

No. 692,813.

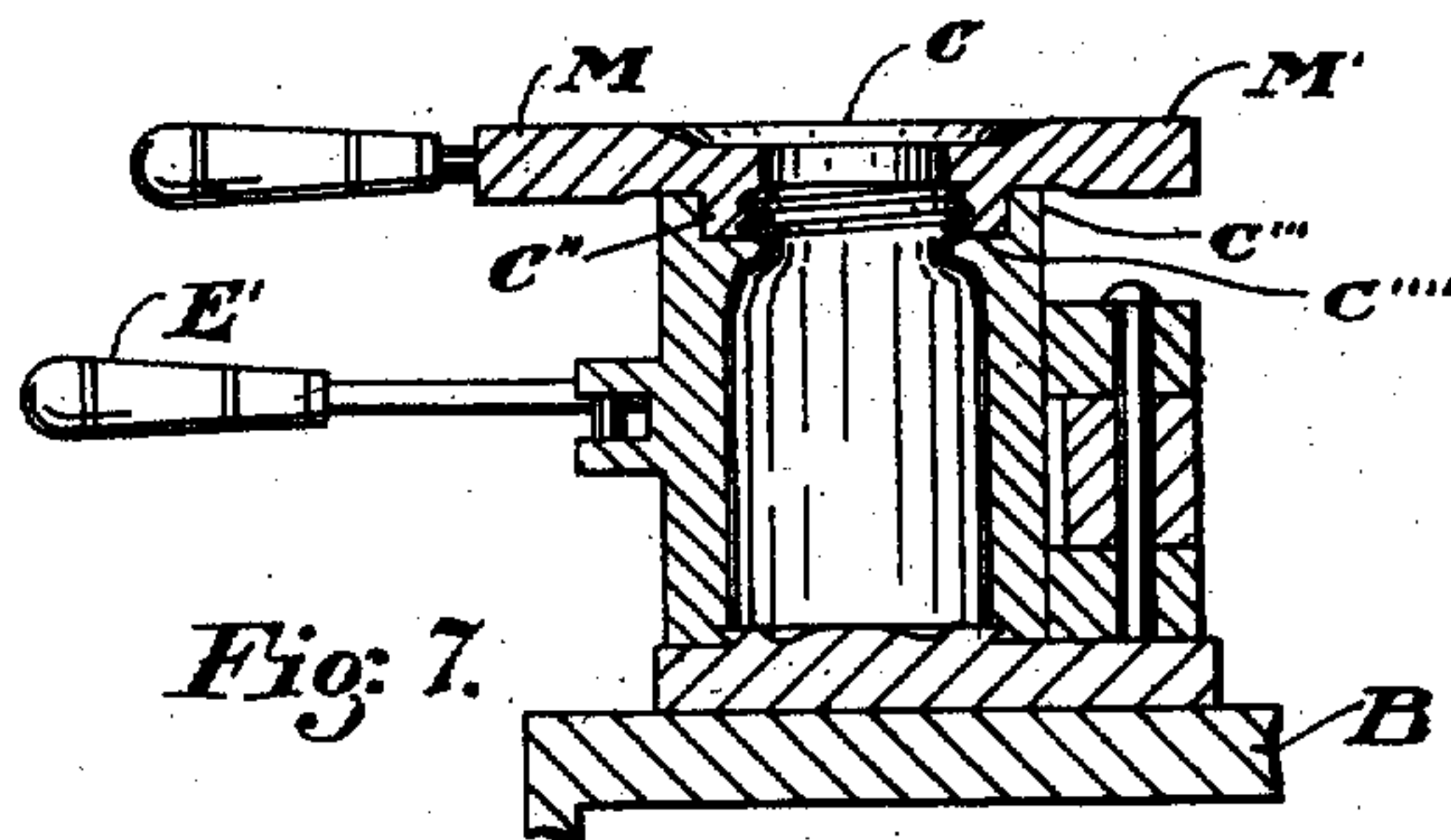
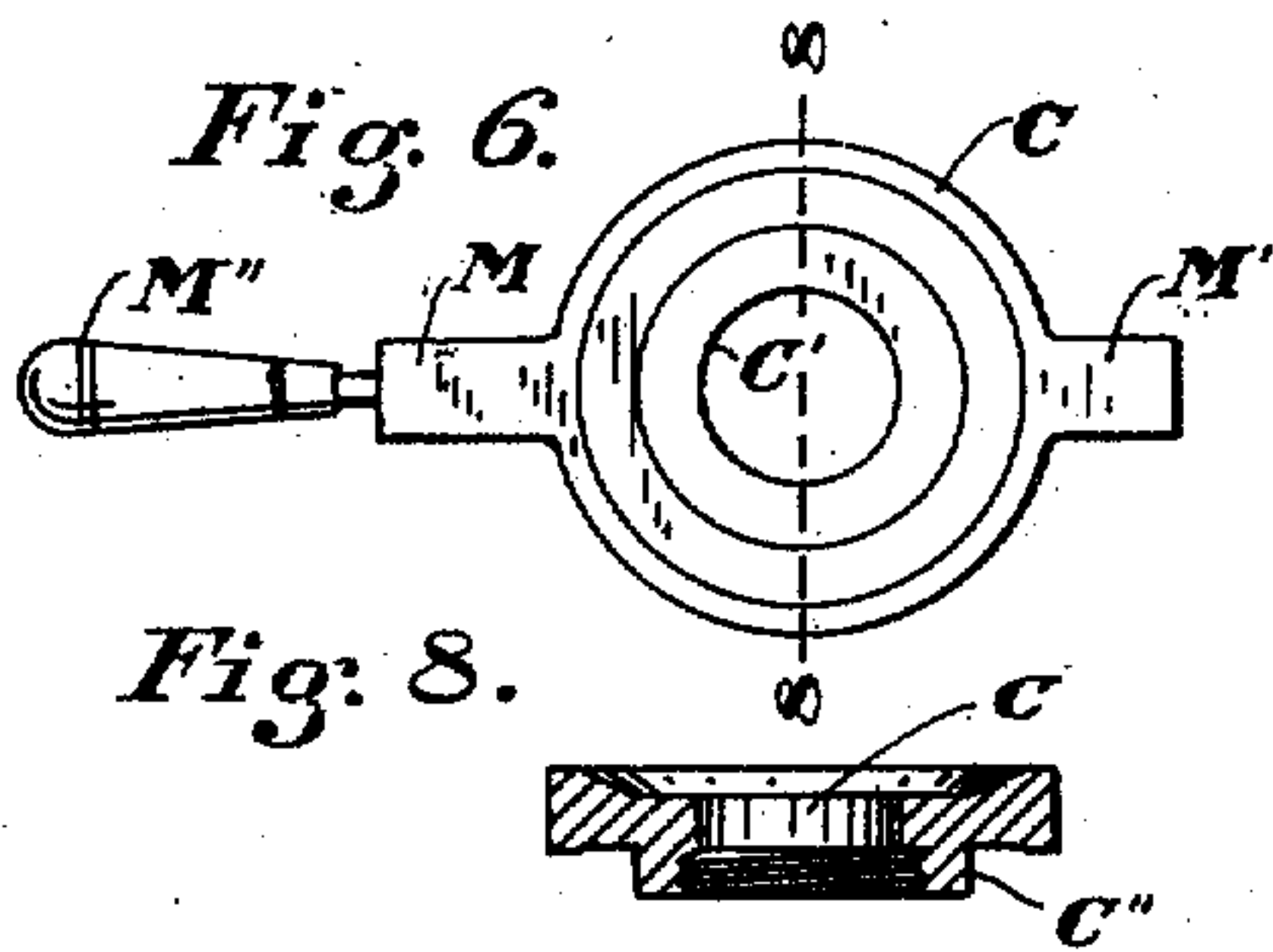
