belts may be made and broken, as required, when re-arming, etc. The pin, which secures the flap in the closed position, is attached to the chute by a short length of light chain.

Ejection

302. Empty case ejection chutes (see Figs. 102 and 104) are fitted in the gun bay door panels. The link chute extension also projects into an enlarged portion of the ejection chute.

Firing Mechanism

303. Maxiflux electric firing units are used, and are operated by a firing button on the control column (see Sect. 1, para. 42). Briefly, the firing unit consists of a base plate, which is screwed and lock-wired to the gun. The sear release unit, including the operating coils, is held to the plate by a quick-release device operated by a knurled screw.

WARNING: It should be noted that there is no fire-and-safe mechanism on the guns excepting that embodied in the firing button safety flap, and the only master switch is the "GROUND-FLIGHT" switch in the cockpit, which controls the whole aircraft electrical system. Therefore, before attending to the guns in any way, the electrical lead plugs should be disconnected from the firing units and only replaced when aircraft are "at readiness."

Cocking

304. This is carried out with a No. 11 hand cocking unit (see Fig. 104), a stowage for which is provided on the gun bay access door. One cocking unit (Ident No. E7G/1164) is provided with each aircraft.

Blast Tubes

305. Blast tubes (see Fig. 101), which are of the Martin Baker telescopic spring type, are fitted to the four guns and are secured to the front mounting unit housing by a special Jubilee clip.

Tie Rods

306. Adjustable tie rods are provided for setting the rack roller clearance, the amount of adjustment being approximately $\frac{3}{8}$ ins. The tie rods are fixed by their forward end to the gun bay bulkhead, and are attached to the outboard side of the magazine carrier in each instance. The two port magazine carrier tie rods are on the left-hand side of the magazine carrier, and the two starboard magazine carrier tie rods are on the right-hand side of the carrier.

Gun Sight and Recorder

307. The aircraft is fitted with a Mk. 4B or 4E gyro gun sight. Provision is made for a Mk. 2 Camera Recorder, which is fitted on the top of the gun sight and can be stowed when not in use in a spring clip on the left-hand side of the cockpit.

For further details see AP.1275E.

Camera Gun

308. The AN-N6 G.S.A.P. camera, with type 27 mounting (Ident No. F14A/1042) and adaptor (Ident No. F14A/501218) is situated in the nose of the aircraft. Access to the camera is obtained through the detachable nose panel, which is locked with a spring loaded plunger.

For further details see Operation, Service and Overhaul Instructions and Parts Catalogue. U.S.A.F. Standards Publication AN 10-10CB-8.

Gun Heating

309. Heating of the guns is provided by a hot air pipe, which is located on the starboard side, leading from the engine. The pipe is a fixture in the aircraft, but does not interfere with the removal and installation of the guns.

REMOVAL AND INSTALLATION DETAILS

WARNING: Unless the external locks are fitted to the undercarriage legs and/or the trestles in position, personnel must not work underneath the aircraft when the cockpit is occupied, nor (vice versa) enter the cockpit when personnel are at work underneath the aircraft.

Access to Guns

310. Access to the guns is obtained by removing the port and starboard nose panels and opening the gun bay doors from the underside of the aircraft. The nose panels are shaped to accommodate the blast tubes and are secured to the aircraft by Dzus fasteners. The two gun bay doors form part of the lower skin of the fuselage and incorporate the empty case chutes and link ejection openings.

Removal of Sear Release Units

311. The removal of the Sear release units from the guns can be done with the guns installed; it is effected as follows:—

(i) Ensure the breech block is in the fired position.

(ii) Release the gun back block catch and ease up the back block about 3/16th in.

(iii) Support the weight of the Sear release unit, and unscrew the knurled-headed screw on the underside until the unit has free vertical movement.

(iv) Slide the Sear release unit to the rear and downwards (out of engagement with Sear).

Installation of Sear Release Units

312. For installing the Sear release units, the sequence of operations described in para. 311 is followed in reverse.

Guns

313. WARNING: Before unloading the guns a "Safety Man" must be posted in a position commanding an unobstructed view; his duty is to prevent all persons and vehicles from crossing the immediate danger area until all the guns are cleared.

Removal

314. For gun removal, two Armourers are required (A and B, as referenced below). Before any guns are removed, all guns must be unloaded (see para. 320 (i) to (xx)), a "Safety Man" (C) being posted as described in Warning above.

Completion of Unloading Operations

315. At the completion of the unloading operations, all guns are in a loaded position and suspended from their respective lowering tools (see para. 320). Proceed as follows, working on the S.O. gun first:—

(i) (B) Remove the blast tube by unscrewing the Jubilee clip.

(ii) (B) Fit the wooden muzzle plug, Part No. S00127 (Ident No. A79/501153), which is stowed on the gun bay door.

(iii) (B) Unscrew the muzzle thread protector of the front mounting unit and remove the front mounting unit.

(iv) (A)★ Disconnect the magazine carrier tie rod by removing the nut and bolt between the tie rod and the extension.

(v) (A)★ (B)★ (C) Withdraw the gun to the rear and clear of the aircraft.

The above procedure is repeated for the P.O. gun and then for both inner guns.

Installation

316. For installing the guns, the sequence of operations described in para. 315 is followed in reverse.

SERVICING

Servicing Creeper

317. A special servicing creeper (Ident No. W4G/4033) is available to facilitate gun servicing. Operations (in para. 315 and 320) which call for the use of this creeper have been annotated by an asterisk (★). The headrest cover is detachable, and should be changed at frequent intervals.

Re-Arming

318. To re-arm the guns the safety precautions given in Vampire Mk. 30 Maintenance Schedule (Sub-Sectn. F) must be adopted, an armament assistant being posted as described in para. 313.

Equipment and Personnel Required

319. The following equipment and per-

sonnel are required for re-arming the guns:—

(i) Equipment:

4 B.F.Ms. (2 L.H. and 2 R.H.) loaded with 16 rounds and fully tensioned.

Sufficient boxed ammunition, in belts of 25 rounds.

1 Vampire servicing creeper (Ident No. W4G/4033).

1 low platform or steps.

1 breech stoppage tool (Ident. No. D1E/2917), which is stowed on the gun bay door.

1 tool for opening gun bay doors, Part No. Y00162A (Ident No. A79/500016).

1 No. 11 Cocking unit (Ident No. E7G/1164), which is stowed on the gun bay door.

Armourer's tools as necessary.

(ii) Personnel:

Two Armourers (A) and (B) and one assistant (C), as referenced below. The assistant is to act as "Safety Man" (see WARNING, para. 313), until (A) has reported that all the guns are unloaded. He then assists in the re-arming.

Procedure

320. The re-arming drill for the personnel detailed in para. 319 has been provisionally agreed as follows:—

(i)	(C)	Maintain constant vigilance in his capacity as "Safety Man" until (A) reports that all guns are unloaded (item (xx)).
(ii)	(A)	Set firing button safety flap to "SAFE".
(iii)	(A) (B)	Remove gun bay doors.
(iv)	(A)★	Remove plug from port and starboard gun firing units.
(v)	(B)	Open ammunition box access doors, remove ammunition box tubular frames. Should there be any unexpended ammunition, pull the ends of the belts back into the boxes after (A) has broken the belts.
(vi)	(A)★	Open the flaps in the detachable feed chutes of any guns which have not expended all their ammunition, break the ammunition belts and instruct (B) to pull the remaining ammunition back into the box.
		NOTE: If the belt remaining in any feed chute is too short for (B) to be able to withdraw it, it must be steadied down the feed chute and removed.
(vii)	(A)★	Insert tools breech stoppage No. 2 Mk. 1 (Ident No. D1E/2917) on all guns, one tool is stowed on the gun bay door.
(viii)	(A)★	Position No. 11 cocking unit on S.O. gun; the unit is stowed on the gun bay door.
(ix)	(B)★	Cock S.O. gun.
(x)	(A)★ (B)★	Repeat for P.O. gun.
(xi)	(A)★	Remove P.O. detachable feed chute.
(xii)	(B)★	Remove S.O. detachable feed chute.
(xiii)	(A)★ (B)★	Lower S.O. gun, using the lowering tool, and remove S.O. B.F.M.
(xiv)	(A)★ (B)★	Repeat for P.O. gun.
(xv)	(A)★	Position No. XI cocking unit on S.I. gun.
(xvi)	(B)★	Cock S.I. gun.
(xvii)	(A)★ (B)★	Repeat for P.I. gun.
(xviii)	(A)★ (B)★	Remove inner detachable feed chutes.
(xix)	(A)★ (B)★	Lower inner guns and remove B.F.Ms.
(xx)	(A)★	Report guns unloaded to (C).
(xxi)	(A)★ (B)★	Carry out "between flight inspections" as necessary.
(xxii)	(C)	Remove any unexpended ammunition from the ammunition boxes and refill the boxes, joining the belts as necessary.

(xxiii) (A)★ (B)★ Position loaded B.F.M. on S.I. gun. Lift gun and lock it into position, ensuring that the quick release locking plungers are fully engaged in the rear stirrup mounting. Complete fitment of S.I. B.F.M., ensuring that magazine catch is fully engaged.

(xxiv) (A)★ (B)★ Repeat for P.I. gun.

(xxv) (A)★ (B)★ Repeat for outer guns.

(xxvi) (A)★ Replace inner detachable feed chutes, feeding the rounds hanging from the B.F.M. through the open flaps.

(xxvii) (B)★ Replace outer detachable feed chutes, feeding the rounds hanging from the B.F.M. through the open flaps.

(xxviii) (C) Feed ammunition belt to S.I. gun, and pull up slack in the belt when the belt has been joined by (A).

(xxix) (A)★ Join S.I. ammunition belt, and close and secure flap of S.I. detachable feed chute.

(xxx) (C) Feed ammunition to S.O. gun, and pull up slack in the belt when the belt has been joined by (B).

(xxxi) (B)★ Join the S.O. ammunition belt and close and secure flap of S.O. detachable feed chute.

(xxxii) (A)★ (B)★ (C) Repeat in the same sequence on the port side.

(xxxiii) (A)★ Replace plugs in gun firing units (if aircraft is "at readiness").

(xxxiv) (C) Replace port ammunition box tubular frames, and close and secure port ammunition box access door.

(xxxv) (B) Replace starboard ammunition box tubular frames, and close and secure starboard ammunition box access door.

(xxxvi) (A) (B) Remove servicing creeper and replace cocking unit, breech stoppage tool and plugs in stowages on the gun bay door.

(xxxvii) (A) (B) (C) Refit and secure gun bay doors. Particular attention must be paid to the sequence of closing and securing the doors, and the following sequence MUST be rigidly adhered to:—

i. Hang the doors on hinge attachments on the fuselage.

ii. Extend hooks as far as possible by screwing the adjuster in an ANTI-CLOCKWISE direction.

iii. Ensure that hook is lying in correct position to attach on to hook bracket. Close doors by hand and allow them to fall open until opening is restrained by Ripaults hooks engaging in brackets on the opposite door.

iv. Screw the adjuster progressively, by turning in a clockwise rotation so that all three hooks are evenly tightened. When adjusters are felt to have come to the end of their travel, care must be taken to avoid shearing the grub screw, thus leading to loss of doors during flight.

NOTE: If stoppages have occurred, the causes should be ascertained, the necessary remedial action taken, and the details reported to the senior armament N.C.O.

Harmonization Equipment and Procedure

321. For details of Harmonization refer to A.A.P.730 6B/3.

Butt Tests

322. When the gun installation is Butt tested, it is essential that the aircraft is lashed down and that the following instructions are rigidly adhered to:—

(i) Before the guns are fired, the front under panels MUST be fitted. Failure to comply with this instruction will result in extensive damage to the forward structure of the aircraft, due to "blast" from the guns.

(ii) The nose wheel must be retracted.

Installation of Rockets and Bombs

The following paragraphs dealing with RP/Bomb installations are applicable to Mk. 31 aircraft only:—

323. Rocket Projectors Mk.8 are fitted on the underside of each wing between the fuselage and stub booms. The front carrier struts are bolted to the front spars and the rear struts to the inner fuel tank doors. The junction of the wing plugs to the electrical firing leads is inside the rear carrier strut fairings.

Bomb Carriers

(See Fig. 110)

324. A standard carrier EM/EF 100/1000 lb. jettison type (Stores Ref. E11A/500063, incorporated in a joining assembly, carrier, Part No. S001159-60AND) can be attached to the manual type release gear under each wing.

This release gear normally supports the wing drop tank.

The carrier position relative to the wing lower surface is located by pegs and is adjustable by brace screws to the carrier fairing assembly.

Electro-magnetic release and fusing gear is incorporated in the bomb carrier.

Adjustable crutches for the bomb and an adjustable crutch for the bomb fin make the bomb carrier adaptable for several types of bombs.

Rocket and Bomb Master Switch

325. The R.P. and Bomb Master Switch is mounted on the port side of the cockpit just aft of the throttle box. The auto-selector unit is mounted near the floor to the right of the pilot's seat.

Rocket Selection

326. A three-position switch is located on the R.P. and Bombs junction box, which is mounted on the floor just below junction box No. 1. This switch gives the pilot the choice of firing the rockets in pairs, or a salvo.

Bomb Selection and Fusing

327. Switches of the R.P. and Bomb Junction Box are provided for bomb selection, and nose and tail fusing.

R.P. and Bomb Firing Switch

328. The firing push switch is mounted in the top of the Control Column Handle to the right of the camera push switch. The switch is protected against inadvertent depression by a cover pivoted from the centre of the handle face. The button releases either Rockets or Bombs depending on the position of the Rocket and Bomb master switch.

Removal of Rocket Projectors

329. Unscrew the four attachment bolts on each carrier strut, and in the case of the rear carrier struts, disconnect the electrical leads after the struts have been lowered sufficiently to expose the sockets. It is important that the two bolts (Part No. D006719, Stores Ref. A79/501817) through the rear of the front carriers are replaced when the struts have been removed, as they are structural components.

Fitting Bomb Carriers

330. Open the door on each side of the carrier fairing assembly. This will give access for assembly and adjustment of the carrier in the wing. With the jettison lever fully down and the slip release jaws open, engage the carrier locating pegs with the holes in the wing and the carrier suspension lug in the release jaws. Pust the carrier up sharply to cock the slip release unit.

Check that the unit is cocked by pressing on the projecting plunger in the base of the unit. If the unit is cocked correctly, a point will be felt. Adjust the two outer brace screws until the centre line of the carrier, viewed from the front, is perpendicular. Connect the carrier electrical socket to the wing plug.

NOTE: To test the functioning of the manual release unit, before fitting the bomb carrier, refer to Sect. 4, para. 71, of this publication.

Removal of Carriers

331. To remove the carriers open the fairing doors and disconnect the electrical leads at the wing sockets. Support each carrier and pull the jettison lever, in the cockpit, up to its stop. This will release both carriers,

which can then be lowered to clear the locating pegs from the wings.

Bomb Carrier Jettison Gear

332. Before fitting the bomb carriers to the wings, the functioning of the release gear should be checked. Ref. to Sect. 4, Page 28, para. 71 (i)-(iii).

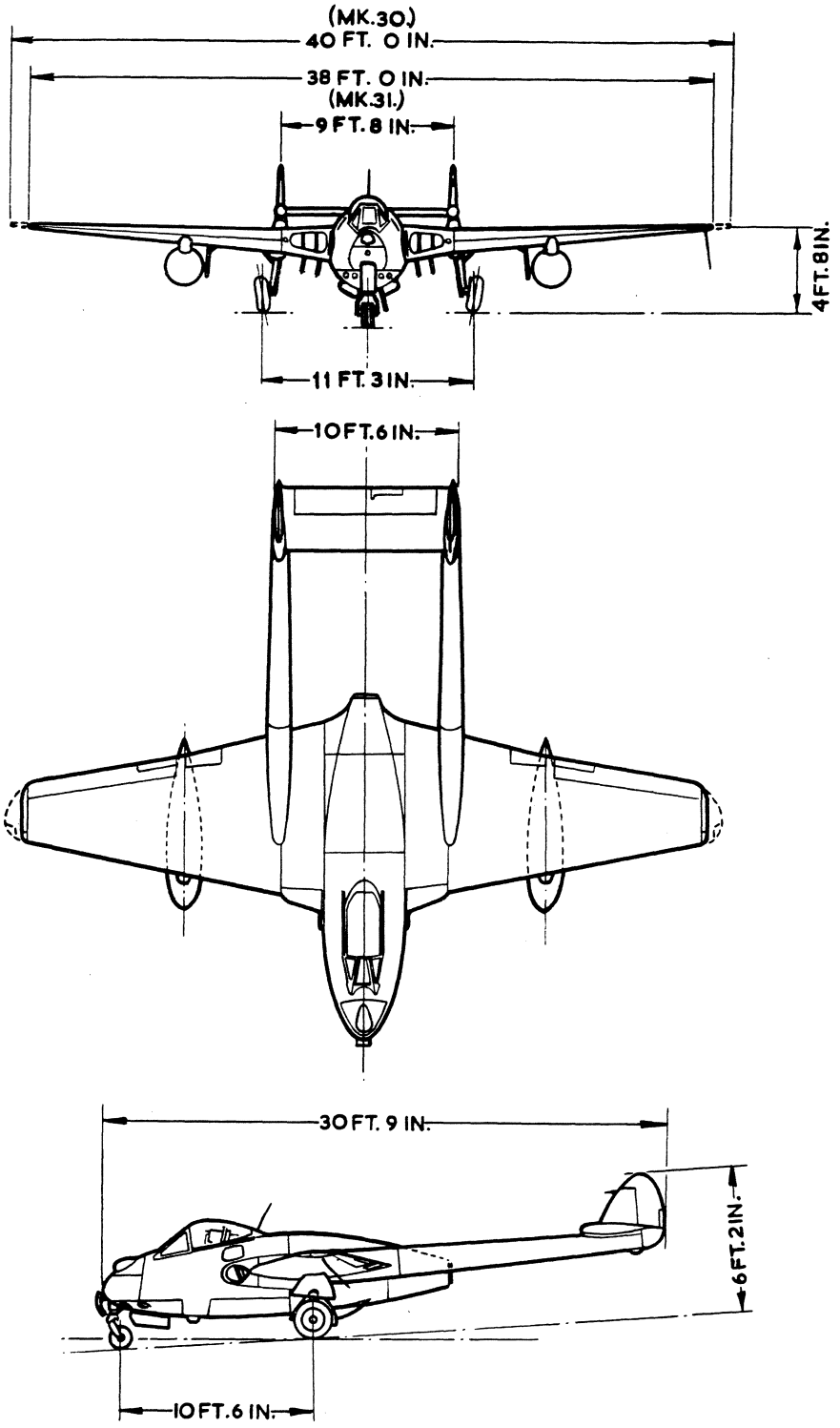


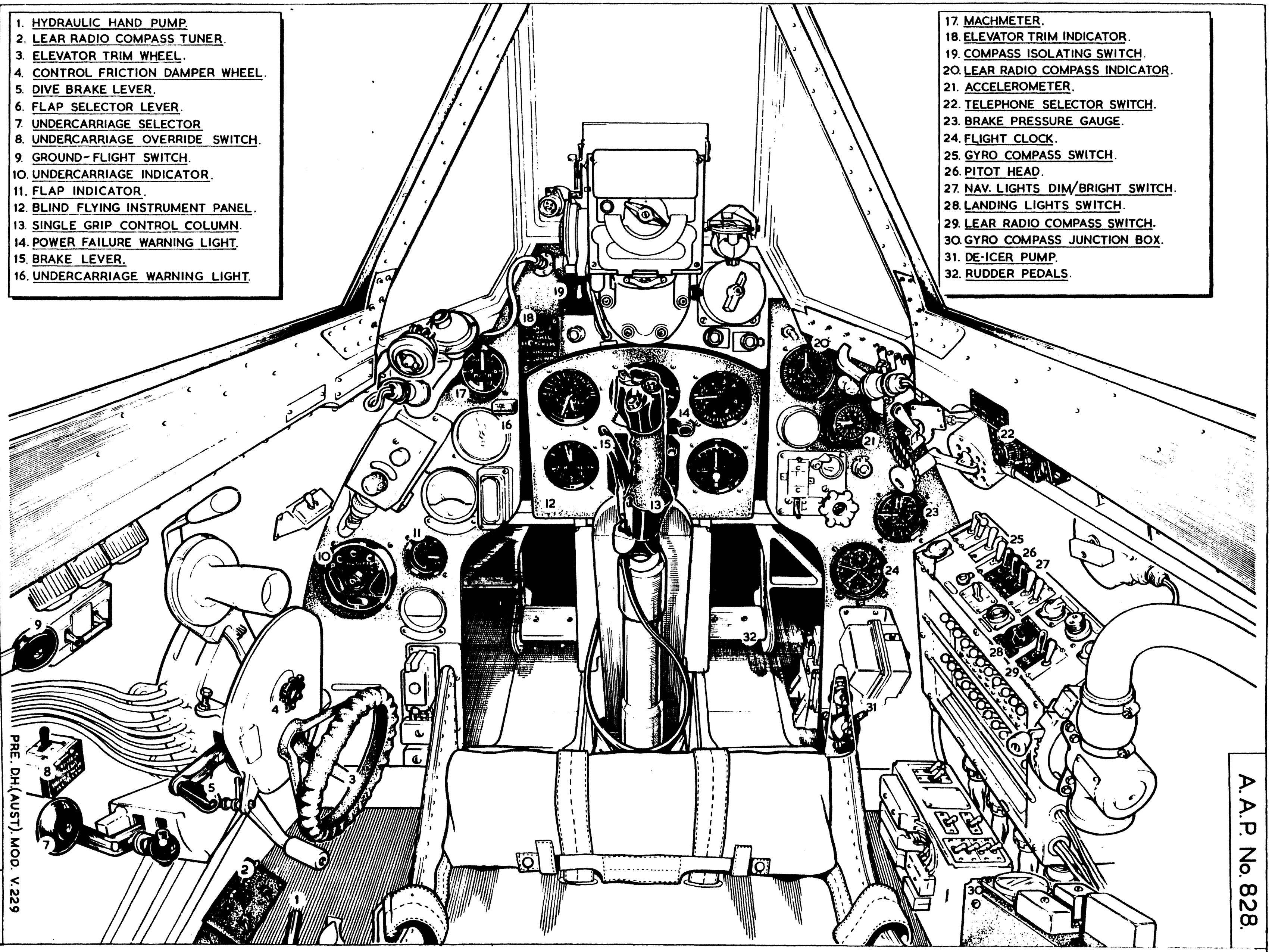
FIG. 1

GENERAL ARRANGEMENT

FIG. 1

FIG. 2

FLYING CONTROLS

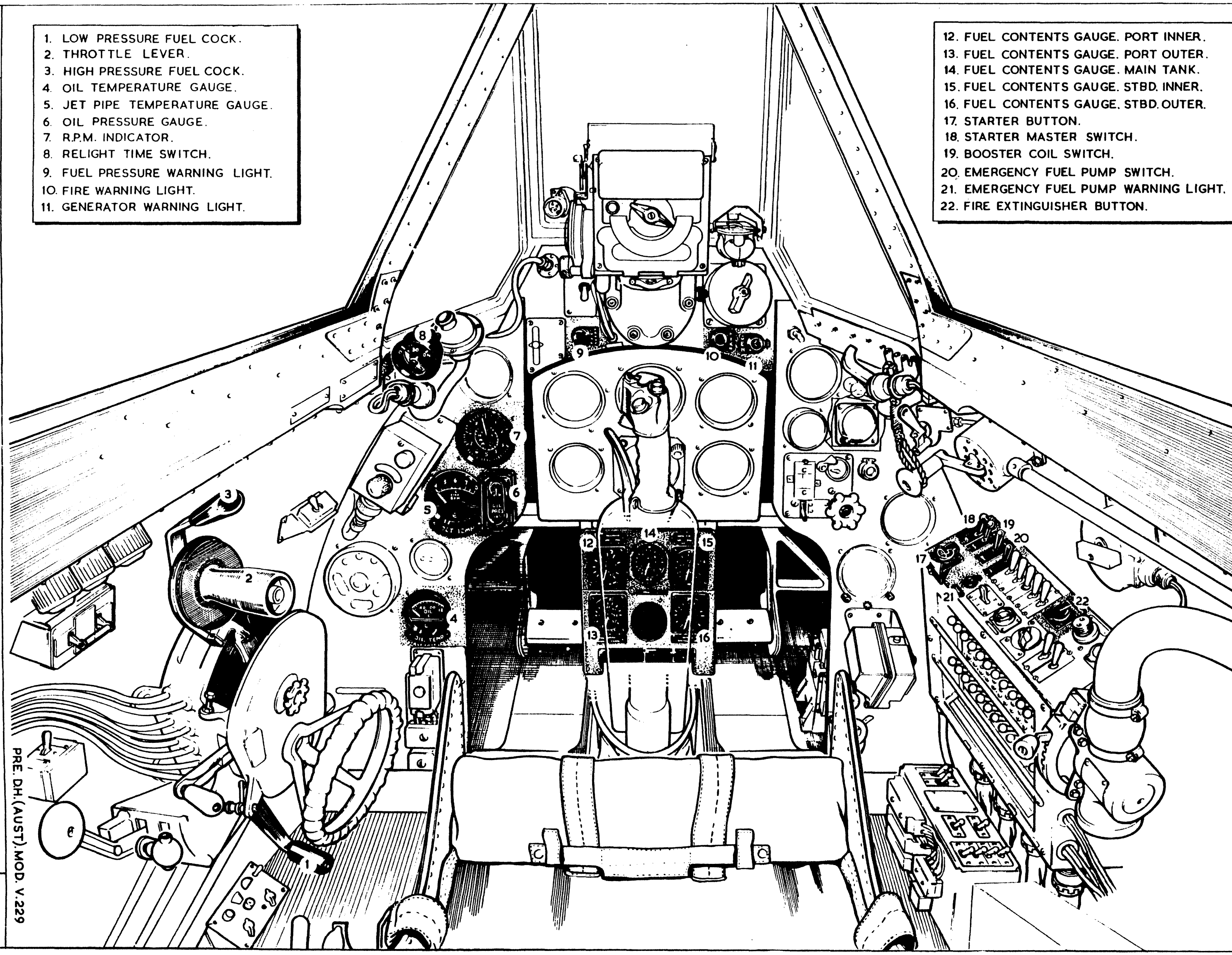


1. HYDRAULIC HAND PUMP.
2. LEAR RADIO COMPASS TUNER.
3. ELEVATOR TRIM WHEEL.
4. CONTROL FRICTION DAMPER WHEEL.
5. DIVE BRAKE LEVER.
6. FLAP SELECTOR LEVER.
7. UNDERCARRIAGE SELECTOR
8. UNDERCARRIAGE OVERRIDE SWITCH.
9. GROUND-FLIGHT SWITCH.
10. UNDERCARRIAGE INDICATOR.
11. FLAP INDICATOR.
12. BLIND FLYING INSTRUMENT PANEL.
13. SINGLE GRIP CONTROL COLUMN.
14. POWER FAILURE WARNING LIGHT.
15. BRAKE LEVER.
16. UNDERCARRIAGE WARNING LIGHT.
17. MACHMETER.
18. ELEVATOR TRIM INDICATOR.
19. COMPASS ISOLATING SWITCH.
20. LEAR RADIO COMPASS INDICATOR.
21. ACCELEROMETER.
22. TELEPHONE SELECTOR SWITCH.
23. BRAKE PRESSURE GAUGE.
24. FLIGHT CLOCK.
25. GYRO COMPASS SWITCH.
26. PITOT HEAD.
27. NAV. LIGHTS DIM/BRIGHT SWITCH.
28. LANDING LIGHTS SWITCH.
29. LEAR RADIO COMPASS SWITCH.
30. GYRO COMPASS JUNCTION BOX.
31. DE-ICER PUMP.
32. RUDDER PEDALS.

PRE. DH(AUST). MOD. V.229

FIG. 2

ENGINE CONTROLS

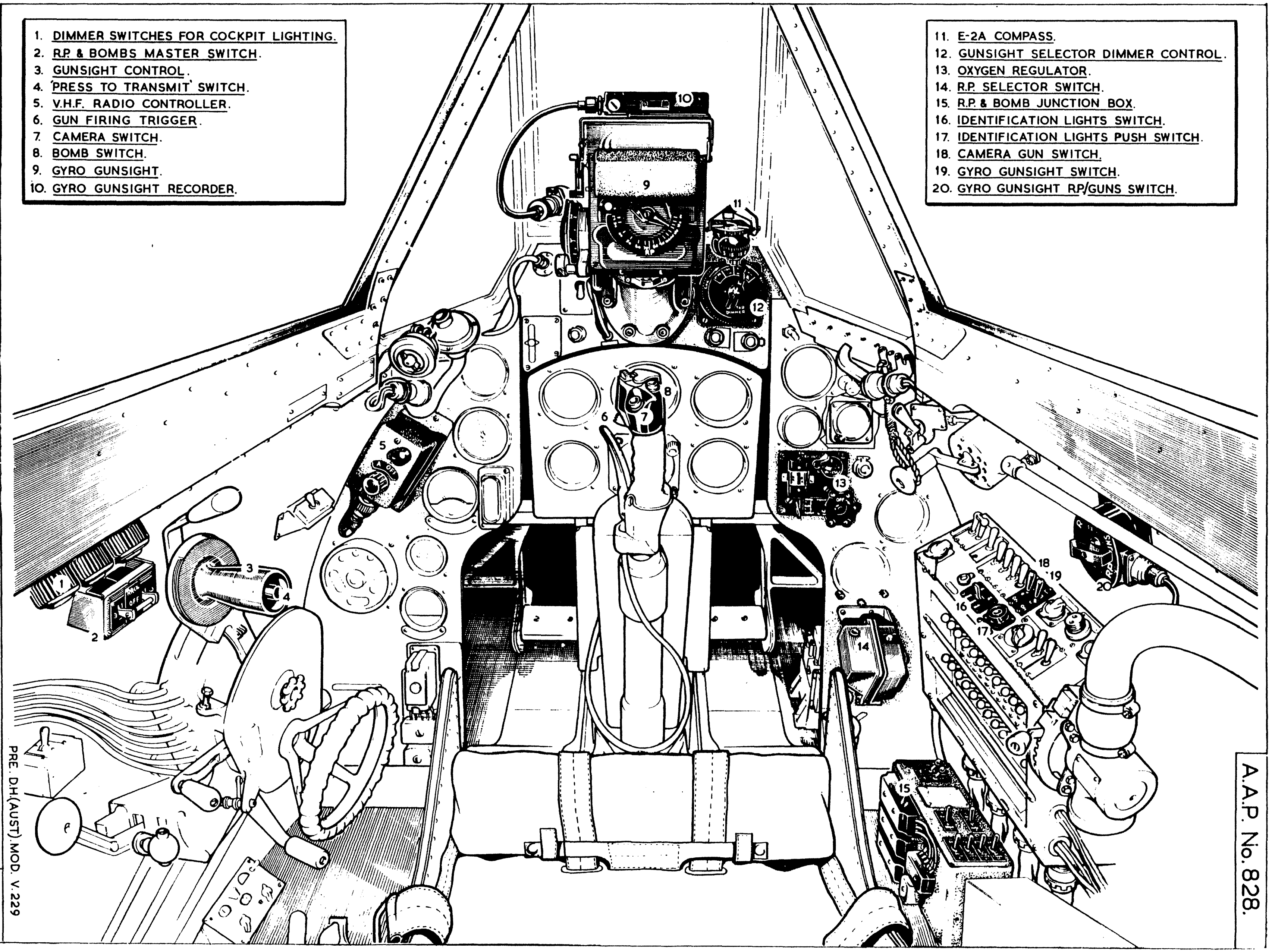


1. LOW PRESSURE FUEL COCK.
2. THROTTLE LEVER.
3. HIGH PRESSURE FUEL COCK.
4. OIL TEMPERATURE GAUGE.
5. JET PIPE TEMPERATURE GAUGE.
6. OIL PRESSURE GAUGE.
7. R.P.M. INDICATOR.
8. RELIGHT TIME SWITCH.
9. FUEL PRESSURE WARNING LIGHT.
10. FIRE WARNING LIGHT.
11. GENERATOR WARNING LIGHT.
12. FUEL CONTENTS GAUGE. PORT INNER.
13. FUEL CONTENTS GAUGE. PORT OUTER.
14. FUEL CONTENTS GAUGE. MAIN TANK.
15. FUEL CONTENTS GAUGE. STBD. INNER.
16. FUEL CONTENTS GAUGE. STBD. OUTER.
17. STARTER BUTTON.
18. STARTER MASTER SWITCH.
19. BOOSTER COIL SWITCH.
20. EMERGENCY FUEL PUMP SWITCH.
21. EMERGENCY FUEL PUMP WARNING LIGHT.
22. FIRE EXTINGUISHER BUTTON.

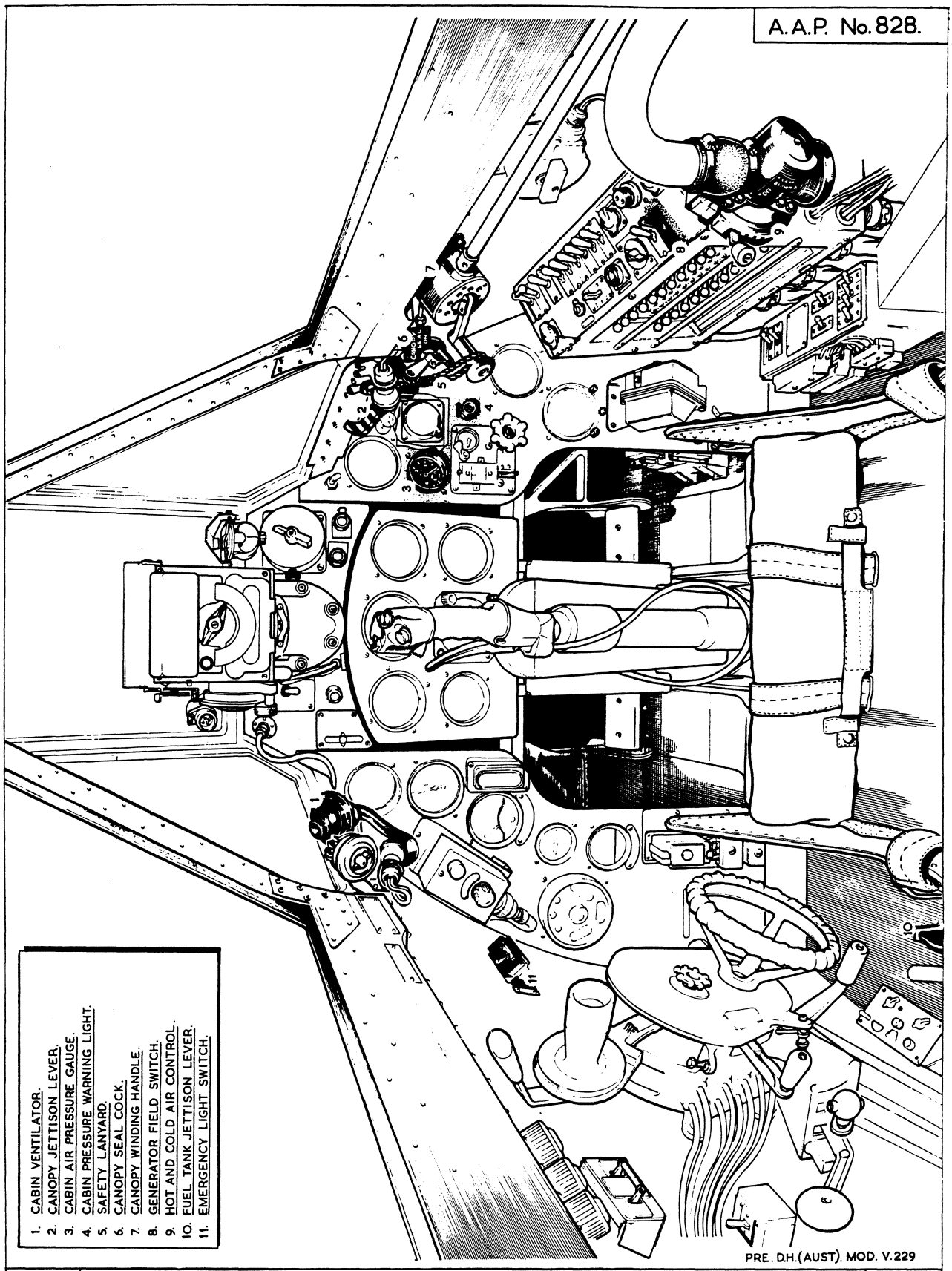
PRE. DH.(AUST).MOD. V.229

OPERATIONAL CONTROLS

1. DIMMER SWITCHES FOR COCKPIT LIGHTING.
2. R.P. & BOMBS MASTER SWITCH.
3. GUNSIGHT CONTROL.
4. 'PRESS TO TRANSMIT' SWITCH.
5. V.H.F. RADIO CONTROLLER.
6. GUN FIRING TRIGGER.
7. CAMERA SWITCH.
8. BOMB SWITCH.
9. GYRO GUNSIGHT.
10. GYRO GUNSIGHT RECORDER.
11. E-2A COMPASS.
12. GUNSIGHT SELECTOR DIMMER CONTROL.
13. OXYGEN REGULATOR.
14. R.P. SELECTOR SWITCH.
15. R.P. & BOMB JUNCTION BOX.
16. IDENTIFICATION LIGHTS SWITCH.
17. IDENTIFICATION LIGHTS PUSH SWITCH.
18. CAMERA GUN SWITCH.
19. GYRO GUNSIGHT SWITCH.
20. GYRO GUNSIGHT RP/GUNS SWITCH.



PRE. D.H.(AUST).MOD. V.229



1. CABIN VENTILATOR.
2. CANOPY JETTISON LEVER.
3. CABIN AIR PRESSURE GAUGE.
4. CABIN PRESSURE WARNING LIGHT.
5. SAFETY LANYARD.
6. CANOPY SEAL COCK.
7. CANOPY WINDING HANDLE.
8. GENERATOR FIELD SWITCH.
9. HOT AND COLD AIR CONTROL.
10. FUEL TANK JETTISON LEVER.
11. EMERGENCY LIGHT SWITCH.

PRE. D.H.(AUST). MOD. V.229

FIG 5

MISCELLANEOUS EQUIPMENT

FIG 5

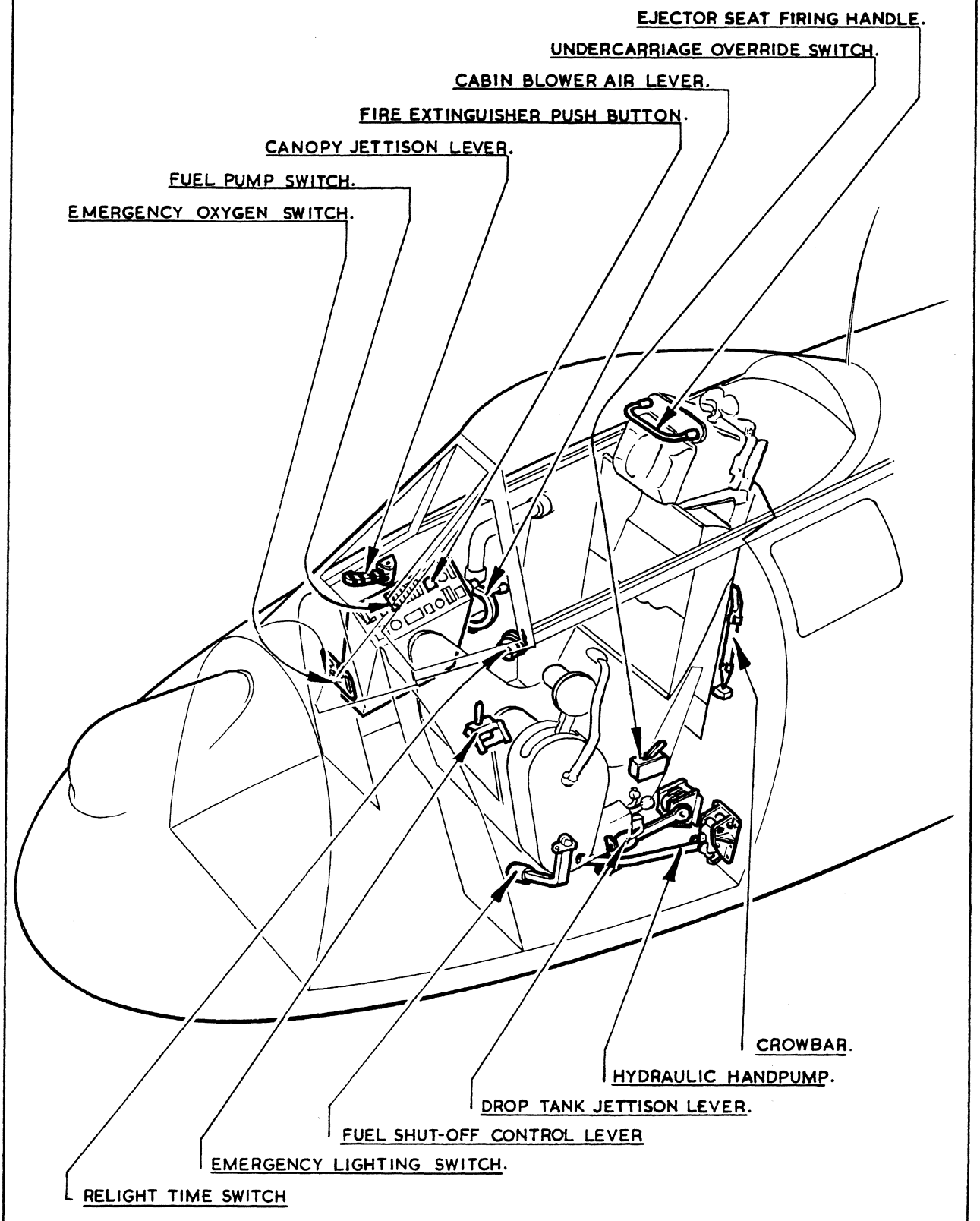


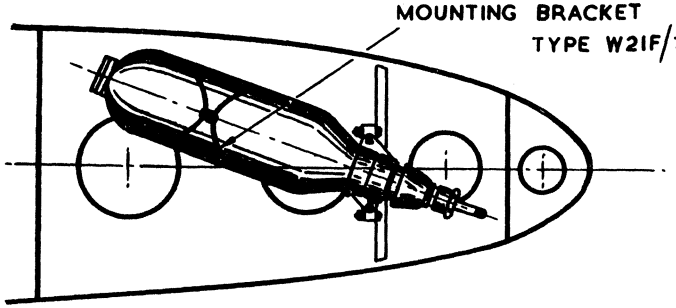
FIG. 6

EMERGENCY EQUIPMENT

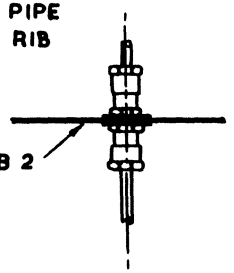
FIG. 6

FIG 7

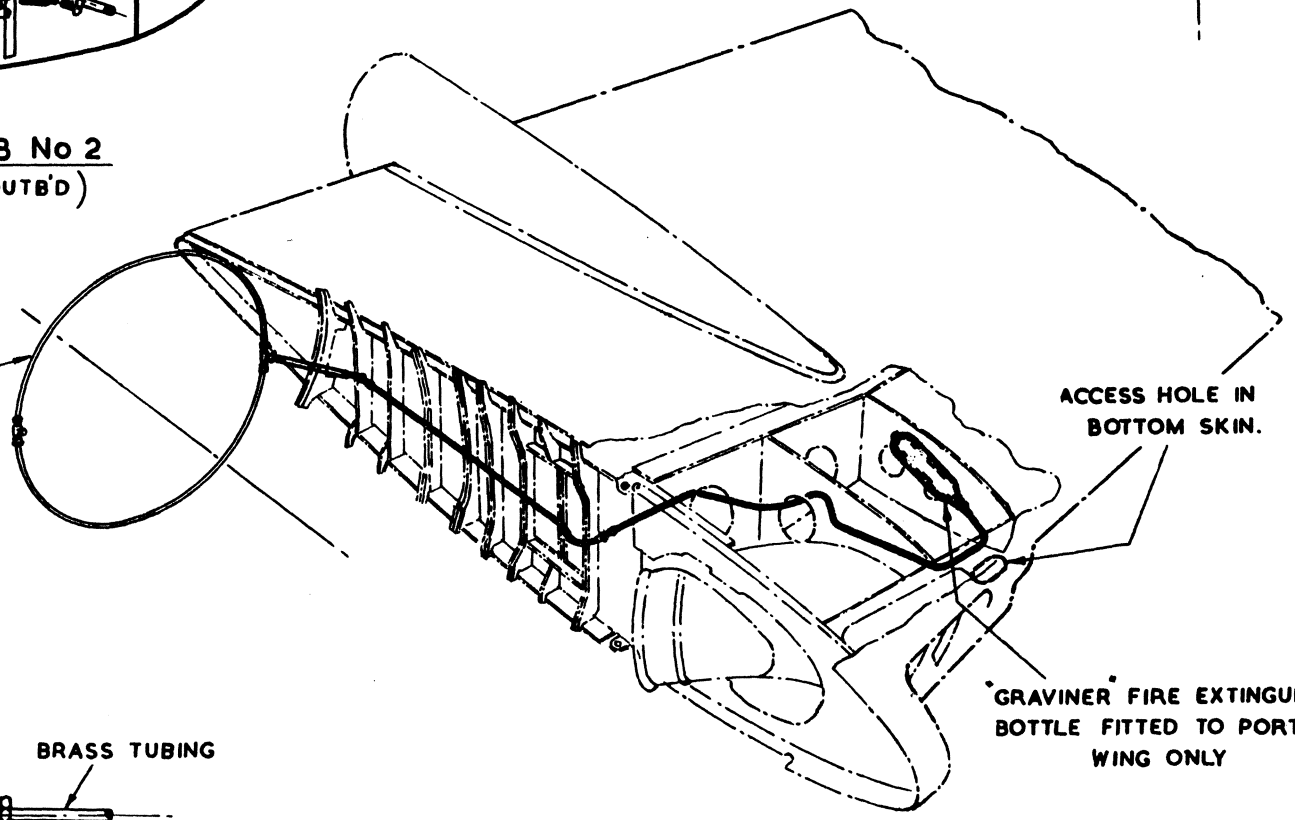
FIRE EXTINGUISHER SYSTEM

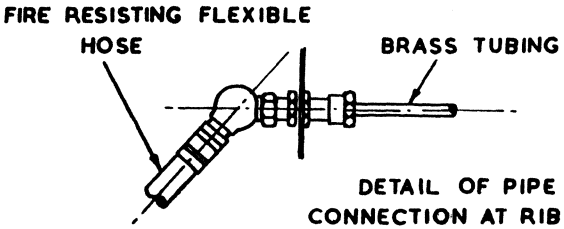


DETAIL OF PIPE CONNECTION AT RIB



VIEW ON RIB No 2
(LOOKING OUTB'D)



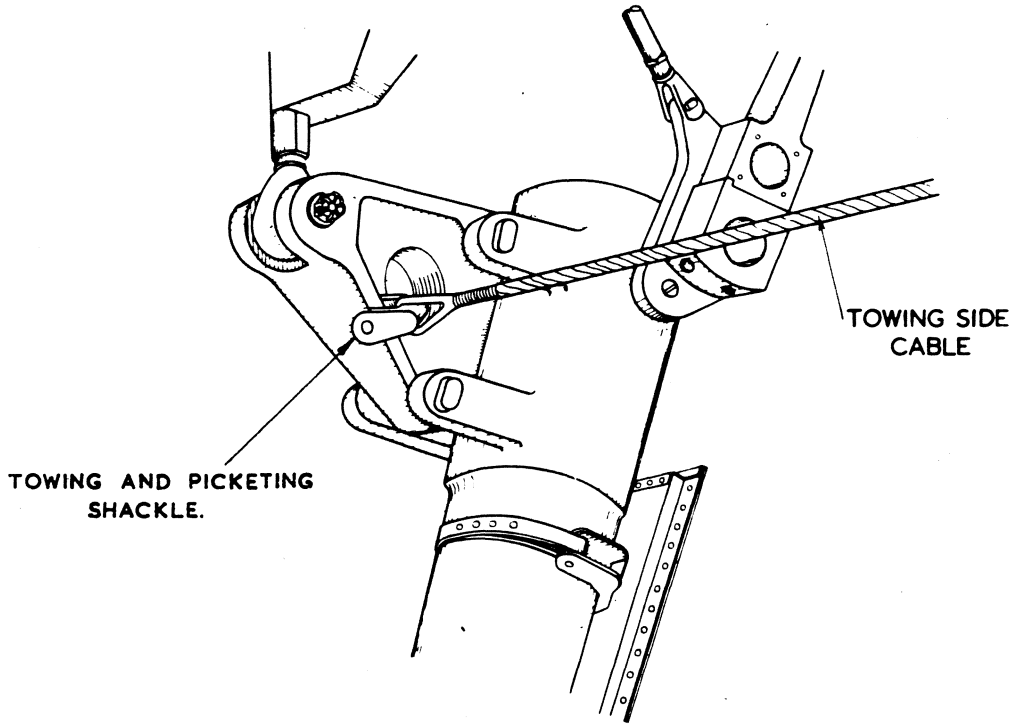


DETAIL OF PIPE CONNECTION AT RIB STIFFENER

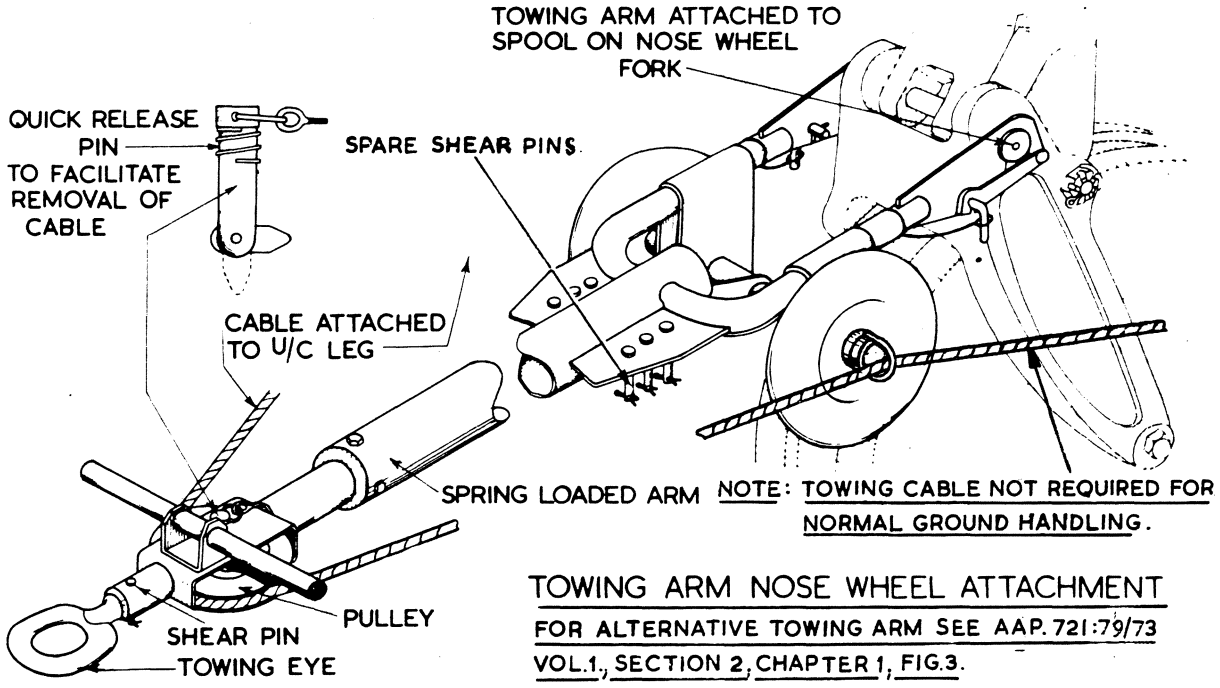
RAAF PUB No 828

K.J.H.

FIG 7



COMPRESSION LEG ON STARBOARD UNDERCARRIAGE
VIEW LOOKING REARWARDS



NOTE: TOWING CABLE NOT REQUIRED FOR NORMAL GROUND HANDLING.

TOWING ARM NOSE WHEEL ATTACHMENT

FOR ALTERNATIVE TOWING ARM SEE AAP. 721:79/73 VOL.1., SECTION 2, CHAPTER 1, FIG.3.

FIG. 8	TOWING DIAGRAM	FIG 8

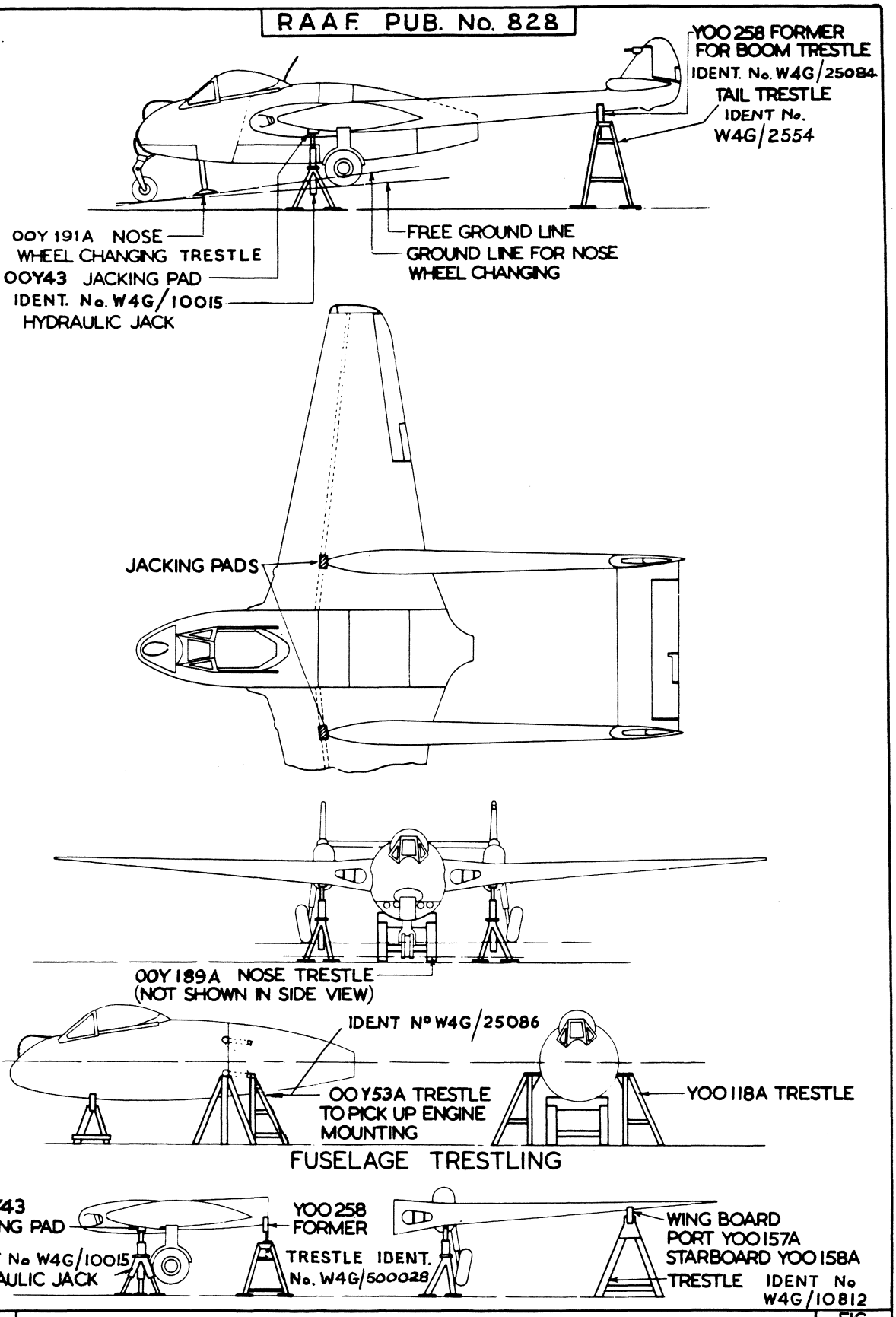


FIG. 9

TRESTLING DIAGRAM

FIG. 9

A.L.2

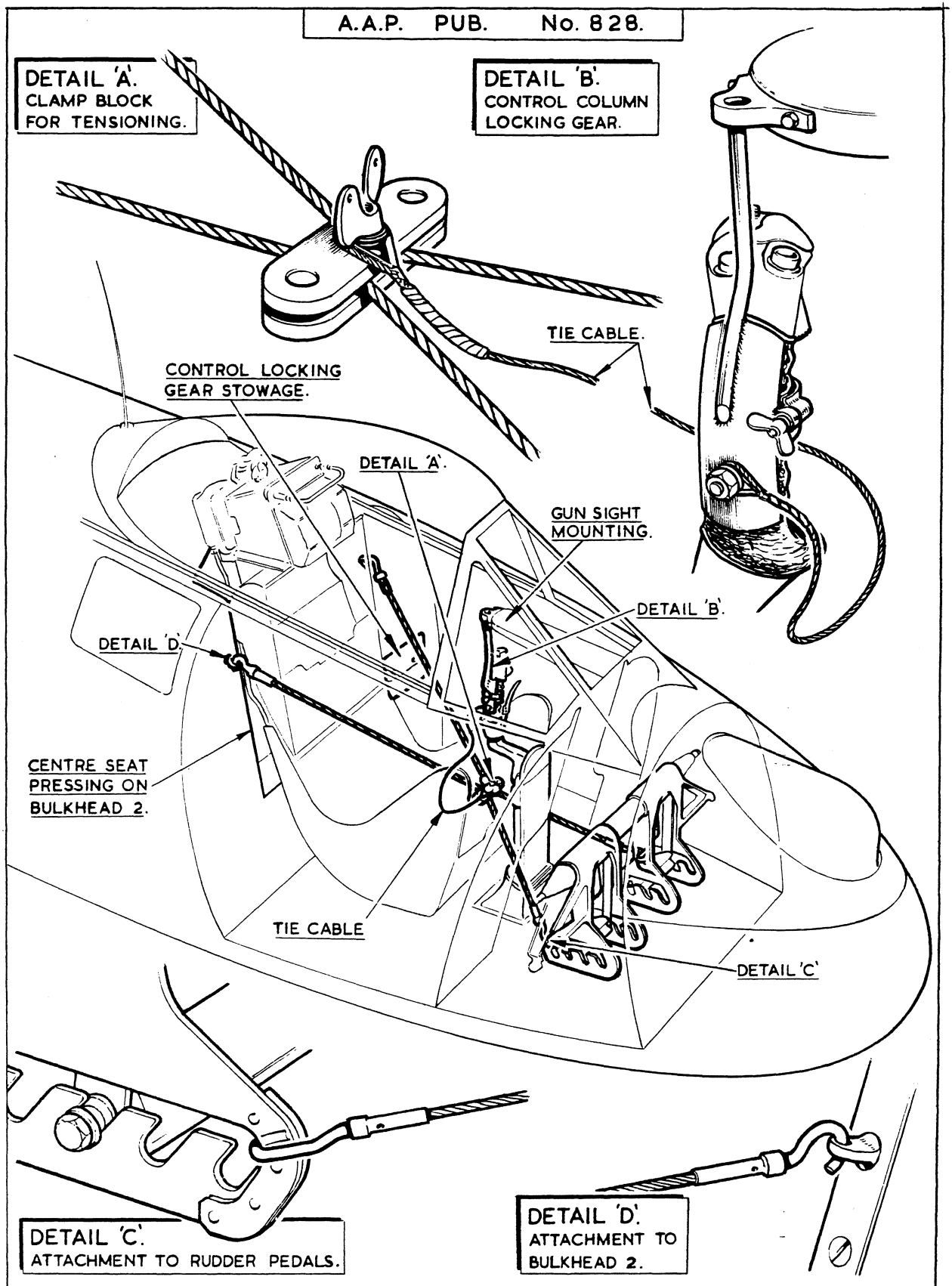


FIG. 10

CONTROL LOCKING

FIG. 10

A.L.2

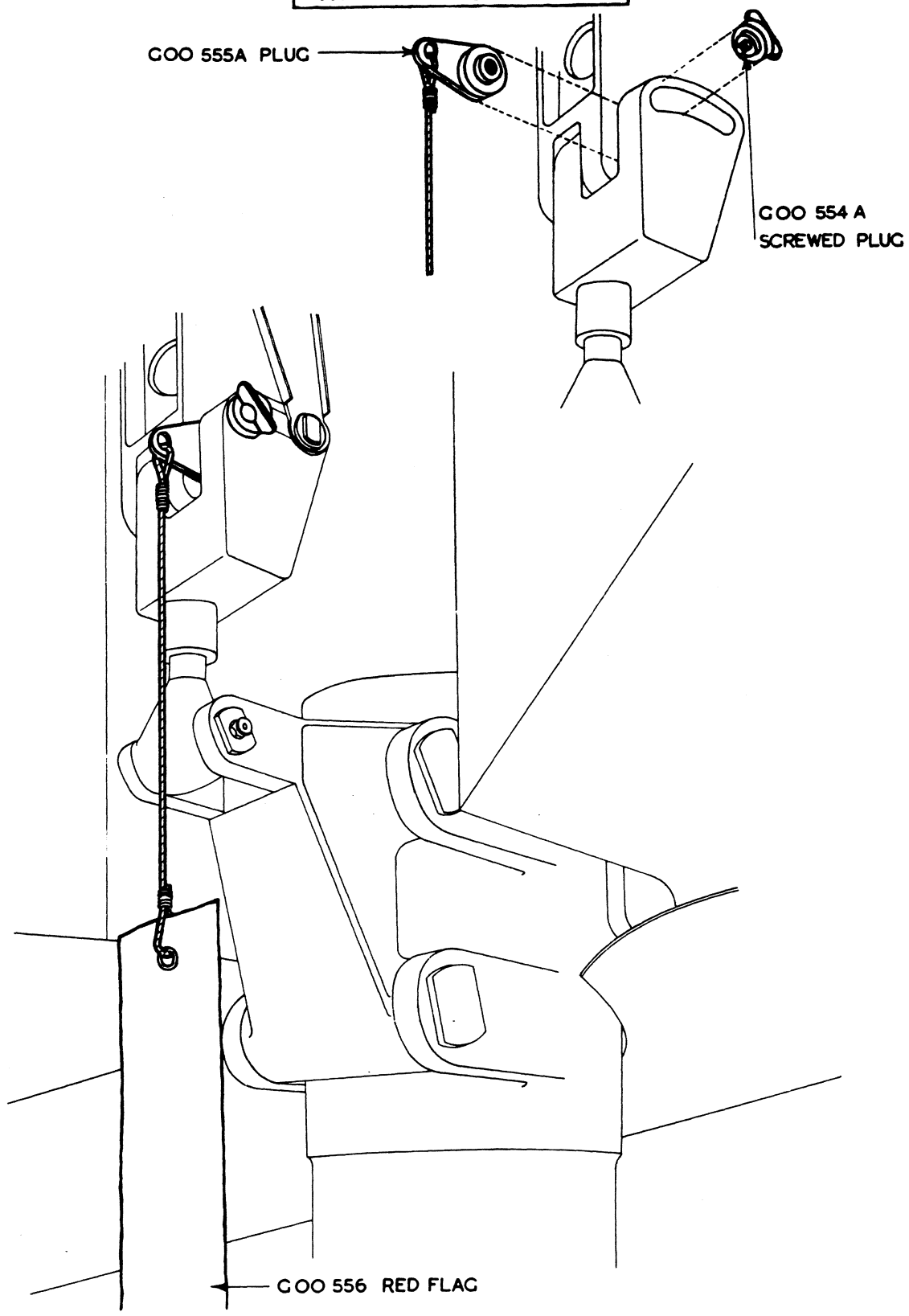


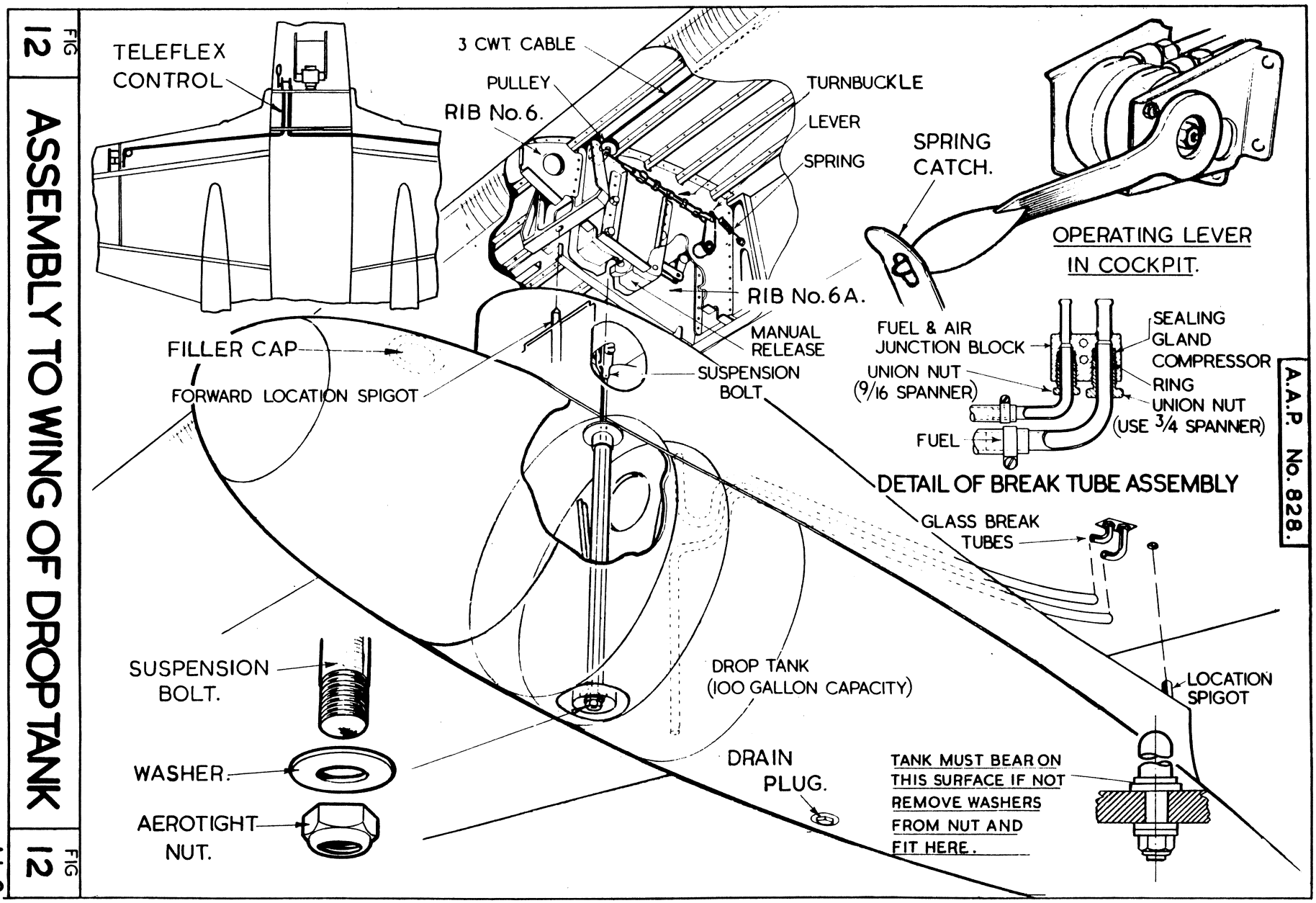
FIG 11

UNDERCARRIAGE LOCKING

FIG 11

FIG 12

ASSEMBLY TO WING OF DROP TANK



A.A.P. No. 828.

