

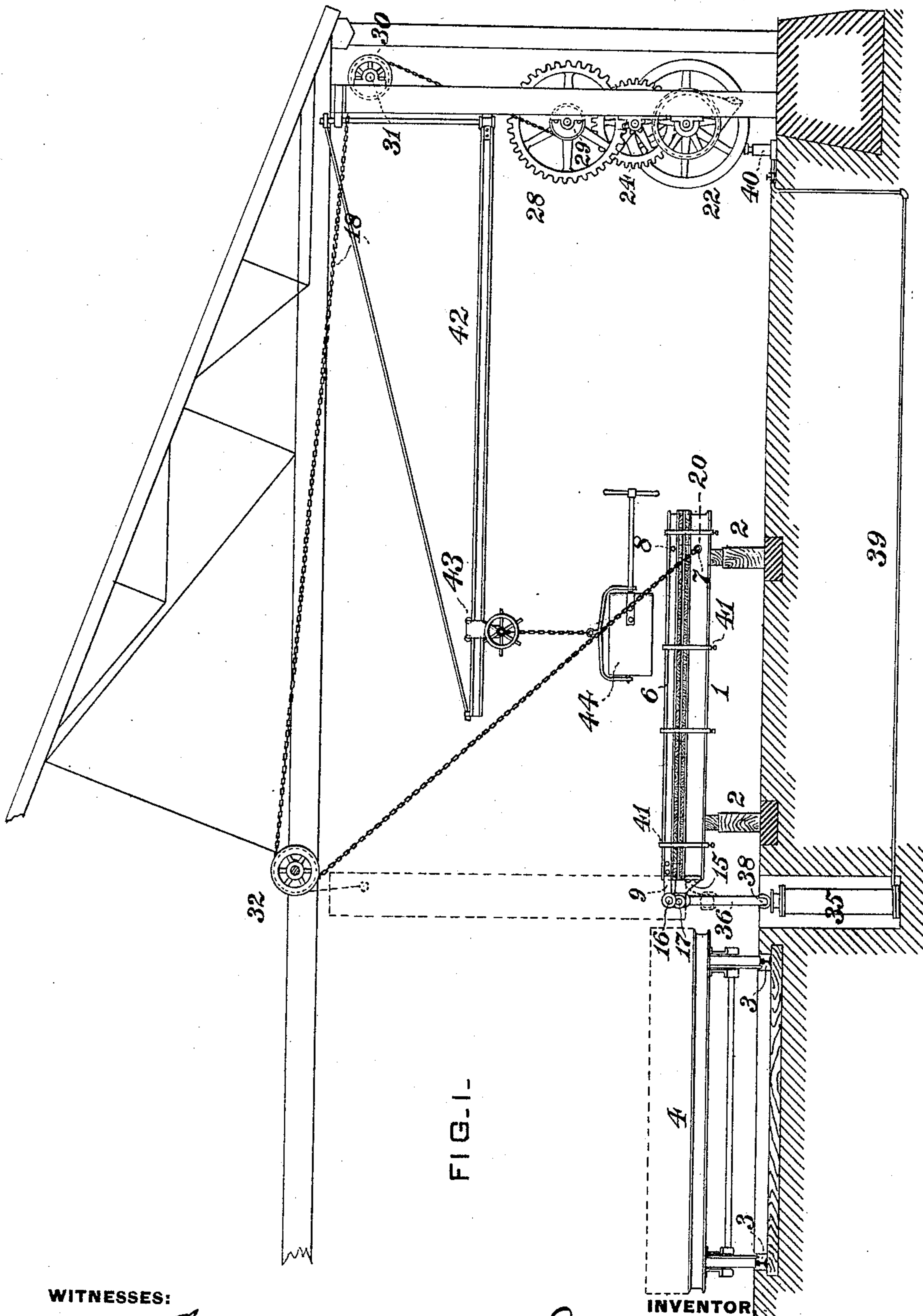
(No Model.)

4 Sheets—Sheet 1.

J. M. HOWARD.
PLATE GLASS SEALING APPARATUS.

No. 449,043.

Patented Mar. 24, 1891.



WITNESSES:

R. A. Whittlesy
F. E. Gaither

INVENTOR

James M. Howard,
by J. Snowden Bell
Att'y.

