

Chapter 2

PREPARATION FOR FLIGHT

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*To be issued later

WARNING

AN AIRCREW EJECTION SEAT IS FITTED TO THIS AIRCRAFT

This equipment is a source of potential danger to personnel and of damage to the aircraft. If the firing mechanism is operated while the aircraft is on the ground, the seat will be ejected, damage will be done to the aircraft and injury may be caused to any person in, or leaning into, the cabin.

Before any individual is allowed to enter the cabin, therefore, the N.C.O. i/c air-frame servicing is to ensure that the safety strap is in position over the firing handle of the ejection seat and secured with the safety pin, or that the safety pin is fitted in the hole in the seat.

Introduction

1. The location of the various servicing points are given in fig. 1. When the necessary operations have been completed, a check

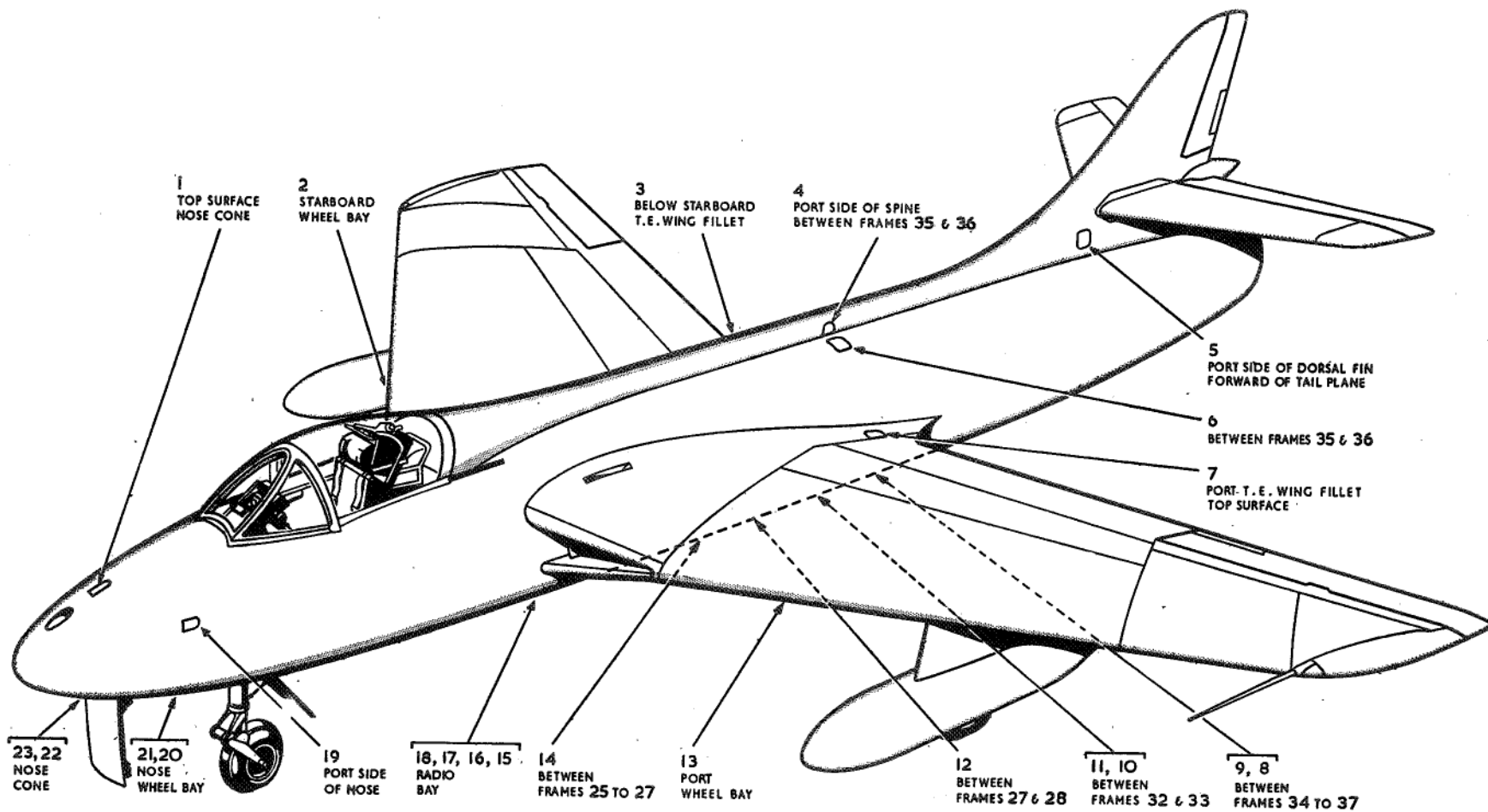
must always be made to ensure that all tools have been removed and that all panels and access doors lie flush with the surrounding surface and are securely fastened. The positions of the access doors and panels are shown in Sect. 2, Chap. 4. The operations described below are grouped for convenience under their various systems and do not, therefore, constitute the order in which they are to be carried out. For details of the sequence to be followed, reference should be made to the Servicing Schedules.

