

SECTION 7, CHAPTER 6

PNEUMATIC GROUND EQUIPMENT

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Introduction

1. Compressed air is required every day for the operation of pneumatic tools, tyre inflation, sand blasting, spraying and such like operations. Very simply, means are required to take air from the atmosphere and compress it in some form of reservoir from which, because the different applications require different pressures, the output can be controlled.

2. The supply of compressed air is obtained by means of a compressor which may be driven by an electric motor or by an internal combustion engine. Permanent workshop type buildings may be equipped with a static supply having air lines which can be tapped at various points. For servicing aircraft situated away from main supply points, compressed air bottles, which can be charged by a compressor and kept in readiness, are widely used. Also available are pneumatic servicing trolleys which are complete portable

supply units. The following information deals with typical items of pneumatic ground equipment.

COMPRESSORS

A.I.D., 2.A.S.6.

3. This compressor forms part of the air compressor set, Type L, as shown in Fig. 1.

4. This compressor is a vertical, air cooled, two-stage type. It has a capacity of 4 cubic feet per minute at 1,000 r.p.m. and a normal pressure of 450 lb per sq. in. The high pressure cylinder forms an extension, of smaller diameter, to the low pressure cylinder, and a single piston operates in both cylinders (Fig.2).

5. The high pressure cylinder is spigoted into the low pressure cylinder and forms the low pressure cylinder head. The low and

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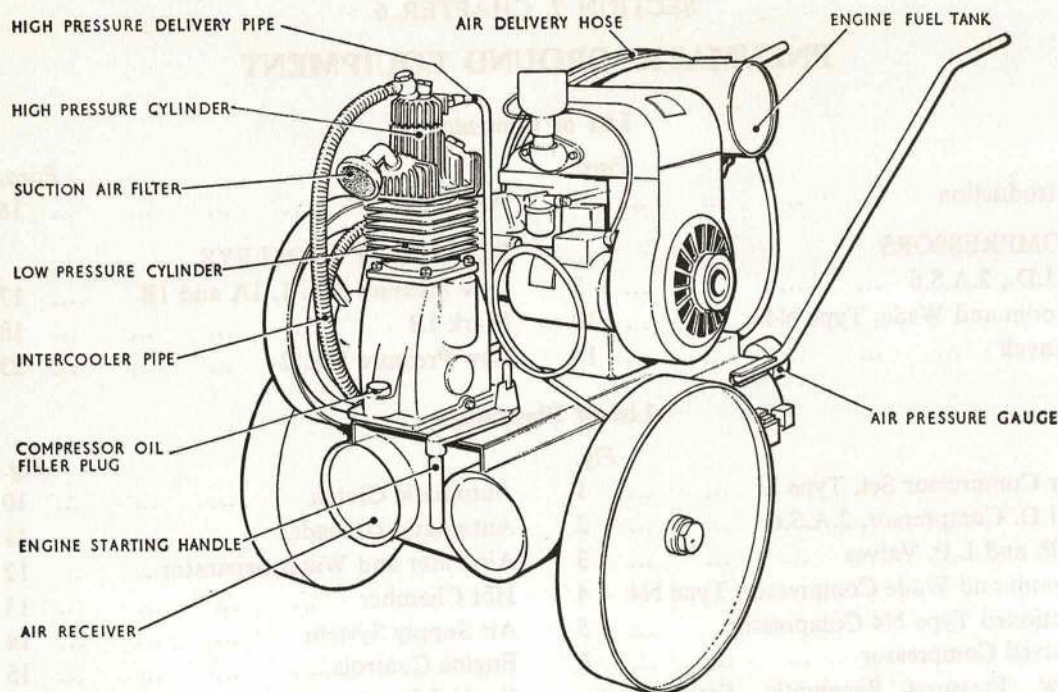


Fig. 1. AIR COMPRESSOR SET, TYPE L

high pressure cylinder heads contain respectively the low and high pressure inlet and delivery valves (Fig. 3).

6. The intercooler pipe is fitted to convey air from the low pressure to the high pressure stage. The intercooler relief valve (Fig. 2) acts as a safety valve to prevent a build-up of pressure in the intercooler pipe. A filter is fitted at the entrance to the low pressure inlet valve.

7. The tandem piston has four compression rings for the high pressure part and two compression rings plus a bevelled scraper ring for the low pressure part. The connecting rod big-end bearing is white-metal lined and has an oil dipper screwed into the cap. The crankshaft is borne in ball bearings and an oil seal is fitted at the flywheel side.

8. **Lubrication.** The crankcase sump contains one pint of oil and this is raised to the dip tray by a small plunger type pump actuated by a cam on the crankshaft. The oil dipper splashes the oil around for lubrication of the working parts.

9. **Operation.** Air passes through the inlet filter and enters the low pressure cylinder via the low pressure inlet valve. Here it is compressed and discharged via the low pressure delivery valve into the externally-finned intercooler pipe. From this pipe the air passes via the high pressure inlet valve into the high pressure cylinder where it undergoes the second stage of compression and is ejected via the high pressure delivery valve into the copper pipe leading to the air receiver. Thus at every "UP" stroke of the piston, air is compressed at both high and low pressure stages, the high pressure stage air having passed through the low pressure stage on the previous stroke.

Broom and Wade, Type N4

10. This compressor (Fig. 4) is a two-cylinder air-cooled single stage type in which the crankpins are set at 180 degrees to each other so that when one cylinder is compressing the other is drawing in air through the intake filter. It has a capacity of 24 cubic feet per minute at 100 lb per sq. in. and 650 r.p.m. The heat generated by the compression of the air is partly dissipated by a cooling coil which

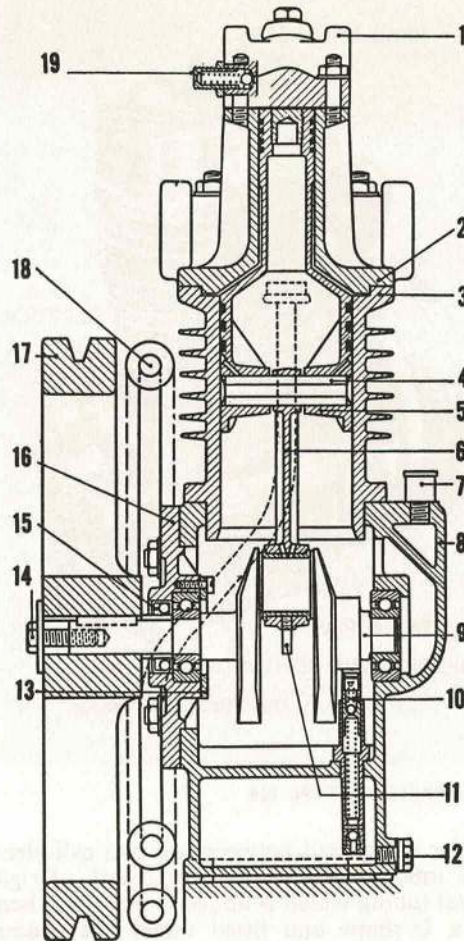


Fig. 2. A.I.D. COMPRESSOR, 2.A.S.6.

- | | |
|--------------------------------|------------------------------|
| 1. High Pressure Cylinder Head | 10. Oil Pump |
| 2. Low Pressure Cylinder Head | 11. Dipper |
| 3. Low Pressure Cylinder | 12. Oil Drain Plug |
| 4. Gudgeon Pin | 13. Bearing Retaining Ring |
| 5. Piston | 14. Flywheel Setscrew |
| 6. Connecting Rod | 15. Crankshaft Oil Seal |
| 7. Crankcase Breather | 16. Bearing Cover |
| 8. Crankcase | 17. Flywheel |
| 9. Crankshaft | 18. Intercooler Pipe |
| | 19. Intercooler Relief Valve |

is fitted between the delivery side of the compressor and the air receiver.

