No. 671,757. Patented Apr. 9, 1901.

T. COLEMAN, JR.

MECHANISM FOR MANUFACTURING GLASSWARE.

(Application filed Apr. 3, 1899.)

(No Model.) 4 Sheets—Sheet 1.

FIG. 1.

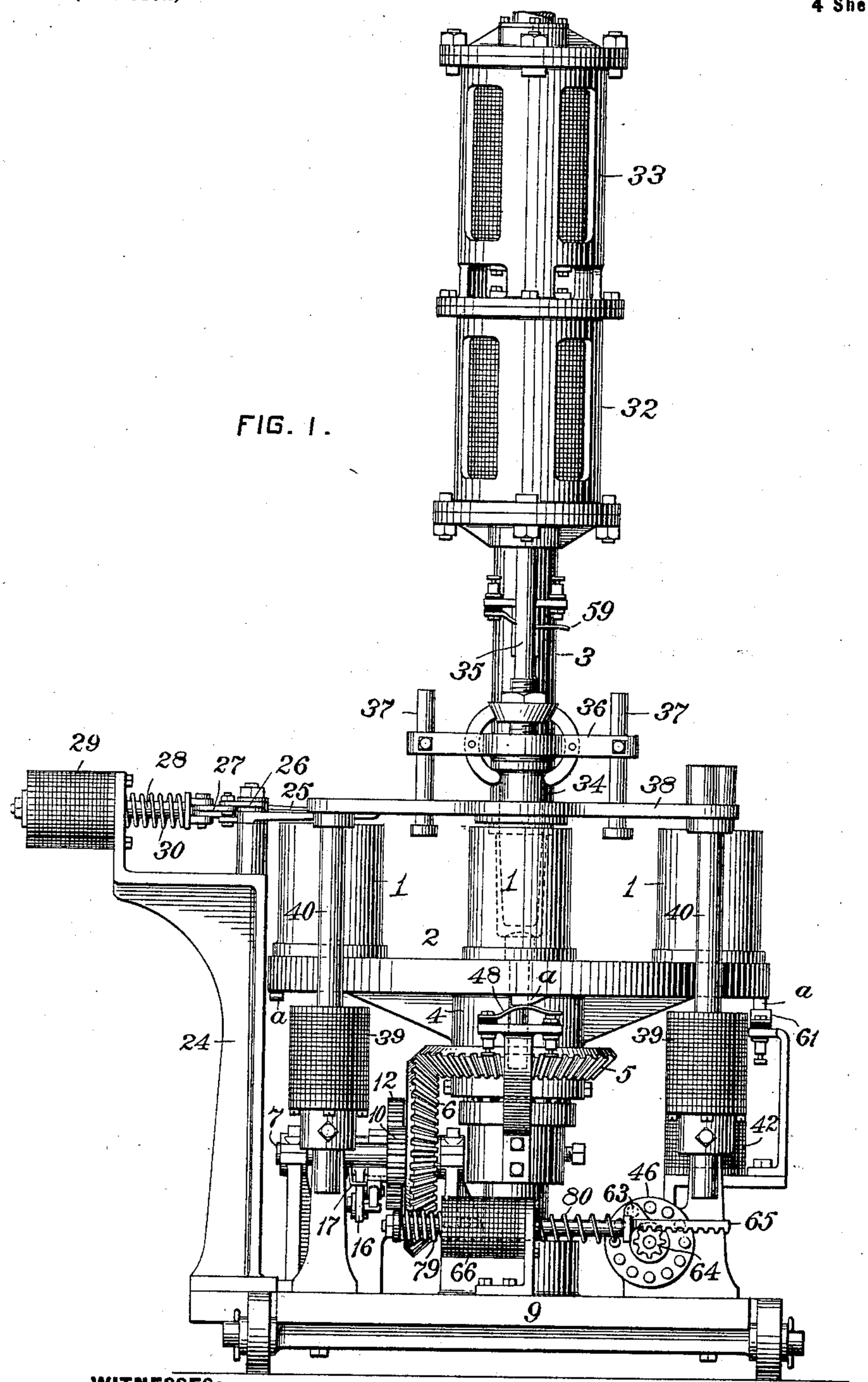

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FIG. 7.

