(No Model.)

A. L. ELIEL.

GLASS BLOWING APPARATUS.

No. 282,870. Patented Aug. 7, 1883.

Fig. 4

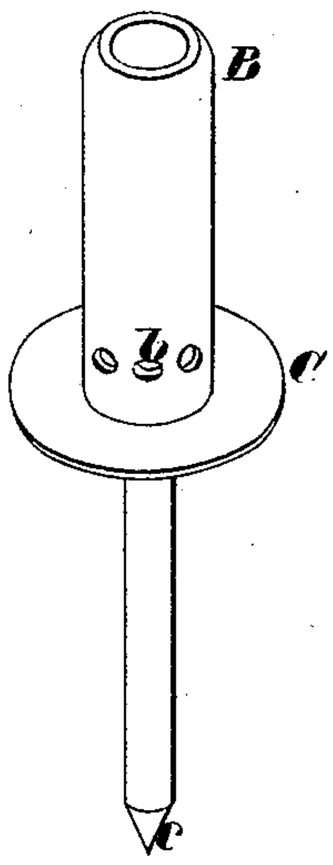


Fig. 2.

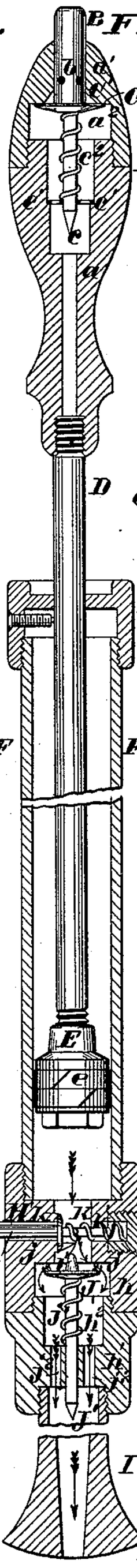


Fig. 1.

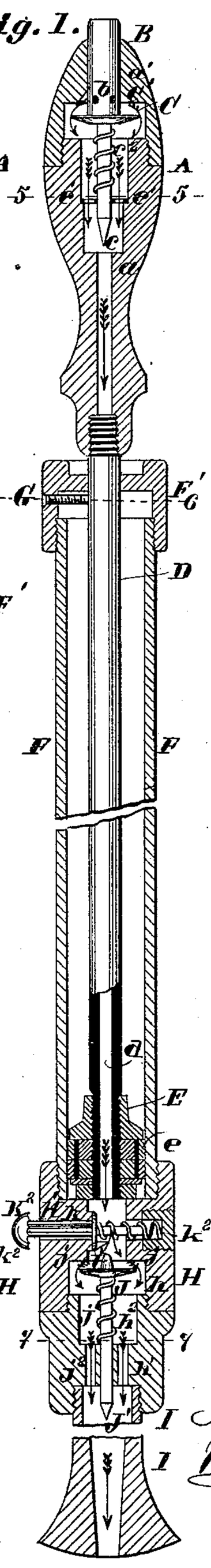


Fig. 5

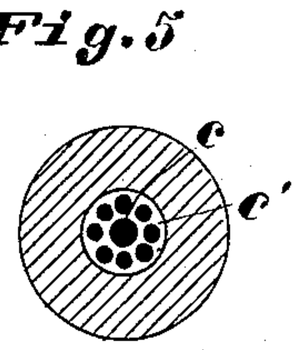


Fig. 6.

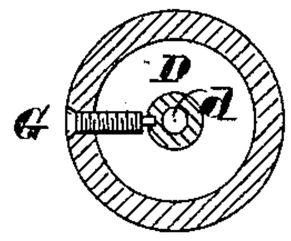


Fig. 7.

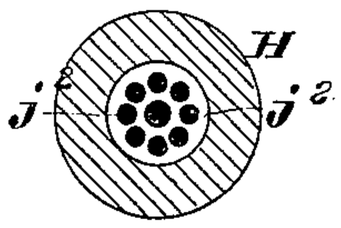


Fig. 8.

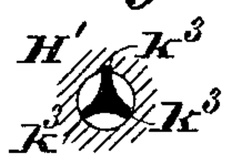


Fig. 3.

