

No. 693,130.

Patented Feb. 11, 1902.

J. HALEY & H. H. BRIDGWATER.
MACHINE FOR FORMING GLASSWARE.

(Application filed Aug. 18, 1899.)

(No Model.)

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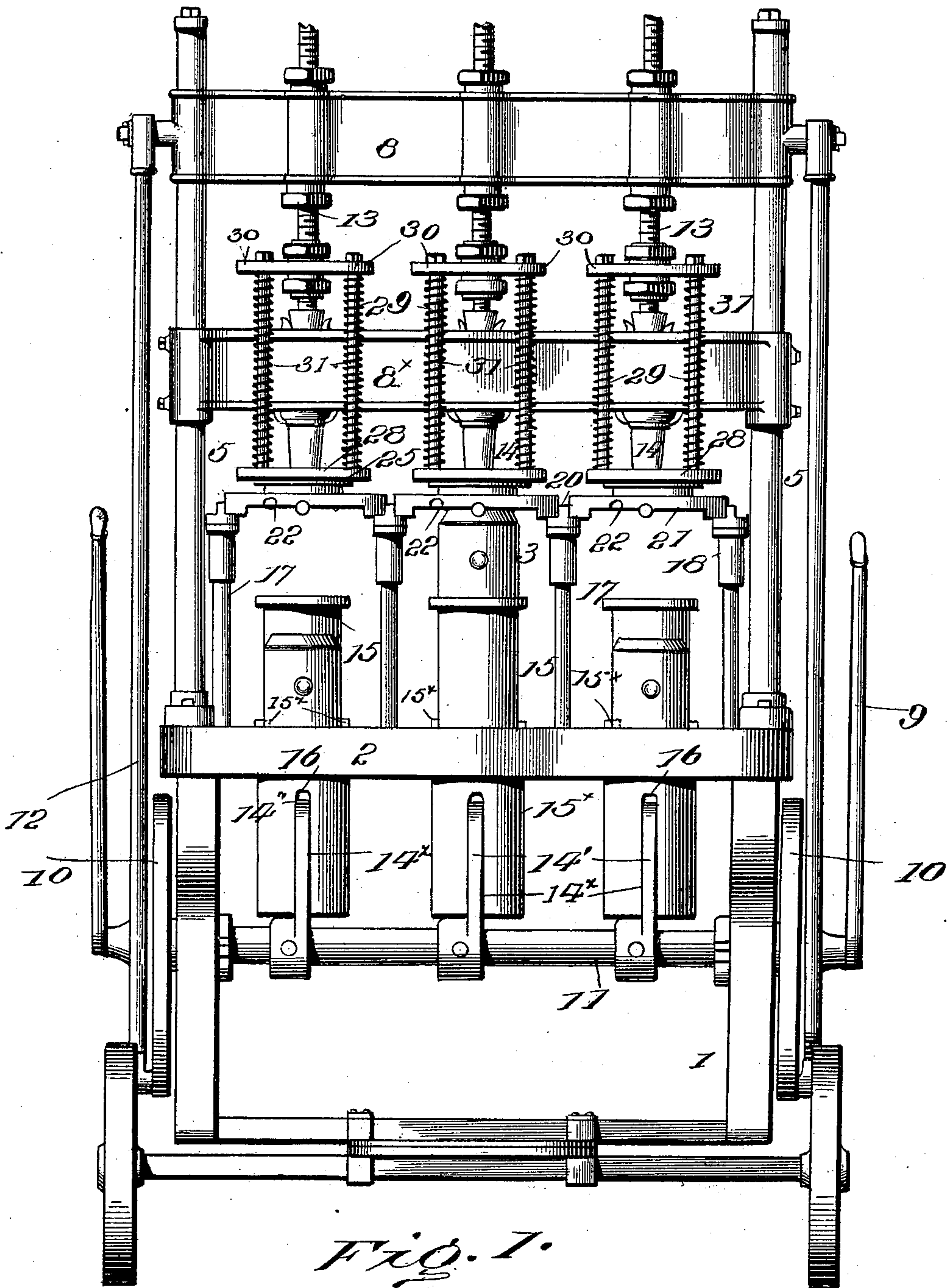


Fig. 1.