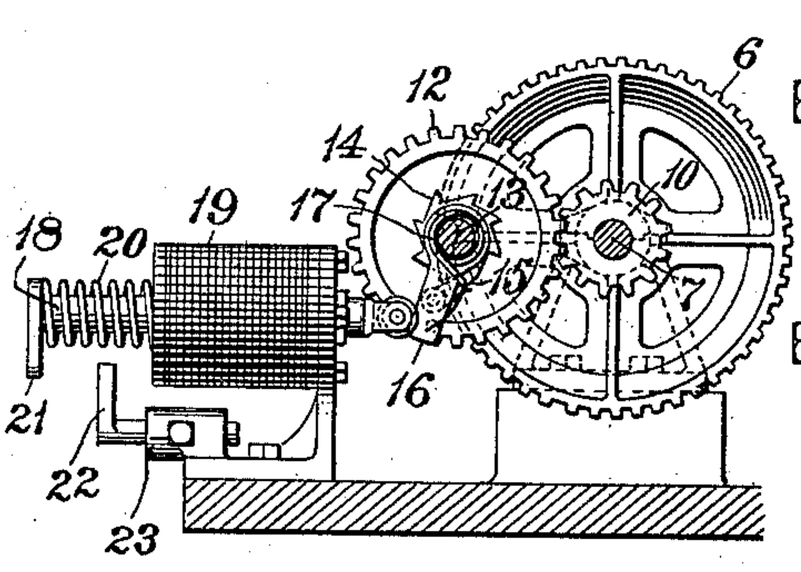

FIG. 2.

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FIG. 3.

