(No Model.) 2 Sheets—Sheet 1.

R. S. PEASE.

MANUFACTURE OF GLASS BOTTLES, &c.

No. 463,646. Patented Nov. 24, 1891.

Fig. 1.

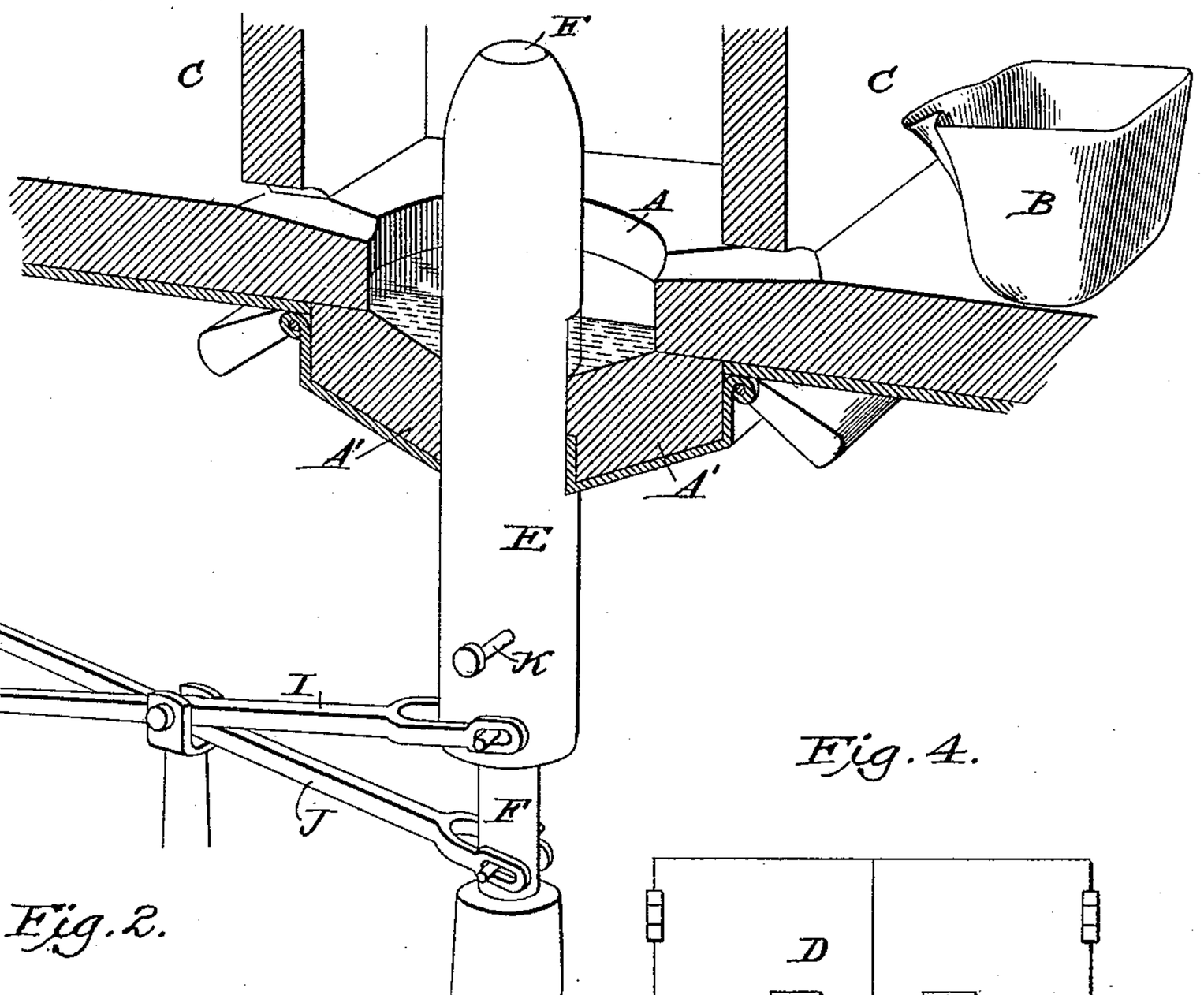


Fig. 2.

