C. W. TOCKNELL.

COMPRESSED AIR VIBRATOR.

APPLICATION FILED APR. 17, 1917.

1,241,783. Patented Oct. 2, 1917.

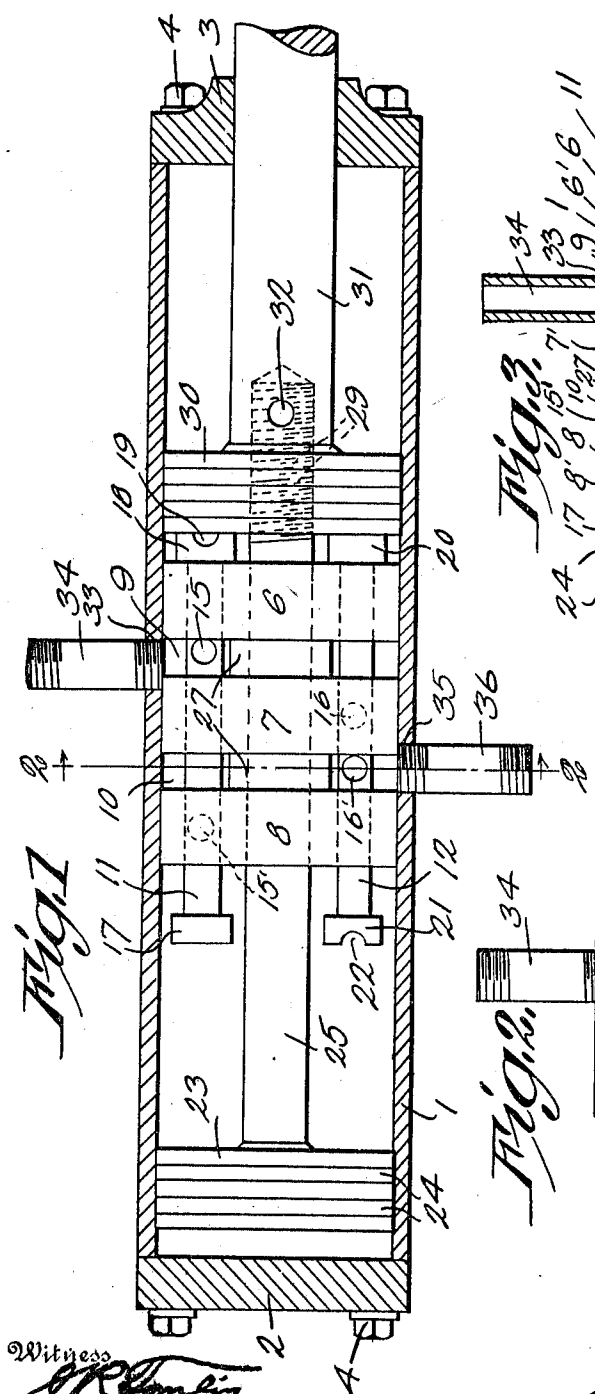


Fig. 1.

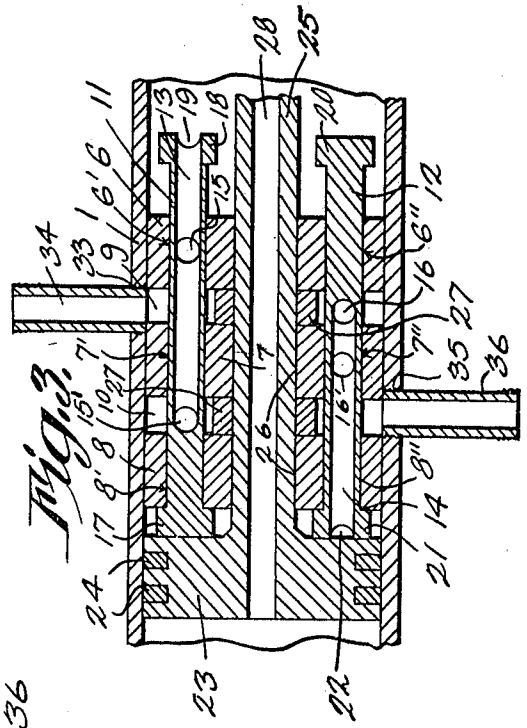


Fig. 3.

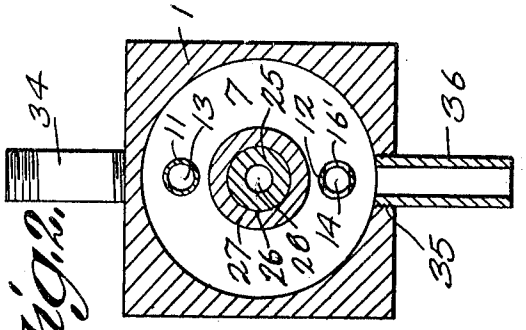


Fig. 2.

Witness

J. Thomas

H. A. Mitchell

Inventor

C. W. Tocknell,

By C. A. Snow & Co.

Attorney

UNITED STATES PATENT OFFICE.

CHARLES W. TOCKNELL, OF KENILWORTH, NEW JERSEY.

COMPRESSED-AIR VIBRATOR.

1,241,783. Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed April 17, 1917. Serial No. 162,641.

To all whom it may concern:

Be it known that I, CHARLES W. TOCKNELL, a citizen of the United States, residing at Kenilworth, in the county of Union and State of New Jersey, have invented a new and useful Compressed-Air Vibrator, of which the following is a specification.

The subject of this invention is a vibrator wherein fluid pressure acts alternately on the opposed faces of pistons to cause a rapid reciprocation thereof.

One object of the invention is to provide a cylinder having pistons adapted to move in unison, reciprocating therein, and means for applying pressure alternately to the opposed faces of the pistons.

