

A. BEVERLEY.  
 MACHINE FOR BLOWING GLASS BOTTLES, JARS, AND THE LIKE.  
 APPLICATION FILED JUNE 15, 1912.

1,065,499.

Patented June 24, 1913.

6 SHEETS—SHEET 1.

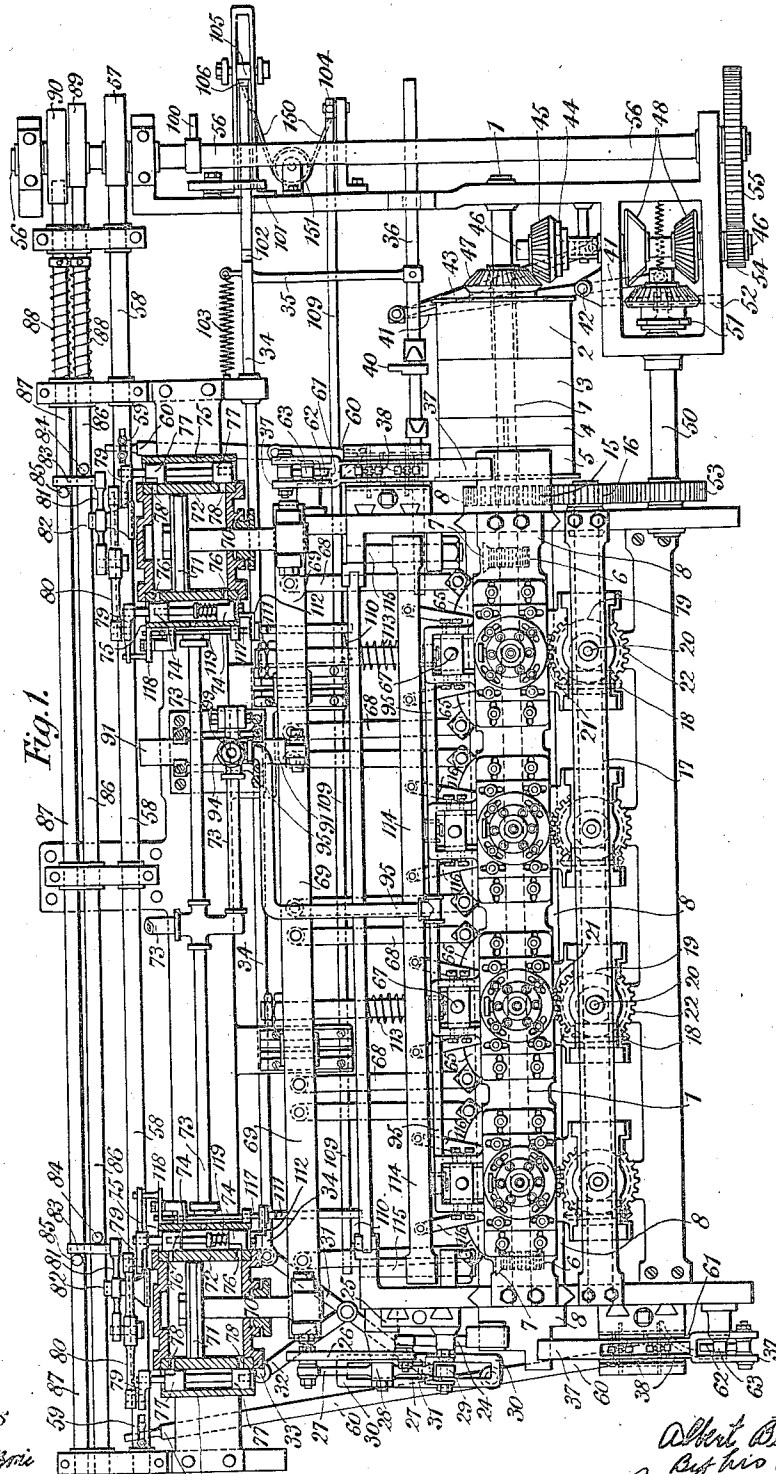


Fig. 1.