FIG 12

A.L.2

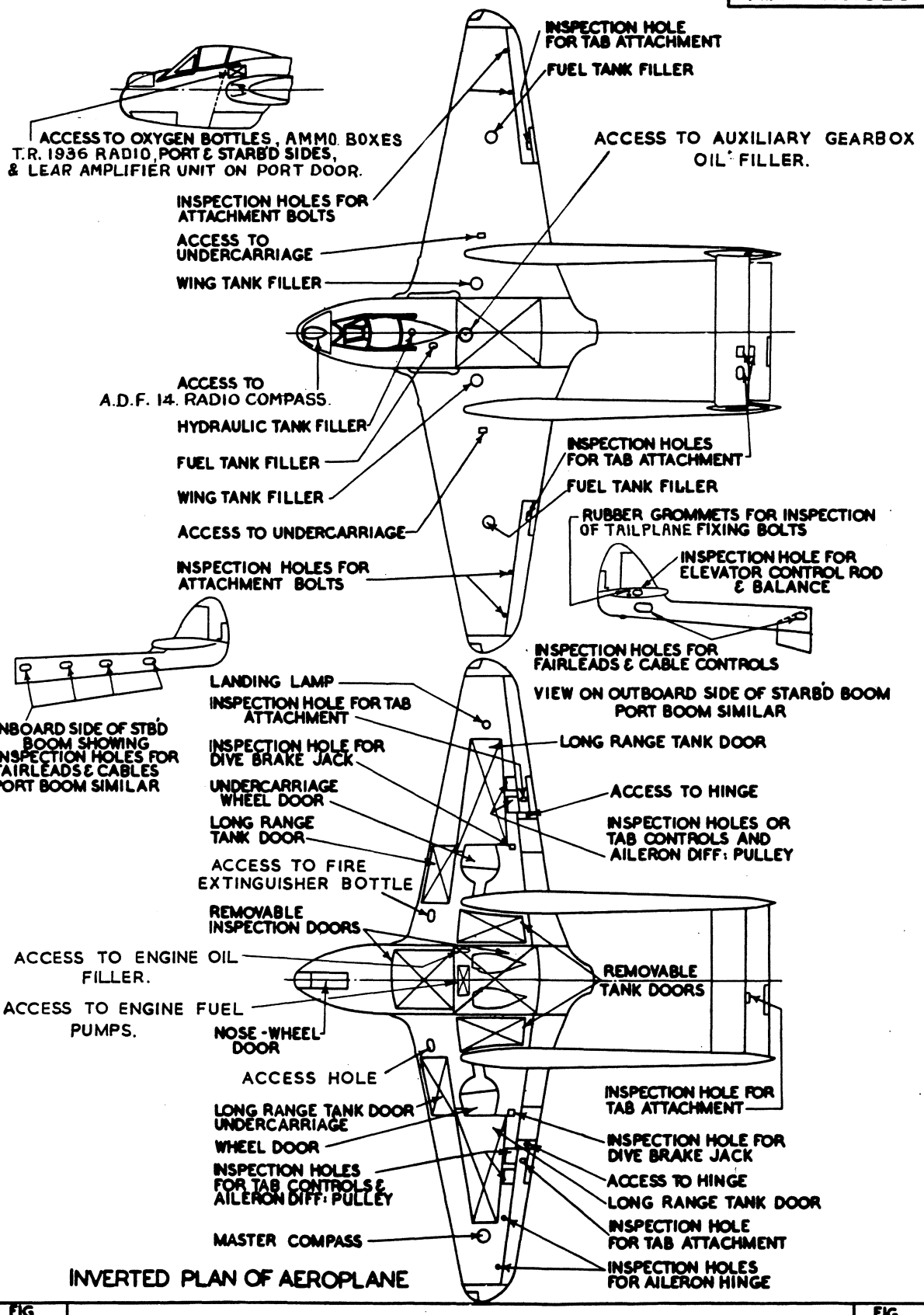
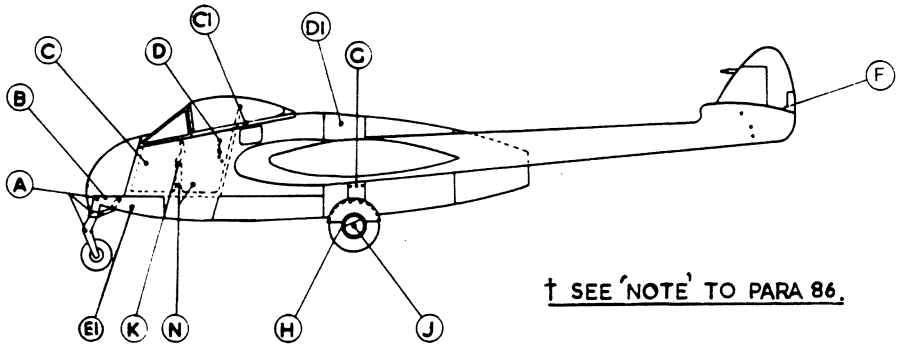


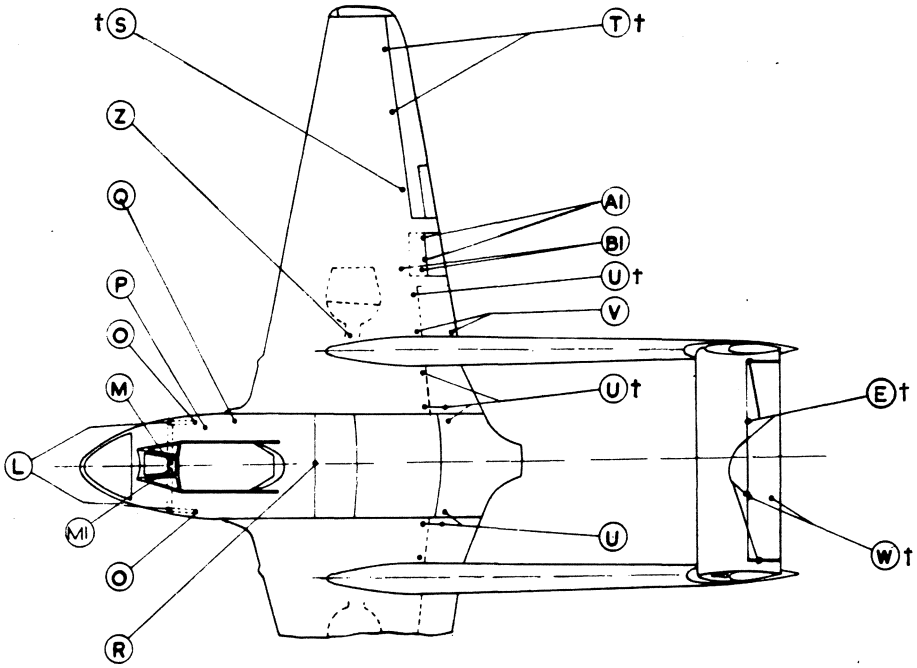
FIG 14

INSPECTION PANELS

FIG 14



† SEE 'NOTE' TO PARA 86.

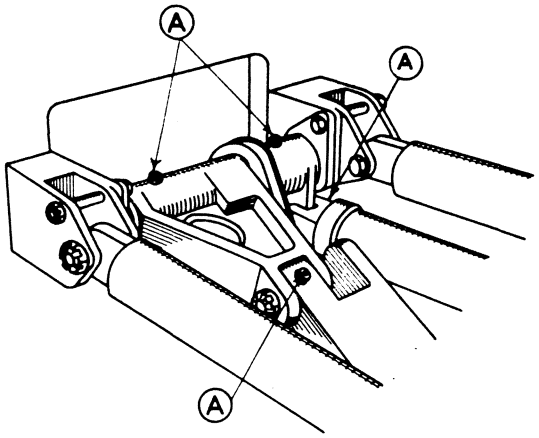


NOTE! ALL CABLE CONTROL PULLEYS AND FLYING CONTROL LEVERS IN TAIL UNIT SEALED BALL RACES

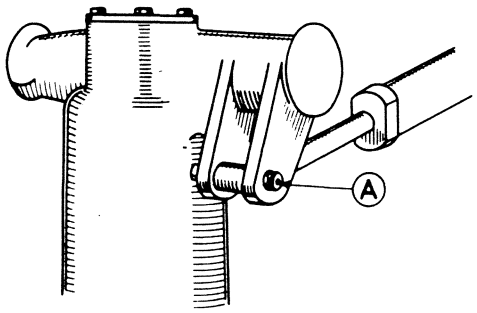
(A) NOSE WHEEL 13 GREASE NIPPLES ▭
(B) NOSE WHEEL DOOR HINGE •
(C) PENDULUM RUDDER PEDALS •
(D) TELEFLEX CONTROLS 6 GREASE NIPPLES ▭
(E) ELEVATOR HINGES SEALED BALL RACES
(F) ELEVATOR TAB JACK ▭
(G) RADIUS ROD • (PORT & STAR'BD) 4 POINTS
(H) WHEEL DOOR HINGES • (PORT & STARB'D) 4 ▭
(J) HUB GREASE ■ U/C LEG 6 GREASE NIPPLES ▭
(K) CONTROL COLUMN • 2 BALL RACES
(L) ELEVATOR LEVER BALL RACE • PORT & STARB'D.
(M) BEARING SLEEVE ON CONTROL COLUMN •
(M1) BRAKE CABLE NIPPLES ON CONTROL COLUMN •
(N) ELEVATOR CON ROD (2 BALL RACES) • PORT & STARB'D.
(O) ELEVATOR PULLEY BALL RACE • PORT & STARB'D.
(P) CANOPY UNIVERSAL CONTROL JOINTS •
(Q) CANOPY SPROCKETS ▭
(R) THROTTLE CONTROL SHAFTS 4 BALL RACES
(S) SERVO TAB SEALED BALL RACE
(T) AILERON HINGE POINTS. SEALED BALL RACES
(U) FLAP HINGES SEALED BALL RACES
(V) FLAP JACK ATTACHMENT ▭
(W) ELEVATOR TRIM CONTROL SEALED BALL RACE
(Z) U/C STRUT ◑
(A1) DIVE BRAKE HINGES 2 BALL RACES - SEALED.
(B1) DIVE BRAKE JACK HINGES 2 GREASE NIPPLES ▭
(C1) CANOPY ROLLERS ▭
(D1) AUXILIARY GEAR BOX DRIVE COUPLING ⊕
(E1) CANNON FT. MTG. ■

▭ GREASE ANTI FREEZING IDENT Nº K2/210
• OIL LUBRICATING ANTI FREEZING IDENT Nº K2/55
◑ FLUID HYDRAULIC (MINERAL) IDENT Nº K2/138
⊕ GREASE, ANTI SIEZE K2/212.
■ HIGH MELTING PT. GREASE IDENT Nº K2/66

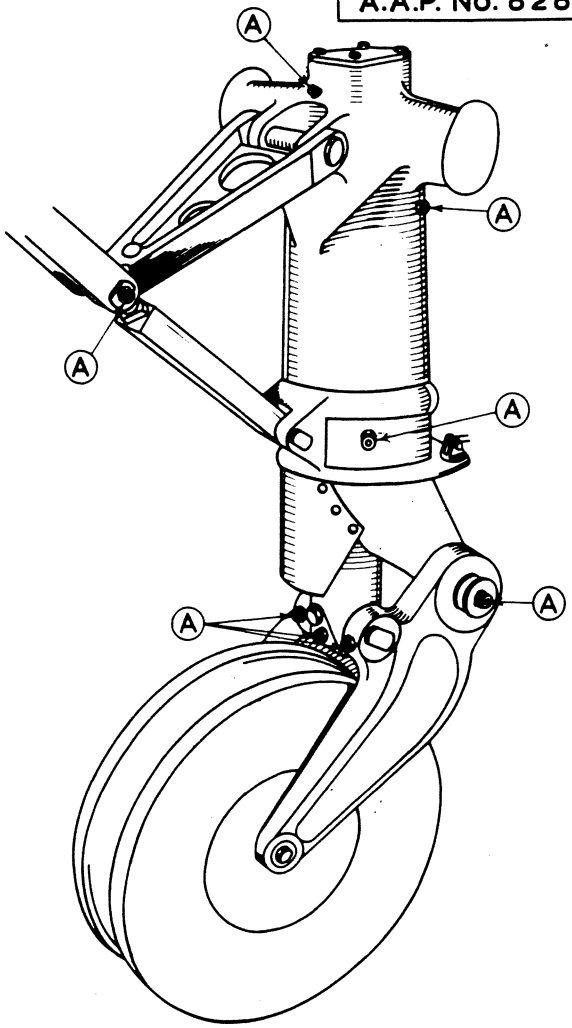
FIG. 15 — # LUBRICATION DIAGRAM — FIG. 15



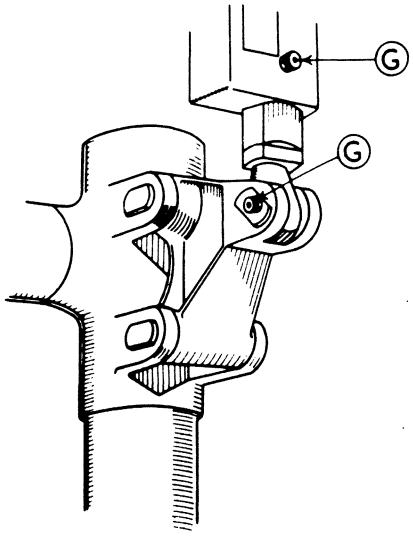
NOSE WHEEL RADIUS ROD HINGE



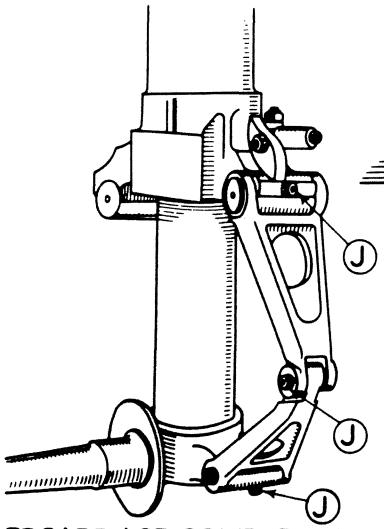
NOSE WHEEL JACK HINGE



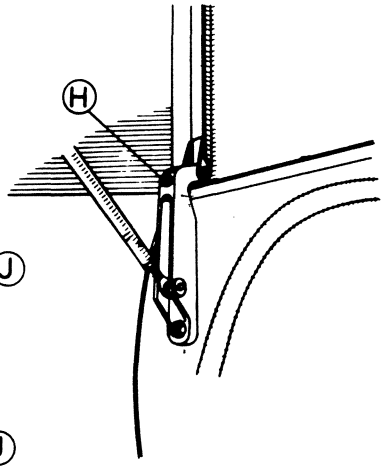
NOSE WHEEL UNIT



UNDERCARRIAGE HINGE



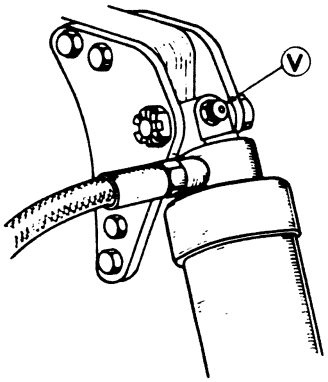
UNDERCARRIAGE COMPRESSION LEG



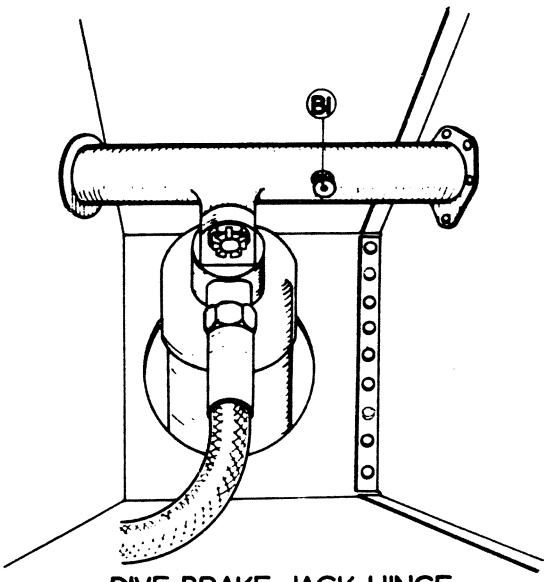
UNDERCARRIAGE WELL DOOR

FOR LUBRICATION DIAGRAM SEE FIG. 15

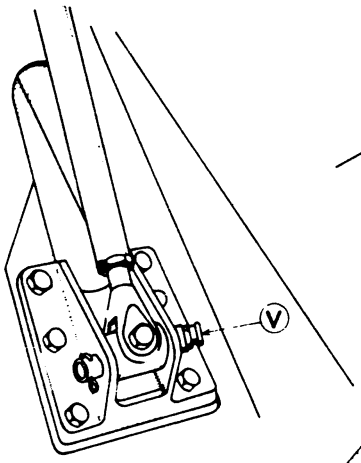
FIG. 16	UNDERCARRIAGE & NOSE WHEEL LUBRICATION	FIG. 16



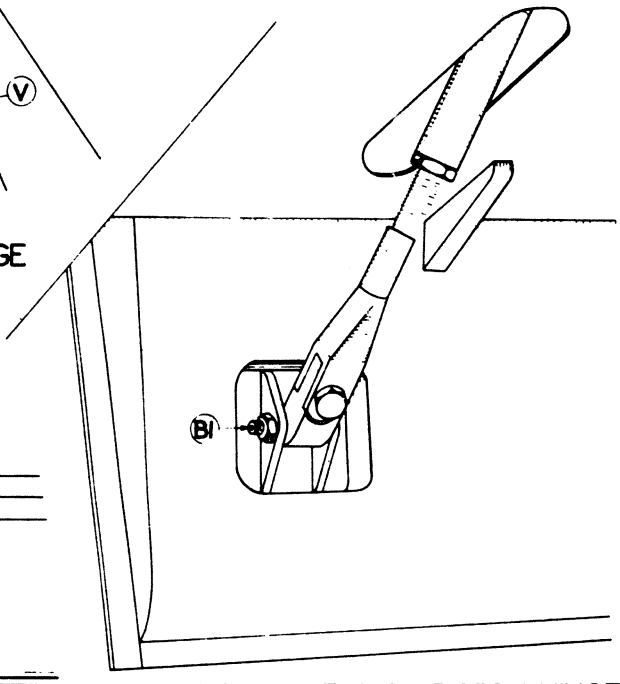
FLAP JACK HINGE



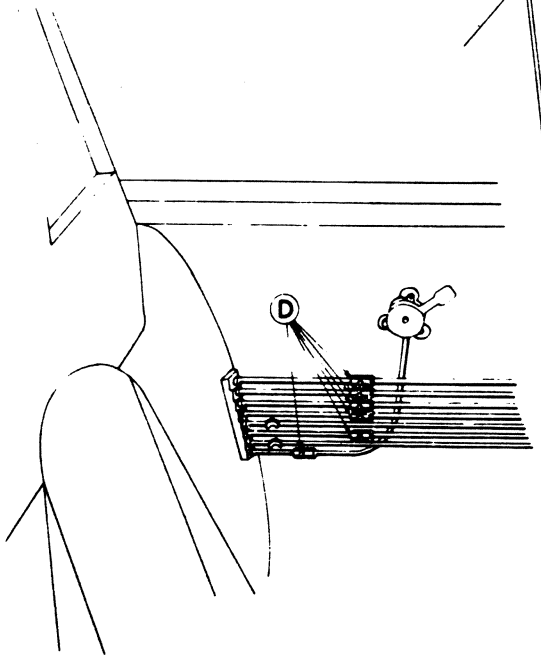
DIVE BRAKE JACK HINGE



FLAP JACK PISTON HINGE



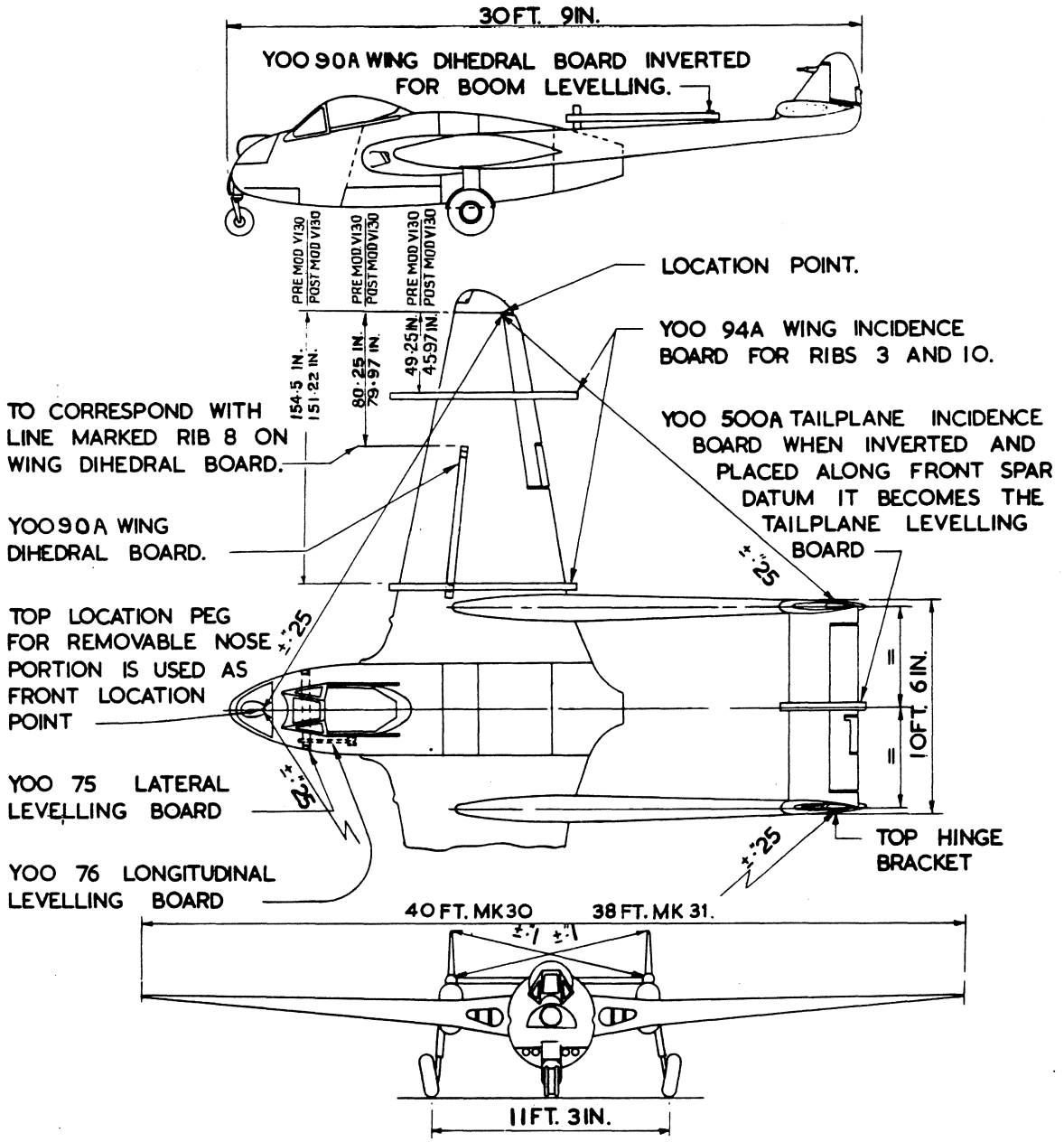
DIVE BRAKE JACK PISTON HINGE



TELEFLEX ENGINE CONTROLS

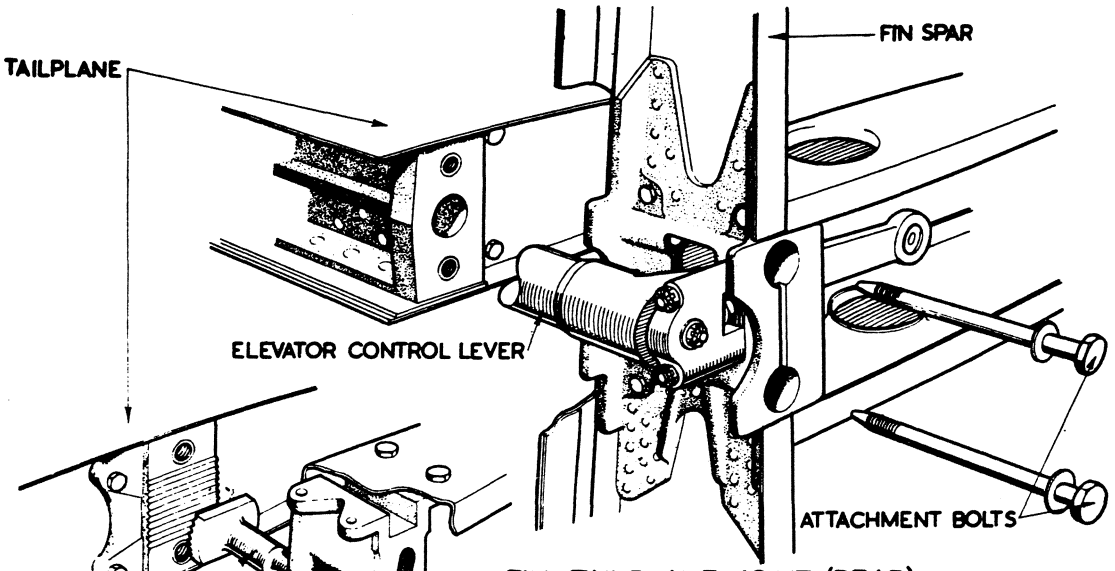
FOR LUBRICATION DIAGRAM SEE FIG 15

FIG. 17	MISCELLANEOUS LUBRICATION	FIG. 17

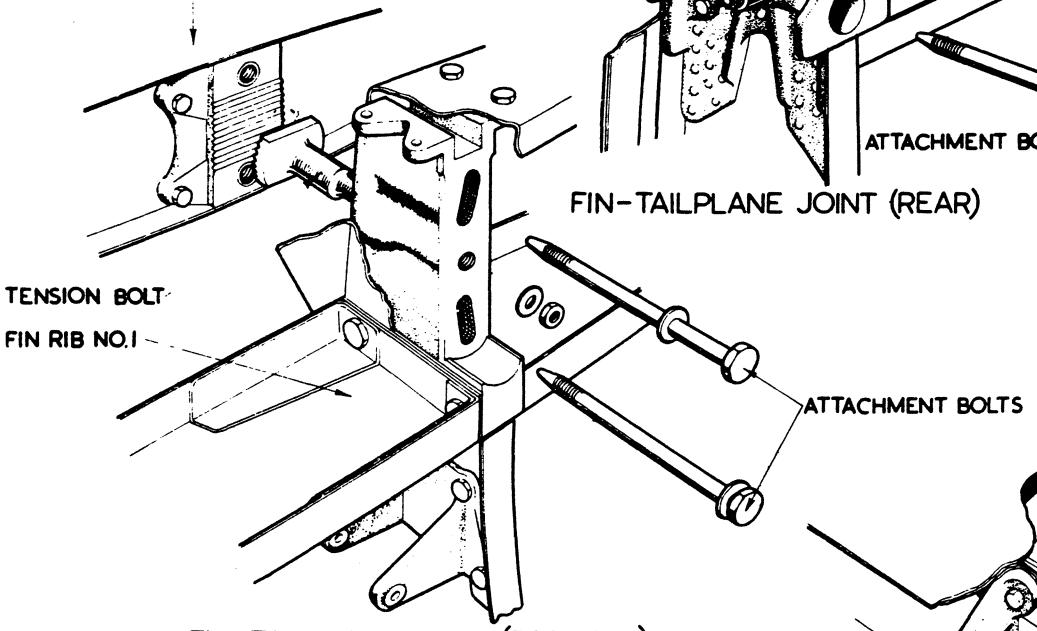


CONTROL SURFACE MOVEMENTS		MAINPLANE INCIDENCE, ZERO AT FUSELAGE DATUM.
AILERON	15° 36′ UP 10° 31′ DOWN (3·0 IN. UP 2·0 IN. DOWN)	DIHEDRAL ON TOP SURFACE OF FRONT SPAR 1° 15′.
TAB	·85 IN UP 1·2 IN DOWN	DIHEDRAL BOARD READS HORIZONTAL WHEN IN POSITION.
RUDDER	24° 36′ (7·8 IN.) EACH WAY	TAILPLANE INCIDENCE, NEUTRAL.
TAB	GROUND TRIM ONLY	LOCATION POINTS FOR RIGGING BOARDS ARE PAINTED ON AIRFRAME.
ELEVATOR	19° 0′ UP 10° 20′ DOWN (5·10 IN. UP 2·8 IN. DOWN)	
TAB	6° UP 18° DOWN PRE MOD. V90 8° UP 22° DOWN POST MOD V90	
FLAPS	80° DOWN (29·3 IN.)	
DIVE BRAKE	73° UP (12·18 IN.)	

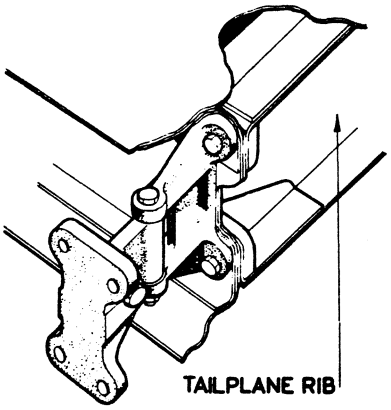
FIG. 18 — # RIGGING DIAGRAM — FIG. 18



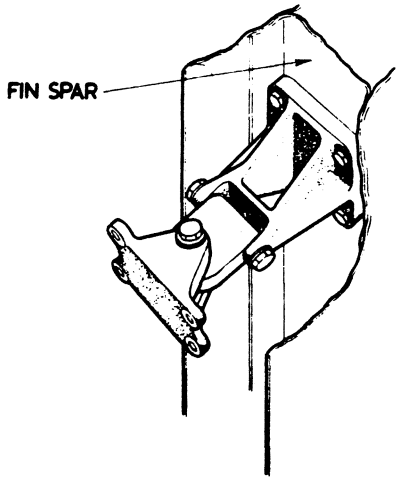
FIN-TAILPLANE JOINT (REAR)



FIN-TAILPLANE JOINT (FORWARD)



ELEVATOR HINGE



RUDDER HINGE

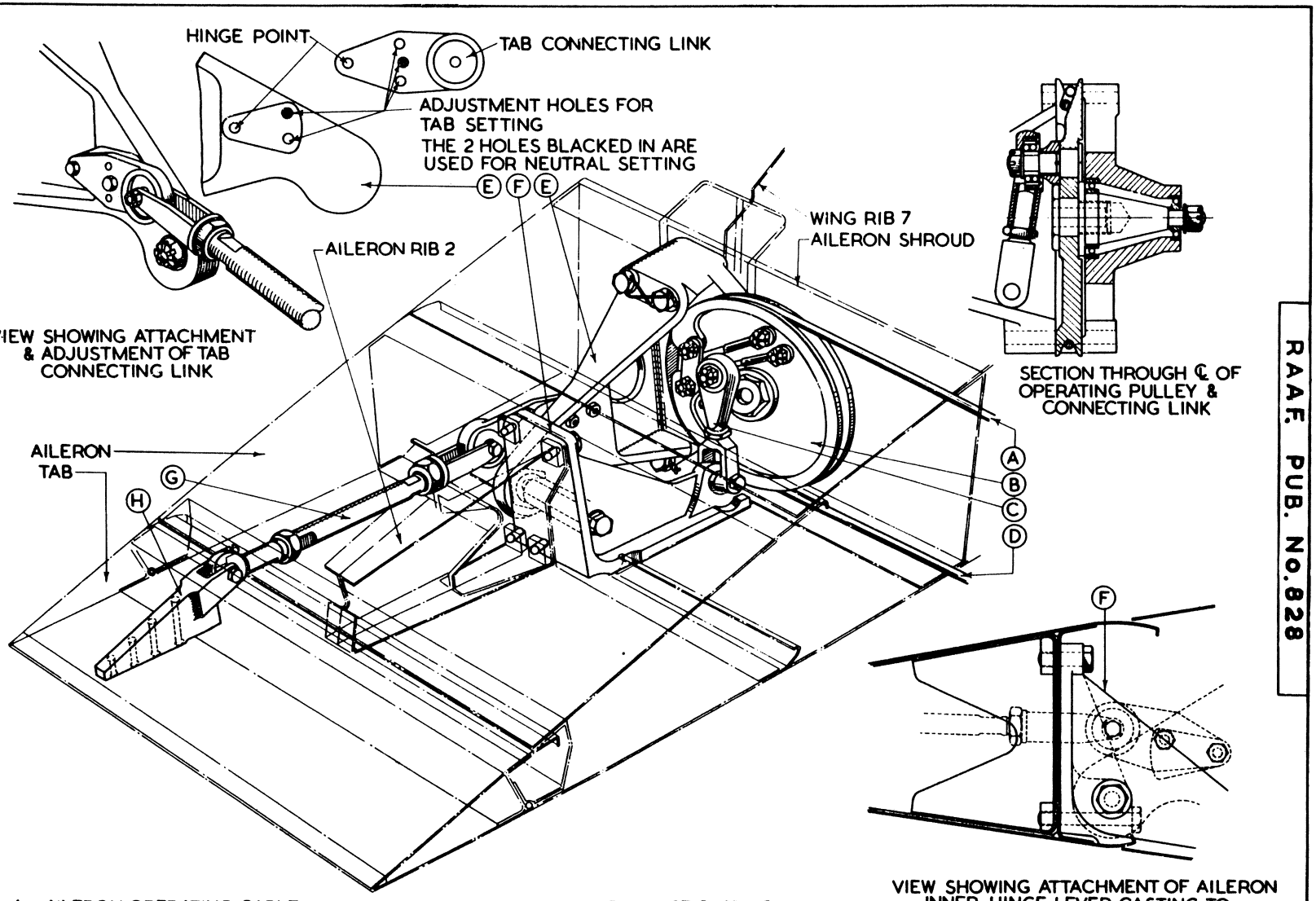
FOR TAIL UNIT STRUCTURE SEE SECT. 7

FIG. 19	TAIL UNIT DETAILS	FIG. 19

FIG 20

PORT AILERON DIFFERENTIAL UNIT

STARBOARD SIMILAR



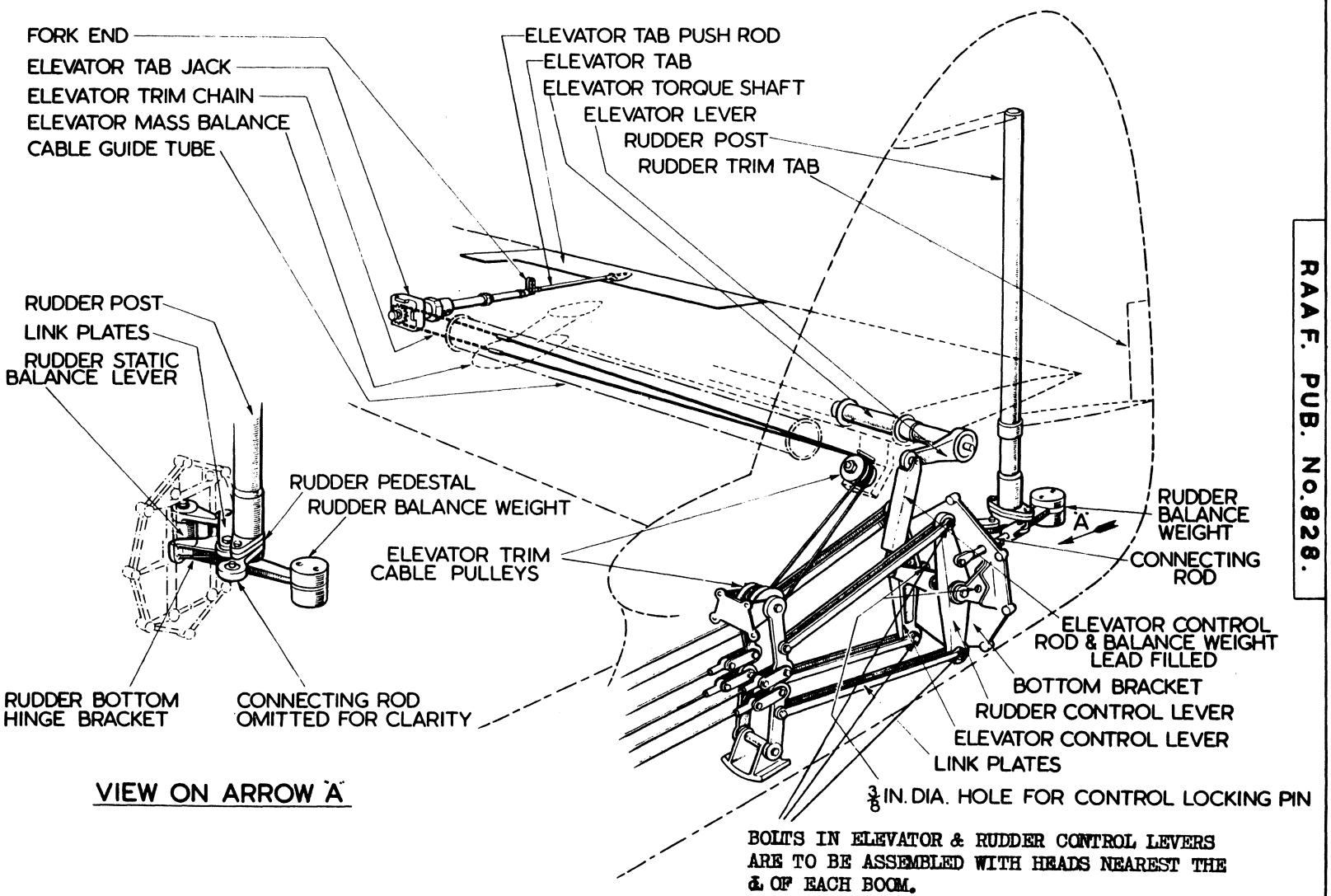
A AILERON OPERATING CABLE
B AILERON CONTROL PULLEY WHEEL
C AILERON CONNECTING LINK
D AILERON BALANCE CABLE
E AILERON INNER HINGE CASTING
F AILERON INNER HINGE LEVER CASTING
G CONNECTING ROD
H TAB OPERATING LUG

FIG 20

R.A.A.F. PUB. No. 828

FIG. 21

ASSEMBLY OF CONTROLS IN TAIL UNIT

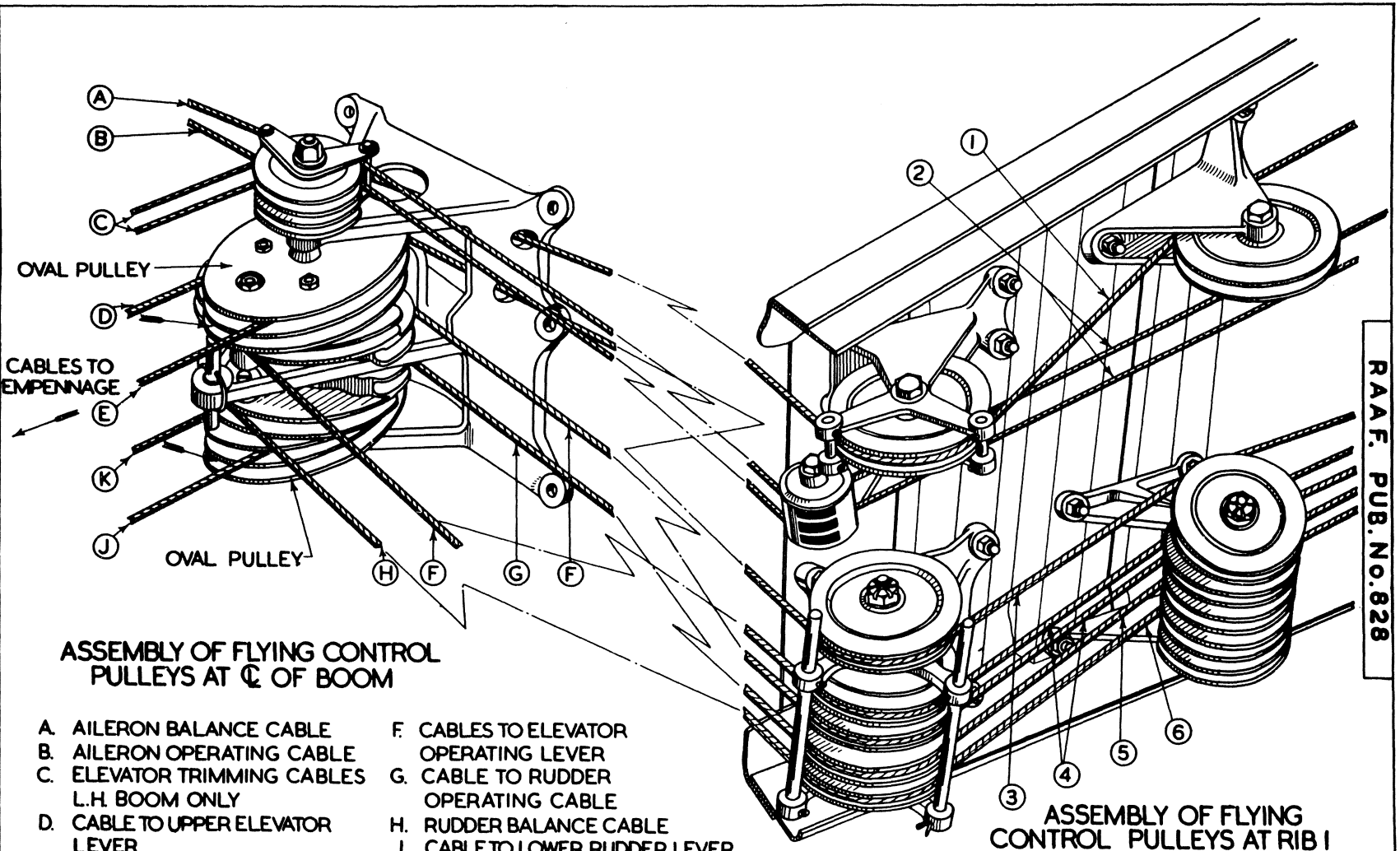


RAAF. PUB. No.828.

FIG. 21

FIG. 22

DETAILS OF FLYING CONTROL GUIDE PULLEYS



ASSEMBLY OF FLYING CONTROL PULLEYS AT ℄ OF BOOM

A. AILERON BALANCE CABLE
B. AILERON OPERATING CABLE
C. ELEVATOR TRIMMING CABLES L.H. BOOM ONLY
D. CABLE TO UPPER ELEVATOR LEVER
E. CABLE TO LOWER ELEVATOR LEVER
F. CABLES TO ELEVATOR OPERATING LEVER
G. CABLE TO RUDDER OPERATING CABLE
H. RUDDER BALANCE CABLE
J. CABLE TO LOWER RUDDER LEVER
K. CABLE TO UPPER RUDDER LEVER

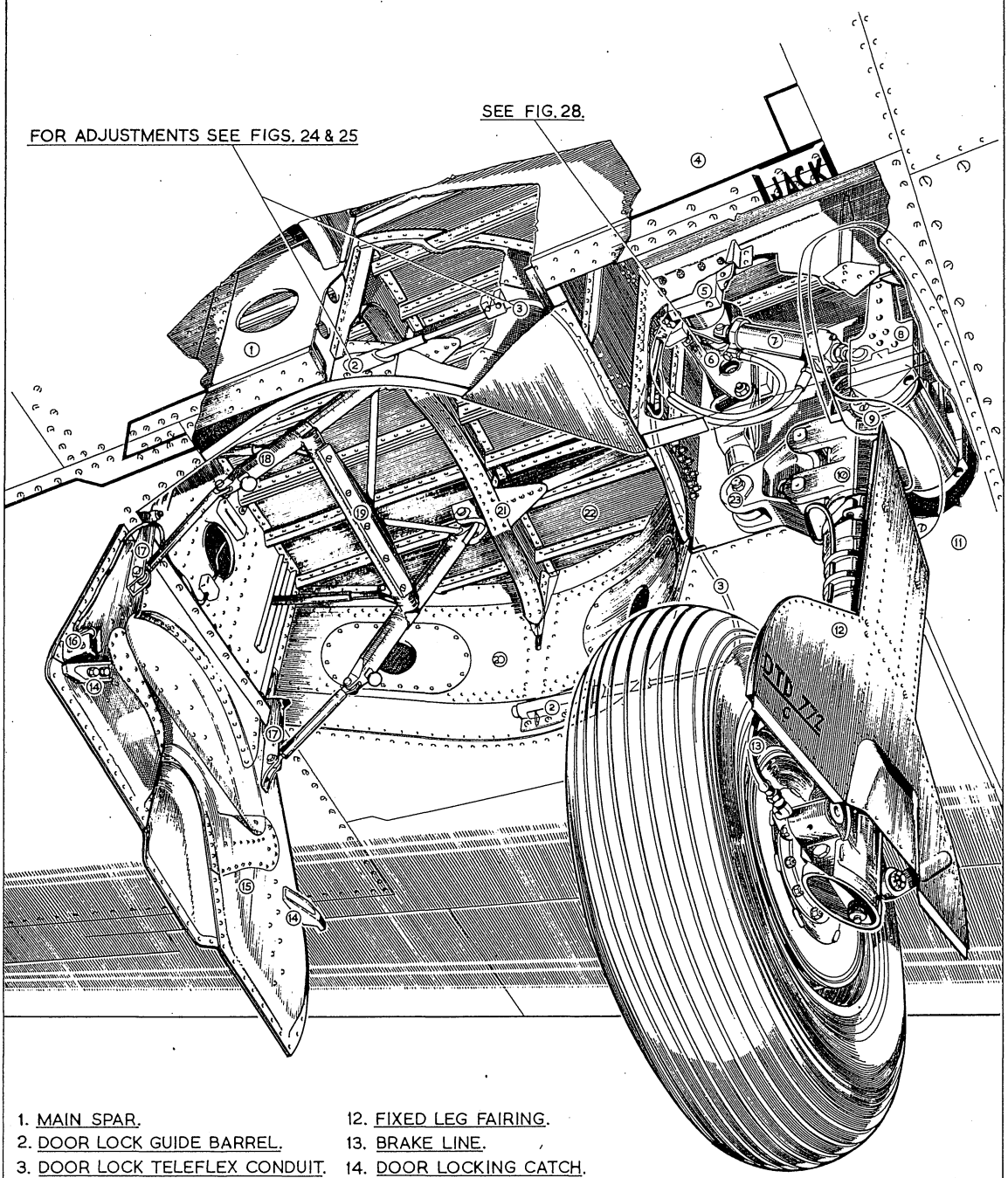
→ DENOTES GROOVE IN WHICH CABLE RUNS

ASSEMBLY OF FLYING CONTROL PULLEYS AT RIB 1

1. AILERON BALANCE CABLE
2. ELEVATOR TRIMMING CABLES L.H. BOOM ONLY
3. AILERON OPERATING CABLE
4. CABLES TO ELEVATOR OPERATING LEVER
5. RUDDER OPERATING CABLE
6. RUDDER BALANCE CABLE

RAAF. PUB. No. 828

FIG. 22

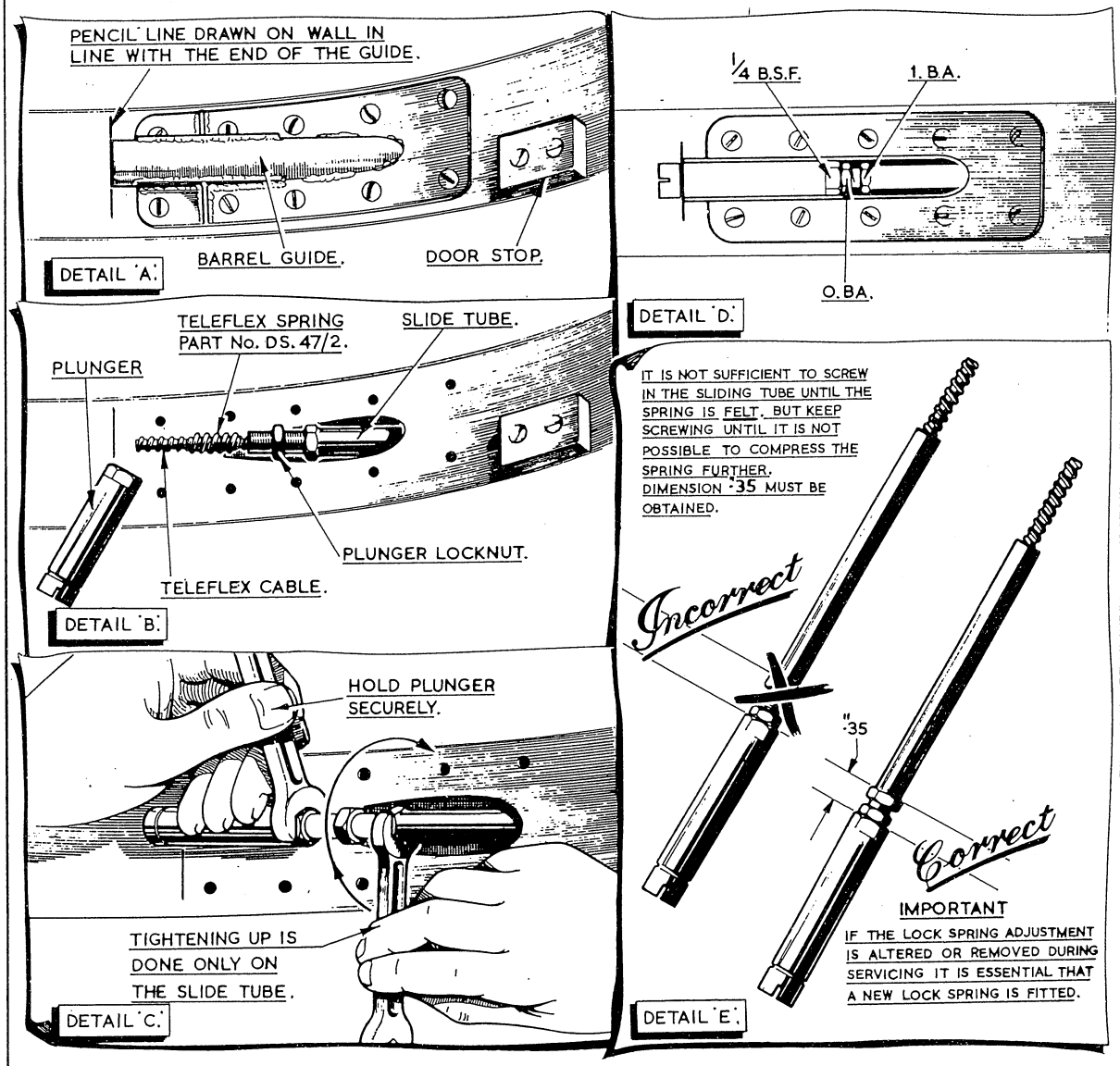


1. MAIN SPAR.
2. DOOR LOCK GUIDE BARREL.
3. DOOR LOCK TELEFLEX CONDUIT.
4. BOTTOM SKIN OF WING.
5. RADIUS ROD END FITTING & PICK UP.
6. RADIUS ROD.
7. MAIN WHEEL RETRACTION JACK.
8. HINGE END FITTING & PICK UP.
9. JACK OPERATING LEVER.
10. COMPRESSION LEG.
11. TAIL BOOM FAIRING.
12. FIXED LEG FAIRING.
13. BRAKE LINE.
14. DOOR LOCKING CATCH.
15. MAIN WHEEL DOOR.
16. DOOR UP-LOCK MICRO SWITCH.
17. MAIN WHEEL DOOR HINGE.
18. DOOR RETRACTION FRAME.
19. RUBBING STRIP.
20. WHEEL WELL WALL.
21. WHEEL ARCH (RIB 4).
22. TOP SKIN OF WING.
23. LOCK LINK PIN.

FIG 23

UNDERCARRIAGE

FIG 23



NOTE:
FOR ADJUSTMENT PROCEDURE SEE FIG. 25.

FIG 24 | # U/C DOOR LOCK-ADJUSTMENTS | FIG 24

A.L.2

DOOR LOCK PLUNGER — ADJUSTMENT PROCEDURE

WARNING

A number of undercarriage failures have been due to the fracturing of the teleflex controls which operate the door lock plungers, these are attributed to semi-seizure of the teleflex cables inside the conduits, the plungers fouling the door catches, or maladjustment of the door lock plungers. Detailed below is the correct sequence of the door lock plunger adjustment and the check required to ensure unrestricted movement of the teleflex system.

PROCEDURE

(a) Jack up the aircraft and remove the leg fairing and main wheel. Then disconnect the 'D' door by means of the adjustable radius rods.

(b) Refer to Detail A and draw a pencil line on the wheel well wall to coincide with the forward face of the plunger barrel guide. Remove the barrel guide.

(c) Remove the front and rear access panels inboard of the plunger barrel guide on the wheel well wall. Check that the dimension between the centre line of the clamp block, assembled on the lower wing skin and the outboard end of the conduit is 5.25 inches. This will ensure the correct routing of the conduit, which should then contact the face of Rib 3 and obviate the possibility of the conduit 'bottoming' inside the slide tube, which will cause the teleflex to fracture. At the same time, it is most essential that these conduits inside the wing are checked for any signs of movement in relation to their respective clamp blocks. Any movement of the conduit on its clamping block will alter the plunger adjustment.

(d) Retract the undercarriage.

(e) Remove the inspection panel on the top wing surface immediately above the main undercarriage, and ensure that the teleflex cable protrudes .1 inch through the guide holes on the wrapped wheel.

(f) Remove the plunger assembly, fit a new lock spring Teleflex Part No. DS.47/2, Ident.No. T27K/504 (Note lock spring should be used once only). With the teleflex pulled out to its full extent, adjust the position of the spring so that when the plunger is replaced against the spring, the groove on the plunger is approximately 1/32 inch in advance of the pencil line (see Detail B.)

(g) Prior to assembly of the sliding tube to the conduit, lubricate the conduit with anti-freeze grease DTD.825 Ident. No. K2/210.

(h) Important Note: Screw the locknut back against the hexagon plug of the sliding tube as far as possible. Holding the plunger stationary, screw up the sliding tube tight and secure the locknut (see Detail C). It is not sufficient to screw the sliding tube in until the spring is felt, but keep screwing until it is not possible to compress the spring further. Dimension .35 inch must be obtained (see Detail E). The groove on the plunger should now be level with the pencil line as in Detail D. Lubricate the lock plunger with anti-freeze grease DTD.825 and replace the barrel guide. Lower the undercarriage and perform a retraction test to ensure the correct functioning of the plunger under operating conditions. Re-check the plunger protrusion in the retracted position (see Detail D).

(i) Refit the undercarriage wheel and connect up the 'D' door adjustable radius rods. Adjust the wheel doors so that when the undercarriage is fully retracted the doors are a tight fit against the two door stops in the wheel well. It should require a load of approximately 50 lbs. applied at each corner of the door to pull it down on to the lock plungers. The gap between the lock plunger and door catches should be .04 inch to .06 inch, this clearance is most important in order to obviate the door catches fouling the Teleflex plunger during the actual operation of locking in the up position.

(j) To ensure unrestricted movement of the teleflex controls, disconnect the main undercarriage radius rod at its lower attachment and remove the lower hydraulic jack attachment bolt Part No. G00.87; operate the radius rod by hand through its full range of travel checking for signs of stiffness in the teleflex cable run. Ad an approximate guide to the required freedom of movement, the radius rod should fall from the retracted position due to its own weight. If severe stiffness is experienced, the cause must be traced and remedial action taken.

(k) Where it is found necessary to remove the teleflex cable and conduit in order to trace stiffness, it will be appreciated that, where the teleflex controls are broken down, the adjustments of the door lock plungers as detailed in paragraphs d-h will have to be repeated.

(l) In cases where a new cable is being fitted prior to re-assembly, ensure that the ends are well radiused on a grindstone to remove all burrs and sharp edges. All filing or grinding must be done only in the direction of the winding of the helix of the cable. Lubricate the teleflex cable prior to assembly with anti-freeze grease DTD.825, Ident. No. K2/210.

(m) Disconnect the 'D' Door adjustable radius rods and fit the leg fairing. With the undercarriage locked in the up position, and the strap securing the leg fairing tight, ensure that the fairing has all round clearance of .050 inch with the underside of the wing. A flush fit is effected by the addition or removal of the packing washers on the strap attachment fittings, and by moving the fairing about the leg. At the same time ensure a clearance of .05 inch to .2 inch between the leg fairing and 'D' door. (This does not refer to the leg fairing shroud which overlaps the 'D' door). When a good fit has been obtained, lower the undercarriage and, with the compression leg fully deflated and compressed, ensure that the torque links do not foul the leg fairing.

(n) Reconnect the 'D' door adjustable radius rod and carry out a retraction test with a hydraulic rig. On completion, refit all access and inspection panels and re-lock all appropriate parts which were broken down to carry out this instruction.

(o) When it is found necessary to renew the Teleflex cable, a thorough examination of the wheel, wrapped Ident. No. A79/501471, Part No. C20059 (Port) or Ident. No. A79/501472, Part No. C20060 (Starboard) must be carried out. If any doubt exists as to its condition, replacement must be made.

FIG 25 — U/C DOOR LOCK-PROCEDURE — FIG 25

DISMANTLING SHOCK ABSORBER STRUT

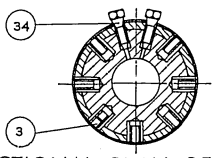
1. RELEASE ALL AIR & REMOVE THE INFLATION VALVE (37)
   REMOVE THE FILLER PLUGS (34) COMPRESS THE STRUT TO EJECT FLUID
2. REMOVE THE UPPER HINGE PIN (39) AND THE LOWER HINGE PIN (31) REMOVE THE UPPER & LOWER TORQUE LINKS (44) (43)
   PART LINKS BY REMOVING HINGE PIN (41)
3. REMOVE BOLT (47)
   REMOVE AXLE (25) FROM THE PLUNGER TUBE (15)
4. REMOVE COUNTERSUNK SCREW (35) & RETAINING RING (2)
   EXTRACT DOWELS (3) FROM FLUID HEAD (1) WITHDRAW DOWELS WITH DOWEL EXTRACTOR OR 2BA BOLT
5. COMPRESS THE STRUT SO THAT THE PISTON BUTTS ON THE FLUID HEAD & PUSH THE FLUID HEAD & PLUNGER TUBE ASSEMBLY OUT OF CYLINDER TUBE
6. REMOVE GRUB SCREW (33)
   UNSCREW PISTON (7) FROM PLUNGER TUBE REMOVE PISTON BUSH (8)

LONG STROKE.

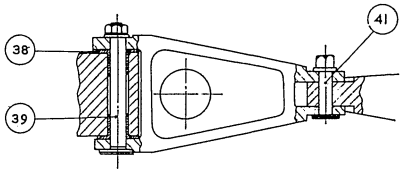
7. PUSH SEPARATOR (14) AIR HEAD (48) & STOP TUBE (46) OUT OF PLUNGER TUBE
8. TO REMOVE FLUTTER PLATE (10) HOLD FLUTTER PLATE RETAINER (12) UNSCREW NUT (9) & TAP RETAINER OUT OF PISTON HEAD COLLECT FLUTTER PLATE & SPRING (11)
9. UNSCREW 4 SCREWS (36) REMOVE WIPER RETAINER (23) WIPER (22) & SEAL (21)
   UNSCREW SEAL RETAINER (20) REMOVE SEAL (19) UNSCREW BUSH RETAINER (17) & REMOVE THE MAIN BEARING BUSH (16)

OTHER COMPONENTS NOT MENTIONED IN DISMANTLING

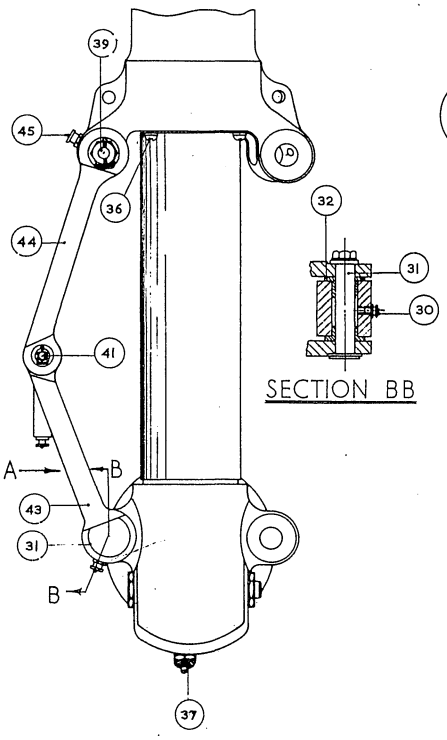
(4) (13) (24) SEALS
(30) (45) GREASE NIPPLES
(32) FLANGED BUSH
(38) FLANGED BUSH.



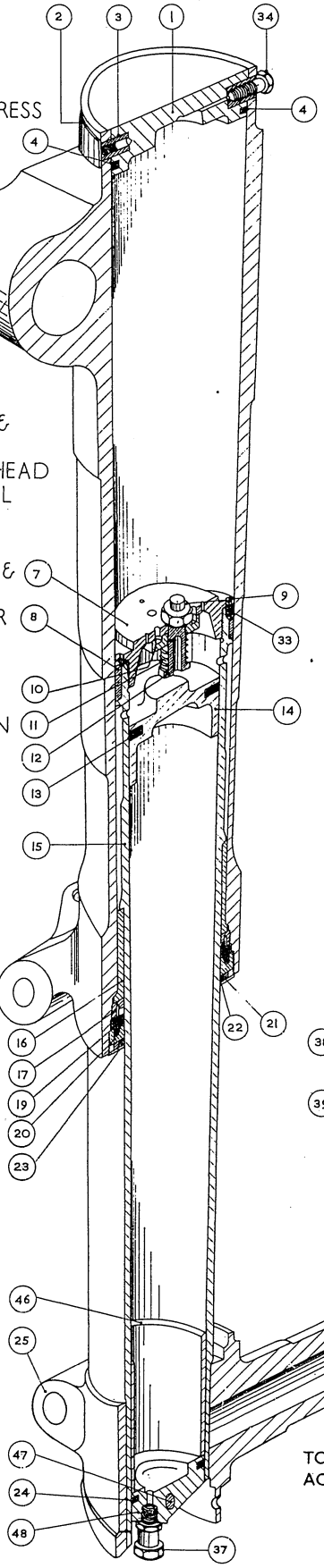
SECTIONAL PLAN OF FLUID HEAD SHOWING DOWELS & FILLER PLUGS.



VIEW ON ARROW A



SECTION BB



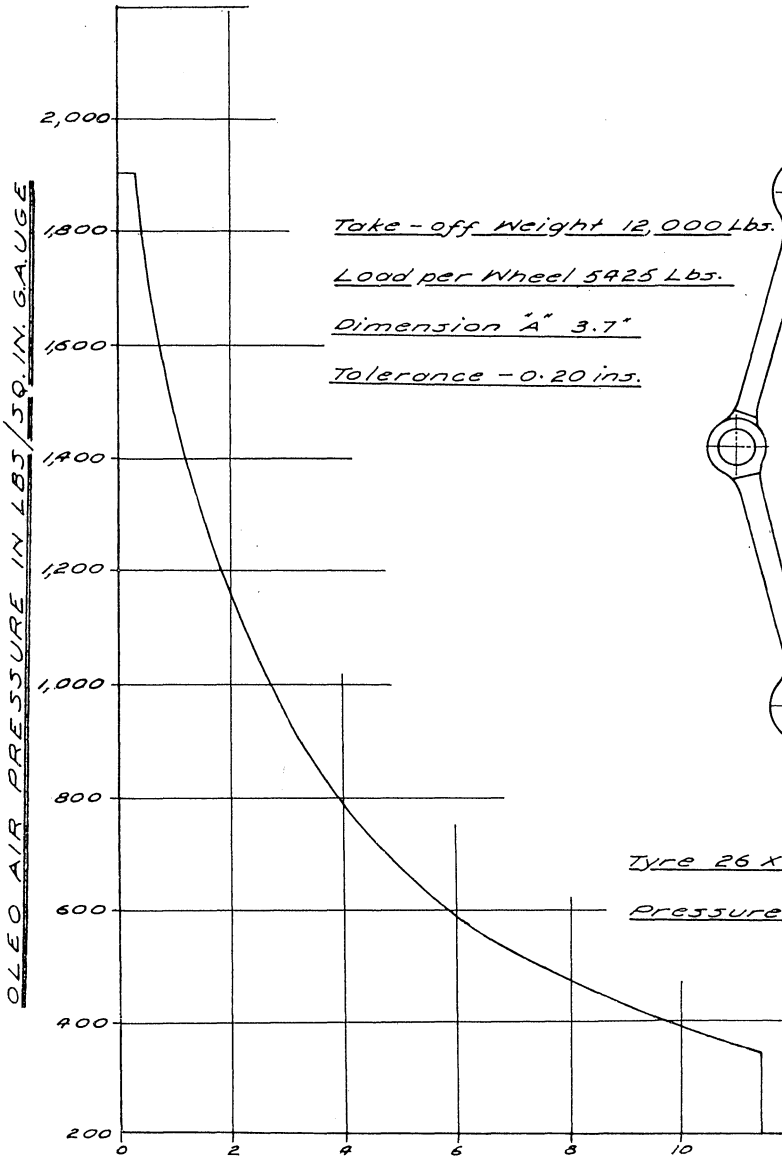
WARNING.
DEFINITELY NO SCREWS NUTS ETC. TO BE REMOVED PRIOR TO DEFLATION OTHERWISE A SERIOUS ACCIDENT MAY RESULT.

A.I.R. { 51756 L.H. / 51757 R.H.

FIG. 26 — **UNDECARRIAGE SHOCK ABSORBER STRUT** — FIG. 26

MAIN UNDERCARRIAGE AIR 51756 - 7

NOMINAL PRESSURE 350 LB./SQ.INS.

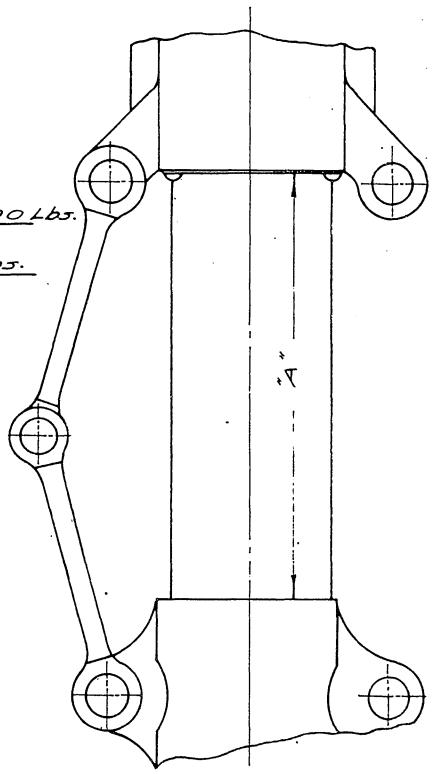


Take-off Weight 12,000 Lbs.

Load per Wheel 5925 Lbs.

Dimension "A" 3.7"

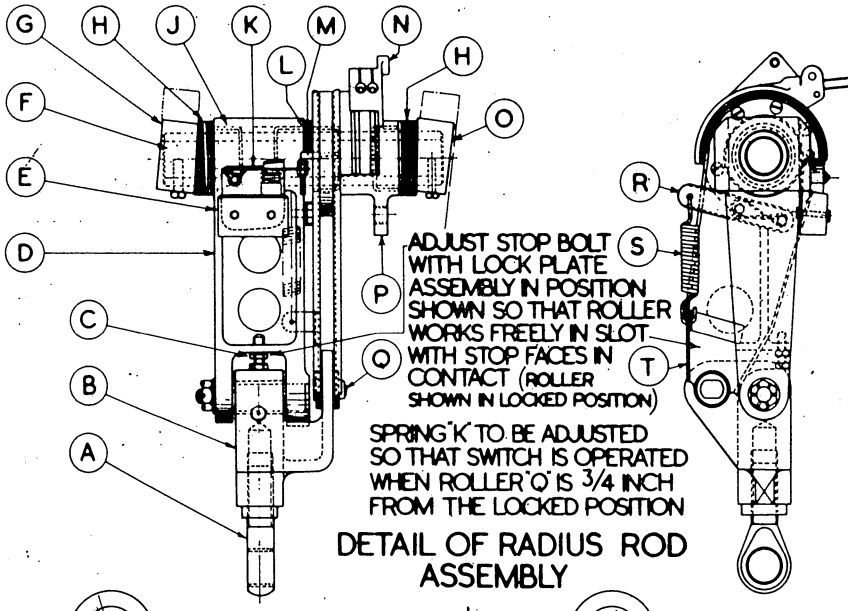
Tolerance - 0.20 ins.



