

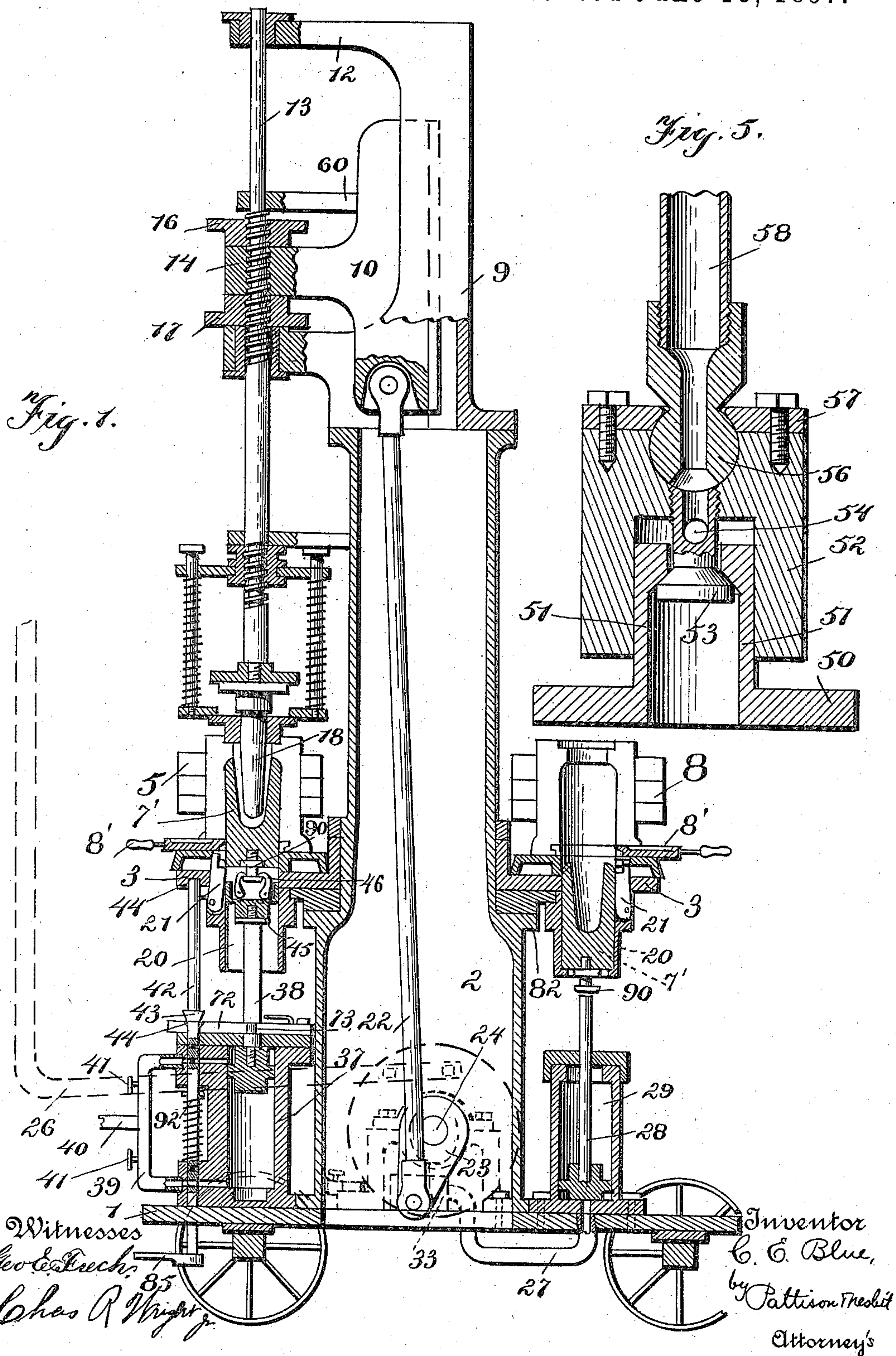
(No Model.)

4 Sheets—Sheet 1.

C. E. BLUE.
MACHINE FOR MANUFACTURING GLASSWARE.

No. 584,665.

Patented June 15, 1897.



(No Model.)

