Sept. 6, 1932. L. H. MORIN 1,875,818

GLASSWARE FORMING MACHINE

Filed March 22, 1928 4 Sheets-Sheet 1

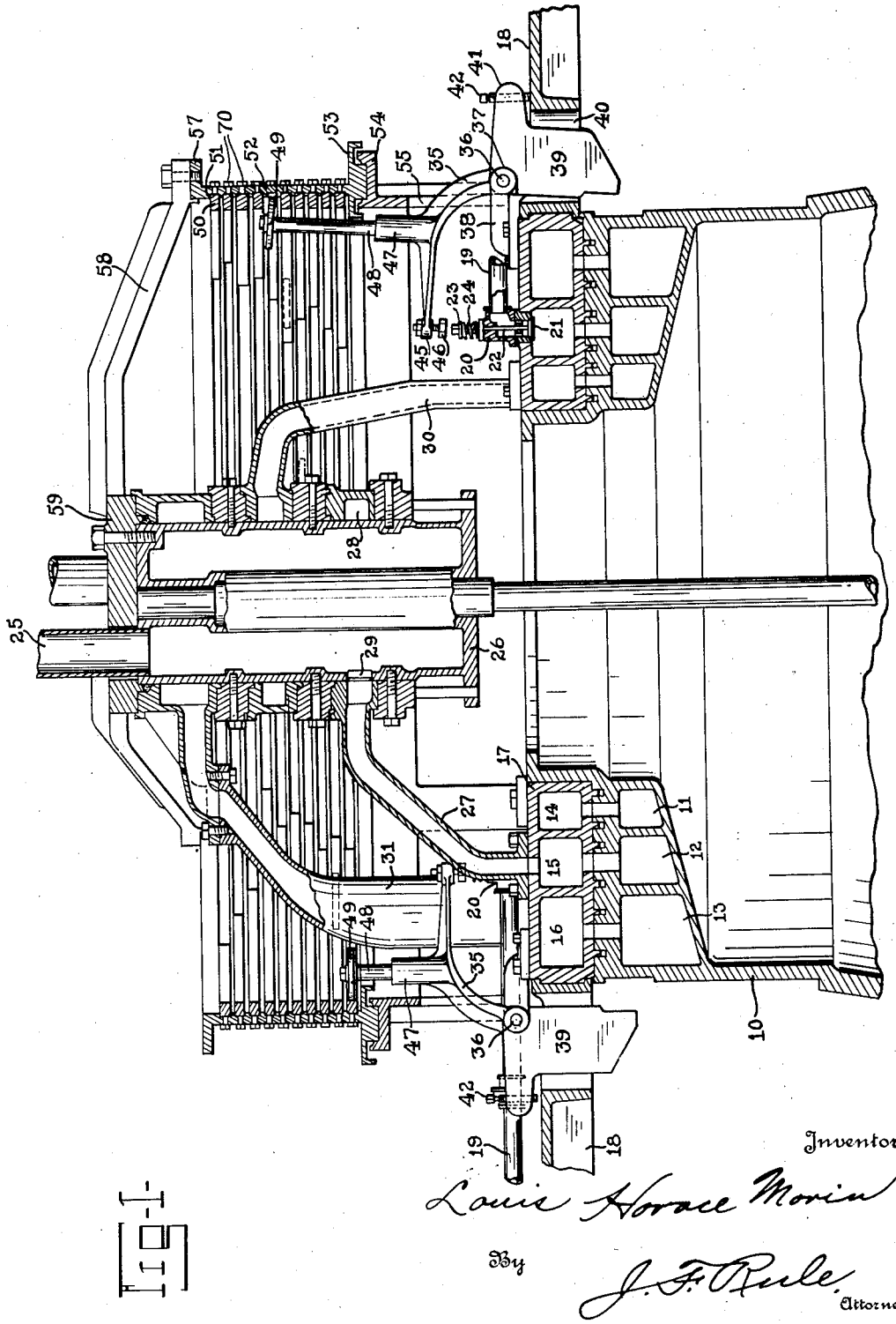


Fig. 1.

