Jan. 11, 1955 J. SZCZEPANEK 2,699,288

AIR COMPRESSOR OR PUMP

Filed Nov. 2, 1949 2 Sheets-Sheet 1

FIG. 1.

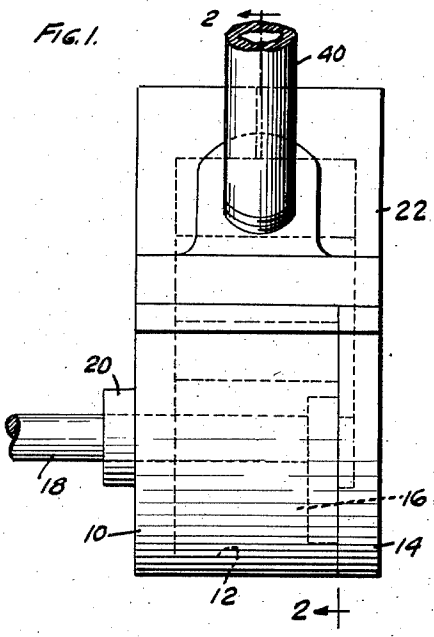


FIG. 2.

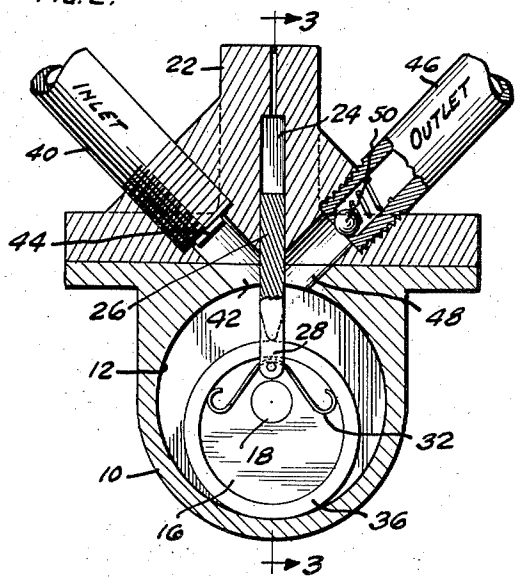


FIG. 4.

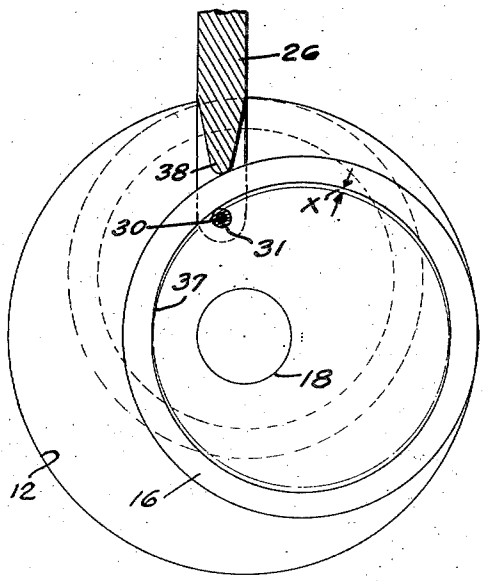
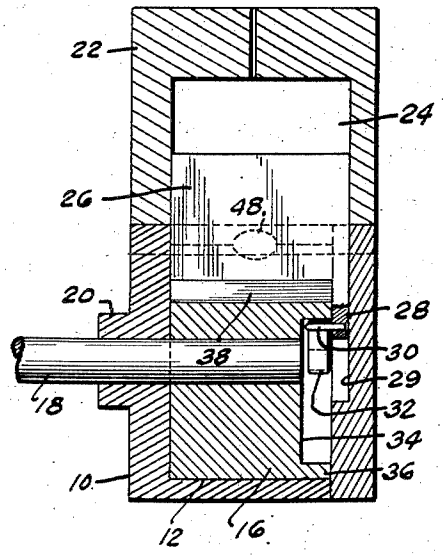


FIG. 3.



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Filed Nov. 2, 1949 2 Sheets-Sheet 2

FIG. 5.

