

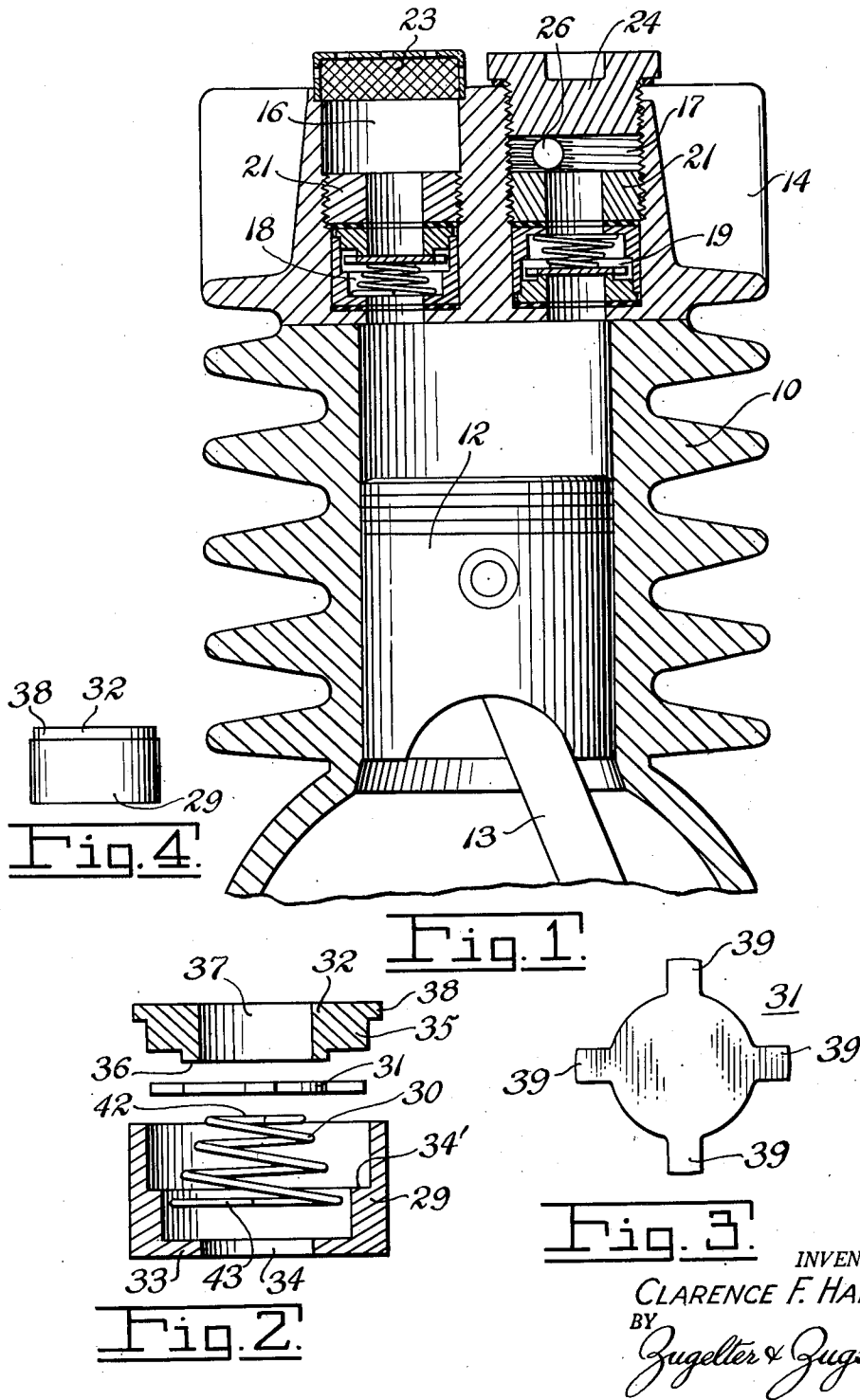
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VALVE

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VALVE

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1 Claim. (Cl. 251-144)

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This invention relates to air compressors and the like and more particularly relates to valves for air compressors.

An object of this invention is to provide a self-contained valve suitable for use either as an intake or as an exhaust valve.

A further object of this invention is to provide a self-contained valve assembly having a body and a cap and a disc valve therein, the cap being retained on the body by friction, the assembly being capable of use interchangeably as an exhaust or intake valve.

A further object of this invention is to provide a valve for an air-compressor having limited disc movement.

A further object of this invention is to provide a valve adapted for use both as an intake and as an exhaust valve which is readily replaceable without disassembly.

A further object of this invention is to provide a valve which is economical to manufacture in that the parts are simple screw machine products or stampings.

A further object of this invention is to provide a valve whose seat is outwardly disposed so that the finishing of the seat is an extremely simple operation adaptable to hand or machine lapping.

The above and other objects and features will in part be apparent and will in part be obvious from the following detailed description and the drawing, in which:

Figure 1 is a view in transverse section showing a cylinder of an air compressor having intake and exhaust valves constructed in accordance with an embodiment of this invention;

Fig. 2 is an exploded view showing parts of one of the valves;

Fig. 3 is a view in top plan showing a valve disc;

Fig. 4 is a view in side elevation showing an assembled valve.

