(No Model.) 2 Sheets—Sheet 1.

H. HILDE.

MEANS FOR WORKING GLASS.

No. 567,236. Patented Sept. 8, 1896.

Fig. 1.

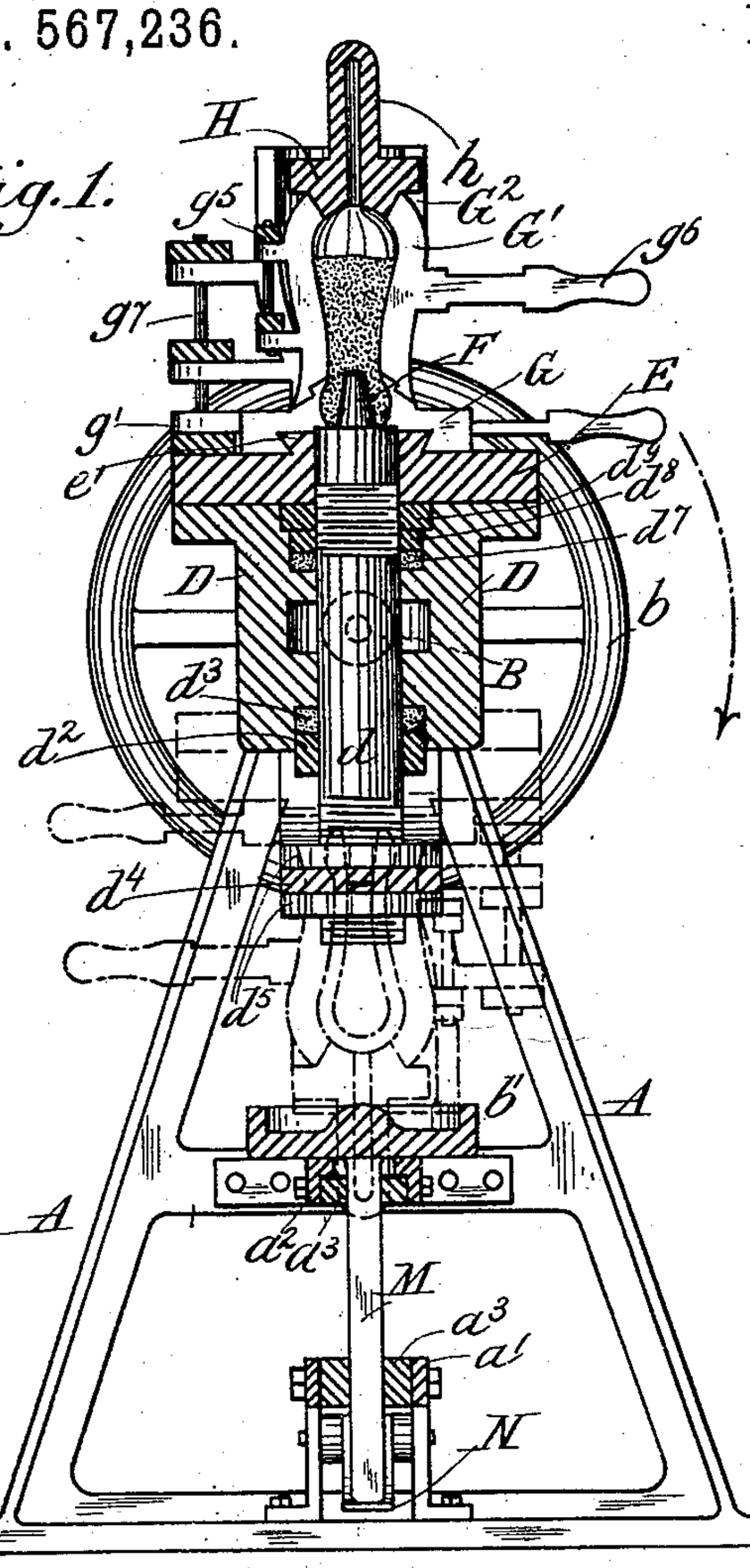


Fig. 3.