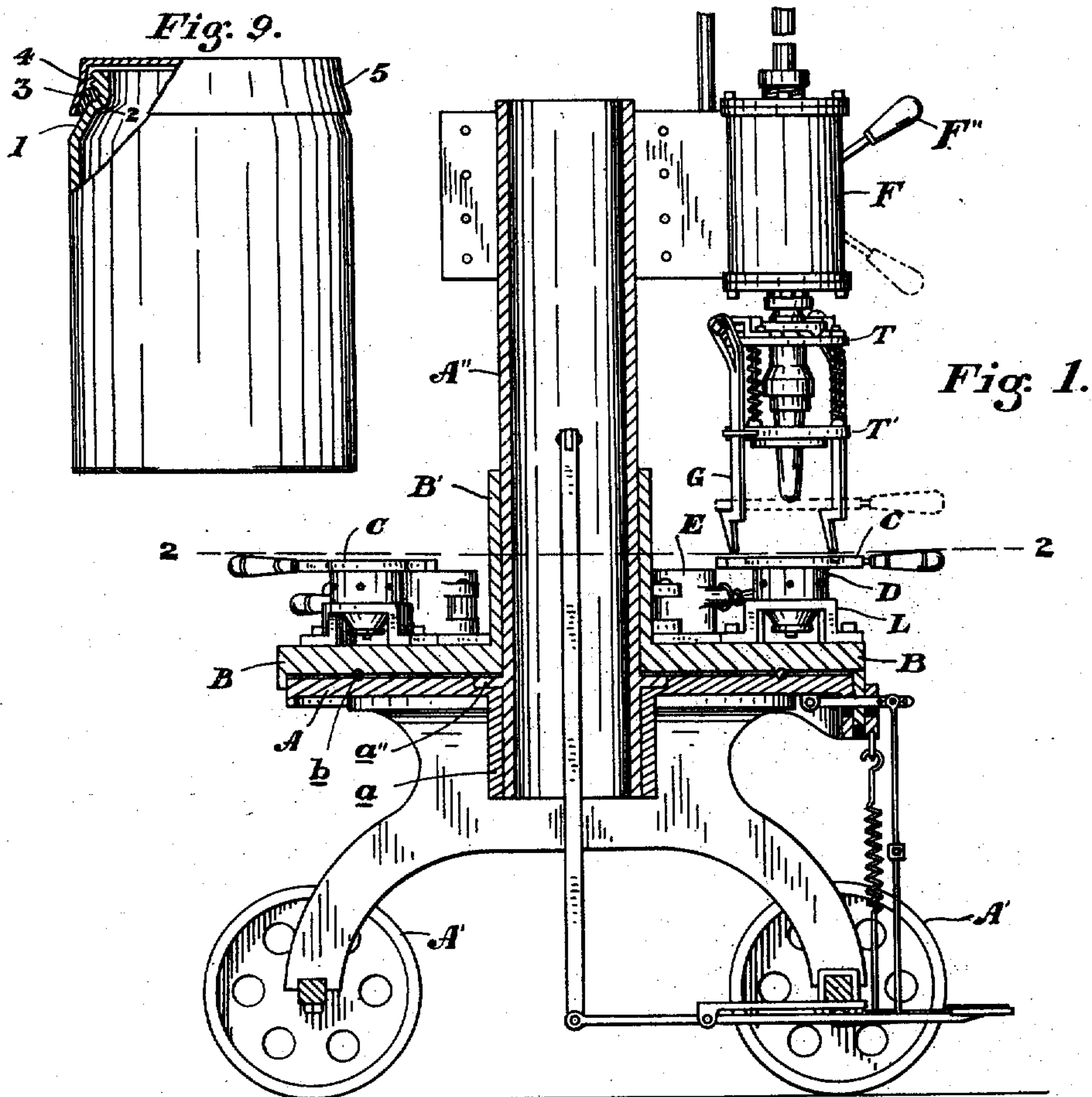
Patented Feb. 11, 1902.