4 Sheets—Sheet 2.

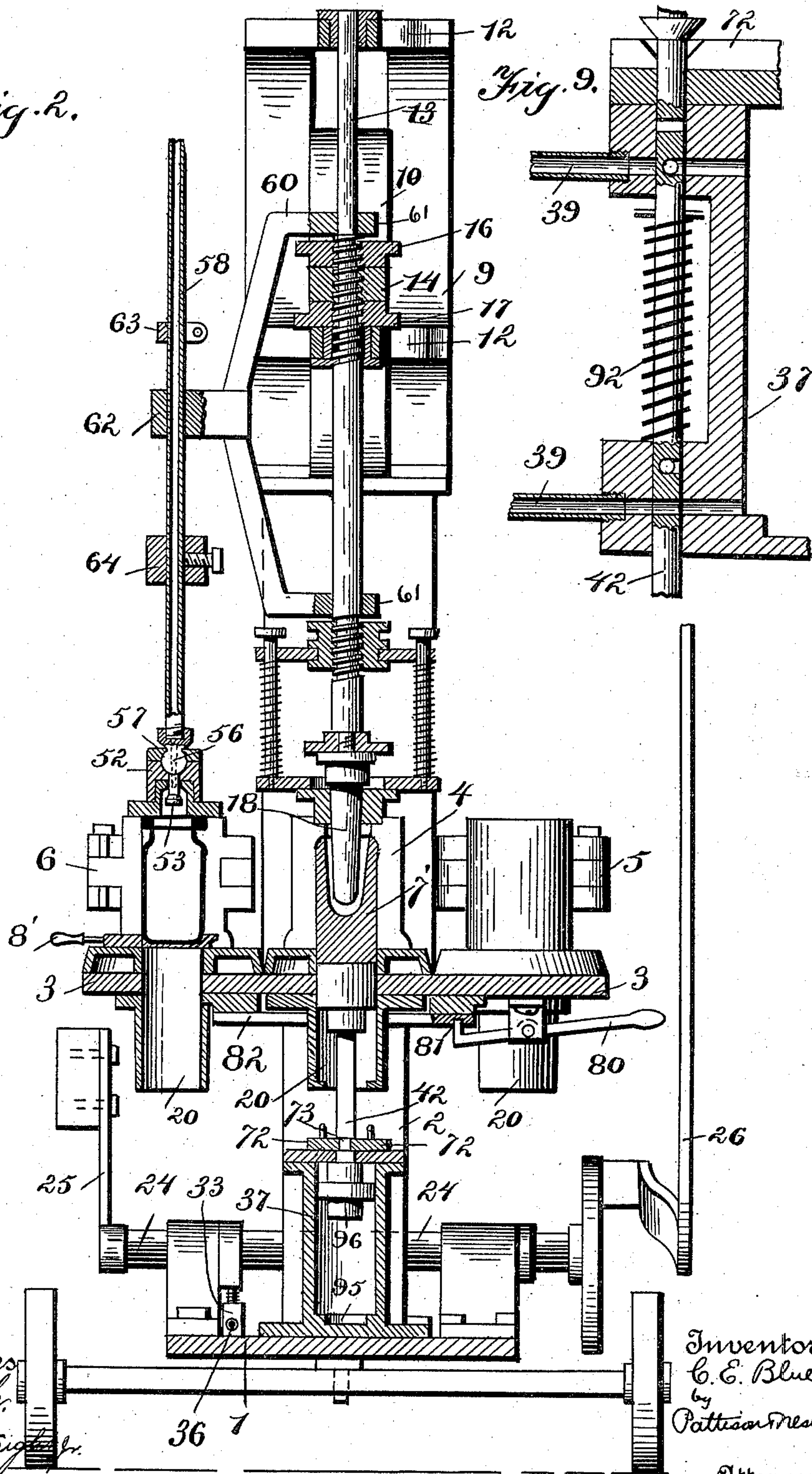
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Fig. 2.

Fig. 9.



Witnesses
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(No Model.)

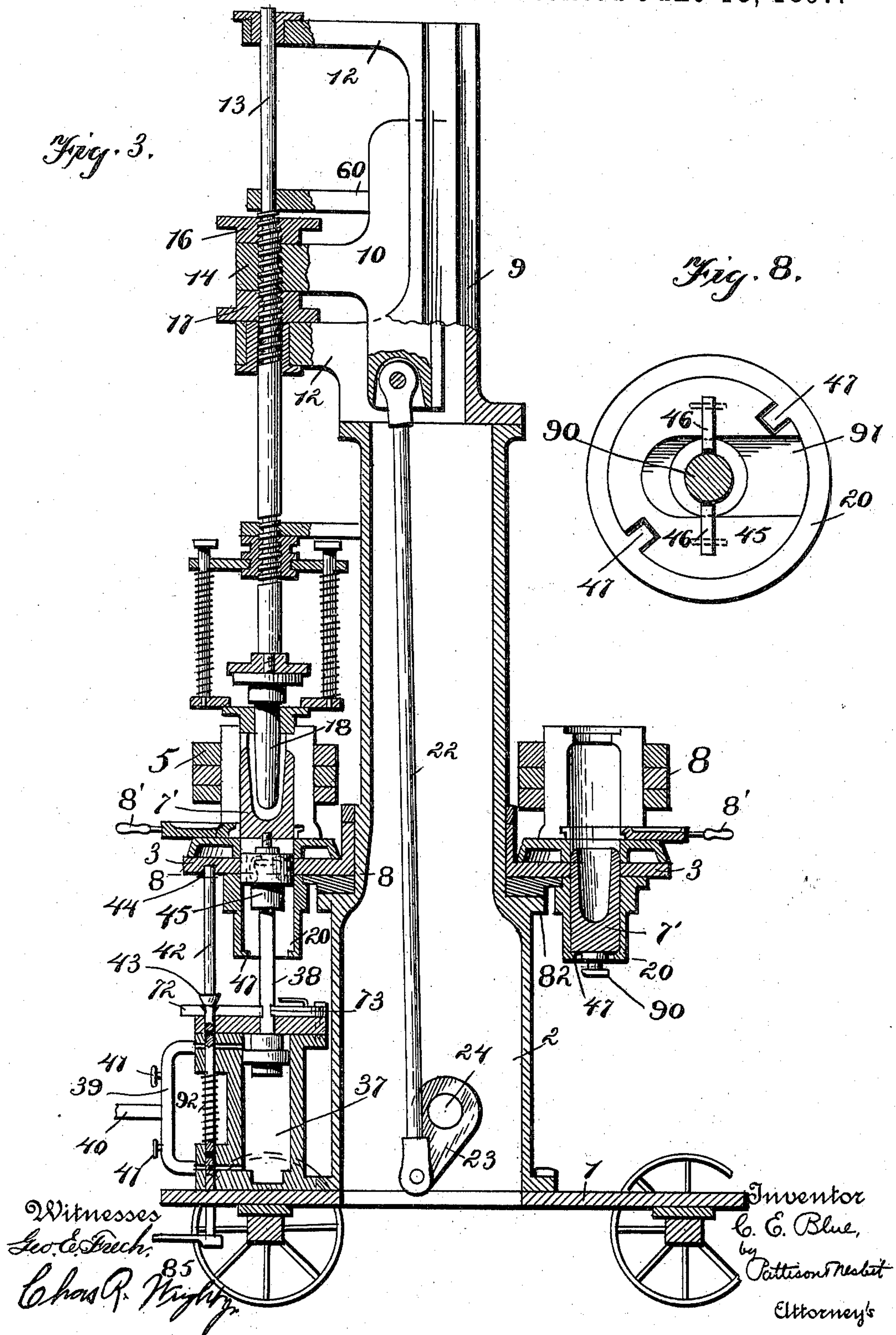
4 Sheets—Sheet 3.