11. The main parts of the compressor (Fig. 5) are a cylinder head assembly, a cylinder block, a crankshaft assembly, a pair of pistons and connecting rods, and an oil pump. The cylinder head and the barrels of the block are externally finned for cooling purposes. The spring-loaded valves, of which

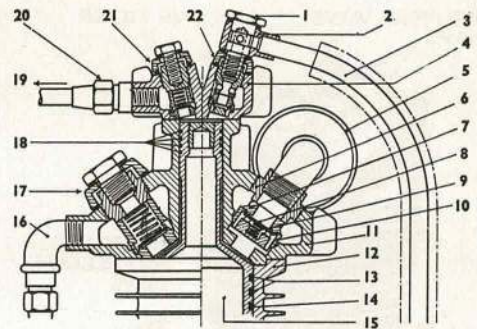


Fig. 3. H.P. AND L.P. VALVES

- | |
|---------------------------------------|
| 1. Banjo Connector Screw |
| 2. Banjo Connector Body |
| 3. Intercooler Pipe |
| 4. H.P. Cylinder Head |
| 5. Suction Air Filter |
| 6. L.P. Suction Valve Plug |
| 7. L.P. Suction Valve Seat |
| 8. L.P. Suction Valve Plate |
| 9. L.P. Suction Valve Spring |
| 10. L.P. Suction Valve Guide |
| 11. L.P. Cylinder Head |
| 12. L.P. Cylinder |
| 13. L.P. Piston Compression Rings |
| 14. L.P. Piston Scraper Ring |
| 15. Piston |
| 16. L.P. Delivery to Intercooler Pipe |
| 17. L.P. Delivery Valve |
| 18. H.P. Piston Rings |
| 19. H.P. Delivery To Receiver |
| 20. H.P. Delivery Connection Union |
| 21. H.P. Delivery Valve |
| 22. H.P. Suction Valve |

there are two types, are housed in the cylinder head; the compressor may be fitted with one type only, either early or late. A hand-operated unloader device is fitted to each inlet valve assembly for relieving the compression in each cylinder.

12. The top half of the crankcase is cast integral with the cylinder block and houses the two split white metal main bearings which carry the crankshaft. The bottom half of the crankcase forms the oil sump. The connecting rods have split white metal big end bearings which are shimmed between the halves. The cast iron pistons have two compression and one scraper ring above the gudgeon pin and a third compression ring at the base of the skirt.

13. **Lubrication.** The crankcase sump contains 9 pints of oil and the contents can be checked by means of a dipstick. The plunger-type oil pump, which is secured to the rear main bearing cap, supplies oil under pressure to the two main bearings from whence it flows through drillings to the big end bearings.

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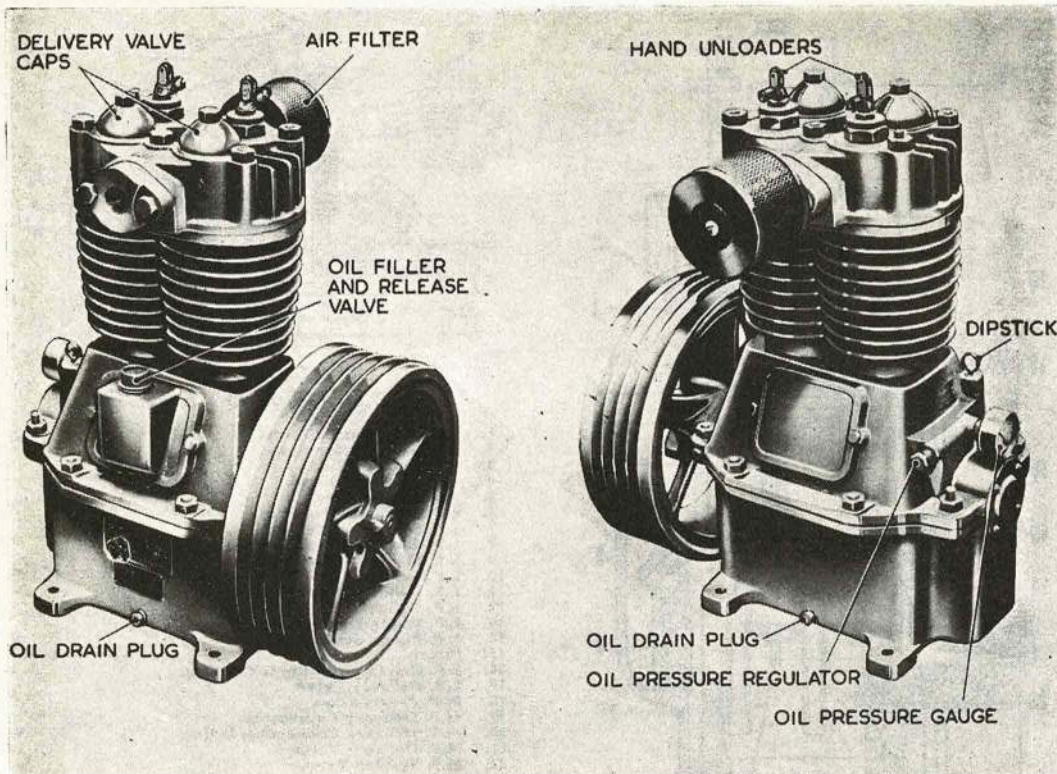


Fig. 4. BROOM AND WADE COMPRESSOR, TYPE N4

Oil escaping from the big end bearings lubricates the cylinders, pistons and gudgeon pins. The oil pressure regulator is housed in the cylinder block beside the oil pressure gauge and is of the by-pass type, any surplus oil being returned to the sump; the pressure on the spring-loaded ball may be adjusted by means of a nut and locknut.

Reavell

14. This compressor (Fig. 6) is a two-cylinder air-cooled two stage type, the pistons in both cylinders moving in the same direction. It has a capacity of $24\frac{1}{4}$ cubic feet per minute when working at a pressure of 100 lb per sq. in. at 720 r.p.m. The bore and stroke of the cylinders are:—

Low pressure cylinder..... $5\frac{1}{8}$ in. $\times$ $3\frac{1}{2}$ in.
High pressure cylinder..... $2\frac{3}{8}$ in. $\times$ $3\frac{1}{2}$ in.

15. Air from the atmosphere enters the low pressure cylinder via the filter and inlet valve and after compression is used to charge the high pressure cylinder. The heat generated at the first stage of compression is dissipated by passing the air through a

cooler interposed between the two cylinders. The intercooler consists of a length of rigid metal tubing which is finned for cooling, bent to a U-shape and fitted under the chassis frame. Each end is attached to the valve ports by a piece of flexible metal hose, and a drain tap is fitted at the lowest point.

Air Filters

16. An air filter is fitted to the inlet port of all compressors to prevent the ingress of foreign matter. Servicing required will depend on the particular type but in general will be as follows:—

- (a) Remove the element and shake vigorously to remove as much dust as possible.
- (b) Wash it in gasoline (no lead) and allow to dry.
- (c) Dip it in oil OMD 110, shake off the surplus and refit.

