

No. 645,189.

Patented Mar. 13, 1900.

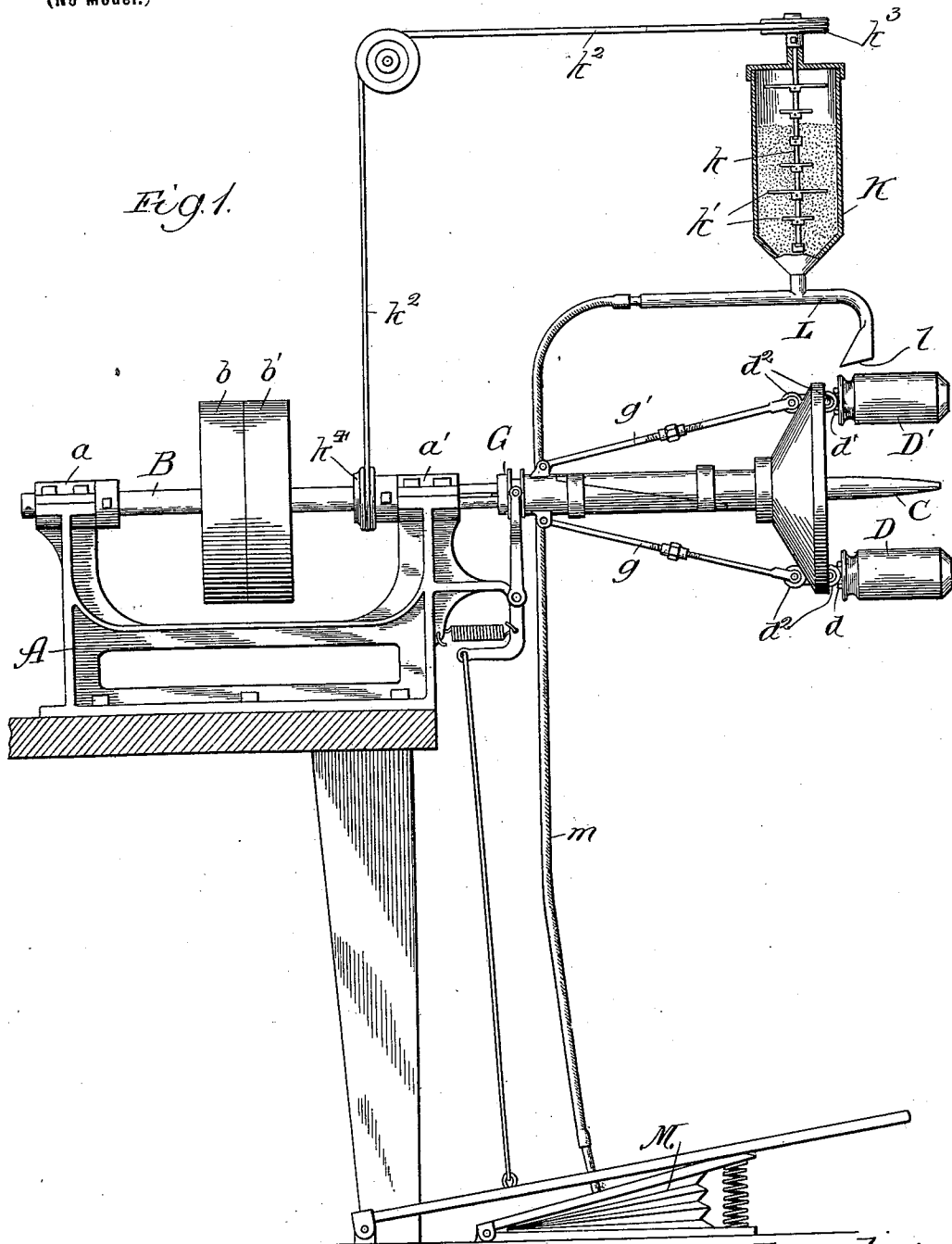
A. J. RUDOLPH.

MACHINE FOR FORMING BOTTLE NECKS.

(Application filed Aug. 8, 1898. Renewed July 27, 1899.)

2 Sheets—Sheet 1.

(No Model.)



Witnesses,

East Gaylord,
June 1. 1878

Inventor:

Alexander J. Rudolph,
By Manning P. Manning & Sheridan,
Attys. at Law.

No. 645,189.

Patented Mar. 13, 1900.

A. J. RUDOLPH.

MACHINE FOR FORMING BOTTLE NECKS.

(Application filed Aug. 8, 1898. Renewed July 27, 1899.)

(No Model.)

