J. C. KITTON.

COMPRESSOR.

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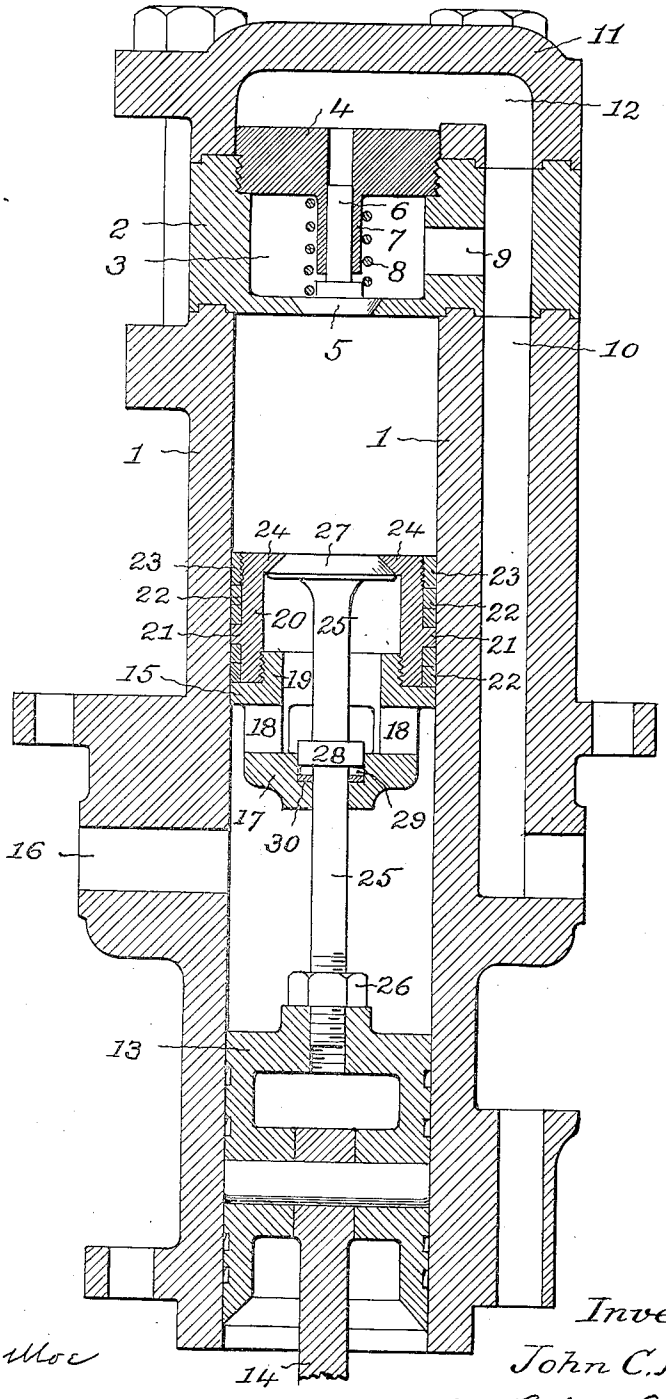
1,039,757. Patented Oct. 1, 1912.



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JOHN C. KITTON, OF ELGIN, ILLINOIS.

COMPRESSOR.

1,039,757. Specification of Letters Patent. Patented Oct. 1, 1912.

Application filed December 11, 1909, Serial No. 532,519. Renewed February 26, 1912. Serial No. 680,093.

To all whom it may concern:

Be it known that I, JOHN C. KITTON, a citizen of the United States of America, and a resident of Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Compressors, of which the following is a specification.

This invention relates to that type of gaseous fluid compressors in which the inlet valve to the compression chamber is carried by the piston. And the present improvement has for its object to provide a simple and efficient structural arrangement and combination of parts, whereby a positive closing and opening of said valve is attained in the initial movements of the compressor parts, and with which the supply of gaseous fluid to the compression chamber is attained with a minimum retardance, all as will hereinafter more fully appear.

In the accompanying drawing my invention is shown in sectional elevation applied to a vertical air compressor.

Referring to the drawings, 1 represents the compressor cylinder provided at its lower end with an attaching flange for connection with the crank casing, and at its upper end with a like flange for connection with the outlet valve housing and top closure head or cap, hereinafter described.

2 is the outlet valve housing having a horizontal form corresponding with that of the cylinder 1 and fitting the top of the same to form a closure therefor.

3 is a central chamber formed in the valve housing 2, and closed at its upper end by a screw-bushing 4 forming a guide for the stem of the outlet valve hereinafter described. The bottom wall of said chamber is formed with a central opening the margin of which constitutes the seat for the outlet valve aforesaid.

5 is the outlet valve arranged in the chamber 3 aforesaid, and having a vertical stem 6 guided in its vertical movement by a depending sleeve 7 on the bushing 4, aforesaid.

