

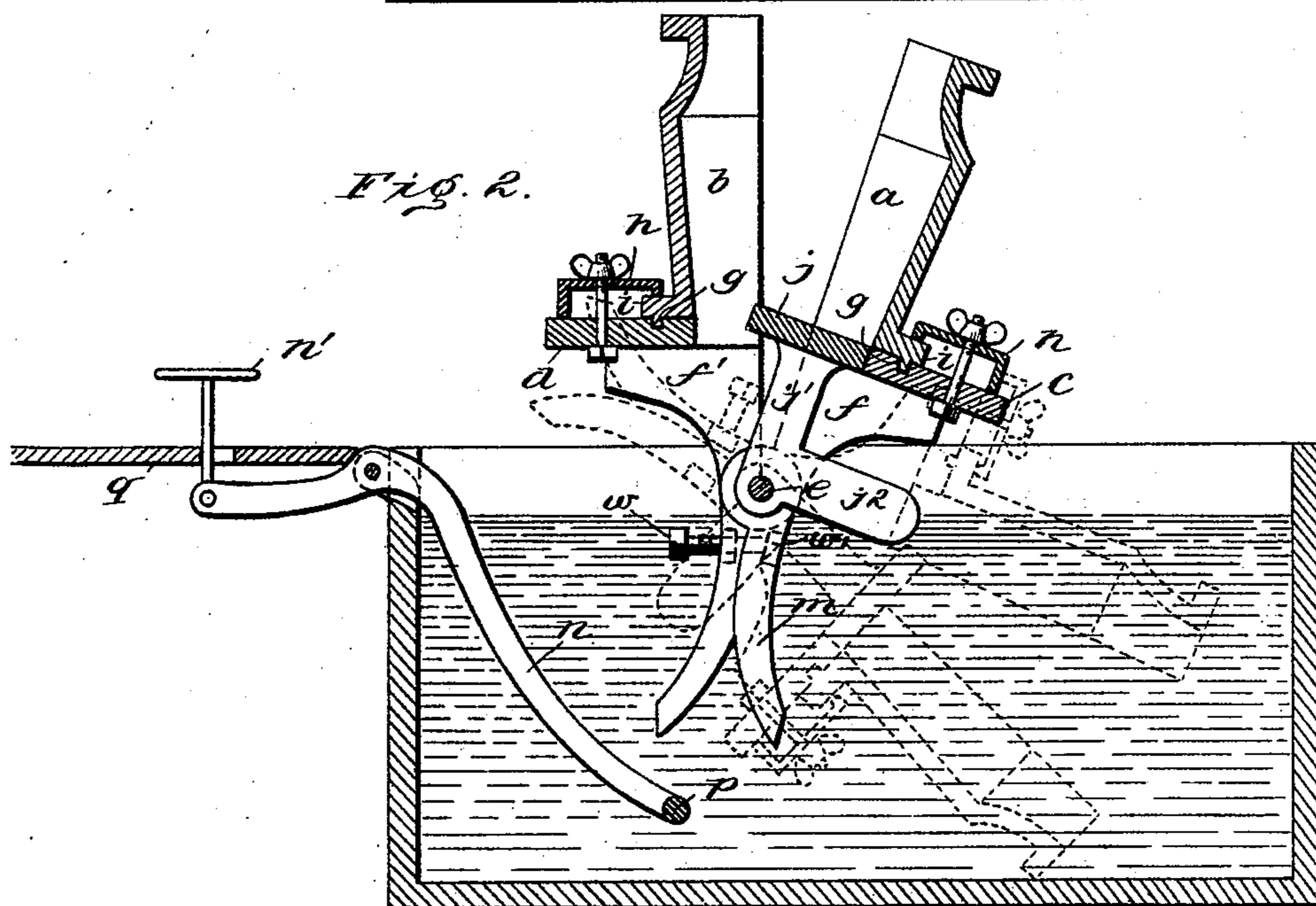
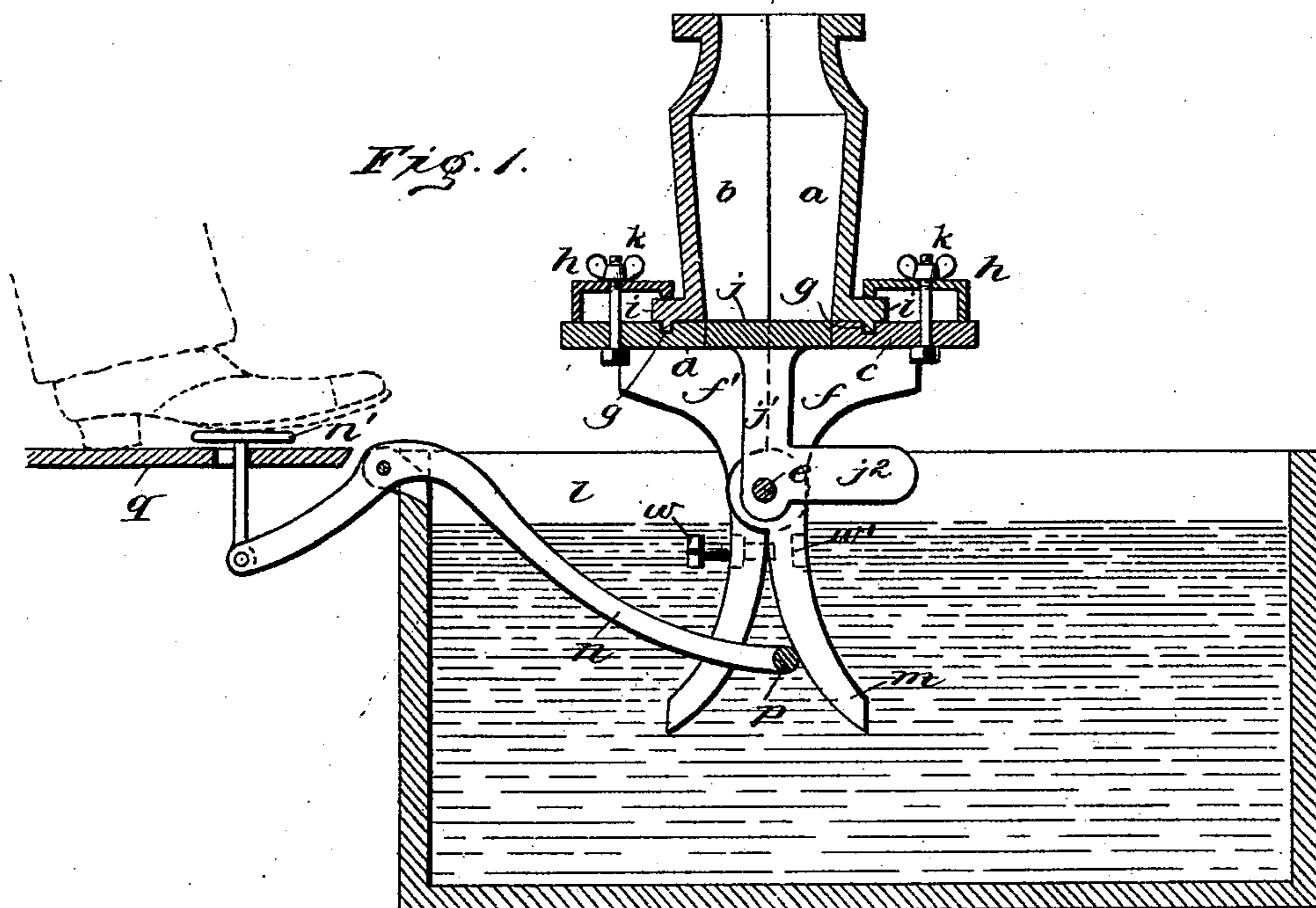
(No Model.)

