No. 646,874. Patented Apr. 3, 1900.

A. J. RUDOLPH.

MACHINE FOR FORMING BOTTLE NECKS.

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

(No Model.) 2 Sheets—Sheet 1.

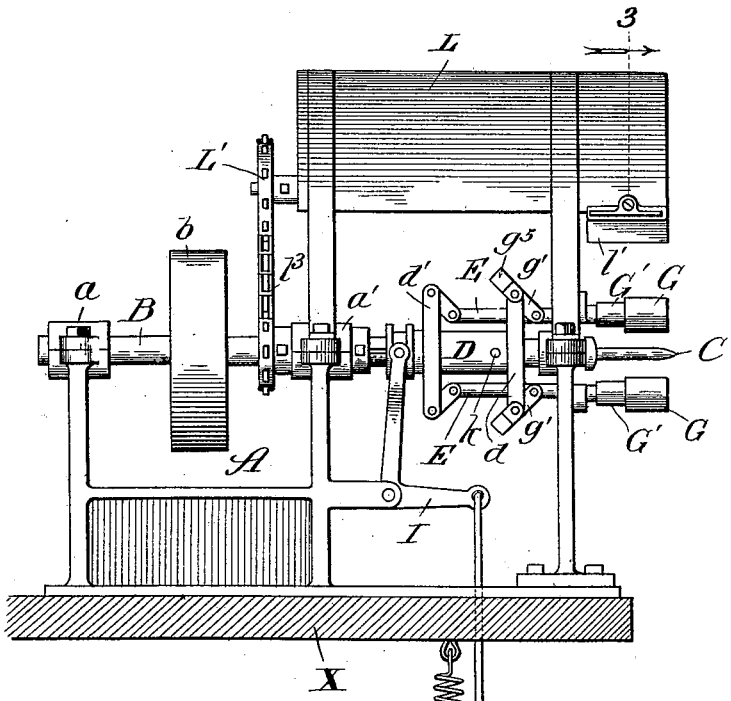


Fig. 1.

Fig. 3.

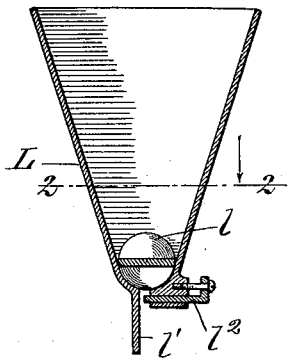
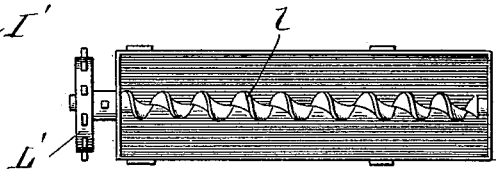


Fig. 2.



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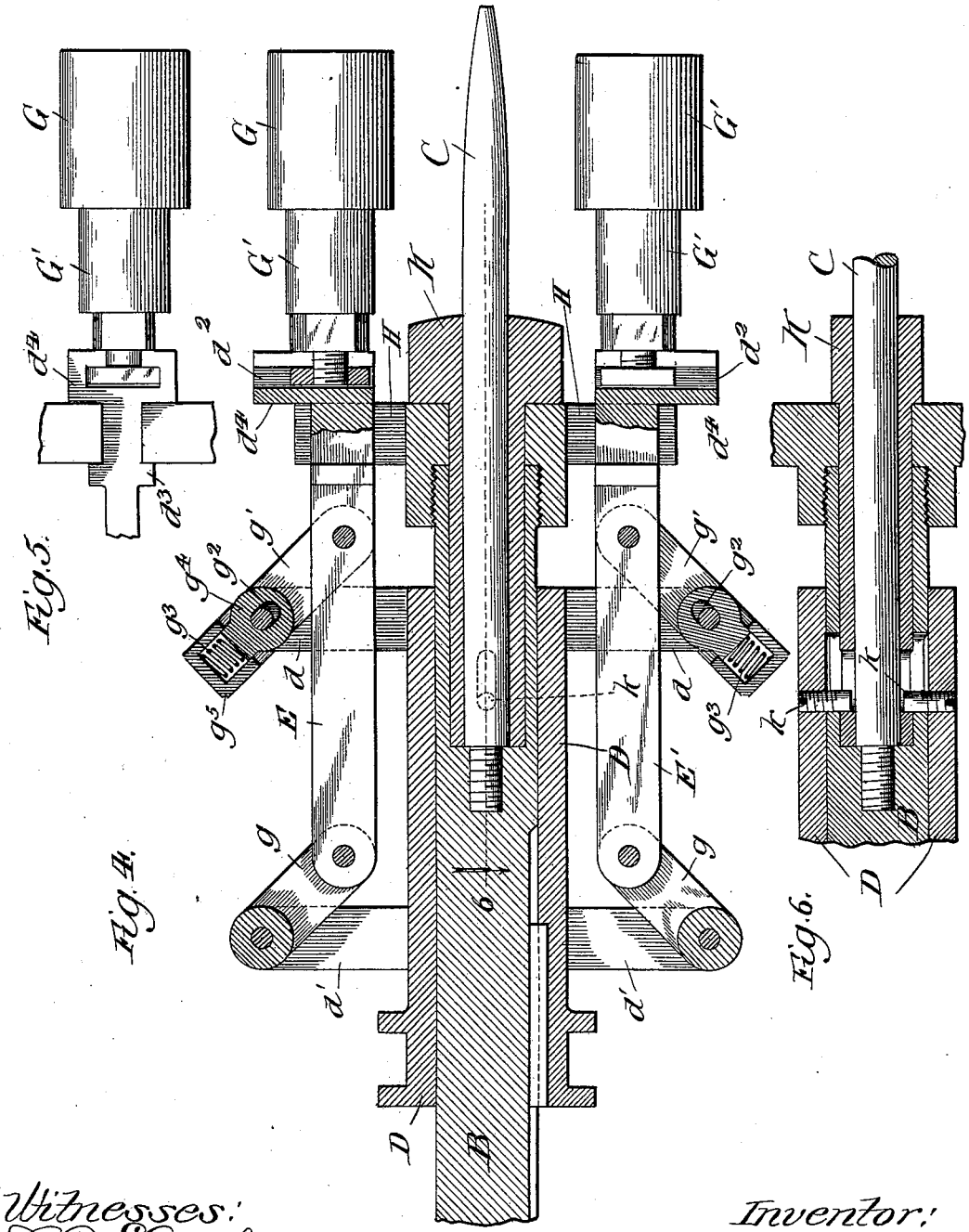