RE-FUELLING

2. The aircraft is re-fuelled under pressure through a 1½ in. standard coupling in the port wheel bay. High pressure bowzers which are capable of re-fuelling the aircraft at a rate of 150 gallons per minute at a pressure of 45-50 lb. per sq. in. should be used, but if these are not available existing bowzers may be used with an adapter hose.

3. The disposition of the tanks, their inter-connections and diagrams of the fuel system are given in Sect. 4, Chap. 2. The procedure for re-fuelling the system is as follows:—

- (1) Earth the bowser to the aircraft structure.
- (2) Ensure that the de-fuelling cock, accessible through the engine starter access door in the bottom of the fuselage, is turned OFF. (This is the normal flight position for the cock, which is wire locked.)
- (3) Ensure that the L.P. fuel cock in the cabin is OFF.
- (4) Remove the sealing cap from the re-fuelling coupling in the port wheel bay and connect up the bowser hose in its place.



- 1 CAMERA GUN
- 2 CHARGING CONNECTION - ALERON ACCUMULATOR
- 3 ENGINE OIL SUMP FILLER
- 4 EXTERNAL AIR CONNECTION - FUEL SYSTEM
- 5 CHARGING CONNECTION - ELEVATOR ACCUMULATOR
- 6 COLD AIR UNIT DIPSTICK
- 7 HYDRAULIC RESERVOIR FILLER
- 8 ENGINE FUEL FILTER

- 9 HYDRAULIC HANDPUMP
- 10 ACCESSORIES GEARBOX FILLER
- 11 HYDRAULIC EXTERNAL SUPPLY VALVES
- 12 FUEL SYSTEM DRAIN VALVES (2)
- 13 RE-FUELLING AND DE-FUELLING COUPLING
- 14 FUEL SYSTEM DE-FUELLING COCK
- 15 FUEL SYSTEM DRAIN VALVES (2)
- 16 EXTERNAL ELECTRICAL SUPPLY SOCKET

- 17 BATTERIES
- 18 CHARGING CONNECTION - EMERGENCY AIR BOTTLES
- 19 DE-ICING TANK FILLER
- 20 CHARGING CONNECTION - WHEEL BRAKES
- 21 CHARGING CONNECTION - OXYGEN CYLINDERS
- 22 EXTERNAL HOOD SWITCH
- 23 GROUND PRESSURISING CONNECTION

Fig. 1. Servicing points

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- (5) Start the bowser pump and set the bowser control to RE-FUEL.
- (6) Set the battery master switch on the leg panel in the cockpit to ON and the time switch in the port wheel bay to ON. (If a low-pressure bowser is being employed, re-fuelling may take longer than eight minutes, and this will necessitate switching on the time switch for a second cycle.) The servo valves in the aircraft fuel system will automatically close when the tanks are full and the re-fuelling circuit will cease to operate.
- (7) When re-fuelling is completed, check the contents of the tanks by the fuel gauges in the cockpit.
- (8) Remove the re-fuelling equipment and replace the sealing cap on the re-fuelling coupling in the port wheel bay. Switch OFF the time switch if it has not completed its full cycle.

DE-FUELLING

Note . . .

Before de-fuelling is commenced, the de-fuelling cock (fig. 1, item 14) must be turned to the ON position. The de-fuelling cock is accessible via the engine starter access door in the bottom of the fuselage aft of the main spar.

