

No. 617,921.

Patented Jan. 17, 1899.

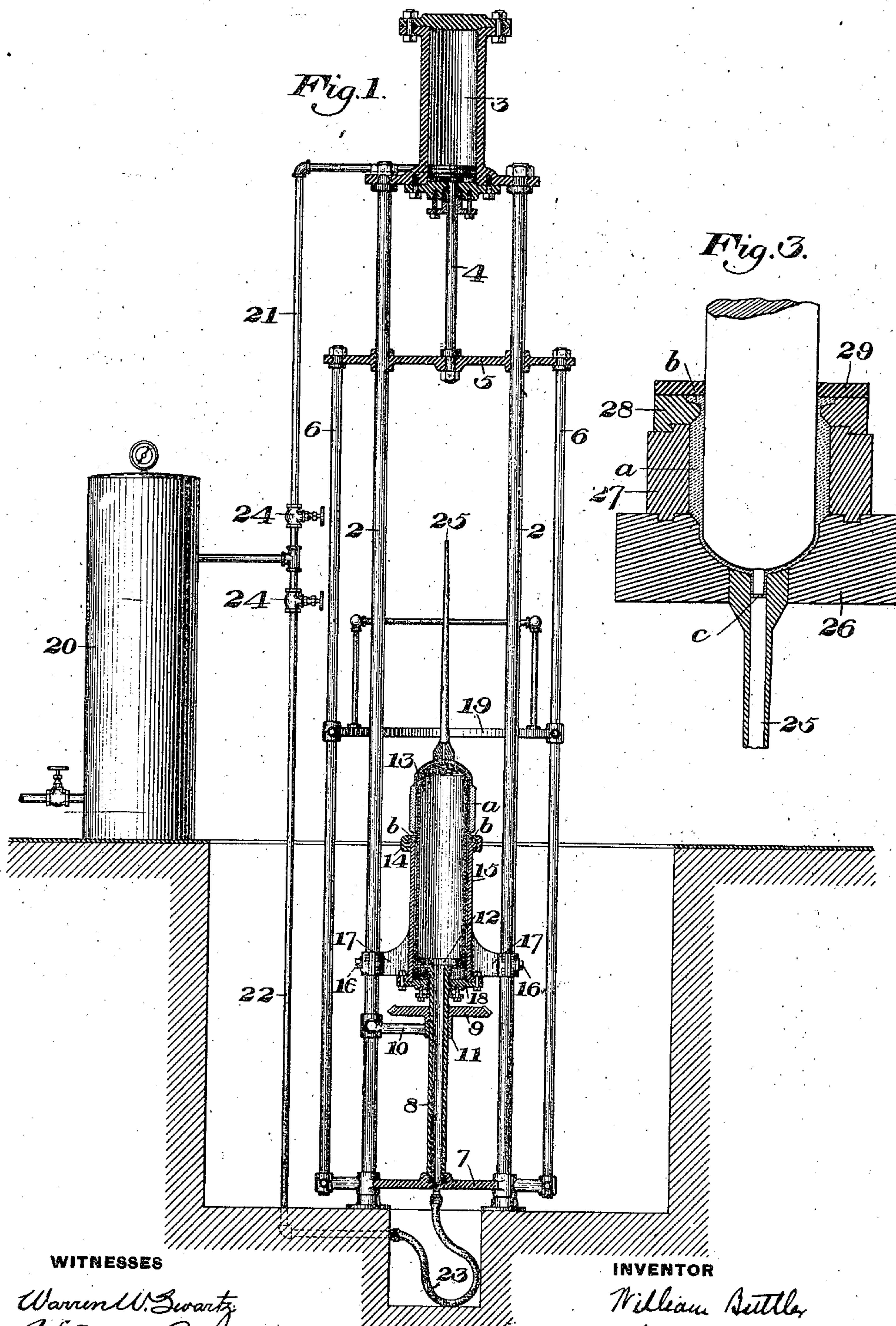
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METHOD OF AND APPARATUS FOR MAKING GLASS ROLLERS.

