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PATENTED JULY 14, 1903.

C. E. BLUE & W. B. JONES.

MACHINE FOR THE MANUFACTURE OF GLASSWARE.

APPLICATION FILED JUNE 13, 1899.

NO MODEL.

2 SHEETS—SHEET 1.

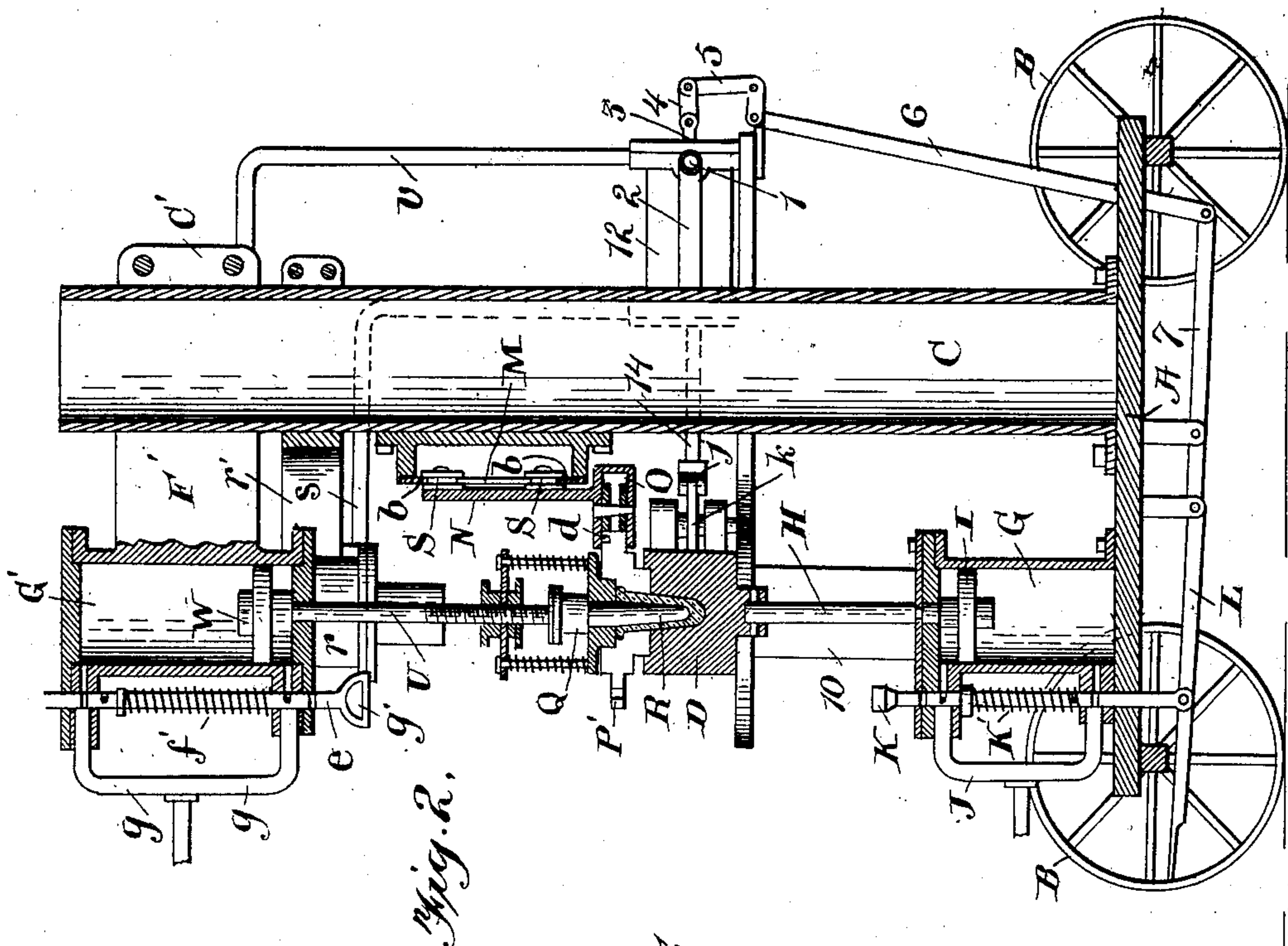


Fig. 2.

