

T. C. DUFFIELD.
BOTTLE MOLD.

APPLICATION FILED JULY 1, 1905.

5 SHEETS—SHEET 1.

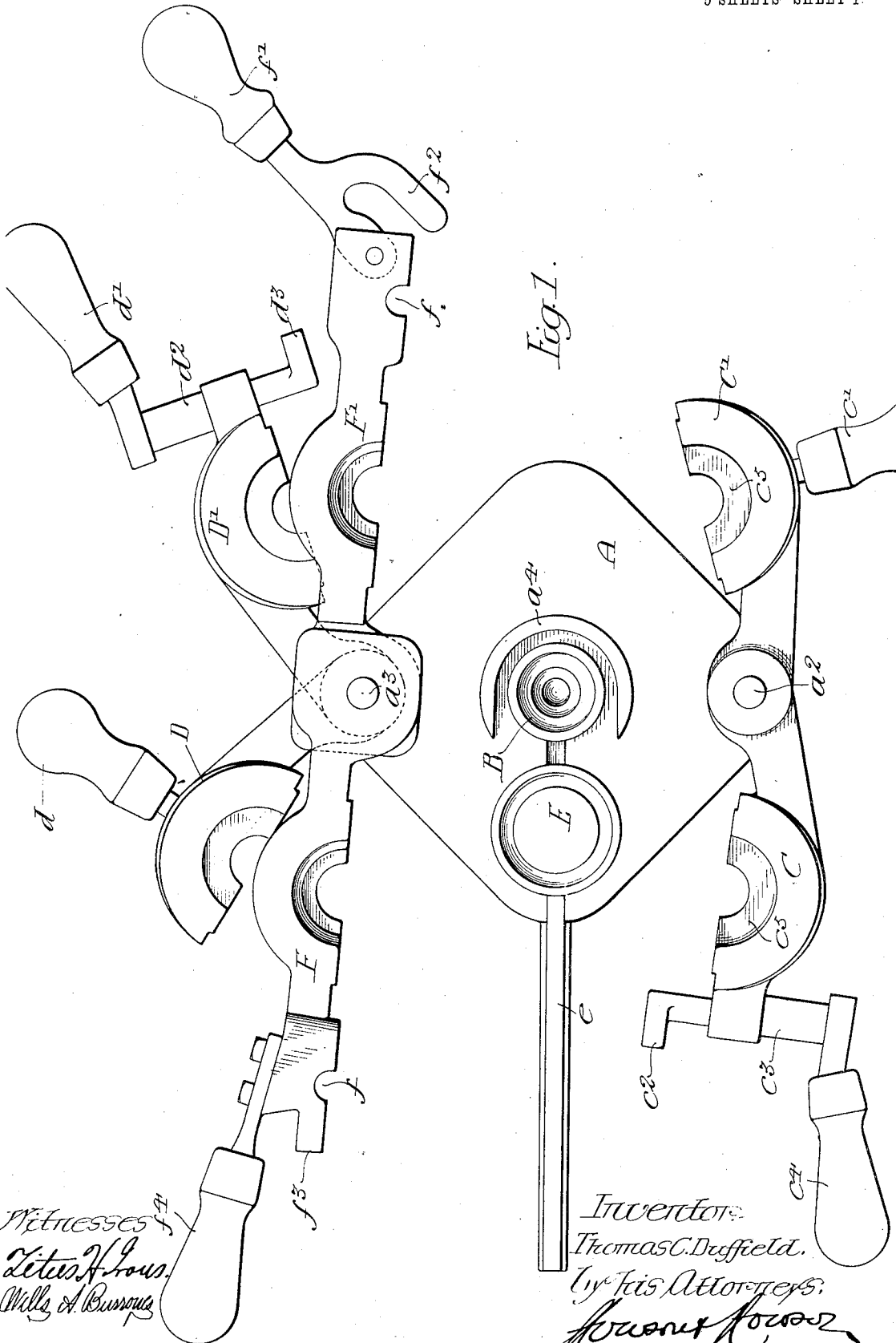


Fig. 1.