(Application filed Dec. 14, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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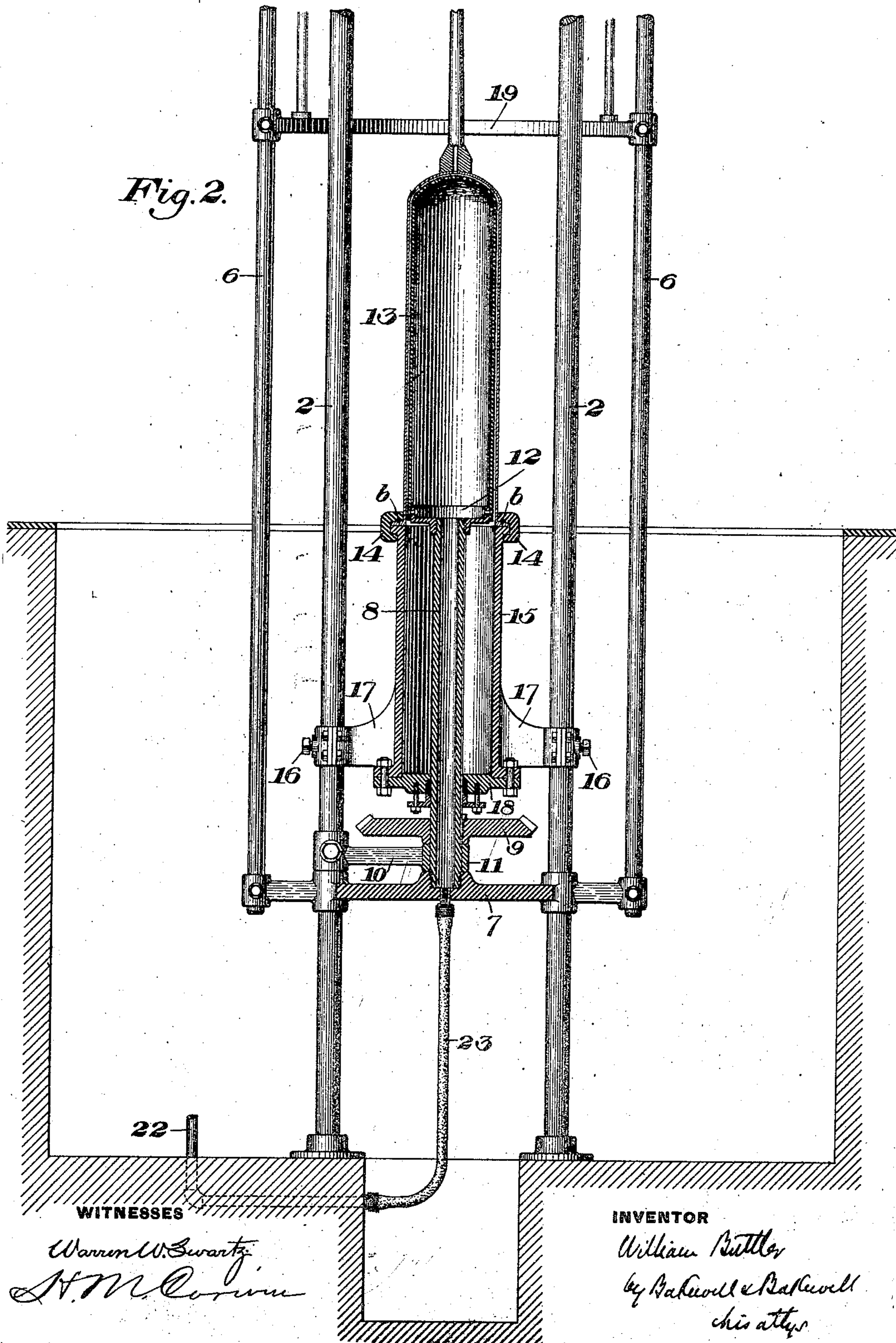
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# UNITED STATES PATENT OFFICE.