2 Sheets—Sheet 1.

S. HIPKINS, Jr.  
MECHANICALLY OPERATED GLASS MOLD.

No. 498,116.

Patented May 23, 1893.



Witnesses  
Cary Johnson  
Woodbury Lowery

Inventor  
Stephen Hipkins Jr.  
By Johnson & Johnson  
his Attorneys.

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2 Sheets—Sheet 2.

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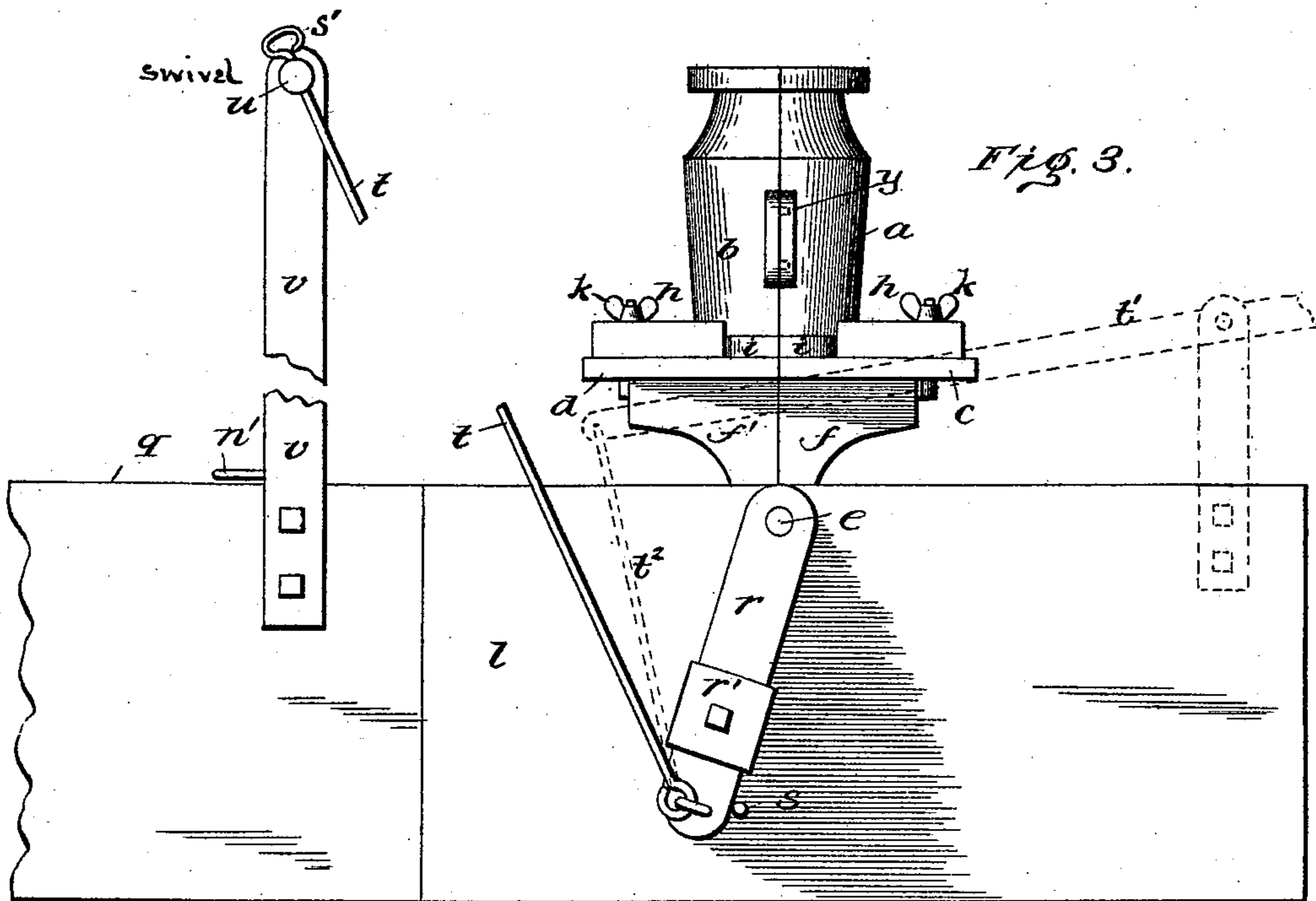


Fig. 4.

