No. 698,818. Patented Apr. 29, 1902.

L. H. COLBURN.

GLASS BLOWING MACHINE.

(Application filed Apr. 25, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

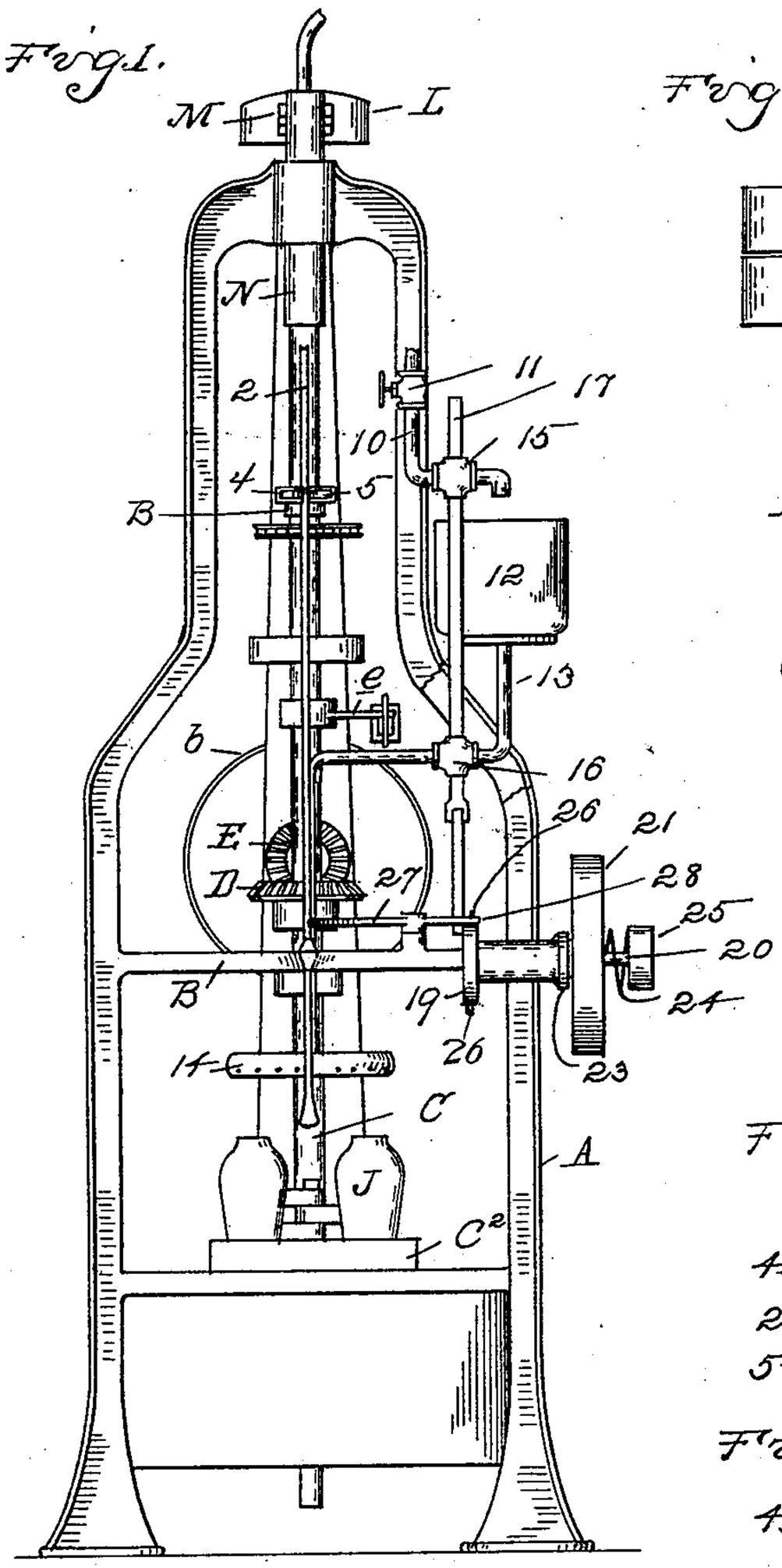


Fig. 9.