Witnesses  
 E. B. Franconi  
 M. E. Russell

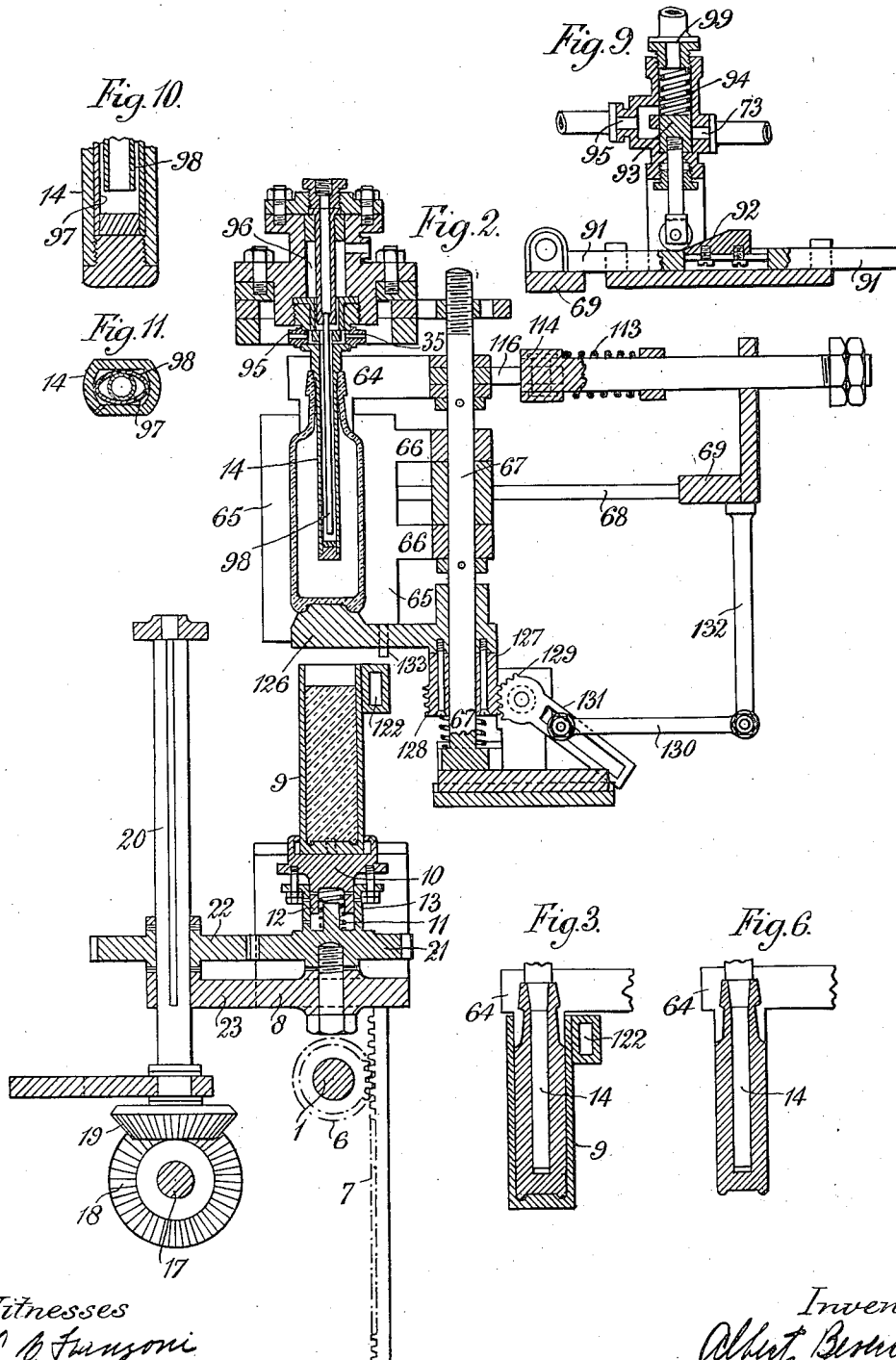
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Witnesses  
C. C. Franzoni  
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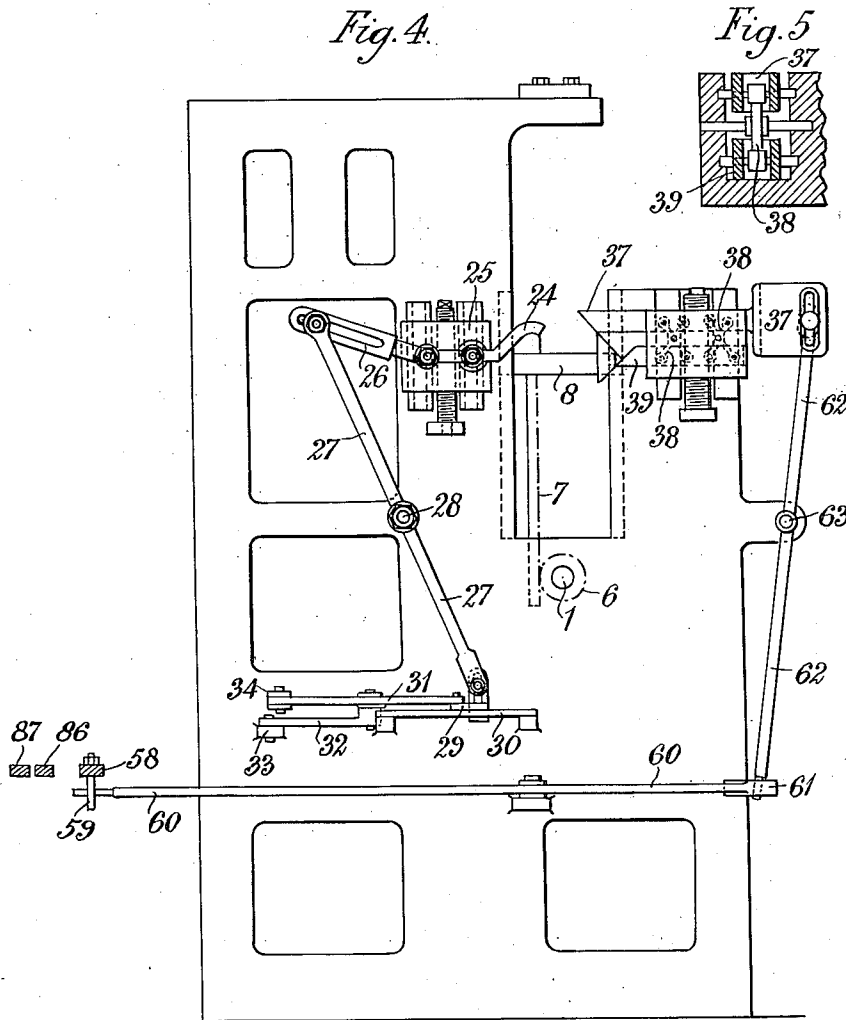
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6 SHEETS—SHEET 3.



