

(No Model.)

R. E. DONOVAN, F. HAZLETT & J. JOHNSTON.

APPARATUS FOR BLOWING GLASS BY MEANS OF COMPRESSED AIR.

No. 373,132.

Patented Nov. 15, 1887.

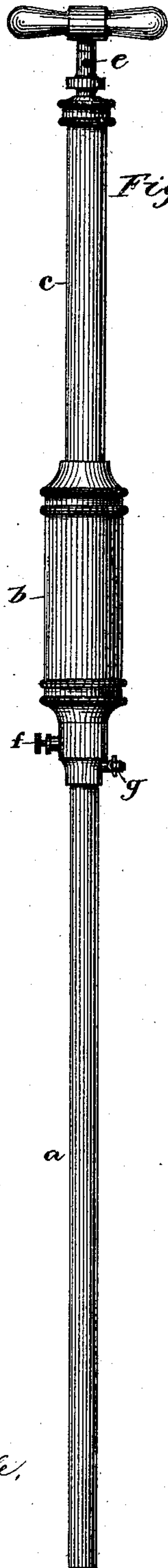


Fig. 1.

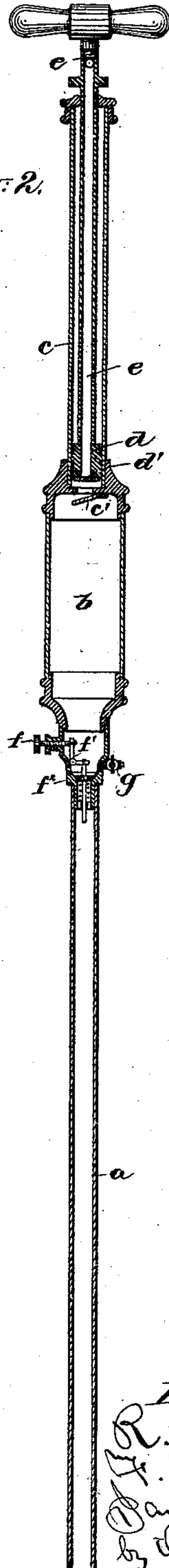


Fig. 2.

Witnesses:

*Charles R. Searle,
H. A. Johnston.*

Inventors:

*R. E. Donovan
F. Hazlett
James Johnston
by their attorney
James Drew Stetson*

UNITED STATES PATENT OFFICE.

RICHARD EDWARD DONOVAN, FRANCIS HAZLETT, AND JAMES JOHNSTON,
OF DUBLIN, IRELAND.

APPARATUS FOR BLOWING GLASS BY MEANS OF COMPRESSED AIR.

SPECIFICATION forming part of Letters Patent No. 373,132, dated November 15, 1887.

Application filed March 10, 1887. Serial No. 230,417. (No model.)

To all whom it may concern:

Be it known that we, RICHARD EDWARD DONOVAN, FRANCIS HAZLETT, and JAMES JOHNSTON, of Dublin, Ireland, citizens of the United Kingdom of Great Britain and Ireland, have invented a certain new and useful Apparatus for Blowing Glass Mechanically; and we do hereby declare that the following is a full, clear, and exact description thereof.

Efforts have been heretofore made to blow glass mechanically, by which we mean to avoid the injurious method heretofore ordinarily employed of blowing by the mouth of the operator. In one form of apparatus heretofore known an air-pump has been carried on the blow-pipe or tube, arranged to form a part of the same. In another a chamber of compressed air has been provided separately and connected by a flexible tube.

We have discovered that it is practicable to carry a chamber on the tube, and movable therewith, into which air may be compressed, either by an air pump carried on the tube and forming a part of the same or by other means, a sufficient supply being thus stored to be of material service in the rapid delivery of air required to be introduced when the bulb of melted glass is properly conditioned.

We provide a valve operated by the glass-blower, which controls the delivery of the air from the chamber through the tube in expanding the melted glass. We provide another valve, also operated at will, which controls the discharge.

When compressed air is introduced to the chamber from an external source, the air-pump may be dispensed with, and the chamber with suitable controlling-valves alone can be utilized for the purpose in view.

In order that our said invention may be more readily understood and applied in practice, we will describe the accompanying drawings, forming a part of this specification.

Figure 1 is an elevation, and Fig. 2 a vertical cross-section, showing the arrangement and construction of apparatus which we prefer to use in carrying out our invention.

Similar letters of reference indicate corresponding parts in both the figures.

a represents the blow-pipe or tube; b , the chamber for holding the condensed air; c , the

cylinder in which works the piston d , attached to the rod e . In the piston d is a valve, d' , opening downward. At the base of the cylinder c is a foot-valve, c' , opening downward. The air is taken in through the hollow piston-rod from an aperture above, near the handle, at each ascent of the piston d , and is compressed and expelled downward into the chamber b at each descent of the piston. By working the rod e the air is condensed in the chamber b to the extent required, on the principle of the ordinary air-pump, and when sufficiently charged the apparatus is ready for use.

f is a screw acting through a bell-crank lever, f' , on the valve f^2 . By operating this the condensed air is allowed to flow at pleasure through the pipe or tube a . An ordinary valve, g , is introduced for the purpose of allowing the air to escape when necessary.

Modifications may be made in the details without departing from the principle or sacrificing the advantages of the invention. We can dispense with the screw f and operate the valve f^2 by a more direct connection; but it is important by some means to maintain a complete control of the flow of the compressed air from the reservoir b through the tube a .

The air-pump may be varied. The air may be taken in by other methods than through the rod e .

We can use air at ordinary atmospheric pressure. When the piston is raised, the chamber b , as well as the pipe a , will become filled with atmospheric air at ordinary pressure. This will be sealed up when the lower end of the pipe is loaded with molten glass. Then a slight pressure on the handle of the plunger drives the air into the glass bulb and swells it to the extent required.

Our invention may apply in the manufacture of a great variety of glass articles.

What we claim is—

1. As an improvement in glass-blowing apparatus, the tube a , rigidly-connected chamber b , induction-valve c' , and delivery-valve f^2 , with means, as the lever f' and screw f , for operating the latter, adapted to receive compressed air, to transport it with the tube, and deliver it as required to expand the molten glass, substantially as herein specified.

2. The combination, in a single convenient

instrument, of the tube *a*, chamber *b*, induction-valve *c'*, delivery-valve *f*², and controlling means *f' f*, with the cylinder *c*, piston *d*, with its valve *d'*, hollow piston-rod *e*, and provisions for inducting air therethrough to be compressed into the chamber *b* and delivered therefrom, as herein specified.

3. The combination, in a single convenient instrument, of the tube *a*, chamber *b*, provisions for compressing air into said chamber, and the valve *f*², and suitable operating means for receiving air from the chamber to expand the glass, and the valve *g*, controlled by the

operator, adapted to discharge the air, all arranged for joint operation substantially as herein specified.

Dated this 24th day of January, 1887.

RICHARD EDWARD DONOVAN.
FRANCIS HAZLETT.
JAMES JOHNSTON.

Witnesses:

J. L. McCASKILL,
U. S. Consul.

ANGELO FAHIE, C. E.,
10 Leinster Street, Dublin.