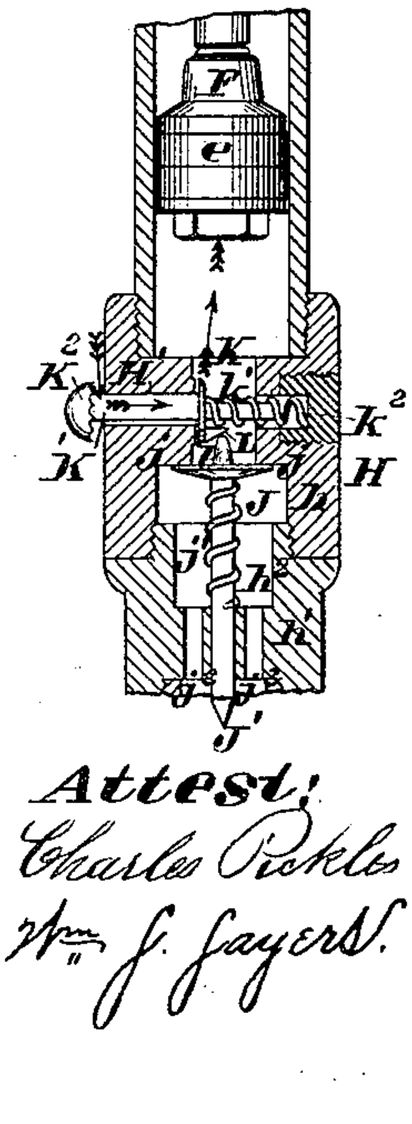
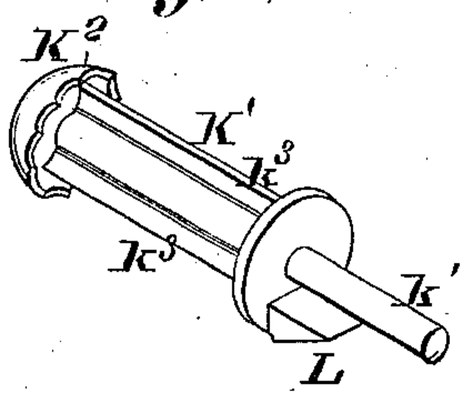


Fig. 9.



Attest:
Charles Pickles
Wm. J. Sayers.

Inventor:
Albert Lee Eliel.
By Knight & Bro's.
Attys.

UNITED STATES PATENT OFFICE.

ALBERT L. ELIEL, OF LA SALLE, ILLINOIS, ASSIGNOR OF ONE-HALF TO JACOB HOELLE, OF SAME PLACE.

GLASS-BLOWING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 282,870, dated August 7, 1883.

Application filed October 13, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALBERT LEE ELIEL, of La Salle, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Glass-Blowing Pipes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This is an improvement on the blowing pipes or "irons" used by glass-blowers. It contains means for use by the mouth, valves to check a return air-current and to allow the same to pass when required, and an air-pump for mechanical blowing.

Figure 1 is a longitudinal axial section with the parts in position for use by the mouth in forcing air through the instrument. (A part of the tubular piston-rod is shown in side view.) Fig. 2 is an axial section part in side view, parts in position for mechanical blowing. Fig. 3 is a detail section with the lower check-valve closed and the thumb-valve partly open to allow the entrance of air beneath the piston. Fig. 4 is a perspective view of the mouth-piece, enlarged. Fig. 5 is a transverse section at 5 5, Fig. 1. Fig. 6 is a transverse section at 6 6, Fig. 1. Fig. 7 is a transverse section. Fig. 8 is a transverse section of the stem of the thumb-valve by which air is allowed to escape from the interior of the glass vessel under construction, and Fig. 9 is an enlarged perspective view of said valve.

A is the upper end of the instrument, so formed as to be conveniently grasped by the hand. It consists of two parts, a body, *a*, and a cap, *a'*, connected by screwing together. The handle A is axially bored for the passage of air downward, the bore being enlarged into a valve-chamber at a^2, and at the upper end fitting a mouth-piece, B, that constitutes the stem of a valve, C, closing against a seat, C', above, the mouth-piece having endwise movement in its bearing. The mouth-piece is tubular from the outer end to the lateral holes *b*, through which the breath of the operator escapes into the valve-chamber when the valve C is open—in fact the pressure of the air issuing through the holes *b* tends to keep the valve open.

c is a guide-stem working through a guide-plate, *c'*, having an annular series of perforations for the downward passage of air.

c^2 is a spiral spring, whose ends bear against the valve-disk C and the guide-plate *c'*, tending to close the valve, but giving way easily under the pressure of the breath and the lips of the operator.