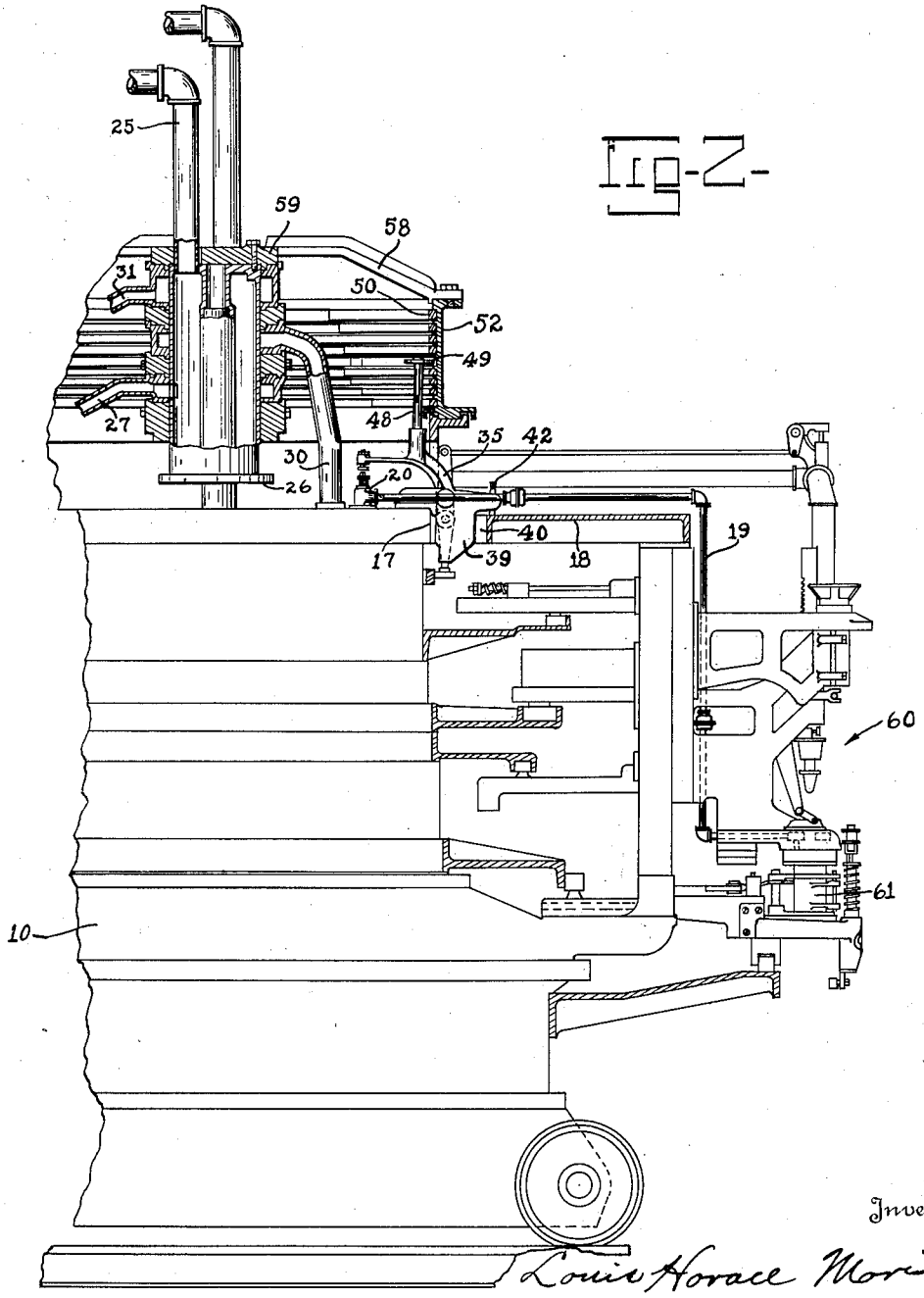
Inventor
Louis Horace Morin
By J. F. Rule
Attorney