Witnesses
Peter H. Jones
Wills A. Burgess

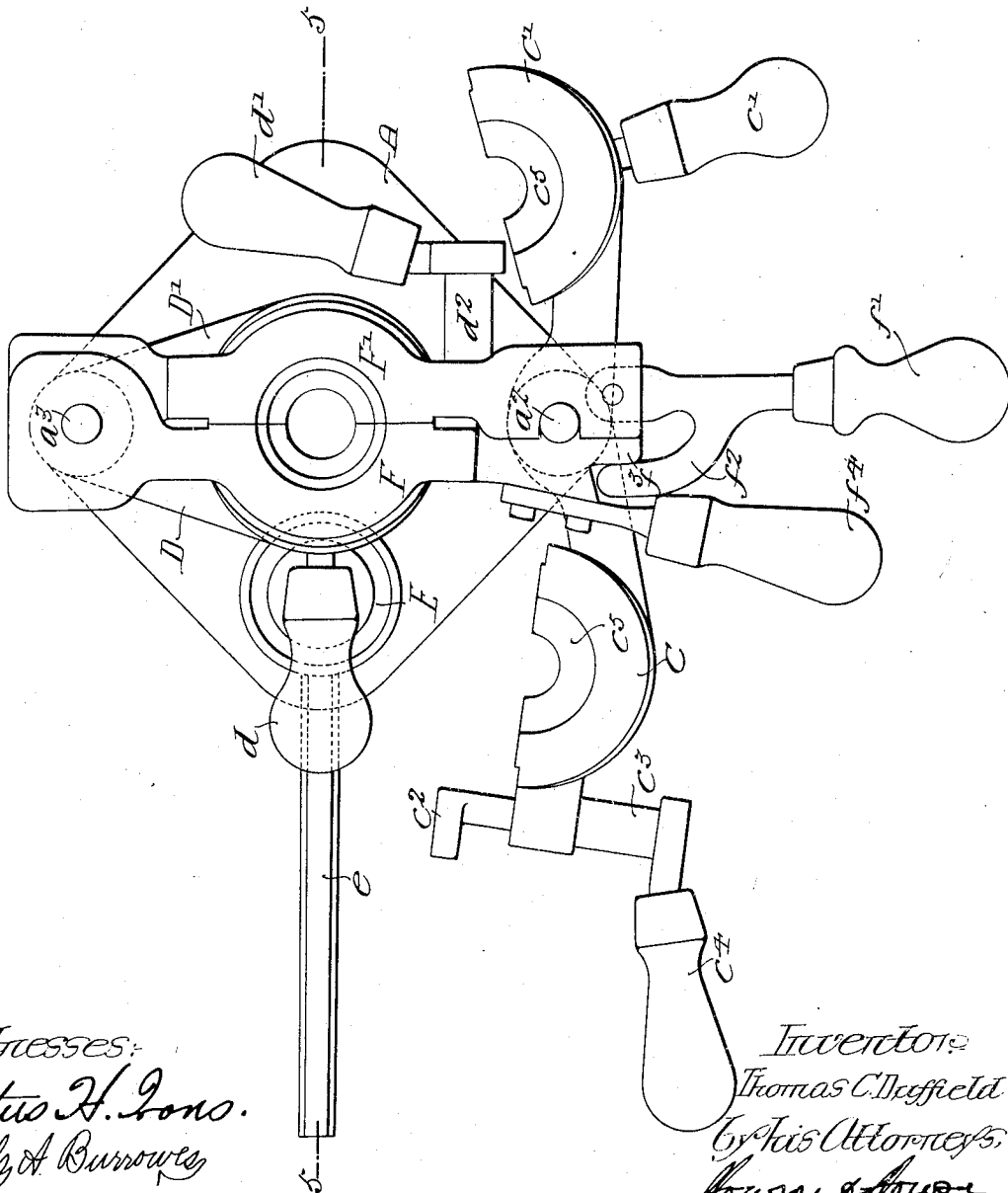
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By his Attorneys:
Homer Jones

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5 SHEETS—SHEET 2.