SERVICING TROLLEYS

Low Pressure Mk. 1, 1A and 1B

17. These low pressure pneumatic servicing trolleys are two-wheeled trailers, fitted with

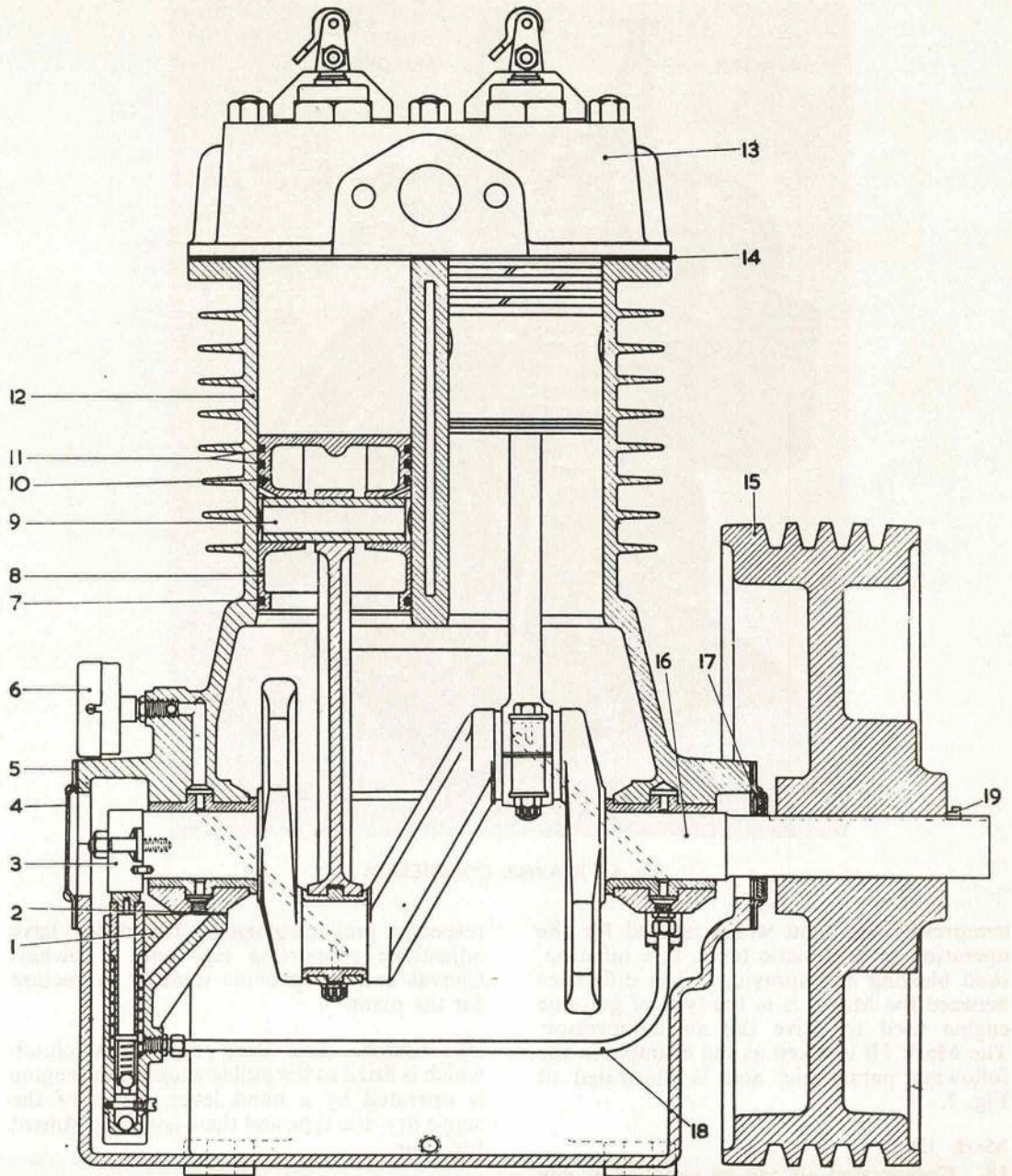


Fig. 5. SECTIONED TYPE N4 COMPRESSOR

- | | | |
|-----------------------|-----------------------|------------------|
| 1. Oil Pump | 8. Piston | 15. Flywheel |
| 2. Joint Washer | 9. Gudgeon Pin | 16. Crankshaft |
| 3. Oil Pump Eccentric | 10. Scraper Ring | 17. Oil Seal |
| 4. End Cover | 11. Compression Rings | 18. Oil Pipe |
| 5. Joint | 12. Cylinder Block | 19. Flywheel Key |
| 6. Oil Pressure Gauge | 13. Cylinder Head | |
| 7. Compression Ring | 14. Joint Washer | |

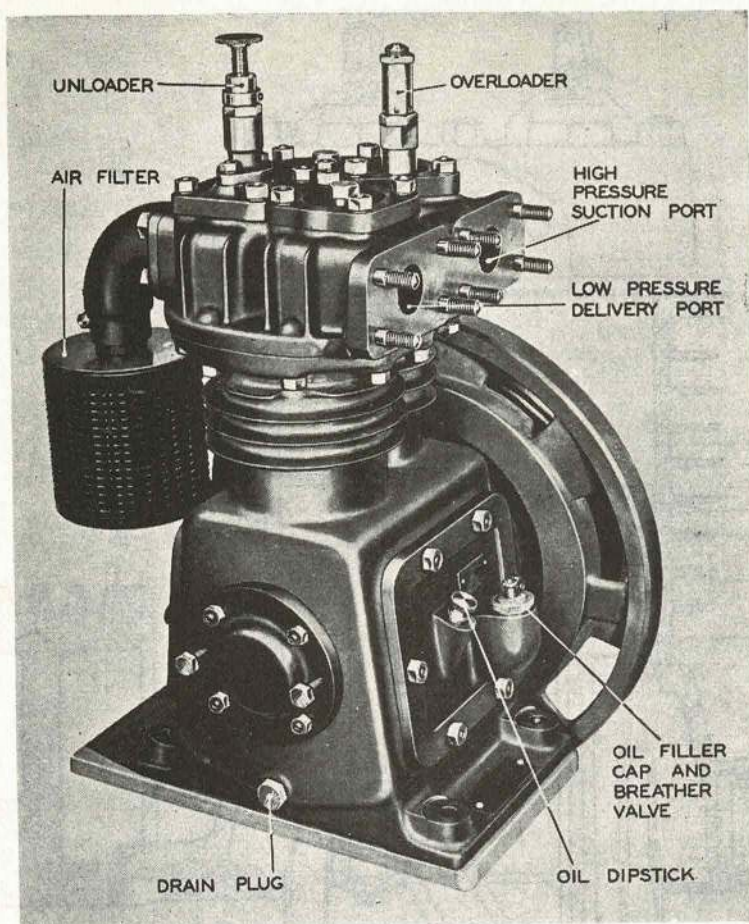


Fig. 6. REAVELL COMPRESSOR

compressed air plant which is used for the operation of pneumatic tools, tyre inflation, sand blasting and spraying. The difference between the Marks is in the type of gasoline engine used to drive the air compressor. The Mark 1B is taken as the example in the following paragraphs and is illustrated at Fig. 7.

Mark 1B

18. Compressed air can be supplied at any pressure between 5 and 100 lb per sq. in., the air pressure at the final outlet being determined by the setting of the regulator valves and reduction valve (Fig. 8).

19. The plant consists of a Petter P.A.2 gasoline engine, a Reavell or Broom and Wade compressor and an air receiver, together with the regulator valves and their

respective pressure gauges. The trolleys have adjustable supporting legs and a towbar. Canvas curtains provide weather protection for the plant.

20. **Clutch.** The Borg and Beck clutch which is fitted to the pulley wheel of the engine is operated by a hand lever. It is of the single dry-disc type and there is no adjustment for wear.

21. **Air Receiver.** The receiver is fitted with a drain tap in the base, and the internal pressure is limited to 105 lb per sq. in. by means of a spring-loaded safety valve.

22. **Operating Precautions.** Before starting the plant the supporting legs should be adjusted and locked in position so that the trolley is level. This is to ensure that the oil