WILLIAM BUTTLER, OF REDKEY, INDIANA.

## METHOD OF AND APPARATUS FOR MAKING GLASS ROLLERS.

SPECIFICATION forming part of Letters Patent No. 617,921, dated January 17, 1899.

Application filed December 14, 1897. Serial No. 661,786. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM BUTTLER, of Redkey, in the county of Jay and State of Indiana, have invented a new and useful Improvement in Methods of and Apparatus for Making Glass Rollers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a general side elevation, partly in section, of the apparatus I employ. Fig. 2 is a similar view of the lower part of the apparatus on a larger scale and with the hollow former in its upper or raised position; and Fig. 3 is a vertical section of the press-mold wherein the blank is formed, showing my peculiar shape of blank.

My invention relates to the forming of glass cylinders or rollers, and is designed to provide an improved method of, as well as apparatus for, the making of such rollers. Heretofore it has been attempted to obtain these rollers by stretching a hollow blank and maintaining an air-pressure within it. It has been found, however, extremely difficult to keep the roller of the same size throughout with this method, which method demands a very considerable degree of skill in the operator. My invention is designed to overcome this difficulty; and it consists, broadly, in pressing a hollow blank over an internal former, by the use of which the roller may be maintained of a uniform size throughout. It also consists in rotating such former while the glass is drawn over it, whereby a finely-finished surface is imparted to the glass.

It further consists in a new and improved apparatus therefor, as hereinafter described and claimed.

In the drawings, 2 2 represent vertical standards of my preferred form of machine, these standards carrying at the upper end a single-acting motive cylinder 3. To the lower end of the piston-rod 4 of this cylinder is secured a cross-head 5, which is guided upon the standards 2 2, as shown, and is provided with depending rods 6 6, to the lower ends of which is secured a second cross-head 7, also guided upon the standards 2 2. To the central portion of the cross-head 7 is secured a hollow shaft 8, having a spline connection

with a bevel-wheel 9, which by means of suitable connections may rotate the shaft in any and all positions thereof.

10 is an arm secured to one of the standards and having collar 11, which supports the bevel-wheel 9 in proper place. To the upper end of the shaft 8 is secured a circular disk or head 12, which is centrally perforated to allow air under pressure to pass through the hollow shaft and into a hollow former 13, which is secured to the head 12. The former 13 is of general cylindrical form and is provided with a convex or bulb-shaped upper end, which is perforated, as shown, to allow air to pass therethrough. This hollow former is preferably made of cast-iron and is covered with paste coating in the usual manner, so as to give a fine polished surface to the interior of the glass cylinder. The glass blank is secured by means of suitable clamps 14 to the upper end of a cylinder 15, adjustably secured to the standards 2, by set-screws 16, extending through arms 17, secured to the cylinder. The lower end of this cylinder is provided with a head 18, which is provided with a suitable packing surrounding the shaft 8, which passes therethrough, so as to prevent leakage of the compressed air at this point. To the intermediate portions of the rods 6 6 is secured a platform 19, which moves vertically with these rods and upon which the operator stands during the formation of the glass roller.

20 is a compressed-air reservoir having a pipe 21, leading to the motive cylinder 3, and another pipe 22, to the lower end of which is connected the flexible hose 23, the other end of which is secured in the cross-head 7, so as to admit air to the hollow shaft 8 in all positions thereof. The pipes 21 and 22 are provided with suitable valves 24, by which the air-supplies may be regulated as desired.