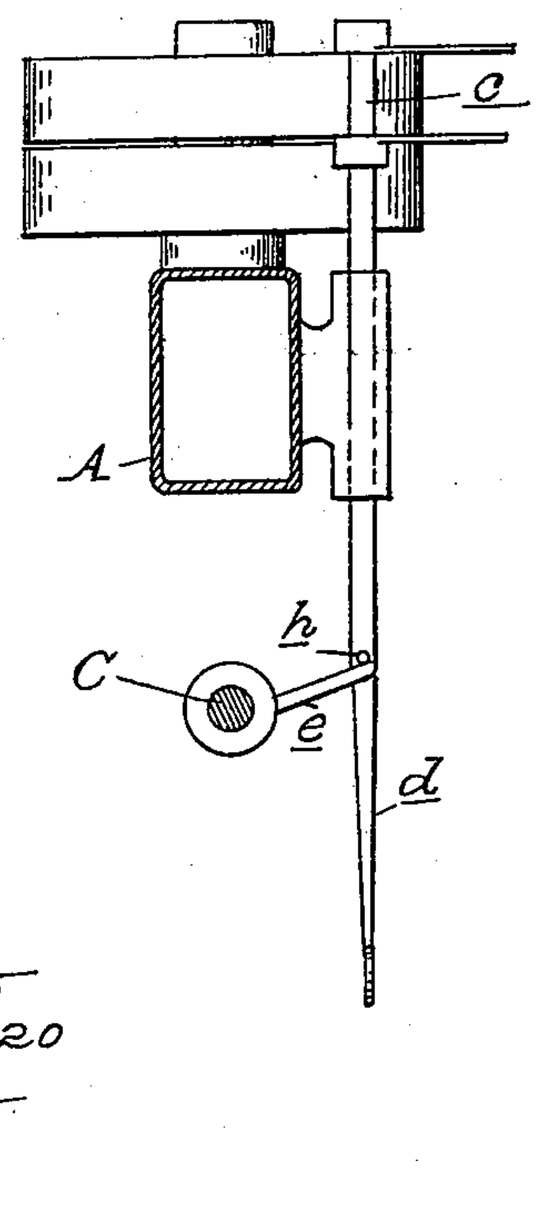


Fig. 8.

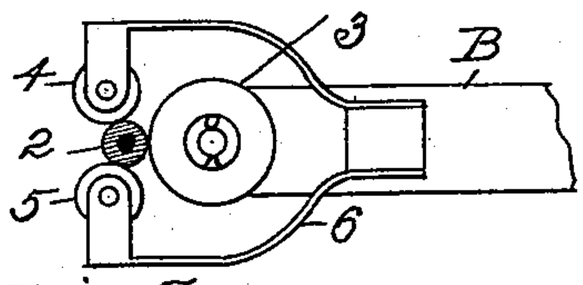
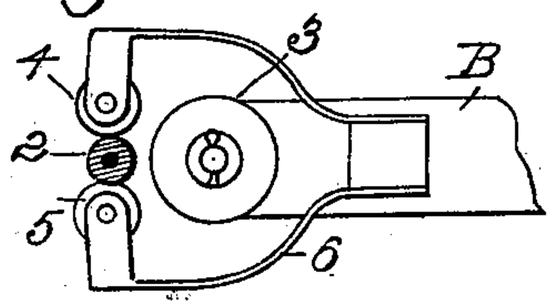