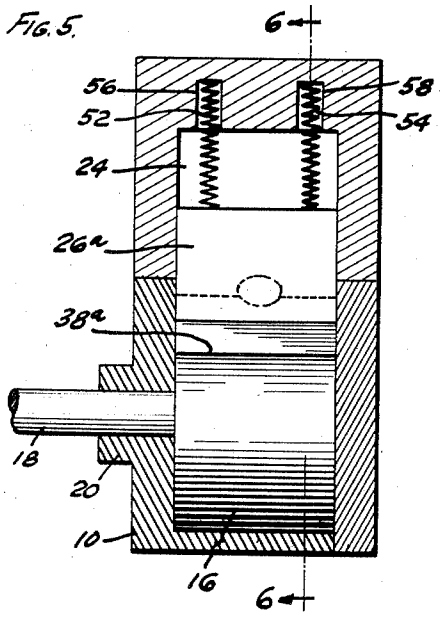
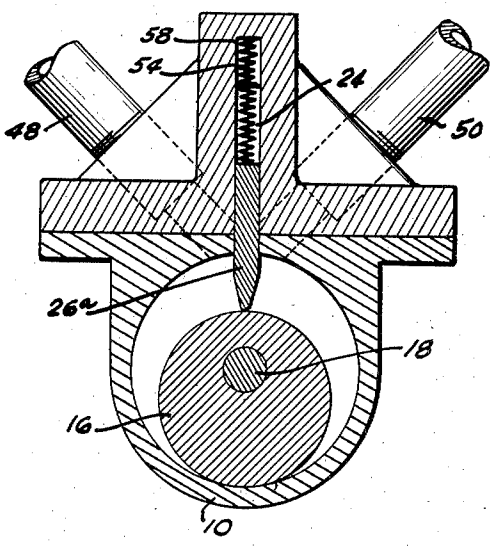


FIG. 6.



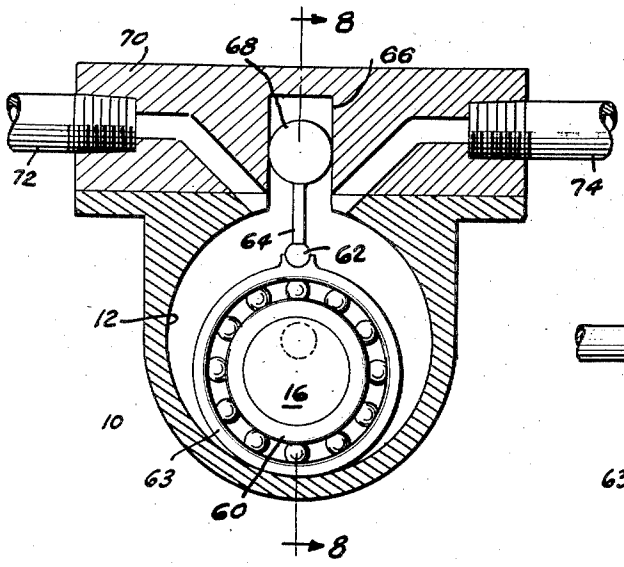


FIG. 7.

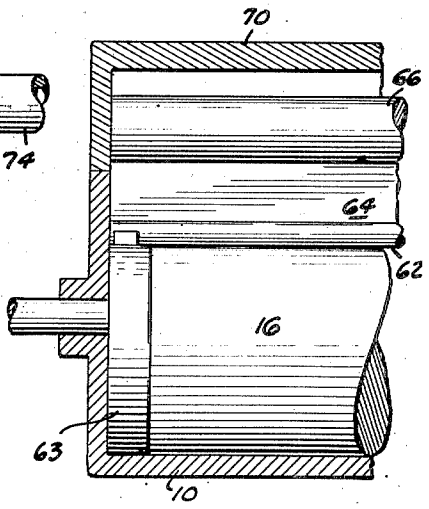


FIG. 8.

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AIR COMPRESSOR OR PUMP

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Application November 2, 1949, Serial No. 125,031

3 Claims. (Cl. 230—149)

My invention relates to improvements in air compressors, pumps or similar devices.

