(No Model.) 4 Sheets—Sheet 1.

C. E. SCHMUNK.

APPARATUS FOR MANUFACTURING GLASSWARE.

No. 604,907. Patented May 31, 1898.

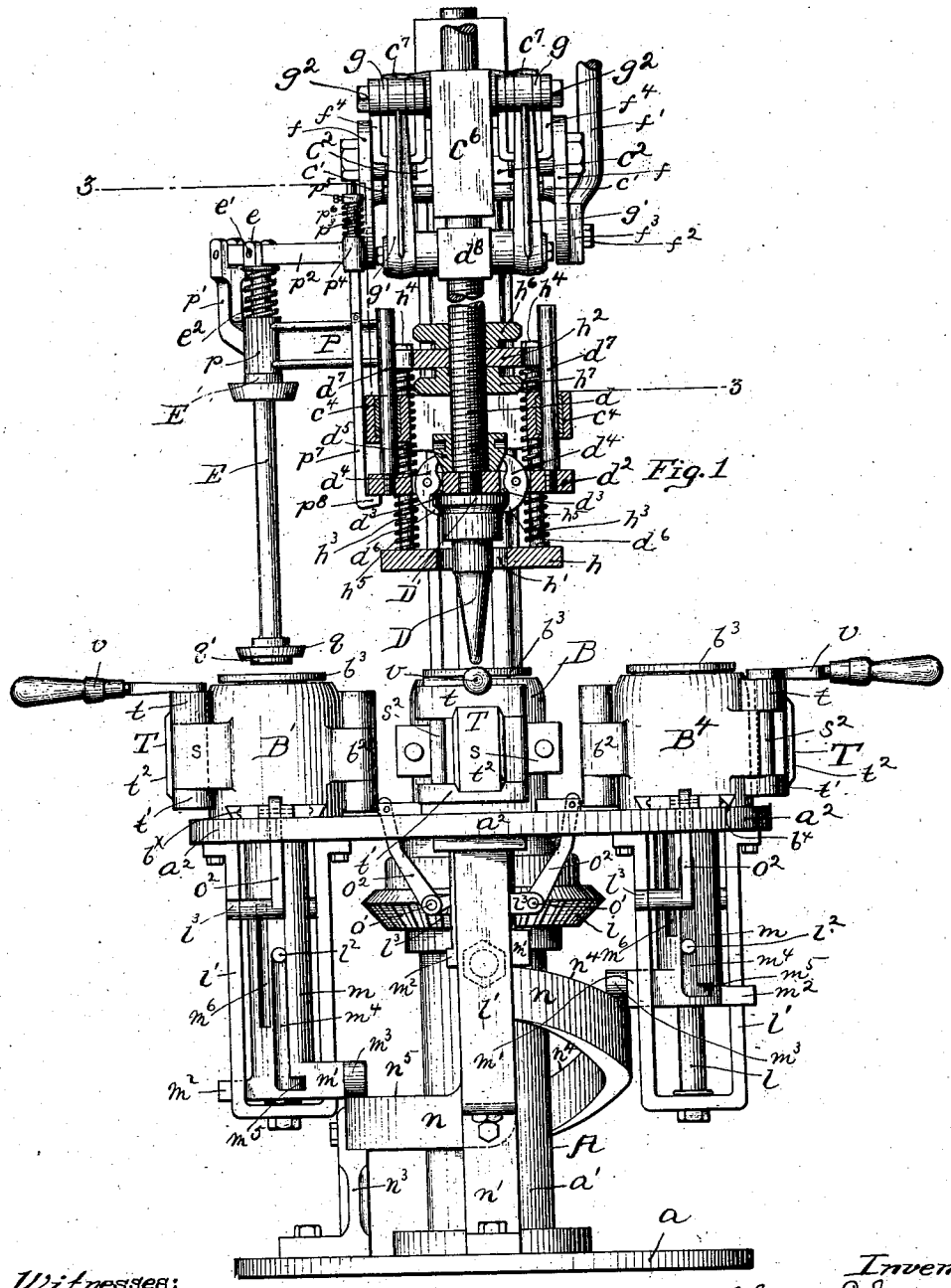

Fig. 1

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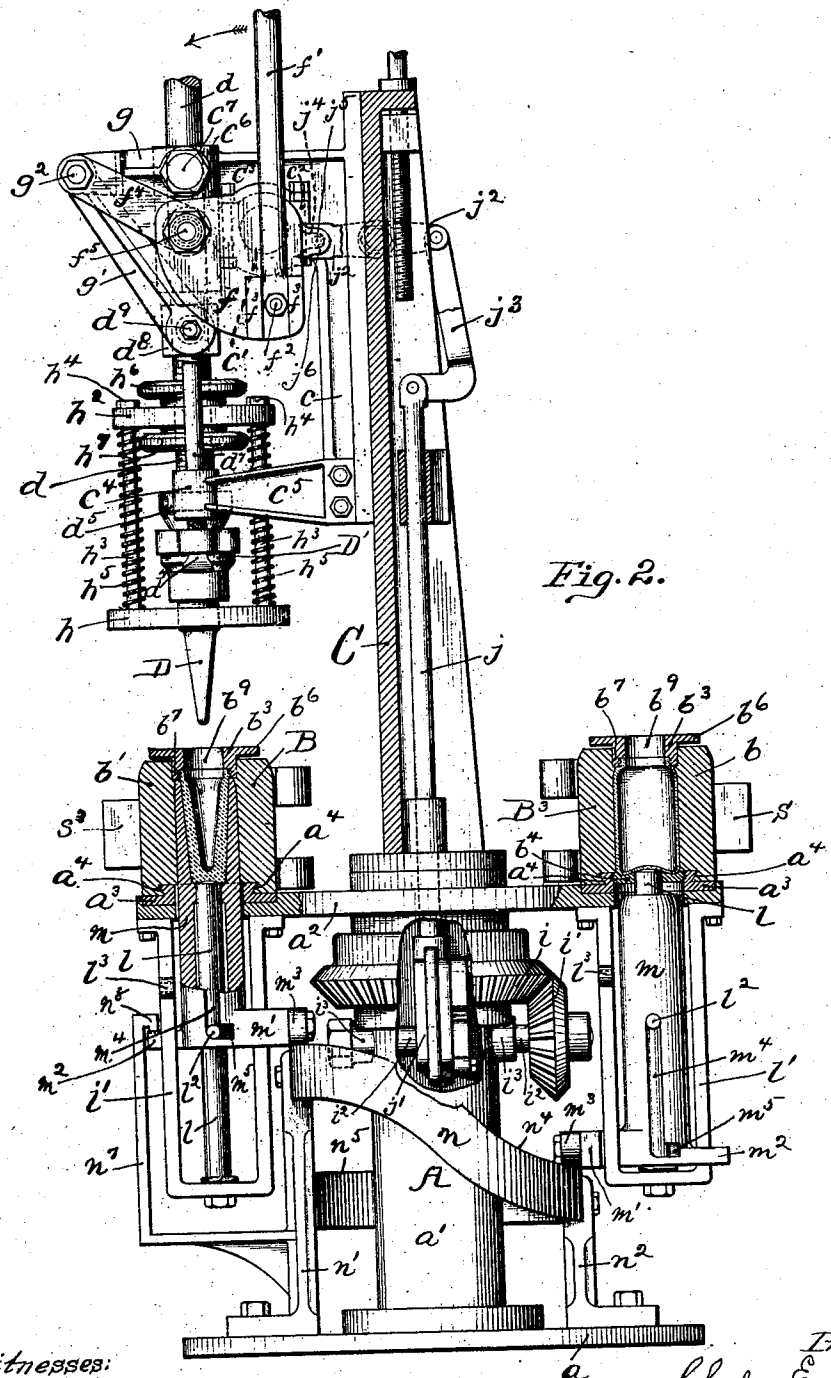