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Fig. 3.



Witnesses
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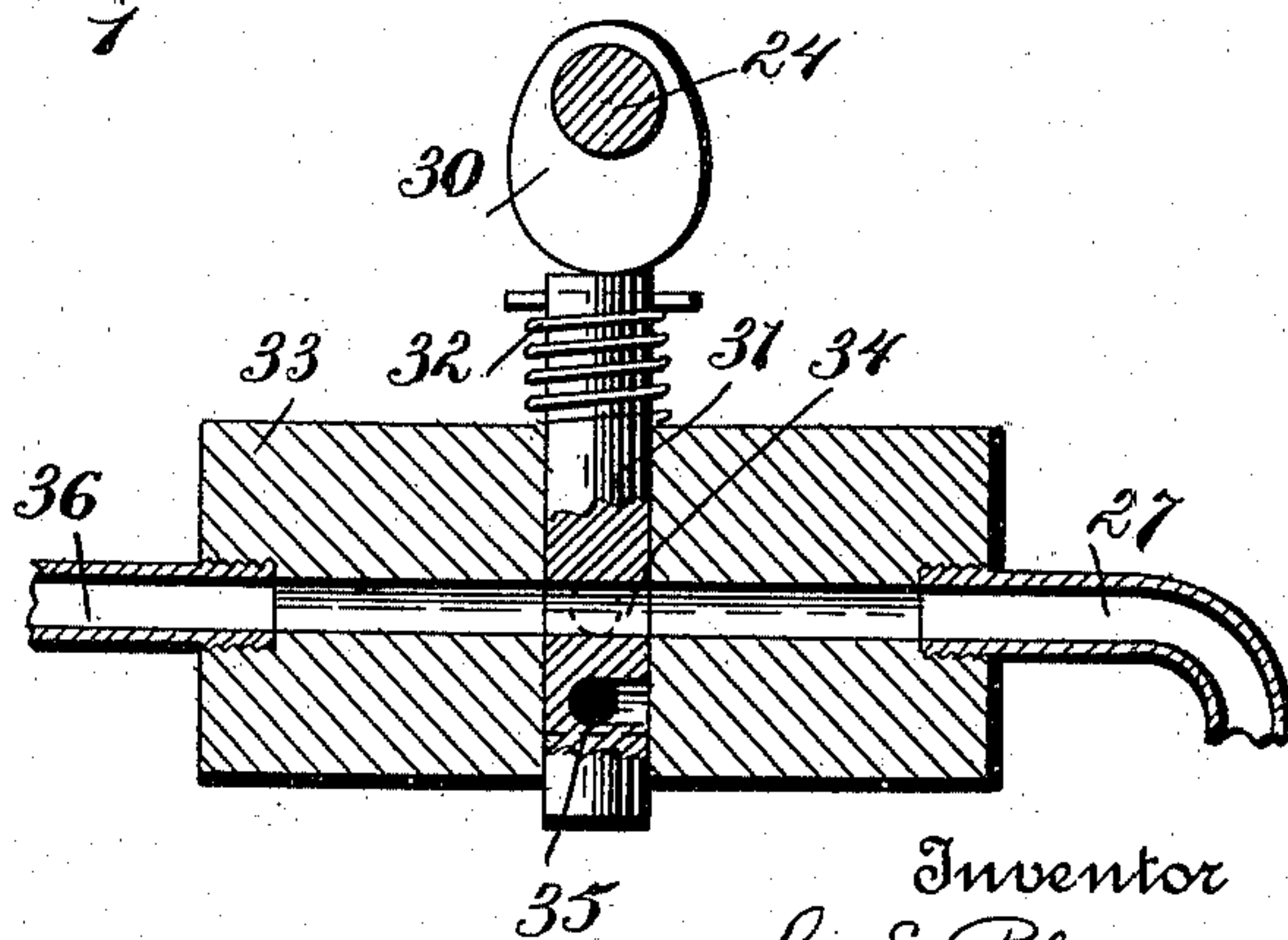
