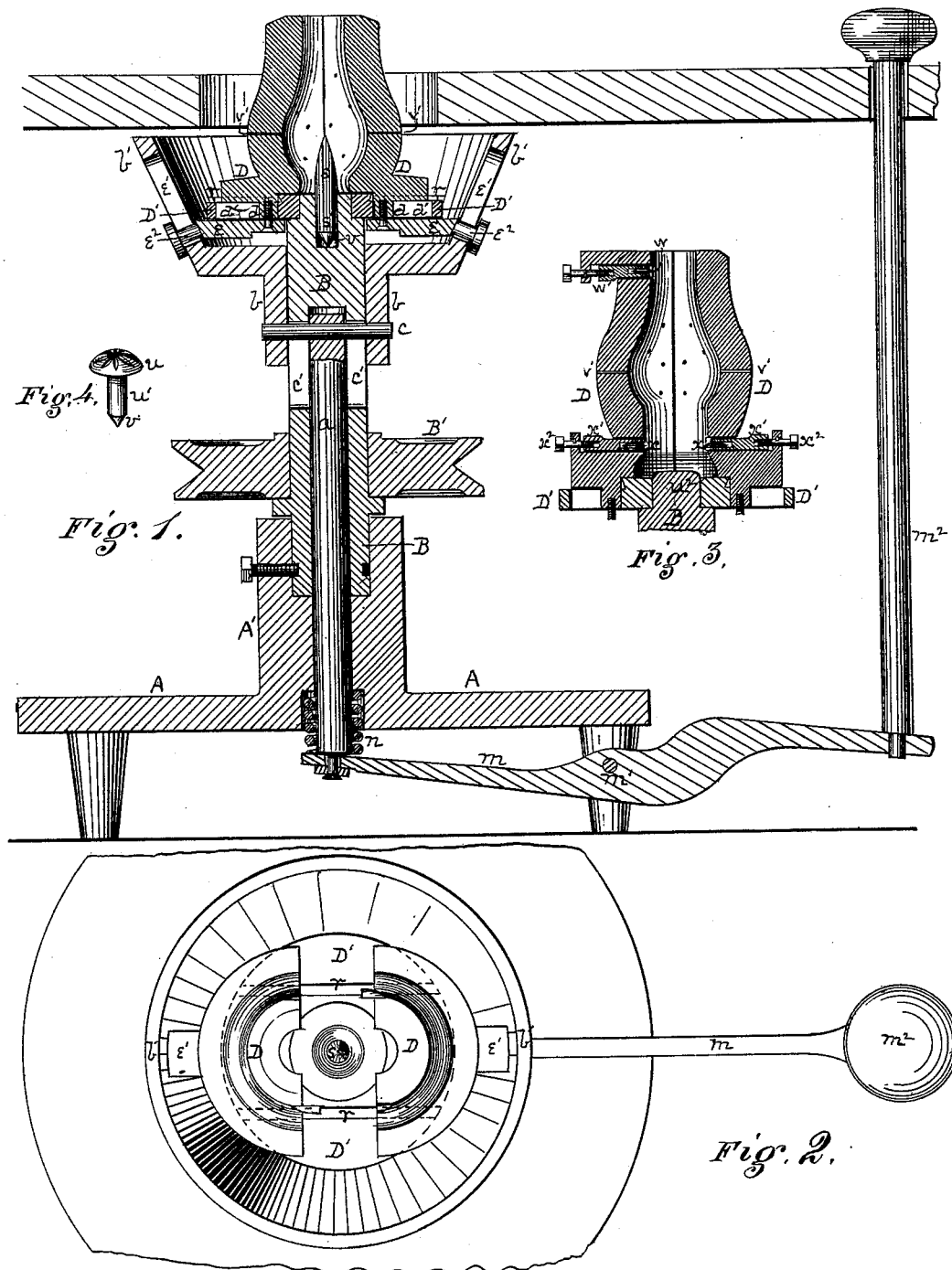


T. B. ATTERBURY & W. BECK.
Glass-Mold.

No. 214,274.

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UNITED STATES PATENT OFFICE.

THOMAS B. ATTERBURY AND WASHINGTON BECK, OF PITTSBURG, PA:

IMPROVEMENT IN GLASS-MOLDS.

Specification forming part of Letters Patent No. **214,274**, dated April 15, 1879; application filed March 19, 1879.

To all whom it may concern:

Be it known that we, THOMAS B. ATTERBURY and WASHINGTON BECK, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Glass-Molds; and we do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a vertical sectional view of our improved machine. Fig. 2 is a top-plan view of the same. Fig. 3 is a vertical sectional view illustrative of a modification in the construction of the mold, as presently described; and Fig. 4 is a perspective view of a device designed for use in connection with the mold and adapted to imprint a design or mark on the bottom of the article.

