No. 611,631. Patented Oct. 4, 1898.

E. HOFFMAN.

APPARATUS FOR FINISHING NECKS OF GLASS VESSELS.

(No Model.) (Application filed Mar. 11, 1898.) 2 Sheets—Sheet 1.

FIG. 1.

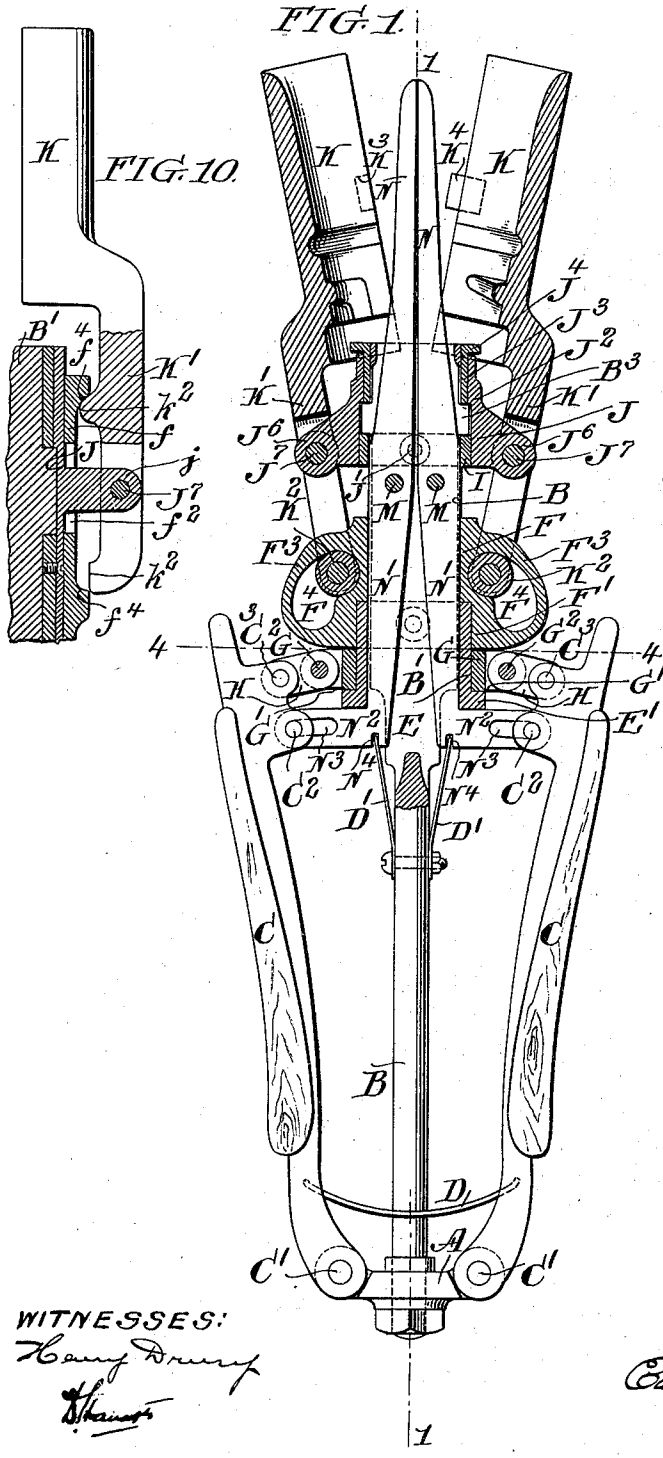
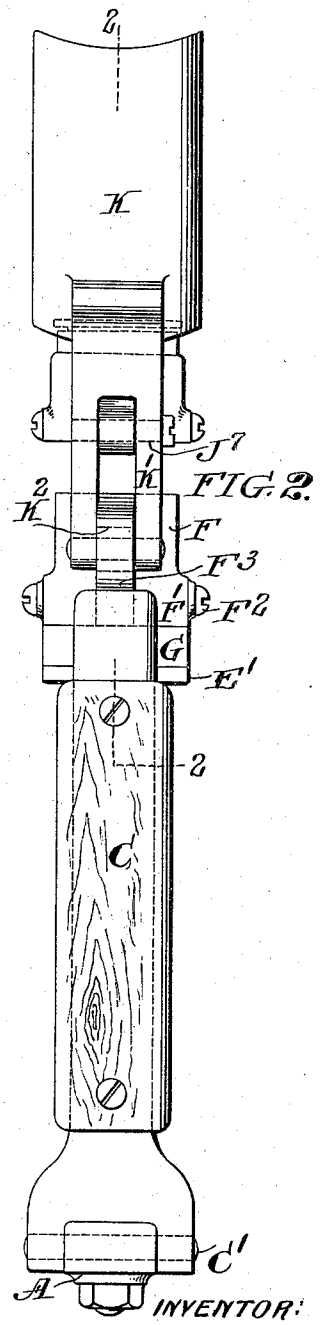


