No. 744,010. PATENTED NOV. 10, 1903.

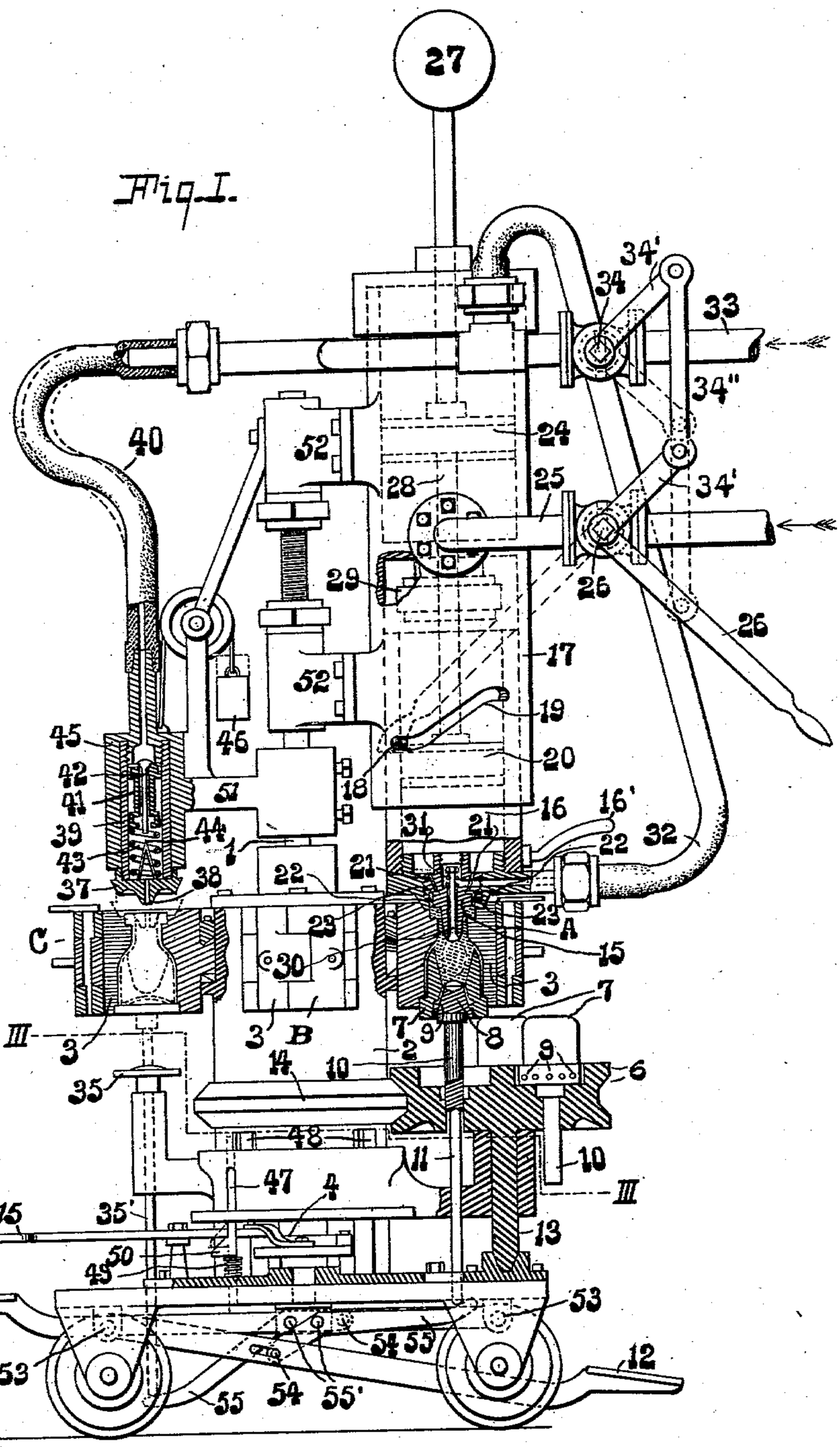
J. PROEGER.