Fig. 5.

Fig. 4.

Fig. 6.

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UNITED STATES PATENT OFFICE.

ALEXANDER J. RUDOLPH, OF CHICAGO, ILLINOIS.

MACHINE FOR FORMING BOTTLE-NECKS.

SPECIFICATION forming part of Letters Patent No. 646,874, dated April 3, 1900.

Application filed August 8, 1898. Renewed July 27, 1899. Serial No. 725,322. (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 certain new and useful Improvements in Machines for Forming Bottle-Necks, of which the following is a specification.

My invention relates to that class of machines which are used for forming the necks and lips of glass bottles, and has for its object the providing of a simple, economical, and efficient machine for the forming of the inside of the bottle neck and lip; and the invention consists 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, a sectional view of the charcoal-feeding mechanism, taken on line 2 of Fig. 3; Fig. 3, a sectional elevation taken on line 3 of Fig. 1; Fig. 4, an enlarged sectional elevation of the forming mechanism removed from the machine; Fig. 5, a plan view of one of the forming-rolls and a portion of its holding mechanism, and Fig. 6 a longitudinal sectional view of a portion of the mechanism shown on line 6 of Fig. 4.

In the art to which this invention relates it is well known that there is considerable difficulty in forming bottle-necks by hand, and even by machinery, and that while many machines have been designed for this purpose very few, if any, have embodied therein the economical requirements of the art. The objections to these old devices are numerous and have led to their abandonment or non-adoption. One of the principal objections has been to the means by which the lip is formed. Other objections are due to the fact that the charcoal could not be properly distributed and applied to the rolls while the forming-rolls were in motion, so that very few of the machines were any better than the old method of forming the bottle-necks by hand.

The principal objects of my invention, therefore, are to provide a simple, economical, and efficient machine for forming the bottle neck and lip by means of an advancing sleeve, and the even feeding of the charcoal automatically while the machine is in operation. The means by which I accomplish these results will be more fully hereinafter set forth, and will also show the novel features of my invention and its operation and use.

In constructing a machine in accordance with my improvement I make a frame A of the desired size, shape, and form, adapted to hold the operative and other parts in position. This frame is practically in the shape of a head-stock mounted upon a supporting-bench X, and is further provided with bearings or boxes a and a', in which is mounted a rotatable mandrel or spindle B. This spindle is provided with the usual driving-pulley b for the purpose of driving the mandrel or spindle.

To form the bottle-neck, I provide the spindle with a plug C, adapted to enter the interior of the bottle-neck and to size and form the same during its rotations. To finish the exterior of the bottle-neck and form the lip, an operating-sleeve D is provided, having projecting lugs or disks d and d', mounted thereon or secured thereto. These disks or projections are slotted to receive parallel moving bars E and E', which at one end are provided with T-shaped slots d^2, in which are adjustably and movably secured the forming-rolls G and G'. The parallel bars are connected with the projections or disks of the operating-sleeve by means of the links $g\,g'$, one set of which are provided with elongated slots g^2 and tension-springs g^3, adapted to yieldingly hold them on their pivots. The links g' are bifurcated links connected together at g^4, in which the elongated slot is made. Caps g^5 are provided, which straddle the lugs d of the operating-sleeve, as shown particularly in Fig. 1, and are hollowed out, so as to receive the tension-spring g^3. Parallel bars are provided with recesses, as hereinafter described, which loosely engage the projections H, so that a slight amount of loose play is provided for, the operation being such that when an unusually hard piece of glass is contacted by the forming-rolls the links g' may have a certain amount of play by means of their tension-pivots.