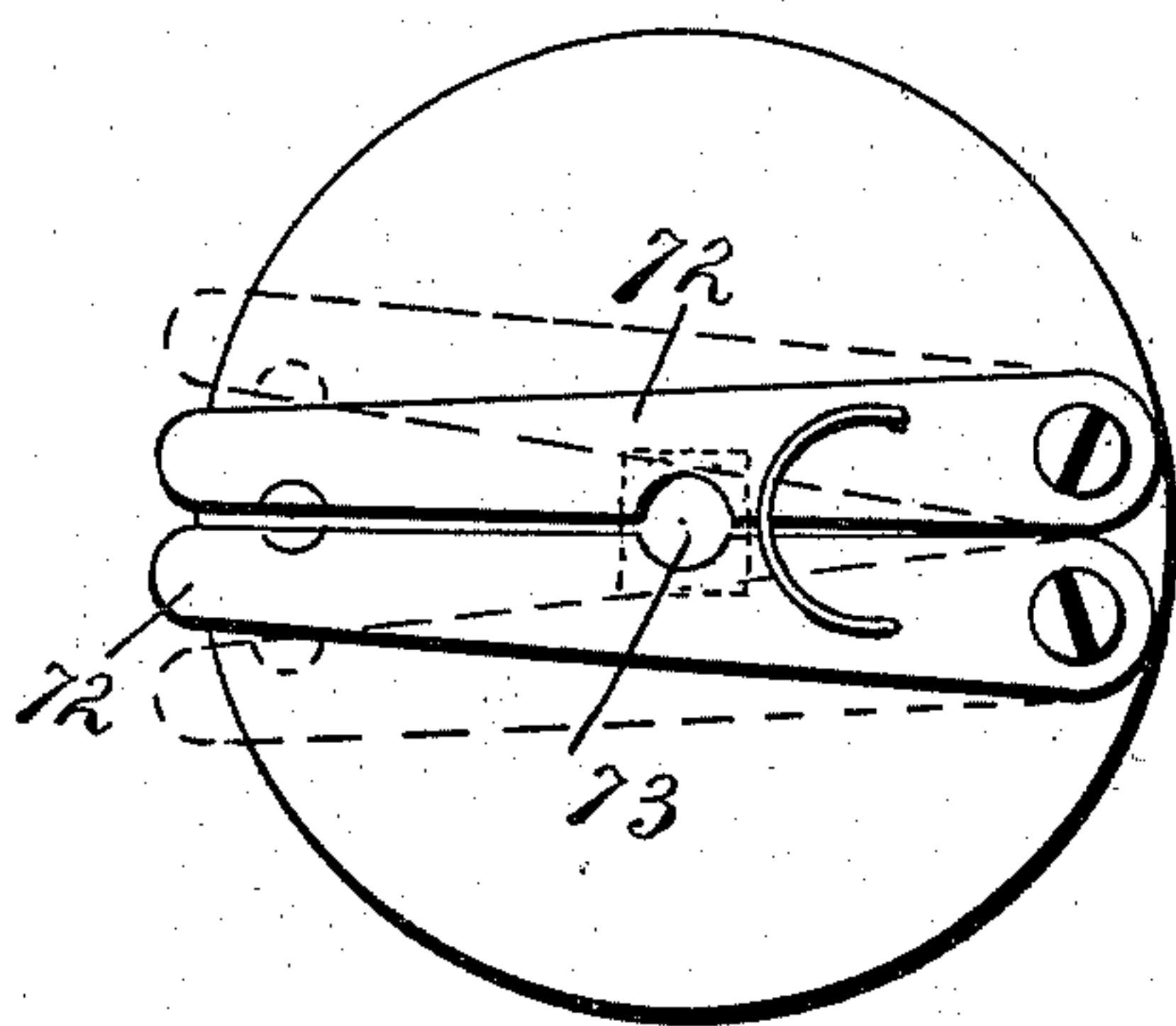
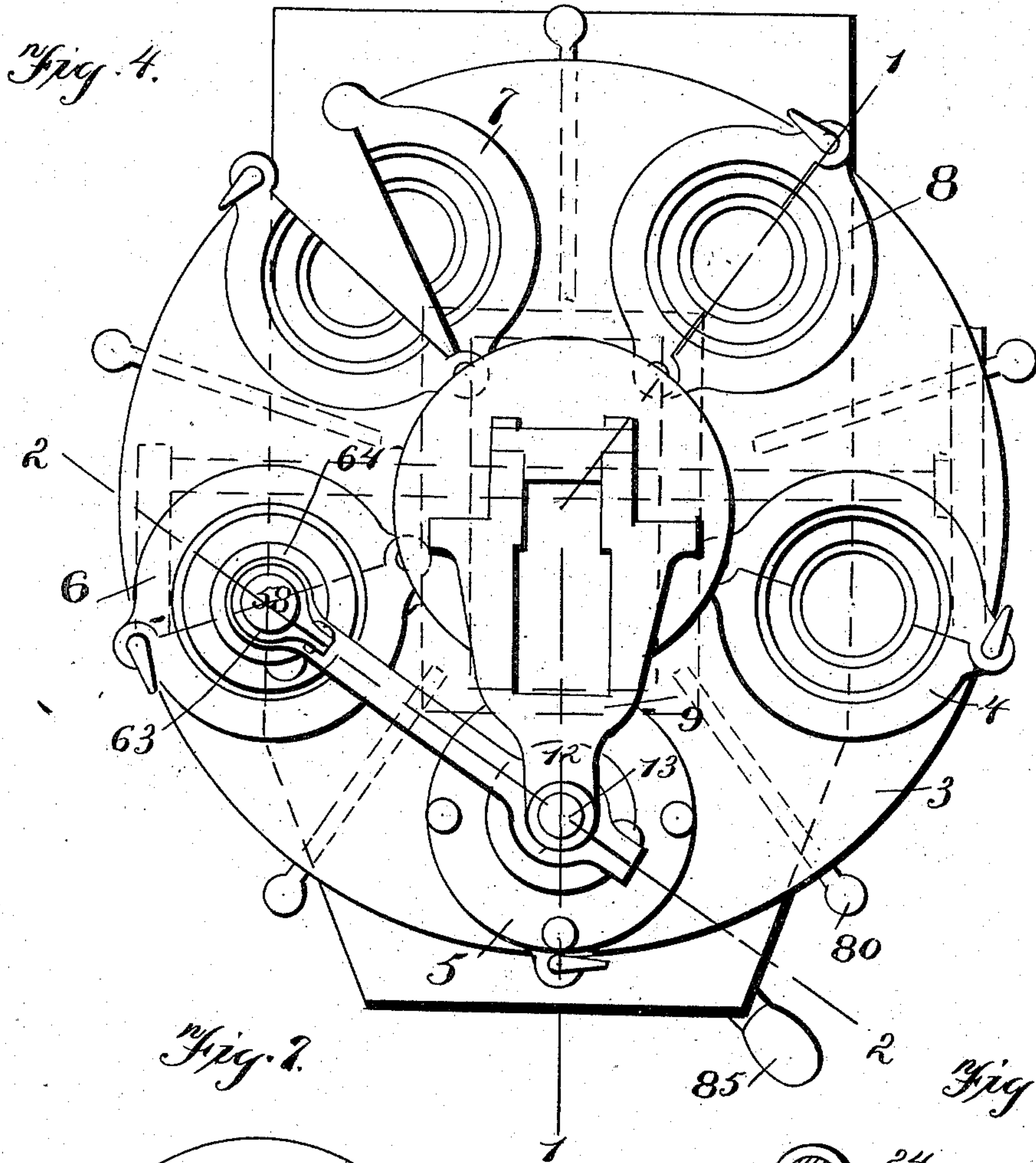
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4 Sheets—Sheet 4.