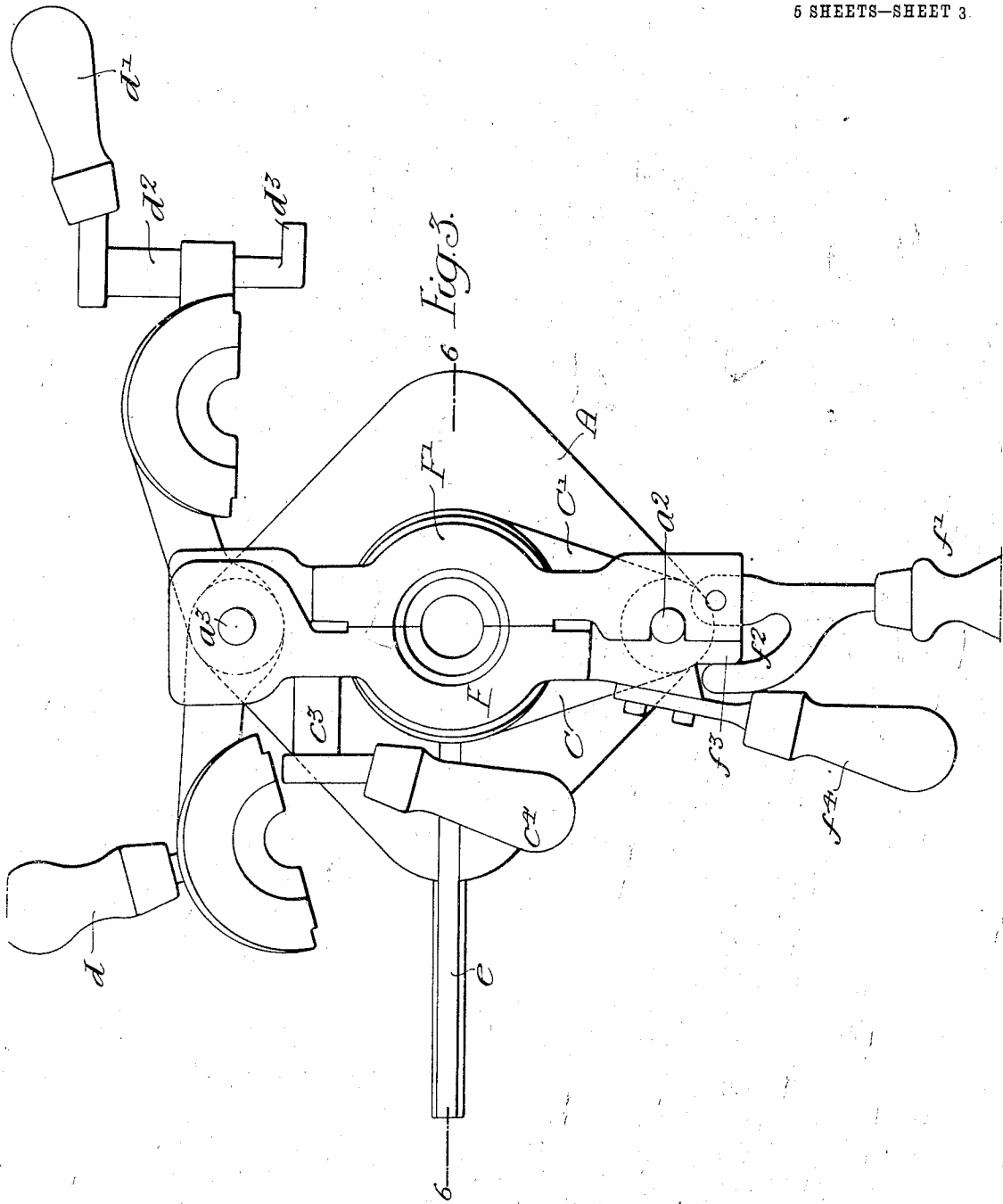
Fig. 2.



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5 SHEETS—SHEET 4.