The parallel moving bars are provided with shoulders d^3 and d^4, which form recesses that

engage with a third set of disks or projections H and prevent such bars having any movement other than parallel, so that during the forward and backward movements of the operating-sleeve the parallel bars are moved inwardly and outwardly to contact a bottle-neck or be removed therefrom. The operating-sleeve is moved backwardly and forwardly by means of the bell-crank lever I, rod I′, and treadle I².

To form the lip on the bottle-neck, when desired, it is advantageous to make such lip while the forming-rolls are engaging the body portion of the neck, so that there will be no jamming of the bottle-body or twisting of the bottle-neck. In order to accomplish this result, I provide what I term an "advancing sleeve" K, which is preferably slidingly mounted in the spindle, as shown particularly in Fig. 4. This advancing sleeve is moved backwardly and forwardly (see Fig. 6) by means of the screw-pins *k*, which engage a slotted portion thereof. It will be noticed that the slots in the advancing sleeve, as shown in Figs. 4 and 6, are elongated or longer than the diameter of the screw-pins, so that the operating-sleeve may advance sufficiently to force the forming-rolls into engagement with the bottle-neck, and when they are in such engagement the further forward movement of the operating-sleeve moves the advancing sleeve forward and curls up the material not engaged by the main portion of the forming-rolls until it contacts the reduced portion G′ of such forming-rolls and is given the desired cylindrical contour. The backward movement of the operating-sleeve allows the advancing sleeve and forming-rolls to be withdrawn from contact with the bottle-neck.

To feed pulverized charcoal automatically and uniformly to the forming-rolls, a receptacle L is provided, which has a feed-screw *l* rotatably mounted in the bottom portion thereof. This receptacle is provided with an opening or spout *l′*, arranged adjacent to the forming-roll, so that when its gate or slide *l²* is opened and the feed-screw rotated pulverized charcoal is fed to the forming-rolls. This feed-screw has one end projecting out of the receptacle and is provided with a sprocket L′, engaging with a sprocket on the main spindle by means of the link-belt *l³*. By this arrangement it will be seen that only when the machine is being operated is the charcoal being fed to the forming-rolls and that when so fed it is fed automatically and uniformly.

I claim—

1. In a machine of the class described, the combination of a main spindle, a forming-plug secured in the front end thereof, an operating-sleeve reciprocatingly mounted on such spindle, a bar or bars provided with a forming-roll at one end thereof arranged to move inwardly and outwardly by means of the operating-sleeve, an advancing sleeve mounted in such spindle, and pin mechanism connecting the advancing and operating sleeves together, whereby the movements of the operating-sleeve cause the backward and forward movements of the advancing sleeve, substantially as described.

2. In a machine of the class described, the combination of a main spindle, a forming-plug secured in one end of such spindle, an operating-sleeve on such spindle adapted to be moved backwardly and forwardly and rotate with such spindle, at least two parallel bars connected with the operating-sleeve and provided with a forming-roll at one end thereof adjacent to the forming-plug, whereby the reciprocating movements of the operating-sleeve cause the parallel bars and their forward rolls to be moved inwardly and outwardly in a parallel manner, an advancing sleeve for forming the lip on a bottle-neck surrounding the forming-plug and movably mounted in the spindle and provided with an elongated slot or slots, pin mechanism secured to the operating-sleeve and engaging the slotted opening or openings in the advancing sleeve, whereby the advancing sleeve is caused to be moved backwardly and forwardly by the movements of the operating-sleeve, substantially as described.

3. In combination with a machine of the class described, a charcoal-feeding mechanism comprising a receptacle, a feeding-screw rotatably mounted in the lower portion of such receptacle, a spout on such receptacle arranged near the bottle-forming mechanism, and means operatively connecting the feed-screw with the mobile parts of the bottle-forming mechanism to automatically and uniformly agitate and feed pulverized charcoal to the bottle-forming mechanism, substantially as described.

4. In a machine of the class described, the combination of a main spindle, a forming-plug secured in the front end thereof, bars for carrying the forming-rolls inwardly and outwardly, means for moving the bars inwardly and outwardly, and a forming-roll on each of the bars and adjustably secured thereto so as to be moved inwardly and outwardly on the bars to and from the axis of the plug and secured in different positions, substantially as described.

5. In a machine of the class described, the combination of a main spindle, a forming-plug secured in the front end thereof, an operating-sleeve reciprocatingly mounted on such spindle, a bar or bars moved inwardly and outwardly by means of the operating-sleeve carrying the forming-rolls at the front end thereof, a forming-roll adjustably mounted on the front end of each of such bars and so as to be moved inwardly and outwardly on the bars to and from the axis of the plug, substantially as described.

6. In a machine of the class described, the combination of a main spindle, a forming-plug secured in the front end thereof, an operating-sleeve reciprocatingly mounted on

such spindle, a bar or bars arranged to move inwardly and outwardly in a parallel manner and provided with T-slots at the front end thereof, link mechanism connecting the bar or bars with the operating-sleeve, to move such bars inwardly and outwardly, and a forming-roll adjustably mounted in the T-slot of each of the parallel moving bars, substantially as described.

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