Chapter 16

MAIN UNDERCARRIAGE DOOR JACKS
Type No. 1.00493.001 (Stb'd)
1.00493.002 (Port)

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Introduction

1. These jacks, which are handed for port and starboard installations, operate to open and close the main undercarriage doors. In the fully closed position the jack is automatically locked by an internal mechanism and remains locked until a selection is made to extend the jack, when the lock is disengaged by fluid pressure.

2. An indicator unit (*fig.* 1), operated by the internal lock, actuates a micro-switch which is incorporated in the undercarriage indication electrical circuit.

3. To allow for movement of the jack during operation, swivel pipe units are fitted to both fluid connections. The pipes carrying fluid to extend the jack are duplicated for normal or emergency use and incorporate a shuttle valve which isolates the inoperative fluid path.

DESCRIPTION

Jack details (*fig.* 2)

4. At the closed end of the jack the light alloy cylinder is formed with bosses for the attachment of the shuttle valve and the indicator unit. The cylinder is also threaded at this end for an end cap which retains an end plug and a steel claw locking ring. The end plug is fitted with an oil-retaining bush and is spigoted into the bore of the claw locking ring. Both the end plug and the locking ring are grooved for sealing and backing rings and the locking ring is located, to prevent rotation, by a pin which fits in a slot at the

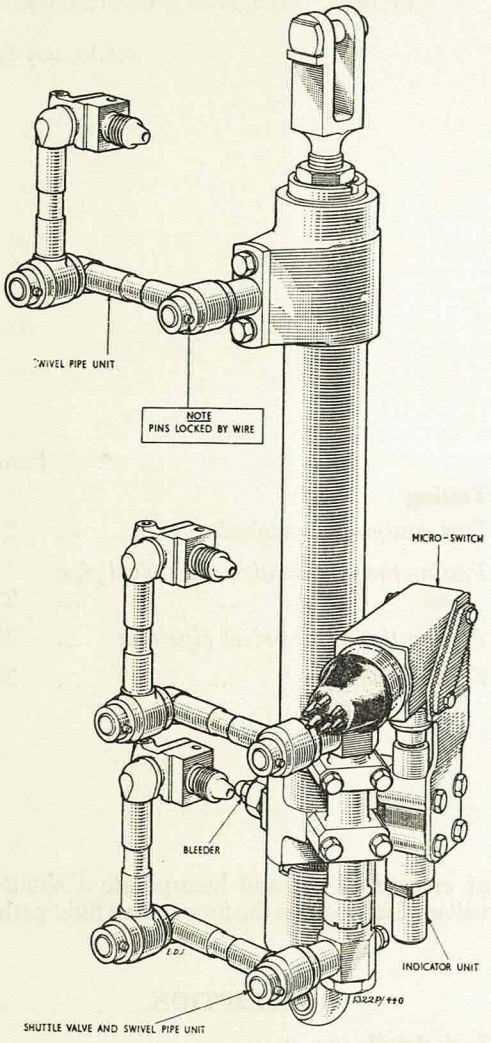


Fig. 1. Main undercarriage door jack

end of the cylinder. Location of the claw locking ring is essential to permit the spindle of the indicator unit to protude through a gap in the spring claws.

5. A boss at the opposite end of the cylinder is for the attachment of a single swivel pipe unit and the cylinder is internally threaded for the gland nut through which the piston rod operates. The gland nut houses a wiper ring and retains a gland ring and a

