No. 814,774. PATENTED MAR. 13, 1906.

H. L. DIXON & G. A. MARSH.

APPARATUS FOR SHEARING GLASS.

APPLICATION FILED MAR. 10, 1905.

2 SHEETS--SHEET 1

Fig. 1.

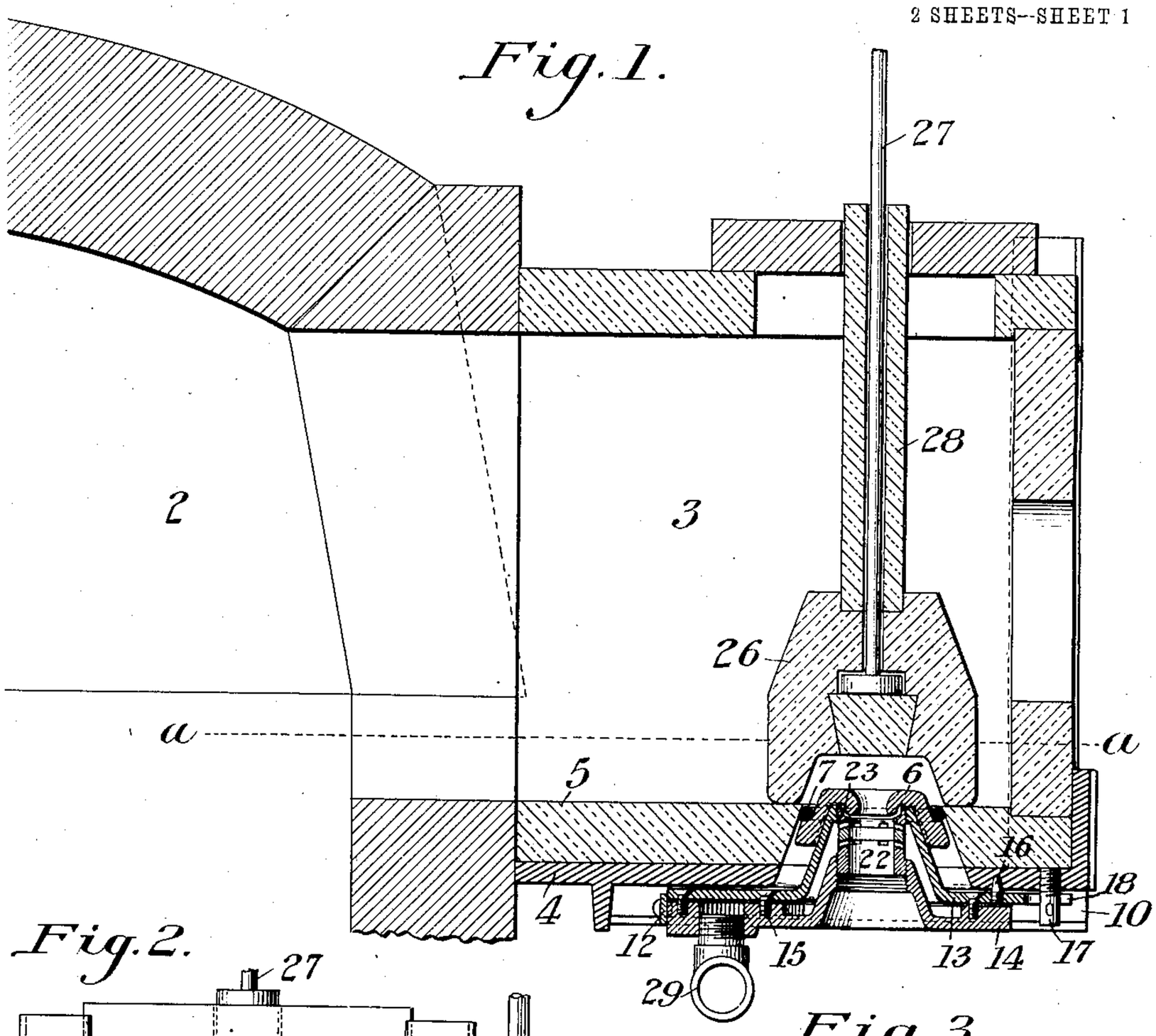


Fig. 2.