E. B. BALL.  
GLASS BLOWING MACHINE.

(Application filed Mar. 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES.  
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2 Sheets—Sheet 2.

Fig. 2.

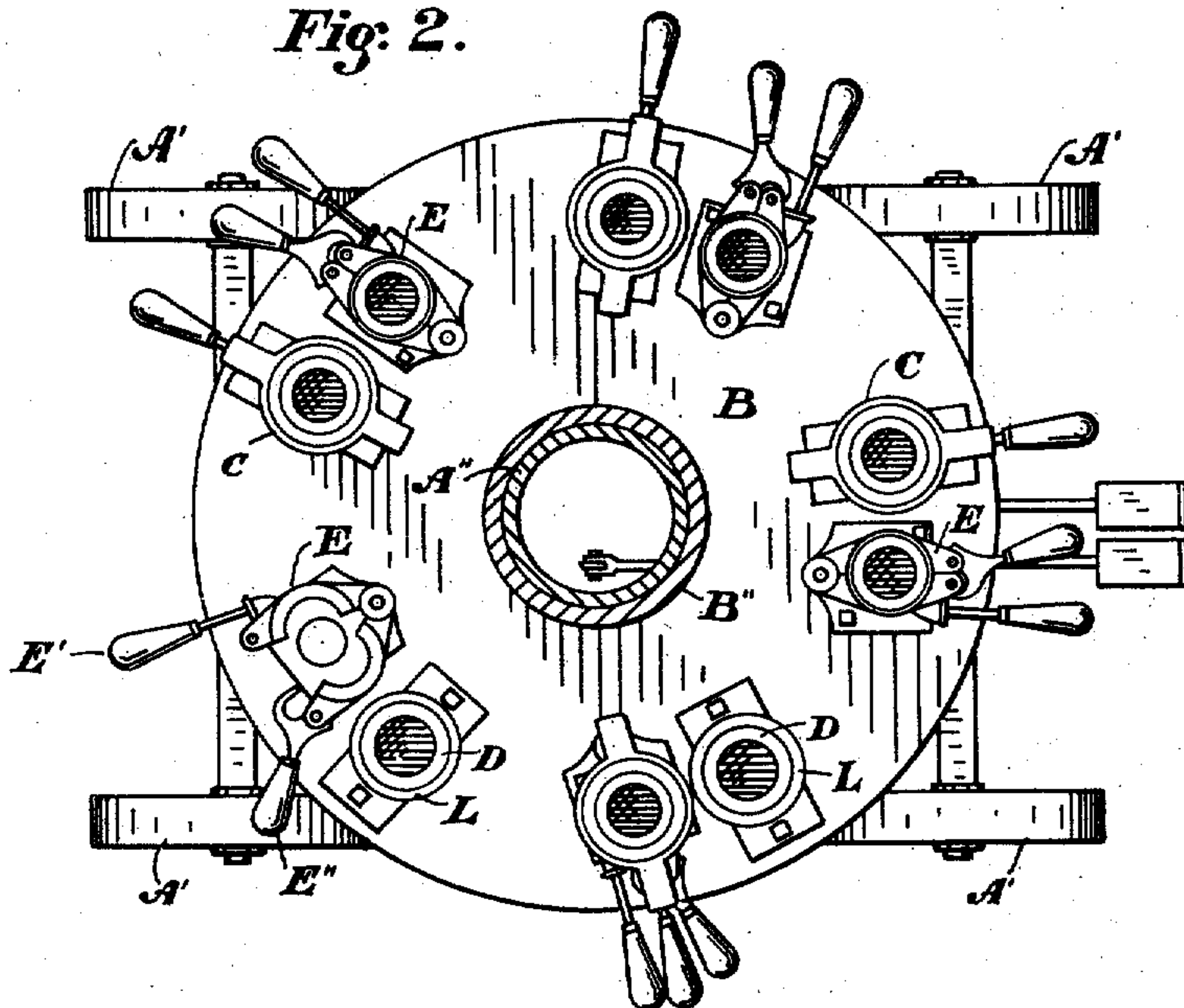


Fig. 3.

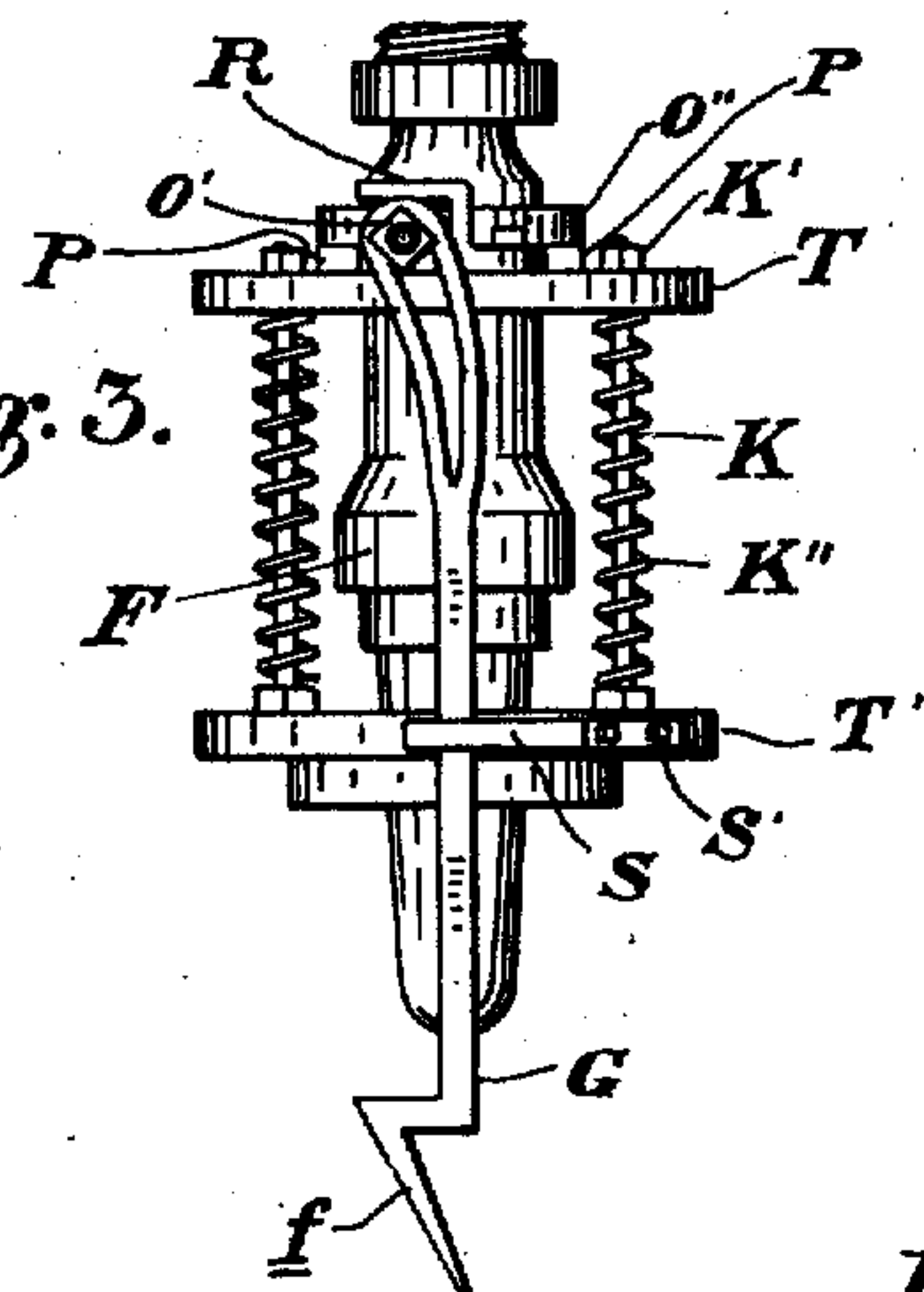


Fig. 4.

