2 Sheets--Sheet 1.

J. H. BEAN.

Pressure-Blower for Gas-Machines.

No. 165,782. Patented July 20, 1875.

Fig 1

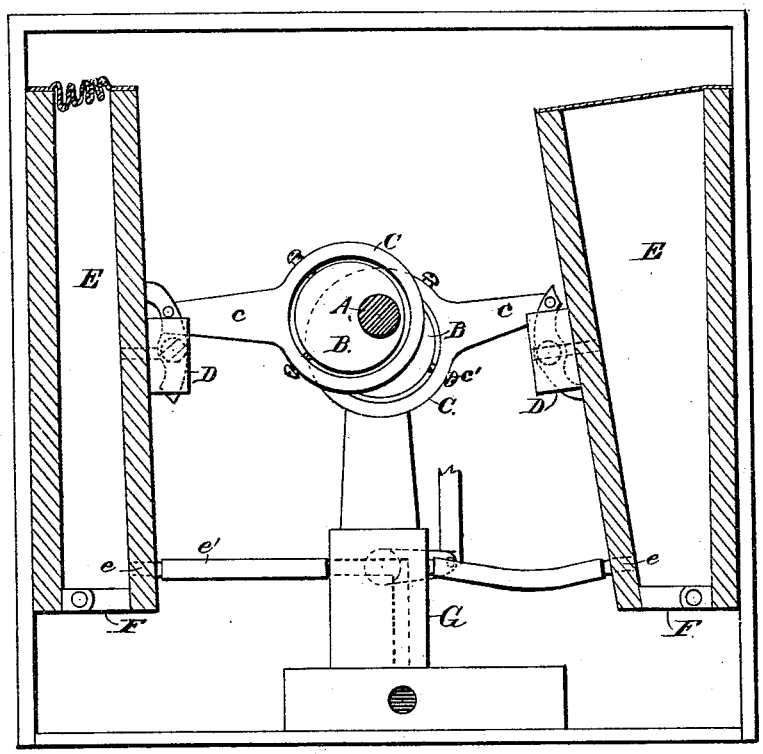


Fig 2.

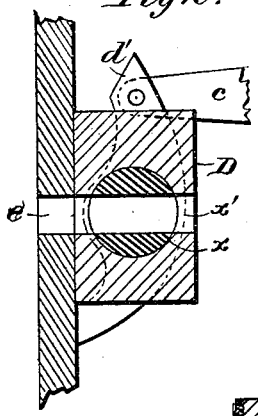


Fig 3.

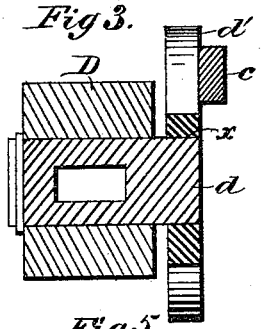


Fig 4.

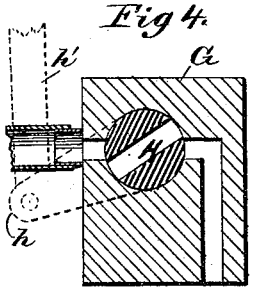
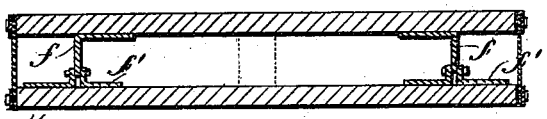


Fig 5.



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2 Sheets--Sheet 2.

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Pressure-Blower for Gas-Machines.

No. 165,782. Patented July 20, 1875.

Fig 6.

