No. 631,196. Patented Aug. 15, 1899.

C. E. BLUE.

METHOD OF MEASURING AND DELIVERING MOLTEN GLASS FROM TANKS TO MOLDS.

(Application filed Mar. 9, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

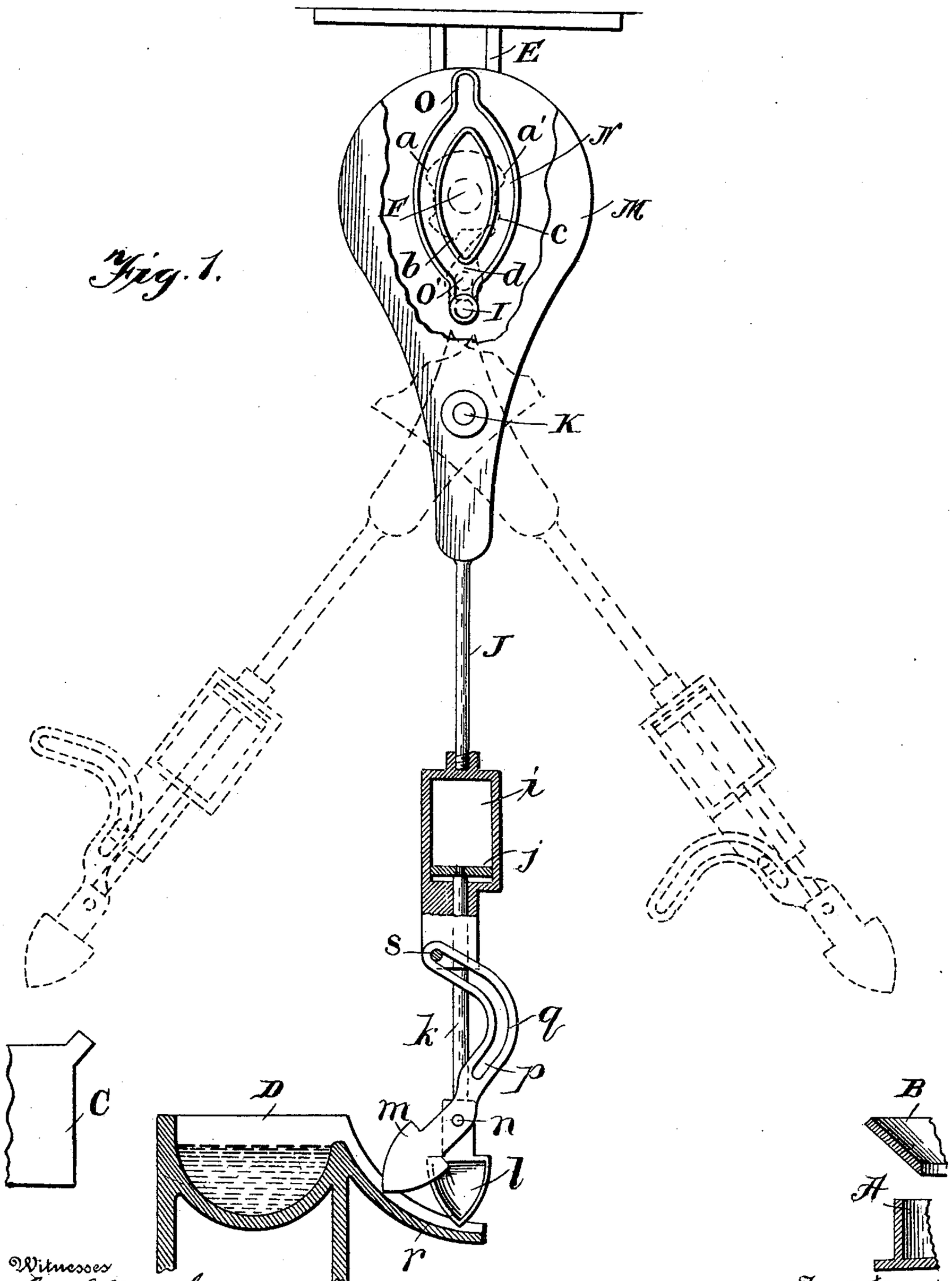

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Fig. 2.