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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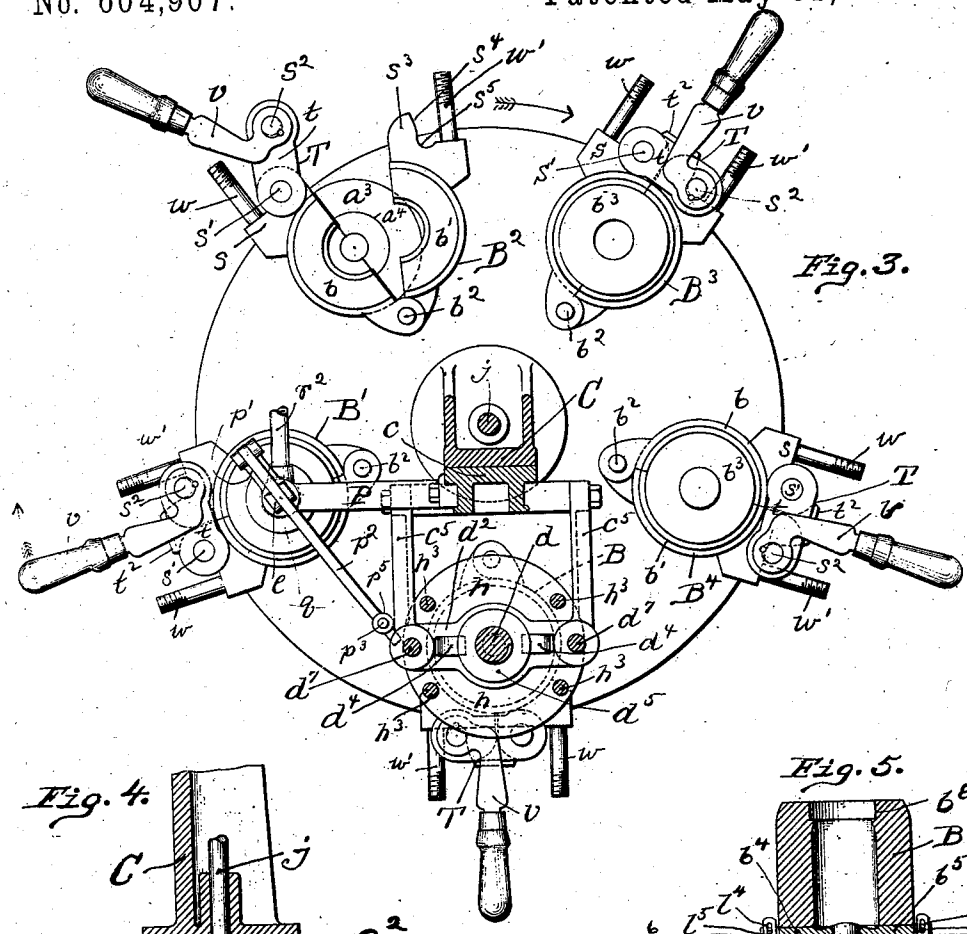

Fig. 3.

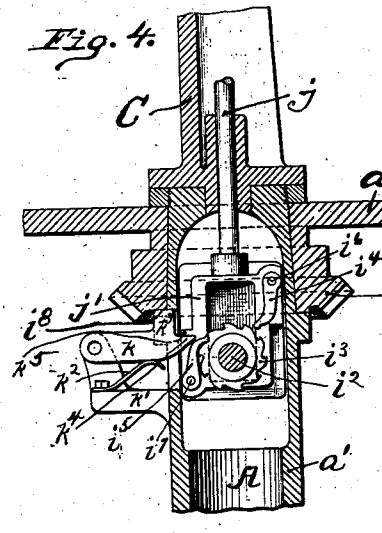

Fig. 4.