Fig. 7.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

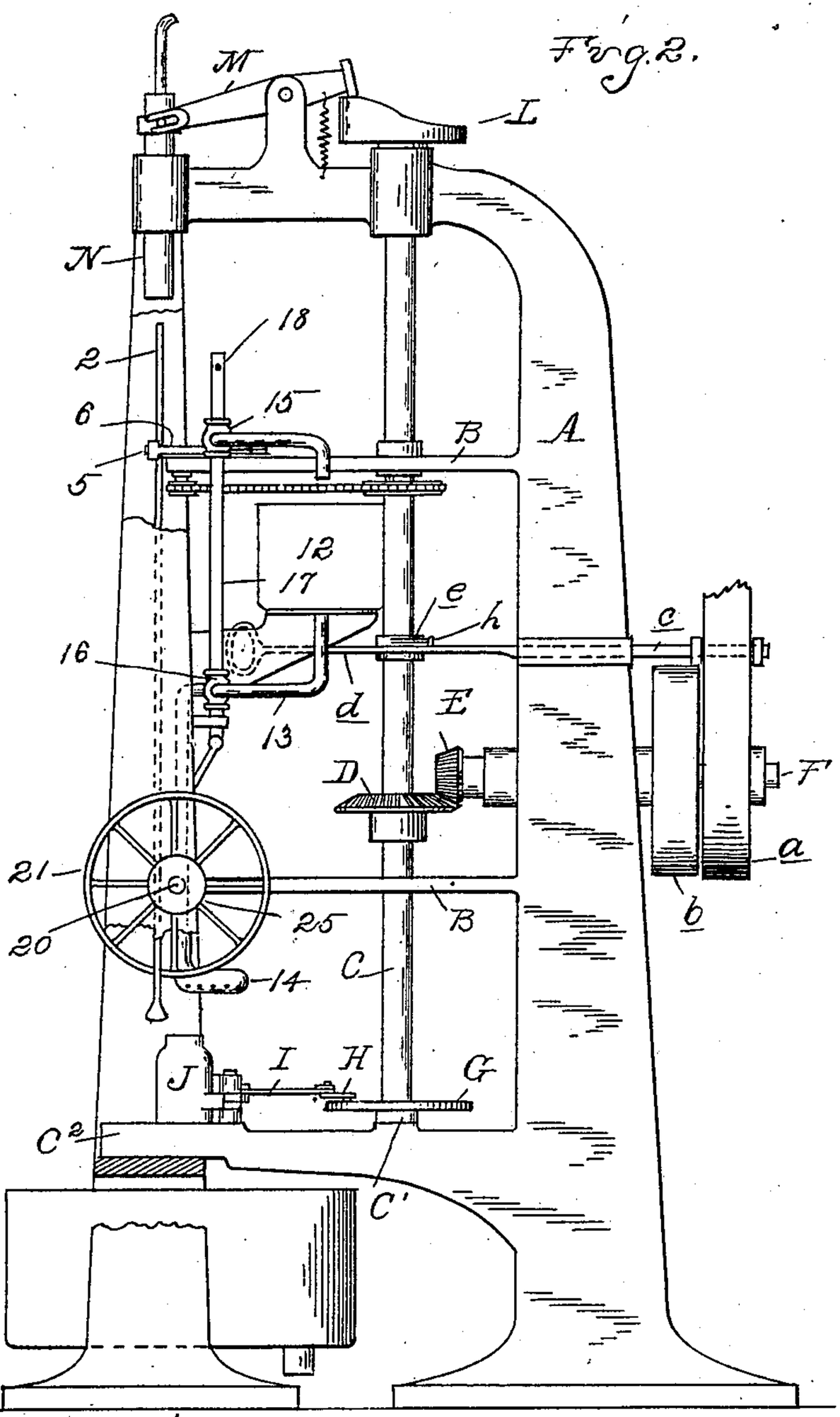
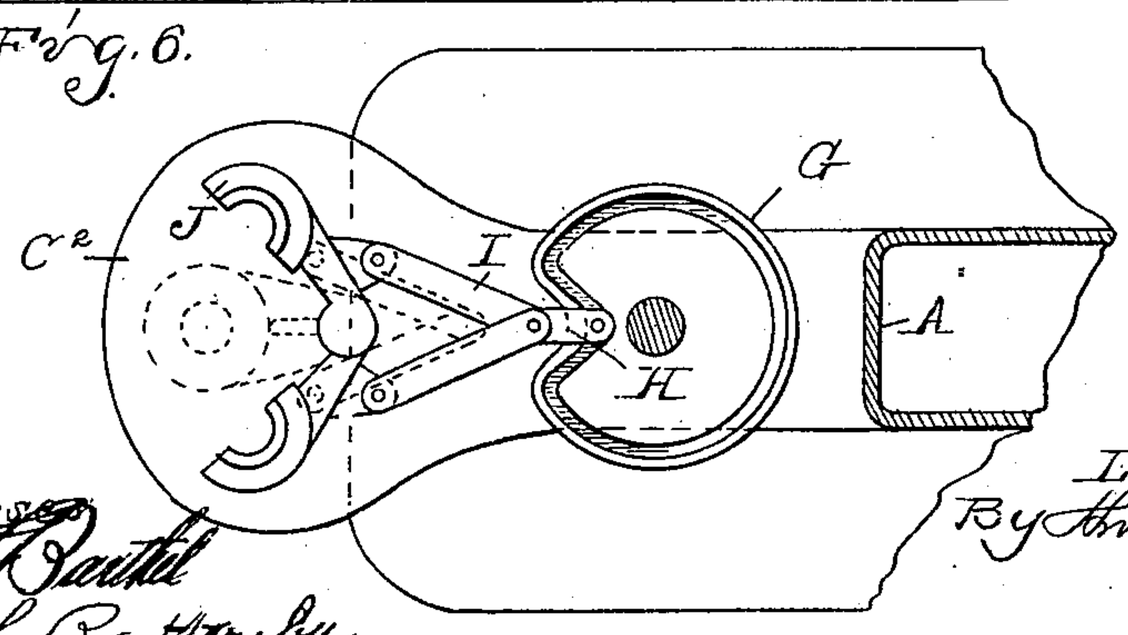