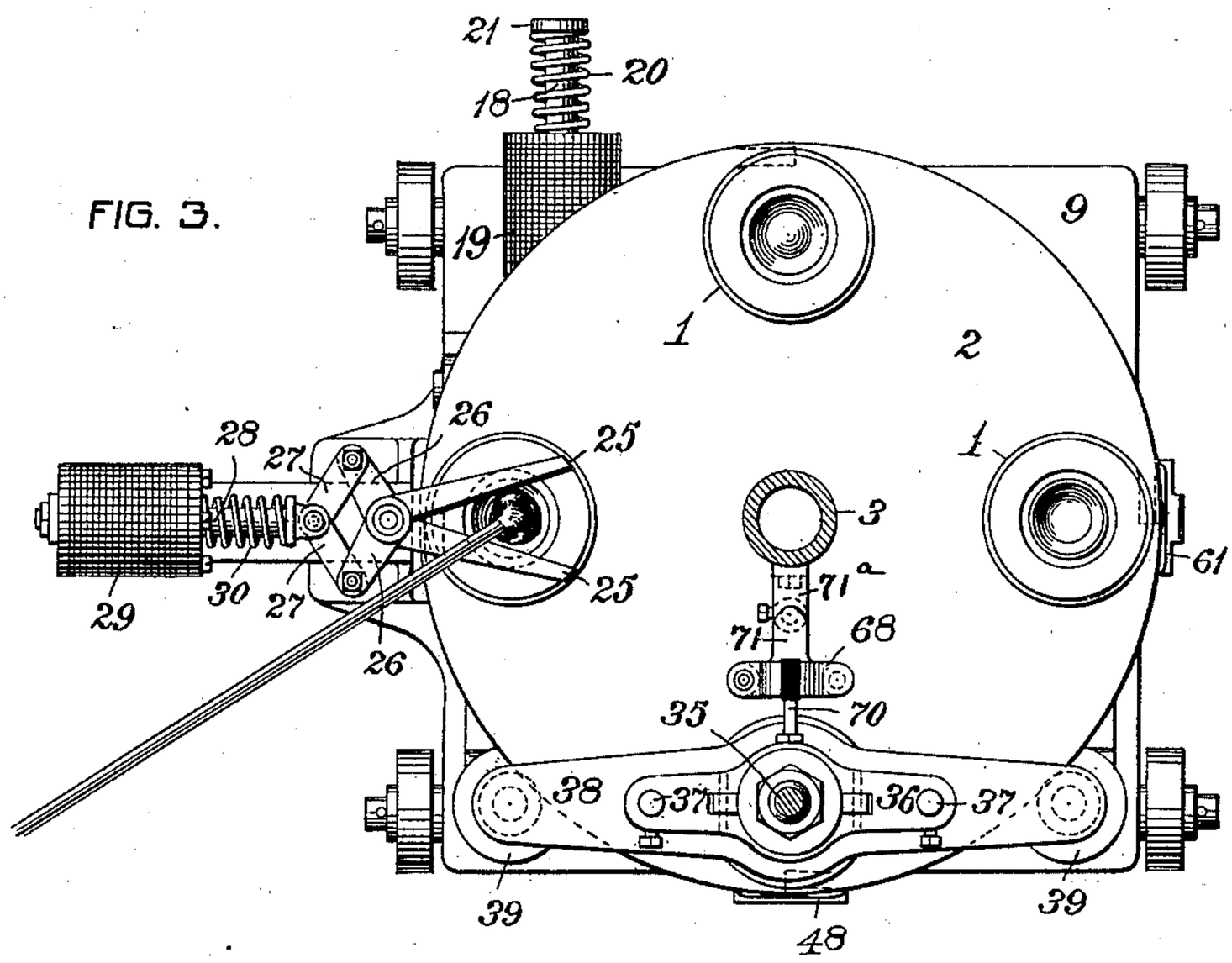

FIG. 4.