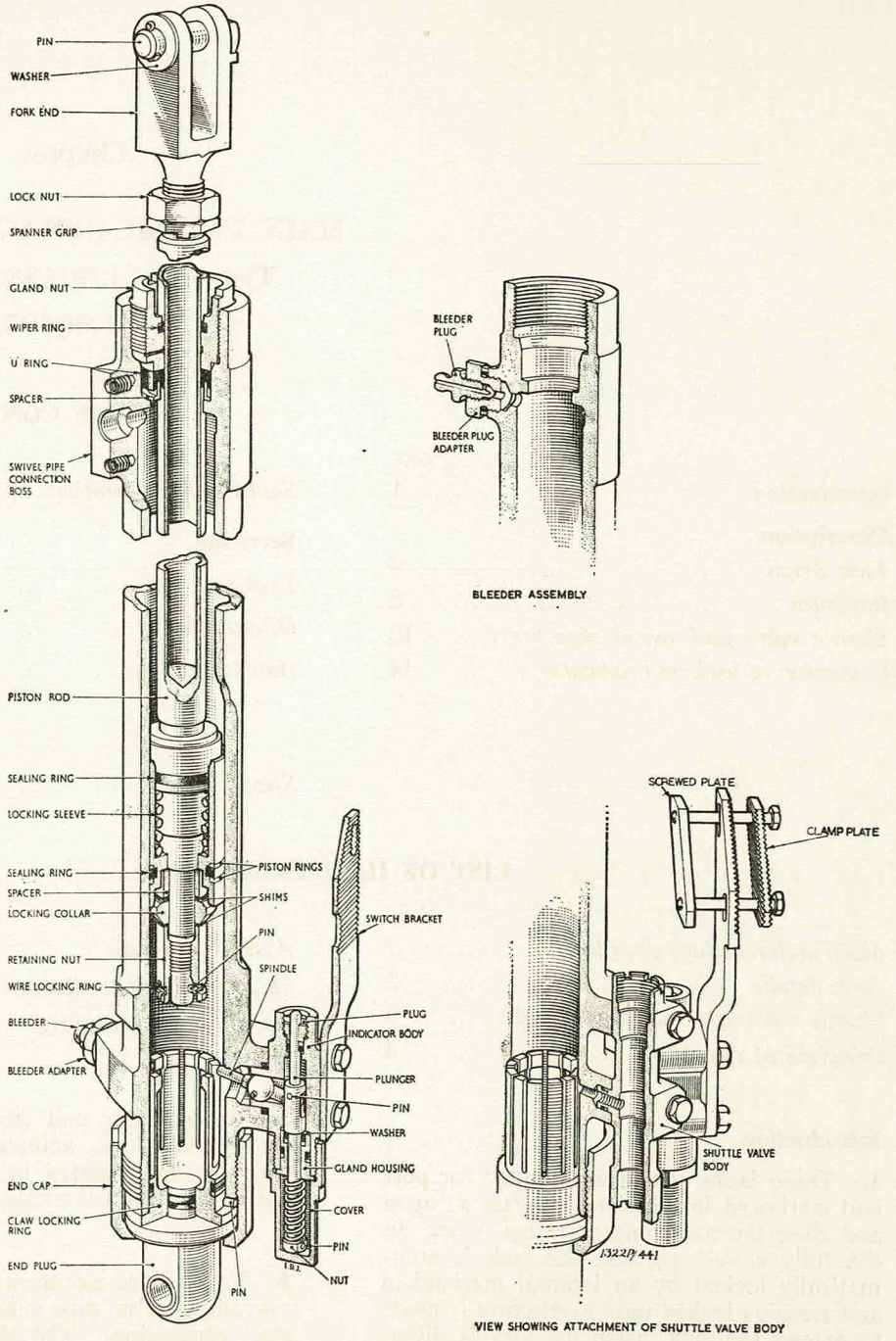


Fig. 2. Jack details

spacer against an internal flange of the cylinder. At each end of the cylinder a bleeder plug adapter is screwed into a small boss against a bonded seal.

6. The steel piston rod is counterbored at its outer end and tapped for a fork-end which receives an attachment pin retained by a washer and a split pin. A spanner grip is located to the end of the piston rod and is retained by a nut which also locks the fork-end.

7. The piston which is integral with the piston rod is fitted with a sealing ring for operation in a spring-loaded locking sleeve. The sleeve, which is fitted externally with a sealing ring and two piston rings for operation in the cylinder, is permitted a limited movement on the stepped extension of the piston head and is retained by a spacer, a locking collar and a retaining nut. The nut is locked by a pin and a wire-locking ring and shims are fitted on either side of the locking collar for adjustment of backlash.

Indicator

8. This unit is spigoted and bolted to the jack cylinder and consists of a body and a cover screwed together to house a spring-loaded plunger. The plunger operates through a gland assembly and protudes through a sealed plug to oppose the button of a micro-switch. One end of a spindle, which is pivoted in the body spigot, engages against a pin in the central slot of the plunger. The opposite end of the spindle protrudes through the claw locking ring in the jack cylinder and is operated by the locking sleeve when the piston rod is fully closed and locked.

9. The bolts which secure the indicator also retain a bracket to which the micro-switch is attached by two bolts, a clamp plate and a screwed plug. Slotted holes in the bracket permit longitudinal adjustment of the switch relative to the indicator plunger and serrations on the bracket and clamp plate ensure positive location of the switch body. Additional plain washers may be inserted between the switch and the bracket or between the indicator and the bracket to obtain correct alignment of the switch button with the indicator plunger.

Shuttle valve and swivel pipe units (*fig.* 3)

10. The unit consists of two identical swivel pipe assemblies which pivot on opposite ends of a shuttle valve assembly. The shuttle valve body is formed with attachment lugs and a fluid connection spigot. A shuttle, fitted with a sealing ring and bonded rubber seals, operates in the bore of the body.

11. A banjo bolt is screwed into each end of the valve body to retain a banjo formed with a post on which each pipe swivel assembly is retained. Each banjo is tongued for location in slots at each end of the valve body. Both banjos and banjo bolts are longitudinally and radially drilled for the passage of fluid and are fitted with sealing rings and anti-extrusion rings.

12. A swivel connection and a swivel post are brazed to opposite ends of each short pipe section. The swivel connections at each joint are retained on their respective posts by a collar and a wire-locked pin. Sealing and backing rings on either side of the fluid ways prevent leakage at the swivel joints. At the outer end of each pair of pipes is a swivel connection which is formed with a pipe coupling and drilled for attachment purposes.

13. The single swivel pipe unit which carries fluid to close the jack is identical to the others except for the swivel post which is spigoted and formed with lugs for attachment to the jack cylinder.

Operation of lock and indicator (*fig.* 4)

14. Fluid entering the single swivel pipe unit forces the piston rod towards the closed position, whilst fluid on the opposite side of the piston is expelled through the shuttle valve body and the " normal " swivel pipe to return.

15. As the piston approaches the closed position the tapered face of the locking collar expands the claws of the locking ring towards the walls of the cylinder. In this position the claws prevent further movement of the spring-loaded locking sleeve (" a " in *fig.* 4) which remains stationary until the piston reaches the fully closed position. The claws then spring inwards behind the locking collar and allow the locking sleeve to extend by fluid and spring pressure. The skirt of the sleeve is then between the claws and the wall of the cylinder and the piston is positively locked (" b " in *fig.* 4). The final movement of the locking sleeve causes the indicator spindle to pivot which results in actuation of the micro-switch by the indicator plunger.

16. When a selection is made to extend the jack, fluid enters the jack through the swivel pipe and shuttle valve body. The pressure first moves the locking sleeve towards the piston head, thus releasing the claws. The piston rod can now extend and the claws flex over the locking collar. The initial movement of the locking sleeve allows the indicator spindle to pivot back to its original position under the loading of the spring and the indicator plunger is withdrawn from contact with the micro-switch button.

Shuttle valve operation

17. In the event of normal supply failure, emergency fluid to extend the jack flows through the " emergency " swivel pipe and forces the shuttle to the opposite end of the bore to seal off the " normal " flow path. Fluid then enters the cylinders to disengage the lock and extend the piston rod as already described. A small diagonal drilling through the shuttle eliminates the possibility of a hydraulic lock which might prevent its movement.