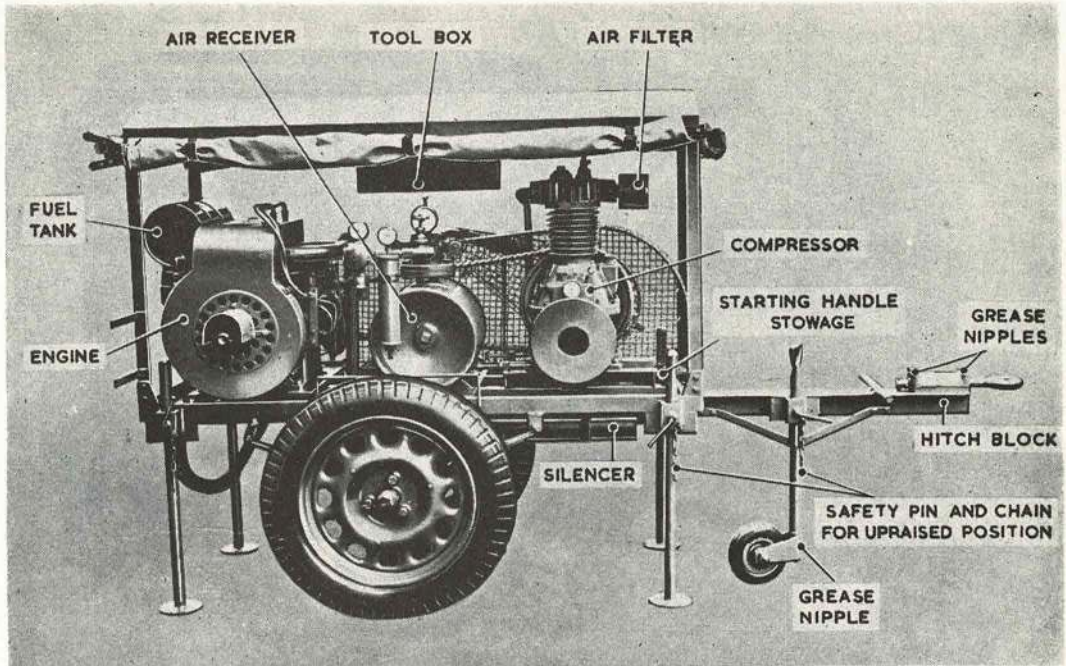


Fig. 7. LOW PRESSURE PNEUMATIC SERVICING TROLLEY—Mk. 1B

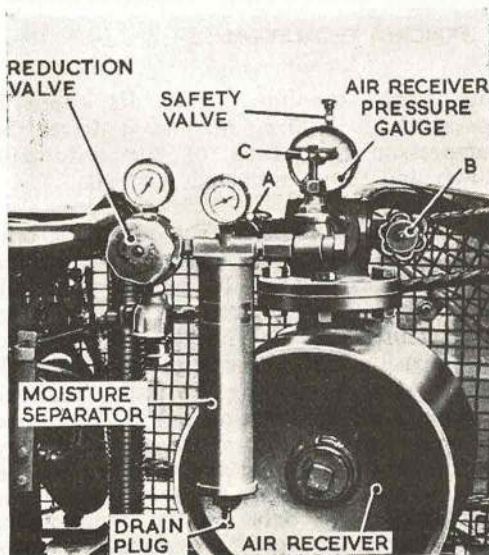


Fig. 8. VALVES

in the sumps of both the engine and the compressor is circulated. The plant must be started off load and, for this reason, the engine is disconnected from the compressor

by means of the clutch and started independently.

Low Pressure Mk. 2

23. The low pressure pneumatic servicing trolley (Fig. 9) is used where no static lines are available for supplying compressed air for aircraft servicing and for general workshop purposes. The trolley has a maximum output of 20 cu. ft. of free air per minute at 200 lb per sq. in. pressure, but the supply of compressed air can be controlled to any selected pressure between 20 and 200 lb per sq. in. A heater coil uses the heat from the engine exhaust to heat the air to controlled temperatures up to 212-250 deg. F. Moisture is removed from the compressed air supply by means of a filter charged with silica gel.

24. **General.** The twin air receivers form the main longitudinal members of the four-wheeled chassis on which are mounted the air compressor and its driving engine and the following components:—

- (a) An automatic clutch.
- (b) An automatic unloader.
- (c) An air filter and water separator.

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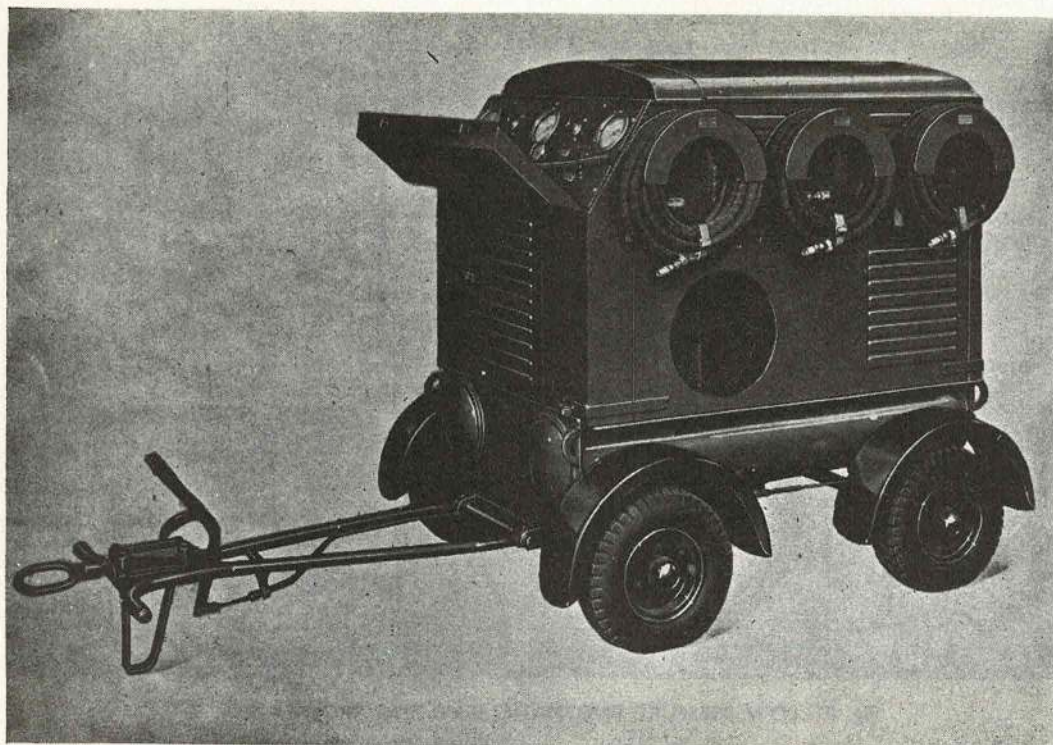


Fig. 9. LOW PRESSURE PNEUMATIC SERVICING TROLLEY—Mk. 2

- (d) Pressure regulating valves.
- (e) Pressure gauges.
- (f) A delivery air temperature gauge.
- (g) Four 30 ft. long delivery hoses fitted with "Instantair" female socket connections at their delivery ends.
- (h) A hot chamber.

25. Air Compressor. This is a Siebe Gorman, Type T.S., two-stage, vee twin-cylinder, air-cooled type. It has an output capacity of 20 cu. ft. of free air per minute and a maximum operating pressure of 200 lb per sq. in. at 650 to 680 r.p.m. A Vokes type C1 air filter is fitted to the inlet on the low pressure cylinder. A mechanical unloader is incorporated in the low pressure inlet valve assembly for manual operation; this device is operated also by compressed air and for this purpose it is connected by a pipeline to the automatic unloader. The oil capacity is 3 pints and a dipstick is provided for checking the level; lubrication is by splash.

26. Engine. This is a J.A.P. model 55, air-cooled, two-cylinder in line, side valve,

four stroke gasoline engine. Its speed is governed to 1,800 r.p.m. and it drives the compressor by means of the automatic clutch and three laminated vee belts.

27. Automatic Clutch. The automatic centrifugal clutch (Fig. 10) is fitted to the engine crankshaft extension. It consists of a hub which carries the clutch mechanism, a pulley and a clutch drum. The hub is secured to the extension shaft and carries the two clutch shoes. At slow running the pulley remains stationary on the rotating hub and increase of speed forces the shoes outwards by centrifugal force so that at 800-900 r.p.m. the Ferodo shoe linings grip the bore of the drum and transfer the drive to the compressor. When the engine speed is reduced to slow-running the springs retract the clutch shoes to disengage the drive.

28. Automatic Unloader. This component (Fig. 11) is used to maintain an approximately constant pressure in the receivers by causing the compressor to cease delivering air when the required pressure has been reached. The range of the unloader, i.e. the