C. E. BLUE.
MACHINE FOR MANUFACTURING GLASSWARE.

No. 584,665.

Patented June 15, 1897.



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UNITED STATES PATENT OFFICE.

CHARLES EDWIN BLUE, OF WHEELING, WEST VIRGINIA.

MACHINE FOR MANUFACTURING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 584,665, dated June 15, 1897.

Application filed November 16, 1896. Serial No. 612,330. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDWIN BLUE, of Wheeling, in the county of Ohio and State of West Virginia, have invented certain new and useful Improvements in Machines for the Manufacture of Glassware; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in machines for the manufacture of glassware, and pertains to mechanisms comprising a plurality of molds in which the several operations necessary to construct a bottle, jar, or other vessel is respectively performed, whereby a finished article is produced at each movement of the mechanisms.

The object of my present invention is to provide a machine having the mode of operation and advantages hereinafter pointed out, producing a machine simple in construction, reliable in operation, and capable of rapid manipulation.

In the accompanying drawings, Figure 1 is a vertical section of a machine embodying my invention, taken on the dotted line 1 1 of Fig. 4. Fig. 2 is a vertical section of a machine embodying my invention, taken on dotted lines 2 2 of Fig. 4. Fig. 3 is a vertical section taken on the line 1 1 of Fig. 4 and showing a modification of my invention. Fig. 4 is a top plan view of my invention. Fig. 5 is an enlarged detail view of the blowing-head. Fig. 6 is an enlarged sectional detail view showing the valve for admitting air to the cylinder 29. Fig. 7 is an enlarged top plan view of jaws used in connection with the mechanism for withdrawing the primary mold from its operative position. Fig. 8 is a sectional view taken on the line 8 8 of Fig. 3. Fig. 9 is an enlarged sectional detail view of the cylinder-valve.

Referring now to the drawings, 1 indicates a base, which is preferably supported upon wheels, as here shown, and this base carries a hollow housing 2. Supported upon and surrounding the housing 2, intermediate its ends upon a ring 82, is a table 3. This table is capable of rotation around the housing 2 and

carries a plurality of molds, including, preferably, a charging, a blowing, a fixing, a removing or discharging, and a refixing or arranging mold numbered, respectively, 4, 5, 6, 7, and 8 in Fig. 4.

Each of the molds is provided with a primary bottom 7' and a secondary bottom 8'. The function of the primary bottom is to have the glassware charged therein and then pressed and then removed from its operative position, and the secondary bottom 8' supplementing it for the purpose of forming a blowing-bottom, as indicated clearly in Fig. 2 of the drawings, all of which is well understood by those versed in the art.

The table carries depending casings or receptacles 20, in which the primary bottoms 7' extend when they are out of operative position, the lower ends of the casings or housings 20 being provided with lips 47, adapted to arrest and support the primary bottoms in their lower positions, as clearly illustrated in the drawings.

Passing through the lower end of the housing is an operating-shaft 24, carrying a crank 23, to which the lower end of a pitman 22 is connected in any suitable manner. The upper end of the pitman 22 is suitably connected to a vertically-movable head 10, supported and movable vertically within an extension 9 of the housing 2, the said extension forming a slideway and a support for the head 10. The extension or slideway 9 is provided at its lower end with a laterally-extending arm and at its upper end with a corresponding laterally-extending arm 12, which form guides and supports for the presser-head rod 13. A laterally-projecting arm 14 is provided upon the head 10, through which the presser-head rod 13 passes. Above this arm 14 is an adjusting-nut 16 and beneath it an adjusting-nut 17, through the medium of which the rod 13 can be adjusted vertically through the arm 14 of the head 10, as may be desired. An operating-lever 26 is connected with a wheel on the arms at one end of the shaft 24, and the opposite end of the shaft is provided with a counterweighted lever 25, as illustrated clearly in Fig. 2. When the operating-lever 26 is actuated, the shaft 24 moves through a portion of a revolution and through the medium of the crank 23 and pitman 22 moves

the head 10 up or down, according to the direction in which the operating-lever is moved. The lower end of the rod 13 carries the presser-head 18 and also the usual spring mechanism just above the presser-head, and which is so well understood by those skilled in the art that reference and description thereof in this application is considered unnecessary.