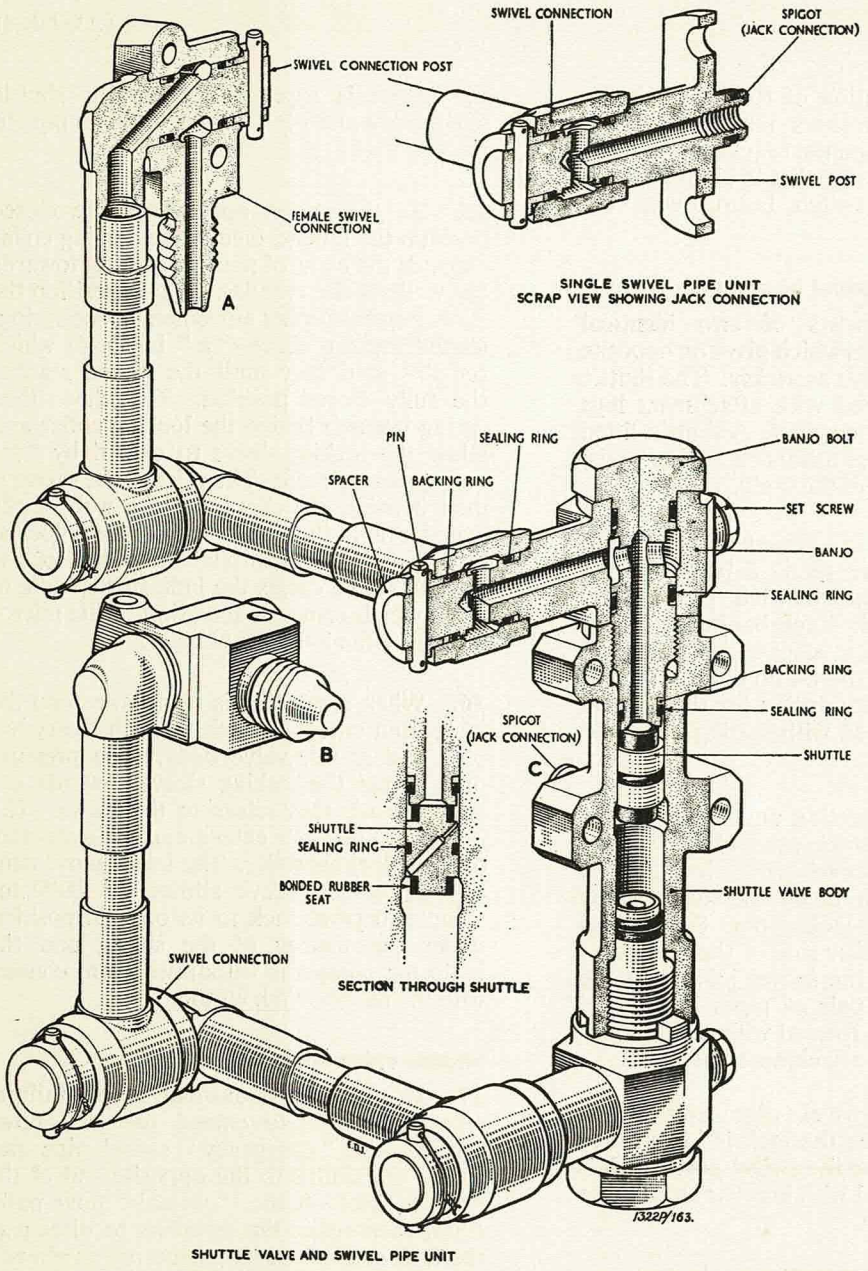


Fig. 3. Shuttle valve and swivel pipe units

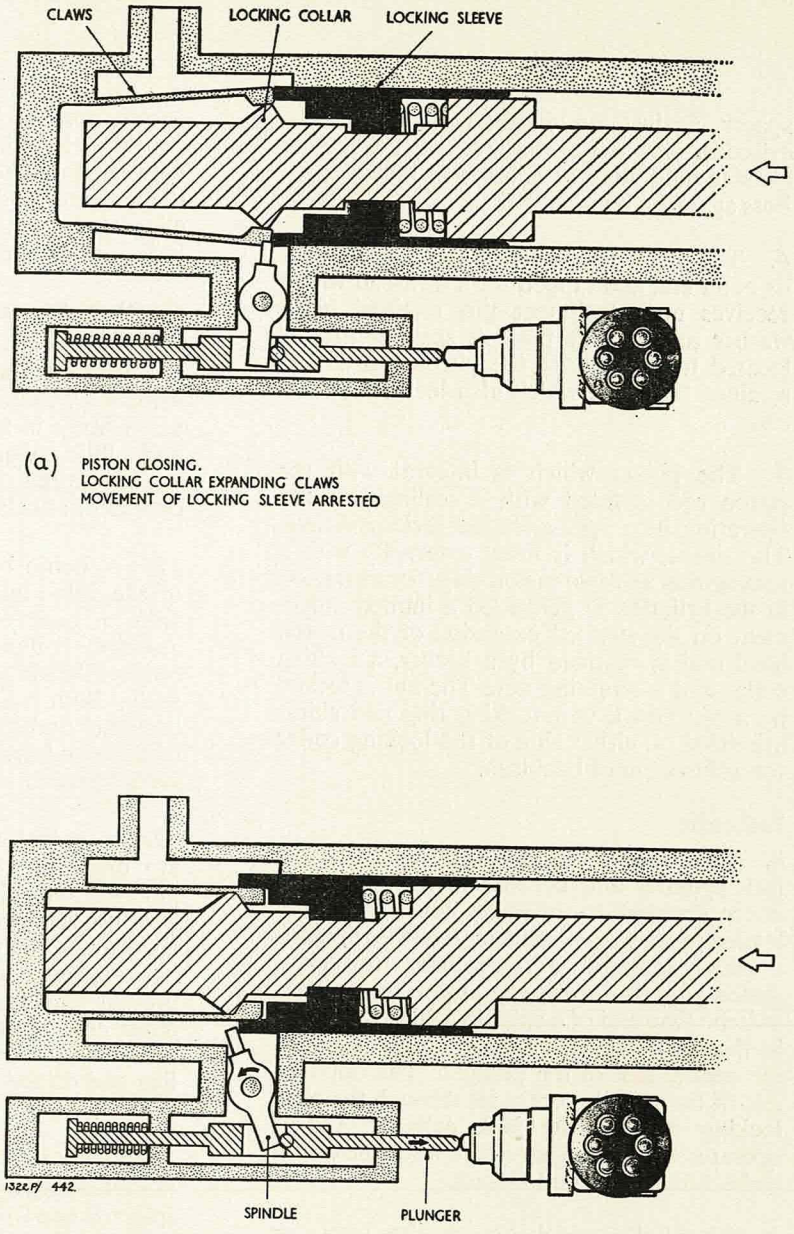


Fig. 4. Principle of operation

SERVICING

TABLE 1

Special tools

Part No.	Description
RS.181/14	"C" key spanner—for assembly of gland nut to and removal from cylinder
03185TAO1	Assembly tool—for assembly of gland ring into cylinder
S.T.1214 S.T.1214 Mk. 4	Vice Clamp Collet } for holding piston rod
RS.181/20	"C" key spanner—for assembly for end cap to and removal from cylinder
S.T.1416	Drift—for assembly of bush to and removal from end plug
03186TAO1	Tubular key spanner—for assembly of retaining nut to and removal from piston rod
S.T.2156	Assembly post—for assembly of sealing ring to indicator gland housing
S.T.2157	Tubular key spanner—for assembly of plug to and removal from indicator body
03025TAO1	Test adapter—for shuttle valve tests
4.60001.258	Assembly post—for 'O' sealing rings—swivel pipes
4.60001.271	Assembly post—for leather backing rings—swivel pipes

Leakage

18. External leakage will indicate a faulty sealing ring which must be renewed. Internal leakage past the piston rings may be shown by sluggish action of the jack or by loss of pressure during tests. Renew the faulty ring. Internal leakage past the shuttle indicated by loss of pressure in service or during tests will indicate a faulty sealing ring or failure of the bonded rubber seals. The shuttle or its sealing ring must be renewed.

Dismantling

19. (1) If the piston is fully closed and locked, connect the delivery line of a static test rig to one connection of the shuttle valve and swivel pipe unit and apply pressure to disengage the lock. Release the pressure and disconnect the pump line.

(2) Remove the micro-switch by removing the bolts, the clamp plate and the screwed plate.

(3) Unscrew the bolts and remove the washers and the switch bracket. Withdraw the indicator unit from the jack.

(4) Remove the single swivel pipe unit by removing the bolts and washers.

(5) Remove the shuttle valve and swivel pipe unit by removing the bolts and washers.

(6) Unscrew the end cap and withdraw the end plug and locating pin and the claw locking ring from the cylinder.

(7) Remove the sealing rings and the anti-extrusion rings from the end plug and the claw locking ring.

(8) Withdraw the split pin and remove the washer and pin from the fork-end. Slacken the lock nut and unscrew the fork-end from the piston rod. Remove the spanner grip and the lock nut.

(9) Insert a rod of suitable diameter into the hollow piston rod and push the piston assembly out of the cylinder.

(10) Remove the wire locking ring, withdraw the pin and unscrew the retaining nut from the head end of the piston rod.