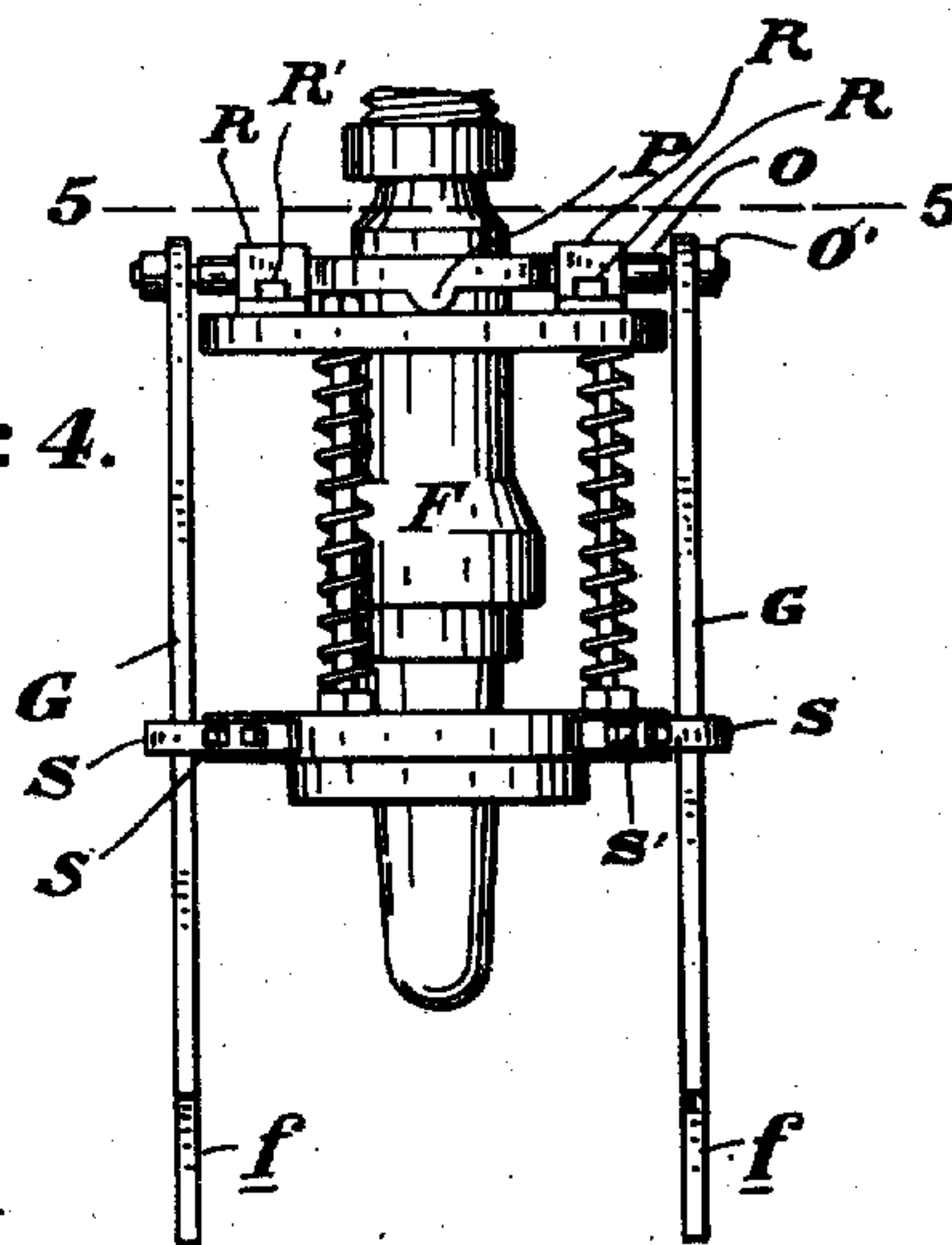
