

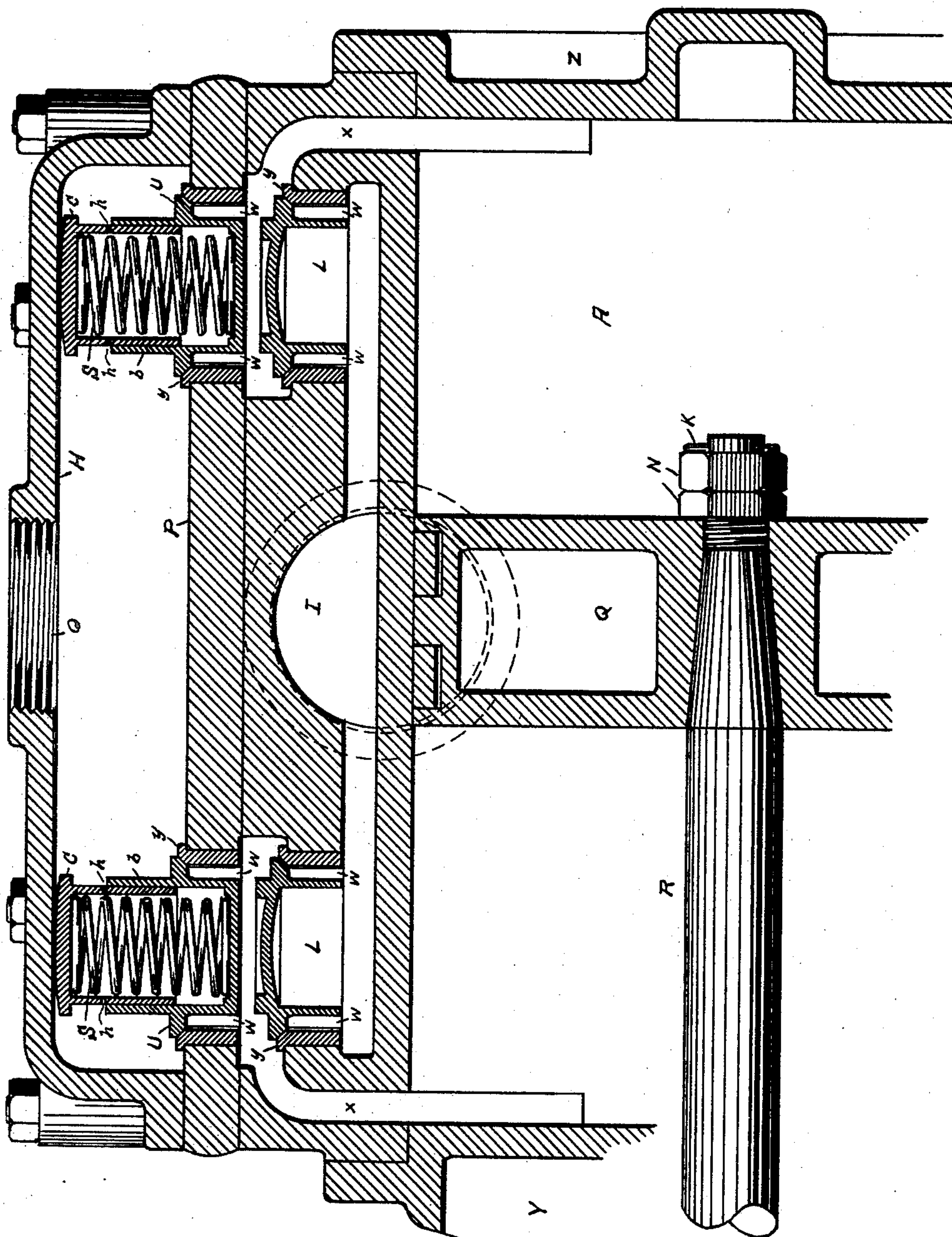
No. 713,661.