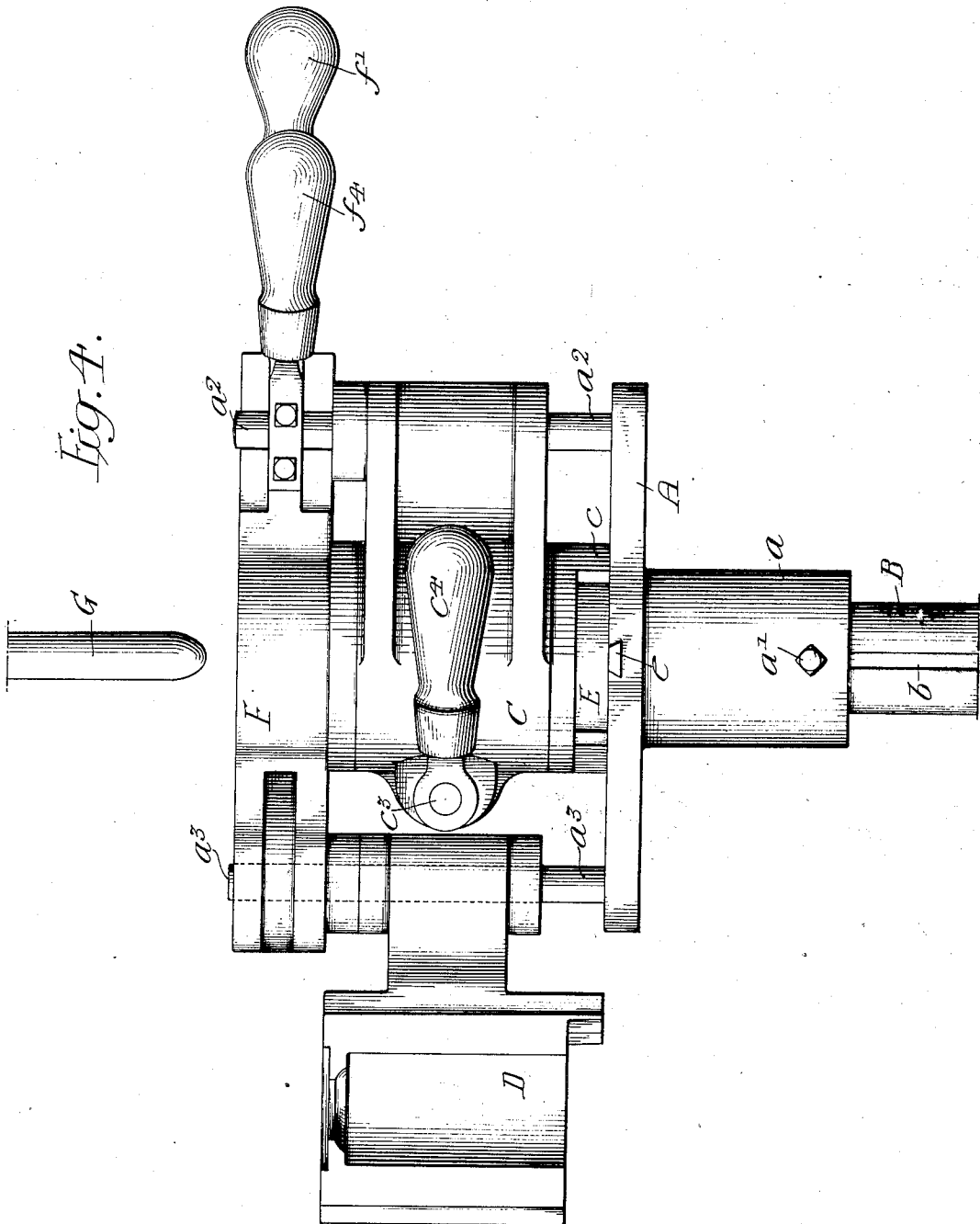


Fig. 4.

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5 SHEETS—SHEET 5.