Note . . .

The thickness of shims fitted on either side of the locking collar should be noted.

(11) Remove the shims, the locking collar, the spacer, the locking sleeve and the spring. Remove the piston rings and sealing ring from the locking sleeve and the sealing ring from the piston rod.

(12) Unscrew the gland nut and withdraw the gland ring and the spacer from the cylinder. Remove the wiper ring from the gland nut.

(13) Unscrew the bleeder screws and the bleeder screw adapters from the cylinder and remove the bonded seals.

(14) To dismantle the indicator unit, unscrew the cover, remove the pin, unscrew the nut and remove the spring.

(15) Remove the spindle by withdrawing the pivot pin from the spigot. Remove the rubber washer from the spigot or from the recess in the jack cylinder whichever is applicable.

(16) Withdraw the plunger, the gland housing and the washer. Remove the sealing rings and the anti-extrusion rings of the gland assembly and, if necessary, withdraw the pin from the plunger.

(17) Unscrew the plug and remove the sealing ring and the anti-extrusion ring from the body.

(18) To dismantle the shuttle valve and swivel pipe unit and the single swivel pipe unit, remove the pins and spacers and separate all swivel joints. Remove the backing rings and sealing rings from each swivel post.

(19) Remove the set-screws and bonded seals from the banjos of the shuttle valve assembly.

(20) Remove the sealing rings and backing rings from the shuttle valve spigot.

(21) Unscrew the banjo bolts and remove the banjos from the shuttle valve body. Remove the sealing rings and backing rings.

(22) Withdraw the shuttle from the valve body and remove the central sealing ring. Do not attempt to remove the bonded rubber seals.

Assembling

20. All sealing rings must be lightly coated with Grease XG-315 (34B/9100519) before being assembled in the units.

Note . . .

Do not grease bonded seals.

(1) To assemble the single swivel pipe unit fit a backing ring followed by a sealing ring in the inner grooves of each swivel post, with the rough face of the backing ring adjacent to the sealing ring.

(2) Insert the posts into the relevant swivel connections of the pipes and the airframe connection.

(3) Fit a further sealing ring and backing ring over each post in the bore of the associated swivel connection and follow with a spacer. Secure each spacer with a pin and lock each pin with wire.

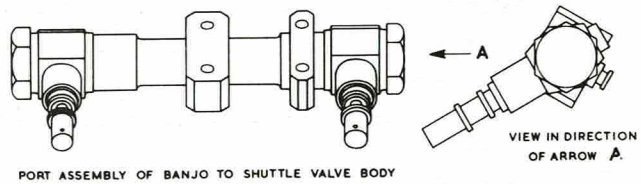
(4) Fit a backing ring and a sealing ring to the short spigot of the swivel post.

(5) To assemble the shuttle valve and swivel pipe unit, fit the sealing ring to the shuttle and insert the shuttle into the bore of the shuttle valve body.