Fig. 6.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

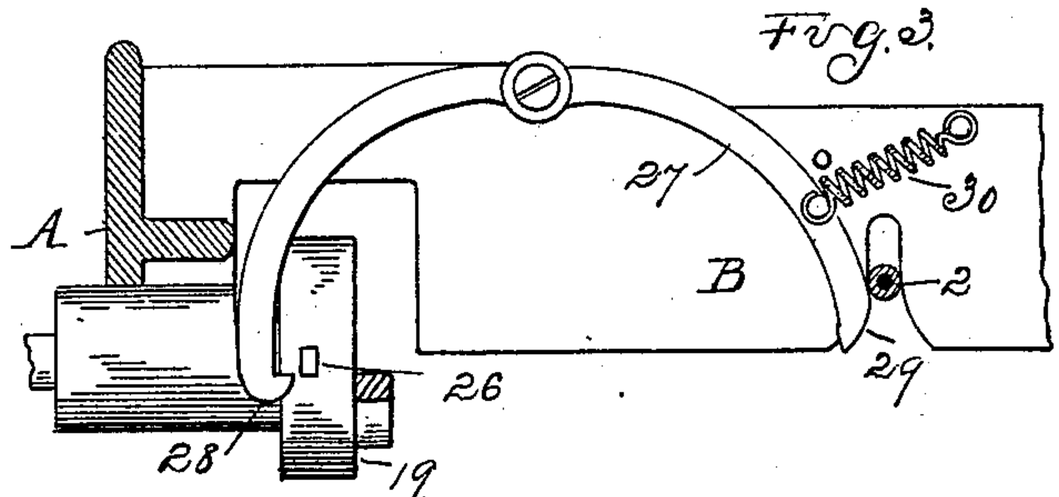

Fig. 4.