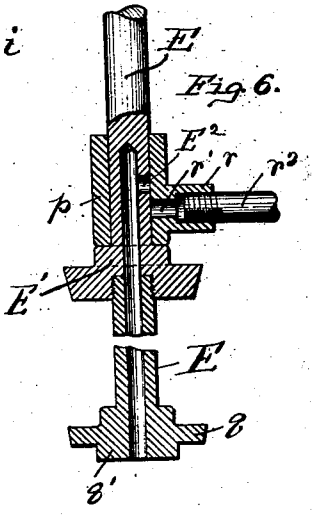

Fig. 6.

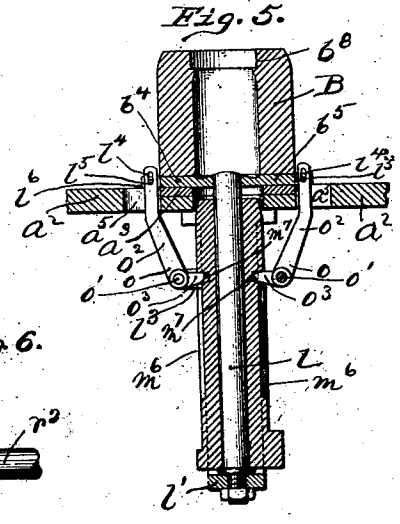

Fig. 5.

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(No Model.) 4 Sheets—Sheet 4.

C. E. SCHMUNK.

APPARATUS FOR MANUFACTURING GLASSWARE.

No. 604,907. Patented May 31, 1898.

Fig. 7.

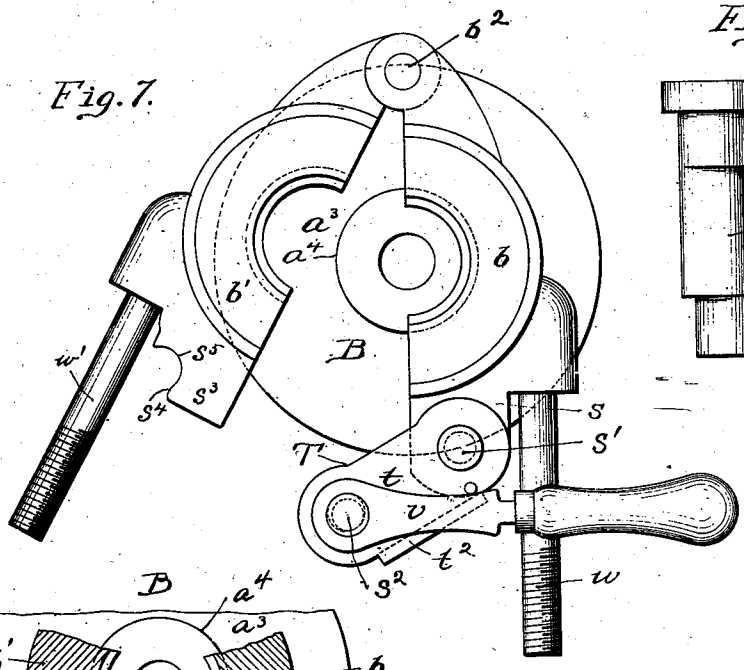
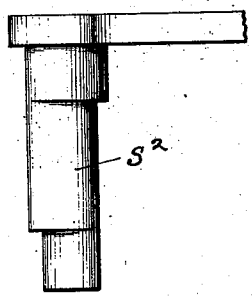


Fig. 10.



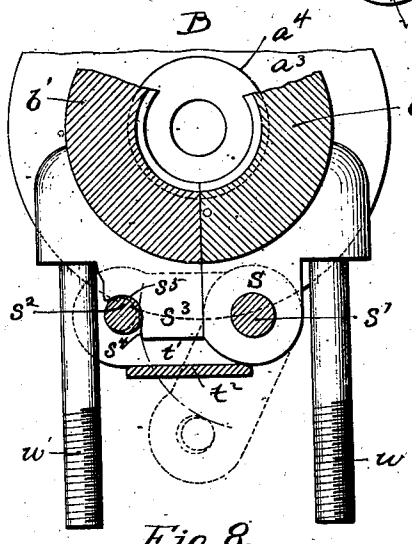


Fig. 8.

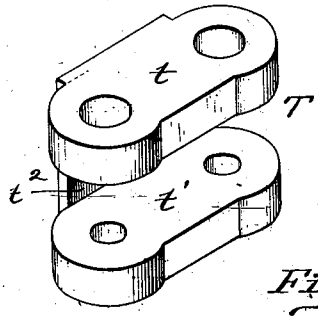


Fig. 9.

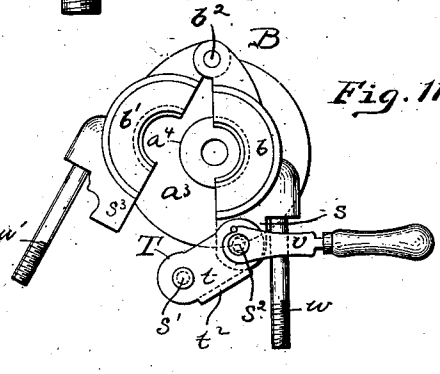


Fig. 11.

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UNITED STATES PATENT OFFICE

CHARLES E. SCHMUNK, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM S. McKEE, OF ALLEGHENY, PENNSYLVANIA.

APPARATUS FOR MANUFACTURING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 604,907, dated May 31, 1898.

Application filed October 8, 1897. Serial No. 654,554. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCHMUNK, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for the Manufacture of Articles of Glassware; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for forming articles of glassware.

The object of my invention is to provide apparatus by which articles of glassware may be manufactured with great rapidity and in large quantities without the employment of skilled labor.

My invention comprises the features which are set forth in the claims.

In the drawings, Figure 1 is a front elevation of the machine, certain parts being shown in section. Fig. 2 is a side view, partly shown in section. Fig. 3 is a sectional plan on the line 3 3 Fig. 1. Fig. 4 is a section showing the means whereby the table is revolved. Fig. 5 is a sectional detail of certain parts forming the mold. Fig. 6 is a sectional detail of certain parts used in the blowing operation. Fig. 7 is an enlarged plan view of the mold partially open. Fig. 8 is a sectional plan view of a portion of the mold closed. Fig. 9 is a perspective view of the latch. Fig. 10 is a view of the eccentric-pin. Fig. 11 is a modified form of the locking mechanism.