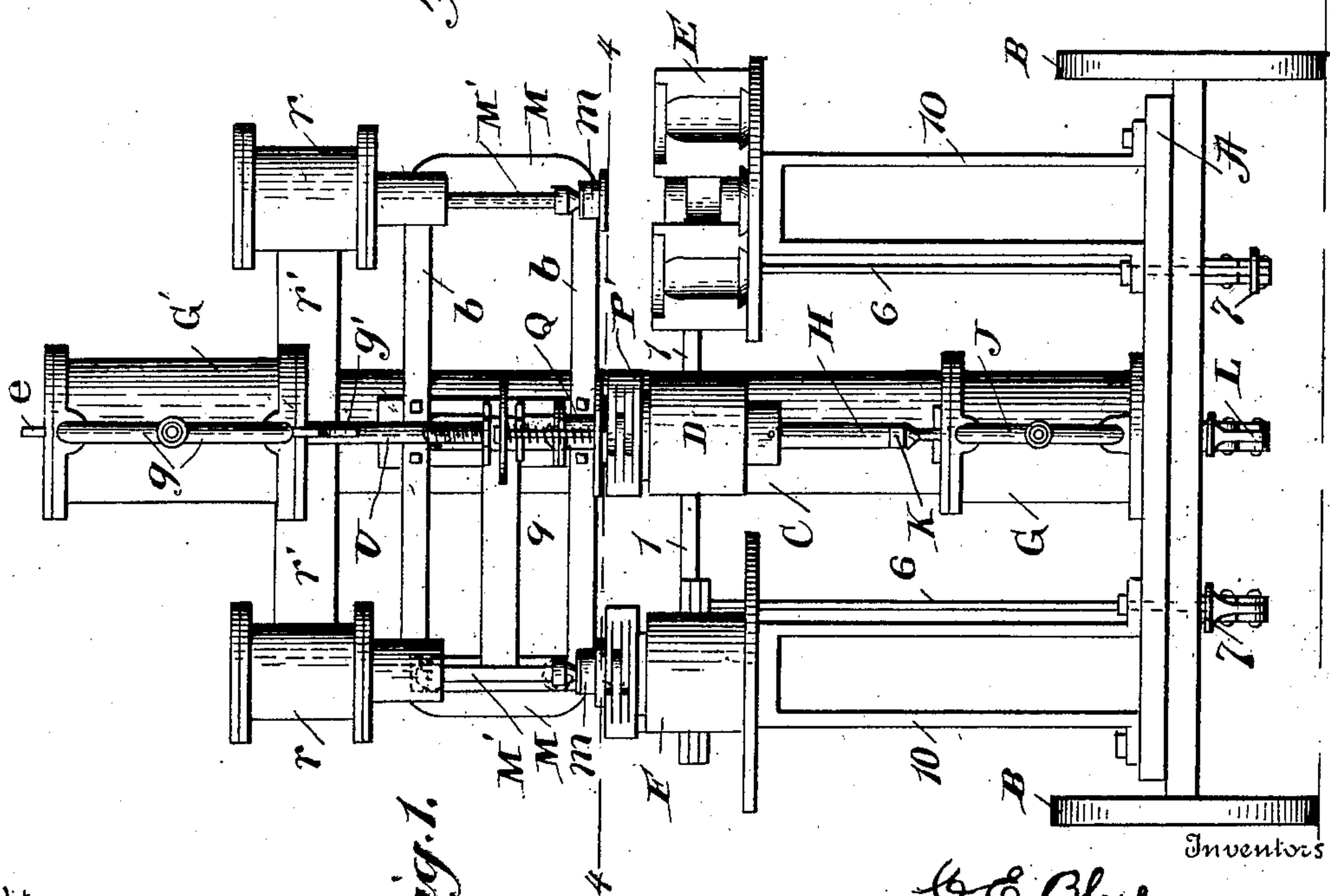


Fig. 1.

Witnesses
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Chas. R. Wright.