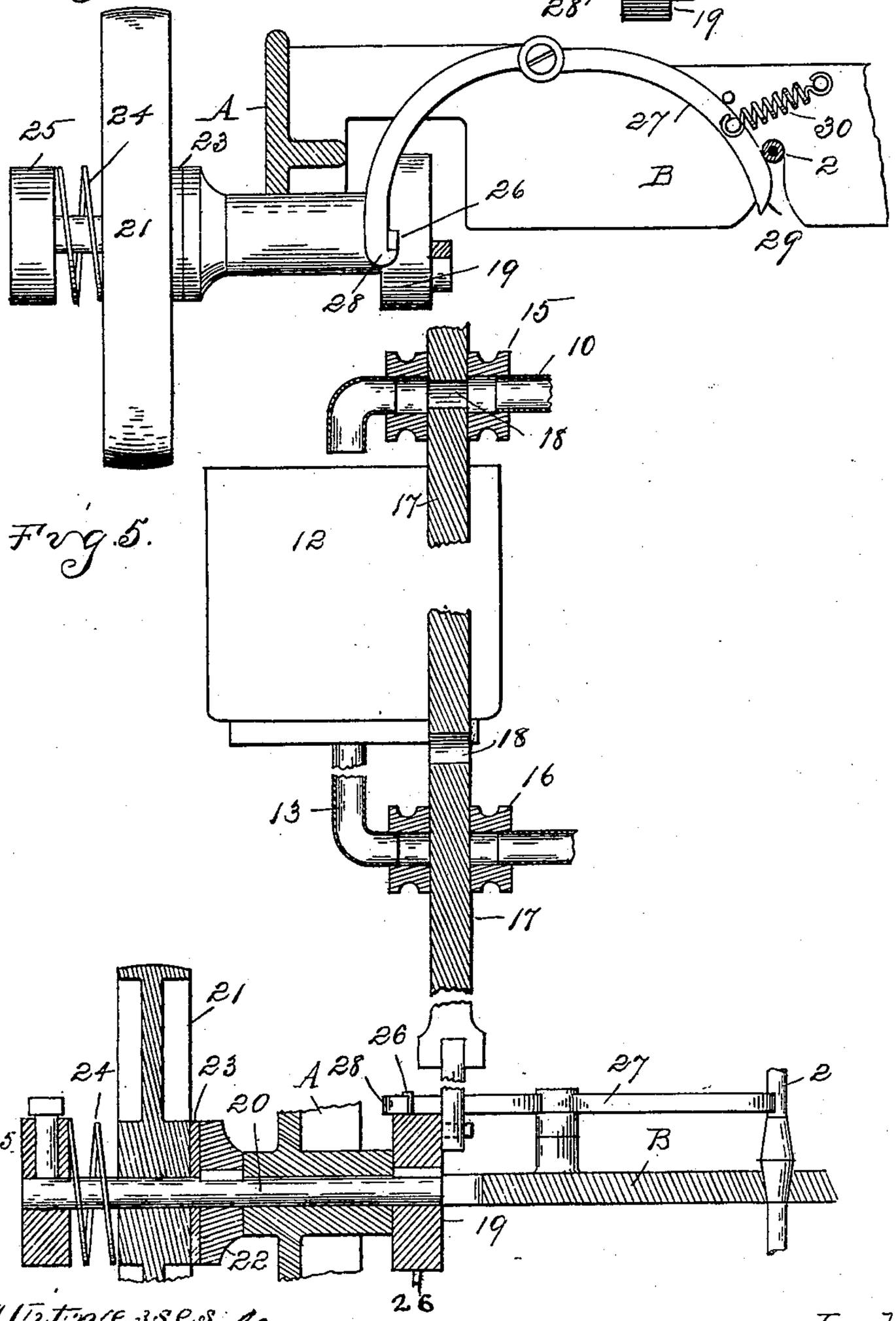

Fig. 5.

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UNITED STATES PATENT OFFICE.

LESLIE H. COLBURN, OF TOLEDO, OHIO, ASSIGNOR TO THE TOLEDO GLASS CO., OF TOLEDO, OHIO, A CORPORATION OF OHIO.

GLASS-BLOWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 698,818, dated April 29, 1902.

Application filed April 25, 1898. Serial No. 678,733. (No model.)

To all whom it may concern:

Be it known that I, LESLIE H. COLBURN, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Glass-Blowing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to glass-blowing machines of that type in which the glass is gathered upon the end of a blowpipe and is then supported in the blowing-machine, one end being in proper relation to a sectional mold which is closed about it and the other end in proper relation to a source of air under pressure for effecting the blowing, these machines being commonly known as "glass-blowing" machines.

The invention consists in mechanism for closing the mold, holding it closed during the blowing period and then opening it, mechanism for effecting a rotation of the blowpipe, and in the peculiar construction of the means for supplying the air to the blowpipe and of regulating the pressure of such air-supply; in the mechanism for wetting molds, and particularly in the construction of this mechanism, so that but a specified quantity of water will be sprinkled upon the molds at each operation, and, further, whereby this sprinkling is effected upon the withdrawal of the blowpipe from the machine, and, further, in such an organized machine having connections for carrying out these various functions, and a motor normally disconnected therefrom, with means by which the operator can connect the motor to the machine, so as to carry out the functions thereof, and then be disconnected.

The invention further consists in the construction, arrangement, and combination of the various parts, all as more fully hereinafter described.

In the drawings, Figure 1 is a front elevation of a machine embodying my invention. Fig. 2 is a side elevation thereof. Figs. 3 and 4 are horizontal detail sections showing in plan the mechanism by which the water-supply is controlled by the insertion and withdrawal of the blowpipe. Fig. 5 is a vertical section therethrough showing the water-pipes and the controlling-valves. Fig. 6 is a horizontal section showing in plan the mold and the mold-actuating cam. Fig. 7 is a top plan view of the mechanism for rotating the blowpipe, showing the blowpipe as being inserted. Fig. 8 is a similar plan showing the blowpipe in position for blowing. Fig. 9 is a horizontal section showing in plan the tight and loose pulley and the belt-shifting mechanism.

