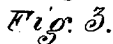
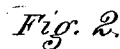
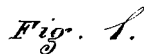


Patented Mar. 25, 1879.



Inventors Thomas B. Atterbury
Washington Beck
By Attorney George H. Christy

UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN MACHINES FOR SHAPING AND FINISHING GLASSWARE.

Specification forming part of Letters Patent No. **213,605**, dated March 25, 1879; application filed January 23, 1879.

To all whom it may concern:

Be it known that we, THOMAS B. ATTERBURY and WASHINGTON BECK, both of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Machines for Shaping and Finishing Tubular Open-Ended Glassware; 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 perspective view of our improved machine for shaping and finishing open-ended tubular articles of glassware. Fig. 2 is a similar view of a detached portion of the same; and Fig. 3 shows, in elevation, our improved machine, with an attachment forming a part of the same, as presently described.

Our present improvement relates to mechanism for finishing or shaping and finishing open-ended or tubular articles of glassware, such as bottle-mouths, the ends of lamp-chimneys, and other like articles.

In Fig. 1 of the drawings, A represents the bed or base of the machine, supported by posts A', or in other convenient way. Plumber-blocks or bearings B' rest on the base A and carry the main shaft B, which is journaled in the blocks in any convenient way. The shaft is driven by band-wheel or pulley D, and may be prevented from endwise motion by collars d, Fig. 2, arranged to bear against the faces of the blocks.

In the extended or projecting end of the shaft B is secured a mandrel, a, preferably conical or tapering somewhat. Any desired form may be given to the mandrel, however, adapted to the work to be done. This mandrel is removably attached to the shaft by a threaded socket-and-pin connection or otherwise, so that others of different form or size may be substituted. We prefer, also, to make this mandrel sharp-pointed, as shown, so that it may operate as a perforating and flaring or opening tool; and it may be made solid, as shown in Fig. 1, or recessed on one or more sides, as at a' in Fig. 3, within which recess is

arranged a movable inside shaping-tool, i, as presently described.

Between the mandrel a and shaft B is a plate, a', which serves as a stop, against which the end of the glass article abuts, and by which the end may be finished or made smooth and true.

Outside shaping and finishing tools, c c, made of cast-iron or other suitable material, are removably attached, by pin-and-socket joints c' c' and binding-screws c'', to levers e e, arranged on opposite sides of the shaft B and pivoted or fulcrumed to posts o, extending out from, and rigidly attached to, the shaft. These levers e e are vibrated on their fulcrums, so as to move the tools c c toward and from the interposed mandrel, by links n n, pivoted at one end to the rear of the levers, and at the other end to a sliding hub or collar, S; and this hub or collar is moved back and forth upon the shaft B, so as to operate the levers e e, by a forked standard, H, engaging the hub in a groove, s, and connected below the bed A to a sliding bar, H', guided and supported by boxes h. This bar is given its longitudinal motion in one direction by bell-crank lever K and treadle K', and in the reverse direction by spring h'. Other well-known or suitable devices may be used, however, for this purpose. Suitable rests R may also be erected for supporting and guiding the article operated on.

In operation, the shaft B and attached mechanism is rotated with some rapidity, and the article to be operated on, being properly heated and secured in a snap or equivalent device, is laid in the rests R and pressed forward onto the mandrel a, preferably until its end or edge abuts against the plate a'.

The operator then presses upon the treadle K', and, thereby moving the hub or collar S forward on the shaft, as shown in Fig. 2, closes the tools or formers c c down upon the outside of the article to any desired degree, and such formers, being rotated around the article, will give to the part operated on a shape corresponding to the working-faces of the formers. At the same time the end of the article, abutting and turning against the plate a', will be made smooth and true, and the

whole of this part of the article will receive the desired finish. Upon releasing the treadle K' the formers *c c* will be returned to their opened position by the action of the spring *h'*, and the article may be removed.