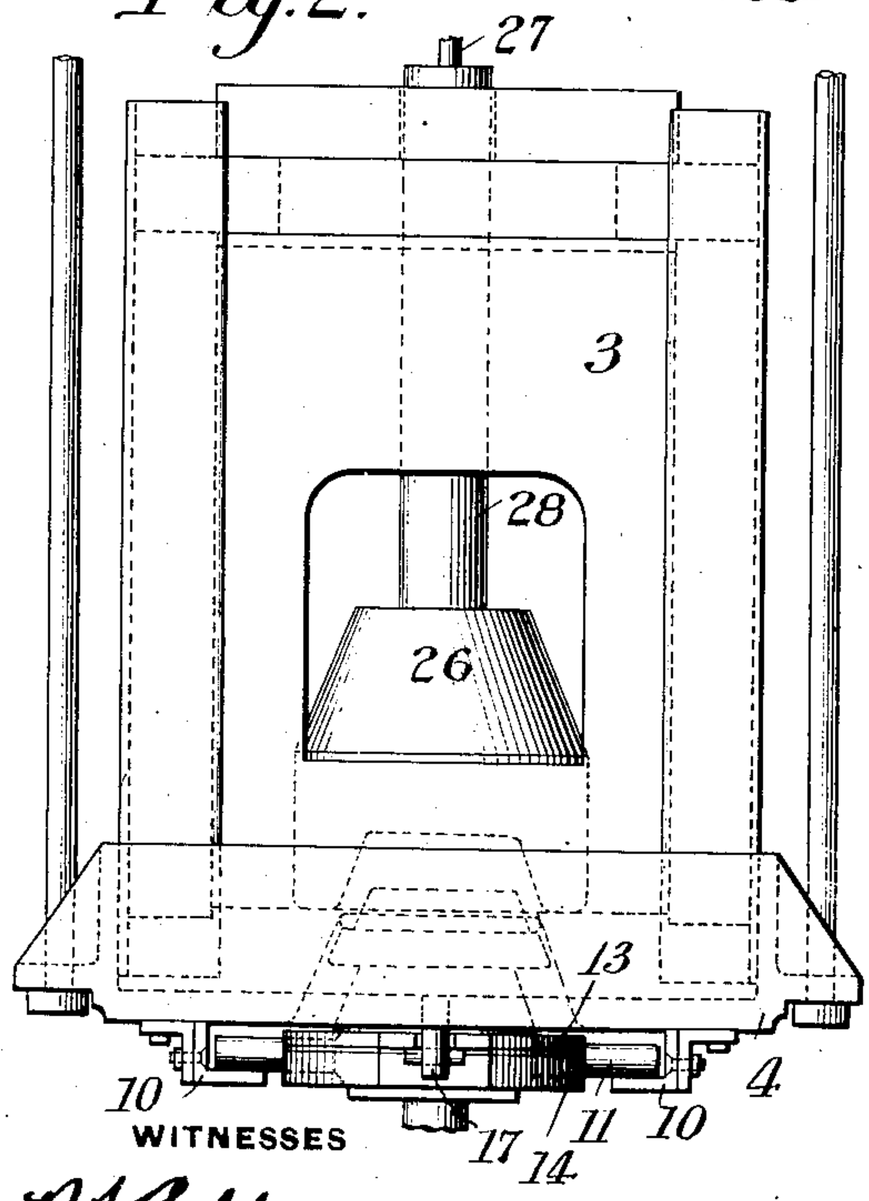