D is the tubular piston-rod attached to the handle A, and carrying a piston, E, working in the cylindrical stem or cylinder F. The cylinder has a cap, F', through which the piston-rod works. The piston is prevented from turning in the cylinder by any suitable means. For this purpose I show a screw, G, whose end enters a longitudinal groove in the side of the piston-rod. (See Fig. 6.) The piston has packing *e*, working air-tight in the cylinder F. I show it consisting of metal packing-rings of usual construction. The piston-rod D has a central bore, *d*, from end to end, so that the air passes downward from the mouth-piece to the part of the cylinder below the piston. To the lower end of the cylinder is attached the valve-piece H, consisting of two parts, *h* and *h'*, screwed together. To the lower end of the piece H is attached the lower end or section, I, of the instrument.

J is a check-valve to prevent the return of air from the interior of the glass vessel under construction to the cylinder. This valve closes upwardly against a seat, *j*, being held up by a light spiral spring, *j'*.

J' is the guide-stem working in a socket in the metal beneath. The socket is surrounded by air-holes j^2, forming communication between the valve-chamber h^2 and the bore of part I.

K is a valve seated at *k*.

k' is the guide-stem of this valve, surrounded by a spiral spring, k^2, acting to hold the valve against its seat. The valve K has a stem, K', with ribs k^3, bearing against the sides of the valve-port H', the air passing freely through the grooves between the ribs when the valve is open. One of these ribs fits in a groove or seat in the side of the port to prevent the stem K from turning.

K^2 is a thumb-knob by which the valve may be forced inward to open it.

L is an inclined lug upon the valve K, which, by the inward movement of said valve, is

brought in contact with a boss, *l*, upon the valve J, to force the valve J downward and thus open it. The valve K opens as the piston is drawn upward and allows the entrance of air beneath it, the valve C also being capable of performing the same office.

Operation: Under this head will be described the use of the instrument when blowing with the human lungs, and then when blowing by mechanical means. In the first the piston is at the bottom of the cylinder and kept there as long as the blowing with the lungs continues. (See Fig. 1.) The valve C is opened by the pressure of the lips upon the mouth-piece B. On the removal of the mouth the valve C closes and prevents the escape of air. Thus the usual way of stopping with the thumb, after the escape of some air, is avoided, as the close of the valve is instantaneous and prevents all loss of air and partial collapse of the vessel under formation. The current of air is shown by arrows. If a partial vacuum should form inside the vessel under construction, the pressure of the air from without will open the valve K and admit air. When it is desired to allow the escape of air from the interior, the valve K is forced inward and the lug L thereon opens the valve J, thus allowing said air to escape. In blowing by mechanical means the piston is pulled upward in the cylinder, the valves C and K opening by the pressure of air from without and allowing the air to fill the cylinder beneath the piston, the valve J being closed. On the piston being pushed downward in the cylinder the valves C and K close and the valve J opens, allowing the air to pass into the pipe I and the glass vessel under formation.

I claim the following advantages: Time and labor are saved, as there is no escape of air through the mouth-piece. Injurious strain of the lungs is avoided, and a person of weak lungs can perform blowing operations that can, with the common blowing-iron, only be performed by persons with powerful lungs.

I claim as my invention—

1. The combination, in a glass-blowing pipe, of a piston and cylinder and induction and eduction valves, for the purpose set forth.

2. The combination, in a glass-blowing pipe, of induction-valve C, hollow piston-rod and piston and check-valve J, substantially as and for the purpose set forth.

3. In a pipe for glass-blowing, a movable mouth-piece combined with a check-valve constructed to open by the inward movement of the mouth-piece.

4. In a pipe for glass-blowing, a movable mouth-piece closed at the inner end and working snugly in a socket, said mouth-piece having side ports, *b*, carried beneath the inner end of the socket by the inward movement of the mouth-piece.

5. The combination, with a pipe for glass-blowing, provided with a check-valve to prevent the escape of air through the receiving end of the pipe, of a spring-valve, K, allowing the escape of air from the pipe, for the purposes set forth.

6. The combination, with the valve K, having an inclined lug, L, of the spring check-valve J, with boss *l*, for the purpose set forth.

ALBERT L. ELIEL.

Witnesses:
GEORGE W. GERE,
JOHN W. HILL.