4. The aircraft is de-fuelled through the re-fuelling coupling in the port wheel bay. The fuel is drained via the front tanks, being either sucked out by a bowser or pumped out by the tank booster pumps. An air supply is required to transfer the fuel from the centre, wing and drop tanks to the front tanks during de-fuelling. The air supply, which must not exceed 120 lb. per sq. in., is fed into the system through an external supply connection accessible via an access panel in the spine of the centre fuselage (fig. 1, item 4). The procedure for de-fuelling the aircraft is as follows:—

- (1) Earth the bowser to the aircraft structure.
- (2) Remove the sealing cap from the re-fuelling coupling in the port wheel bay and connect the bowser hose in its place.

- (3) Connect an external air supply to the external air pressurization connection in the spine of the centre fuselage (fig. 1, item 4) and apply a pressure not exceeding 120 lb. per sq. in. (Generally, the cabin pressurization test rig is used for this purpose, after it has been set to 10 lb. per sq. in. pressure.)
- (4) Set the bowser control to DE-FUEL.
- (5) Turn the L.P. cock to OFF.
- (6) Turn the de-fuelling cock (fig. 1, item 14) to ON (accessible via the engine starter access door in the bottom of the fuselage).
- (7) Start the bowser pump to draw out fuel.
- (8) When the tanks are empty, turn the de-fuelling cock to OFF immediately and re-lock with stainless steel wire (Stores Ref. 30A/2514 to Spec. D.T.D.189) to ensure that it remains closed. This is important.
- (9) Disconnect the de-fuelling equipment, re-fit the sealing cap on the re-fuelling coupling in the port wheel bay and re-fit the cap and access door of the air pressurization connection in the spine member.

DRAINING WATER FROM FUEL SYSTEM

5. To facilitate the drainage of water that may accumulate in the fuel system, four small drain valves are provided at the lowest points of the fuel system, together with a small plug in the engine fuel filter casing. These must be used daily to drain off a few pints of fuel and any water that may have accumulated. The position of these valves are indicated in fig. 1, items 12 and 15. To use the valves, remove the sealing caps and insert a suitable length and diameter of hose into each valve in turn. Inserting the hose pushes open a spring-loaded valve. When drainage of water is complete, remove the hose, replace the sealing caps and secure the access doors.

RE-FILLING HYDRAULIC RESERVOIR

Note . . .

Hydraulic fluid has a detrimental effect on paint, rubber, electrical cables, etc., and

although a drip tray is provided, great care must be taken to ensure that no fluid is spilled on such parts. Fluid drained from the system during bleeding, even if clean, must not be put back into the system until at least 24 hours have elapsed to allow the fluid to become de-aerated.

6. Access to the filler neck of the hydraulic reservoir is obtained by removing an access door from the top surface of the port wing fillet (fig. 1, item 7). The filler neck is provided with a sight glass to facilitate checking the level. If, with the aircraft standing on its alighting gear with the hydraulic accumulators inflated and fully charged and the landing flaps and air brake up, the level no longer overlaps the white background below the sight glass, the reservoir must be topped up. To top up, remove the filler cap slowly to release any built up pressure and pour in fluid until it reaches the white background. A container, fitted with a flexible nozzle, should be used to facilitate the operation. When re-filling is complete, replace the filler cap securely and mop up any spilled fluid.

CHARGING AIR BOTTLES (HYDRAULIC EMERGENCY AND ANTI-G)

7. The two high-pressure air bottles for the emergency operation of the alighting gear and flaps are mounted together in the front fuselage just behind the pilot's seat. The two anti-g air bottles are installed above them. It is essential that these bottles are fully charged before each flight. Three pressure gauges are provided to check the pressure in the bottles. The hydraulic emergency air bottle gauges are situated in the cockpit at the aft end of the cockpit port shelf. The anti-g bottle gauge is situated on the starboard side of the cockpit between frames 10 and 11 above the cockpit shelf. If the pressure is below that specified in the Leading Particulars, the bottles must be re-charged. An in-situ charging valve, located just aft of frame 16 on the port side of the aircraft and accessible via the radio access door (fig. 1, item 18), is provided for the purpose. All four bottles are charged simultaneously through the one valve.

