

No. 829,530.

PATENTED AUG. 28, 1906.

C. KUHLEWIND.
APPARATUS FOR MANUFACTURING GLASS ARTICLES.

APPLICATION FILED SEPT. 19, 1905.

4 SHEETS—SHEET 1.

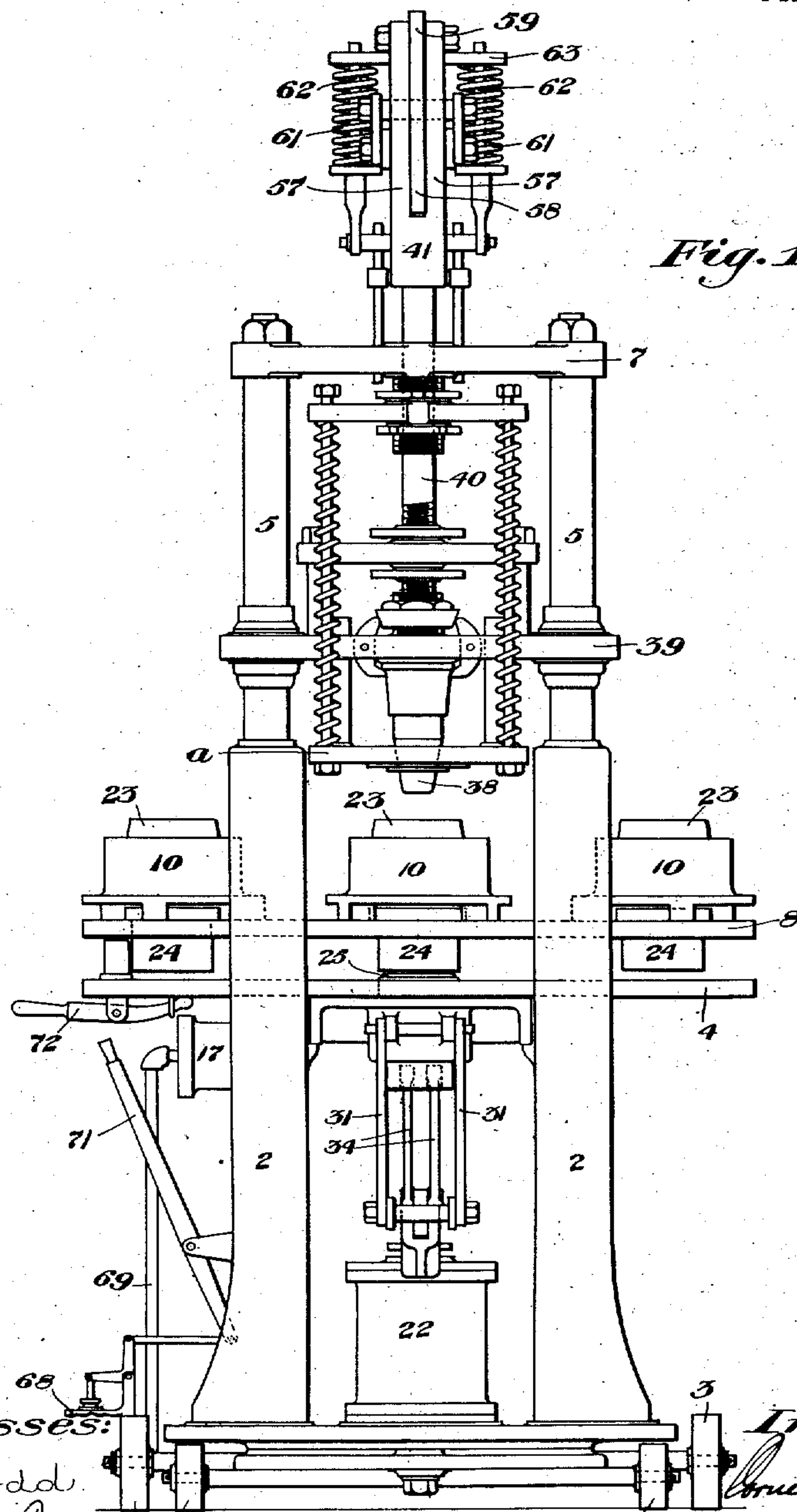


Fig. 1.

Witnesses:

C. R. Rodd.

Chas. S. Spley

Inventor:

