No. 618,560. Patented Jan. 31, 1899.

T. COLEMAN, JR. & W. H. EHMSEN.

MACHINE FOR PRESSING GLASS.

(Application filed June 24, 1898.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.

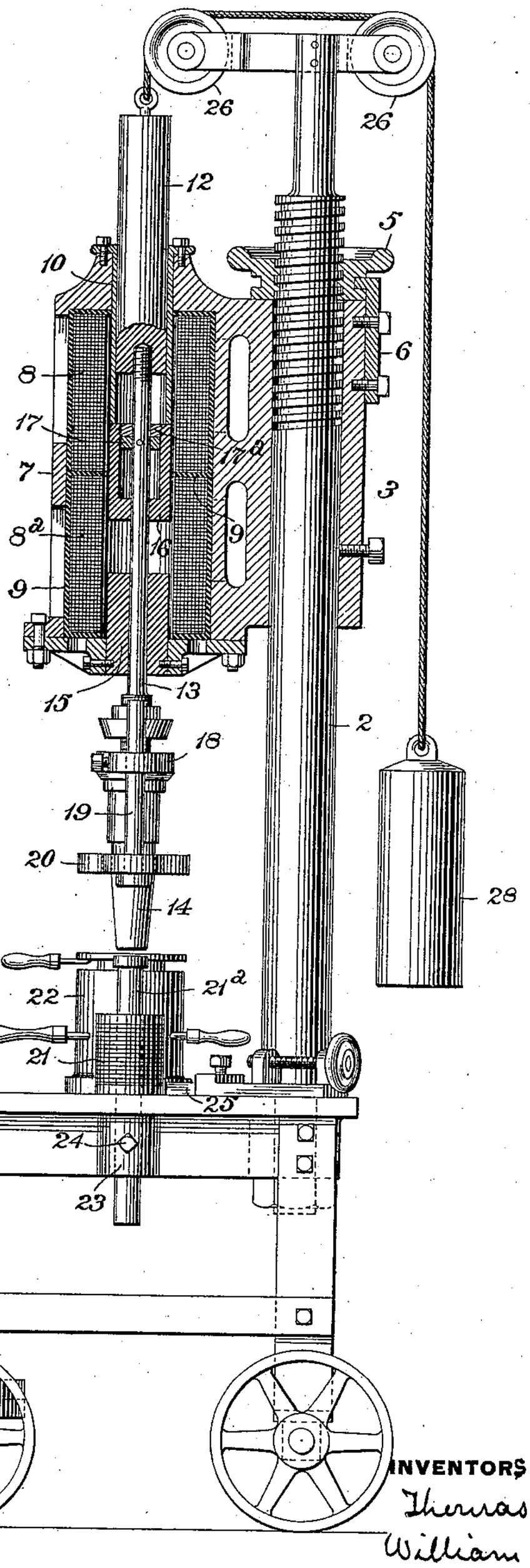

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FIG. 2.

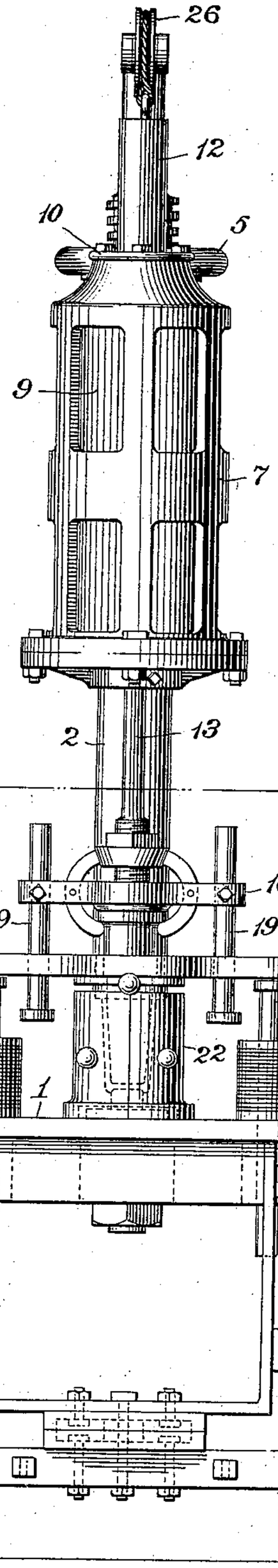

FIG. 3.