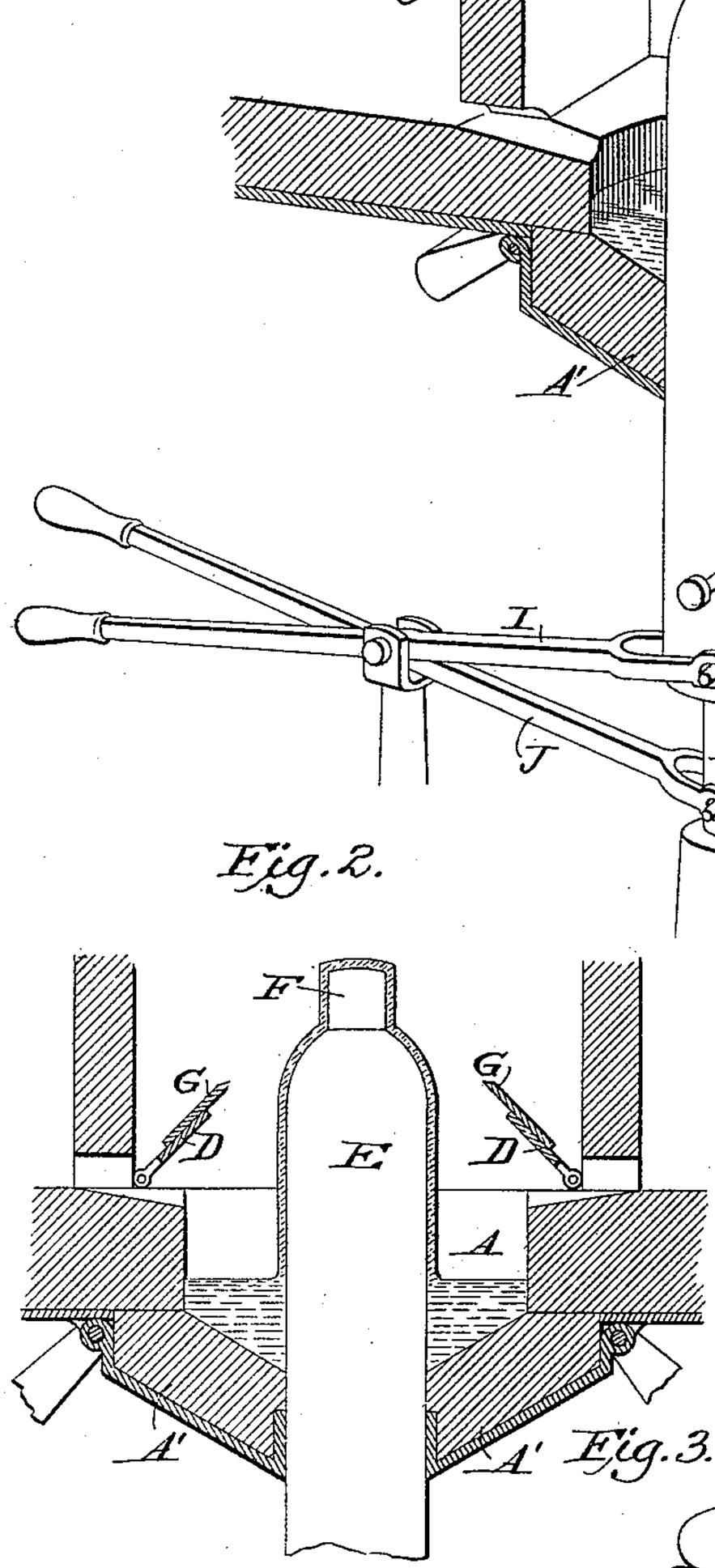
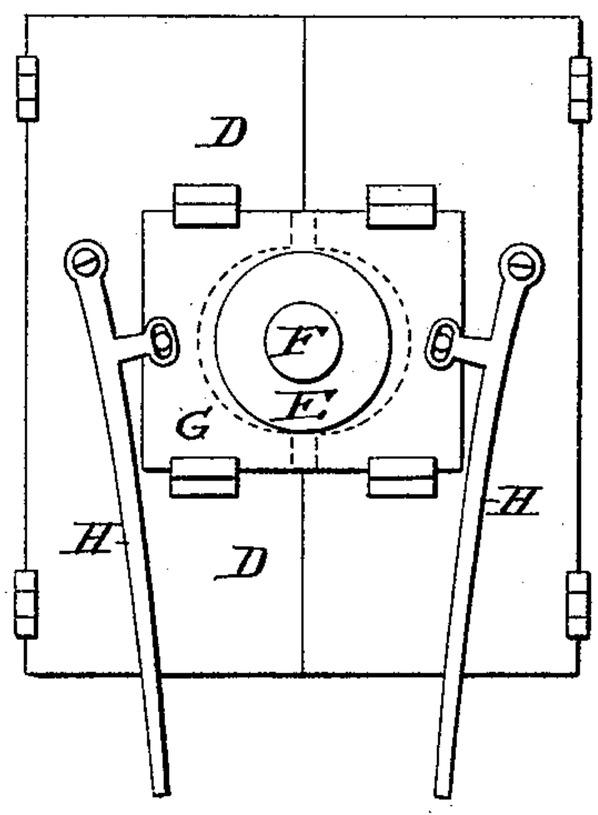