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W. B. Jones,
by A. S. Patterson, Attorney

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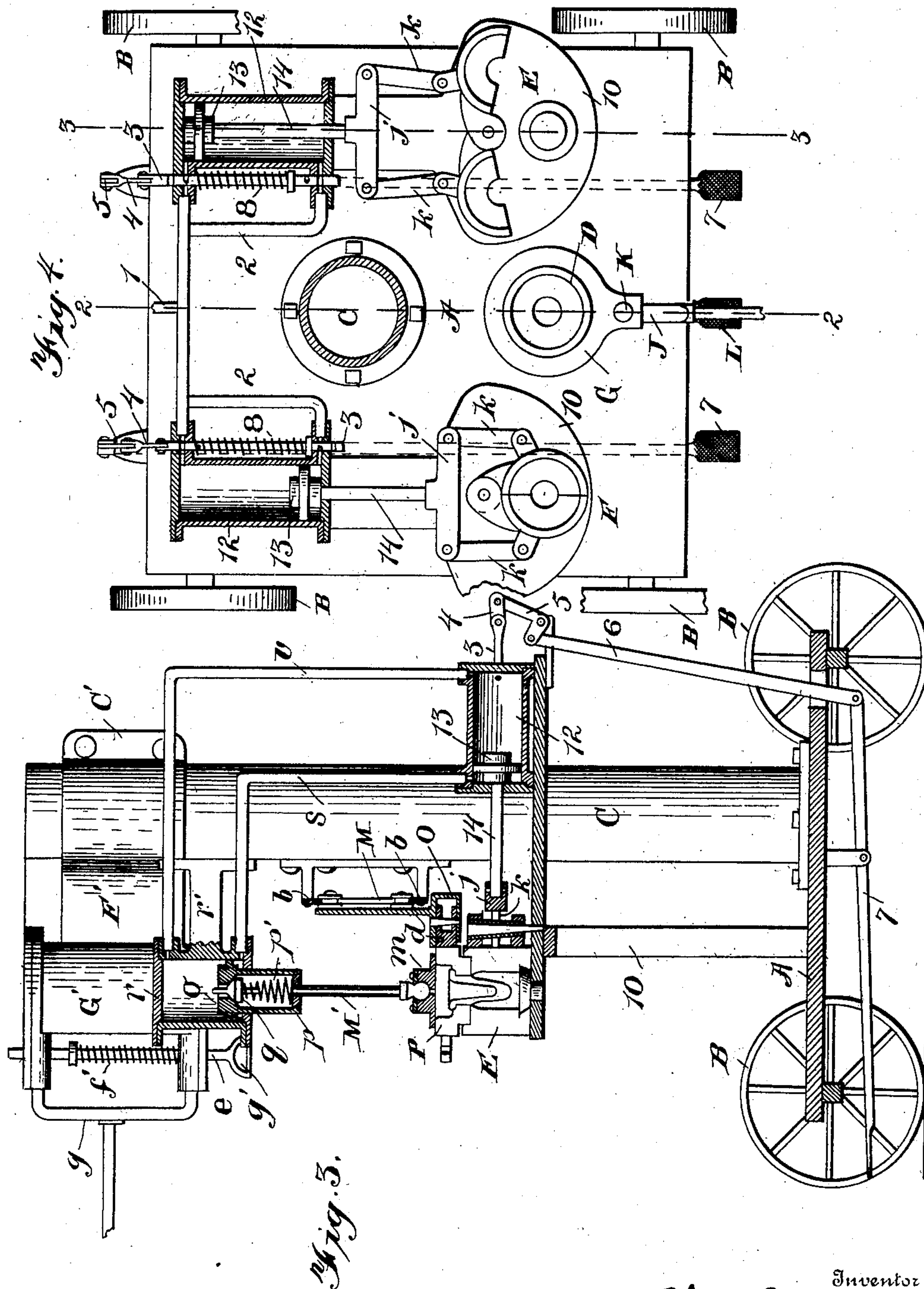
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Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES E. BLUE AND WILLIAM B. JONES, OF WHEELING, WEST VIRGINIA.

MACHINE FOR THE MANUFACTURE OF GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 733,806, dated July 14, 1903.

Application filed June 13, 1899. Serial No. 720,422. (No model.)

To all whom it may concern:

Be it known that we, CHARLES E. BLUE and WILLIAM B. JONES, citizens of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented new and useful Improvements in Machines for the Manufacture of Glassware, of which the following is a specification.