Sept. 6, 1932. L. H. MORIN 1,875,818

GLASSWARE FORMING MACHINE

Filed March 22, 1928 4 Sheets-Sheet 2

Fig-2-



Inventor

Louis Horace Morin

By J. F. Rule

Attorney

Sept. 6, 1932. L. H. MORIN 1,875,818

GLASSWARE FORMING MACHINE

Filed March 22, 1928 4 Sheets-Sheet 3

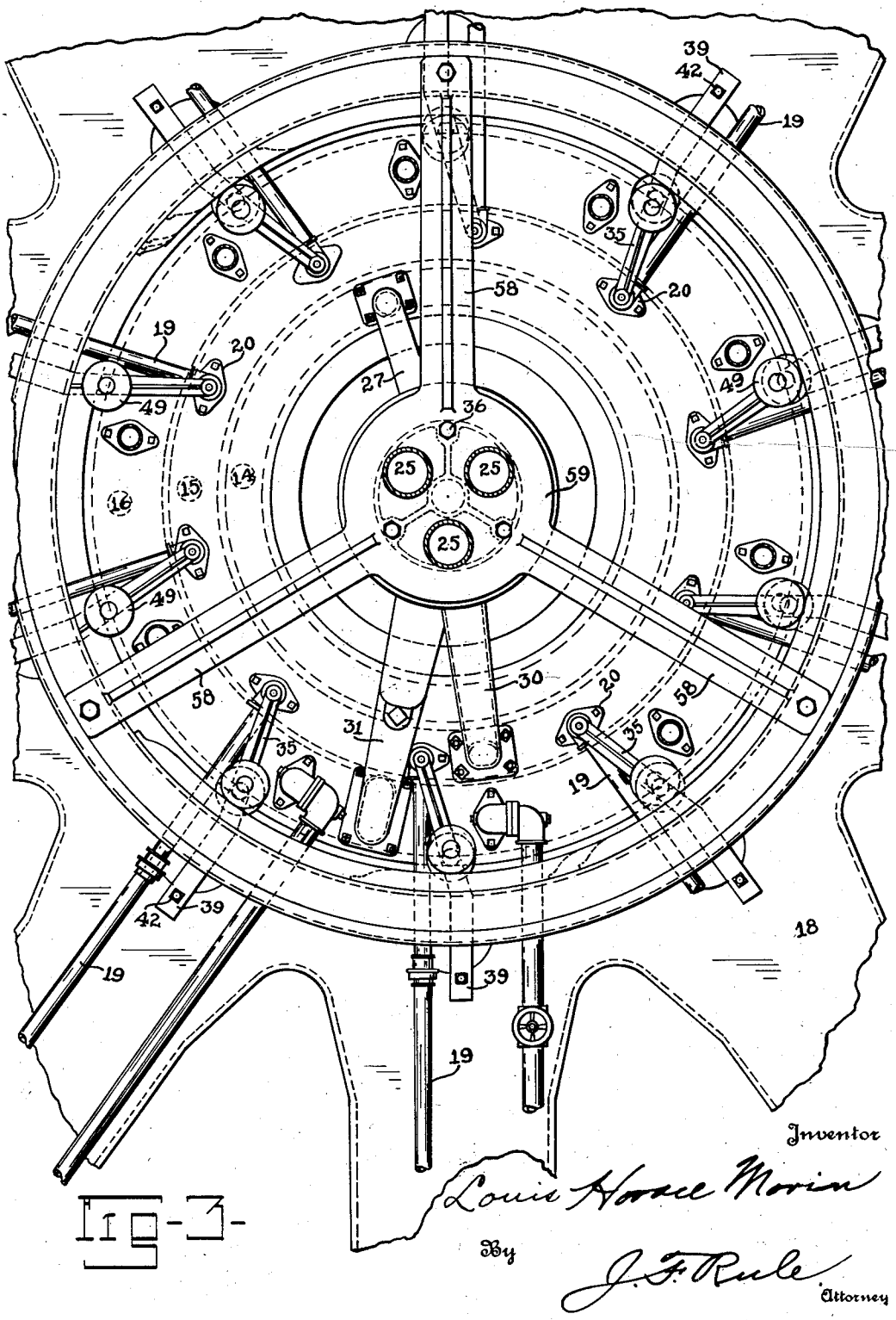


Fig. 3.

