No. 659,832. Patented Oct. 16, 1900.

G. SIPP.

AIR PUMP AND COMPRESSOR.

(Application filed May 8, 1900.)

(No Model.)

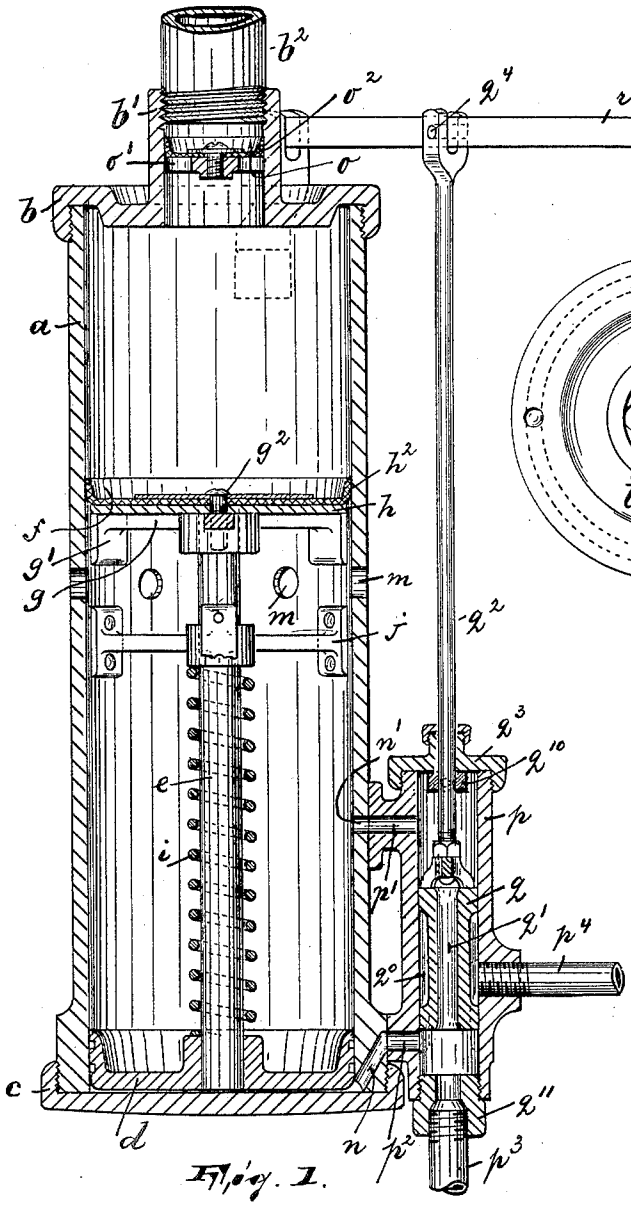


Fig. 1.

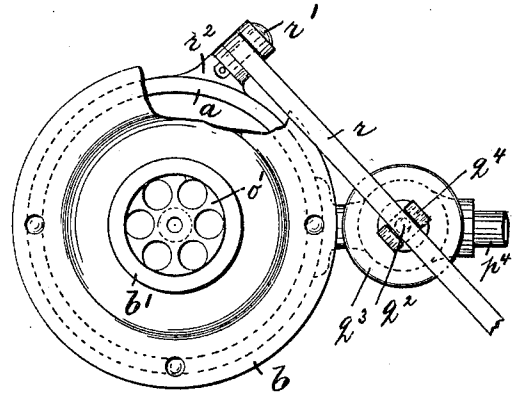


Fig. 2.

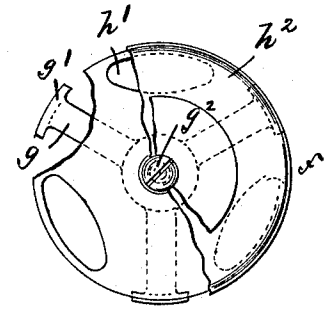


Fig. 3.

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AIR PUMP AND COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 659,832, dated October 16, 1900.

Application filed May 8, 1900. Serial No. 15,898. (No model.)

To all whom it may concern:

Be it known that I, GRANT SIPP, a citizen of the United States, residing in Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Air Pumps and Compressors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to manually-controlled fluid-operated pumps and compressing apparatus, and especially to air pumps and compressors.

The object of this invention is to provide an air pump and compressor of simple, strong, and durable construction, reliable and efficient in operation, and easily controllable.

The invention consists in the improved air pump and compressor and in the combination and arrangement of the various parts thereof, substantially as will be hereinafter more fully described and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a central sectional view through my improved apparatus, certain parts being shown in full and others broken away; Fig. 2, a top plan view of the upper portion of Fig. 1, a certain leather cup-valve being removed; and Fig. 3, a detail view of a certain piston-valve used in connection with my improved apparatus.

In said drawings, a represents a cylinder provided at opposite ends with heads b and c, secured to the cylinder by screw-threaded connection, as shown, or in any desired and well-known manner.

Within the cylinder a is slidingly arranged a piston d, carried at one end of a piston-rod e, to the opposite end of which is secured a piston-valve f. Said piston-valve consists, preferably, of a spider g, bearing with its downwardly-extending projections g' on the inner face of the cylinder a and having its central portion secured to the piston-rod e by means of a screw g^2. On the top of the spider rests a plate h, provided with a series of openings h' and supporting a cup-shaped leather valve h^2, the operation of which latter will be hereinafter more fully described.

The piston-rod e is surrounded by a spiral spring i, bearing against the piston d and against a spider j, secured within the cylinder a, as clearly shown in Fig. 1.