Witnesses

J. W. Gould.
D. W. Gould.

Inventors

J. Haley,
H. H. Bridgwater,
by *Wm. R. Gaslin* Attorney

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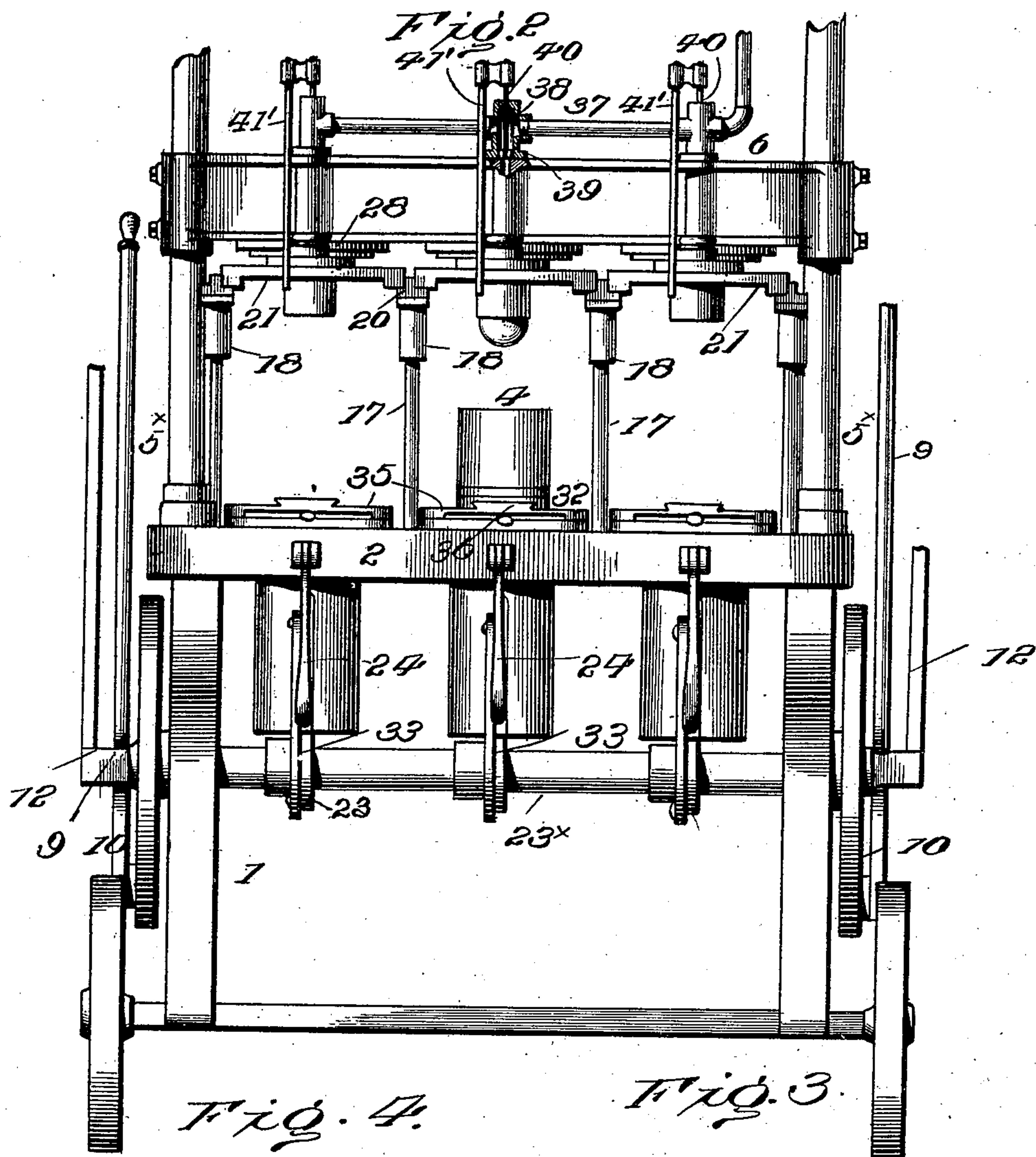