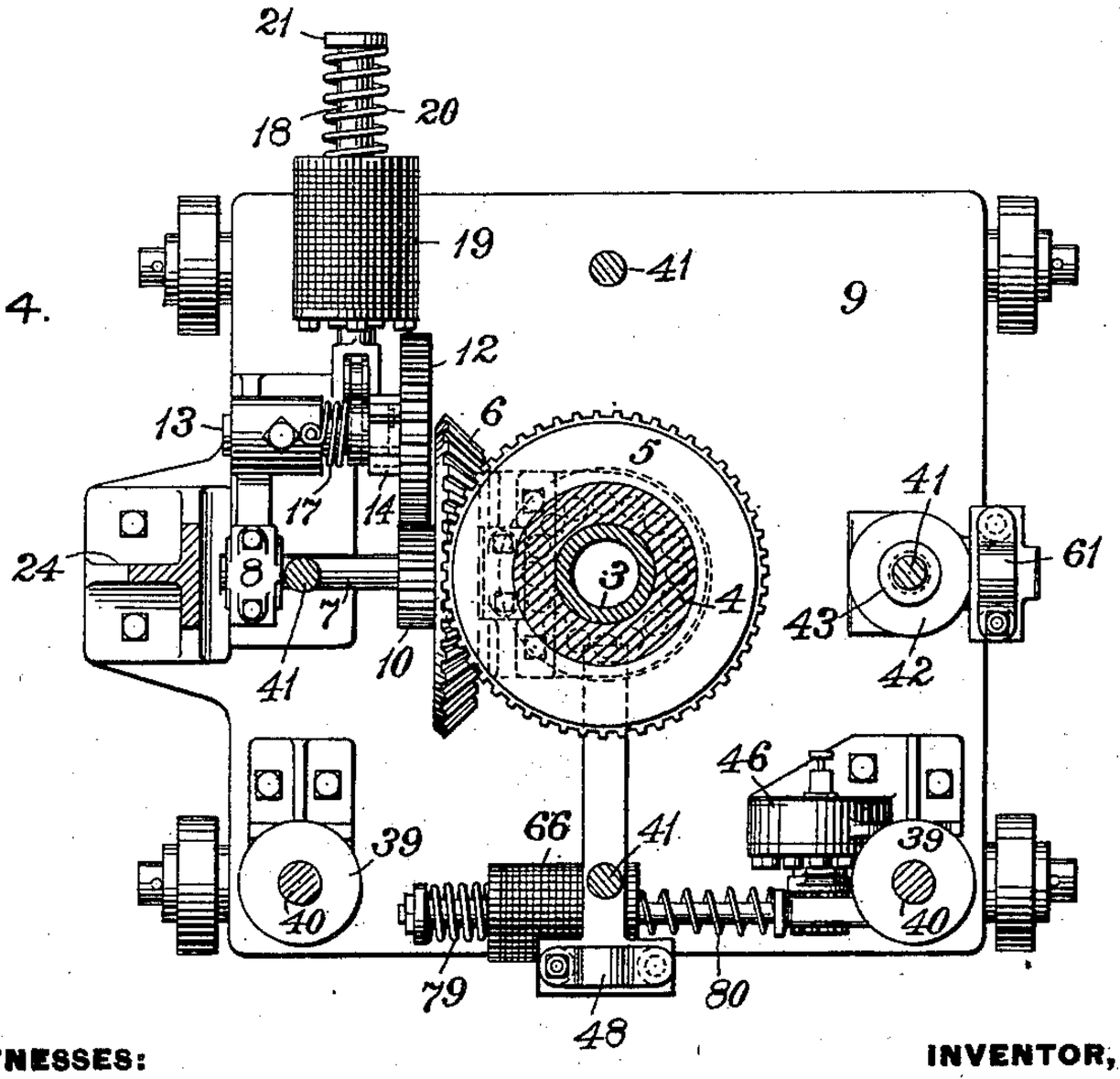

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FIG. 5.