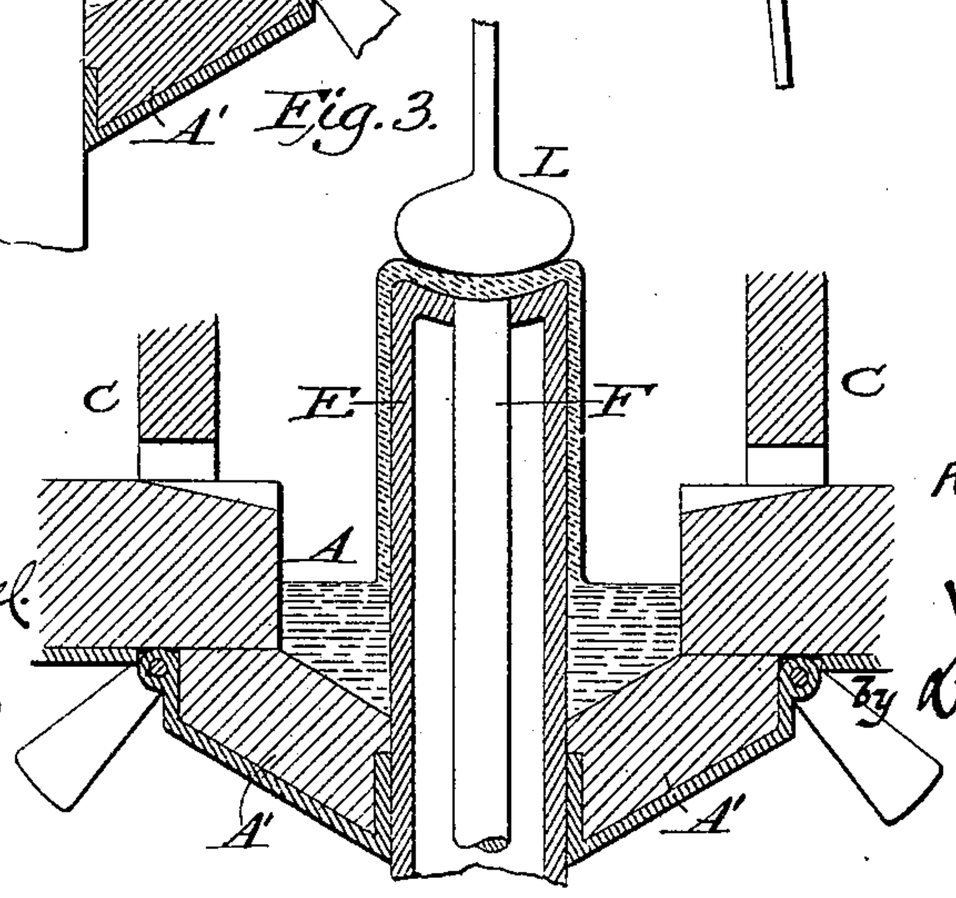


