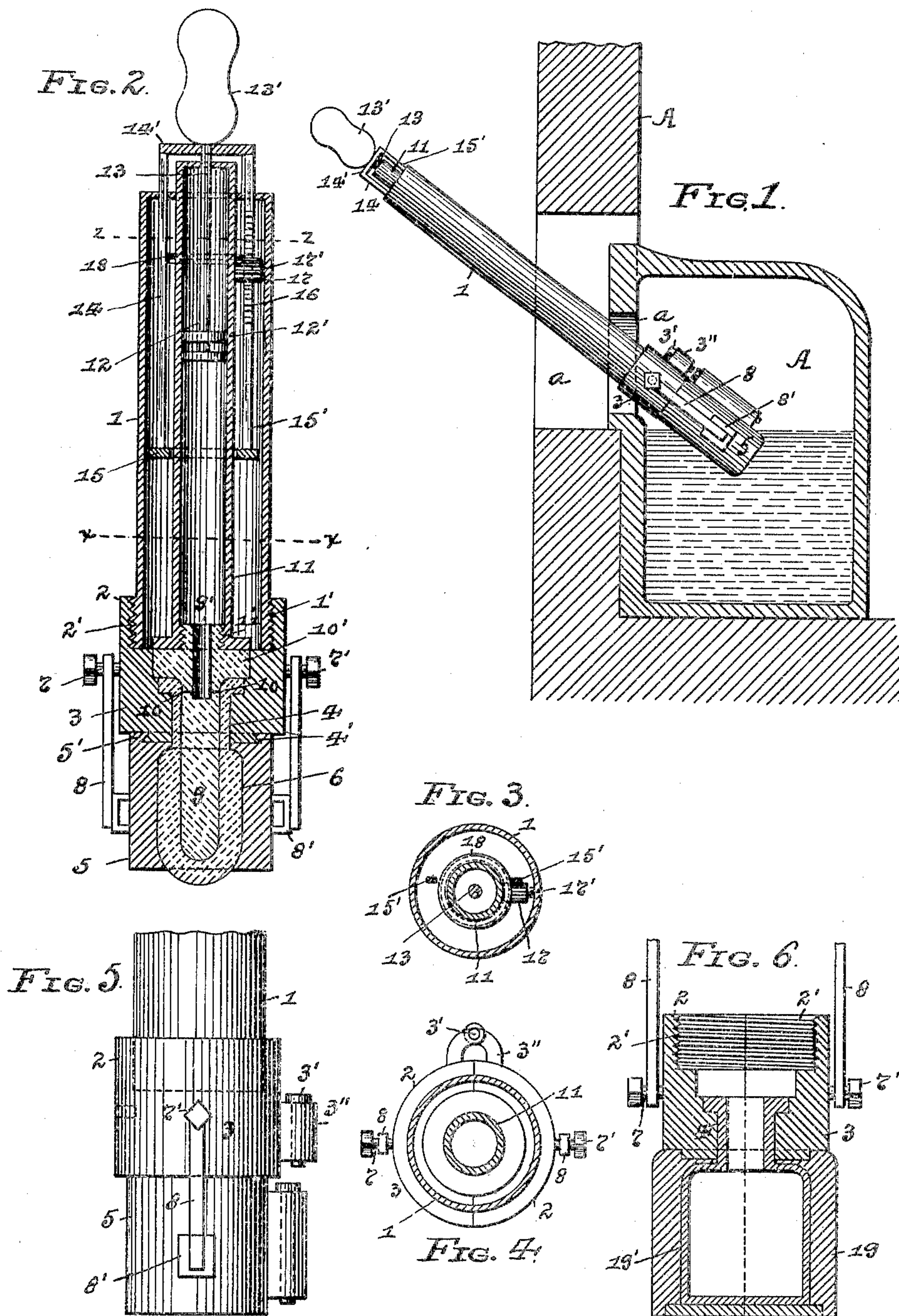


J. J. POWER.
MANUFACTURE OF GLASS ARTICLES.
APPLICATION FILED MAR. 1, 1901.



WITNESSES:

Walter Tamaris
J. L. Trefaller, Jr.