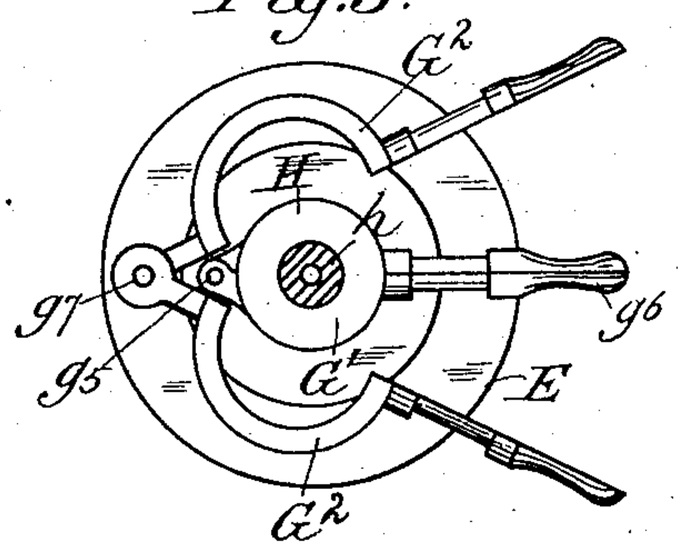


Fig. 4.

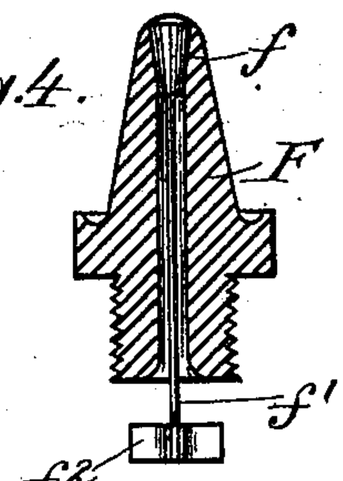


Fig. 5.

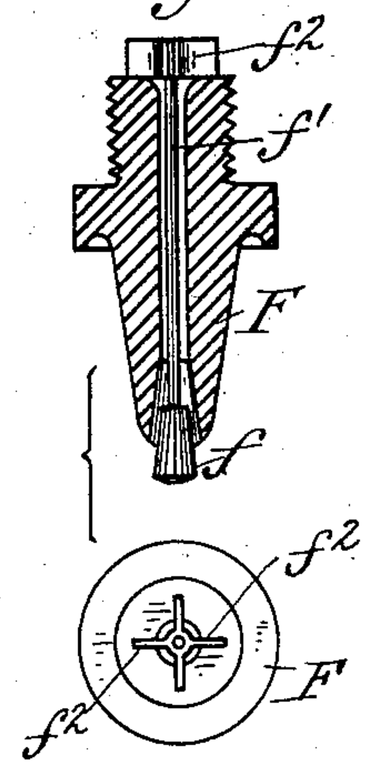
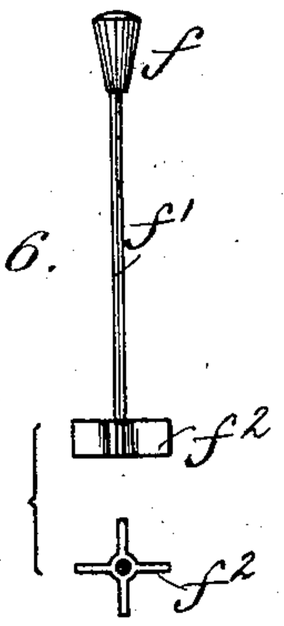


Fig. 6.



Attest:

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Inventor:

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(No Model.) 2 Sheets—Sheet 2.

H. HILDE.

MEANS FOR WORKING GLASS.

No. 567,236. Patented Sept. 8, 1896.

Fig. 2.