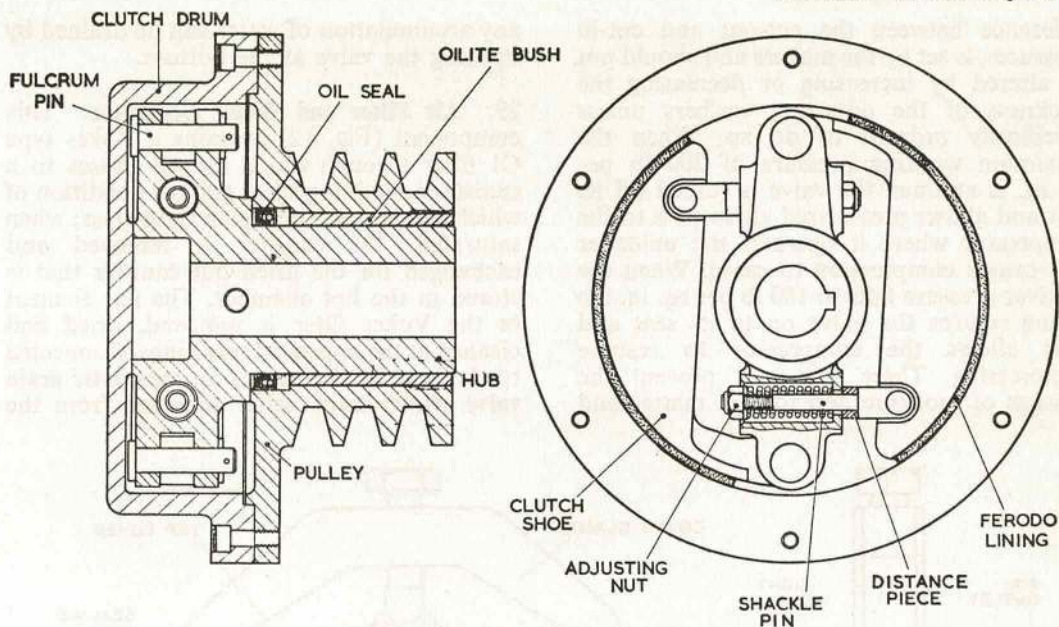


Fig. 10. AUTOMATIC CLUTCH

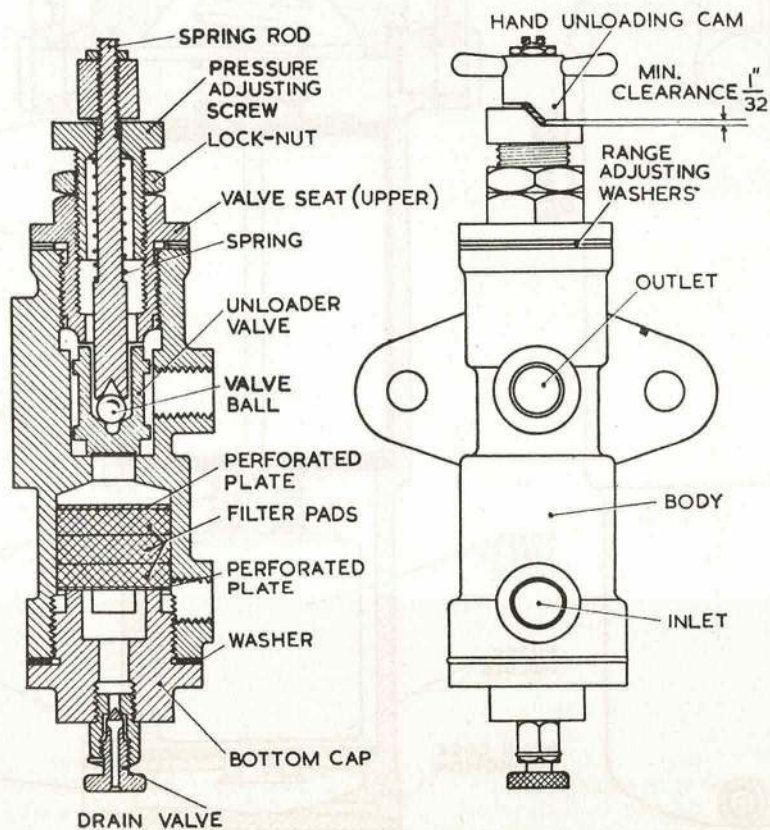


Fig. 11. AUTOMATIC UNLOADER

difference between the cut-out and cut-in pressures, is set by the makers and should not be altered by increasing or decreasing the thickness of the adjusting washers unless specifically ordered to do so. When the maximum working pressure of 200 lb per sq. in. is attained the valve is forced off its seat and allows pressurized air to pass to the compressor where it operates the unloader and causes compression to cease. When the receiver pressure falls to 180 lb per sq. in. the spring returns the valve on to its seat and thus allows the compressor to resume compressing. Three felt pads prevent the passage of moisture and foreign matter and

any accumulation of water can be drained by opening the valve at the bottom.

29. Air Filter and Water Separator. This component (Fig. 12) contains a Vokes type C1 filter through which the air passes to a canister containing silica gel, the condition of which can be seen through a sight glass; when saturated, the canister is removed and exchanged for the dried out canister that is stored in the hot chamber. The felt element in the Vokes filter is removed, dried and cleaned at the approved servicings. Connected to the base of the unit is an **automatic drain valve** which traps water removed from the

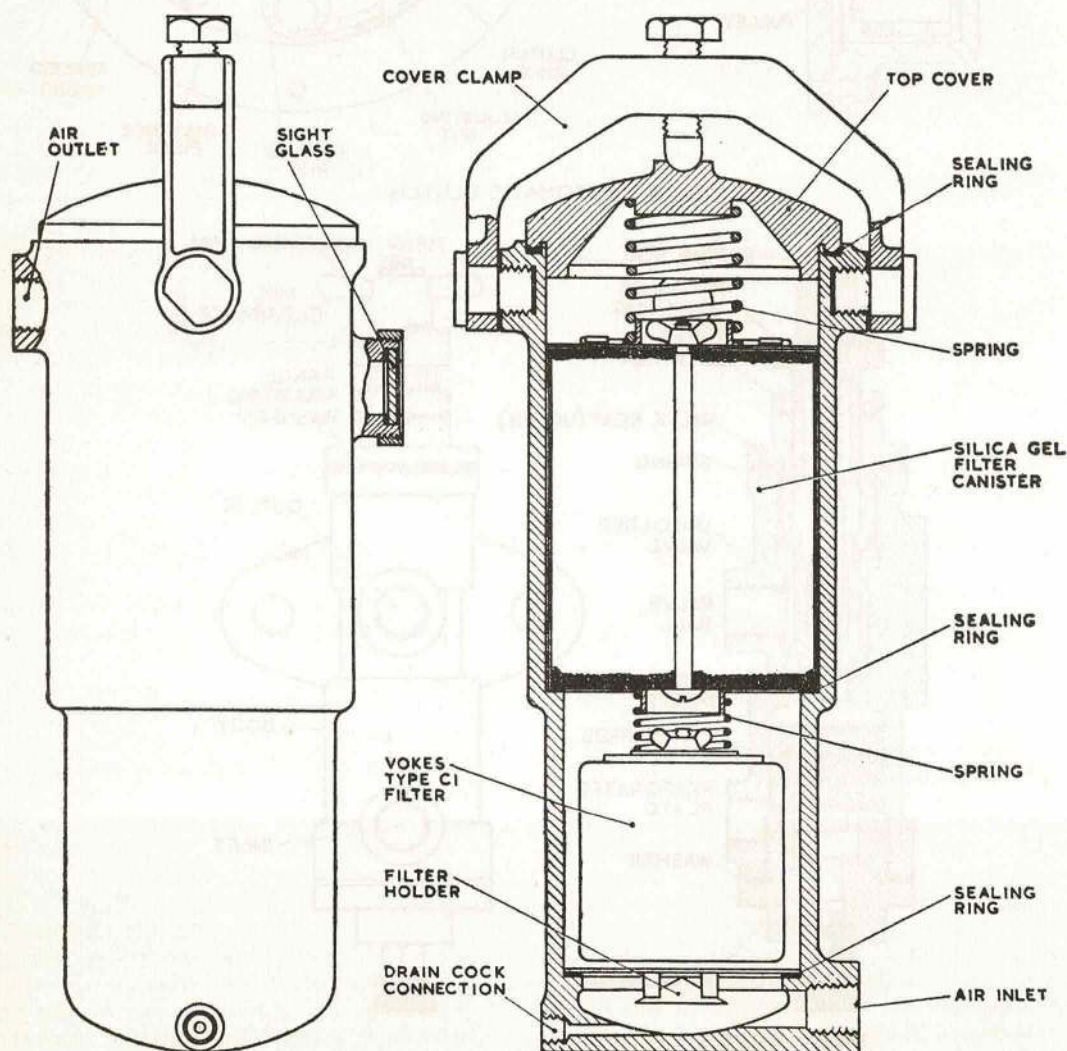


Fig. 12. AIR FILTER AND WATER SEPARATOR

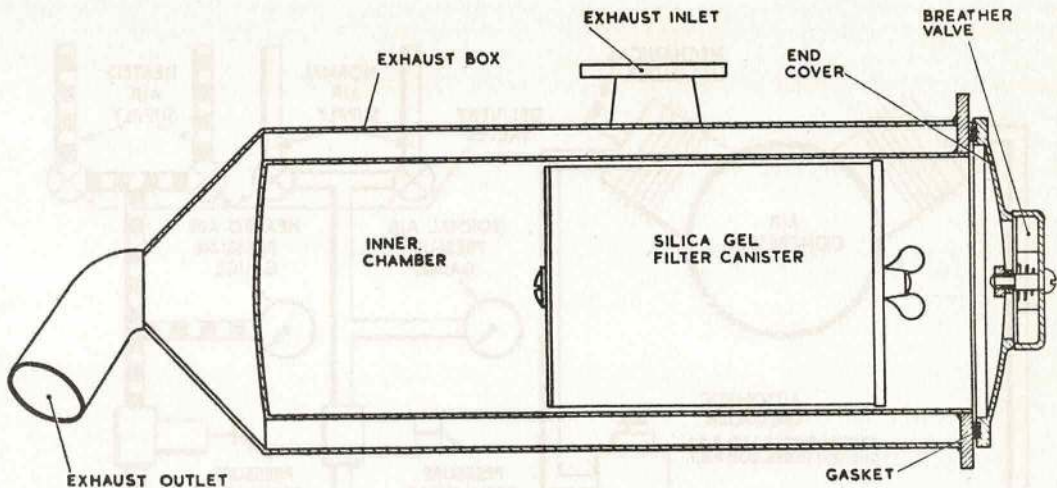


Fig. 13. HOT CHAMBER

compressed air during operation of the trolley and is opened and closed by means of a float; the **shut-off drain valve** is used to drain off accumulations of water in the filter body and also for releasing the pressure when closing down the plant.