Another object is to provide a cylinder having pistons adapted to move in unison reciprocating therein, and means for introducing fluid to the cylinder between the pistons to cause a reciprocation of the pistons.

Still another object is to provide valves reciprocating within the cylinder and operated by contact with the pistons.

Another object is to provide spaced walls within the cylinder for supporting the valves, and coöperating with them to direct the flow of the liquid.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

One practical embodiment of the invention is shown in the accompanying drawing, wherein:—

Figure 1 is a side elevation of the device, the casing being shown in section.

Fig. 2 is a cross section taken on the line 2—2 of Fig. 1.

Fig. 3 is a broken detail showing the central portion of the cylinder in vertical, longitudinal section, the valves and piston shown in a position opposite that shown in Fig. 1.

Referring to the drawing by numerals:—

A cylinder 1 has a head 2 and a head 3 secured to opposite ends thereof by means of the screw bolts 4. The head 3 is centrally apertured, as indicated at 5, Fig. 1.

Within the cylinder 1, and positioned at the longitudinal center thereof, are spaced cross walls 6, 7 and 8, forming therebetween the restricted chambers 9 and 10. Each wall is drilled or bored at diametrically opposite points, as indicated at 6′, 6″, 7′, 7″, 8′ and 8″. The bores in each wall are positioned to aline with the bores in the other walls.

Adapted to each set of alining bores 6′, 7′ and 8′, and 6″, 7″ and 8″, and reciprocating therein, is a cylindrical valve 11 and 12, respectively. Each valve 11 and 12, has a longitudinal bore 13 and 14, respectively, extending through the greater portion of its length, and transverse bores 15, 15′ and 16, 16′ respectively, communicating with its longitudinal bore and forming ports. The valve 11 is provided with a head 17 at its closed end and a head 18 at its apertured end, and there is formed in the head 18 a transverse groove 19, communicating with the bore 13. The valve 12 has a similar head 20 at its closed end and a head 21 at its apertured end, the head 21 being formed with a transverse groove 22 which communicates with the bore 14. It will be seen from Figs. 1 and 3, that the closed and apertured ends of the valves 11 and 12, are oppositely disposed.

A piston 23, formed with spaced annular grooves around its periphery, to which are adapted piston rings 24, reciprocates in one end of the cylinder 1. A piston rod 25 is provided for the piston and passes through a central bore 26, formed through the walls 6, 7 and 8, and through spacing collars 27—27 which are interposed between the walls. The piston rod 25 has a longitudinal bore 28 which extends through the piston 23, and its rod 25. The end of the piston rod 25, extending beyond the cross wall 6, has threads 29 to engage the centrally bored and tapped piston 30, with its piston rod 31. The central bore of the piston 30 extends for a short distance along its rod 31, and there is provided in the rod 31, a transverse bore 32, which communicates with said central bore, and alines with a similar transverse bore formed adjacent the end of the piston rod 25, and communicating with the longitudinal bore 28. The piston rod 31, reciprocates in the hereinbefore mentioned aperture 5 of the cylinder head 3.

An aperture 33 is formed in the cylinder 1, communicating with the chamber 9, and the aperture is tapped to receive the threaded end of an inlet pipe 34. Another aperture 35 is formed in the cylinder 1, communicating with the chamber 10, and tapped to receive the threaded end of an outlet pipe 36.

The operation of the device is as follows:—With the parts in the position shown in Fig. 1, fluid pressure is admitted through pipe 34 into the chamber 9. The fluid will fill the chamber 9 and pass through port 15 to bore 13, of valve 11, and through groove 19 to the space between cross wall 6 and piston 30. This will move piston 30 toward the head 3 of the cylinder, and the piston 23 with it. The air trapped between the piston 30 and cylinder head 3, will pass through port 32 and bore 28 to the space between piston 23 and cylinder head 2. When the pistons have traveled toward the cylinder head 3 to a sufficient extent to bring them to the position shown in Fig. 3, the piston 23 will contact the heads 17 and 21 of the valves and force them to the new position shown in Fig. 3. This will bring port 15 within wall 6 and close this port. It will also bring port 16, which has been closed within wall 7, into the chamber 9. The fluid pressure in the chamber 9 will then pass through port 16, bore 14, and groove 22, to the space between piston 23 and cross wall 8. This will force piston 23 toward cylinder head 2. At the same time the fluid which had accumulated between piston 30 and cross wall 6 is free to pass through bore 13 of valve 11, port 15′, which in the new position of the valve is situated in chamber 10, to chamber 10 and thence escape through the discharge pipe 35. On the next return stroke the action first described takes place, the fluid which has accumulated between piston 23 and cross wall 8, passing through bore 14 of valve 12, and port 16′, to chamber 10, from whence it is discharged through pipe 36.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A compressed air vibrator, comprising a cylinder, permanently spaced pistons reciprocating in the cylinder, walls arranged transversely of the cylinder between the pistons and defining compartments, means for admitting fluid pressure to one compartment, means for delivering the pressure from said compartment to the face of the adjacent piston, said means actuated by the other piston to deliver the fluid pressure to the other compartment to discharge said fluid.

2. A compressed air vibrator, comprising a cylinder, permanently spaced pistons reciprocating in the cylinder, walls arranged transversely of the cylinder between the pistons and defining compartments, means for admitting fluid pressure to one of the compartments, means for directing the pressure from said compartment to one end of the cylinder and from said end of the cylinder to the other compartment, and means for directing fluid pressure from the first compartment to the other end of the cylinder and from said end to the other compartment.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHARLES W. TOCKNELL.

Witnesses:
THOS. W. BANHAM,
B. M. ROBINSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."