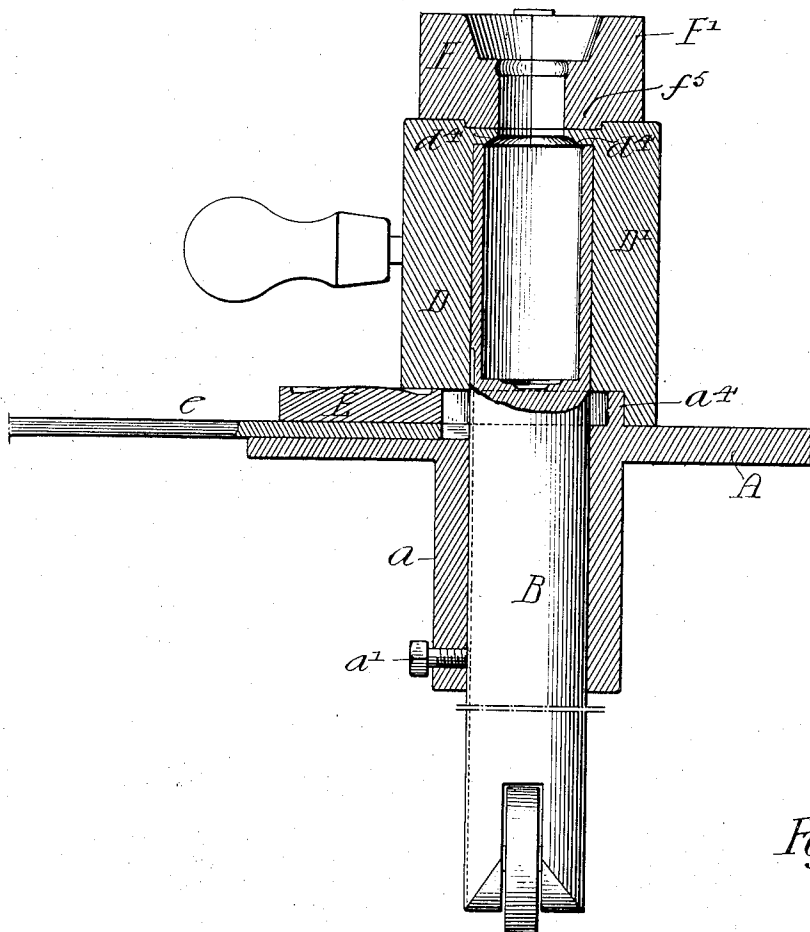


Fig. 5.

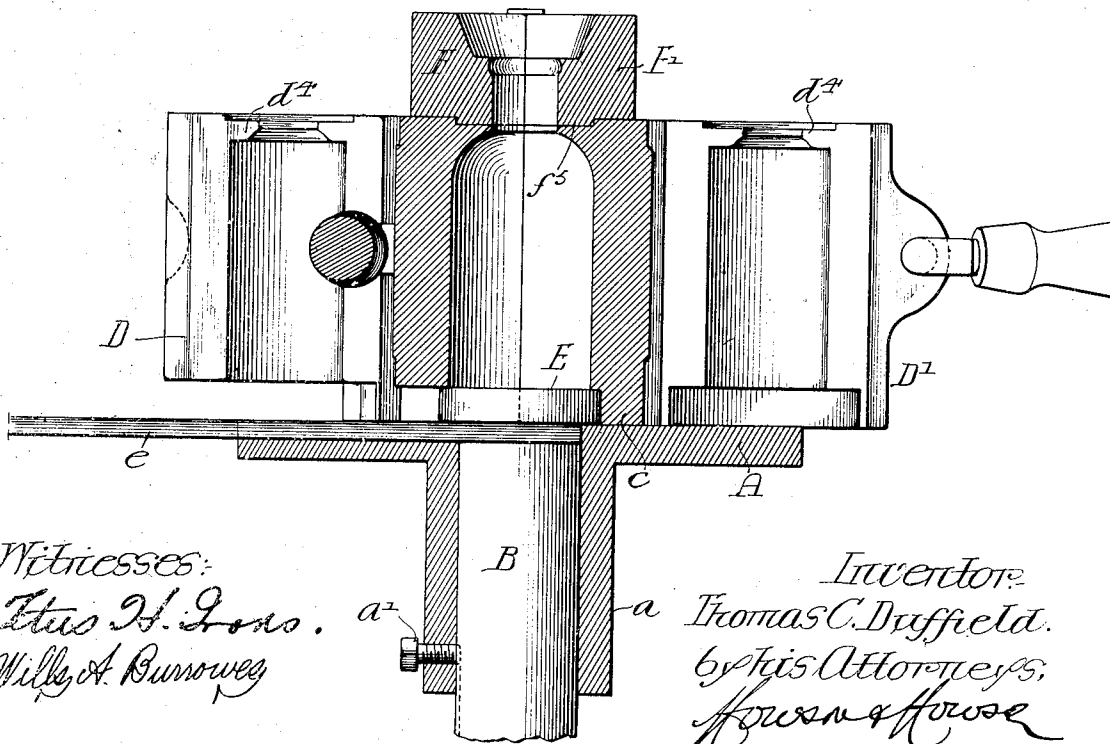


Fig. 6.