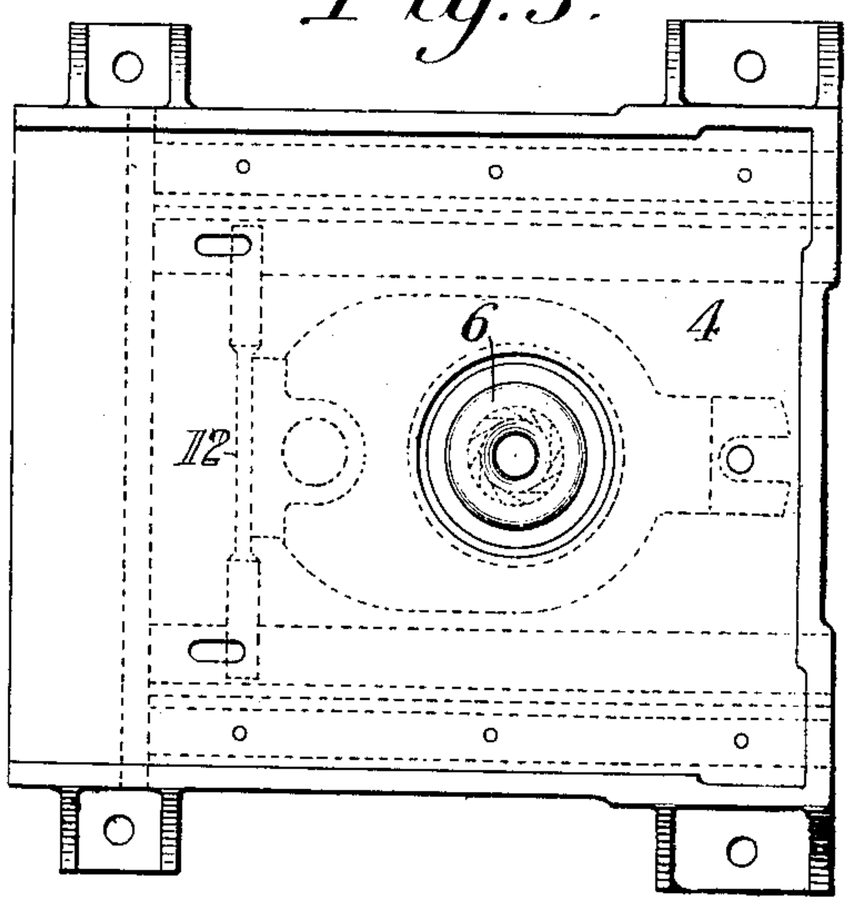