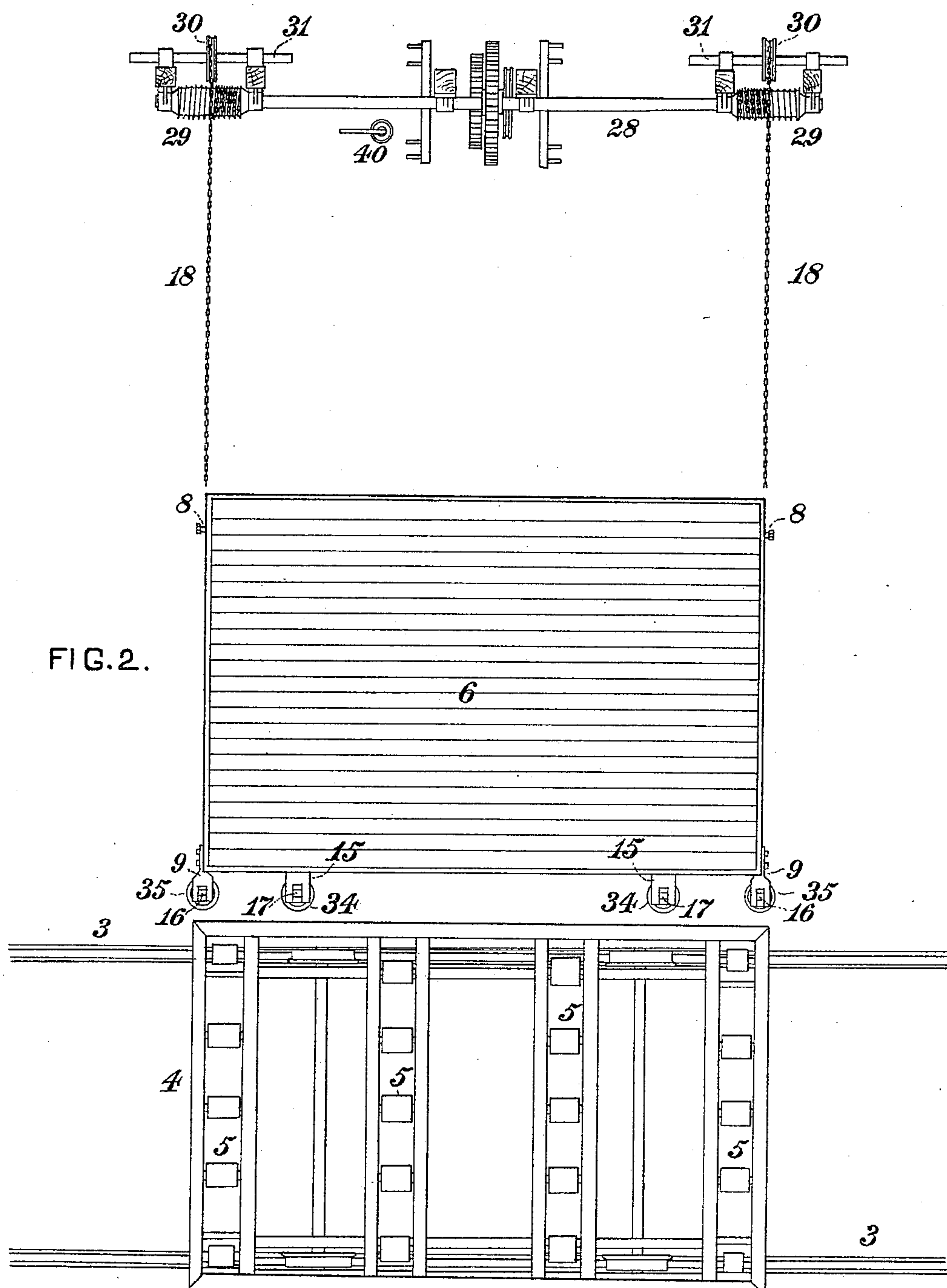
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4 Sheets—Sheet 2.