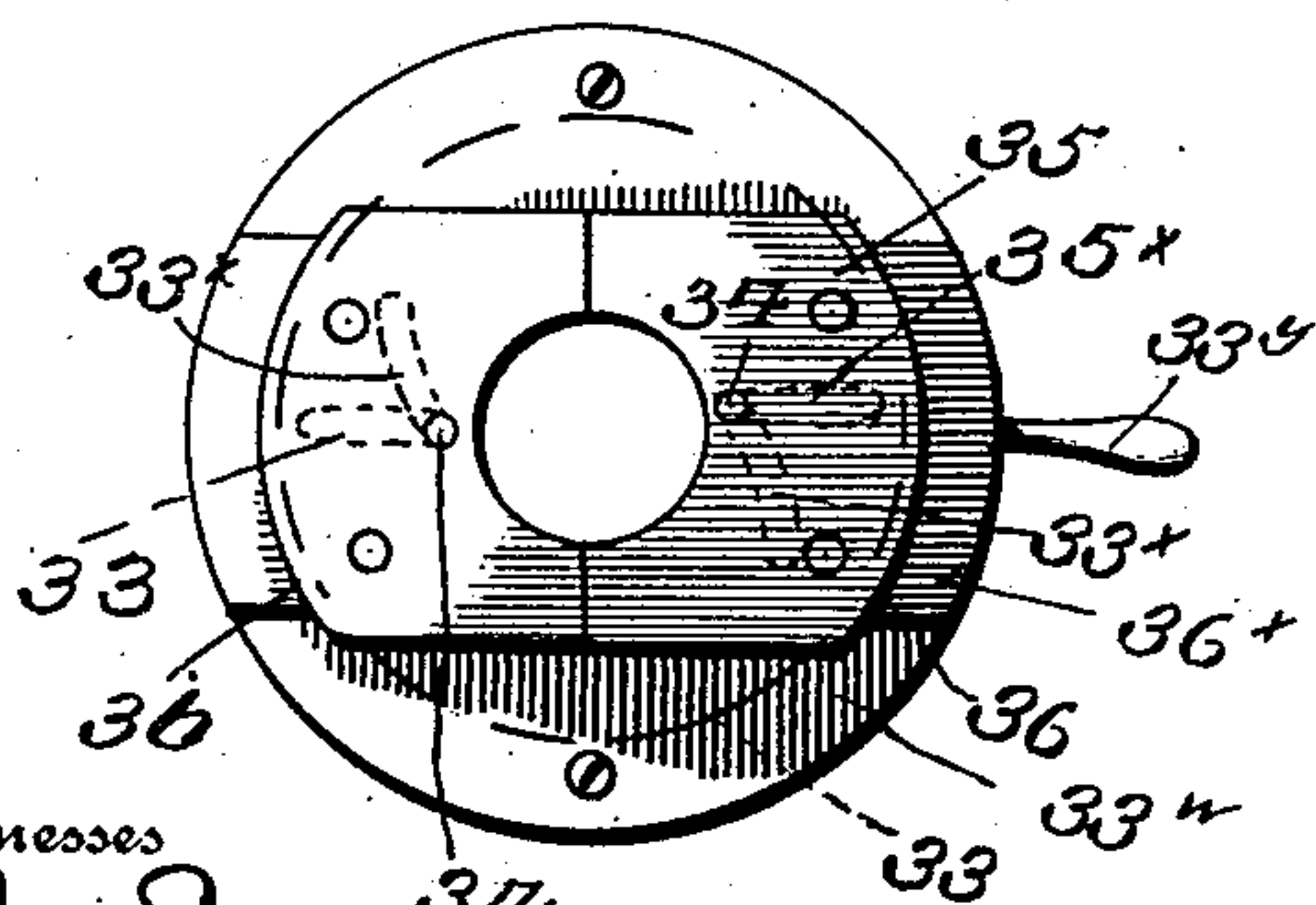
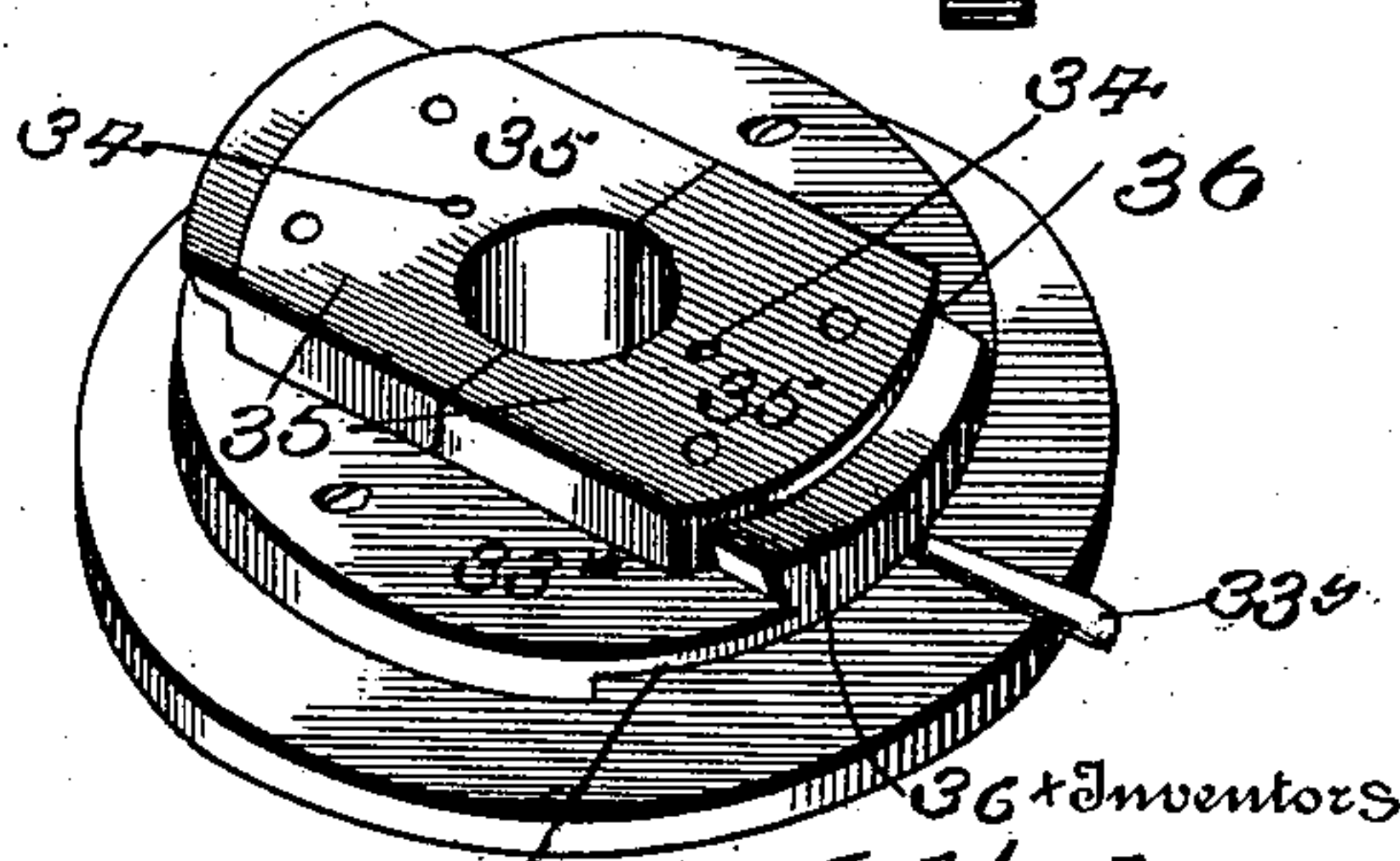