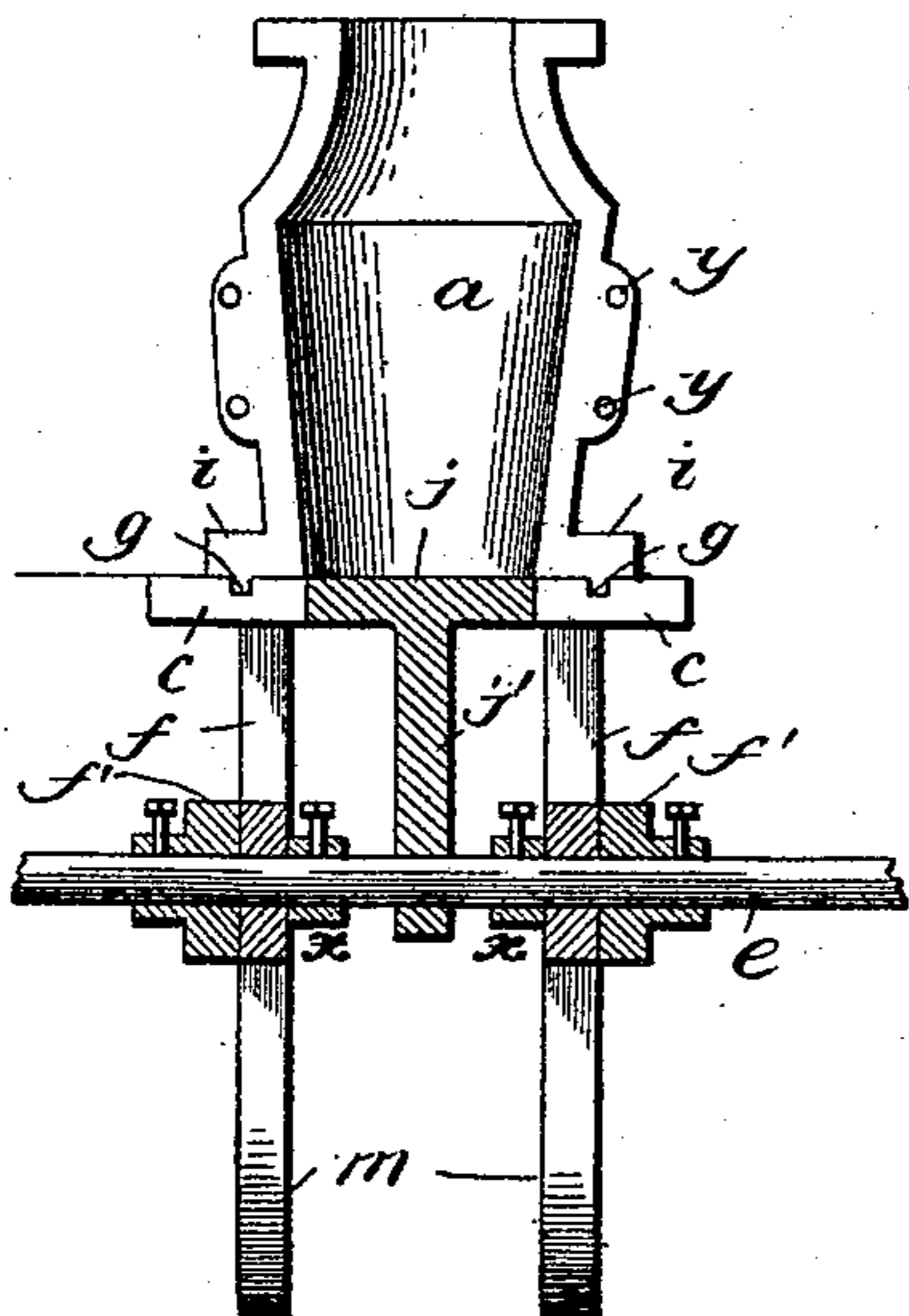


Fig. 5.