Fig. 3.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 4.

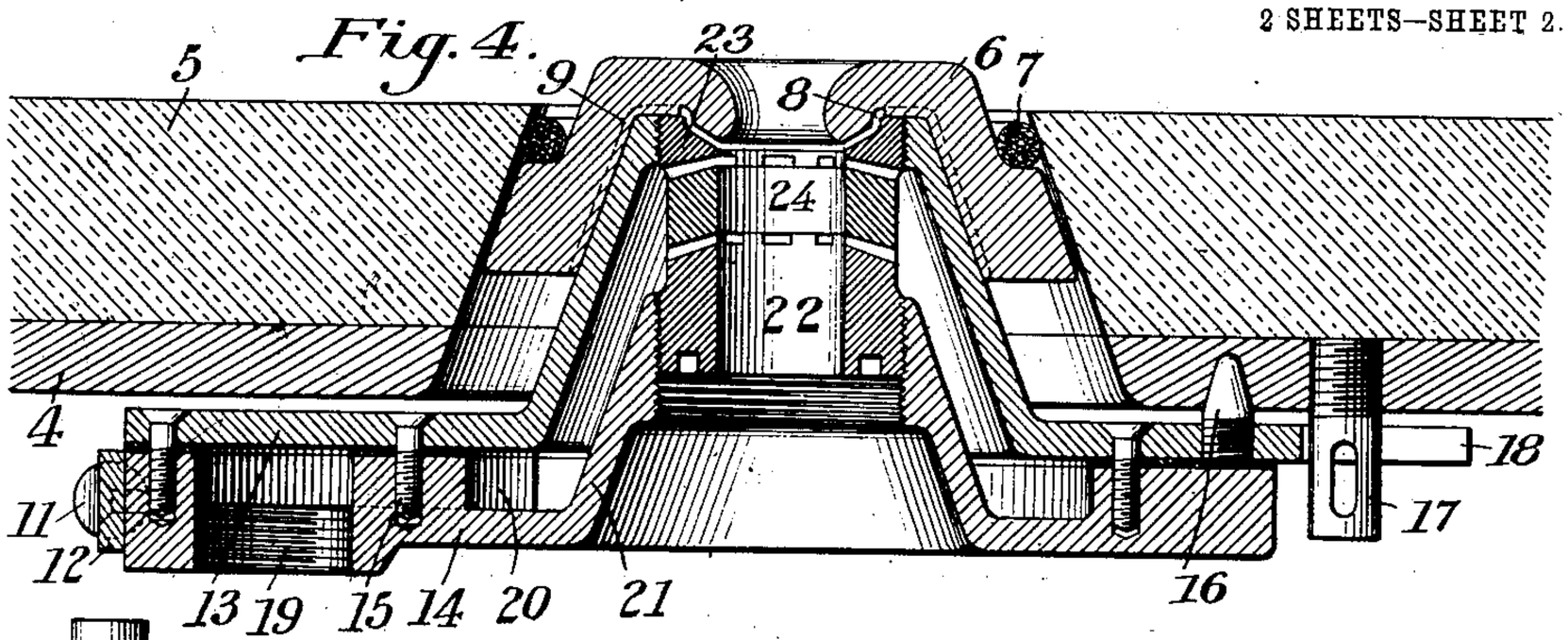


Fig. 5.