The cylinder a is provided with a series of air-inlets m, situated below the piston-valve f, and is also provided in its lower portion with a steam-inlet n, and about midway between said steam-inlet and air-inlets with an exhaust n'.

The cylinder-head b is provided with a nipple b', adapted to receive the compressed-air outlet-tube b^2. In said nipple is arranged an auxiliary valve o, consisting of a perforated plate o', to which is secured the central portion of a cup-shaped leather valve o^2.

On one side of the cylinder a is mounted a valve-chest p, provided with ports p' p^2, communicating with the ports n' and n, respectively. The lower portion of said valve-chest p is provided with an exhaust p^3, while steam is supplied to said cylinder through a port or inlet p^4. Within the valve-chest p is slidingly arranged a piston-valve q, penetrated by a central opening q', and having secured thereto one end of a piston-rod q^2, which penetrates the head q^3 of the valve-chest p. Said piston-valve q is limited in its upward movement by a stop q^{10} at the upper end of the valve-chest p, and in its downward movement by the plug q^{11}, forming the lower end of said valve-chest. The other end of said piston-rod q^2 is pivotally connected, as at q^4, to a handle r, having its shorter arm fulcrumed, as at r', to a projecting bracket r^2, secured to or integral with the cylinder a, as clearly shown in Figs. 1 and 2 of the drawings.

In operation when a supply of compressed air is needed the piston-valve q is depressed by means of the handle r until the annular groove q^0 establishes a communication between the steam-inlet p^4 and the port p^2. The steam will enter through said port p^2 and port n into the cylinder a and below the piston d and will force said piston upwardly against the action of the spiral spring i. The

air contained in the upper part of the cylinder a—that is to say, in the part between the piston-valve f and the cylinder-head b—will accordingly be compressed and will be forced out of said cylinder into the tube b^2 by lifting the leather cup-valve o^2, as will be manifest. The piston d will be moved upward by the steam-pressure until it clears the exhaust-port n', when a portion of the steam will exhaust through said port and through the port p' into the valve-chest p and from there through the central opening q' of the piston-valve q into the exhaust p^3. Simultaneously the handle r is moved upwardly, thereby cutting off communication with the port p^2 and preventing steam from entering into the cylinder a. As soon as a portion of the steam in the cylinder a has exhausted in the manner heretofore described the piston d and piston-valve f will be forced back into the normal position by means of the spiral spring i, and while so returning, a new supply of air having entered through the air-inlets m, will lift the cup-shaped leather valve h^2 and enter the upper chamber of the cylinder a. The portion of the steam remaining in the said cylinder a below the piston after it passes the port n' will exhaust through the ports n and p^2 into the valve-chest p and out of the exhaust p^3.

The above-described operation is repeated until the needed supply of compressed air has been pumped through the tube b^2 into the reservoir or apparatus in which said compressed air is to be used.

From the foregoing it can be seen that my improved pump and compressor is single-acting—that is to say, that air is pumped or compressed only by the upward movement of the piston and that on account of the peculiar construction of the various parts and the arrangement of the various ports very little manual power will be required to control the steam-operated piston.

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

1. In a fluid-pumping, compressing or other similar apparatus, the combination, with a cylinder having a valve-controlled discharge for the compressed fluid at one end, of spaced operatively-connected pistons arranged in said cylinder, the piston adjoining the discharge end of said cylinder having a valve opening toward said discharge end of the cylinder, a supply for an actuating fluid, an exhaust for said actuating fluid, said cylinder having a port at its other end affording common communication for the supply and exhaust with said cylinder, and a valve controlling the communication between said port and the supply and exhaust, said valve being adapted to simultaneously close the supply and open the exhaust and vice versa and said cylinder having another fluid-inlet opening for the fluid to be compressed between the last-named end thereof and the valve-carrying piston, substantially as described.

2. In a fluid-pumping, compressing or other similar apparatus, the combination, with a cylinder having a valve-controlled discharge for the compressed fluid, of spaced operatively-connected pistons arranged in said cylinder, the piston adjoining the discharge end of said cylinder having a valve opening toward said discharge end of the cylinder, a valve-chest, a supply and an exhaust for an actuating fluid connected to said valve-chest, said cylinder and the valve-chest having a port of communication entering the former at the other end thereof, and a valve arranged in said valve-chest and controlling the communication between said port and the supply and exhaust, said valve being adapted to simultaneously close the supply and open the exhaust and vice versa and having a port penetrating it, said cylinder and valve-chest having another port of communication controlled by said valve, and said last-named port and the exhaust being adapted to have communication through the port of said valve, substantially as described.

3. In a fluid-pumping, compressing or other similar apparatus, the combination, with a cylinder having a valve-controlled discharge for the compressed fluid at one end, of spaced operatively-connected pistons arranged in said cylinder, the piston adjoining the discharge end of said cylinder having a valve opening toward said discharge end of the cylinder, means for normally forcing said pistons away from the discharge end of said cylinder, a valve-chest, a supply for an actuating fluid and an exhaust for said actuating fluid connected to said valve-chest, said cylinder and the valve-chest having a port of communication entering the cylinder at the other end thereof, and a valve arranged in said valve-chest and controlling the communication between said port and the supply and exhaust, said valve being adapted to simultaneously close the supply and open the exhaust and vice versa and having a port penetrating it, said cylinder and valve-chest having another port of communication controlled by said valve, and said last-named port and the exhaust being adapted to have communication through the port of said valve, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 25th day of April, 1900.

GRANT SIPP.

Witnesses:
ALFRED GARTNER,
MARGARET BRITTON.