Fig. 4.

Fig. 3.



Witnesses
J. M. Smith
D. W. Gould.



Inventors
J. Haley,
H. H. Bridgwater,
by R. R. Carlin Attorney.

No. 693,130.

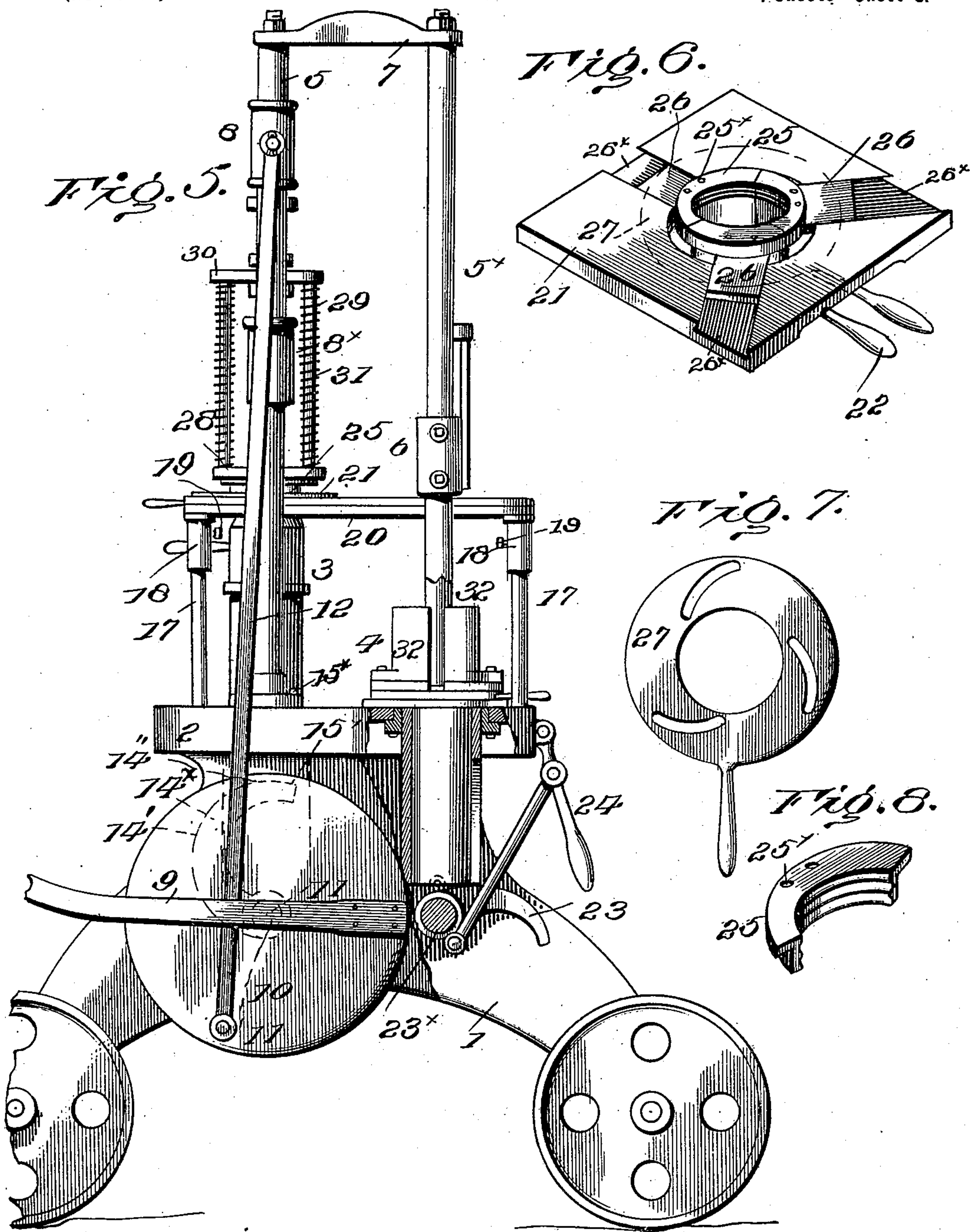
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4 Sheets—Sheet 3.



Witnesses

Jno. Irvine
D. W. Gould.

Inventors

J. Haley.

H. H. Bridgwater,

By R. R. Catlin Attorney

No. 693,130.