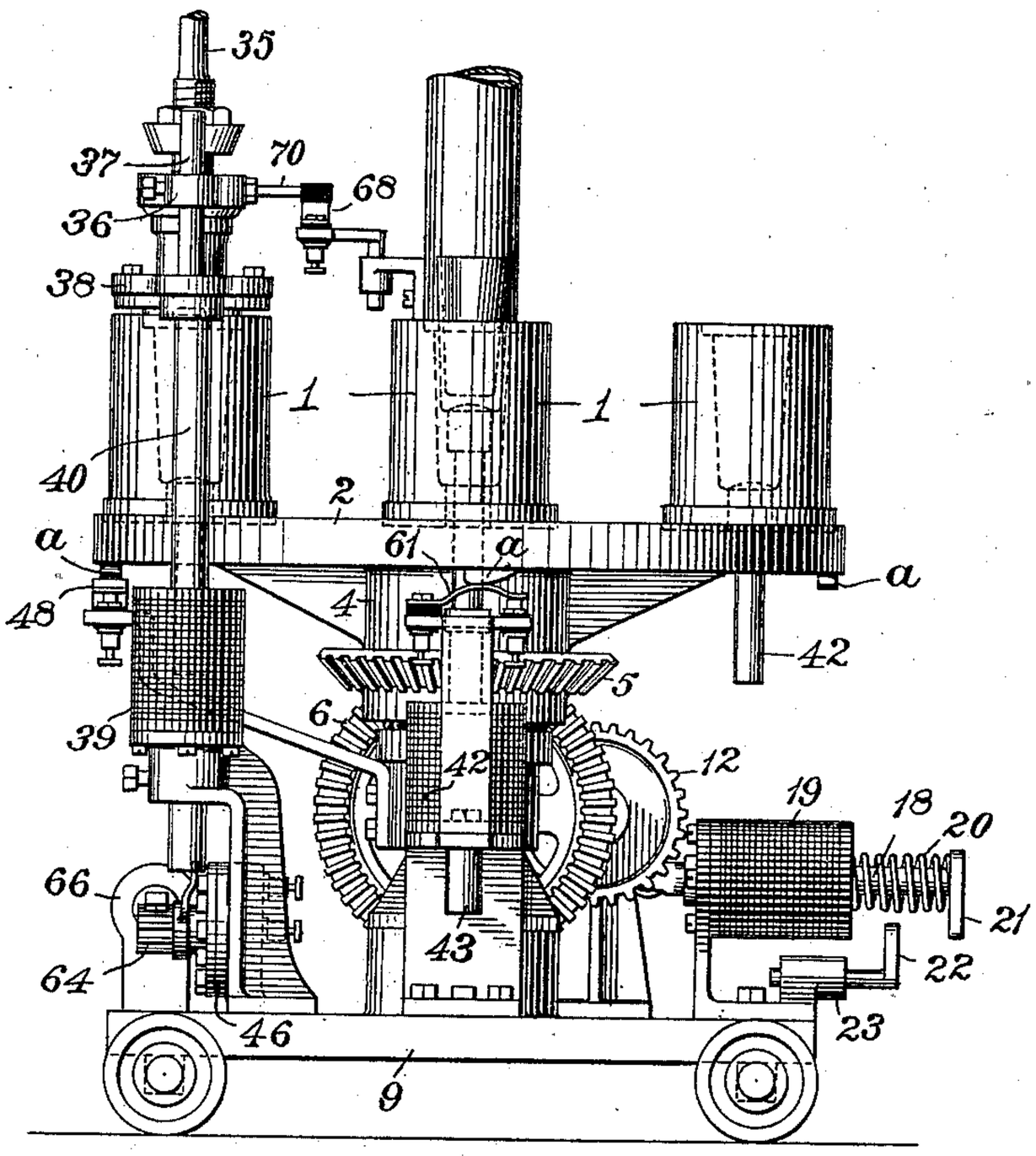
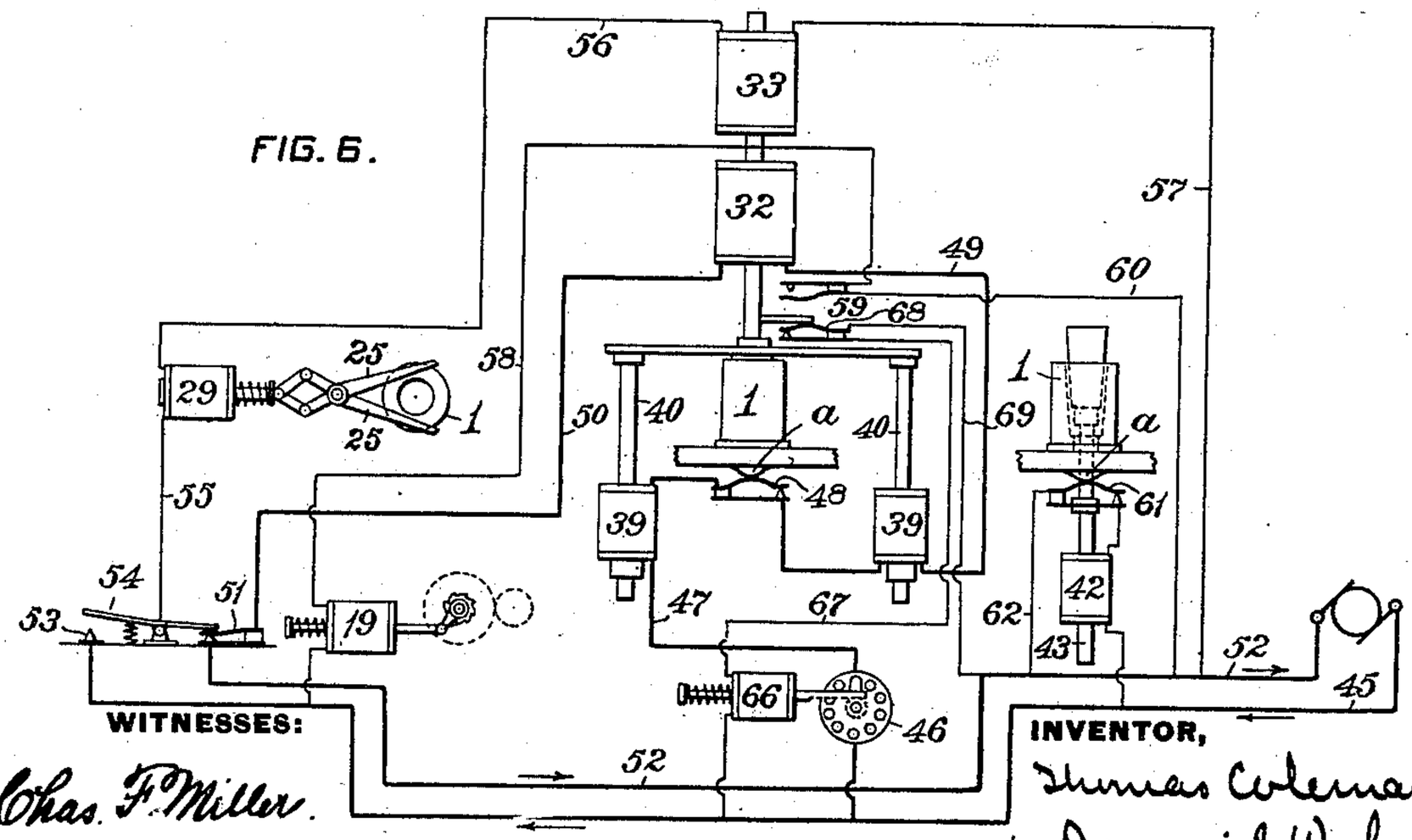