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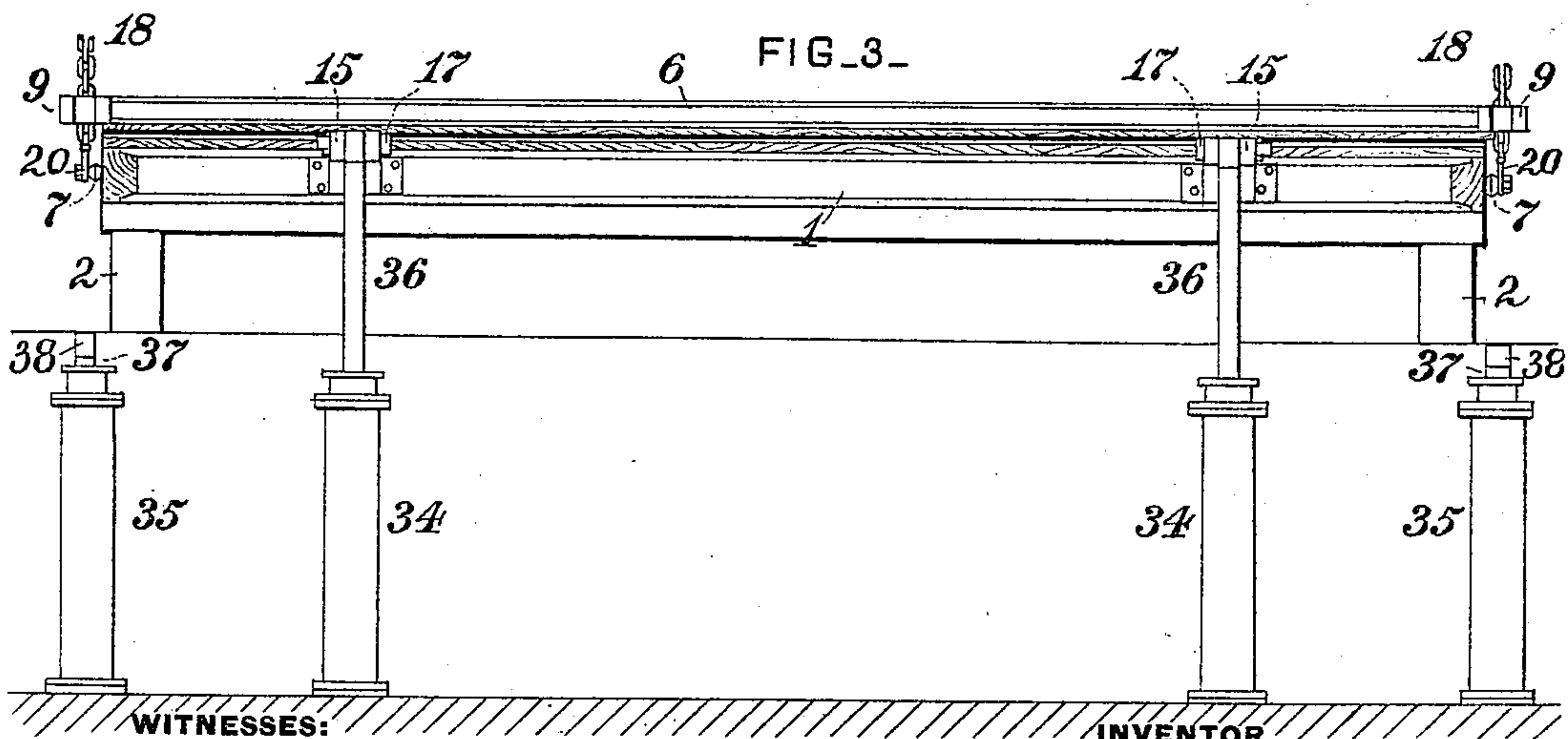
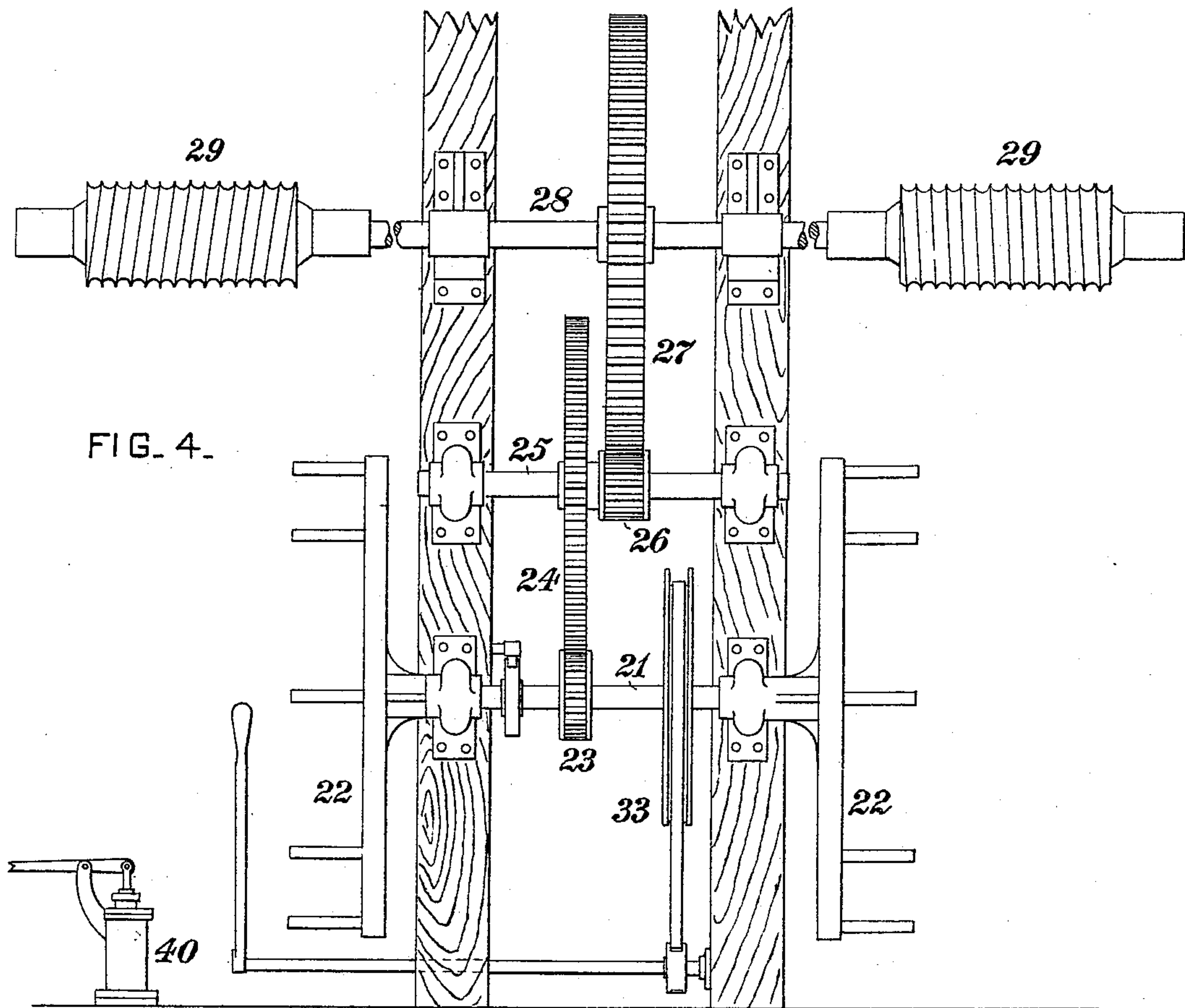
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4 Sheets—Sheet 4.

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FIG. 5.