Inventor

Louis Horace Morin

By

J. F. Rule

Attorney

Sept. 6, 1932. L. H. MORIN 1,875,818

GLASSWARE FORMING MACHINE

Filed March 22, 1928 4 Sheets-Sheet 4

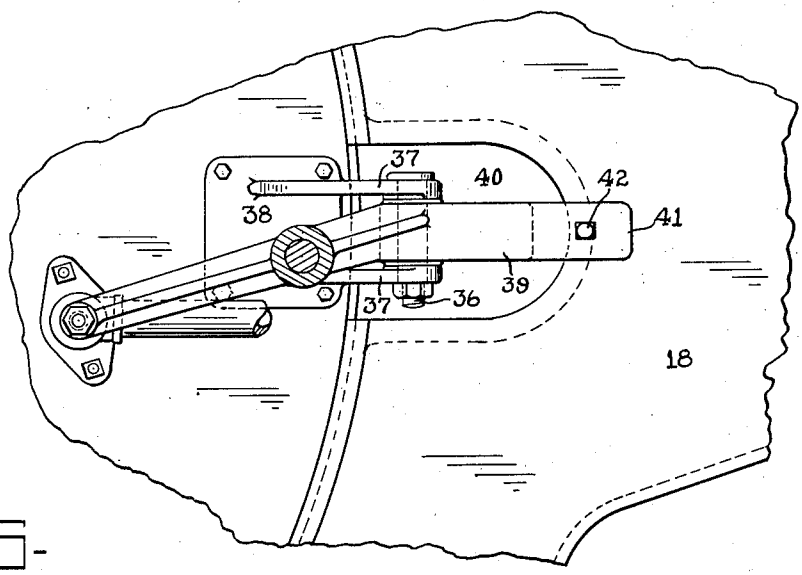


Fig-5-

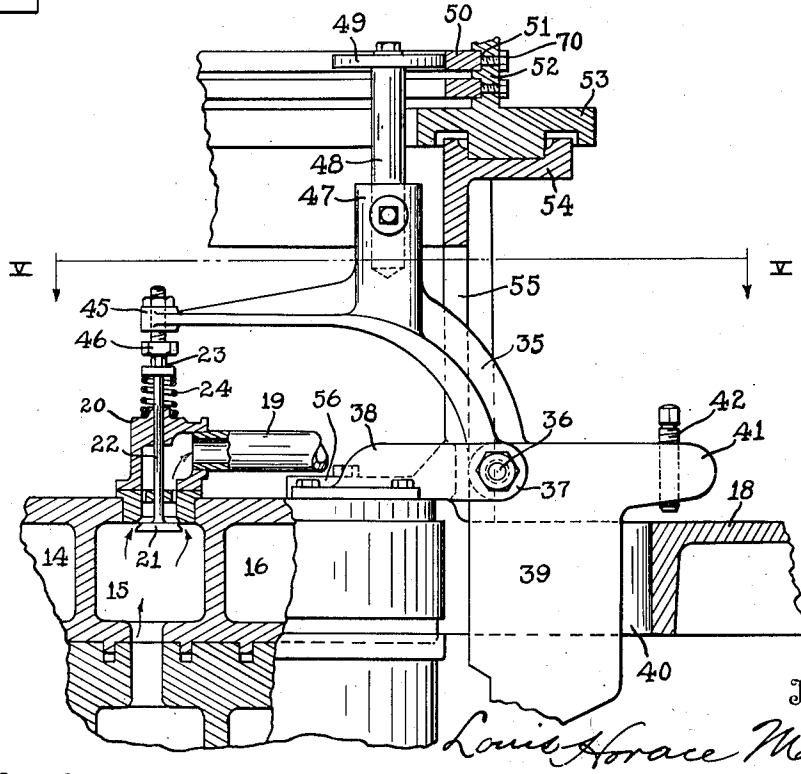


Fig-4-

Inventor

Louis Horace Morin

By J. F. Rule

Attorney

Patented Sept. 6, 1932 1,875,818

UNITED STATES PATENT OFFICE

LOUIS HORACE MORIN, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR TO OWENS-ILLINOIS GLASS COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO

GLASSWARE FORMING MACHINE

Application filed March 22, 1928. Serial No. 263,651.