Witnesses

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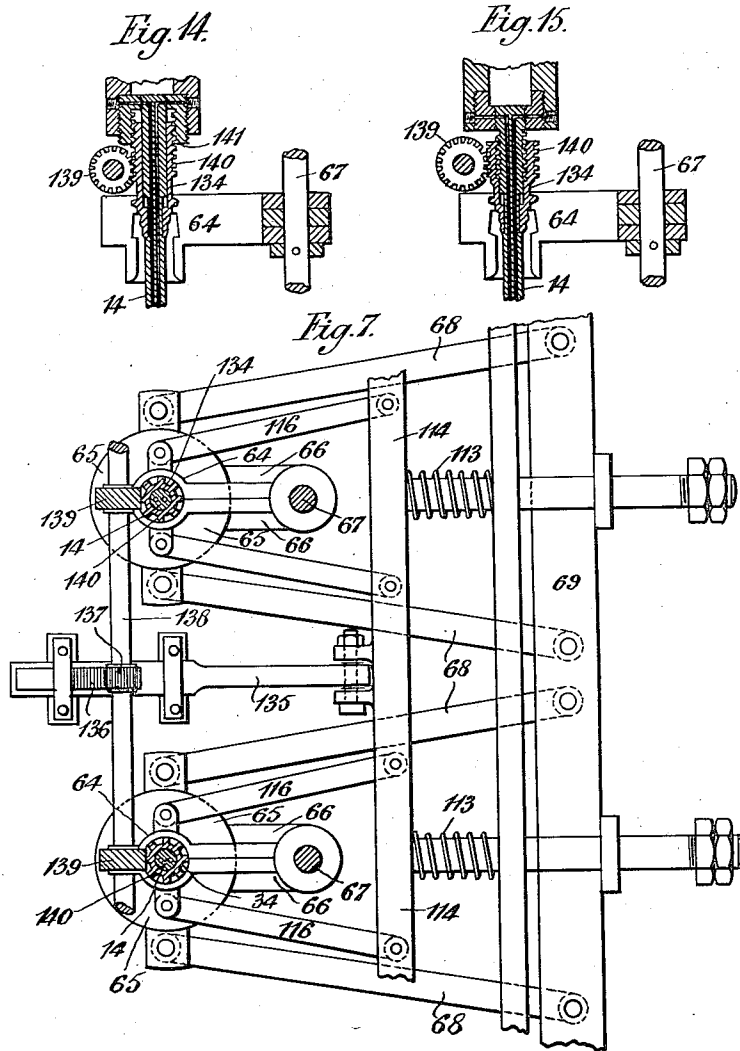
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6 SHEETS—SHEET 4.