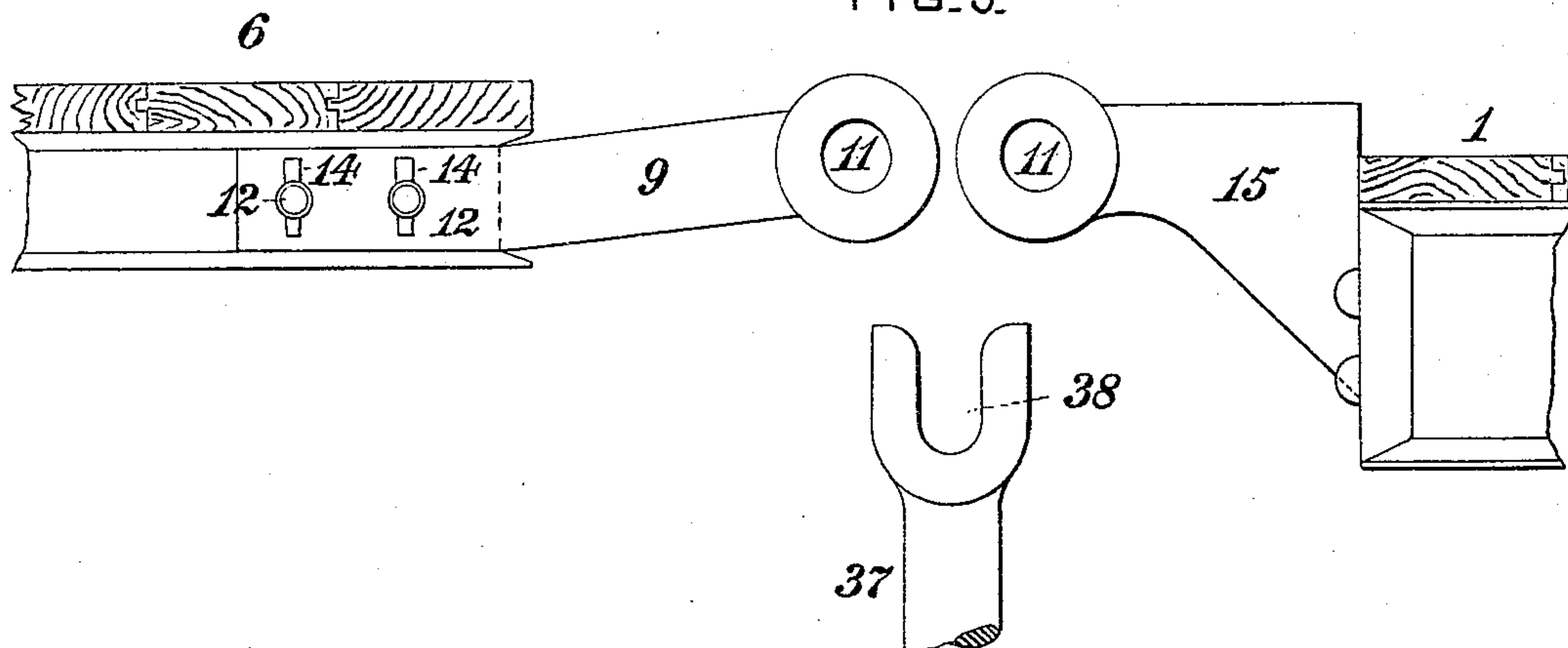


FIG. 6.

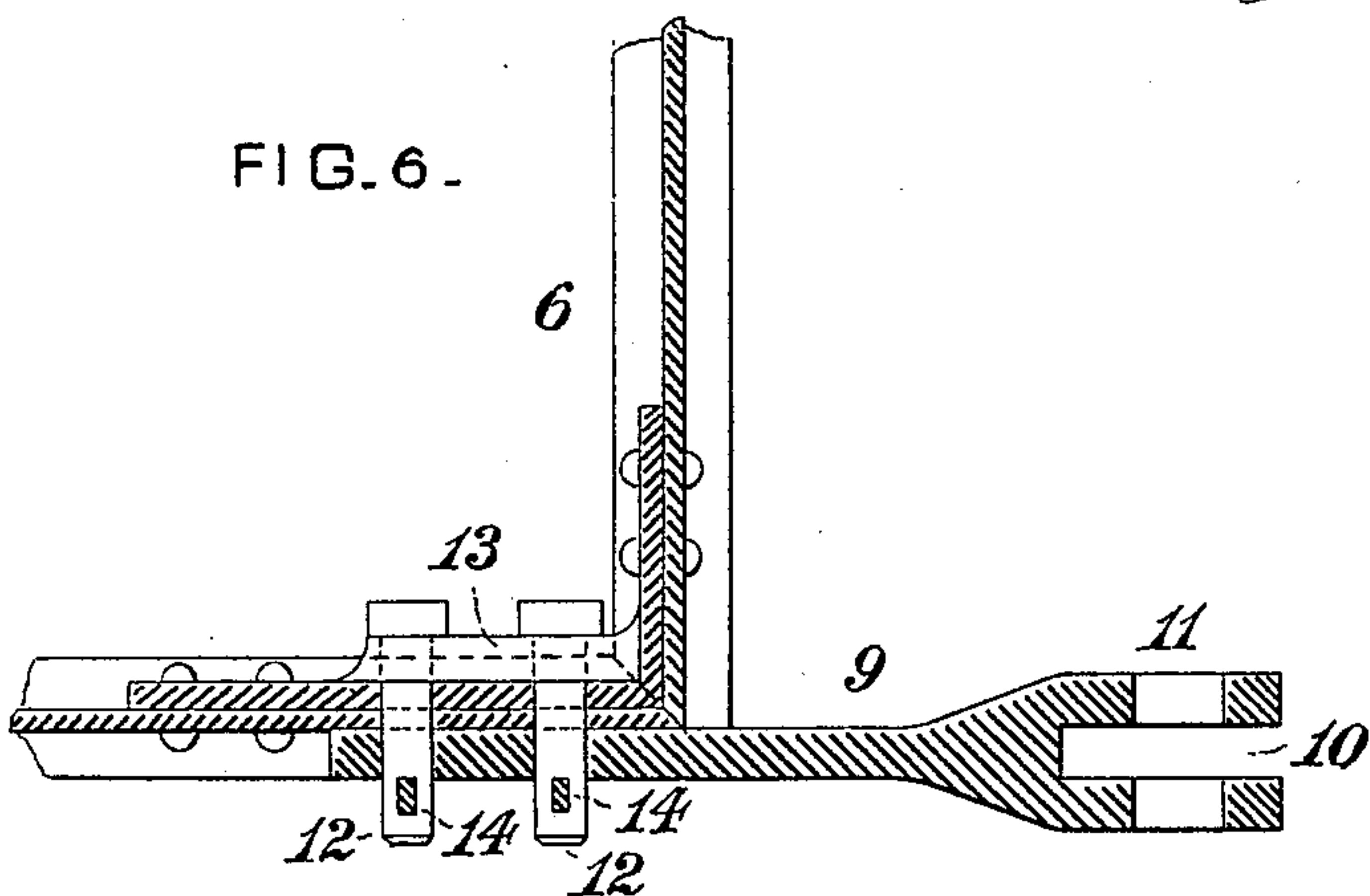


FIG. 8.