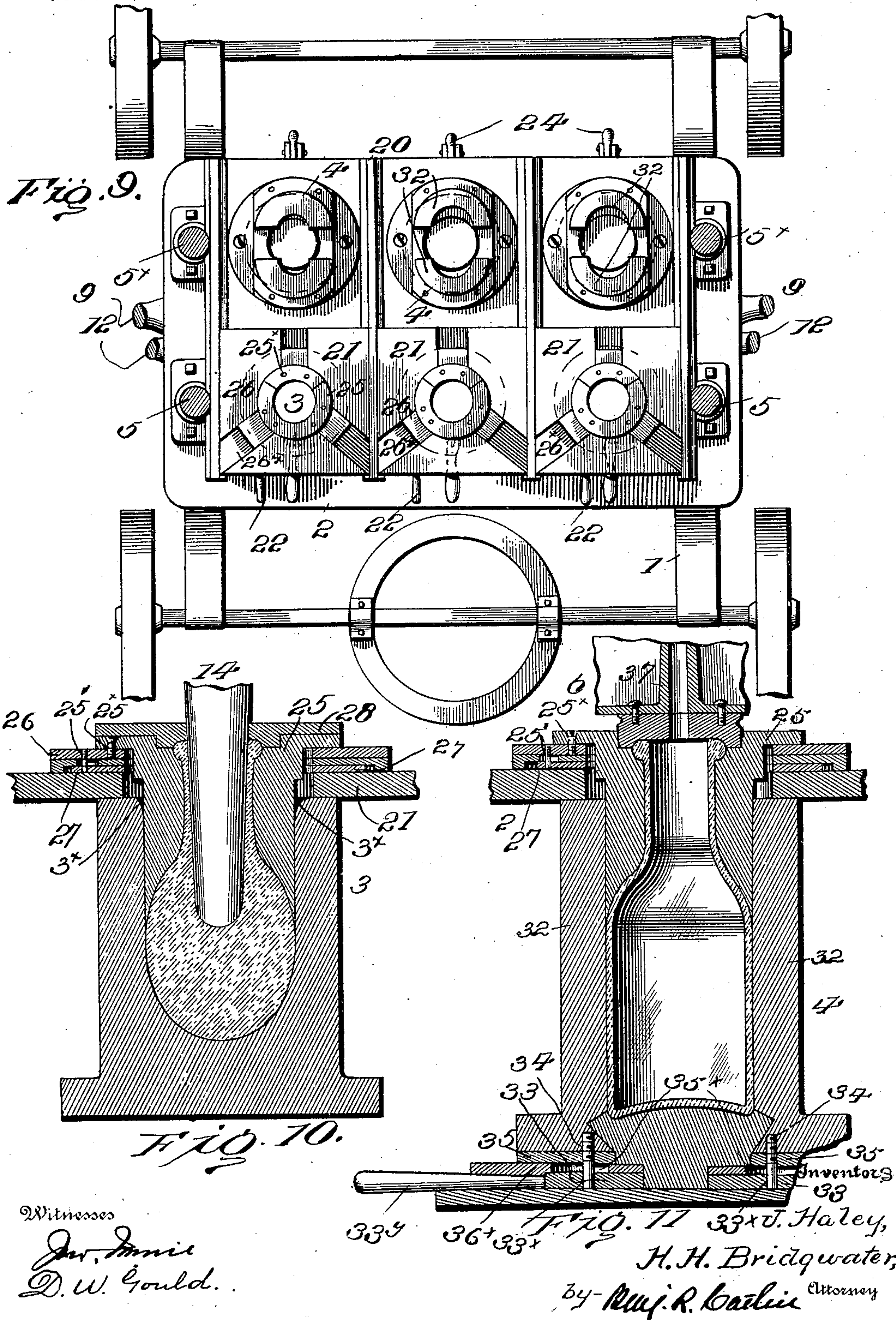
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(No Model.)

4 Sheets—Sheet 4.



UNITED STATES PATENT OFFICE.

JONATHAN HALEY AND HARRY H. BRIDGWATER, OF AKRON, OHIO,
ASSIGNORS TO THE AKRON GLASS & MACHINERY COMPANY, OF
AKRON, OHIO, A CORPORATION OF OHIO.

MACHINE FOR FORMING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 693,130, dated February 11, 1902.

Application filed August 18, 1899. Serial No. 727,719. (No model.)

To all whom it may concern:

Be it known that we, JONATHAN HALEY and HARRY H. BRIDGWATER, residents of Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Machines for Forming Glassware; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

The invention relates to machines for forming glassware, and is especially suitable for forming narrow-mouth ware, such as beer-bottles. It has for its object to increase economy, efficiency, and certainty of action and also to avoid undue complexity and cost of construction.

The invention consists in the devices and combinations hereinafter described and then pointed out.

In the accompanying drawings, Figure 1 is a front elevation of the improved machine. Fig. 2 is a partial rear elevation. Fig. 3 is a perspective of devices for supporting and moving the sections of a finishing-mold, the sections being omitted. Fig. 4 is a plan of the inner parts of the same. Fig. 5 is a side elevation, partly in section, of the machine. Fig. 6 is a perspective of the neck-mold sections and their supporting and operating devices. Fig. 7 is a plan of a cam-plate for moving the neck-mold sections. Fig. 8 is a perspective of one of said sections. Fig. 9 is a horizontal section of the machine, taken above the molds and showing the finishing-molds open and the neck-molds closed. Fig. 10 is a longitudinal section of a press and neck-molds. Fig. 11 is a longitudinal section of a blow or finishing mold and neck-mold.

Numeral 1 denotes the frame of a carriage, and 2 denotes a table or platform in which are supported a plurality of press-molds 3 and blow-molds 4. As shown, the latter are sectional, the press-molds being preferably entire. To the table are fixed posts or guides 5 and 5^x. The latter are connected by an adjustably-fixed cross-bar 6, which supports

blowing devices. The posts are also connected in pairs by top bars 7.

8 and 8^x denote cross-heads sliding on the posts 5 and operated at will by a lever 9, fixed eccentrically in the present instance to one of a pair of disks 10, fixed on a rocking shaft 11.