Witnesses.

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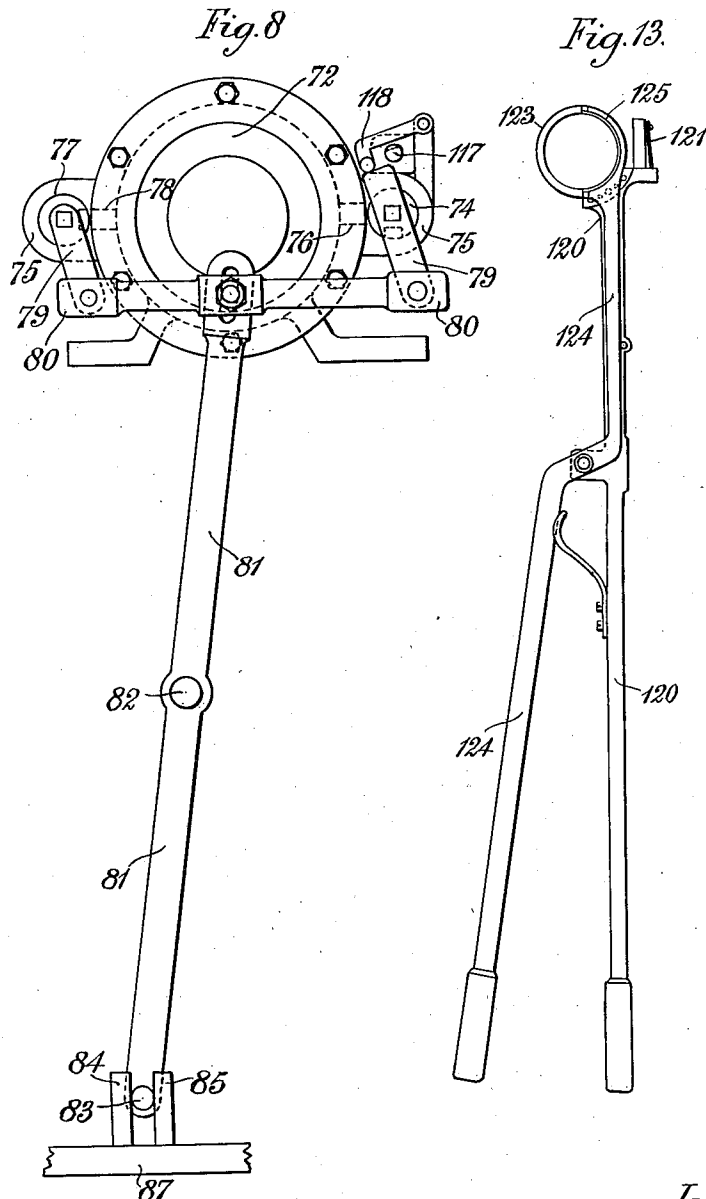
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6 SHEETS—SHEET 5.



Witnesses

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6 SHEETS—SHEET 6.