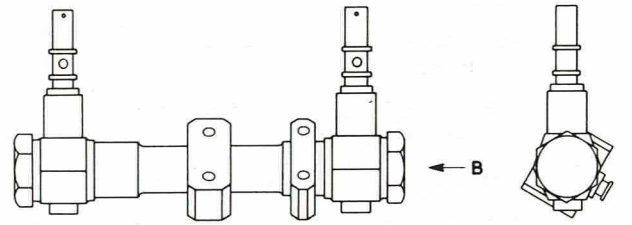
(6) Fit the sealing rings and the back ing ring to each banjo bolt. Locate the banjos to the slotted ends of the shuttle valve, referring to fig. 5 for port or starboard assembly. Screw in the banjo bolts to secure the banjos.

(7) Fit a bonded seal to each set-screw and screw a set-screw into each banjo.

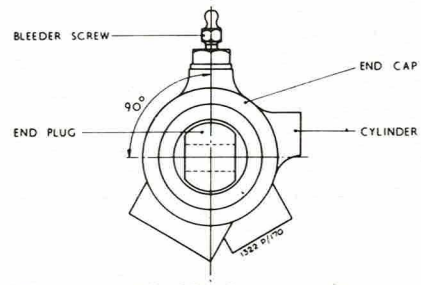
(8) Fit the sealing and backing rings and assemble the swivel pipes as described in



PORT ASSEMBLY OF BANJO TO SHUTTLE VALVE BODY



STARBOARD ASSEMBLY OF BANJO TO SHUTTLE VALVE BODY



POSITION OF END PLUG RELATIVE TO BLEEDER SCREW

Fig. 5. Assembly details

sub-para. (1) to (3) inclusive, attaching the swivel pipes to the banjos of the shuttle valve unit with the spacers and pins. Wire-lock each pin. Test the shuttle valve and swivel pipe unit and the single swivel pipe unit, before attaching these units to the jack. When the tests are completed, ensure that the set-screws, the banjo bolts and all pins at the swivel joints are wire-locked.

(9) To assemble the indicator unit fit the pin through the plunger and peen the ends of the pin lightly to retain.

(10) Fit the sealing and backing ring to the external groove of the gland housing with the backing ring adjacent to the flange and its rough face adjacent to the sealing ring.

Note . . .

The backing ring may be scarf cut to facilitate assembly.

(11) Fit the backing ring followed by the sealing ring in the bore of the gland housing.

(12) Fit the washer over the longer end of the plunger followed by the gland housing and the spring.

(13) Screw the nut on to the end of the plunger with the flat faces of the nut seating against the spring. Insert the pin to retain the nut and lightly peen the ends of the pin.

(14) Insert the plunger and gland assembly into the indicator body with the slot of the plunger aligned with the body spigot. Fit the spindle through the spigot to engage the squared end in the slot of the plunger. Insert the pin to retain the spindle and lightly peen the ends.

(15) Fit the sealing ring and the backing ring over the protuding end of the plunger and bed the rings together in the bore of the body.

(16) Screw the plug tightly into the body and lock by punching.

(17) Screw the cover tightly on to the opposite end of the body and lock the cover to the body with wire.

(18) Before fitting any sealing rings, piston rings or gland rings, partially assemble the jack and adjust the backlash in the locking mechanism as follows: —

(19) Fit the spring, the locking sleeve and spacer on to the piston rod. Fit the locking collar and the shims on the rod, disposing the same thickness of shims on either side of the collar as noted during dismantling. If this thickness is not known, dispose the shims equally about the collar. Temporarily secure the assembly by screwing the retaining nut tightly on to the rod.

Note . . .

It is not necessary to lock the nut at this stage.

(20) Insert the rod in the cylinder to approximately mid-travel position. Slide the gland nut over the rod and screw it into the cylinder to support the rod.

(21) Fit the claw locking ring into the opposite end of the cylinder and locate it with the pin. Insert the spigot of the end plug into the claw locking ring and secure these items by screwing the end cap tightly on to the cylinder.

(22) Temporarily screw the fork-end into the piston rod.

(23) Fully close the rod by hand until the locking mechanism engages and secure the jack horizontally in a vice. Mount a dial test indicator integral with the piston rod to measure the amount of free movement of the locked piston relative to the cylinder. The backlash must be between 0·004 in. and 0·007 in. Adjust the thickness of shims on either side of the locking collar to obtain the correct backlash. A total of six shims 0·0015/0·0025 in. and six shims 0·010/0·0125 in. must be carried on the piston rod disposed about the locking collar.

(24) When the correct backlash has been obtained, remove the piston assembly from the cylinder and remove the items from the piston rod, ensuring that the correct disposition of shims is maintained. Unscrew the gland nut.

(25) Fit the sealing ring to the piston and the sealing ring and split rings to the locking sleeve. If new split rings are fitted, they must be gapped on assembly, to 0·009 to 0·012 in. and sharp edges at the gap, on the flat faces only, removed by a maximum radius of $^{1}/_{64}$ in.

(26) Re-assemble the piston rod by fitting the spring, the locking sleeve, the spacer and the locking collar with the correct thickness of shims as determined in *sub-para.* (23). Screw the retaining nut tightly on to the rod against the shims, then screw back to the nearest locking position (i.e. It must be possible to insert the locking pin). Remove the nut and pack extra shims (0·010/0·0125 in.) on to the rod to eliminate slackness. Screw on the retaining nut, fit the locking pin and the wire locking ring.

(27) Insert the piston rod assembly into the cylinder to approximately mid-travel position.

(28) Fit the backing ring and the sealing ring to the claw locking ring with the sealing ring adjacent to the claws.

(29) Fit the backing ring, followed by the sealing ring to the spigot of the end plug.

(30) Fit the claw locking ring into the cylinder and locate it with the pin. Insert the spigot of the end plug into the claw locking ring, screw the end cap on to the cylinder and ensure that before the end cap is finally tightened, the end plug is

positioned with the centre line of the pin hole at right angles to the centre line of the bleeder boss as shown in fig. 5.

