Chapter 4

CABIN PRESSURE CONTROL VALVES, Mk. 12 and 13

(Ref. No. 27KD/613 and /597)

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Introduction

1. Reconditioning of cabin pressure control valves is to be undertaken only by approved Repair Depots that are equipped with the necessary facilities.

2. The Mk. 12 and 13 units are identical except that the inlet grid and packing plate assembly is not supplied with the Mk. 13. This unit is intended for installations in which the inlet grid is supplied by the aircraft manufacturer. For general and technical information on cabin pressure control valves refer to A.P.1275A, Vol. 1, Sect. 20, Chap. 4.

Special tools

3. The following special tools are required :—

Ref. No.	*Part. No.*	*Item*
27KD/628	ST.5003	Diaphragm setting fixture
629	ST.5004	Top chamber fixture
630	ST.5005	Peg spanner
631	ST.5007	Peg spanner
1414	ST.5021	Valve body support

Spare parts

4. Spares for cabin pressure control valves are listed in A.P.4515R, Vol. 3, Part 1.

DISMANTLING

Main assembly (*fig.* 1)

5. (1) Remove the inlet grid and packing plate assembly (Mk. 12 unit only) and the gasket. Separate the grid from the packing plate (*fig.* 2), but do not dismantle these parts further unless damage is apparent.

(2) Removal of the three 2 B.A. nuts and washers at the periphery of the bottom chamber cover will permit separation of the top and bottom chambers, and the six packing washers.

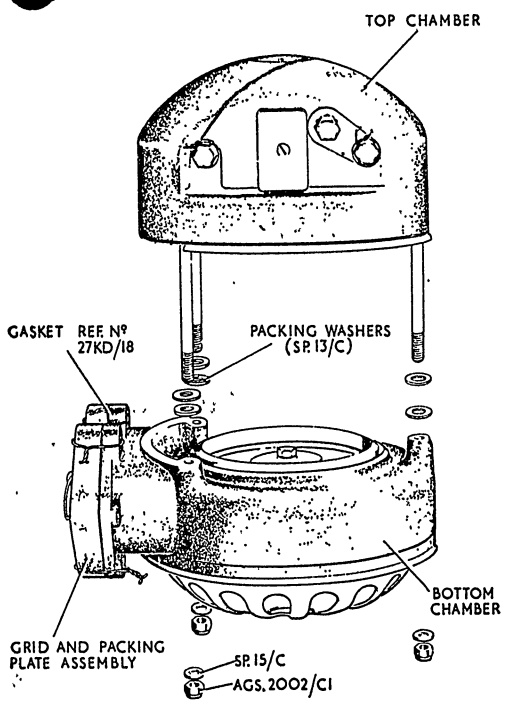

Fig. 1. Main assembly

Bottom chamber (*fig.* 2)

6. (1) Mount the bottom chamber on the valve body support ST.5021 (*fig.* 3). This fixture is a hardwood block with a shaped face to accommodate the body casting. The casting fits on the fixture with the discharge valve seating downwards, and is held firmly whilst the various components are dismantled from it.

(2) Unscrew the three countersunk-head screws from the rim of the slotted cover, and remove the cover.

(3) Unscrew the two countersunk-head screws from the inwards relief valve seating, and remove the seating, the relief valves assembly and the inwards relief valve spring.

Relief valves (*fig.* 4)

7. (1) *Safety valve.*—Remove the $\frac{1}{16}$ in. dia. split pin, and unscrew the adjusting ring from the skirt of the safety valve. Remove the nut and the two washers from the safety valve adjusting bolt, and withdraw the bolt, the spring retainer, the safety valve spring, the dust excluder and the safety valve.

(2) *Inwards relief valve.*—Unscrew the eight countersunk-head screws from the inwards relief valve, and detach the diaphragm support and the diaphragm from the valve.

Top chamber (*fig.* 5)

8. (1) Unscrew the spring housing, using the peg spanner ST.5005 (*fig.* 6). Remove the sealing washer and the spring.

(2) Mount the top chamber on the fixture ST.5004 (*fig.* 7). This fixture supports the top chamber whilst the components are being dismantled.

(3) Unscrew the thirteen countersunk-head screws from the diaphragm support. Remove the support and the orifice filter assembly.

(4) Unclip the filter guard from the outlet valve cap-nut, and remove the nut. Remove the internal circlip from the nut, and shake out the filter, the support plate and the rubber washer. Remove the gland packing, slack off the outlet valve locknut, and remove the outlet valve and the washer. Unscrew the Schrader valve core from the valve body.

Capsule assemblies

9. (1) Remove the pivot pin connecting the beam to the semi-circular link. Remove