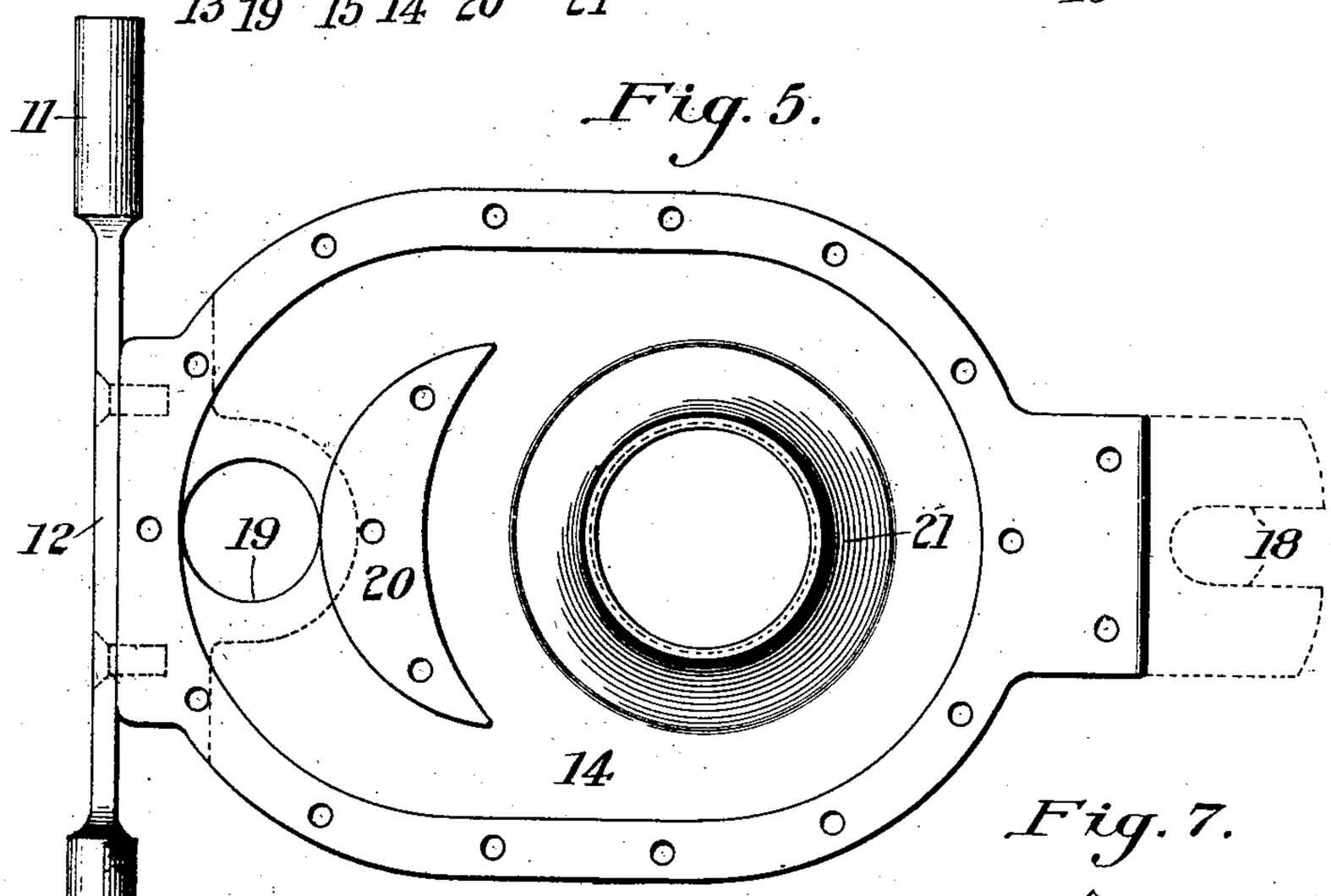


Fig. 6.

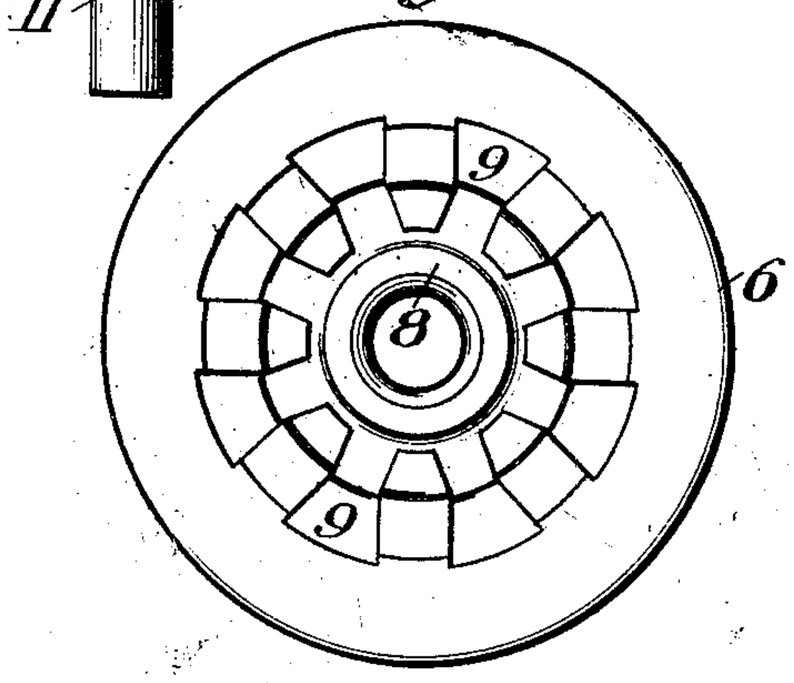


Fig. 7.

