

SECTION 5

REMOVAL ASSEMBLY AND DISMANTLING OPERATIONS

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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 pro-

cedure, 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 $\frac{1}{4}$ 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 MAIN-

PLANES"—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 $\frac{3}{8}$ " "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.



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