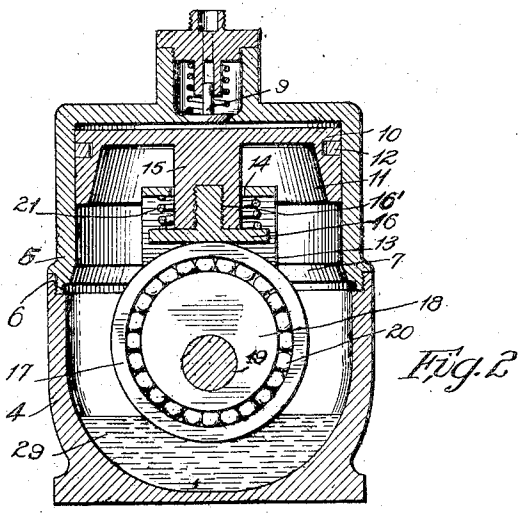
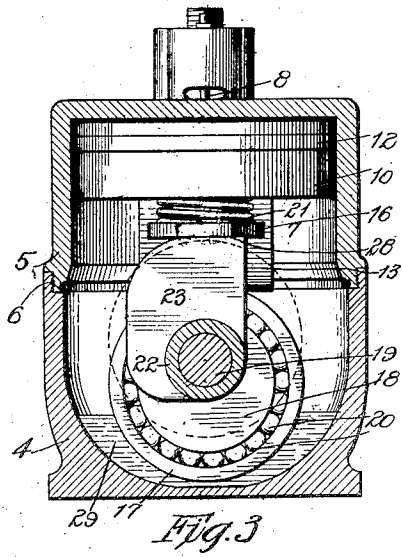
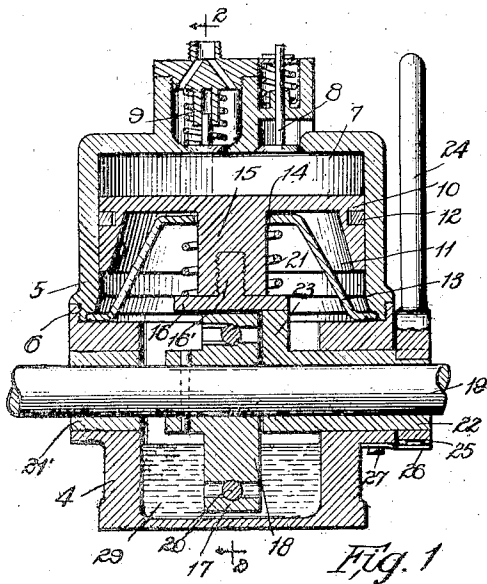


S. H. HUMAN.
 FLUID COMPRESSOR.
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1,377,583.

Patented May 10, 1921.



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UNITED STATES PATENT OFFICE.

SAMUEL H. HUMAN, OF CHICAGO, ILLINOIS.

FLUID-COMPRESSOR.

1,377,583.

Specification of Letters Patent.

Patented May 10, 1921.

Application filed June 5, 1916. Serial No. 101,731.

To all whom it may concern:

Be it known that I, SAMUEL H. HUMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Fluid-Compressors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to fluid compressors or pumps, and more specifically to that class of compressors wherein positive means are employed for moving the piston in one direction, such as in the direction of its compression stroke, and wherein spring means are employed for returning the piston to its original position, or moving the same in the direction of its intake stroke.

The principal feature of my invention resides in the spring means which I employ for thus returning the piston to its original position after it has been moved by some positive means in its advanced position. One of the objects of the present invention is to locate this returning spring so that no space is occupied by it within the working chamber of the cylinder, and to provide spring means which apply force to the piston concentrically therewith so that any tilting action of the piston within its working cylinder is prevented. This is an important feature in a pump wherein a relatively wide but short piston is employed.

A further object of this invention is the provision of means for moving the piston away from its positive operating means so that when it is desired to discontinue the pumping action of the compressor the reciprocation of the piston may be interrupted whether its operating means is permitted to operate or not, the means for rendering the pump piston inert being operable entirely independently of the position of the piston. My invention is illustrated in the accompanying drawings in which similar parts are designated by like characters, and in which—

Figure 1 is a vertical cross sectional view showing the pump piston in its operating position;

Fig. 2 is a vertical cross sectional view taken along the line 2—2 of Fig. 1 looking in the direction indicated by the arrows show-

ing the piston at the end of its compression stroke; and

Fig. 3 is a view somewhat similar to Fig. 2, some of the parts being shown in elevation, illustrating the means for moving the piston to clear its operating means.

The casing of the compressor is made up of a base portion 4 and an upper portion 5, the base and upper portions being screwed together as illustrated at 6. The upper portion 5 contains the working cylinder 7 which communicates with the intake valve 8 and the outlet valve 9. Arranged to reciprocate within the working cylinder is a piston 10 having its lower end hollowed out at 11. One or more piston rings may be provided at 12 to tightly seal the space between the piston and the cylinder wall. Held in a recess provided in the upper portion 5 is an inverted U member 13 extending upwardly, as shown in Fig. 1, into the hollow portion of the piston 10. An aperture is provided at 14 centrally located with respect to the piston. As most clearly illustrated in Fig. 1, that portion of the casing 5 which clamps the legs of the inverted U member 13 is recessed so that the U member is held in place within the upper casing 5 when the portions 4 and 5 of the casing are disassembled. Extending downwardly from the central part of the piston, and preferably forming a part thereof, is a stud 15 extending through the aperture 14 in the inverted U member. Threaded into the lower end of the stud 15 at 16 is a combined bearing plate and flange 16, serving, as will presently be described, as the engaging face for the piston operating means and a flange or abutment for a return spring. To facilitate assembling of the parts the member 16 may be constructed hexagonal in shape as illustrated. This flange or plate is arranged to bear against a ring 17 rotatably mounted around an eccentric 18 fixed to the operating shaft 19. Ball bearings 20 are interposed between the ring 17 and the eccentric 18 to provide free rotation of the ring around the eccentric. Interposed between the flange 16 and the underside of the inverted U member 13 and disposed around the downwardly extending stud 15 is a helical compression spring 21 tending at all times to move the piston downwardly.