Fig. 3.

Fig. 4.





Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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MANUFACTURE OF GLASS BOTTLES, &c.

No. 463,646. Patented Nov. 24, 1891.

Fig. 5.

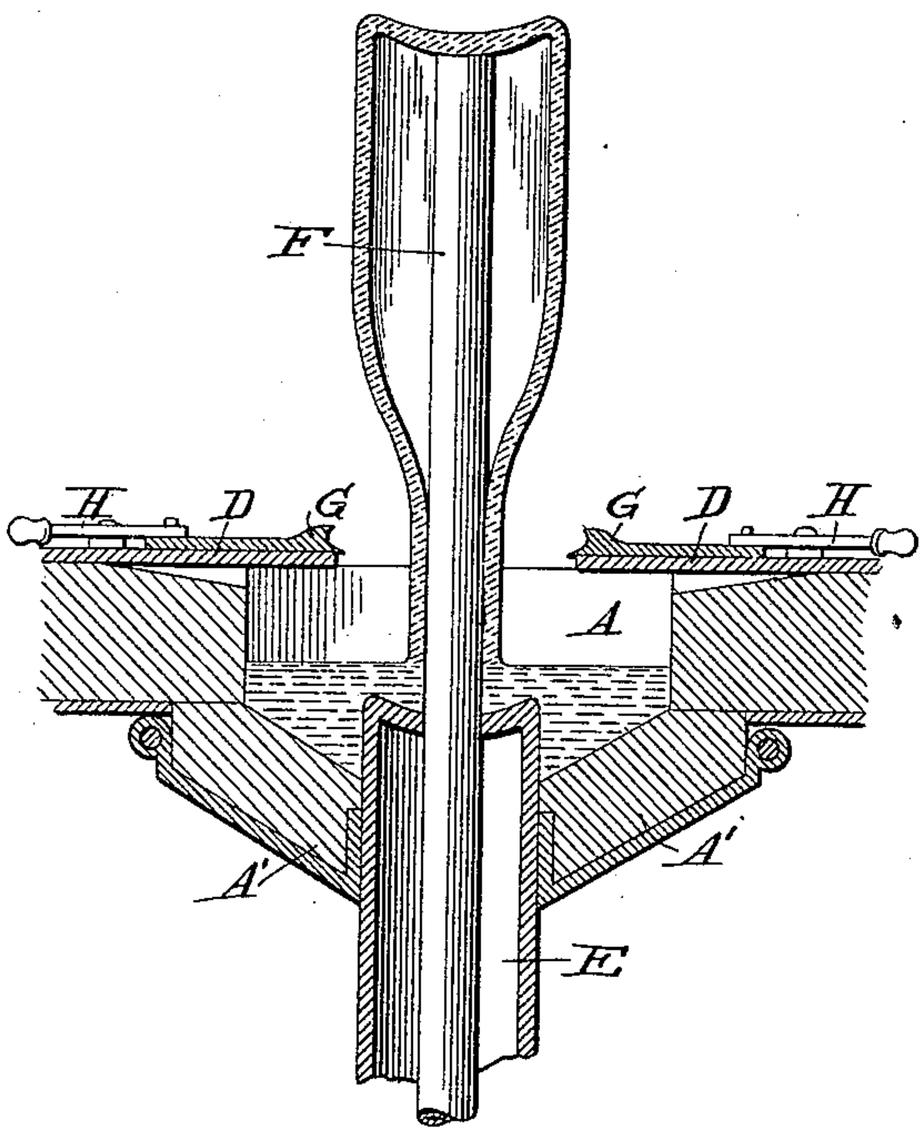
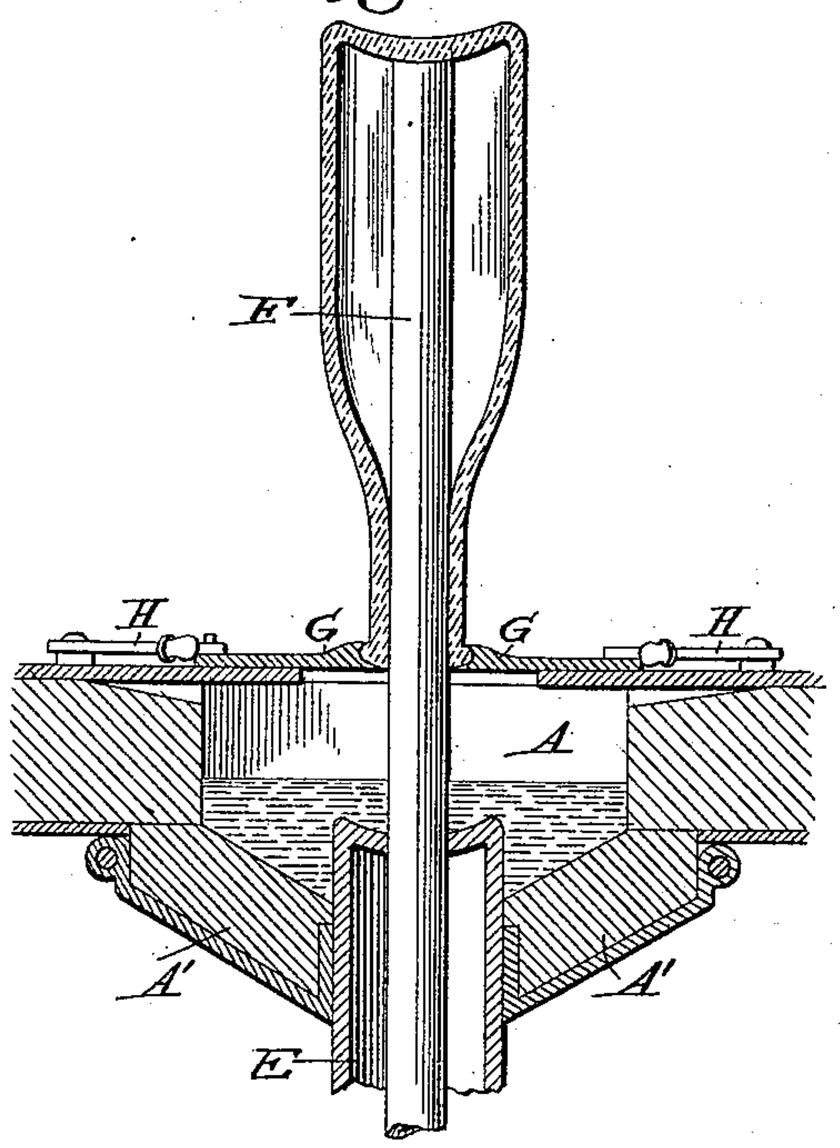