My invention relates more particularly to improvements in the construction of devices of this type wherein the parts are generally greatly simplified and the efficiency of the simplified construction is very high.

While the construction, which will be explained and described, is directed particularly to small or portable types of compressors or pumps such as are used for paint spray guns, etc., it will be understood that the invention is not so limited, and the size or capacity of the construction is not restricted to the details of construction which will be shown.

The principal object of the present invention is to provide an improved air compressor or pump construction.

A further object is to provide such construction with a minimum of moving parts, yet which will function in a highly efficient manner for the purpose desired.

A further object of the invention is to provide a compressor or pump of the type described that has an improved valve construction.

A further object of the invention is to provide a compressor or pump of the type described with a novel cooperation of the rotor and the valve mechanism so that no springs need be employed therewith.

A further object is to provide a comparatively frictionless cooperation of rotor and valve in a construction of the type described thereby insuring long life and high efficiency.

A further object of the invention is to provide a compressor or pump of the type described that is easily and cheaply made and one which will give long and hard service without becoming broken or out of order.

Other objects and advantages will be more apparent from the following description wherein reference is had to the accompanying drawings upon which

Fig. 1 is a side elevational view of my improved compressor or pump.

Fig. 2 is a vertical sectional view thereof taken generally on the line 2—2 of Fig. 1.

Fig. 3 is a transverse vertical view taken generally on the line 3—3 of Fig. 2.

Fig. 4 is a somewhat diagrammatic sectional view showing a form of construction wherein the valve plate is held against the rotor without the use of springs.

Fig. 5 is a cross-sectional view similar to Fig. 3, showing a modified form of construction.

Fig. 6 is a cross-sectional view thereof taken generally on the line 6—6 of Fig. 5.

Fig. 7 is a cross-sectional view of a further modified form of the invention,

Fig. 8 is a fragmentary sectional view thereof taken generally on the line 8—8 of Fig. 7.

In the embodiment of the invention which I have chosen to illustrate and describe the same, I have shown a compressor which may include a housing 10 having a cylindrical bore or chamber 12 therein, the housing being closed by a removable side wall 14. An eccentrically mounted rotor 16 may be positioned in the chamber 12, the rotor being mounted upon a drive shaft 18 which extends outwardly through a suitable bearing 20 on the side of housing 10 to a source of power.

I provide a valve housing 22 suitably mounted upon the top of the cylindrical housing 10, the valve housing being provided with an elongated parallel wall slideway 24 to receive a flat plate valve member 26. The valve

26 is provided with a downwardly extending arm 28 which carries a pin 30 over which a flat compressor spring 32 is mounted. The pin 30 and spring 32 are positioned in a concentric groove 34 formed in one end of the rotor 16 by a peripheral flange 36. The blade 38 of the valve plate 26 is pointed, as shown, with a slight race at its edge so that due to the tension of the spring 32, the edge of the valve plate will, at all times, be frictionally held against the outer periphery of the rotor 16. The arm 28 may reciprocate in a suitable groove 29 formed in the inner face of the plate 14.

Inlet and outlet conduits are provided in communication with the chamber 12, an inlet conduit 40 being screwthreadedly mounted upon one side of the valve housing 22 and communicating with a bore 42 directed to the chamber 12. A return check valve 44 may be provided, if desired, in the inlet conduit 40 and may be of the flat spring type which is normally closed but which will be opened to permit flow in one direction under either vacuum or pressure.

An outlet conduit 46 may be communicated by means of a bore 48 with the chamber 12 upon the opposite side of the plate valve 26, the conduit preferably being provided with a ball check valve 50. With the construction shown, it can be seen that a highly efficient compressor or pump has been provided. When the rotor is driven, it will move fluid about from the inlet conduit 40 to the outlet conduit 46, the valve plate 26 moving up and down in its slideway 24 as the excentrically mounted rotor is revolved. As previously pointed out, the spring member 32 yieldingly holds the edge 38 of the valve plate against the periphery of the rotor during its operation.