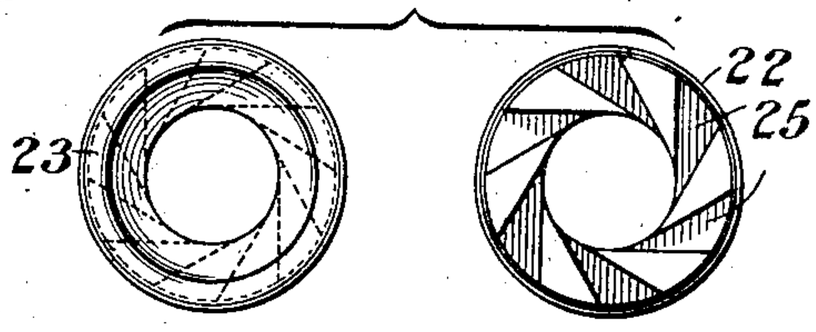
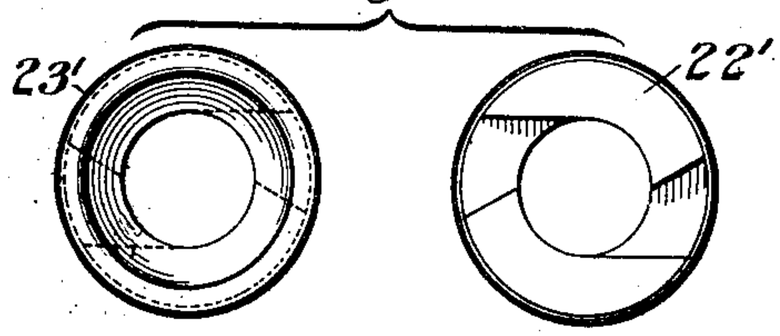


Fig. 8.



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UNITED STATES PATENT OFFICE.

HENRY L. DIXON AND GEORGE A. MARSH, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO AUTOMATIC MACHINE GLASS COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR SHEARING GLASS.

No. 814,774. Specification of Letters Patent. Patented March 13, 1906.

Application filed March 10, 1905. Serial No. 249,437.

To all whom it may concern:

Be it known that we, HENRY L. DIXON and GEORGE A. MARSH, of the city of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Apparatus for Shearing Glass, 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 vertical longitudinal section of our improved apparatus. Fig. 2 is a front elevation of the same. Fig. 3 is a top plan view of the forehearth bottom plate with cut-off plate and attachments. Fig. 4 is an enlarged central vertical section of the cut-off device. Fig. 5 is a top plan view showing the bottom plate of the cut-off. Fig. 6 is a bottom plan view of the outlet-nozzle. Fig. 7 is a top plan view of the two air-blast rings; and Fig. 8 is a view similar to Fig. 7, showing another form.

Our invention relates to apparatus for cutting off glass fed or drawn from a furnace or receptacle.

The object of the invention is to provide apparatus which will cut off the glass without crizzling or without forming threads or portions which will injure the appearance of the article formed from the glass so cut off.

The invention consists in providing means for cutting off the glass by directing a current of fluid against it, this fluid being preferably a gaseous fluid, such as air, superheated steam, &c.

The invention also consists in providing means for simultaneously directing the fluid against a stream of glass on different sides thereof; further, in driving the fluid against the stream in such a manner as to cause a swirl and give a twisting action.

It further consists in providing means for simultaneously driving streams at two different levels, one stream of fluid giving a twisting action to the glass to one direction and the other a twisting action in the opposite direction.

The invention further consists in providing a relief-outlet for the air or fluid used in cutting off the glass, and, further, in the construction and arrangement of the parts, as hereinafter more fully described and claimed.

In the drawings, 2 represents a portion of a glass-tank furnace having an overhanging forehearth or projection 3, the bottom of which is preferably near the level of the glass-bath in the tank. Thus the glass-line will preferably lie at about the level *a a*, though the location of the forehearth may of course be varied as desired.

An upwardly-tapering hole is cut through the bottom plate 4 of the forehearth and its refractory lining 5, and in this hole is set our improved cut-off device. In the form shown a nozzle 6 of porcelain or suitable refractory material and of general conical form is forced up within the hole in the forehearth-bottom and preferably sealed by an asbestos gasket 7, seated in a recessed portion of the nozzle and compressed between it and the sides of the hole as the nozzle is forced up. This nozzle is recessed upwardly in its central portion, and its bottom inner face is provided with a central recess 8, from which radial outlet-ports 9 lead outwardly and downwardly to the lower edge of the nozzle. These ports are to allow exit of the air which is preferably forced upwardly as it is driven in the stream of glass passing down through the nozzle.