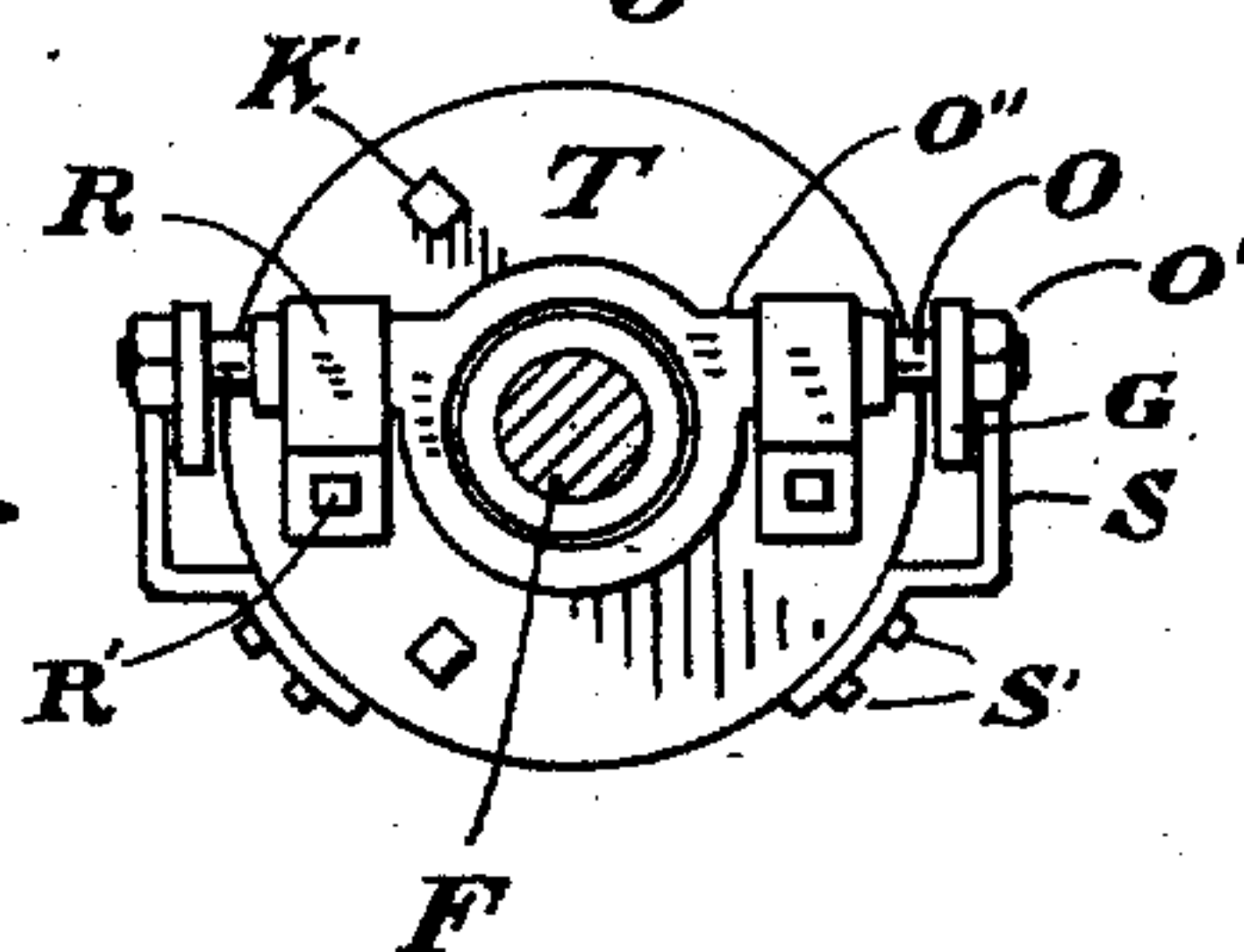


