(No Model.)

E. & J. A. JONES.

MACHINE FOR PRESSING AND BLOWING GLASSWARE.

No. 436,790. Patented Sept. 23, 1890.

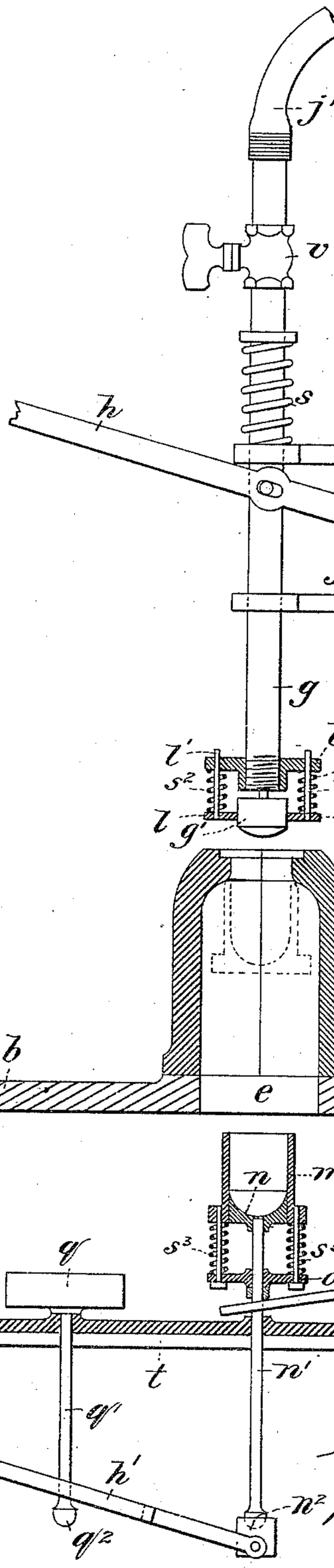

Fig. 1.

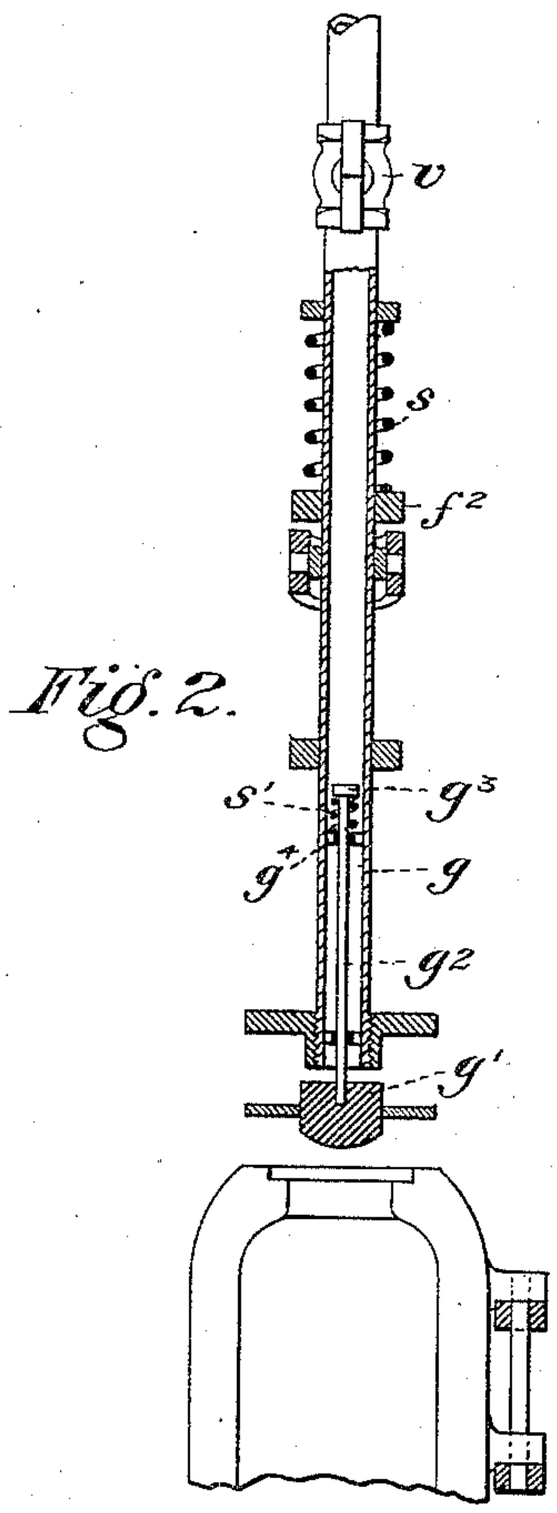

Fig. 2.

WITNESSES.

T. B. Conover

Jno. K. Smith

INVENTOR.

Evan Jones

John A. Jones.

UNITED STATES PATENT OFFICE.