C. Kuhlewind

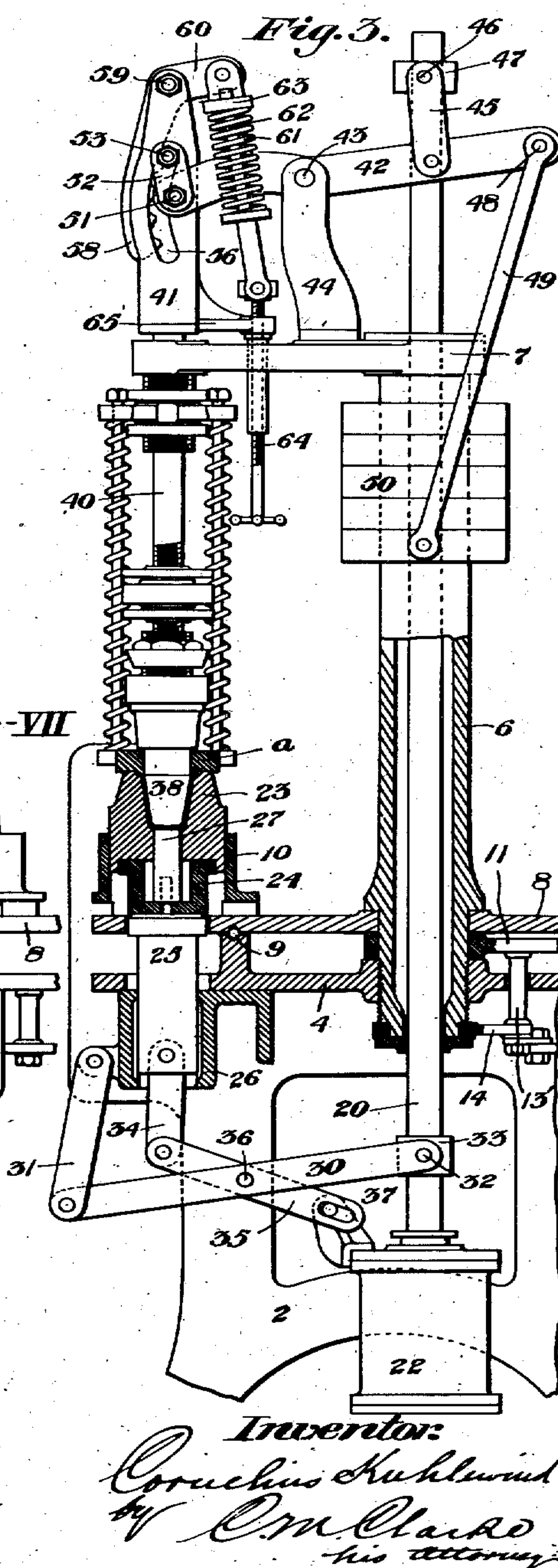
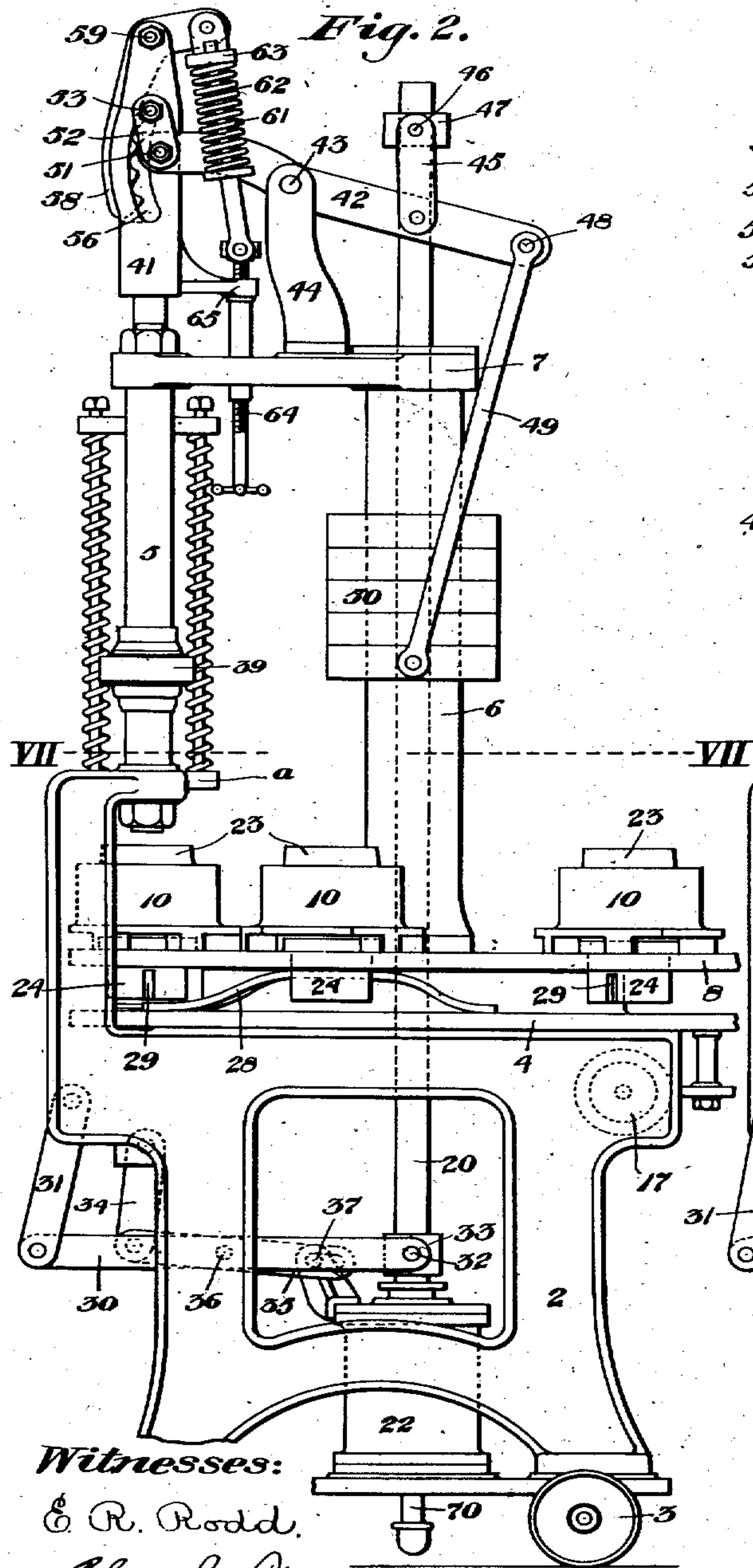
by C. M. Carde
his attorney

C. KUHLEWIND.

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4 SHEETS—SHEET 2.