Note . . .

If either the alighting gear or the flaps are lowered by the emergency system it is necessary to bleed and re-prime the hydraulic system (Sect. 3, Chap. 6). The air bottles must then be re-charged.

CHARGING HYDRAULIC ACCUMULATORS

Wheel brakes

8. Access to the wheel brakes hydraulic accumulators and their charging connection is from within the nose wheel bay, port side. The pressure in the accumulators is indicated on a pressure gauge on the rear portion of the port shelf in the cabin. If the pressure shown on the gauge is below that quoted in the Leading Particulars, the accumulator must be re-charged through the charging connection in the wheel bay. Prior to re-charging, it will be necessary to dissipate the pressure by operating the brake control a number of times until the brakes cease to operate. The accumulators are then exhausted and may be re-charged in the normal manner (fig. 1, item 20).

Aileron assister

9. Access to the hydraulic accumulator for the aileron assister, together with its charging connection, may be obtained from within the starboard wheel bay. The pressure should be checked by connecting a pressure gauge to the charging connection, and if below that quoted in the Leading Particulars the accumulator must be re-charged. Prior to re-charging, the pressure in the accumulator must be dissipated by operating the control a number of times until the hydro-booster jacks cease to operate. The accumulator will then be exhausted and may be re-charged in the normal manner (fig. 1, item 2).

Note . . .

When pressure is dissipated prior to re-charging, the power control for the ailerons is automatically disengaged and, therefore, it is important to ensure that the pawls of the hydro-booster jacks are re-engaged before flight by having an aileron held and moving the control column laterally, while the hydraulic hand pump is being operated (fig. 1, item 9).

Elevator assister

10. Access to the hydraulic accumulator and its charging connection may be obtained by removing an access door in the port side of the dorsal fin just forward of the tail plane. The access door is provided with a window to enable the accumulator pressure to be checked by reference to a pressure gauge located next to the accumulator. If the pressure is below that quoted in the Leading Particulars the accumulator must be re-charged. Before re-charging, the pressure in the accumulator must be dissipated by operating the elevator control a number of times until the hydro-booster ceases to operate. The accumulator will then be exhausted and may be re-charged in the normal manner after removing the access door (fig. 1, item 5).

Note . . .

When pressure is dissipated prior to re-charging the accumulator, the elevator power control will be automatically disengaged and, therefore, it is important to ensure that the pawls of the hydro-booster jacks are re-engaged correctly before flight by having the elevator held and moving the control column fore and aft while the hand pump is being operated.

CHARGING OXYGEN CYLINDERS

11. The two oxygen cylinders are mounted in the nose of the aircraft between frames 4, 5 and 6 on the starboard side of the aircraft, the in-situ charging valve Mk. 8* or Mk. 10 being mounted below them on the forward face of frame 6 (fig. 1, item 21). Access to both cylinders and charging valve can be gained from within the nose wheel bay. The cylinders may be re-charged in-situ to the pressure quoted in the Leading Particulars, through the charging valve; or the cylinders may be replaced by fully charged cylinders as described in Sect. 3, Chap. 10 of this handbook. The procedure for in-situ charging is described in A.P.1275A, Vol. 1, Sect. 8, Chap. 3. (All oxygen equipment and servicing is in the process of being transferred to A.P.1275G, Vol. 1.)

Note . . .

It is essential in the interests of safety that oxygen installations are kept free from oil, grease or moisture, and for this reason covers

are fitted over the cylinder valves and charging valve. The charging valve cover must be removed before the system can be re-charged.

CHANGING BATTERIES

12. The two 12-volt batteries are carried on a platform mounted at the bottom of the radio bay in the front fuselage. Access may be obtained through the radio access doors (fig. 1, item 17) and the procedure for changing the batteries is as follows:—

- (1) Ensure that the battery isolating switch, mounted on the leg panel in the cockpit, is set to the OFF position.
- (2) Disengage the battery cover retaining strap from the mounting platform and remove the cover.
- (3) Disconnect the battery leads and stow them on the dummy terminals on the mounting platform.
- (4) Unscrew the four wing nuts, located above the platform, disconnect the hinged wire straps on the batteries from the locking plates and carefully remove the batteries.
- (5) Place a new set of batteries on the platform and reverse the procedure in sub-para. (2) and (4).