Patented Nov. 18, 1902.

F. M. METCALF.
AIR COMPRESSOR VALVE.

(Application filed Apr. 28, 1902.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

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AIR-COMPRESSOR VALVE.

SPECIFICATION forming part of Letters Patent No. 713,661, dated November 18, 1902.

Application filed April 28, 1902. Serial No. 105,119. (No model.)

To all whom it may concern:

Be it known that I, FOSTER M. METCALF, a citizen of the United States, residing at Battlecreek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Air-Compressor Valves, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to that class of air-valves which operate automatically by difference in air-pressure, and has for its object a cushioned stop, acting against the lift, and means for promptly effecting a closure of the
15 delivery ahead of the piston movement. As ordinarily constructed in compressors having valves of this class a much higher pressure must be attained in the air-cylinder than that
20 contained within the delivery-chamber on account of the unbalanced area between the upper and lower valve-surfaces before the delivery-valves can be unseated. As soon, however, as the valves actually lift the differential area disappears and the valves are
25 violently opened against the stop-limits with an emphatic action, which soon wears or breaks both stops and valves.

30 In the accompanying drawing, I have shown an air-cylinder and piston in partial section with the hood and valve-plate complete, embracing a set of my improved air-valves.

35 In the drawing, A represents the air-cylinder; Y, end of yoke; Z, cylinder-head; Q, air-piston; R, piston-rod; P, valve-plate; H, valve-chamber hood; I, suction-inlet; O, delivery-outlet; X X, ports.

40 The valve details are designated as follows: L L represent the suction or inlet-valves; U U, the delivery-valves; *y y y y*, the valve-seats; *w w w*, &c., the valve-guide wings; *b b*, the valve-sleeves; C C, the valve cushion-caps; *h h h h*, admission-holes to cushion-chambers between valves and caps, and S S valve-springs.

45 The delivery-valves have each a cup-shaped cylindrical extension or sleeve, within which fits the cup-shaped cap C, the space between forming a cushion-chamber, which is filled with air at delivery-pressure when the valves
50 are seated by means of the radial holes *h h* in the caps.

The operation is as follows: Air is drawn into the cylinder by the piston through the inlet-valves, which are preferably made very

light and seated only by gravity, and after 55 completion of the stroke the air contained is compressed by the reverse action of the piston until its tension exceeds the effective force of pressure and springs acting upon the upper surface of the delivery-valves, 60 causing the latter to rise and admit the compressed air to the delivery-chamber.

Any tendency of the delivery-valves to pound or strike violently against their stop-limits in lifting is resisted by the combined 65 action of the seating-springs and added compression of air contained within the cushion-chambers of the valves, both of which elements act also to seat the valves again quickly as the piston pauses at the completion of the 70 stroke.

In construction the cushion-caps C' C' are to be made a nice sliding fit within the embracing-sleeves *b b* and provided with small inlet-holes *h h* at or near the top of sleeve- 75 hub when the valves are closed, the interior chamber thus formed to be provided with a spring of sufficient tension to hold the valve firmly to its seat and the top of cap against the retaining-hood forming the delivery-chamber 80 of the compressor. I prefer to make top of caps slightly convex, as shown, that contact with hood shall be at or near the center line of valve-seat.

85 Having thus fully described and explained the advantages of my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An air-compressor valve having an extended sleeve, a cushion-cap embraced within the same, and in sliding engagement therewith, an internal spring acting to separate the valve and cap, and the cap having radial holes communicating with the interior thereof, substantially as shown and described. 95

2. An air-compressor valve having a cylindrical extension or sleeve, a cushion-cap freely fitted therein and forming therewith a cushion-chamber and having radial openings in its stem, and a spring located between the 100 valve and cap.

In testimony whereof I affix my signature in presence of two witnesses.

FOSTER M. METCALF.

Witnesses:

RICHARD R. HICKS,
ALBERT C. PERKINS.