Fig. 5.



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# UNITED STATES PATENT OFFICE.

EDMUND B. BALL, OF MUNCIE, INDIANA, ASSIGNOR TO BALL BROTHERS  
GLASS MANUFACTURING COMPANY, OF MUNCIE, INDIANA, A CORPORATION OF INDIANA.

## GLASS-BLOWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 692,813, dated February 11, 1902.

Application filed March 15, 1901. Serial No. 51,309. (No model.)

*To all whom it may concern:*

Be it known that I, EDMUND B. BALL, a citizen of the United States, residing at Muncie, county of Delaware, and State of Indiana, have invented a new and useful Glass-Blowing Machine, of which the following is a specification.

My invention relates to certain improvements in glass-blowing machines, and more specifically to such a machine as is shown and described in Letters Patent of the United States No. 608,022, issued to Alvah L. Bingham, dated July 26, 1898; No. 610,515, issued to Frank C. Ball, dated September 6, 1898, and No. 644,395, issued to Edmund B. Ball, dated February 27, 1900. I have illustrated various parts of these machines in conjunction with my present invention in order that the same can be fully understood, and for the purpose of clearness will briefly describe such machines; but the description will principally relate to the parts involved in my present improvements.

My improved machine is illustrated in the accompanying drawings, wherein like letters and numerals of reference indicate corresponding parts in the several views, and in which—

Figure 1 is a vertical central longitudinal section through my improved machine, showing the pressing-mechanism-actuating means in elevation. Fig. 2 is a horizontal section on the line 2 2, Fig. 1. Fig. 3 is an end elevation of a portion of the pressing-mechanism-actuating means, showing the hooks. Fig. 4 is a side elevation of the same. Fig. 5 is a sectional view of the same on the line 5 5, Fig. 4. Fig. 6 is a top plan view of the neck-mold. Fig. 7 is a sectional view showing the neck-mold in position on the blowing-mold, showing the jar in elevation. Fig. 8 is a section on the line 8 8, Fig. 6; and Fig. 9 is an elevation of one type of vacuum-jar, showing the neck and cap in elevation.

In the drawings, A designates the frame of the machine, suitable to contain and support the various parts of the machine.

B designates a rotating table supported on the frame, and *b* a series of balls interposed between the frame and table in order that the

table can be readily rotated. The frame is supported by the wheels A'. Extending up centrally from the table B is a hollow standard A". This standard extends below the frame and is supported thereby by means of the collar *a''*, seated in the frame, and by means of a sleeve extension *a*, extending down from the frame. The standard is further held in position by means of the sleeve B', extending upward from the table.

C designates the neck-molds, D the pressing-molds, and E the blowing-molds. The pressing and blowing molds are supported on the rotating table B. The table is adapted to be revolved during the progress of the work and to be accurately stopped from time to time at the proper positions. The pressing and blowing molds are arranged in sets, and I have shown five such sets in the drawings. The manner of supporting the various molds on the table and the manner and means for rotating and stopping the table in its proper position have been fully set forth in Patent to Ball No. 644,395.

The present invention relates to an improved neck-mold and improved means for suspending and operating the hooks for lifting the neck-molds carrying the glass from the pressing-molds, so that the glass can be deposited in the blowing-mold.

In the present style of machines I find that by using a two-part neck-mold in pulling the mold apart the glass around the neck will have a tendency to stick to the mold, so that the jar at the neck will not be perfectly round. This is quite a serious defect, for the reason that if the neck portion of the jar is not perfectly round there will not be an air-tight joint between the neck and cap. A perfectly round neck is especially advantageous in the manufacture of what are known in the trade as "self-sealing" or "vacuum" jars. In this class of jars the gasket is on the outside of the neck, and the flange of the cap extends down over the gasket, so that when the fruit is placed in the jar and the cap in position and the contents of the jar slightly heated it will form a vacuum in the jar, and the air-pressure on the outside will force the cap down, making an air-tight joint. One type



of such a vacuum-jar is shown in Figs. 7 and 9 of the drawings, wherein 1 designates an inclined shoulder on the neck of the jar; 2, an annular groove; 3, the gasket in the groove; 4, the screw-threaded end portion of the neck, and 5 the cap having the flange extending down and over the gasket. It is to be understood that the threads on the portion 4 have nothing to do with the sealing of the jar, but are placed thereon for convenience in manufacturing, as more fully hereinafter described.

The pressing-mold D is supported by the standards L, and the blowing-mold is split and provided with the handles E' and E'' and operated in the same manner as is shown in the Patent No. 644,395.

The neck-mold C in this improvement is in the form of a solid cylindrical ring, as plainly shown in Fig. 6. Extending in opposite direction from this ring are the projections M and M'. Secured to the projection M is a handle M''. The central portion of the mold is provided with a central opening C', and extending downwardly from this opening is the annular screw-threaded flange C''. The neck-mold sets on the pressing and blowing mold in the same manner, so a description of one will suffice for both. Referring to Fig. 7, it will be seen that the blowing-mold is provided with an upwardly-extending annular flange C''', which surrounds the flange C'' on the neck-mold, and that the bottom of the flange C'' will rest upon a shoulder C'''' on the blowing-mold. By this construction a tight and solid bearing is provided for the neck-mold.

F designates the pressing-head or plunger, and F' the cylinder for operating the plunger, which is controlled by the lever F'', fully described in the prior patents before mentioned. Surrounding the plunger are two plates T and T'. The upper plate T is rigidly secured to the plunger-rod, and the lower plate T' is slidingly secured thereon and secured to the upper plate by means of the bolts K, which extend up through apertures in the upper plate. The bolts are provided with nuts K' above the plate T for limiting the downward movement of the plate T'. The bolts are surrounded with coiled springs K'' for normally holding the plate T' in a downward position and exert a yielding pressure on the plate when the plunger is in operation. Thus far the plunger-head mechanism is the same as is shown in the prior patents above mentioned.

