Nov. 12, 1946. C. W. BASSETT 2,410,799

MOISTURE EJECTION DEVICE FOR AIR PRESSURE SYSTEM

Filed March 2, 1945 2 Sheets-Sheet 1

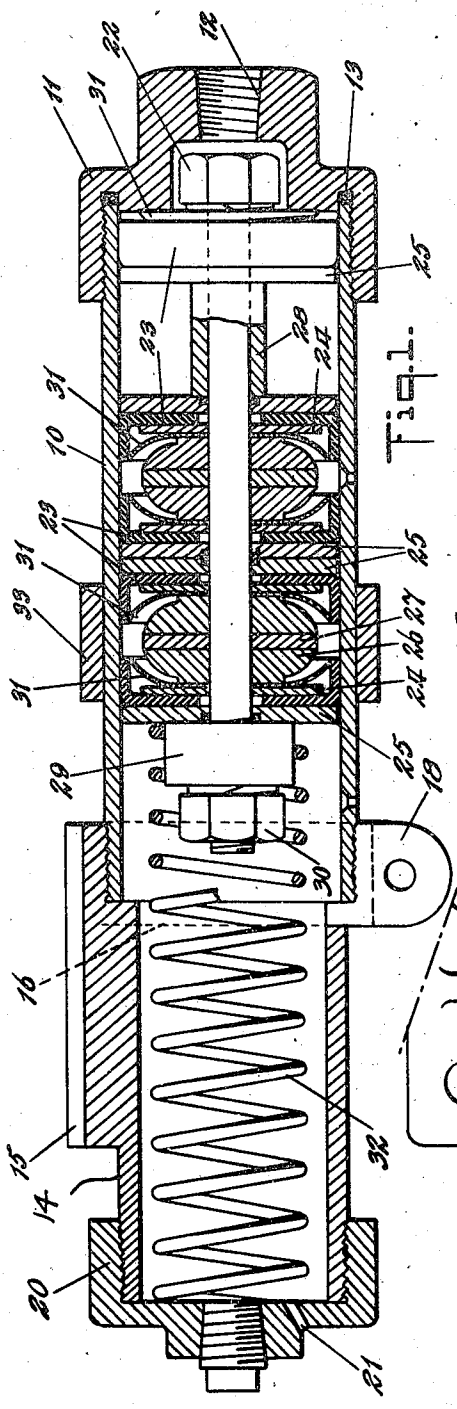


Fig. 1.