FIG. 10.

FIG. 2.



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FIG. 3.

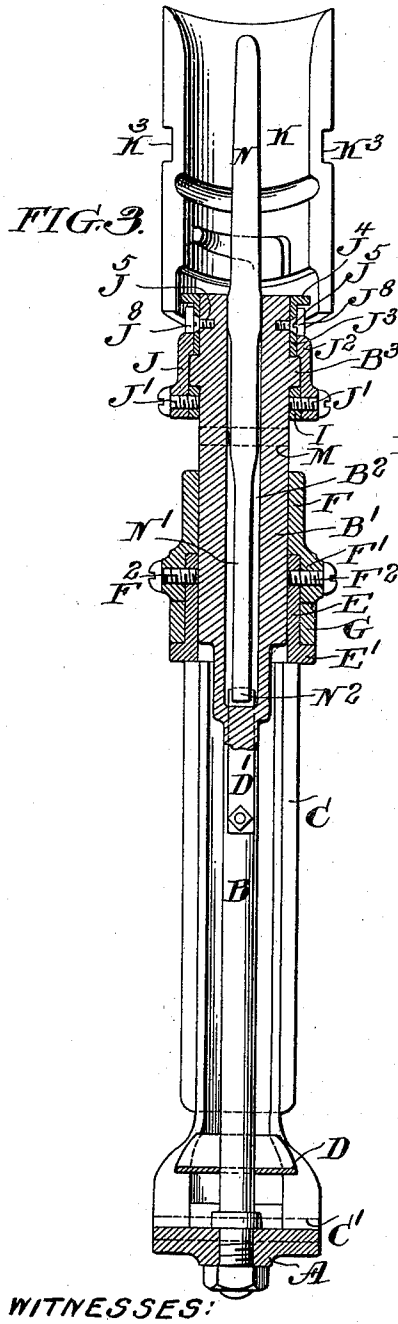


FIG. 4.

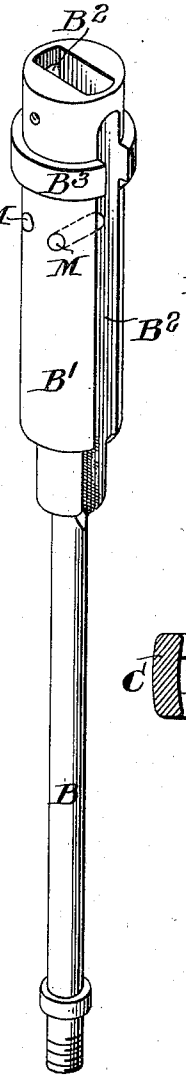


FIG. 5.

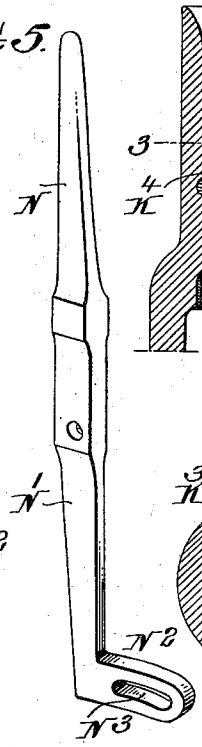


FIG. 6.