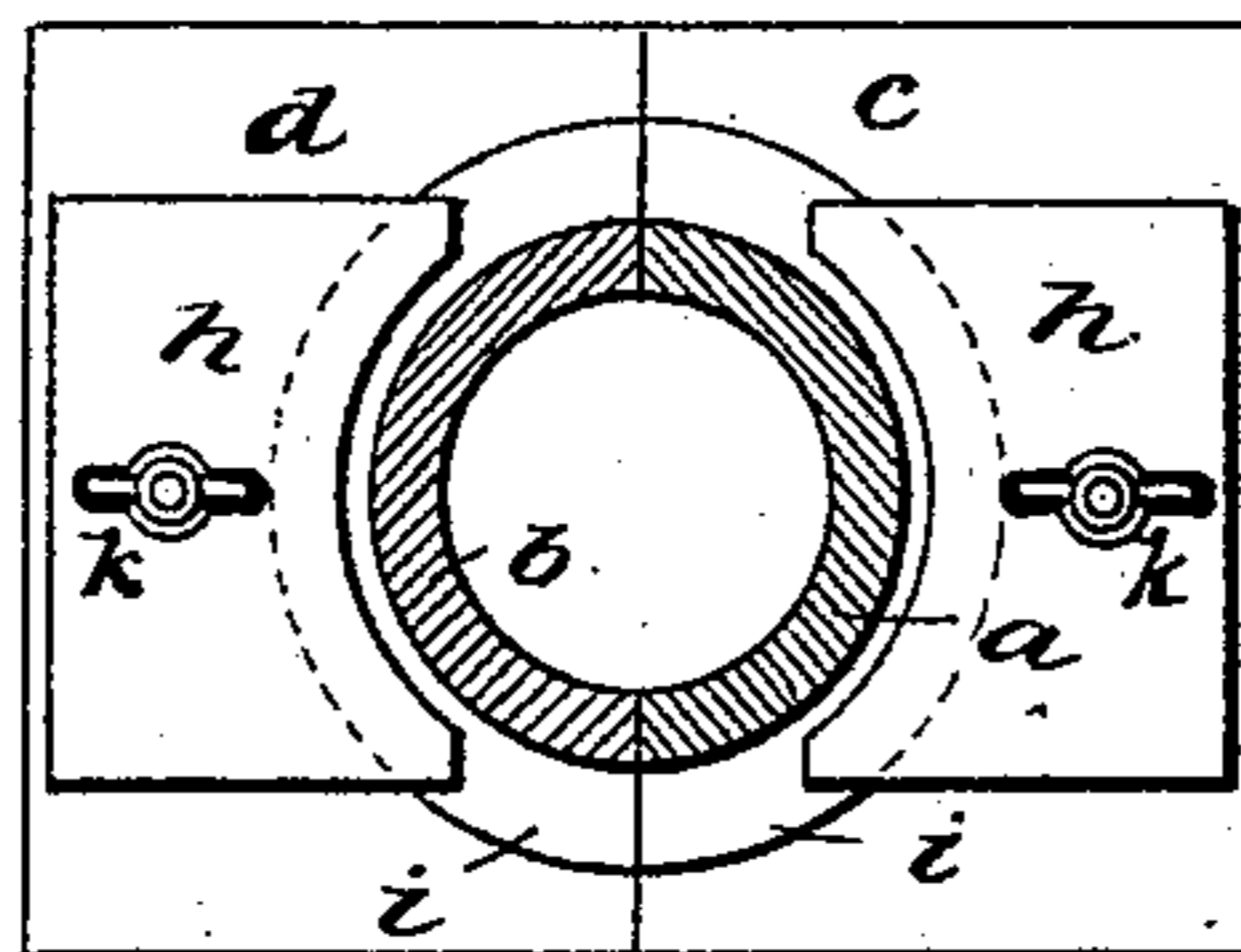
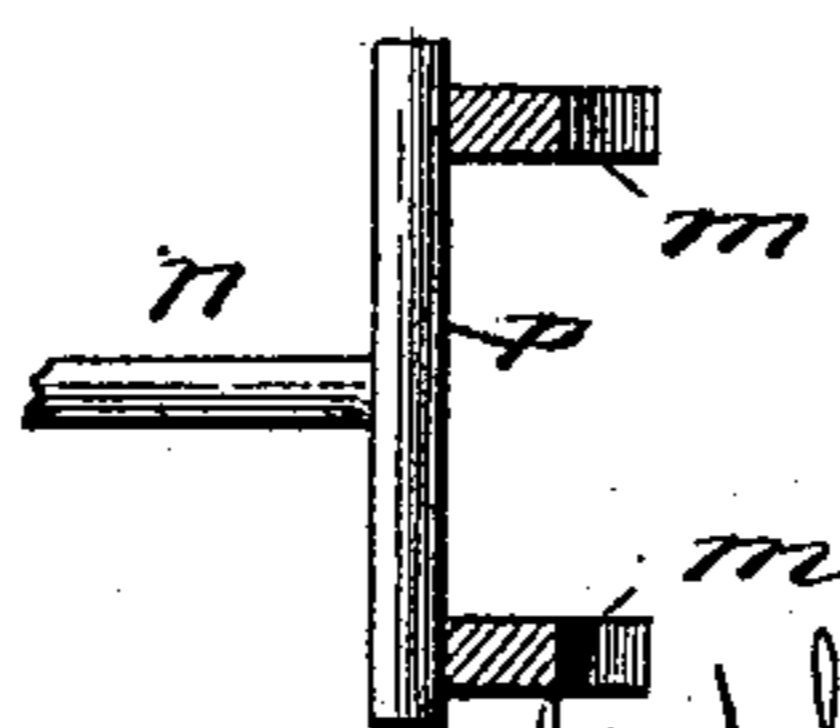