EVAN JONES AND JOHN A. JONES, OF PITTSBURG, PENNSYLVANIA.

MACHINE FOR PRESSING AND BLOWING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 436,790, dated September 23, 1890.

Application filed July 1, 1889. Renewed June 28, 1890. Serial No. 357,042. (No model.)

To all whom it may concern:

Be it known that we, EVAN JONES and JOHN A. JONES, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machines for Pressing and Blowing Glassware, of which the following is a full, clear, and exact description.

Our invention consists in certain improvements in apparatus for the manufacture of hollow glassware—such as bottles—by a combined operation of blowing and pressing; and we will now describe the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a representation, partly in section, of our improved apparatus. Fig. 2 is a sectional representation of part of the apparatus, the plane of section being at right angles to that in Fig. 1.

Like letters of reference indicate like parts in each.

The frame of the machine shown in Fig. 1 consists of a base *a* and bed-plate *b* and legs or supports *c* at each end. The bed-plate and base are horizontal and parallel to each other, and placed a sufficient distance apart to give room for the removal of the former *m n* downward from the mold.

The mold *d*, in which the glass article is to be formed, is supported on the bed-plate *b*, over an aperture *e* in the bed-plate, which is circular or of the shape of the cross-section of the article to be formed and of the same diameter, so that the sides of the cavity of the mold *d* and of the aperture *e* exactly coincide.

On the bed-plate *b* and at one side of the mold *d* is an upright post *f*, having brackets f' f^2, which extend over and above the mold *d*. The brackets f' f^2 form supports and guides for the rod *g* of the plunger g' of the glass-press, and to the post *f* is pivoted, at *i*, between the brackets f' f^2, the hand-lever *h*, by which the press is operated. The plunger-rod *g* extends above the upper bracket f^2, and is surrounded by a short spiral spring *s*, which keeps the plunger raised out of the mold *d* when not depressed by the lever *h*. The plunger-rod *g* is hollow throughout, and is attached at its upper end to a flexible tube *j*, which connects with a reservoir of compressed air, (not shown,) and a cock or valve *v* serves to regulate the admission of compressed air through the hollow plunger-rod *g* into the mold, or rather into the glass contained in the mold. The plunger g' is solid, and when pressed up against the end of the hollow plunger-rod *g* closes it. A stem g^2 is attached to the plunger g' and extends up the hollow plunger-rod *g*, having a button g^3 at its upper end, between which and the guide-ring g^4 a short spiral spring s' serves to counterbalance the weight of the plunger g', making it easily movable in the hollow rod *g*. The plunger g' passes through an annular plate *l*, to which are attached pins l' l', which pass through a flange l^2 on or near the lower extremity of the plunger-rod *g*, and a spiral spring s^2 interposed between the flange l^2 of the plunger-rod *g* and the annular plate *l*, serves to keep the plunger g' depressed and the lower end of the hollow rod *g* normally open.

Immediately below the aperture *e* in the bed-plate and above the base *a* of the machine is the former *m n*, which serves, in combination with the plunger g', to give a preliminary cupped or hollow form to the piece of molten glass which is introduced into the mold. The former is shown partly in section in Fig. 1, and consists principally of a hollow cylinder *m* and a cup-shaped bottom piece *n*, which fits into and slides within the cylinder *m*. The cup-piece *n* is supported by an upright stem n', which stem has at its lower extremity a ball fitting into a socket n^2, as shown in the drawings, the socket n^2 being pivoted to one end of a lever h', which is pivotally connected with the base of the machine or to a link depending therefrom at i', (which forms its fulcrum,) and at the other extremity to a treadle *p*, so that by depressing the treadle with his foot the workman raises the former *m n* until it passes through the aperture *e* in the bed-plate and enters the mold *d* to the position shown by dotted lines in Fig. 1. The lower end of the cylinder *m* has a flange, which rests on spiral spring s^3 s^3, supported by pins attached to a plate *o*, which rests on the outer end of a lever h^2, pivoted to the frame at i^2. Thus by operating the lever h' the cup *n* of the former is moved independently of the cylinder *m*, and by the lever h^2 the cylinder *m* is moved independently of the cup *n*.

When the former *m n* is inserted in the mold *d*, as shown by dotted lines in Fig. 1, the mold *d* has no bottom; but after the former has performed its office, as hereinafter described, the former is lowered out of the mold to the position shown by full lines in Fig. 1, and the bottom piece *q* is inserted into the aperture *e*, thus furnishing a bottom to the mold *d*. The bottom piece *q* has a stem *q'* and a ball q^2 at its lower extremity, which ball fits into the socket n^2, which is pivoted to the outer extremity of the lever *h'*, taking the place of the ball n^2 of the stem *n'*. The stems *n'* of the former and *q'* of the bottom piece are both connected with a slide *r*, which is a plate covering a slot *t* in the base *a* of the machine. They are so connected by passing each through a suitable hole in the sliding plate *r*, and they may be readily raised or permitted to fall by the lever *h'* and at the same time moved lengthwise of the frame of the machine by shifting the sliding plate *r*. The motion of this plate is effected by means of a lever or other device, and the length of stroke of the plate *r* requisite to bring the stems *n'* and *q'* centrally under the mold *d* being regulated by stops *u u*.