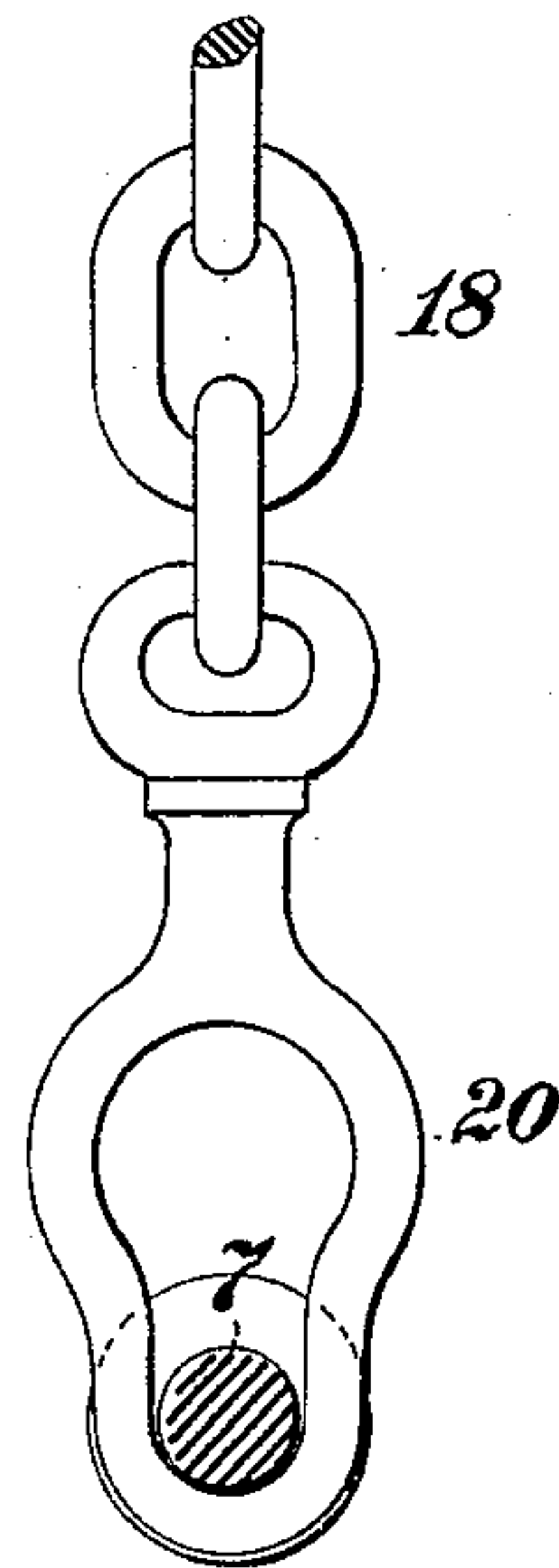
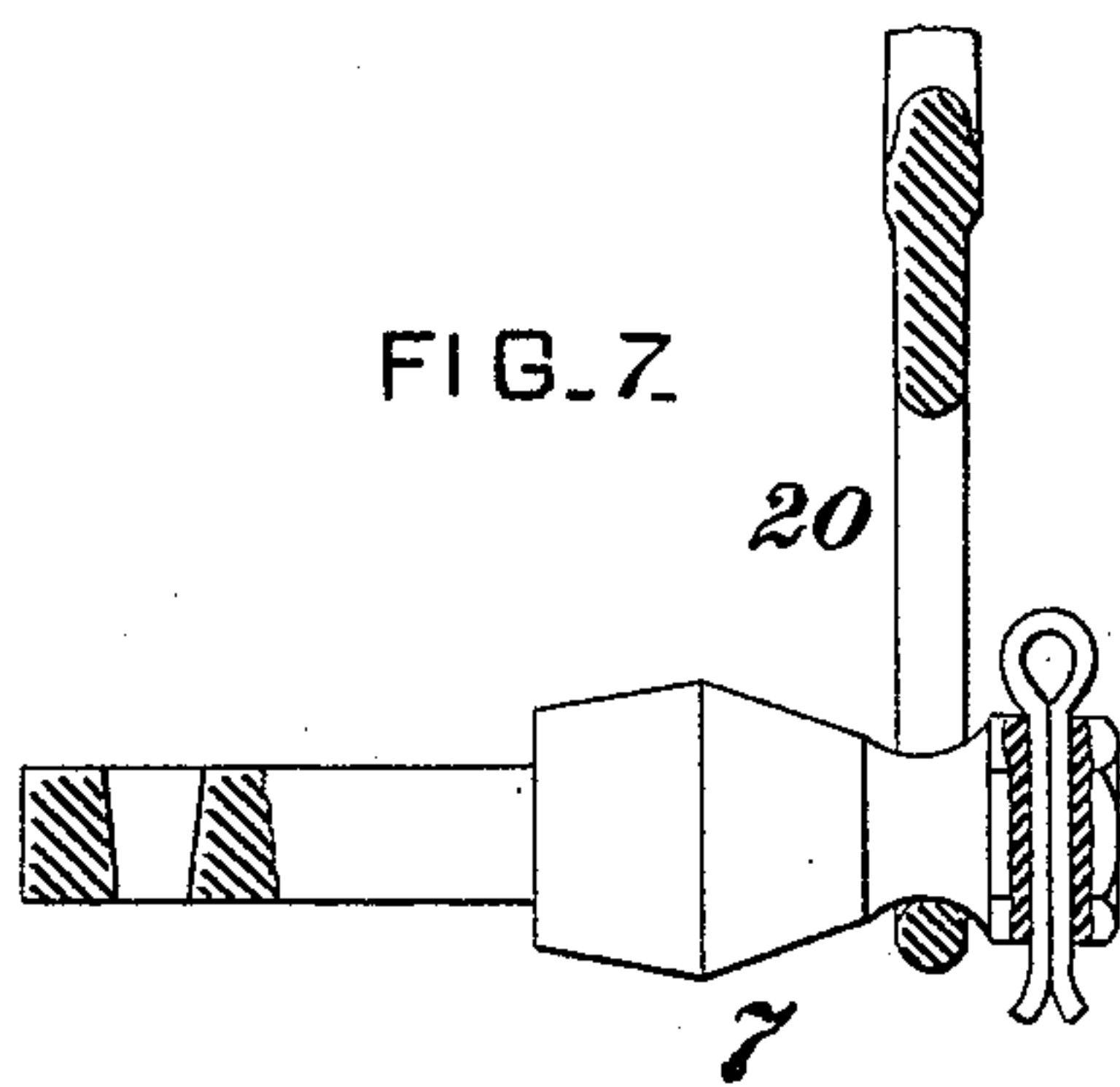