Like letters indicate like parts in each of the figures.

The letter A represents a stand consisting of the plate a and the hollow post a'. Mounted to revolve upon the post a' is the table a^2. Secured upon this table and revolving therewith are the molds B B' B^2, &c.

Secured to the post a' and extending above the table a^2 is the standard C, which carries the plunger D, the blow-pipe E, and the mechanism for operating them, all of which will be more fully hereinafter described.

Bolted or otherwise secured to the standard C is the bracket or frame c. A shaft c' is mounted to reciprocate in the bearings c^2, which are formed in the upper parts of said frame c. Segmental plates f are secured at each end of the shaft c'. A handle f' is secured to one of the plates f by means of the bolt f^2, the lugs f^3 upon the plate f holding the lever firmly in position. The said segmental plates and the handle together constitute a lever.

The plunger D is secured to the lower end of the plunger-rod d. The plunger-rod d is screwed into the plate d^2, said plate having the slots d^3 therein, in which are pivoted the fingers d^4. The upper ends of these fingers rest against the inclined face of the nut d^5, which moves up and down on the threaded surface of the plunger-rod d. When the nut d^5 is turned upon the plunger-rod d so as to move the nut d^5 downward between the upper ends of the fingers d^4, said upper ends are forced out and the lower ends d^6 of said fingers are forced together under the shoulder D' of the plunger, gripping it and holding it firmly in place against the plate d^2.

Guide-rods d^7, secured to the plate d^2, slide in the guides c^4 as the plunger-rod moves up and down and holds the plunger against any side motion. The guides c^4 are formed at the outer ends of the arms c^5, which in turn are bolted to the frame c.

The plunger-rod d moves in the guide c^6, formed at the outer end of the extension c^3 of the frame c. Pivoted to the upper ends of said guide c^6 at the point c^7 are the two levers g, one at each side thereof. To the outer ends of said levers g at the points g^2 are pivoted the two levers g', which at their lower ends are pivoted to the block d^8, said block being secured to the plunger-rod d. Links f^4 are pivoted to the inner sides of the segmental plates f, as at f^5, said links also being pivoted at their other ends to the pivotal point g^2 of the levers g and g'. It will thus be seen that as the lever f' is moved in the direction of the arrow, Fig. 2, the plates f will rock upon the shaft c' and by means of the links f^4 will draw the point g^2 of the levers g and g' toward the standard C. The two sets of levers g and g' each form a toggle, and as the points c^7 are stationary the pivotal points d^9 of the levers g' are forced downwardly, thus forcing the plunger into the mold. As the two segmental plates f are fixed upon the rock-shaft c^2, the one moving simultaneously with the other, both toggles act

simultaneously upon the plunger-rod when the lever f' is operated.

The plunger D passes through the opening h' in the spring-plate h, said spring-plate being suspended from the plate h^2 by means of the rods h^3. These rods h^3 slide freely up and down in openings in the plate h^2, and nuts h^4 at the upper end of the rods h^3 limit the downward movement of said rods. Coiled springs h^5 surround these rods h^3, being interposed between the plates h and h^2, and hold the spring-plate firmly against the top of the mold when the plunger is being forced therein.

The plate h^2 surrounds the plunger-rod d and is free to slide thereon, being held in adjustment by means of the nuts h^6 and h^7, which move upon the threaded surface of the rod d, the nuts h^6 and h^7 being, respectively, above and beneath the plate h^2.

The revolving table a^2 has the bevel-gear i either formed integral therewith or attached thereto, said gear-wheel being secured beneath the table. A bevel-pinion i', mounted upon the horizontal shaft i^2, meshes into the bevel-gear i. The shaft i^2 revolves in the bearings i^8, formed upon the outside of the hollow post a'.

A rod j, carrying at its lower end the yoke j', is pivotally attached at one end of levers j^2 by means of the bifurcated link j^3. The levers j^2 (only one of which is shown in the drawings) are pivoted at about their centers to the standard C, one at each side thereof, at the points C', the other ends of these levers being bifurcated, as shown in dotted lines at j^4. Pins j^5 are secured to the lugs j^6 upon the plates f, said pins entering these bifurcated ends j^4 of the levers j^2.

Secured to the horizontal shaft i^2 is the ratchet-wheel i^3, Fig. 4. Pawls i^4 and i^5 are pivoted to the yoke j', said yoke encircling the shaft i^2 and moving up and down thereon. The pawl i^4 is pivoted to the yoke j' at the point i^6 and hangs downwardly therefrom in such a position that its free end may enter a tooth of the ratchet-wheel i^3 as the yoke descends and revolve the ratchet-wheel and its shaft i^2 therewith. The pawl i^5 is pivoted to the lower end of the yoke j' at the point i^7, its free end extending up in such a position as to engage the teeth of the ratchet-wheel as the yoke j' moves up.

A spring-actuated pawl k is pivoted to the arm k', said arm extending out from the post a', either being attached thereto or forming a part thereof. The spring k^2, which actuates the pawl k, is bolted to the arm k'. The lip k^3 of the pawl enters a slot or notch i^8 in the gear-wheel i, locking said gear, and consequently the table a^2, from being carried too far around by its momentum when the table is revolved as the plunger recedes from the mold.

The number of notches in the gear-wheel corresponds to the number of molds used upon the table. A lug k^4 extends beyond the lip k^3 of the lever k, and a pin or projection k^5 is in such position upon the yoke j' as to engage said lug or projection k^4 and release the lip k^3 from the slot or notch i^8 as the yoke descends and before the pawl i^4 engages with the ratchet-wheel i^3 to revolve the same and rotate the table to carry one of the molds beneath the plunger.

I will now proceed to describe the mold and the several parts connected therewith.