30. Hot Chamber. This component (Fig. 13) acts as a silencer and also has a heated inner chamber which is used for reactivating the silica gel used in the air system filter. The spring-loaded breather valve operates automatically to release any pressure which may be caused by the steam generated when the moisture saturated silica gel is heated.

31. Air System. A diagrammatic layout of the air supply system is shown in Fig. 14. Compressed air is delivered via a non-return valve to the receivers which are interconnected to equalize the pressure. When the compressed air leaves the air receivers it passes through the air filter and water separator to the pressure regulating valves, one of which is used for the heated air supply. The outlet of each regulating valve is connected to two separate valves and hoses. When the pressure regulating valve (heated supply) is adjusted, the heated air valve opened, and the temperature control lever positioned, the delivery air can pass through the heater coil. Thus, the trolley delivers up to four feeds of cold air or two of cold and two of heated air to a maximum pressure of 200 lb per sq. in.

32. Precautions in Use. The following precautions must be observed during the handling and operation of the trolley:—

(a) Ensure that the trolley is serviceable. Ensure that the oil level in both the engine and the compressor is correct and that there is sufficient gasoline in the fuel tank. Check the tyre pressures (30 lb per sq. in.).

(b) Before towing the trolley ensure that the delivery hoses are properly stowed, the fuel cock is closed, and the doors and top cover are closed and secure. If the towing vehicle is to be reversed ensure that the hinged stop on the tow bar is engaged to prevent the brake being applied by the override device.

(c) Ensure that the driving belts are correctly adjusted and do not run the engine at slow-running speed for long periods.

(d) Keep the top cover open to prevent overheating of the engine and compressor whilst the plant is running. Do not operate the trolley if the belt guard is removed or insecurely fitted.

(e) Examine the state of the silica gel through the sight glass; it is **blue** when **dry** and **pink** when **moist**. If necessary, change the canister.

(f) **Warning.** Always stop the engine and release the pressure in the air system by opening the drain valves before disconnecting any part of the system or removing the top cover from the air filter and water separator.

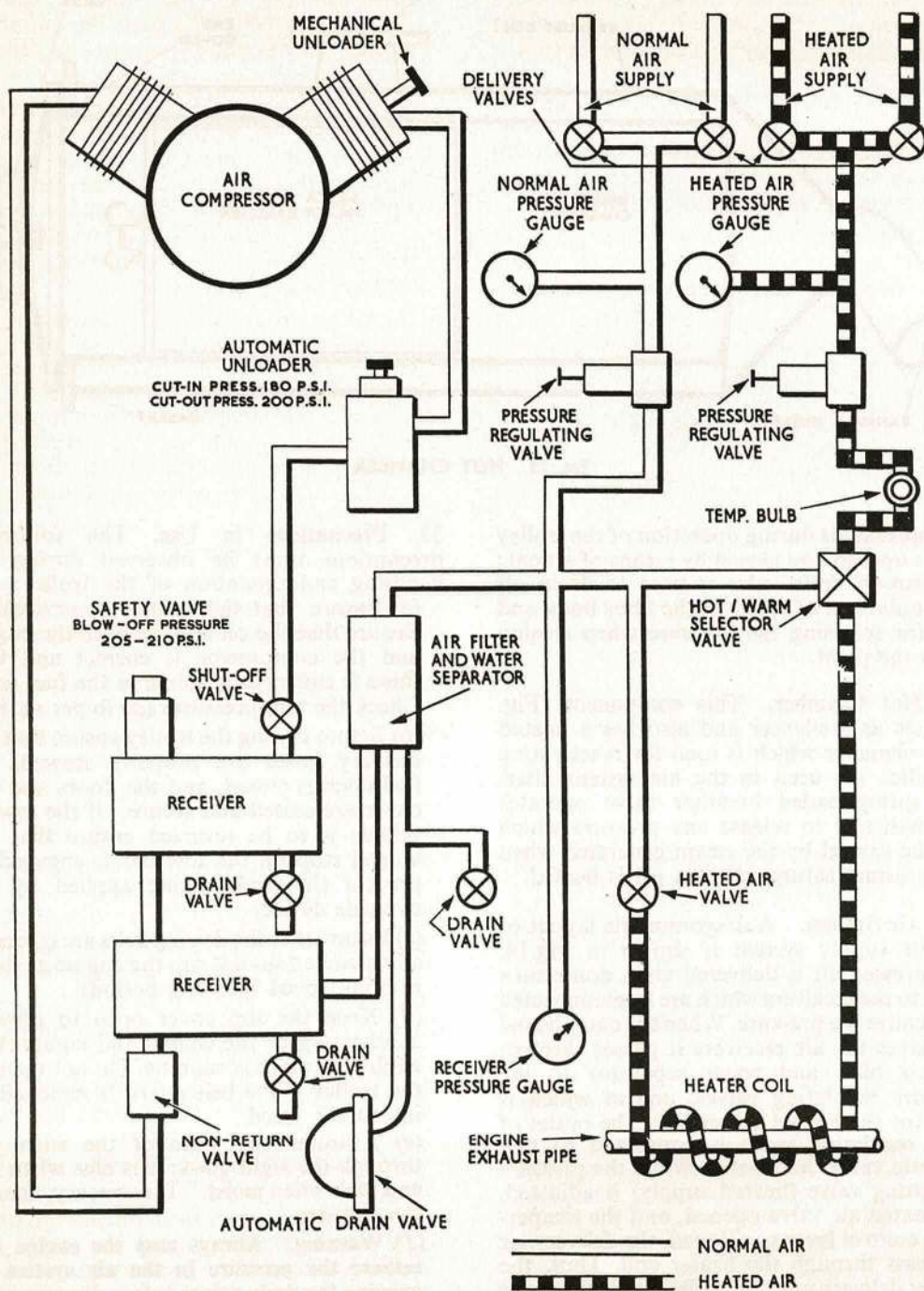


Fig. 14. AIR SUPPLY SYSTEM

(g) Use the trolley in the open air. If the trolley must be used in an enclosed space provision is to be made to ensure that the exhaust gases discharge into the open air.

33. Starting the engine. To start the engine:—

- (a) Open the trolley doors and the top cover.
- (b) Turn the fuel cock ON.
- (c) Pull out the throttle control (Fig. 15) to the slow running position, and, if the engine is cold, push the choke control inwards.
- (d) Engage the starting handle and turn it slowly for two or three revolutions to draw in a rich mixture.
- (e) Switch the ignition ON.
- (f) Pull up sharply on the starting handle. The magneto is fitted with an impulse starter, therefore do not attempt to turn the engine through a full revolution with the ignition ON.
- (g) The engine will run at 400-500 r.p.m. with the throttle control in the slow running position. Allow the engine to warm up at this speed until it runs smoothly when the choke control is released.

34. Starting the Compressor. To start the compressor after following the instructions in paras. 32 and 33:—

- (a) Set the hand unloader lever (Fig. 16) to the ON position.

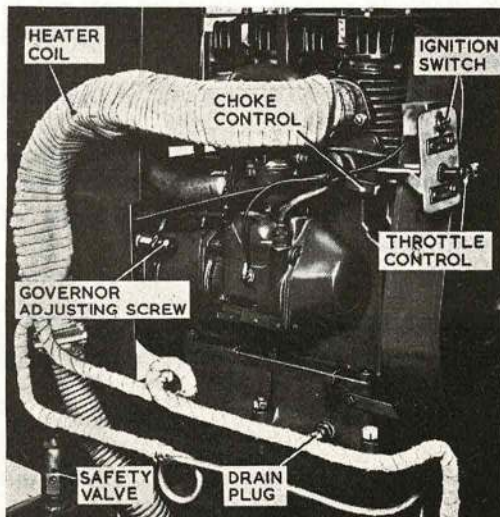


Fig. 15. ENGINE CONTROLS

(b) Slowly push the engine throttle from the slow running to the normal running position. At 800-900 r.p.m. the automatic clutch will operate to engage the drive to the compressor.