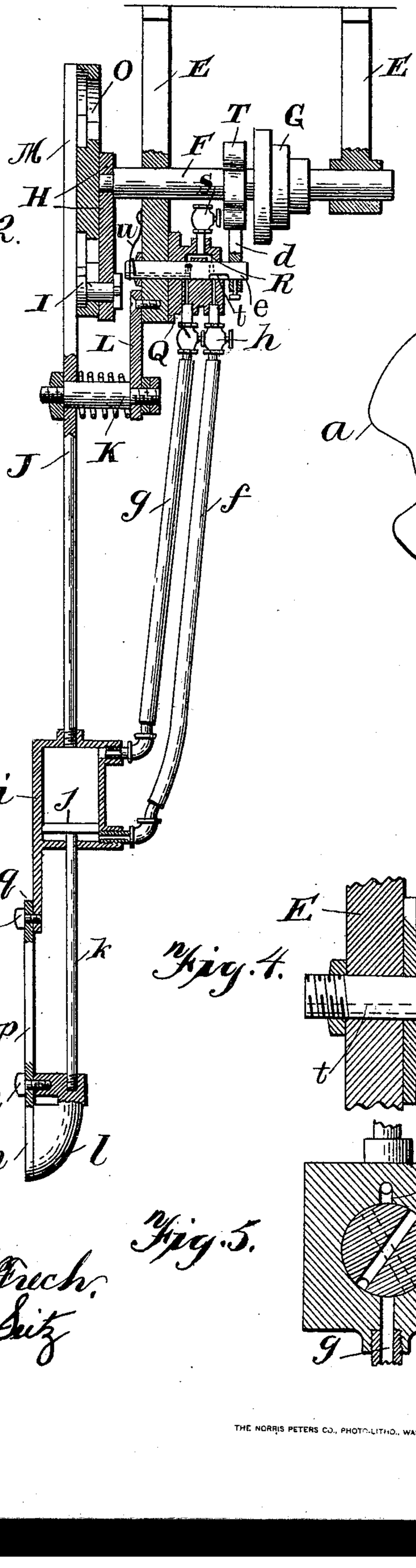

Fig. 3.