RE-FILLING DE-ICING TANK

13. The de-icing tank is mounted between frames 4 and 5 (fig. 1, item 19), access being obtained by removing a small panel in the port side of the aircraft nose. The tank should be filled up to the level of the filler cap with de-icing fluid to the specification quoted in the Leading Particulars.

TOPPING-UP COLD AIR UNIT

14. An access door in the top port side of the centre fuselage (fig. 1, item 6), between frames 35 and 36, gives access to the cold air unit dipstick and filler orifice. The oil level in the unit should be examined daily and topped-up as necessary with oil, as quoted in the Leading Particulars, until it reaches the full mark on the dipstick. The oil should be poured through the dipstick orifice in small quantities, otherwise a false level will be indicated on the dipstick.

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ENGINE**Re-filling oil sump**

15. The filler cap for the engine oil sump is accessible through an access door in the side of the fuselage just below the starboard wing trailing edge fillet. The sump has a capacity of 17 pints approx., and the correct level, with the engine cold, is up to the filler cap seat. The filler neck incorporates an integral drip tray from which a drain pipe is taken to atmosphere. Do not remove the filter. Only oil as specified in the Leading Particulars may be used. Before replacing the filler cap, ensure that the sealing washer in the filler neck is clean and undamaged, and when replacing the cap ensure that the self-locking wing nut is tightened down securely.

Note . . .

It is not necessary to prime the oil system, although it is advisable to turn the engine over to ensure oil circulation and pressure indication before running the engine. After the initial ground run, the level should be re-checked and the sump replenished if necessary.

Re-filling accessories gearbox

16. An access door in the undersurface of the centre fuselage (fig. 1, item 10), just aft of frame 32, gives access to the filler cap and dipstick of the accessories gearbox. Prior to checking the level, ensure that the dipstick is pressed right home before removing. If the level is incorrect, replenish to the correct level indicated by the dipstick. The specification of the oil to be used for topping-up is given in the Leading Particulars.

Priming the fuel system

17. Priming consists of bleeding the fuel pumps and the system generally to remove all air or oil, if the engine has been inhibited. Bleeding must always be carried out if the engine is newly installed, whenever it has been inhibited, when there has been disconnection in the system at any point, or the fuel tanks have been drained.

Note . . .

The high-pressure pumps are fuel lubricated, consequently they will suffer damage if the engine is turned over when the pumps are dry. It is essential, therefore, to ensure that the engine is not turned before the system is primed.

18. The system should be bled at each point, working upwards from the lowest bleed point. The procedure is described in A.P.4321G, J & L, Vol. 1, Part 2, Sect. 3, Chap. 1.

Note . . .

To obviate the risk of fire when starting the engine, remove any fuel that may have been spilled. It may be necessary to bleed the system again if fluctuations of r.p.m. are experienced on the initial ground run after bleeding. This fluctuation may be due to trapped air having moved round into the pumps under running conditions.

Running the engine**WARNING**

Before attempting to start the engine, ensure that all personnel are at a safe distance from the air-intakes and jet exhaust and take the necessary action to prevent any person walking into these danger zones.

Precautions prior to running the engine

19. Before running an engine which has been newly installed, or which has been inhibited, or an engine in which there has been some disturbance of the components of the fuel system, such as disconnected pipes, draining, etc., the fuel system must be primed as described in para. 17 and 18.

20. Remove the air-intake, jet pipe sealing covers and centre fuselage covers, and examine the engine to ensure that the air-intake ducts and engine are free from accumulations of fuel or oil and that no cleaning cloths or tools have been left around the engine. The air-intake safety guards must be fitted prior to ground running the engine.

Starting

21. The engine is started through the medium of a triple-breech turbo starter. The unit is described in A.P.1181, Vol. 1 and 6, Part 1, Sect. 3.

WARNING

Before attempting to work on, or adjust the starter, remove all cartridges. Detailed instructions in the event of defective operation are contained in the above mentioned publication.

Running engine with batteries removed

22. If the engine is run-up with the batteries removed, care must be taken to ensure that the bared ends of the battery leads are stowed on the dummy terminals provided on the battery mounting platform.