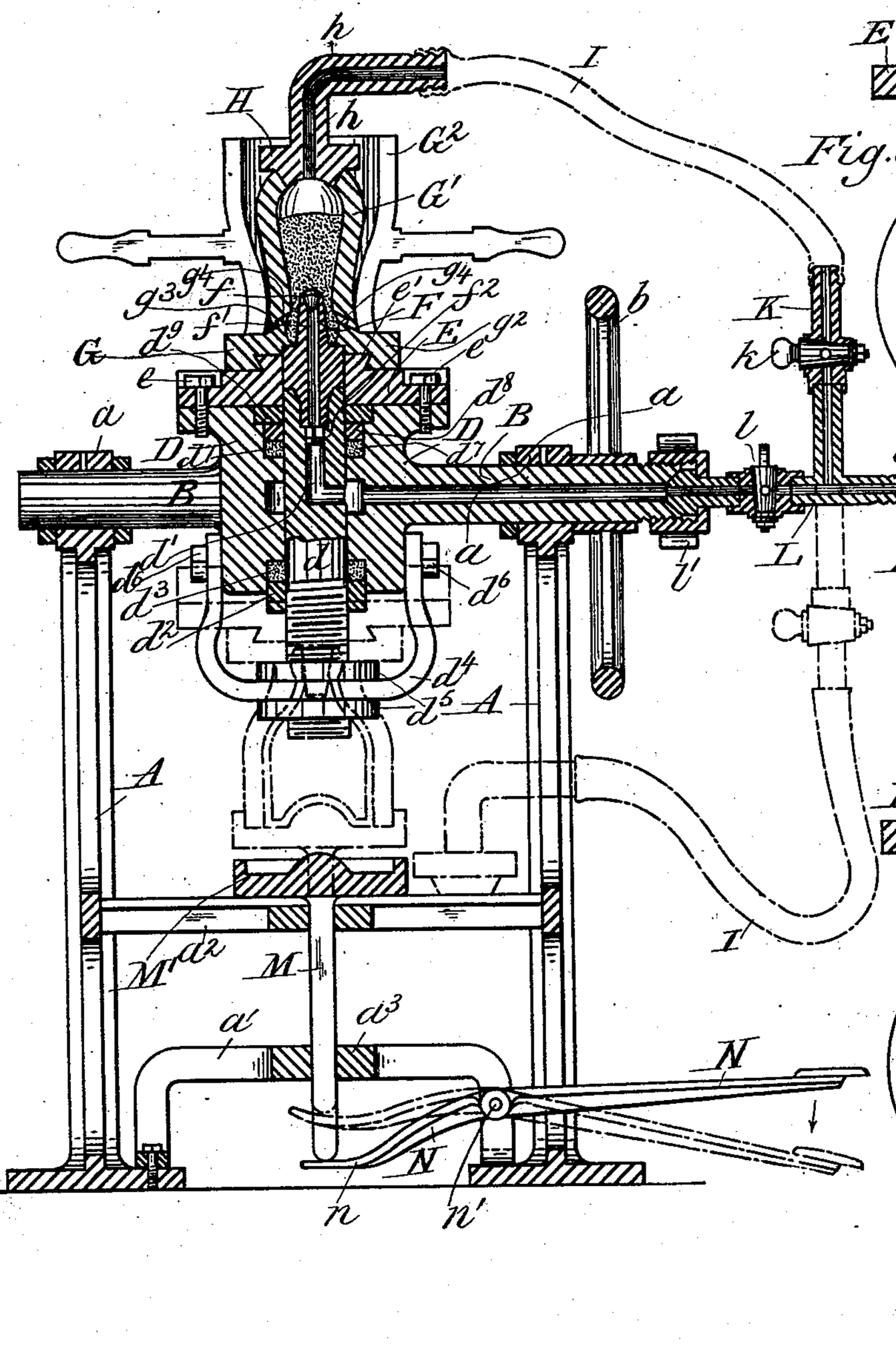


Fig. 7.