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 Geo. H. Jones.
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Inventor:
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UNITED STATES PATENT OFFICE.

THOMAS C. DUFFIELD, OF ELMER, NEW JERSEY.

BOTTLE-MOLD.

No. 820,404.

Specification of Letters Patent.

Patented May 15, 1906.

Application filed July 1, 1905. Serial No. 267,966.

To all whom it may concern:

Be it known that I, THOMAS C. DUFFIELD, a citizen of the United States, residing in Elmer, New Jersey, have invented certain improvements in Bottle-Molds, of which the following is a specification:

The main object of my invention is to provide a bottle-mold by which it shall be possible to blow what are technically known as "narrow-neck" bottles—that is, bottles having necks of small diameter relatively to the diameter of their body portions. This object I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of my bottle-mold, showing its various sections in their open positions. Fig. 2 is a plan view of the mold, illustrating the neck and dummy sections in their closed positions and showing the main mold-sections in their open positions occupied during the time that the neck of a bottle is being formed. Fig. 3 is a plan view of my mold, showing the dummy sections in their open positions and the neck and main mold sections in their closed positions, the bottom section of the mold being in its inner position, as when the body of the bottle is being blown. Fig. 4 is a side elevation of the mold with the parts occupying the positions shown in Fig. 3. Fig. 5 is a vertical section taken on the line 5-5, Fig. 2; and Fig. 6 is a vertical section of the mold, taken on the line 6-6, Fig. 3.

In carrying out my invention I provide a supporting structure having a reciprocable blank coacting with apparatus for blowing bottles by compressed air, which may be of the general type shown and described in my Patent No. 736,708, dated August 18, 1903. Coöperating with the blank I provide in the present instance a pair of dummy sections and a pair of neck-forming sections, which are designed to receive a definite predetermined charge of molten glass. When such charge has been inserted, a vertically-moving plunger is then entered into the blank through the neck-sections, and this forces the glass up into said sections, causing it to assume the desired shape under the action of both the neck and the dummy sections. This plunger is now removed and the blank allowed to drop, after which the dummy sections are turned to their open positions and the bottom section is moved into place over

the opening through which the blank has been dropped while the main-mold sections are closed. Compressed air is then supplied to the mold and the body of the bottle is blown, it being noted that by means of the secondary or dummy mold sections I am enabled to form the neck and a portion of the shoulder of a bottle having a neck of any desired dimensions as to thickness of material, diameter, and length. Moreover, the mold-sections and neck-sections are so made that the act of closing one pair of said mold-sections incidentally causes the closing of the neck-sections, and while the mold-sections may be opened independently of said neck-sections these latter may be maintained locked in their closed positions independently of the dummy and main mold sections.

In the above drawings, A represents the supporting-base of the mold, and this has depending from it a tubular guide portion *a*, in which operates the blank B, this latter being prevented from turning relatively to the base by means of a set-screw *a'* in the portion *a*. A suitable keyway *b* is formed in said blank for the reception of the end of said screw.

Carried by the supporting structure A are two pivot-pins *a²* and *a³*, upon the first of which are carried or pivotally supported the two parts or sections C and C' of the main mold. It will be understood that the said pin *a²* is so spaced from the opening in the supporting structure, through which the blank B operates, and that the two sections C and C' are so proportioned that when in their closed positions the axis of the recess in which the bottle is to be blown coincides with the line of motion of said blank. Projecting upwardly from the top of the base of the supporting structure A is a flange or collar *a⁴*, concentric with the opening in which the blank B moves and cut away at one side to permit of the entrance and removal of the bottom section E, which consists of a disk-like piece having an operating-handle *e*, slidably mounted in an undercut or dovetail groove in the supporting structure A.