The present invention relates to improvements in glassware forming machines and more particularly to means for controlling the periods of application of air pressure during final blowing of articles in the finishing molds.

In commercial production of glassware, such for example as bottles, jars and the like containers, it is desirable to subject various sized ware to final blowing for periods of time varying in length as determined by the particular size or type of ware. For example, if a single glassware forming machine is producing several different sizes or shapes of ware, each requiring a different period of application of blowing air, such requirement can be met on the average machine only with considerable difficulty, there generally being no provision made for readily adjusting the periods of blowing. In commercial production of glassware, a single machine may be employed to produce several types of ware, but these several types must necessarily be such that they may be blown to their final shape without varying the lengths of the periods of application of blowing air thereto. Under these conditions, it is highly probable that the largest container of the group being simultaneously produced on a single machine would be subjected to the final blowing for too short a period of time, and the smallest bottle of said group would be subjected to blowing air for an unnecessarily long period of time. In other words, with this single setting controlling the blowing air for all of the mold groups or heads, ideal blowing conditions for simultaneous production of several different types of ware may not be obtained.

An object of the present invention is to overcome the above objections by providing means individual to the several mold groups or heads whereby the periods during which blowing air is applied to the parisons may be lengthened or shortened as determined by the size and type of ware being produced.

A further object is to provide means of the above character which may be readily applied to the commercial machines now in operation without extensive structural changes therein.

Other objects will be apparent hereinafter.

In the accompanying drawings:

Fig. 1 is a vertical transverse sectional view of the upper portion of a glassware forming machine embodying my invention.

Fig. 2 is a sectional view of one head or mold group embodying my invention.

Fig. 3 is a fragmentary plan view of the machine with parts in section.

Fig. 4 is a detail sectional elevation illustrating the valve actuating mechanism.

Fig. 5 is a sectional view taken substantially along the line V—V of Fig. 4.

In the drawings, the machine with which the present invention is associated is shown as comprising a central stationary pillar 10 provided at its upper end with three concentric chambers 11, 12 and 13 which communicate through upwardly extending openings with gas, air and vacuum chambers 14, 15 and 16, respectively, in a collar 17 rotatively supported on the upper end of said pillar. A horizontally disposed frame 18 is in part carried by the collar or annular frame 17. The mold groups or heads 60 are in part supported by the frame 18, said groups each including a blow mold 61 of any preferred or conventional form to which air pressure is applied at regular intervals by way of a radial air pressure supply pipe 19, said pipe communicating at its inner end with the air pressure chamber 15. An elbow 20, which provides connection between said pipe 19 and the interior of the air pressure chamber 15, includes an inwardly opening valve comprising a disk 21 carried by the stem 22, the latter extending upwardly through said elbow and carrying an axially adjustable head 23 consisting of a washer and nut. A coil spring 24 is interposed between the washer and the elbow 20 and encircles the upper portion of the valve stem 22 to normally and yieldingly hold the valve in closed position.

Air pressure is continuously supplied to the chamber 15 from any suitable source by way of a pipe 25 leading downwardly into one compartment of a stationary drum 26 and a branch pipe 27, the latter communicating at its upper inner end with an annular chamber 28 which is at all times in communication with the interior of the stationary drum 26 by way of a radial opening 29. Gas

and vacuum may be supplied to the chambers 14 and 16, respectively, from suitable sources by way of pipes 30 and 31, respectively (Fig. 1).