Our invention relates to improvements in machines for the manufacture of glassware, and pertains to a machine constructed to produce a finished article by a pressing and blowing operation; all of which will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a front elevation of a machine embodying our invention. Fig. 2 is a vertical sectional view taken on the line 2 2 of Fig. 4. Fig. 3 is a similar view taken on the line 3 3 of Fig. 4. Fig. 4 is a plan sectional view taken on the line 4 4 of Fig. 1.

Referring now to the drawings, A is a base or platform mounted upon wheels B for the purpose of enabling the machine to be readily moved around. Projecting from this base or platform A, preferably approximately at the center thereof, as indicated in Fig. 4, is a column or standard C.

D is a press-mold in which the molten glass is placed and in which a pressed blank is formed to be afterward expanded in a blow-mold to its finished shape.

Situated at the left of the press-mold D is a blow or finishing mold F, and situated at the right of the press-mold D is another finishing or blow mold E. These blow-molds are supported upon suitable standards 10, which project upward from the base or platform A at opposite sides of the press-mold. Situated between these standards is a cylinder G, carrying a piston I, from which projects a piston-rod H, and this piston-rod H carries and supports the press-mold D and by means of which the press-mold is raised or lowered, as will be more fully described hereinafter.

Communicating with opposite ends of the cylinder G are the pressure-supply pipes J, and regulating the admission of the pressure to opposite ends of the cylinder is a vertically-movable valve K, which has openings arranged so that when the valve is in one position air is admitted to one end of the cylinder

and when in the other position it is admitted to the opposite end of the cylinder for the purpose of raising and lowering the press-mold. The valve K is normally held upward and air is normally admitted to the lower end of the cylinder G, a spring K' serving to hold the valve upward. Pivoted to the under side of the base is a treadle L, which is connected with the lower end of the valve K, as illustrated in Fig. 2, and by means of which the valve is depressed by the foot of the operator when it is desired to lower the press-mold.

The blow-molds E and F preferably, though not necessarily, consist of two horizontally-opening sections and which are of the usual form.

Secured to the standard or column C is an oblong neck-ring-supporting track M, which provides two parallel tracks *b* for supporting a neck-ring support N, which is made of a length to span the space between either of the blow-molds and the press-mold, as illustrated in Fig. 1, and each corner of this neck-ring support N is provided with grooved wheels S, the grooves of which receive the tracks *b* and by which it is supported. The ends of the oblong track M serve as stops for the carrier N, and thus always insures the neck-molds being supported directly over either the right or the left blow-mold and the intermediate press-mold.

The neck-rings P and P' each consist of two separable portions of the usual form, and these are pivoted at their inner ends between the jaws O, and extending from one of the jaws between the two pivoted parts of the neck-ring is a pin *d*, which pin is adapted to form a stop for the two parts of the neck-ring, so that they will always be properly centered when closed over either the press-mold or one of the blow-molds.

The neck-ring support or carrier N is horizontally movable upon its supporting-track for the purpose of carrying the neck-rings into position to cooperate with the central press-mold and the blow-mold F in the position shown in Fig. 1 and when moved to the opposite end of the track M to cooperate with the blow-mold E at the opposite side of the press-mold and with the press-mold. For the purpose of enabling this result the press and the blow molds are situated in a direct line

and in a line parallel to the supporting-track M.

Projecting from the column or standard C is a collar C', which supports cylinders for the purpose of operating the pressing-head and plunger and also for the purpose of operating the blow-heads, as will now be described.

A bracket F', projecting from the collar C', supports a cylinder G', in which is placed a piston W, carrying a piston-rod U, the piston-rod carrying at its lower end the usual or other form of presser-head Q and a plunger R, which is adapted to enter the press-mold when it is elevated for the purpose of forming a pressed blank within the press-mold, the parts assuming the positions shown in Fig. 2 when in act of pressing the molten glass. Communicating with opposite ends of this cylinder G' are pressure-supply pipes *g*, and regulating the supply of the pressure to opposite ends of the cylinder is a valve *e*, carrying at its lower end an operating-handle *g'*. This valve is normally held upward by means of a spring *f'* and to thus normally admit air to the lower end of the cylinder and normally hold the plunger R in an elevated position.

