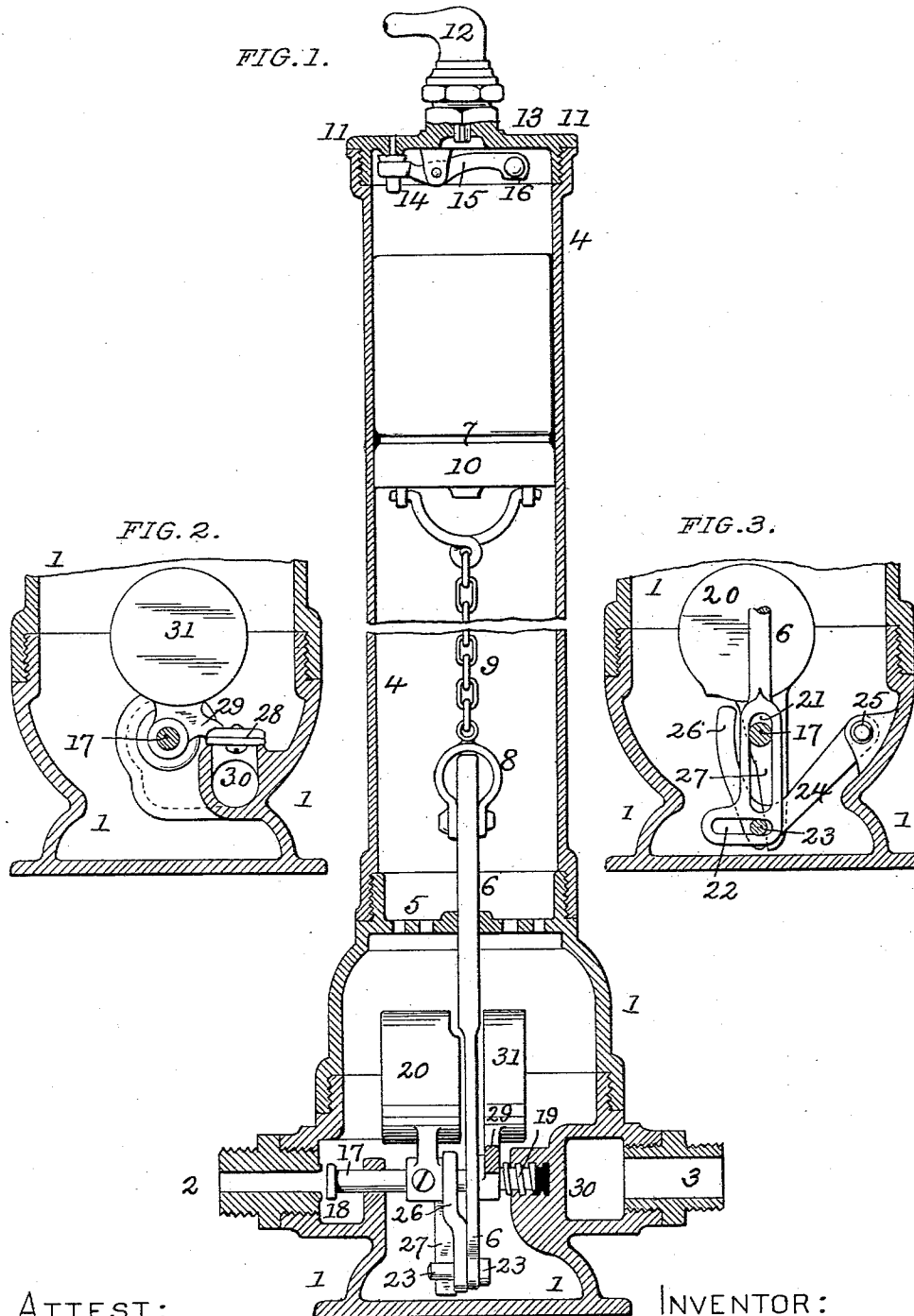


(No Model.)

B. BECK.
AUTOMATIC AIR COMPRESSOR.

No. 476,723.