MACHINE FOR MAKING GLASSWARE.

APPLICATION FILED MAY 16, 1902. RENEWED SEPT. 8, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. I.



WITNESSES:

Geo. H. Harvey.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. II.

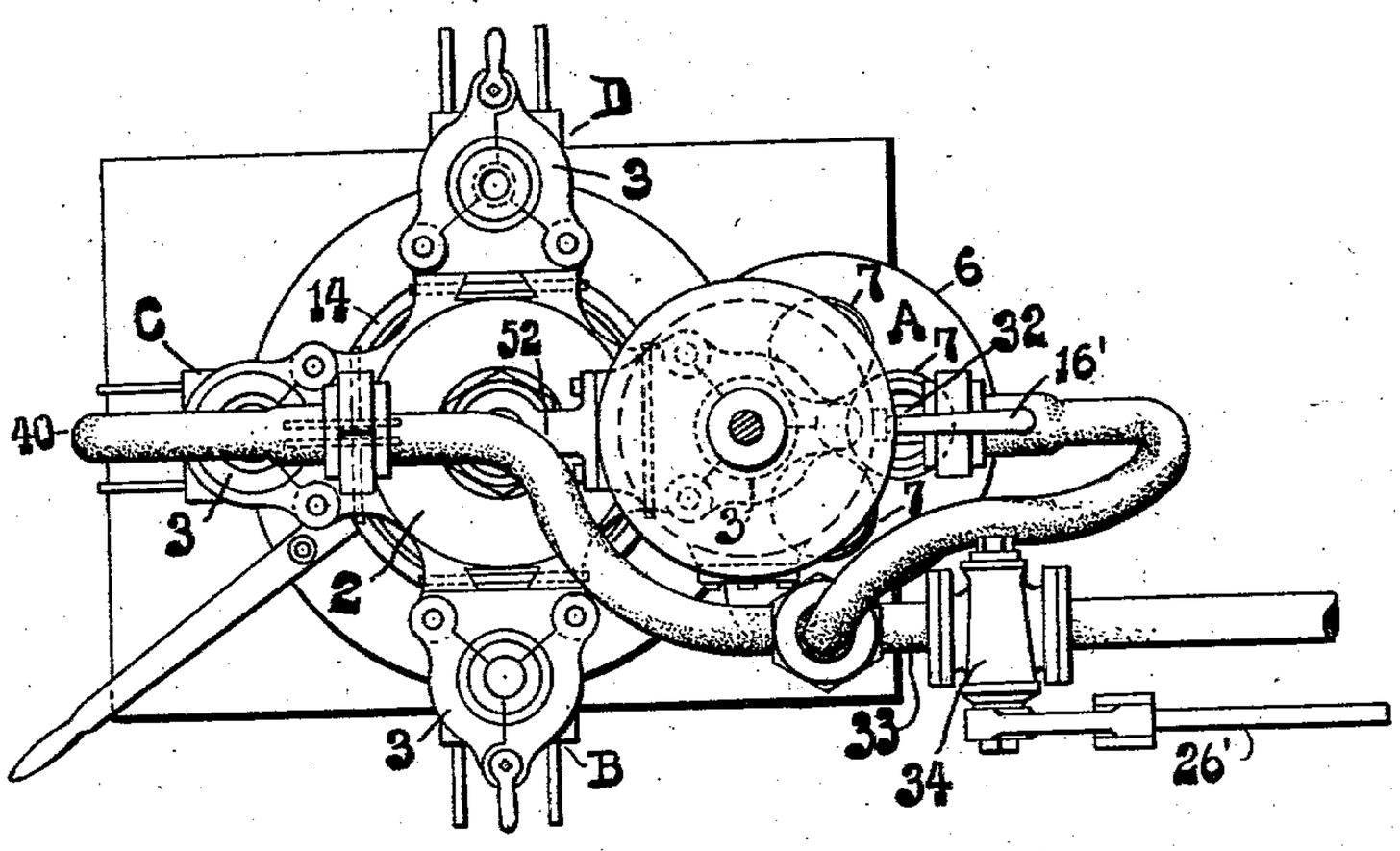
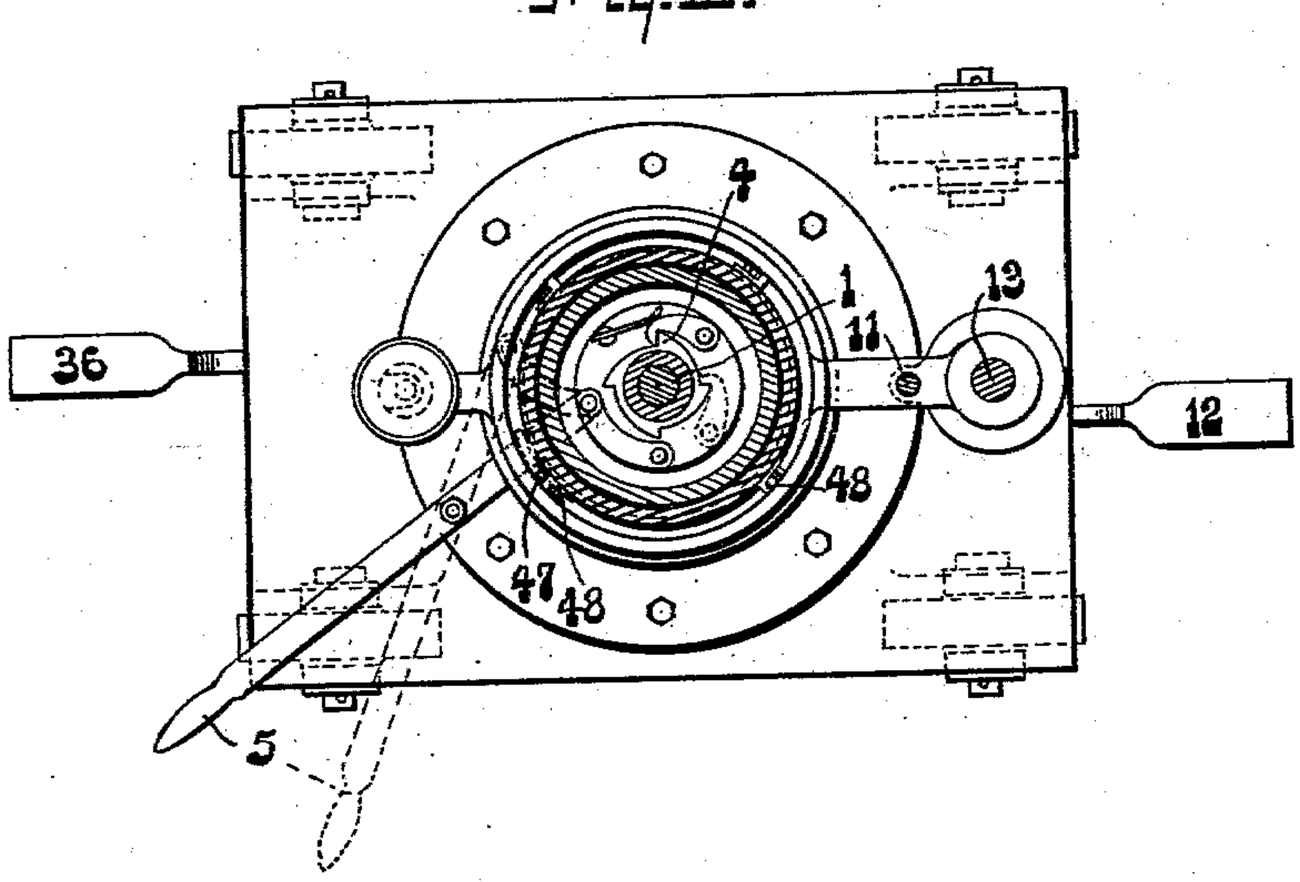


Fig. III.