The operation of the machine is as follows: The former *m n* being in the depressed position shown in Fig. 1, a lump of molten glass gathered from a pot or furnace is dropped into the cylinder *m* and rests on the cup *n*, and the former carrying the plastic glass is immediately raised by the lever h^2 to the position shown by dotted lines in Fig. 2 within the mold *d*, or, if preferred, the former may be raised to that position before the glass is deposited within it. The plunger *g'* is immediately lowered by the lever *h* into the mold *d*, and, entering the former *m n*, is forced into the plastic glass, which is thereby molded into the shape of the cavity of the former, the plunger being of smaller diameter than the cavity of the cylinder *m*, so as to permit the glass to pass upward within the cylinder *m* and around the plunger *g'* and into the neck of the mold, where, if desired, a collar is formed in said neck. The glass thus molded within the former is quite thick, the article thus far formed being much smaller in height and diameter than the finished article is designed to be. The cylinder *m* of the former is then lowered and the cup *m* slightly depressed, which permits the spring s^2 to depress the plunger *g'* still further, thus opening the mouth of the tubular plunger-rod *g*. Some compressed air is then admitted by opening the valve *v*, which air, passing through the tube *g*, finds its exit around the top of the plunger *g'* within the glass in the cavity of the mold, the annular plate *l* around the plunger *g'* being kept close down on the top of the mold by the spiral spring s^2, thus keeping the mold closed and preventing the escape of the compressed air. The effect of the admission of the compressed air is to swell out the glass within the mold uniformly in all directions, and to cause it to fill the cavity of the mold *d* the same as when glass is blown in a mold by a workman through a pipe. When the glass in the mold begins to expand by the internal pressure of the compressed air, the former *m n* is rapidly withdrawn, being lowered to the position shown by full lines in Fig. 1 by means of the lever h^2, and the sliding plate *r* being then moved until the bottom piece *q* comes under the aperture *e* of the bed-plate, it is raised into place so as to fill the aperture *e*. The piece *q* fitting into the aperture forms the bottom of the mold, and the introduction of the compressed air through the tubular plunger-rod *g* is continued until the glass fills the entire cavity of the mold, when the air is shut off by the valve *v*, and the article is then ready to be removed.

The mold *d* is made in two or more parts, as may be desired, and in the usual way, and is movable on the bed-plate *b*, so that different molds may be used on the same machine. So, also, the former *m n* and bottom piece *q* may be changed to suit different sizes of molds, and the size of the aperture *e* in the bed-plate *b* may be varied by the use of movable rings.

It will be noticed that in the use of our improved apparatus the glass article to be made receives a preliminary shaping by pressure in a mold smaller than that of the finished article; that this preliminary mold (called a "former" in the specification) is then quickly removed out of the way, leaving the plunger of the mold in close connection with the partially-shaped glass; that a bottom is then placed in the final or finishing mold, and that the partially-formed article is then completed by blowing so as to receive its final shape within the larger or finishing mold.

By means of the apparatus constructed and operated as we have described, we not only dispense with the services of one man out of three in operating a glass-press, but make the bottles or other articles of hollow-ware of more uniform weight and of better finish.

We claim—

1. The combination of a glass-blow mold, a hollow press-mold insertible within the cavity of the blow-mold, and a plunger insertible within the cavity of the press-mold to form therein a hollow article within the limits of the cavity of the blow-mold, said plunger having a hollow stem for the introduction of air to expand the pressed glass article without removal of the plunger, substantially as and for the purposes described.

2. The combination of the blow-mold *d*, an insertible and removable press-mold, and a plunger having a hollow stem and a movable end adapted to close the passage through said stem, substantially as and for the purposes described.

3. The combination of the glass-mold *d*, former *m n*, removable mold-bottom *q*, slide *r*, and plunger *g'*, with the levers *h h'* and h^2

for operating the same, substantially as described.

4. The combination of the former *m n*, capable of a vertical movement, the hollow plunger-rod *g*, capable of connection with an air-supply, the plunger *g'*, capable of motion relatively to the rod so as to close it when depressed, and the glass-mold *d*, together with the levers for operating the moving parts, the movable bottom *q*, and the slide *r* for bringing either the former or the mold-bottom in the vertical line of the axis of the mold, substantially as described.

In testimony whereof we have hereunto set our hands this 17th day of June, A. D. 1889.

EVAN JONES.
JOHN A. JONES.

Witnesses:
JNO. K. SMITH,
W. B. CORWIN.