In the operations of pressing and blowing an article of glassware it is necessary to have a mold of the proper size and shape in which the blank may be pressed. It is also necessary to have a mold of the proper size and shape conforming to the finished article in which the aforementioned blank may be blown out into the finished article. This I accomplish by means of a combination-mold, one mold serving for both the purposes of pressing and blowing.

As previously explained, any number of molds may be used upon the table; but I find in practice that five molds work most perfectly.

As the molds and their attachments are all alike, I will describe one, such description applying to each.

My mold B is a two-part mold composed of the two halves b b', as will be readily understood by consulting Fig. 3, these two halves being hinged together at b^2, as shown, and locked together at the front by a new and novel construction of mold-locking device, which will be more fully hereinafter described. These two halves when closed and locked serve the purpose of a blow-mold in connection with the ring b^3 and the false bottom composed of the two halves b^4 and b^5.

In Fig. 2 I have shown the parts of the mold lettered B^3 as being in the positions they would assume during the blowing operation with the finished article therein. In reality, although the parts are shown in proper relation with each other for the position of the mold, the finished article would have been removed from said mold when it was in the position B^2 shown in Fig. 3, the table revolving in the direction of the arrow. The ring b^3 may of course be made of any design to suit the shape desired for the top rim of the article to be formed. In the present instance the interior of said ring is threaded to suit the top of the fruit-jar. This ring is formed with the upper flange b^6 and the neck b^7, said neck fitting into the countersunk portion b^8, formed in the top of the mold. This ring is of course formed with the central opening b^9, in which the neck of the plunger D fits when said plunger descends. The interior of this ring, as before stated, conforms at its lower end to the shape of the top of the article to be formed.

A rod l, secured at its lower end to the hanger l', extends up within the lower portion of the mold at its center and forms the central portion of the bottom for both the blow-mold and the press-mold.

The aforementioned hanger l' is formed U-shaped and is bolted at its upper end to the under side of the plate a^2.

Sliding upon the rod l is the sleeve m, said sleeve being of such a shape at its upper end as to form the walls of the mold in which the blank is pressed when the sleeve is lifted up into the blow-mold. As shown in Fig. 2, the mold lettered B is arranged for the pressing operation, the pressed blank being shown therein. The press-mold is formed of the upper portion of the sleeve m, the rod l, and the ring b^3. The top surface of the rod l forms the bottom of said press-mold, the upper portion of sleeve m forms the sides of said mold, and the lower portion of the neck of ring b^3 shapes the neck of the jar as it will appear in the finished article, which in the case illustrated has screw-threads upon its outer surface.

The sleeve m has cast thereon at its lower end the lugs m' and m^2. The lug m' serves as a bearing for the roller m^3, which rides upon the upper face of the cam-shaped ring n. This cam-shaped ring n surrounds the post a' and is supported by the posts n', n^2, and n^3. This cam-shaped ring n is formed of the inclined portion n^4 and the horizontal portion n^5. As the plate or table a^2 revolves, carrying the molds and its accessories therewith, the rollers m^3 of the sleeve m ride upon the upper face of the ring n. The highest point of the incline n^4 is directly beneath the radial line drawn through the point of the plunger D and the center of rotation. It will thus be seen that as the roller m^3 rides up the inclined face of the portion n^4 of ring n the sleeve m will be carried up into the mold B, and when it has reached its highest point it is in proper position for the plunger to descend therein and form the blank. A pin l^2 passes through the rod l and the slots m^4 cut in opposite sides of the sleeve m, said pin sliding in the slots m^4 as the sleeve moves up and down on the rod l and prevents the sleeve m from rotating upon the rod l. Recesses m^5 are formed at the bottom of said slots m^4, in which the pin l^2 engages when the sleeve m has been carried to its highest point, the sleeve being partially revolved by the natural drag of the roller m^3 upon the ring n until the pin l^2 engages in said recess m^5.

A stop n^7 is attached to the post n', being a part thereof, and is of such shape that the portion n^8 at the upper end thereof is in the path of the lug m^2 of sleeve m. When the lug m^2 comes in contact with the stop n^8, the sleeve m is revolved in a direction opposite to that occasioned by the drag of the roller upon the ring n and the pin l^2 is disengaged from the recesses m^5. The sleeve then drops by its own weight until the roller m^3 strikes the horizontal portion n^5 of the ring n.

The molds B B' B^2, &c., rest upon the bottom ring a^3, said ring fitting into the table a^2, its top surface being flush with the top surface of said table. This bottom ring a^3 is formed with the dovetail portion a^4, which projects above its upper face. The two parts of the mold are formed with recesses which fit snugly around said dovetailed portion when the mold is closed. The two slides b^4 and b^5, which form the bottom for the blow-mold, have the tongues $b^\times$ thereon, which slide in grooves cut in the inside faces of the projecting dovetail portions a^4 of the plates a^3.

Levers o are pivoted to the lugs l^3 of the hangers l', as at o'. The long arms o^2 of the levers o extend up through slots a^5, formed in the table a^2, said arms o^2 having slots l^4 at their upper ends, which engage pins l^5 in the slots l^6 of plates b^4 and b^5. The short arms o^3 of levers o extend substantially at right angles to the arms o^2. Grooves m^6 are cut in the outer face of sleeve m, at the upper end of which is the recess m^7.

Bolted or otherwise secured to the upright C is the arm P, having at its outer end the guide or bearing p. Mounted to slide in said guide is the blowpipe E. Projecting upwardly from the guide p is the arm p', at the upper end of which is formed a bearing for the lever p^2. At the upper end of the blowpipe E is the fork e, in which the pin e' of the lever p^2 is journaled. A spring e^2 surrounds the upper end of pipe E, being interposed between the fork e' of pipe E and the upper face of guide p. This spring normally holds the shoulder E' of pipe E up against the lower face of the guide p. A rod p^3 slides in the guide p^4, formed at the outer end of lever p^2, said rod having the ring p^5 keyed near its upper end and a spring p^6 surrounding said rod and interposed between said ring and guide. Pivoted to the lower end of rod p^3 is the hook p^7. The hooked portion p^8 thereof projects beneath the plate d^2 of the plunger-rod d. The rod p^3 may be jointed, as at p^9, to admit of a certain amount of play on the part of the lower section of said rod.