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UNITED STATES PATENT OFFICE.

JULIUS PROEGER, OF GREENSBURG, PENNSYLVANIA, ASSIGNOR TO TOLEDO GLASS COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO.

MACHINE FOR MAKING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 744,010, dated November 10, 1903.

Original application filed May 22, 1900, Serial No. 17,527. Divided and this application filed May 16, 1902. Renewed September 8, 1903. Serial No. 172,262. (No model.)

To all whom it may concern:

Be it known that I, JULIUS PROEGER, a citizen of the United States, residing at Greensburg, in the county of Westmoreland and State of Pennsylvania, have invented or discovered new and useful Improvements in Machines for Making Glassware, of which the following is a specification.

In the accompanying drawings, which make part of this specification, Figure I is a vertical section of my machine, parts being shown in side elevation; Fig. II, a plan view thereof, and Fig. III a horizontal section on the line III III of Fig. I.

This application is a division of my application, Serial No. 17,527, filed May 22, 1900, the present views being the same as original Figs. 23, 24, and 25.

My invention relates to mechanism for making hollow glassware rapidly, cheaply, and perfectly. By its use I am enabled to dispense with much labor ordinarily employed in the manufacture of machine-blown glassware.

My apparatus is especially designed for the manufacture of narrow-necked ware, but may be equally well employed for the manufacture of other forms of hollow glassware.

To move the molds 3, I employ a rotary standard 2, mounted upon a central shaft 1 and carrying the molds 3, which are arranged around its periphery, as shown at stations A B C D. This standard is driven by a pawl-and-ratchet mechanism 4, (illustrated in Fig. III,) operated by a hand-lever 5 or otherwise, so that at each operation of the ratchet the standard will be turned one step, in the construction illustrated one-fourth of a revolution, there being four molds on the standard.

Beneath the station A, in which the neck of the blank is formed by suction, is a movable (preferably a rotary) table 6, carrying a series of cups 7, adapted to receive the gathering of glass. One of the cups is shown in section in Fig. I. It has a matrix-cavity in which the glass is received and a base composed of a plug 8, fixed to the body of the cup and formed with an air-passage or air-passages 9 of small size adapted to admit air to the interior of the matrix when suction takes place. The plug and the body of the cup may be made in a single piece. The cups have stems 10, by which they may be raised vertically into the mold-cavity when they are successively brought thereunder by rotation of the table, and to lift the stem I use a pusher-rod 11, adapted to be raised by a foot-lever 12. The table 6 is mounted on a vertical shaft or stem 13 and is rotated simultaneously with the rotation of the standard 2, preferably by engagement of a friction-wheel 14 on said standard with the periphery of the table 6.

The molds 3 are open at the bottom to permit insertion of one of the cups, and the upper part of the mold-matrix has the shape desired to be given to the end of the blank formed therein. Above the mold at the station A is a blowing apparatus comprising a hollow stem 15, carried by a vertically-moving head 16, which is movable downwardly, so as to bring the stem 15 into the matrix of the mold. As a convenient means of effecting this motion I may mount the head 16 in a cylindrical casing 17 and fit a pin 18 on the head in an inclined groove 19 in the casing, so that when the head is turned by a handle 16′ it will also be caused to move vertically. To produce the exhaustion of air by which the suction is caused, I make the head 16 tubular, so that it may serve as a cylinder with respect to an internal piston 20, the raising of which will cause a rarefaction of air in the head 16 below it. Air-passages 21 of small diameter lead from the cavity in the head 16 into the chamber 22, whence air-passages 23 of small diameter lead through the head of the stem 15 and terminate at the part thereof which when the stem is inserted in the molds is at the end of the matrix-cavity. The piston 20 may be operated by a motor-piston 24, contained within the casing 17, above the hollow head 16, and operated by compressed air admitted from a pipe 25 and controlled by a valve 26, which when its lever 26′ is in the position shown in Fig. I by full line will admit air to raise the piston and to cause a suction in the lower part of the head 16 and which when turned into the position shown in dotted lines causes the air