(c) After warming up the compressor under no load for two or three minutes, open the shut-off valve connected in the pipeline between the receivers and the automatic unloader, and move the hand unloader lever to the OFF position. The compressor will then commence to pump air into the air receivers.

(d) When the receivers are charged to the normal working pressure, open the drain valve for a few seconds on each receiver, the automatic unloader, and the air filter and water separator to expel any accumulations of water. It should not be necessary to again open the drain valves until the trolley is closed down when operations are completed.

(e) Close the trolley doors.

35. Connecting the Hoses. The delivery hoses are permanently connected to the delivery side of the air system. Uncoil the required lengths of hoses from the stowage brackets and turn the appropriate delivery valves (Fig. 17) ON to remove any accumulations of moisture; close the delivery valves. Connect the ends of the hoses to the equipment as required. Adjust the regulating valves to the required delivery pressures and open the delivery valves.

36. Stopping the Plant. To stop the plant:—

- (a) Close the delivery valves and disconnect the equipment from the delivery hoses.
- (b) Off-load the compressor by moving the hand unloader lever on the control panel to the ON position.
- (c) Pull out the throttle control knob from the normal to the slow running position; this will stop the compressor.
- (d) Switch the ignition OFF to stop the engine.
- (e) Open the drain valves on the air filter and water separator and on each air receiver to release the pressure from the air system.
- (f) Wait until all air pressure is released and then close the drain valves.

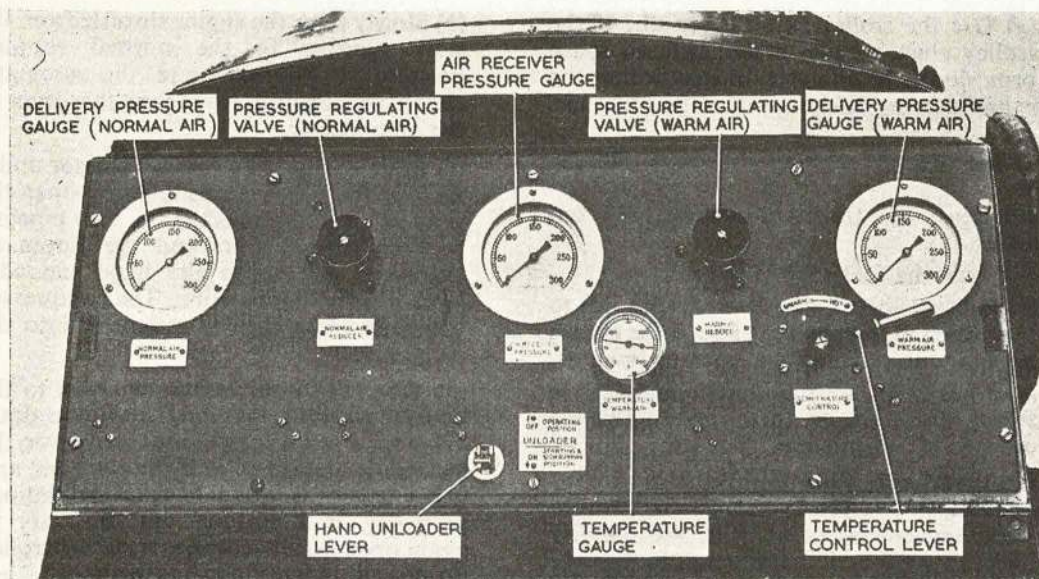


Fig. 16. CONTROL PANEL

(g) Move the hand unloader lever to the OFF position.

(h) Close the shut-off valve in the pipeline between the air receivers and the automatic unloader.

(j) Turn the fuel cock OFF.

(k) Stow the hoses and close the doors and top cover.

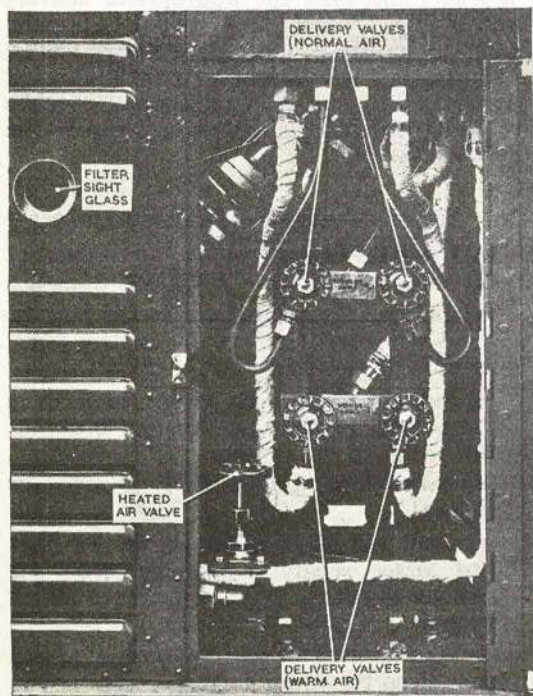


Fig. 17. DELIVERY VALVES

37. **Servicing.** The routine servicing requirements of the trolley are specified in the basic servicing schedules and consist principally of lubrication and inspection and correction of any faults which may be revealed or which may develop during the operation of the plant. In general, personnel engaged in servicing and operating the trolley must ensure that:—

- (a) All nuts, bolts and screws are tightened correctly.
- (b) The trolley is kept clean and free from corrosion and is repainted when necessary.
- (c) The correct grades and amounts of lubricant are used.
- (d) The tyres are kept free from contamination (oil, grease and so on) and are inflated to the correct pressure.
- (e) The air and fuel systems are free from leaks.
- (f) The tension of the driving belts is correct.

38. **Adjusting the Brakes.** To adjust the override and parking brakes (Fig. 18):—

- (a) Jack up the trolley so that the rear wheels are clear of the ground and chock the front wheels.

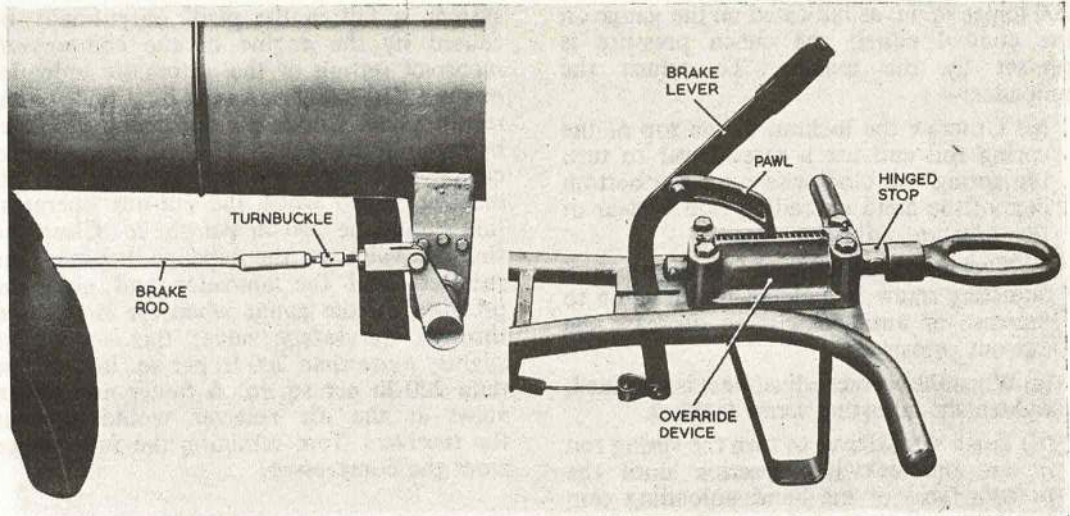


Fig. 18. BRAKE ADJUSTMENT

(b) Release the brake lever pawl, set the brake lever to rest against the rear end of the override device and re-engage the pawl in the ratchet.

(c) Adjust each brake rod turnbuckle so that the brake is free when the lever is in the forward position and engaged when the lever is raised to move the pawl five notches along the ratchet.