12 denotes connecting-rods eccentrically pivoted to the said disks and loosely connected to the cross-head 8, the construction being known in the art as a means for operating the plungers of glass-pressers.

The cross-heads 8 and 8^x are connected, and in the latter are adjustably secured a plurality of rods 13, each having a plunger 14, adjustably connected to its post and in proper alinement with a press-mold 3.

In operation the press-molds are raised from an inoperative to an operative position and then held stationary while a plunger is forced into one of them, the press-molds being subsequently lowered and the plungers retracted, these operations being effected by the movement of the lever 9, that draws down the cross-heads 8 and 8^x. The lifting of the press-molds to meet the plungers is effected by cams 14^x, fixed on the shaft 11, said cams having bearing-faces 14' and 14'' of suitable form to first raise the molds and then to rotate under them without further vertical movement of said molds. The parts or faces 14'' of the cams are circular and correspond to this latter part of the operation.

15 denotes pistons movable in cylinders 15^x to raise the molds, and 16 are slots in the cylinders for the passage of the rocking cams 14^x.

The blow-molds are raised by cams 23, loose on a shaft 23^x, which cams are separately actuated by levers 24.

On the platform 2 are fixed small posts 17, provided with adjustable parts, such as sleeves 18. Set-screws are denoted by 19, and immediately supported by said posts and directly by the sleeves are ways 20 for neck-mold-supporting plates 21. A handle for moving a plate, a neck-mold, and a pressed article suspended by said mold is denoted by 22.

25 denotes the sections of a three-post neck-mold fixed at 25^x to feet or supports 26, sliding

ing in ways 26^x. They are moved back and forth by a suitably-slotted plate 27, provided with a handle and having its slots engaged with pins 25', fixed in the sliding supports 26.

5 28 denotes one of several plates suspended by rods 29 from plates 30, fixed to rods 13. The latter support the plungers and connect the movable cross-bars 8 and 8^x in a usual manner.

10 When a plate 28 is lowered upon a plate 21 by the descent of the cross-heads which carry the supporting-rods, said plates 28 are held on the plates 21, while the plates 30 are moved down on said rods 29 as the plunger
15 enters the mold. Springs 31 are compressed by this operation and act as a cushion, and they subsequently react to lift the plates 30 on the rods 29.

20 The glass that has been pressed in a mold 3 is relieved from said mold by its descent when its lifting and supporting cams permit the pistons 15 to drop, and the plunger being lifted said glass or pressed article remains suspended by the neck and is moved by suit-
25 ably sliding the neck-mold plate under the blower and in situation to be embraced by a blow-mold.

The blow or finishing mold 4, composed of two sections 32, is closed upon the suspended
30 glass after the latter has been moved to a proper situation, as stated, by means of a rotating cam-plate 33, (indicated by broken circle in Fig. 4.) Said plate has slots 33^x to engage pins 34, fixed in the mold-sections
35 and mold-section supports 35, as shown in Fig. 11. The rotation of the plate 33 is effected by a handle 33^y, which, together with plate 33, plays in a recess 33^z, formed in the under side of the fixed plate 33^w, which latter
40 plate also has a raised part 36^x, having shoulders 36, over which the mold-section supports 35 fit, as best shown in Fig. 3. The proper movement of plate 33 moves the mold-section supports by means of the engagement of its
45 slots 33^x with pins 34, and said movement is kept in a right line by the shoulders 36, the pins 34 also moving in slots 35^x, situated in plate 33^w.

37 denotes a pipe communicating with a
50 source of air under pressure, and 38 are branches to discharge air into the pressed glass after its transfer to and inclosure by the blow-mold sections.

39 is a valve, one for each blowpipe, to control the air-blast. The valve-stem 40 is connected to an adjustable rod 41', depending in the ascending path of the blow-mold and adapted to be lifted by the ascent of the said mold when forced up by a cam 23, acting on
60 a piston 15. Upon the descent of said mold the valve is closed by air-pressure.

To charge the metal into a press-mold, the latter is drawn off from the upper end of a piston 15 and from between suitable stops,
65 such as 15', on the table 2 in front, and the glass dropped therein. The mold is then pushed back against the stops and the press-

mold raised, so that it embraces the previously-closed neck-mold, the upper edge of the press-mold being preferably chamfered, 70 as indicated at 3^x. As the mold 3 is pushed up it forces the metal into the neck-mold. The descending plunger opens the bottle-neck and expands the glass laterally into engagement with the neck-mold, so that upon 75 dropping the body of the press-mold and lifting the plunger the neck-mold and partially-formed article can be slid back to be inclosed by the blow-mold, as above explained. The operator who manipulates the blow-mold de- 80 vices having finished the article lowers the mold, opens both sectional molds, removes the finished article, closes the neck-mold, and returns it to the front.