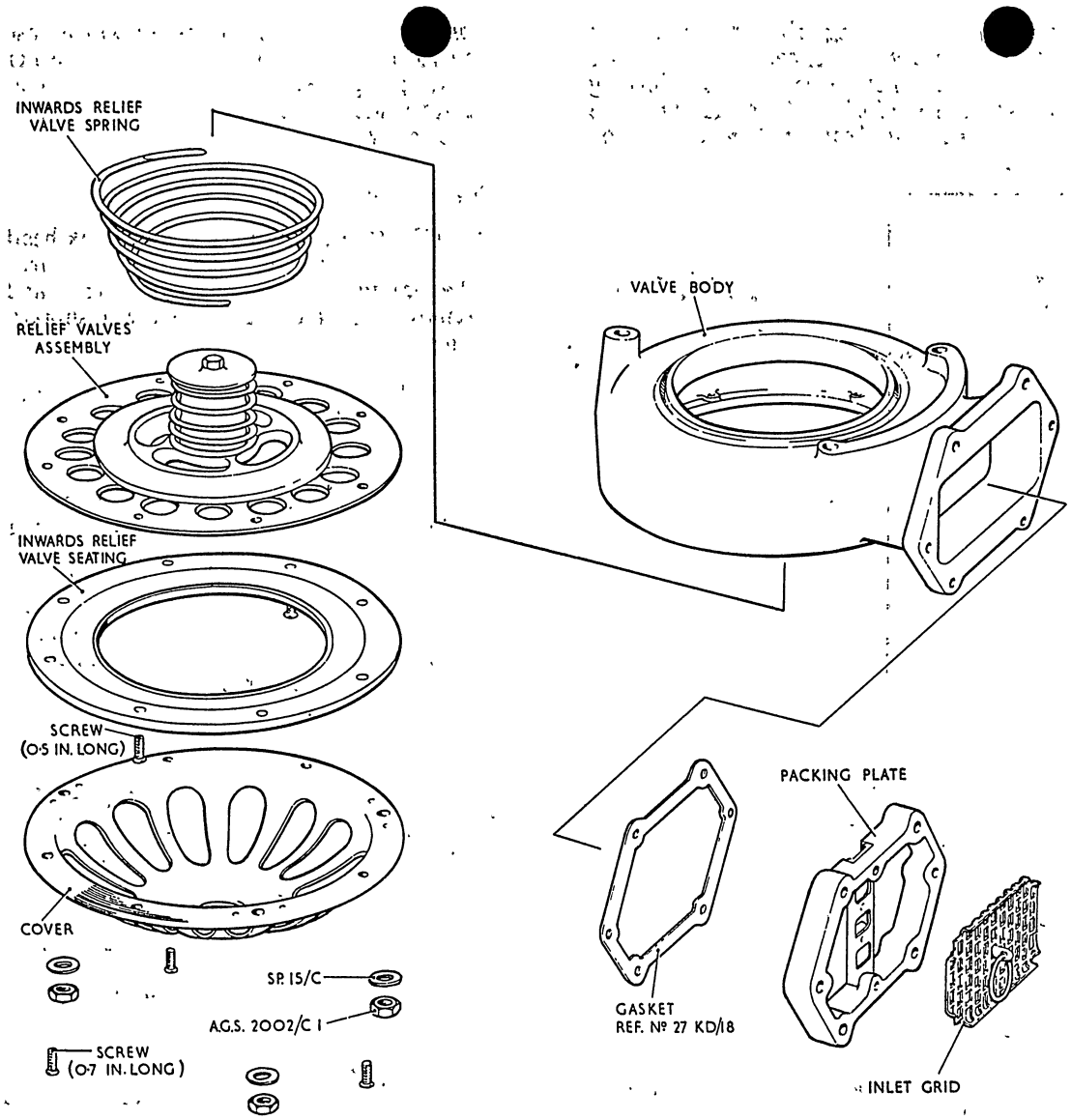

Fig. 2. Bottom chamber

the cap-nut, the locknut and the washers from the head of the beam stop, and unscrew the stop.

(2) Support the head of each capsule attachment bolt in turn, and unscrew the securing nut on the outside of the casting. Remove the capsule assemblies, complete with the beam.

(3) Remove the absolute capsule assembly from the beam (*fig.* 8) by unsoldering the pin in the capsule end fitting. Remove the washer and spring. Dismantle the atmospheric capsule assembly from the beam by cutting off one end of the crimped pin at the end fitting, and withdrawing the pin. Do not attempt to dismantle the capsules.

Switch mechanism (*fig.* 9)

10. (1) Unscrew the two nuts securing the insulating base, and remove the base complete with the contact assemblies and the semicircular link. Remove the terminal block from the outside of the casting, and drift out the two terminal bolt insulating bushes.

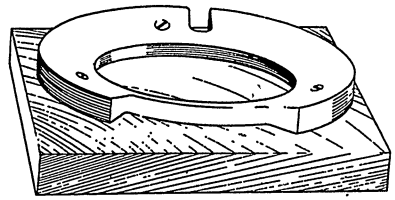

Fig. 3. Valve body support ST.5021

(2) Cut off one end of the pivot pin at the link anchorage, and remove the link.

(3) Unscrew the two nuts securing the upper contact assembly. Remove the assembly, the contact supports and the link plate. The heads of the screws on which these items are fitted are locked and insulated with shellac or Chatterton's compound run into the counterbored holes on the underside of the insulating base. Unscrew the nut securing the lower con-

tact assembly. Remove the assembly, the contact support and the other link plate.

(4) Unscrew the blanking plug on the outside of the casting. Remove the cap-nut, seal and locking tab from the contact adjusting screw. Remove the locknut and the washer, then unscrew the adjusting screw from the inside of the casting. The adjusting screw should not be dismantled unless damage is apparent, in which case remove the split pin to release the washer and spring, then remove the $\frac{1}{16}$ in. dia. rivet which secures the adjusting head to the screw.

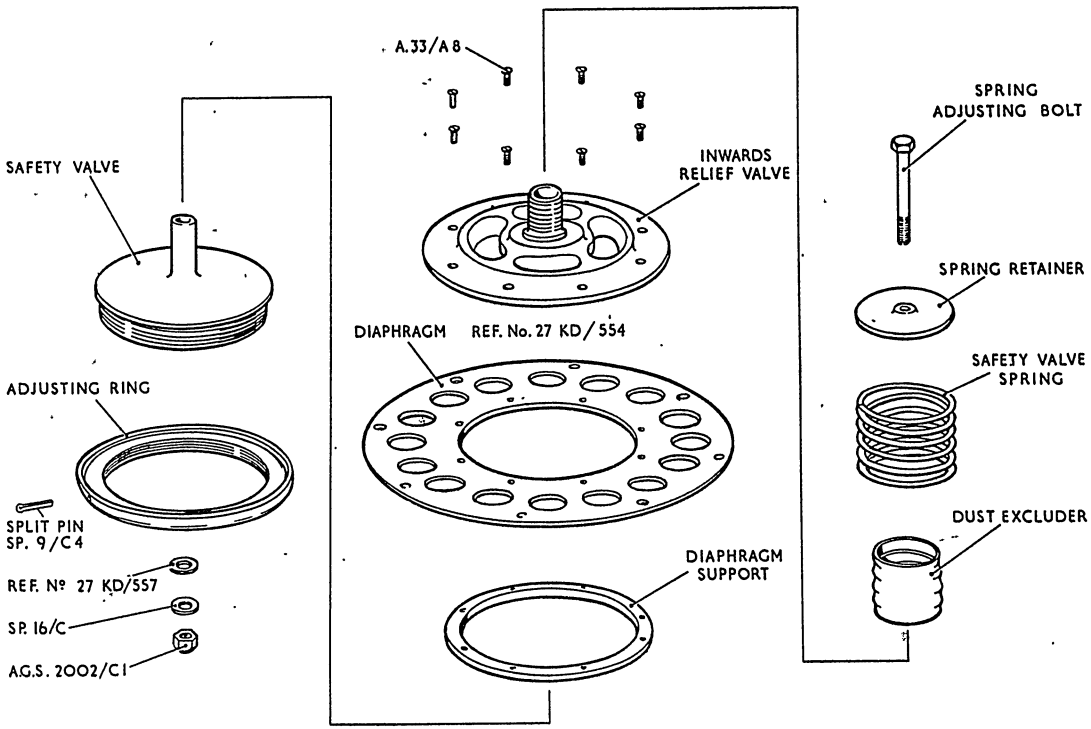

Fig. 4. Relief valves

TABLE 1
Schedule of fits and clearances

Description of part	*Dimensions as new*	*Interchangeable assembly*	*Selective assembly*	*Clearances*	
				New	*Extended*
Safety valve guide (int. dia.)	0·376 / 0·375	0·377	0·380	0·004 / 0·001	0·006
Safety valve stem (ext. dia.)	0·374 / 0·372	0·371	0·369		