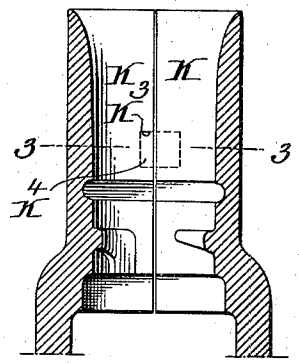


FIG. 7.

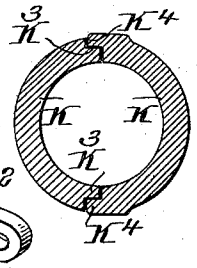


FIG. 8.

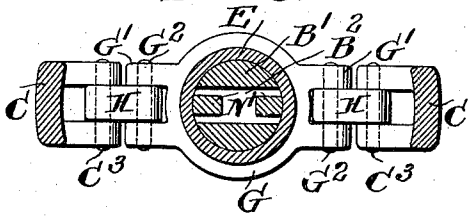
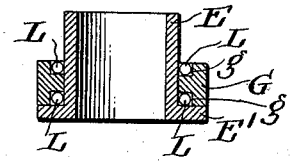


FIG. 9.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FINISHING NECKS OF GLASS VESSELS.

SPECIFICATION forming part of Letters Patent No. 611,631, dated October 4, 1898.

Application filed March 11, 1898. Serial No. 673,501. (No model.)

To all whom it may concern:

Be it known that I, EDMUND HOFFMAN, a citizen of the United States of America, residing in the city of Bridgeton, in the county of Cumberland, in the State of New Jersey, have invented a certain new and useful Improvement in Apparatus for Finishing the Necks of Glass Vessels, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to apparatus for finishing the necks of glass vessels, and has for its object particularly to provide improved means for forming on the outside of the bottle-neck devices for engaging with a cap.

The leading feature of my invention consists in providing a separable and rotatable mold for forming the outside of the bottle-neck, in combination with an expansible and non-rotatable pair of fingers arranged to act upon the inside of the neck and to push the metal into the mold.

It is also an important feature of my invention that the means acting upon the separable part of the mold close and open it and the means acting upon the fingers to expand and contract them should be so arranged that the rotatable sectional mold will be closed before the fingers expand and that the fingers should be contracted or closed together before the mold is opened, and it is a matter of great practical importance that the mechanism for actuating the mold-sections and expansible fingers should be put in operation by a single hand movement.

The nature of my improvements, and particularly the details of the mechanism in which I have embodied my invention in what I believe to be its best and most practical form, will be best understood as described in connection with the drawings, in which it is illustrated, and in which—

Figure 1 is a side elevation of a hand-tool provided with my improvements and shown, partly in longitudinal section, as on the line 2 2 of Fig. 2. Fig. 2 is an edge view, so to speak, of the tool. Fig. 3 is a longitudinal sectional view taken as on the section line 1 1 of Fig. 1. Fig. 4 is a perspective view of the central stem of the tool. Fig. 5 is a perspective view of one of the expansible fingers. Fig. 6 is a sectional view of the sectional mold, showing the parts in the same section as in Fig. 1, but closed together. Fig. 7 is a cross-section on the line 3 3 of Fig. 6. Fig. 8 is a cross-section on the line 4 4 of Fig. 1. Fig. 9 is a view of a detail of the mechanism, showing the employment of balls to diminish friction; and Fig. 10 is a partly-sectional side elevation illustrating a modification in the actuating-cam for the sectional mold.

A is the end piece of the tool, to the center of which is secured the central rod B, the outer end of which is enlarged, as shown, into the cylindrical stem B′, having formed in it the longitudinal slot B^2, and near its upper end being provided with a ring-like flange B^3. To each side of the end piece A are hinged the grip-levers C C, the pivotal connections with the end piece being indicated at C′ C′, and the upper ends of the levers being provided, as shown, with pins C^2 and C^3, secured to inwardly-projecting arms, as shown in the drawings.

D is a spring acting to normally keep the grip-levers C C expanded—that is, in the position shown in Fig. 1 of the drawings.

E is a cylindrical sleeve sliding on the lower part of the stem B′ and provided with a circumferential flange E′.