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF GLASS BOTTLES, &c.

SPECIFICATION forming part of Letters Patent No. 463,646, dated November 24, 1891.

Application filed February 24, 1891. Serial No. 382,567. (No model.)

To all whom it may concern:

Be it known that I, ROGER S. PEASE, a citizen of the United States, residing at Rose, in the county of Ramsey and State of Minnesota, having my place of business and post-office address at Minneapolis, Minnesota, have invented certain new and useful Improvements in the Manufacture of Glass Bottles, Pipes, &c., of which the following is a specification.

This invention has reference to the manufacture of glass bottles, pipes, globes, and other articles of like nature, and particularly such as require to be made of varying diameter or of two or more diameters in different parts.

In the accompanying drawings, Figure 1 is a perspective view of the main portion of my apparatus, showing so much thereof as is necessary to a proper explanation of the invention; Fig. 2, a vertical central section of the same as adapted to the manufacture of glass globes, such as are used in connection with electric lights, gas-lamps, &c.; Fig. 3, a similar view showing the apparatus adapted to the manufacture of bottles; Fig. 4, a plan view showing the covers by which the heat is retained in the receptacle containing the molten metal; Figs. 5 and 6, views illustrating the mode of forming the necks of bottles under this plan.

In some respects the present apparatus resembles and embodies the mode of working set forth in a patent to me granted on the 13th day of January, 1891, and numbered 444,560—that is to say, it involves the use of a vertically-movable plunger which rises through a mass of molten metal and carries upward upon its exterior a film or body of glass, which is subsequently severed from the glass of the receptacle and removed from the plunger. In the present instance, however, the plunger is made of two or more parts, having a joint and an independent movement, whereby certain effects are produced which would otherwise be unattainable with such an apparatus.

Referring again to the annexed drawings, A indicates a receptacle designed to receive and contain molten metal, the size of the receptacle depending somewhat upon the character of the work to be performed, but being preferably small, so as to contain a comparatively-limited quantity of metal. This receptacle is designed to be supplied either from pots B, contained in heating or melting ovens or chambers C, or from tanks located in said chambers, or at other suitable points, the use of pots being generally preferred.

To retain the heat within the receptacle A and prevent the too rapid cooling of its contents, I provide covers D, which are hinged to swing upward out of the way or to be lowered to a horizontal plane coincident with the top of the receptacle A.

E represents a plunger, which is here represented in both cases as of cylindrical form in cross-section, but which may be of any other desired form, according to the desired result. Within the plunger E is a secondary plunger F, and so fashioned that when drawn down flush with the top of the main plunger it shall finish out the lines thereof and present the appearance of one complete plunger without break or offset of any kind. In Figs. 1 and 2 I have represented this plunger as of a form corresponding to that of the globes commonly used in electric-arc lamps, the internal or secondary plunger being of a diameter corresponding to the neck or reduced portion of said globe and designed to produce said neck. Thus fashioned the two parts of the plunger are brought flush one with the other at their tops, as shown in Fig. 1, and the plunger, as a whole, is then passed upward from below the surface of the molten metal contained in receptacle A, thus carrying upward upon its upper end and outer surface a film or body of metal corresponding exactly to the contour of the plunger and of uniform thickness throughout, except at the upper end, where it will ordinarily be slightly thicker than at the sides. When raised to the proper height—that is to say, when the plunger reaches a point where the proper cutting-line of the film is in line with the top of the receptacle A or slightly above it—the movement of the plunger, as a whole, is stopped, or, in other words, the main plunger E is brought to a standstill; but the plunger F is caused to rise somewhat higher,

passing through and above the plunger E, as indicated in Fig. 2. This independent movement of the plunger causes the still plastic metal which lies over it to be drawn upward, as indicated in said Fig. 2, thereby forming the neck of the globe or body encompassing the upper end of the main plunger. When in this position if the covers D be already lowered, or, after lowering them, if they be elevated, sliding cutting-plates G, lying upon said covers, are thrown inward by means of hand-levers H and caused to sever the glass on the upper end of the plunger from that below. The globe or body thus produced and severed from the remaining portion is then lifted from the plunger before it has time to chill and shrink and is taken to the annealing-oven and annealed, the neck being cut off at the proper point by wrapping about it a thread of molten metal, a heated wire, or in any other of the common and well-known methods generally made use of in glass factories.

It is sometimes desirable to free the plunger in the event of the metal becoming unduly chilled in the receptacle A or for other reasons, and I therefore by preference make the bottom A′ of said receptacle in two independent sections, which are cut out to afford an opening conforming accurately in size and shape to the exterior of the plunger E, said bottom sections being counterweighted, so as to properly sustain the weight of the molten metal in the receptacle and bear against each other and make close contact with the plunger during the working of the apparatus.

The movements of the plungers E and F may be produced in any convenient manner, and, if desired, a number of plungers may be connected to operate in unison.