Orifice filter (*fig.* 10)

11. (1) Remove the six countersunk-head screws and nuts which secure the discharge diaphragm to the support rings, and remove the diaphragm and lower support ring.

(2) Unscrew the orifice cap, and shake out the orifice plate, the filter, the three fibre washers and the spring washer.

(3) Using a box-spanner in combination with a screwdriver unscrew the retaining nut, and remove the filter body. Remove the circlip, and withdraw the retaining bolt. Do not dismantle the orifice body from the support ring unless the parts are damaged, in which case remove the $\frac{1}{8}$ in. dia. rivets and separate the parts.

EXAMINATION

12. Clean the components in an approved cleaning solvent, and examine them for evidence of wear, damage and corrosion. Discard all parts manufactured from rubber, and all non-metallic washers, irrespective of apparent condition. Procure new parts for incorporation during assembly (*Table* 3).

13. The following parts require special attention: —

(1) *Safety valve.*—Examine the head of the safety valve and the seating on the inwards relief valve for nicks and burrs. Lap the valve on to its seating, supporting the valve head with the peg spanner ST.5007 (*fig.* 11). Use fine grinding paste for lapping the valve and metal polish for the final finish. Inspect the safety valve stem and guide in accordance with the schedule of fits and clearances (*Table* 1).

(2) *Absolute capsule assembly.*—Examine the capsules for defects. A punctured capsule will be apparent by lack of parallelism. Examine the soldered joints at the attachment bolt and end fittings for security. The vertical distance between the shoulder on the attachment bolt and the centre of the transverse hole in the end fitting must be 1·219 ± 0·025 in.

(3) *Atmospheric capsule assembly.* — Examine the soldered joints at the attachment bolt and end fitting for security. Examine the filter gauze at the outer end of the attachment bolt for damage. Check that the vertical distance between the shoulder on the attachment bolt and the centre of the holes in the end fitting is 1·181±0·010 in. Test the capsules for leaks (*para.* 26).

(4) *Switch mechanism.* — Examine the contacts for signs of pitting or burning, if necessary renew the parts. If the contact adjusting screw has not been dismantled to its component parts (*para.* 10(4)), test the adjusting head by inserting a $\frac{3}{32}$ in. dia. rod into the hollow end of the adjusting screw and depressing the head to the full extent of its travel. The adjusting head must move freely, and return to its original position on removal of the rod.

(5) *Filters.*—Examine the filter gauzes for damaged mesh. Renew as necessary.

(6) *Orifice plate.*—Hold the plate against a strong light to check that the orifice is not blocked. Use cleaning solvent or an air jet to clear a blocked orifice; a drill or wire must not be used.

(7) *Springs.*—The spring data are as follows : —

(a) *Safety valve spring.*—The load at a compressed length of 1·187 in. must be 16·9 lb ± 5%.