Fig. 6.



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# UNITED STATES PATENT OFFICE.

STEPHEN HIPKINS, JR., OF MARTIN'S FERRY, OHIO.

## MECHANICALLY-OPERATED GLASS-MOLD.

SPECIFICATION forming part of Letters Patent No. 498,116, dated May 23, 1893.

Application filed November 18, 1892. Serial No. 452,420. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN HIPKINS, Jr., a citizen of the United States, and a resident of Martin's Ferry, in the county of Belmont and State of Ohio, have invented certain new and useful Improvements in Mechanically-Operated Glass-Molds, of which the following is a description.

My invention is directed to improvements in mechanically operated paste-molds; and my said improvement consists in certain novel parts and combinations of parts which are particularly pointed out and described in the claims concluding this specification, and illustrated in the accompanying drawings, in which—

Figure 1 represents in vertical section a paste-mold embracing my invention, the mold being closed and in position it occupies for the blowing operation. Fig. 2 is a similar view the mold being shown in the position it occupies when open to receive the charge of glass, or to remove the blown article. It also shows by dotted lines the mold when turned down into the water. Fig. 3 is a side view showing the mechanical connections for turning the mold down into the water. Fig. 4 is a vertical section of the mold as mounted upon the loosely supported table part. Fig. 5 is a horizontal section of the mold, and the table clamps which secure its sections to the separate table parts; and Fig. 6 shows a detail view of the treadle for acting upon the cam-legs of the loosely mounted table-part.

My improvement embraces provision of construction whereby a divided mold is closed by the action of a treadle operated lever and opened by the action of gravity on one of the mold sections. It embraces provision whereby one section of the mold is held in operative position by the action of gravity and sustained automatically in such position. It embraces provision whereby the blower is enabled to control the mold to open and to close it and to turn it down into the water; and it embraces among other novel features provision whereby the mold sections are rendered interchangeable upon separate hinged table parts to adapt the mold for the production of different articles.