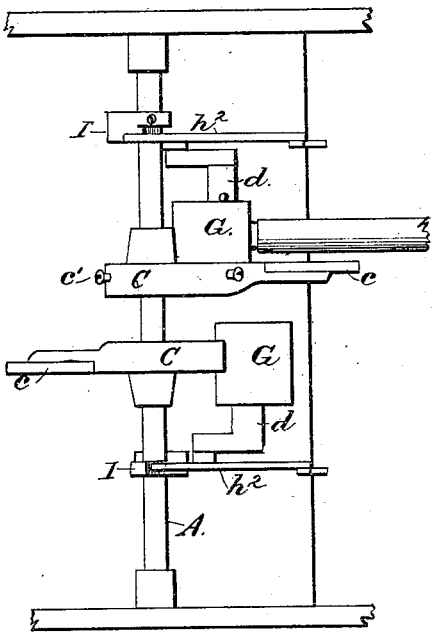


Fig 7

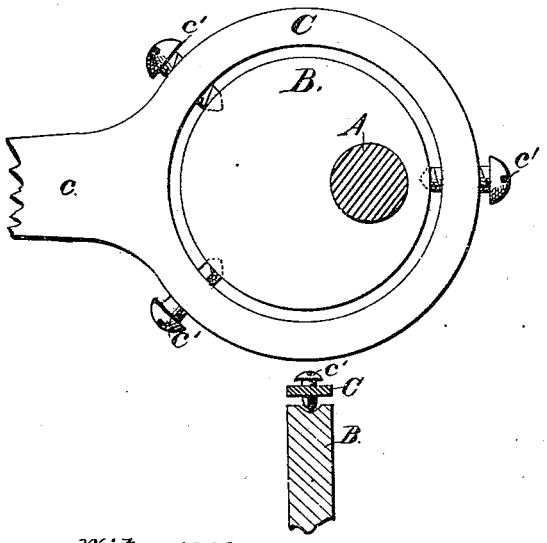
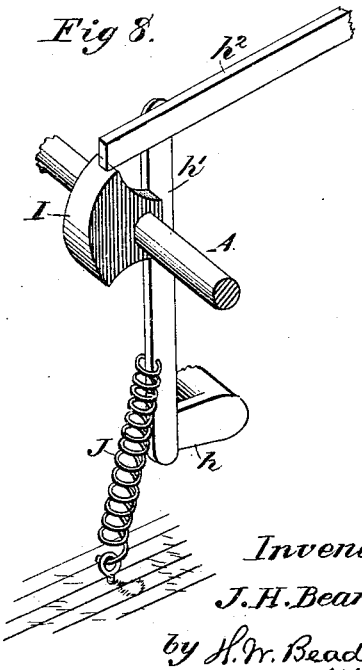


Fig 8.



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UNITED STATES PATENT OFFICE.

JOSEPH H. BEAN, OF CINCINNATI, OHIO.

IMPROVEMENT IN PRESSURE-BLOWERS FOR GAS-MACHINES.

Specification forming part of Letters Patent No. **165,782**, dated July 20, 1875; application filed December 12, 1874.

To all whom it may concern:

Be it known that I, JOSEPH H. BEAN, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Pressure-Blower for Gas-Machines; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

This invention consists, first, in the combination of the bellows and operating-pitman and a valve of peculiar construction; and, second, in the combination of the bellows, of peculiar construction, with a pitman adapted to operate the bellows in a peculiar manner; third, in certain combinations of parts, all of which will be fully described hereinafter.

In the drawings, Figure 1 represents a view in elevation, partially in section, of my improved blower; Figs. 2 and 3, enlarged views of the bellows-valve; Fig. 4, an enlarged view of one of the valves attached to the air-chamber; Fig. 5, a top view of the bellows-hinges; Fig. 6, a plan view of the main shaft and its immediate connections; Fig. 7, a view in elevation of one of the eccentrics, with its ring and bearing-screws; and Fig. 8, a perspective view of one of the cams for operating the air-chamber valve.

To enable others skilled in the art to make and use my invention, I will now proceed to fully describe its construction and manner of operation.