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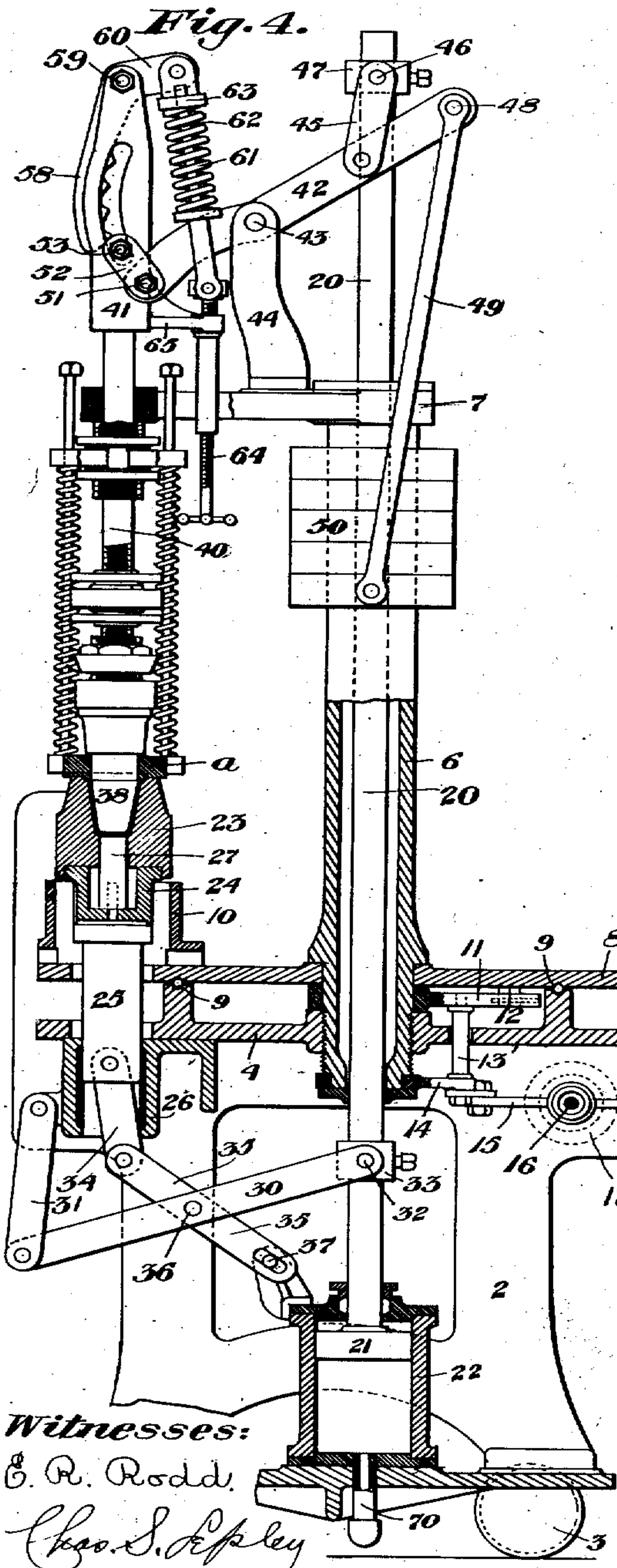
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