(31) Insert the spacer, leading with the flat face, into the opposite end of the cylinder. Follow with the gland ring with the lips leading. Fit the wiper ring into the groove of the gland nut with the chamfer outermost and screw the gland nut tightly into the cylinder.

(32) Screw the lock nut fully on to the fork-end. Locate the spanner grip to the end of the piston rod and screw the fork-end into the rod. Temporarily tighten the lock nut against the spanner grip. Insert the fork-end attachment pin with the flat located against the flat of the fork. Fit the washer and the split pin to the attachment pin. Open the legs of the split pin just sufficiently to retain the pin.

(33) Fit the rubber washer over the spigot of the indicator unit and with the piston rod unlocked and clear of the claw locking ring, insert the indicator spigot and rubber washer into the cylinder boss.

(34) Position the relative switch mounting bracket (port or starboard) against the outer face of the indicator and secure the bracket and indicator to the cylinder with the washers and bolts. Torque load each bolt to 30 lb in.

(35) Temporarily secure the micro-switch to the inner face of the bracket with the bolts, the clamp plate and the screwed plate. The micro-switch button must be aligned with the indicator plunger and, if necessary, plain washers Part No. BS. SP. 10C may be fitted between the switch and the mounting plate and between the indicator and the mounting plate to achieve this condition. Until the final adjustment is made, position the micro-switch with the maximum clearance between the button and the indicator plunger. Torque load the attachment bolts to 30 lb in.

(36) After the tests of the shuttle valve and swivel pipe have been completed, insert the spigot of the unit into the relevant boss of the jack cylinder and secure the unit with the bolts and washers. Torque load the bolts to 30 lb in.

(37) After tests of the single swivel pipe unit have been completed, insert the spigot of the unit into the cylinder boss and secure the unit with the bolts and washers. Torque load the bolts to 30 lb in.

(38) Fit a bonded seal on to each bleeder screw adapter and screw the adapters into the relevant bosses of the cylinder. Torque load each adapter to 100/110 lb in. Screw a bleeder screw into each adapter. The bleeder screws must not be locked until after installation in the aircraft.

(39) Fully close the piston rod until the rod "bottoms" and the lock engages. Slacken the fork-end lock nut and adjust the pin centre dimension of the jack to 17·625/17·825 in. Tighten but do not wire-lock the lock-nut, spanner grip or fork-end until the jack is installed in the aircraft.

Note . . .

The pin centre dimension may require to be readjusted on installation in the aircraft, but must remain within the limits quoted.

(40) With the piston closed and locked, adjust the position of the micro-switch by slackening the bolts and moving the clamp plate and switch until the switch button is depressed by the indicator plunger 0·02/0·045 in. beyond the point of switch actuation. Before tightening the bolts, ensure that the serrations of the clamp plate and bracket are correctly engaged.

Note . . .

Switch actuation may be detected audibly by a slight click, or visually by means of a suitable indicating lamp circuit.

(41) After testing and final adjustments, wire-lock the end cap, the gland nut, the bleeder screw adapters and all bolt heads.

TESTING

Test equipment required

21. The following equipment is required for testing the jack and the shuttle valve and swivel pipe units.

(1) A static hydraulic test rig and a power pump rig capable of delivering 3·45 gall. per minute. All pipes between the rig and the unit under test are to be $\frac{3}{8}$ in. outside diameter metal or $\frac{3}{8}$ in. nominal diameter flexible hose. Reducing adapters must be fitted adjacent to the unit under test.

(2) A test adapter Type No. 03025TAO1, a separate stop cock and a pressure gauge for the shuttle valve tests.

(3) A lock loading rig Type No. 03260TAO1 as described in A.P.1803D, Vol. 1, Book 1, Sect. 1, together with a piston rod fitting Part No. 03270TAO1, an eyebolt fitting, Part No. 03274TAO1 and a cylinder end fitting, Part No. 03275TAO1.

Testing the shuttle valve and swivel pipe unit

22. Proceed as follows, referring to *fig.* 3: —

(1) Connect the delivery lines of the static hydraulic test rig to the adapters A and B. Select flow to A and operate the hand pump. Fluid must flow freely from the spigot C.

(2) Select fluid flow to B and operate the hand pump to move the shuttle along the bore of the valve body. Fluid must then flow freely from the spigot C.

(3) Ensure that the backing ring and the sealing ring are fitted to the spigot. Bolt the test adapter 03025TAO1 over the spigot and fit a blanking cap to the adapter to prevent flow from C.

(4) Raise the pressure at B gradually up to 6,600 lb/in^2. Leakage is not permissible. Release the pressure.

(5) Select the flow to A and repeat the test in *sub-para.* (4). Leakage is not permissible. Release the pressure.

(6) Raise the pressure at A to 100 lb/in^2 and rotate each swivel joint through 180 degrees and back ten times. Then rotate each joint through 360 degrees ten times, (five clockwise and five anti-clockwise).

Where full rotation is prevented, rotate each joint as far as possible. Leakage is not permissible.

(7) Repeat the test in *sub-para.* (6) with 100 lb/in² applied at B. Leakage is not permissible.

(8) Repeat the tests in *sub-para.* (6) and (7) but with a pressure of 3,300 lb/in². Check the torque required to rotate each swivel joint at this pressure. The torque must not exceed 25 lb. in. Leakage is not permissible. Release the pressure, remove the blanking cap from the test adapter and disconnect the static rig lines.

(9) Couple the connections A and B to the delivery lines of the power rig and connect a short length of pipe to the test adapter to enable the fluid flow from C to be conveniently observed.

(10) With the test rig selector in the neutral position, (i.e. no flow to connections A and B) start the rig and adjust the supply pressure to 100 lb/in². Select pressure to A and fluid must flow from A to C. Reverse the selection and fluid must flow from B to C. Repeat this test three times to ensure that the shuttle is operating freely. Stop the power pump and disconnect the delivery lines from the swivel pipe connections.