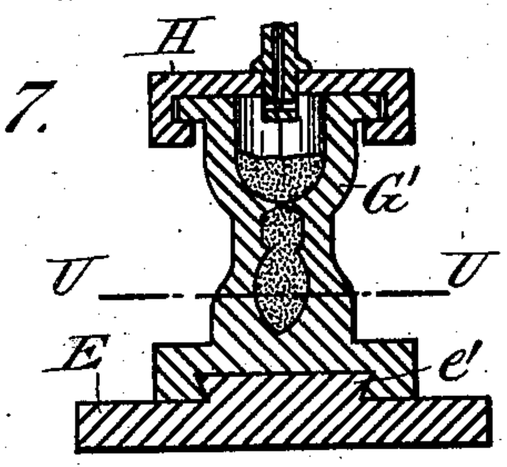


Fig. 8.

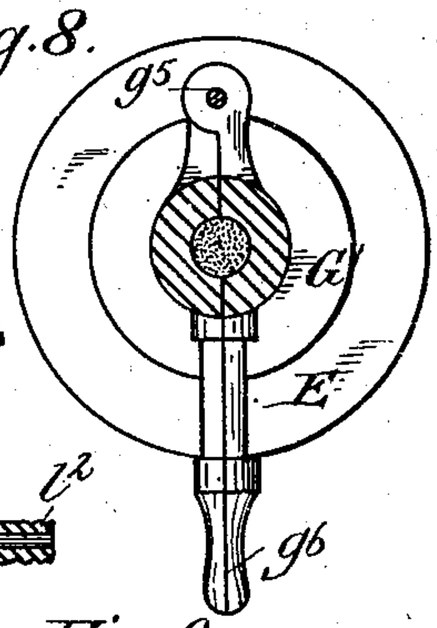


Fig. 9.

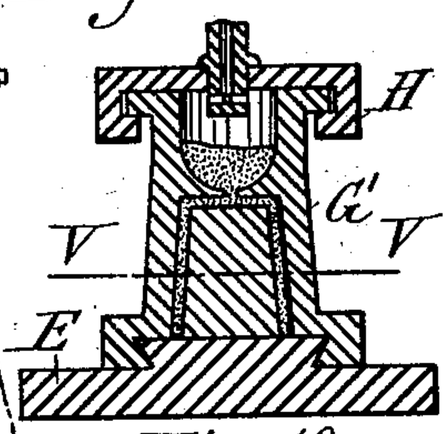
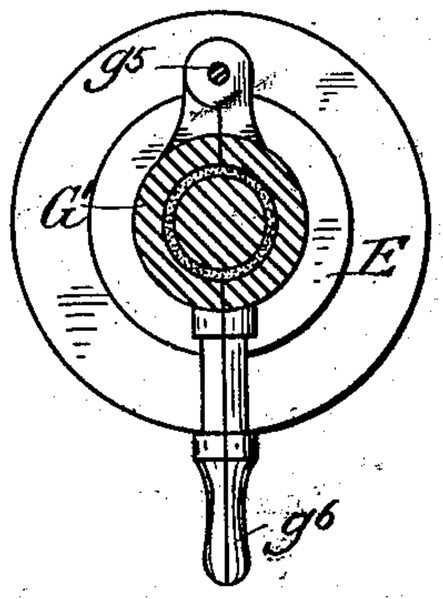


Fig. 10.



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UNITED STATES PATENT OFFICE.

HERMANN HILDE, OF ROSSWEIN, GERMANY.

MEANS FOR WORKING GLASS.

SPECIFICATION forming part of Letters Patent No. 567,236, dated September 8, 1896.

Application filed October 29, 1894. Serial No. 527,332. (No model.) Patented in Germany August 15, 1891, No. 63,540, February 16, 1892, No. 69,551, and February 19, 1893, No. 72,734; in England February 28, 1893, No. 4,385, and in Austria-Hungary August 26, 1893, No. 12,690, and No. 23,308.

To all whom it may concern:

Be it known that I, HERMANN HILDE, of Rosswein, in the Kingdom of Saxony, Germany, have invented a new and useful Means for Working Glass, (patented in Germany August 15, 1891, No. 63,540, February 16, 1892, No. 69,551, February 19, 1893, No. 72,734; in England February 28, 1893, No. 4,385, and in Austria-Hungary August 26, 1893, No. 12,690 and No. 23,308,) of which the following is a specification.