Patented June 7, 1892.



ATTEST:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

BRUNO BECK, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO PHILIP J. COOK, OF SAME PLACE.

AUTOMATIC AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 476,723, dated June 7, 1892.

Application filed September 14, 1891. Serial No. 405,695. (No model.)

To all whom it may concern:

Be it known that I, BRUNO BECK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented certain new and useful Improvements in Automatic Air-Compressors; and I do hereby declare the following to be a full, clear, and exact description of the invention,
10 such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of automatic air-compressors in which a hydraulic piston within a suitable cylinder is operated by pressure from a water-main to compress
15 the air as above the piston for use in drawing beer, &c., and more especially to that type of air-compressors in which the piston of an upright cylinder is connected by a chain or other yielding connection to the valve mechanism
20 in the base, so as to automatically reverse the same as the weighted piston reaches its upper and lower position within the hydraulic cylinder.

The object of the present invention is to
25 provide a simple and effective arrangement of the valve mechanism and valves whereby the automatic operation of the air-compressor is rendered certain and a liability to accidental derangement avoided. I attain such
30 objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of an automatic air-compressor embodying
35 my present improvement; Fig. 2, a detail transverse section looking to the right; Fig. 3, a similar view looking to the left.

Similar numerals of reference indicate like parts in the different views.

40 Referring to the drawings, 1 represents the base of the apparatus, having water inlet and outlet necks 2 and 3 and made hollow to receive the operating mechanism of the water inlet and outlet valves, its top portion having
45 a vertical neck, on which joins the vertical hydraulic cylinder 4 by counterpart screw-threads, as shown, or any other usual means.

5 is a perforated diaphragm forming a strainer for the water as well as a guide for
50 the vertical sliding valve-rod 6, that connects with the weighted piston 7 by means of a

shackle 8 and chain or other flexible connection 9. The weighted piston will be provided with the usual hydraulic cup-packing 10 and weighted by a heavy cylindrical weight, as
55 shown.

The upper end of the hydraulic cylinder is closed by a cap 11, having a suitable air-outlet neck 12, having a check-valve 13 of any usual construction to prevent a retrograde
60 movement of the air back through outlet-neck, and also an air-inlet valve 14 of any usual construction, but preferably an elastic valve-head mounted on a pivoted lever 15, that is balanced by a counter-weight 16, so
65 that the valve will open and close in a ready and quick manner responsive to a slight relative variation of pressure on its upper and lower sides.

The valve mechanism consists of a longitudinal valve-stem 17, arranged horizontally
70 and carrying a valve-head 18, that has its seat on the inner end of the water-inlet passage or neck 2, the other end of the valve-stem being formed with a quick-pitch screw-thread
75 19, that screws into a socket on the base 1, the construction being such that a partial rotation of the valve-stem will cause it to move longitudinally to open or close the water-inlet passage, as the case may be.
80

20 is an overbalance-weight, the arm of which is keyed to the valve-stem 17, so that said weight will be supported in an approximately vertical position slightly to the left of
85 a vertical line drawn through its pivot-axis, as shown in Fig. 3, when the valve 18 is in its open condition, so that the tendency of such weight will be to hold said valve open, and when tilted to the right to pass said vertical line said weight will act by gravitation
90 to rotate the valve-stem to cause the same to unscrew and fully close said valve, the initial movement being imparted to said weight by the valve-rod 6, the movement of which is responsive to the final upward movement of the
95 weighted piston 7 through flexible connections 8 9.

In the construction shown the lower end of the valve-rod is of a forked formation, the vertical elongated slot 21 thus formed embracing
100 the stem 17, so as to be guided thereby, with its extreme lower end formed with a laterally-

elongated slot 22, that engages a pin or stud 23, fixedly attached to the angle of a bell-crank lever 24, pivoted at 25 to the base 1, with its free end 26 adapted to engage against the overbalance-weight 20 to move or operate the same over the vertical line above mentioned in the movement of closing the water-inlet valve. The corresponding movement of opening the inlet-valve is effected by the weight of the weighted piston 7 forcing the valve-rod 6 in a downward direction, which through the instrumentality of the bell-crank lever 24 and its pin or stud 23 engaging the extension arm 27 of the counterbalance-weight 16, acts to return the overbalance-weight 20 back to the position heretofore described—*i. e.*, to a position a little to the left of a vertical line drawn through its pivotal axis—and cause an opening of the water-inlet valve.