We provide a blow-head *m* for each of the blow-molds, and these blow-heads are supported in a line directly above the blow-molds and adapted to coact therewith. The blow-heads *m* are connected and carried by a tubular piston-stem M', which is connected at its upper end with an enlarged hollow stem *p*, the upper end of this hollow stem being formed into a piston *o*, situated within a cylinder *r*, which is suitably supported by a bracket *r'*, extending from the standard or column C. The upper end of the hollow portion *p* of the piston is provided with a valve-seat, which is normally closed by a spring-pressed valve *q*, a spring *p'* being placed within the hollow portion *p* for the purpose of holding the valve normally to its seat.

Preferably, though not necessarily, we provide a pressure mechanism for opening and closing the blow-molds, and this consists of the two horizontal cylinders 12, each situated directly behind the molds E and F, and situated in these cylinders are the pistons 13, carrying piston-rods 14, the outer ends of the piston-rods having cross-heads *j*, which are connected to the two parts of each of the blow-molds by means of the links *k*. It will be readily understood that when the pistons are drawn backward or outward the molds are opened and when the pistons move inward the molds are closed. Communicating with opposite ends of these pistons are the pressure-supply pipes 2, which are preferably supplied by a main or common supply 1, and the admission of the pressure to opposite ends of the cylinders is regulated by means of the valves 3, which are arranged to admit air to either end of the cylinders, according to their positions. The construction of these valves is well understood and need not be

specifically explained. Springs 8 serve to hold these valves normally in a position to admit air to their outer ends and to thus normally hold the blow-molds closed. These valves 3 are operated by means of independent treadles 7, which are intermediately pivotally supported to the under side of the base A and have their inner ends connected by means of links 6 to bell-cranks 5, which in turn are connected by links 4 to the rear projecting ends of the valves, as clearly illustrated in Figs. 3 and 4. Thus it will be seen that by depressing either of the treadles 7 the operator is enabled to open either of the blow-molds, and when the treadle is released the blow-molds will be automatically opened owing to the valve which regulates the pressure to opposite ends thereof being carried by its spring to the position of admitting air for closing the mold.

Each of the cylinders *r* for operating the blow-heads are connected, respectively, by means of the pipes *s* and *v* with the cylinders 12, the said pipes *s* being connected with the lower end of the cylinders *r* and with the inner ends of the cylinders 12 and the pipes *v* with the opposite ends of said cylinders.

In operation when one of the treadles 7 is depressed for the purpose of closing one of the blow-molds around the depending pressed blank air is admitted at the same time to the upper end of the coacting cylinder *r* for carrying downward the blow-head in position upon the neck-ring thereunder. This air is admitted directly to the cylinder 12 and must pass through the pipe *v* to enter the cylinder *r*. It will be readily understood that the cylinder 12 becomes first filled and its piston moved to the end thereof for closing the blow-mold before the blow-head is carried downward to its position for expanding the pressed blank. The spring *p'* is of a strength greater than the pressure required to depress the piston *o*, and consequently the blow-head, whereby the blow-head is first seated before the valve *q* is moved from its seat for admitting air through the stem and the blow-head to the blow-mold for expanding the pressed blank therein, and when the pressure is released the valve *q* immediately reseats itself and the pressure of air is cut off from the blow-mold and the blow-head withdrawn from the neck-ring. From this description it will be noted that the air-supply for carrying the blow-head to position is used for expanding the pressed blank, which avoids the necessity of having separate supplies for the cylinder and for the blowing operation and which construction also enables us to automatically admit air for expanding the pressed blank, thus avoiding the necessity of separate hand operating devices or of separate automatic mechanisms for accomplishing this function of the machine.

In operation glass is placed in the press-mold either when it is elevated or lowered, as may be desired, and if placed within the