Our improvement relates to sundry improvements in glass-molds, such as are used in blowing glassware, intended to be open at both ends when finished, or at one end only.

In our improvement, for most purposes, we revolve the mold, and arrange the foot-treadle in such position that while the mold is revolving the blower can, while blowing, open and shut the mold at pleasure.

In the drawings, A represents any suitable foundation. In a step in the stem A' we arrange a revolving hollow shaft, B, and drive the same by power communicated through a band-wheel, B', or in other suitable way. Passing lengthwise up the bore of this shaft, and, preferably, from below the foundation-plate, is a longitudinally moving and revolving spindle, *a*. Above the band-wheel B', on the outside of the shaft B, we arrange a sleeve, *b*. A pin, *c*, is employed to effect a connection between the spindle *a* and sleeve *b*; and in order that both may move up and down independently of the shaft B, and at the same time revolve with it, we make a slot, *c'*, in B for the pin *c* to play in.

Projecting in an angular direction from the sleeve *b* is a pair of guides, *b'*, slotted as at *e*¹. A contracted flattened or reduced neck, *e*², on the ends of each of the stems *e* plays in each such slot, so as to give to the stems a movement in the direction of their length. Each

stem, at its forward end, is connected with a lug, *d*, projecting down from a half-mold, D, through a slot, *d'*, made for the purpose in the revolving base-plate D', whereby, while the base-plate D' (being rigidly connected with the shaft B) and the molds D, with their connecting devices, are caused to revolve, such molds are moved to and from each other at the pleasure of the blower. For this purpose a lever, *m*, is attached to the spindle *a*, and pivoted at *m*¹, and to its outer end we attach a treadle-post, *m*², or other suitable connection, which extends up to a convenient position on or near the blower's stand, so that while engaged in the work of blowing he can also, by his foot or otherwise, operate the treadle and close the molds. The opening of the molds when the treadle is released may be effected by a spring, *n*, or in other convenient way.

The molds D, made in two or more parts, as may be desired, have any desired form of cavity, such as is employed for blowing purposes. These part or sectional molds are held in place on the base-plate D' by the connections already described; and additional devices may be employed, if so desired, such as ribs *r* on the base-plate, playing in grooves in the base ends of the molds; and it will be within the scope of our invention to hinge the two halves of the molds to each other, but in such case the guiding-slots *e*¹ should be inclined instead of vertical. The other changes necessary will come within the knowledge of the skilled mechanic.

The particular cavity shown is that intended for the blowing of lamp-chimneys. For this purpose, or with other-shaped cavities for making blown glassware open at both ends, the ordinary form of bottom may be used; but we prefer to arrange in such bottom a perforator, *s*, in such position that as the glass is blown against its point the latter will puncture the glass, and make an opening suitable for the subsequent insertion of an opening-tool, for the purpose of opening out and finishing such end. This perforator may be made with a stem, *s'*, to be inserted loosely in a central socket made for the purpose in the upper end of the shaft B, the stem resting, by preference, on a point, *v*, so as to prevent rotation by friction; or the perforator *s* may have vertical

motion into and out of the mold-cavity in the manner already known in the art; or, again, being made movable, it may be combined with vertically-movable opening-tools, so that the base end of the chimney or other article may not only be perforated, but also opened out and finished while still in the molds, and at the same time that it is blown, the adjacent mold-cavity in such case being properly shaped for that purpose. But the mode of perforating blown articles by pressing them onto or against the point of a perforator while air is confined within the article is not claimed herein, but is included as a part of the subject-matter of an application already filed, as also the combination of a perforator and opening-tools.

The combination of a perforator and opening-tools with a revolving blowing-mold is not included herein as a part of this invention, but will form the subject-matter of a separate application.

In blowing bottles or other articles closed at the bottom, if an ornamental design or peculiar or irregular shape is desired in such bottom, we use a removable bottom-piece, *u*, having the desired design or shape on its upper face, (a star being shown in the drawings,) and center it, as before, by a stem, *u'*, which enters the central socket in the upper end of the shaft B, and is supported loosely therein on the point *r*, so as to be non-rotary; and, if desired, this removable piece *u* may be made to cover the entire bottom of the article.

In Fig. 3 we have shown a mold adapted to forming the cylindrical base of slip-chimneys without the use of a perforator or opening-tools. This two-part mold D has a cavity of the desired form, and is arranged and operated on the base-plate D' as before described.