From Figs. 4 and 6 it will be seen that one of the main-mold sections C has a depending flange portion *e*, designed to engage the upwardly-projecting flange *a⁴* of the supporting structure when the former is moved to its closed position, the similar portion of the section C' being partially cut away to permit of

the entrance and removal of the bottom section E when the main-mold sections are closed. A handle c' is provided for the section C' , which latter is recessed, as indicated in dotted lines in Fig. 6, for the reception of the projecting end c^2 of a rotary bar c^3 , carried by the section C and operated by means of a handle c^4 . The two sections C and C' are recessed to form the body, shoulder, and base of the neck of a finished bottle, and it will be seen from the figures that the upper ends of the two sections are provided with a circular recess (indicated at c^5) for a purpose hereinafter noted. Upon the second pivot-pin a^3 are pivotally mounted the two sections D and D' of the dummy mold, as well as the two sections F and F' of the neck-mold, and the former of these, like the main mold, is so constructed and of such dimensions that when closed its center line corresponds to the line of motion of the blank B, the lower edges of its sections fitting around the upwardly-projecting collar or flange a^4 of the supporting structure, as previously described in the case of the main mold and being cut away to permit of their movement independently of the bottom section E. Said sections D and D' are, moreover, respectively provided with handles d and d' , the latter of which is carried upon a revoluble locking-bar d^2 , having on one end a projecting portion d^3 , designed to engage a suitable recess in the section D. These two sections, which together form what is known as the "dummy mold," are recessed, so as to permit of the entrance of the blank B, their essential element, however, being the part d^4 , which is designed to form the upper part of the shoulder and base of the neck of a bottle. The blank B fits up against the lower portion of this part d^4 , as shown in Fig. 5, which also illustrates the hollow or recessed portion of the blank for receiving the charge of molten glass.

The neck-mold, as shown in Fig. 1, consists of two sections hinged upon the pivot-pin a^3 , which are designed, when in their closed positions, to provide a mold for the neck and top of the bottle. In order that these sections may be brought to the necessary position, with their neck-forming recesses in line with the line of motion of the blank B and in the axis of the recesses formed by both pairs of the sections C and C' and D and D' , I provide semicylindrical recesses f , respectively, in the two sections F and F' for the reception of the pivot-pin a^2 and in addition provide a handle f' , having a projecting locking-bar f^2 , designed to engage with the end f^3 of section F. This latter section is also provided with an operating-handle f^4 .

As shown best in Figs. 5 and 6, I provide a circular projecting shoulder or collar f^5 on the lower faces of the neck-sections F and F' , which is designed to coact with the recesses

in either the dummy or main mold sections, so that when the two sections of either of said two molds are moved to their closed positions their upper portions engage this collar f^5 of the sections of the neck-mold and turn said sections upon the pivot-pin a^3 , thereby locking them in a closed position as long as said mold remains closed.

When the mold is ready for operation, the various parts are in the position shown in Fig. 1 and a definite charge of molten glass is placed in the hollow of the blank. The two sections D and D' of the dummy mold are then turned on their pivot to their closed position, thereby also closing the two sections F and F' of the neck-mold, the various parts then occupying the positions shown in Fig. 2. The handle d' is then given a partial turn, so as to bring its locking-arm d^3 into engagement with the section D, and the handle f' of section F' of the neck-mold is also swung on its pivot, so as to bring its portion f^2 into locking engagement with the end f^3 of the section F. A vertically-movable plunger of the well-known form, as indicated at G in Fig. 4, is now forced through the neck-mold into the mass of glass within the hollow of the blank B, thereby forcing said glass upwardly out of the said blank and into the spaces surrounding said plunger and defined by the shoulder d^4 of the dummy mold and the walls of the recess in the neck-mold. This plunger G is then withdrawn, the blank B is allowed to drop, and the two sections of the dummy mold are moved to their open positions, after which the two sections of the main mold are brought into their closed positions and locked, as shown in Fig. 3. The bottom section E is then moved inwardly by means of its handle e , and suitable blowing apparatus is applied to the opening of the neck-mold, after which compressed air is admitted to said mold and the bottle blown in the well-known way. The main mold and neck-mold may now be opened and the finished bottle removed.

