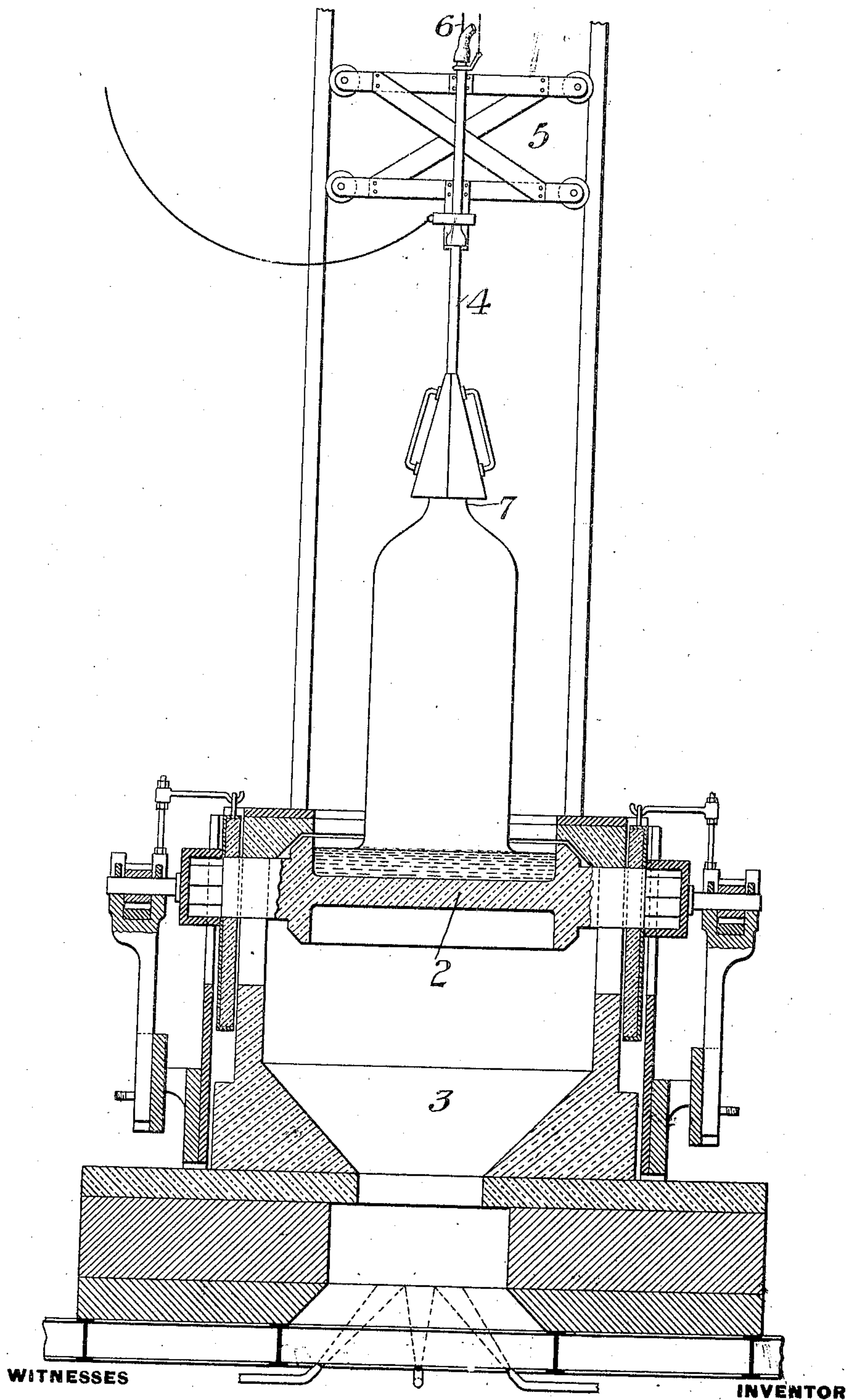


No. 822,678.

PATENTED JUNE 5, 1906.

J. H. LUBBERS.  
METHOD OF DRAWING GLASS CYLINDERS.

APPLICATION FILED APR. 12, 1905.



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# UNITED STATES PATENT OFFICE.

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## METHOD OF DRAWING GLASS CYLINDERS.

No. 822,678.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed April 12, 1905. Serial No. 255,144.

*To all whom it may concern:*

Be it known that I, JOHN H. LUBBERS, of Allegheny, Allegheny county, Pennsylvania, have invented a new and useful Method of Drawing Glass-Cylinders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, in which the figure is a sectional side elevation showing one form of drawing apparatus which may be used for carrying out my invention.

In the drawing of glass cylinders or rollers to be flattened into window-glass I have discovered that results of great importance can be secured by beginning the drawing of the cylinder proper at comparatively low speed and then increasing this speed gradually up to the full speed at which the major portion of the cylinder is drawn. I have also discovered that I can sever the cylinder from the glass in the bath much more easily by largely increasing the speed preparatory to cutting off, thus giving thinner glass in the lower portion to be cut off. I have also discovered that by using the lower speed in starting the drawing of the cylinder I can draw cylinders of a length equal to at least two or three of the cylinders or rollers which have previously been blown by hand. I can thus draw a cylinder of several times the length of an ordinary roller and then sever the cylinder at an intermediate point or points to give rollers of a length desirable for flattening and working up.