FIG. 6.



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UNITED STATES PATENT OFFICE.

THOMAS COLEMAN, JR., OF ROCHESTER, PENNSYLVANIA.

MECHANISM FOR MANUFACTURING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 671,757, dated April 9, 1901.

Application filed April 3, 1899. Serial No. 711,577. (No model.)

To all whom it may concern:

Be it known that I, THOMAS COLEMAN, Jr., a citizen of the United States, residing at Rochester, in the county of Beaver and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Mechanism for Manufacturing Glassware, of which improvements the following is a specification.

The invention described herein relates to certain improvements in presses for the manufacture of glassware, and has for its object a construction of mechanism whereby the several operations of cutting the glass, so as to release it from the gathering-rod, pressing the glass in the mold, and removing the completed article from the mold may be automatically effected in due succession, the several operations being controlled by the mechanism which effects the severance of the glass from the gathering-rod, or may be controlled by the mechanism which effects the completion of any one of the several steps involved in the manufacture of the glassware as above recited.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a front elevation of my improved press. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional plan view, the plane of section being indicated by the line III III, Fig. 2. Fig. 4 is a similar view, the plane of section being indicated by the line IV IV, Fig. 2. Fig. 5 is a view in elevation of a portion of the machine on the side opposite that shown in Fig. 2. Fig. 6 is a diagrammatic view illustrating the several circuits and controlling-switches, and Fig. 7 is a detail view illustrating table-shifting mechanism.

In the practice of my invention the molds 1, in which the articles are to be shaped, are arranged upon a revoluble table 2, which is mounted on a suitable bearing on the vertical post or standard 3. The hub 4 of the table has secured thereto a beveled pinion 5, intermeshing with a corresponding pinion 6, secured on the shaft 7, which is mounted in bearings 8 on the bed-plate 9. A pinion 10 is also secured to the shaft 7 and intermeshes with the gear-wheel 12, loosely mounted on a pin or stud 13. A ratchet-wheel 14 is secured to one side of the gear-wheel 12 and is adapted to be rotated by a spring-pawl 15 on the arm 16, loosely mounted on the stud or pin 13. This arm 16 is adapted to be moved back in a direction to cause the pawls to slide freely over the teeth of the ratchet-wheel by a spring 17, surrounding the stud or pin 13 and having one end secured to the ratchet-wheel 14, while its opposite end is secured to a stationary part of the machine. The arm 16 is shifted to rotate the gear-wheel 12 and, through the gearing described, the table 2 by means of the core 18 of the solenoid 19, which on the completion of its circuits will move the core 18 in such direction as to effect the desired onward movement of the table. The core is withdrawn to permit the backward swinging of the arm 16 by the spring 20 bearing at one end against the solenoid and at the opposite end against a shoulder 21, which is preferably so extended on one side that it will strike against a stop 22, which is adjustably secured in a socket 23, so as to limit the movement of the core 18 as it is shifted by the solenoid. The limitation of the movement of the core will effect a corresponding limitation in the onward movement of the table.

Adjacent to one of the resting-points of the molds a post or standard 24 is secured to the bed-plate 9 of the machine and on the upper end of this post or standard is secured to the shearing mechanism whereby the glass which is to be deposited in the mold is severed from a gathering-rod. This shearing mechanism may be of any suitable form or construction—as, for example, that shown, consisting of two pivoted blades 25, provided with arms 26, whose ends are connected by links 27 to a rod or bar 28. This rod or bar may form, as shown in Fig. 3, the core of a solenoid 29, by which the shear mechanism can be operated. The return movement of the rod 28, whereby the shears are opened, is effected by a spring 30, interposed between one end of the solenoid and a shoulder on the rod. As clearly shown in Fig. 1, the shear mechanism is so supported that the blades thereof will pass in their opening and closing movement immediately above the molds.