The bottom plate of the forehearth is provided with side supporting-guides 10 10, adapted to receive the ends 11 of the front supporting-bar 12 for the blow-plate. This blow-plate is made in two parts—namely, an upper plate 13 and a lower plate 14—which are secured together by screw-bolts 15 or other suitable means. The outer portion of the upper plate is provided with a centering-stud 16, adapted to enter a registering recess in the bottom plate of the forehearth when the blow-plate is swung up into place. The plate is then secured by a key driven through a slot in the screw-bolt 17, which extends within a slot (indicated at 18) in the upper plate. The lower half of the blow-plate is shown in top plan view in Fig. 5. The air-inlet hole is indicated at 19, the air being spread and equalized by the lune-shaped deflector 20.

21 is an upwardly-extending boss having a central hole into which is screwed the lower blow-ring 22.

The top blow-ring 23 is secured into a registering hole in the upper half of the blow plate, and between the rings 22 and 23 is the

plain spacing-ring 24, having inclined or beveled upper and lower faces to fit the inclined or beveled faces of the blow-rings.

As shown in Fig. 7, the lower ring 22, shown at the right-hand, is provided on its upper edge with inclined ports 25, extending around it and directed clockwise. The top ring 23, shown at the left hand, is similarly provided on its lower face with slots which are directed in a counter-clockwise direction.

In order to shut off the glass from the nozzle and blow-plate when desired, we preferably provide the refractory internal stopper 26, which is of sufficient size to entirely cover the hole in the bottom of the forehearth and may be raised and lowered by a stem 27, extending up through a hole in the top of the forehearth and protected by refractory sleeve 28. Any other suitable means may be employed for shutting off the glass from the nozzle when desired.

In our apparatus, the parts being in the position shown in Figs. 1 and 2 with the stopper 26 raised, the glass flows down through the hole in the nozzle into the molds or suitable receptacles beneath. When it is desired to cut off the stream of glass, air under pressure is admitted through the pipe 29, which air passes through the non-radial slots in the two blow-rings, one ring thus producing a swirling action in the glass in one direction and the other a similar swirling action in the opposite direction. The glass is thus simultaneously twisted in opposite directions, so that it is quickly cut off without leaving strings or portions of glass which would mar the article molded from the glass thus cut off. The streams being directed slightly upwardly will tend to hold up the glass flowing down through the nozzle and prevent injury to the glass cut off, while the surplus air passes through the channels between the nozzle and the blow-plate, thus preventing the blowing of air-bubbles into the bath and the shredding of the glass. The air may now be turned off either by hand or automatically, when the stream of glass will again start down through the hole and will again cut off when the desired amount has flowed through. The glass may be received in cups or molds, preferably on an endless carrier, which may then be brought into registry with other molds, in which the glass is given its final form.

In the form shown in Fig. 8 only two slots are employed in the lower ring 22′ and the upper ring 23′. These slots are non-radial and give the opposite twists or swirls to the glass, as before. The number and direction of the slats may of course be varied in many ways. We prefer, however, to make the slots non-radial, so as to produce the swirl. One ring may be employed, if desired, giving a twisting action in one direction, though we prefer to use both, as this severs the glass more quickly and more sharply without leaving knobs or strings.

The advantages of our invention result from the simple and effective apparatus for cutting off glass by a blast of fluid, which is preferably a gaseous fluid, though liquid may be used. The glass being inclosed on all sides when the cutting-blast is applied, the blast acts quickly and uniformly to cut and twist off the connection, thus doing away with the use of shears, moving shutters, &c., which rapidly deteriorate and burn out. as well as stick to the glass.

The apparatus may be used either for an outward-flowing stream, as shown, or for cutting off the glass sucked into a cup or gatherer or taken out in other ways.

Many changes may be made in the form and arrangement of the blow-off device, the liquid or gaseous fluid used, and the other parts of the apparatus without departing from our invention.