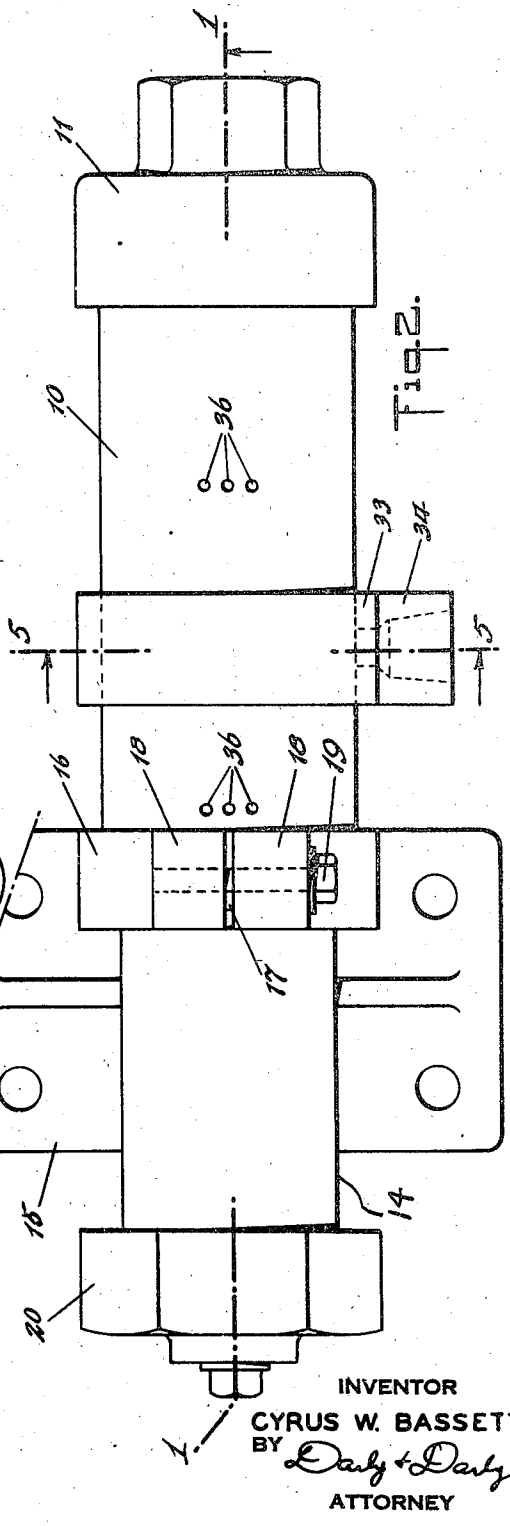


Fig. 2.

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MOISTURE EJECTION DEVICE FOR AIR PRESSURE SYSTEM

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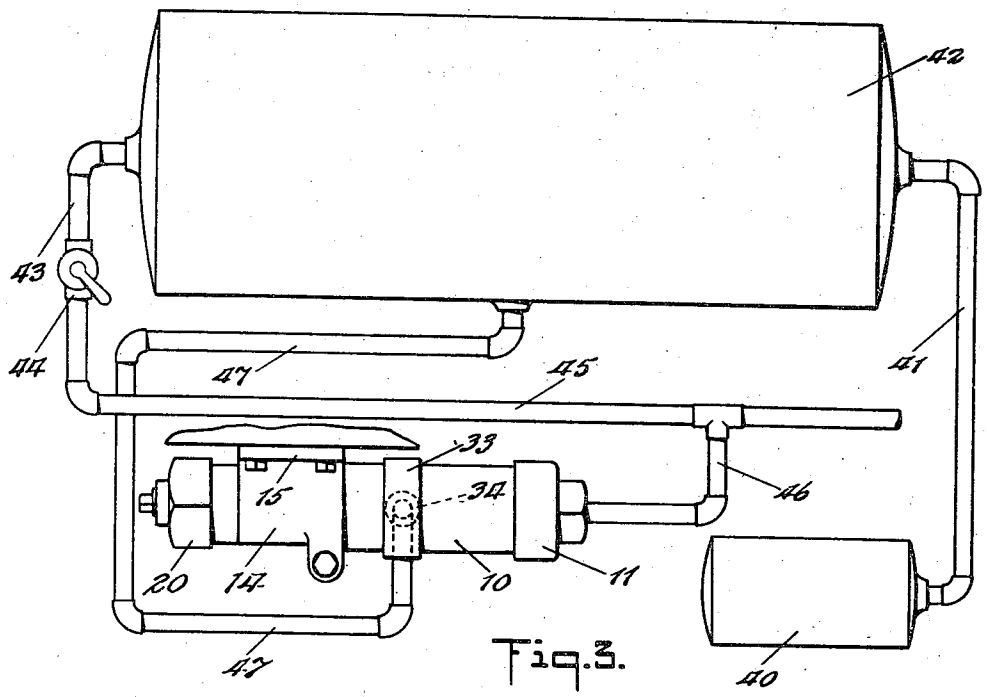


Fig. 3.

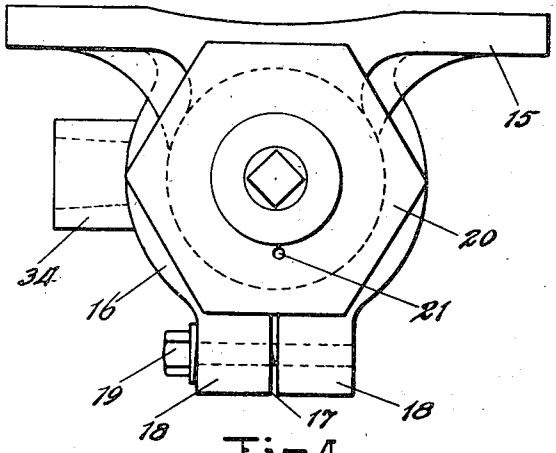


Fig. 4.

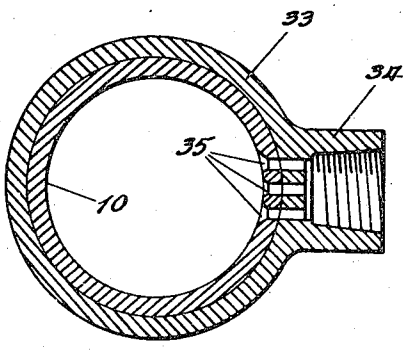


Fig. 5.