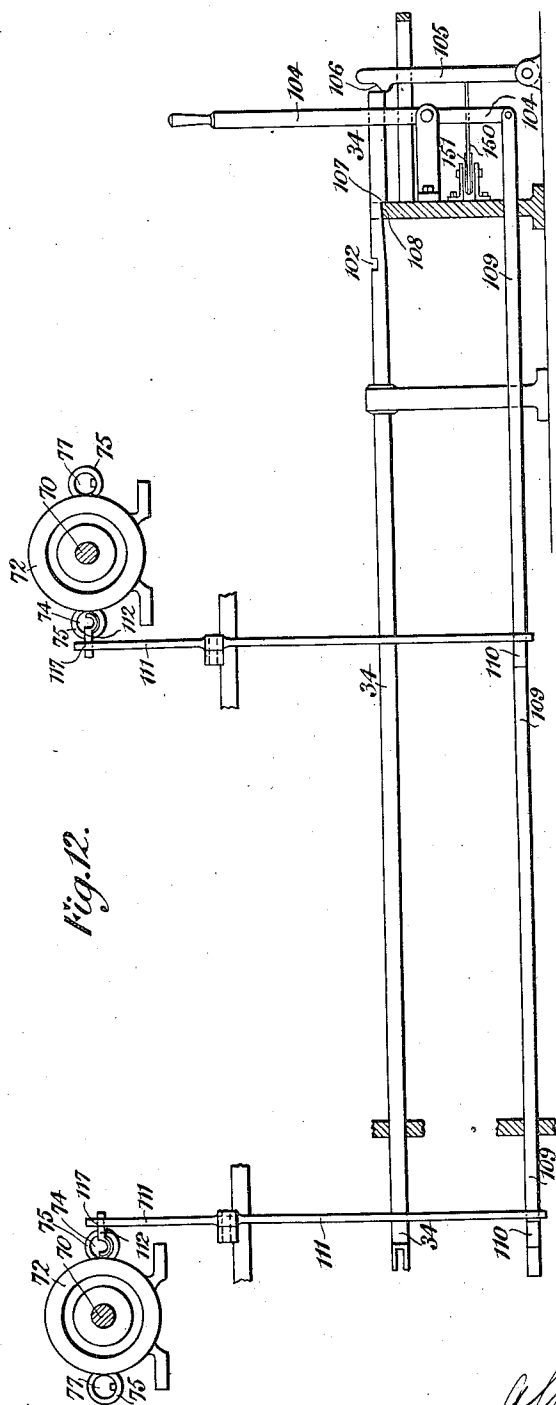


Fig. 12.

Witnesses  
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# UNITED STATES PATENT OFFICE.

ALBERT BEVERLEY, OF GORRINGE PARK, MITCHAM, ENGLAND.

MACHINE FOR BLOWING GLASS BOTTLES, JARS, AND THE LIKE.

1,065,499.

Specification of Letters Patent.

Patented June 24, 1913.

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*To all whom it may concern:*

Be it known that I, ALBERT BEVERLEY, a subject of the King of Great Britain, residing at 46 Tynemouth road, Gorrington Park, Mitcham, in the county of Surrey, England, have invented new and useful Improvements in Machines for Blowing Glass Bottles, Jars, and the Like, of which the following is a specification.

The object of this invention is to provide an improved machine for blowing glass bottles, jars and the like.

The accompanying drawings show a preferred embodiment of my invention but it is obvious that many minor changes may be made therein without going beyond the scope of my invention.

The machine illustrated is capable of making four bottles at one time but this number may be varied.

Figure 1 is a plan of the machine; Fig. 2 is a transverse section; Fig. 3 shows a detail; Fig. 4 is a left hand end view; Figs. 5 and 6 show details; Fig. 7 shows part of the mechanism for operating the molds and neck rings; Figs. 8 to 15 show details. Figs. 1, 4 and 12 are to a smaller scale than the others.

1 is the main shaft having on it four pulleys on which runs the driving belt. The first pulley 2 is on a sleeve on the shaft; the second 3 is a loose pulley, the third 4 is fast with the shaft and the fourth 5 is on a sleeve. The fourth and fifth are narrow pulleys so that the belt may drive both together. Fast on the shaft are two pinions 6 one at either end of the machine; these gear with vertical racks 7 depending from the table 8 which is thus capable of an up and down movement in guides on the frame of the machine. The table carries four parison molds 9. The molds may simply be dropped into sockets 10 on the table and these sockets are preferably capable of vertical movement with regard to the table, being mounted on springs 11 and carried by pistons 12 moving in cylinders 13 open to the atmosphere. This allows any mold to stop short of its highest position if too great a charge has been placed in it. Hereafter I will describe the machine as if there were only one mold and one socket on the table for however many sockets there be on the table, that is however many be the bottles than can be blown at one operation, the mechanisms

will simply be repetitions of that used for one bottle.