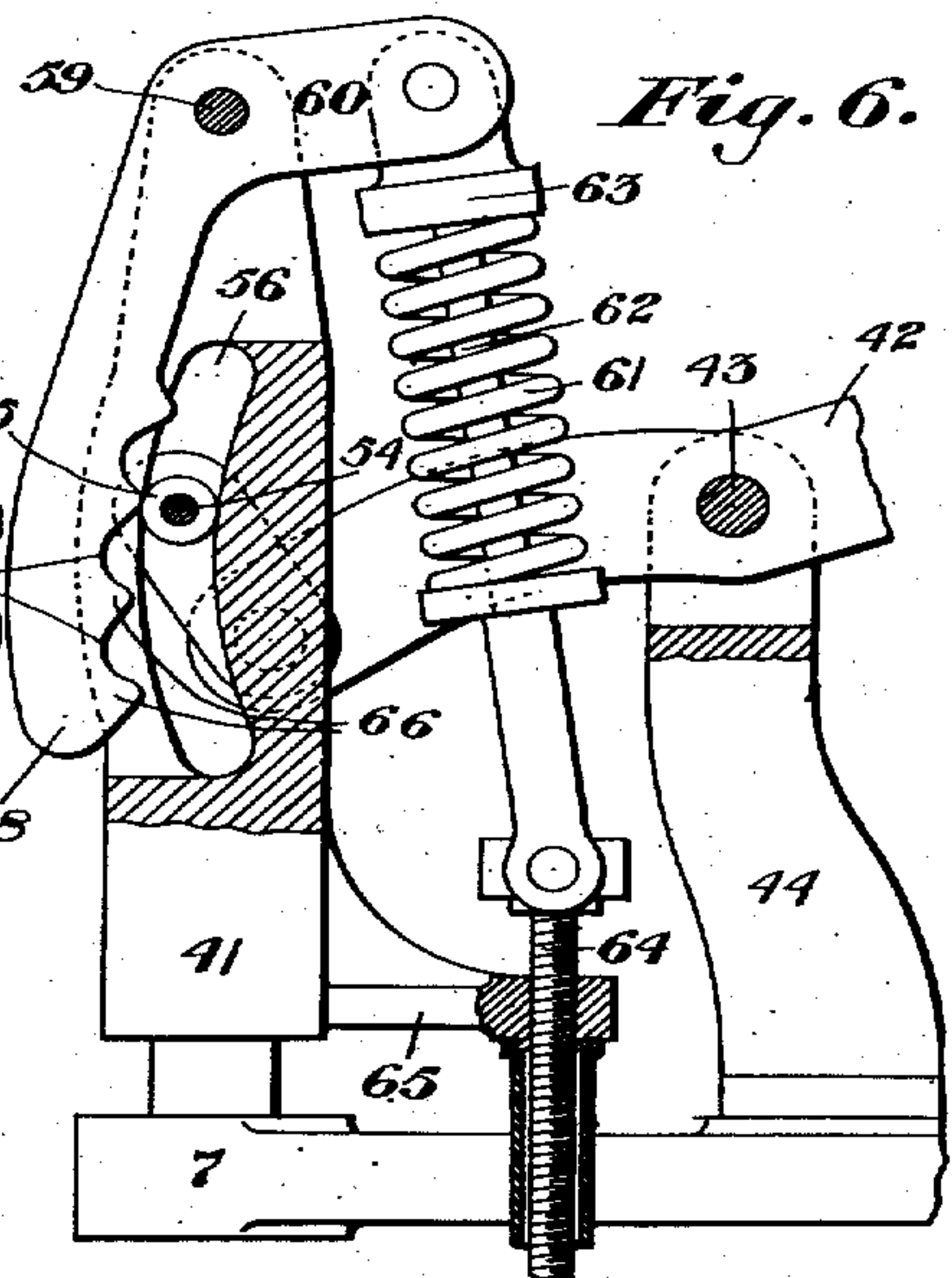
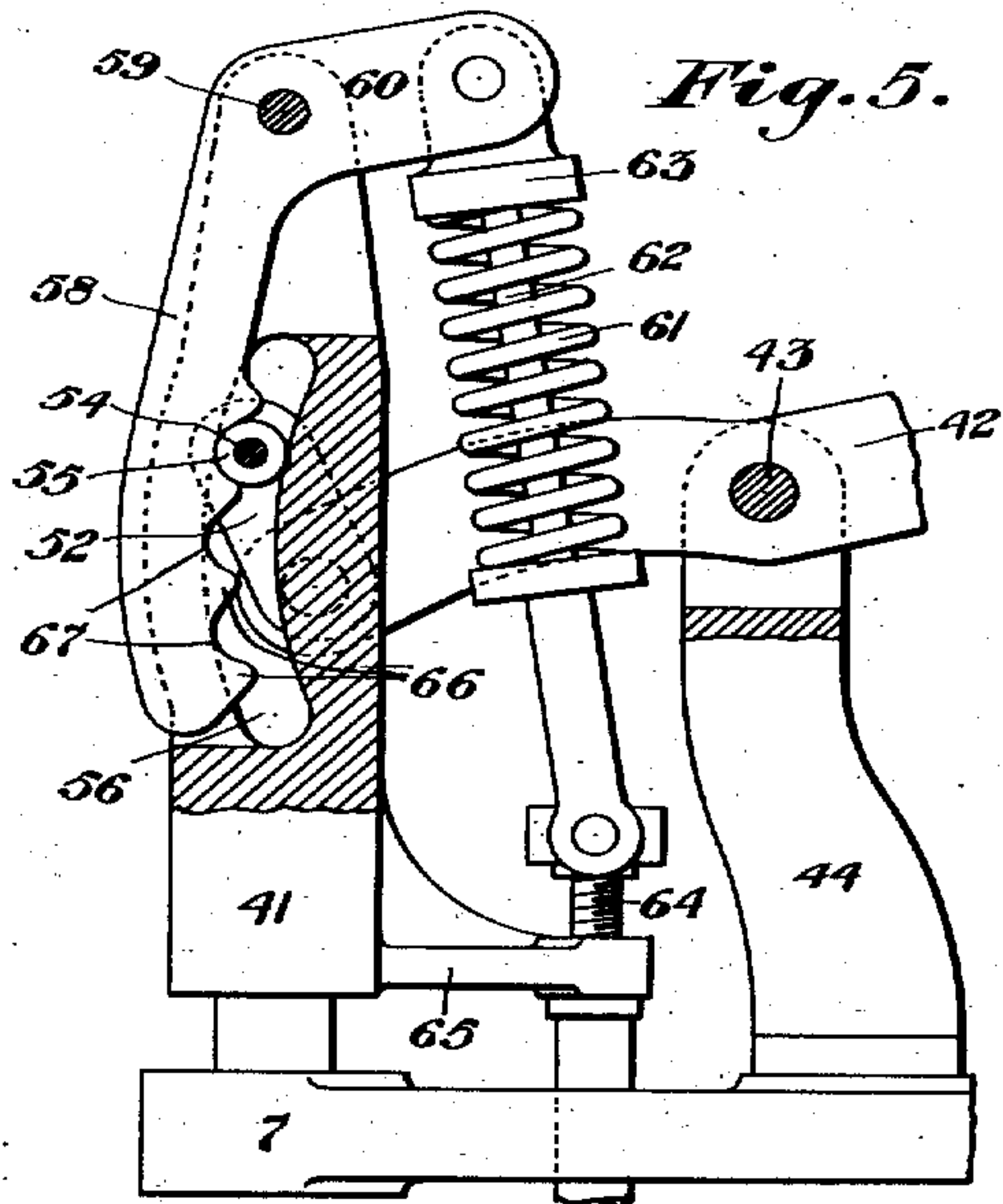
4 SHEETS—SHEET 3.