At the lower end of the blowpipe E is the flange q, which rests upon the top face of ring b^3 during the blowing operation, the reduced portion q' of flange q entering ring b^3 and forming a tight joint therewith.

The blowpipe E is formed hollow throughout the greater portion of its length (see Fig. 6) and has the hole E^2 drilled therein. A boss r is cast upon the outer surface of guide p, said boss being formed with the hole r' therein. A pipe r^2 is threaded into the boss r, said pipe being in connection with an air pump or reservoir, as may be desired. When the pipe E is carried down so that the flange q is in contact with the ring b^3 of the mold, the hole E^2 comes in line with the hole r' of boss r and the air passes from the pump or reservoir through pipe r^2 and hole E^2 to the blowpipe E, and thence into the mold B', filling the blank therein and forming the finished article.

To facilitate the operation of handling the mold and the product therefrom, I use a lock of a new and novel construction, the main

feature thereof being the rapidity with which the mold may be unlocked, opened, and relocked. To the forward end of the part *b* of the mold I cast the lug *s*, through which the pin *s'* passes. A latch T, composed of the upper and lower plates *t* and *t'* and connected by the web t^2, is mounted to swing on the pin *s'*, journaled in the lug *s*. An eccentric-pin s^2 passes through holes formed therefor in the free ends of the links *t* and *t'*. The eccentric-pin s^2 extends above the link *t* and a lever *v* is keyed thereto. The said eccentric-pin s^2 is freely removable by means of the lever or handle *v*. A lug s^3, having the curved face s^4 and the recess s^5 therein, is cast to the part *b'* of the mold and corresponds in general to the lug *s* of part *b* of said mold. Threaded rods *w* and *w'* are attached to the mold in such positions that handles may be placed thereon, so that they may be readily grasped by the operator and the molds opened and closed thereby.

In Fig. 11 I have shown a modified form of my invention in which the eccentric-pin instead of passing through openings formed in the free ends of the links *t t'* passes through the opposite ends of the latch. The device operates in the same manner as before, the centering-pin *s'* in this case engaging with the recess s^5.

Suppose the parts to be in the position shown in Fig. 3, referring to any one of the molds, such as B', said mold being closed. To open the mold, the operator grasps the lever *v* and moves it in the direction of the arrow. By so doing the short side of the eccentric-pin (shown in dotted lines) is turned toward the face s^4 of the lug s^3, when the lock may be easily swung out to the position shown in mold lettered B^2 and the mold opened. The face s^4 of lug s^3 is an arc of a circle whose center will be the center of pin *s'* when the molds are closed. This lock may of course be employed with any form of mold, whether a press or blow mold, and I do not wish to limit myself to its use in connection with the mold illustrated.

The molds are placed in ovens to be heated before they are used, and the eccentric-pin is removed before the mold is introduced into the oven in order that said pin may not be subjected to the action of the heat and caused to expand. If the pin was permitted to remain in the latch and the eccentric-pin was for any reason turned so as to lock the parts of the mold when in the oven, the expansion would cause said pin to bend or the lugs on the latches would break under the strain. By having the eccentric-pin freely removable and yet capable of locking and unlocking the mold without removal is an important feature, as it permits of the ready withdrawal of the pin when the mold is inserted in the oven, and yet avoids the necessity of removing the pin each time the mold is opened.

In the operation of my invention the operator first drops the proper amount of glass into the mold which stands one-tenth of a revolution to the right of the plunger, said mold being the one which will come next beneath the plunger as the lever *f'* is moved in the direction of the arrow, Fig. 2. The roller m^3 has previously moved up the inclined surface n^4 of the cam-ring *n* and the sleeve *m* moved up into the mold, the ring b^3 of course being in position at the top of the mold. Having dropped the proper amount of glass in the mold, the operator grasps the lever *f'* and draws it toward him, said lever moving in the direction indicated by the arrow. As the lever is thus moved the plates *f* will move upon the rock-shaft *c'* in the arc of a circle. The pins j^5, projecting into the space between the jaws j^4 of lever j^2, will lift said end of lever, depressing the opposite end thereof, to which the rod *j* is attached, through the means of link j^3. The rod *j* being thus depressed will carry the yoke *j'* downwardly therewith. The pin k^5, pressing against the lug k^4 of lever *k*, acts to remove the lip k^3 from engagement with the gear-wheel and unlock said gear-wheel and table, so that said table may be revolved. By the time the lever *k* has been depressed sufficiently to unlock the table the pawl i^4 enters a tooth of the ratchet-wheel i^3, revolving the same, and, through the shaft i^2, the bevel-pinion *i'* and bevel gear-wheel *i*. The table is thus revolved sufficiently to bring the mold directly beneath the plunger. As the rock-shaft is further revolved the pin j^5 passes from between the prongs j^4 of lever j^2 and does not further move said lever or its adjuncts. As the lever is moved and the plates *f* are partially revolved therewith the levers f^4, connected thereto, act to draw the common point g^2 of levers *g* and *g'* downwardly and in toward the standard C. In so doing the point d^9 descends and the plunger is pressed into the mold. As the plunger descends the taper of said plunger acts to properly center the mold, if it should be for any reason out of line. After the pressing operation has been completed the lever is moved upwardly or in a direction opposite to that indicated by the arrow, and the parts again assume the position shown in Fig. 2, the pin j^5 having entered the bifurcated end j^4 of lever j^2 and raising the rod *j* and yoke *j'* thereon. As the yoke *j'* is thus raised the pawl i^5 enters a tooth of the ratchet-wheel i^3, partially revolving said ratchet-wheel, and, in a similar manner to that previously described, further revolves the table a^2 one-tenth of a revolution until the plunger again stands elevated half-way between two of the molds. This operation is continued and the blanks are pressed one after the other. As the plunger recedes and the table revolves the lug m^2 of sleeve *m* strikes the stop n^8, and the pin i^2 is released from the recess m^5. At the same time the roller m^3 leaves the inclined portion n^4 of cam-ring *n*, and the sleeve *m* drops until the roller m^3 strikes the horizontal portion n^5 of said cam-ring. As the sleeve drops the short