INVENTOR:

John J. Power
By *J. M. Cooke*
Attorney.

UNITED STATES PATENT OFFICE.

JOHN J. POWER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE TOLEDO GLASS COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO.

MANUFACTURE OF GLASS ARTICLES.

SPECIFICATION forming part of Letters Patent No. 793,906, dated July 4, 1905.

Original application filed April 10, 1900, Serial No. 12,279. Divided and this application filed March 1, 1901. Serial No. 49,429.

To all whom it may concern:

Be it known that I, JOHN J. POWER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Glass Articles; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the manufacture of glassware, and has for its object to provide for the manufacture of hollow glass articles, such as bottles, jars, tumblers, chimneys, and various other articles in hollow ware, as well as other articles of tubular or cylindrical form.

My invention consists, generally stated, in the novel method and features hereinafter more specifically set forth and described, and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to practice and use the method, I will describe the same, referring to the accompanying drawings, in which—

Figure 1 is a side view of the apparatus employed and used in connection with a glass-pot in a furnace, which is shown in section. Fig. 2 is an enlarged longitudinal section of the apparatus. Fig. 3 is a cross-section on the line Z Z, Fig. 2. Fig. 4 is a cross-section on the line X X, Fig. 2. Fig. 5 is a plan view of the blank and neck mold shown in Fig. 2 looking at the opposite side of the same, and Fig. 6 is a sectional view of the neck and body or blow mold ready for the blowing operation.

The apparatus illustrated is used in practicing my invention in the making of hollow articles in which the article is given either a preliminary or blank form or a finished portion and a preliminary blank portion, accordingly as required, such an apparatus being shown, described, and claimed in an application filed by me on April 10, 1900, Serial No. 12,279, of which this application is a division.

In this apparatus, 1 indicates the casing, which is provided at one end with the screw-threads 1' for engaging with the screw-threads 2', formed on a flange 2 on the top of a partible neck-mold 3, the halves of which are hinged together by a pin 3', passing through

lugs 3'' on said mold 3 in the usual manner. The neck-mold 3 is provided with the mold-cavity 4 therein, and each half of said mold is provided with a groove 4', in which a tongue 5' on the two halves of a partible blank-mold 5 is adapted to slide and fit. The blank-mold 5 is provided with a cavity 6 and is adapted to connect with the cavity 4 of the neck-mold 3, which forms the neck of the bottle or jar, and pins 7 are secured in the sides of the neck-mold 3, around which are journaled the arms 8, which are held in place by the nuts 7', engaging with said pins 7, and these arms 8 being adapted to engage at their free ends in the side pieces 8' on the sides of the blank-mold 5, and so hold the halves of the said mold 5 securely together. Extending down within the cavities 4 and 6 of the neck-mold 3 and blank-mold 5 is the plunger 9, which has a hollow portion 9' at its top and is provided with perforations 10 therein, and this plunger 9 is also provided with a head 10' at its upper end, to which is secured the cylinder 11 by means of screw-threads 11', while working within the cylinder 11 is the piston 12, which is provided with the piston-head 12', and piston-rod 13, having a handle 13' thereon for operating the same. Secured around the cylinder 11 and within the casing 1 is a frame 14, which consists of a ring 14', rigidly secured around the piston-rod 13 of the piston 12 at the top of the casing 1 and cylinder 11, and a ring 15, which fits loosely around the exterior of the cylinder 11 within the casing 1. Connecting to and between the rings 14' and 15 are the supporting-rods 15', on one of which is formed the rack 16 for engaging with a pinion 17, which is secured to a pin or stud 17' on the inside of the casing 1, and this pinion 17 is also adapted to engage with a circular rack 18, secured around the exterior of the cylinder 11 for rotating said cylinder 11 and plunger 9.