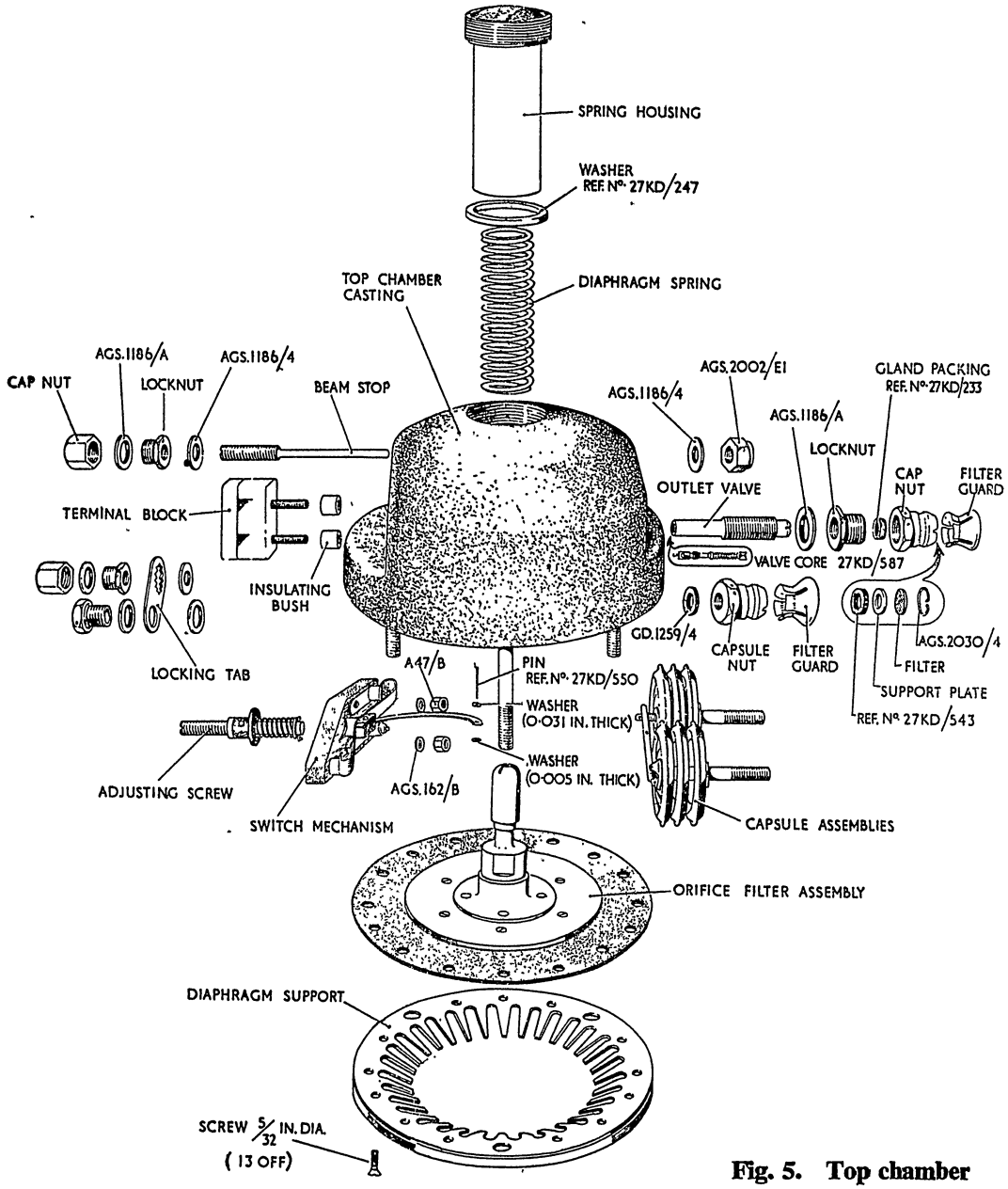

Fig. 5. Top chamber

(b) *Inwards relief valve spring.*—The free length of this spring must be 1·87 ± 0·01 in. The spring load is not a critical factor in the operation of the unit.

(c) *Diaphragm spring.* — The free length must be 3·000 ± 0·01 in., and the load at a compressed length of 2·00 ± 0·01 in. must be 1·74 lb ± 5%.

(d) *Absolute capsules spring.*—The free length must be 0·44 ± 0·01 in. and the spring rate 3·0 ± 0·3 lb/in.

(8) *Inlet grid (Mk. 12 unit only).*—Examine the inlet grid and packing plate for damage. Check that the spring clip on the packing plate is serviceable.

(9) *Inwards relief valve seating.*—Examine the seating edge for nicks and burrs.

ASSEMBLY

14. Sealing compounds No. 1751 and 1790 (Ref. No. 33C/1139 and 33C/1138) are specified for use during assembly.

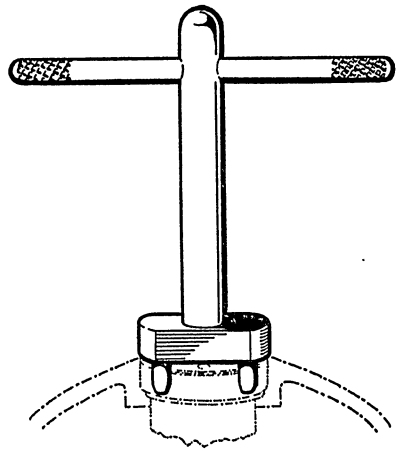

Fig. 6. Peg spanner ST.5005

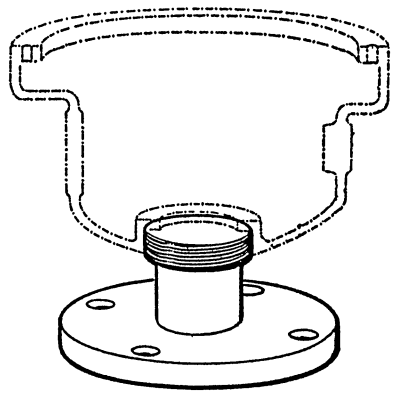

Fig. 7. Top chamber fixture ST.5004

Top chamber

Capsule assemblies (fig. 8)

15. (1) Fit the spring and the washer over the absolute capsule end fitting. Compress the spring, pass the end fitting through the slot in the beam, and fit a new pin (Ref. No. 27KD/223) in the hole in the end fitting. Lock the pin by soldering it to the end fitting, taking care that solder does not accumulate on the underside of the pin. Trim off the end of the sides of the end fitting against the beam.

Note . . .

If spares are not available the pivot pins for the absolute and atmospheric capsule assemblies can be made from $\frac{1}{16}$ *in. dia. copper plated steel wire (D.T.D.82).*

(2) Attach the atmospheric capsule assembly to the other end of the beam, using a second new pivot pin (Ref. No. 27KD/223). Lock the pin by crimping the ends, taking care not to squeeze the sides of the end fitting against the beam.

(3) Place the top chamber casting on the bench fixture ST.5004 (*fig.* 7). Apply a light coating of sealing compound (No. 1751) to the capsule attachment bolts, then fit the assemblies in the top chamber (absolute capsules to the left when the capsules side of the chamber is towards the operator). Rotate the absolute capsules until the pin in the end fitting is at right angles to the beam, then secure the assembly with a new bonded seal (A.G.S. 1186/4) and the stiffnut (A.G.S.2002/E1). Secure the atmospheric capsules assembly with a new Seloc washer (GD.1259/4) and the capsule nut. On completion check that the beam can pivot about the end fitting without side-friction.

Outlet valve

16. ◀(1) Fit a new Schrader valve core (Ref. No. 27KD/587) to the outlet valve adjusting screw, tightening the core to a torque between 2 and 2·5 lb in. On completion, the distance between the end of the screw and the top of the pip on the valve core must be 0·130±0·030 in. Obtain this dimension by selective assembly of valve cores. Apply the sub-assembly test (para. 27).▶

(2) Assemble the internal components to the outlet valve cap-nut in the following order; a new rubber washer (Ref. No. 27KD/543), the support plate and the filter. Secure the parts with the circlip (A.G.S.2030/4). Fit the filter guard over the end of the nut.

(3) Screw the outlet valve into the casing from the outside until the stem of the Schrader valve just touches the beam, then a further one and a half turns (this will open the valve approximately 0·035 in).