arms o^3 of levers o move up in the grooves m^6 of said sleeve until the limit of said grooves is reached, when the arm o^3 is carried down, the end of said arm entering the recess m^7. The upper arms o^2 of lever o move toward each other as the arm o^3 is forced down, and in so moving carry the plates b^4 b^5, which form the false bottom, inwardly until they fit snugly around the post at its upper end, and in conjunction therewith form the bottom of the blow-mold. The pressed blanks will remain in the mold as the sleeve m recedes after the pressing operation has been completed, being supported in the neck of the mold and also at its bottom upon the top of the rod. As the plunger again descends, bringing the next mold beneath said plunger, the mold holding the blank which has just previously been pressed is carried around beneath the blowpipe E. As the plunger further descends the hook p^5, being engaged beneath the plunger-plate d^2, is carried down therewith, depressing the lever p^2 and blowpipe E. The blowpipe thus descends until the flange q rests upon the top of ring b^3, the reduced portion q' of flange q entering the ring and forming and air-tight joint therewith. The hole E^2 of blowpipe E is brought into line with opening r'. When the flange q has reached its seat, the compressed air enters through the pipe r^2 and the blank is blown out to the shape of the mold. As the plunger recedes and the plate d^2 moves up therewith the tension upon lever p^2 is released and the spring e^2 acts to lift the blowpipe E and the flange q from contact with the mold, and the air-pressure is cut off as the hole E^2 recedes from line with the opening r'. As the blowpipe recedes the operator revolves the ring b^3 backwardly on the threads formed upon the neck of the jar, in order to release the ring from said thread. The lever v is then grasped, the mold unlocked and subsequently opened in the usual manner, and the article is removed.

I will now proceed to give a more detailed description of the different positions assumed by the several parts of the mold, &c., referring more especially to Figs. 1, 2, and 3.

In Fig. 2 the mold B^3 is so situated that the roller m^3 is just ready to start up the incline n^4, the plates b^4 and b^5, which constitute the bottom for the blow-mold, still being in position. The mold is of course closed and locked and the ring b^3 in place. As the machine goes through another complete operation the mold has moved to the position B^4, Fig. 1. Here it will be seen that the roller m^3 has moved part way up the incline. The plates b^4 b^5, forming the bottom of the blow-mold, have been withdrawn, allowing the sleeve m to move up into the mold a distance corresponding to the ascent of roller m^3. As the table further revolves until it reaches the position shown at B the parts will take the positions shown in Fig. 2, except that when the plate so moves as to bring the mold directly beneath the plunger the drag of the roller m^3, occasioned by the friction of said roller moving upon the cam-ring, will allow the pin l^2 to enter the recess m^5 and hold the sleeve m firmly up into the mold. The plunger, hereupon descending, presses the glass previously dropped by the operator into the form of the blank, as shown in the mold B, Fig. 2. As the plunger is raised the table moves around and the lug m^2, coming into contact with the stop n^8, acts to revolve the sleeve m in a direction opposite to that caused by the drag of the roller m^3 upon the cam-ring and the pin i^2 is released from the recess m^5, and as the roller at the same time reaches the end of the inclined portion n^4 of ring n the sleeve l drops, leaving the blank suspended in the mold, as previously described. As the sleeve drops the plates b^4 and b^5 are forced in, as previously described, forming the bottom for the blow-mold. The table then further revolves until the mold reaches the position as shown at B', Figs. 1 and 3, where the blowing operation is completed, as previously described. As the table is further revolved the ring b^3 is removed by turning said ring backward upon the threads formed around the neck of the jar. In this manner I am enabled to form an article with a perfect thread during the pressing operation. The mold is then unlocked and the jar removed.

By my method of pressing the threads of the jar in a solid ring and subsequently removing said ring by revolving the same backward upon said threads I form a uniform thread free from fins.

Another valuable feature of my construction lies in the fact that my blank when pressed rests upon the top of rod l and remains thereon during the blowing operation and until the mold is opened and the finished article removed. By this construction the blank is firmly held in place and cannot sag to one side, as it is free to do when the blank is merely suspended from the neck, as is the usual method. I am also enabled to form an article with a smooth neck—that is to say, with no bead or thread to hold the blank in place, as is necessary when the blank is merely suspended from the neck, as previously explained.

I do not wish to limit myself to the exact construction shown and described, as that may be varied and changed without departing from the spirit of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a mold supported thereon, an upright below said mold and forming a portion of the bottom of same, a sleeve on said upright, the upper portion of said sleeve constituting the walls of press-mold, and mechanism for raising and lowering said sleeve and a locking device for holding said sleeve in its raised position, substantially as set forth.

2. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a press-mold supported thereon, an upright below said mold and forming a portion of the bottom of same, a sleeve on said upright, the upper portion of said sleeve constituting the walls of the press-mold, a bottom for the mold to convert it into a blow-mold surrounding said upright, and mechanism for raising and lowering said sleeve and simultaneously opening and closing said bottom, substantially as set forth.

3. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a mold supported thereon, an upright below said mold and forming a portion of the bottom of same, a sleeve on said upright, the upper portion of said sleeve constituting the walls of press-mold, bottom plates for the blow-mold, and mechanism for raising and lowering said sleeve and simultaneously opening and closing said bottom plates, substantially as set forth.

4. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a mold supported thereon, an upright below said mold and forming a portion of the bottom of same, a sleeve on said upright, the upper portion of said sleeve constituting the walls of press-mold, bottom plates for the blow-mold, levers connected to said bottom plates, and mechanism for raising and lowering said sleeve and operating said levers to advance and withdraw said bottom plates, substantially as set forth.

5. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a mold supported thereon, an upright below said mold and forming a portion of the bottom of same, a sleeve on said upright, the upper portion of said sleeve constituting the walls of press-mold, bottom plates for the blow-mold, levers connected to said bottom plates, said levers having inwardly-projecting arms engaging with grooves in said sleeve, and mechanism for raising and lowering said sleeve, substantially as set forth.

6. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a mold supported thereon, an upright below said mold and forming a portion of the bottom of same, a sleeve on said upright, the upper portion of said sleeve constituting the walls of press-mold, bottom plates for the blow-mold, levers connected to said bottom plates, said levers having inwardly projecting arms engaging with grooves in said sleeve, said arms entering recesses at the upper ends of said grooves, and mechanism for raising and lowering said sleeve, substantially as set forth.

7. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a press and blow mold mounted thereon, an upright below said mold and forming a portion of the bottom of same, the press-mold being mounted on said upright and vertically movable thereon, a stud on said upright entering a guide in said press-mold and forming a bayonet-lock at the lower end of said guide, and mechanism for unlocking same and for raising and lowering said press-mold, substantially as set forth.

8. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a combination press and blow mold mounted thereon, an upright below said mold and forming a portion of the bottom of same, the press-mold being mounted on said upright and vertically movable thereon, a stud on said upright entering a guide in said press-mold and forming a bayonet-lock at the lower end of said guide, a projection on said press-mold, a stop on the frame with which said projection engages, and mechanism for raising and lowering said press-mold, substantially as set forth.

9. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, mechanism for rotating said table, a plurality of molds mounted thereon, a plunger, a lever for operating said plunger, a toggle-joint between said lever and plunger, and connections between said lever and mechanism for rotating said table, substantially as set forth.

10. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, mechanism for rotating said table, a plurality of molds mounted thereon, a plunger, a lever for operating said plunger, a vertically-movable rod, connections between said rod and said lever, pawls on said rod, a ratchet-wheel, and connections between said ratchet-wheel and gearing mechanism for rotating said table, substantially as set forth.

11. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, mechanism for rotating said table, a plurality of molds mounted thereon, a plunger, a lever for operating said plunger, a vertically-movable rod, connections between said rod and said lever, oppositely-arranged pawls on said rod, a ratchet-wheel, and connections between said ratchet-wheel and gearing mechanism for rotating said table, substantially as set forth.

12. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, a plurality of molds mounted thereon, a plunger, a lever for operating same, a vertically-movable rod, connections between said rod and said lever, oppositely-arranged pawls on said rod, a ratchet-wheel mounted on a shaft, a bevel-pinion on said shaft, and a like pinion on said table with which said first-mentioned pinion engages, substantially as set forth.

13. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, a plurality of molds mounted thereon, a plunger, a lever

for operating same, a vertically-movable rod, connections between said rod and said lever, a rotary shaft, mechanism for turning said shaft by the movement of said rod, gearing mechanism between said shaft and said table, and a lock for holding said table against rotation, substantially as set forth.

14. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, a plurality of molds mounted thereon, a plunger, a lever for operating same, a vertically-movable rod, connections between said rod and said lever, a rotary shaft, mechanism for turning said shaft by the movement of said rod, gearing mechanism between said shaft and said table, and a lock operated by said rod for holding said table against rotation, substantially as set forth.

15. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, a plurality of molds mounted thereon, a plunger, a lever for operating same, a vertically-movable rod, connections between said rod and said lever, a rotary shaft, mechanism for turning said shaft by the movement of said rod, a bevel-pinion on said shaft, a like pinion on said table with which said first-mentioned pinion engages, a spring-latch engaging a seat in said pinion on said table, said latch being operated by said rod, substantially as set forth.

16. In a partible mold for forming articles of glassware, the combination of a swinging latch mounted on one of the parts of said mold, a freely-removable eccentric-pin mounted to turn in bearings in said mold, the free end of said swinging latch being adapted to engage with a shoulder on the opposite part of the mold, substantially as set forth.

17. In a partible mold for forming articles of glassware, the combination of a swinging latch mounted on one of the parts of said mold, a freely-removable eccentric-pin mounted to turn in the free end of said latch, and a recess in the opposite part of the mold in which the pin is adapted to enter, substantially as set forth.

18. In a partible mold for forming articles of glassware, the combination of a swinging latch mounted on one of the parts of said mold, a freely-removable eccentric-pin mounted to turn in the free end of said latch, a handle secured to said pin, and a recess in the opposite part of the mold in which the pin is adapted to enter, substantially as set forth.

19. In a partible mold for forming articles of glassware, the combination of a swinging latch mounted on one of the parts of said mold, a freely-removable eccentric-pin mounted to turn in the free end of said latch, the opposite part of said mold having a lug with a curved face and a recess beyond said face, substantially as set forth.

20. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, means to rotate the table, a plurality of molds mounted thereon, a plunger, a blowpipe, a movable rod in the path of the plunger and lowered thereby, and connections between said rod and said blowpipe, substantially as set forth.

21. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, means to rotate the table, a plurality of molds mounted thereon, a plunger, a blowpipe, a lever connected to the upper end of said blowpipe, a rod extending down from said lever, said rod having a projection in the path of said plunger, substantially as set forth.

22. In apparatus for the manufacture of articles of glassware, the combination with a suitable frame, of a rotary table, means to rotate the table, a plurality of molds mounted thereon, a plunger, a blowpipe, a lever connected to the upper end of said blowpipe, a spring-actuated rod extending down from said lever, said rod having a projection in the path of said plunger, substantially as set forth.

In testimony whereof I, the said CHARLES E. SCHMUNK, have hereunto set my hand.

CHARLES E. SCHMUNK.

Witnesses:
ROBT. D. TOTTEN,
ROBERT C. TOTTEN.