We claim—

1. In apparatus for severing glass, a jet device arranged to direct a current of fluid under pressure against the glass while in a molten or plastic condition; substantially as described.

2. In apparatus for severing glass, a jet device arranged to direct a current of fluid under pressure against the glass while in a molten or plastic condition, and a connection leading from a source of gaseous fluid under pressure to the jet device; substantially as described.

3. In apparatus for severing glass in a molten or plastic condition, a jet device arranged to direct a current of fluid under pressure against the glass at an angle to cause a swirl; substantially as described.

4. In glass-severing apparatus, a ring surrounding a portion of molten glass, and means for directing a current of fluid under pressure against the glass while surrounded by the ring; substantially as described.

5. In glass-severing apparatus, a nozzle through which the glass flows, and a jet device arranged to direct a current of gaseous fluid against the glass while inclosed by the nozzle; substantially as described.

6. In glass-severing apparatus, a nozzle through which the glass flows, and a jet device arranged to direct a current of gaseous fluid against the glass in a non-radial direction while inclosed by the nozzle; substantially as described.

7. In glass-severing apparatus, a nozzle or inclosing ring arranged to surround a portion of molten or plastic glass, and non-radial slots therein arranged to direct a current of gaseous fluid against the glass in a direction to cause a swirl therein; substantially as described.

8. In glass-severing apparatus, a nozzle

arranged to contain a stream of glass and having non-radial slots arranged in opposite directions to cause opposite swirls in the glass stream and sever the same; substantially as described.

9. In glass-severing apparatus, a nozzle or surrounding ring having a slot arranged to direct a current of fluid under pressure against the molten glass at a slight upward angle; substantially as described.

10. In glass-severing apparatus, a nozzle or surrounding ring having a slot arranged to direct a current of fluid under pressure against the molten glass at a slight upward angle and in a non-radial direction to cause a swirl; substantially as described.

11. A receptacle for molten glass having an outlet-hole with a nozzle arranged to direct a thin sheet of fluid against the stream of molten glass, and an outlet for the air under pressure; substantially as described.

12. A receptacle for glass having an outlet-hole with a nozzle arranged to direct a cutting blast of fluid into the glass at a slight upward angle, and relief-ports for the excess fluid; substantially as described.

13. A receptacle for molten glass having an outlet-hole with a nozzle, said nozzle having ports on opposite sides connected to a source of fluid under pressure and arranged to deliver a series of thin currents of the fluid against the stream of glass; substantially as described.

14. A receptacle for molten glass having an outlet with a nozzle, said nozzle having two series of ports connected to a source of gaseous fluid under pressure, said ports being arranged to cause opposite swirls in the stream of molten glass; substantially as described.

15. A receptacle for molten glass having a refractory nozzle and a blow-ring below the nozzle arranged to surround the glass and direct a thin sheet of fluid against it; substantially as described.

16. A receptacle for molten glass having an outlet-nozzle and a blow-ring of slightly larger internal diameter below the nozzle and having slots arranged to direct a blast of gaseous fluid against the stream of glass inclosed by the ring; substantially as described.

17. A glass-receptacle having a removable blowing device supported beneath a hole therein and arranged to direct a cutting-off jet against the molten glass; substantially as described.

18. A receptacle for molten glass having a hole in its bottom with a blowing device for cutting off, and an internal stopper arranged to cut off the glass from the bottom hole; substantially as described.

19. A receptacle for molten glass having a blow-plate removably secured to its bottom, and connected to a source of fluid under pressure; substantially as described.

20. A receptacle for molten glass having a refractory nozzle in its bottom, a blow-ring below the nozzle, and air-escape ports between the ring and the nozzle; substantially as described.

21. A receptacle for molten glass having a bottom refractory nozzle and a blow-plate below the nozzle having a fluid-chamber with a central ring having non-radial slots; substantially as described.

In testimony whereof we have hereunto set our hands.

H. L. DIXON.
GEO. A. MARSH.

Witnesses:
H. M. CORWIN,
C. D. BYRNES.