FIG. 7.



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UNITED STATES PATENT OFFICE.

JAMES M. HOWARD, OF MIFFLIN, ASSIGNOR OF TWO-THIRDS TO ABNER U. HOWARD AND HARTLEY HOWARD, BOTH OF PITTSBURG, PENNSYLVANIA.

PLATE-GLASS-SEALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 449,043, dated March 24, 1891.

Application filed November 5, 1890. Serial No. 370,428. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. HOWARD, a citizen of the United States, residing at Mifflin township, (Duquesne P. O.) in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Plate-Glass-Sealing Apparatus, of which improvement the following is a specification.

The object of my invention is to effect a substantial economization of time and labor and attain materially greater accuracy and exemption from liability to breakage than has heretofore been practicable in the sealing of plate-glass—that is to say, the attachment of the same to the “slates” or tables upon which it is supported during the operation of polishing.

To this end my invention, generally stated, consists in the combination of a sealing bed or table, a slate or polishing table, a hoist for swinging said tables vertically into and out of positions in which they are connected and detached, respectively, and fluid-pressure-adjusting mechanism for maintaining the normal relation of the adjacent faces of the table in being brought together and separated, respectively.

The improvement claimed is hereinafter set forth.

In the sealing of plate-glass as ordinarily heretofore practiced, the plate or series of plates to be polished are set by hand upon a bed of plaster, which is poured over the surface of a polishing table or “slate,” as it is technically termed. This operation is a slow and a difficult one, requiring very careful manipulation, even with which the plates are frequently cracked in polishing by reason of failure to attain a perfectly plane supporting-surface. It is also impracticable to polish plates of different thicknesses upon the same slate at one operation, because of the difficulty in setting them so that their outer surfaces shall be uniformly in the same horizontal plane.

My improvement obviates the delay, inaccuracy in setting, and damage by breakage incident to the ordinary method of sealing plate-glass by enabling the surfaces which are to be polished to be expeditiously and

accurately brought into coincidence with a truly plane surface without involving any of the manipulation heretofore required for bedding the plate-glass upon the slate.

In the accompanying drawings, Figure 1 is an end view in elevation, of a plate-glass-sealing apparatus embodying my invention; Fig. 2, a plan or top view of the same; Fig. 3, a side view in elevation; Fig. 4, a view in elevation of the driving-gearing of the hoist; Fig. 5, an end view of a portion of the slate and sealing table, showing a hinge-arm of each, and also the upper end of one of the adjusting piston-rods; Fig. 6, a horizontal section through one corner of the slate-frame and a connected hinge-arm; Fig. 7, a side view, partly in section, of one of the lifting-pins and a vertical section through a connected hanger; and Fig. 8, a transverse section through the same with the hanger in elevation.

In the practice of my invention I provide a sealing bed or table 1, which is preferably a rectangular metallic frame provided with a wooden facing which is made truly plane and smooth, and is of sufficient size to receive the largest plates of glass which are to be polished. The sealing-table rests freely upon vertical standards or supports 2, which are fixed to a suitable floor or foundation adjacent to a line of railroad-track 3, extending to or near a polishing-machine, upon which track a car 4 traverses for the conveyance of a polishing-table and plate-glass sealed thereon to and from one or more polishing-machines. The car 4 is provided with a series of friction-rollers 5, which serve to support and facilitate the loading and unloading of a polishing table or slate 6, which is of substantially similar form and dimensions to the sealing-table, and is preferably of similar construction—that is to say, composed of a metallic frame and a plane-surfaced wooden facing. A lifting-pin 7 is fixed to each end of the frame of the sealing-table 1 near one of its sides, and a similar lifting-pin 8 is fixed to each end of the frame of the slate near one of its sides, said pins being provided for the attachment of hangers connected to hoisting-chains, as presently to be described. A hinge-arm 9, which is provided with a vertical slot

or passage 10 and a horizontal eye 11 near its outer end, is connected detachably to each end of the frame of the slate 6 on the side farthest from the lifting-pins 8. The connecting-bolts 12 of the hinge-arms 9 pass through substantial angle-braces 13, riveted to the side and end bars of the slate-frame at two of the angles thereof and passing through the end frame-bar and hinge-arm are secured by keys 14, which are readily removable, as from time to time required. Two hinge-arms 15, each having a vertical slot or passage and a horizontal eye near its outer end similarly to the hinge-arms 9, are secured to the side of the sealing-table farthest from its lifting-pins 7, the longitudinal distance between the hinge-arms 15 being less than that between the arms 9.