10 Situated upon the base 1 at a point under the fixing-mold 8 is a cylinder 29, carrying a piston-rod 28, with a piston-head thereon, the upper end of the said rod 28 being adapted to engage the lower end of the primary bot-
15 tom when the table or carrier is at rest. A pipe 27 communicates with the lower end of this cylinder 29 and also with a block 33, having a longitudinal opening, as clearly shown in Fig. 6, the other end of the block commu-
20 nicating with any source supplying air through the medium of a pipe 36. Passing vertically through the block 33 is a vertically-movable valve 31, which is normally held up by means of a spring 32, surround-
25 ing the upper projecting end thereof. This valve is situated immediately below the operating-shaft 24, and the shaft 24 carries a cam 30, adapted to engage the upper end of the valve. This valve has a passage 34,
30 adapted to aline with the opening in the block 33, so that when the valve is depressed, as illustrated in Fig. 6, air is permitted free access to the lower end of the cylinder 29, which forces the rod 28 up, carrying with it
35 the primary bottom 7'. When the pitman is moved downward by the oscillation of the shaft 24 to lower the presser-head and perform the pressing operation, the valve 31 is depressed and air admitted into the cylinder
40 29, as just stated. When, however, the shaft 24 is oscillated through the medium of the handle 26 to elevate the presser-head after the pressing operation, the cam 30 is rotated out of engagement with the valve 31, which
45 permits it to move upward, bringing the opening 35 in alinement with the opening in the block 33. This upward position of the valve permits a lateral escape of the air through the block 33 as the piston-rod 28 and
50 its head moves downward in the cylinder under their own weight. From this description it will be seen that while one primary bottom of a mold is moved upward automatically by the pressing action the pressing of
55 the glass is being performed in another, blowing may be going on in a third mold, and the opening and the removal of the finished glass article from still another mold may be simultaneously going on.

60 Situated on the base 1 at a point below the pressing-mold 5 is a cylinder 37, carrying a piston-rod 38, having a piston-head movable within the cylinder 37, the upper end of the rod having a head 45, provided with catches
65 46, the said head having a lateral opening 91, for a purpose to be presently described. A pipe 39 has its opposite ends communicating

respectively with the upper and lower ends of the cylinder 37, as shown in Fig. 1, and air is fed to this pipe 39 through the medium
70 of a pipe 40, communicating with any source of air-supply, said pipe 40 having regulating valves 41, by means of which the flow of air to opposite ends of the cylinder can be regulated. A rod 42 has its upper end adapted
75 to engage openings 44 in the under side of the table 3, and this rod is adapted to move downward, being held normally upward through the medium of a spring 92. This rod 42 has at its lower end a foot-piece 85, by
80 means of which it may be depressed. The rod passes through the air-communication to the cylinder and is provided with openings, so that when the rod is in its upward position air is admitted to the lower end of the
85 cylinder and permitted to escape at its upper end, and when the rod is depressed air is admitted to the upper end of the cylinder and allowed to escape at the lower end.

Situated adjacent to each of the primary
90 bottoms 7' is a holder 21, here shown in the form of a latch. When the bottom is forced upward through the medium of the rod 28 in the cylinder 29, the holder automatically drops inward by gravity under the primary
95 bottom and holds it in the upward position ready to be charged when it reaches the position 4 in Fig. 4, and it is sustained in this upward position until it reaches the pressing
100 position 5 in Fig. 4. When it has reached this position and after the pressing-head has been depressed and the pressing operation performed, the operator places his foot upon the foot-piece 85 of the rod 42, which first
105 separates the jaws 72, through the medium of a wedge or cam 43, secured to the rod 42, and which engages the jaws when the rod is depressed and forces them apart. These jaws 72 are provided with an opening 73 through
110 which the rod 38 passes, the rod having a shoulder to rest upon the upper side of the jaws, so that when the rod has been forced upward it is held in this upward position for sustaining the primary bottom. The jaws having
115 been separated by the downward movement of the rod 42 and the upper end of the said rod thrown out of engagement with the opening 44, the operator then, by means of the handle 80, moves the table around until the next
120 mold is brought to position for pressing, at which time the upper end of the rod 42 will automatically drop into its opening 44, thus automatically admitting air to the lower end of the cylinder 37 and automatically forcing
125 upward the rod 38, the rod carrying a valve which controls the primary bottom at the pressing-point. The upper end of this rod, as before stated, carries a head 45, provided with catches 46, and these catches automatically grasp the headed projection 90 upon
130 the lower end of the primary bottom. The depression of the rod 42 causes the air to force the rod 38 downward, which carries with it the primary bottom, and when in this

downward position the table may be revolved, the headed projection 90 passing out of the lateral opening 91 in the head 45. The upward movement of the head 45 engages the holder or supporting-latch 21 and throws it out of engagement with the lower end of the primary bottom, so that the primary bottom is no longer locked in its upward position, but is permitted to move downward with the rod 38.