The mechanism for controlling application of blowing air to the finishing molds (not shown) by way of the radial pipes 19, includes valve actuating devices individual to the mold groups or heads. Each device comprises a lever 35 pivoted at its outer lower end to a horizontally disposed hinge pin 36 extending through spaced bearings 37 on a bracket 38. This lower end of the lever 35 is rigidly connected to and may be integrally formed with a counterweight 39 which projects downwardly through an opening 40 in the aforementioned horizontal frame 18. The counterweight includes a radially outwardly directed finger 41 at its upper end, said finger carrying a set screw 42 extending vertically downwardly through said finger and adapted at times to abut the upper side of the frame 18. Thus, the angular positions of the counterweight and lever may at times be controlled. The upper inner end of the lever 35 is formed with a vertical bearing 45 carrying a disk 46 on a stem which is adjustable in said bearing 45, said disk adapted to contact with the adjustable head 23 on the valve stem 22 at regular intervals.

An upwardly extending socket 47 intermediate the ends of said lever 35 supports a rod 48 rising upwardly and carrying at its upper end a cam roll 49 which is adapted to engage a cam 50 at regular intervals, such engagement between the cam roll 49 and cam 50 operating to rock the lever and counterweight about the hinge pin 36 to thereby move the inner end of the lever downwardly to unseat the valve disk 21 whereby air pressure may enter the pipe 19 leading to the mold 61 from the supply chamber 15. The length of the periods of time during which each valve disk 21 is unseated to admit air pressure into the pipe 19 is determined by the length of the cam 50, it being understood that when the cam roll passes beyond the cam 50, the counterweight 39 lifts the lever away from the valve and permits the coil spring 24 to seat the disk 21 and thereby shut off supply of air pressure to the pipe 19. The degree of adjustment of the set screw 42 (Fig. 4) in the finger 41 is determined by the relation between the cam 50 and the frame 18, it being evident that this screw relieves the cams and cam drum of the strain to which they would be subjected if the screws and frame did not support the counterweights.

The series of cams 50 which periodically rock the levers 35 are suitably and removably secured by bolts 70 in grooves 51 formed on the inner surface of a stationary drum 52 whose lower end is provided with a bearing ring 53 resting in an upwardly opening annular trackway 54 supported on legs 55, the lower ends of the latter provided with inwardly extending attaching feet 56 which are bolted or otherwise secured to the rotary collar 17 in which the vacuum air and gas chambers are formed. The upper margin of the drum 52 is formed with an annular flange 57 to which are bolted the outer ends of arms 58 of a spider whose central body portion 59 is secured to the upper end of the stationary drum 26 by bolts 70 or the like elements. Thus, the drum 52 and cams 50 carried thereby are held stationary while the several valve actuating levers 35, frame 18 and drum supporting track 54 rotate with the mold carriage as usual. In this manner, the cam rolls 49 are periodically brought into contact with their corresponding cam sections 50 to rock the levers 35 and thereby open the valves for the purpose above pointed out.

From the above, it is apparent that in operating the glassware forming machine for the purpose of producing several different types or shapes of ware, cams 50 of different lengths are employed so that the lengths of the periods during which air pressure is applied to the finishing molds 61 meet the particular requirements of the particular type of ware. Thus, a relatively large article of ware may be subjected to a long period of final blowing by using a long cam 50, while a smaller article which requires much less final blowing air will be subjected to a less amount of air pressure than the larger article by employing a shorter cam. Obviously, ware produced under these improved conditions will be of better quality than ware produced under the old and more or less objectionable conditions pointed out heretofore.

Modifications may be resorted to within the spirit and scope of the appended claims.

What I claim is:

1. In a glassware forming machine, the combination of a stationary central pillar, a mold carriage rotatably supported thereon, an annular series of molds on said carriage, means to periodically supply air pressure to the molds, air pressure control valves individual to the molds, valve actuating levers individual to the valves, means normally yieldingly holding the levers out of operative engagement with the valves, and cams individual to the molds to rock the levers at regular intervals and thereby open the valves to apply air pressure to the mold.

2. In a glassware forming machine, the combination of a stationary central pillar, a mold carriage rotatably supported thereon, an annular series of molds on said carriage, means to periodically supply air pressure to the molds, air pressure control valves individual to the molds, valve actuating levers individual to the valves, means normally yieldingly holding the levers out of operative engagement with the valves, cams indi-

vidual to the molds to rock the levers at regular intervals and thereby open the valves to apply air pressure to the mold, and means whereby the cams may be removed and replaced independently of each other.