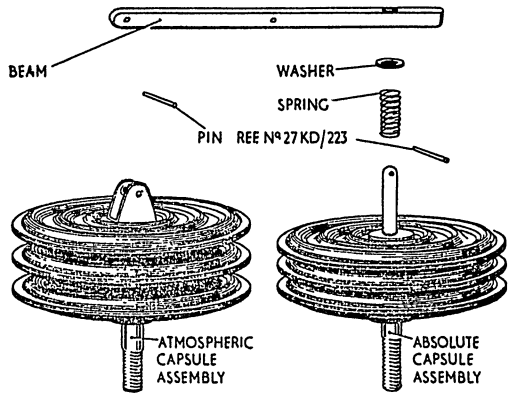

Fig. 8. Capsule assemblies

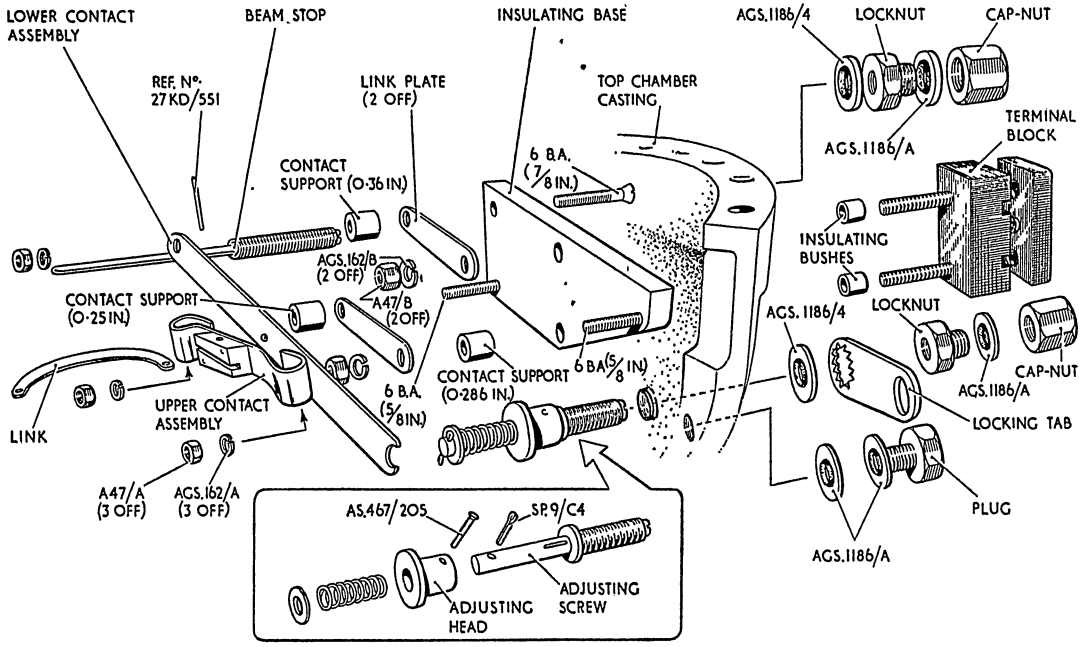

Fig. 9. Switch mechanism

Place a new seal (A.G.S.1186/A) over the valve, and screw on the locknut. Fit a new gland packing (Ref. No. 27KD/233), tapered side outwards, and screw on the cap-nut.

Beam stop

17. Screw the beam stop into its location in the casting until the end of the stop just touches the beam at the absolute capsules end, then unscrew the stop three complete turns (this adjustment is made to facilitate setting). Fit a new seal (A.G.S.1186/4) to the external end of the stop, screw on the locknut, fit a new seal (A.G.S.1186/A) over the locknut and screw on the cap-nut.

Switch mechanism (fig. 9)

18. (1) *Contact assemblies.*—

(a) Insert a 6 B.A. screw ($\frac{5}{8}$ in. long) through the left-hand hole in the insulating base from the underside, so that the countersunk head of the screw beds in the counterbore of the hole. Fit the contact support (0·286 in. long), the upper contact assembly, a spring washer (A.G.S.162/A) and the nut (A47/A). Screw on the nut finger-tight only at this stage.

Note . . .

The lengths of the screws and the contact supports vary at each attachment point. The overall lengths of the screws and supports are quoted as an aid to identification.

(b) Insert a second 6 B.A. screw ($\frac{5}{8}$ in. long) into the lower right-hand hole in the base. Fit one of the link plates, the contact support (0·250 in. long), the other end of the upper contact assembly, a spring washer (A.G.S.162/A), and the nut (A47/A). Align the hole in the link plate with the terminal bolt hole in the base, then tighten both nuts.

(c) Insert the 6 B.A. screw ($\frac{7}{8}$ in. long) through the upper right-hand hole in the base. Fit a second link plate, the contact support (0·360 in. long), the lower contact assembly, a spring washer (A.G.S. 162/A) and the nut (A47/A). Align the hole in the link plate with the hole for the terminal bolt before tightening the nut.

(d) Melt flake shellac or Chatterton's compound into the counter-bores on the underside of the insulating base. Allow the compound to set, then finish off flush with the base.

(e) Attach the link to the link anchorage with a new pivot pin (Ref. No 27KD/551). Lock the pin by crimping the ends. If spares are not available the pivot pin can be made from a 0·54 in. length of 19 s.w.g. (0·0405 in. dia.) steel wire (D.T.D.126 or S.1). Either end of the link can be connected to the anchorage, but in the assembled condition the curved part of the link must be towards the beam stop.

(2) *Contact adjusting screw.*—If the contact adjusting screw has been dismantled reassemble as follows : —

(a) Place the adjusting head, smaller diameter first, over the plain shank of the adjusting screw. Secure the parts with a $\frac{1}{16}$ in. dia. rivet (AS.467/205).

(b) Place the spring and the washer over the plain shank of the screw, and secure with a $\frac{1}{16}$ in. dia. split pin (SP.9/C4).

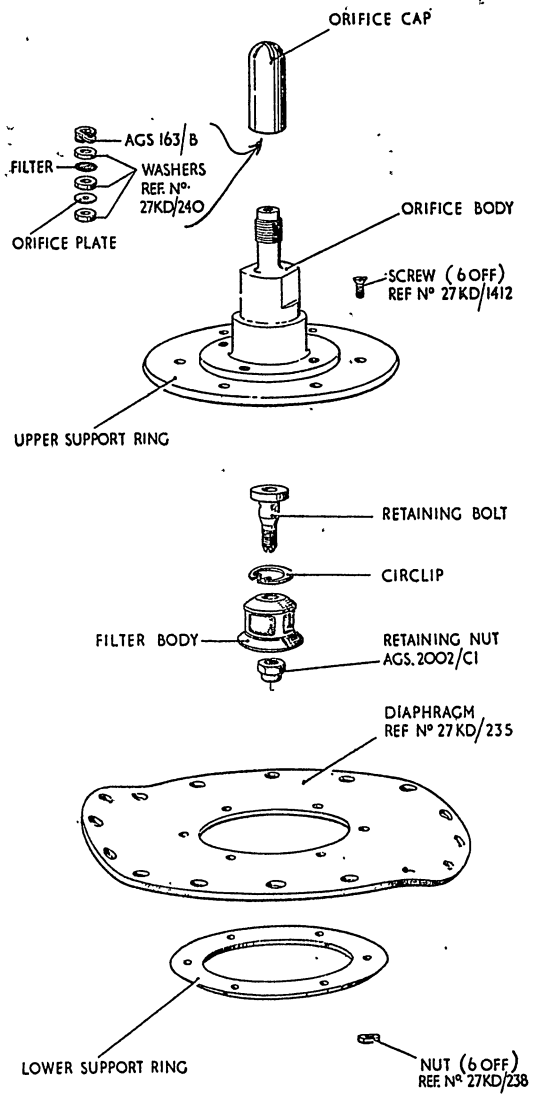

Fig. 10. Orifice filter

(c) Test the assembly (*para.* 13 (4)).