In Fig. 3 I show the improved form of blank which I employ and which is formed in the press-mold illustrated in this figure. The mold consists of a bottom plate 26, made in two parts, with a central opening of the diameter of the nose of the blowpipe 25, which is clamped within this hole, as shown. 27 is a one-part cylinder which rests upon the base-plate and upon which is placed the two-part mold 28, upon which lies the ring 29. When



the parts are in the position shown in this figure, the glass is dropped into the mold, and the plunger being forced thereinto, as shown, a small pin at the lower end of the plunger enters the nose of the pipe 25 and forms a thin web of glass therein. The plunger then being withdrawn, the thin glass within the pipe is opened by a rod, and the parts being removed the blank may be taken out with the pipe attached thereto, the cylinder 27 lifting upwardly off the blank and leaving its sides without seams. It will be noted that the blank *a* thus formed is open at one end and is provided at this end with an annular ring *b*, the main body of glass in the blank being located in its sides, which are thick and heavy, as shown, so as to contain a considerable amount of hot glass, which forms the supply from which the roller is drawn. The other end of the blank is considerably thinner than its sides, so as to become cold as compared with its sides. The ring *b* is made of substantially the same size as the upper end of the cylinder 15, and when the blank is removed from the mold it is clamped upon this cylinder or support in the position shown in Fig. 1.

The operation is as follows: The glass blank *a* having been formed and clamped upon the cylindrical base 15, the operator, standing upon the platform 19, by operating the valves 24 admits compressed air to the cylinder 3 and to the hollow shaft 8. A rotary motion being imparted to the shaft by the bevel-wheel 9, the upper end of the hollow shaper, contacting with the comparatively cold end portion of the blank, stretches this blank upwardly and tends to pull the same against the body of the former. At the same time the air-pressure within the former, passing through the holes in its upper end is regulated by the operator, who places his thumb or mouth over the upper end of pipe 25, thus preventing the glass from being drawn too tightly against the former. This is substantially the only function of the air-pressure within the former, there being no substantial increase in the diameter of the cylinder over that of the blank. When the parts have passed into the position shown in Fig. 2, the glass blank having been stretched into the glass roller therein shown the valves 24 are closed, and the former moving down to its normal position the cylinder may be unclamped and removed, and the operation is repeated. The cylinder 15 is filled with water, so that when the revolving plug is lowered it will be immersed and cooled.

The advantages of my invention result from the fact that by means of the interior former a perfect cylinder may be obtained which is of the same diameter and thickness throughout, while if rotation is imparted to the former a finely-finished surface will be obtained upon the interior of the roller. The air-pressure between the former and the blank prevents the glass from pinching about

the former, while owing to the peculiar shape of the blank the cold end portions thereof give substantially rigid supports, while the thick hot sides form a reservoir of hot glass from which the cylinder is drawn.

The former may be used without an air-pressure therein and may be rotated or not, as desired. The plug may be stationary and the cylinder 15 moved downwardly over it, and the parts of the machine employed may be varied widely without departing from my invention, since I consider myself the first to form a hollow blank and stretch the same into a cylinder by an internal former, as well as the first to form a blank of the size of the finished cylinder and form the cylinder by stretching this blank endwise.

I claim—

1. The method of forming glass rollers consisting in forming a hollow blank of the same size as the finished roller and stretching the same longitudinally over an internal former while at least a portion of the sides of the blank is out of lateral contact with any forming apparatus for the blank.

2. The method of forming glass rollers or cylinders consisting in forming a blank and stretching the same longitudinally by internal pressure applied to one end thereof while at least a portion of the sides of the blank is out of lateral contact with any forming apparatus for the blank.

3. The method of forming glass cylinders consisting in forming a hollow glass blank with an inward projection at one end, clamping the opposite end thereof and stretching the same longitudinally by internal pressure applied to an inward projection at the other end of the blank while at least a portion of the sides of the blank is out of lateral contact with any forming apparatus for the blank.

4. The method of forming glass cylinders consisting in forming a hollow blank, clamping one end thereof, stretching the same longitudinally over an internal former by pressure applied to the inner surface of the other end of the blank and admitting air between the blank and the inner former.