3. In a glassware forming machine, the combination of a stationary central pillar, a mold carriage rotatably supported thereon, an annular series of molds on said carriage, means to periodically apply air pressure to the molds, a stationary cam support mounted on said pillar, cams on said support individual to the molds, and mechanisms individual to the molds and operable at regular intervals by said cams to control and regulate the lengths of the periods of application of air pressure to the molds.

4. In a glassware forming machine, the combination of a stationary central pillar, a mold carriage rotatably supported thereon, an annular series of molds on said carriage, means to periodically apply air pressure to the molds, a stationary cam drum mounted on said pillar, cams on said drum individual to the molds, mechanisms individual to the molds and operable at regular intervals by said cams to control and regulate the lengths of the periods of application of air pressure to the molds, each of said mechanisms including a valve, yielding means normally holding the valve closed, a valve actuating lever mounted for vertical swinging movement into and out of operative engagement with said valve, yielding means normally holding the lever out of engagement with the valve, and means carried by said lever and periodically engaged by one of said cams to rock the lever and open said valve.

5. In a glassware forming machine, the combination of a stationary central pillar, a mold carriage rotatably supported thereon, an annular series of molds on said carriage, means to periodically apply air pressure to the molds, air pressure control valves individual to the molds, cam actuated levers individual to the valves for alternately opening and closing the latter, a circular cam drum arranged above said pillar, and cams carried by said drum, said cams being individual to the molds and adapted to actuate the valve control levers at regular intervals.

6. In a glassware forming machine, the combination of a stationary central pillar, a mold carriage rotatably supported thereon, an annular series of molds on said carriage, means to periodically apply air pressure to the molds, air pressure control valves individual to the molds, cam actuated levers individual to the valves for alternately opening and closing the latter, a circular cam drum arranged above said pillar, cams carried by said drum, said cams being individual to the molds and adapted to actuate the valve control levers at regular intervals, and counterweights individual to the valve actuating levers, normally and yieldingly holding said levers out of engagement with corresponding air pressure control valves.

7. In a glassware forming machine, the combination of a stationary central pillar, a mold carriage rotatably supported thereon, an annular series of molds on said carriage, means to periodically apply air pressure to the molds, air pressure control valves individual to the molds, cam actuated levers individual to the valves for alternately opening and closing the latter, a circular cam drum arranged above said pillar, cams carried by said drum, said cams being individual to the molds and adapted to actuate the valve control levers at regular intervals, and means separably interconnecting the cams and cam drum whereby said cams may be readily removed or adjusted.

8. In a glassware forming machine, a rotary mold carriage, an annular series of finishing molds thereon, means to supply air pressure to said molds to blow articles to their final form therein, means individual to molds for controlling the length of the periods of application of air pressure thereto, said last named means including air pressure control valves individual to the molds, a set of cams including a separate cam for each mold, said cams arranged in a vertical series above said valves, and valve actuating levers individual to the valves and cams and operable by said cams.

9. In a glassware forming machine, a rotary mold carriage, an annular series of finishing molds thereon, means to supply air pressure to said molds to blow articles to their final form therein, air pressure control valves individual to the molds, a cam drum, cams on the drum including a separate cam for each mold, said cams operable to individually actuate the valves, and removable means connecting the cams and drum whereby the cams may be individually adjusted circumferentially or individually replaced.

10. A machine for producing glass articles, comprising a mold carriage rotatable about a vertical axis, an annular series of molds thereon, means cooperating with the molds in the production of said glass articles therein, said means including mechanisms individual to the molds and carried on the mold carriage, a stationary cam support, cams thereon individual to said mechanisms and individually controlling the operation of said mechanisms, and means for individually adjusting the cams and thereby adjustably regulating the time of operation of each said mechanism independently of the others.

Signed at Montreal, in the Province of Quebec, this 16th day of March, 1928.

LOUIS HORACE MORIN.