Witnesses:

E. R. Rodd,

Chas. S. Spley



Inventor:

C. Kuhlewind
by C. M. Clark
his attorney

No. 829,530.

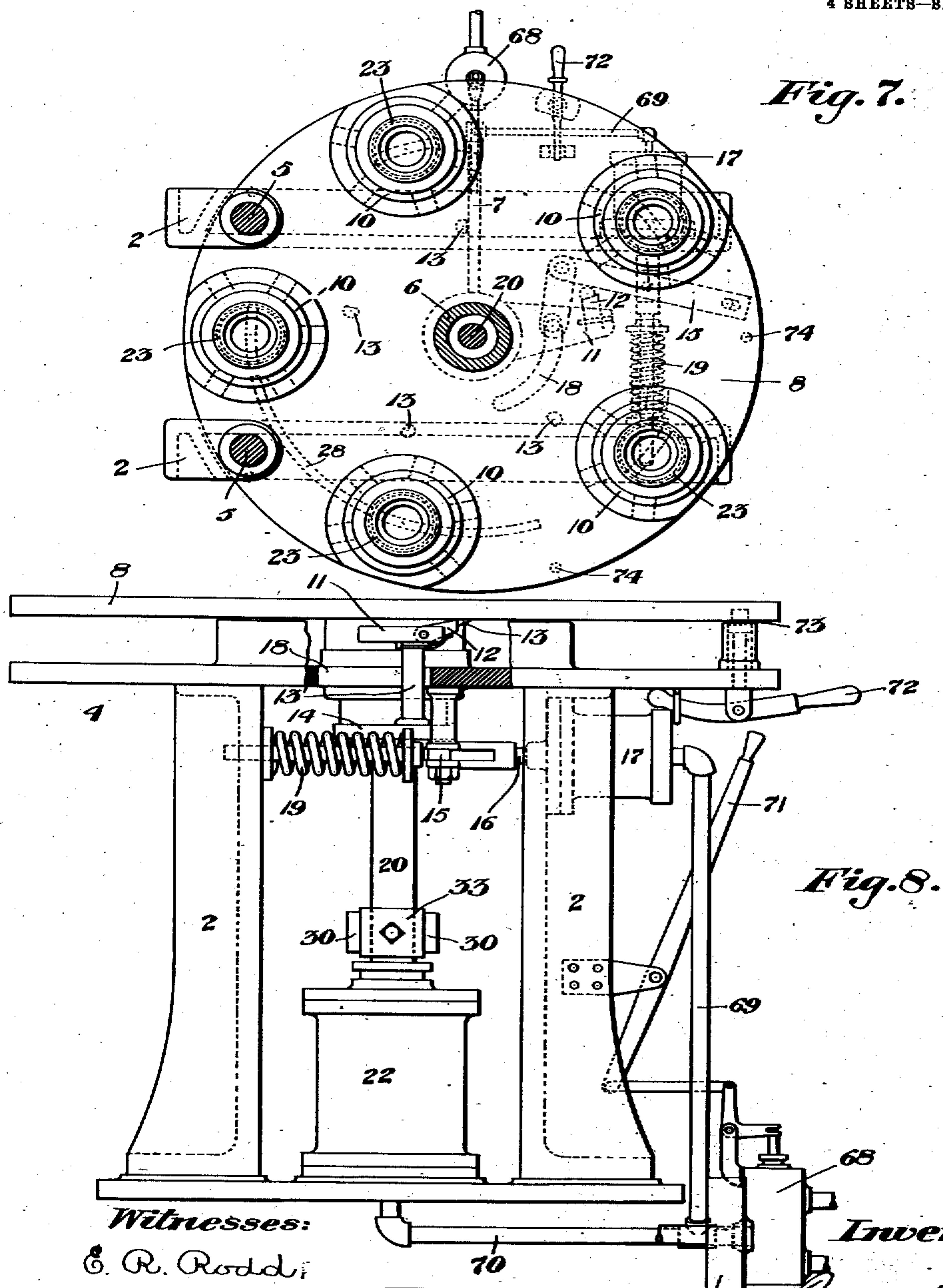
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4 SHEETS—SHEET 4.



Witnesses:

G. R. Rodd;

Chas. S. Spley

Inventor:

Cornelius Kuhlman
by C. M. Clarke
his attorney

UNITED STATES PATENT OFFICE.

CORNELIUS KUHLEWIND, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF
ONE-HALF TO PAUL WUESTHOFF, OF PITTSBURG, PENNSYLVANIA.

APPARATUS FOR MANUFACTURING GLASS ARTICLES.