A bracket 31 is adjustably secured on the post or standard 3 and is adapted to support

an electrically-controlled plunger-operating mechanism. This plunger-operating mechanism preferably consists of solenoids constructed and operating as described and shown in Letters Patent to myself and W. H. Ehmsen, No. 618,560, dated January 31, 1899. As set forth in said patent, the lower solenoid 32 is employed for the purpose of forcing down the plunger to shape the glass in the mold, while the solenoid 33 is employed for raising the plunger from the mold; but, as will be readily understood by those skilled in the art, the same solenoid can be employed for raising and lowering the plunger by a reversal of the current through it. As shown in Figs. 1, 2, and 3, the shaping-plunger 34 is secured to the lower end of the rod 35, attached to the cores of the solenoids, and a cross-arm 36 is also connected to said rod. Rods 37 are adjustably secured to the cross-head 36, and their lower ends pass freely down through the presser-plate 38. These rods are provided with heads on their lower ends, so that when the plunger is raised the presser-plate will be lifted from the mold-ring, so as to permit the removal of the article from the mold; but during the downward movement of the plunger the rods 37 will, after the plate rests upon the mold-ring, pass freely through the plate. The presser-plate 38 is held down to secure the mold-ring in position during the pressing operation by means of the electromagnets 39, provided with adjustable cores 40, which extend up a suitable height, so that they will have an attractive effect upon the presser-plate.

As shown in the drawings, the bottom of each mold is formed by a movable section, which is provided with a downwardly-extending stem 41, so that by the operation of a lifting device on the lower end of the stem the article may be lifted sufficiently far from the mold as to permit its removal therefrom. This bottom section of the mold can be operated by any suitable mechanism; but it is preferred to employ a solenoid 42, preferably located opposite the shear mechanism. As the mold, with a completed article, comes above the core 43 of the solenoid 42 the circuit through the latter is completed, as will be hereinafter described, thereby raising the core 43 and forcing up the stem 41 with the bottom section of the mold.

As shown in Fig. 6, the pressing-solenoid 32 is included in the circuit consisting of the wires 45, rheostat 46, wire 47, electromagnets 39, switch 48, wire 49, solenoid 32, wire 50, switch 51, wire 52, to generator. The switch 48 is adapted to be closed by means of projections *a* on the table 2, so located with reference to the positions of the molds that when one of the latter comes into line with the pressing mechanism the projection *a* will close the switch 48, thereby effecting the downward movement of the plunger. The solenoids 29 for operating the shear mechanism and 33 for raising the plunger are preferably included in the same circuit, consisting of wire 45, contact-point 53, treadle 54, wire 55, solenoid 29, wire 56, solenoid 33, wire 57, to generator. The solenoid 19 for shifting the table is included in the circuit consisting of the wire 45, solenoid 19, wire 58, switch 59, wire 60, to generator. It will be readily understood that the switch 59 should not be closed while any of the operations of cutting the glass, pressing it, or removing the completed article from the mold are being effected, but may be closed by the mechanism employed for effecting any one of these steps during the latter part of its movement or after its movement is completed and during the return movement of the mechanism. For example, I have shown the switch as operated to close the circuit through the solenoid 19 by means of an arm 70 on the rod 35, which will close the switch after the plunger has been raised from the mold. The circuit through the solenoid 42 to raise the completed article from the mold consists of the wire 45, solenoid 42, switch 61, wires 62 and 52, to generator. The switch 61 is so located as to be closed by one of the shoulders *a* in the rotation of the table 2.