(11) Connect the hand pump delivery line to B, remove the short pipe from C and blank off the test adapter. Operate the hand pump to apply pressure at B. An initial spurt of fluid from A, due to the movement of the shuttle, is permissible. Raise the pressure at B to 300 lb/in², then gradually increase it to 6,600 lb/in². Leakage is not permissible. Release the pressure.

(12) Disconnect the delivery line from B and connect it to A. Operate the hand pump to apply a pressure at A of 100 lb/in². The shuttle must move across indicated by a spurt of fluid from B. Raise the pressure to 300 lb/in² and then increase it gradually to 6,600 lb/in². Leakage is not permissible. Release the pressure.

(13) Disconnect the delivery line from A and connect it to B. Operate the pump to apply a pressure of 100 lb/in². The shuttle must move across, indicated by a spurt of fluid from A. Raise the pressure to 300 lb/in², then gradually increase it to 6,600 lb/in². Leakage is not permissible. Release the pressure.

(14) Repeat the tests in *sub-para.* (12) and (13) alternately three times. Finally, remove the blanking cap from the test adapter and ensure that the shuttle is positioned for flow from A to C.

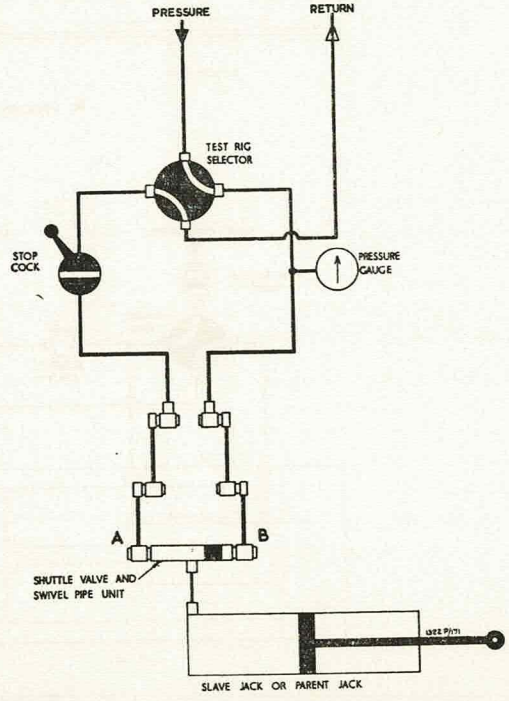


Fig. 6. Shuttle valve test diagram

(15) Connect the shuttle valve and swivel pipe unit to the power rig as shown in *fig.* 6 with a stop-cock in the delivery line to A and a pressure gauge in the delivery line to B. Connect the test adapter at C to the cylinder end of any convenient slave jack or, alternatively, remove the test adapter and bolt the shuttle valve body to the parent main undercarriage door jack. The pipe lines and the jack must be bled free of air and the piston rod must be fully closed.

(16) Close the stop-cock to trap fluid at zero pressure at A. With the test rig selector in neutral, start the power pump and adjust the delivery pressure to 200 lb/in². Select pressure to B. The jack must extend and a stable pressure must be registered on the gauge. Open the stop-cock to connect A with the return line. Leakage is not permissible except for an initial spurt of fluid from A due to the movement of the shuttle. Release the pressure and repeat the test five times. When the tests have been completed, disconnect the unit from the test rig and remove the test adapter if this is fitted.

Testing the single swivel pipe unit

23. (1) Couple the hand pump delivery line to the connection adapter and operate the pump. Fluid must flow freely from the spigot of the swivel posts.

(2) Blank off the spigot with a set-screw Part No. 1007UDO46 and a bonded seal AGS.1186.3 Apply pressure gradually up to 6,600 lb/in² with the unit static. Leakage is not permissible. Release the pressure.

(3) Raise the pressure to 100 lb/in² and rotate each swivel joint through 180 degrees and back ten times. Then rotate each swivel joint through 360 degrees ten times (five clockwise and five anti-clockwise). Where full rotation is prevented, rotate the joints as far as possible. Leakage is not permissible. Release the pressure.

(4) Repeat the test in *sub-para.* (3) with a pressure of 3,300 lb/in². Check the torque required to rotate each joint at this pressure. The torque must not exceed 25 lb. in. Leakage is not permissible. Release the pressure and remove the set-screw and bonded seal.

Testing the jack

24. With the shuttle valve and swivel pipe units and the indicator and micro-switch attached to the jack, proceed as follows: —

(1) Couple the static test rig delivery lines to one branch of the shuttle valve and swivel pipe unit and to the single swivel pipe unit to enable the jack to be operated in both directions. Prime and bleed the unit until all air is expelled and close the bleeder screws.

(2) Select for flow to close the jack and operate the hand pump to raise pressure slowly to 300 lb/in², then increase it gradually to 4,950 lb/in². Leakage is not permissible. Release the pressure.

(3) Select flow to extend the jack and repeat the test as in *sub-para.* (2).

(4) Couple the jack to the rig to enable pressure to be applied at both ends simultaneously. Apply pressures alternating between zero and 3,300 lb/in² at both ends of the jack simultaneously. Repeat this test for 200 cycles. Leakage is not permissible.

(5) Connect the jack to the rig to enable the jack to be operated both ways and repeat the tests in *sub-para.* (2) and (3).

(6) Couple the jack to the power pump rig for operation both ways and select pressure to fully close and lock the jack. With the rig selector in neutral, adjust the delivery pressure to any convenient figure below 220 lb/in². Select pressure to extend the jack. If necessary, slowly increase pressure until the lock disengages (indicated by movement of the indicator plunger). The pressure required to disengage the lock must not exceed 220 lb/in². Allow the jack to fully extend.

(7) Reduce the delivery pressure to 120 lb/in² and select flow to close the jack. At a pressure not exceeding 120 lb/in² the piston rod must close fully in 4 seconds maximum. An increase in pressure may be required to engage the locking mechanism. This must not exceed 190 lb/in².