Tyre 26 X 7.75 - 13

Pressure 80 lbs./sq. ins.

FIG. 27 UNDERCARRIAGE INFLATION DIAGRAM FIG. 27



DETAIL OF RADIUS ROD ASSEMBLY

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

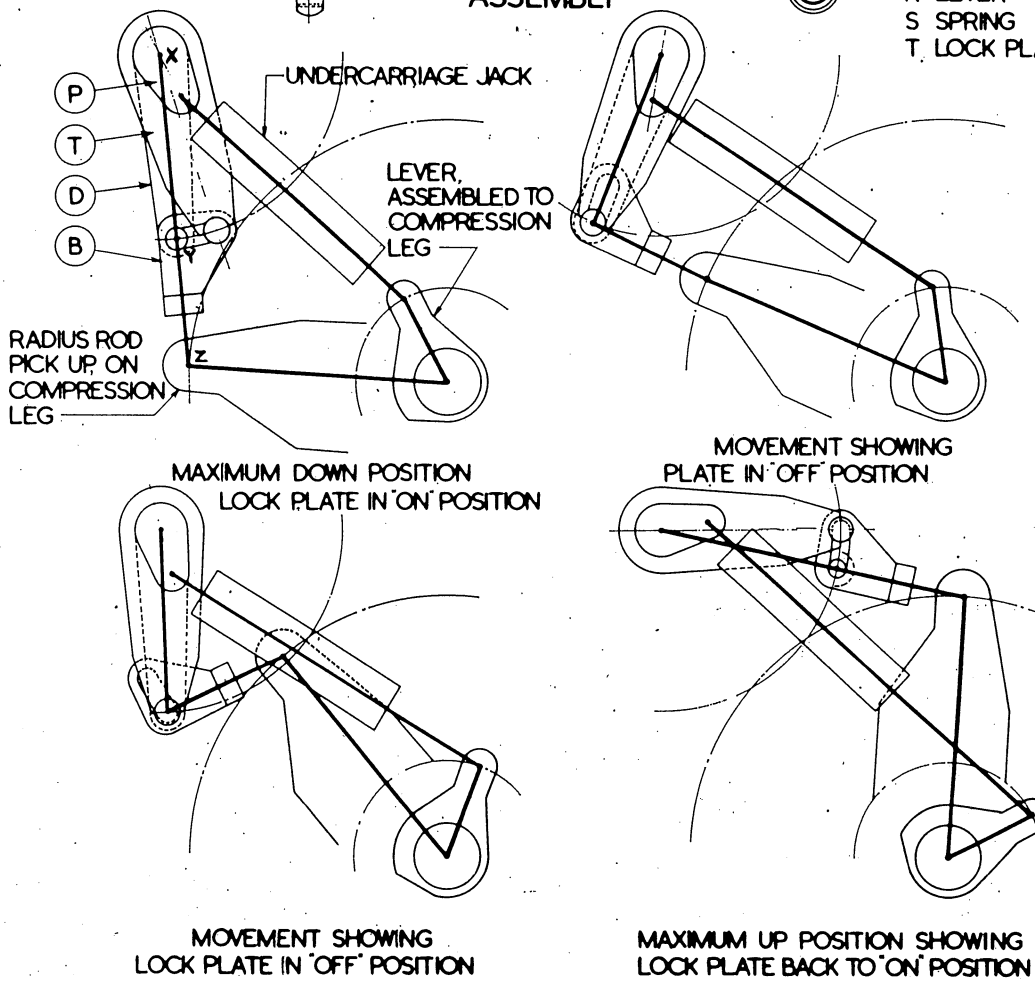


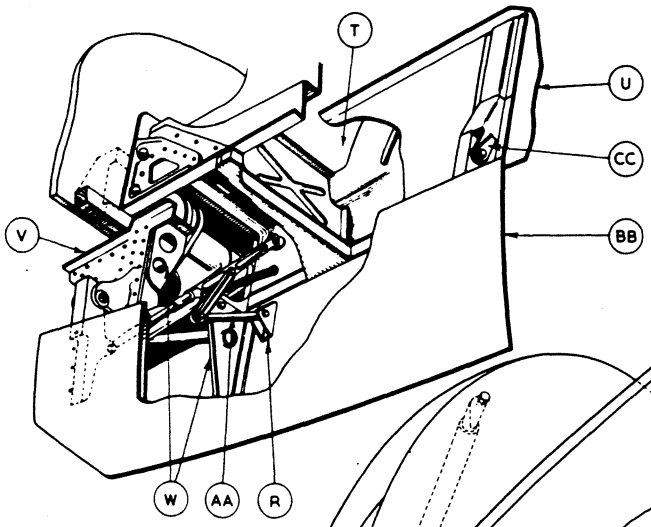
DIAGRAM OF UNDERCARRIAGE MOVEMENTS

FIG. 28

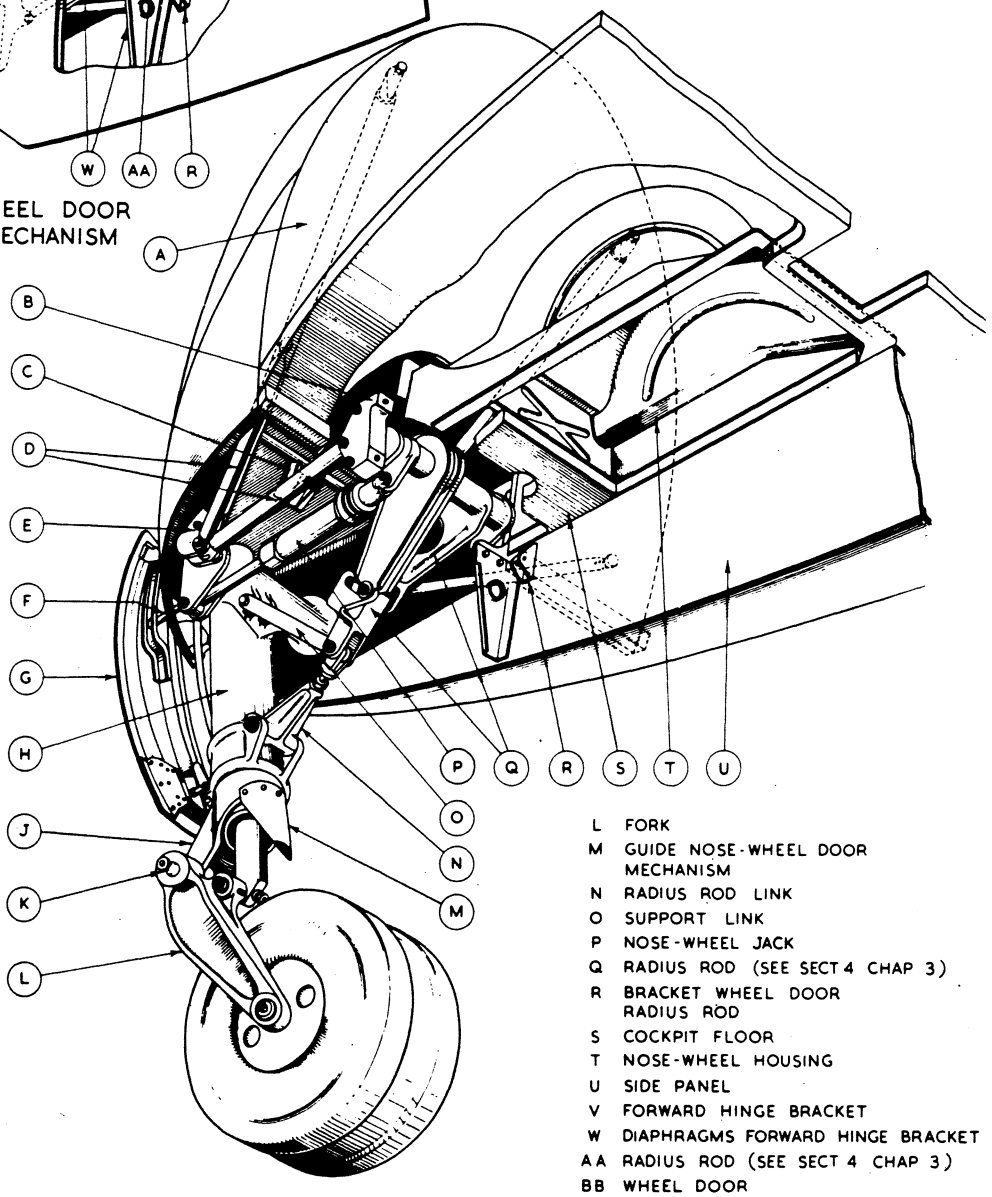
DETAILS OF UNDERCARRIAGE

FIG. 28

A.L.2



WHEEL DOOR MECHANISM



A FRONT ARMOUR BULKHEAD Nº 1
B ATTACHMENT BRACKET NOSE-WHEEL TOP STRUCTURE
C "UP" MICRO SWITCH ASSEMBLED TO CINE CAMERA MOUNTING
D NOSE-WHEEL TOP STRUCTURE
E END BEARING
F BRIDGE LINK
G FIXED NOSE FAIRING
H NOSE-WHEEL BARREL
J SWIVEL LUG
K SPOOL FOR ATTACHING TOWING ARM

L FORK
M GUIDE NOSE-WHEEL DOOR MECHANISM
N RADIUS ROD LINK
O SUPPORT LINK
P NOSE-WHEEL JACK
Q RADIUS ROD (SEE SECT 4 CHAP 3)
R BRACKET WHEEL DOOR RADIUS ROD
S COCKPIT FLOOR
T NOSE-WHEEL HOUSING
U SIDE PANEL
V FORWARD HINGE BRACKET
W DIAPHRAGMS FORWARD HINGE BRACKET
AA RADIUS ROD (SEE SECT 4 CHAP 3)
BB WHEEL DOOR
CC REAR HINGE BRACKET

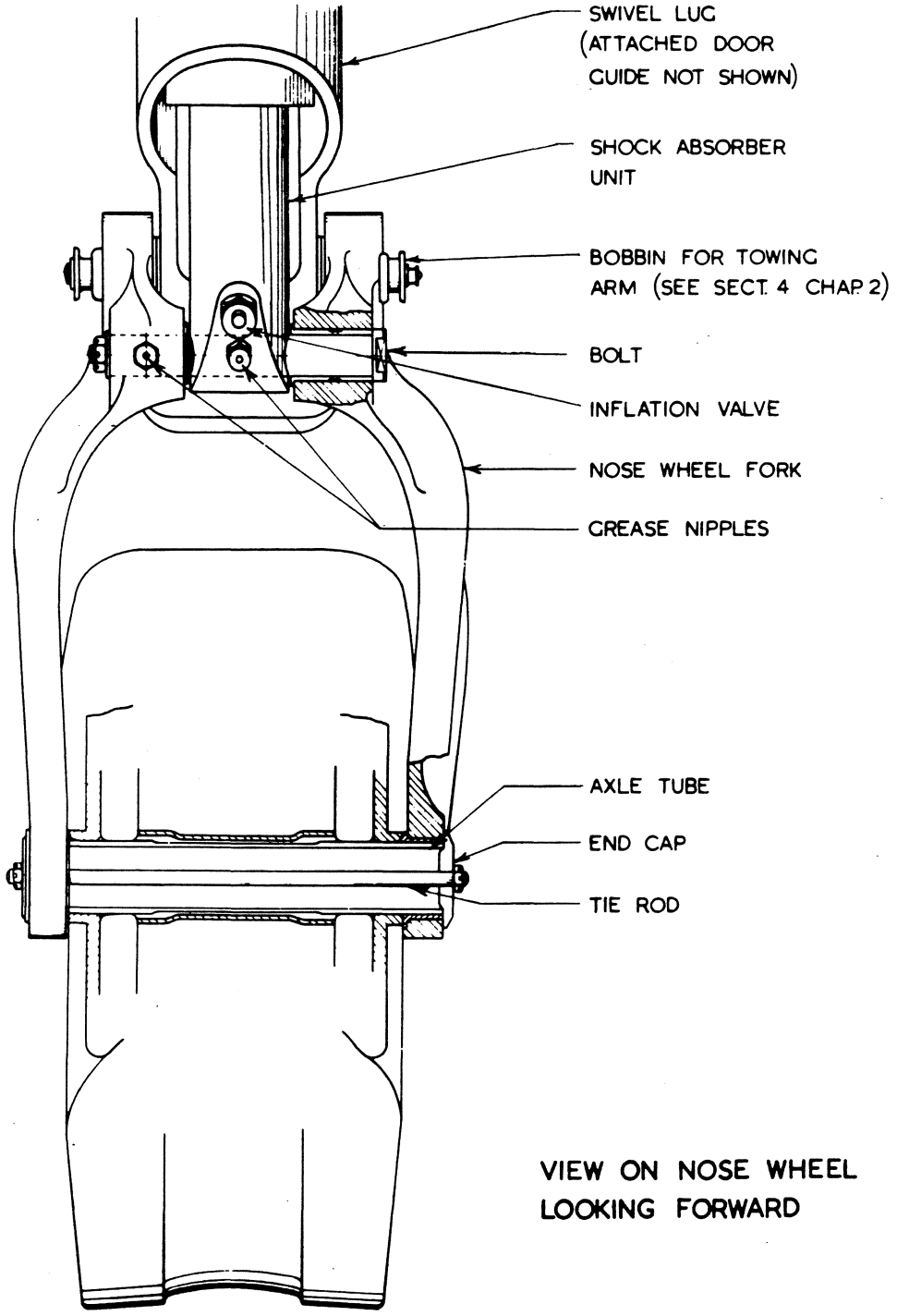
VIEW LOOKING FORWARD ON NOSE-WHEEL. WHEEL DOOR AND PORT SIDE PANEL REMOVED TO SHOW WHEEL HOUSING ON COCKPIT FLOOR

FIG. 29

NOSE - WHEEL

FIG. 29

A.L.2

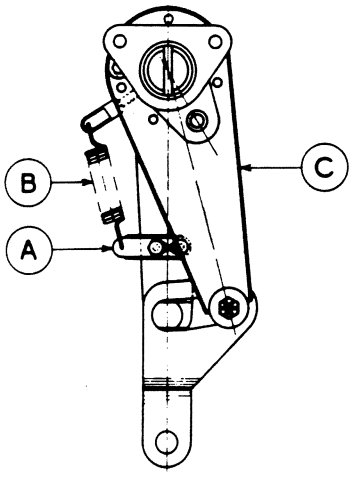


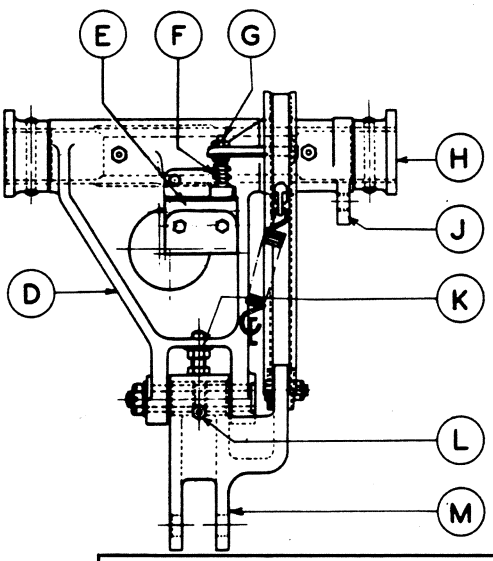
VIEW ON NOSE WHEEL
LOOKING FORWARD

FIG. 30

NOSE WHEEL DETAILS (1)

FIG. 30



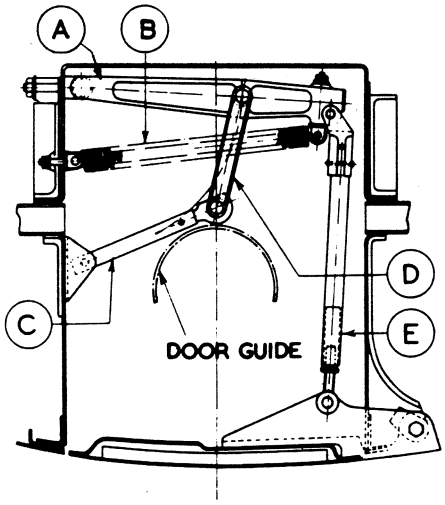


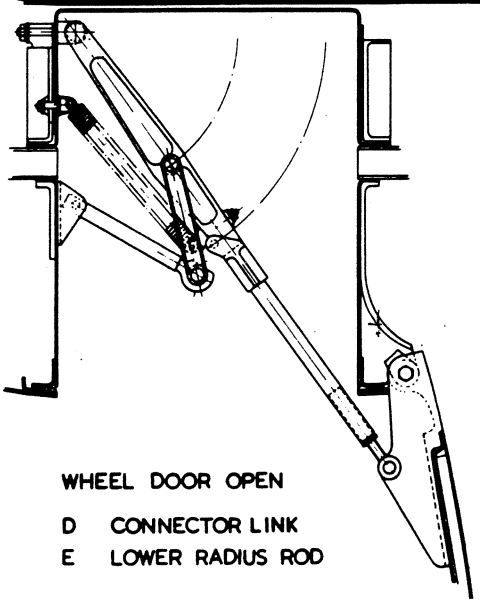
A LEVER
B SPRING
C LOCK PLATE
D UPPER LINK
E MICRO SWITCH
F SPRING CONTACT
G STRIKER BOLT
H BEARING
J LUG FOR JACK
K STOP BOLT
L GREASE NIPPLE
M LOWER LINK

NOSE WHEEL DOOR TENSIONING

1. DISCONNECT FAIRING ATTACHMENT STRUTS FROM LEG SUPPORT CASTING & REMOVE LOWER RADIUS ROD ATTACHMENT PIN.
2. SLOWLY RETRACT THE NOSE WHEEL.
3. CLOSE THE NOSE WHEEL DOOR & HOLD IN POSITION BY HAND PRESSURE, ADJUST LOWER RADIUS ROD EYE BOLT UNTIL THE PIN CAN BE FITTED BY HAND.
4. LOWER THE NOSE WHEEL & REMOVE THE PIN, SCREW THE EYE BOLT IN 1½ TURNS TO TENSION THE DOOR IN THE RETRACTED POSITION.
5. RE-FIT PIN & SPLIT PIN.
6. CARRY OUT NOSE WHEEL RETRACTION TEST.

DETAIL OF RADIUS ROD ASSEMBLY





WHEEL DOOR CLOSED

A UPPER RADIUS ROD
B DOUBLE SPRING
C LINK GUIDE

WHEEL DOOR OPEN

D CONNECTOR LINK
E LOWER RADIUS ROD

DETAILS OF NOSE WHEEL DOOR MECHANISM

FIG. 31

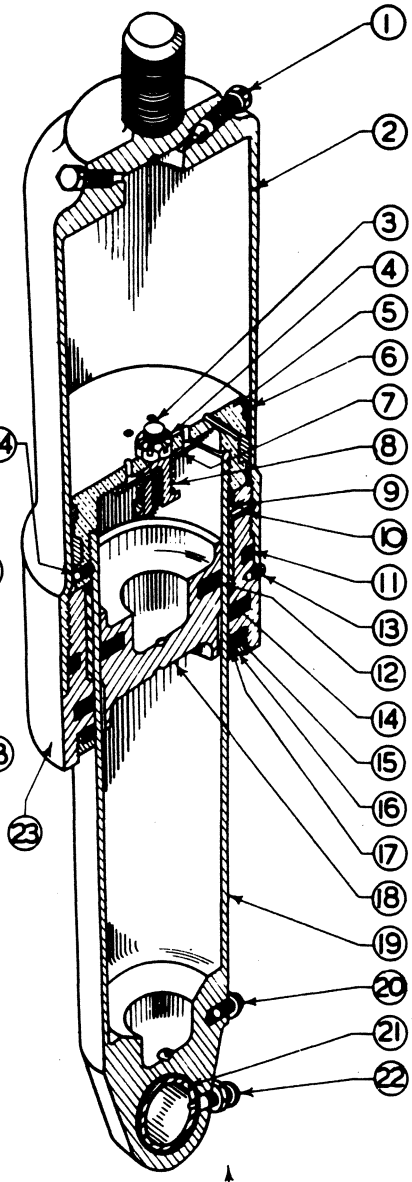
NOSE WHEEL DETAILS (2)

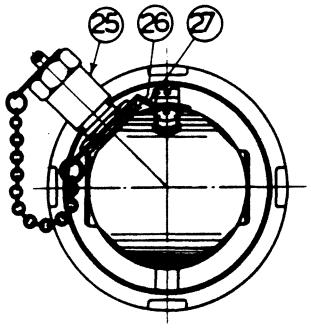
FIG. 31

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), (12), (14) } SEALS.
(26) JOINTING WASHER

PART Nº A.I.R.40012

WARNING :- DEFINITELY NO SCREWS NUTS ETC. TO BE REMOVED PRIOR TO DEFLATION, OTHERWISE A SERIOUS ACCIDENT MAY RESULT.

FIG 32 — NOSE WHEEL SHOCK ABSORBER STRUT — FIG 32

A.I.R. 40012

NOSE WHEEL STRUT.

NOMINAL PRESSURE 500 LB/SQ. INS.

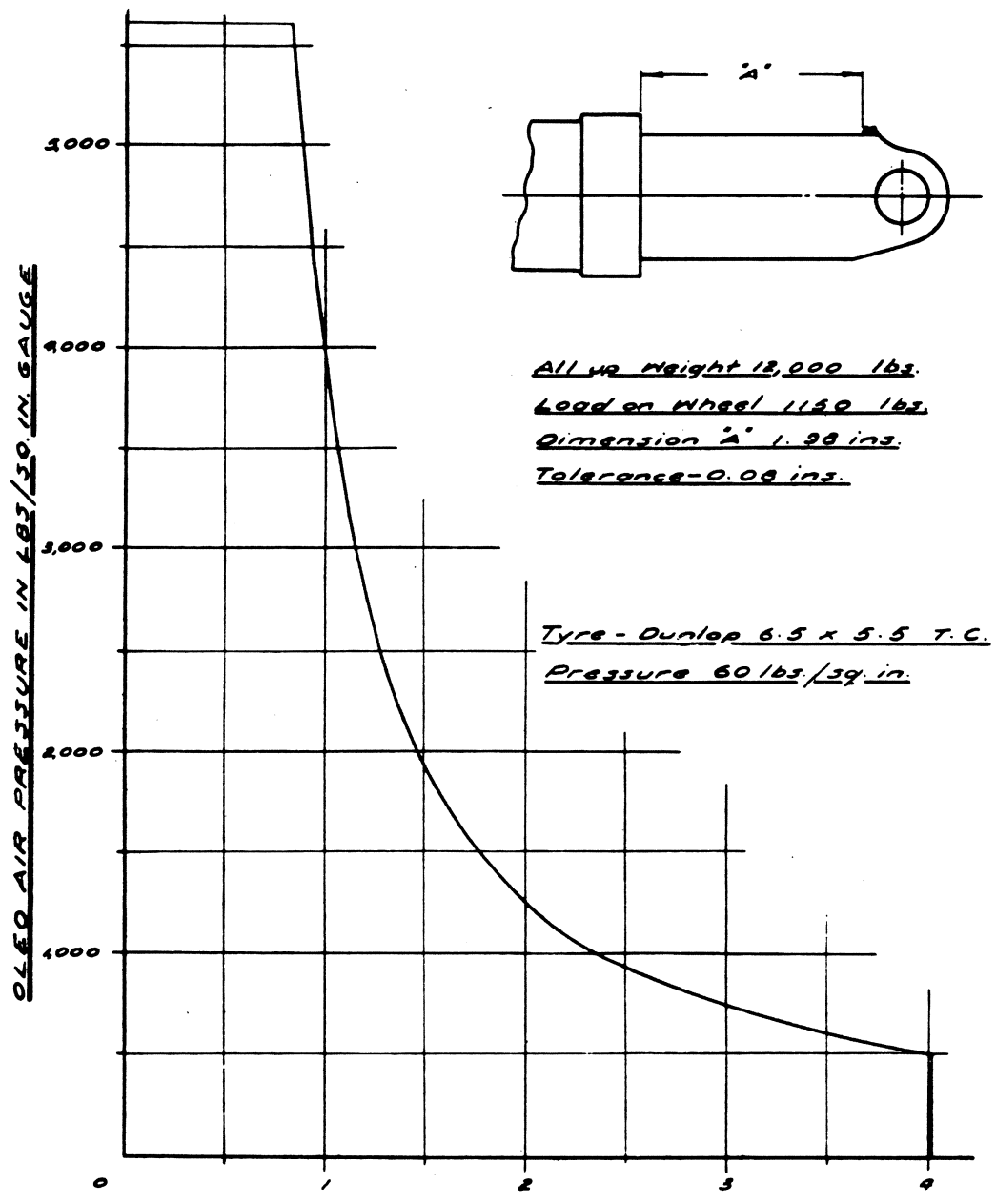
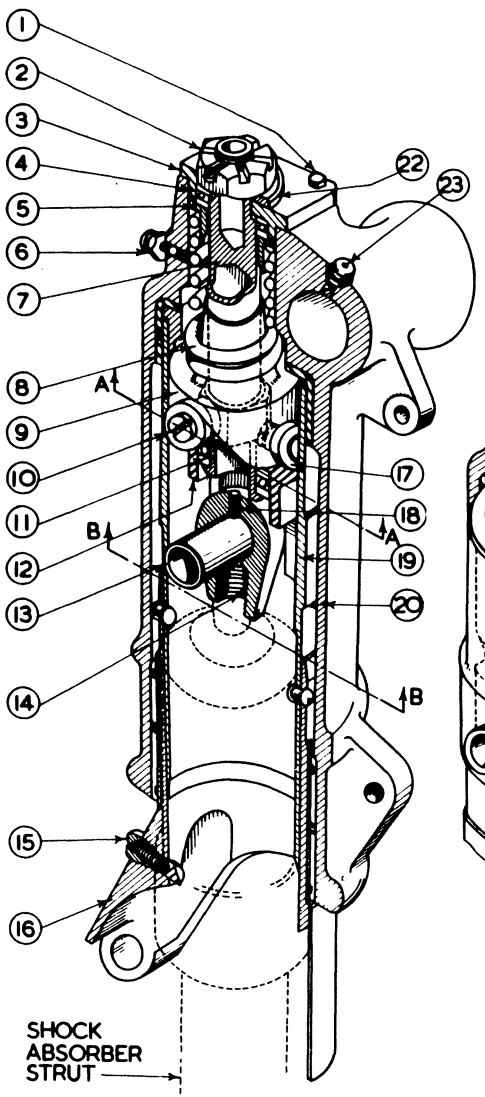
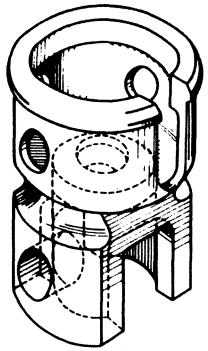


FIG 33 NOSE WHEEL – INFLATION DIAGRAM FIG 33

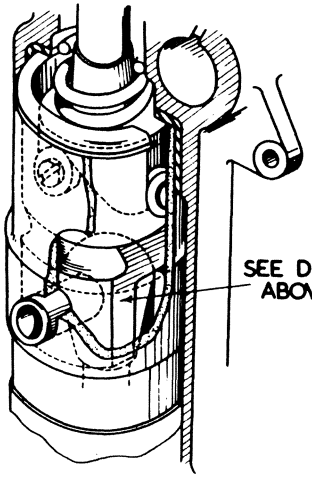
FIG. 34

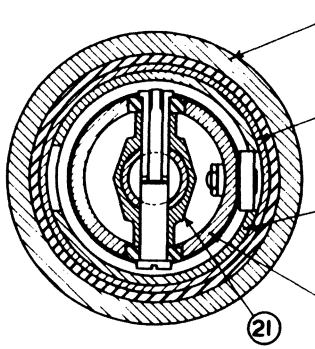
SELF CENTRING UNIT



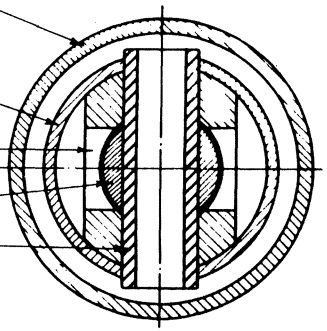


DETAIL OF THRUST HEAD PICK-UP (12)





SECTION "A-A" SHOWING SELF-CENTRING CAM, BALL RACES & SUPPORT COLLAR



SECTION "B-B" SHOWING PIVOT SOCKET & SOCKET PIN

DISMANTLING OF SELF CENTRING UNIT

1 UNSCREW SLOTTED NUT (2) REMOVE 4, 2 B.A. SECURING BOLTS (1) AND LIFT OUT LOCATING PLATE (3) THEN REMOVE THRUST BEARING (4) SPRING COLLAR (5) AND SPRING (8)

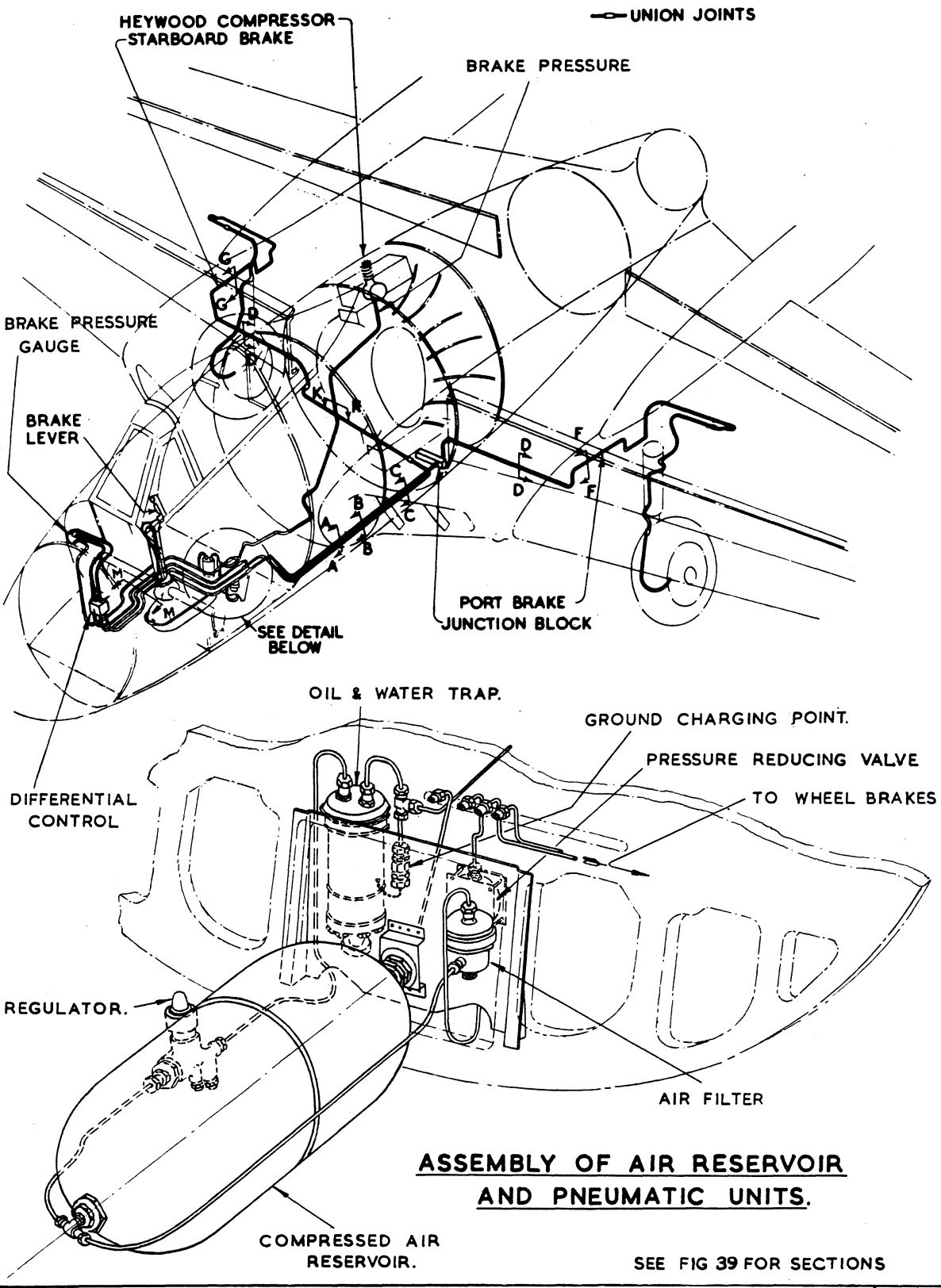
2 REMOVE SHOCK ABSORBER UNIT AND SELF-CENTRING UNIT COMPLETE INSIDE SWIVEL LUG (19) TO REMOVE SHOCK ABSORBER UNIT, UNSCREW LOCK PLUNGER (15) SECURE LOWER END OF UNIT IN A VICE, AND INSERTING A LEVER IN PIVOT SOCKET PIN (13) UNSCREW AT PIVOT SOCKET (14)

3 UNSCREW BOLT (18) KNOCK OUT PIVOT SOCKET PIN (13) REMOVE SWIVEL LUG (19) AND PIVOT SOCKET (14) UNSCREW ROLLERS (10) AND REMOVE SELF CENTRING CAM (9) ENABLING SLIPPER (17) TO BE REMOVED FROM IT. THE SUPPORT COLLAR (21) MAY NOW BE REMOVED THE ASSEMBLY BOLT (7) AND THRUST RACE (11) ARE THEN EXTRACTED FROM THE THRUST HEAD (12)

OTHER COMPONENTS NOT MENTIONED IN DISMANTLING

(6) GREASE NIPPLE
(23) GREASE NIPPLE
(20) NOSE WHEEL BARREL
(22) WASHER

FIG. 34



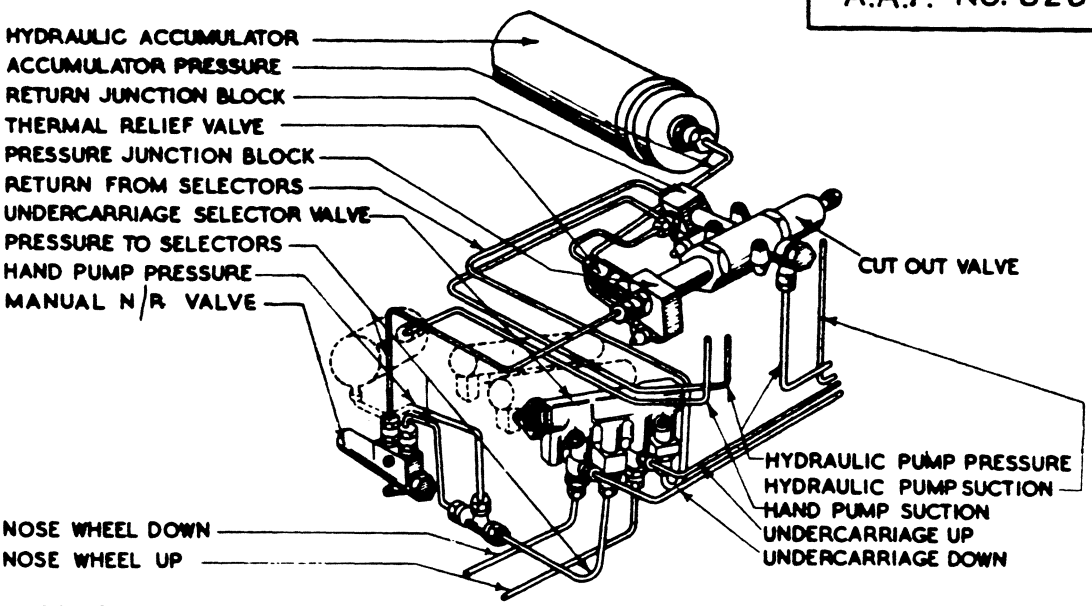
ASSEMBLY OF AIR RESERVOIR AND PNEUMATIC UNITS.

SEE FIG 39 FOR SECTIONS

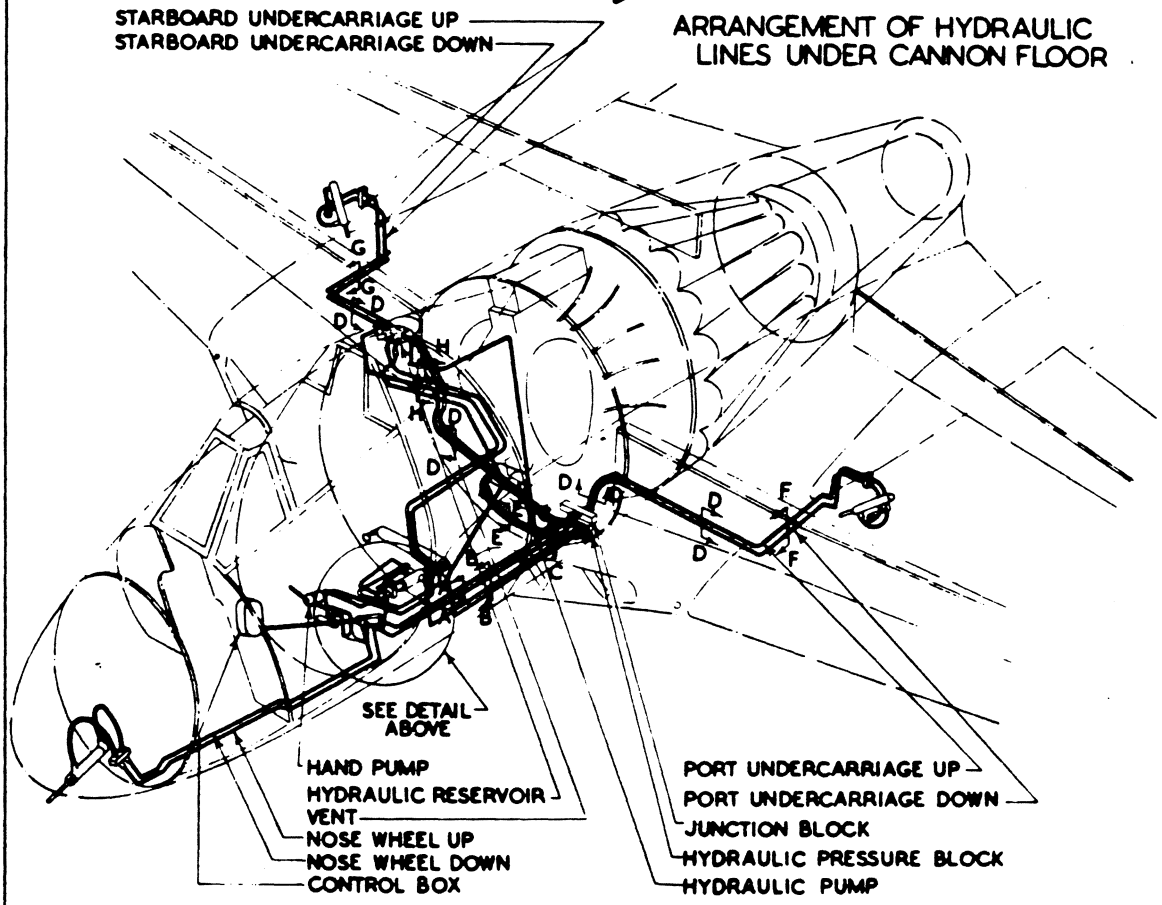
FIG. 35

BRAKE PNEUMATIC SYSTEM

FIG. 35



ARRANGEMENT OF HYDRAULIC LINES UNDER CANNON FLOOR



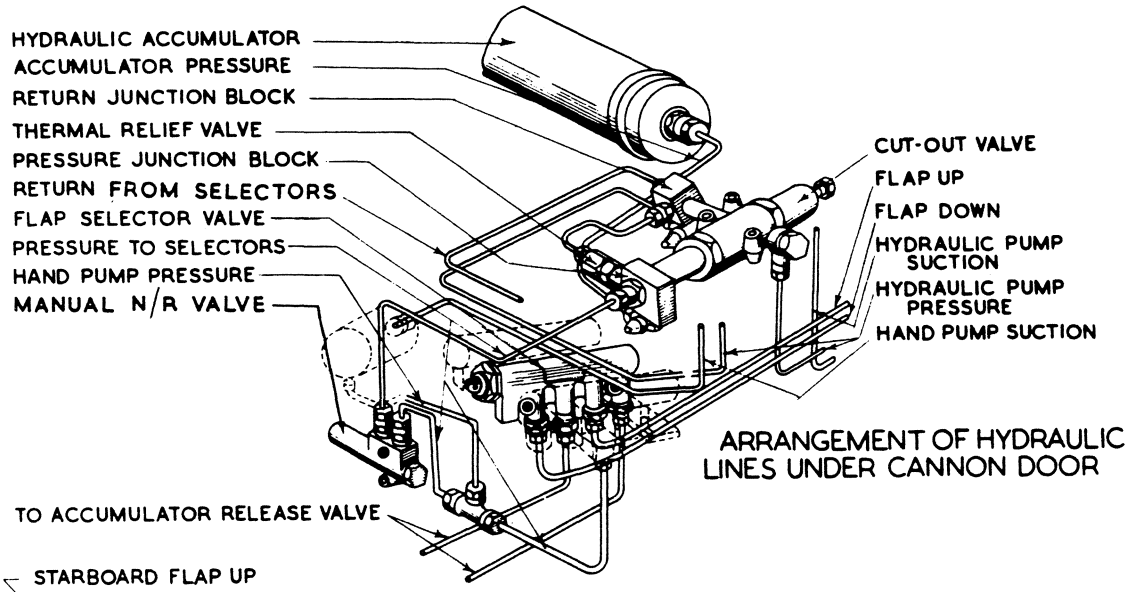
SEE FIG 39 FOR SECTIONS

UNION JOINTS

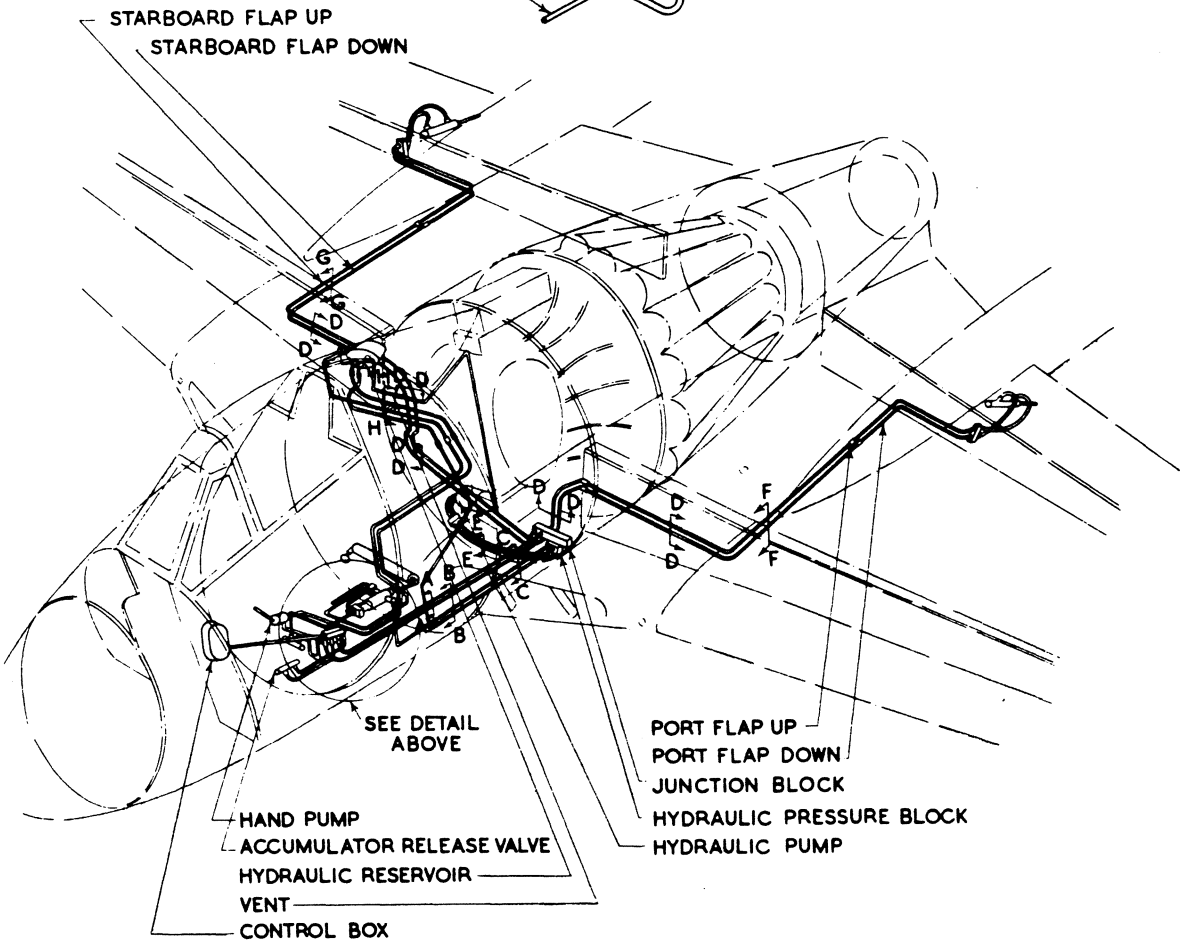
HOSE JOINTS

NOTE: ACCUMULATOR RELEASE VALVE NOT SHOWN. REFER TO FIG 37

FIG. 36 UNDERCARRIAGE AND NOSE WHEEL HYDRAULIC SYSTEM FIG. 36



ARRANGEMENT OF HYDRAULIC LINES UNDER CANNON DOOR



SEE FIG. 39 FOR SECTIONS

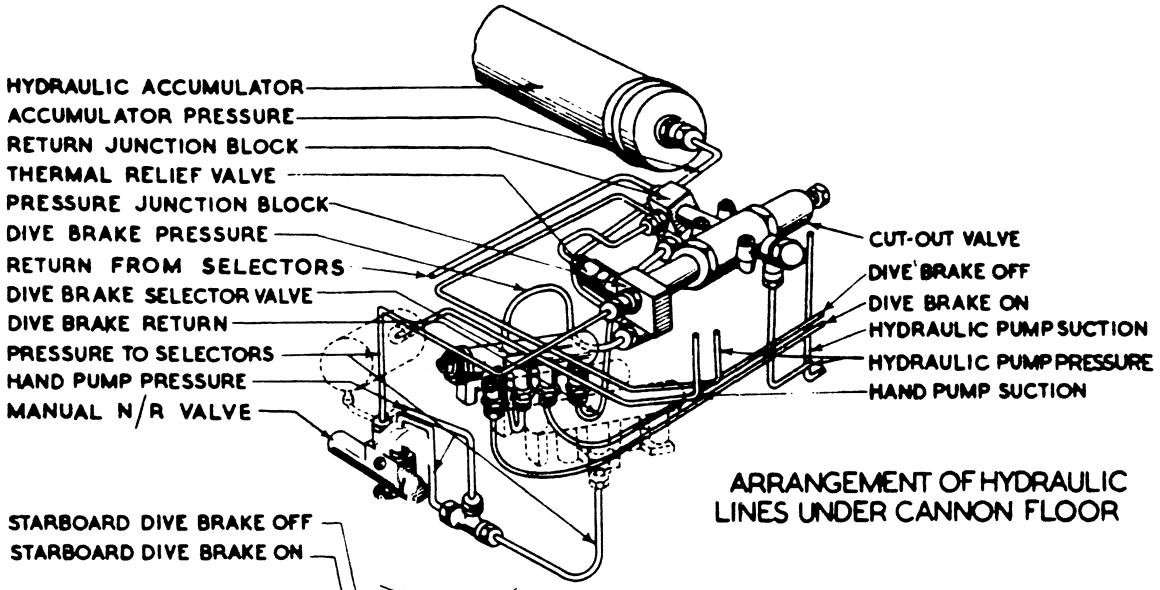
UNION JOINTS

HOSE JOINTS

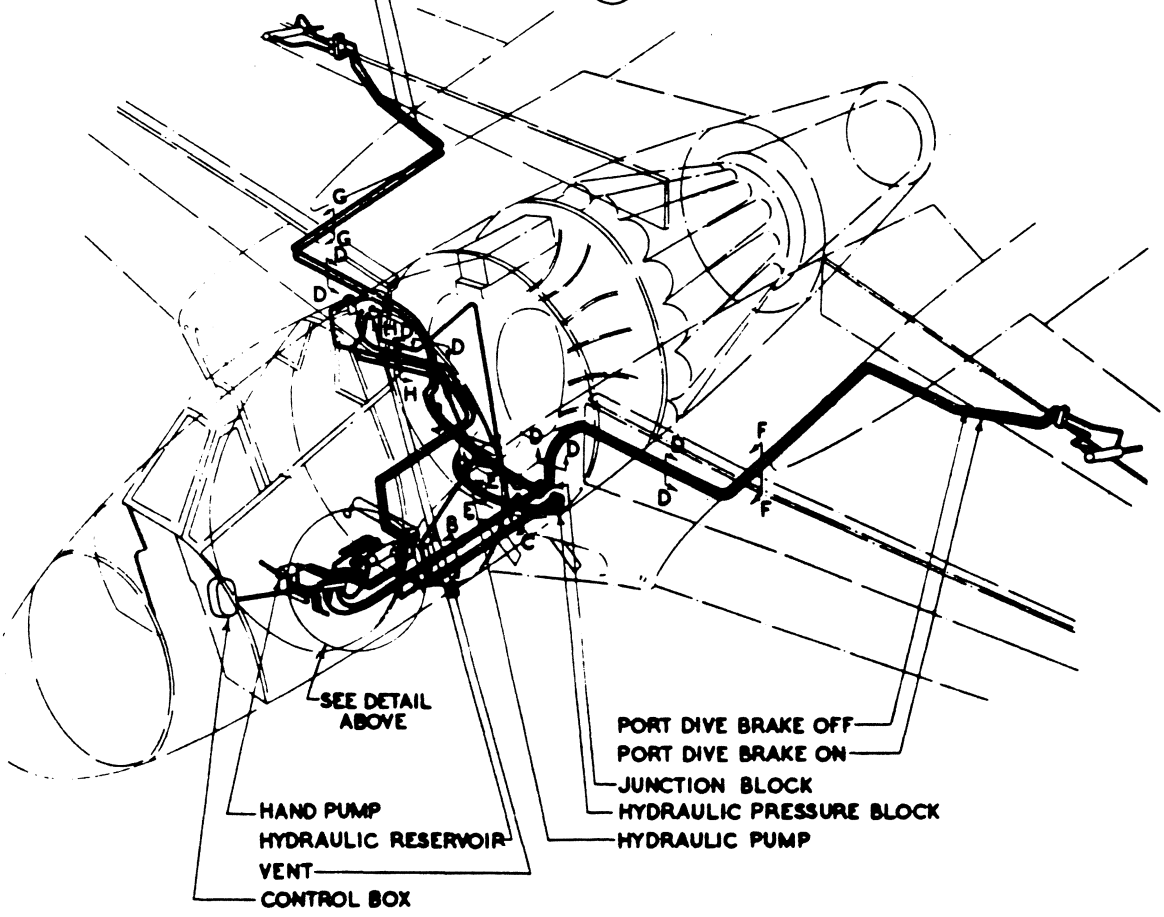
FIG. 37

FLAP HYDRAULIC SYSTEM

FIG 37



ARRANGEMENT OF HYDRAULIC LINES UNDER CANNON FLOOR



SEE FIG. 39 FOR SECTIONS

UNION JOINTS

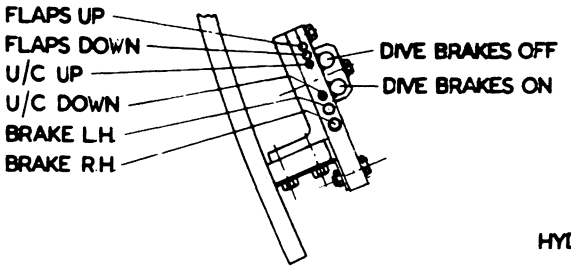
HOSE JOINTS

NOTE: ACCUMULATOR RELEASE VALVE NOT SHOWN, REFER TO FIG. 37.

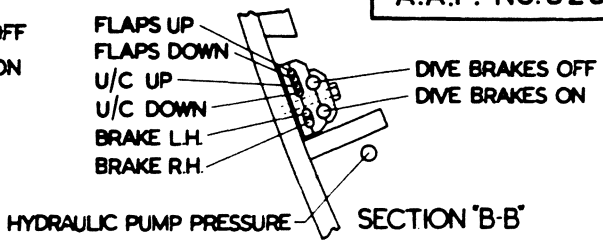
FIG. 38

DIVE BRAKE HYDRAULIC SYSTEM

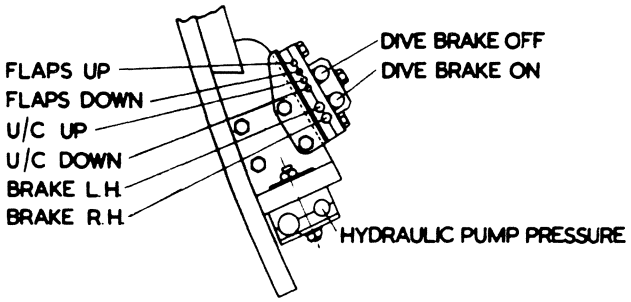
FIG. 38



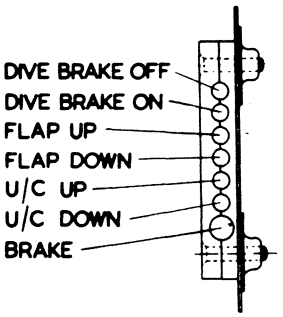
SECTION "A-A"



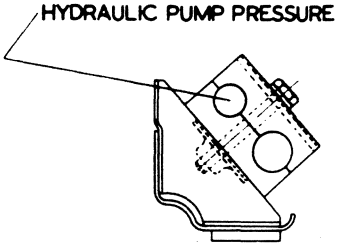
SECTION "B-B"



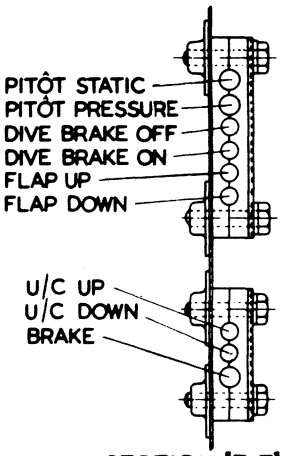
SECTION "C-C"



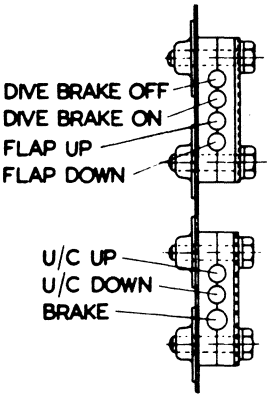
SECTION "D-D"



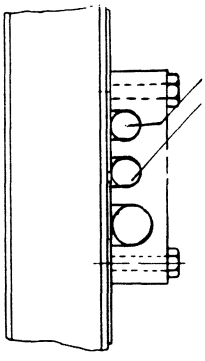
SECTION "E-E"



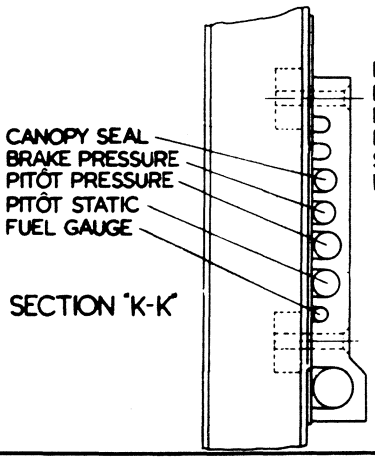
SECTION "F-F"



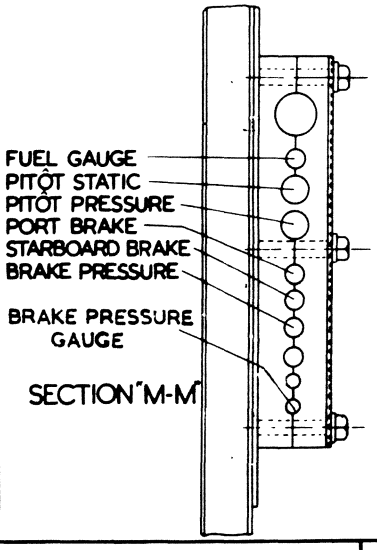
SECTION "G-G"



SECTION "H-H"



SECTION "K-K"



SECTION "M-M"

FIG. 39

ASSEMBLY OF PIPES IN CLAMP BLOCKS

FIG. 39

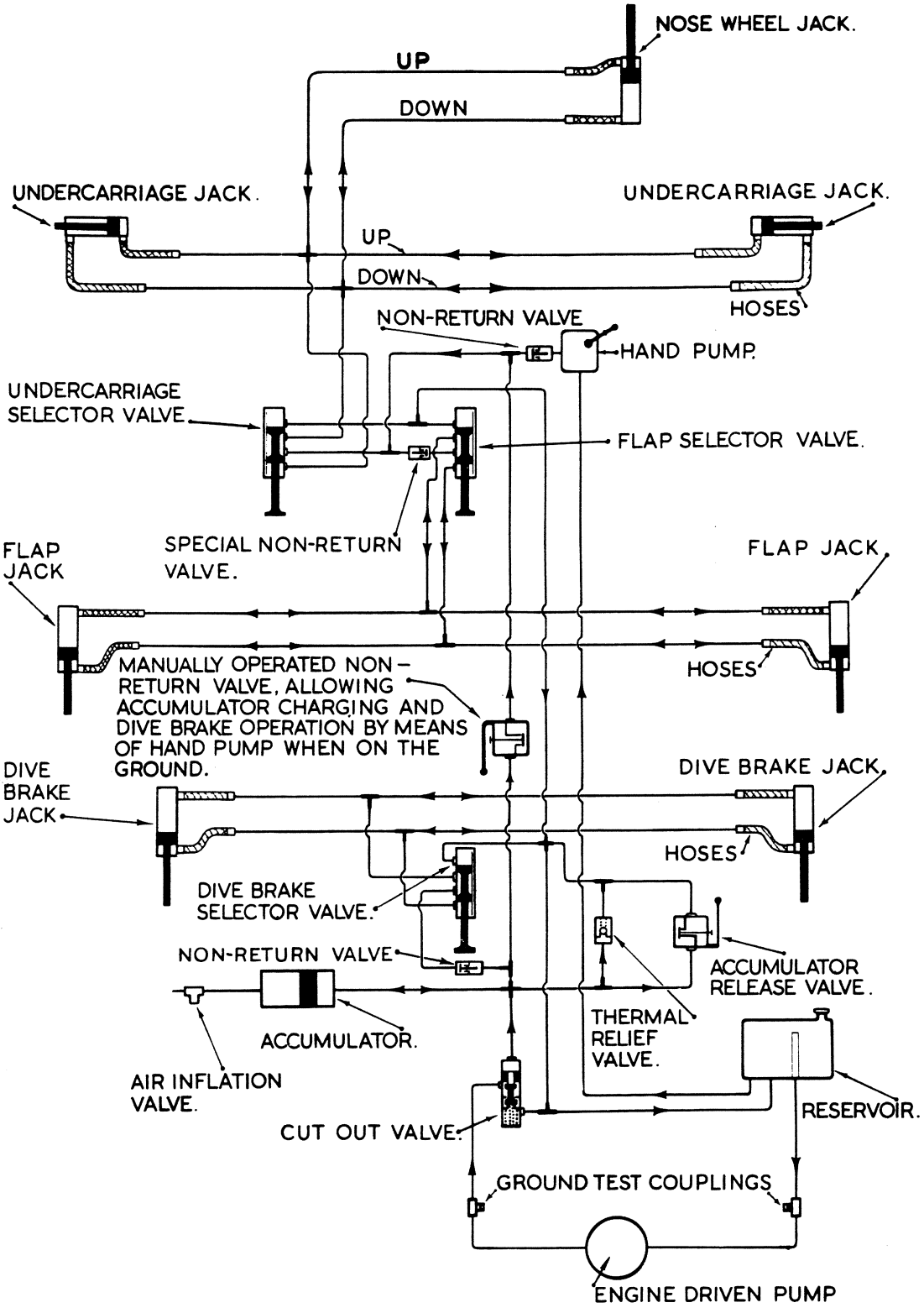


FIG 40 **DIAGRAM OF HYDRAULIC SYSTEM** FIG 40

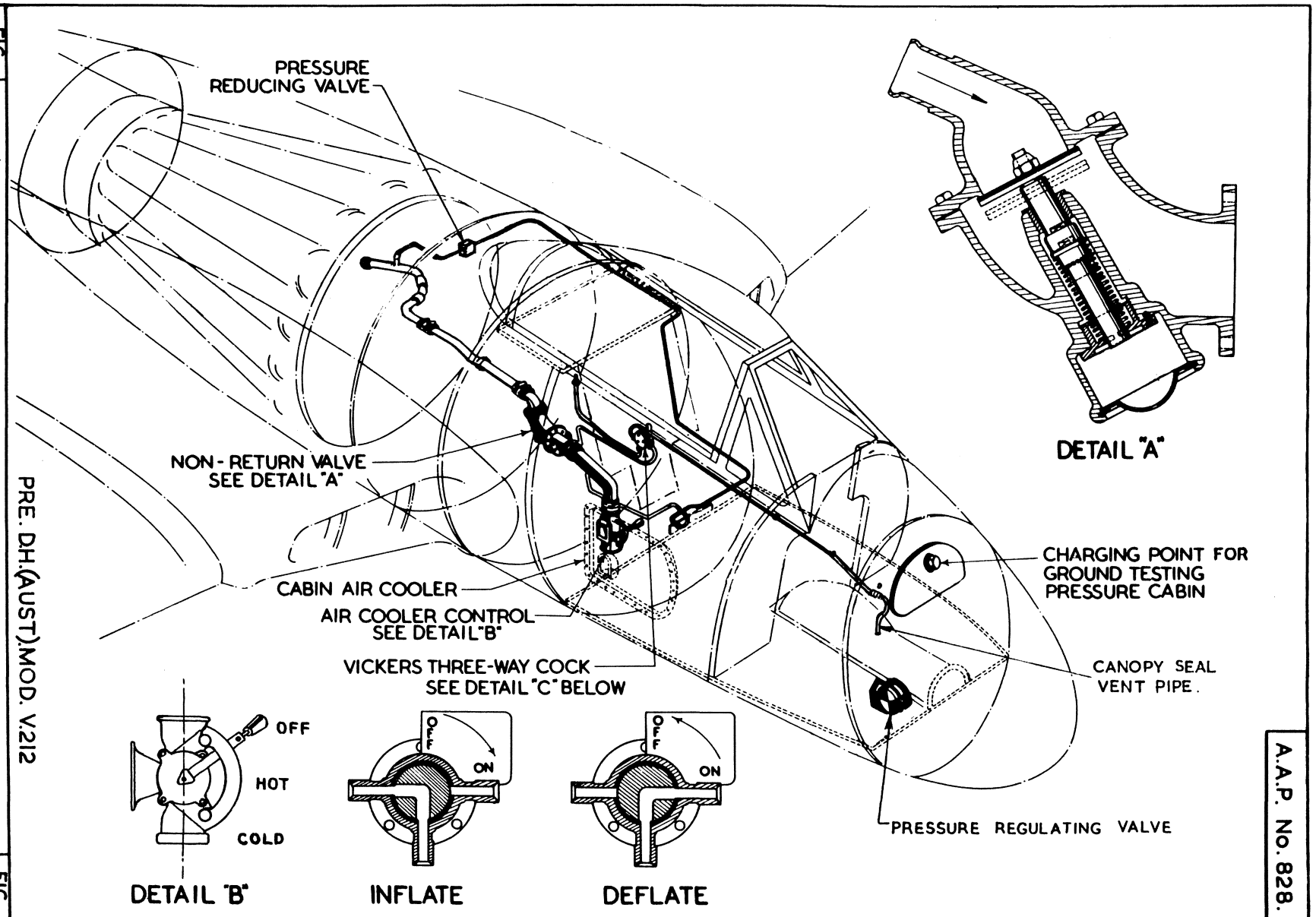
A.L.2

SYMPTOM	FAULT	PROB. CAUSE	REMEDY
ALL SERVICES INOPERATIVE	LOSS OF PRESSURE	FAILURE OF PUMP	FIT NEW PUMP
EXTERNAL LEAKAGE	LOSS OF PRESSURE	FAULTY CONNECTIONS	TIGHTEN CONNECTIONS AND IF NECESSARY FIT NEW WASHERS, EXTERNAL GLANDS ON JACKS, OR NEW COUPLINGS
SLUGGISH MOVEMENTS OF ALL SERVICES	INTERNAL LEAKAGE OR LOW PRESSURE IN ACCUMULATOR	EXCESSIVE CLEARANCE IN ENGINE DRIVEN PUMP ALLOWING FLUID TO ESCAPE FROM THE PRESSURE SIDE TO THE SUCTION SIDE LEAKING VALVE	FIT NEW PUMP FIT NEW VALVE
SLUGGISH MOVEMENT OF A PARTICULAR SERVICE	INTERNAL LEAKAGE	FLUID LEAKAGE PAST GLANDS IN CONTROL VALVE	FIT NEW GLANDS
SAGGING OF FLAPS OR LIFTING WHEN LOWERED IN FLIGHT	INTERNAL LEAKAGE	FLUID LEAKAGE PAST VALVES IN SELECTOR	DISMANTLE SELECTOR AND INSPECT FOR WEAR, IF NECESSARY FIT NEW SELECTOR
DIVE BRAKES MOVE WHEN HAND PUMP IS OPERATED AND MAN OPR.NON-RETURN VALVE IS CLOSED.	LOSS OF PRESSURE	FAULTY MANUALLY OPERATED NON-RETURN VALVE	FIT NEW M/O NON-RET. VALVE
CIRCUIT OPERATING TIMES EXCESSIVE	INTERNAL LEAKAGE OR LOW PRESSURE IN ACCUMULATOR	FLUID LEAKAGE PAST GLANDS IN JACKS. LEAKING VALVE	FIT NEW GLANDS FIT NEW VALVE
OPERATING TIMES SLOW BACKLASH AT FLAPS LOAD ON HAND PUMP VERY LIGHT & SPONGY	AIR IN SYSTEM		FUNCTION THE SYSTEM SEVERAL TIMES CAUSING AIR TO DISSIPATE THROUGH RESERVOIR
INCREASE OF LOAD		1. MAL-ALIGNMENT OF JACKS CAUSING SIDE LOAD ON EXTENDED PISTON ROD. 2. MECHANICAL INTERFERENCE BETWEEN MOVING PARTS. 3. PRESENCE OF FOREIGN MATTER BETWEEN MOVING PARTS. 4. INCREASE OF FRICTION DUE TO EXCESSIVE TIGHTENING OF GLANDS ETC.	

FIG 42

PRESSURE CABIN AIR SYSTEM.

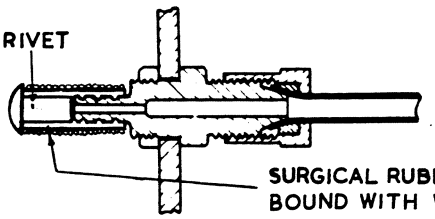
PRE. D.H.(AUST).MOD. V.212



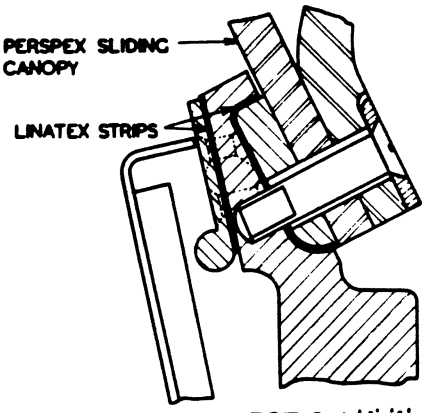
A.A.P. No. 828.