(3) Apply a coating of sealing compound (No. 1790), not exceeding $\frac{1}{8}$ in. wide, to the outer edges of the base of the terminal block. Place the insulating bushes over the terminal bolts, and fit the terminal block to the casting. Place the insulating base of the switch mechanism over the terminal bolts and secure with two spring washers (A.G.S.162/B) and the nuts (A47/B).

(4) Connect the free end of the link to the centre of the beam, using a new pivot pin (Ref. No. 27KD/550) and placing the brass washer (0·120 in. o.d., 0·031 in. thick) under the head of the pin, and the brass washer (0·125 in. o.d., 0·005 in. thick) between the link and the beam. Bend the end of the pin to approximately 45° to hold it in position.

(5) Insert the contact adjusting screw from the inside of the casting, screwing in until there is a gap of approximately 0·050 in. between the contacts. Check that the semicircular cut-out at the end of the lower contact assembly is central on the flange of the adjusting head, and does not foul the spindle. If necessary adjust the contact assembly. Test the assembly by inserting a $\frac{3}{32}$ in. dia. rod into the end of the adjusting screw, and depressing the head. Note that the contacts close, and that the adjusting head returns to its original position and the contacts open on withdrawal of the rod. Place a new seal (A.G.S.1186/4) over the threaded end of the screw, fit the locknut, place a new seal (A.G.S.1186/A) over the locknut, and fit the cap-nut. The locking tab may be omitted at this stage.

(6) Test the insulation resistance between the two terminals of the terminal block, and between each terminal and the casting. In each instance the resistance must not be less than 10 megohms at 250V.

Orifice filter (*fig.* 10)

19. (1) If the upper support ring has been dismantled from the orifice body, lightly coat the mating faces with sealing compound (No. 1751) and secure the parts with four rivets (AS.162/405 or AS.160/405).

(2) Secure a new diaphragm (Ref. No. 27KD/235) between the upper and lower support rings with six screws (Ref. No. 27KD/1412) and nuts (Ref. No. 27KD/238), first coating the threads of the screws with sealing compound (No. 1751). Lock the screws by trimming to length and riveting over.

(3) Insert the internal parts into the orifice cap in the following order: the double spring washer (A.G.S.163/B), a new fibre washer (Ref. No. 27KD/240), the filter, a second fibre washer, the orifice plate and a third fibre washer. Screw the orifice cap on to the orifice body. The filter body and its retaining bolt should be omitted at this stage.

(4) Fit the top chamber to the diaphragm setting fixture ST.5003 (*fig.* 12), ensuring that it is screwed down to the end of the thread. Apply a light coating of sealing compound (No. 1751) to the rim of the casting and the mating face of the diaphragm support (*fig.* 5). Set the orifice filter assembly in position, so that the flange on the orifice body is supported by the fixture. Check that the diaphragm is free from wrinkles, and set the diaphragm support in position. Secure the parts with the thirteen $\frac{3}{32}$ in. dia. screws, first coating the threads with sealing compound (No. 1751). Tighten the screws evenly all round to prevent distortion of the diaphragm.

(5) Remove the top chamber from the setting fixture. Fit the diaphragm spring, a new sealing washer (Ref. No. 27KD/247) and the spring housing. Use the peg spanner ST.5005 (*fig.* 6) to tighten the housing.

(6) Apply the top chamber sub-assembly tests (*para.* 28 *and* 29).

(7) Fit the retaining bolt into the orifice body, securing it with the circlip (A.G.S.

2030/4). Insert the filter body, and secure with the retaining nut (A.G.S. 2002/C.1). A screwdriver slot is provided on the end of the bolt so that it can be held stationary whilst the nut is tightened.

(8) Place two new seals (A.G.S.1186/A) on the blanking plug, and screw the plug into the threaded hole adjacent to the contact adjuster. The locking tab may be omitted at this stage.

Bottom chamber

Inwards relief valve (*fig.* 4)

20. Fit a new diaphragm (Ref. No. 27KD/554) between the inwards relief valve

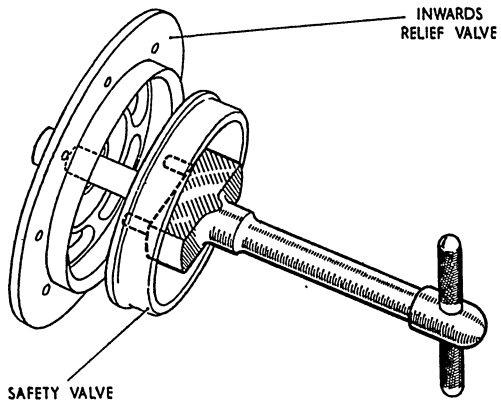

Fig. 11. Peg spanner ST.5007

and the diaphragm support, securing the parts with the eight screws (A33/A8). Lock the screws with an approved locknut cement.

Safety valve

21. Apply a light coating of low temperature grease (D.T.D.825) to the stem of the safety valve, and insert the valve into the valve guide on the inwards relief valve. Fit the dust excluder, the safety valve spring and the spring retainer, then secure the parts with the spring adjusting bolt, a new sealing washer (Ref. No. 27KD/557), a plain washer (SP.16/C) and the nut (A.G.S.2002/C.1). Screw the adjusting ring, external flange first, on to the skirt of the safety valve. Adjust the ring to a gap of 0·025 ± 0·005 in. between the flange on the ring and the underside of the diaphragm support. Do not lock the ring with the split pin at this stage, since the setting is provisional and may require to be altered during the test procedure.

22. (1) Mount the valve body casting on the valve body support (*fig.* 3).