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UNITED STATES PATENT OFFICE

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MOISTURE EJECTION DEVICE FOR AIR PRESSURE SYSTEMS

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Application March 2, 1945, Serial No. 580,691

15 Claims. (Cl. 303—88)

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The present invention relates to a device for ejecting moisture from air pressure systems, and particularly, to such a device in which the means for ejecting moisture includes chambers reciprocable in a cylinder.

It is a well known fact that moisture and foreign matter tend to collect at the bottom of air pressure tanks, and that, unless removed, such moisture and matter tend to cause rust, gumming, and premature wear of piston and valve parts utilized in connection with the air pressure system.

It is an object of this invention to provide a mechanism for removing moisture and foreign matter from an air pressure tank and the lines and devices connected thereto without substantial reduction of the tank pressure.

It is another object of the invention to cause such moisture removal automatically.

It is a still further object of the invention to provide a device for such moisture removal which shall be economical to manufacture and efficient in operation.

Further objects and features of the invention will appear when the following description is considered in connection with the accompanying drawings, in which,

Figure 1 is a longitudinal cross sectional view of my device, the section being taken on the plane of the line 1—1 of Figure 2;

Figure 2 is a bottom elevation of the device of Figure 1;

Figure 3 is an elevational view showing the application of the device of the invention to an air pressure system;

Figure 4 is a left end elevation of the device as shown in Figures 1 and 2; and

Figure 5 is a transverse cross section of the device, the section being taken on the line 5—5 of Figure 2, the piston structure being removed.

Referring now to the drawings, the device of my invention comprises a cylinder 10 which is capped at one end with end cap 11 having a threaded pipe connection 12 centrally located therein. Between the end of the cylinder and the cap 11 there is provided the usual gasket member 13.

Cylinder 10, at its left end, is screw threaded and engages with a casting 14, this casting being generally cylindrical in shape and having provided integrally therewith a plate 15 which may be suitably supported upon the equipment on which the air pressure system, including the device, is located. The portion 16 of the casting is slotted at 17 and is provided with integral ears

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or lugs 18 so that the cylinder may be clamped in adjusted position by means of the screw 19. The cylindrical portion of the casting 14 is capped at its left end, as seen in Figures 1 and 2, by means of the cap 20, which cap is provided with a port 21 to assure that no pressure will build up within this cylinder. A piston assemblage is provided which operates in the cylinder 10, this assemblage comprising a piston rod 22 in the form of a bolt, together with a plurality of leather cups 23, washers 24 and 25, spacers 26 and 27, sleeves 28 and 29, and nut 30. In addition, each cup 23 is provided with an expander disk 31 of a common type. The right hand one of the cups 23 together with a pair of washers 24 and 25 and expander disk 31, comprises the operating piston for the device; pressure exerted thereupon causes movement of the entire assemblage to the left against the action of a spring 32 which extends from the cap 20 to the left hand one of the washers 25.

The remaining four leather cups 23 are arranged in pairs, with the flanges thereof facing each other, thus forming two chambers which are reciprocable with the piston assemblage.

Surrounding the cylinder 10, in a location to be in alignment with a chamber formed between two of the leather cups 23 when the piston assemblage is in normal position, is a ring 33 having a boss 34 thereon, which boss is threaded and communicates with the interior of the cylinder 10 by means of the ports 35 extending through the ring 33 and the cylinder 10. The ports or holes 35 are countersunk on the inner ends thereof to avoid sharp cutting edges which might damage the cups 23. Further, a number of small holes 35, in the particular instance three, is provided rather than a single hole of the same cross sectional area, in order to reduce the tendency to cut the cups 23.

Groups of holes 36 similar to holes 35 are provided in the cylinder walls at points axially spaced from the holes 35 in either direction and at distances equal to the travel of the piston assemblage. By means of this arrangement, when the left hand chamber is in communication with the holes 35, the right hand chamber is in communication with the right hand group of holes 36; and when the right hand chamber, by virtue of operation of the piston, is in communication with the holes 35 the left hand chamber is in communication with the left hand group of holes 36.

Referring now to Figure 3, there is shown therein the use of the device above described in an air pressure system. In this system a com-

pressor 40 supplies air through the pipe 41 to the pressure tank 42. A pressure line 43 extends from the tank 42 through a control valve 44 and line 45 to the point of utilization, which may be, for example, a differential engine of a vehicle door, or the brake cylinder of a vehicle brake system. A branch 46 from the line 45 is connected to pipe connection 12 in the cap 11 previously described.