(8) Select pressure to disengage the lock, then reduce the pressure and slowly close the piston rod as far as possible without re-engaging the lock. With the rig selector in neutral, adjust the delivery pressure to 105 lb/in². From the pre-set position the piston rod must extend fully in 3 seconds maximum at a pressure not exceeding 105 lb/in².

(9) With the micro-switch wired to a suitable indicating lamp, operate the jack hydraulically to engage and disengage the lock. Check that the micro-switch functions correctly by reference to the lamp.

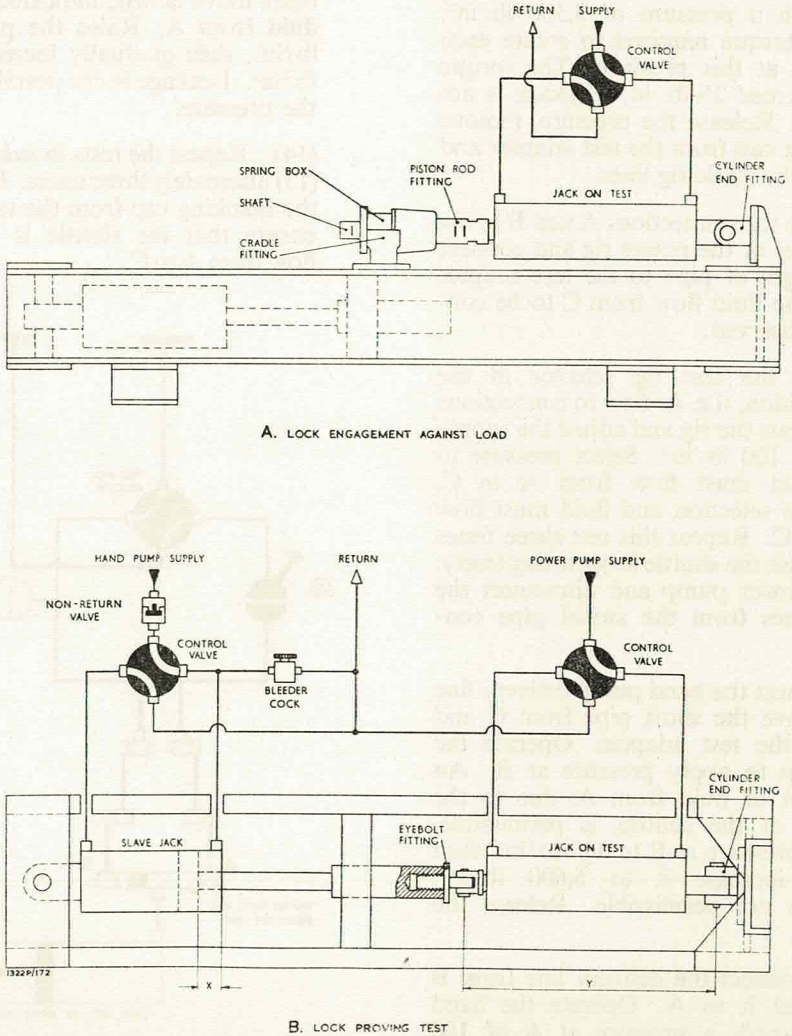


Fig. 7. Use of lock loading rig

(10) Mount the jack in the lock loading rig shown in " A " of fig. 7 as follows: —

(11) Bolt the cylinder end fitting, Part No. 03275TAO1, to the lock loading rig. Unscrew the fork end from the piston rod and screw in the piston rod fitting. Part No. 03270TAO1. Remove the spring box assembly from the rig and screw the threaded end of the spring box shaft into the piston rod fitting.

(12) Mount the jack on top of the rig and connect the cylinder to the cylinder end fitting.

(13) Couple the supply lines of the power rig to the swivel pipes and apply pressure to close the jack and engage the internal lock.

(14) Adjust the position of the spring box and the cradle on the rig to compress the springs to a loading between 475 and 525 lb. as shown by the graduations on the shaft of the spring box.

(15) Select pressure to disengage the lock then reverse the selection to close the jack and engage the lock against the loading of the spring box. Note the pressure required to engage the lock and then select pressure to disengage the lock.

(16) With the rig selector in neutral, adjust the line pressure to the pressure noted plus 100 lb/in^2.

(17) Select pressure to engage the lock, then close the power pump supply valve and reverse the position of the selector. The lock must not disengage until the power supply valve is opened. Repeat this test at least six times, then stop the power rig and disconnect the delivery lines from the jack.

(18) Remove the spring box and piston rod fitting from the jack. Reassemble the spanner grip, the lock nut and the fork-end to the piston rod. Remove the jack and cylinder end fitting from the upper attachment plate of the rig and bolt the end fitting to the lower attachment plate as shown in " B " of fig. 7.

(19) Screw the eyebolt fitting, Part No. 03274TAO1 tightly into the piston rod of the slave jack and connect the fork-end of the main undercarriage door jack to the eye-bolt fitting.

(20) Refer to " B " of fig. 7 and adjust the slave jack and test jack until the dimension X is between 0·5 in. and 2·5 in. and dimension Y does not exceed 17·87 in. with the test jack fully closed.

(21) Couple the jacks to the rig delivery lines and bleed the circuit to expel all air, finally closing and locking the test jack.

(22) Operate the rig selector valves to partially close the slave jack and extend the test jack between 2·5 and 3·0 in. Shut-off the pump supply to the selector valves and close the bleeder cock. Adjust the pump pressure between 2,200 and 2,250 lb/in^2, operate the test jack selector to close the jack and open the pump supply line, opening the bleeder cock slowly to allow the test jack to close slowly. When the lock commences to engage, the movement may be momentarily arrested and the bleeder cock must be opened a further amount until the jack is fully closed and locked. Check for the engagement of the locking sleeve by reference to the indicator plunger. Repeat this test at least three times and ensure that the locking sleeve engages fully each time.

(23) At any convenient stage during the foregoing tests, ensure that the bleeder screws function correctly on the main undercarriage door jack.