From the description thus far given it

will be observed that upon rotation of the shaft 19 the piston is moved by means of the eccentric 18 on its compression stroke against the tension of the spring 21. As the eccentric returns to the position illustrated in Fig. 1 the spring 21 serves to lower the piston on its intake stroke. The eccentric 18 is located so that it applies force to the piston at substantially its central portion, thus avoiding tilting of the piston and, consequently, wear between the piston and the cylinder wall. On account of the central location of the spring 21 the force applied by it to the piston on the downward stroke thereof is such that tilting of the piston is prevented also on the intake stroke.

The left hand end of the shaft 19 (Fig. 1) is journaled in a bearing 21' while the other end extends loosely through a sleeve 22 extending from the outside of the casing to the inside thereof. Fixed to the inner end of the sleeve 22, or forming a part thereof, is a cam 23 positioned in close proximity to the center of the piston. This cam is arranged when in the position indicated in Fig. 1 to permit the eccentric 18 and the spring 21 to cooperate to reciprocate the piston. When, however, the cam is moved to the position illustrated in Fig. 3 the piston is lifted above the eccentric so that the piston remains inert. The outer end of the sleeve 22 has attached thereto an operating handle 24 containing, if desired, a notch 25 arranged to cooperate with a spring detent 26 secured at 27 to the base portion 4. This detent mechanism serves to hold the cam in the position illustrated in Fig. 1. A second notch may be provided in the handle to hold the cam in the position illustrated in Fig. 3, or the cam may be made straight at 28 upon which straight portion the piston may rest. It is to be noted that the cam 23 may be operated at any time entirely independently of the position of the piston 10 or the eccentric 18.

To lubricate the parts the base portion 4 is provided with the oil reservoir 29 into which the eccentric is arranged to dip. The cam 23 is arranged so that when it is moved to the position illustrated in Fig. 1 it engages the lower end of the piston and prevents full movement thereof in its downward course thus permitting the ring 17 of the eccentric to momentarily disengage the piston and rotate with the eccentric 18. This part rotation of the ring 17 causes it to carry oil to the engaging surface of the plate or flange 16 as well as to the cam 23 and the bearings for the shaft 19.

The pump which I have herein described is particularly useful for attachment to automobile engines for compressing air for tires and air starters, though I do not wish to be in any manner limited to this use of the invention, it being applicable to any

other use in which air or fluid is required to be pumped. Although my improvement is described with respect to the details of construction herein illustrated it is to be understood that many modifications may be made without departing from the spirit or scope of my invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a fluid compressor the combination of a casing provided with a working cylinder, a piston reciprocable therein, said piston having a hollow side opposite the working chamber of the compressor, an inverted U carried by the casing and arranged to extend into the hollow portion of the piston, said U being provided with an aperture located co-axial with the piston, a central stud carried by the piston and extending through the aperture in the U member, a flange provided on the outer end of the stud, a helical compression spring disposed around the stud and between the U and the flange, and means for moving the piston against the tension of the spring, the spring serving to impart movement to the piston in the opposite direction.

2. In a fluid compressor the combination of a casing provided with a working cylinder, a piston reciprocable therein, said piston having a hollow side opposite the working chamber of the compressor, an inverted U carried by the casing and arranged to extend into the hollow portion of the piston, said U being provided with an aperture located co-axial with the piston, a central stud carried by the piston and extending through the aperture in the U member, a flange provided on the outer end of the stud, a helical compression spring disposed around the stud and between the U and the flange, a shaft bearing in the casing, and an eccentric carried by the shaft for moving the piston against the tension of the spring, the spring serving to impart movement to the piston in the opposite direction.

3. In a fluid compressor the combination of a casing provided with a working cylinder, a piston reciprocable therein, said piston having a hollow side opposite the working chamber of the compressor, an inverted U carried by the casing and arranged to extend into the hollow portion of the piston, said U being provided with an aperture located co-axial with the piston, a central stud carried by the piston and extending through the aperture in the U member, a flange provided on the outer end of the stud, a helical compression spring disposed around the stud and between the U and the flange, a shaft bearing in the casing, and an eccentric carried by the shaft arranged to bear against the stud for moving the piston against the tension of the spring, the spring serving to

impart movement to the piston in the opposite direction.

4. In a fluid compressor the combination
5 with a hollow base containing bearings of a
shaft rotatable in said bearings, a cam se-
cured to said shaft, a cylinder detachably
secured to said base, a hollow piston recip-
rocable in said cylinder and having a por-
tion adapted to be engaged by said cam, a
10 spring abutment secured between said base
and said cylinder and retaining the piston

therein, and a compression spring in said
piston confined between said abutment and
a portion of said piston to urge said piston
against said cam.

In witness whereof I hereunto subscribe
my name this 26th day of May, A. D. 1916.

SAMUEL H. HUMAN.

Witnesses:

ROBERT F. BRACKE,
A. G. McCaleb.