F is another cylindrical sleeve provided at its lower end with a sleeve-like extension F′, which fits over the top of the sleeve E, as shown, and is secured thereto in any convenient way, as by the screws F^2 F^2. The sleeve F is provided with two oppositely-disposed outwardly-projecting lugs F^3 F^3, in which are formed the cams F^4 F^4.

G is an annular ring fitting on the sleeve E and between the flange E′ of this sleeve and the edge of the flange F′ of the sleeve F. Preferably, though not necessarily, the sleeve G is formed, as shown in Fig. 9, with channels at top and bottom to receive and hold balls L L, so that its bearing upon the sleeve

E and against the flange E′ and F′ will be what is familiarly known as a "ball-bearing." The ring is provided with oppositely-disposed outwardly-extending lugs G′ G′, (see Figs. 1 and 8,) in which lugs are secured pins G^2 G^2, and the pins G^2 and C^3 are connected by links H H, as shown in Figs. 1 and 8, so that as the grip-levers C C are moved together the ring G will be moved upward, carrying with it the sleeves E and F, but without interfering with the freedom of these sleeves to turn freely on the stem B′.

I is an annular ring fitting on the sleeve B′ below the flange-like ring B^3.

J is a sleeve fitting over the flange-ring B^3 and secured to the ring I, as by screws J′ J′, said sleeve J having formed or attached to it an inwardly-projecting flange, as indicated at J^2, which rests upon the top of the flange-ring B^3, the arrangement being such that the ring I and the sleeve J can turn freely, but are so engaged by the flange-ring B^3 as not to be movable longitudinally on the stem B′. As shown, a sleeve J^3 is secured to the upper part of the stem B′, as by screws J^5, and has formed upon its upper end in position to be flush with the end of the stem B′ an outwardly-extending flange J^4, which serves as a stop and gage for the bottle-neck when inserted in the mold. It is not necessary, however, that this sleeve should be rigidly fastened to the top of the stem, and, if preferred, it may be made as a part of and movable with the sleeve J.

J^6 J^6 indicate oppositely-disposed outwardly-extending lugs formed on the ring J and provided with pivot-pins J^7, as shown.

K K indicate the separable halves of the mold. Each half is secured on the end of a lever K′, and the said levers are pivoted on the pins J^7 J^7, as shown, and have at their lower ends friction-rollers K^2, arranged to lie in the cams F^4 F^4. In order to cause the mold-sections to fit nicely together when closed, it may be desirable in some cases to employ a registering device—such, for instance, as is indicated in the drawings, where K^3 K^3 indicate slots formed on the outside of one mold-section K, and K^4 K^4 tongues formed in the registering mold-section and adapted to engage in the slots K^3, as indicated. (See Fig. 7.)

M M indicate pivot-pins placed side by side and extending through the slot B^2 of the stem B′, and upon these pins are pivoted the expanding fingers N N′ N N′, the upper ends N N of which lie between the mold-sections, as shown, while to the lower ends of the fingers are formed or secured outwardly-expanding heels N^2 N^2, preferably provided with slots N^3, as shown, the pins C^2 C^2, attached to the grip-lever C, passing through these slots. The heels of the levers are also provided, as shown, with notches N^4 N^4, with which are engaged springs D′ D′, acting to normally press the heels apart and close the active ends N N of the fingers together.

The normal position of the parts is that shown in Fig. 1.

When it is desired to use the tool for forming the neck of a bottle, the operator preferably first compresses the grip-levers C C, forcing through the links H H the ring G and the sleeves E and F upward on the body of the stem B′ and by the upward motion of the cams F^4 F^4 forcing out the lower ends of the levers K′ and closing the mold-sections K K together. The slots N^3 in the heel extensions N^2 of the expansible fingers permit the closing of the mold to take place without affecting the position of the fingers N N, and when the mold-sections are closed the operator introduces the neck of a bottle between them, gaging its position by the contact of the top of the bottle with the flange J^4. Then further compressing the levers C C the pins C^2 act against the heel extensions N^2 of the levers, forcing the ends N′ together and the ends N N apart, and while applying a graduated pressure by the expanding fingers to press the metal out into the molds K K the bottle is rotated around the fingers, carrying with it the mold, which, together with the ring J, upon which it is secured and pivoted, and the rings E and F, by which it is secured, are opened and closed, can turn freely around the stem B′, within which the lower part of the expanding fingers are situated. In the case of a hand-tool such as shown in the drawings the rotation of the bottle and mold, with its attached portions, is effected by rolling the bottle over a board and by the simple means of a backward and forward sweep of the tool. As soon as the neck of the bottle has been properly formed the operator relaxes his grasp upon the grip-levers C, which in moving apart first permit the fingers N N to close together and then drawing down the cams F^4 effect the separation of the mold-sections and the relaxation of their grasp upon the formed bottle-neck, which can be removed, and the tool is then ready for service with another bottle.