2 Sheets—Sheet 2.

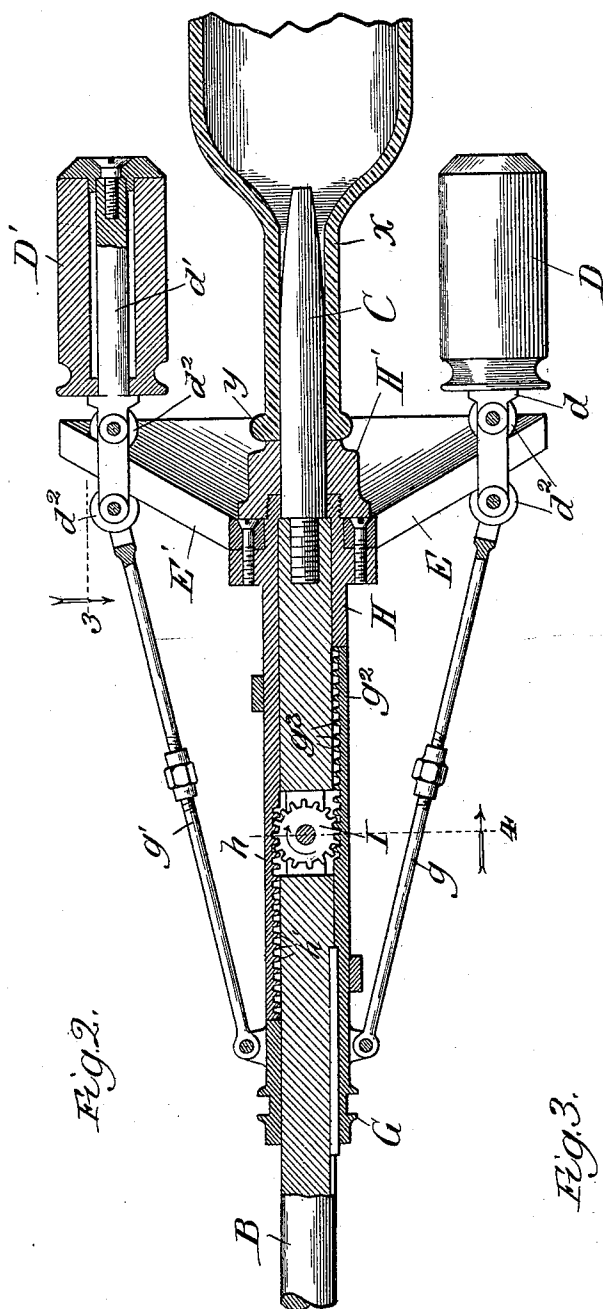


Fig. 2.

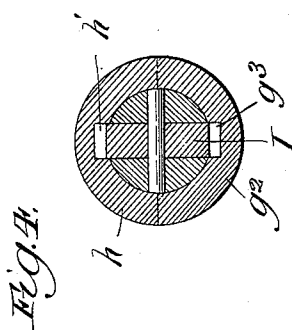


Fig. 4.

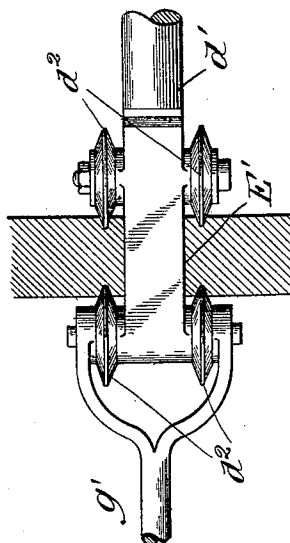


Fig. 3.

Witnesses:
 Jas. E. Gaylord,
 Lute S. Allen

Inventor:
Alexander J. Rudolph,
By Banning & Banning, Sheridans,
Attys.

UNITED STATES PATENT OFFICE,

ALEXANDER J. RUDOLPH, OF CHICAGO, ILLINOIS.

MACHINE FOR FORMING BOTTLE-NECKS.

SPECIFICATION forming part of Letters Patent No. 645,189, dated March 13, 1900.

Application filed August 8, 1898. Renewed July 27, 1899. Serial No. 725,321. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER J. RUDOLPH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Machines for Forming Bottle-Necks, of which the following is a specification.

My invention relates to that class of mechanisms for forming and finishing the necks of glass bottles and other open-ended tubular articles formed of glassware or similar material while such articles are in a heated, malleable, or ductile condition.

The principal object of my invention is to provide a simple, economical, and efficient machine for forming bottle-necks; and the invention consists principally in the combination of a rotatable mandrel or spindle, a forming-plug mounted in one end thereof, a forming roll or rolls eccentrically mounted with regard to and adapted to rotate with the spindle, means for moving such rolls outwardly and inwardly during the rotation of the spindle, a hollow advancing sleeve mounted on the spindle and adapted to bear against the bottle-neck, and means for moving the sleeve forwardly and backwardly to raise the neck of the bottle, substantially as hereinafter described.