In Fig. 4, I have shown a modified form of construction wherein the use of a spring for keeping the edge 38 of the valve plate in contact with the periphery of the rotor 16 is eliminated. In this construction, I have provided a roller 31 mounted on the pin 30 and adapted to engage the inner periphery 37 of the flange 36. In order to provide an equal thickness of the valve wall throughout the rotation of the eccentrically mounted rotor, the inner periphery of the flange 36 is cut in, as shown at X, upon both sides so that when the extreme positions of the rotor with relation to the plate valve and follower are reached, the thickness of the flange will correspond to the thickness at the exact vertical positions of the rotor. With this construction, the plate valve is automatically driven up and down in contact with the periphery of the rotor at its operation.

In Figs. 5 and 6, I have shown a modified form of construction wherein I employ a generally rectangularly shaped plate valve 26*a* with its edge 38*a* frictionally against the periphery of the rotor by means of a pair of compressor springs 52 and 54 seated in suitable pockets 56 and 58 at the upper end of the valve plate slideway 24. With this construction, the requirement for the spring member 32, the arm 28, and associated parts is eliminated and a simpler construction is effected.

In Figs. 7 and 8, I have provided a form of construction wherein I mount an inner ball bearing race 60 upon the ends of the rotor 16 and mount an elongated roller 62 in the outer race 63. The roller 62 is connected to the plate valve 64 which has a spherical head 68 operating in a valve passage way 66 at the valve housing 70. Suitable inlet conduits 72 and outlet conduits 74 are connected to the chamber 12 upon the opposite sides of the plate valve 64.

With this construction, when the rotor 16 is operated, the outer race 63 will turn on the ball bearing raceway and the valve 64 will be moved up and down in a slightly angular path with the roller portion 62 at all times riding against the outer periphery of the roller 16.

While I have illustrated and described a specific embodiment and several modifications of the construction for either a compressor or pump, it will be apparent to those skilled in the art that changes and modifications may be made in the exact details shown, and I do not wish to be limited in any particular, rather what I desire to secure and protect by Letters Patent of the United States is:

1. In a compressor, the combination with a housing having inlet and outlet ports, of an eccentrically mounted rotary piston in said housing, said piston having a countersunk opening in one side which provides the piston with a peripheral rim, a movable valve plate having an edge contacting the surface of said piston and an arm extending below said peripheral rim, a pin on said arm extending into said countersunk opening and a leaf spring bent to a U-shape with arcuately curled ends and loosely mounted over said pin in said opening with its ends bearing against the inner edge of said peripheral rim to hold the edge of said valve plate in engagement with the surface of said piston.

2. The combination of a housing having a cylindrical chamber therein, a cylindrically shaped rotor axially mounted in said chamber, a drive shaft extending therefrom, said rotor eccentrically mounted on said drive shaft, said rotor having a peripheral flange at one end of the same, a reciprocal plate valve mounted in said housing, said plate valve having an arm extending downwardly therefrom, an inlet to said chamber on one side of said plate, an outlet on the other side and means connected between the arm on said plate valve and the flange of said rotor for keeping an edge of said plate against the periphery of said flange at all times, said means comprising a roller mounted on said arm and bearing against the underside of said flange, the thickness of said flange being narrower at opposite sides of the same so that the edge of the plate valve will at all times be held against the outer periphery of said flange.

3. The combination of a housing having a cylindrical chamber therein, a cylindrically shaped rotor axially mounted in said chamber, a drive shaft extending therefrom, said rotor eccentrically mounted on said drive shaft, said rotor having a peripheral flange at one end of the same, a reciprocal plate valve mounted in said housing, said valve plate having an arm extending downwardly therefrom, an inlet to said chamber on one side of said plate, an outlet on the other side and means connected between said arm and the flange of said rotor for keeping an edge of said plate against the periphery of said flange at all times, said means comprising a roller mounted near the end of said plate valve, said roller bearing against the under side of said flange, the thickness of said flange being narrower at opposite sides of the same so that the edge of the plate valve will at all times be held against the outer periphery of said flange, the outer periphery being a true circle and the inner periphery being arcuately out in at opposite sides to make the flange narrower at these points.

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