No. 829,530.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed September 19, 1905. Serial No. 279,097.

To all whom it may concern:

Be it known that I, CORNELIUS KUHLEWIND, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Manufacturing Glass Articles, of which the following is a specification, reference being had therein to the accompanying drawings, forming a part thereof, in which—

Figure 1 is a view in front elevation of my improved glass-pressing apparatus. Fig. 2 is a similar view in side elevation. Fig. 3 is a vertical sectional view showing the mold raised and the plunger inserted thereinto in the operation of pressing. Fig. 4 is a similar sectional view showing the same parts in engagement, but illustrating the mold and plunger as both raised above the position shown in Fig. 3 and in operative engagement due to the equalizing-pressure mechanism for the plunger. Figs. 5 and 6 are detail views showing the equalizing-pressure mechanism for the plunger in different positions. Fig. 7 is a plan view of the mold-table and molds indicated by the horizontal section line VII VII of Fig. 2. Fig. 8 is a partial view in rear elevation similar to Fig. 1, but from the opposite side, showing the valve-controlling apparatus.

My invention refers to improvements in apparatus for manufacturing glass articles of the class known as "pressed ware."

It constitutes a pressing mechanism wherein a series of molds are brought into register with a reciprocating plunger arranged to coöperate with the mold to form the article of ware, and the invention particularly relates to the means for raising and lowering the mold and plunger, respectively.

The object of the invention is to provide a construction wherein the various movements are secured in such a manner that a proper pressure will be maintained upon the glass in the mold at all times and at varying positions of the mold and plunger, with means for preventing excessive pressure and for allowing the plunger to recede against its actuating pressure due to lifting movement of the mold, also to secure said operation through the medium of a single prime mover and its connected parts with the various other attendant necessary movements, as the rotation of the table, &c., as well as various other

features of improvement and construction through the mechanism hereinafter described.

Referring now to the drawings, 2 represents the main frame of the apparatus mounted upon the usual supporting-wheels 3, provided with an upper base-table 4, upwardly-extending supporting-posts 5, a centrally-arranged hollow mast 6, and an upper connecting-frame 7, all of which parts constitute the main frame elements of the apparatus.

8 is the mold-carrying table, rotatably mounted around the central mast 6, preferably upon a series of rolling bearings 9 of any suitable construction and provided with a radially-arranged series of mold-shells 10. The table 8 is intermittently partially rotated after each operation to bring each mold successively underneath the plunger at the proper time by means of an arm 11, provided with a spring-pressed pawl 12, adapted to engage ratchet-abutments 13 extending downwardly from the table 8, the arm 11 being actuated through a connecting-post 13' from arm 14, which is intermittently actuated by lever 15 from the piston-rod 16 of a piston mounted in cylinder 17, located underneath the base-table 4. The post connection 13' extends upwardly through an annular slot 18 in the base-table 4, and piston-rod 16 is provided with an actuating-spring 19, which reacts against the piston-rod, so that when pressure is admitted to cylinder 17 it will operate to swing arm 11 over to engage the next adjacent ratchet-abutment 13. Upon releasing the pressure from the piston of cylinder 17 spring 19 will by its expansion effect the desired partial rotation of the table. The special advantage of this construction in the present apparatus is that the cylinder 17 is thereby capable of operation through the same valve mechanism which operates the piston of the main actuating-cylinder, the rotation of the table thus being effected at the proper period after the finishing of the pressing function and at the time that the fluid is exhausted from the main cylinder.

The apparatus is designed for the purpose of performing the operations of raising the mold and lowering the plunger thereinto by mechanism operated from a single cylinder. For this purpose I employ a longitudinal piston rod or shaft 20, provided with piston 21,

mounted in main cylinder 22, set upon the lower framework of the machine, rod 20 extending upwardly through the hollow mast 6 and beyond the upper frame 7 and connected with the plunger through the pressure equalizing or compensating mechanism, herein-after described.

23 is a vertically-movable mold mounted within the mold-shell 10, provided with a lifting-base 24 upon which it is set, said base being adapted to be brought centrally over a mold-raising plunger 25, slidingly mounted in a suitable bearing-cylinder 26 at the front of the base-table 4 and just below the lower face of the rotating table for clearance. The mold-base 24 is made hollow, as shown, to receive the lower end of the ware-discharging post 27, and for the purpose of raising said post and the finished article after the pressing operation I provide an inclined cam-track 28, arranged to engage the mold-base 24 through slot 29 in its lower portion as it is carried around by the rotating table 8, thereby raising post 27 and ejecting the article at the next stationary position of the mold, in which position it may be readily removed by an attendant.

The mold-post 25 and its supported mold 23 are raised upwardly to meet the pressing-plunger and positively lowered away therefrom by operation of piston-rod 20, through lifting-levers 30, pivoted at their outer ends to the lower end of links 31 and at their inner ends at 32 to pins of a ring 33, secured upon piston-rod 20, preferably adjustably, in any suitable manner, as by a set-screw. For the purpose of utilizing the leverage of arms 30 to increase the travel of post 25 and its supported mold said post is connected through links 34 and levers 35 with lever-arms 30 by means of a pivotal joint 36 intermediate between the ends of lever-arms 35, pivoted at their inner ends at 37 upon a stationary supporting pin or rod, preferably with a clearance slot, so as to insure free operation. It will thus be seen that upon upward motion of piston-rod 20 corresponding upward motion will be imparted to post 25 and mold 23 and that the travel of these parts may be regulated or varied through the lever mechanism just described, so as to secure the desired amount of travel.