In addition, a connection 47 extends from the bottom of the tank 42, which is where moisture and foreign matter normally collects, to the boss 34 on the ring 33, being threaded or otherwise suitably connected to the ring 33 thereby to communicate with the holes 35.

Whenever pressure is applied to the line 45 and branch 46, there will be a movement of the piston assemblage to the left. Whenever the pressure is removed, the assemblage will return to the right under urge of the spring 32. Moisture and air will be supplied continually through the connection 47 and the holes 35 to the interior of one of the chambers formed by the two pairs of cups 23. When the piston is in the normal position, as shown in Figure 1, such air and moisture will be supplied to the left hand one of the two chambers, the amount being determined by the equalization of pressure in the tank 42 and the chamber. Upon the next operation of the valve 44, the piston assemblage will move towards the left in Figure 1, and thus connect the left hand chamber to the atmosphere through the left hand set of holes 36, thereby permitting discharge of the moisture and foreign matter to the atmosphere. While this discharge is taking place the right hand chamber will have been brought into communication with the bottom of the tank 42 and air, and moisture will be discharged into this chamber. As soon as the valve 44 is operated to release the pressure from the line 45 and branch 46, the spring 32 will cause the piston to move to the right; upon completion of this movement, the air and moisture trapped in the left hand chamber will be discharged to atmosphere through the right hand group of holes 36.

In general, the device is mounted upon the bottom of a vehicle, such as a trolley car or a bus, and the position of the cylinder 10 angularly adjusted by means of the clamp and the bolt 19 so that the holes 36 face downwardly, to direct the discharge of moisture from the chambers downwardly.

Owing to the fact that two chambers are provided, and that there is thus a discharge of moisture from the cylinder when the piston assemblage lies in either one of its extreme positions, the device of this invention is especially efficient, particularly as contrasted with rotary valve structures known in the art in which there is a single discharging action for each complete reciprocation of the piston assemblage.

While I have described a preferred embodiment of my invention it will be clear that many other forms thereof may be constructed. Consequently I do not want to be restricted by the foregoing description but on the contrary I wish that the only limits be those of the appended claims.

What is claimed is:

1. In a moisture ejecting device for an air pressure system, in combination, a cylinder, a piston reciprocable in said cylinder, a pair of chambers movable with said piston, means for supplying moisture and foreign matter from a pressure reservoir to one of said chambers when said piston is in normal position and means comprising outlets to atmosphere, spaced from said moisture supplying means a distance equal to the travel of the piston for discharging moisture from said chamber.

2. In a moisture ejecting device for an air pressure system, in combination, a cylinder, a piston reciprocable in said cylinder, a pair of chambers movable with said piston, means for supplying moisture and foreign matter from a pressure reservoir to one of said chambers when said piston is in normal position, said means also serving to supply moisture and foreign matter to the other of said chambers when said piston is in operated position and means comprising outlets to atmosphere spaced along said cylinder on either side of said supply means a distance equal to the travel of the piston for permitting discharge from one of said chambers at each end of the stroke of said piston.

3. In a moisture ejecting device for an air pressure system, in combination, a cylinder, a piston reciprocable in said cylinder, means for communicating pressure of the system to urge said piston in one direction, a plurality of leather cups mounted for movement with said pistons, said cups being arranged in pairs facing each other to thereby form with the cylinder walls a pair of chambers, an inlet through said cylinder walls, said inlet communicating with the lower portion of an air reservoir, a pair of outlets in said cylinder, said outlets being spaced the length of the piston travel on either side of said inlet whereby moisture is admitted to one of said chambers when the piston is in normal position and is discharged therefrom when the piston reaches its operated position and moisture admitted to the second of said chambers when said piston is in operated position and is discharged when the piston returns to normal position.

4. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, means for forming a chamber within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, an outlet from the cylinder spaced from the inlet, means in the cylinder for moving the chamber, the moving means including means normally effective to place the chamber in registry with the inlet, and including means under control of air under pressure through the conduit for bringing the chamber into registry with the outlet.

5. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a substantially horizontally disposed cylinder, means for forming a chamber within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, an outlet from the bottom of the cylinder and spaced from the inlet, means in the cylinder for moving the chamber, the moving means including means normally effective to place the chamber in registry with the inlet, and including means under control of air under pressure through the conduit for bringing the chamber into registry with the outlet.

6. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, chamber-forming means cooperating with the cylinder, means to form a delivery connection between the cylinder and the reservoir, means to provide discharge communication with the cylinder, the discharge communication providing means being spaced from the delivery connection forming means, means in the cylinder for moving the chamber, the moving means including means normally effective to place the chamber in registry with the delivery connection forming means, and including means under control of air under pressure through the conduit for bringing the chamber into registry with the discharge communication providing means.

7. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a substantially horizontally disposed cylinder, chamber-forming means cooperating with the cylinder, means to form a delivery connection between the cylinder and the reservoir, means to provide discharge communication with the bottom of the cylinder, the discharge communication providing means being spaced from the delivery connection forming means, means in the cylinder for moving the chamber, the moving means including means normally effective to place the chamber in registry with the delivery connection forming means, and including means under control of air under pressure through the conduit for bringing the chamber into registry with the discharge communication providing means.

8. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, a piston movable in the cylinder, means carried by the piston and cooperating with the cylinder to form a chamber within the cylinder, means to form a delivery connection between the cylinder and the reservoir, means to provide discharge communication with the cylinder, the discharge communication providing means being spaced from the delivery connection forming means, means normally effective to place the chamber in registry with the delivery connection forming means, and means to conduct air from the conduit to the cylinder to cause the piston to bring the chamber into registry with the discharge communication providing means.

9. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a substantially

horizontally disposed cylinder, a piston movable in the cylinder, means carried by the piston and cooperating with the cylinder to form a chamber within the cylinder, means to form a delivery connection between the cylinder and the reservoir, means to provide discharge communication with the bottom of the cylinder, the discharge communication providing means being spaced from the delivery connection forming means, means normally effective to place the chamber in registry with the delivery connection forming means, and means to conduct air from the conduit to the cylinder to cause the piston to bring the chamber into registry with the discharge communication providing means.

10. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, means for forming a plurality of chambers within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, an outlet from the cylinder spaced from the inlet, means in the cylinder for moving the chambers, the moving means including means normally effective to place a chamber in registry with the inlet, and including means under control of air under pressure through the conduit for bringing a chamber into registry with the outlet.

11. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, means for forming a plurality of chambers within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, an outlet from the cylinder spaced from the inlet, means in the cylinder for moving the chambers, the moving means including means normally effective to place the chambers alternately in registry with the inlet, and including means under control of air under pressure through the conduit for bringing a chamber into registry with the outlet.

12. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, means for forming a plurality of chambers within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, a plurality of outlets from the cylinder spaced from the inlet, means in the cylinder for moving the chambers, the moving means including means normally effective to place one of the chambers in registry with the inlet and the other chamber in registry with an outlet, and including means under control of air under pressure through the conduit for bringing the first indicated chamber into registry with another outlet and the other chamber into registry with the inlet.

13. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir

is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, a piston movable in the cylinder, means carried by the piston and cooperating with the cylinder to form a plurality of chambers within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, an outlet from the cylinder spaced from the inlet, means normally effective to place a chamber in registry with the inlet, and means to conduct air from the conduit to the cylinder to cause the piston to bring the chamber into registry with the outlet.

14. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure though said conduit, the device including a cylinder, a piston movable in the cylinder, means carried by the piston and cooperating with the cylinder to form a plurality of chambers within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, an outlet from the

cylinder spaced from the inlet, means normally effective to place the chambers alternately in registry with the inlet, and means to conduct air from the conduit to the cylinder to cause the piston to bring the chamber into registry with the outlet.

15. A system cleaning device for a system placed under air pressure, wherein a pressure reservoir is provided, and wherein foreign matter and moisture accumulate in the reservoir, and wherein air under pressure is led away from the reservoir by a conduit, and wherein means are provided to control the flow of air under pressure through said conduit, the device including a cylinder, a piston movable in the cylinder, means carried by the piston and cooperating with the cylinder to form a plurality of chambers within the cylinder, an inlet to the cylinder, the inlet being in communication with the reservoir, a plurality of outlets from the cylinder spaced from the inlet, means normally effective to place one of the chambers in registry with the inlet and the other chamber in registry with an outlet, and means to conduct air from the conduit to the cylinder to cause the piston to bring the first indicated chamber into registry with another outlet and the other chamber into registry with the inlet.

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