A is the frame of the machine, which supports the operating parts in the arms B. Extending from the vertical portion of the frame is supported the shaft C, the lower end of which is preferably stepped and journaled in the bearings C′ of the mold-table C^2. This shaft is provided with a gear-wheel D, which meshes with the pinion E on the horizontal shaft F. This shaft F has any suitable means to connect it with a source of power. In this case I have shown it provided with a loose pulley *a* and a tight pulley *b*.

c is a belt-shifter supported in bearings in the frame and having a flexible outer portion *d*, which has a handle arranged in proper proximity to the operator, so that he may connect the shaft F with its source of power to operate it by pulling on the shifter-rod to shift the belt. As soon as the shaft F turns the shaft C will be turned one revolution through the gearing described. As it approaches the end of that revolution a finger *e* on the shaft strikes a pin *h* on the shifter-bar and shifts the belt again to the loose pulley. It will be obvious that in pulling on the shifter-bar to restart the machine it must be first bent down sufficiently so that the pin *h* will clear the finger *e*, and when the operator releases it it will return up into the path of that finger, so as to stop the machine in the manner described. Any other form of clutch may be used to connect the shaft C with its actuating power or motor.

The lower end of the shaft is provided with a cam G, having a camway therein, as shown in Fig. 7. Engaging in this camway is a pin on the link H, and this link is connected to the link I, which are connected to the mold-sections J. The camway is of such shape that in the inoperative position of the machine—that is, when it is not connected to its source of power—the molds will be open and so that

the first part of the rotation will act to close the molds, that they will then be held closed during the blowing period, but finally be opened again at the time the machine stops.

I believe I am the first to embody in a machine of this kind a sectional mold with a movable cam for positively closing it, holding it closed, and opening it by power-actuating mechanism, such mechanism being under the control of the operator for starting it at each operation of the machine.

The controlling mechanism for the air-supply is of the following construction: At the top of the shaft C is a cam L, which is intended to raise and lower a lever M, which at its outer end is connected to the air-supply nozzle N, which reciprocates in vertical guides in the frame, so that it may be made to approach and recede from the upper end of the blowpipe, as plainly shown in Fig. 2. Air is supplied to this nozzle from any suitable source, and the air may be under a substantially fixed pressure, and the variation of the pressure in the blowpipe can be entirely controlled by causing the mouth of the nozzle N to approach more nearly or to recede more or less from the upper end of the blowpipe, and this variation can be controlled, if desired, by changing the shape of the cam L.

The blowpipe 2 is rotated through the following mechanism: 3 is a friction-wheel on the upper arm B, driven by suitable gearing from the shaft C, and 4 and 5 are friction-wheels supported on spring-arms 6, which are secured to either side of the arm B and slightly separated. These parts are so arranged that the blowpipe may be inserted between the wheels 4 and 5, as shown in Fig. 8, by expanding the spring slightly, and just after they pass the center of those wheels the blowpipe will strike the friction-disk 3, being held in contact therewith by the springs 6 and rotated by the rotational movements of the disk 3.

In the previous state of the art devices have been produced for sprinkling the molds of glass-blowing machines; but so far as I am aware these devices have been constantly connected up with a source of water-supply, and there has been no adequate means of measuring a fixed quantity of water for the sprinkling which takes place; nor has there been any means, so far as I am aware, in a machine having a stationary mold for automatically opening and closing the water-supply and limiting the amount thereof, nor has any one employed the mechanism which I hereinafter describe for effecting this result.

10 is a water-supply pipe having a shut-off valve 11 at any suitable point therein. This pipe discharges into a tank 12 above the mold. 13 is an exit-pipe from this tank, which leads to the nozzle or nozzles 14, arranged in such position that the discharge therefrom will strike the molds. In the pipes 10 and 13 are the valve-casings 15 and 16, respectively, and slidingly secured in these valve-casings is the rod 17, which is provided with two ports 18, so arranged that either may be registered with the port through its valve-casing; but when one is so registered the other is out of registration. The rod 17 is connected to a crank or a crank-pin on the face-plate 19 on the shaft 20, which is journaled in bearings on the frame of the machine. Loose on this shaft is a pulley 21, driven from any suitable source of power, this pulley being constantly in motion.

22 is a collar keyed to the shaft 20, having the friction-face 23, of vulcanized fiber or some such material, and the pulley 21 is forced against the friction-face 23 by means of the spring 24, pressed at one end against the pulley and at the other end against the collar 25 on the end of the shaft. The face-plate 19 is provided on opposite points on its periphery with the pins 26.