The operation of the above apparatus in the process of making bottles or other articles wherein the article is partially formed by a blowing operation is as follows: The apparatus being ready, as shown in Fig. 1, the op-

erator proceeds with the same to a pot or tank furnace A and inserting the mold 5 through the opening or mouth *a* of the pot or tank slightly merges the open end of the mold 5 into the molten glass therein. The operator then draws back the piston 12 by means of the handle 13', thereby drawing the air out of the cavity 6 of the blank-mold 5 through the perforations 10 in the plunger 9 into the cylinder 11, thereby effecting a vacuum in the cavities 4 and 6 of the neck-mold 3 and blank-mold 5 and causing or permitting the molten glass to be gathered and fill or flow into the said cavities 4 and 6 around the plunger 9, thus forming the finished neck and rim of the bottle or other article in the cavity 4 of the neck-mold 3 and a preliminary blank or hollow bulb of glass in the cavity 6 of the blank-mold 5. When the operator thus draws back the piston 12, the frame 14, being rigidly attached to the piston-rod 13 by the ring 14', is also drawn back, thereby causing the rack 16 to operate the pinion 17, secured on the casing 1, which being in engagement with the circular rack 18, secured around the cylinder 11, will cause the cylinder 11, with the plunger 9 attached thereto, to revolve or rotate, and thereby prevent the molten glass from entering into the perforations 10. The apparatus is then withdrawn from the pot or tank A, and the cylinder 11 is then drawn back sufficient to withdraw the plunger 9 from the glass in the cavities 4 and 6 of the neck-mold 3 and blank-mold 5, when the arms 8 can be raised away from the side pieces 8' on the blank-mold 5, so that the halves of the mold 5 can be withdrawn from the glass blank by inserting mold-handles (not shown, but which are common) in the side pieces 8' and sliding the mold 5 away from the neck-mold 3 and depending blank through the medium of the grooves 4' and the mold 3 and the tongues 5' on the mold 5. The neck-mold 3 is then placed on top of a body or blow mold 19, so that the depending bulb of glass is suspended within the body or blow mold 19 from the neck-mold 3, after which the body or blow mold 19 can be closed around the preliminary glass blank or depending bulb of glass and the casing 1 detached from the neck-mold 3, as shown in Fig. 6. Air is then applied through the top of the neck-mold 3 into the depending bulb of glass in any well-known mechanical way, thus blowing out the depending bulb of glass or preliminary blank to finished form within the cavity 19' of the blow-mold 19, after which the neck-mold 3 and body or blow mold 19 can be opened by the usual mold-handles and the finished article removed.

The revolving or rotating of the plunger 9 and cylinder 11 may be dispensed with; but it is desirable under some conditions, and it is evident that several apparatus may be used, as well as several neck-molds, blank-molds,

and body or blow molds. It is also evident that the body-molds may be arranged and the blowing operation performed on either a stationary or rotary table, as desired, and it will also be evident that instead of blowing the blank to finished form by air-pressure it may be developed to such finished form by a vacuum being created in the blow-mold. Articles of cylindrical form will not need the blowing operation.

It will thus be seen that my improved process of manufacturing glassware is cheap and simple in its operation and does not require the employment of any skilled labor and that various modifications and changes in the various steps and apparatus for performing the different methods employed, as well as the design of the various parts of the apparatus, may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The method of making glass articles which consists in gathering the glass from the top of the mass by means of differential pressure at different points thereof, creating a rotary movement between the gathered mass and the exhaust-aperture of said pressure-producing means, simultaneously shaping the blank, and subsequently blowing the blank to its completed form.

2. The method of making glass articles consisting in forming a blank by gathering a portion from the mass of molten glass by vacuum, creating a rotary movement between the gathering mass and the exhaust-aperture of the vacuum-creating means, simultaneously shaping said blank to have a part of the form of the finished article, and subsequently giving the remainder of said blank its final shape while in a plastic condition from its initial heat.

3. The method of making glass articles which consists in gathering a blank from a mass of molten glass by a vacuum at the gathering-point, creating a relative movement between the blank and the exhaust-aperture, and subsequently blowing said gather to its final form.

4. The herein-described method of making glass articles, which consists in gathering a parison directly from the top of the molten mass, creating a rotary movement between the parison and the exhaust-apertures of the gathering means, and then blowing the parison into the desired form while plastic from its initial heat.