Above the socket 10 is a stationary hollow core rod 14 so situated that as the table rises the core rod enters the mass of glass in the parison mold as shown in Fig. 3. It must be understood that to save drawing Fig. 2 shows not only a parison mold with its charge below the core rod but also the finishing mold in position around the core rod and that such finishing mold must be withdrawn and the finished bottle removed from the core rod before the table rises.

Fast with the pulley 5 is a pinion 15 meshing with a pinion 16 on a shaft 17 on which is a bevel wheel 18 gearing with a bevel wheel 19 on a vertical spindle 20. The socket of the parison mold is supported by a pinion 21 meshing with a pinion 22 which is free to slide up and down the spindle 20. As the table 8 rises, an arm 23 upon it raises the pinion 22 which is thus always level with the pinion 21 and therefore the mold 9 is rotated on its axis during the rise of the table. When the table reaches its highest position it comes against a lever 24 (see Fig. 4) pivoted to an adjustable block 25 and connected by a slotted link 26 to a lever 27 fulcrumed on the frame at 28. The lower end of this lever moves a slide 29 along a fixed guide 30 and to this slide is connected one end of a link 31 pivoted to an arm 32 which can turn on a fixed pivot 33. The other end of the link 31 is hinged to a rod 34 running along the rear of the machine and connected by a bar 35 to the belt shifter 36. The effect of the parts numbered from 24 to 36 is that when the table strikes lever 24 the belt shifter is moved to the right and the belt is removed from pulleys 4 and 5 to pulley 2. The table is therefore raised no higher. In the path of the table and at each end thereof I arrange a detent or slide 37 connected by cross links 38 (see Figs. 4 and 5) to a detent 39 in such a way that when the table strikes slides 37 and moves them toward the front of the machine, the detents 39 move rearward beneath the table and hold it up. While the table is thus retained, the charge in the mold is marvered as follows:—As the belt shifter moves to the right an arm 40 (see Fig. 1) upon it comes against the rear end of a lever 41 and rocks it on its pivot 42. To the rear end of this lever is hinged a link 43 connected

to the bottom of a lever 44 by which a bevel wheel 45 on a shaft 46 can be moved into engagement with a bevel pinion 47 fast with the pulley 2. On the shaft 46 are two bevel pinions 48, each of which has teeth around one half only of its periphery and with these mutilated pinions meshes a bevel wheel 49 which is moved on its shaft 50 by a lever 51 pivoted at 52 and having its lower end hinged to the lever 41. This shaft 50 has fast on it a spur wheel 53 which meshes the pinion 16 already described. As therefore the pulley 2 rotates the shaft 50 is rotated first in one direction and then in the other and the mold is consequently rotated first in one direction and then in the other, marvering the charge within it. If the machine be required to make bottles other than cylindrical, the marvering may be obviated by removing the fork on lever 51 which embraces bevel wheel 49. On the shaft 46 moreover is a pinion 54 gearing with a pinion 55 on a cam shaft 56 on which is a cam 57 adapted to move to the left a rod 58 which engages by pins 59 (see Figs. 1 and 4) the rear ends of a pair of horizontal levers 60 the front ends of which have upon them inclines 61 which bear against the lower ends of levers 62 turning on horizontal pivots 63 while their upper ends engage the slides 37. When therefore the rod 58 is shifted to the left the slides 37 are moved rearward and the detents 39 are withdrawn. The table therefore falls by its own weight and the charge is left hanging to the core rod and neck ring as seen in Fig. 6. The neck ring 64 just referred to is constructed in two halves which are closed around the core rod before the table begins to rise as will be described later and the glass is forced by the rise of the mold up between the neck ring and the core rod. As soon as the table has fallen sufficiently to bring the top of the parison mold below the bottom of the charge, the finishing mold may be closed upon the half formed bottle. This is effected as follows:—The mold is formed in two halves 65 carried by arms 66 (see Figs. 2 and 7) which can turn around a pillar 67 and linked by links 68 to a longitudinal bar 69 to which are attached the rods 70 of pistons 71 moving in cylinders 72 arranged one at each end of the machine and supplied with compressed air by a supply pipe 73. Each cylinder has an inlet valve 74 in a valve box 75 coöperating with ports 76 admitting air to each end of the cylinder while 77 are exhaust valves coöperating with exhaust ports 78 by which the pressure at each end of the cylinders can be relieved. The inlet valves 74 and exhaust valves 78 have at their rear ends arms 79 pivoted to a bar 80 (see Figs. 1 and 8) at the top of a lever 81 pivoted at 82 and having at its lower end a pin 83 between pins 84, 85 on rods 86, 87 held by