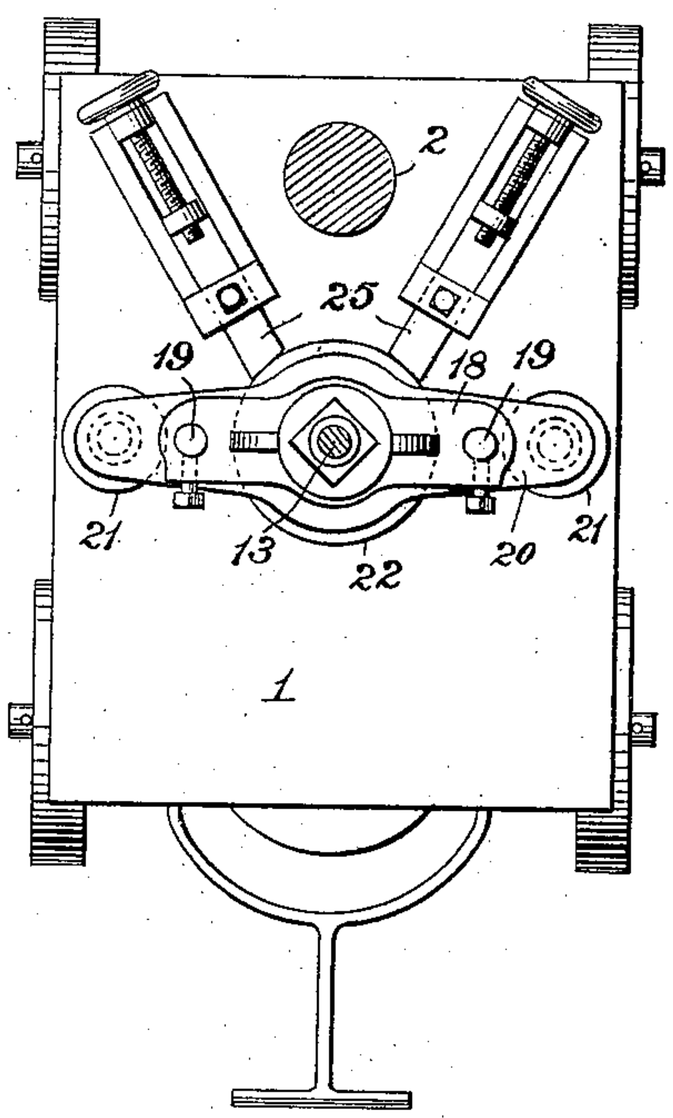

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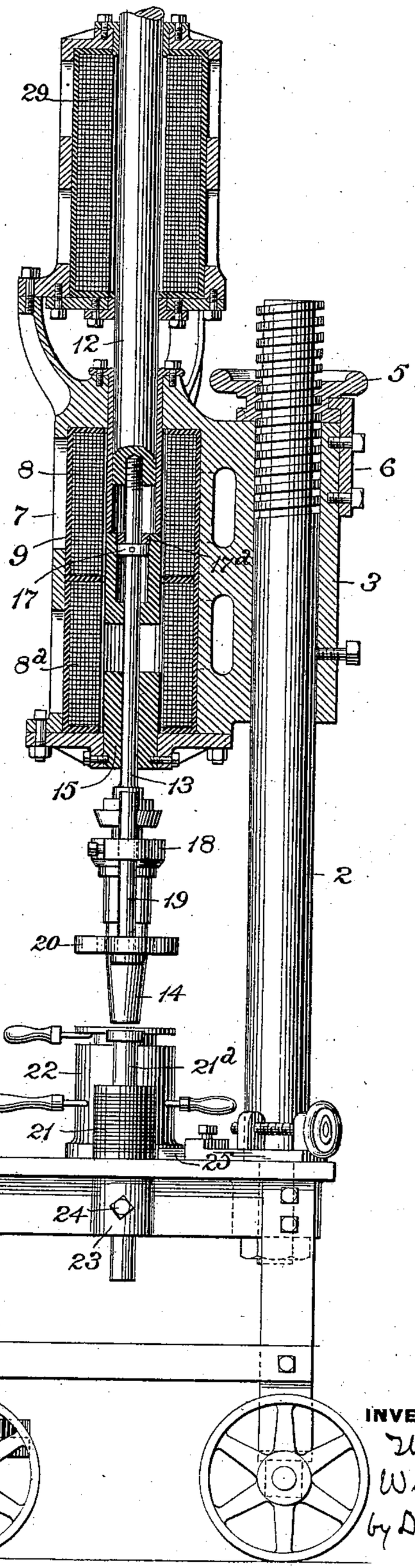
FIG. 4.



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UNITED STATES PATENT OFFICE.