(2) Insert the inwards relief valve spring (*fig.* 2), larger diameter first, into the body casting, ensuring that the lower coil seats evenly in the recess in the casting. Place the relief valves assembly in position, aligning the holes in the diaphragm with the corresponding holes in the casting. Fit the inwards relief valve seating, seating edge downwards, and align the three 2 B.A. clearance holes in the casting. Secure the parts with two $\frac{3}{32}$ in. dia. screws (0·5 in. long), first coating the threads of the screws with sealing compound (No. 1751).

(3) Fit the slotted cover, securing it with the three $\frac{3}{32}$ in. dia. screws (0·7 in. long), also coating the threads of these screws with sealing compound.

Main assembly (*fig.* 1)

23. (1) Place two packing washers (SP.13/C) over each of the three studs on the top chamber. Fit the top chamber to the bottom chamber casting, and secure with the washers (SP.15/C) and stiffnuts (A.G.S.2002/C.1).

(2) Test and set the unit (*para.* 30).

Final assembly

24. (1) Fit the locking tab (*fig.* 9). The serrated hole in the tab fits over the locknut of the contact adjusting screw, and the blanking plug fits through the plain hole, with one of the two seals on each side of the tab.

(2) Wire lock the beam stop cap-nut, the cap-nut of the atmospheric capsules assembly and the outlet valve cap-nut to the spring housing. Use 22 s.w.g. steel wire (D.T.D.189 or 161) and seal the ends of the wires with lead seals (Ref. No. 27KD/732). Wire lock the blanking plug to one of the holes in the locking tab, and

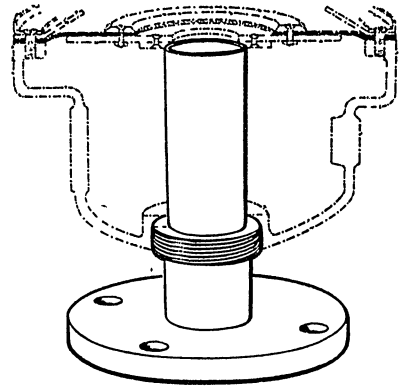

Fig. 12. Diaphragm setting fixture ST.5003

wire lock the contact adjusting screw cap-nut to the other hole.

(3) Place a new gasket (Ref. No. 27KD/18) in a protective envelope, and attach it to the unit so that it is available on installation.

(4) Wire the inlet grid and packing plate assembly to the mounting flange (Mk. 12 unit only).

TESTING AND SETTING

Sub-assembly tests

25. These tests (*para.* 26 *to* 29) are to be applied during the examination and assembly stages of reconditioning.

Atmospheric capsules leak test

26. Since this test involves the application of air pressure to the exterior of the assembly an adapter of the type illustrated in fig. 13 is required. Fit the assembly in the adapter, and connect to an air supply, the supply pipe being provided with a pressure gauge and a shut-off cock. Apply a pressure of 4 lb/in² then shut off the air supply. Over a period of 2 min. there must be no leakage.

Outlet valve leak test

27. With the valve core assembled to the adjusting screw apply an air pressure of 4 lb/in² in a direction tending to open the valve, and then in a direction tending to close the valve. In each instance the valve must hold the pressure for 2 min. without leakage.

Top chamber leak test

28. This test should not be applied until at least four hours after assembly, to allow the sealing compound to set.

(1) Blank off the outlet valve with a suitable blanking cap. Fit a rubber plug in the open end of the orifice body, that is in the position normally occupied by the filter.

(2) Apply a pressure of 3 lb/in² through the $\frac{1}{8}$ in. B.s.p. threaded connection adjacent to the contact adjusting screw, then shut off the air supply. The top chamber must hold the pressure for 2 min. without leakage.

Orifice flow test

29. The purpose of this test is to confirm that the 0·012 in. dia. orifice will pass the requisite airflow.

(1) Blank off the outlet valve. Connect the $\frac{1}{8}$ in. B.s.p. threaded connection in the top chamber to the outlet side of a capacity chamber of known internal volume. The connecting piping should be as short as practicable, and the capacity chamber should be provided with a pressure gauge (preferably a mercury manometer), and fitted with a shut-off valve on both the inlet and outlet sides.

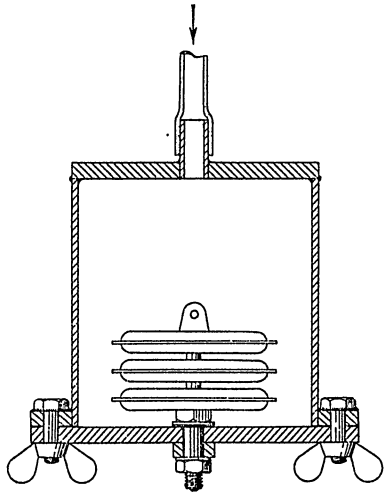

Fig. 13. Leak test adapter

(2) Close the outlet valve on the capacity chamber, open the inlet valve and charge the chamber to a pressure of 2·25 lb/in² (4·55 in. Hg). Close the inlet valve. Open the outlet valve and measure the time for the pressure to drop to 1·75 lb/in² (3·54 in. Hg). This time must be between 89 and 124 sec. for each ft³ of capacity chamber volume, equivalent to an airflow through the orifice of between 0·00126 and 0·00176 lb/min at 2 lb/in².

Complete assembly tests

30. These tests (*para.* 31 *to* 38) are to be applied after the unit has been completely assembled.

Insulation resistance test

31. The insulation resistance between the terminals of the terminal block, and between each terminal and the body of the unit, must not be less than 10 megohms at 250V.

Inwards relief valve test

32. With the unit held in a horizontal position, relief valves uppermost, insert a wooden rod through the central hole in the slotted cover, and depress the valves assembly. The inwards relief valve diaphragm must show no tendency to stick to the seating, and it must have an unrestricted opening of at least 0·18 in. (measured at the centre of the assembly). On removal of the rod the valve must return to the seating under spring pressure only, and be held there with the diaphragm resting evenly on the seating.

Safety valve setting

33. Mount the unit on a low pressure leak test rig (*A.P.*4340, *Vol.* 6, *Sect.* 14, *Chap.* 1) so that air pressure can be applied through the mounting flange. Connect the auxiliary air supply pipe on the rig to the blanking plug connection on the top chamber. Blank off the outlet valve. With air pressure applied simultaneously to the interior of the unit and the top chamber adjust the loading of the safety valve spring so that the valve starts to relieve at a pressure between 3·1 and 3·2 lb/in² (6·32 and 6·53 in. Hg).