The invention consists, further and finally, in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a machine constructed in accordance with my improvements; Fig. 2, an enlarged sectional detail view of the forming mechanism separated from the machine; Fig. 3, a longitudinal sectional view taken on line 3 of Fig. 2, and Fig. 4 a cross-sectional view taken on line 4 of Fig. 2.

In the art to which this invention relates it is well known that heretofore in the forming and finishing of bottle-necks the operation of forming and finishing the neck of the bottle has been laborious and expensive in that the bottle while in a heated ductile condition is liable to torsional stress or strains, which results in twisting the neck and jamming the bottle by attempting to force the neck against a shoulder. The principal ob-

ject of my invention is to obviate these objections and provide mechanism which will form the bottle-neck by rolling and finishing, at the same time holding the neck so that the advancing sleeve will curl up that portion which is necessary to form the lip, all of which will be more fully hereinafter described.

In constructing a machine in accordance with my improvements I make a frame portion A of the desired size, shape, and strength to hold the operative and other portions in position. Rotatably mounted in the bearings *a* and *a'* of the frame portion is a spindle or mandrel B, provided with the usual tight and loose pulleys *d* and *d'*, to which power and motion are transmitted by any suitable belt mechanism.

In order to form the bottle-neck, the forward end of the mandrel is provided with a plug C of the desired size and shape adapted to enter the opening in the bottle-neck, so that during its rotation the interior of the neck is sized and finished.

To form the outer portion of the bottle-neck, two forming-rolls D and D' are provided and rotatably mounted upon parallel-moving shafts *d* and *d'*. These parallel moving shafts are provided with rolls *d²* at their inner ends, which run up and down the inclined surfaces of the cones E and E', so as to carry the forming-rolls inwardly and outwardly during the movements of these rolls on the inclined planes in a substantially-parallel manner. To operate these rolls on the inclined planes, a longitudinally-movable operating-sleeve G is provided and reciprocatingly mounted on the spindle or mandrel, which by means of the rods *g* and *g'* transmit the necessary power and motion to the parallel-moving shafts. When the forming-rolls are at their inner limit of motion, they rest upon the bottle-neck X, contacting the same and rolling around to give it the desired contour. When it is desired to form a lip Y on the bottle-neck, it is desirable to have an advancing shoulder and preferably have this shoulder arranged on a sleeve which may be moved forwardly and backwardly, moving forwardly while the forming-rolls are holding the neck solid against the plug, thus acting to curl up the lip without twisting the neck or jamming the bottle. In order to accomplish this result, I

provide what I term an "advancing" forming-sleeve H, which is provided with a forward shoulder portion H', adapted to impinge against the lip on the bottle-neck. In order to give this sleeve its advancing motion, the longitudinal operating-sleeve G is provided with a forward extension g^2 , having a rack g^3 thereon, adapted to engage with a pinion I, rotatably mounted in the mandrel or spindle.

The advancing forming-sleeve is provided with a rearwardly-extending portion h , having a rack h' , engaging with the pinion I, so that when the operating-sleeve is moved backward the pinion is rotated in the direction of the arrow and moves the advancing sleeve forwardly on the plug, so as to contact the bottle-lip and curl it up at about the time the forming-rolls are operating on the bottle-neck.

It is well known in this art that the mechanical operation of forming bottle-necks by rolls is very difficult, owing to the fact that the molten glass or small fibers formed thereof enter the minute recesses of even a highly-finished metal roll, so as to gather thereon and tear or cut the surface of the bottle. In order to obviate this objectionable feature, it is necessary to use finely-divided charcoal or the like and keep a constant supply of it between the rolling-surfaces and the glass of the bottle. To accomplish this by hand is a very difficult matter, as well as a wasteful process, in that the operator cannot judge just when to throw it in, and, as a consequence, has to use a superabundance of material. To accomplish this feeding of charcoal between the finishing-surfaces of the rolls and the material forming the bottle-neck automatically in proper quantities and at the proper time is one of the objects of my invention.