blow-mold when in its lowered position it is then elevated to the position shown in Fig. 1. Then by a downward pull upon the valve *e* the pressing-head and the plunger are carried
 5 into the position shown in Fig. 2 for forming the pressed blank. The operator then releases the treadle *L*, the press-mold is lowered, leaving the pressed blank suspended by the neck-ring *P'*, Figs. 1 and 2, and the
 10 carrier *N* is then moved upon the track *M* to carry the neck-ring *P'* over the blow-mold *E* at the right thereof. The operator then by depressing the treadle 7 closes the blow-mold *E* around the pressed blank, and the blow-
 15 head is carried automatically, as before explained, to and upon the neck-ring, as illustrated in Fig. 3, and air is admitted to the blow-mold and the pressed blank is expanded. The treadle 7 then being released, the blow-
 20 mold is automatically opened, the blow-head automatically moved upward, and then the turning-out boy has simply to open the neck-ring and remove the finished article. This operation is continued, the neck-ring *P* being
 25 in the position in which the neck-ring *P'* is shown in Fig. 1 when the pressed blank is being expanded in the blow-mold *E*, and molten glass having been placed in the press-mold it is pressed, and the carrier *N* is then
 30 moved to the position shown in Fig. 1, which carries the pressed blank to the blow-mold *F*, and there the operation just described is repeated. From this description it will be seen that a pressing and a blowing operation are
 35 being carried on at the same time and that at each operation of the machine a finished article is produced.

While we have explained a pneumatic mechanism for opening and closing the blow-
 40 molds and have shown a closed vertically-movable press-mold, we do not limit ourselves to these specific constructions so far as the other mechanism of the machine is concerned, in that the press and the blow molds
 45 can be of the ordinary open-and-shut construction and operated by hand, as will be readily understood so far as the specific form of carriers for the neck-rings is concerned. We also wish it understood that instead of
 50 using two blow-molds a single blow-mold may be used without departing from the spirit of our invention.

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

1. A machine for the manufacture of glassware comprising a press-mold, a blow-mold, a neck-ring support arranged in a parallel line with the said molds, and a neck-ring sup-
 60 ported by and movable upon the said support at one side of the molds and adapted to be carried over either of said molds.

2. A machine for the manufacture of glassware, comprising a vertically-movable press-mold, a blow-mold at each side thereof and disconnected therewith, a neck-ring support arranged thereabove, two neck-rings support-

ed thereby and adapted to coact with said press-mold and its respective blow-mold, and coacting pressing and blowing mechanism, 70 substantially as described.

3. A machine for the manufacture of glassware comprising a vertically-movable press-mold, a blow-mold at one side thereof, horizontally-disposed tracks arranged one above 75 the other, a neck-ring supported thereby and adapted to coact respectively with said press and blow molds and coacting pressing and blowing mechanism, substantially as described. 80

4. A machine for the manufacture of glassware comprising a press-mold, a blow-mold situated at each side thereof, a horizontally-arranged supporting-track, a neck-ring support carried by and movable upon said track, 85 and two neck-rings carried by the said support at distances apart equal to the distances between the press and the blow molds.

5. A machine for the manufacture of glassware comprising a press-mold, a blow-mold, 90 two parallel tracks one situated above the other, a neck-ring support situated at a point between and engaging said tracks, a neck-ring carried by said support, the tracks arranged to support the neck-rings over the said 95 molds respectively.

6. A machine for the manufacture of glassware comprising a press-mold, a blow-mold at each side thereof, a track arranged horizontally and in a line parallel with the said 100 molds, a support carried by and movable upon said tracks, neck-rings carried by the support and at distances apart equal to the distances between the press-mold and the blow-molds for the purpose of coöperating 105 therewith.

7. A machine for the manufacture of glassware comprising a press-mold, a blow-mold arranged at a fixed distance therefrom, a horizontally-arranged track, a neck-ring support- 110 ed and movable upon the said track and adapted to coöperate with said molds, the track having stops to limit the movement of the neck-ring and to support it over the said molds respectively. 115

8. A machine for the manufacture of glassware comprising a press-mold, a blow-mold at each side thereof, an oblong open supporting-track arranged in a line parallel with said 120 molds, an elongated neck-ring support having its corners engaging the inner edges of said track, and two neck-rings supported by the said carrier at distances apart equal to the distances between the press-mold and the blow-molds. 125

9. A machine for the manufacture of glassware comprising a vertically-movable press-mold, an independent fixed support at each side of said mold, a blow-mold on each support and a movable neck-ring for each blow- 130 mold and adapted to coact with the press-mold, substantially as described.

10. A machine for the manufacture of glassware comprising two blow-molds, fixed sup-

ports for said molds, an intermediate vertically-movable press-mold, and a horizontally-movable neck-ring carrier carrying two neck-rings at distances apart equal to the distances
5 between the press and the blow molds.