My invention relates to an apparatus for manufacturing glassware.

The object of my invention is to construct a machine for blowing hollow or other glassware which will first drive the molten glass tightly into the mold, thereby completely filling all the smaller convolutions or openings of the matrix, which would not otherwise be uniformly filled.

The invention consists in the features, details of construction, and combination of parts, which will first be described in connection with the accompanying drawings, and then particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical sectional view through the device at right angles to the axis of rotation; Fig. 2, a longitudinal section of the same; Fig. 3, a plan of the mold or former; Figs. 4 to 6, detail views showing the arrangement of the valve-nozzle; and Figs. 7 to 10, details of the devices by means of which the glass body may be produced around a core, or without the same, by the aid of an air-blast.

Referring to the drawings, A is a framework or stand provided at its upper end with bearings or journal-boxes a, in which are mounted trunnions B, one of said trunnions being hollow, as shown in Fig. 2, and extending beyond its respective journal-box a, where it is provided with a hand-wheel b.

The trunnions are fixed to and formed integral with a mold-carrier D, which has a central bore extending entirely through it, in which bore is located a cylinder or plug d, solid at its lower end and provided with a central duct d' at its upper end, said duct opening laterally and communicating with the central duct or passage in the hollow trunnion. The lower end of the cylinder d has a collar d^2 fixed to it, which collar enters an annular recess formed in the lower end of the mold-carrier. In this recess, above the said collar d^2, is placed packing material d^3, of any suitable kind, the said packing being held in place by the collar d^2. The lower end of the cylinder d projects through a yoke d^4, and is provided at each side of said yoke with nuts d^5. The yoke is secured to the lower end of the mold-carrier by bolts d^6. By adjusting the nuts d^5 up or down on the cylinder the collar d^2 may be forced against the packing material as tightly as desired, in order to pervent the escape of compressed air or other fluid around the cylinder at its lower end. The upper end of the mold-carrier is also provided with an annular recess around the cylinder or plug d, this recess having a larger diameter at its upper end than at its lower end, the lower or smaller portion of the recess containing packing material d^7 and a follower d^8, loose upon the cylinder or plug, said follower being above the packing and fitting loosely in the recess.

The enlarged portion of the recess contains a collar d^9, loosely surrounding the plug d, which collar is held in place by a joint-plate E, held to the mold-carrier D by screws e, by means of which the joint-plate may be forced downward upon the collar d^9, thereby pushing the latter against the follower d^8 and causing the said follower to compress the packing material d^7 against the plug d.

To the upper end of the plug d is secured a valve-nozzle F, having a conical end provided with a coned opening forming a valve-seat in which can rest a valve f, provided with a stem f', which passes through, but does not fill, an air-duct in the longitudinal axis of the nozzle. The lower end of the valve-stem projects into the air-passage d', and is there provided with wings f^2, forming a stop device, which serves to limit the longitudinal movement of the valve-stem and valve.

The upper face of the joint-plate has an upward-projecting base e', whose edge or rim

is cut under, as shown in Fig. 1, to receive the correspondingly-shaped jaws g^2 of a lower matrix G, formed in two parts, hinged together at g', Fig. 2, and provided with a pair of handles, each half having a cavity, the two cavities, when the matrix is closed, serving as a mold for the neck of the bottle or other article.

Above the lower matrix is an inner matrix G′, having jaws g^3 arranged to engage a projection g^4 on the lower matrix G, said projection having its edge cut under or chamfered, as shown, to hold the inner matrix firmly. The said inner matrix is formed in two parts hinged together at g^5, as shown in Fig. 1, and provided with handles g^6 in the usual manner.