The mold may be of the usual divided construction for opening and closing it in the

operation of blowing glassware, such as tumblers, goblets, bottles, decanters and set pieces, and it may be adapted for blown paste work, or it may be used for iron mold blowing.

In the drawings I have shown special adaptation for working what is known as paste molds and it is opened and closed by the vertical swinging movement of one of the sections to permit the plastic glass to be put into the mold and for the removal of the blown article. I make the mold sections *a* and *b* separate and independent of each other and I mount each section upon a separate table-part *c* and *d*, so that when closed they will have a matching relation. The table parts are each mounted upon a horizontal rod *e* beneath the table parts by suitable depending brackets or end pieces *f* and *f'* so that the table parts will be independent of each other each carrying in fixed relation thereto a section of the mold. These mold sections are confined in place by tongues and grooves *g* and suitable clamps *h* secured to the table parts so as to engage a flange *i* at the base of each mold section to clamp them firmly in place and allow them to be quickly and easily removed and replaced by others of different size and form suited for different articles. This construction permits of the use of different molds interchangeable on the same hinged table parts, and gives the advantage of producing at comparatively little expense a number of molds for use on the hinged table parts for different articles.

One of the table-parts *c* is mounted to turn loosely upon its supporting rod *e*; while the other part *d* is fixed to said rod, so that it must turn with it, the purpose of which I will presently state. The meeting edges of the table-parts are cut out at the bottom line of the molding wall and I provide an independent bottom *j* for the mold and support it in proper position therewith by a depending stem *j'* loosely mounted on the rod to which the table parts are hinged. This depending stem *j* has a weight *j<sup>2</sup>* so as to cause the bottom to move automatically with that section *a* of the mold which opens, as if it was a fixture with it, for a purpose which I will presently state. The clamps *h* can be secured to the table-parts by screws *k* and constructed to have a firm binding action upon the mold

section around its base *i* and permit the removal of the mold when desired.

The rod *e* which forms the hinge of the table parts is mounted in suitable bearings upon a tank *l* open at the top for containing water, into which the mold can be turned down and immersed. In this dipping operation the table parts turn with the mold to wet its interior pasted walls for a purpose well understood in the art, and the provisions for effecting this operation I will presently describe. As I have stated one part of the mold table *c* is mounted to turn loosely upon its rod *e* to open and to close the mold and the provision for effecting this closing operation I will now describe. The mounting brackets *f* of this opening and closing mold section are extended below its hinge forming rod and form curved legs or cams *m* standing away from the hinge. At the end of the tank I pivot a treadle *n* so as to extend down into the tank and terminate in a cross bar *p* adapted to act upon the cam legs to push them out so as to turn the table part *c* to close the mold section *a* carried by it with the mold section *b* carried by the other table part. For this purpose the outer end *n'* of the treadle is in position to be depressed by the blower, who stands on a platform *q* at the end of the tank. As the weight of the mold section *a* and its loosely mounted table part *c*, tends to constantly open the mold, this treadle operated mold section will therefore automatically open when the treadle is released from the foot of the blower to allow the removal of the blown article and the placing of the molten glass into the mold. The blower then depressing the foot rest *n'* of the treadle, closes the mold by means of the cam legs, and holds it closed while blowing the article in the mold. As both the mold section and their table parts are free to be turned together for the purpose stated, I provide for supporting and holding that section *b* of the mold which is carried by the table part *d* which is fixed on its hinged rod *e* in a vertical position against the pressure of the treadle operated mold section *a* during the operation of blowing, and also while the mold is being opened and closed. This provision consists of a weighted arm *r* fixed to and depending from the hinged rod *e* and a fixed stop *s* against which said weighted arm rests to hold its connected mold section in its normal vertical position. For this purpose the weight *r'* of said depending arm *r* and the tendency of its connected mold section and table part to open or turn back from its vertical position serves to hold the mold section firmly during the operation of blowing. This counterbalancing provision permits the mold to be turned down into the water in the tank after the blown article is removed to wet the mold before again inserting a partly blown glass bloom. Such provision also serves to automatically bring the mold up again into working position by the descent of its weighted

arm. It will be seen therefore that the pressure of the blower's foot upon the treadle to close the mold is transferred through the mold and its weighted arm *r* against the stop *s* of the latter to sustain the mold in its upright position while being held closed, with sufficient force to counteract the interior pressure due to the expansive force of the glass under the pressure from the blow pipe, as seen in Fig. 1.

It is important to notice that the treadle has no fixed connection with the table cam legs *m* or with the mold and that it is so mounted that its cam acting end *p* will hang down into the tank out of the way of said cam legs when the mold is turned down into the water as seen in Fig. 2.