8 is a closure spring surrounding the depending collar 7, and bearing against the valve 5 to yieldingly hold the same to its seat.

9 is a lateral outlet port from chamber 3, said port preferably opens into an outlet duct 10 in a side wall of the compression cylinder 1, as shown.

11 is the top head or cap of the compression cylinder, above referred to; said cap has a counterpart horizontal form to that of the cylinder 1 and valve housing 2, and fits on top of the valve housing to inclose the upper end of the same, and to such end is provided with a chamber 12 which has communication with the outlet duct 10 of the compressor cylinder 1 and is adapted to introduce pressure upon the upper end of the valve stem 6 to aid the spring 8 in effecting a closing movement of the outlet valve.

13 is the lower and follower piston of the compressor, having pivotal connection with the operating pitman 14 of the apparatus.

15 is the upper and primary piston. The pistons 13 and 15 have a co-axial relation in the compression cylinder, and are connected together in separated relation by the intermediate connection hereinafter described to provide an inlet chamber between the two pistons for the gas to be compressed. With the described construction the inlet port 16 of the compression cylinder will be near the lower end of the same, and adapted to register with said chamber in the down stroke of the pistons, and be closed by the lower piston in the final upstroke of the pistons, as usual in the present type of compressors. The primary piston 15 is of an annular form, and comprises a main annulus to the lower end of which is secured a guide hub 17, by spider arms 18, while the upper end of said annulus is formed with a screw-threaded neck 19 for the attachment of the piston annulus now to be described.

20 is a piston annulus screwing upon the main annulus above described and provided with a central peripheral collar 21, at each side of which are arranged the packing rings 22 of the primary piston.

23 is a follower ring screwing upon the upper part of the piston annulus 20 to secure the packing rings in place.

24 is an annular inturned flange at the upper end of the piston annulus 20, constituting a seat for the hereinafter described inlet valve to the compression chamber.

25 is a vertical rod constituting the intermediate connection above referred to, and

secured in a vertically adjustable manner to the lower piston 13, by a screw-thread connection and a lock nut 26, as shown.

27 is a valve head, usually of the cone type shown, carried at the upper end of the rod 25 and seated upon the inturned flange 24 of the piston annulus above described.

28 is a collar secured to the rod 25 between the valve head 27 and the guide hub 17 aforesaid, and adapted to have limited vertical movement in a vertical cavity in the hub 17. The amount of movement of said collar corresponds with the normal amount of movement of the aforesaid valve from a closed to an open position, and the movement of said collar in said vertical cavity is adapted to retard, and so prevent a rapid opening and closing of the valve and the consequent injurious pounding of the same which would otherwise occur.

30 is an elastic cushion arranged in the lower portion of the vertical cavity aforesaid, and adapted to receive the impact of the collar 28 in its downward movement, and eliminate the noise due to such movement.

With the present improved construction the lower and follower piston 13 has a limited vertical movement independent of the upper and primary piston 15, at the end of each up and down stroke of the pistons, and such limited independent movement is adapted by the present construction to very effectively close and open the valve 27 in the initial portions of the up and down stroke of the parts, and in a positive manner. In consequence very little retardance is had to the entry of the gas to be compressed into the compression chamber in the down stroke of the parts, while such gas is very effectively confined in the compression chamber during the up stroke of the parts.

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

1. In a compressor of the class herein described, the combination with the compression cylinder and its outlet valve, of a primary piston and a follower piston having coaxial and separated relation, the primary piston comprising a main annulus, a guide hub connected thereto by a spider, a piston annulus, detachably secured to said main annulus and provided with a central peripheral collar and an inturned flange constituting a valve seat, packing rings arranged at the sides of said collar and a follower ring holding said packing rings in place, a rod connecting said pistons and permitting a limited independent movement of one piston with relation to the other, and a valve head carried by said rod and having its seat on the aforesaid inturned flange of the primary piston, the inlet for the gas to be compressed being located below the primary piston, substantially as set forth.

2. In a compressor of the class herein described, the combination with the compression cylinder and its outlet valve, of a primary piston and a follower piston having coaxial and separated relation, the primary piston comprising a main annulus, a guide hub connected thereto by a spider, a piston annulus detachably secured to said main annulus and provided with a central peripheral collar and an inturned flange constituting a valve seat, packing rings arranged at the sides of said collar and a follower ring holding said packing rings in place, a rod connecting said pistons and having a collar moving in a vertical cavity of the guide hub, and a valve head carried on one end of said rod and engaging the valve seat in the primary piston, the inlet for the gas to be compressed being located below the primary piston, substantially as set forth.

Signed at Elgin, Illinois, this 7th day of December 1909.

JOHN C. KITTON.

Witnesses:
P. P. WIPPELL,
N. A. NEWDECK.