MAIN UNDERCARRIAGE DEFLECTION CHECK

23. The main undercarriage legs must be checked in accordance with the instructions contained in Sect. 3, Chap. 5, Fig. 18, and the legs recharged as necessary.

NOSE UNDERCARRIAGE DEFLECTION CHECK

24. (To be issued later.)

AIR DRIER

25. The air drier for the dry-air sandwich of the windscreen is located on the front face of frame 8 just forward of the cockpit starboard shelf, and is connected to the valve on the windscreen by a rubber tube. The system must be examined as follows:—

- (1) Examine the windscreen for signs of internal misting and moisture deposits. The presence of moisture indicates leaking connections, a cracked transparent panel, saturated silica gel or a blanked off air drier.
- (2) Examine the system for damage and security and check the colour of the silica gel crystals in the air drier tube. The crystals, which are normally blue in colour, should be changed when they become saturated with moisture and

turn red. Use silica gel (Stores Ref. 33C/790) when replenishing the air drier tube.

Note . . .

Before attempting to remove the air drier tube, the windscreen dry-air sandwich must be sealed against the ingress of moisture by unscrewing and removing the banjo-bolt and rubber tube from the windscreen valve connection. The valve is spring-loaded and will close, thus sealing the windscreen.

- (3) Before flight, ensure that the air drier is not taped or otherwise blanked off. The cellotape around the body of the drier is not to be disturbed.

REMOVAL OF LOCKING DEVICES AND COVERS

26. Before flight, remove the following locking devices, as well as any weather covers that may be fitted:—

- (1) Flying controls locking gear.
- (2) Control surfaces locking clamps.

(3) Air-intake sealing covers, or safety guards, if they have been fitted for ground running. Jet pipe and pitot head sealing covers. Any other covers.

(4) Any picketing equipment and attachments.

(5) Undercarriage safety stops.

(6) Pilot's ladder.