springs 88 against cams 89, 90 on the cam shaft 56. When the cam 89 moves the rod 86 to the left, the valves 77 are turned so as to put the front ends of the cylinders to exhaust while the inlet valves 74 are turned so as to admit air to the rear of the pistons which therefore move forward bring the bar 69 forward and therefore close the molds as shown in Fig. 2. As soon as the molds are thus closed, I supply air to the core rods; this is effected as follows:—The bar 69 has attached to it a slide 91 (see Figs. 1 and 9) on which is an incline 92 and as the bar moves forward as above described this incline pushes up a valve 93 in a valve box 94 connected to the air pipe 73 so that air can pass to a pipe 95 leading to the top of the core rod which is suitably perforated so that the air can pass into the interior of the glass and below it to the form shown in Fig. 2. The core rod will of course be varied in shape and size to suit the various molds in use and in some cases may have grooves, flats or indentations formed upon it to enable it to hold the glass while the parison mold is descending and the molds closing. The core rod is preferably cooled by oil which is supplied to a chamber 96 and passes down an oval tube 97 (see Figs. 10 and 11) to near the bottom of the core rod and returns up a central pipe 98. Blowing continues until a drop in the cam 90 comes opposite the end of the rod 87 which is then moved to the right by its spring 88 so turning the valves 74 and 77 to move the pistons 71 rearward. This brings back the bar 69 cutting off air from the core rods, putting them to exhaust by port 99 and opening the finishing molds. All this time the belt has remained on pulley 2 but now a wiper 100 on the cam shaft 56 comes against a pivoted catch 101 and lifts it out of a slot 102 in the rod 34 which is then pulled to the left by the spring 103 (see Figs. 1 and 12); this brings the belt on to the loose pulley 3 and the machine stops. The finished bottle can now be taken off the core rod and a fresh parison mold that has had a charge gathered in it meanwhile can be placed on the table. An attendant now moves to the left a starting lever 104 (see Figs. 1 and 12) to which is coupled by a cord 150 passing over a pulley 151 a rocking arm 105 provided with an incline 106 which lifts the rod 34 so that a shoulder 107 on the rod which had been caught by a fixed stop 108 is freed from that stop and the rod is moved to its extreme left position thus shifting the belt on to the pulleys 4 and 5, from which the cycle of operations already described is repeated.

The lever 104 has pivoted to its lower end a rod 109 parallel to the rod 34 and carrying two inclines 110 (see Fig. 12) which as this rod moves to the right come against the lower ends of two vertical levers 111 and 130

move these ends forward; the upper ends therefore move back bearing against fingers 112 adapted to push rearward the front parts of the inlet valves 74 thus uncovering the ports 76 of the front of the cylinders and relieving the pressure in front of the pistons so that springs 113 are free to move forward a bar 114 (see Figs. 1, 2 and 7) which moves on guides 115 and is connected to the bar 69 moved backward and forward by the pistons. The bar 114 is linked by links 116 to the two halves of the neck ring 64 which thus close ready for the next parison mold to be raised around them.

Fast with the fingers 112 are rods 117 beside the valve boxes 75 and these rods are caught by catches 118 (see Figs. 1 and 8) which retain the front ends of the valves in the position last mentioned until the valves are turned by the return movement of the lever 81 due to the spring 88 on the rod 87 when the upper end of the arm 79 of the inlet valve 74 lifts the catch, whereupon the spring 119 moves the front of the inlet valve forward again.

With the parison molds referred to and shown in Figs. 2 and 3 I preferably use a rod or holder as shown in Fig. 13. This consists of a main rod 120 with a spring stud 121 adapted to enter the eye 122 on the mold and with a ring 123 adapted to fit over the top of the mold; to the rod 120 is pivoted a spring pressed shearing rod 124 the forward end of which is provided with a semi-circular knife 125 which coöperates with the ring 123 to shear off the glass when the gatherer considers the amount in the mold sufficient.