In place of using closed cams, as F^4 F^4, mold-section-actuating cams such as are indicated in Fig. 10 may be used. In this case the levers K′ are shown as pivoted at J^7 on lugs *j*, extending out from the ring J, which is very considerably prolonged, and a sleeve *f*, slotted, as indicated at f^2, to give passage to the lugs *j*, is provided with cams f^4 f^4, arranged to act upon cams k^2 k^2 on the lever K′, as indicated. This figure is only shown to illustrate another obvious modification of the particular apparatus illustrated in the main drawing.

It will be understood that in its essential features my invention is adapted for use not only with hand-tools, but with what may for contrast be called "machines," in which the various parts are secured to a stationary frame, and it must also be clearly understood that the said mechanism illustrated in my drawings is exhibited simply as the best form

for embodying my invention, the particular devices being capable of considerable modification without departure from the spirit of my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for forming and molding the necks of bottles, a separable and rotatable mold for forming the outside of the neck in combination with expansible but non-rotatable fingers for forming the inside of the neck and forcing the metal into the mold.

2. In a machine for forming and molding the necks of bottles, a separable and rotatable mold for forming the outside of the neck in combination with expansible but non-rotatable fingers for forming the inside of the neck and forcing the metal into the mold and means for operating the mold-sections and fingers arranged as specified to first close the mold and then expand the fingers.

3. In a machine for forming and molding the necks of bottles, a slotted cylindrical stem in combination with fingers pivoted in said stem and extending beyond the end thereof, a collar secured on the outside of the stem as described and so as to turn freely thereon, separable mold-sections pivoted on the collar aforesaid and means for expanding the fingers and closing the mold-sections.

4. In a machine for forming and molding the necks of bottles, a slotted cylindrical stem in combination with fingers pivoted in said stem and extending beyond the end thereof, a collar or ring J secured on the outside of the stem as described and so as to turn freely thereon, separable mold-sections pivoted on said collar or ring J, a ring F arranged to both turn and slide on the stem, cams secured to said ring F and arranged to actuate the mold-sections as the ring is moved up and down on the stem, and means as described arranged to actuate said ring and also the fingers.

5. In a machine for forming and molding the necks of bottles, a slotted cylindrical stem in combination with fingers N N pivoted in said stem and extending beyond the end thereof, a collar or ring J secured on the outside of the stem as described and so as to turn freely thereon, separable mold-sections pivoted on ring J, a ring F arranged to both turn and slide on the stem, cams secured to said ring F and arranged to actuate the mold-sections as the ring is moved up and down on the stem, a ring G arranged to turn on but move with ring F, levers C C pivoted at one end to an extension B of the slotted stem, links H H connecting the free ends of said levers with ring G and means also actuated by levers C C for expanding fingers N N.

6. In a machine for forming and molding the necks of bottles, a slotted cylindrical stem in combination with fingers N N having extensions $N' N^2$ pivoted in said stem and extending beyond the end thereof, a collar J secured on the outside of the stem B′ as described and so as to turn freely thereon, separable mold-sections K K pivoted on ring J, a ring F arranged to both turn and slide on stem B′, cams secured to said ring and arranged to actuate the mold-sections as the ring is moved up and down on the stem, a ring G arranged to turn on but move with ring F, levers C C pivoted at one end to an extension B of the slotted stem, links H H connecting the free ends of said levers with ring G and a pin-and-slot connection, $C^2 N^3$ between the ends of levers C and the heels N^2 of the fingers.

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Witnesses:
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