The water-outlet valve consists of a valve-head 28, carried by an arm 29 on the valve-stem 17 and having a seat on a laterally-arranged port or passage 30, that constitutes an extension of the water outlet, neck, or passage 3, this valve-head being so arranged with relation to the inlet-valve head 18 that when one is closed the other will be open, and vice versa. This water-outlet valve is preferably provided with an overbalance-weight 31, arranged in a manner similar to the weight 20, as illustrated in Figs. 1 and 3. It may in some instances be dispensed with and reliance placed on the single weight 20 without departing from the spirit of my invention.

The operation of the apparatus is as follows: The inlet-valve 18 being open, the outlet-valve 28 closed, and the weighted piston 7 nearing the end of its upward stroke, as shown in Figs. 1, 2, and 3, as such stroke nears completion it first takes the slack out of the flexible connection 9 and then draws the vertical valve-rod 6 upward, and through the instrumentality of the pin or stud 23, bell-crank 24, and its movable end or toe 26 tilts the overbalance-weight 20 (and with it the auxiliary overbalance-weight 31) past the vertical pivot-axis, so that it will descend by gravity and in its pivotal descent rotate the valve-stem, so as to close the inlet-valve 18 and at the same time open the outlet-valve 28. With this reversal of the inlet and outlet valves the water is forced out by the descent of the weighted piston, which as it nears its final downward movement comes in contact with the upper end of the valve-rod 6 and forces the same downward, and through the instrumentality of the pin or stud 23 of the bell-crank lever 24, acting against the ex-

tension-arm 27 of the overbalance-weight 20, lifts said weight, and with it the auxiliary weight 31, back to its original position—*i. e.*, a little to the left of a vertical line passing through the pivot-axis. In its pivotal upward movement the weight 20 reverses the valves 18 and 28 to their original condition—*i. e.*, the inlet-valve 18 open and the outlet-valve 28 closed. These alternate actions of the valves and valve mechanisms are continuous and automatic, while the water-pressure supply is on the apparatus.

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

1. In an automatic air-compressor, the combination, with the vertical cylinder and its weighted piston, of the valve-rod 6, a flexible connection between the piston and the valve-rod, the bell-crank lever 24, connected to the valve-rod and having an arm 26, adapted to operate the overbalance-weight, the valve-stem 17, having movement in a longitudinal direction by means of the screw formation 19 and provided with an overbalance-weight 10, and an outlet-valve head 28, controlling the outlet-passage 30, substantially as herein described.

2. In an automatic air-compressor, the combination, with the vertical cylinder and the weighted piston, of the valve-rod 6, a flexible connection between the piston and the valve-rod, the bell-crank lever 24, connected to the valve-rod and having a pin or stud 23, adapted to operate the overbalance-weight, the valve-stem 17, having movement in a longitudinal direction by means of the screw formation 19 and provided with an overbalance-weight 20, and an outlet-valve head 28, controlling the outlet-passage 30, substantially as herein described.

3. In an automatic air-compressor, the combination, with the vertical cylinder and its weighted piston, of the valve-rod 6, a flexible connection between the piston and the valve-rod, the bell-crank lever 24, connected to the valve-rod and having an arm 26 and a pin or stud 23, adapted to operate the overbalance-weight, the valve-stem 17, having movement in a longitudinal direction by means of the screw formation 19 and provided with an overbalance-weight 20, and an outlet-valve head 28, controlling the outlet-passage 30, substantially as herein described.

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

BRUNO BECK.

Witnesses:

ROBERT BURNS,
GEO. H. ARTHUR.