to exhaust and permits the piston 24 to be forced down by the action of a weight 27 or other retracting device. The piston 24 is connected with the suction-piston 20 by an intermediate stem 28, passing through a stuffing-box 29, contained in the casing 17.

To admit air for the blowing and expanding of the blank, the stem 15 is made hollow, and the passage through it is closed by a valve 30, which is normally held in a seated position by a spring 31 and which may be unseated by the pressure of air flowing through the stem. The air is admitted through a pipe 32, leading from an air-supply pipe 33, whose valve 34 may be connected with the lever 26′ of the valve 26 by the arms 34′ and link 34″, so as to be opened to admit air to the pipe 32 by the same motion which connects the pipe 25 with the exhaust-port.

The operation of the parts of the apparatus which I have just described is as follows: The operator introduces into one of the cups 7 sufficient glass to fill the cup. The standard 2 is rotated by the mechanism 4, and the same motion which brings the mold around to the station A also turns the table 6, so as to bring a charged cup 7 into position directly below the matrix of the mold. The operator then by depressing the foot-lever 12 raises the cup, with its charge of glass, into the matrix of the mold and by the lever 16′ brings the head 16 downwardly, so as to cause the stem 15 to enter and to close the end of the matrix. Then by operation of the valve 26 the piston 24 is raised, moving also the piston 20 in the casing 17 and producing an exhaustion of air, which, connecting with the interior of the matrix through the air-passages 21, 22, and 23, sucks up the molten glass around the stem 15 and into the end of the matrix and forms the neck of a bottle. The valve-lever 26′ is then reversed, and the air is admitted thereby through the pipe 32, which, unseating the valve 30 and passing through the hollow stem 15, blows a cavity in the body of the blank, as shown by dotted lines in Fig. I, thereby filling the cavity of the cup left by the glass which has been displaced upwardly by the suction, although this preliminary blowing in some instances may be omitted. The cup is then withdrawn downwardly from the bottom of the mold, the blowing-stem is lifted from the neck of the mold, and the sleeve-standard 2 is turned a quarter-revolution to the station B, bringing another mold into position below the stem 15 and another cup 7, charged with glass, below the mold, whereupon the operation above described is repeated. The next quarter-turn of the standard brings the mold from the station B into the station C, at which the blank is finally expanded by blowing. For this purpose I provide at the station C a movable mold-bottom 35, which can be raised into contact with the mold by a foot-lever 36, engaging a stem 35′ of the mold-bottom.

The blowing apparatus comprises a vertically-movable cap 37, which fits on top of the mold and has a nose 38, and above the cup and fixed thereto is a cylinder 39, connected with a curved flexible air-supply pipe 40, leading from the pipe 33. Within the cylinder 39 is a hollow piston 41, whose passage is closed by a valve 42. The piston is normally kept in elevated position by a spring 43; but when air is admitted through the pipe 40 the piston is moved downwardly until the end of the valve-stem engages a stop or projection 44, which will unseat the valve and permit the air to flow through the nose 38.

When the mold is brought into the station C and the valve 34 is opened by the same operation which admits air through the pipe 32, as above described, the air also enters the pipe 40, and as this pipe is flexible the passage of the air therethrough will force the cylinder 39 downwardly in its casing or guide 45 until the end of the cap 37 is seated upon the top of the mold. Further exertion of the air-pressure from the pipe 40 within the cylinder 39 will force down the piston 41 against the pressure of the spring 43, (said spring being made strong enough to uphold the piston until the cap 37 has been seated,) and at the end of the piston's motion, when the valve-stem engages the stop 44, the valve is opened and the air passes through the nose into the matrix and expands the blank into its finished form, the mold-bottom 35 having been raised, so as to close the matrix before the blowing begins.

