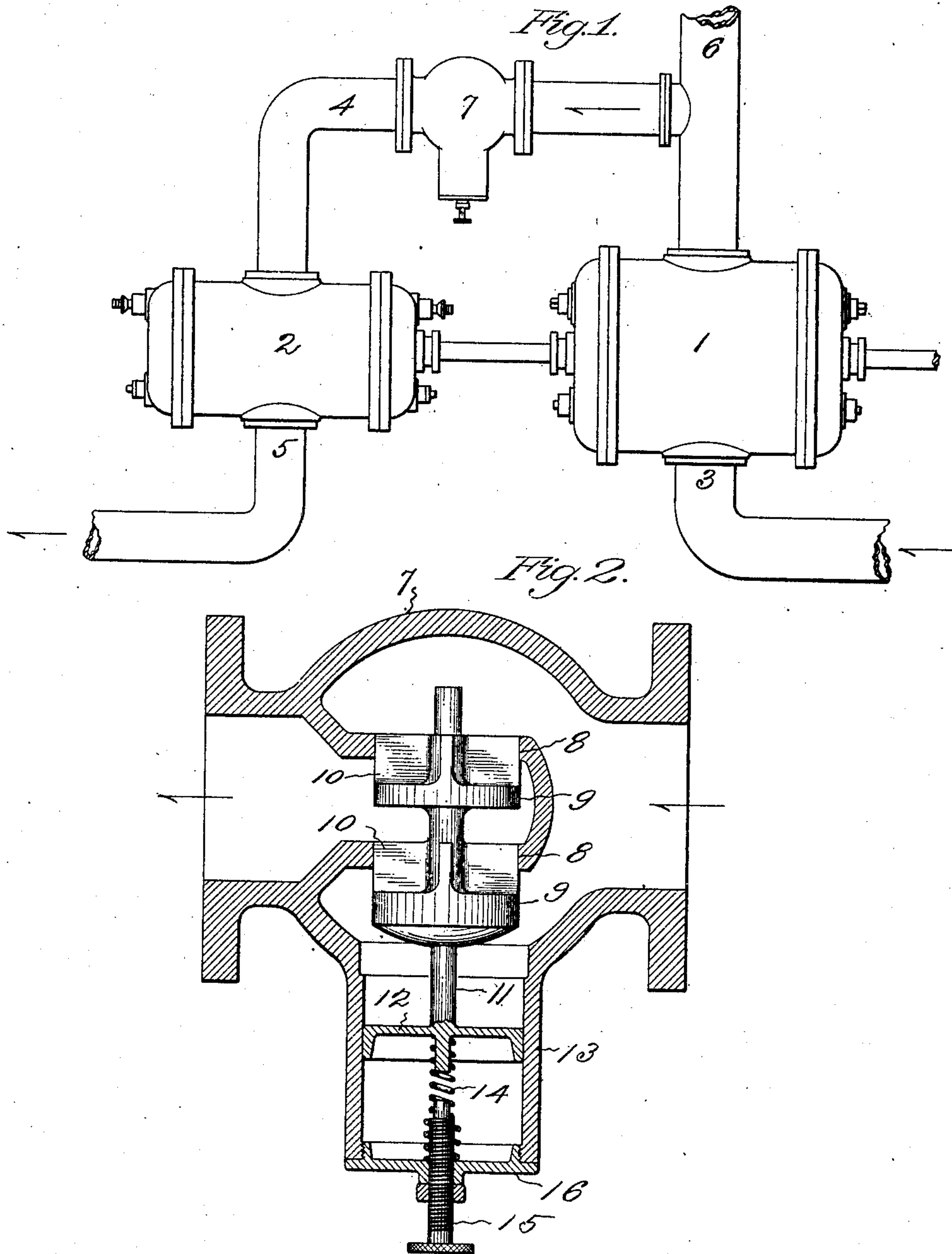


No. 830,503.

PATENTED SEPT. 11, 1906.

E. HILL.
COMPOUND AIR COMPRESSOR.
APPLICATION FILED AUG. 18, 1905.



Witnesses.

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EBENEZER HILL, OF NORWALK, CONNECTICUT.

COMPOUND AIR-COMPRESSOR.

No. 830,503.

Specification of Letters Patent.

Patented Sept. 11, 1906.

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To all whom it may concern:

Be it known that I, EBENEZER HILL, a citizen of the United States, residing at Norwalk, in the county of Fairfield and State of Connecticut, have invented a new and useful Compound Air-Compressor, of which the following is a specification.

It is desirable to build air-compressors so that with a single machine air may be supplied at widely-different pressures for various uses. They are often desired for use in mines for supplying air at comparatively low pressures for operating drills and other tools and for supplying air at very high pressure for driving locomotives. In manufacturing establishments it is desirable to be able to supply from a single compressor air at high pressure for pneumatic tools, hoists, and general power purposes and at low pressure for sand-blasting, painting, blowing chips, and cleaning heavy articles. In the interest of economy and efficiency in operating the various mechanisms it is necessary that the pressures used be constant.