For the purpose of lowering the plunger into the mold simultaneously with its upward travel and also of providing means whereby the positive downward pressure upon the mold-plunger will continue only until the glass has been pressed to the desired form and no longer, so as to avoid "crackling," I have provided means for lowering the plunger, actuated from the same piston-rod 20, and having incorporated between said piston-rod and the plunger pressure equalizing or compensating mechanism by which positive downward motion may be

imparted and pressure continuously exerted while still allowing for the automatic arresting of the downward travel of the plunger, and also of its positive upward travel, while such downward pressure, sufficient to maintain the plunger firmly in the mold, is still being continued. For this purpose the plunger 38 is connected by suitable gripping mechanism to a traveling cross-head 39, which in turn is actuated through the usual threaded rod 40, extending upwardly through the top plate 7 and provided at its upper end with an operating-frame 41. This frame is designed to impart raising and lowering motion to rod 40 from piston-rod 20 through the operation of levers 42, pivoted at 43 in the upper end of a supporting-bracket 44, mounted upon the upper plate 7, lever-arms 42 being connected by links 45 to pins 46 of a cross head or ring 47, secured, preferably adjustably, as by a set-screw, upon the upper end of piston-rod 20. Arms 42 extend outwardly beyond their pivotal connection with links 45 and are connected at 48 with rods 49, attached at their lower ends to counterweight 50, slidingly mounted around mast 6. By this arrangement positive downward motion is imparted to piston 20 upon release of pressure underneath piston 21. The front end of lever 42 is connected at 51 with links 52, which are connected at 53 with the outer ends of pin 54, carrying a roller-terminal 55, extending across the operating-frame 41 and adapted to travel upwardly and downwardly through arc-slots 56. These slots are formed in the sides 57 of frame 41, said sides being separated by a vertical slot in which is mounted the pressure-lever 58, pivoted at 59 in the upper end and between the sides of frame 41 and provided with a backwardly-extending lever extension 60. The pressure-lever 58 extends downwardly and conforms generally in its normal position to the arc of slots 56, described from the center of pivotal bearing 43 of lever 42, and it will be seen that if pressure-lever 58 were removed that lever 42 in its operation would merely result in throwing roller-terminal 55 upwardly and downwardly through slot 56 without imparting any motion whatever to frame 41 or to plunger 38.

For the purpose of utilizing the operation of lever 42 to impart motion to these parts through the resistance of a flexible compensating mechanism pressure-lever 58 is inserted and is designed to bear against roller 55 with considerable uniform pressure at all times, for which purpose I provide compression-springs 61, adapted to exert pressure of lever 58 against the roller 55. For this purpose springs 61 are mounted around central rods 62 and bear upwardly against a pressure-plate 63, connected to lever 60, the tension of spring 61 being regulated by threaded rod 64, passing downwardly through a bracket ex-

tension 65 of frame 41, so that the pressure of said springs may be delicately regulated and the entire mechanism will rise and fall with frame 41.

5 The inner face of lever 58 is provided with a series of shoulders or serrations 66, having under sloping faces, the intervening depression 67 being adapted to receive the periphery of roller-terminal 55, and it will thus be
10 seen that as lever 58 presses inwardly against said roller and as roller 55 is lowered through the lever mechanism described it will engage one of said shoulders or projections 66 at the commencement of the operation. Due to
15 the spring-pressure maintaining these parts in engagement, the roller-terminal will carry the entire frame 41 downwardly until resistance of said spring is overcome by the greater resistance of the mold, rendered positive at the end of the pressing operation
20 when the molten glass has been finally pressed to finished form. Upon the plunger arriving at such position and the usual following plate *a* (mounted by means of the customary sustaining-rods, attendant pressure-springs, adjusting mechanism, &c., in the usual way) being also lowered upon the top of the mold continued raising operation of piston-rod 20 will effect further raising of the
30 mold 23 and will carry upward with it the mold-plunger 38. Such contrary pressure acting upwardly against frame 41 will cause it to also rise, whereupon the roller 55 will press the lever 58 outwardly and will ride past projections 66 until it has arrived at the full limit of its travel, lever 58 in the meantime, however, continuing to exert its inward pressure and to engage roller 55 at all times, thus insuring the continued pressure up to
40 the desired limit of the plunger toward the mold, and vice versa. It will be observed that whatever position the terminal-roller 55 may assume the pressure against it of the lever 58 will be maintained about the same, inasmuch as the length of the spring is not continuously changed, but will retain approximately the same normal length at which it has been set, the only variation being due to the slight inward and outward movement
50 of lever 58 as the roller 55 rides successively past each shoulder 66. Upon releasing the pressure from cylinder 22 the operation of the parts will be immediately reversed, roller 55 traveling backwardly to its initial position past the sloping under faces of shoulders 66, whereupon the machine will be ready for another operation.

In Fig. 7 I have illustrated the mechanism for controlling the pressure to cylinders 17
60 and 22, respectively, comprising a valve 68 located in the main feed-line and adapted to control the supply branches 69 and 70, respectively, leading to said cylinders, said valve 68 being under the control of an operating-lever 71 within convenient reach of the

attendant. A lever 72 is connected with a spring-controlled locking-bolt 73, whereby the rotating table 8 is positively locked at the termination of each partial revolution, bolt 73 springing upwardly into a socket 74
70 automatically, due to the release of unlocking lever 72 by the operator.