In the drawing, 2 represents the pot, containing molten glass; 3, the furnace; 4, the blowpipe; and 5 the drawing-frame, to which the blowpipe is removably secured. The drawing-pot may be raised and lowered to admit heat to the glass or cut it off from the drawing-point, as desired.

The drawing-frame is lifted by any suitable connection, and I have shown a flexible wire rope 6, which leads to a winding-drum of ordinary type, which may be driven by a steam-engine, an electric motor, or a motor of any desirable form.

In drawing cylinders with this form of apparatus the blowpipe is lowered into the bath to cause the glass to adhere thereto, and the pipe is then drawn up, with a small amount of air admitted to form a neck portion 7. More air is then admitted to swell out the glass be-

ing drawn to the size of the cylinder desired, thus forming what is called the "cap." During the forming of the neck and the cap and during the first part of the drawing of the cylinder proper the drawing-frame is lifted at slow speed by suitably controlling the fluid passing to the motor or in any other desirable manner. After the cylinder proper is started the speed of the drawing-frame is increased, preferably gradually, until it reaches the full normal drawing speed, which may then be continued until the complete cylinder is drawn of the desired length. The speed is then increased to a considerable extent, such as to draw a thin portion of glass at the lower end, which may be easily severed from the glass in the tank by shearing, cutting off with the flame, or otherwise. The relative speeds which I prefer to employ are about as follows: If the motor gives about one hundred revolutions per minute in drawing the first portion, I preferably increase this to about six hundred revolutions in drawing the major portion of the cylinder length. The speed at the end to thin the glass is preferably much higher, preferably about two thousand four hundred revolutions per minute. The speed which I have employed during the main drawing operation is about thirty inches per minute with six hundred revolutions. After cutting off the drawing-frame is lowered and the glass removed in the ordinary manner.

By this method the cylinder is made stronger and thicker in the upper part, so as to support a long cylinder without breaking, and the change from the slow to fast speed is preferably gradual, so as to prevent excessive jerks, which would injure the cylinder. I am thus enabled to draw a cylinder of at least two or three times the length of an ordinary hand-blown roller, which cylinder I then crack off at an intermediate point or points and cap off at its ends, thus forming several glass rollers or cylinders, which are cracked longitudinally and flattened in the ordinary manner. By thus drawing a cylinder of more than ordinary length I am enabled to increase the output and cheapen the product.

The glass cylinder may be drawn by the use of a circular bait of substantially the same size as the cylinder desired, or approximately so, without forming the neck and cap,



and many other variations may be made in the form and arrangement of the apparatus without departing from my invention.

I claim—

5 1. The method of drawing hollow glass articles, consisting in starting the draw at comparatively low speed continuing at such speed for a portion of the draw, and then increasing to higher speed, and continuing the  
10 drawing operation; substantially as described.

2. The method of drawing hollow glass articles, consisting in starting the draw at comparatively low speed continuing at such  
15 speed for a portion of the draw, and then increasing to higher speed, and continuing at a higher speed until the hollow article is drawn to the desired length; substantially as described.

20 3. The method of drawing hollow glass articles, consisting in starting the draw at comparatively low speed continuing at such speed for a portion of the draw, and then gradually increasing to higher speed, and continuing the drawing operation; substantially  
25 as described.

4. The method of forming hollow glass articles, consisting in drawing the same from a bath of molten glass, then materially increasing the speed to thin the walls of the article,  
30 and then severing the thinned portion; substantially as described.

5. The method of drawing hollow glass articles, consisting in starting the draw at comparatively low speed, and then increasing to higher speed, continuing at such higher speed  
35 until the hollow article is drawn to the desired length, then increasing the speed of the

draw to thin the glass, and severing the thin lower portion from the glass of the bath; substantially as described. 40

6. The method of drawing hollow glass cylinders, consisting in forming a neck and cap portion, drawing said parts and a part of the cylinder proper at comparatively low speed, then materially increasing the speed, and continuing the drawing operation; substantially as described. 45

7. The method of drawing hollow glass cylinders, consisting in forming a neck and cap portion, drawing said parts and a part of the cylinder proper at comparatively low speed, then materially increasing the speed, continuing the drawing operation at higher speed until the article is drawn of the desired length, then further increasing the speed of the draw to thin the glass, and then severing the thin lower portion from the glass of the bath; substantially as described. 50

8. The method of drawing hollow glass cylinders which consists in starting the draw and continuing while a portion of the cylinder is formed, at a slow speed, then increasing the speed while drawing the major portion of the cylinder, and finally again increasing the speed to draw a thin bottom portion, the three rates of speed being of materially increasing character; substantially as described. 55

In testimony whereof I have hereunto set my hand. 70

JOHN H. LUBBERS.

Witnesses:

J. A. BOLARD,  
C. D. GRENO.