To provide a charcoal-feeding mechanism in combination with a machine for forming bottle-necks, I provide a reservoir K, adapted to hold a quantity of powdered charcoal or similar material. This reservoir is provided with a vertical rod k , on which is mounted a set of stirrers k' , which act to keep the charcoal in a finely-divided condition, so that it may readily pass out through the bottom of the receptacle into the feed-pipe L, which has its exit-opening l arranged adjacent to the forming-rolls. The stirrers and beaters are operated by means of a belt k^2 , which engages a pulley k^3 on the stirrer-shaft and a pulley k^4 on the spindle of the machine, so that during the running of the machine the stirrers are kept in operation, but when the machine is stopped the stirrers are also stopped and the charcoal-feeding shut off. To facilitate the feeding, a bellows M is provided, though any other machine for furnishing a supply of air under pressure may be used having an air-supply pipe m connected therewith and with the charcoal-supply pipe L, so that the finely-divided or powdered charcoal is furnished under pressure—sufficient to overcome the centrifugal force generated by the rotating

rolls—to the desired point and in the desired manner and quantity.

In operation the main spindle is rotated, so as to permit centrifugal force to bring the rolls D and D' into the position shown in Figs. 1 and 2. A glass bottle in a heated or ductile condition is inserted in the usual "snap" and its neck forced on the plug C. The depressing of the treadle forces the operating-sleeve backwardly and the forming-rolls inwardly, so as to contact the exterior of the bottle-neck. The advancing sleeve is moved forwardly, so as to curl up the material at the forward portion of the bottle-neck, so as to form the lip of the neck y , the forming or operating rolls assisting in such formation. The operator then releases the treadle, which during the action of the springs is raised and the operating-sleeve moved forwardly. Centrifugal force, with the assistance of the connecting-rods g and g' , forces the forming-rolls outwardly. During the operations above described the charcoal or carbon in the receiver K is agitated and forced outward through the spout l into contact with the forming-rolls and the bottle-neck.

While I have described my invention with more or less minuteness as regards details and as being embodied in certain precise forms, I do not desire to be limited thereto unduly or any more than is pointed out in the claims. On the contrary, I contemplate all proper changes in form, construction, and arrangement, the omission of immaterial parts, and the substitution of equivalents, as circumstances may suggest or necessity render expedient.

I claim—

1. In a machine of the class described, the combination of a rotatable spindle, a forming-plug mounted in one end thereof, a forming roll or rolls eccentrically mounted with regard to the spindle, means for moving the rolls inwardly and outwardly, an advancing sleeve adapted to surround the forming-plug and be moved backwardly and forwardly to curl up a bottle-lip and finish the front end thereof, and means for moving the advancing sleeve forwardly and backwardly, substantially as described.

2. In a machine of the class described, the combination of a rotatable spindle, a forming-plug mounted in one end thereof, a forming roll or rolls adapted to move inwardly and outwardly and thus form a bottle-neck, an advancing forming-sleeve surrounding the plug adapted to curl up the lip of a bottle-neck and finish the front end thereof, and means for moving the sleeve forwardly when the forming roll or rolls are in contact with the bottle-neck, substantially as described.

3. In a machine of the class described, the combination of a rotatable spindle, a forming-plug mounted in one end thereof, an inclined plane connected with the spindle, a forming roll or rolls mounted upon such inclined plane, an operating-sleeve longitudinally movable

on the spindle, and rods connecting the longitudinally-moving sleeve with the forming-rolls to move them inwardly and outwardly in a substantially-parallel manner, substantially as described.

4. In a machine of the class described, the combination of a rotating spindle, a forming-plug in one end thereof, a forming roll or rolls eccentrically mounted with regard to the spindle, a longitudinally-movable sleeve for moving such rolls inwardly and outwardly, an advancing sleeve surrounding the spindle and forming-plug so as to curl up the lip of a bottle-neck, a longitudinal extension on the rolls-operating sleeve provided with a rack, a rearward extension provided with a rack on the advancing sleeve, a pinion intermediate and engaging such racks for transmitting power and motion from one to the other, and means for moving the advancing sleeve forwardly and backwardly and thus causing the operations of the advancing sleeve, substantially as described.

5. In combination with a machine of the class described, a charcoal-feeding mechanism comprising a receptacle, means for keep-

ing the charcoal in such receptacle in an agitated condition, a supply-pipe leading to the point of use, mechanism for supplying air under pressure, and a pipe or passage connecting such air-supply mechanism with the supply-pipe to feed the charcoal forward to the desired point in a finely-divided condition, substantially as described.

6. In combination with a machine of the class described, a charcoal-feeding mechanism comprising a receptacle, means for keeping the charcoal in such receptacle in an agitated condition, a supply-pipe leading to the point of use, mechanism for supplying air under pressure, a pipe or passage connecting such air-supply mechanism with the supply-pipe to feed the charcoal forward to the desired point in a finely-divided condition, and power-transmitting mechanism connecting the charcoal-feeding and bottle-forming mechanism together to operate both simultaneously, substantially as described.

ALEXANDER J. RUDOLPH.

Witnesses:

THOMAS F. SHERIDAN,
THOMAS B. MCGREGOR.