FIG 42

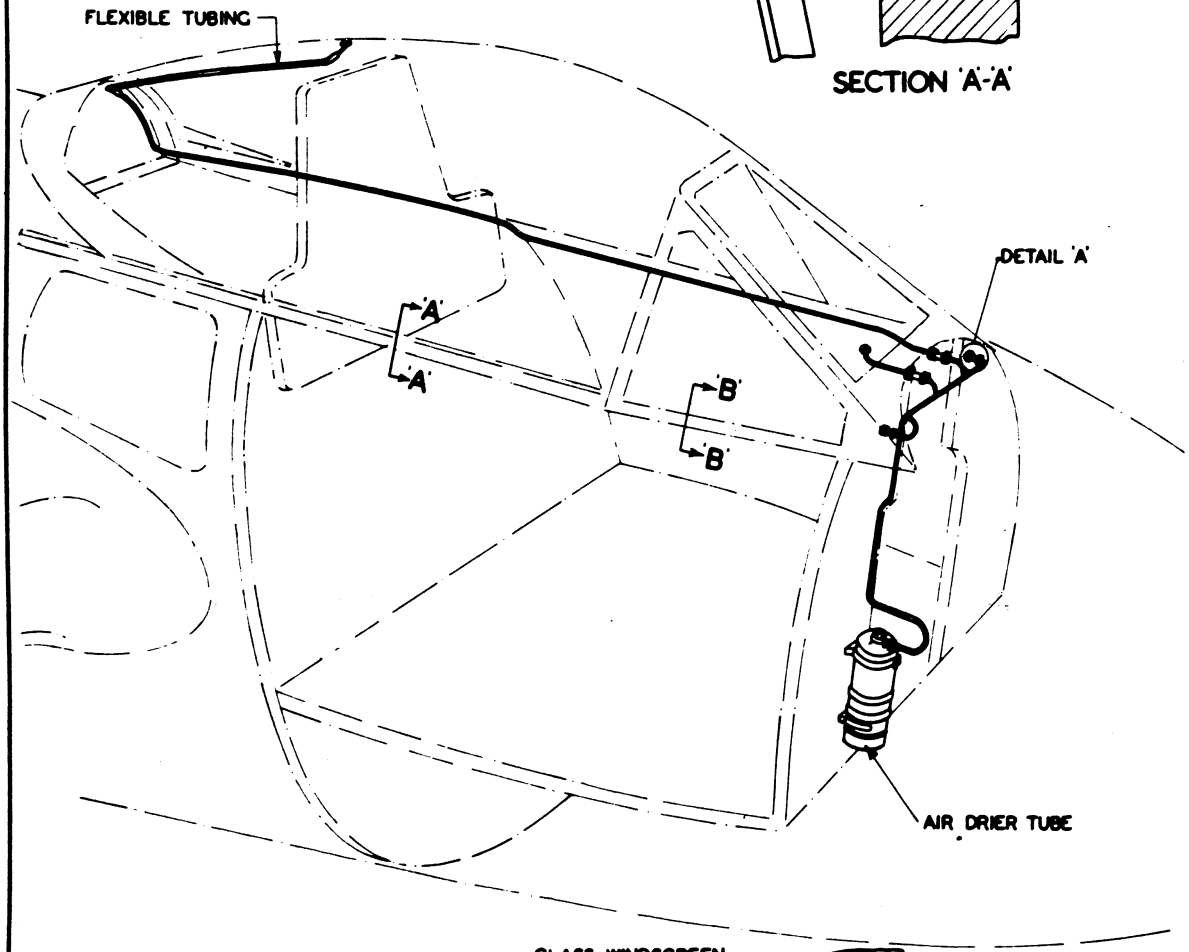
A.L.2

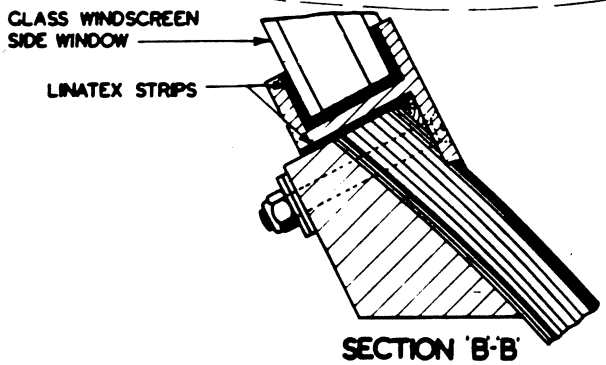


DETAIL 'A'
COUPLING AT BULKHEAD



SECTION 'A-A'





SECTION 'B-B'

FIG. 43

AIR DRIER SYSTEM

FIG. 43

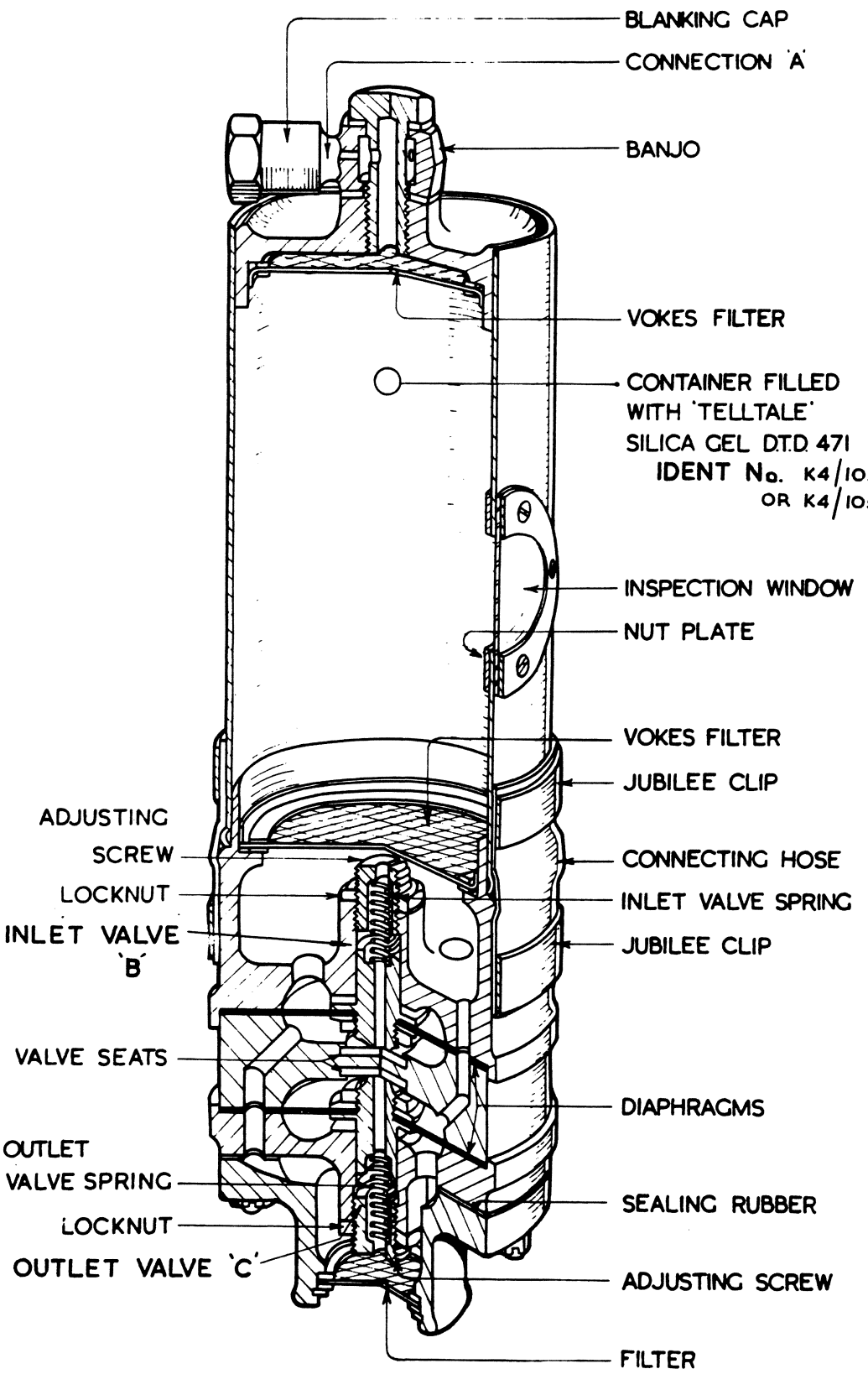


FIG 44

DRIER TUBE

FIG 44

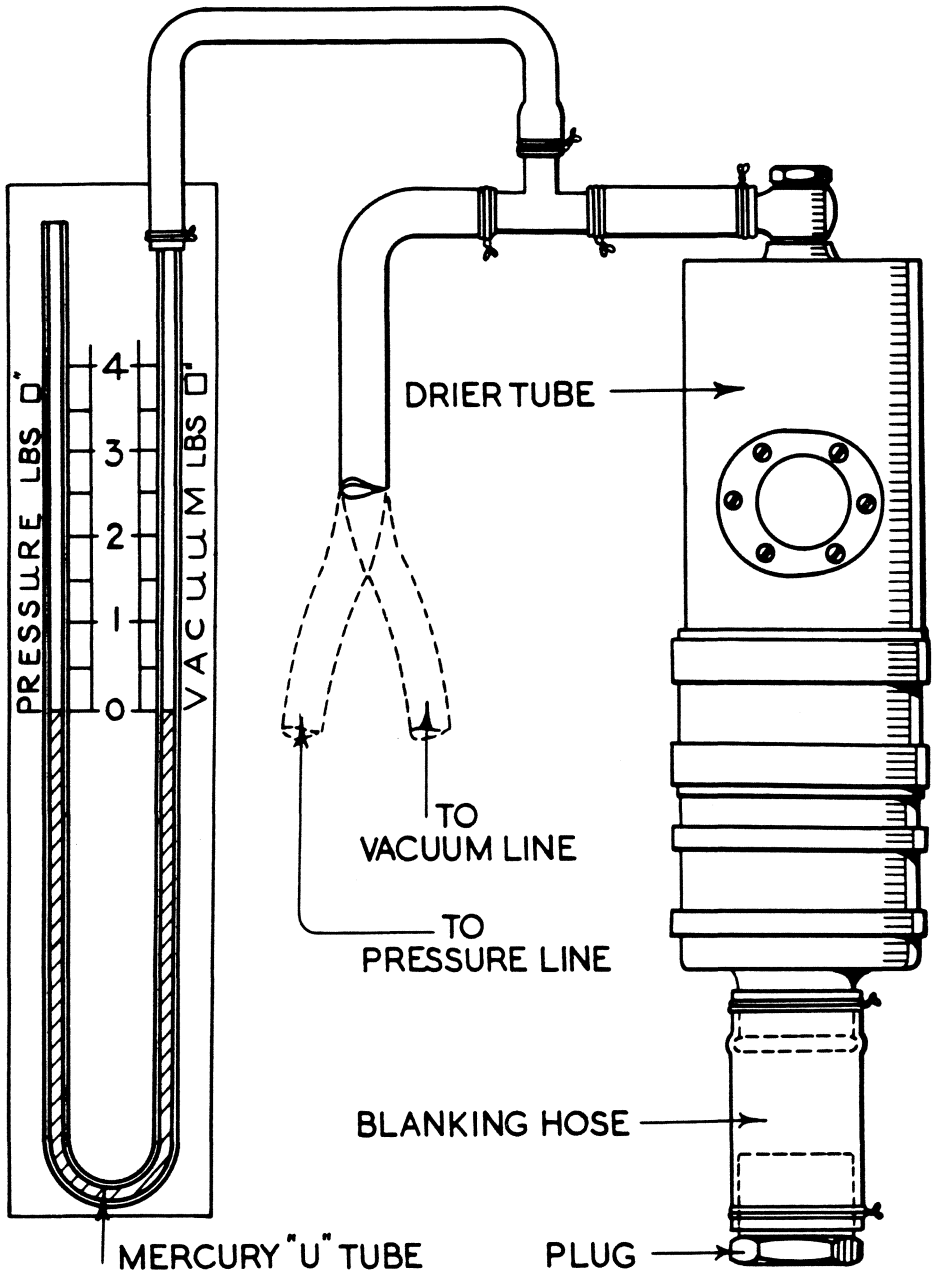
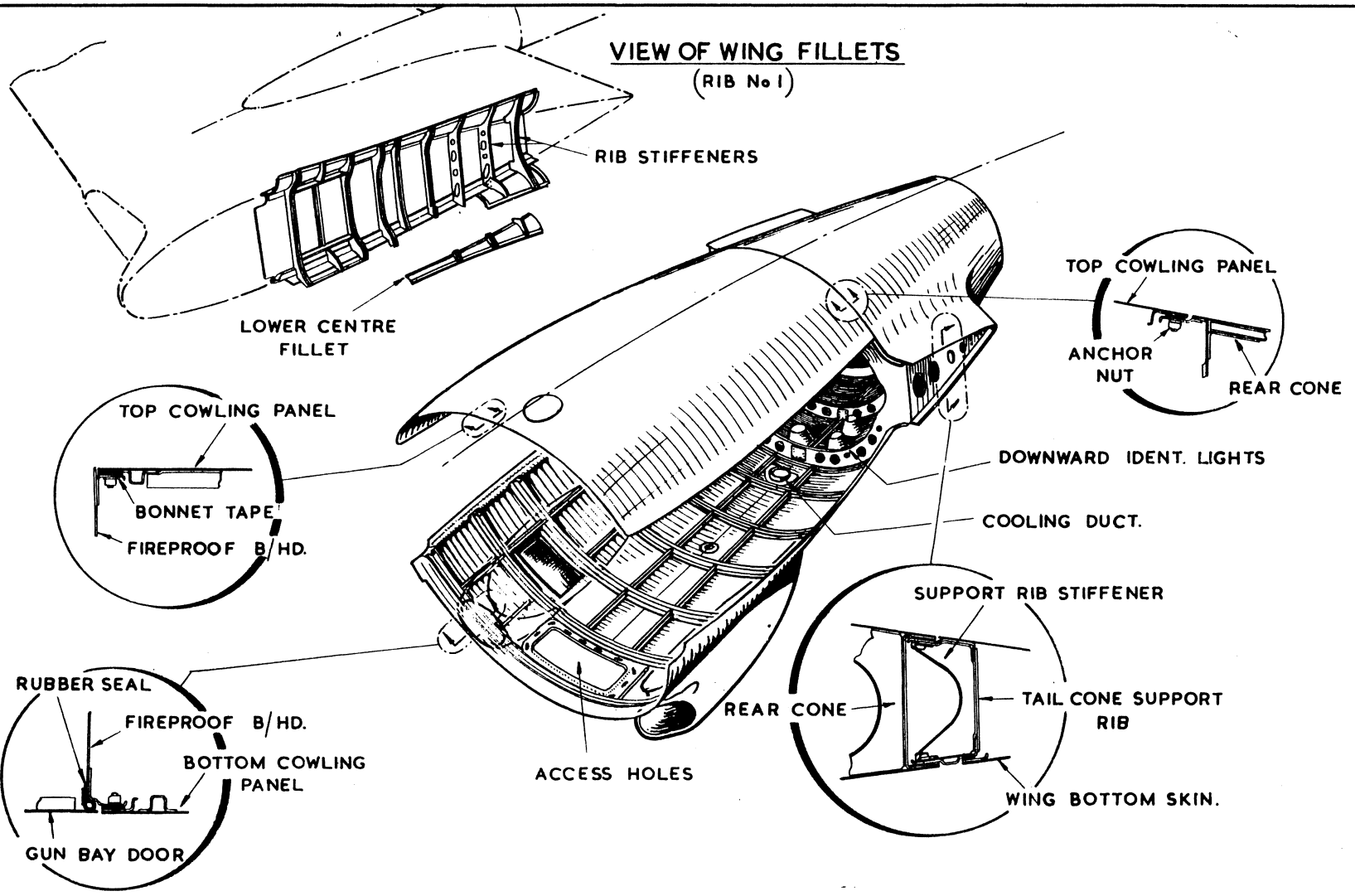
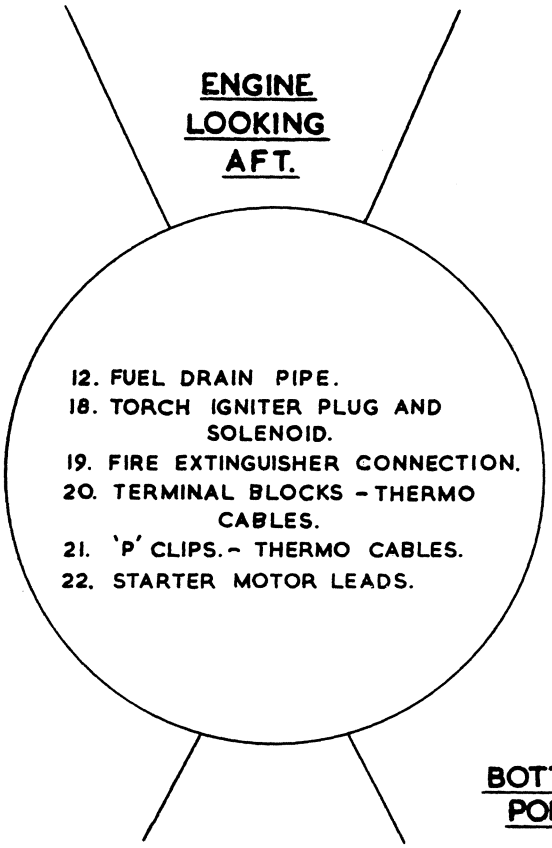


FIG 45 — DRIER TUBE TEST — FIG 45


VIEW OF WING FILLETS
(RIB No 1)
RIB STIFFENERS
LOWER CENTRE FILLET
TOP COWLING PANEL
ANCHOR NUT
REAR CONE
TOP COWLING PANEL
BONNET TAPE
FIREPROOF B/HD.
DOWNWARD IDENT. LIGHTS
COOLING DUCT.
SUPPORT RIB STIFFENER
RUBBER SEAL
FIREPROOF B/HD.
BOTTOM COWLING PANEL
GUN BAY DOOR
ACCESS HOLES
REAR CONE
TAIL CONE SUPPORT RIB
WING BOTTOM SKIN.

K.J.H.



REFER TO PAR.145 FOR EXPLANATION.

KEY TO FIG 47.

RAAF PUB No 828

K.J.H.

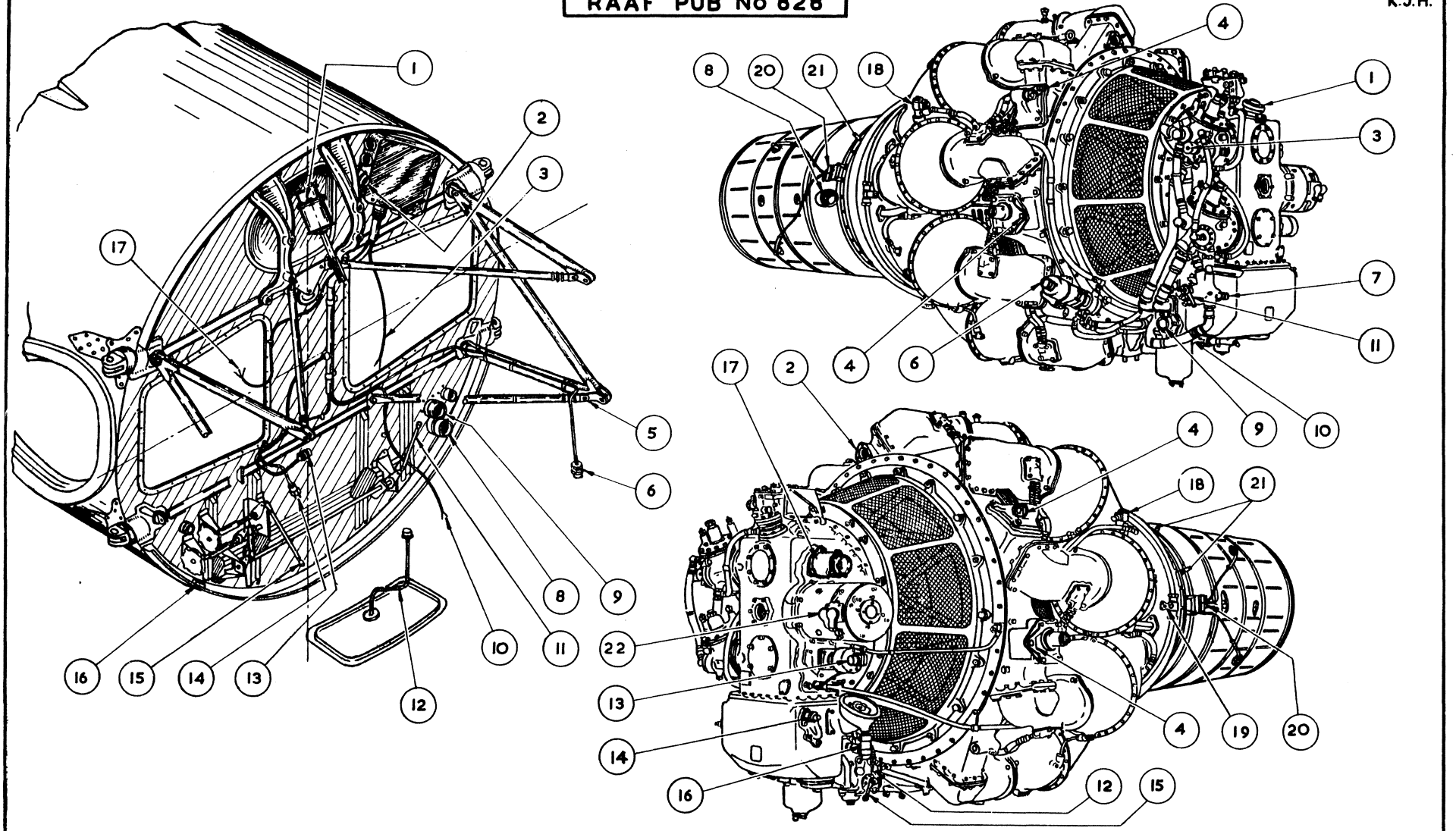
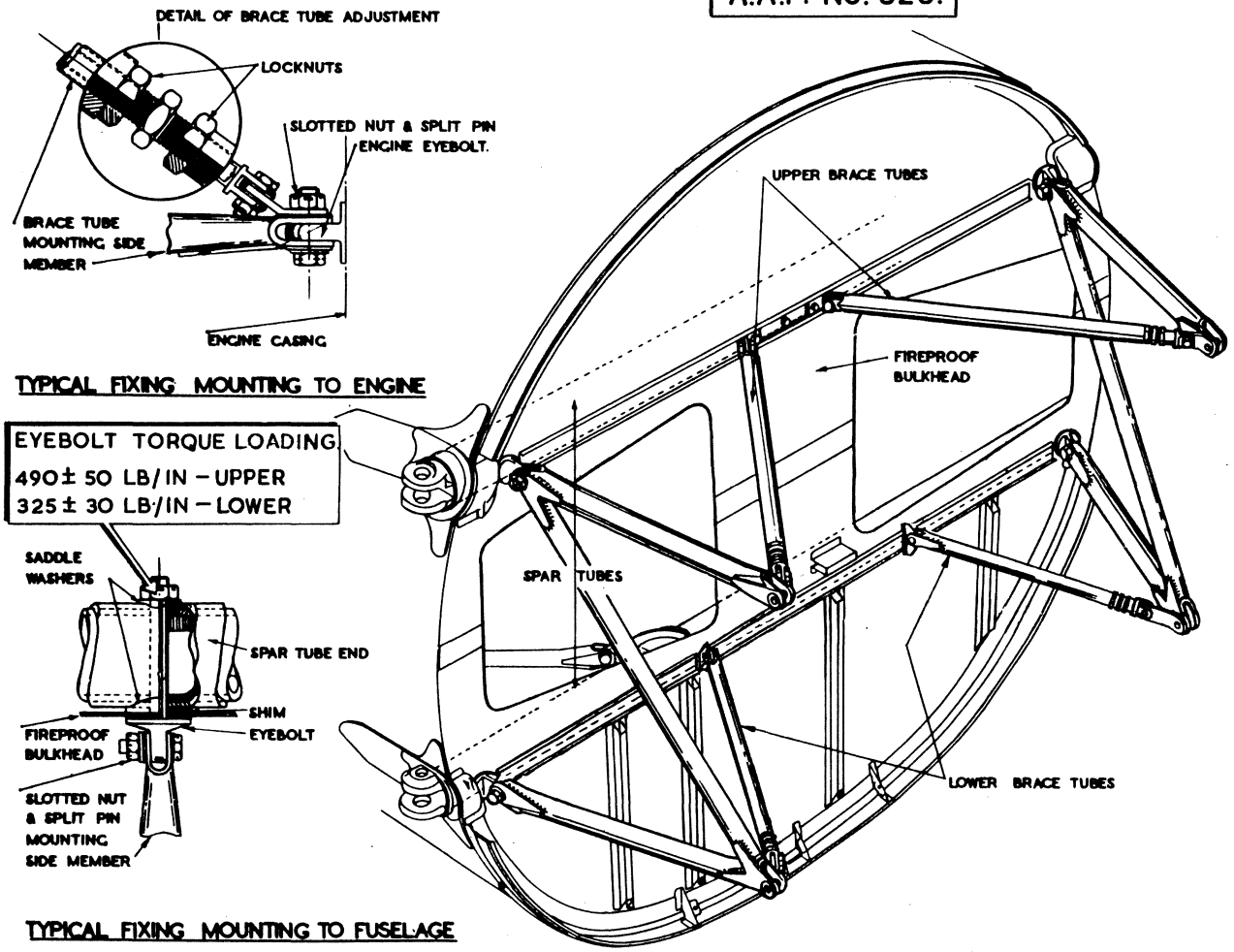


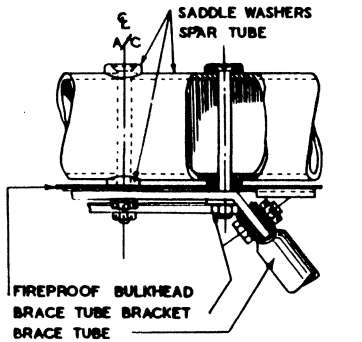
FIG 47

ENGINE REMOVAL

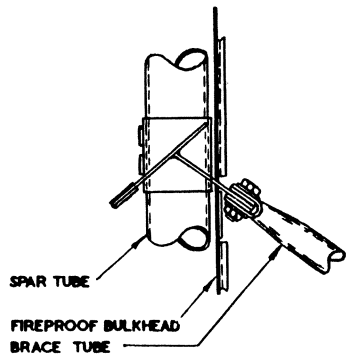
FIG 47

A.A.P. No. 828.





FIXING OF UPPER BRACE TUBES



FIXING OF LOWER BRACKET TUBES

A.L.2

FIG 48

ENGINE MOUNTING

FIG 48

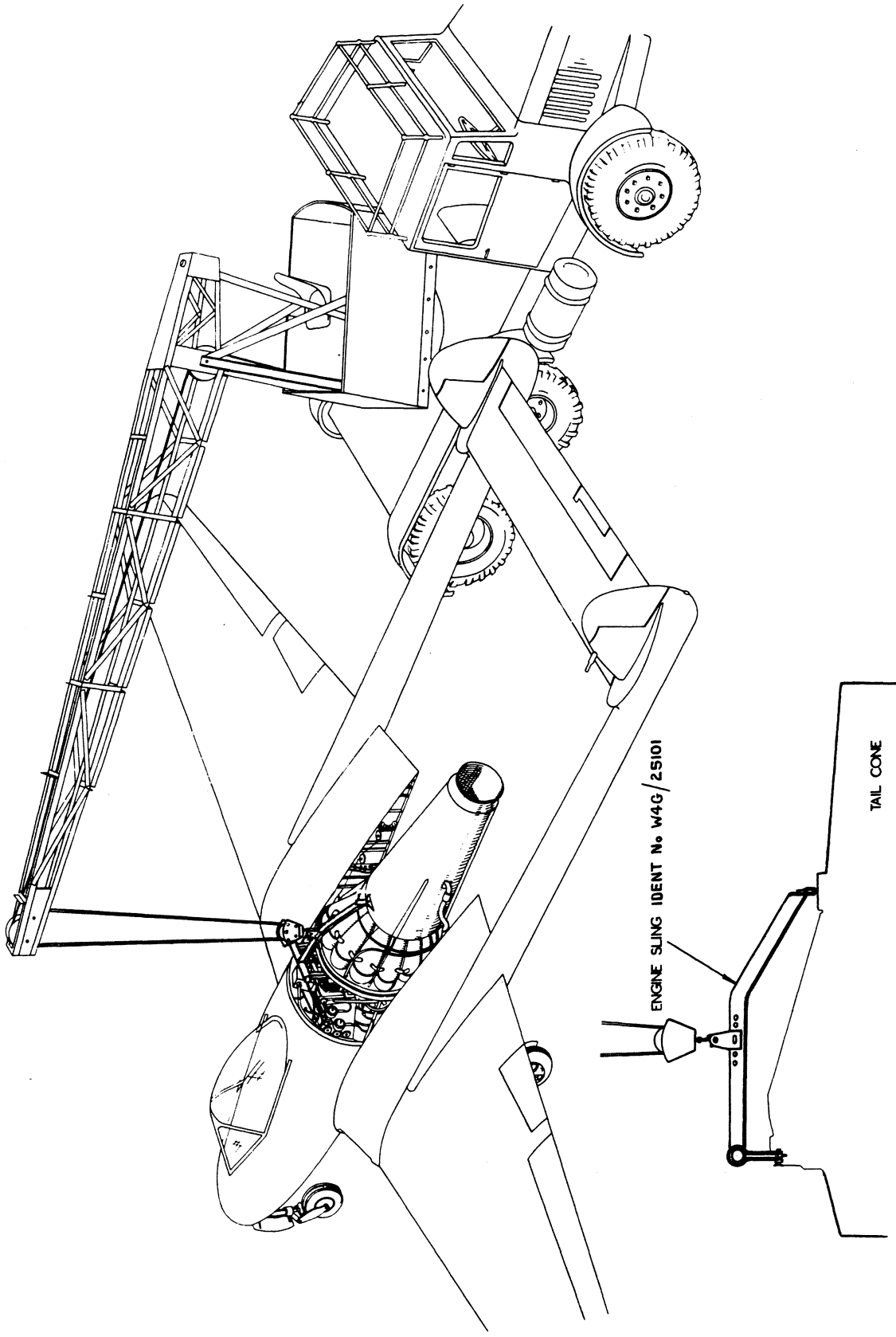
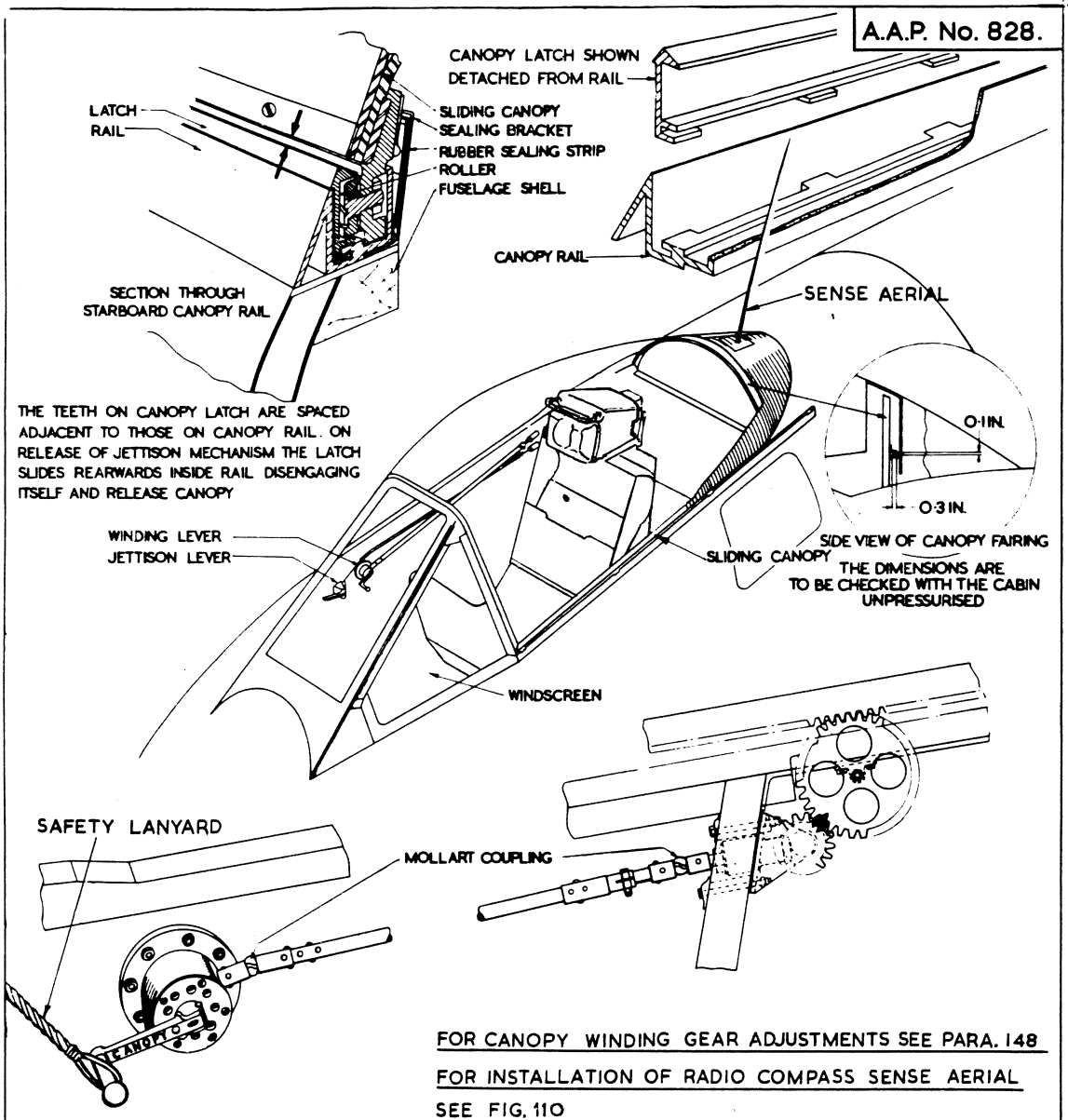


FIG. 49

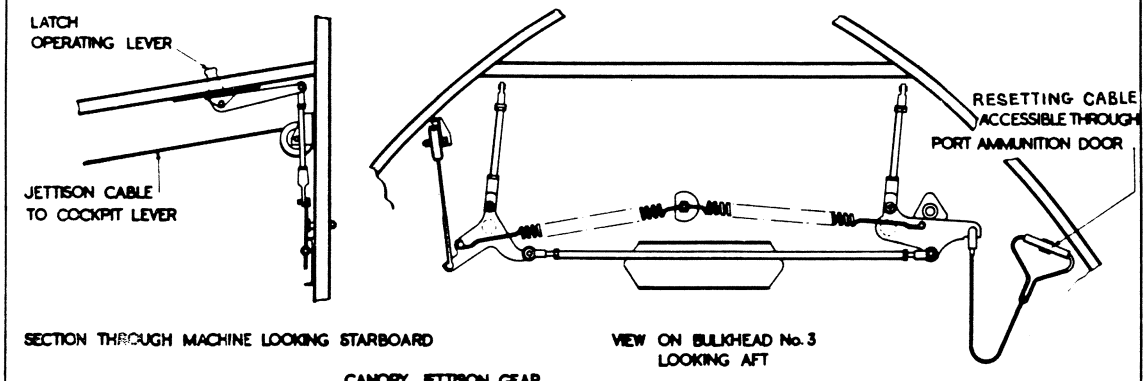
POWER PLANT REMOVAL

FIG. 49



FOR CANOPY WINDING GEAR ADJUSTMENTS SEE PARA. 148

FOR INSTALLATION OF RADIO COMPASS SENSE AERIAL SEE FIG. 110



SECTION THROUGH MACHINE LOOKING STARBOARD

VIEW ON BULKHEAD No. 3 LOOKING AFT

CANOPY JETTISON GEAR

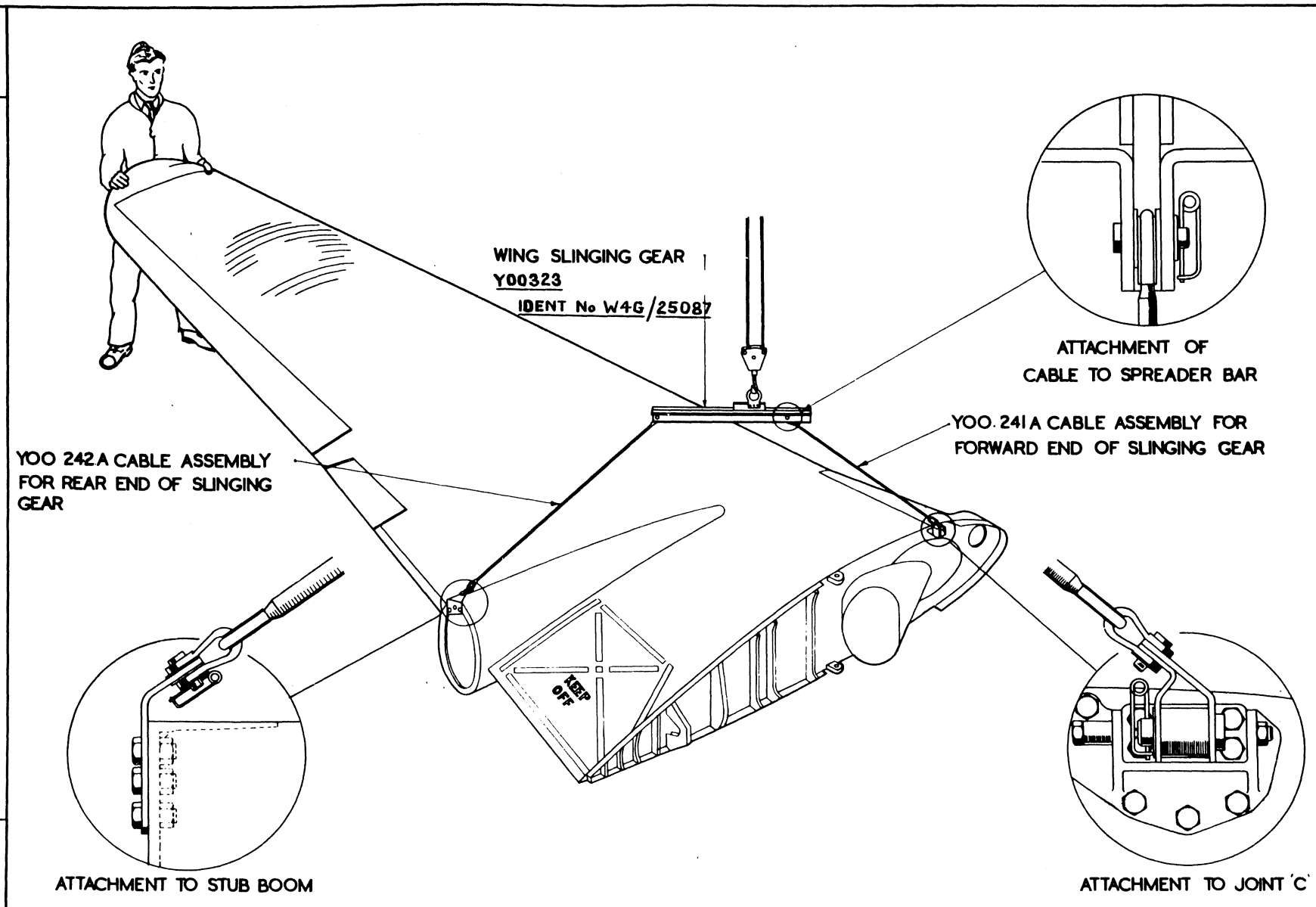
FIG. 50

CANOPY

FIG. 50

FIG. 51

WING SLINGING



RAAF PUB No 828

FIG. 51

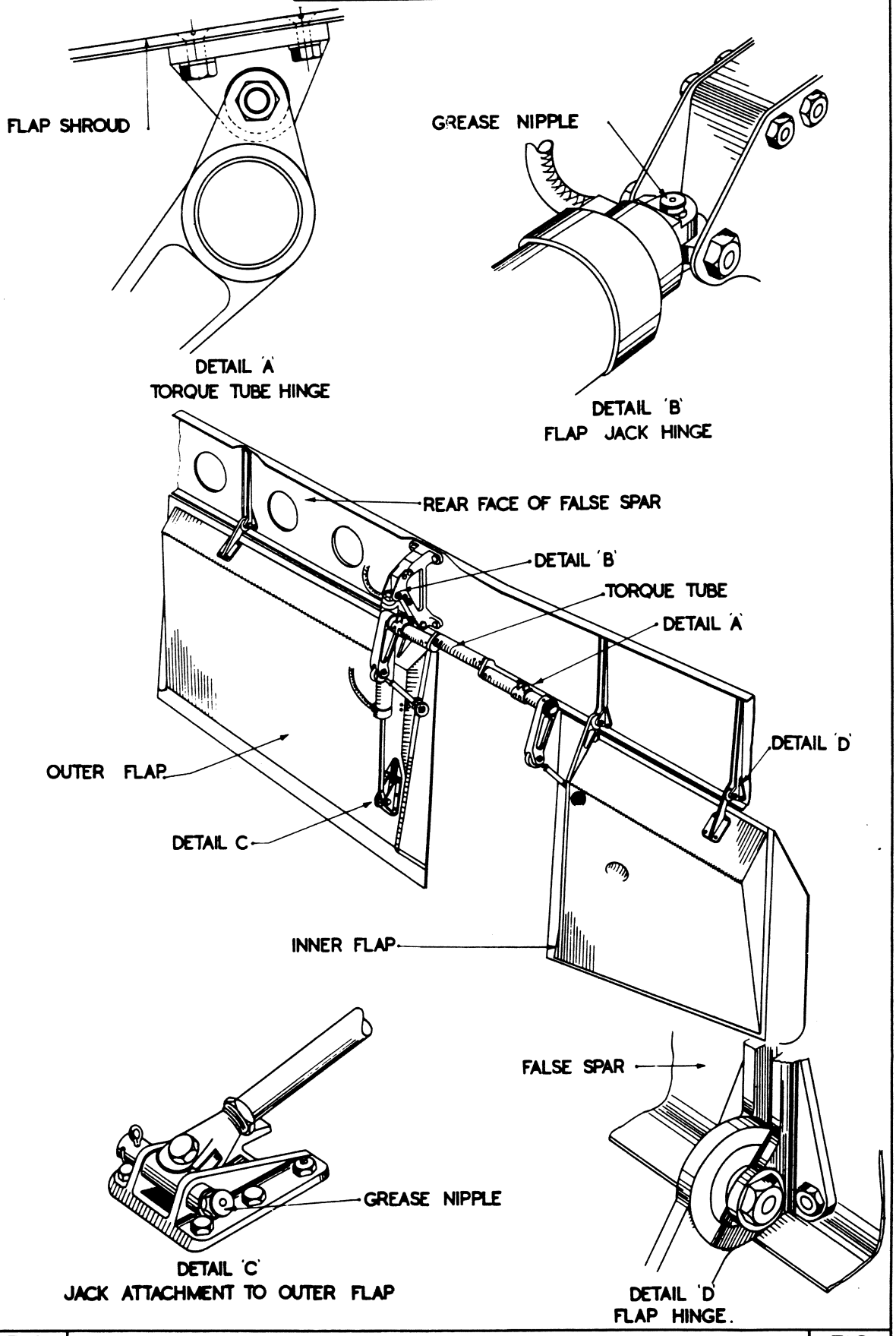
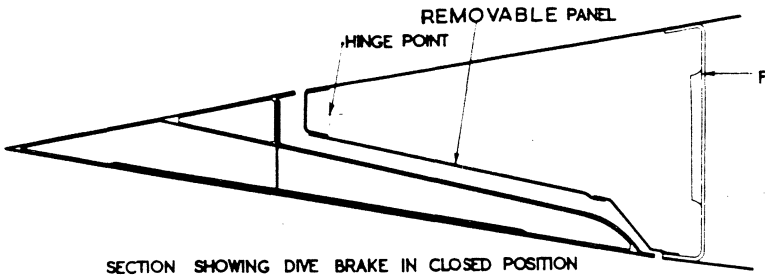


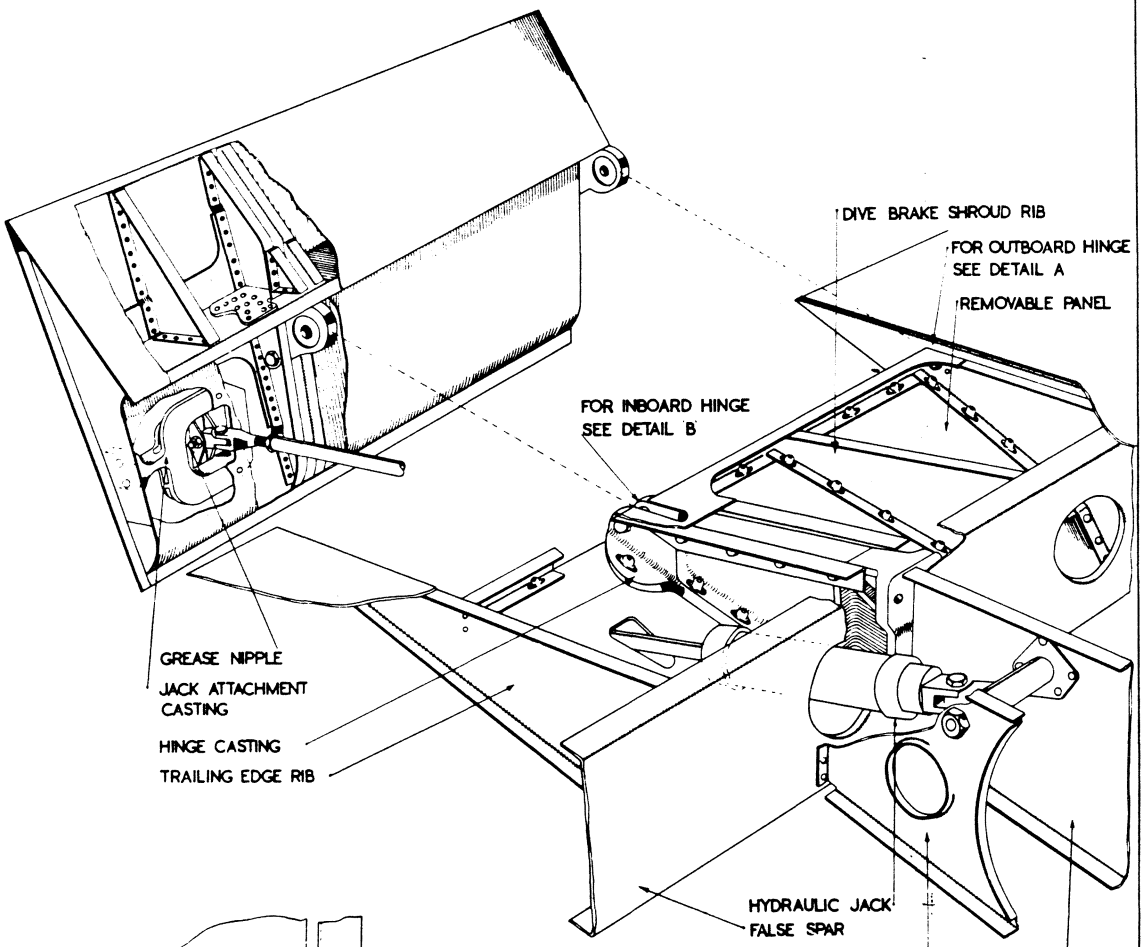
FIG. 52

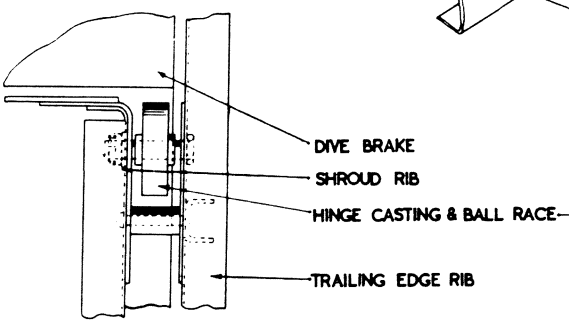
SPLIT FLAP ASSEMBLY

FIG. 52

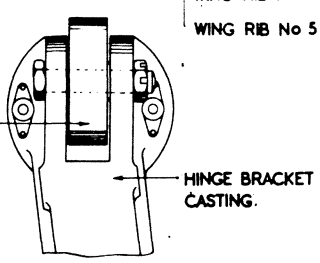


SECTION SHOWING DIVE BRAKE IN CLOSED POSITION





DETAIL A
DIVE BRAKE OUTER HINGE
TOP SKIN REMOVED FOR CLARITY

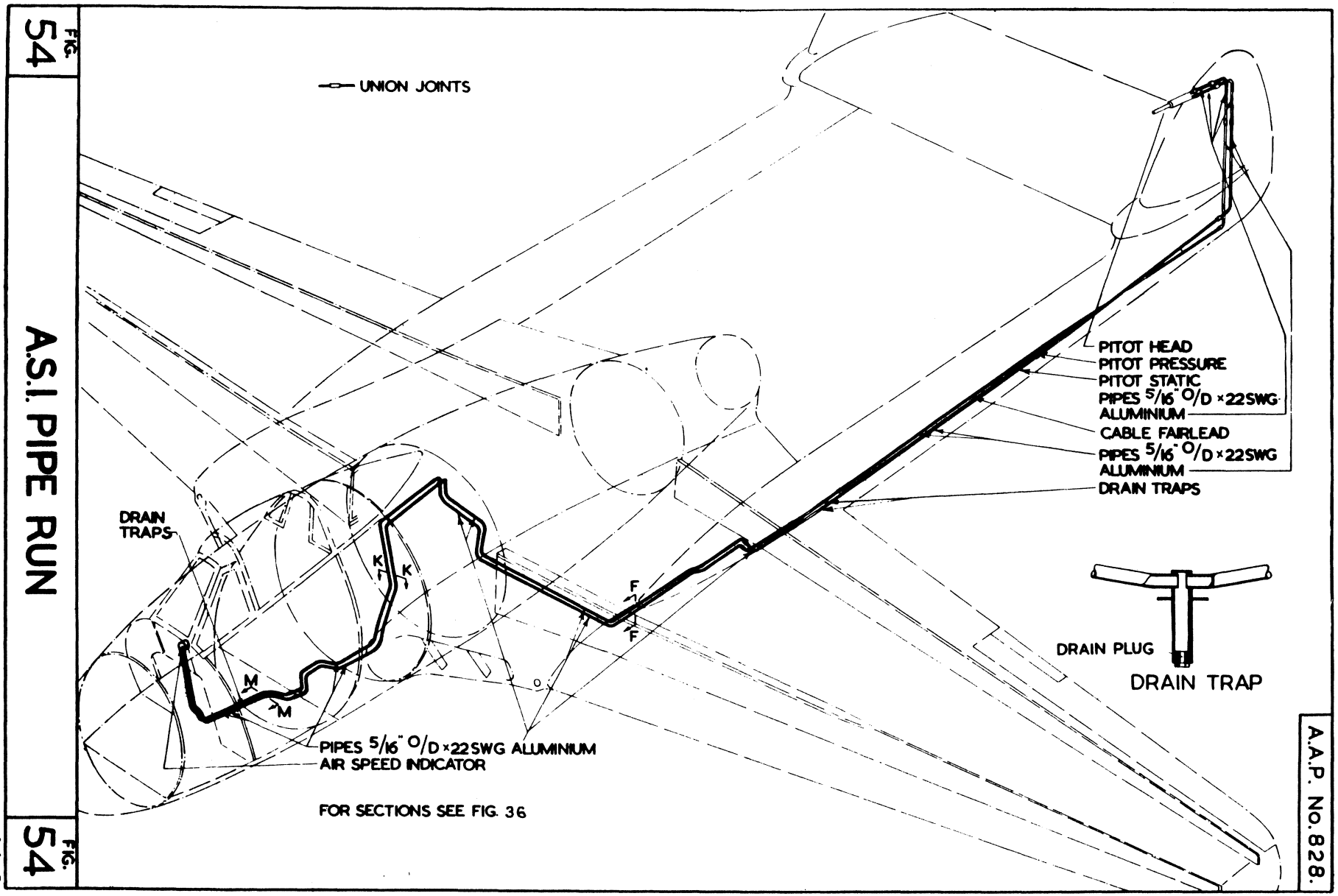


DETAIL B
DIVE BRAKE INNER HINGE

FIG 53 — DIVE BRAKE INSTALLATION — FIG 53

FIG. 54

A.S.I. PIPE RUN



A.A.P. No. 828.

FIG. 54

A.L.2

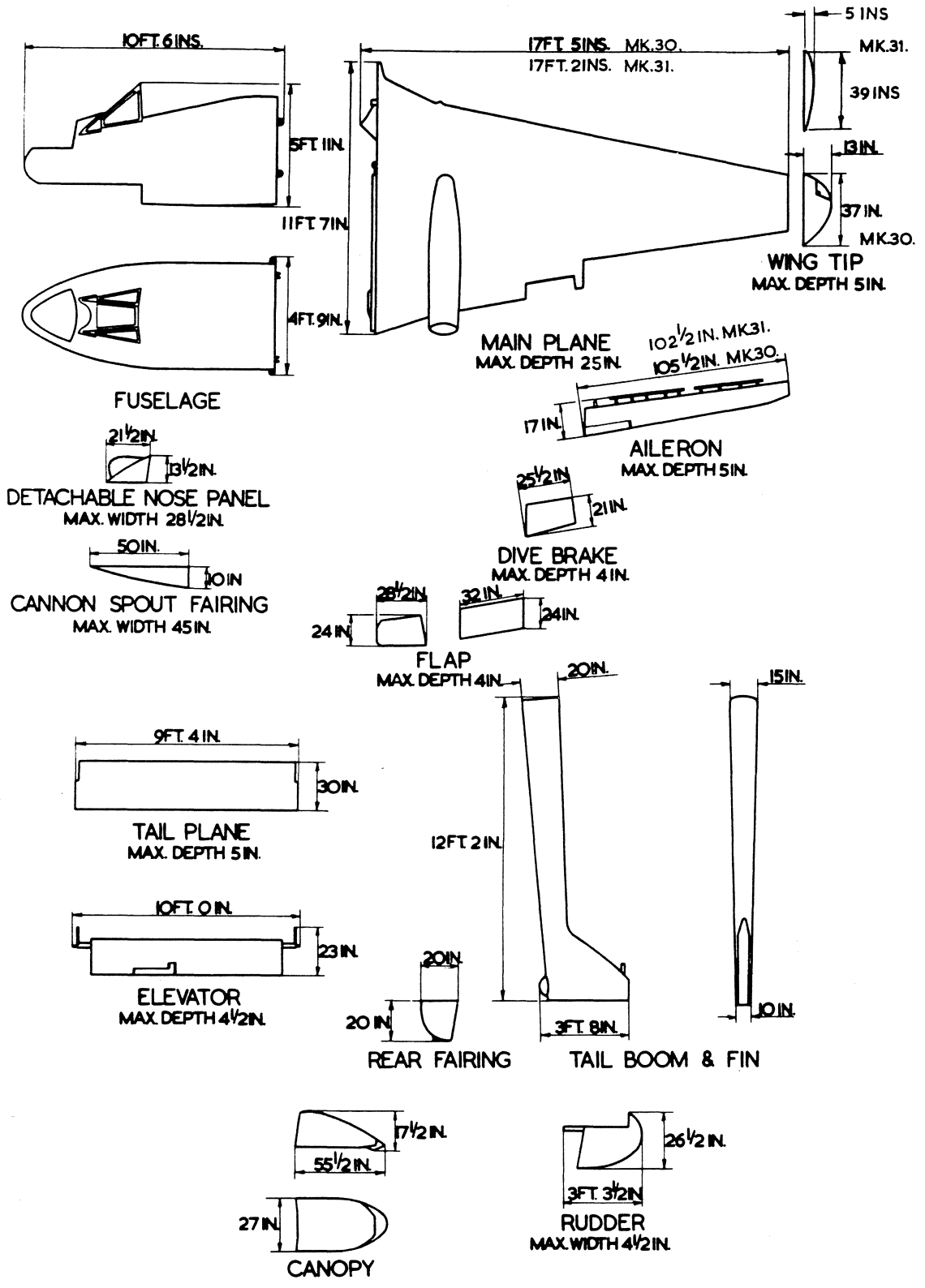
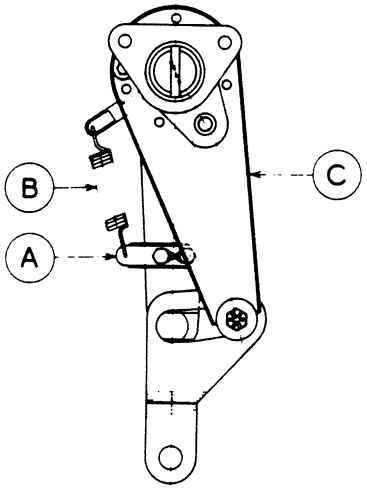


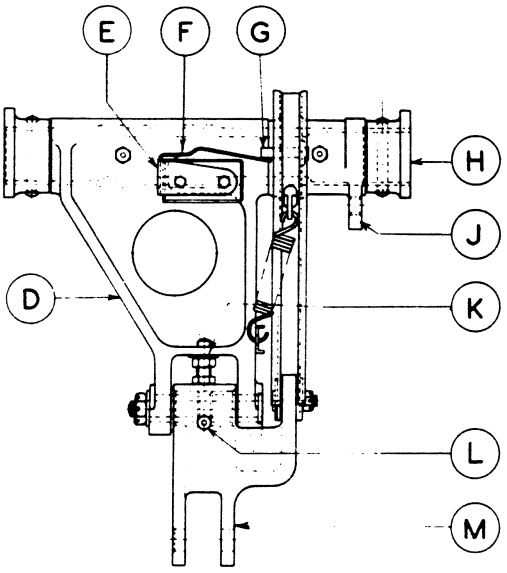
FIG. 55

MINIMUM PACKING DIMENSIONS

FIG. 55

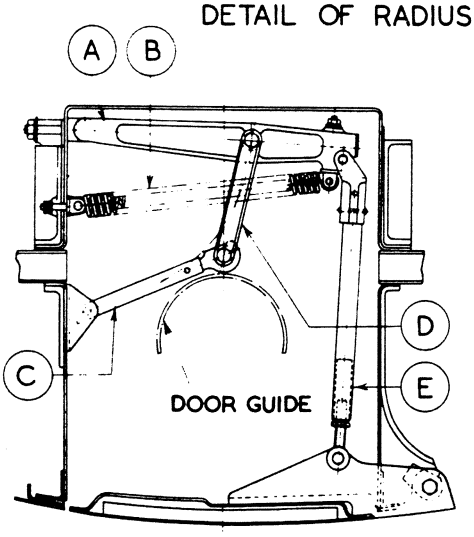
A.L.2

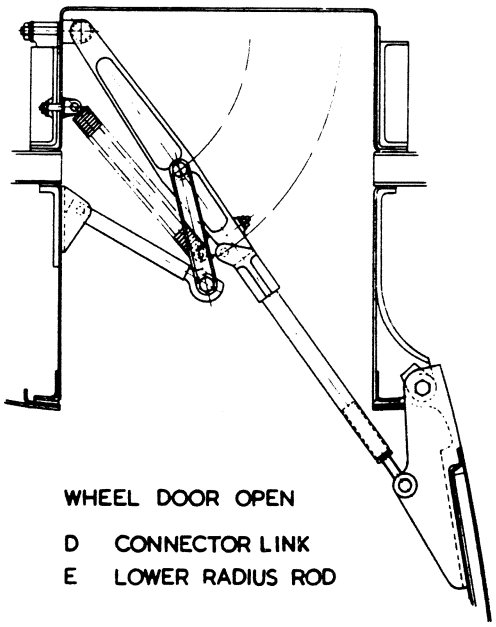




A LEVER
B SPRING
C LOCK PLATE
D UPPER LINK
E MICRO SWITCH
F SPRING (MICRO SWITCH)
G SPIGOT
H BEARING
J LUG FOR JACK
K STOP BOLT
L GREASE NIPPLE
M LOWER LINK

DETAIL OF RADIUS ROD ASSEMBLY





WHEEL DOOR CLOSED

A UPPER RADIUS ROD
B DOUBLE SPRING
C LINK GUIDE

WHEEL DOOR OPEN

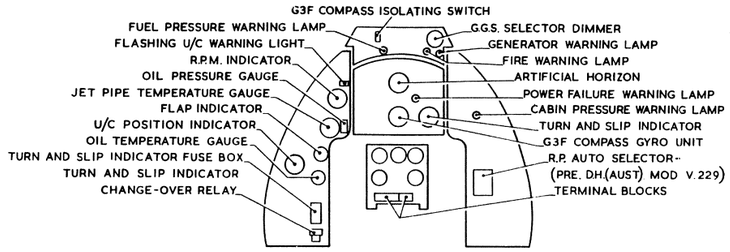
D CONNECTOR LINK
E LOWER RADIUS ROD

DETAILS OF NOSE WHEEL DOOR MECHANISM

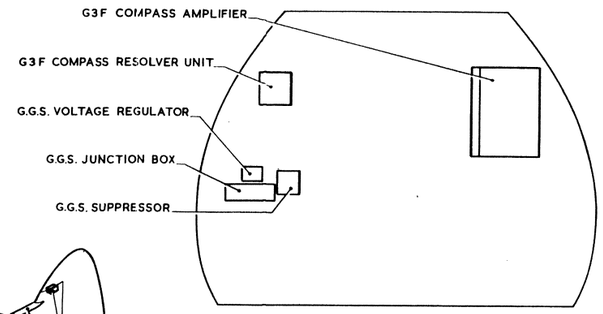
FIG. 56

NOSE WHEEL DETAILS (2)

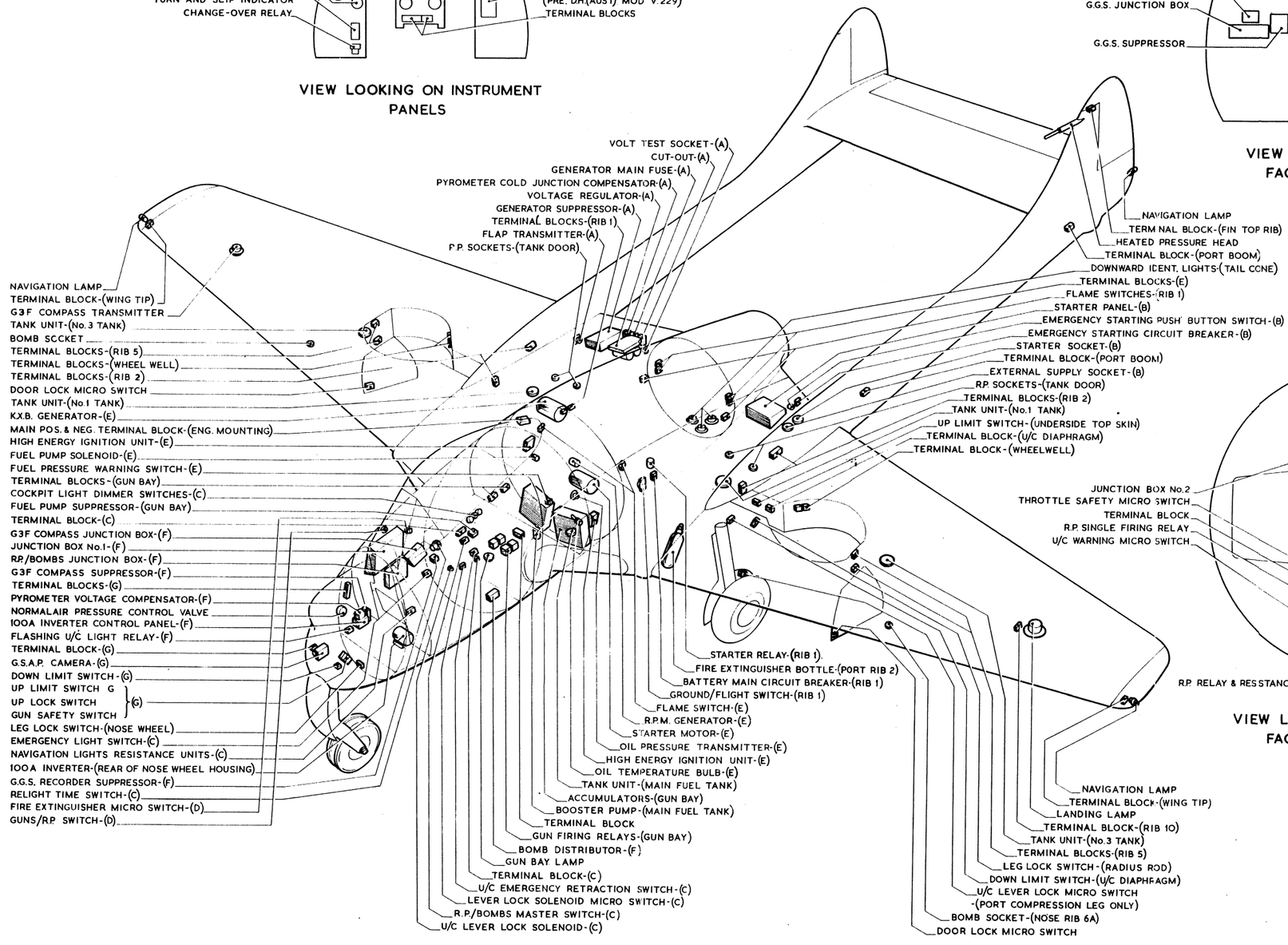
FIG. 56

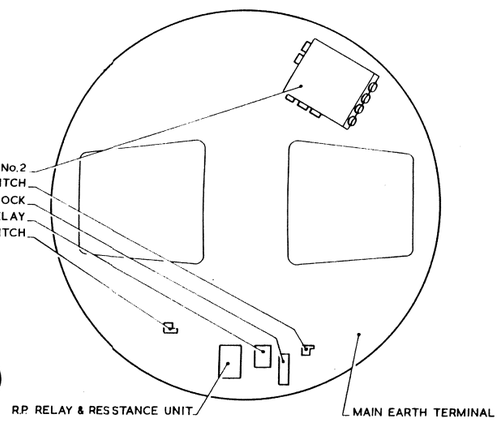


VIEW LOOKING ON INSTRUMENT PANELS



VIEW LOOKING AFT ON FRONT FACE OF BULKHEAD No. 2

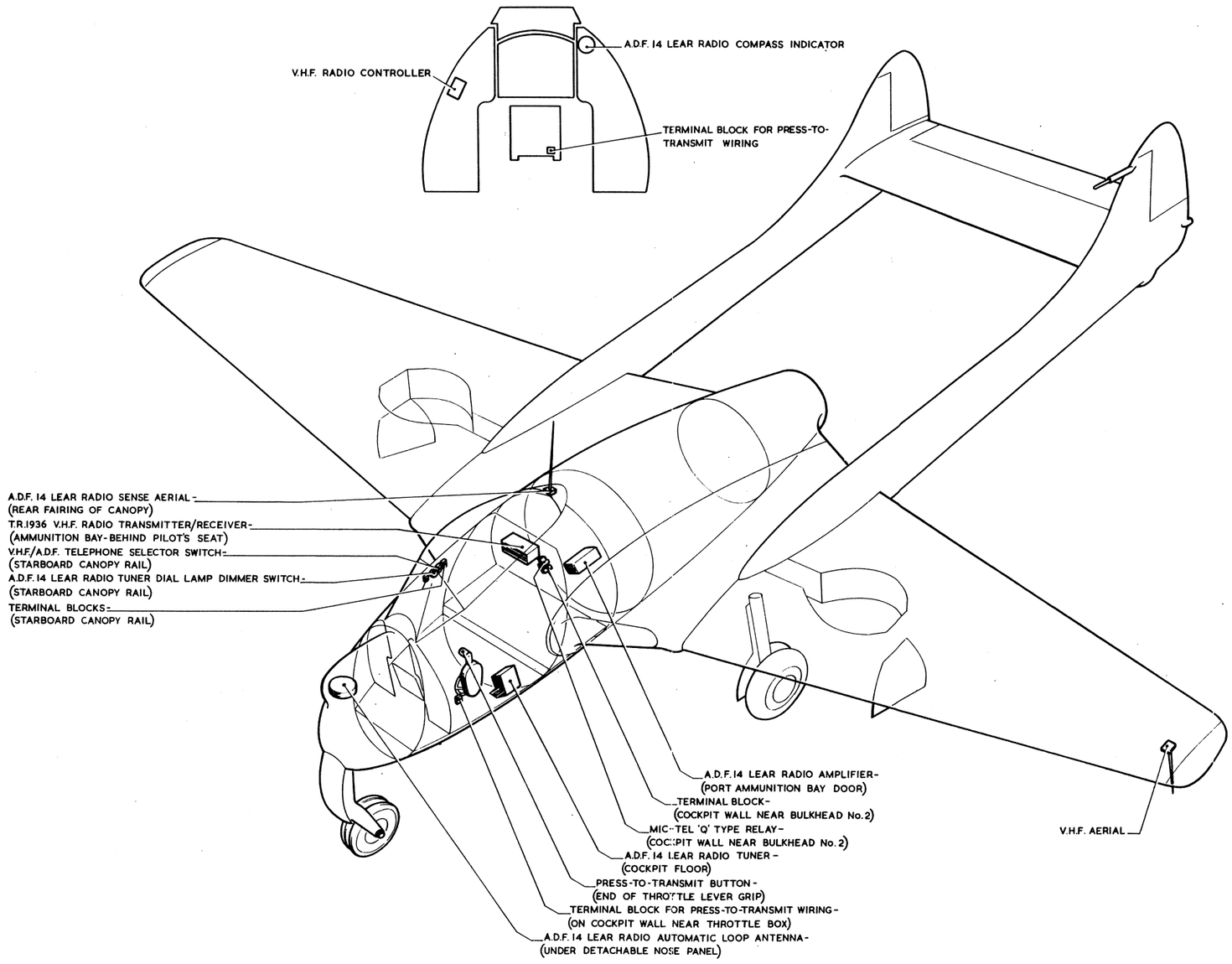


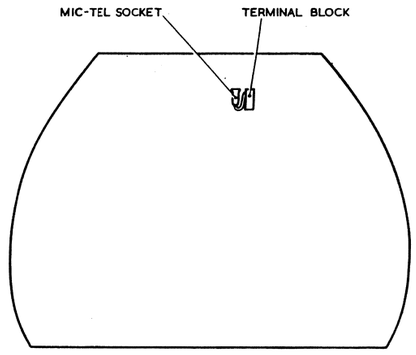


VIEW LOOKING FORWARD ON REAR FACE OF BULKHEAD No. 4

LOCATION CODE
A - STARBOARD FLAP SHROUD
B - PORT FLAP SHROUD
C - PORT COCKPIT WALL
D - STARBOARD COCKPIT WALL
E - ENGINE BAY
F - COCKPIT FLOOR
G - NOSE COMPARTMENT

LOCATION DIAGRAM (ELECTRICAL GENERAL SERVICES) FIG. 57

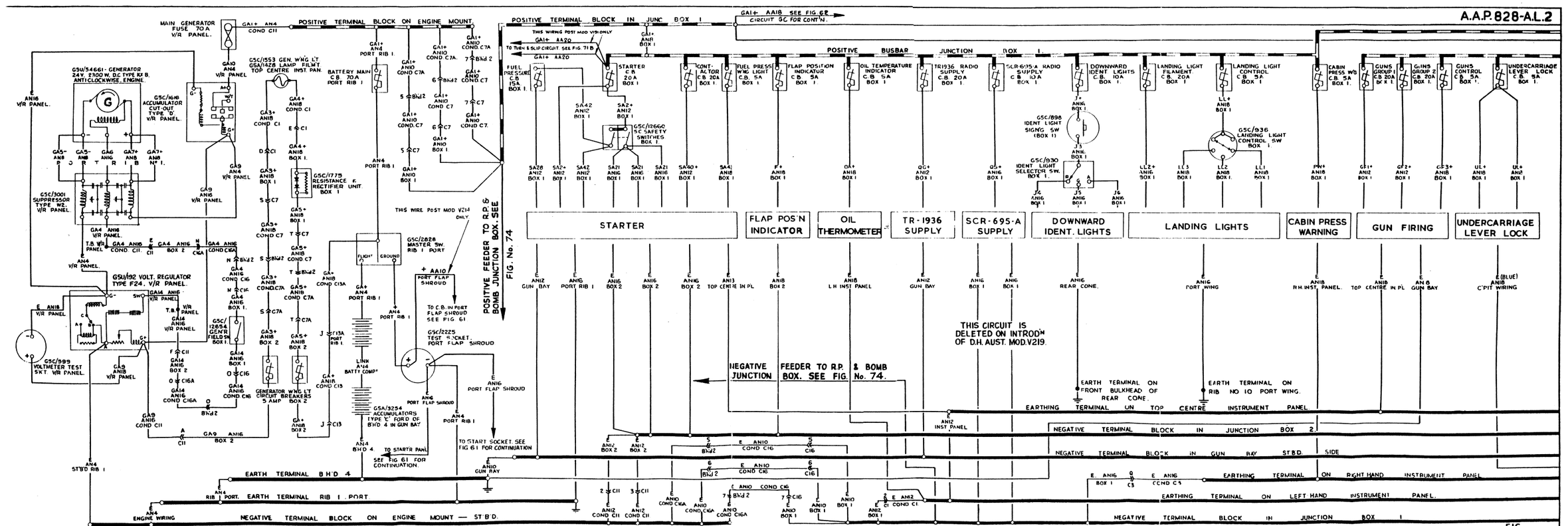




VIEW LOOKING AFT ON FRONT FACE OF BULKHEAD No. 2

LOCATION DIAGRAM (RADIO)

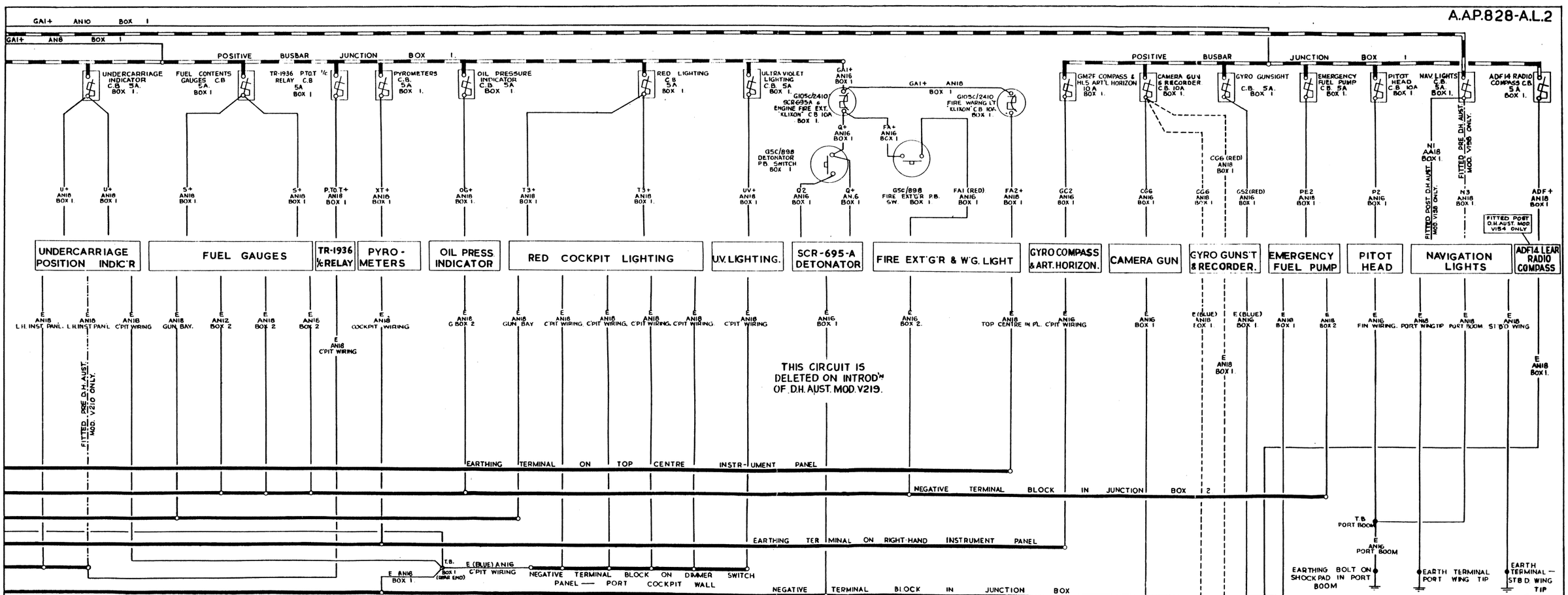
FIG. 58



GENERAL SERVICES ELECTRICAL SYSTEM DH·100 MK. 30 POSITIVE & NEGATIVE FEEDER DIAGRAM.