27 is a lever pivoted, preferably, on the arm B of the frame and having at one end a hook 28 and at the other end an inclined bearing 29. This lever is normally held by the spring 30 with its hook in the path of the pins 26, Figs. 3, 4, and 5.

When the operator inserts the blowpipe in the bearing in the outer end of the arm B, he will necessarily force the blowpipe between one side of that bearing and the inclined bearing 29 on the lever 27, thereby rocking the lever slightly on its pivot sufficient to disengage the hook 28 from the pin 26, the parts being then in the position shown in Fig. 3. As soon as the operator does this the motion of the pulley 21 will be communicated, through the friction-disk 23 and collar 22, to the shaft 20 and will rotate that shaft and with it the face-plate 19. As soon as the blowpipe has been pushed into the bearing in the arm B to the end thereof the spring 30 will draw the lever back to the position shown in Fig. 4, in which position the hook 28 is in the path of the pins, and as soon as the face-plate has made a half-revolution the second pin will engage the hook and the shaft 20 will stop. This half-revolution upon the insertion of the blowpipe will shift the rod 17 so that the port 18 at the upper end of the rod 17 will be registered with the passage through its valve-casing, while that port in the lower valve-casing 16 will be drawn out of coincidence and that valve will be closed. During the blowing period, therefore, the water will run into the tank 12. As soon as the operator withdraws the blowpipe at the end of the blowing period the levers 27 will again be tripped, the face-plate 19 will make another half-revolution, and the rod 17 shifted to close the upper valve and open the lower one, thereby shutting off the water-supply to the tank 12 and allowing the water which has accumulated therein during the blowing period to be discharged upon the molds. In this way I control the supply of water as to quantity, I start the sprinkling automatically upon the

withdrawal of the blow-pipe, and, in effect, stop it automatically after a given quantity of water has fallen upon the mold.

The operation of the machine as a whole in brief is as follows: The operator inserts the blowpipe in its supports. In doing this he starts the water to run into the tank 12. He then draws the shifter-rod down and out, so as to connect the mechanism with its motor. The mold is then closed, the blowpipe rotated, the air-conduit lowered into operating proximity to the blowpipe, and the pressure regulated therein as desired, and when the desired blowing period has passed and the article is properly blown, which takes place in one rotation of the shaft C, the arm *e*, striking the pin *h*, will again disconnect the motor from the mechanism and the machine will be at rest, with the mold open. The operator then drawing the blowpipe closes the water-supply to the tank and opens the discharge therefrom and the mold is sprinkled.

What I claim as my invention is—

1. In a glass-blowing machine, a sectional mold, opening in a horizontal plane, a movable cam for opening and closing the mold in each operation and for positively holding it open at the close of the operation, means under the control of an operator for starting the cam, and automatic means for stopping it.

2. In a glass-blowing machine, in which there are employed a mold and a detachable blowpipe, sprinkling devices for the mold comprising a storage-reservoir, means for supplying water thereto started by the insertion of the blowpipe in its support and means for stopping the supply upon the withdrawal of the blowpipe.

3. In a glass-blowing machine, the combination of a blowpipe supported in operative relation to the mold, of an air-supply for delivering air under pressure to the article to be blown arranged in proximity to the mouth of the blowpipe, and means for varying the pressure of air in the article to be blown after each operation by varying the distance of said air-supply from the blowpipe during the blowing period.

4. In a glass-blowing machine, comprising the blowpipe supported in operative relation to the mold, of a nozzle arranged in proximity to the blowpipe and connected with a source of air-supply and automatic means for raising and lowering said nozzle to change its proximity to the blowpipe during each blowing period.

5. In a glass-blowing machine comprising a mold and a blowpipe supported in operative relation thereto, a source of air-supply under pressure having its discharge adjustably supported in proximity to the mouth of the blowpipe, of automatic mechanism for varying the distance between said air-supplying means and the blowpipe during the blowing period to change the pressure in the article to be blown.

6. In a glass-blowing machine the combination with a sectional mold, a support for the blowpipe and a sliding air-supply nozzle arranged in line, a vertical shaft extending in the machine beside said parts, a drive connection at the bottom from said shaft to the molds and at the top from said shaft to the air-supply nozzle, and an intermediate drive connection from said shaft to the blowpipe-support, with means for rotating said blowpipe in its support.

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

LESLIE H. COLBURN.

Witnesses:
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HENRY C. TRUESDALL.