The presser-head rod 13 supports an essentially U-shaped arm 60, with its ends 61 encircling the rod, and this U-shaped arm or frame 60 is provided at its center with a laterally-projecting arm 62, through which a hollow rod or pipe 58 freely passes. The lower end of this rod 58 is provided with a ball-joint 56 in the upper end of a portion of the blower-head 52. The ball-joint 56 is held in position by a plate 57, as clearly illustrated in Fig. 5, and the portion 52 carries a valve 53, projecting downward within the cavity formed therein. The blower-head proper, 50, has an upward extension 51, movable vertically within the cavity or recess formed in the portion 52, and the valve 53 has a stem which is made hollow at its upper portion and communicates with the opening made in the ball-joint 56. An opening 54 is made laterally through the valve-stem, which permits the air to pass laterally therethrough and above the upper end of the extension 51 of the blower portion of the blower-head 50. When the head 10 is moved upward for carrying the presser-head out of the mold, the arm 62 of the U-shaped frame 60 engages an adjustable stop 63 upon the pipe or hollow rod 58, moving the rod upward, and in this upward movement the lower portion 50 of the blower-head drops down and the valve 53 is seated. This position cuts the air off, and the air above the upper end of the extension 51 serves to seat it firmly and to more perfectly cut off the escape of any air. When the head 10 is lowered for the purpose of pressing the glass in the mold, the lower portion 50 of the blower-head resting upon the upper end of the mold, it forces downward the portion 52, thus unseating the valve 53 and permitting air to escape around its stem into the mold through the portion 50, thus blowing or expanding the pressed glass previously placed therein, as illustrated in Fig. 2. The hollow pipe or rod 58 is provided with a weight 64, so that when it is permitted to drop it will be sure to unseat the valve 53 by forcing the portion 52 down upon the extension 51 of the blower-head seat 50. Through the medium of the adjustable stop 63 the blower-head can be adjusted to seat itself at exactly the proper time, as will be readily understood.

It will be noted from the above description that all manipulations of the primary and secondary bottoms are performed completely and wholly while the table is at rest. This is a great advantage in that it reduces the

amount of power in operating the machine. That is to say, where any means is used to cause the movement of either the secondary or the primary bottoms or of both of them, or of controlling them in any manner through the medium of the movement of the table, it requires considerable power to move the table and makes it extremely laborious upon the operator. This is avoided absolutely in my construction, the operator only being called upon to move the presser-head up and down through the medium of the lever 26 to depress the foot-piece 85 and to turn the table. As the turning of the table does not perform any function in the way of operating any part of the machine, it is readily turned with but little labor and is a great saving upon the operator. By means of the mechanism herein described the laborious part of the operation is performed by air-pressure and not by the operator, since the head 10 and the lever 26, as well as the pitman 22, are counterbalanced through the medium of the weighted lever or arm 25 upon the shaft 24, thus enabling the pressing operation to be easily accomplished at the expense of but little labor.

In Fig. 3 I illustrate a modification of my machine by which the supporters or controllers 2i are omitted, and likewise the cylinder 29 and its coöperating mechanism. In this instance the primary bottom remains down until it reaches the pressing position, when the rod 42, moving upward automatically by dropping in its opening 44, admits air to the lower end of the cylinder, which carries the primary bottom upward in position to be charged, and after the charging operation the pressing is carried on as described in relation to Fig. 1. In this instance the upper end of the head 45 will have a curved groove like unto the groove 91 in Fig. 8, except the groove will extend entirely through the head, so that as the table is rotated the headed projection 90 upon the lower end of the primary bottom will move into the said slot and be engaged by the catches carried by the head. When the pressing has been performed, a downward movement of the rod 42, through the medium of the pedal or foot-piece 85, admits air to the upper end of the cylinder, as described in relation to Fig. 1, which causes the primary bottom to be carried downward, when, owing to the fact that the slot extends entirely across the head, the table can be rotated and the headed projection 90 moved from engagement with the head 45 of the rod 38. This construction is not so desirable as that shown in Fig. 1, in that the charging is performed at the pressing-point, thus delaying the pressing until the charging has been completed. By the construction in Fig. 1 the charging, pressing, blowing, discharging, and refixing of the bottoms are all being performed at the same time, thus enabling the machine to be more rapidly manipulated, as will be readily understood. It will also be noted that the movement of the presser-head,

or rather the movement of the presser-head rod, controls the blowing mechanism through the medium of the U-shaped frame 60 and its arm 62. This accomplishes in a single movement both the pressing and the blowing of the glass.

Through the medium of the ball-joint 56 the lower or seating portion of the blowing-head 50 is permitted to seat itself at all times perfectly in contact with the face of the mold, which is necessary to accomplish an air-tight joint.

In the lower end of the cylinder 37 is provided a cavity or recess 95, and the lower side or end of the piston-head within the cylinder is provided with a projection 96. The object of this is to form an air-cushion for arresting the downward movement of the piston-head under the weight of the primary bottom when air is admitted at the upper end of the cylinder. This relieves the machines of the concussion and jar which would otherwise occur.

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

1. In a glass pressing and blowing machine, the combination of a single endless carrier, a plurality of primary mold-bottoms carried by said carrier, a plurality of mold-bodies carried by said carrier, one for each primary bottom, the said bottoms and mold-bodies being in fixed relative relations and moving together, secondary bottoms for said mold-bodies supported by said single carrier, and an actuating member for said primary bottoms situated at a point below the pressing point or mold and independent of said carrier, substantially as described.

2. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for the said molds, an actuating member for elevating the primary bottom, a support holding the primary bottom when elevated, and an actuating member independent of the carrier adapted to engage the elevated primary bottom, disengage the support therefrom and to lower the primary bottom, substantially as described.

3. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for the said molds, the said molds including a fixing, charging, pressing and blowing mold, an actuating member situated at the fixing-mold when the carrier is at rest and independent thereof, said actuating member adapted to carry the primary bottom to its operative position, a holder supporting said bottom in its raised position, and an actuating member situated at the pressing-mold adapted to lower the primary bottom, substantially as described.

4. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and

secondary bottoms for said molds, an actuating member for carrying the primary bottom to operative position, said actuating member situated in advance of the pressing mold or point, a holder supporting said bottom in its raised position, and an actuating member independent of the carrier and situated at the pressing mold or point, said member being vertically movable and controlling the downward movement of the primary bottom, substantially as described.

5. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, an actuating member for moving the primary bottom to operative position, a pressing mechanism, a communication between the actuating member and a motor, a controller situated in the said communication, the pressing mechanism constructed to regulate the communication-controller, substantially as described.

6. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, a cylinder situated at the fixing-point for moving the primary bottom to operative position and independent of the carrier, a piston head and rod within the cylinder, the rod adapted to engage the primary bottom for moving it to operative position, a communication with the cylinder and an air-supply with the communication, a valve situated in the said communication and controlling the same, and an operative connection between the valve and the pressing mechanism, substantially as described.

7. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, a reciprocating member adapted to move the primary bottoms to operative position, a pressing mechanism, an oscillating or reciprocating member connected with and operating the pressing mechanism, an air-supply, a communication between the reciprocating member and the air-supply, a valve situated in the air communication, said oscillating or reciprocating member having a cam adapted to engage the valve and control the communication, substantially as described.

8. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds, primary and secondary bottoms therefor, a cylinder, a piston head and rod adapted to operate the primary bottoms, a motor, a communication between the motor and the opposite ends of the cylinder, a movable controller for said communication to the cylinder, the controller engaging the carrier, the carrier constructed to automatically regulate the controller, substantially as described.

9. In a glass pressing and blowing machine, the combination of an endless carrier, a plu-

ality of molds carried thereby, primary and secondary bottoms for said molds, a cylinder independent of the carrier, a piston head and rod within said cylinder and adapted to operate the primary bottoms, a communication with the cylinder, a valve controlling the communication, a connection between the valve and the carrier, the carrier being constructed to control the valve, substantially as described.

10. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, a cylinder independent of the carrier, a piston head and rod for said cylinder adapted to control the primary bottoms, a communication with the cylinder for controlling the movement of the piston-head, a valve for said communication, the carrier having shoulders or depressions, the valve having an extension adapted to be controlled by the shoulders or depressions and thus control the communication to the cylinder, substantially as described.

11. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds, a cylinder independent of the carrier, a piston head and rod for the cylinder adapted to operate the primary bottoms, a communication with the cylinder, a valve controlling the communication, the valve having an extension engaging the carrier, the carrier having shoulders or depressions for the end of the extension, a spring for holding the extension normally in contact with the carrier, the valve having an operating extension or foot-piece for moving it in one direction, against the tension of the spring, the parts adapted to operate as described.

12. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, a cylinder independent of said carrier, a piston head and rod for said cylinder, the rod adapted to engage and be separated from the primary bottoms, communications at each end of the said cylinder to admit pressure to operate the piston, a valve controlling said communications, the valve having its upper end extended and engaging the carrier, the carrier having shoulders or depressions controlling the extension, a spring for holding the extension in contact with the carrier, and a foot-piece for moving the valve against the tension of the spring.

13. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, a pressing-head, a reciprocating member actuating the pressing-head, a blowing-head, having an opening communicating with the mold, a hollow rod or pipe communicating with the blow-

ing-head, a connection between the blowing-head and the said reciprocating member, a lifting-stop connected with the blowing-head and adapted to be engaged by the reciprocating member, substantially as described.

14. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, a pressing-head, a blowing-head, a reciprocating member connected with the pressing-head, a supporting hollow rod for the blowing-head, the blowing-head having an opening in communication with said pipe, an arm extending from said reciprocating member through which the said pipe loosely passes, and a stop on said pipe above and adapted to be engaged by said arm, substantially as described.

15. A blow-head for glass-blowing machines consisting of upper and lower members having pressure communications, one member having a valve-seat, and the other member a valve having a hollow stem forming part of said pressure communication, substantially as described.

16. A blow-head for glass-blowing machines, comprising a seating member, a lifting member, one member having an opening, and the other member a projection movable in said opening, the members having pressure communications, said projection having an internal valve-seat, the other member a valve-stem projecting through said seat and carrying a valve, said stem having a pressure-outlet above the valve for the purpose described.

17. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, a cylinder independent of said carrier, a piston head and rod for said cylinder adapted to lower the primary bottoms, jaws supporting the piston-rod when the rod is elevated, and a member to separate the jaws and release the rod, substantially as described.

18. In a glass pressing and blowing machine, the combination of an endless carrier, a plurality of molds carried thereby, primary and secondary bottoms for said molds, a cylinder independent of said carrier, a piston head and rod for said cylinder adapted to operate the primary bottoms, a pressure communication for said cylinder, a supporting member for said piston-rod when elevated, a valve controlling said cylinder communication, the movement of the valve controlling and operating the supporting member for releasing the piston-rod, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES EDWIN BLUE.

Witnesses:

A. G. HUBBARD,
L. V. BLUE.