FIG 59

NOTE:- THE ABOVE DIAGRAM HAS THE FOLLOWING D.H. AUST. MODS. INCORPORATED:- V84-V108-V141-V162-V189-V214-V219 V191, V154, V198, V202.



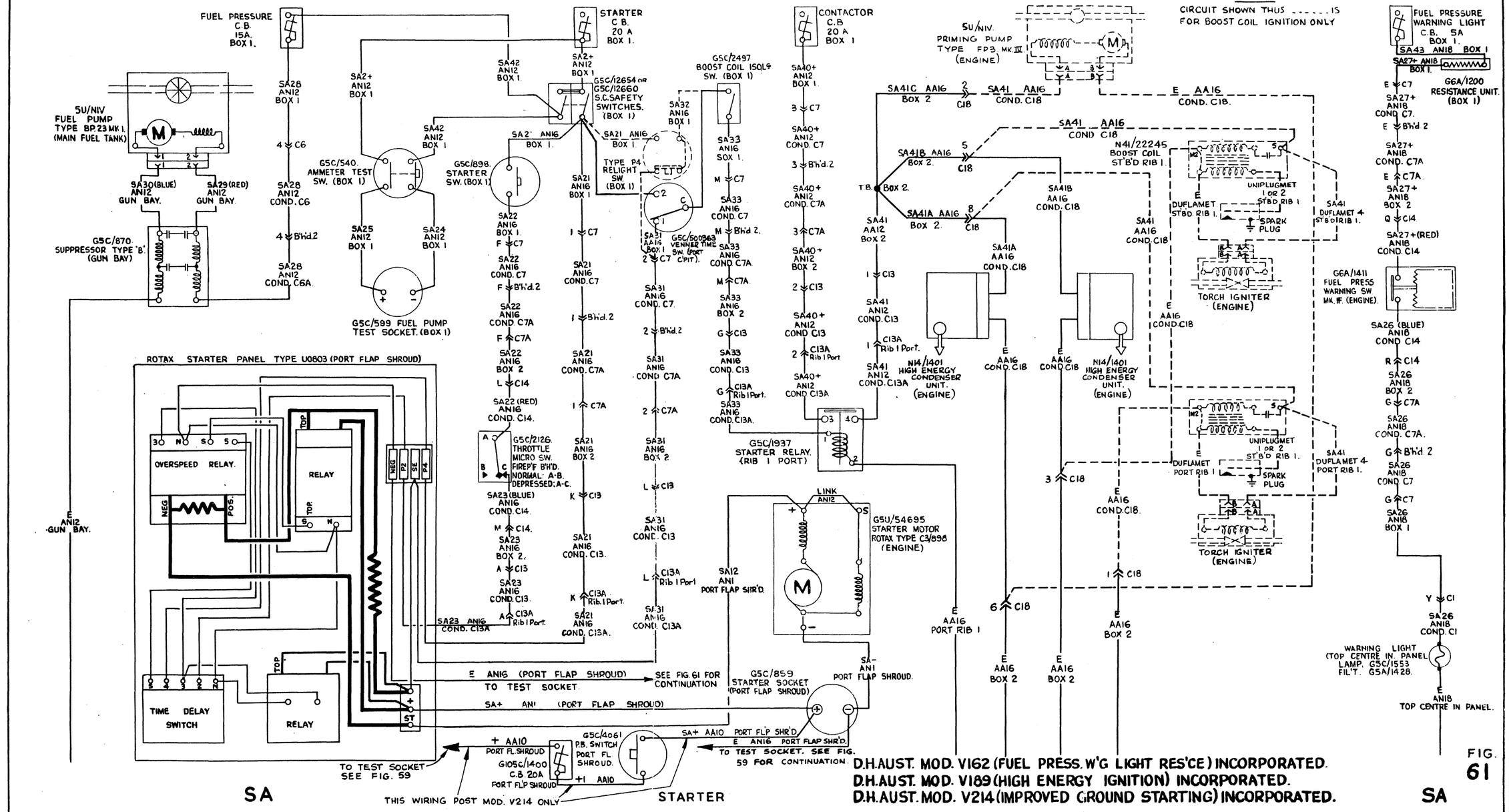
NOTE:- THE ABOVE DIAGRAM HAS THE FOLLOWING D.H. AUST. MODS. INCORPORATED:- V102-V108-V111-V84-V159-V210-V198-V219-V154-

WIRING SHOWN THUS --------IS FITTED 'PRE MOD. V84 ONLY'.

GENERAL SERVICES ELECTRICAL SYSTEM DH·100 MK. 30 POSITIVE & NEGATIVE FEEDER DIAGRAM.

FIG. 60

NOTE
CIRCUIT SHOWN THUS ..... IS FOR BOOST COIL IGNITION ONLY



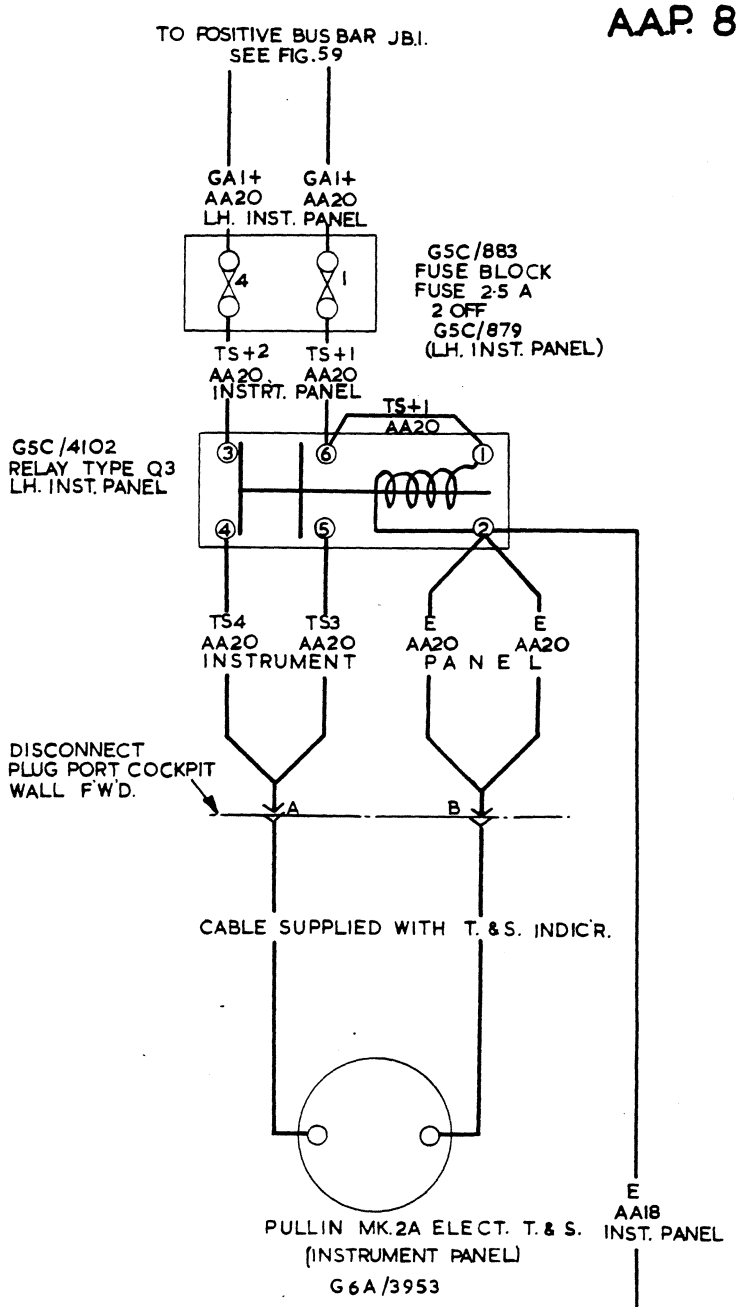
SA

STARTER

D.H.AUST. MOD. V162 (FUEL PRESS. W'G LIGHT RES'CE) INCORPORATED.
D.H.AUST. MOD. V189 (HIGH ENERGY IGNITION) INCORPORATED.
D.H.AUST. MOD. V214 (IMPROVED GROUND STARTING) INCORPORATED.

SA

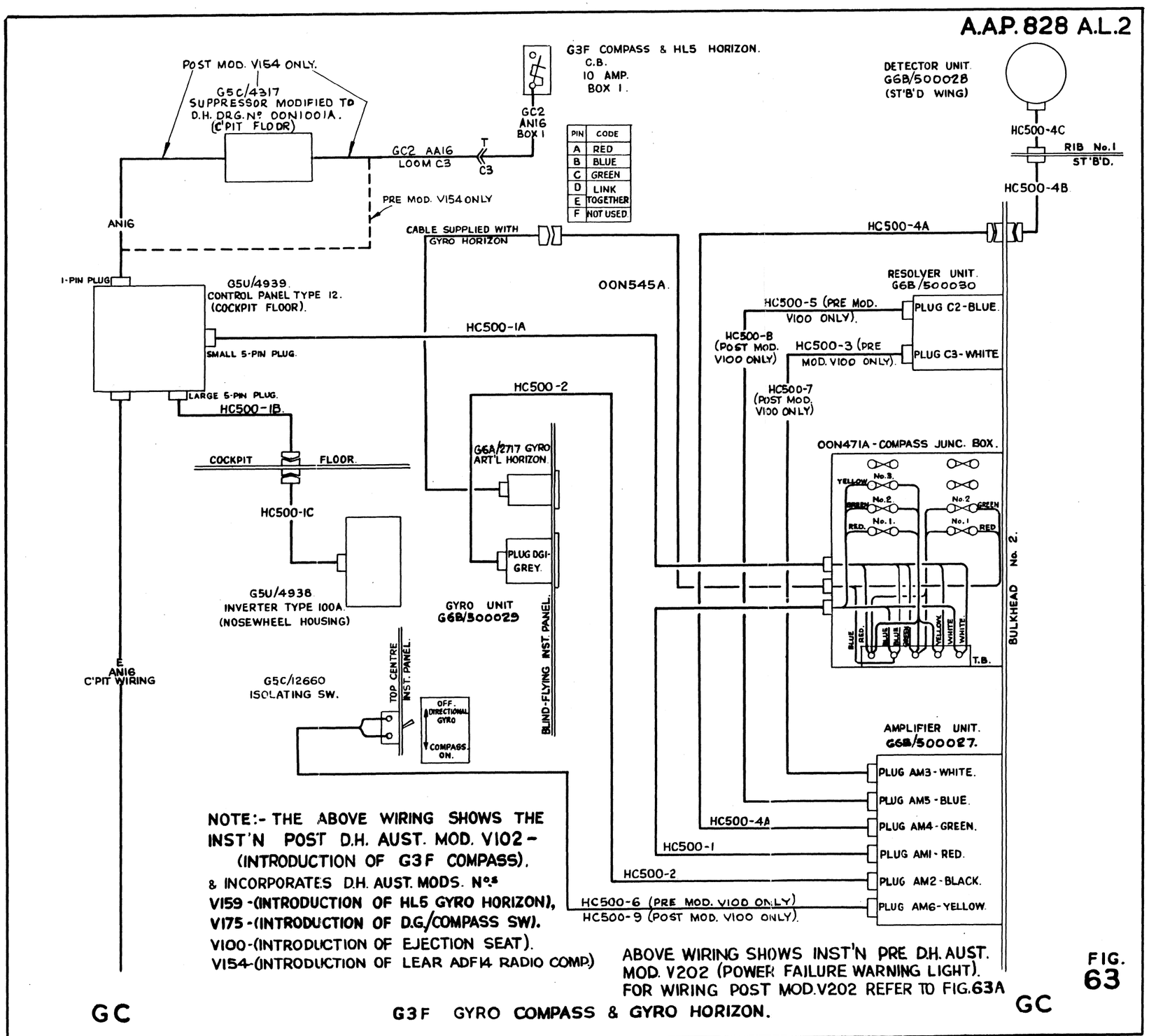
FIG. 61



ABOVE WIRING SHOWS INSTN. POST D.H. AUST. MOD. V191 (INTROD'N. OF PULLIN MK.2A. TURN & SLIP INDICATOR).

TS TURN AND SLIP INDICATOR TS

FIG. 62



NOTE:- THE ABOVE WIRING SHOWS THE INST'N POST D.H. AUST. MOD. V102 - (INTRODUCTION OF G3F COMPASS), & INCORPORATES D.H. AUST. MODS. Nºs V159 - (INTRODUCTION OF HL5 GYRO HORIZON), V175 - (INTRODUCTION OF D.G./COMPASS SW). V100 - (INTRODUCTION OF EJECTION SEAT). V154 - (INTRODUCTION OF LEAR ADF14 RADIO COMP.)

ABOVE WIRING SHOWS INST'N PRE D.H. AUST. MOD. V202 (POWER FAILURE WARNING LIGHT). FOR WIRING POST MOD. V202 REFER TO FIG. 63A

FIG. 63

GC

G3F GYRO COMPASS & GYRO HORIZON.

GC

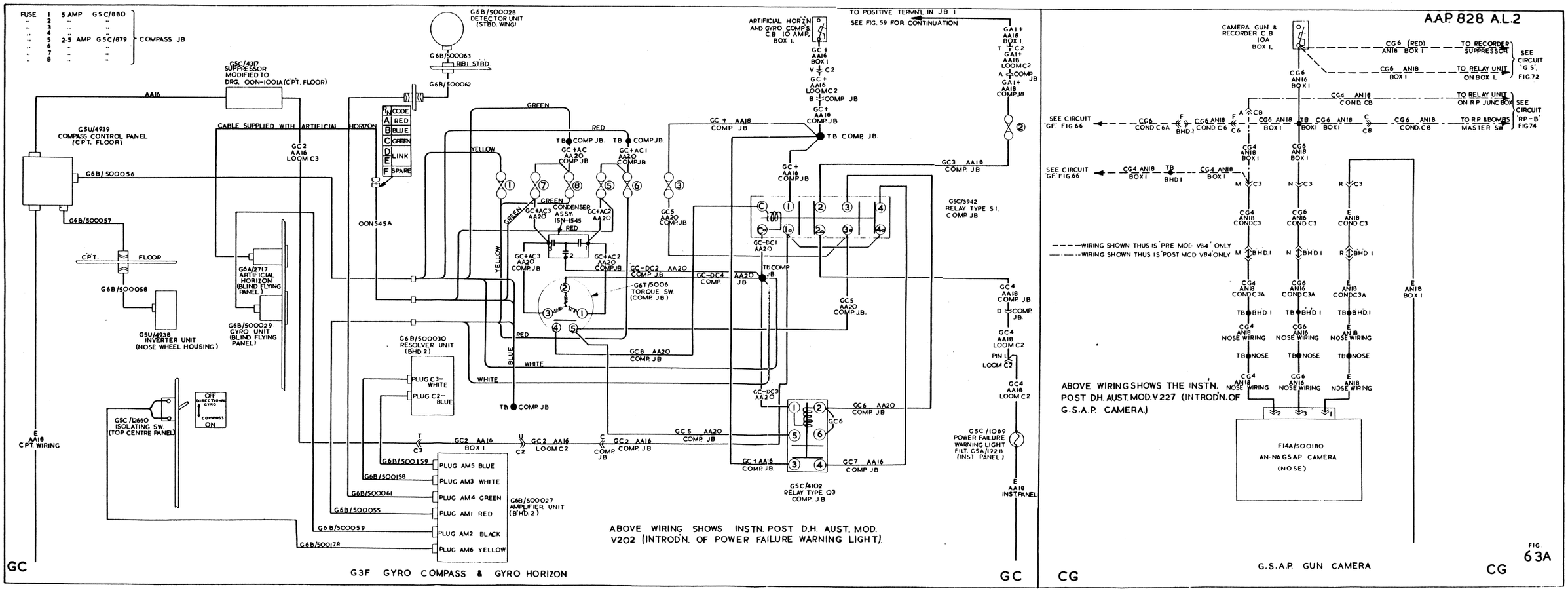
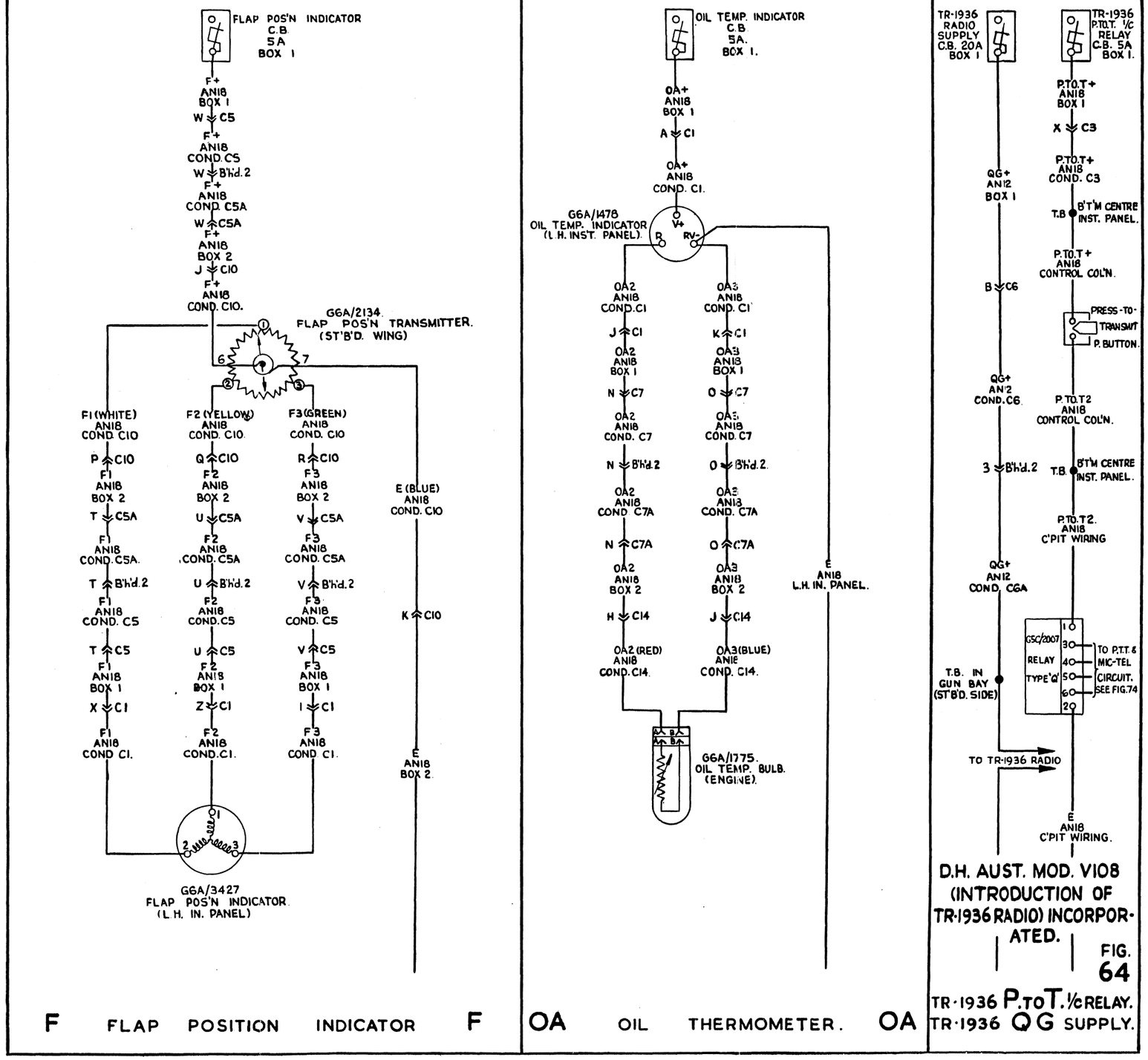
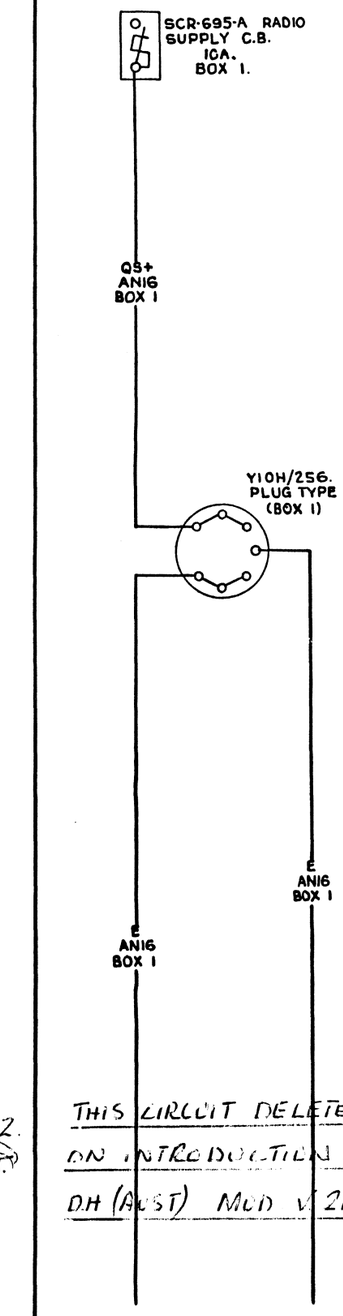

FUSE 1 5 AMP G5C/880
2
3
4
5 2.5 AMP G5C/879
6
7
8
COMPASS JB
G5C/4317 SUPPRESSOR MODIFIED TO DRG. OON-1001A (C'PT. FLOOR)
AA16
CABLE SUPPLIED WITH ARTIFICIAL HORIZON
G5U/4939 COMPASS CONTROL PANEL (C'PT. FLOOR)
GC2 AA16 LOOM C3
G6B/500056
G6B/500057
C'PT. FLOOR
G6B/500058
G5U/4938 INVERTER UNIT (NOSE WHEEL HOUSING)
G6A/2717 ARTIFICIAL HORIZON (BLIND FLYING PANEL)
G6B/500029 GYRO UNIT (BLIND FLYING PANEL)
G5C/12660 ISOLATING SW. (TOP CENTRE PANEL)
OFF DIRECTIONAL GYRO
COMPASS ON
E AA18 C'PT. WIRING
G6B/500028 DETECTOR UNIT (STBD. WING)
G6B/500063
RIB1 STBD
G6B/500062
CODE
A RED
B BLUE
C GREEN
D LINK
F SPARE
OON545A
GREEN
RED
YELLOW
TB COMP JB.
GC+AC1 AA20 COMP JB
GC+AC2 AA20 COMP JB
GC+AC3 AA20 COMP JB
GC+AC4 AA20 COMP JB
CONDENSER ASSY. ISN-1545
-G6T/5006 TORQUE SW (COMP JB)
GC-DC1 AA20
GC-DC2 AA20 COMP JB
GC-DC4 COMP. AA20 JB
GC-IC3 AA20
GC6 AA20 COMP JB
GC7 AA16 COMP JB
G5C/4102 RELAY TYPE Q3 COMP. JB
GC5 AA20 COMP JB
GC8 AA20 COMP JB
GC5 AA20 COMP JB.
GC3 AA18 COMP JB
G5C/3942 RELAY TYPE S1 COMP JB
GC4 AA18 COMP JB
D COMP JB.
GC4 AA18 LOOM C2
PIN L LOOM C2
G5C/1069 POWER FAILURE WARNING LIGHT FILT. G5A/192H (INST. PANEL)
E AA18 INST. PANEL
WHITE
BLUE
G6B/500030 RESOLVER UNIT (BHD 2)
PLUG C3 WHITE
PLUG C2 BLUE
GC2 AA16 BOX 1
GC2 AA16 LOOM C2
GC2 AA16 COMP JB
GC 5 AA20 COMP JB
G6B/500159
G6B/500158
G6B/500061
G6B/500055
G6B/500059
G6B/500178
PLUG AM5 BLUE
PLUG AM3 WHITE
PLUG AM4 GREEN
PLUG AM1 RED
PLUG AM2 BLACK
PLUG AM6 YELLOW
G6B/500027 AMPLIFIER UNIT (BHD 2)
ARTIFICIAL HORIZN AND GYRO COMP.S C.B 10 AMP. BOX 1.
GC+ AA16 BOX 1
GC+ AA16 LOOM C2
GC+ AA16 COMP JB
GC+ AA18 COMP JB
GA1+ AA18 BOX 1
GA1+ AA18 LOOM C2
GA1+ AA18 COMP JB
TO POSITIVE TERMNL IN JB 1
SEE FIG. 59 FOR CONTINUATION
ABOVE WIRING SHOWS INSTN. POST D.H. AUST. MOD. V202 (INTROD'N. OF POWER FAILURE WARNING LIGHT).
GC
G3F GYRO COMPASS & GYRO HORIZON
GC
AAP 828 A.L.2
CAMERA GUN & RECORDER C.B 10A BOX 1.
CG6 AN16 BOX 1
CG6 (RED) AN18 BOX 1
TO RECORDER SUPPRESSOR
CG6 AN18 BOX 1
TO RELAY UNIT ON BOX 1.
SEE CIRCUIT 'G' S' FIG 72
CG4 AN18 COND CB
TO RELAY UNIT ON R.P. JUNC BOX
SEE CIRCUIT 'RP-B' FIG 74
TO R.P. BOMBS MASTER SW
SEE CIRCUIT 'GF' FIG 66
CG6 COND C6A
CG6 AN18 COND C6
CG6 AN18 BOX 1
CG6 AN18 COND C8
CG4 AN18 BOX 1
CG4 AN18 COND C3
CG6 AN16 COND C3
E AN18 COND C3
CG4 AN18 COND C3A
CG6 AN16 COND C3A
E AN18 COND C3A
CG4 AN18 NOSE WIRING
CG6 AN16 NOSE WIRING
E AN18 NOSE WIRING
TB BHD 1
TB NOSE
E AN18 BOX 1
---WIRING SHOWN THUS IS 'PRE MOD: V84' ONLY
-.-.-WIRING SHOWN THUS IS 'POST MOD V84' ONLY
ABOVE WIRING SHOWS THE INSTN. POST D.H. AUST. MOD. V227 (INTROD'N. OF G.S.A.P. CAMERA)
F14A/500180 AN-N6 G.S.A.P. CAMERA (NOSE)
G.S.A.P. GUN CAMERA
CG

FIG 63A

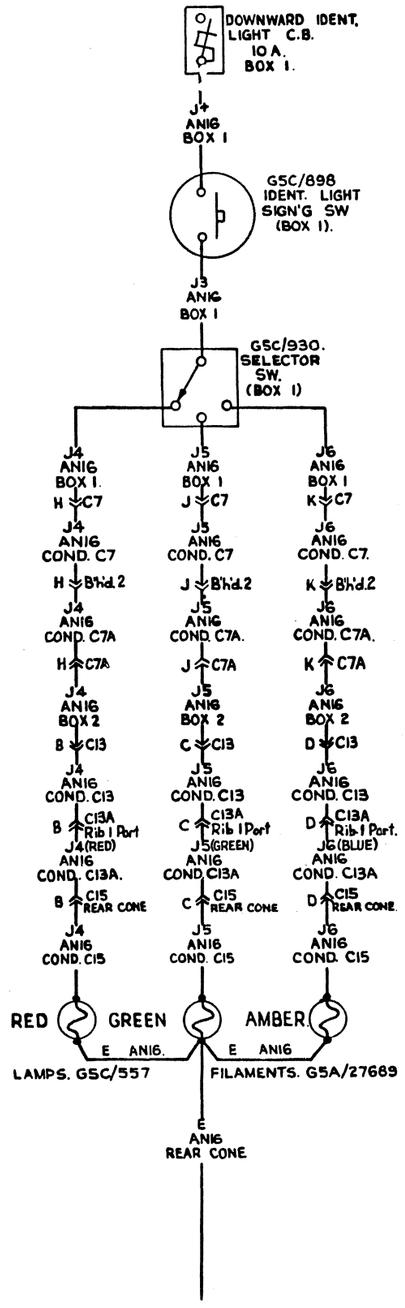

FLAP POS'N INDICATOR C.B. 5A BOX 1
F+ AN18 BOX 1
W C5
F+ AN18 COND. C5
W B'hd. 2
F+ AN18 COND. C5A
W C5A
F+ AN18 BOX 2
J C10
F+ AN18 COND. C10.
G6A/2134. FLAP POS'N TRANSMITTER. (ST'B'D. WING)
F1 (WHITE) AN18 COND. C10
F2 (YELLOW) AN18 COND. C10.
F3 (GREEN) AN18 COND. C10
E (BLUE) AN18 COND. C10
P C10
Q C10
R C10
F1 AN18 BOX 2
F2 AN18 BOX 2
F3 AN18 BOX 2
T C5A
U C5A
V C5A
F1 AN18 COND. C5A.
F2 AN18 COND. C5A
F3 AN18 COND. C5A
T B'hd. 2
U B'hd. 2
V B'hd. 2
F1 AN18 COND. C5
F2 AN18 COND. C5
F3 AN18 COND. C5
T C5
U C5
V C5
F1 AN18 BOX 1
F2 AN18 BOX 1
F3 AN18 BOX 1
X C1
Z C1
I C1
F1 AN18 COND C1.
F2 AN18 COND. C1.
F3 AN18 COND C1.
K C10
E AN18 BOX 2
G6A/3427 FLAP POS'N INDICATOR (L.H. IN. PANEL)
F FLAP POSITION INDICATOR F
OIL TEMP. INDICATOR C.B. 5A. BOX 1.
OA+ AN18 BOX 1
A C1
OA+ AN18 COND. C1.
G6A/1478 OIL TEMP. INDICATOR (L.H. INST. PANEL).
V+
R
RV-
OA2 AN18 COND.C1
OA3 AN18 COND. C1
J C1
K C1
OA2 AN18 BOX 1
OA3 AN18 BOX 1
N C7
O C7
OA2 AN18 COND. C7
OA3 AN18 COND. C7
N B'hd.2
O B'hd.2.
OA2 AN18 COND C7A
OA3 AN18 COND. C7A
N C7A
O C7A
OA2 AN18 BOX 2
OA3 AN18 BOX 2
H C14
J C14
OA2 (RED) AN18 COND. C14.
OA3 (BLUE) AN18 COND. C14.
G6A/1775. OIL TEMP. BULB. (ENGINE).
E AN18 L.H. IN. PANEL.
OA OIL THERMOMETER. OA
TR-1936 RADIO SUPPLY C.B. 20A BOX 1
TR-1936 P.TO.T. 1/C RELAY C.B. 5A BOX 1.
P.TO.T+ AN18 BOX 1
X C3
P.TO.T+ AN18 COND. C3
QG+ AN12 BOX 1
T.B B'T'M CENTRE INST. PANEL.
P.TO.T+ AN18 CONTROL COL'N.
B C6
PRESS-TO-TRANSMIT P. BUTTON.
QG+ AN12 COND. C6.
P.TO.T2 AN18 CONTROL COL'N.
3 B'hd.2
T.B B'T'M CENTRE INST. PANEL.
P.TO.T2. AN18 C'PIT WIRING
QG+ AN12 COND. C6A
GSC/2007 RELAY TYPE 'Q'
1 O
3 O
4 O
5 O
6 O
2 O
TO P.T.T. & MIC-TEL CIRCUIT. SEE FIG. 74
T.B. IN GUN BAY (ST'B'D. SIDE)
TO TR-1936 RADIO
E AN18 C'PIT WIRING.
D.H. AUST. MOD. V108 (INTRODUCTION OF TR-1936 RADIO) INCORPORATED.
FIG. 64
TR-1936 P.TO.T. 1/c RELAY.
TR-1936 QG SUPPLY.



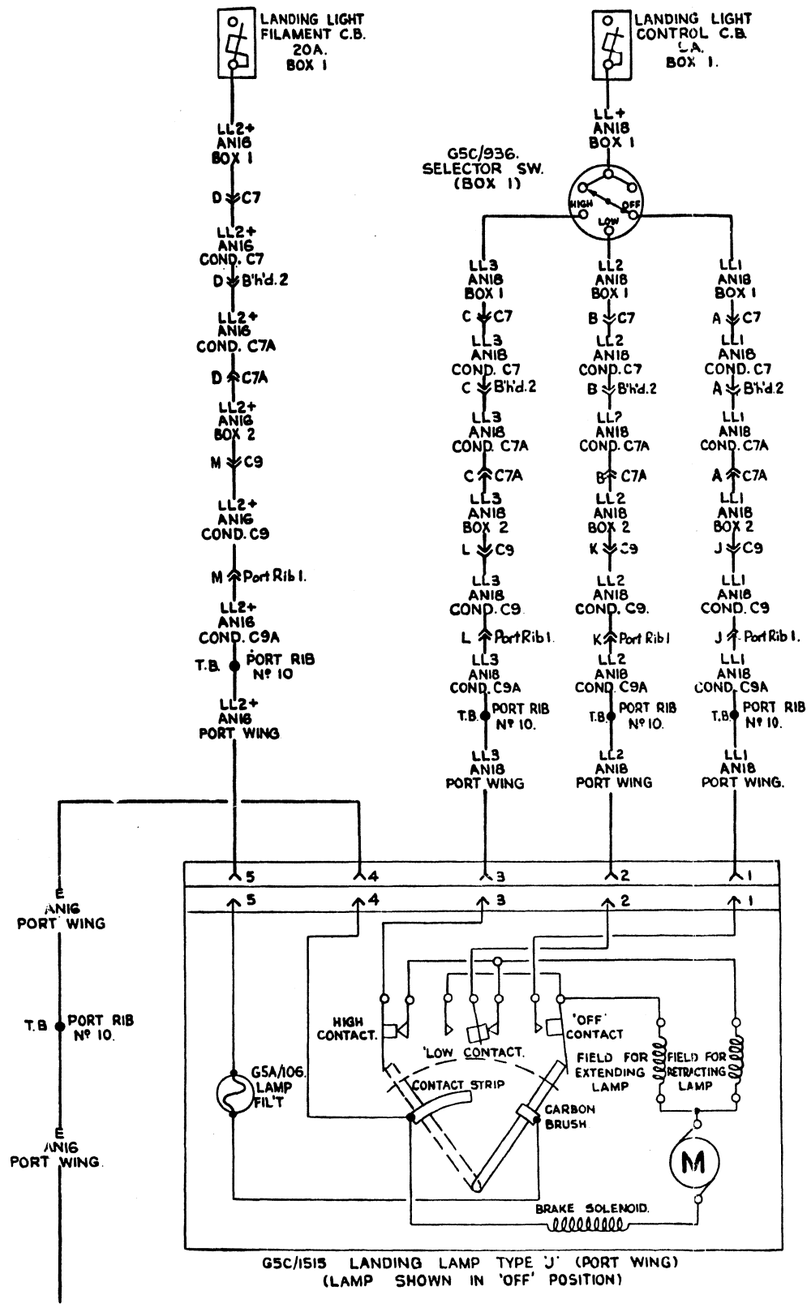
D.L.Z. (W.T.)

THIS CIRCUIT DELETED ON INTRODUCTION OF D.H (AUST) MOD V 210

SCR·695·A **QS** SUPPLY.



DOWNWARD **J** IDENT. LIGHTS.



G5C/1515 LANDING LAMP TYPE 'J' (PORT WING) (LAMP SHOWN IN 'OFF' POSITION)

LL LANDING LIGHT. **LL**

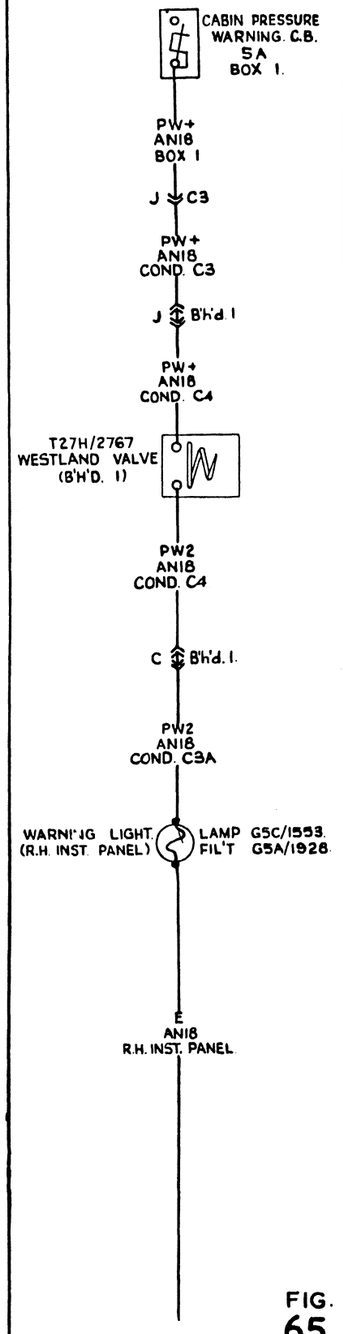
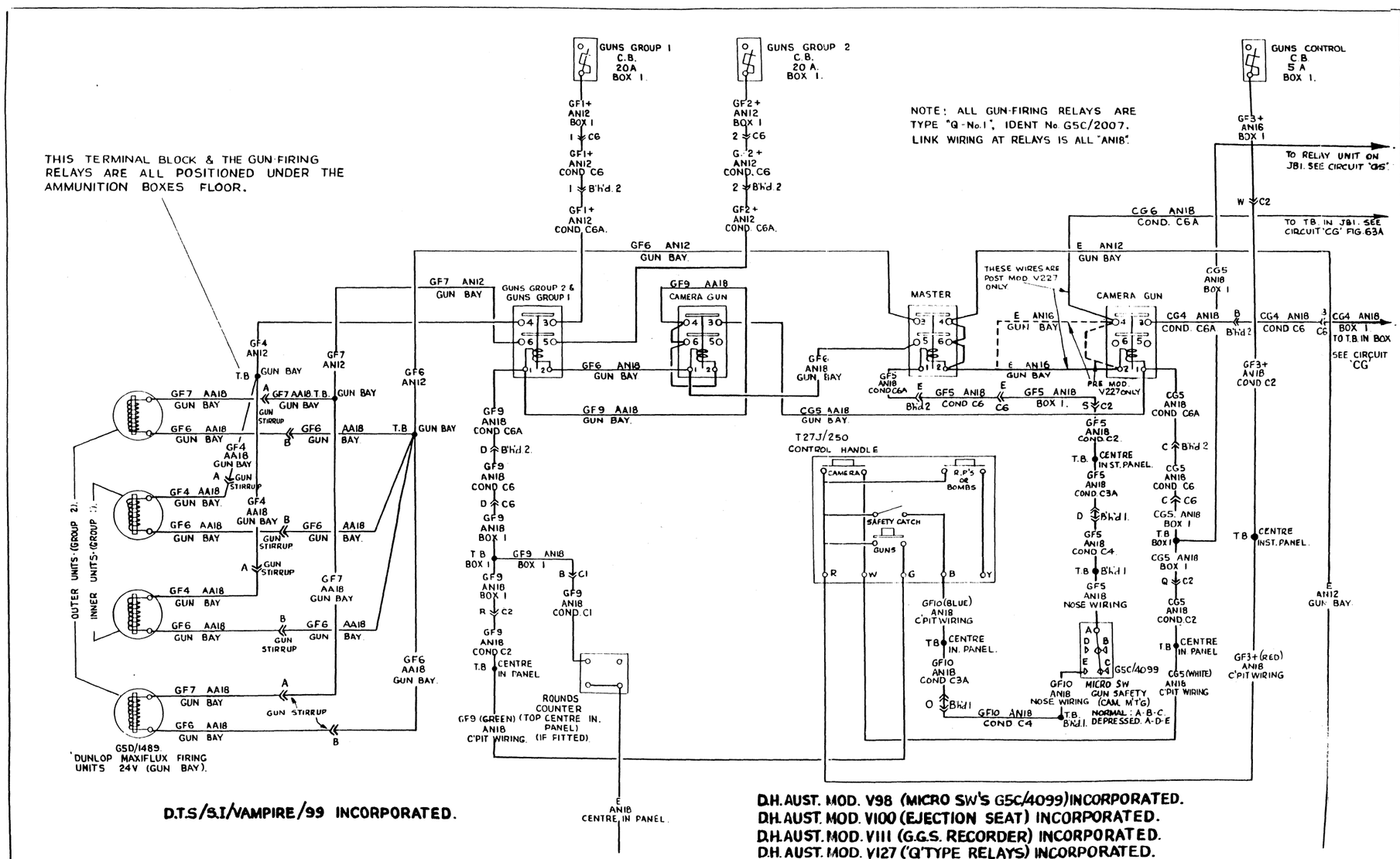


FIG. 65

CABIN PRESS. **PW** WARNING.



D.T.S/S.I/VAMPIRE/99 INCORPORATED.

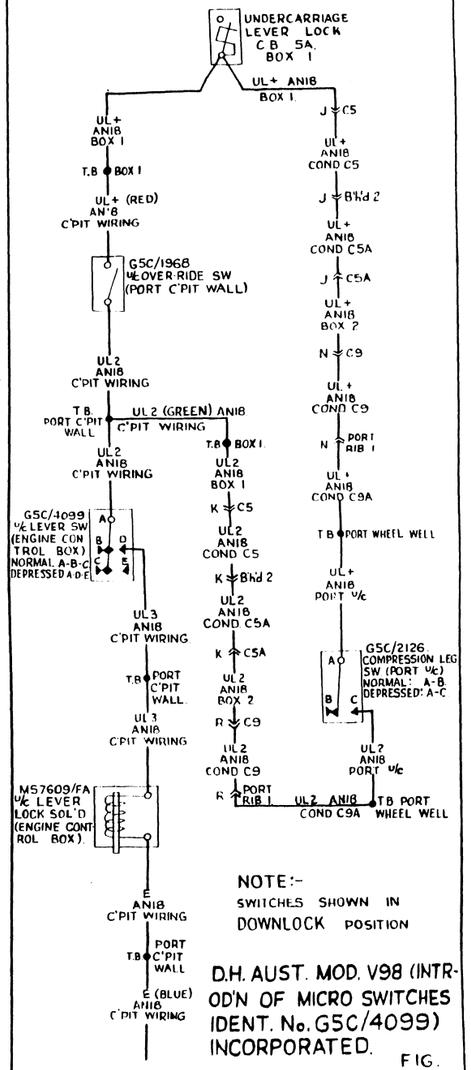
D.H.AUST. MOD. V98 (MICRO SW'S G5C/4099) INCORPORATED.
D.H.AUST. MOD. V100 (EJECTION SEAT) INCORPORATED.
D.H.AUST. MOD. V111 (G.G.S. RECORDER) INCORPORATED.
D.H.AUST. MOD. V127 ('Q' TYPE RELAYS) INCORPORATED.
D.H.AUST. MOD. V211 (BREAK IN GUN-FIRING CABLES) INCORPORATED.
D.H.AUST. MOD. V227 (G.S.A.P. CAMERA) INCORPORATED.

GF

GUN FIRING
(APPLICABLE TO MK.30 A/C ONLY)

SEE FIG 66A FOR MK 31 A/C

GF

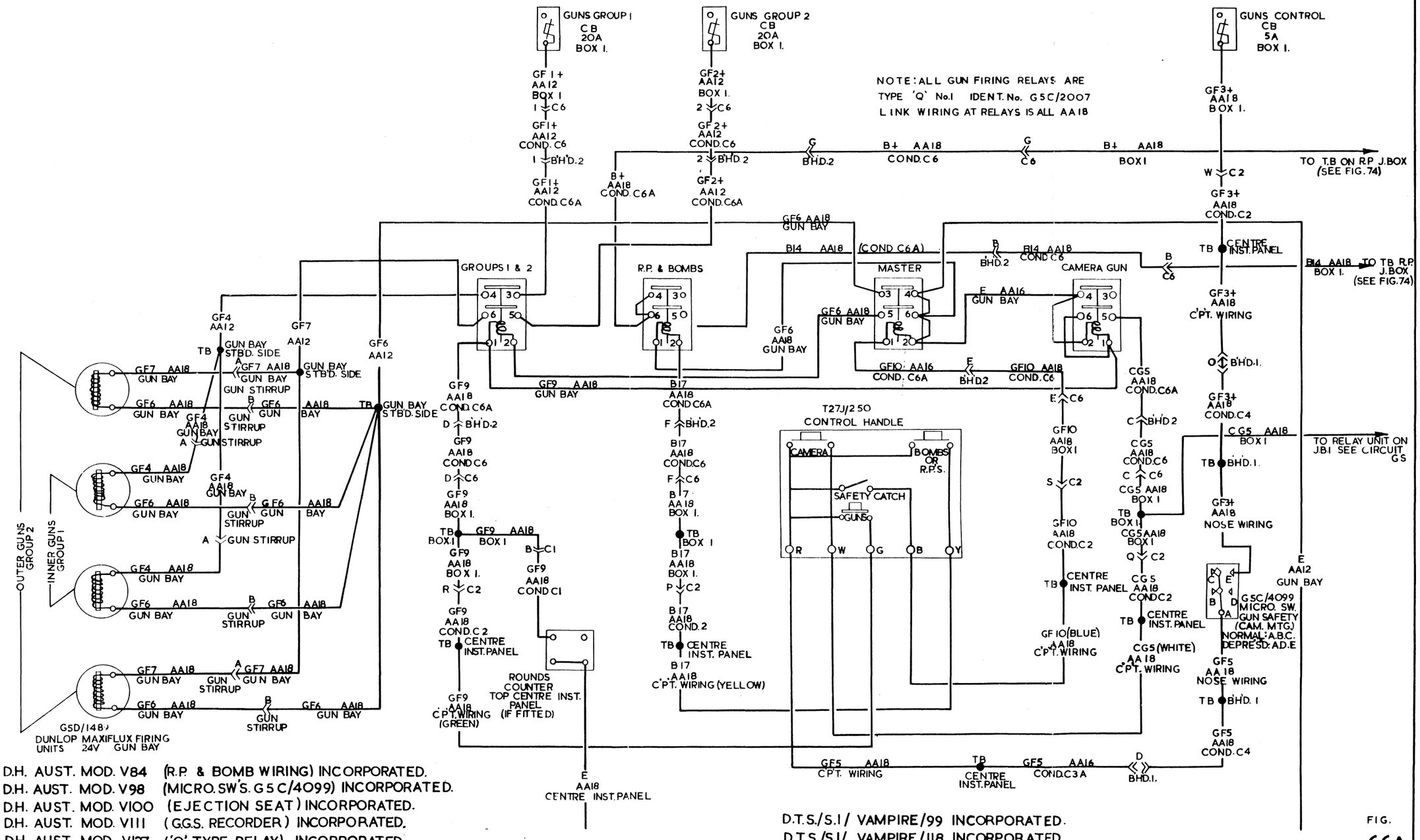


NOTE:-
SWITCHES SHOWN IN DOWNLOCK POSITION

D.H. AUST. MOD. V98 (INTROD'N OF MICRO SWITCHES IDENT. No. G5C/4099) INCORPORATED.

FIG. 66

UNDERCARRIAGE UL LEVER LOCK.



D.H. AUST. MOD. V84 (R.P. & BOMB WIRING) INCORPORATED.
D.H. AUST. MOD. V98 (MICRO. SW'S. G5C/4099) INCORPORATED.
D.H. AUST. MOD. V100 (EJECTION SEAT) INCORPORATED.
D.H. AUST. MOD. V111 (G.G.S. RECORDER) INCORPORATED.
D.H. AUST. MOD. V127 ('Q' TYPE RELAY) INCORPORATED.
D.H. AUST. MOD. V211 (BREAK IN G/F CABLES) INCORPORATED.

D.T.S./S.1/ VAMPIRE/99 INCORPORATED.
D.T.S./S.1/ VAMPIRE/118 INCORPORATED.

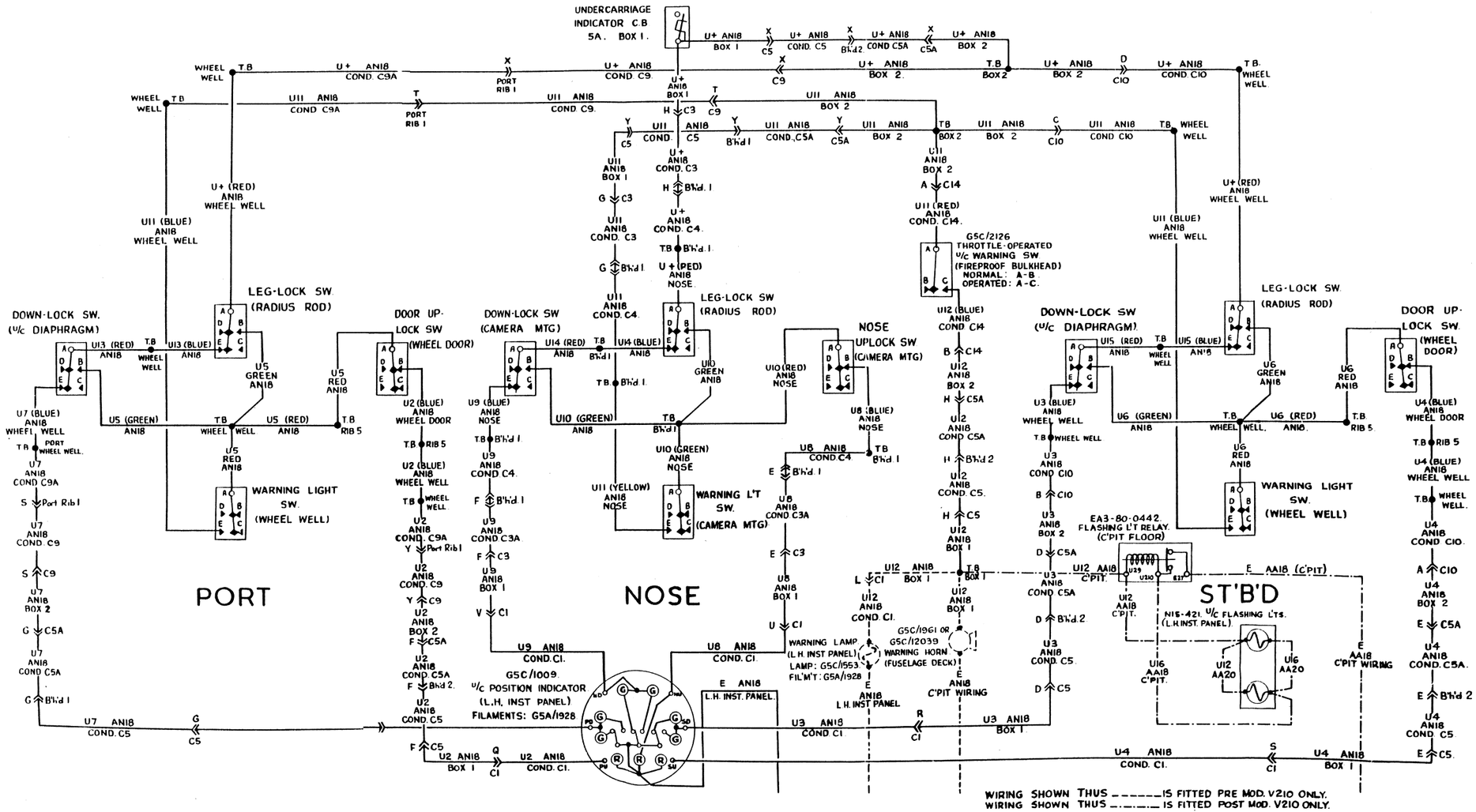
GF

GUN FIRING
(APPLICABLE TO MK31 A/C ONLY)

SEE FIG.66 FOR MK30 A/C

GF

FIG. 66A



NOTES.

CIRCUIT DRAWN WITH UNDERCARRIAGE IN THE DOWN-LOCK POSITION.
LEG-LOCK SWITCH CONTACTS ARE IN THE SAME POSITION IN THE UP-LOCK OR DOWNLOCK STATE & ONLY CHANGE WHEN THE LEG IS UNLOCKED.
UNLESS OTHERWISE STATED THE MICRO SWITCHES ARE IDENT. No G5C/4099-TYPE 4A- THE CONTACT POSITIONS BEING:-
NORMAL: A-B-C
OPERATED: A-D-E

INDICATING SET-UP:-

WHEELS LOCKED DOWN ——— GREEN LIGHTS.
WHEELS BETWEEN DOWN & UP — RED LIGHTS.
WHEELS LOCKED UP BUT DOORS NOT LOCKED — RED LIGHTS.
WHEELS LOCKED UP & DOORS LOCKED — NO LIGHTS.
WHEELS LOCKED UP BUT THROTTLE LESS THAN ¼ OPEN — U/C WARNING LIGHT & HORN.

NOTE!
ABOVE WIRING SHOWS INST'N POST D.H. AUST. MOD. V98 (INTROD'N OF MICRO SWITCHES IDENT No. G5C/4099).
D.H. AUST. MOD. V210 (FLASHING U/C LIGHTS) INCORPORATED.

U — UNDERCARRIAGE POSITION INDICATOR — U

FIG 67

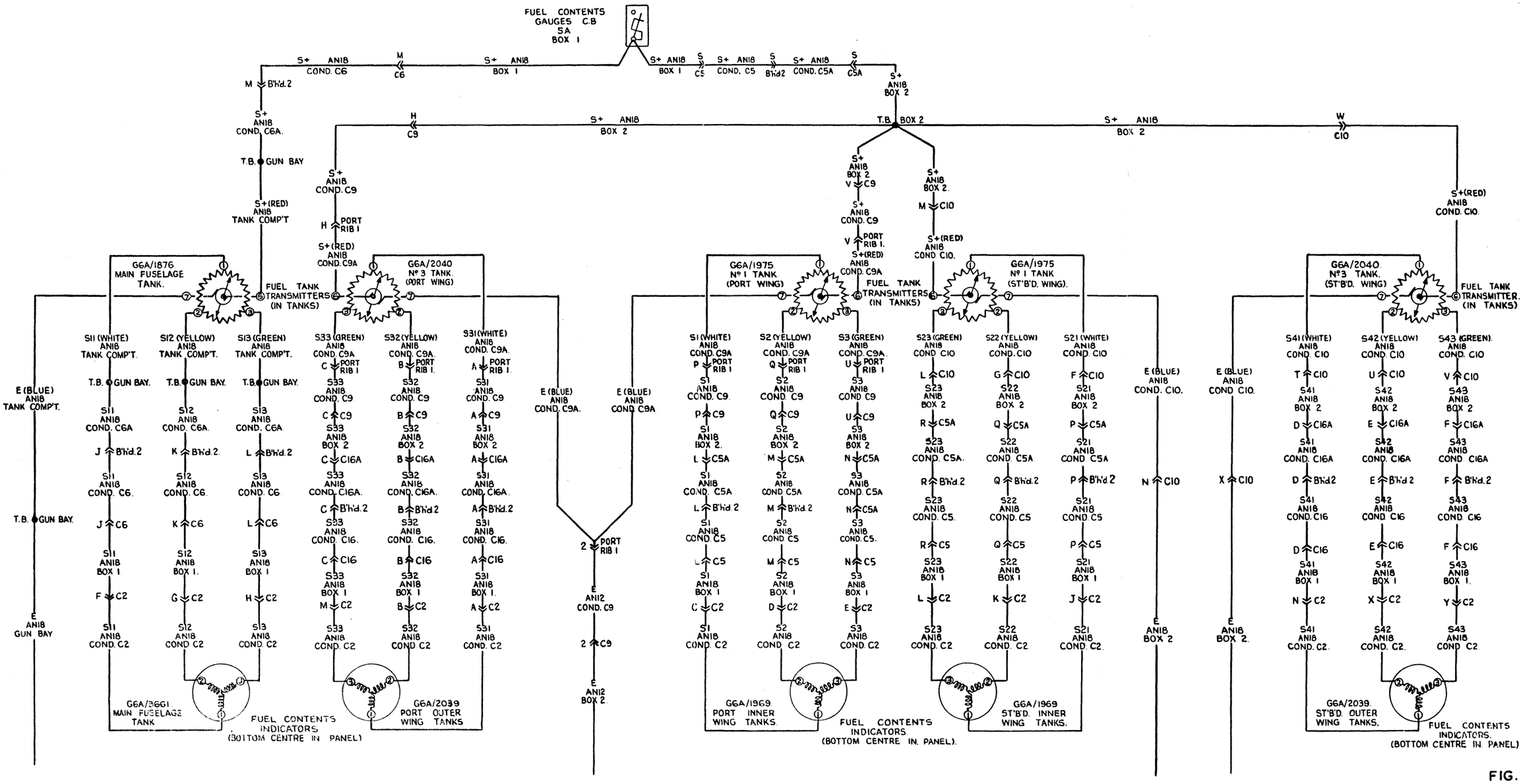
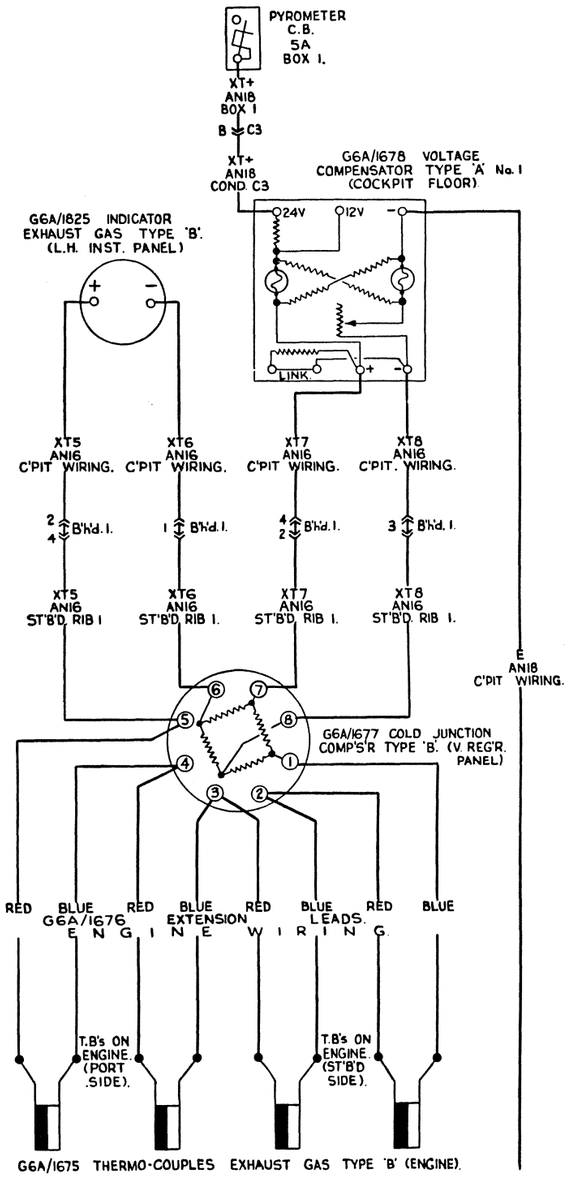


FIG. 68

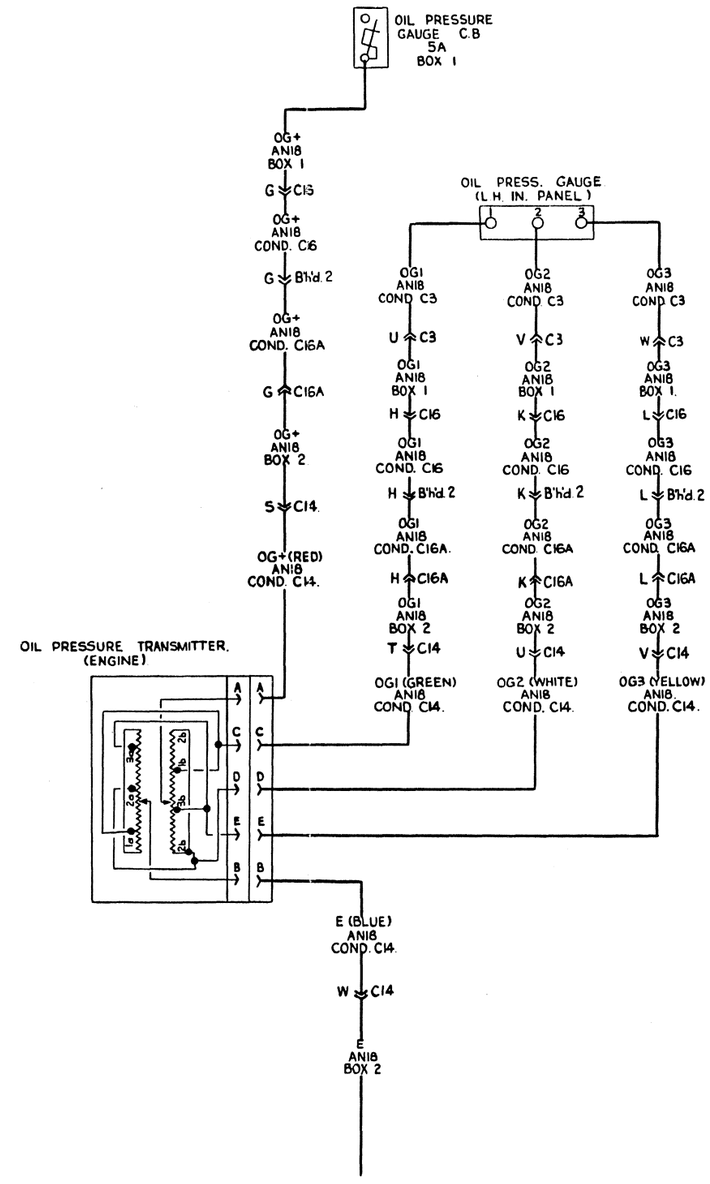
S

FUEL GAUGES.