G designates the lifting-hooks. In the prior construction these hooks were hinged directly to the upper plate. I have found by experience that in some instances the glass will have a tendency to stick in the pressing-mold, sometimes in one place and sometimes in another, and the hooks being hinged to a rigid plate will be obliged to rise simultaneously, and thereby tear the glass where stuck in the mold and injuring the quality of the ware. To obviate this difficulty, I now

hinge these hooks to a balancing-rod O. These hooks are secured to the opposite end of this rod by means of the nuts O', as plainly shown in Figs. 3, 4, and 5. The central portion of this rod is enlarged, as shown at O'', Fig. 5, so as to embrace the upper end of the plunger-rod. This enlarged central portion is provided with an aperture somewhat larger than the rod, as also plainly shown in said figure. On opposite sides of this central opening the bar is provided with a depending lug P, which rests upon the top of the plate F'. These lugs are located at the exact longitudinal center of the bar, so that the bar is normally balanced thereon, as plainly shown in Fig. 1. With this construction when the neck-mold is in position on the pressing-mold, as shown in Fig. 1, and the pressing-head is lowered, the hooks will engage the oppositely-extending projections M M' of the neck-mold. The hooks being hinged on the end of the bar and being provided with the portion f will be forced away from the projections M M' until the hooks are below these projections, when they will by their own weight fall by gravity and engage these projections. Now when the pressing-head carrying the hooks is raised if any glass sticks at a point in the pressing-mold the bar O will rock or teeter on the lug P and compensate for the irregular pull on the hooks, so that when the glass is finally disengaged from the pressing-mold the pull will have been even at all points on the glass removed, thereby preventing any injury to the finished ware. To prevent the bar from having too much of a teeter, I provide clips R, which extend over the opposite ends of the bar. These clips are secured to the top of the plate by means of the bolts R'. To prevent the hooks having too much swing when engaging the projections on the neck-mold, I provide the guards S, secured to the lower plate F'. These guards are secured to the plate by means of the bolts S'.

The operation of the machine is similar to that shown and described in the prior patents above mentioned. The glass is first dropped from the gatherer into the pressing-mold D. The plunger is then lowered, so that the hooks will engage the projections on the neck-mold, the plunger raised, and the neck-mold, with the depending glass, removed from the hooks by grasping the handle of the same and deposited in the blowing-mold. When this is accomplished, the blowing-head (not shown) blows the ware to its completed state. After this is accomplished the blowing-mold is opened by means of the handles thereon and the completed ware removed therefrom, with the neck-mold still attached, and placed to one side. To remove the neck-mold, it is simply unscrewed from the neck of the jar. As constructed it is only necessary to give the neck-mold a quarter-turn to release it from the neck, when it is again placed on the pressing-mold ready for a new supply of glass. By



this operation of unscrewing the neck-mold from the neck of the jar instead of opening the neck-mold, as before, the pull or strain will be equal entirely around the neck and the neck will be left perfectly round and without any defects.

I am aware that many minor changes can be made in the construction and arrangements of parts without in the least departing from the nature and principles of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a glass-blowing apparatus, of integral pressing-molds, blowing-molds, and a pressing-head or plunger, an integral cylindrical neck-mold provided with a central screw-threaded opening, and oppositely-extending projections, a handle extending from one of the projections, means adapted to engage the projections on the neck-mold and lift the same from the pressing-molds, and mechanism for operating said lifting means.

2. In a glass-blowing machine, the combination with a pressing-mold, a neck-mold, a plunger arranged above the pressing-mold, a plate carried by the plunger, a rod balanced on the plate, hooks pivoted to the opposite ends of the rod adapted to engage and lift the neck-mold and means for actuating the plunger.

3. In a glass-blowing machine, the combi-

nation with a pressing-mold, a neck-mold, a plunger arranged above the pressing-mold, a plate carried by the plunger, a rod balanced on the plate, hooks pivoted to the opposite ends of the rod adapted to engage and lift the neck-mold, clips on the plate for limiting the movement of the rod, and means for actuating the plunger.

4. In a glass-blowing machine, the combination with a pressing-mold, a neck-mold, of a plunger arranged above the pressing-mold, a plate carried by the plunger, a rod balanced on the plate, gravity-actuated hooks pivoted to the opposite ends of the rod, means for limiting the movement of the hooks, and mechanism for actuating the plunger.

5. In a glass-blowing machine, the combination with a pressing-mold, a neck-mold, of a plunger arranged above the pressing-mold, a plate carried by the plunger, a rod provided with an opening surrounding the plunger, depending lugs on the rod located on opposite sides of the plunger bearing against the top of the plate on which the rod is balanced, hooks pivoted to the opposite ends of the rod adapted to engage and lift the neck-mold, and means for actuating the plunger.

In testimony whereof I have hereunto set my signature in the presence of two witnesses.

EDMUND B. BALL.

Witnesses:

WM. DU VAL BROWN,  
MORRIS L. HAGEMAN.