We have shown formers adapted to shaping and finishing bottle-mouths; but others of different construction or form may be substituted adapted to give the desired shape and finish to the ends of lamp-chimneys and other open-ended or tubular articles of glassware; and they may be made with a flat working-face having the desired form or configuration (in reverse) cut or made therein; or such face may be more or less concave in form, so as to bear upon a greater portion of the article, such concave face having the desired configuration in counterpart, as before.

In finishing certain kinds of bottles it is desirable to form an interior groove or depression around the throat and below the mouth, into which the cork or stopper may expand, and thus be better sealed and held in place. We have shown in Fig. 3 an attachment adapted to form such groove or depression, consisting of one or more shaping-tools, *i*, arranged to work in recesses, *i'*, cut in the mandrel *a*. These tools are shaped so as to give the desired form of groove, and they are so arranged, by preference, that when not employed they are withdrawn, or rest within the surface of the mandrel *a*, so as not to interrupt its taper form and interfere with its operation in receiving the article, but that, when desired, they may be raised or projected outside the surface of the mandrel any desired distance, and either alone or in co-operation with the outside formers, *c*, shape or form the desired groove or depression in the interposed glass article. We have shown one such interior moving tool, *i*, attached to or formed on the end of a lever, *r*, which is fulcrumed to post *o*, as at *o'*, and connected by link *r'* to one of the levers *e* in such way that, as the tools *c c* are operated toward each other, the interior tool, *i*, will be projected above the surface of the mandrel *a*, and as such tools are opened out the tool *i* will be carried and held below or within the surface of the mandrel. As thus arranged, both inside and outside tools will be operated by one movement of the hub or collar S, and such tools will co-operate, along with the mandrel *a*, to shape and finish both the inside and outside of the bottle-mouth at one operation, such operation being performed substantially as before described. If preferred, however, separate lever-and-link connections may be made from tools *i* and *c* to two different hubs or sliding collars, S, so that such tools may be operated separately and independently, and such modification we consider as coming within our invention. Also, such tools being made inter-

changeable, others may be substituted adapted to give other forms to the article, or to shaping and finishing other kinds of glass articles, as desired.

By arranging an adjustable stop, *w*, on the main table, so as to limit the forward motion of the arm H, the movement of the tools *i* and *c* may be controlled at pleasure.

Instead of the links *n n*, equivalent radial arms may be extended up from the hub S, and such arms may receive the levers *e* in suitable slots or holes made for the purpose, so that upon the forward or backward motion of the hub, the levers *e* being inclined to the shaft, the tools will be operated, as before described. So, also, instead of the link or arm *r'*, an equivalent inclined guide connected to or formed on the front of the hub S may act directly on the lever *r* and operate the same, substantially as before described; and such modifications we include within our invention; but special claims for the modifications referred to are included in the subject-matter of a separate application.

We claim as our invention—

1. The combination of the shaft B, interior supporting-mandrel, *a*, outside shaping and finishing tools, *c c*, pivoted levers *e e*, connecting-links *n n*, each pivoted at one end to a lever and at the other end to the exterior sliding hub or collar, S, arranged substantially as and for the purposes described.

2. In a machine for shaping and finishing open-ended or tubular articles of glassware, the combination of an interior supporting-mandrel, a separate interior shaping-tool, one or more exterior shaping-tools, and mechanism for rotating and shifting the tools, arranged and operated substantially as described.

3. As a device for forming a groove or depression in the interior surface of glass bottles and similar open-ended articles of glassware, the combination of a rotary recessed interior supporting-mandrel, *a*, and a separate interior movable tool adapted to operate within and outside of the surface of such mandrel, and rotating with the mandrel, substantially as set forth.

4. The combination of shaft B, mandrel *a*, interior movable tool, *i*, exterior movable tools, *c*, levers *e* and *r*, fulcrumed to the shaft B, links *n* and *r*, or their described equivalents, and sliding collar or hub S, substantially as and for the purposes set forth.

In testimony whereof we have hereunto set our hands.

THOS. B. ATTERBURY.
WASHINGTON BECK.

Witnesses:

R. H. WHITTLESEY,
CLAUDIUS L. PARKER.