S



XT PYROMETERS. XT



QG OIL PRESSURE INDICATOR. QG

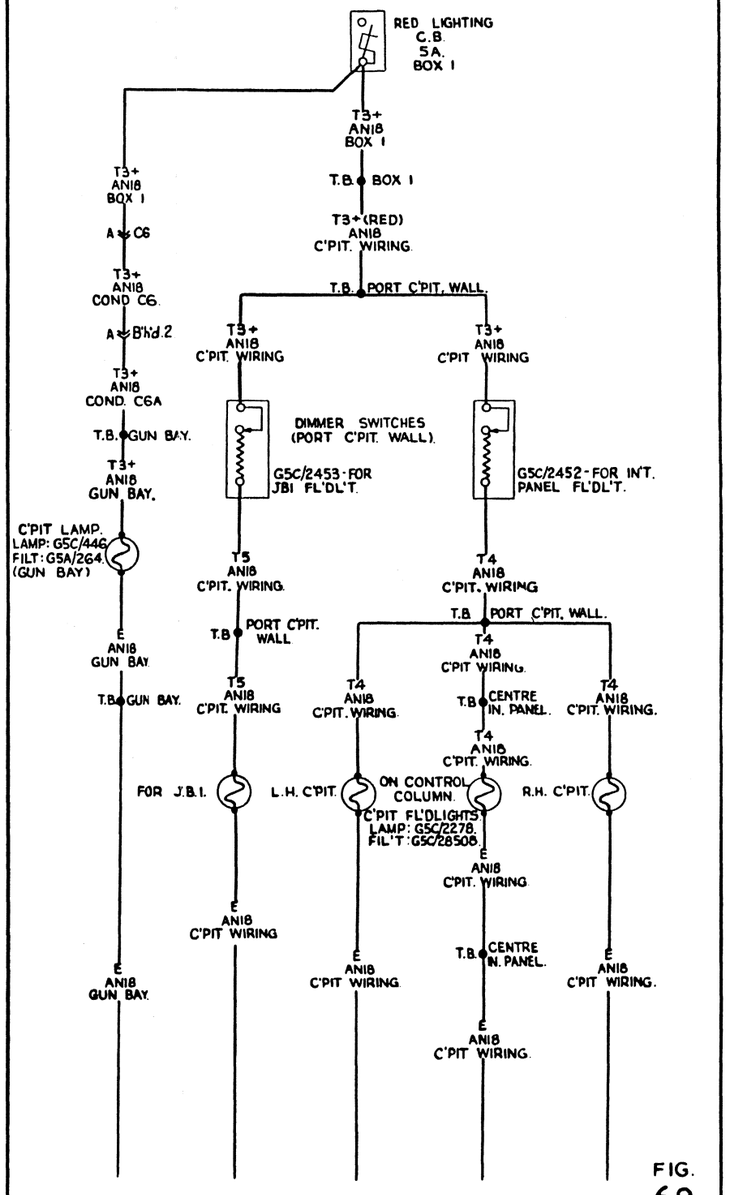
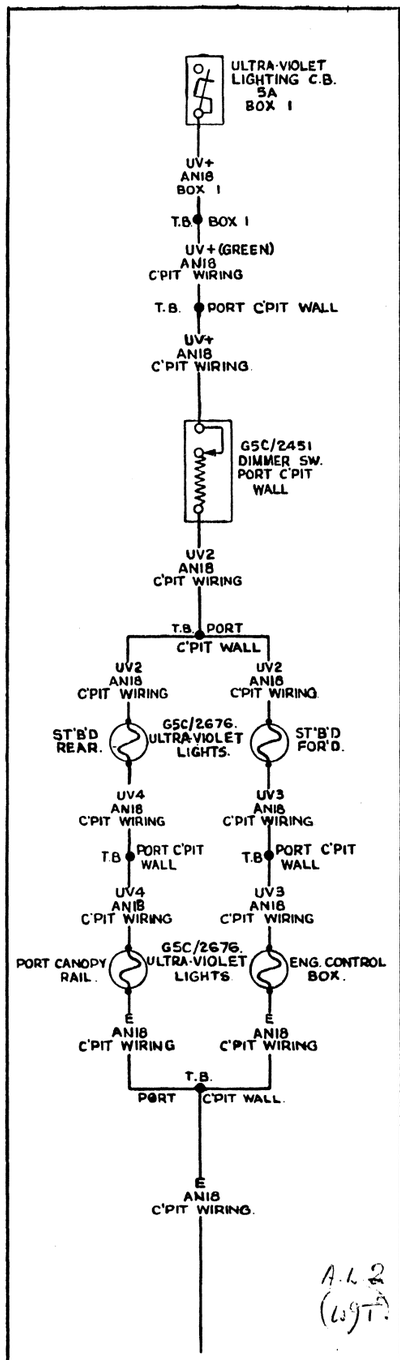


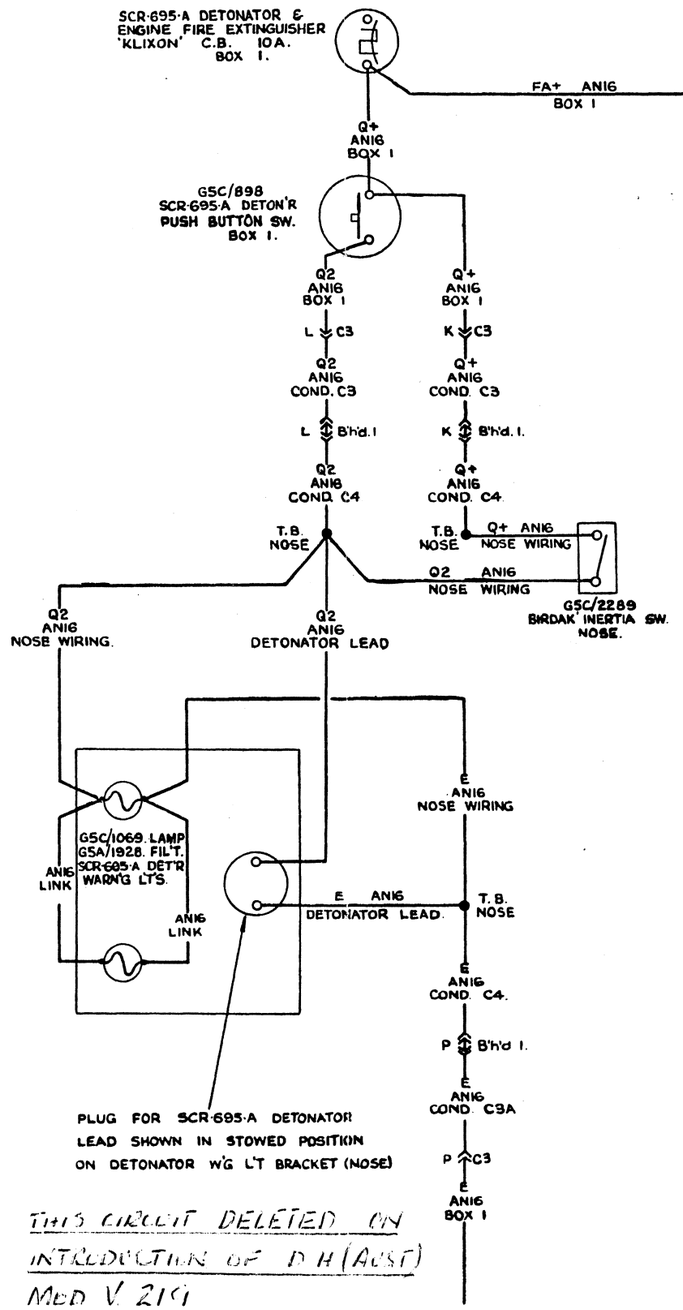
FIG. 69

T RED COCKPIT LIGHTING. T



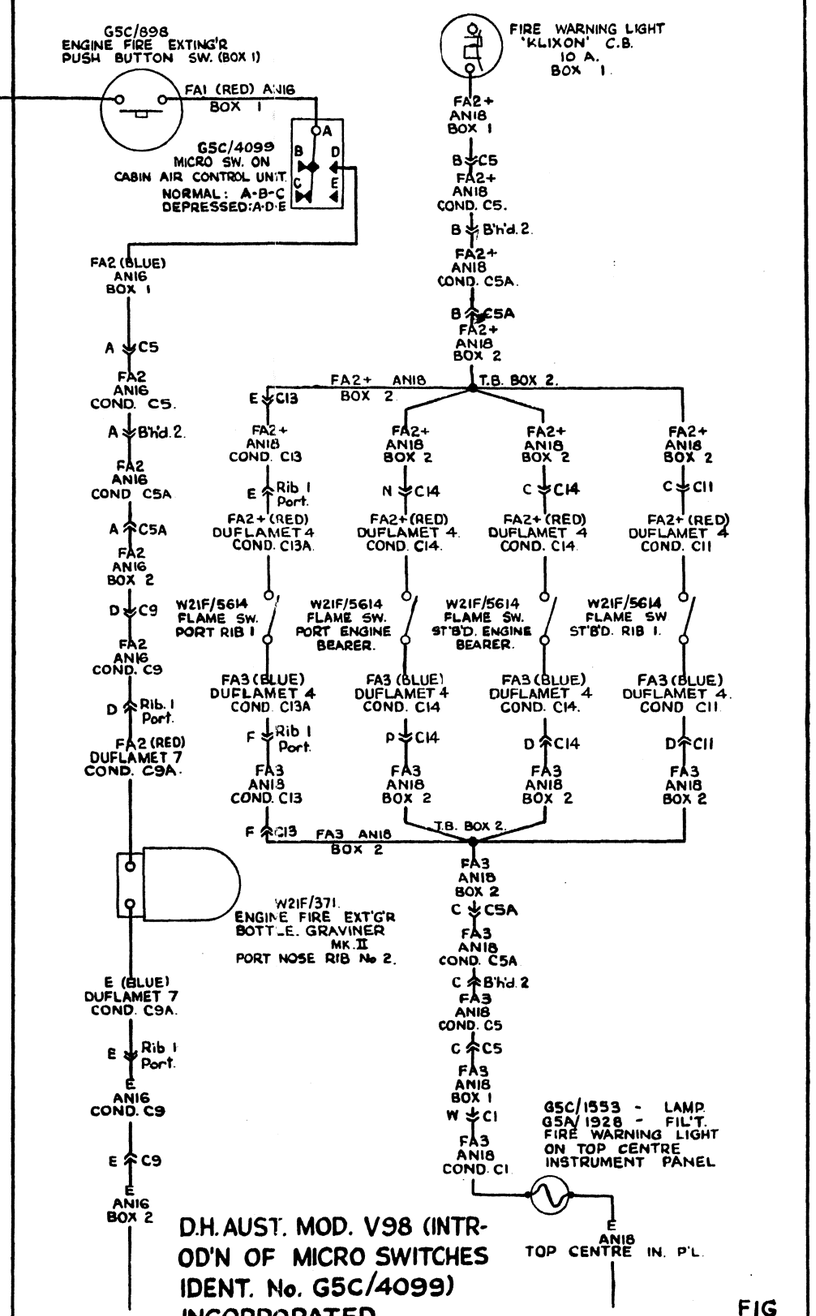
A.L.2 (W'GT.)

ULTRA-VIOLET **UV** LIGHTING.



THIS CIRCUIT DELETED ON INTRODUCTION OF D.H.(AUST) MOD V.216

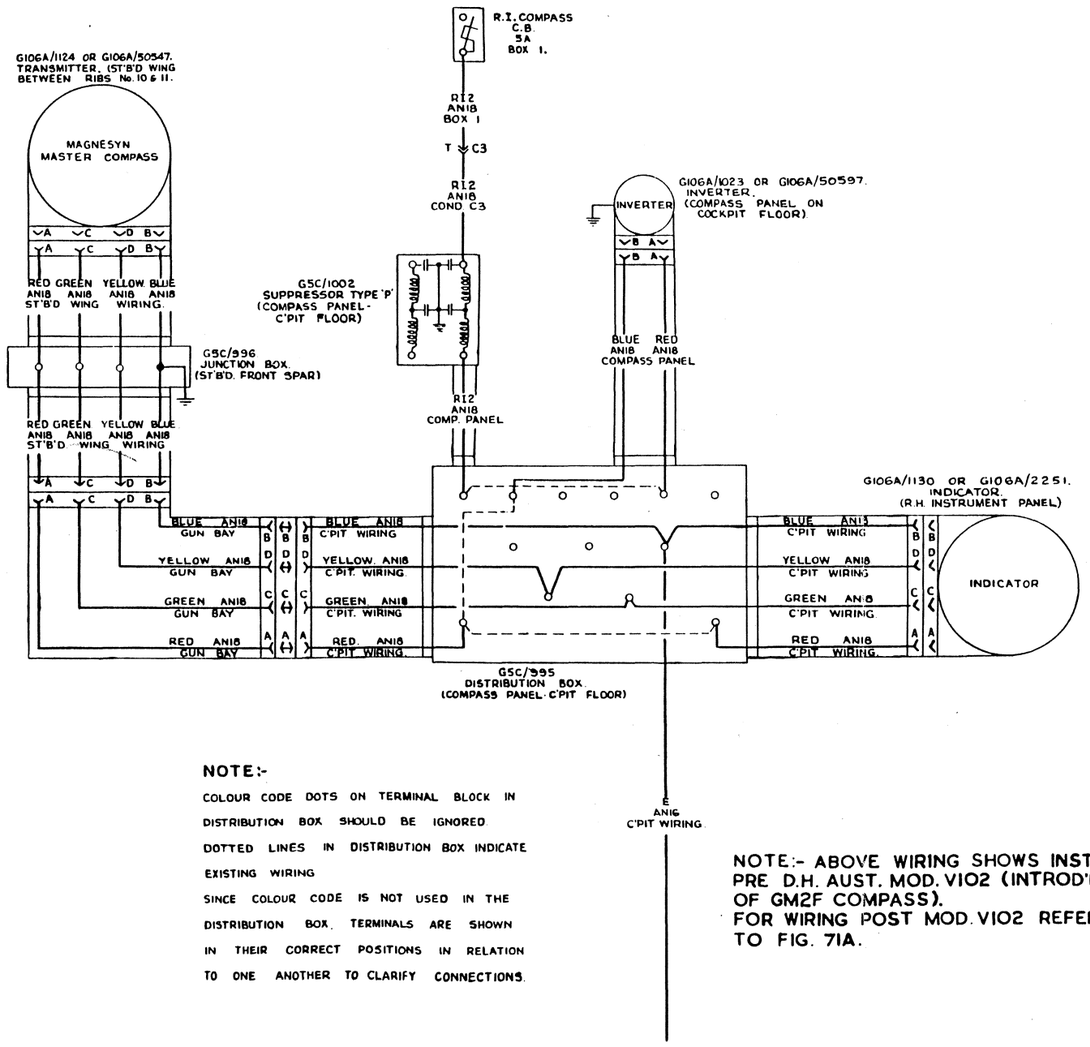
Q SCR-695-A RADIO DETONATOR. **Q**



D.H. AUST. MOD. V98 (INTR-OD'N OF MICRO SWITCHES IDENT. No. G5C/4099) INCORPORATED.

FA FIRE EXTINGUISHER & WARNING LIGHT. **FA**

FIG 70



NOTE:-

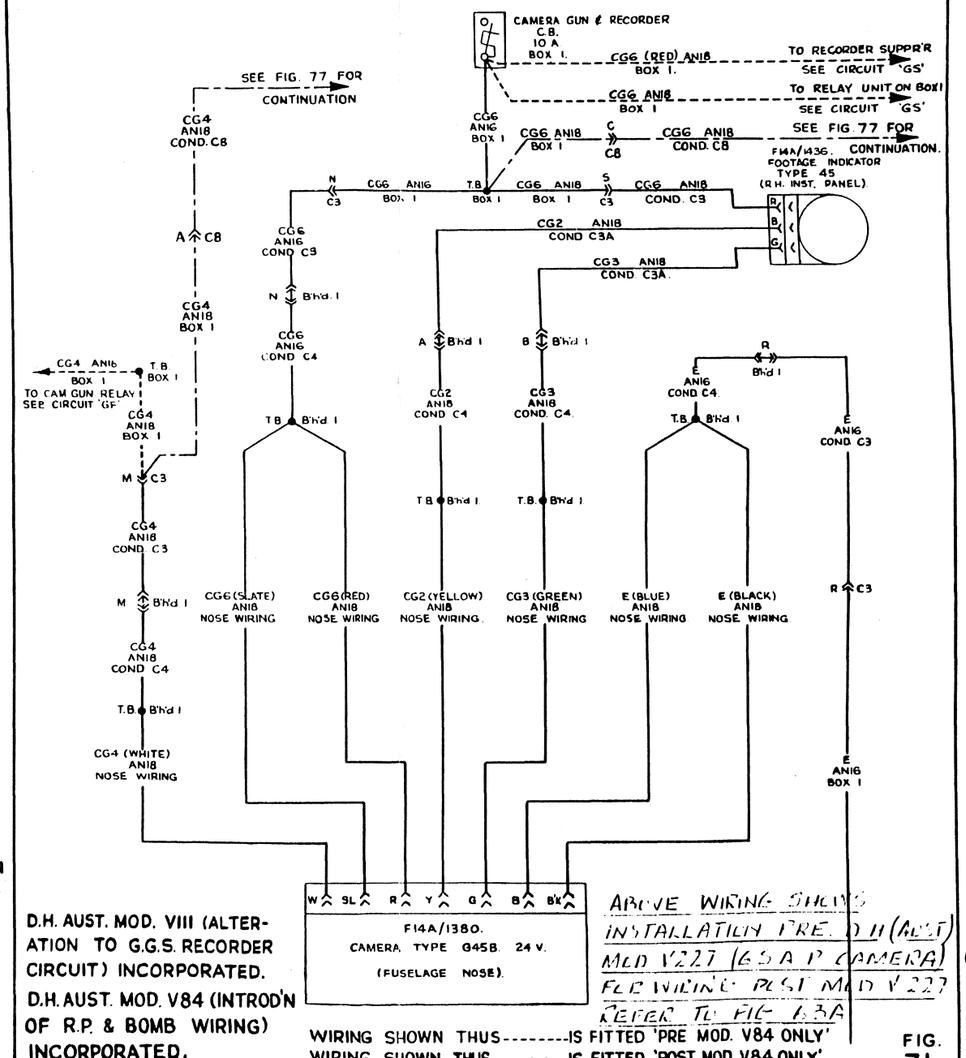
COLOUR CODE DOTS ON TERMINAL BLOCK IN DISTRIBUTION BOX SHOULD BE IGNORED.

DOTTED LINES IN DISTRIBUTION BOX INDICATE EXISTING WIRING

SINCE COLOUR CODE IS NOT USED IN THE DISTRIBUTION BOX, TERMINALS ARE SHOWN IN THEIR CORRECT POSITIONS IN RELATION TO ONE ANOTHER TO CLARIFY CONNECTIONS.

NOTE:- ABOVE WIRING SHOWS INST'N PRE D.H. AUST. MOD. V102 (INTROD'N. OF GM2F COMPASS).
FOR WIRING POST MOD. V102 REFER TO FIG. 71A.

DR MAGNESYN COMPASS. DR



D.H. AUST. MOD. VIII (ALTERATION TO G.G.S. RECORDER CIRCUIT) INCORPORATED.

D.H. AUST. MOD. V84 (INTROD'N OF R.P. & BOMB WIRING) INCORPORATED.

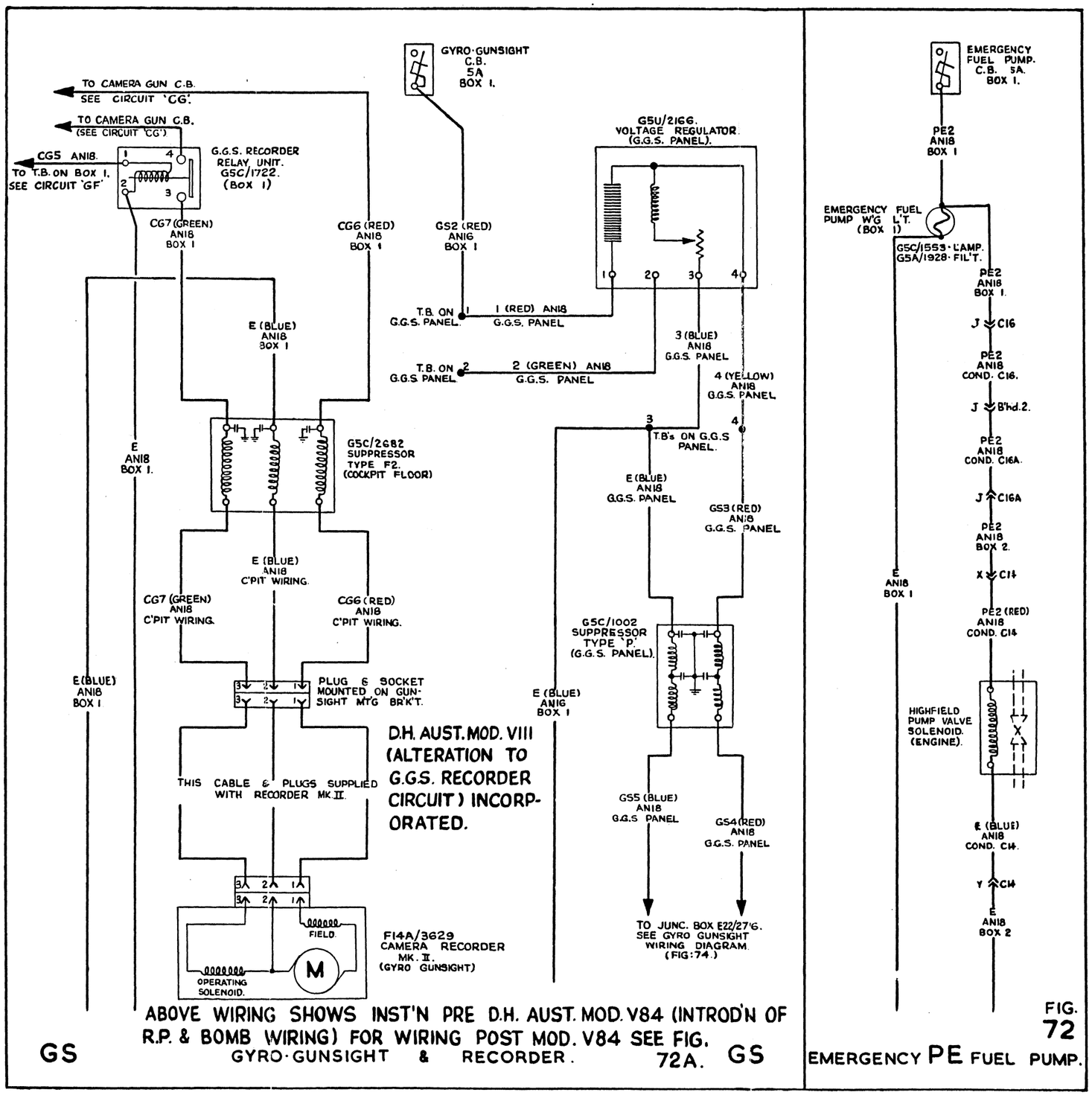
ABOVE WIRING SHOWS INSTALLATION PRE. D.H. (AUST) MOD V227 (G.S.A.P. CAMERA) FOR WIRING POST MOD V227 REFER TO FIG. A3A

A1.2 (1ST)

WIRING SHOWN THUS-------IS FITTED 'PRE MOD. V84 ONLY'
WIRING SHOWN THUS——·——IS FITTED 'POST MOD. V84 ONLY'.

FIG. 71

CG CAMERA GUN. CG



ABOVE WIRING SHOWS INST'N PRE D.H. AUST. MOD. V84 (INTROD'N OF R.P. & BOMB WIRING) FOR WIRING POST MOD. V84 SEE FIG. 72A.

GS GYRO-GUNSIGHT & RECORDER. GS

FIG. 72

EMERGENCY PE FUEL PUMP.

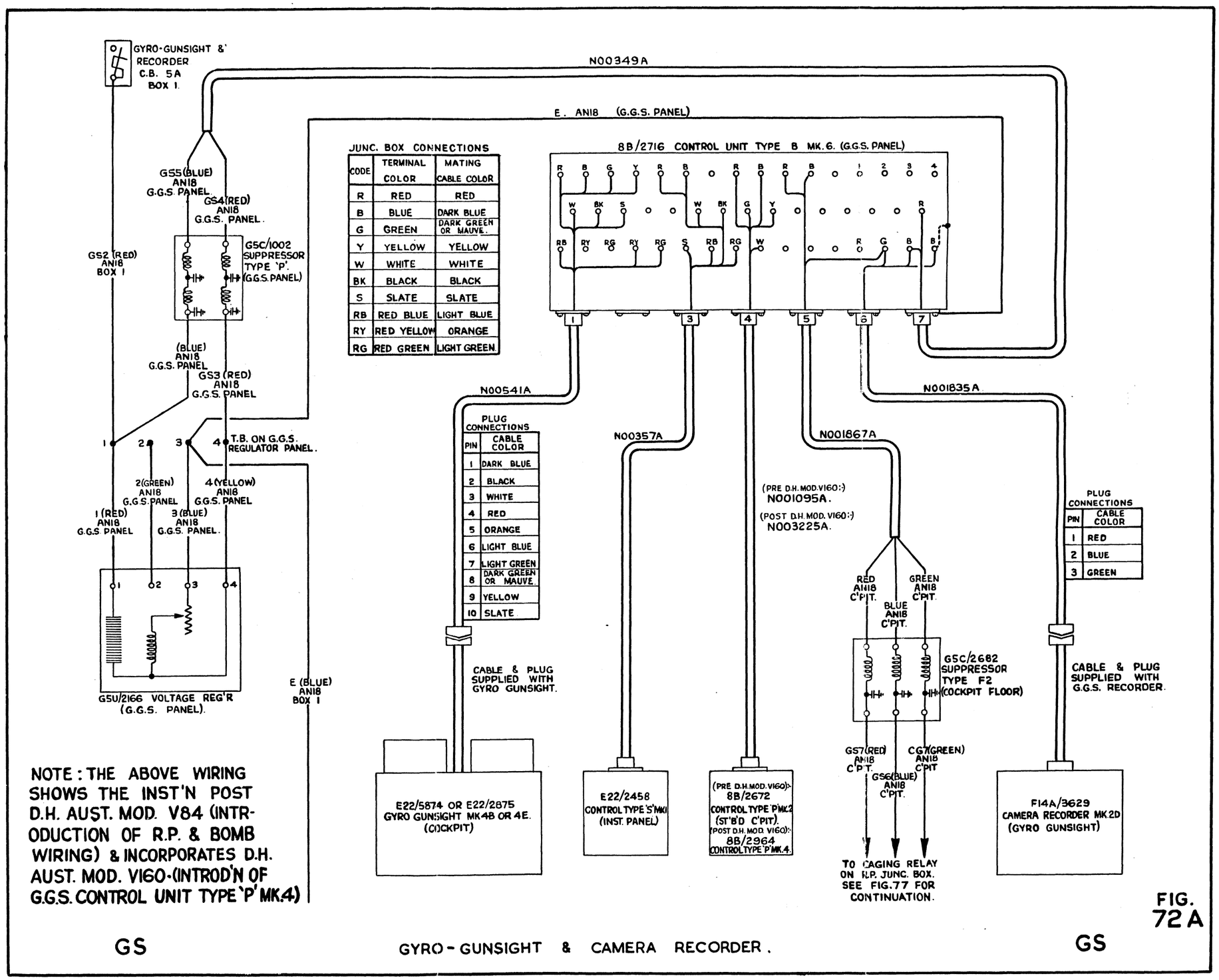
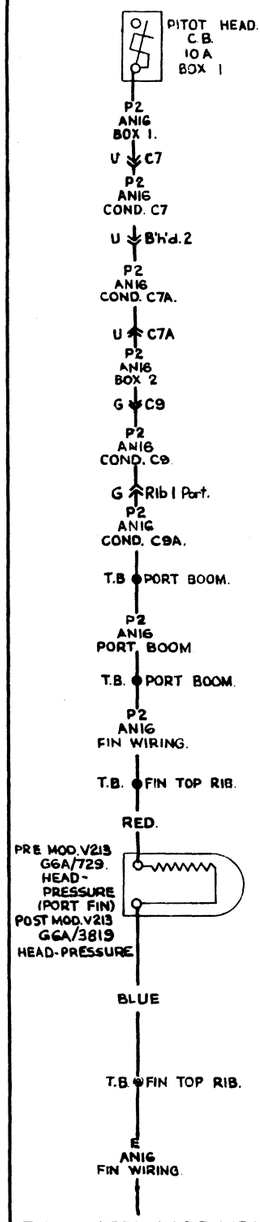
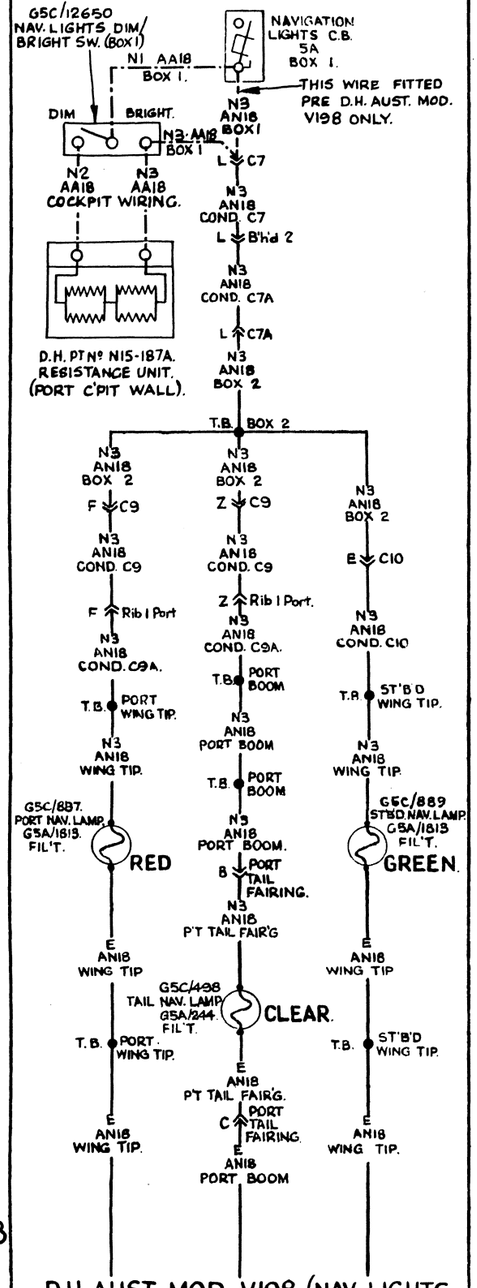

GYRO-GUNSIGHT & RECORDER C.B. 5A BOX 1.
N00349A
E. AN18 (G.G.S. PANEL)
JUNC. BOX CONNECTIONS
CODE | TERMINAL COLOR | MATING CABLE COLOR
R | RED | RED
B | BLUE | DARK BLUE
G | GREEN | DARK GREEN OR MAUVE.
Y | YELLOW | YELLOW
W | WHITE | WHITE
BK | BLACK | BLACK
S | SLATE | SLATE
RB | RED BLUE | LIGHT BLUE
RY | RED YELLOW | ORANGE
RG | RED GREEN | LIGHT GREEN.
8B/2716 CONTROL UNIT TYPE 8 MK.6. (G.G.S. PANEL)
GS5(BLUE) AN18 G.G.S. PANEL.
GS4(RED) AN18 G.G.S. PANEL.
GS2 (RED) AN18 BOX 1
G5C/1002 SUPPRESSOR TYPE 'P'. (G.G.S. PANEL)
(BLUE) AN18 G.G.S. PANEL.
GS3 (RED) AN18 G.G.S. PANEL
T.B. ON G.G.S. REGULATOR PANEL.
2(GREEN) AN18 G.G.S. PANEL
4 (YELLOW) AN18 G.G.S. PANEL
1 (RED) AN18 G.G.S. PANEL
3 (BLUE) AN18 G.G.S. PANEL.
G5U/2166 VOLTAGE REG'R (G.G.S. PANEL).
E (BLUE) AN18 BOX 1
N00541A
PLUG CONNECTIONS
PIN | CABLE COLOR
1 DARK BLUE
2 BLACK
3 WHITE
4 RED
5 ORANGE
6 LIGHT BLUE
7 LIGHT GREEN
8 DARK GREEN OR MAUVE
9 YELLOW
10 SLATE
CABLE & PLUG SUPPLIED WITH GYRO GUNSIGHT.
E22/5874 OR E22/2875 GYRO GUNSIGHT MK4B OR 4E. (COCKPIT)
N00357A
E22/2458 CONTROL TYPE 'S' MK1 (INST. PANEL)
N001867A
(PRE D.H. MOD. V160:-) N001095A.
(POST D.H. MOD. V160:-) N003225A.
(PRE D.H. MOD. V160):- 8B/2672 CONTROL TYPE 'P' MK.2 (ST'B'D C'PIT).
(POST D.H. MOD. V160):- 8B/2964 CONTROL TYPE 'P' MK.4.
N001835A
RED AN18 C'PIT.
BLUE AN18 C'PIT.
GREEN AN18 C'PIT.
G5C/2682 SUPPRESSOR TYPE F2 (COCKPIT FLOOR)
GS7(RED) AN18 C'PIT.
GS6(BLUE) AN18 C'PIT.
GS7(GREEN) AN18 C'PIT
TO CAGING RELAY ON R.P. JUNC. BOX. SEE FIG.77 FOR CONTINUATION.
PLUG CONNECTIONS
PIN | CABLE COLOR
1 RED
2 BLUE
3 GREEN
CABLE & PLUG SUPPLIED WITH G.G.S. RECORDER.
F14A/3629 CAMERA RECORDER MK.2D (GYRO GUNSIGHT)
NOTE: THE ABOVE WIRING SHOWS THE INST'N POST D.H. AUST. MOD. V84 (INTRODUCTION OF R.P. & BOMB WIRING) & INCORPORATES D.H. AUST. MOD. V160-(INTROD'N OF G.G.S. CONTROL UNIT TYPE 'P' MK.4)
GS
GYRO-GUNSIGHT & CAMERA RECORDER.
GS

FIG. 72 A



D.H. AUST. MOD. V213 (INTR'N OF MK. 8T PRESSURE HEAD) INCORPORATED.

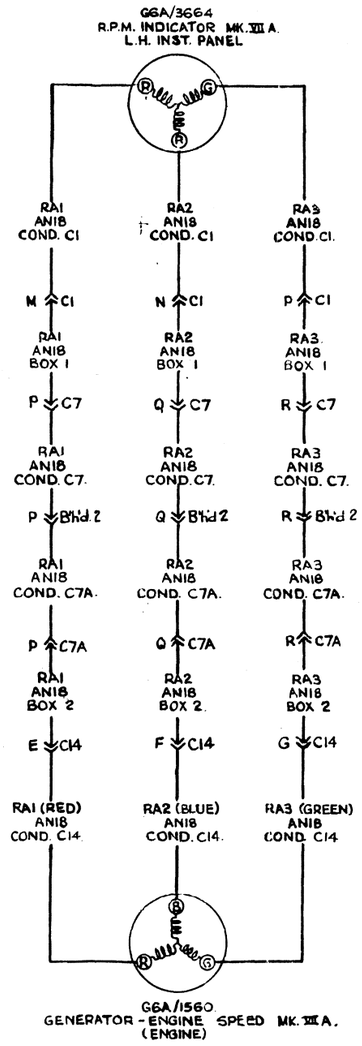
PITOT **P** HEAD.



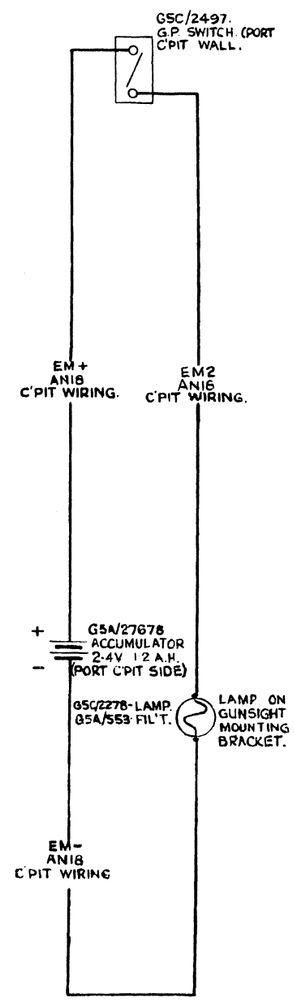
D.H. AUST. MOD. V198 (NAV. LIGHTS DIM/BRIGHT SW.) INCORPORATED.

WIRING SHOWN THUS—·—·—IS FITTED POST MOD. V198 ONLY.

NAVIGATION **N** LIGHTS.



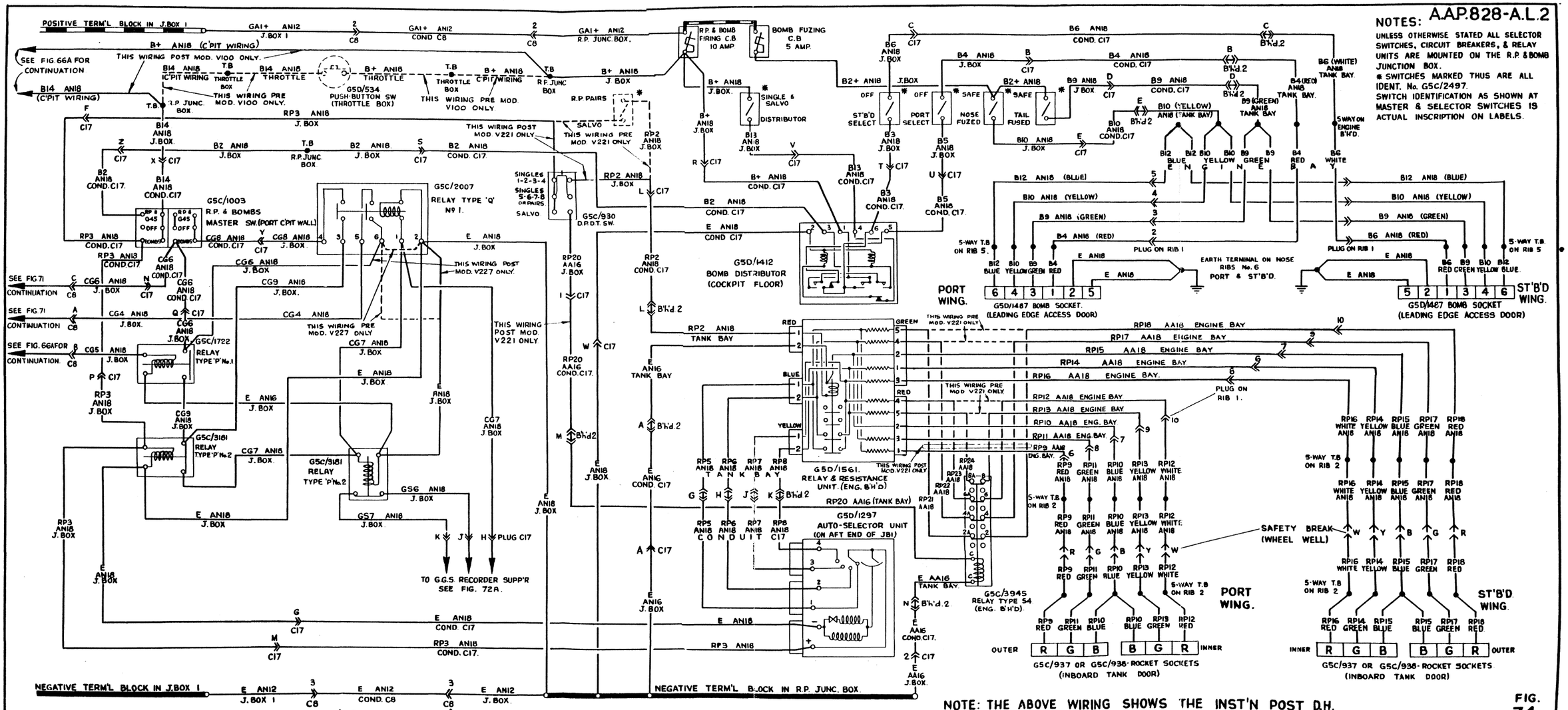
R.P.M. RA INDICATOR.



EMERGENCY EM LIGHTING

FIG. 73

FIG. 73



RP-B

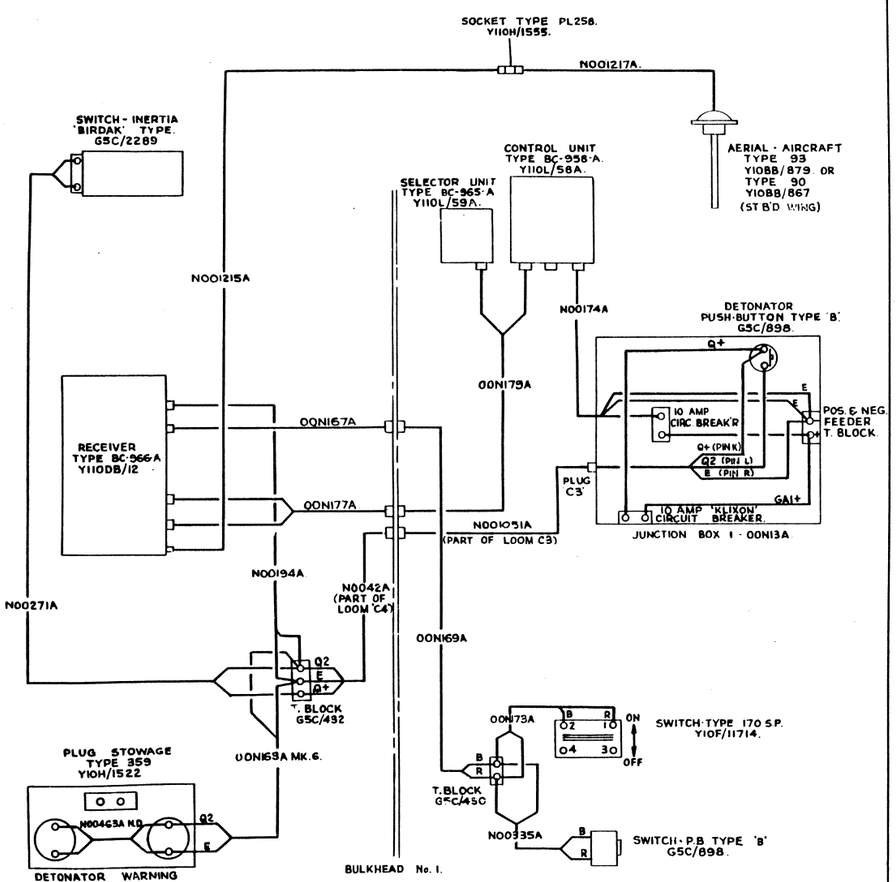
D.H. AUST. MOD. V100 - (EJECTION SEAT) INCORPORATED.
D.H. AUST. MOD. V221 - (R.P. FIRING SINGLE/PAIRS/SALVO) INCORPORATED.
D.H. AUST. MOD. V227 - (G.S.A.P. CAMERA) INCORPORATED.

ROCKET PROJECTILES & BOMB FIRING.

NOTE: THE ABOVE WIRING SHOWS THE INST'N POST D.H. AUST. MOD. V84 - (INTRODUCTION OF R.P. & BOMB WIRING). & INCORPORATES D.H. AUST. MOD. V149 - (REPOSITIONING OF MASTER SW.)

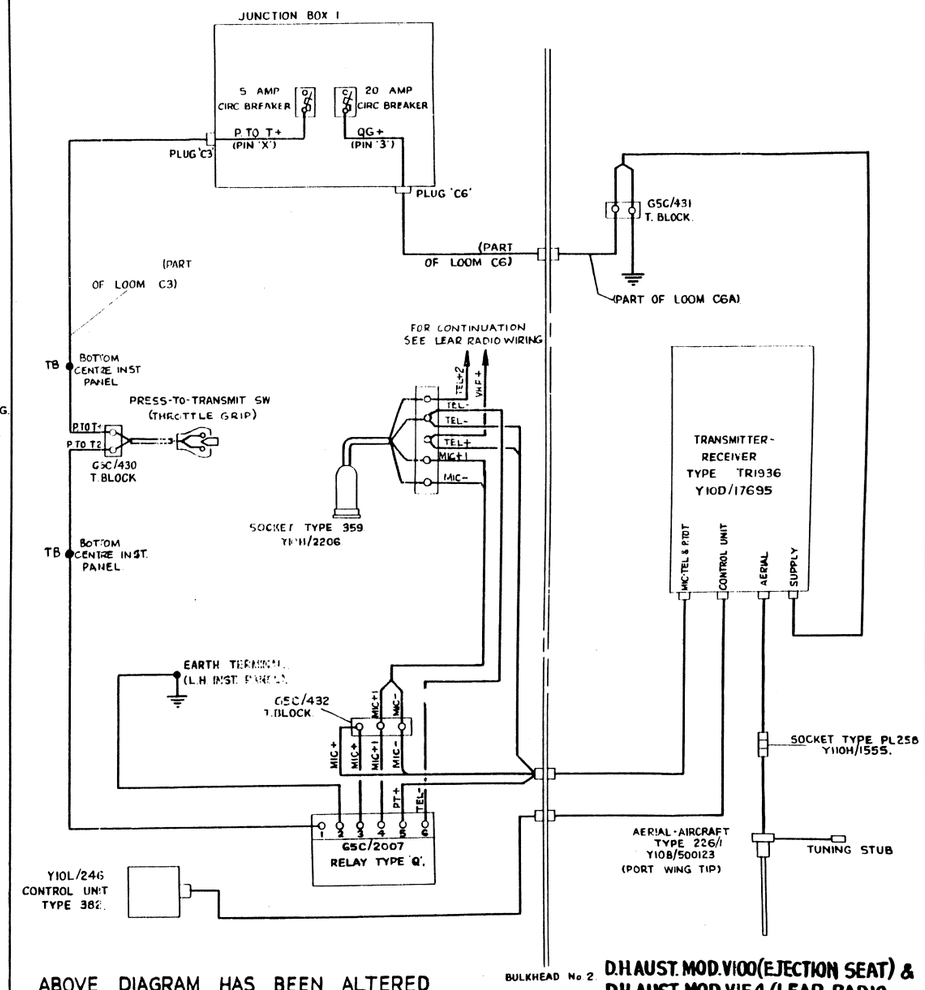
RP-B

FIG. 74



THIS CIRCUIT IS DELETED ON THE INTRODUCTION OF D.H. AUST. MOD. V219.

SCR-695-A RADIO.



ABOVE DIAGRAM HAS BEEN ALTERED TO INCORPORATE D.H. AUST. MOD. V108 (INTROD'N OF TR-1936 RADIO).

TR-1936 RADIO.

D.H. AUST. MOD. V100 (EJECTION SEAT) & D.H. AUST. MOD. V154 (LEAR RADIO COMPASS) EMBODIED.

TERMINALS IN JUNCTION BOX ARE SHOWN IN THEIR CORRECT POSITION IN RELATION TO ONE ANOTHER TO CLARIFY CONNECTIONS.

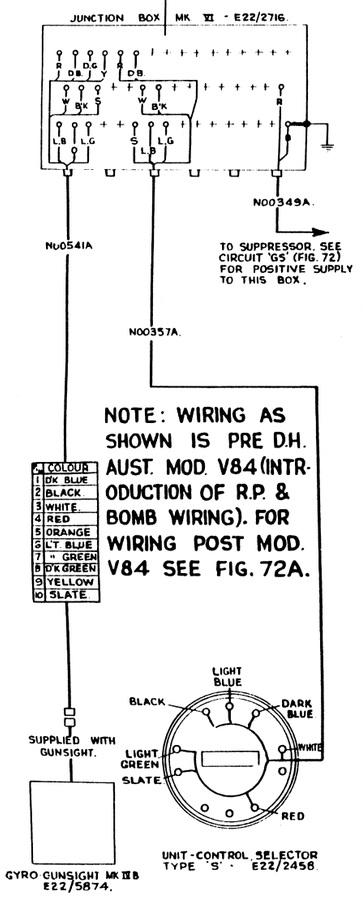


FIG. 75

GYRO GUNSIGHT.

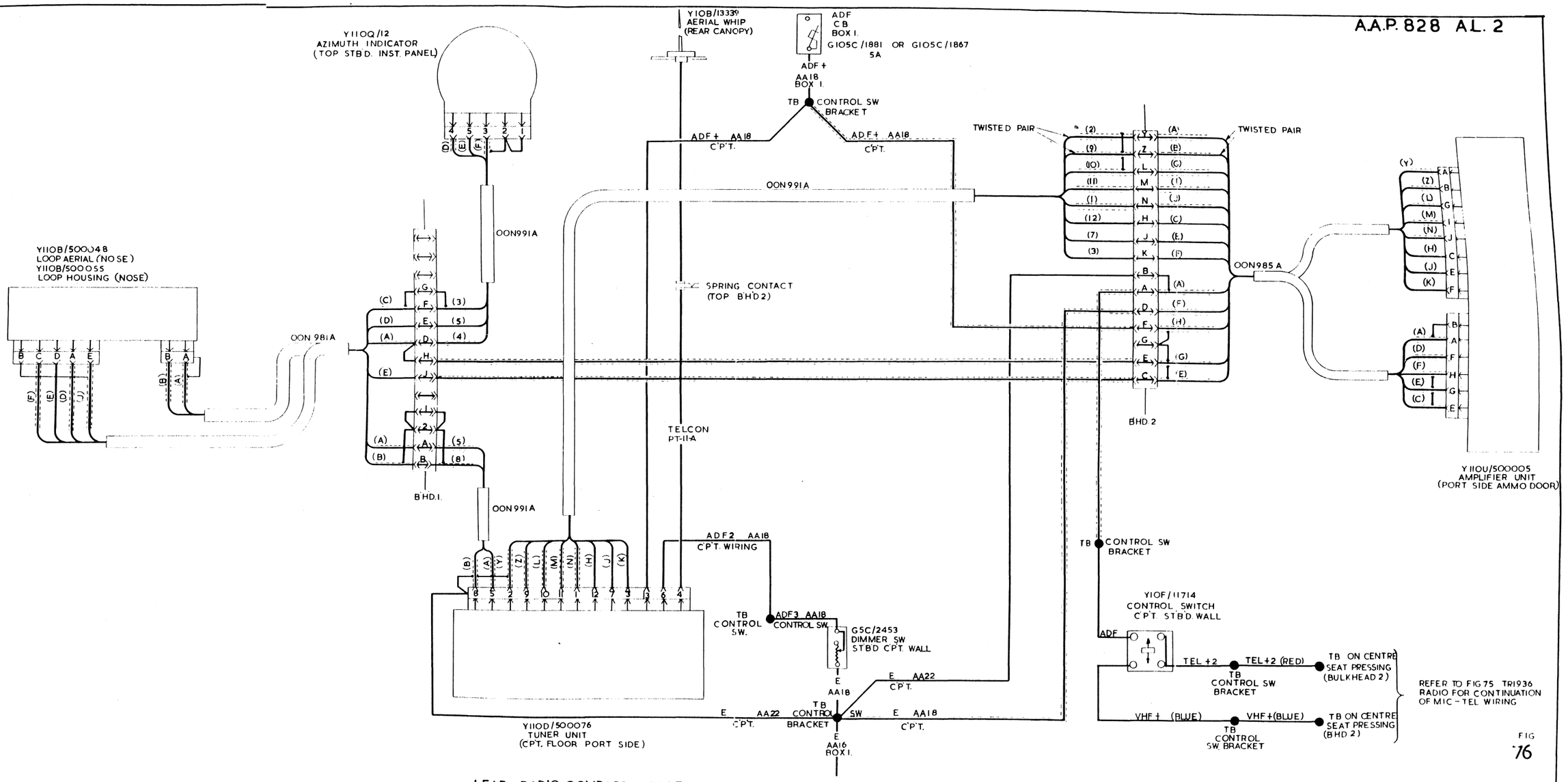
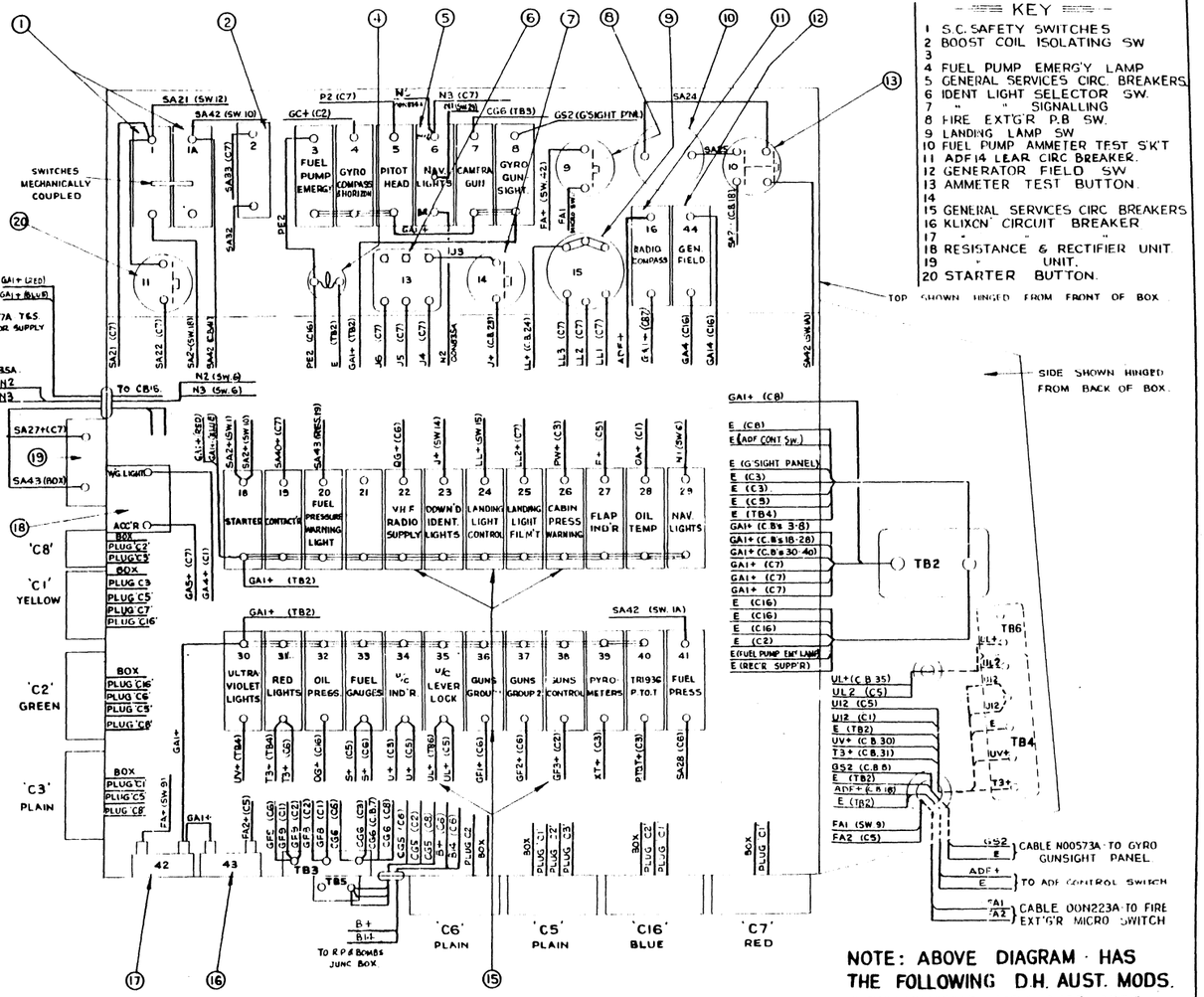


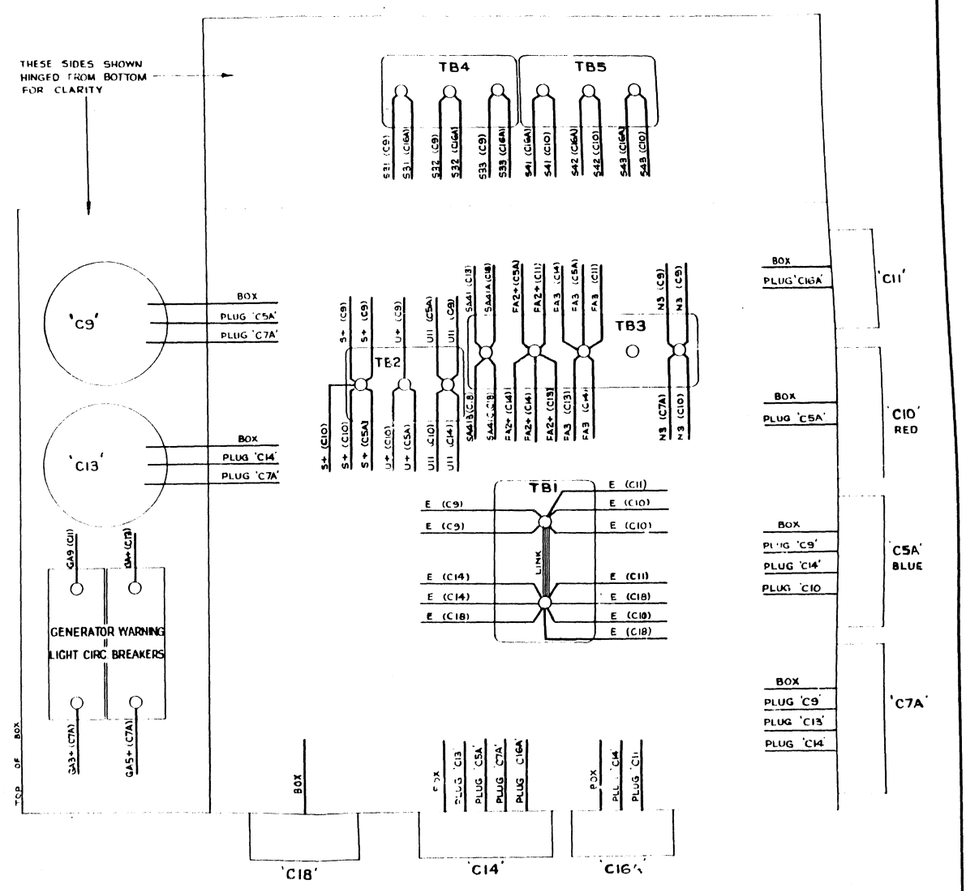
FIG 76

LEAR RADIO COMPASS - TYPE ADF 14 INSTALLATION



NOTE: ABOVE DIAGRAM HAS THE FOLLOWING D.H. AUST. MODS. INCORPORATED: V84, V102, V108, V159, V162, V506, V198, V100, V191, V189, V202, V154, V219, V227.

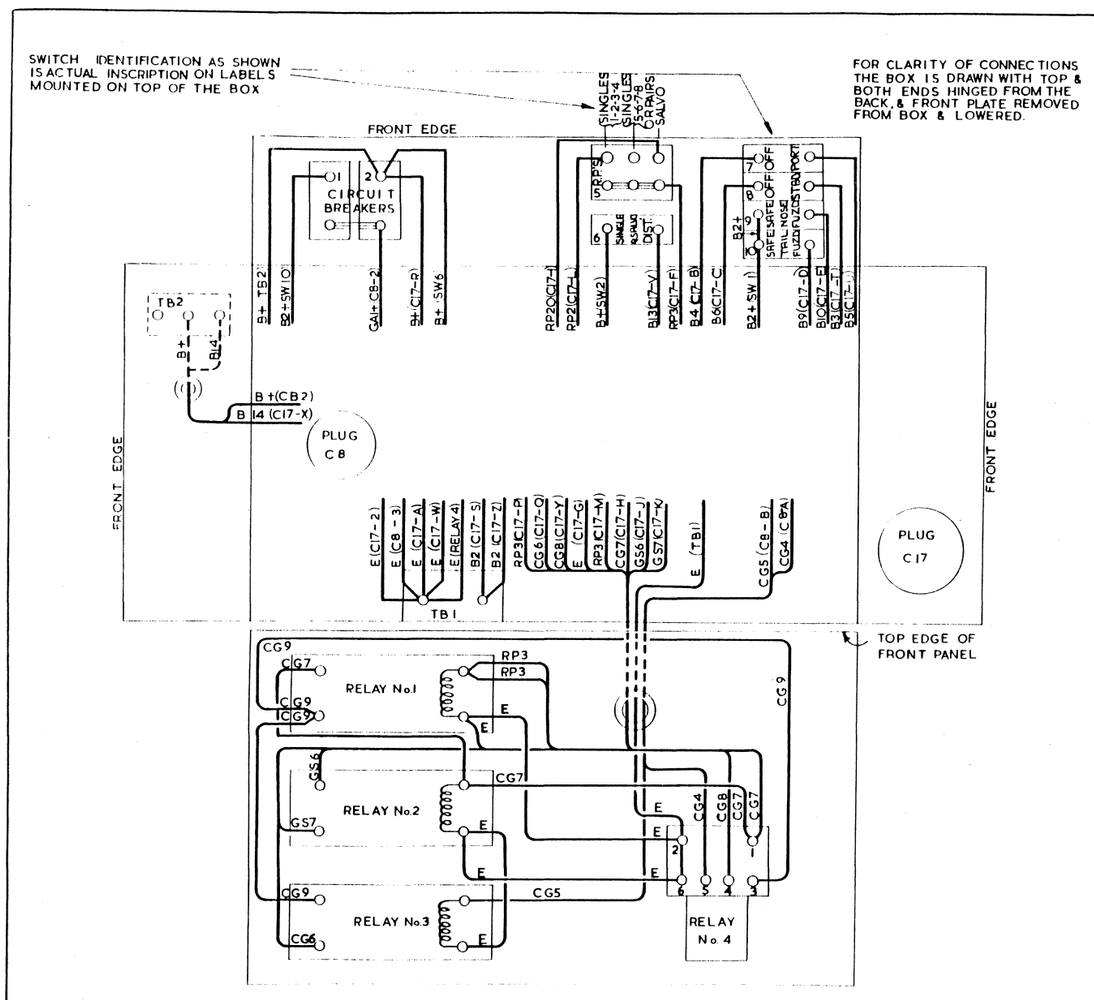
WIRING DIAGRAM JUNCTION BOX 1



THE ABOVE DIAGRAM HAS THE FOLLOWING D.H.AUST. MODS. INCORPORATED: V189.

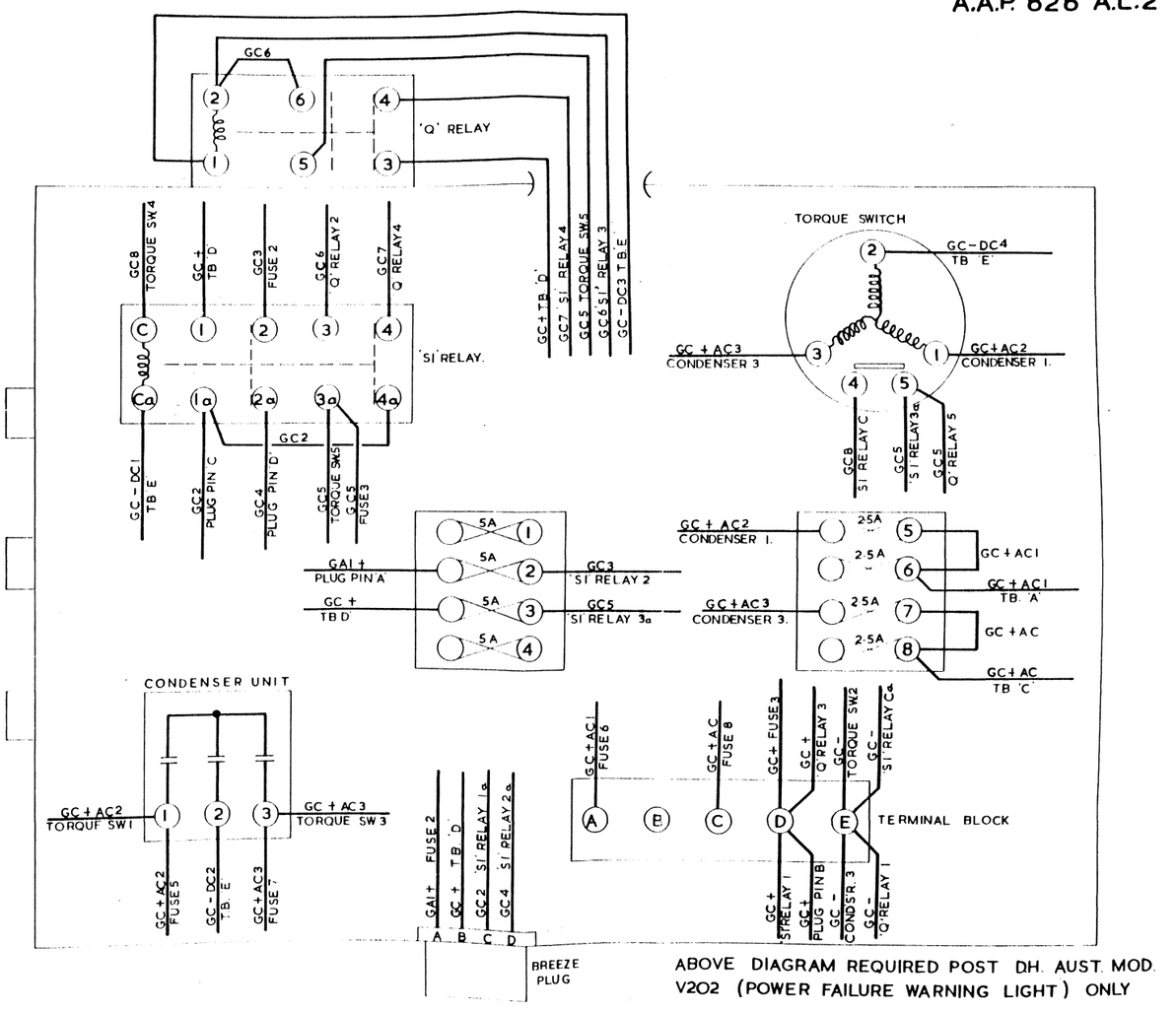
WIRING DIAGRAM JUNCTION BOX 2

FIG. 77



NOTE: ABOVE DIAGRAM HAS THE FOLLOWING D.H. AUST. MODS. INCORPORATED: V149, V221.