11. A machine for the manufacture of glassware comprising an open and shut mold, a vertically-movable member adapted to cooperate with the mold, separate mechanisms for opening and closing the mold and for moving the
10 vertical member and operative connections between the mechanisms whereby when one is operated the other is correspondingly operated.

12. A machine for the manufacture of glassware comprising a mold composed of a plurality of movable portions, a cylinder, a piston within the cylinder operatively connected with the movable portions of the mold for
20 opening and closing it, a vertically-movable member for cooperating with the mold, a cylinder having a piston, said piston connected with the vertically-movable member, and communication between the opposite ends of the
25 said cylinders whereby the pressure which actuates the piston in the one will actuate the piston within the other.

13. A machine for the manufacture of glassware comprising an opening and closing mold, a horizontally-arranged cylinder having a piston, connections between the piston and the
30 mold for opening and closing it by the movement of the piston, a vertically-movable member adapted to cooperate with the mold, a vertically-arranged cylinder, a piston within said cylinder connected with the vertically-movable member, and pipe connections respectively with the upper and lower ends of the
40 vertically-arranged cylinder and the inner and outer ends of the horizontally-arranged cylinder, and a valve controlling the admission of pressure to opposite ends of one of said cylinders.

14. A machine for the manufacture of glassware comprising a blow-mold, a blow-head, a cylinder, a vertically-movable hollow piston within the cylinder having communication with the blow-mold, the said piston having pressure-valves for controlling the admission
50 of pressure within the piston, and pressure communications with opposite ends of the cylinder.

15. A machine for the manufacture of glassware comprising an opening and closing blow-mold, a cylinder having a piston, connections between the piston and the mold for opening and closing it, a vertically-movable blow-head, a cylinder, a hollow piston within the cylinder and connected and in communication
60 with the blow-head, the hollow piston having a pressure-valve controlling communications between the hollow pistons and the cylinder, and communications between the ends of both of said cylinders.

16. A machine for the manufacture of glassware comprising an opening and closing blow-mold, a horizontally-arranged cylinder hav-

ing a piston, connections between the piston and the blow-mold for opening and closing it, a vertically-arranged cylinder, a hollow piston within the cylinder having communication therewith, a blow-head carried by the piston and having an opening in communication with the piston, the piston having a pressure-valve controlling the communication
70 with the cylinder, pipes connected respectively with the ends of both the cylinders and in communication therewith, and a valve controlling the admission of pressure to opposite ends of one of said cylinders. 80

17. A blow-head for a glass-machine comprising a cylinder, a hollow piston having communication with the cylinder, the piston carrying at its outer end a blow-head, an inwardly-opening valve controlling the said
85 communication, pressure communications with opposite ends of the cylinder, a pressure device normally holding the valve closed and of a strength exceeding the pressure required to force the piston outward. 90

18. A machine for the manufacture of glassware comprising an opening and closing blow-mold, a cylinder having a piston, connections between the piston and the mold for opening and closing it, a vertically-movable blow-head, a cylinder, a piston within said cylinder, and connected with and carrying the said blow-head, pipes establishing communication between opposite ends of said cylinder, and a valve controlling the admission of pressure
95 to opposite ends of the mold-actuating cylinder whereby the mold is closed before the blow-head is lowered. 100

19. A machine for the manufacture of glassware comprising two blow-molds arranged on fixed supports, an intermediately vertically movable press-mold, and a horizontally-movable ring-carrier provided with a neck-ring. 105

20. A machine for the manufacture of glassware, comprising a press-mold, a blow-mold, horizontally-extending tracks disposed one above the other, a carrier between said tracks, a laterally-extending arm carried by said carrier, and a neck-ring carried by said arm and traveling parallel with said molds, substantially as described. 115

21. A machine for the manufacture of glassware, comprising a press-mold, a blow-mold on each side of said press-mold, horizontally-arranged tracks disposed one above the other, a carrier between said tracks, two laterally-extending arms carried by said carrier, and a neck-ring carried by each arm, and traveling parallel with said molds and coacting therewith, substantially as described. 125

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

CHARLES E. BLUE.
WILLIAM B. JONES.

Witnesses:

F. S. CAMPBELL,
A. G. HUBBARD.