5. In apparatus for the formation of glass cylinders, the combination with apparatus for forming a hollow blank, of means for releasing at least a portion of the blank from said apparatus, a former arranged to enter the blank and means for moving the blank and former relatively to each other to stretch the blank longitudinally.

6. In apparatus for the formation of glass cylinders, the combination with apparatus for forming a hollow blank, of means for releasing at least a portion of the blank from said apparatus, a hollow former arranged to enter the blank and means for forcing the former against inwardly-projecting portions of the blank, to elongate the same.

7. In apparatus for the formation of glass cylinders, the combination with apparatus



for forming a hollow blank with an inwardly-projecting portion, of means for releasing at least a portion of the blank from said forming apparatus, a clamp arranged to secure one end of the blank, a hollow former arranged to enter the blank, and means for forcing the same against the inwardly-projecting portion thereof to elongate the same.

8. In apparatus for forming glass cylinders, the combination with apparatus for forming a hollow blank, of means for holding one end of the blank, a hollow perforated cylindrical former arranged to enter the blank and stretch it endwise and shape it, means for moving the blank and former relatively to each other, and means for supplying fluid under pressure to the former.

9. In apparatus for the formation of glass cylinders, the combination with apparatus for forming a hollow blank, of means for releasing at least a portion of the blank from said apparatus, a rotatory former arranged to enter the blank and means for moving the blank and former relatively to each other to stretch the blank longitudinally.

10. In apparatus for forming glass cylinders, the combination with a mold in which a hollow glass blank is formed, of means for releasing at least a portion of the blank from this mold, an internal former arranged to enter the blank, and means for moving the blank and former relatively to each other to stretch the blank longitudinally.

11. In apparatus for forming glass cylinders, the combination with a mold in which a hollow glass blank is formed, of means for releasing the blank from the mold, a hollow support having a clamping mechanism for gripping one end of the hollow blank and a reciprocatory former arranged to move through the support and stretch the blank.

12. In apparatus for forming glass cylinders, the combination with a hollow support having means for clamping the hollow glass blank at one end thereof, of a hollow former of greater length than the blank arranged to reciprocate through the hollow support and elongate the blank, said former having perforations in its upper portion, and means for supplying fluid under pressure to the former.

13. In apparatus for the formation of glass cylinders, the combination with a mold arranged to form a hollow glass blank, of a separate hollow support having means for clamping the hollow glass blank thereto, a reciprocatory former movable through the support and into the blank, and arranged to elongate the same, and mechanism for rotating said former.

14. In apparatus for the formation of glass cylinders, the combination with mechanism for clamping one end of a hollow glass blank, of a reciprocatory former of greater length than the blank arranged to enter the same and stretch the blank longitudinally, said former being hollow and having perforations at one end thereof, means for supplying fluid-pressure to the former, and a platform or support for the operator arranged to move with the former.

15. In apparatus for forming glass cylinders, the combination with apparatus for forming a hollow glass blank, of a separate hollow support arranged to contain a cooling fluid and having at its upper end clamps for securing the hollow glass blank thereto, and a reciprocatory former arranged to move through the support and stretch the blank longitudinally.

16. The method of forming glass cylinders consisting in forming a hollow blank, releasing at least a portion of the blank from the forming apparatus therefor, and then stretching the blank longitudinally over an internal former.

17. In apparatus for the formation of glass cylinders, the combination with mechanism for clamping one end of a hollow blank, of a hollow former perforated at one end arranged to enter and stretch the blank longitudinally, means for supplying fluid-pressure to the former, and a pipe arranged to be connected to the blank, and by which the air-pressure from the interior of the blank may be regulated.

In testimony whereof I have hereunto set my hand.

WILLIAM BUTTLER.

Witnesses:

FRED WOLTJEN,  
M. H. SLONN.