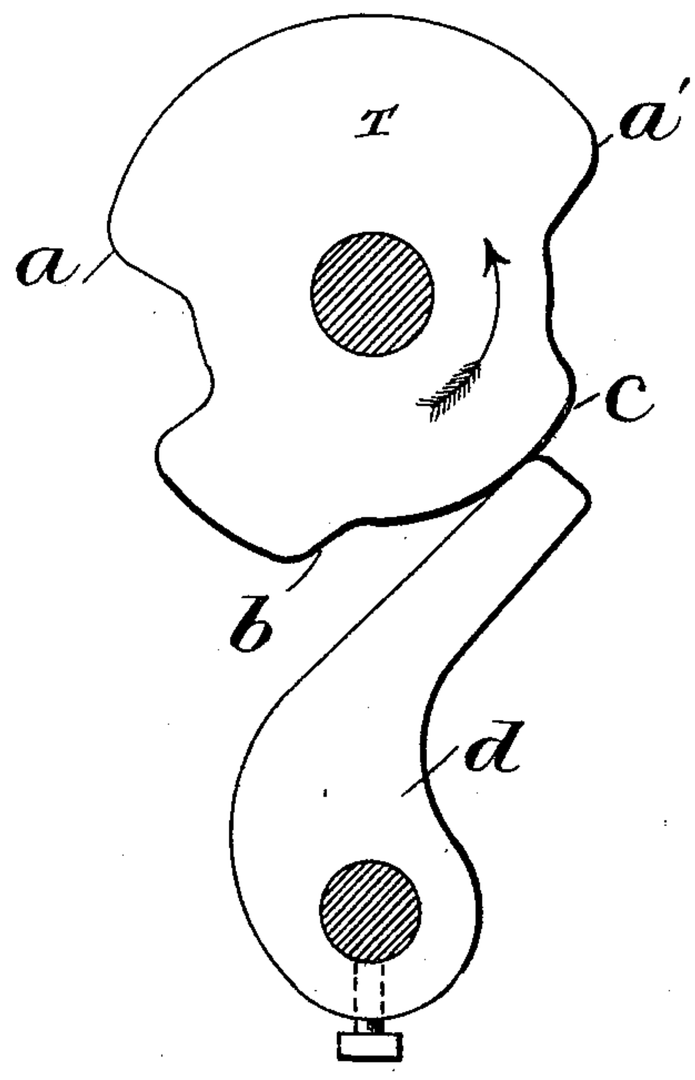

Fig. 4.

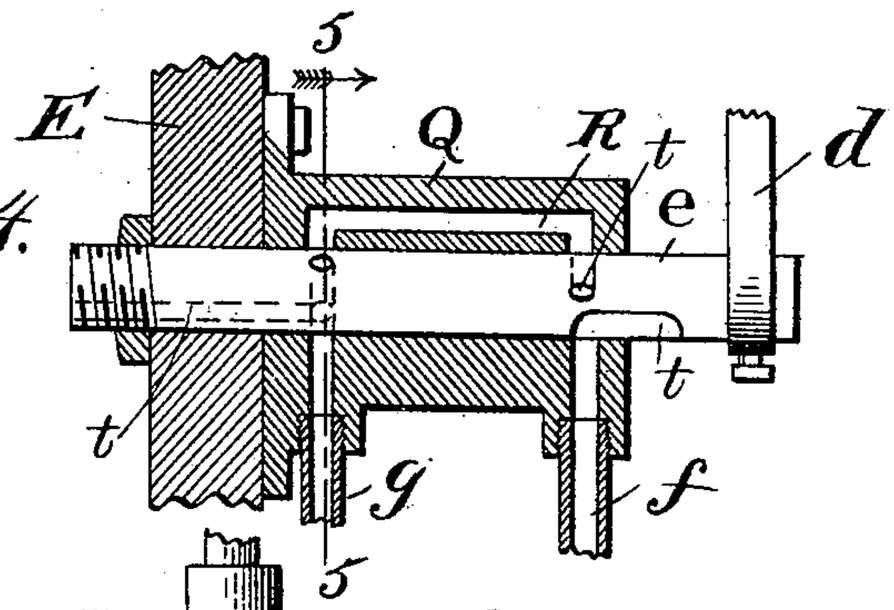

Fig. 5.

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UNITED STATES PATENT OFFICE.

CHARLES EDWIN BLUE, OF WHEELING, WEST VIRGINIA, ASSIGNOR OF ONE-HALF TO ARTHUR G. HUBBARD AND LOUIS V. BLUE, OF SAME PLACE.

METHOD OF MEASURING AND DELIVERING MOLTEN GLASS FROM TANKS TO MOLDS.

SPECIFICATION forming part of Letters Patent No. 631,196, dated August 15, 1899.

Original application filed October 9, 1897, Serial No. 654,674. Divided and this application filed March 9, 1899. Serial No. 708,409. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES EDWIN BLUE, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented new and useful Improvements in Methods of Measuring and Delivering Molten Glass from Tanks to Molds, (which is a division of my application filed October 9, 1897, Serial No. 654,674,) of which the following is a specification.

My invention relates to the method of measuring and delivering molten glass from tanks to molds, which is fully disclosed and described in my application, Serial No. 654,674, filed October 9, 1897, of which this application is a division.

The accompanying drawings illustrate the machine shown and described in my aforesaid application and which carries out my method, and in which—

Figure 1 is a front elevation of a glass-dipping machine embodying my invention, the operating lever or pendulum shown in a vertical position in full lines and in its opposite positions in dotted lines. Fig. 2 is a vertical sectional view of Fig. 1. Fig. 3 is an enlarged detail view of the cam operating the air-controlling valve through the medium of an arm or lever. Figs. 4 and 5 are detail views of the air-controlling valve.