(d) Check that the brakes operate evenly on both wheels and then lock the turnbuckles.

(e) Remove the jacks and chocks.

39. Adjusting the Centrifugal Clutch. If the clutch slips when the engine is running at normal operating speed or first engages at an engine speed of over 900 r.p.m., the linings of the clutch shoes are probably worn and the clutch requires adjusting as follows:—

(a) Stop the engine and remove the clutch drum from the pulley flange.

(b) Unscrew the adjusting nut on each shoe by an equal amount to take up the wear; refit the drum.

(c) Run the engine and, using a revolution indicator, check the engine speed at which the clutch engages the drive. It should engage at between 800 and 900 r.p.m.

(d) If further adjustment is required repeat the above operations until the clutch engages at the correct speed.

40. Belt Tension Adjustment. Slipping belts result in a loss of compressor output and excessive wear on the belts and pulleys. Over-tight belts cause unnecessary wear in the engine, clutch and compressor bearings. A correctly tensioned belt should have approximately one inch of up-and-down movement of its top run at a point midway between the driving and driven pulleys. To adjust the tension:—

(a) Slacken the bolts securing the engine to its platform and the adjustment screws on the belt guard.

(b) Slacken the locknuts on the two adjusting screws at the front end of the platform.

(c) Tighten or slacken the adjusting screws to position the engine to give the correct belt tension, taking care to maintain correct pulley alignment.

(d) Tighten the engine holding-down bolts and the belt guard screws; tighten the locknuts on the adjusting screws and re-check the belt tension.

41. Automatic Unloader. Servicing of this component consists of cleaning or renewing the felt filter pads, checking and if necessary adjusting the cut-out pressure and checking to ensure that there is at least 1/32 in. clearance between the pressure adjusting screw and the hand unloading cam. The unloader is adjusted whilst the plant is running to cut out when the pressure in the receivers reaches

200 lb per sq. in. as indicated on the gauge on the control panel; the cut-in pressure is pre-set by the makers. To adjust the unloader:—

(a) Unscrew the locknut at the top of the spring rod and use a screwdriver to turn the spring rod clockwise until the bottom face of the hand unloading cam is clear of the pressure adjusting screw.

(b) Slacken the locknut and turn the pressure adjusting screw in a clockwise direction to increase or anticlockwise to decrease the cut-out pressure.

(c) When the correct adjustment is obtained, tighten the adjusting screw locknut.

(d) Use a screwdriver to turn the spring rod in an anticlockwise direction until the bottom faces of the hand unloading cam are 1/16 in. clear of the top faces of the pressure adjusting screw; tighten the top locknut. After the unloader has been in use for some time the valve becomes bedded down and the clearance decreases to about 1/32 in.

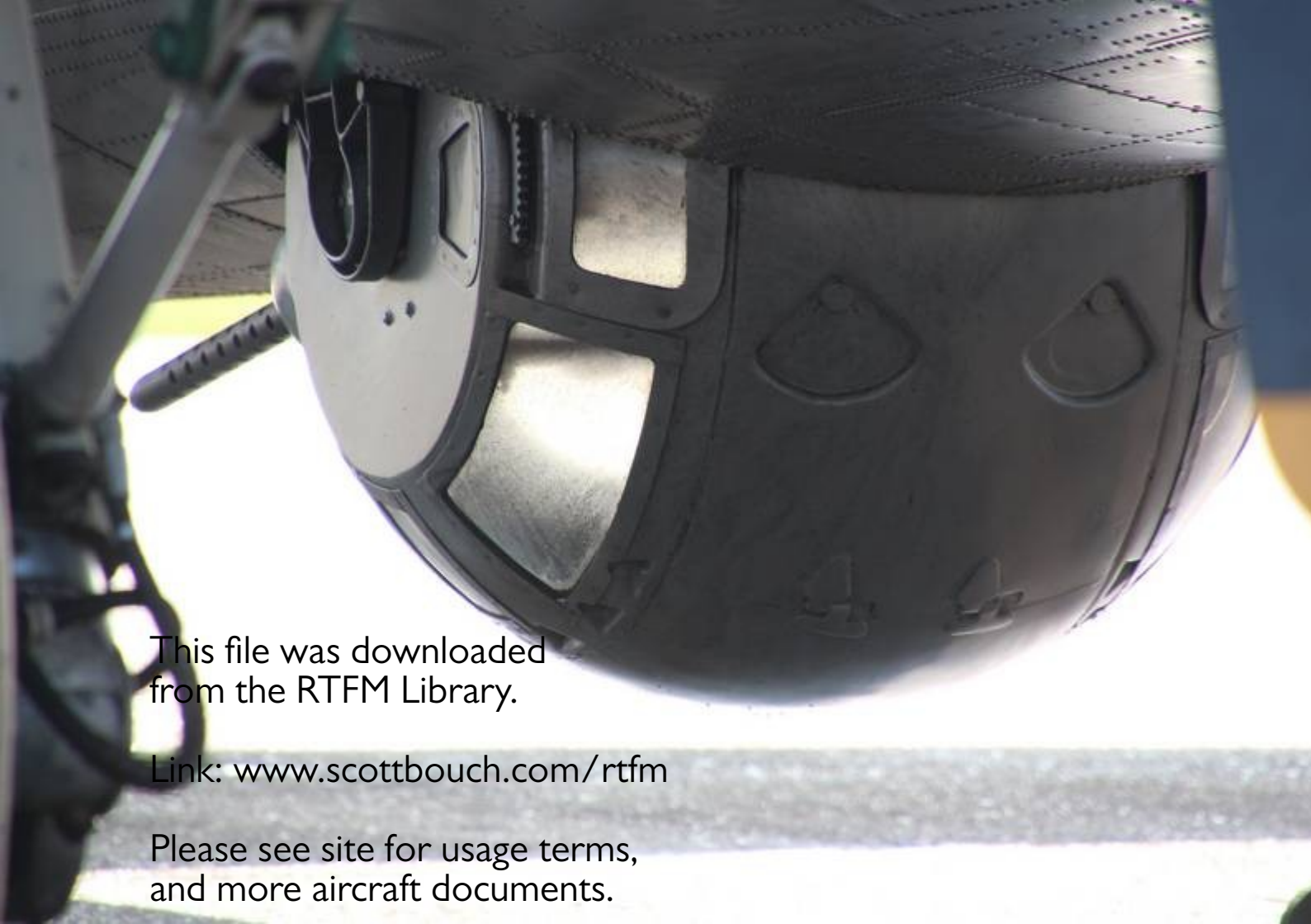
42. Air Leakage. An air leak in the system will cause jerky movement of the air receiver pressure gauge pointer when the plant is operating. The defect may be caused by defective piping, loose connections, or by leakage past the compressor pistons. Brush around the connections with a soapy water solution and any leakage will be shown by bubbles. Leakage past the pistons is indicated by an escape of air and a discharge of oil through the crankcase breather pipe; this can be checked by running the plant after disconnecting the end of the breather pipe from the air filter elbow.

43. Diagnosing Faults. If the belt tension is correct and there are no leaks in the air

system, a fall in the plant output may be caused by the engine or the compressor, incorrect setting of the automatic unloader or the safety relief valve, or by a faulty non-return valve. Check the automatic unloader by running the plant with the delivery valves closed and note the pressure on the air receiver gauge when the cut-out operates; this should be 200 lb per sq. in. Close the shut-off valve in the pipeline between the receivers and the unloader and note the pressure on the gauge when air is released through the safety valve; this should be slightly more than 200 lb per sq. in. but less than 220 lb per sq. in. A faulty non-return valve at the air receiver would prevent the receivers from retaining the full charge from the compressor.

44. Sudden Loss of Output. This would most probably indicate the presence of dirt in one or more of the compressor valves or a broken valve spring. Any fault in the engine which would cause a sudden drop in output would result in a noticeable difference in the running of the engine.

45. Gradual Loss of Output. This could be caused by loss of efficiency of the engine or compressor, or both, and it is advisable first to check the governed speed of the engine under load. If the governed speed is below 1,800 r.p.m. and this speed cannot be maintained after adjustment of the governor, the engine is in need of attention. If, however, the engine is running correctly and there is no apparent leak in the air system, this would indicate that the compressor valves require servicing or that the cylinders, pistons or piston rings are worn excessively and that the compressor requires reconditioning.



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