A represents the main shaft, receiving power from any suitable source. B B represent eccentrics attached to the main shaft A at proper points, as shown. C C represent eccentric rings surrounding the eccentrics B B, and receiving motion therefrom, which are provided with the pitmen *c c*, as shown. *c' c'* represent steel-pointed set-screws, projecting through the rings and bearing with their inner ends in a groove *b*, upon the face of the eccentrics B B, as shown in Fig. 7, by means of which the movement of the eccentrics is communicated to the rings with the minimum amount of friction. D represents the block or casting, adapted to support the bellows valve or cock, which is provided with the transverse cylindrical opening *x*, Figs. 2 and 3, for holding the valve-shaft, and a longitudinal opening, *x'*, for the passage of air, which communicates with a proper opening in the side of the bellows, as shown. *d*, Figs. 3 and 6, represents the valve-shaft supported in the transverse opening of the block D, and provided with a transverse opening, adapted, when in one position, to communicate with the air-passage of the block, and permit air to enter the bellows, but, when in another position, to close the opening and prevent the return of the air as the bellows collapse. *d'* represents a curved arm, rigidly attached to one end of this shaft, to the upper end of which the projecting end of the pitman *c* is attached, as shown. E E represent the bellows, located upon either side of the shaft, opposite the eccentric which gives it movement, one side of each of which is rigidly attached to the frame-work, as shown. These are identical in construction, each being constructed of two similar side pieces, of parallelogrammic form, united together by an intervening strip of leather or rubber cloth of suitable shape, the edges of which are secured to the edges of the side pieces, as shown, the strip being extended entirely around them, and having its ends united at the bottom of the bellows by a double seam. F F represent hinge-joints, by means of which the lower ends of the side pieces are united, consisting of the right-angled arm *f*, rigidly attached to the moving side of the bellows, and the socket-piece *f'*, rigidly attached to the fixed side of the bellows, the two being united, to form a pivot-joint, by the securing-pin, as shown. These joints are adapted to keep the lower ends of the bellows separated at a fixed distance from each other, so that no strain is brought upon the leather upon these points, and the movements of the bellows are made uniform. *e* represents the discharge-opening, communicating by means of the tube *e'* with the valve chest or box of the air-chamber. G represents the valve chest or box, having a suitable cylindrical opening for holding the rotary valve, and also a proper opening controlled by the valve for the passage of the air-blast into the air-chamber. H represents a rotary valve, adapted, when in one position, to open communication with the air-chamber, to permit

the passage of the air, and when in another to close the same and prevent its discharge. *h*, Figs. 4 and 8, represents a crank-arm attached to the shaft of this valve, and h^1 a connecting-rod attached thereto at one end, and to a lifting-lever, h^2, at the other. I I, Figs. 6 and 8, represent cams upon the main shaft, each of which is adapted to raise, at each revolution of the main shaft, the lifting-lever h^2, and thus operate the valve connected therewith by the mechanism described. J, Fig. 8, represents a spring of suitable construction, by means of which the connecting-rod is given a return movement after its lever has been lifted by the cam I.

The operation of the parts described is as follows: Motion being communicated to the main shaft, the pitmen of the eccentric rings consequently receive a reciprocating movement. By means of this movement the bellows are expanded and collapsed at each revolution of the main shaft, for the purpose of creating the desired blast of air.

The pitmen being connected to the upper arm of the valve-shaft, it follows that at each movement of the pitman the valve-shaft is partially revolved and the air-passage opened or closed, the forward movement of the pitman closing the valve and pressing back, by means of the upper arm of the valve-shaft, the movable side of the bellows, for the purpose of expelling the air contained therein, the valve in all cases being closed by the forward movement of the pitman before the side of the bellows is moved, and the rearward movement of the pitman opening the valve and drawing out, by means of the valve-shaft arm, the movable side of the bellows, as shown. The air expelled from the bellows, passing through its discharge-opening and connecting-tube, and through the valve-chest, the valve being open for that purpose, enters the air-chamber, and from thence is forced to any desired point.

The parts, of course, are adapted to work in harmony with each other, so that the valve controlling the entrance to the air-chamber is opened only as the bellows-valve is closed.

To give a uniform blast, three, four, or more bellows are employed, the movements of which are harmonized, so that air is always passing into the chamber.

Some of the advantages of the construction described are as follows:

The arrangement of the bellows with the vibrating end uppermost is advantageous, because by the action of gravitation the moving side of the bellows is held in its outward position while the pitman is moving forward to close the valve, and until it receives a positive movement from the thrust of the pitman.

The construction of the hinge-joint is advantageous, because the leather is relieved from strain at that point, and the movements of the bellows are made uniform.

The construction of the valves is advantageous, because their movements are positive and certain, and are in perfect harmony with the movements of the bellows.

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

1. The combination of the bellows, the valve, and the operating-pitman, substantially as described, the pitman being adapted to operate the valves in advance of the bellows, as and for the purpose described.

2. The combination of the bellows, so arranged that its movable side swings outward by gravity, with a valve and pitman or crank, adapted, when operated, to move the bellows against the force of gravity, substantially as described.

3. The combination of the bellows E and valve *d d'* with the valve H and air-chamber, as described.

This specification signed and witnessed this 23d day of November, 1874.

JOSEPH H. BEAN.

Witnesses:

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B. DAWSON.