When the air is shut off by the valve 34, the piston 39 and cap 37 will be retracted by a weight 46. The mold-bottom then being dropped, the mold is brought at the next quarter-rotation of the standard 2 to the station D, at which it is opened and the finished article removed therefrom.

It will be understood that the operations of the machine are continuous, and at each quarter-revolution of the standard one of the cups 7, with glass charged therein, is brought to station A, an empty mold is also brought to station A, where the blank is initially formed, another mold, with a blank, is brought into the station B, where it is at rest, and a third mold into the station C, where the blank is finally expanded, and a fourth mold into the station D, where the finished article is removed, and that at each operation of the air-valve 34 a blank is initially sucked and blown at A, and another blank is finally blown at C. The station B is an idle station, and although it is preferable it is not essential to the operation of the machine.

Instead of constituting the larger matrix at B merely by removing a cup from the interior of the mold, the same end may be otherwise attained by means now recognized as equivalents.

The following are some of the details of construction of the apparatus shown in the drawings and not already described.

In order that the molds may be locked or

held positively in the several positions into which they are successively brought, I provide a latch-rod 47, adapted to engage stops 48 on the standards 2 and normally held in such engagement by a spring 49. When the lever is moved to turn the standard, it engages a cam 50 on the latch and disengages it from the stop, so as to permit the standard to be rotated.

As shown in Fig. I, the lugs or brackets 51 and 52, by which the casings 39 and 17 are respectively held, are preferably made vertically adjustable in order to provide for the proper adjustment of the parts of the machine.

I prefer that the levers 12 and 36 should be compound levers, each lever being pivoted at its end on a pivot 53 and at a middle point joined by a pin 54 to the end of a lever 55, which is pivoted at 55′ and at its outer end bears upon the stem 11 or 35′, as the case may be. This construction of the levers make it easy for the parts 11 and 35′, which are upheld thereby, to drop as soon as the foot-pressure is released. It will be understood, however, that although I have shown the apparatus adapted for the manufacture of such narrow-neck bottles my invention is not limited thereto, but may be used for making glass articles of other kinds by suitable changes in the form and relation of the parts. As there are many novel and original features of process and apparatus in my application independent of the novelty of sucking the neck, I desire to claim such features, both singly and in combination, even when some other method of forming the neck is resorted to. It will be understood also that parts of my invention stated in the individual claims may be used independently of the other parts or in other combinations and that changes may be made in the apparatus, since

What I claim is—

1. In an apparatus for forming hollow glassware, the combination of an open-bottomed blank-mold, a stem insertible into the top of the mold, a cup adapted to receive a charge of glass and to be inserted in the bottom of said mold, and pneumatic means independently of the movement of the stem for causing a portion of the charge to conform to the opposite end of the mold.

2. In apparatus for forming glassware, the combination of an open-bottomed blank-mold, sucking mechanism for the upper end of said mold and a cup to receive the charge of glass adapted to be inserted in the bottom of said mold.

3. In apparatus for forming glassware, the combination of an open-bottomed blank-mold, sucking and blowing mechanism for the upper end of said mold and a cup to receive the charge of glass adapted to be inserted in the bottom of said mold.

4. In apparatus for forming glassware, the combination of a mold-carrier, open-bottomed blank-molds carried thereby, a second carrier registering with the first carrier, vertically-movable cups carried by said second carrier, a stem insertible into said mold, and pneumatic means independent of the movement of said stem for causing a portion of the glass to conform to that portion of the mold adjacent to the stem.

Signed at Pittsburg this 15th day of May, 1902.

JULIUS PROEGER.

Witnesses:
F. N. BARBER,
GEO. H. HARVEY.