The provision for turning down the mold to dip it into the water I will now describe referring to Fig. 3. A rod *t* pivotally connects the free end of the weighted arm *r* and extends up through a hole in a swivel plug *u* in the upper end of the standard *v* within convenient reach of the blower, so that he can by pulling up the rod *t*, pull up the weighted arm *r* and thereby turn down the mold for the purpose stated, as seen in Fig. 2 by dotted lines. It is evident that the connection of the hand operated rod *t* with the swivel plug *u* will allow the weighted arm *r* to be raised and turned over in the direction of the mold sufficiently to carry the mold down under the water and to bring the mold up again into position to receive the ball or bloom of hot glass, by a positive movement of the weighted arm and independent of its gravity, which will also act automatically to raise the mold.

To limit the opening movement of the mold to receive the ball or bloom of glass I provide the brackets of the table parts with a suitable stop below the hinge forming rod, which, as shown in Figs. 1 and 2, may be an adjustable screw *w* on one bracket acting against a lug *w'* on the other bracket. The brackets of the table part *c* which is loosely mounted on the rod, are made to have a firm fitting on said rod between the collars *x* so as to prevent this table part from moving out of register with the other table part, as seen in Fig. 4. As a supplemental means of maintaining the mold sections in matching relation when closed, I provide one section with dowel pins *y* to engage holes in the other section so that the mold sections can have no lateral movement upon each other when closed.

It is important to notice that the mold sections are not hinged together as in paste molds hitherto constructed, but that they are each mounted upon an independent hinged table part, one of which parts is fixed upon and turns with a hinge-forming rod; while the other table part is mounted to turn loosely upon said rod; and that each of said table parts has a separate controlling part having a specific function in operating the mold in a very advantageous way. It is also important to notice that the separate table parts

can be turned as an entirety with the mold to dip it in the water and that one of the table parts can be turned to carry one of the mold sections bodily away from the other for the purposes which I have stated. It is also important to notice that the mold when turned down into the water is kept open by the gravity of its loosely mounted section and is thereby more quickly cooled.

10 A sufficient quantity of glass upon a punty partly formed having been put into the mold it is then closed by the action of the treadle which is brought in contact with the cam legs, and it is by pressure upon said treadle that  
 15 the mold is kept closed while the article is being blown. By removing pressure from the treadle the mold will open by gravity, the opening section carrying with it also by gravity, the bottom of the mold. The blower by  
 20 means of the hand lever then tilts or turns down the mold while open so as to immerse it into the water in the tank. This gives the blower complete control over the mold. The mold having been wetted is returned to its  
 25 normal position and so held by the action of a counterweight.

It will be understood that while I have described and shown the mold as having a separate bottom, each mold section may have its  
 30 own bottom-part; and I may provide any suitable means for securing the separate mold-sections to the separate table parts, that will permit of the convenient removal and replacement by others of the mold sections for different work. It is also obvious that I may  
 35 dispense with the weight  $r'$  of the arm  $r$  and also with the stop  $s$ , and use the band rod  $t$  connected to the end of said arm and the swivel plug  $u$  of the fixed stud  $v$ , as the means  
 40 of holding said arm against the pressure exerted on the mold by the treadle to support the mold in operative and closed position. In such case the end of the rod  $t$  will form the stop  $s'$  at the swivel plug and thus support  
 45 both the arm  $r$  and the mold in the positions seen in Fig. 3. This gives the advantage of using the rod  $t$  by hand for turning the mold down into the water, raising it up and supporting it firmly in operative position, all by  
 50 the blower; however, these three functions may be performed by the lever  $t'$  (Fig. 3).

I claim as my invention—

1. In a mechanically operated mold, the combination with a rod mounted to turn loosely  
 55 in a fixed frame part, of separate table parts, one fixed on and turning with said rod, the other loose and turning thereon, the separate mold sections upon said table parts, suitable means for both turning and controlling said  
 60 loosely mounted table part on said rod, and suitable means for maintaining both table parts and their mold sections in operative relation and turning them both together on said rod, substantially as described.

65 2. In a mechanically operated glass mold, the combination, with a rod mounted to turn loosely in a fixed frame part, of the table parts

mounted on said rod, one fixed upon and turning with it, the other loose and turning thereon, the separate mold sections upon said table  
 70 parts, a treadle device for closing said mold, and suitable stops on the table parts for limiting the opening movement of the loosely mounted mold part and a suitable stop for maintaining the other mold part in operative  
 75 position, substantially as described.

3. In a mechanically operated paste-mold, the independent mold sections, and the independent table parts, in combination with  
 80 clamps for securing said mold sections in fixed relation to the table parts, a horizontal rod on which one of said table parts is fixed and the other is loose, a weighted arm on said rod, a fixed stop for said arm, and a treadle  
 85 for closing said loosely mounted mold section, substantially as described.