In the drawings I have represented in Fig. 1 the plunger as movable vertically in a suitable guiding base or support and as provided with levers I and J, by which to operate each independently of the other, a fastening-pin K being provided for locking the two cylinders together and causing them to move in unison when desired. Either or both plungers may be cooled or heated, as circumstances require, by water, steam, air, or other fluid introduced into their interiors, both plungers being made hollow for this purpose and to insure lightness.

In Fig. 3 I have represented, essentially, the same construction, but have modified the form of the plunger to adapt it to bottle-making, the operation being also slightly varied, as will now be explained. As shown in said figure, the upper ends of the plungers are fashioned to form a depression or hollow of the same shape produced in the ordinary glass bottle, though this is not essential. The compound plunger thus fashioned is raised from the surface of the molten metal in the receptacle A to a sufficient height to carry upward a layer or film of molten metal and to produce the body of the bottle, the exposed surface of the film being cooled or chilled by the surrounding atmosphere, and the interior being cooled and chilled by the cool surface of the plunger, so that the film or body possesses sufficient rigidity to retain its shape while the main plunger E is drawn down, leaving the body of the bottle sustained by the inner plunger. The diameter of the secondary plunger F is just that of the mouth or cork-hole of the bottle. When the main plunger is drawn below the level of the molten metal and preferably some distance below, the secondary plunger F is raised, and as it is raised more metal is drawn up from the mass in the receptacle A; but the body being unsupported from within at the point where the drawing occurs, the diameter rapidly reduces until the metal draws from immediately against the sides of the inner plunger F, as shown in Figs. 5 and 6. In this way the necking down of the bottle is speedily and accurately performed, the same shape always resulting, provided the consistency of the metal and the rate of movement be the same or substantially the same. When the reduced or neck portion reaches the level of the covers D, they are lowered, or, if already lowered, are permitted to retain their horizontal position, whereupon the cutting-plates G are drawn inward by the levers H, the edges of the cutting-blades being curved to produce a bead on or around the mouth of the bottle and thus give to the bottle substantially the customary form, as shown in Fig. 6. When the plunger is formed with a depression in its upper end, as in Fig. 3, the plastic metal may be depressed and caused to conform to said opening by means of a correspondingly-shaped bunter or tool L, which may be merely a hand-tool, or may be carried in a movable support above the plunger and raised or lowered to the required position at will.

Having thus described my invention, what I claim is—

1. The herein-described method of manufacturing bottles, globes, and articles of varying diameters in different portions, which consists in passing a two-part plunger through a mass of molten metal to form the main body and then moving a secondary plunger through the first to effect the formation of the reduced portion, substantially as set forth.

2. The herein-described method of forming hollow bodies of glass having different diameters in different parts, which consists in first passing a two-part plunger through a mass of molten metal and thereby forming upon the plunger the body of the article desired, withdrawing the main plunger and leaving said body sustained by the secondary plunger, next elevating the secondary plunger and thereby producing the reduced or neck portion, and finally severing the neck.

3. In combination with a receptacle adapted to contain molten metal, a plunger movable through the metal in the same, and a second

plunger movable through the first, substantially as and for the purpose set forth.

4. In combination with a receptacle adapted to contain molten metal, a plunger movable through the same, a second plunger movable through the first, and means, substantially such as described, for moving said plungers.

5. In combination with a receptacle A and main plunger movable through the same, a secondary plunger movable through the first, cover-plates D, adapted to cover or partially cover the receptacle A, and cutting-plates G, mounted upon said cover-plates and adapted to act in conjunction with the plunger to sever the glass thereon.

6. The combination, substantially as set forth, of receptacle A, compound plungers E F, cover-plates D, cutting-blades G, and levers H for actuating said cutting-blades.

7. In combination with receptacle A, compound plungers E F, and levers I J for actuating said plungers, a fastening K for connecting said plungers and causing them to move in unison.

8. In combination with receptacle A and compound plungers E F, the counterbalanced bottom sections A′, substantially as and for the purpose set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

ROGER S. PEASE.

Witnesses:

WALTER S. DODGE,

WILLIAM W. DODGE.