It will be understood, although all the press- 85 mold pistons are simultaneously lifted, that in practice but one press-mold will be in situation to be raised, the others being on the front part of table 2. Obviously a larger number of press-molds could be provided and 90 two or more press-molds simultaneously operated.

The construction provides for dropping metal into a wide (or body) part of a press- 95 mold and subsequently lifting said mold, with the effect to force the dropped metal into a narrow neck-mold, and this is considered important. The locking of the neck-mold sections by the raising of the body of the press- 100 mold is an advantageous feature, as also is the removal of the press-mold, which is entire, from the partially-formed article and simultaneous lifting of the plunger, whereby the article is free to be carried by the neck- 105 mold in a horizontal line. The combination including the press-mold lifting-cams, so formed as to push up the mold-lifting pistons to a suitable height and then support the pistons and their corresponding press-molds in a state of rest while the plunger opens the 110 metal thus forced up into the neck-mold, is especially important.

The simplicity and certainty of the neck- 115 mold-closing devices and also of the blow-mold-closing devices are characteristic of the improvement, also the upward pressure of the various sectional molds against fixed parts of the machine, whereby special locking devices for the sections are rendered unnecessary, and also the four-post construc- 120 tion combined with suitable cross-bars, whereby both the press and blow molds are supported and operated in close proximity without a rotating table. It is obviously incidental to the latter feature of construction 125 that any number of molds may be used by simply lengthening the table and multiplying the devices. It is further obvious that the machine is adapted, with suitable modification of the neck-molds, for the manufac- 130 ture of wide-mouth vessels.

Having described our invention, what we claim is—

1. The combination of a press-mold, a cam

for elevating said mold, the cam being formed with a part concentric with its axis to hold the mold at rest in an operative position, a vertically-movable plunger and means to depress the plunger while the mold is at rest.

2. The combination of a press-mold, a neck-mold, a plunger, and means for moving the press-mold to the neck-mold to partially form the neck of the article and subsequently moving the plunger to the neck-mold and press-mold to initially form the interior of the article.

3. The combination of a press-mold, a neck-mold, a plunger, a cam for moving the press-mold to the neck-mold, and means for subsequently depressing the plunger to the neck-mold and press-mold, said cam and plunger-operating mechanism being controlled and operated by a single lever.

4. In combination, a press-mold, and a neck-mold adapted for coöperation therewith, said neck-mold having depending extensions adapted to embrace the article below the neck, whereby the article is rigidly supported when suspended solely from the neck-mold.

5. The combination of a neck-mold carrying the partially-formed article, a finishing-mold, means for elevating said finishing-mold to embrace the partially-formed article, and blowing apparatus automatically set in operation by the elevation of the finishing-mold.

6. The combination of a neck-mold carrying the partially-formed article, a finishing-mold, means for elevating said finishing-mold to embrace the partially-formed article, and blowing apparatus automatically set in operation by the elevation of the finishing-mold,

and automatically shut off in the lowering of the finishing-mold.

7. The combination of a neck-mold carrying the partially-formed article, a finishing-mold, means for elevating said finishing-mold to embrace the partially-formed article, and suitable blowing apparatus, automatically controlled by the operation of the finishing-mold.

8. The combination of a press-mold, a sectional neck-mold, a plunger, and means for moving the press-mold to the neck-mold to lock the sections of the neck-mold together and partially form the neck of the article, and subsequently moving the plunger to the neck-mold and press-mold to initially form the interior of the article.

9. In combination, a press-mold, a neck-mold adapted for coöperation therewith, said neck-mold having depending extensions adapted to embrace the article below the neck, and means for elevating the press-mold to embrace the neck-mold extensions, said press-mold being chamfered to insure registry with said extensions.

In testimony whereof we have signed this specification in the presence of the subscribing witnesses.

JONATHAN HALEY.
H. H. BRIDGWATER.

Witnesses to Haley's signature:

BENJ. R. CATLIN,
G. W. BALLOCH.

Witnesses to Bridgwater's signature:

HENRY FORREST,
WM. M. WISE.