This invention relates to an air-compressor which is designed to supply air at two different pressures.

The object of the invention is to provide a very simple and efficient construction whereby air may be supplied from a single compound compressor at two widely-different pressures which will remain practically constant under the various conditions of use.

The invention resides in a compound compressor having a valve in the duct between the low-pressure cylinder and the high-pressure cylinder which automatically closes the passage through the duct when the low-pressure piston does not supply a sufficient quantity of air at the desired pressure for both the low-pressure use and the demand of the high-pressure piston, thus without interrupting the reciprocation of the high-pressure piston preventing that piston from drawing air from the duct between the cylinders and lowering the pressure in the pipe from which the air at low pressure is being drawn for use.

Figure 1 of the drawings shows a side elevation of so much of a compound air-compressor as is necessary to illustrate the invention. Fig. 2 shows, on larger scale, a central section of the valve which is arranged in the duct between the high and low pressure cylinders to automatically choke the supply of air for the high-pressure cylinder when air at low pressure is being drawn from the duct.

The first or low-pressure cylinder 1 and the second or high-pressure cylinder 2 are of ordinary construction, and they have the usual inlet and outlet valves and pistons of the common compound compressor. Air is taken into the low-pressure cylinder through the intake 3 and forced through the interduct 4 to the high-pressure cylinder, from which it is forced through the discharge 5 to the high-pressure system. Air for low-pressure use is drawn from the interduct through the pipe 6, and in the interduct between the point where the low-pressure air is drawn off and the high-pressure cylinder is a choke-valve 7—that is, a valve which is arranged so as to stop or hinder the flow of air from one cylinder to the other under certain conditions by entirely closing or restricting the air-passage.

The choke-valve shown has two ports 8, movable in which is a balanced valve that consists of two connected disks 9, which are provided with guiding-spiders 10. The stem 11 of this valve is connected with a small piston 12, that moves in a cylinder 13, which opens to the inlet side of the valve. A spring 14 is arranged to thrust against the piston in such manner as to tend to force the valve-disks into the ports. A thumb-screw 15 is arranged in the cap 16 that closes the outer end of this cylinder for regulating the tension of the spring.

When the low-pressure system is being used, the choke-valve closes the passage through the interduct to the high-pressure cylinder. If the low-pressure system is not being used, the choke-valve remains open, so the air will flow freely from the low-pressure cylinder to the high-pressure cylinder. When air is drawn from the interduct for low-pressure use, the first effect is to lower the pressure in the interduct. This drop of pressure lessens the pressure on the choke-valve piston to such an extent that the spring closes the choke-valve. As the demand at low pressure ceases the pressure against the choke valve piston rises and overcomes the force of the spring and opens the choke-valve, so that air can again flow freely to the high-pressure cylinder.

The invention claimed is—

1. The combination in a compound compressor of a low-pressure cylinder, a high-pressure cylinder, a duct connecting the discharge of the low-pressure cylinder with the intake of the high-pressure cylinder, and a choke-valve in the duct between the cylin-

ders arranged to open and close the passage through the duct according to the pressure in the duct between said valve and the low-pressure cylinder, substantially as specified.

5 2. The combination in a compound compressor of a low-pressure cylinder, a high-pressure cylinder, a duct connecting the discharge of the low-pressure cylinder with the intake of the high-pressure cylinder, a valve
10 adapted to close this duct, means for drawing air from the duct between said valve and the low-pressure cylinder, means controlled by the pressure in the duct between the valve and the low-pressure cylinder for opening
15 and holding open said valve when the pressure in the duct between the valve and the low-pressure cylinder is normal, and means acting in opposition to the pressure for closing and holding said valve closed when the
20 pressure in the duct between the valve and the low-pressure cylinder is below normal, substantially as specified.

3. The combination in a compound compressor of a low-pressure cylinder, a high-
25 pressure cylinder, a duct connecting the discharge of the low-pressure cylinder with the intake of the high-pressure cylinder, a valve

adapted to close this duct, means for drawing air from the duct between said valve and the low-pressure cylinder, a piston connected 30 with said valve and subject to the pressure in the duct between the valve and the low-pressure cylinder, and a spring arranged to thrust the piston in opposition to said pressure, substantially as specified. 35

4. The combination in a compound compressor of a low-pressure cylinder, a high-pressure cylinder, a duct connecting the discharge of the low-pressure cylinder with the intake of the high-pressure cylinder, a bal- 40 anced valve arranged to close this duct, means for drawing air from the duct between said valve and the low-pressure cylinder, a piston connected with said valve and subject to the air-pressure in the duct between the 45 valve and the low-pressure cylinder, a spring thrusting against the piston in opposition to the air-pressure and means for adjusting the pressure of the spring, substantially as specified.

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Witnesses:

J. E. SLATER,
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