Referring now to the drawings, A indicates the glass-mold or other point at which it is desired to deliver a quantity of glass; B, a funnel situated thereabove; C, a glass-pot containing a quantity of molten glass, and D a water-tank adapted to receive the ladle or glass-carrying receptacle and cool the same after it has delivered the glass to the desired point.

E are hangers or supports, F a driving-shaft, and G a cone-pulley receiving its power through a belt from any desired source. It will be readily understood that means other than a belt and pulley may be provided for driving the shaft F without departing from my invention. Attached to one end of the driving-shaft F is a crank H, carrying at its outer end a roller or wrist-pin I.

J is a lever or pendulum carrying at its upper end a disk M, said lever or pendulum being intermediately pivoted and supported upon a belt K, supported by a hanger L. The disk M is provided at opposite sides of its center with arc-shaped grooves N, said grooves being united by means of the upwardly and downwardly projecting recesses O and O′, respectively.

Carried upon the lower end of the lever or pendulum J is a cylinder *i*, containing the piston *j*, to which is connected a piston-rod *k*, carrying at its lower end a glass-ladle or other receptacle *l*. *m* is a cover adapted to close the said ladle, pivoted at the point *n* and having connected therewith a curved arm *p*, having a correspondingly curved or cam slot *g*, which receives a pin or screw *s*, carried by the cylinder *i*.

Secured to the driving-shaft F is a cam T, provided with the cam-surfaces *a*, *b*, and *c*, the function and operation of which will be fully described hereinafter. Attached to one of the hangers or supports E is a casting Q, through which passes a valve *e*, the casting having a chamber or recess R, adapted to register with air-passages *t*, made in the said valve E. Connected with the casting are the pipes *f* and *g*, which communicate, respectively, with the lower and upper ends of the cylinder *i* above and below the piston-head *j*, the upper ends of these flexible pipes being in communication with the air-chamber R of the casting through the passages of the said valve *e*. Attached to the valve *e* is a lever or arm *d*, adapted to be engaged and operated by the cam-surfaces *a*, *b*, and *c* in a manner to be hereinafter set forth. Attached to the valve *e* is a spring *u* of any desired form, constructed to cause the free end of the arm or lever *d* to be in constant engagement with the cam T as it revolves, the said cam serving to force the arm outward and the spring to hold it in engagement therewith.

The piston-head *j*, carrying the ladle *l*, is adapted to be moved up and down by means of air-pressure, which is fed to the chamber R of the casting Q through the communication S from any desired source. When ladle or receptacle *l* is drawn upward, the cover *m*

is moved over and closes the ladle or receptacle through the medium of the cam or curved slotted arm *p* and the stud or screw *s*, and when the ladle is lowered the cover is removed therefrom, both movements being clearly illustrated in Fig. 1.

The device is adapted to take a quantity of molten glass from one point and deliver it to another point—for instance, as illustrated in Fig. 1, to take from the glass-pot C a quantity of glass, carry it over the mold A, deliver the glass within the mold, in moving backward to pass into the water-tank D and be cooled, and thence to the glass-pot for again being charged. When the ladle or receptacle is over the glass-pot C, it is carried down within the glass, and its downward movement causes the removal of the cover of the ladle, when the ladle becomes filled and moving upward again closes, the said receptacle thus removing from the glass-pot filled with glass. The ladle then remains in this upward closed position until it arrives over the mold, as shown in Fig. 1, when the ladle is moved downward and in its downward movement causes the cover to be removed and deliver the glass to the mold, as will be readily understood.