THOMAS COLEMAN, JR., OF ROCHESTER, AND WILLIAM H. EHMSEN, OF WILKINSBURG, PENNSYLVANIA.

MACHINE FOR PRESSING GLASS.

SPECIFICATION forming part of Letters Patent No. 618,560, dated January 31, 1899.

Application filed June 24, 1898. Serial No. 684,390. (No model.)

To all whom it may concern:

Be it known that we, THOMAS COLEMAN, Jr., residing at Rochester, in the county of Beaver, and WILLIAM H. EHMSEN, residing at Wilkinsburg, in the county of Allegheny, State of Pennsylvania, citizens of the United States, have invented or discovered certain new and useful Improvements in Machines for Pressing Glass, of which improvements the following is a specification.

It is characteristic of most glass-presses that the presser-plate employed for holding the mold-ring in position during the pressing operation is connected by springs to the plunger and that the springs are placed under sufficient tension to effect their function by the preliminary downward movement of the plunger, which becomes operative to shape the glass after the preliminary compression of the springs. As the mold-ring must be held tightly on the mold to prevent the escape of glass, the springs are made quite rigid and it requires nearly as much force or power to effect the compression of the springs as is required to produce the desired molding or flow of the glass.

The object of the present invention is to provide for the holding of the mold-ring in position on the mold by means independent of the plunger; and it is a further object of the invention to effect the pressing movement of the plunger by electric energy applied directly thereto.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view, partly in section and partly in elevation, of our improved press. Fig. 2 is a front elevation of the press. Fig. 3 is a sectional plan view, the plane of section being indicated by the line III, Fig. 2; and Fig. 4 is a view similar to Fig. 1, illustrating a modified form or construction of the apparatus.

In the practice of our invention the press-table 1 is preferably supported upon a suitable truck, so as to permit of the easy movement of the press from place to place, as required. A post or standard 2 is secured to the table 1 near one edge thereof, and on said post or standard is mounted a sleeve 3, adapted to be raised and lowered along the standard by a nut 5, engaging the threaded portion of the standard and connected to the sleeve by straps 6, provided at their upper ends with lugs engaging a groove in the nut and having their lower ends bolted to the sleeve. To the sleeve 3 is secured the case or shell 7, containing the solenoid employed for operating the plunger. This solenoid may be of any well-known form or construction; but it is preferred to use the construction shown in the drawings as being more effective and giving greater power for the operation of the plunger. As shown, the solenoid consists of two coils 8 and 8^a, arranged within the shell or cylinder, but insulated therefrom and from each other by filling-pieces 9, formed of non-conducting material, preferably wood. Within the coils and extending up through the head of the cylinder 7 is secured a sleeve 10, formed of brass or other non-magnetic material, said sleeve extending only partially through the coils and serving as a stop, as will be hereinafter described. The core 12 has attached to its lower end a rod 13, to which is connected by any suitable means known in the art the shaping-plunger 14. As is well known, the energizing of the coils of the solenoid will cause the core to move down to a point of equilibrium, and the coils and core are so proportioned as to length that in moving down to or toward equilibrium the required movement will be given to the plunger 14. While the pull of the coils of the solenoid will ordinarily be of sufficient strength to exert the required force on the plunger, it is preferred to reinforce such pull. To this end a cylindrical block 15, formed of iron or steel, is secured or formed integrally with the lower head of the shell 7 and projects up into the wire coils, so that when the coils are energized this cylindrical block will become magnetized and will attract the core 12 in the manner of an ordinary magnet and its armature. As it is necessary to impart a considerable movement to the plunger—say three or four inches, more or less—the attractive force of the magnet 15 will not be in any way materially effective on the core 12 when the latter is in its upper

position. It is proposed, therefore, to introduce between the magnet 15 and the lower end of the core 12 a movable cylindrical block 16, which will serve a double function and will itself become highly magnetic on the energizing of the coils. As shown in Fig. 1, the block 16 is recessed for the reception of a piston or disk 17, which is secured in any suitable manner to the rod 13. The upper end of the opening or recess in the block 16 is closed by a head 17ª, preferably screwing into the opening in the block. This construction permits of the independent movement of the block 16 along the rod 13, as will be hereinafter described. On the energizing of the coils of the solenoid the cylindrical magnet 15 and the block 16 will exert a pull on each other, thereby causing a downward movement of the block 16, which will exert a downward pull on the rod 13. As the block 16 is also rendered magnetic by the energizing of the coils, it will exert a pull upon the core 12, and as the block 16 is held from upward movement by the sleeve 10 the core 12 will be drawn down. The forces exerted by the magnetizing of the magnets or blocks 15 and block 16 to effect a downward movement of the core are additional to the usual action of the coils upon the core 12 and will reinforce or strengthen the action of the coils to force down the plunger 14. The block 16 is made of such a length relative to the required movement of the core 12 as to equally divide the space between the core and the magnetic cylinder 15; but sufficient distance should be left between the upper end of the cylinder 15 and the lower end of the block 16 and between the upper end of said block and the lower end of the core that the sum of these distances will be little greater than the required movement of the plunger.