FITTING DROP TANKS

27. The procedure for fitting the drop fuel tanks is illustrated in fig. 3.

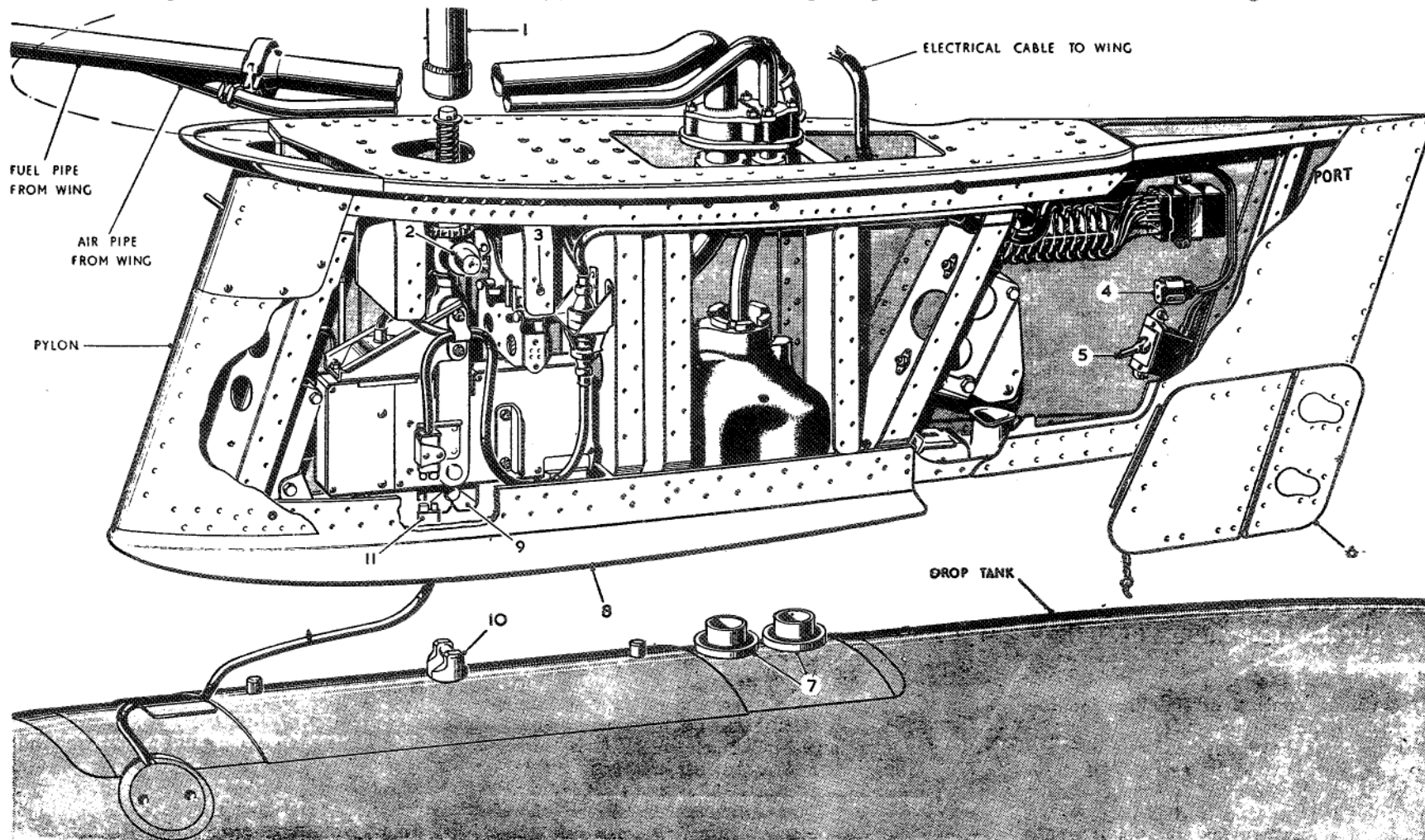


Fig. 3. Fitting drop tank

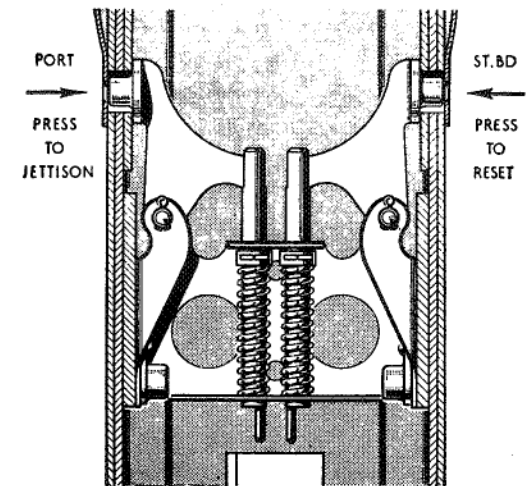
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KEY TO FIG. 3—FITTING DROP TANK (Port described, Stbd. similar)

1. Wheel drop tank into position under pylon.
2. Open rear door (6) on outboard side of pylon and check that the change-over switch (5) is in the DOWN position.
3. If the electro-mechanical release (9) is not open, press jettison button (3), shown also on fig. 4, on port side of pylon, and then reset by pressing the reset button on the starboard side of pylon. (Should the electro-mechanical release be already open, only the reset button on the starboard side should be used.)
4. Remove the access panel in the wing top skin and attach a crutching spanner (1) Hawker Part No. B.204233 to the release housing support (2) and lower release housing.
5. Connect plug (11) on drop tank to socket in pylon.
6. Raise the tank until the tank lug (10) is engaged by electro-mechanical release (9).
7. Now, by means of the crutching spanner (1), raise the tank until the fore-and-aft spigots are engaged in the holes provided in the sole plate (8) and the tank adapters (7) are making contact with the fuel and air valves in the valve body and check that the electrical cable between the tank and the plug (11) is not trapped between the tank and the sole plate.
8. Apply the final crutching load by using an "Acratork" spanner (Mk. VI model B.3) attached to the adapter on the crutching spanner.
9. Check that the release is fully locked by means of the cocking test socket (4).
10. Remove the "Acratork" and crutching spanners and replace access panel in wing.
11. Close rear door (6).

REMOVING DROP TANK

1. Support the drop tank and press the jettison button (3), and fig. 4, on the port side of pylon.

**Fig. 4. Jettison and reset mechanism**

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