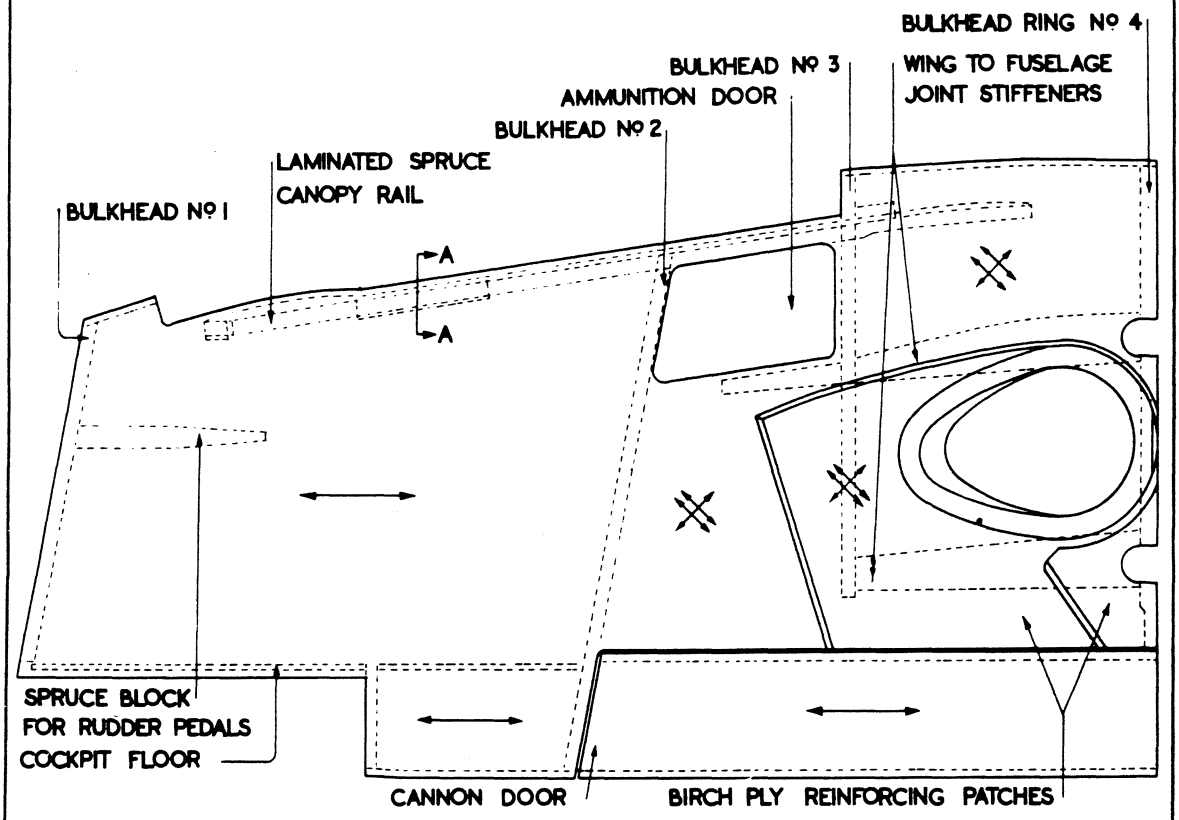
WIRING DIAGRAM – R P & BOMB JUNCTION BOX

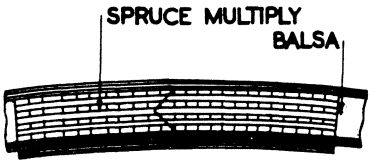


ABOVE DIAGRAM REQUIRED POST D.H. AUST. MOD. V202 (POWER FAILURE WARNING LIGHT) ONLY

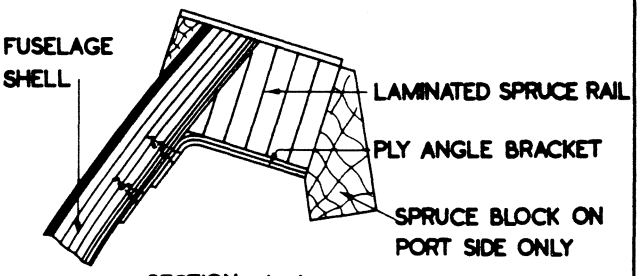
WIRING DIAGRAM GYRO COMPASS JUNCTION BOX

FIG 77A

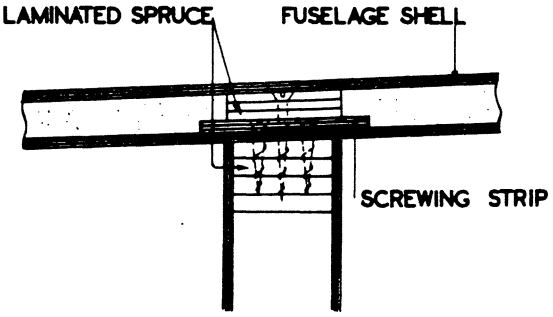




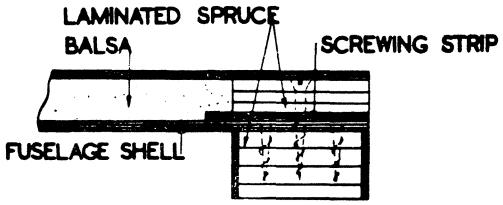
SHELL HALVES JOINT
ON CENTRE LINE OF AIRCRAFT



SECTION A-A
CANOPY RAIL



TYPICAL BULKHEAD JOINT



JOINT AT BULKHEAD RING Nº 4

GRAIN OF PLY SHOWN THUS ←——→

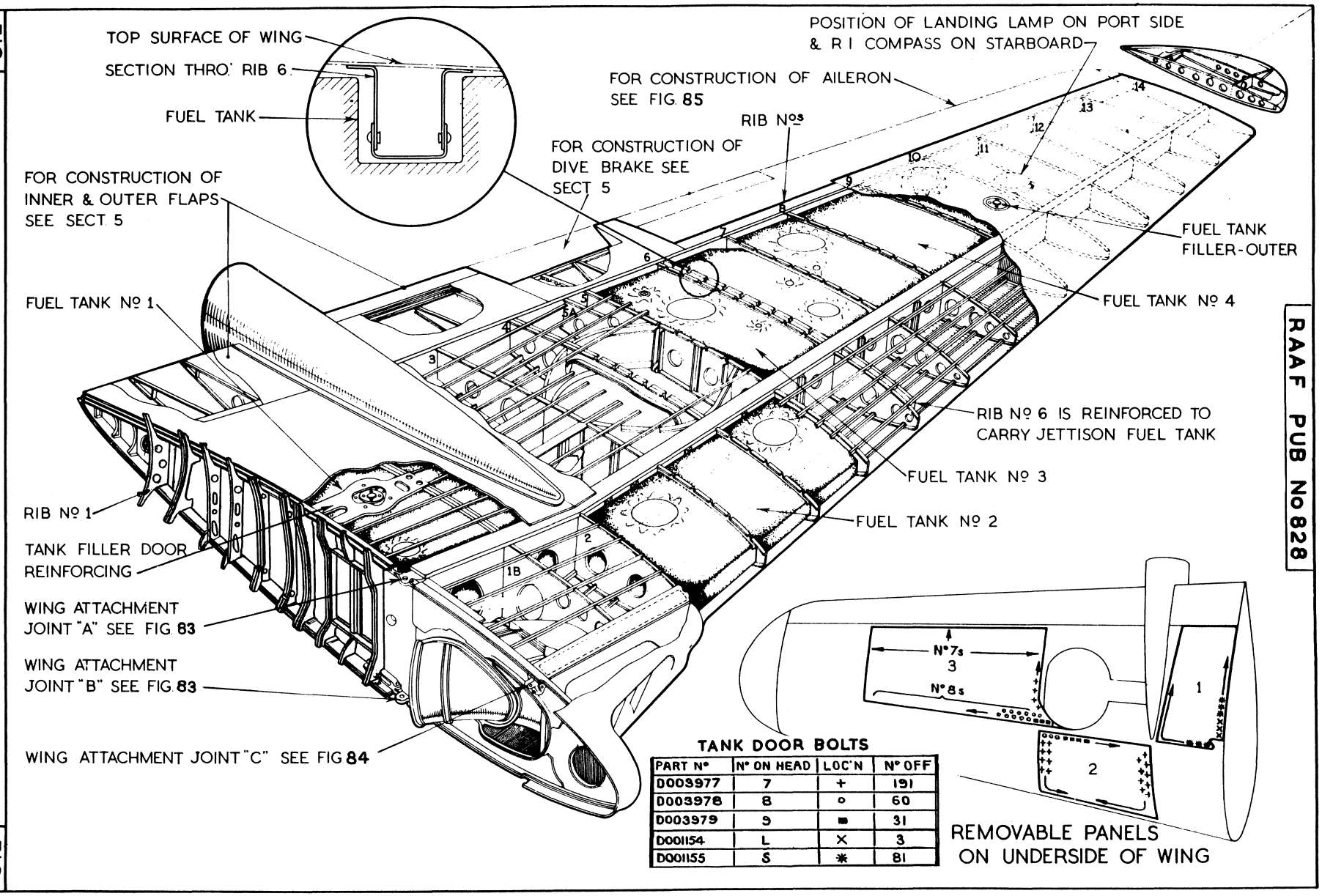
FIG. 78

FUSELAGE CONSTRUCTION

FIG. 78

MAINPLANE

FIG. 79



TANK DOOR BOLTS

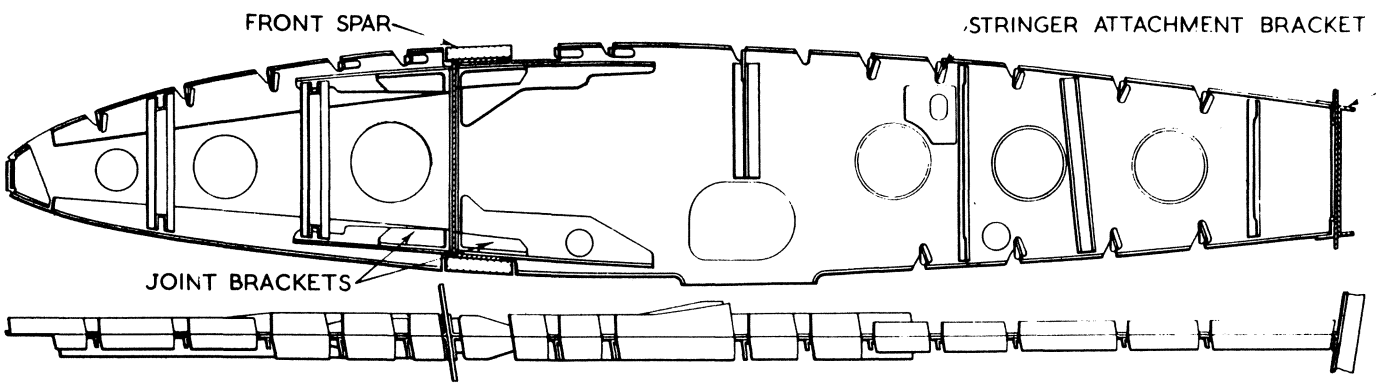
PART N°	N° ON HEAD	LOC'N	N° OFF
D003977	7	+	191
D003978	8	o	60
D003979	9	■	31
D001154	L	×	3
D001155	S	*	81

REMOVABLE PANELS ON UNDERSIDE OF WING

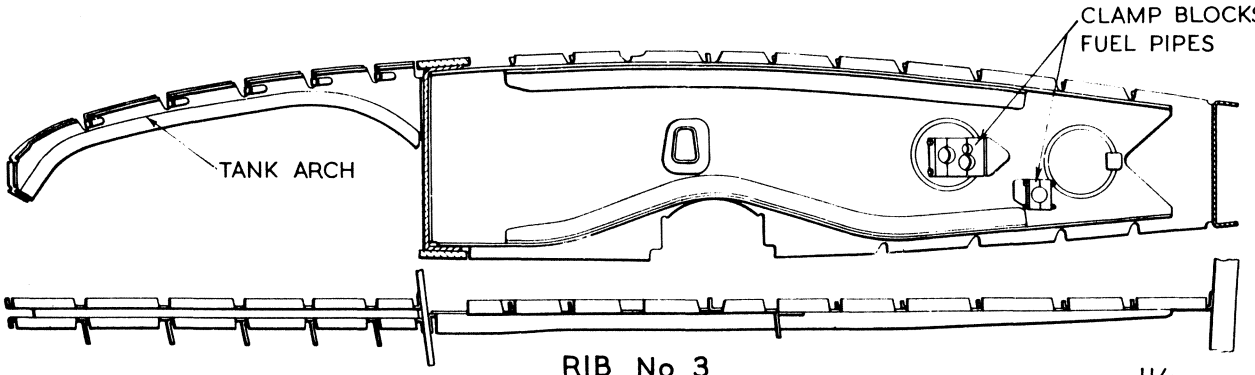
RAAF PUB No 828

FIG. 80

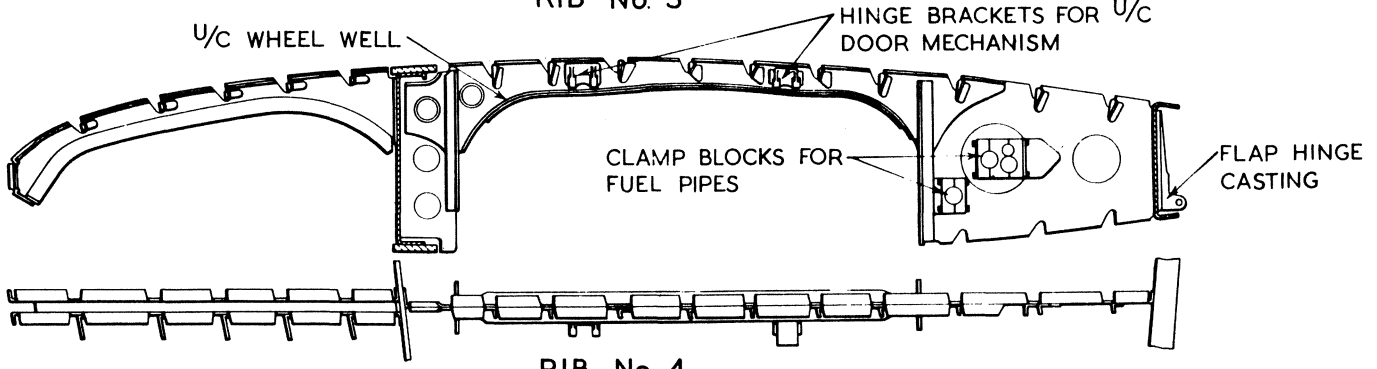
DETAILS OF HEAVY RIBS



RIB No. 2



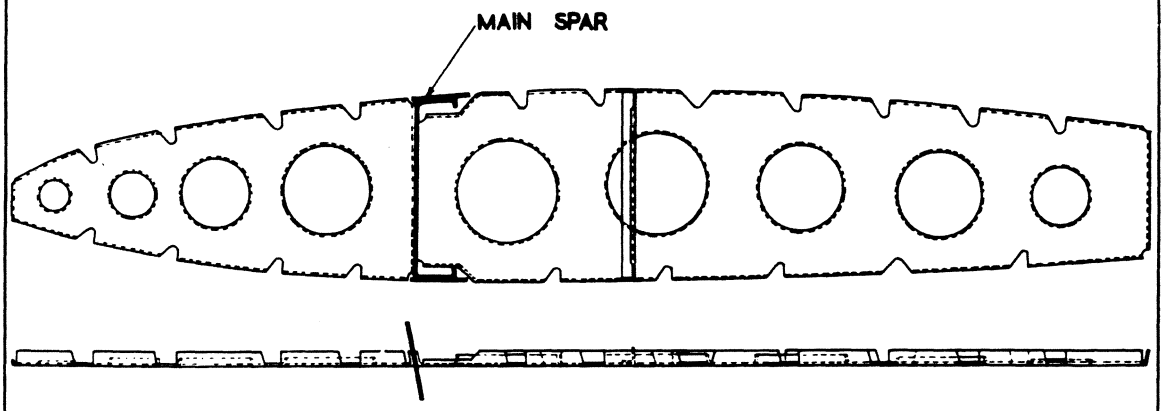
RIB No. 3



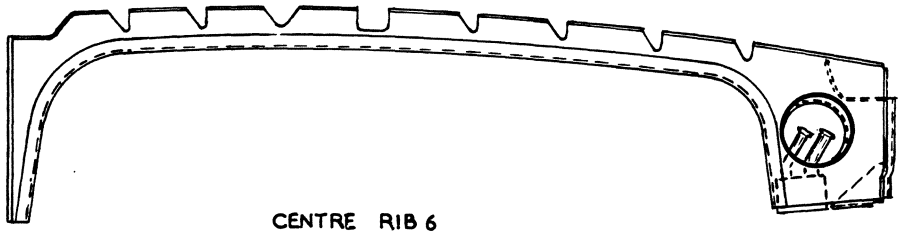
RIB No. 4

RAAF PUB No 828

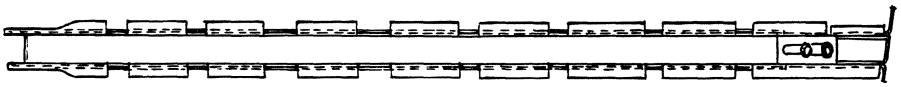
FIG. 80

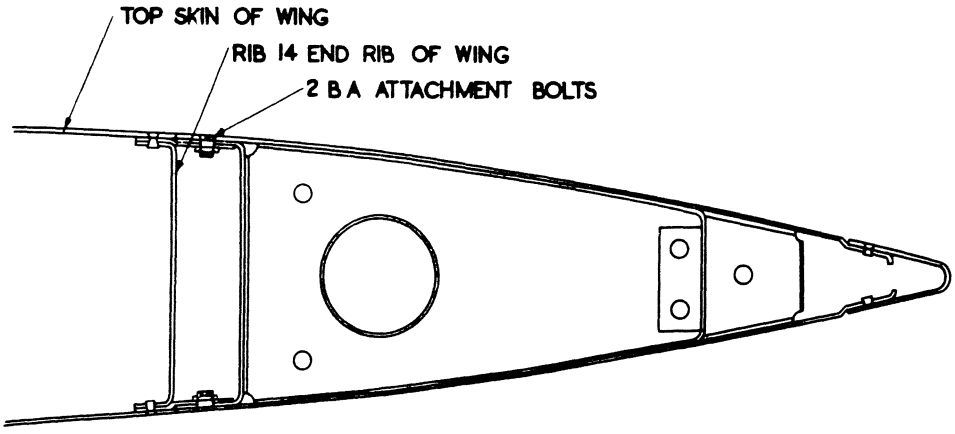


TYPICAL LIGHT RIB



CENTRE RIB 6
SHOWING FUEL AND AIR JUNCTION BLOCK



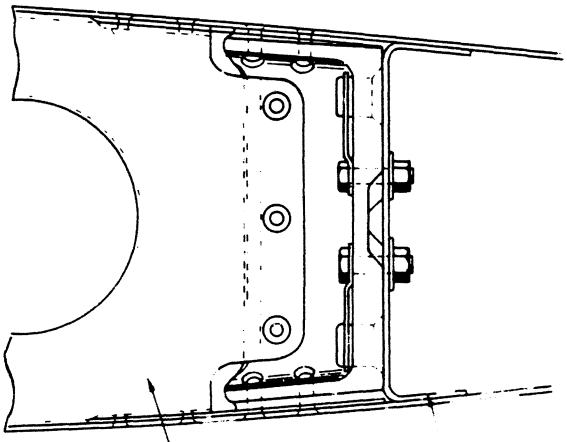


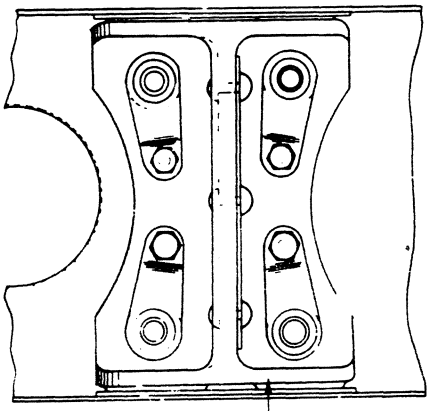
SECTION SHOWING ATTACHMENT OF WING TIP

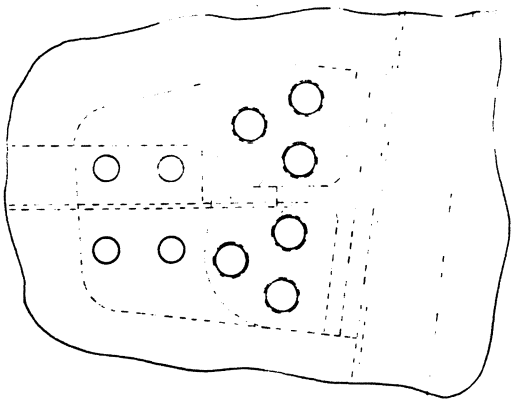
FIG. 81

MAIN PLANE DETAILS (1)

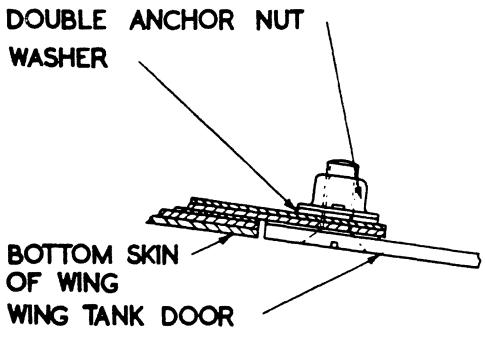
FIG. 81

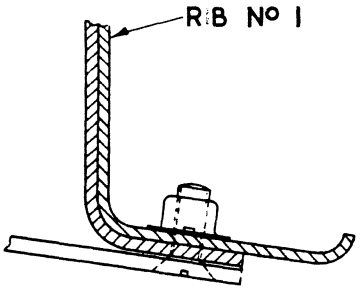






REINFORCING BRACKET ON RIB No. 13
(SIMILAR TO BRACKETS ON RIBS 7 & 10)





SECTION SHOWING TANK DOOR FIXING

FIG. 82

MAIN PLANE DETAILS (2)

FIG. 82

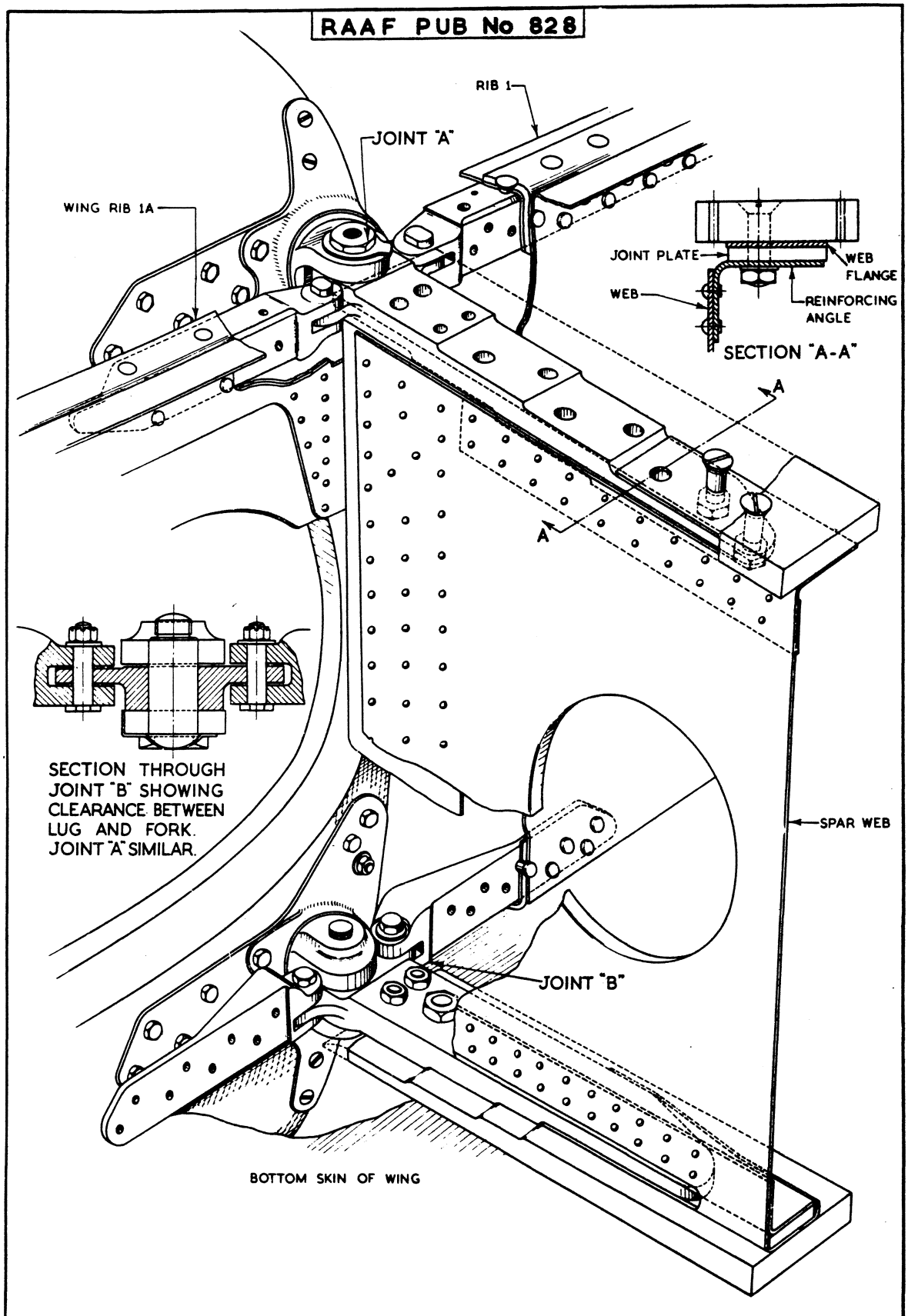
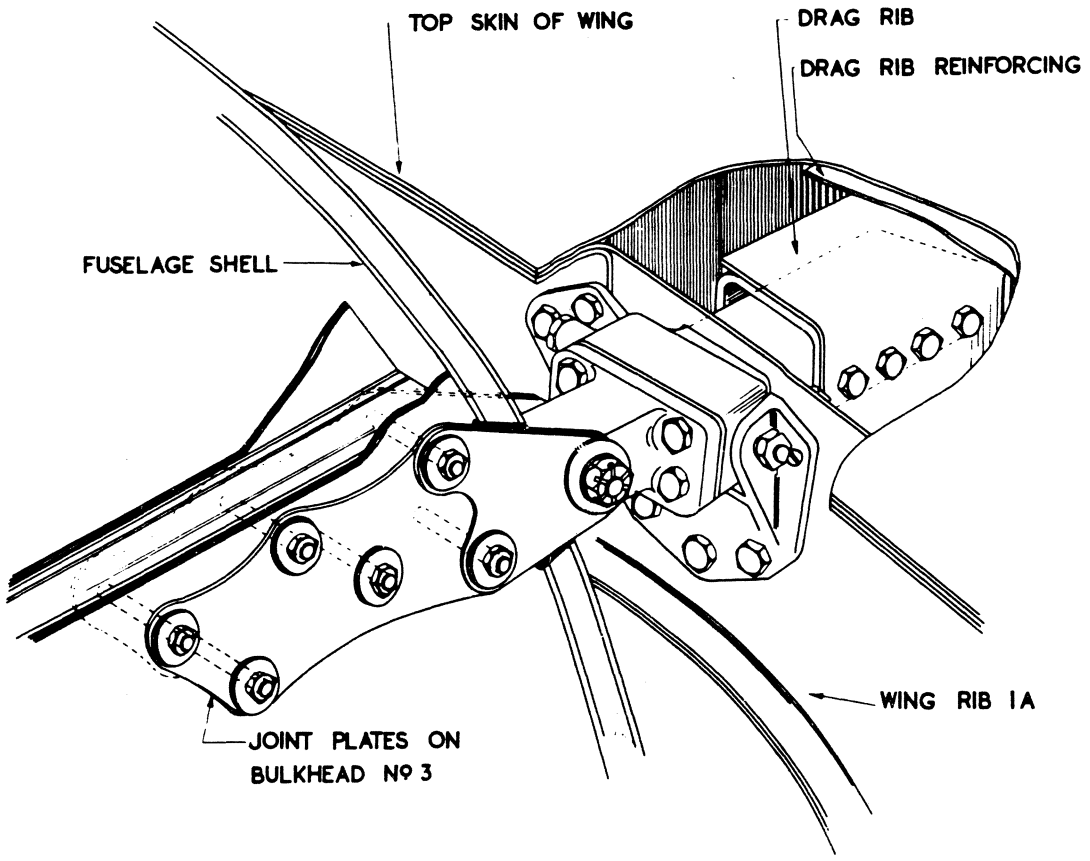


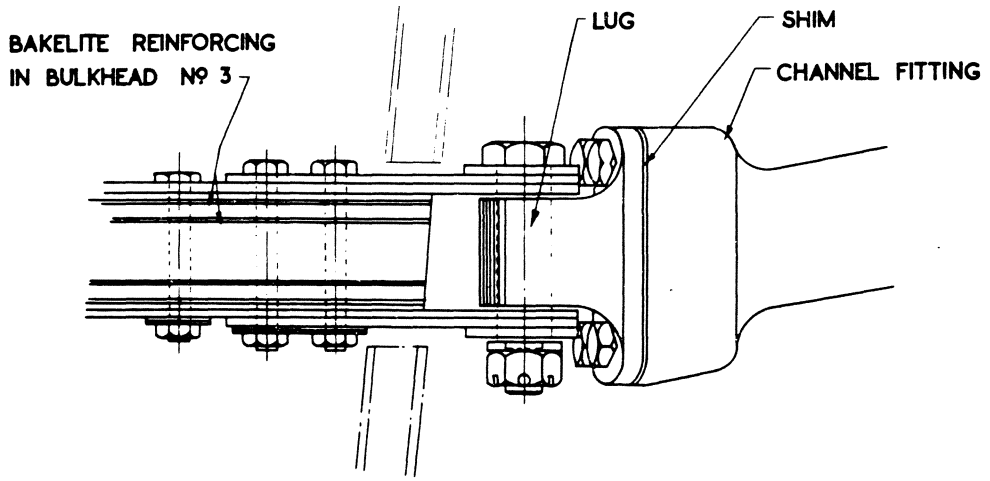
FIG. 83

ATTACHMENT JOINTS WING TO FUSELAGE

FIG. 83

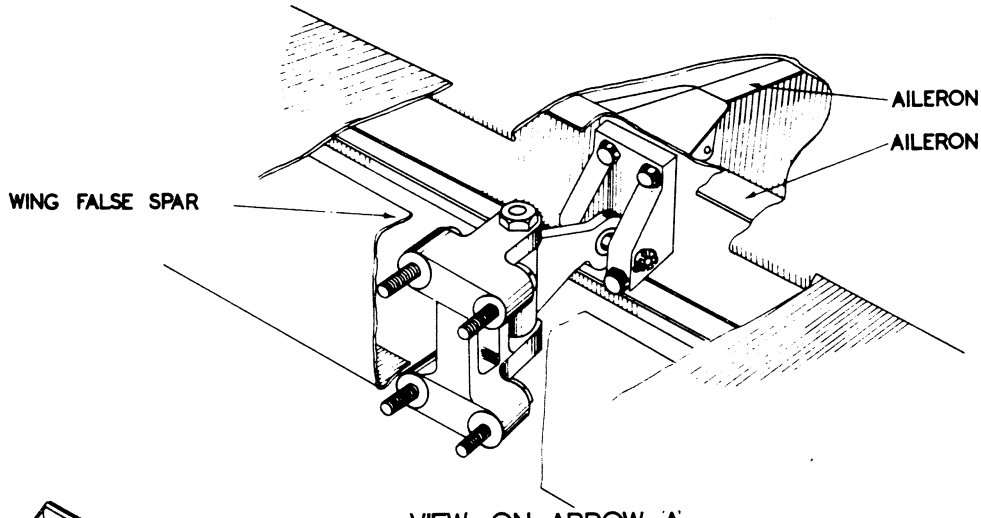


VIEW ON PORT SIDE
STARBOARD JOINT SIMILAR

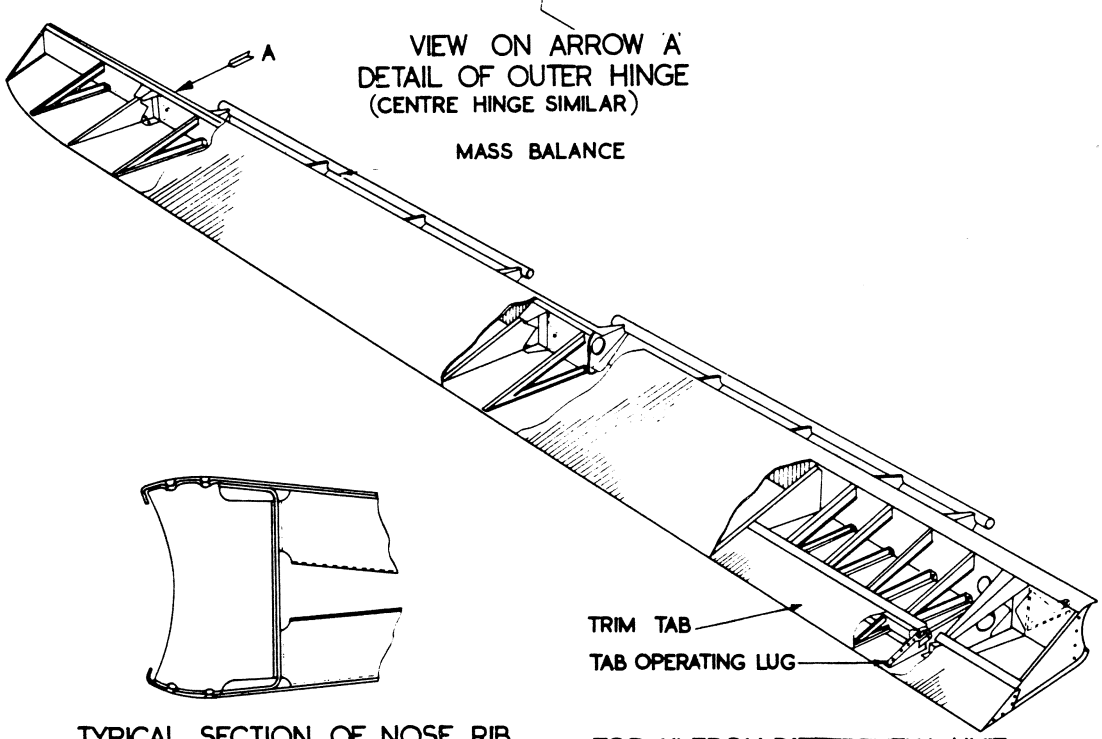


PLAN SHOWING ATTACHMENT OF
LUG TO JOINT PLATES

FIG. 84 **ATTACHMENT WING TO FUSELAGE** FIG. 84

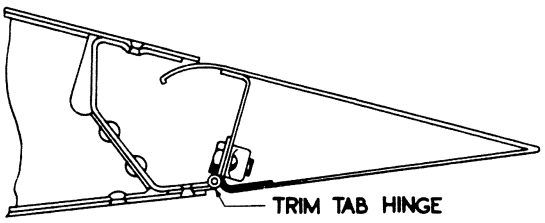


VIEW ON ARROW 'A'
DETAIL OF OUTER HINGE
(CENTRE HINGE SIMILAR)



TYPICAL SECTION OF NOSE RIB

FOR AILERON DIFFERENTIAL UNIT
SEE FIG 20



SECTION THROUGH TRIM TAB AT RIB 2 OF AILERON

FIG. 85	AILERON	FIG. 85

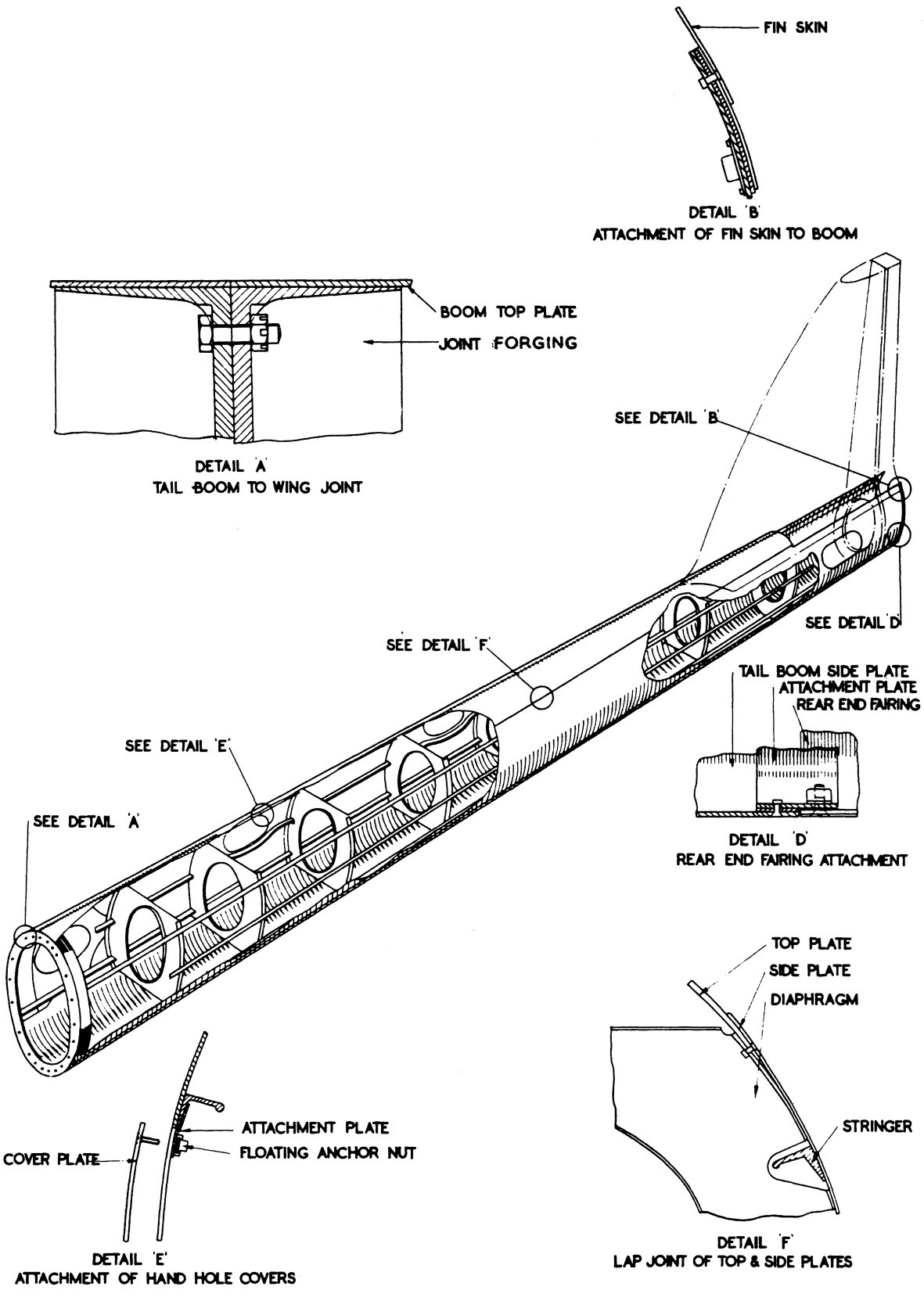


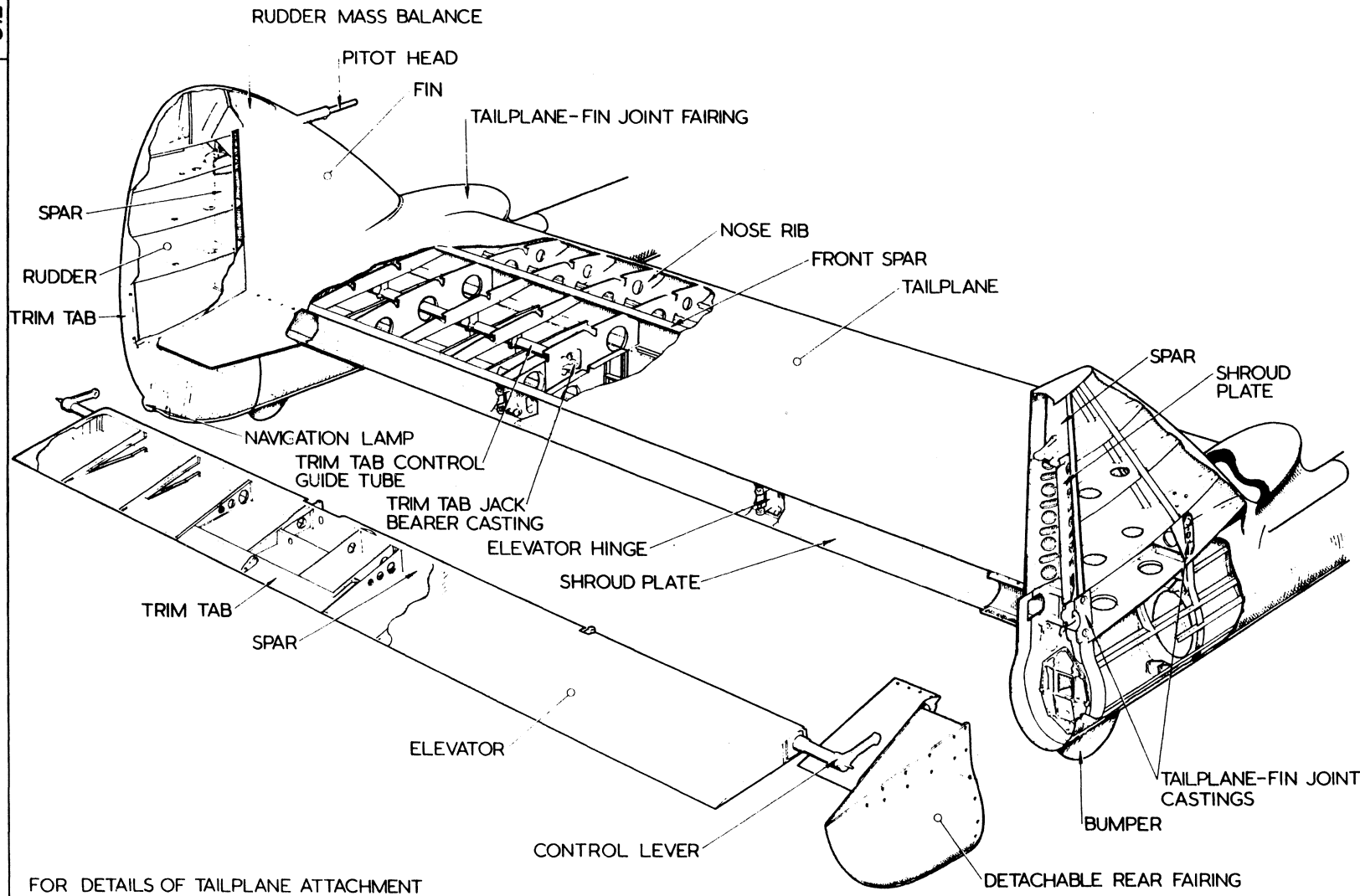
FIG. 86

TAIL BOOM

FIG. 86

FIG. 87

TAIL UNIT STRUCTURE



FOR DETAILS OF TAILPLANE ATTACHMENT AND CONTROL SURFACE HINGES SEE FIG 19

RAAF PUB No 828

FIG. 87

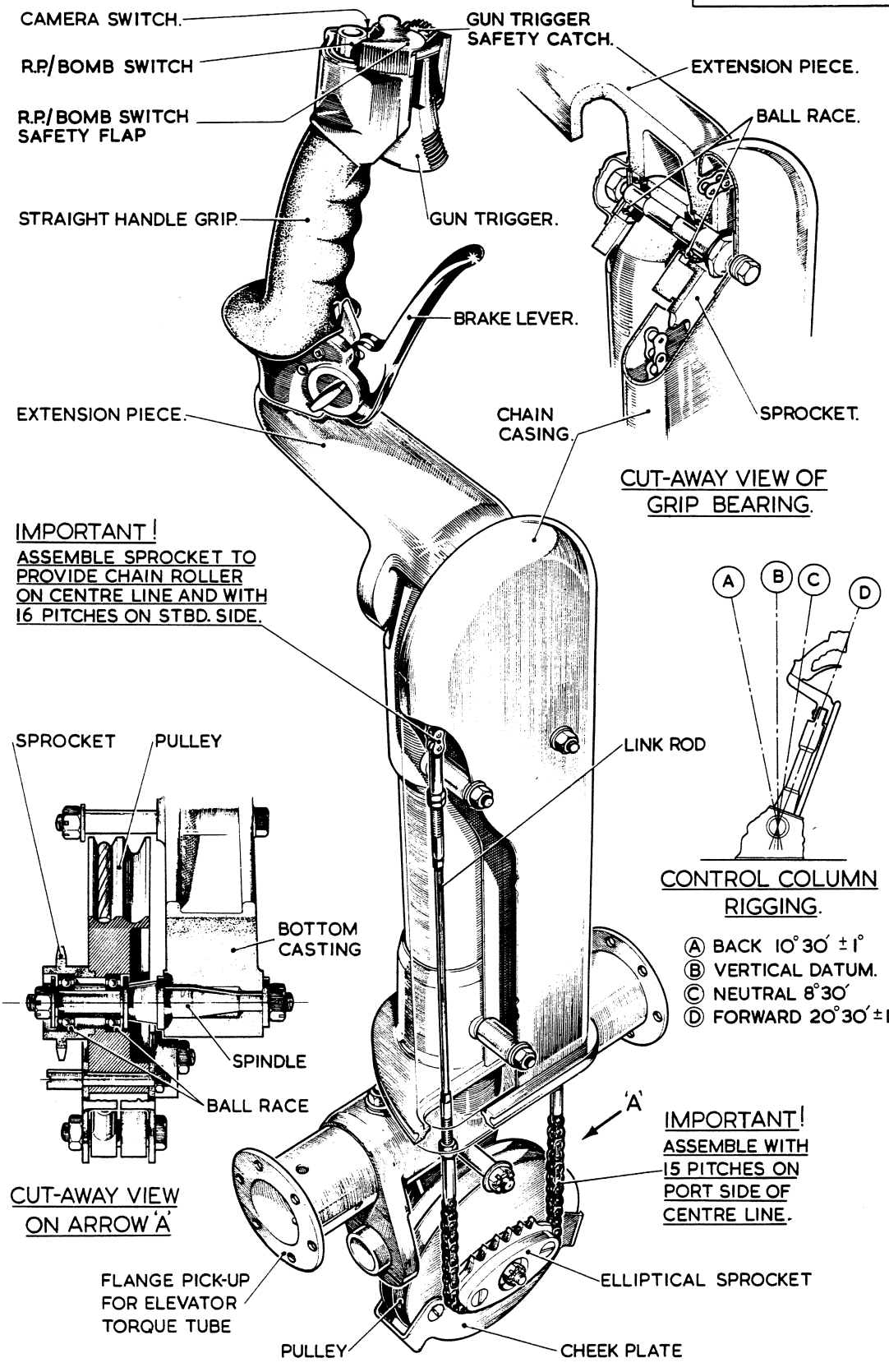


FIG. 88

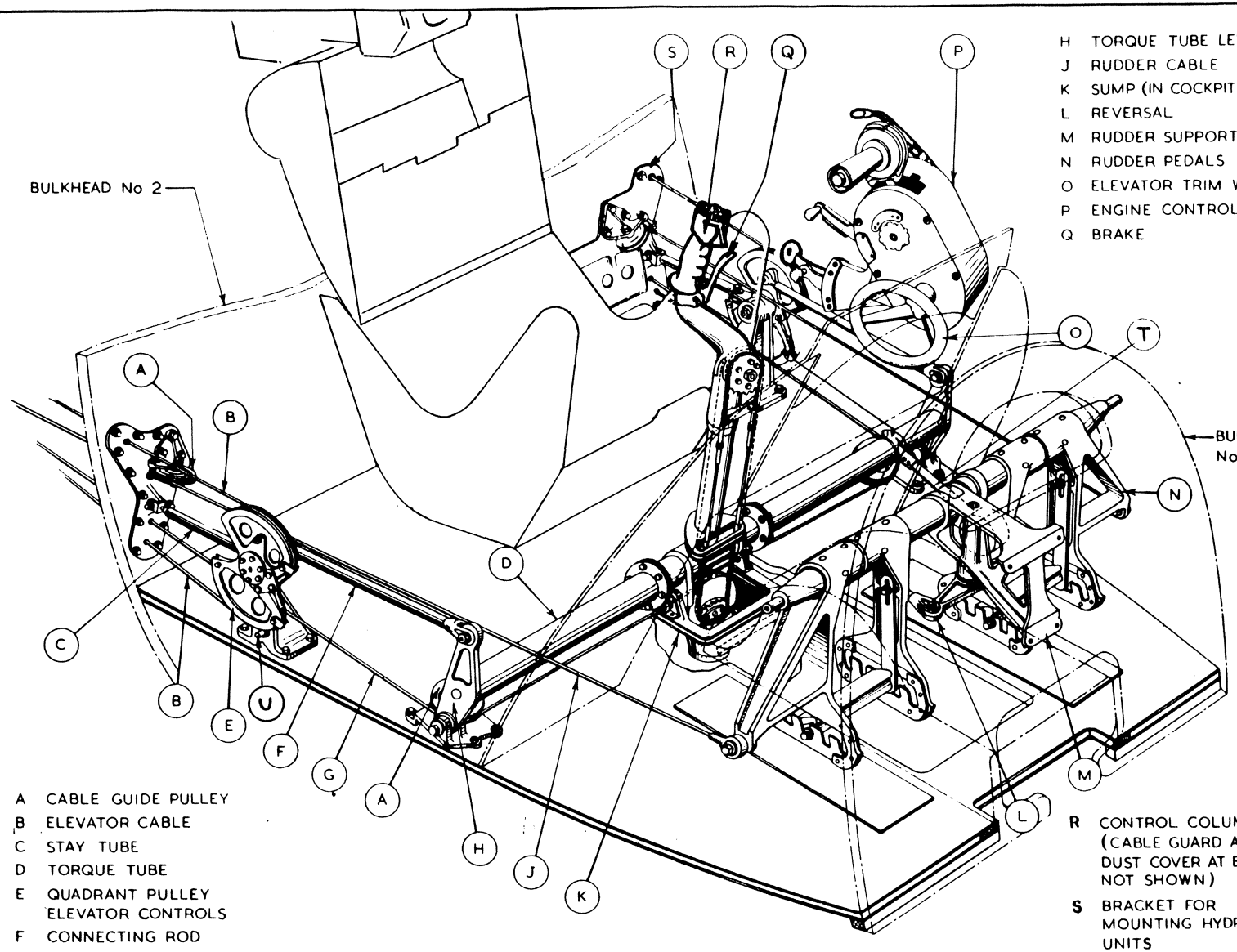
CONTROL COLUMN

FIG. 88

A.L.2

FIG. 89

FLYING CONTROLS IN COCKPIT



H TORQUE TUBE LEVER
J RUDDER CABLE
K SUMP (IN COCKPIT FLOOR)
L REVERSAL
M RUDDER SUPPORT BRACKET
N RUDDER PEDALS
O ELEVATOR TRIM WHEEL
P ENGINE CONTROL BOX
Q BRAKE

A CABLE GUIDE PULLEY
B ELEVATOR CABLE
C STAY TUBE
D TORQUE TUBE
E QUADRANT PULLEY ELEVATOR CONTROLS
F CONNECTING ROD
G AILERON CABLE

U CABLE GUIDE BLOCK.

R CONTROL COLUMN (CABLE GUARD AND DUST COVER AT BASE NOT SHOWN)
S BRACKET FOR MOUNTING HYDRAULIC UNITS
T ELEVATOR BIAS WEIGHT

A.A.P. No.828.

FIG. 89

A.L.2

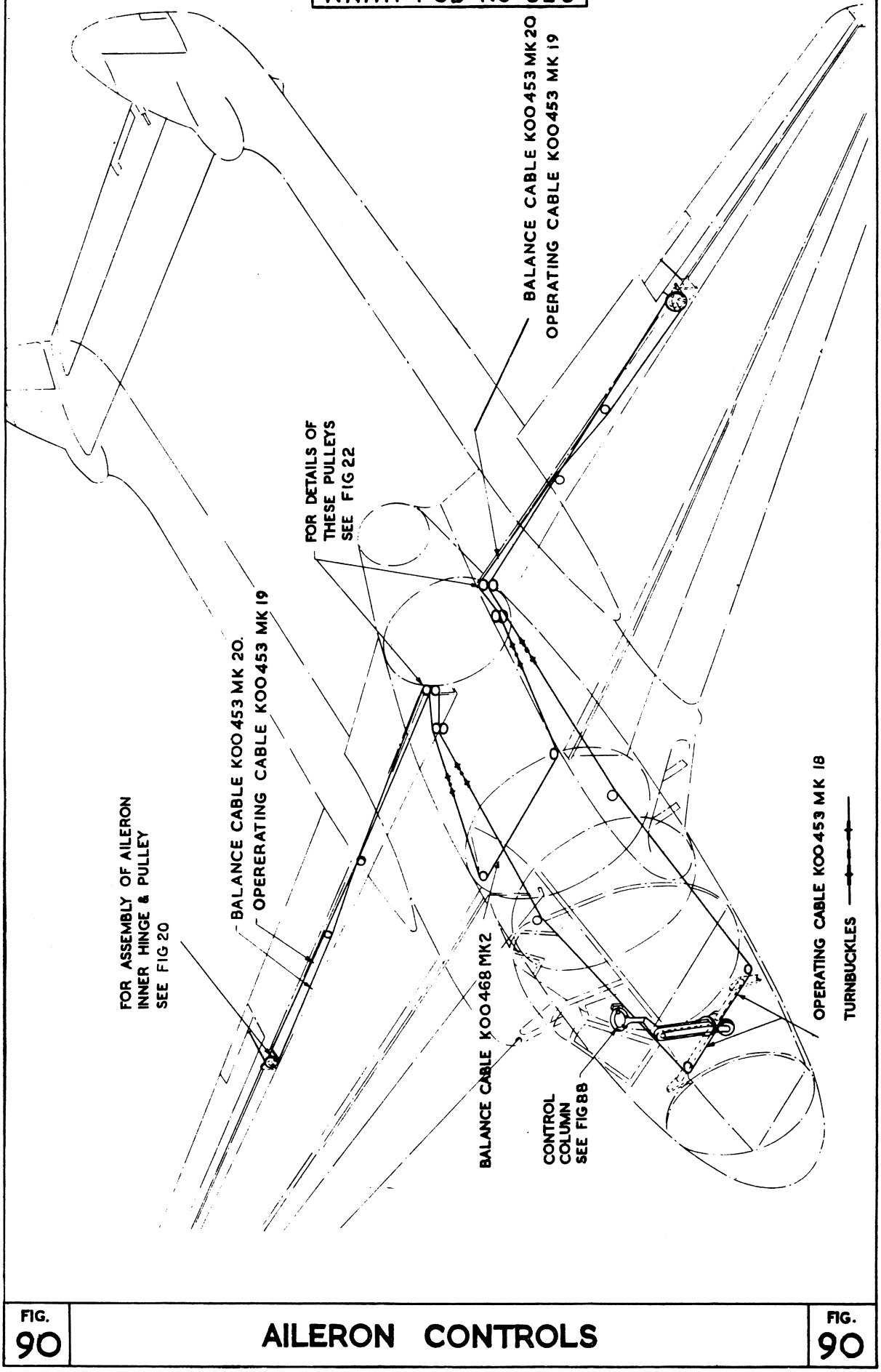


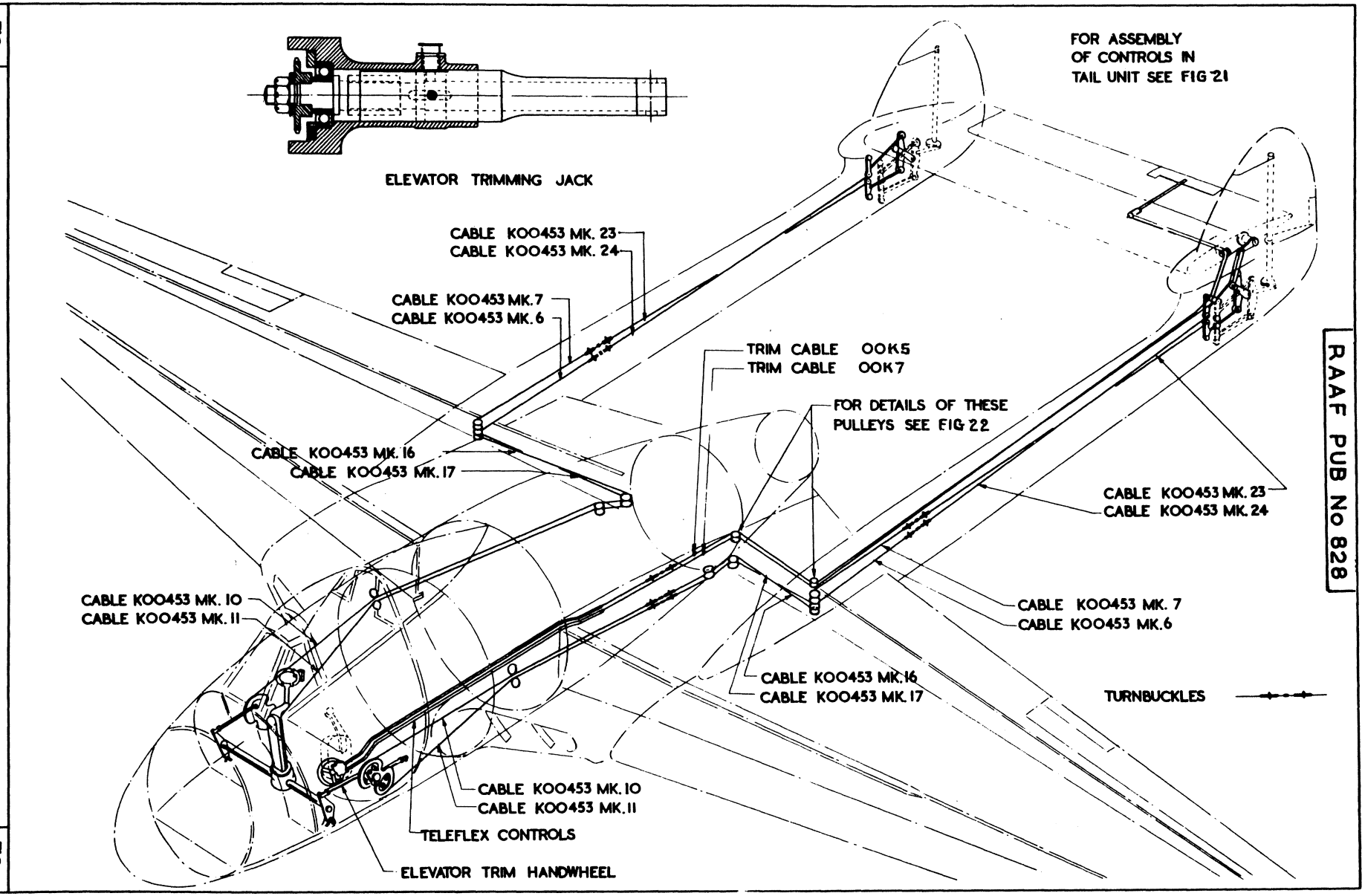
FIG. 90

AILERON CONTROLS

FIG. 90

FIG. 91

ELEVATOR CONTROLS

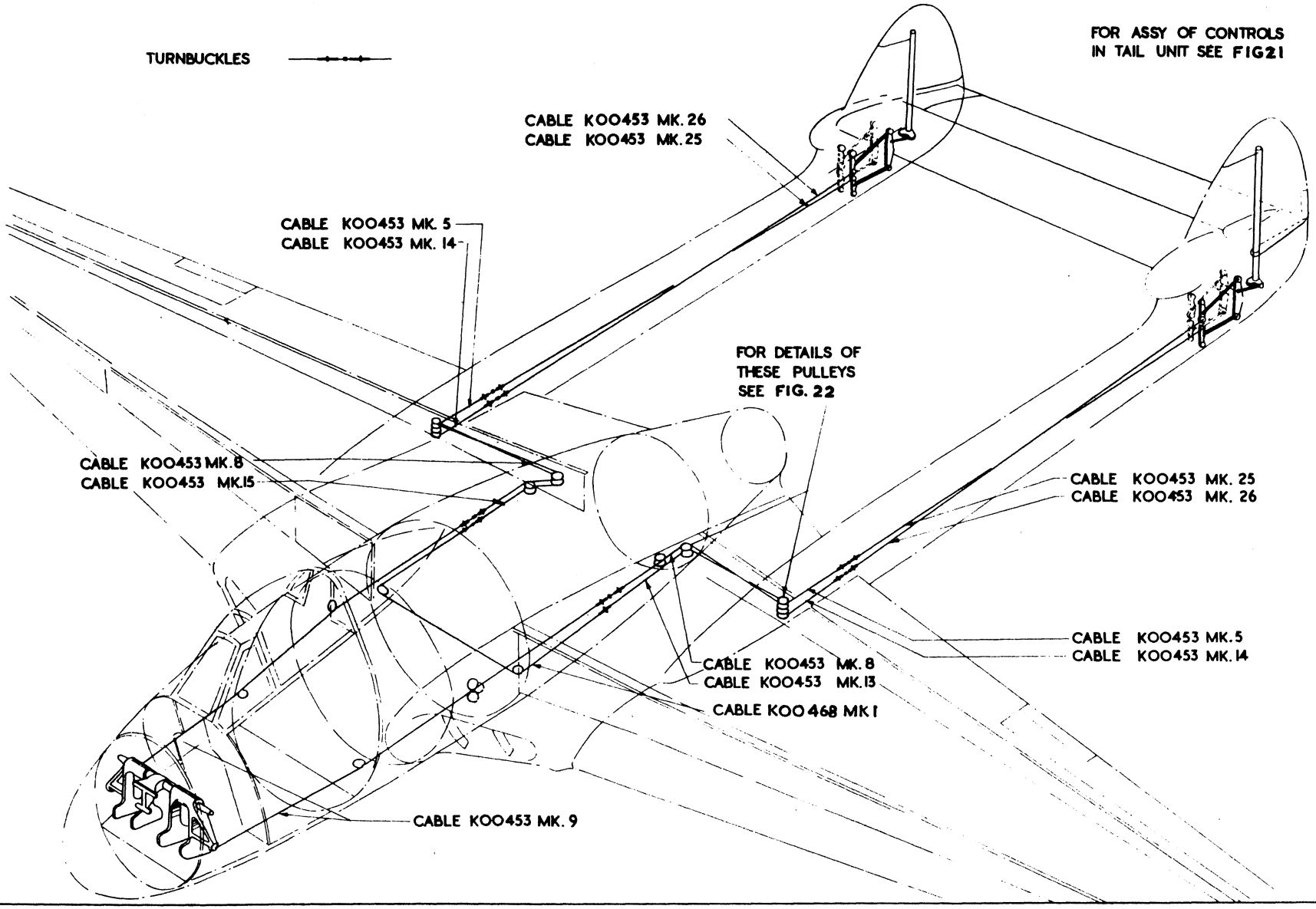


RAAF PUB No 828

FIG. 91

FIG. 92

RUDDER CONTROLS

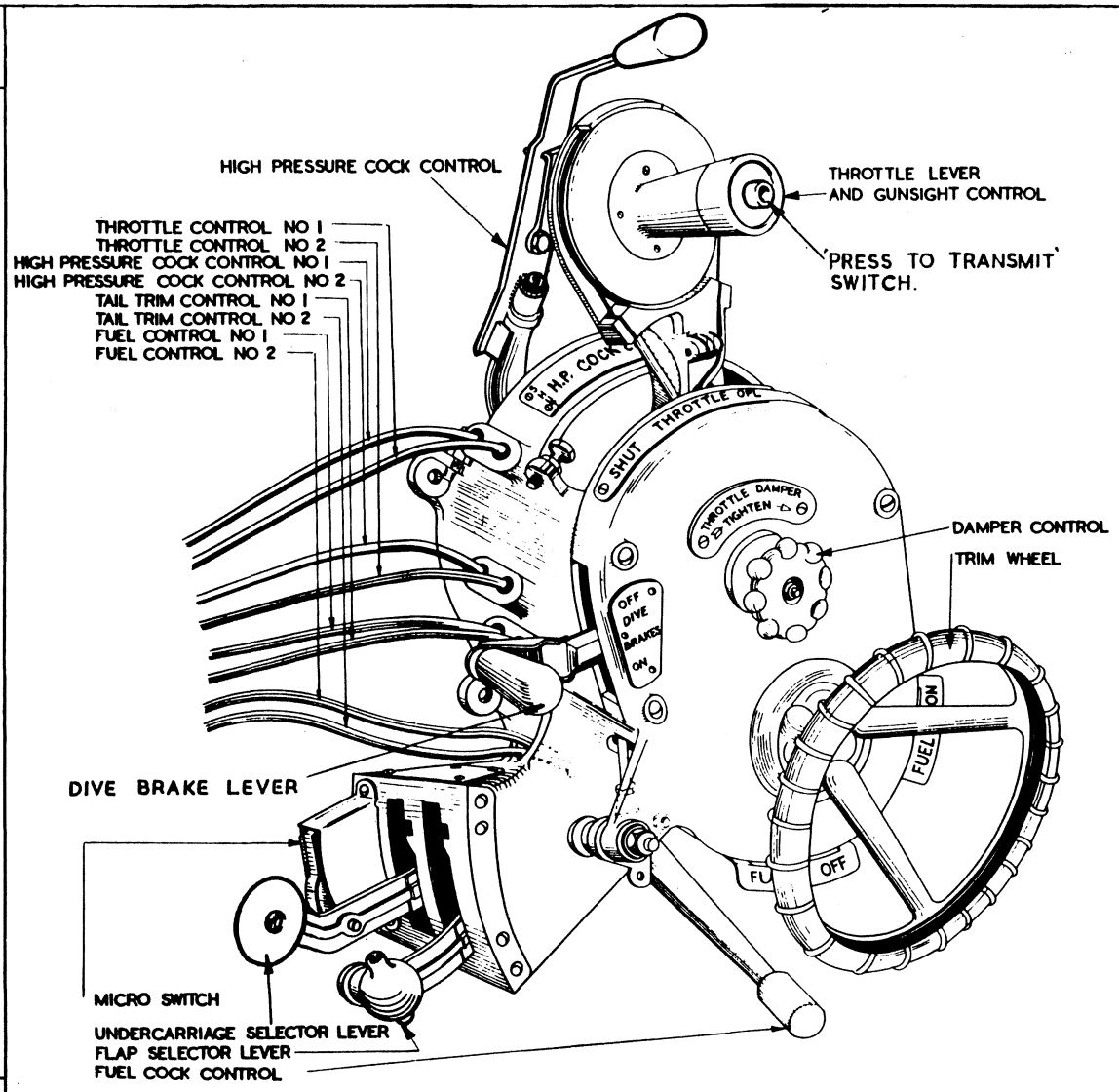


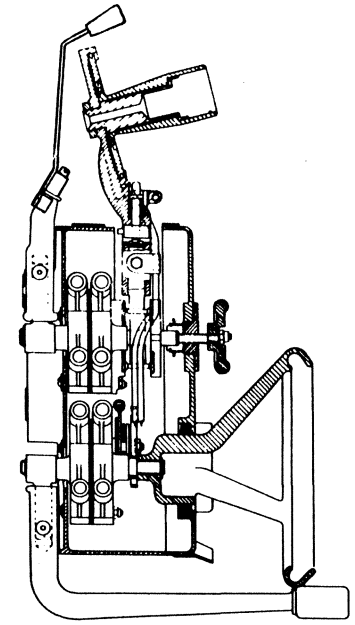
RAAF PUB No 828

FIG 92

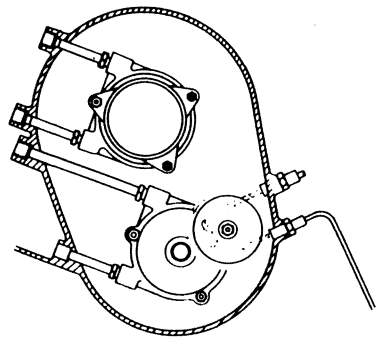
FIG 93

ASSEMBLY OF ENGINE CONTROL BOX





SECTION SHOWING TELEFLEX CONTROL BOXES AND MECHANISM OF THROTTLE LEVER AND GUNSIGHT CONTROL



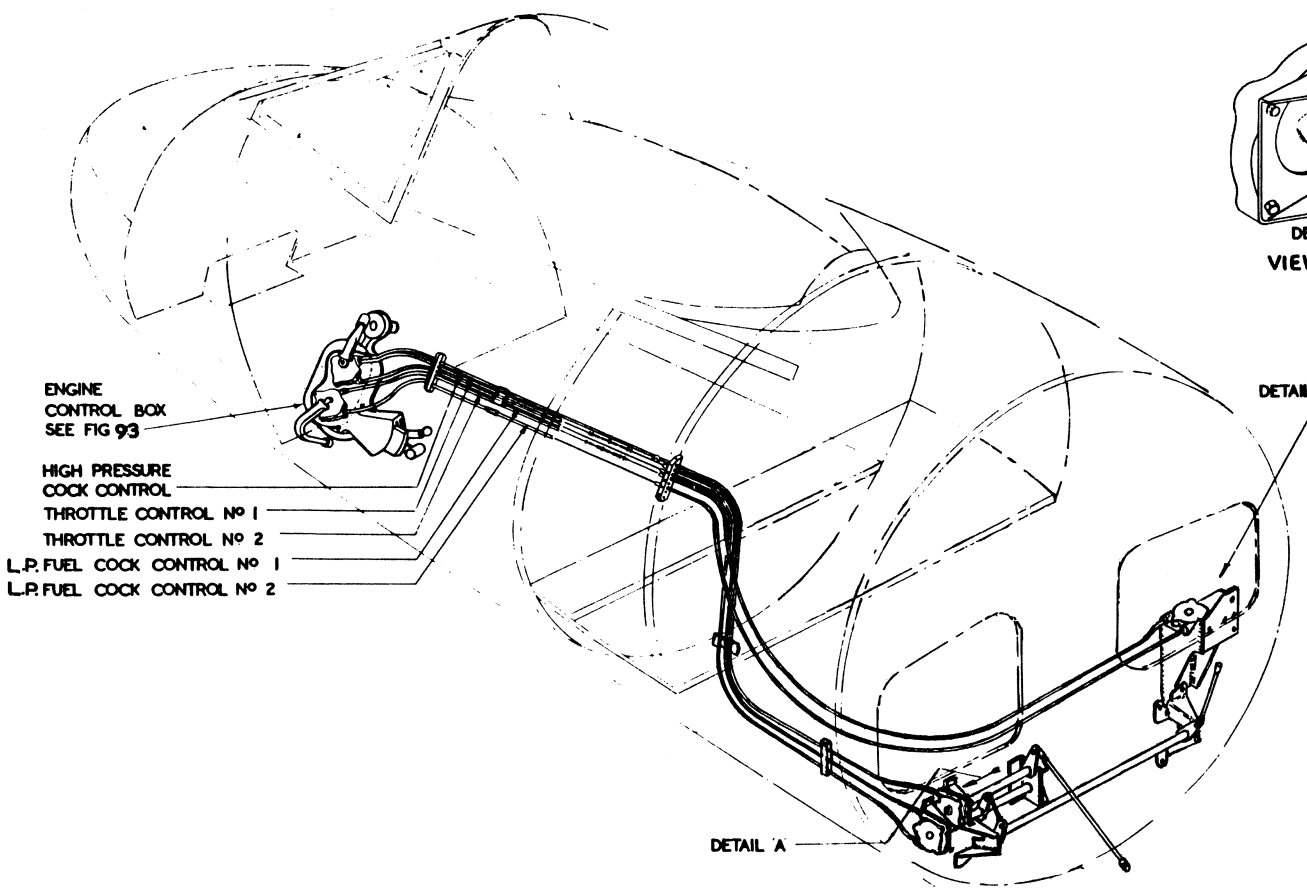
VIEW SHOWING TELEFLEX CONTROL BOXES

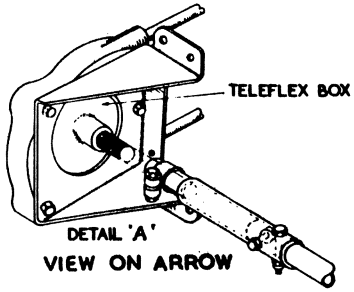
A.A.P. No. 828.