On the plunger 14 or rod 13 is secured a cross-arm 18, and rods 19 are adjustably mounted on the cross-arm. The presser-ring 20 is formed, as usual, with an opening for a passage therethrough and with openings or holes for the free passage of the rods 19, which are provided at their lower ends with heads adapted to bear against and raise the presser-ring when the plunger is raised, as shown in Fig. 2. On the bed or table 1 are secured electromagnets 21, which are arranged on opposite sides of the place occupied by the molds 22 when in position below the plunger. The cores 21ª of these magnets 21 are adjustable through coils and project down through sockets 23, formed on the table 1, where they are held by means of set-screws 24. On the surface of the table are mounted adjustable guides or stops 25 for centering the molds in position below the plunger.

In operating this apparatus the mold in which the article is to be formed is placed in position on the table, the mold-ring adjusted upon the mold, and the plunger lowered until the presser-ring rests upon the mold-ring. The adjustable cores of the magnets 21 are then raised until their upper ends are nearly in contact with the under side of the mold-ring, in which position they are secured by tightening up the set-screws. The plunger is then raised, the mold-ring removed, and a suitable quantity of glass placed in the mold. The mold-ring is then placed in position and the solenoid and magnets 21 are then energized, a suitable switch being employed for opening and closing the circuits of the solenoids and magnets. By the energizing of the solenoid the plunger is forced down into the mold to properly shape the glass contained therein. As soon as the presser-ring is lowered upon the mold or shortly prior thereto it will be acted upon by the magnets 21 or their cores 21ª and firmly held in position. The operation of these magnets to thus hold the presser-ring in position will be prior to the action of the plunger on the glass. As soon as the article has been finished the switch controlling the circuits through the solenoid and magnets is opened and the plunger and presser-ring are raised.

The upward movement of the plunger may be effected in several ways. For example, in Fig. 1 the upper end of the core of the solenoid is connected to one end of a flexible cord or chain which passes over guide-pulleys 26, supported by the post or standard 2, and has its opposite end connected to a weight 28, which is sufficiently large to overcome the weight of the core of the solenoid and the parts carried thereby, so that when the solenoid is deënergized the weight will operate to raise the core, plunger, and presser-ring. In lieu of a weight a second solenoid 29, of any suitable form or construction, may be employed, as shown in Fig. 4. This second solenoid 29 is secured to suitable arms projecting from the cap of the shell 7, and the core 12 is so proportioned as to length that when the current through the pressing-solenoid is broken and that through the lifting-solenoid is closed the latter will operate to raise the core and the parts carried thereby. The switch controlling the circuits through the solenoids should be so constructed, by preference, that a single movement thereof will effect the opening of the circuit through one of the solenoids and the immediate closure of the circuit through the other solenoid.

We claim herein as our invention—

1. In a machine for pressing glass, the combination of a plunger and means for applying an electromagnetic force directly to the plunger for effecting the operative movement of the plunger, substantially as set forth.

2. In a machine for pressing glass, the combination of a mold, a mold-ring, a presser-plate and means for applying an electromagnetic force to the presser-plate for holding the mold-ring in position on the mold, substantially as set forth.

3. In a machine for pressing glass, the com-

bination of a solenoid and a plunger connected to the core of the solenoid, substantially as set forth.

4. In a machine for pressing glass, the combination of a plunger, and two solenoids having the cores connected to the plunger, substantially as set forth.

5. In a machine for pressing glass, the combination of a mold, a mold-ring, a presser-plate and electromagnets arranged on opposite sides of the mold and operative through the presser-plate to hold the mold-ring in position, substantially as set forth.

6. In a machine for pressing glass, the combination of a mold, a mold-ring, a presser-plate and electromagnets having adjustable cores and operative through the presser-plate to hold the mold-ring in position, substantially as set forth.

In testimony whereof we have hereunto set our hands.

THOMAS COLEMAN, JR.
WILLIAM H. EHMSEN.

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