4. In a mechanically operated paste-mold, the independent mold sections and the independent table parts carrying said mold sections, a horizontal rod on which one of said  
 90 table parts is fixed, and the other table part is loose, in combination with a separate bottom for the mold loosely mounted on said rod, and means whereby said bottom is caused to move with the opening of said loosely mounted mold  
 95 section.

5. In a mechanically operated paste-mold, the combination with the independent mold sections and the independent table parts, a  
 100 horizontal rod supporting said table parts, one being fixed and the other loose thereon, of a separate bottom part for said mold mounted loosely on said rod having a weight whereby said separate bottom is automatically  
 105 caused to move as a part of the opening section of the mold, substantially as described.

6. In a mechanically operated paste-mold an opening mold section and a separate mold  
 110 bottom part both moving together by gravity in opening the mold, in combination with a horizontal rod on which said mold sections and bottom are independently carried, and means adapted to close said opening mold section and bottom with the other mold section, substantially as described.  
 115

7. In a mechanically operated paste-mold, the combination, with a tank for containing water, a rod loosely mounted thereon, independent table parts each carrying an independent mold section, one of said table parts  
 120 being fixed and the other loosely mounted on said rod, a stop for said arm fixed on said tank whereby to maintain that mold section which has a fixed relation to said rod, in operative position, a treadle for closing the  
 125 other mold section, and means for turning said mold down into the water, substantially as described.

8. In a mechanically operated mold, the combination with a tank for containing water,  
 130 of a rod  $e$  mounted to turn loosely in said tank, two independent table parts—one part  $c$  fixed to and the other part  $d$  loosely mounted on said rod, a divided mold, one section on

each table part, a weighted arm *r* fixed on said rod, and a stop *s* on said tank for holding said table part *c* and its mold section in their normal positions, a treadle for elevating the loosely mounted table part, and suitable connections with said weighted arm for turning said rod to turn down both table parts, for the purpose stated.

9. In a mechanically operated mold, the combination, with a tank for containing water, of a rod *e* mounted to turn loosely on said tank, two independent table parts, one part *c* fixed to and the other part *d* loosely mounted on said rod, a divided mold, one section on each table part, means for sustaining said table part *c* in its normal position, a stop fixed on the table parts to limit the automatic opening of one part thereof from the other, and means for closing said table part *c* with the table part *d*, substantially as described.

10. In a mechanically operated paste mold, an independent mold section controlled by a counter-weight for maintaining it in operative position, and an independent mold section controlled by a treadle for maintaining it in operative position with the weight controlled mold-section, in combination with means for positively turning said mold down into the water, and means for automatically returning it into operative position, substantially as described.

11. In a mechanically operated paste-mold, a tank for containing water, a rod loosely mounted across the open top of the same, a table part fixed on said rod, a mold section upon said table part, a matching table part loosely mounted on said rod and having a matching mold section, and also cam legs below said rod, a treadle adapted to act upon said cam legs, means connected with said rod for turning the mold down into the water, and means for holding said rod from turning when the mold is in operative position, substantially as described.

12. In a mechanically operated paste-mold, a divided mold one section whereof is held in operative position by the action of gravity, the other section being opened by the action of gravity, in combination with stops arranged to arrest and support each section against the action of such gravity, substantially as described.

13. In a mechanically operated paste-mold, a divided mold and a divided table for carrying the separate mold sections in matching re-

lation, means for securing the mold sections upon the separate table parts, and a clamp for each mold section, whereby the latter are rendered interchangeable for different work, substantially as described.

14. In a mechanically operated paste-mold, a divided mold, and a divided table therefor, and a rod on which the table parts are mounted, one of which table parts is loose upon said rod and is adapted to open by gravity within certain limits, the other table part being turned with and upon said rod by a positive movement to carry both parts with their attached mold sections into a water tank, by a positive movement, substantially in the way described.

15. In combination, in a mechanically operated glass mold, the independent table parts and a rod on which both are mounted, one being fixed and the other loose on said rod, each movable independently and both together on said rod, a weighted arm fixed on said rod, a fixed stop for the latter and a treadle engaging said loosely mounted table part, and means for immersing said mold, substantially as described.

16. In combination, in a mechanically operated mold, the independent table parts each having a mold section, and a rod on which both table parts are mounted one being fixed and the other loose on said rod, each movable independently and both together on said rod, the weighted arm *r* fixed on said rod, and operating connections with said weighted arm for immersing the mold, substantially as described.

17. The combination, with a two part mold, of an independent bottom automatically movable laterally with the opening movement of one of said mold parts, substantially as described.

18. The combination, with a two part mold the sections of which are bottomless with an independent bottom automatically movable laterally with the opening movement of one of said mold parts, and means for closing said mold, parts substantially as described.

In testimony whereof I have hereunto signed this specification in the presence of witnesses.

STEPHEN HIPKINS, JR.

Witnesses:

M. T. WILLIAMS,

CHAS. W. THORNGATE.