The hinge-arms 9 and 15 above described are provided for the reception of hinge-pivots 16 and 17, respectively, upon which pivots, which are adapted to rest in vertically-movable sockets or bearings 38, hereinafter described, the sealing table and slate are each singly and both when clamped together swung vertically by a suitable hoist from horizontal to vertical position, and vice versa, and from one horizontal position to another in the sealing of the plate-glass and the preparation of the slate with the plate-glass sealed thereon for transfer to the polishing-machine. The hoist employed for this purpose may either be driven directly from the main or counter shaft of a prime mover or may be provided with a suitable train of multiplying gearing, actuated either by hand or by power, and rotating two chain-drums, each carrying a lifting-chain 18, which passes around guide-sheaves 30 32, journaled in bearings at a proper distance above the top of the standards 2, and carries on its end a ring or hanger 20, adapted to be coupled either to a lifting-pin 7 of the sealing-table or a lifting-pin 8 of the slate, as the case may be. In this instance the first-motion shaft 21 of the hoist is provided with crank-wheels 22 on its ends for the application of manual power, and carries a spur-pinion 23, which meshes with a corresponding gear 24 on a counter-shaft 25. A spur-pinion 26 on the counter-shaft 25 meshes with a gear 27 on a drum-shaft 28, upon which are secured two chain-drums 29, which are located at such distance apart that the middle of each may be about in line vertically with the middle of the bearing portion of the lifting-pins at one end of the sealing-table and slate. A lifting-chain 18 is connected to and wound on each of the chain-drums 29, and passes therefrom over a guide-sheave 30 fixed upon a shaft 31, which is adapted to rotate and slide longitudinally in bearings supported above the drum-shaft, and thence passes over a second guide-sheave 32, the bearings of which are fixed above the sealing-table at a distance therefrom greater than its width and about in line vertically with the side of the sealing-table to which the hinge-arms are at-

tached. The free end of each chain carries a ring or hanger 20. A friction-brake 33 is provided for arresting the movement of the first-motion shaft and driven gearing when required.

The adjusting mechanism by which the vertical positions of the hinge-pivots of the sealing-table and slate are regulated so as to properly effect the swinging movements of the tables and prevent the edge cramping or straining of the plate-glass is preferably, as shown, a series of fluid-pressure cylinders, the pistons or plungers of which are fixed to and support the bearings of the hinge-pivots. Two vertical cylinders 34 are fixed to a suitable foundation below and adjacent to the standard 2 of the sealing-table which is nearest the side of the table to which the hinge-arms are connected, each cylinder being located in a vertical plane coinciding with the middle of the slot of one of the hinge-arms 15 of the sealing-table 1. Two similar cylinders 35 are located each in line with the central plane of the slot of one of the hinge-arms 9 of the slate 6. Each of the cylinders is provided with a properly-packed piston, to which is connected a piston-rod having a hinge-pivot bearing or socket 38 at its upper end, the bearings of the piston-rods 36 of the cylinders 34 receiving the hinge-pivots of the sealing-table 1, and those of the piston-rods 37 of the cylinders 35 receiving the hinge-pivots of the slate 6. The cylinders 34 and 35 are connected by pipes 39 controlled by suitable cocks or valves with a source of fluid-pressure supply, which in this instance is a forcing-pump 40, so that pressure may be simultaneously applied, regulated, and relieved in the two cylinders of each pair as from time to time required. Water, steam, or air under pressure may be employed as the fluid-pressure medium, being brought to the proper degree of working-pressure by any of the well-known appliances for that purpose.

In the operation of the apparatus the sealing-table 1 is placed upon the standards 2, with its plane working-face upward and the hinge-pins 17, inserted in the eyes of its hinge-arms 15. The pistons of the cylinders 34 are then raised by the application of fluid pressure until the ends of the hinge-pins rest in the bearings 38 of the piston-rods 36. The end rings 20 of the chains 18 are then connected to the lifting-pins 7 of the sealing-table, and the latter is swung about the axes of the pivots 17 into vertical position by the application of power to the hoist and the connected chains 18. The piston-rods 36 are also lowered until the adjacent edge of the sealing-table is brought as near to the floor, as may be desired. The sheet of plate-glass which is to be sealed is then applied to the plane working-face of the sealing-table when standing on edge by the operators who hold it against the table, while the latter, with the glass thereon, is raised and swung back to its original horizontal position, the operators keeping the glass in position until the