Carrying these steps in mind, the operation of my invention is as follows: Taking the position shown in solid lines in Fig. 1, with the ladle down and the arm *d* engaged by the cam-surface *c*, both of the air-passages to the cylinder *i* are closed, the wrist-pin or roller I is within the lower recess O′, and as the crank H revolves in the direction indicated by arrow the ladle is carried to the left. In moving to the left it engages the incline *r* of the water-tank and is moved upward and drops within the water and passes therethrough, and just before it reaches the opposite wall of the water-tank the cam *b* engages the arm *d*, thus actuating the valve, and opens the air-passage to the lower part of the cylinder, thus elevating the ladle or receptacle. The lever or pendulum J continues to move to the left to about the point shown in dotted lines, at which point the disk M has become sufficiently tilted to cause the roller or pin I to pass out of the recess O′ and into the arc-shaped groove N at the right of the disk M. The pendulum then ceases its lateral movement, owing to the fact that the pin or roller moves in the arc-shaped grooves, thus holding the ladle in this position until the pin or roller reaches the recess O at the top of the disk M. While the roller is passing from the recess O′ at the bottom of the disk M to the recess O at the top thereof the arm *d* is actuated by the cam-surfaces of the cam T to cause the admission of air at the top of the cylinder *i*, forcing the ladle downward in the glass-pot and then to remove it immediately therefrom by the quick and successive movements of the arm *d* through the medium of the cam-surfaces *b* and *a*. The movement of the ladle within the glass opens it, as before described, and the movement of the ladle therefrom closes it, as before described, so that the ladle is removed from the glass-pot filled with glass, and the arm *d* is then upon the long cam *a*. At this point, as before stated, the roller L has reached the upper recess O of the disk M, and in passing within the said recess the pendulum or lever J is moved in the opposite direction and passes over to the position shown in dotted lines at the right of Fig. 1. When it reaches this position, the arm *d* has reached the opposite end *a′* of the cam *a*, and the arm is permitted to be drawn in by the spring, and in being drawn inward air is admitted to the top of the cylinder *i* and the ladle moved downward over the mold, and in its downward movement the cover is removed therefrom and the glass deposited within the mold. The downward movement of the ladle at the right-hand side is accomplished while the pin I is in the arc-shaped groove at the left side of the cam M, Fig. 1, and before it reaches the recess O′ at the bottom thereof. When it reaches this point, the ladle is reciprocated in the opposite direction and passes through the water-tank, as before described. This operation is repeated, the glass being taken from one point and delivered at another, as will be readily understood from the above description.

The cam-surfaces of the cam T and the air-passages in the valve E are so situated that air is admitted and cut off from the upper and lower portions of the cylinder I at the proper time to accomplish the operation herein described.

Though my method is adapted to be used in conjunction with any form of mold in which the glass is delivered thereto is molded, yet it is especially intended for use in connection with that form of mold shown and described in my Patents No. 531,609, dated December 25, 1894, No. 567,071, dated September 1, 1896, and No. 584,665, dated June 15, 1897, in which the glass while plastic is first pressed and then blown to its finished form.

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

1. The method of working glass which consists in dipping and forming a predetermined quantity of molten glass into a compact form, cutting off and transferring the same from the mass of glass, then further forming the glass while still plastic into a finished glass article.

2. The method of working glass which consists in dipping and cutting off from a molten mass of glass a predetermined measured quantity thereof, transferring the same from the mass then further forming the separated measured mass into a finished glass article while still plastic.

3. The method of working glass which consists in dipping and cutting off a predetermined measured quantity of glass from a molten mass thereof, transferring the same

therefrom, then forming the same into a finished glass article while still plastic by pressing and blowing.

4. The method of dipping and delivering a predetermined quantity of glass and forming the measured mass into a finished article, which consists in simultaneously dipping, forming, and chilling the surface of a predetermined quantity of glass into a compact form, cutting off and transferring the same from the mass of glass, then further forming the compact measured mass of glass while plastic into a finished glass article.

5. The method of dipping and delivering a predetermined quantity of glass and forming the measured mass into a finished article, which consists in forming a predetermined quantity of glass into a compact form and simultaneously producing a non-adhering film surrounding the compact mass, cutting off and transferring the same from the mass of glass, then further forming the compact measured mass of glass while plastic into a finished glass article.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES EDWIN BLUE.

Witnesses:
M. V. BLUE,
W. B. JONES.