In the following detailed description and the drawing, like reference characters indicate like parts.

In Fig. 1 is shown a cylinder of an air compressor indicated at 10 and containing a piston 12 and a connecting rod 13. The cylinder is provided with a cylinder head 14 having intake and exhaust ports indicated at 16 and 17 respectively, each of which communicates with the interior of the cylinder. Ports 16 and 17 are designed to accommodate valves 18 to 19 that function as intake and exhaust valves respectively. The valves are held in place by appropriate plugs 21 and may be gasketed to prevent leakage past the

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valve bodies. A screen 23 may be positioned at the upper end of intake well 16 to strain air entering intake valve 18, while a plug 24 closes the upper end of the exhaust valve so that compressed air from the exhaust valve can leave through an exhaust opening 26.

Valves 18 and 19 are identical in construction and design and can be used either as exhaust valves or as intake valves by merely reversing position in the valve ports of the cylinder head. One of the valves is shown in detail in Fig. 2, and in assembled form in Fig. 4, while in Fig. 3 the valve disc is shown.

The valve comprises a body 29 of generally cylindrical form, a spring 30, a valve disc 31 seated on the spring and a cap or plug 32. The cap 32 and body 29 are so designed that the cap can be pressed into the end of the body and retained therein by friction.

The end of the body opposite the cap is partially closed by a head plate 33 in which a port 34 is formed in the central portion thereof. The head plate 33 also serves as a seat for the spring 30. The upper portion of the body is machined to provide a bore corresponding in diameter with the diameter of that portion of the cap that is pressed into the body, and a ledge or shoulder 34' which acts as a stop for the valve disc 31.

The body cap 32 is so machined that a plug portion 35 can be pressed into the open end of body 29. The inner end of the cap is machined to provide an annular valve seat 36 on which the valve disc can seat. The closed end of the cap 32 is provided with a port 37 disposed in line with port 34. The outer end of the cap is provided with a flange 38 corresponding in diameter to the outer diameter of the body 29.

The valve disc is preferably circular and has a diameter corresponding to the outside diameter of valve seat 36. The disc may be provided at spaced points with lugs 39 which act to hold the valve disc in a centered position in the valve body and limit the travel of the valve disc so that the disc moves only the short distance between the valve seat 36 and the shoulder 34' in the valve body.

The valve is assembled by placing the spring within the body so that it rests on the bottom thereof, mounting the disc 31 on top of the spring, and pressing the cap 32 into the open end of the body. As shown in Fig. 1, when the valve is assembled, the spring 30 is compressed to such an extent that the valve disc is normally held against the valve seat 36. When so assembled the valve body and cap have generally the appearance of

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a cylinder having a bore extending axially through the same. However, as shown most clearly in Fig. 4, flange 38 is of slightly lesser diameter than the valve body 39 for ease in separating the cap 32 from the valve body 29 for disassembling the valve. When the valve is disassembled, the valve seat 36 is fully exposed (Fig. 2) so that the valve seat may readily and quickly be lapped either by hand or machine to restore the surface of the valve seat when necessary.

As shown in Fig. 2, the coils of the spring vary progressively in diameter from a smallest coil 42 which fits against the central portion of disc 31 to a largest coil 43 which is seated on shoulder 33; and, when the valve is open, air, as it flows between ports 37 and 34, can flow between convolutions of the spring.

When a valve is mounted as shown at 18 in Fig. 1, it acts as an intake valve, and during the intake stroke of piston 12, the valve disc of intake valve 18 is drawn away from the valve seat and air can flow into the cylinder about the sides of the valve disc.

The exhaust valve 19 is identical with intake valve 18 except that the position thereof is reversed so that on the exhaust stroke of piston 12 the valve disc of the exhaust valve 19 is raised off its valve seat and air can flow about the valve disc of exhaust valve 19 and through the exhaust opening.

Each of the valves 18 and 19 can readily be removed and a new valve substituted by merely removing the appropriate plug 21 from the well or port in which the valve is mounted and lifting the valve free since each valve is a completely self-contained unit, and a substitute valve can readily be slipped into position to replace the removed valve.

The embodiment of the invention described above and shown in the drawing may be modified in various structural details without departing either from the spirit or the scope of the invention as set out in the appended claim.

Having described my invention what I claim

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as novel and desire to secure by Letters Patent is:

A reversible valve capable of functioning either as an intake or as an exhaust valve, said valve comprising a hollow cylindrical body open at both ends, said cylindrical body having on the inside spaced annular flanges, one of said flanges being adjacent one end of the body, the other flange being near the middle of the body, a hollow cylindrical, open-ended plug in the other end of the body, the outer end of said plug having a flange of smaller diameter than the cylindrical body and abutting the end of said body, the inner end of said plug having a valve seat, a valve disk between the inner end of said plug and the middle flange of the cylindrical body, said valve disk having a solid center engageable with the valve seat and outwardly projecting prongs engageable with said middle flange, and a compression spring seated on the end flange of the body and engaging the valve disk to hold the valve disk against the valve seat, the outer end of the plug and opposite end of the body being flat and perpendicular to the longitudinal axis of the body and plug, whereby the valve may be reversed end for end in the port of a compressor and caused to function either as an intake or as an exhaust valve.

CLARENCE F. HARTMAN.

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