Leak test

34. With the unit mounted on the leak test rig as in para. 33 apply air pressure simultaneously to the interior of the unit and the top chamber until the safety valve starts to relieve, then shut off the air supply. Measure the time for the pressure to fall from 2·75 to 2·25 lb/in² (5·81 to 4·58 in. Hg). This must not be less than 15·6 sec. for each

TABLE 2

Test altitudes and limits

Aircraft altitude (ft)	*Cabin altitude limits (ft)*	*Cabin limits for warning light (ft)*
15 000	12 100 — 12 750	13 800 — 14 600
25 000	16 480 — 17 000	18 900 — 19 800
35 000	21 900 — 22 250	24 950 — 26 500
40 000	24 800 — 25 200	28 200 — 30 000
45 000	27 350 — 27 800	31 150 — 33 000

TABLE 3

Reconditioning spares

Note . . .

The items listed in this table are to be renewed during reconditioning irrespective of the apparent condition of the existing parts.

Ref. No.	*Part No.*	*Item*	*No. off*
27KD/18	499001	Gasket	1
223	503598	Pin	2
233	400493	Packing	1
235	400461	Diaphragm	1
238	ND/S.173	Nut	6
240	400451/2	Washer	3
247	400459	Washer	1
543	400444	Washer	1
550	400495/2	Pin	1
551	400495/1	Pin	1
554	501824	Diaphragm	1
557	DDS.1098/2	Washer	1
587	ND/S.127	Valve core	1
732	A.6370	Lead seal	2
1412	ND/S.178	Screw	6
28F/12047	AGS.1186/A	Seal	5
14253	AGS.1186/4	Seal	3
28P/12587	SP.9/C4	Pin, split	2
28W/3088	AGS.163/B	Washer, spring	1
3096	AGS.162/A	Washer, spring	3
3097	AGS.162/B	Washer, spring	2
—	GD.1259/4	Washer, Seloc	1

ft³ of test rig capacity, equivalent to a permissible leak rate of 0·01 lb/min at 2·5 lb/in².

Safety valve flow test

35. Mount the unit on the capacity chamber (4 ft³ minimum volume) of a flow test rig, so that the airflow is applied through the inlet of the unit and discharges to atmosphere. Connect the top chamber ($\frac{1}{8}$ in. B.s.p. connection) to the capacity chamber. Blank off the outlet valve. With an airflow of 15 lb/min passing through the safety valve the capacity chamber pressure must be within the limits 3·5 and 3·6 lb/in² (7·14 and 7·34 in. Hg). If necessary rotate the adjusting ring on the skirt of the safety valve to obtain a reading within the limits (clockwise adjustment of the ring will increase the back pressure). If the range of adjustment is insufficient, simultaneous adjustment of the spring load and the ring will be necessary. After adjustment check that the upstream pressure is still within the limits 3·1 and 3·2 lb/in² for the initial opening of the valve.

36. When the adjustment has been completed, remove the slotted cover (three countersunk-head screws). Drill a $\frac{1}{16}$ in. dia. hole transversely through the skirt of the safety valve, using the existing hole in the adjusting ring as a guide. Fit a split pin (SP.9/C4) to lock the adjusting ring. Reassemble the cover, using sealing compound (No. 1751) on the threads of the three screws.

Note . . .

If a complete new relief valves assembly (Ref. No. 27KD/251) has been fitted the safety valve setting and flow tests (para. 33 and 35) need not be applied, since the new assembly is supplied preset and tested.

Setting

37. A test rig Mk. 2 (*A.P.1275T, Vol. 1, Sect. 3, Chap. 15*) is required for setting the control characteristics of the unit. The procedure consists of setting the "aircraft altitude" to selected values, and adjusting the unit to obtain corresponding "cabin altitudes" within certain limits. The switch mechanism is set by increasing the cabin altitude (to simulate loss of cabin pressure) and adjusting the contact assemblies so that the contacts close within specific limits of cabin altitude.

(1) Mount the unit in the test rig.

(2) Set the SUCTION ALTITUDE valve on the test rig to obtain, in turn, aircraft altitudes (ALTITUDE manometer) equal to the values tabulated in Table 2. At each altitude note the reading on the CABIN manometer, then adjust the unit to bring this reading within the limits tabulated under "cabin altitude". Adjustment is provided for at the outlet valve and the beam stop. Adjust the outlet valve at 15 000 and 25 000 ft and the beam stop at the remaining aircraft altitudes tabulated. When reducing the aircraft altitude prior to making an adjustment the rate of reduction of altitude should not exceed 10 000 ft/min. The procedure for adjustment is as follows: —

(a) *Outlet valve.*—Remove the outlet valve cap-nut, slack off the locknut and adjust the valve with a screwdriver, screwing out to decrease cabin altitude. Tighten the locknut and replace the cap-nut before retesting.

(b) *Beam stop.*—Remove the beam stop cap-nut, slack off the locknut and adjust the stop with a screwdriver, screwing out to decrease cabin altitude. Tighten the locknut and replace the seal and the cap-nut before retesting.

(3) Set the ON/OFF switch on the test rig panel to ON. Set the SUCTION ALTITUDE valve to obtain aircraft altitudes equal, in turn, to the values tabulated in Table 2. At each check point open the BALANCE valve to vent the cabin chamber to the altitude chamber (at a rate not exceeding 1 000 ft/min), meanwhile maintaining the aircraft altitude constant. Note the cabin altitude at which the lamp on the test rig panel lights. Adjust the switch mechanism to bring this reading within the corresponding limits tabulated under "Cabin limits for warning light". The procedure for adjustment is as follows: Remove the cap-nut and seal from the contact adjusting screw, slack off the locknut and adjust with a screwdriver, screwing out to cause the lamp to light at a higher cabin altitude. Tighten the locknut, and replace the seal and cap-nut before retesting.

Discharge valve back pressure test

38. Mount the unit on the capacity chamber of a flow test rig, so that the airflow is applied through the mounting flange and discharges to atmosphere. Remove the blanking plug adjacent to the contact adjusting screw (to open the top chamber to atmosphere). With an airflow of 7·65 lb/min the back pressure (capacity chamber pressure) must not exceed 0·29 lb/in² (8 in. W.g.).

REPAIR

39. Repair of the cabin pressure control valve is to be effected by the renewal of defective parts.