As is well known in the art of pressing glass, the greatest pressure must be exerted during the preliminary or pressing operation, and as soon as the glass begins to flow to the desired shape the pressure should be reduced, so as to prevent injury to the glass, and should be cut off or entirely stopped as soon as the mold is full. In order to effect this reduction and entire stoppage of the pressure, the circuit through the pressing-plunger 32 passes through a rheostat 46. The contact-arm 63 of the rheostat is connected to a pinion 64, which intermeshes with a rack 65, secured to the core of the solenoid 66. This solenoid is included in a circuit consisting of the wire 45, solenoid 66, wire 67, switch 68, wires 69 and 52, to generator. The switch 68 is so located as to be closed by an arm 70 on the rod 35 after the plunger which is carried by said rod has completed its initial movement or the initial pressing of the glass. By the closing of this circuit the switch of the rheostat will be shifted so as to introduce one or more resistances into the circuit of the solenoid 32, thereby reducing the effective power of the latter on the plunger. The arm 71, supporting the switch 68, is adjustably mounted in a bracket 71^a, secured to the standard 3, as shown in Fig. 1, so that the time of closing of the circuit through the rheostat may be regulated in accordance with the requirements of the operation of pressing.

The several parts of the machine are shown in the position they will occupy on the completion of the pressing of an article in one mold and the raising of a completed article from a preceding mold. While an article is being pressed, an attendant places a mass of glass on the end of the gathering-rod into the mold under the shears, and as soon as

the pressing is completed the treadle 54 is depressed, thereby opening the normally-closed switch 51 in the circuit of the pressing-solenoid 32 and closing the circuit through the shear-operating and plunger-lifting solenoids 29 and 33. By the operation of the solenoids the glass in the mold is severed from the gathering-rod and the plunger raised and the circuit through the table-shifting solenoid 19 closed by the arm 70 shifting the switch 59. As soon as the switch 59 is closed and the table 2 moved sufficiently far to permit of the opening of the switch 48 in the circuit of the pressing-solenoid the operator releases the treadle, permitting it to be shifted by its spring to open the circuit through shear operating and lifting solenoids and to close the switch 51. By the operation of the solenoid 19 the table is shifted sufficiently far to bring the mold into which the mass of glass has been placed into position under the plunger and the mold with the completed article over the discharging-solenoid 42. As the table reaches this position the projections *a* thereon close the switches 48 and 61 in circuits through the pressing-solenoid 32 and the discharging-solenoid 42. In the downward movement of the plunger the arm 70 leaves the switch 59, permitting it to open, and closes the switch 68 in the circuit of the solenoid 66, which controls the rheostat. By the adjustment of the rheostat the operative effect of the pressing-solenoid is reduced. In order to make the reduction of the current through the solenoid gradual, a spring 79 is arranged between the end of the solenoid and a shoulder on its core. This spring will retard the movement of the core and will also effect its return to normal position.

While it is preferred that the several operations should be primarily controlled by the shear mechanism, as that is the initial step, and the other steps are dependent on its completion, it will be readily understood that the several operations may be primarily controlled or dependent upon the completion of the movements of the mechanisms employed for effecting any of the other steps.

I claim herein as my invention—

1. In a machine for pressing glass, the combination of a series of movable molds, a pressing mechanism, a shearing mechanism and mechanism for shifting the molds into operative relation to said shearing and pressing mechanisms, two of said mechanisms being automatically controlled by and dependent upon the operation of the other mechanism, substantially as set forth.

2. In a machine for pressing glass, the combination of a table, a series of molds arranged on the table, means for shifting the table, a single plunger and a mechanism for operating the plunger controlled by the table, substantially as set forth.

3. In a machine for pressing glass, the combiuation of a table, molds arranged on the table, a shearing mechanism, and means controlled by the shearing mechanism for shifting the table, substantially as set forth.

4. In a machine for pressing glass, the combination of a table, molds arranged on the table, means for shifting the table, a shearing mechanism, and a pressing mechanism controlled by the shearing mechanism, substantially as set forth.

5. In a machine for pressing glass, the combination of a plunger, a power mechanism having a variable length of stroke connected directly to the plunger, and means controlled by the movement of the plunger for varying the effective action of the power mechanism employed for actuating the plunger, substantially as set forth.

In testimony whereof I have hereunto set my hand.

THOMAS COLEMAN, JR.

Witnesses:
DARWIN S. WOLCOTT,
F. E. GAITHER.