table is lowered sufficiently to prevent the glass from slipping off. The surface of the glass on the sealing-table is then covered with a bed of plaster of proper thickness, the same being poured thereon from any suitable receptacle. For this purpose I prefer to provide a swinging crane 42, having a trolley or carriage 43, fitted to traverse on its jib. A plaster-box 44 is suspended from the carriage 43, the plaster-box being swung on pivots and provided with a tipping-arm by which it may be turned or tipped to pour out the plaster, as required. By swinging the jib of the crane into different positions the plaster may be readily and conveniently applied to the entire surface of the glass on the sealing-table. The slate 6 is then placed on the car 4 with its working-face upward, and the car is moved along the track until the centers of the slots 10 of its hinge-arms 9 are brought in line with the axes of the cylinders 35. The hinge-pivots 16 being then inserted in the eyes of the hinge-pins 9 the pistons of the cylinders 35 are raised until the ends of the pivots 16 rest in the bearings 38 of the piston-rods 37. The chains 18 are then connected to the lifting-pins 8 of the slate, and the slate is swung about the axes of its hinge-pivots until it is brought into horizontal position on the opposite side thereof and folded over on the sealing-table, resting on the plaster facing or bed which was placed on the surface of the plate of glass on the sealing-table. In the transfer of the slate from the car to the sealing-table the pistons of the cylinders 35 are raised sufficiently far to prevent a preliminary contact of the slate with one edge of the plate-glass, in order to obviate any strain thereon, which would tend to crack it, and to admit of initial contact being made between the surface of the slate and that of the bed of plaster as nearly as possible simultaneously throughout the entire area of said surfaces. The sealing-table and slate are then connected by a series of clamps 41, the hinge-pivots 16 are removed, the piston-rods 36 raised until the ends of the hinge-pivots 17 rest in their sockets, and the chains 18 are connected to the lifting-pins 7 of the sealing-table. The connected sealing-table and slate are then swung about the axes of the pivots 17 by the hoist and deposited with the slate downward upon the car 4, after which the clamps 41 are removed and the sealing-table is coincidentally relieved at one side from the slate by the piston-rods 36 and raised at its opposite side by the hoist to a vertical position in readiness for the sealing of a plate of glass upon another slate, the slate which has been used, as above described, with the plate of glass that has been sealed upon its face, remaining upon the car 4 and being transferred thereon to the polishing-machine. Previous to the adjustment of the slate upon the polishing-machine its hinge-arms are detached and are again connected to the slate when another plate of glass is to

be sealed. It will be understood that two or more slates are employed in order that glass may be sealed upon one while the others are being transferred to and are fixed in position upon two or more polishing-machines, a series of which is usually operated.

I claim as my invention and desire to secure by Letters Patent—

1. In a plate-glass-sealing apparatus, the combination of a sealing bed or table, a slate or polishing table, a hoist for swinging said tables vertically into and out of positions for connection and detachment, and fluid-pressure-adjusting mechanism for maintaining the normal relation of the faces of the tables in the application and separation of one table to and from the other, substantially as set forth.

2. In a plate-glass-sealing apparatus, the combination of a sealing bed or table, a slate or polishing table, a hoist for swinging said tables vertically into and out of positions for connection and detachment, fulcrums or bearings on which said tables are supported during their movements by the hoist, and fluid-pressure mechanism connected to and acting to adjust said bearings vertically, substantially as set forth.

3. In a plate-glass-sealing apparatus, the combination of a sealing bed or table, a slate or polishing table, a hoist for swinging said tables vertically into and out of positions for connection and detachment, hinge-pivots coupled to each of said tables, fluid-pressure cylinders provided with pistons and connected rods, and bearings fixed to the piston-rods of said cylinders and fitted to receive the hinge-pivots of the table, substantially as set forth.

4. In a plate-glass-sealing apparatus, the combination of a sealing bed or table, a slate or polishing table, two pairs of hinge-arms, one pair being connected to each table, a fluid-pressure cylinder fixed in line with each hinge-arm, piston-rods or plungers working in said cylinders, hinge-pivot bearings fixed to said piston-rods, hinge-pivots adapted to fit in the hinge-arms and bearings, a pair of lifting-pins connected to each of the tables adjacent to the side opposite that to which the hinge-arms are connected, a pair of lifting-chains adapted to be coupled to the lifting-pins of either of the tables, clamps for connecting the tables, guide-pulleys carrying the lifting-chains, chain-drums to which the lifting-chains are connected, and driving mechanism for rotating the chain-drums, substantially as set forth.

5. In a plate-glass-sealing apparatus, the combination of a sealing bed or table, fixed supports therefor, a slate or polishing table, a transfer-car adapted to support both tables and to convey the polishing-table to a different location, a hoist adapted to be connected to either table to swing the polishing-table from the transfer-car to the sealing-table, and to swing both tables from the fixed

supports to the transfer-car, and fluid-pressure-adjusting mechanism for maintaining the normal relation of the faces of the tables in the application and separation of one table to
5 and from the other, substantially as set forth.

6. In a plate-glass-sealing apparatus, the combination of a metallic polishing-table frame, angle-braces connecting the side and end members of said frame, a pair of hinge-
10 arms having vertical slots and horizontal eyes at their outer ends, and bolts connecting said hinge-arms detachably to the angle-braces and end members of the frame, substantially as set forth.

15 7. In a plate-glass-sealing apparatus, the combination of a metallic table-frame, a facing fixed thereon, hinge-arms connected to said frame and provided with vertical slots

and horizontal eyes at their outer ends, hinge-pivots fitting the eyes of the hinge-arms, and
20 fluid-pressure-piston rods provided with socketted or recessed ends fitting the slots of the hinge-arms and receiving the hinge-pivots, substantially as set forth.

8. In a plate-glass-sealing apparatus, the
25 combination of a sealing bed or table, a crane fitted to swing above the surface of the sealing-table, and a plaster-box suspended from and fitted to traverse longitudinally on said crane, substantially as set forth.

30 In testimony whereof I have hereunto set my hand.

JAMES M. HOWARD.

Witnesses:

J. SNOWDEN BELL,
W. B. CORWIN.