FIG 93

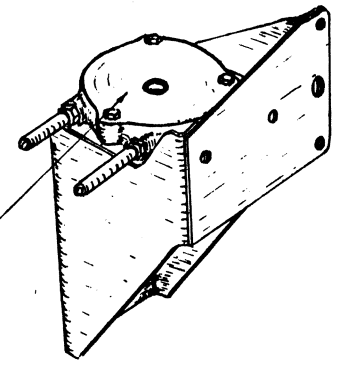
A.L.2

ENGINE CONTROLS



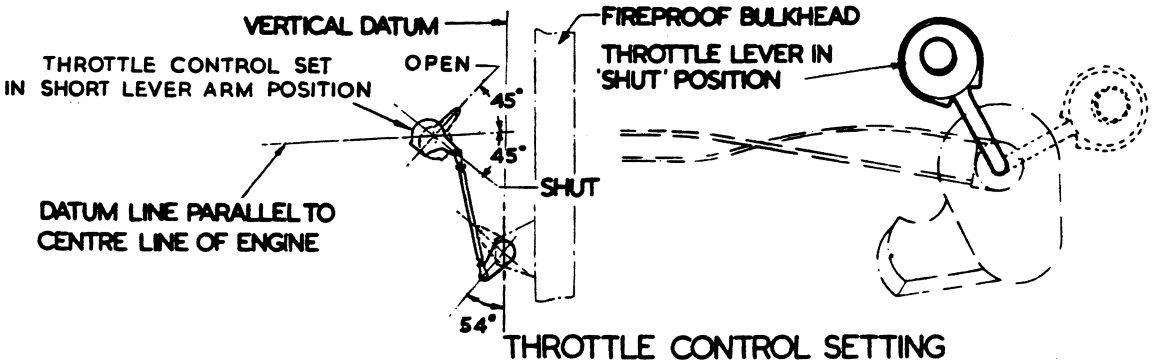


TURNBUCKLES
TELEFLEX GREASERS
TELEFLEX CONDUIT
CLAMP CONNECTOR

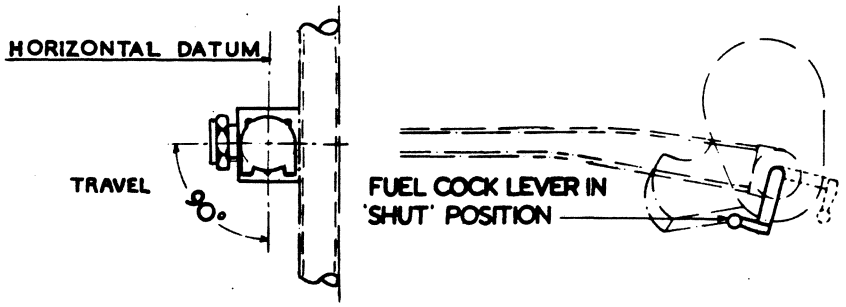


DETAIL "B"
SHOWING FUEL COCK MOUNTING

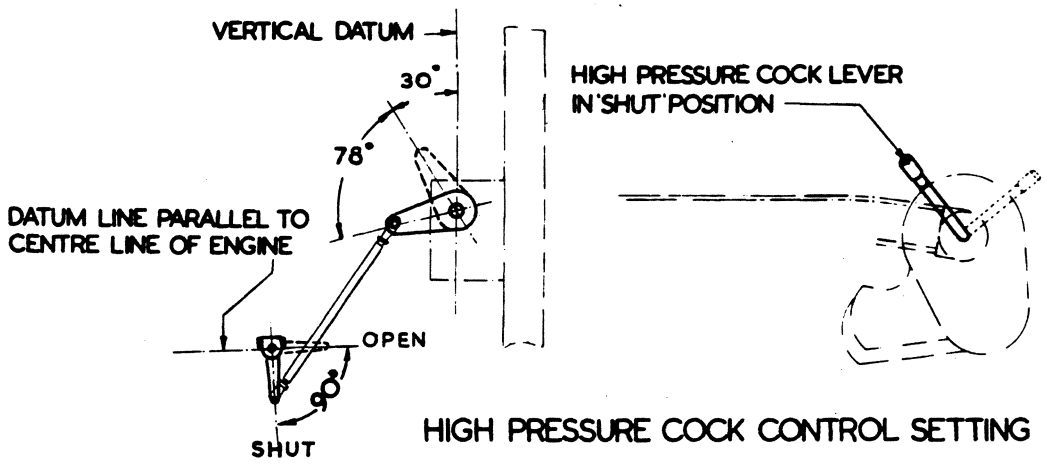
FOR ENGINE CONTROL RIGGING SEE FIG 39



THROTTLE CONTROL SETTING



FUEL COCK CONTROL SETTING



HIGH PRESSURE COCK CONTROL SETTING

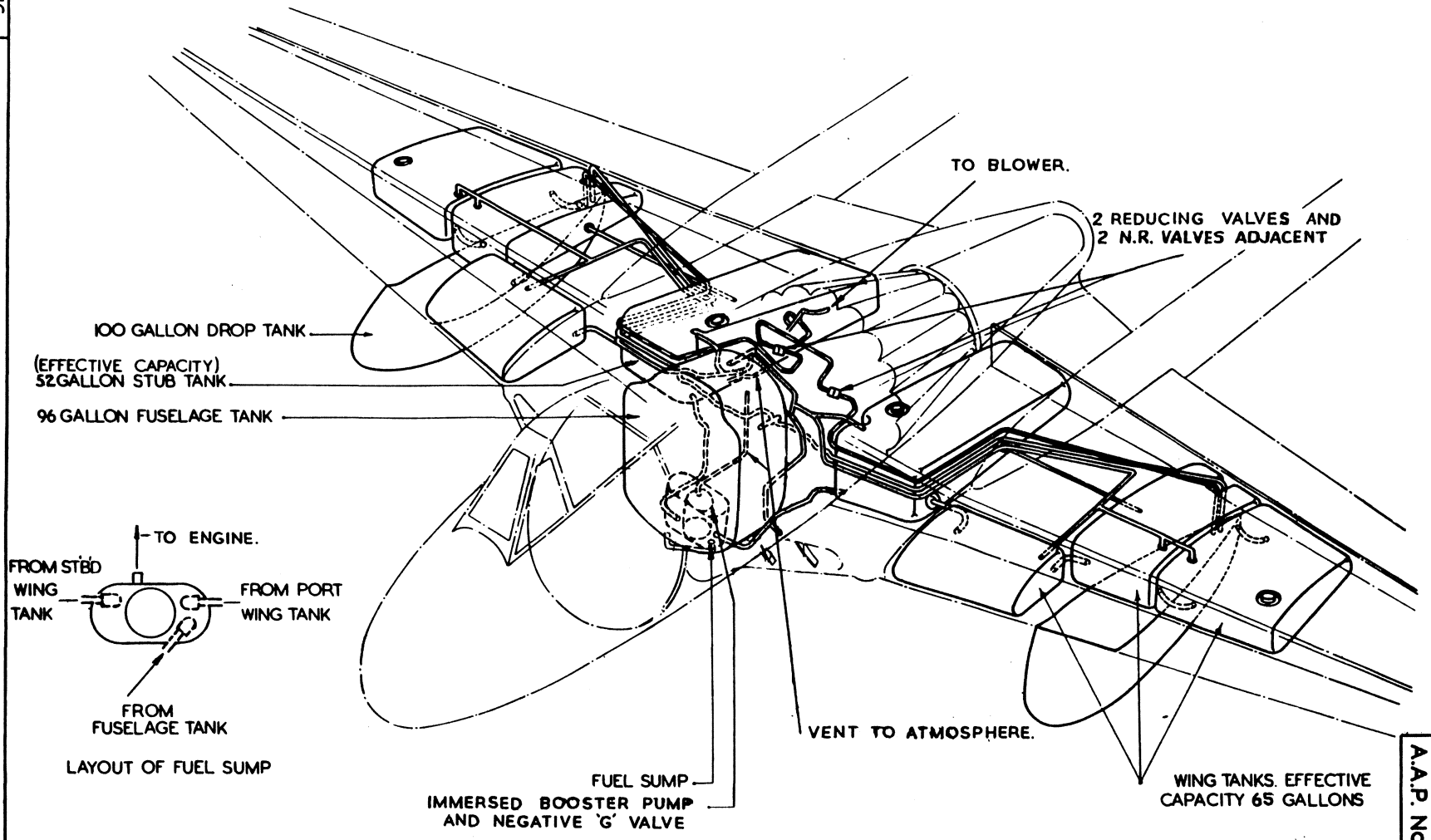
FIG 95

ENGINE CONTROL RIGGING

FIG 95

FIG 96

FUEL SYSTEM

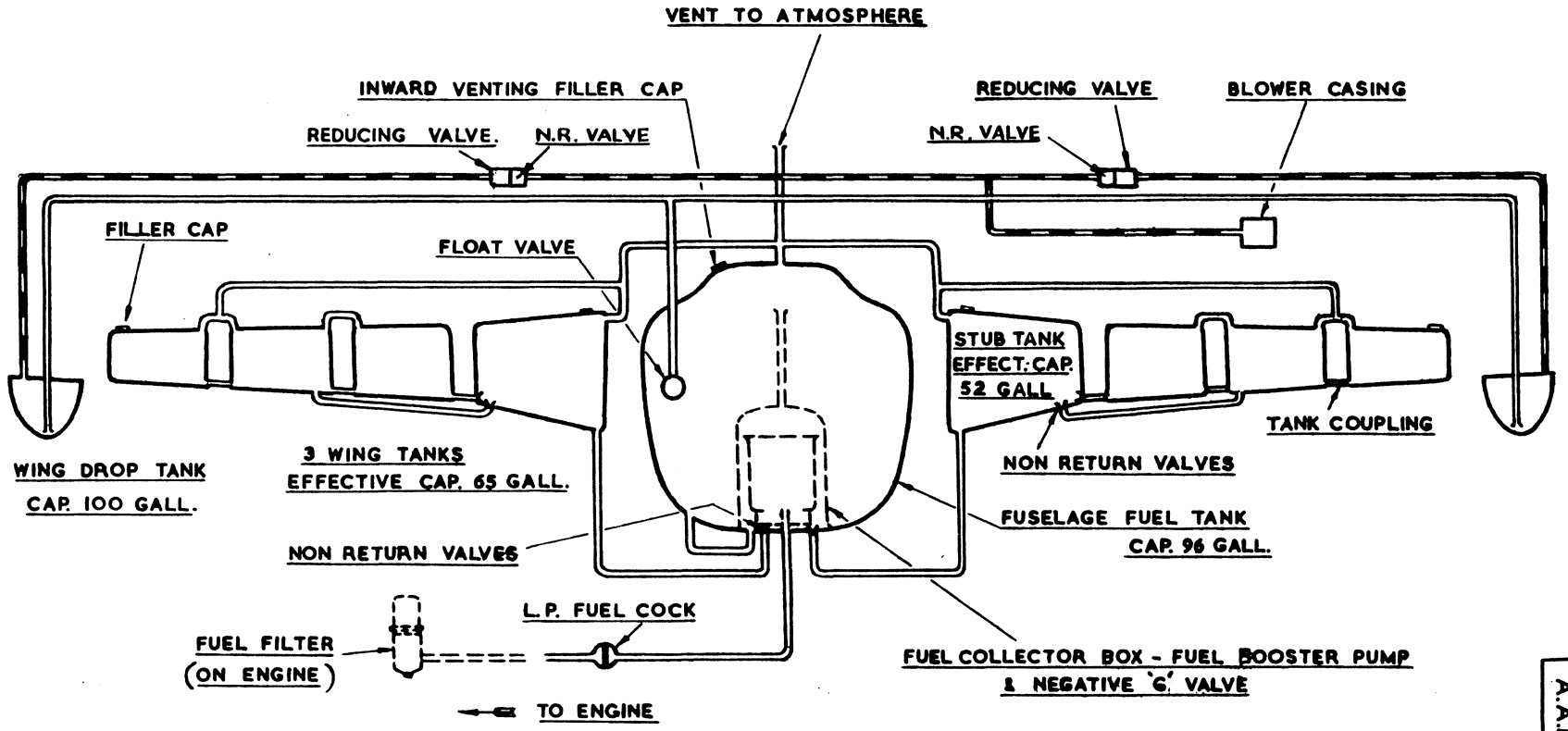


A.A.P. No. 828.

FIG 96 A.L.2

FIG 97

FUEL SYSTEM DIAGRAM



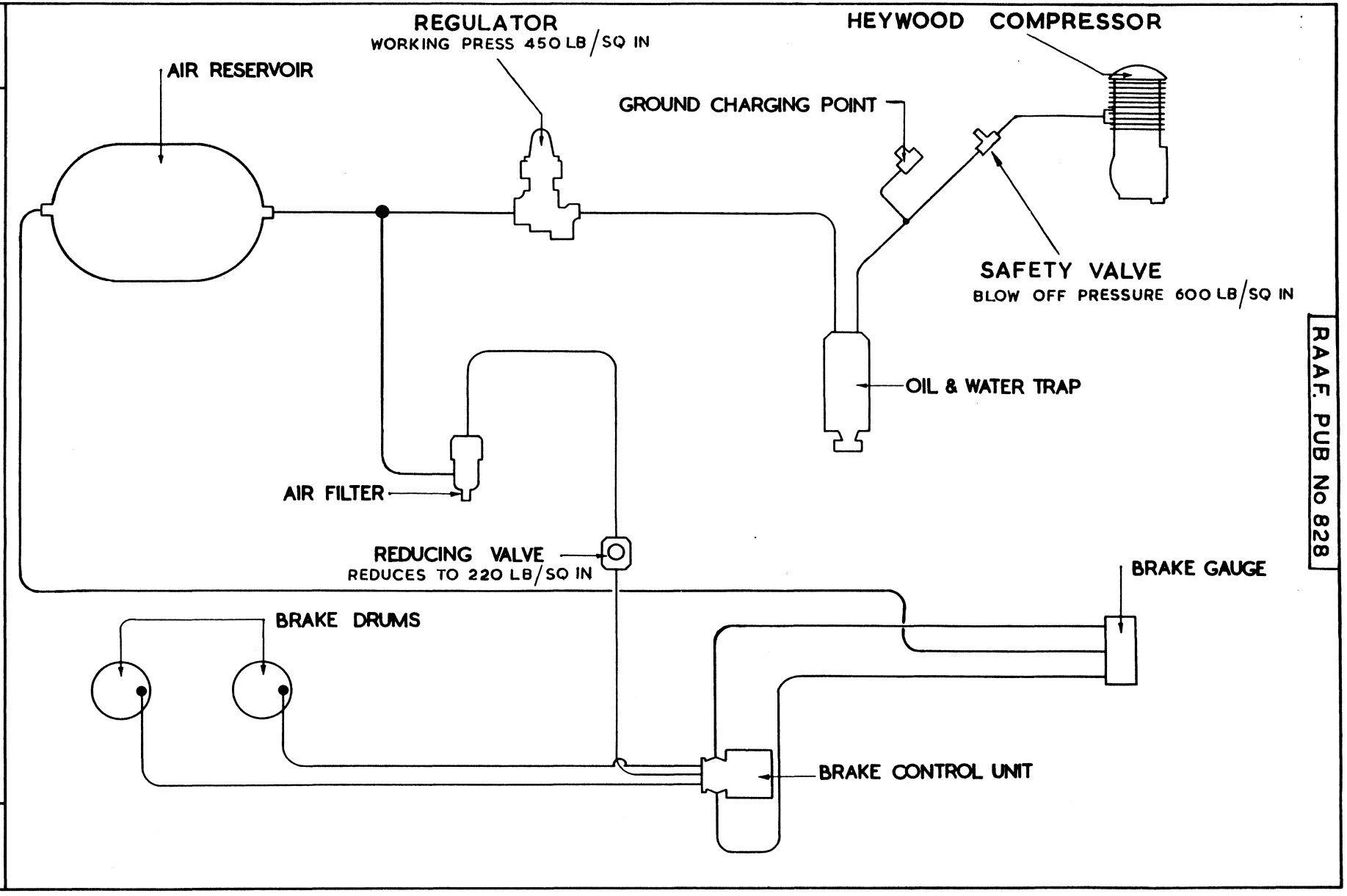
A.A.P. No. 828

FIG 97

A.L.2

FIG 98

PNEUMATIC SYSTEM



RAAF. PUB No 828

FIG 98

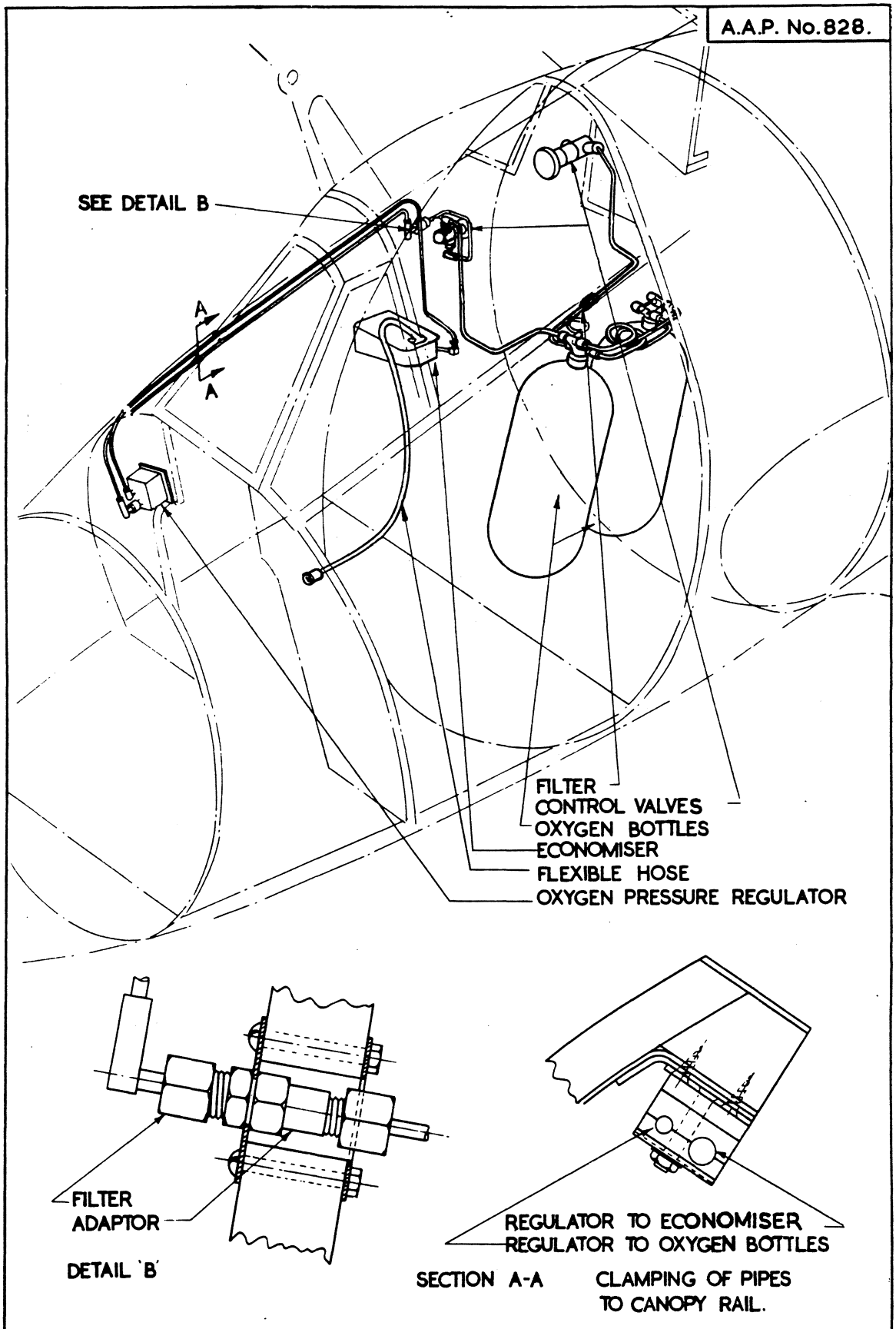


FIG 99	OXYGEN SYSTEM	PRE. D.H. (AUST). MOD. V.229	FIG 99

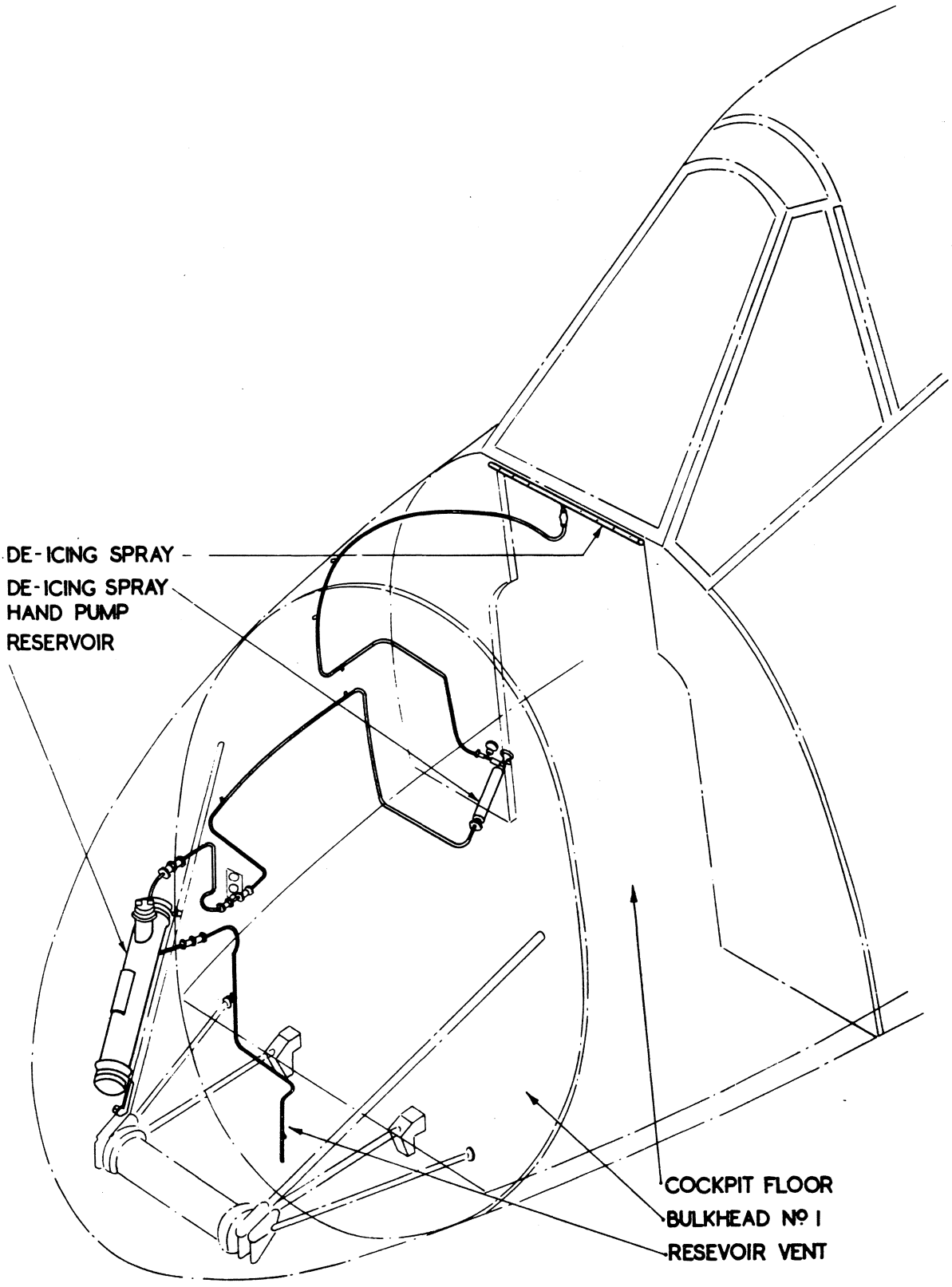


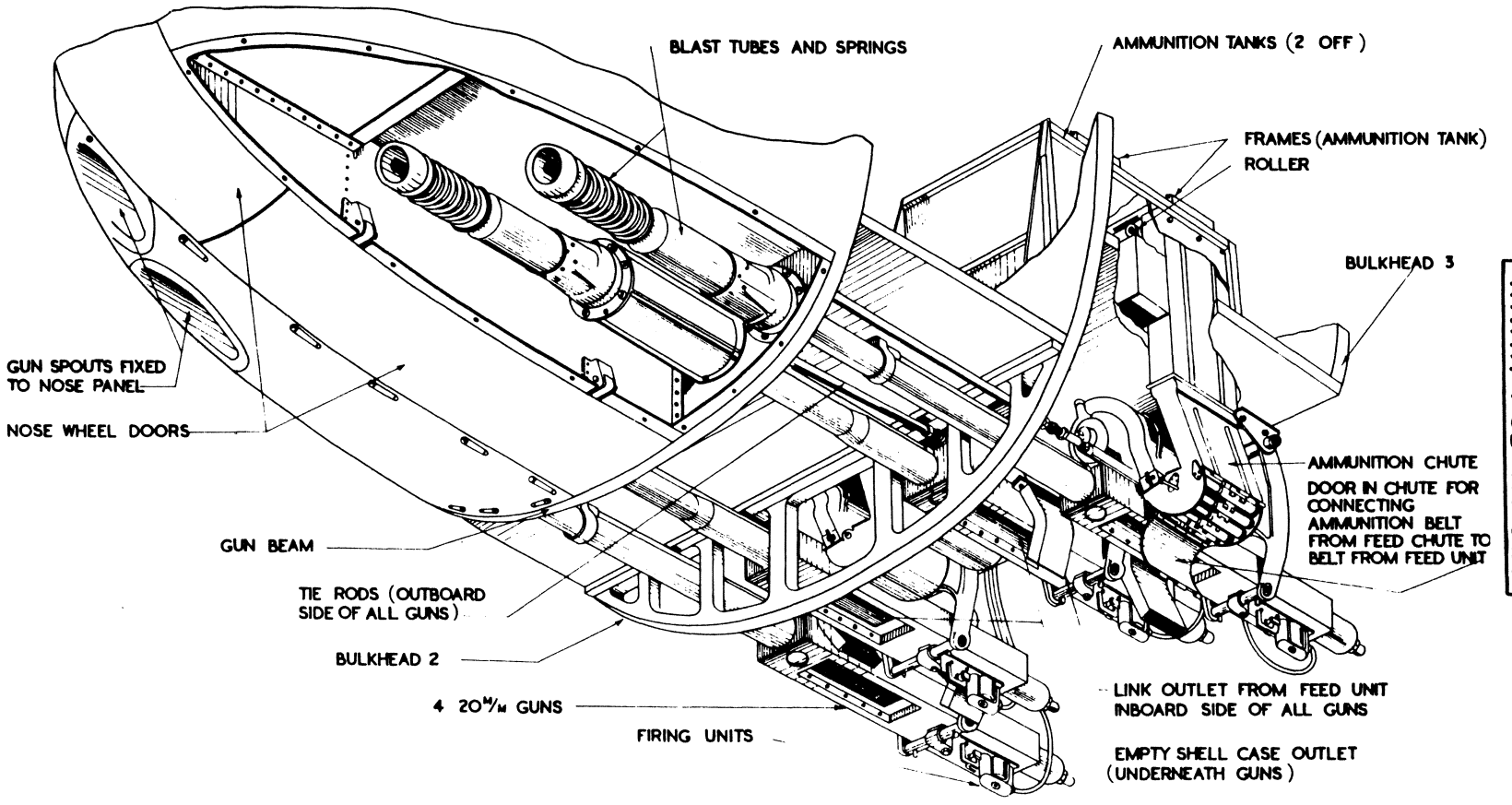
FIG 100

WINDSCREEN DE-ICING SYSTEM

FIG 100

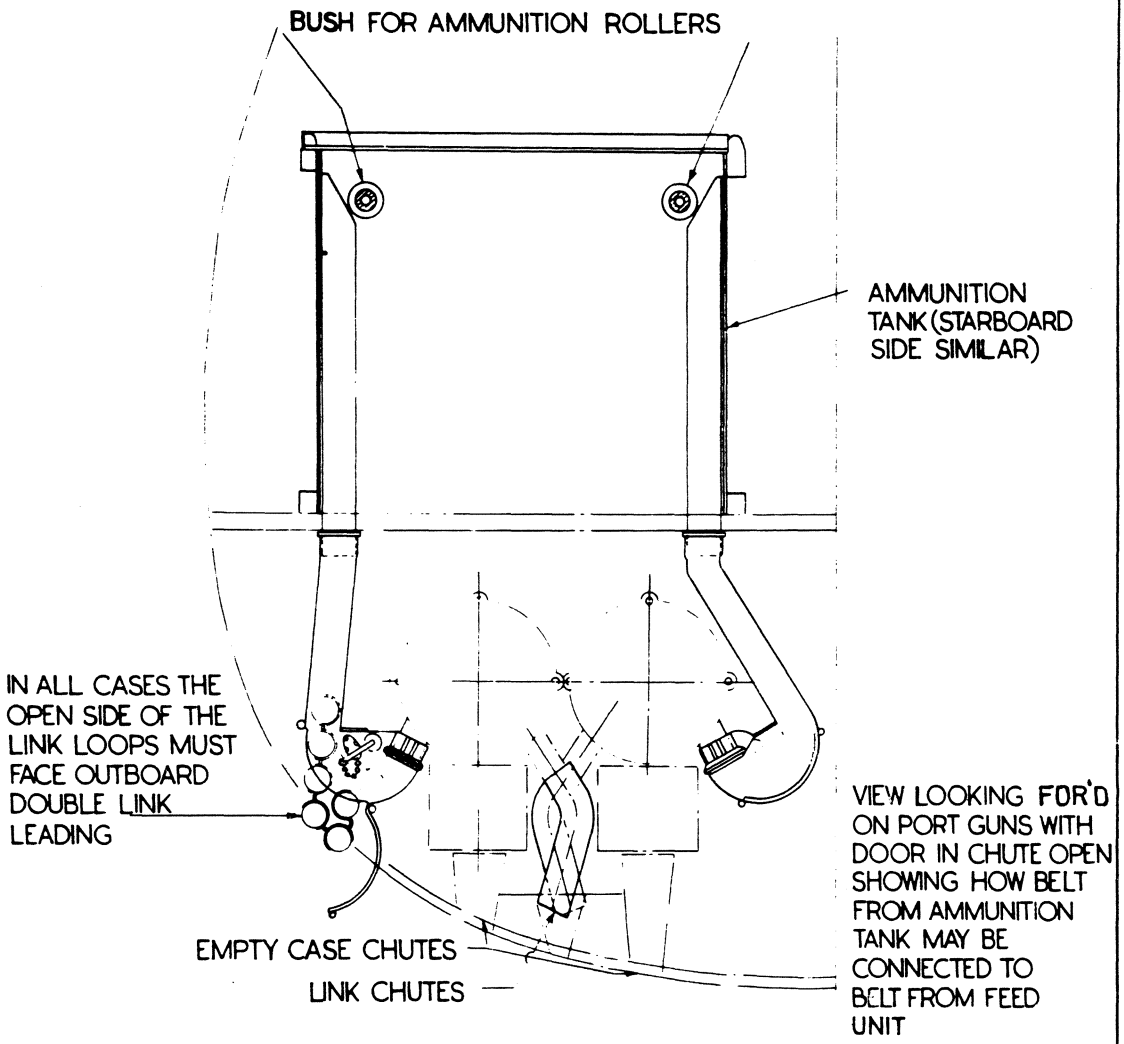
FIG 101

INSTALLATION OF 20M/M GUNS

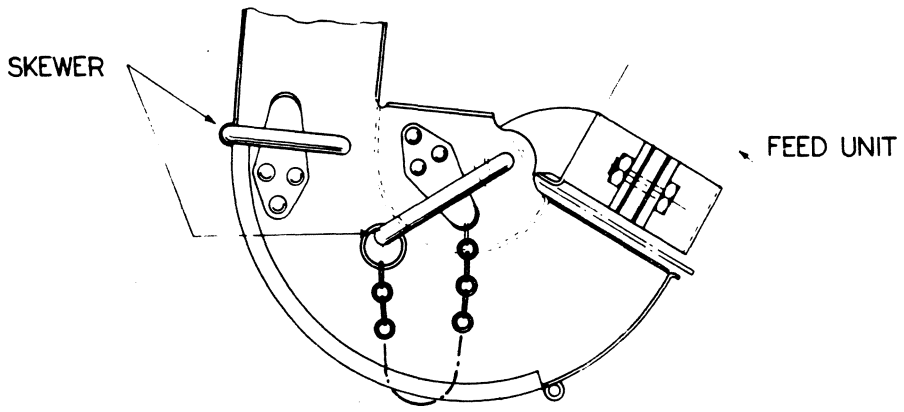


RAAF. PUB No 828

FIG 101

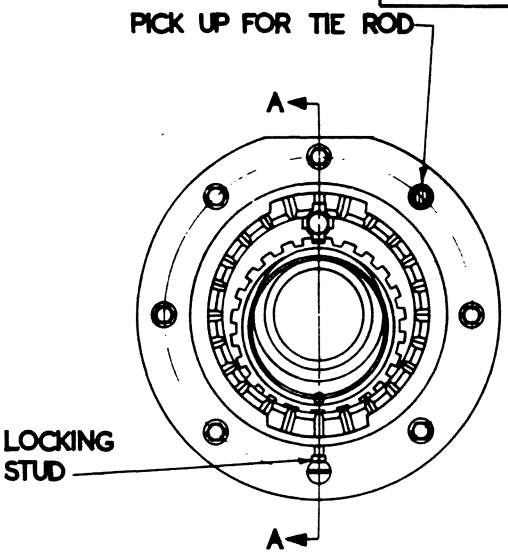


AMMUNITION LOADING FOR 20 M/M GUNS

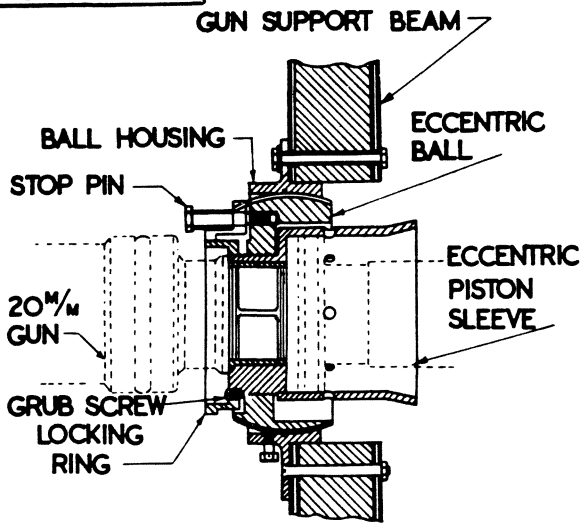


DETAIL SHOWING FIXING OF CHUTES TO FEED UNITS

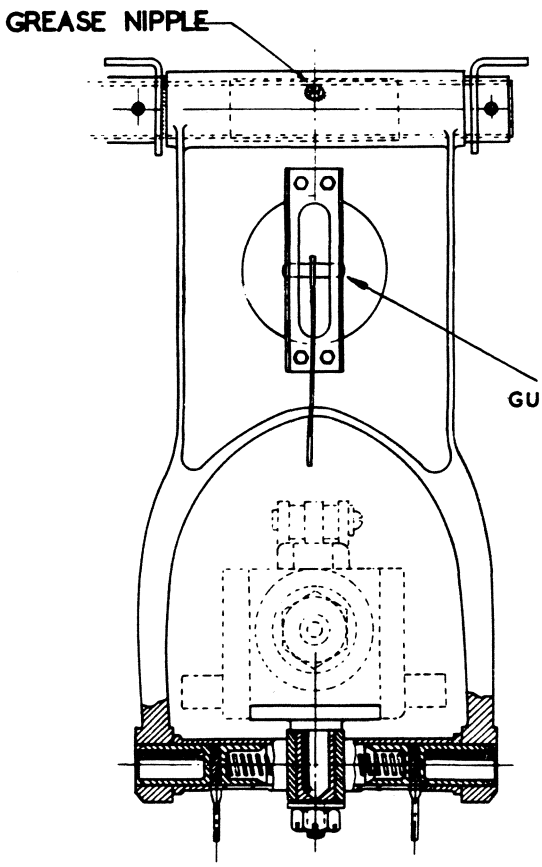
FIG 102 **DETAILS OF 20 M/M GUN INSTALLATION** FIG 102



FRONT MOUNTING
VIEW LOOKING AFT
ON PORT OUTER GUN



SECTION A-A



REAR MOUNTING
VIEW LOOKING FORWARD
ON STARBOARD OUTER GUN

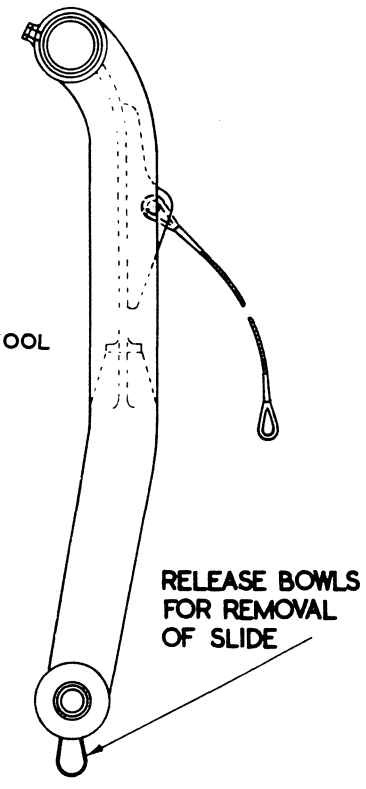
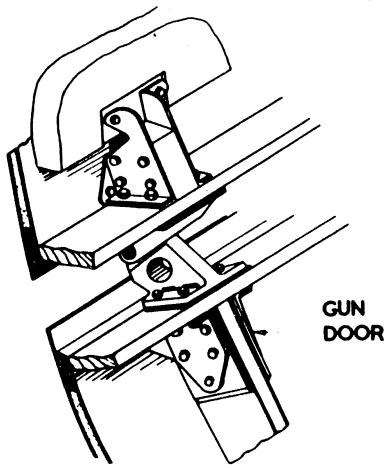


FIG 103 **20M/M GUN MOUNTINGS FRONT & REAR** FIG 103

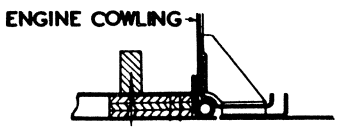
FIG 104

ASSEMBLY OF 20 m/m GUN BAY DOORS & SPOUT FAIRING

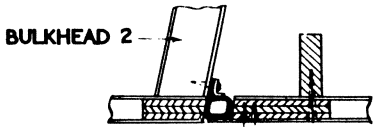


GUN DOOR

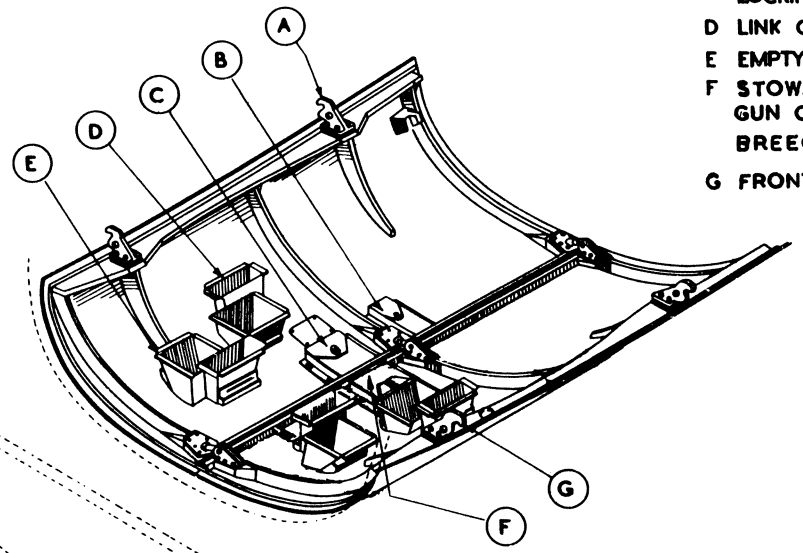
TYPICAL HINGE SHOWING ATTATCHMENT TO FUSELAGE SIDE



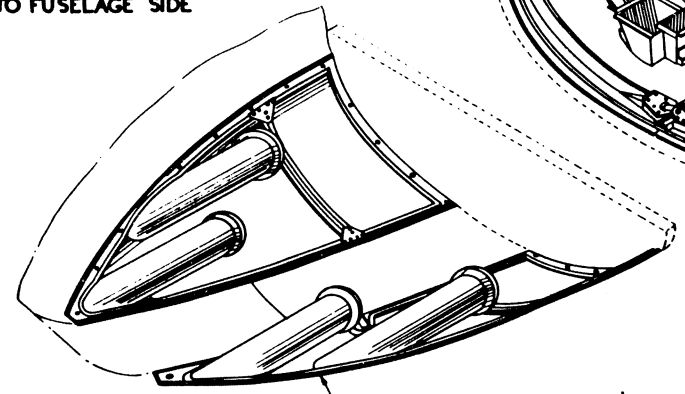
SECTION THRO' REAR OF GUN DOOR SHOWING ASSEMBLY TO ENGINE COWLING



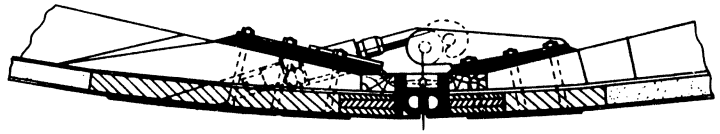
SECTION THRO' GUN DOOR SHOWING ASSEMBLY TO BULKHEAD 2



A REAR HINGE
B STOWAGE BAG CONTAINING BARREL PLUG
C STOWAGE BAG CONTAINING MAIN UNDERCARRIAGE LOCKING GEAR
D LINK CHUTE
E EMPTY CASE CHUTE
F STOWAGE BAG CONTAINING GUN COCKING TOOL AND BREECH STOPPAGE TOOL
G FRONT HINGE



CANNON SPOUT FAIRING ASSEMBLED WITH DZUS FASTENERS TO FIXED NOSE



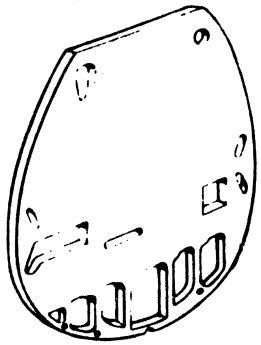
SECTION AT TYPICAL FASTENER

RAAF. PUB No 828

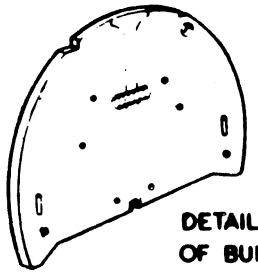
FIG 104

LOCATION OF DRAIN HOLES

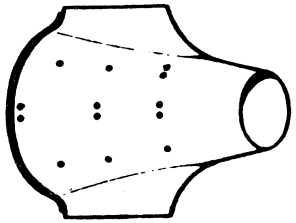
105



DETAIL OF REAR FACE
OF BULKHEAD NO.2

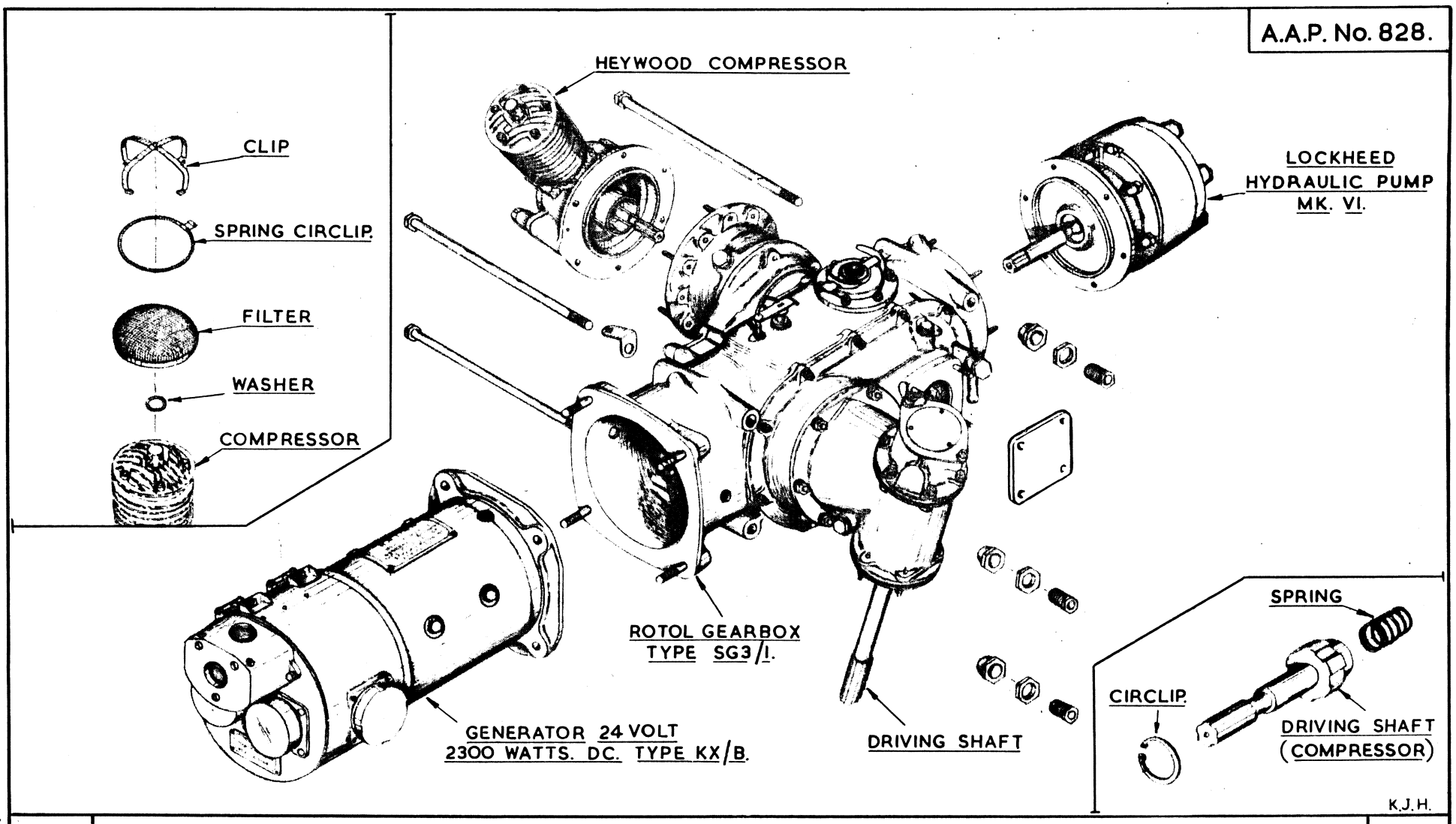


DETAIL OF REAR FACE
OF BULKHEAD NO.3



DETAIL OF UNDERSIDE
OF REAR CONE FAIRING

A.A.P. No. 828.

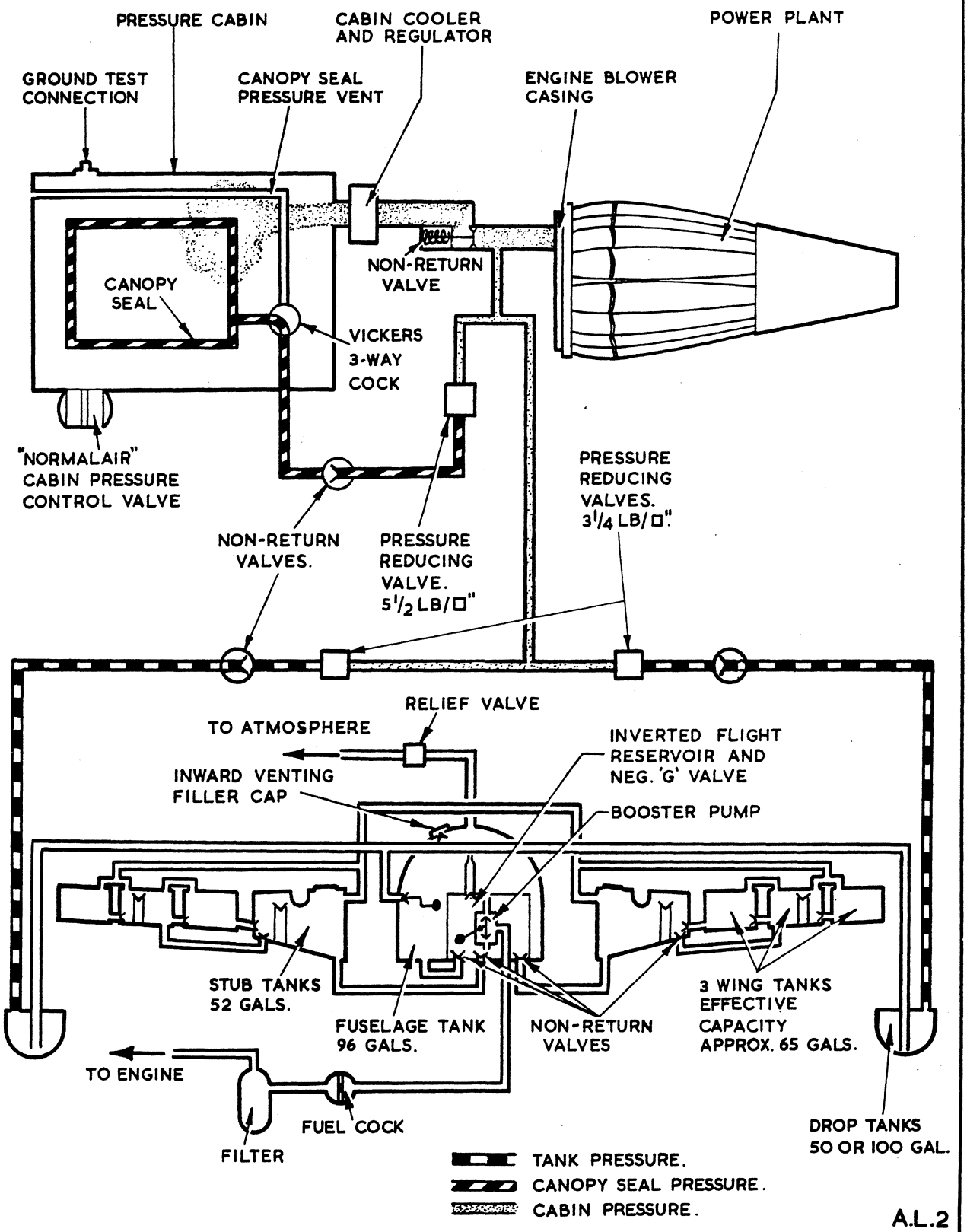


A.L.2

106

AUXILIARY GEARBOX

106



A.L.2

FIG 107

FUEL & AIR SYSTEM DIAGRAM

FIG 107

A.L.2

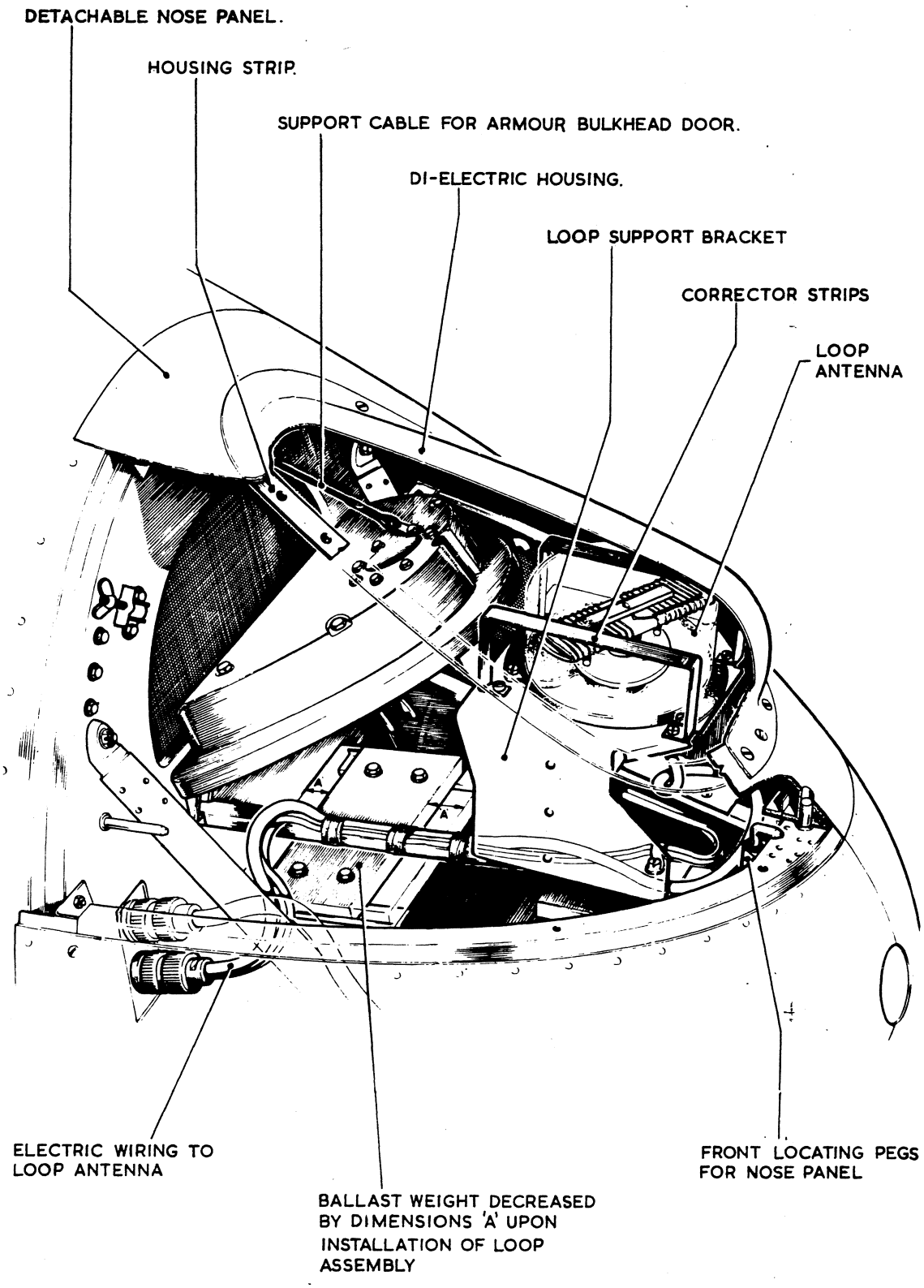


FIG 108 A.D.F.-14 LOOP INSTALLATION FIG 108

FIG 109

A.D.F. 14 - INSTALLATION

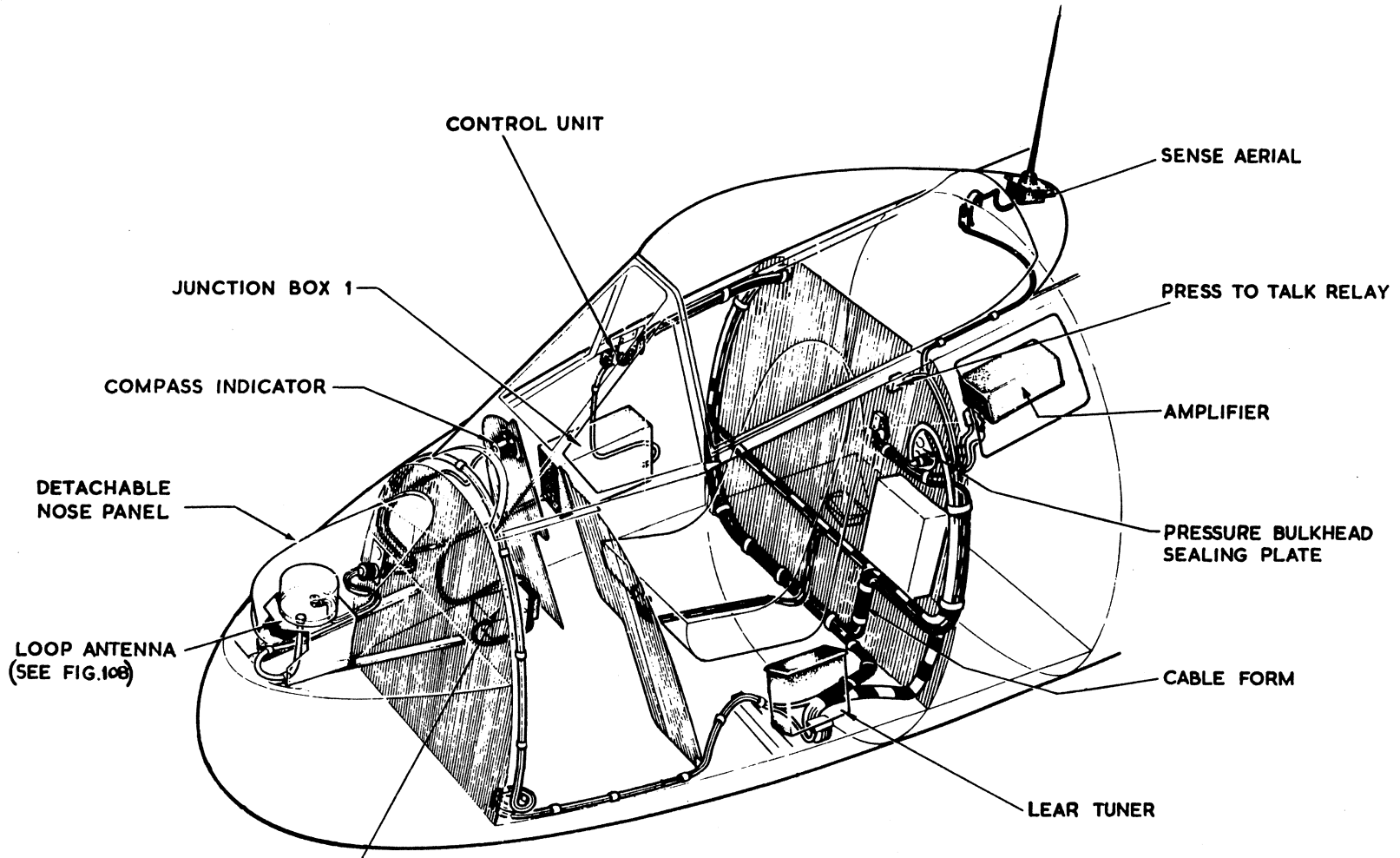
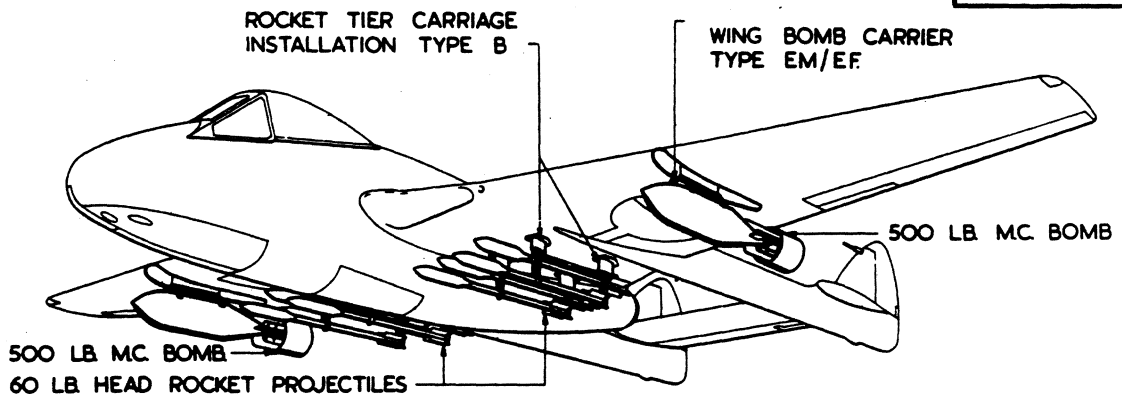
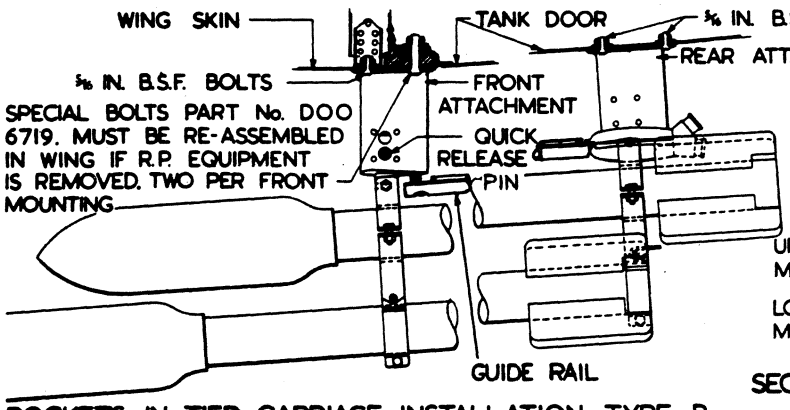


FIG 109

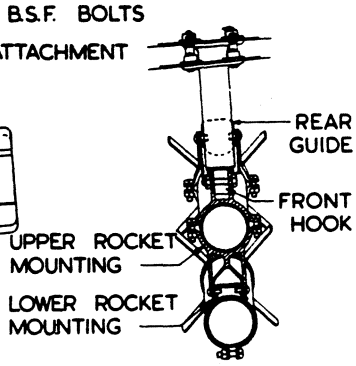
A.A.P. No. 828.

A.L.2

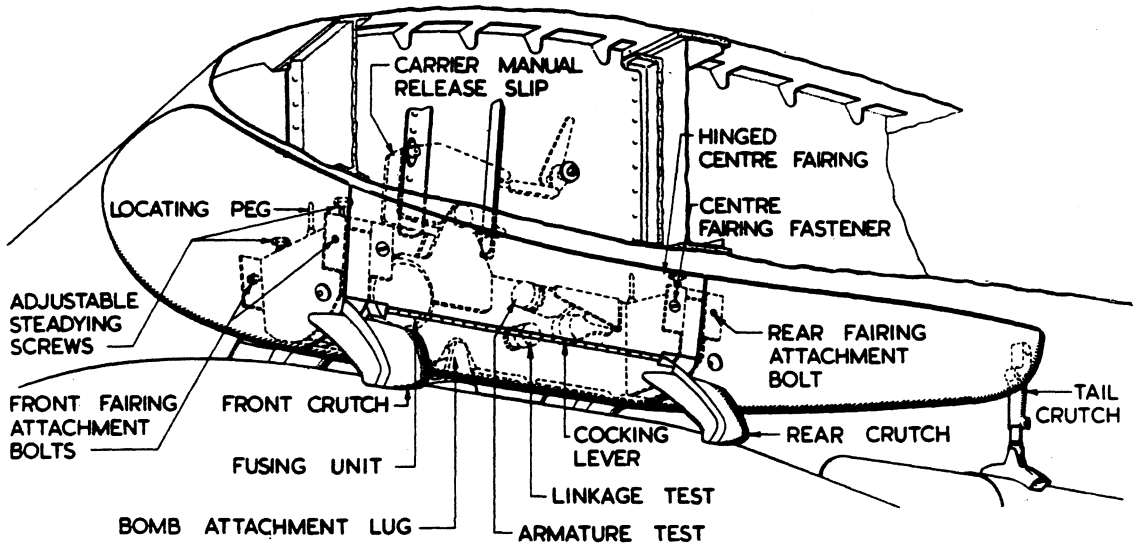




ROCKETS IN TIER CARRIAGE INSTALLATION TYPE B SHOWING ATTACHMENTS TO WING IN SECTION.



SECTION THROUGH FRONT ROCKET MOUNTING LOOKING AFT.



VIEW SHOWING BOMB CARRIER WITH FAIRINGS FITTED AND BOMB ATTACHED.

FIG. 110	WING BOMB AND R.P. INSTALLATIONS	FIG. 110