It will be seen that the blank serves to confine the charge of molten glass during the operation of forming the neck and upper portion of the shoulder of the bottle, while the dummy mold with the neck-mold serve to properly form the corresponding portions of the bottle when the plunger G forces the molten glass up and out of the blank B. As far as the construction of the dummy mold is concerned it is immaterial as to how its neck and shoulder portions are moved into and out of position, although I preferably form them as parts of a relatively large body of metal, which in the present instance fits tightly around the blank when this is in its raised position.

By my invention I am enabled to thus provide a relatively simple and easily-operated device whereby narrow-neck bottles may be blown by the use of compressed air, where

hitherto it has only been possible to so manufacture what are known as "wide-mouthed" bottles.

I claim as my invention—

5 1. The combination of a supporting structure, a recessed blank movable therein, means constructed to form the neck of a bottle, a bottom section for the mold movable in a line substantially at right angles to the line of movement of the blank, a main mold independent of said neck-forming means, and other means for forming the upper portion of the bottle, substantially as described.

15 2. The combination of a supporting structure, two pivot-pins thereon, a reciprocable blank movable between said pins, a dummy mold having its sections mounted upon one of the pins and designed to coact with the blank to form the upper portion of a bottle, and a main mold mounted upon the other pivot-pin designed to form the finished bottle, with a neck-mold having sections mounted upon one of said pins and having means whereby it may be locked to the second pin, substantially as described.

25 3. The combination of a supporting structure, a dummy mold for forming a portion of a bottle and mounted on said structure, a blank and a plunger coacting with said dummy mold, a main mold, and a neck-mold, the parts of said neck-mold coacting with the parts of the dummy mold so as to be moved thereby to their closed positions by the act of closing the dummy mold, substantially as described.

35 4. A mold consisting of two pivotally-mounted sections, a neck-mold also made in sections, with means whereby said first mold is made to coact with the neck-mold to move the sections of the latter to their closed positions when said first mold is closed, and means for locking the neck-mold to the pivot of one of the said mold-sections, substantially as described.

45 5. The combination of a supporting structure, a dummy mold and a main mold having their sections pivotally mounted thereon, and a neck-mold also having pivotally-mounted sections, with a collar on one of the two members comprised by the dummy mold and the neck-mold, placed to engage the other of said members to cause closing of the same when the other is moved to its closed position, with locking means on the neck-mold whereby it may be held to the spindle of one of the other mold-sections, substantially as described.

55 6. The combination of a supporting structure having an opening, a blank movable in said opening, two pivot-pins carried by the supporting structure, a dummy mold having sections recessed to receive the blank and

having portions for forming the upper portion of a bottle, a main mold recessed to form the finished bottle, and a neck-mold for forming the upper portion of a bottle, said neck-mold having means whereby it may be locked with its neck-forming recess in line with the line of motion of the blank, substantially as described.

70 7. The combination of a supporting structure having a blank movable through it, a projecting flange placed concentrically with the line of motion of said blank, a bottom section movable in a line at right angles to the line of movement of the blank and adjacent to the opening therefor, said section having its movement limited by the said flange, a main mold for forming a finished bottle, and a dummy mold for forming a portion of the bottle prior to its completion in the main mold, substantially as described.

75 8. The combination of a supporting structure having a blank movable through it, a projecting flange placed concentrically with the line of motion of said blank, a bottom section movable adjacent to the opening for the blank, and having its movement limited by the said flange, a main mold for forming a finished bottle, a dummy mold for forming a portion of the bottle prior to its completion in the main mold, with a neck-mold having pivotally-supported sections movable so as to bring their neck-forming recess in line with the line of motion of the blank, substantially as described.

85 9. The combination of a supporting structure, a dummy mold thereon for forming the upper portion of a bottle, a neck-mold, a main mold, a blank, a plunger for forcing glass in the blank into the dummy and neck molds, and a bottom section for the device movable in a line substantially at right angles to the line of motion of said plunger, substantially as described.

90 10. The combination of a supporting structure, a dummy mold thereon for forming the upper portion of a bottle, a neck-mold, a main mold, a blank, a plunger for forcing glass in the blank into the dummy and neck molds, and a bottom section for the device, with means consisting of a device carried by the neck-mold for locking said mold to the pivot-spindle of one of the other molds independently of said other molds, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS C. DUFFIELD.

Witnesses:

EDWIN R. LANING,
ALBERT R. McALLISTER.