For making bottles with a "knock up" or indentation in the bottom, a bottom mold 126 is carried on a sleeve 127 sliding on the pillar 67. This sleeve has peripheral teeth 128 meshing with a segment 129 rocked on its pivot by a link 130 engaging a slotted arm 131 fast with the segment and carried by an arm 132 on the bar 69 (see Fig. 2). As therefore the bar 69 moves forward, the mold 126 is raised and swung into the position shown by a pin 133 on one of the halves of the finishing mold 65 which engages a hole in the bottom mold. When the finishing mold opens, the bottom mold is moved down and swung aside out of the way of the parison mold.

If it be desired to form a screw thread within the neck of the bottle, I provide a collar 134 on the core rod 14 (see Figs. 7, 14 and 15). This collar is withdrawn from the formed bottle as follows:—Connected to the bar 114 which operates the neck ring is a transverse arm 135 provided with a rack 136 meshing with a pinion 137 on a longitudinal spindle 138 on which is a skew gear wheel 139 engaging a thread 140 on the collar. As therefore the bar 114 moves back

the collar is turned and by reason of its thread it screws itself up into a nut 141 fixed above it as shown in Fig. 14. Or the collar may have an internal thread as shown in Fig. 15 and screw itself up the core rod.

It is obvious that various parts may be adjustable so that the machine can make bottles of various sizes and shapes. Moreover the sockets 10 for the molds may be so carried by the table 8 that their height above the table may be varied within considerable limits so that bottles of different sizes may be made at the same time.

What I claim is:—

1. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, means for raising a cylindrical mold containing glass up to the core rod, and means for rotating the mold about its axis.

2. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, a table, a socket thereon adapted to receive a cylindrical mold, means for raising the table up to the core rod, and means for rotating the mold about its axis.

3. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, means for raising a cylindrical mold containing glass up to the core rod, means for rotating the mold about its axis, means for lowering the empty mold, a divided finishing mold, and means for closing the finishing mold around the glass hanging upon the core rod.

4. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, a divided neck ring, means for closing the neck ring around the core rod, means for raising a cylindrical mold containing glass up to the core rod, and means for rotating the mold about its axis.

5. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, a divided neck ring, means for closing the neck ring around the core rod, means for raising a cylindrical mold containing glass up to the core rod, means for rotating the mold about its axis, means for lowering the empty mold, a divided finishing mold, and means for closing the finishing mold around the glass hanging upon the core rod.

6. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod,

means for raising a cylindrical mold containing glass up to the core rod, means for rotating the mold about its axis, means for lowering the empty mold, a divided finishing mold, means for closing the finishing mold around the glass hanging upon the core rod, a bottom mold, and means for raising and lowering the bottom mold as the finishing mold closes and opens.

10 7. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, means for raising a cylindrical mold containing glass up to the core rod, means for rotating the mold about its axis, a collar on the core rod adapted to form a thread in the neck of the bottle, and means for raising and lowering the collar.

20 8. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, a divided neck ring, means for closing the neck ring around the core rod, means for raising a cylindrical mold containing glass up to the core rod, means for rotating the mold about its axis, a collar on the core rod adapted to form a thread in the neck of the bottle, and means for raising the collar as the neck ring opens.

9. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, an oil circulation within the core rod, means for raising a cylindrical mold containing glass up to the core rod, and means for rotating the mold about its axis.

40 10. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, an oil circulation within the core rod, a divided neck ring, means for closing the

neck ring around the core rod, means for raising a cylindrical mold containing glass up to the core rod, and means for rotating the mold about its axis.

11. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, means for raising a cylindrical mold containing glass up to the core rod, means for rotating the mold about its axis, means for lowering the empty mold, a divided finishing mold, a cylinder, a piston therein, means for admitting air under pressure to the cylinder, and means whereby the movements of the piston close and open the finishing mold.

12. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, a divided neck ring, means for closing the neck ring around the core rod, means for raising a cylindrical mold containing glass up to the core rod, means for rotating the mold about its axis, means for lowering the empty mold, a divided finishing mold, a cylinder, a piston therein, means for admitting air under pressure to the cylinder, and means whereby the movements of the piston close and open the finishing mold and the neck ring.

13. In a machine for blowing bottles, a stationary hollow vertical core rod having perforations in it, means for admitting compressed air to the interior of the core rod, a table, a socket thereon adapted to receive a cylindrical mold, means for raising the table up to the core rod, means whereby the socket can yield should the mold contain too great a charge, and means for rotating the mold about its axis.

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Witnesses:

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