Outside the inner matrix is an outer matrix G^2, formed in two halves, hinged together, as shown in Fig. 2, the pivot-pin g^7 of the hinge being in line with and integral with the pivot-pin of the hinge connection of the lower matrix G. The outer matrix G^2 has jaws adapted to engage the chamfered edge of the projection g^4 on the lower matrix in the same manner as the inner matrix. The inner matrix G′ has a conical opening at its top, in which is removably secured in any suitable manner, as by a bayonet-joint, a cap H, having an elbow-pipe h, to the outer end of which is secured a hose or conductor I, whose other end is secured to a radial pipe K, provided with a stop-cock k, the radial pipe being attached to an axial pipe L, provided with a stop-cock l, and secured to the outer end of the hollow trunnion B by a coupling l'. The axial pipe L is provided with a nipple l^2, to which a hose or other conductor, leading from a supply of compressed air or steam, is attached.

The frame A has two cross-braces a' a^2 arranged one above the other and provided with bearings a^3, through which passes a rod M, freely movable in a longitudinal direction in said bearings a^3, the rod carrying a bottom-former or similar mold M′ at its upper end and resting with its lower end on the inner arm n of a treadle-lever N, fulcrumed at n' on the lower cross-brace a'.

The operation of the device described is as follows: The inner matrix being secured in place, the cap H is removed and the molten glass placed in the said matrix. The cap is replaced and the stop-cock k opened to admit the compressed air to the top of the matrix, where it forces the molten glass downward, completely filling the lower matrix and forming the neck of the bottle or other article. The cock l during this time is closed. After the molten glass is forced into the lower matrix the mechanism is rotated on its trunnions to bring the matrices downward, whereupon the cock k is closed and the cock l opened, admitting the compressed air through the hollow trunnions and plug, forcing the valve f open, and blowing the glass outward to fill the inner matrix. The valve l is closed and the inner matrix then removed, the treadle being pressed to bring the bottom-mold M′ to its highest position to support the glass. The outer matrix G^2 is then closed around the article and the valve l opened to continue the blowing process, forcing the glass against the inner surface of the outer matrix and against the bottom-mold, thus completing the article, which can be readily removed in an obvious manner.

Instead of the matrices above described, I may use other forms for the manufacture of other articles, as will be fully understood by those skilled in the art. Some of these other forms are illustrated in Figs. 7, 8, 9, and 10, which show matrices for the manufacture of articles not requiring any blowing, but which are cast into their respective matrices by the aid of compressed air or other fluid under pressure, thus forcing the glass into all the cavities of the mold.

What I claim is—

1. In a glass-working apparatus, the combination, with a matrix, of means for supplying fluid under pressure to each end of the matrix in succession, whereby the molten glass is first pressed into the matrix from one end, and then blown from the other end.

2. In a glass-working apparatus, the combination, with a matrix, of a revoluble matrix-support, and means for supplying fluid to the top and bottom of said matrix, substantially as set forth.

3. In a glass-working apparatus, the combination, with a reversible matrix, of means for introducing fluid to either end of said matrix, substantially as set forth.

4. In a glass-working apparatus, the combination with a revoluble matrix-carrier having a passage for fluid, and a matrix removably held to the matrix-carrier over the passage-exit, of a valve located in said passage, substantially as set forth.

5. In a glass-working apparatus, the combination, with a matrix, a matrix-carrier having trunnions and a passage for fluid through one of the trunnions into the matrix, of a nozzle removably secured in the mold-carrier at the termination of said passage, a valve located at the outer end of the nozzle and means for supplying fluid to the passage and to the opposite side of the matrix, substantially as set forth.

6. In a glass-working apparatus, the combination, with a revoluble matrix-carrier, and a matrix removably secured thereto, of a bottom-mold below the matrix-carrier, substantially as set forth.

7. In a glass-working apparatus, the combination, with a revoluble matrix-carrier, and a matrix removably secured thereto, of a bottom-mold below the matrix-carrier, and means for reciprocating said mold, substantially as set forth.

8. In a glass-working apparatus, the combi-

nation, with a revoluble matrix-carrier having a central bore, a plug located within said bore and provided with a passage, of a matrix above the matrix-carrier, and plug, into which said passage opens, a valve located in the passage and packing surrounding the plug, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMANN HILDE.

Witnesses:

MAX WATTHÄI,

RUDOLPH FRICKE.