5. The method of making glass articles which consists in simultaneously gathering and shaping a parison from the top of a molten mass, creating a rotary movement between the parison and the exhaust-apertures of the gathering means, forming a blow-opening in the parison, and blowing the same.

6. The method of making glass articles, which consists in gathering directly from the top of a molten mass a parison having a blow-opening, creating a rotary movement between the gathered mass and the exhaust-apertures of the gathering means, and subsequently giving the parison its final form by pressure admitted into said blow-opening.

7. The method of making glass articles which consists in gathering by means of a vacuum directly from a mass of molten metal a definite quantity of glass, simultaneously shaping it into a parison, creating a rotary movement between the parison and the exhaust-apertures of the vacuum-creating means, and blowing the parison before it loses its plastic condition.

8. The method of making glass articles which consists in gathering glass from the mass by means of a vacuum, creating a rotary movement between the gathered mass and the exhaust-apertures, simultaneously shaping the blank, and subsequently blowing the blank to its completed form.

9. The process of manufacturing hollow glass bodies or blanks, consisting of gathering glass from a molten mass, creating a rotary movement between the gathered mass and the gathering means, and simultaneously forming a hollow blank and partly-finished article.

10. The process of manufacturing hollow glass articles, consisting in gathering the glass from a molten mass, creating a rotary movement between the gathered mass and the gathering means, and simultaneously forming a hollow blank and partly-finished article, and then blowing said blank to finished form.

11. The process of manufacturing hollow glass bodies or blanks, consisting in gathering glass from a molten mass by suction, creating a rotary movement between the gathered mass and the exhaust-apertures of the suction-creating means, and simultaneously forming a hollow blank.

12. The process of manufacturing hollow glass articles, consisting in gathering glass from a molten mass by suction, creating a rotary movement between the gathered mass and the exhaust-apertures of the said suction-creating means, simultaneously forming a hollow blank and partly-finished article, and then blowing said blank to finished form.

13. The process of manufacturing glass articles, consisting in inserting a mold within the molten mass, then drawing the glass therein to form the body or blank, creating a rotary movement between the body or blank and the exhaust-apertures of the drawing-producing means, and then blowing said body or blank to finished shape.

14. The process of manufacturing glass ar-

ticles, consisting in inserting a mold within the molten glass, then drawing said glass therein to form a finished portion and a body or blank, creating a rotary movement between the drawn-in mass, and the means for drawing the same, and then finishing said body or blank.

15. The process of manufacturing glass articles, consisting in inserting a mold within the molten mass, then drawing said glass therein by suction to form a finished portion and a body or blank, creating a rotary movement between the drawn-in mass and the exhaust-apertures of the suction-creating means, and then finishing said body or blank.

16. The process of manufacturing glass articles, consisting in inserting a mold within the molten glass, then drawing said glass therein to form a finished portion and a body or blank, creating a rotary movement between said drawn-in mass and the drawing-producing means, and then blowing said body or blank to finished shape.

17. The process of manufacturing glass articles, consisting in inserting a mold within the molten glass, then drawing said glass therein by suction to form a finished portion and a body or blank, creating a rotary movement between the drawn-in mass and the exhaust-apertures of the suction-creating means, and then blowing said body or blank to finished shape.

18. The process of manufacturing glass articles, consisting in inserting a mold within the molten mass, then drawing said glass therein to form a finished portion and a body or blank, creating a rotary movement between the drawn-in mass and the drawing-creating means, and then blowing said body or blank within a mold to finished shape.

19. The process of manufacturing glass articles, consisting in inserting a mold within the molten glass, then drawing said glass therein by suction to form a finished portion and a body or blank, creating a rotary movement between the gathered mass and the exhaust-apertures of the suction-creating means, and then blowing said body or blank within a mold to finished shape.

20. The process of manufacturing hollow glass articles consisting of inserting a mold and core within a molten mass, then drawing the molten glass into said mold and around said core, to form the body or blank while creating a rotary movement between the core and said drawn-in mass.

In testimony whereof I, the said JOHN J. POWER, have hereunto set my hand.

JOHN J. POWER.

Witnesses:

J. N. COOKE,

J. L. TREFALLER, Jr.