At the lower extremity of that part of the mold-cavity designed to form the cylindrical base of the chimney we arrange one or more steel cutters or creasers, *x*, which may be journaled in the ends of bars *x'*, passing through the sides of the mold, and adjusted in or out by means of screws *x''*, as shown.

The parts of the mold are cut away somewhat below the cutters *x*, so as to provide an enlarged opening or cavity for the blow-over, and to cause the glass at the point of cutting to fill out well against the walls of the mold down to the point of cutting. The blow-over may be suspended in this cavity without support. We prefer, however, to round up the end or head of the shaft B, to form a punt point or support, *u''*, for the center of the blow-over.

The revolution of the mold as the chimney is blown not only prevents the formation of fins and secures a smooth surface, but also the cutters *x*, being carried around the article, will cut, crease, or mark the glass, so that upon being removed from the mold the glass below such mark or crease may be broken off and the base of the chimney left complete without the necessary use of opening-tools. A similar

or any suitable cutting or creasing tool, *w w'*, may also be arranged at or near the top of the mold, which will mark or crease the glass for breaking off the upper end as well as the lower; and in the use of such cutting or creasing tools we do not confine ourselves to rotary sectional molds, as the same can be used to advantage in rotary solid molds, the endwise adjustment of the cutters allowing them to be moved forward into or back out of the mold-cavity, as required.

By the use of rotary molds, as described, we not only are enabled to cut, mark, or crease the article while it is being shaped or formed, but also by closing the parts or sections of the mold (when part-molds are used) in on the plastic glass, as the latter is being expanded out somewhat irregularly by the blowing operation, we can secure a more perfectly finished and better formed product, free from fins or mold-marks, and can also make irregularly-shaped articles, getting therein the perfect finish of the revolving mold, along with facility in removing the irregularly-shaped article from the mold-cavity; and by bringing the treadle within the reach of the blower we dispense with one workman.

We also contemplate the use of the devices shown in Fig. 1 in making flat chimneys or other non-cylindrical articles; but in such case the band-wheel B', and such other features as are intended solely for giving rotary motion to the mold, may be omitted or made non-operative, and in such use the removable bottom *u* may be employed or not, as desired; and as relates to the use of such removable non-rotary bottom, it is equally applicable to solid rotary molds when the article to be made is of such form as can be removed from a solid mold.

In adapting our improvement for use with such solid mold, the devices intended solely for opening and closing the parts of a sectional mold may be made inoperative in any convenient way.

The molds may be made of or lined with any suitable material, such as is commonly used for kindred purposes; and the usual or any desired arrangement of vent-holes *v'* may be made through the side walls for the usual purpose.

We are aware that open-and-shut revolving molds worked to and from each other by a lever and pivoted links are not new; but an operating-lever brought within reach of the blower in his usual position we believe to be new in such apparatus, and that in addition to other advantages it enables the blower to regulate the opening and closing of his molds, both as to time and speed, by the condition of the glass before and after blowing, and by the rapidity with which he blows, both these elements being peculiarly under his own supervision and inspection.

The operation hereinafter claimed for perforating differs from those heretofore known in the art, in that the article while the blow-

ing operation is in progress, and without any necessary interruption or cessation of the same, is blown onto and over a perforator, which then is in position within the mold-cavity.

We claim herein as our invention—

1. A revolving mold made in two or more parts or sections, in combination with a treadle within reach of the blower, for giving the mold-sections the desired motion to or from each other while the mold is being revolved and the blowing operation is in progress, substantially as set forth.

2. The method of making an opening or perforation in the lower end of a blown-glass article, by causing the glass while expanding under and during the blowing operation to expand onto and over a perforator properly arranged or brought into the mold-cavity before the expanding operation is finished, substantially as set forth.

3. In combination with a revolving glass-mold, a removable non-rotary bottom having any desired shape, figure, character, or design on its upper or exposed face, as a means of ornamenting the bottoms of the articles

made, and of changing such ornamentation at pleasure by changing the bottoms, substantially as set forth.

4. A revolving mold made in two or more parts or sections, in combination with stems for moving such parts or sections to and from each other, inclined guides operating the stems, a revolving shaft, B, and a revolving and longitudinally-moving spindle, a, substantially as set forth.

5. A revolving mold made in two or more parts or sections, in combination with one or more cutting or creasing devices arranged in the side walls at one or both ends of the mold, substantially as and for the purposes set forth.

6. In combination with a rotary mold, one or more adjustable cutting or creasing devices arranged in the side walls of the mold, substantially as described.

In testimony whereof we have hereunto set our hands.

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