The operation of the invention will be readily understood from the foregoing description. All of the pressing functions are
75 performed through the movement of a single piston, while the provision for exerting only so much pressure as is required at all times is an important and valuable feature of the invention and will be found to contribute
80 largely to the successful economical operation of this class of machinery.

Having described my invention, what I claim is—

1. In apparatus for manufacturing glass
85 articles, the combination of a vertically-movable mold and a vertically-movable plunger, of unitary means for actuating the mold and plunger, and frictional slippage mechanism adapted to permit stoppage of the
90 plunger and to maintain pressure thereon, substantially as set forth.

2. In apparatus for manufacturing glass articles, the combination of a vertically-movable mold and a vertically-movable
95 plunger, a single longitudinal rod arranged by its motion in one direction to cause the mold and plunger to approach each other, and by motion in the opposite direction to separate from each other, and means for actuating said shaft, substantially as set forth.
100

3. In apparatus for manufacturing glass articles, the combination of a vertically-movable mold and a vertically-movable
105 plunger, a single longitudinal rod arranged by its motion in one direction to cause the mold and plunger to approach each other, and by motion in the opposite direction to separate from each other, and means for actuating said shaft, with mechanism interposed between the plunger-actuating means
110 and the plunger whereby pressure on the plunger may be continued when the travel of the plunger is arrested, substantially as set forth.
115

4. A glass-press provided with a vertically-movable frame, a plunger connected with said frame, mechanism adapted to impart movement to the frame, and interposed coupling devices in frictional engagement and capable
120 of slippage, substantially as set forth.

5. A glass-press provided with a vertically-movable frame, a plunger connected with said frame, and positively-actuated means adapted to impart movement to the frame through
125 interposed coupling devices in frictional engagement capable of maintaining the parts in operative relation to each other against a predetermined resistance but to allow of disengagement of said coupling devices when
130

said resistance is exceeded, substantially as set forth.

6. A glass-press provided with a vertically-movable frame, a plunger connected with said frame, positively-actuated mechanism adapted to move with said frame or independent thereof, and spring-controlled means adapted to make frictional driving engagement between the frame and said mechanism and to allow of slippage, substantially as set forth.

7. A glass-press provided with a vertically-movable frame, a plunger connected with said frame, positively-actuated lever mechanism provided with a roller-terminal, and a spring-actuated pressure-lever mounted on the frame and arranged to bear against said roller, substantially as set forth.

8. A glass-press provided with a vertically-movable plunger-carrier and plunger, positively-actuated lever mechanism provided with a terminal device in operative engagement with said carrier, and a spring-actuated element connected with the carrier and adapted to bear against said terminal device, substantially as set forth.

9. A glass-press provided with a vertically-movable frame, a plunger connected with said frame, positively-actuated lever mechanism provided with a bearing-terminal, and a spring-actuated pressure-lever mounted on the frame provided with a corrugated face adapted to bear against said terminal, substantially as set forth.

10. In apparatus for manufacturing glass articles, the combination of a vertically-movable mold, a vertically-movable plunger, a piston-rod and cylinder with interposed mechanism arranged to raise the mold and

lower the plunger respectively, and means incorporated with the plunger-actuated mechanism adapted to maintain pressure thereon but to allow of stoppage of the plunger upon engagement with the mold, substantially as set forth.

11. In apparatus for manufacturing glass articles, the combination of a vertically-movable mold, a vertically-movable plunger, a piston-rod and cylinder with interposed mechanism arranged to raise the mold and lower the plunger respectively, and means incorporated with the plunger-actuating mechanism adapted to maintain pressure thereon but to allow of stoppage or independent upward travel of the plunger upon engagement with the mold during lowering travel of the plunger-actuating mechanism, substantially as set forth.

12. In apparatus for manufacturing glass articles, the combination of a vertically-movable mold, a vertically-movable plunger, a supporting-framework therefor, a vertically-arranged longitudinal actuating-rod, compound lever mechanism connected with said rod adapted to raise and lower the mold, counterweighted lever mechanism connected with the rod and adapted to raise and lower the plunger, interposed frictional connecting mechanism between said lever mechanism and the plunger, and means for actuating said rod, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CORNELIUS KUHLEWIND.

Witnesses:

CHAS. S. LEPLEY,
C. M. CLARKE.

Corrections in Letters Patent No. 829,530.

It is hereby certified that in Letters Patent No. 829,530, granted August 28, 1906, upon the application of Cornelius Kuhlewind, of Pittsburg, Pennsylvania, for an improvement in "Apparatus for Manufacturing Glass Articles," errors appear requiring correction, as follows: On page 3, line 117, the words "plunger eonnected" should read *plunger connected*, and same page, line 122, the words "A glass glass-provided" should read *A glass-press provided*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of October, A. D., 1906.

[SEAL.]

F. I. ALLEN,
Commissioner of Patents.

said resistance is exceeded, substantially as set forth.

6. A glass-press provided with a vertically-movable frame, a plunger connected with said frame, positively-actuated mechanism adapted to move with said frame or independent thereof, and spring-controlled means adapted to make frictional driving engagement between the frame and said mechanism and to allow of slippage, substantially as set forth.

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