No. 835,236. PATENTED NOV. 6, 1906.

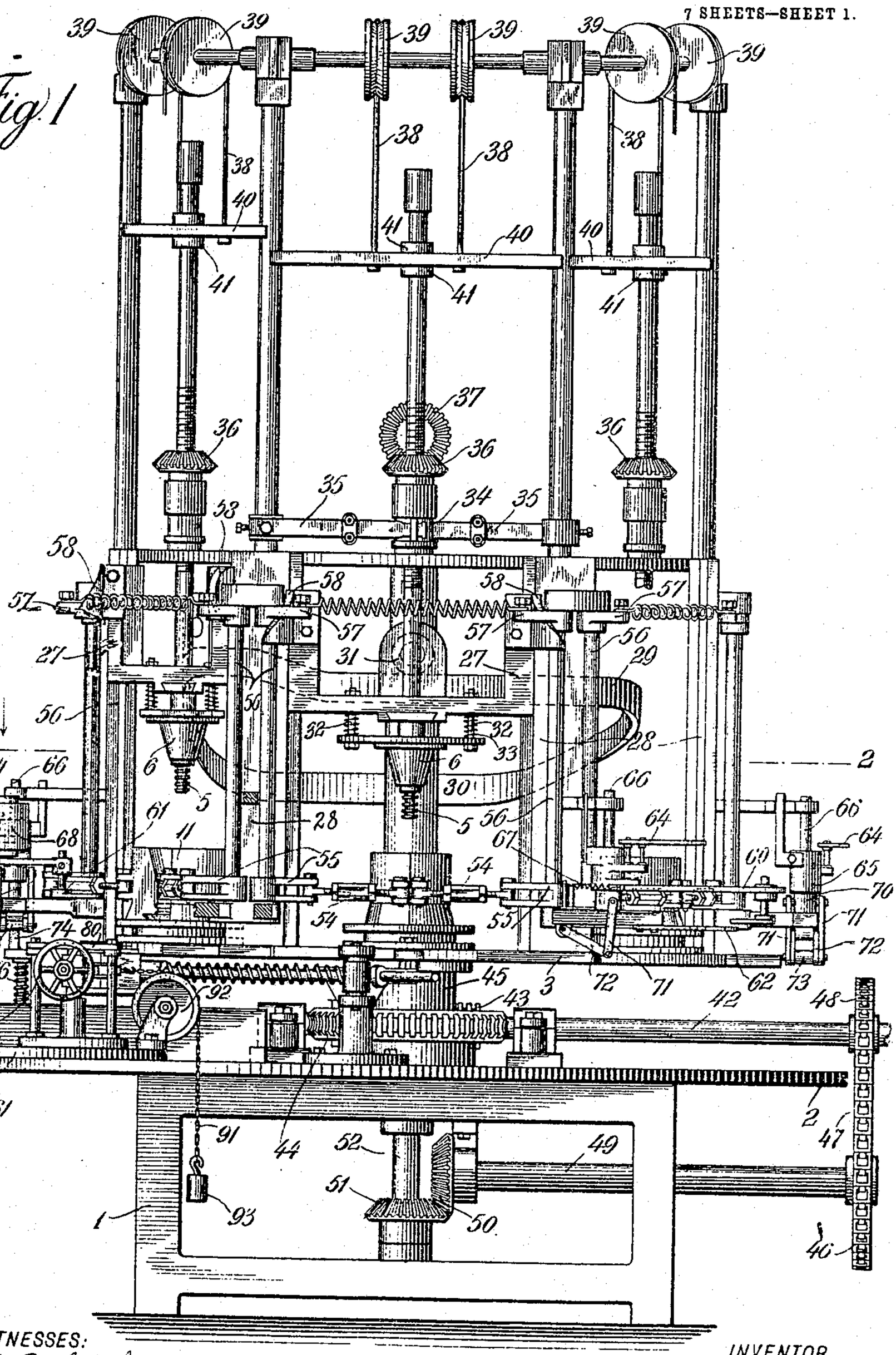
H. M. BROOKFIELD.

PRESS FOR MAKING INSULATORS OR SIMILAR ARTICLES.

APPLICATION FILED AUG. 10, 1905.

7 SHEETS—SHEET 1.

Fig. 1



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508

X 510

X 198-33

X 584 (sheet 2 page 2)

X 630 (sheet 2½ page 2)

X 628 (sheet page 2)

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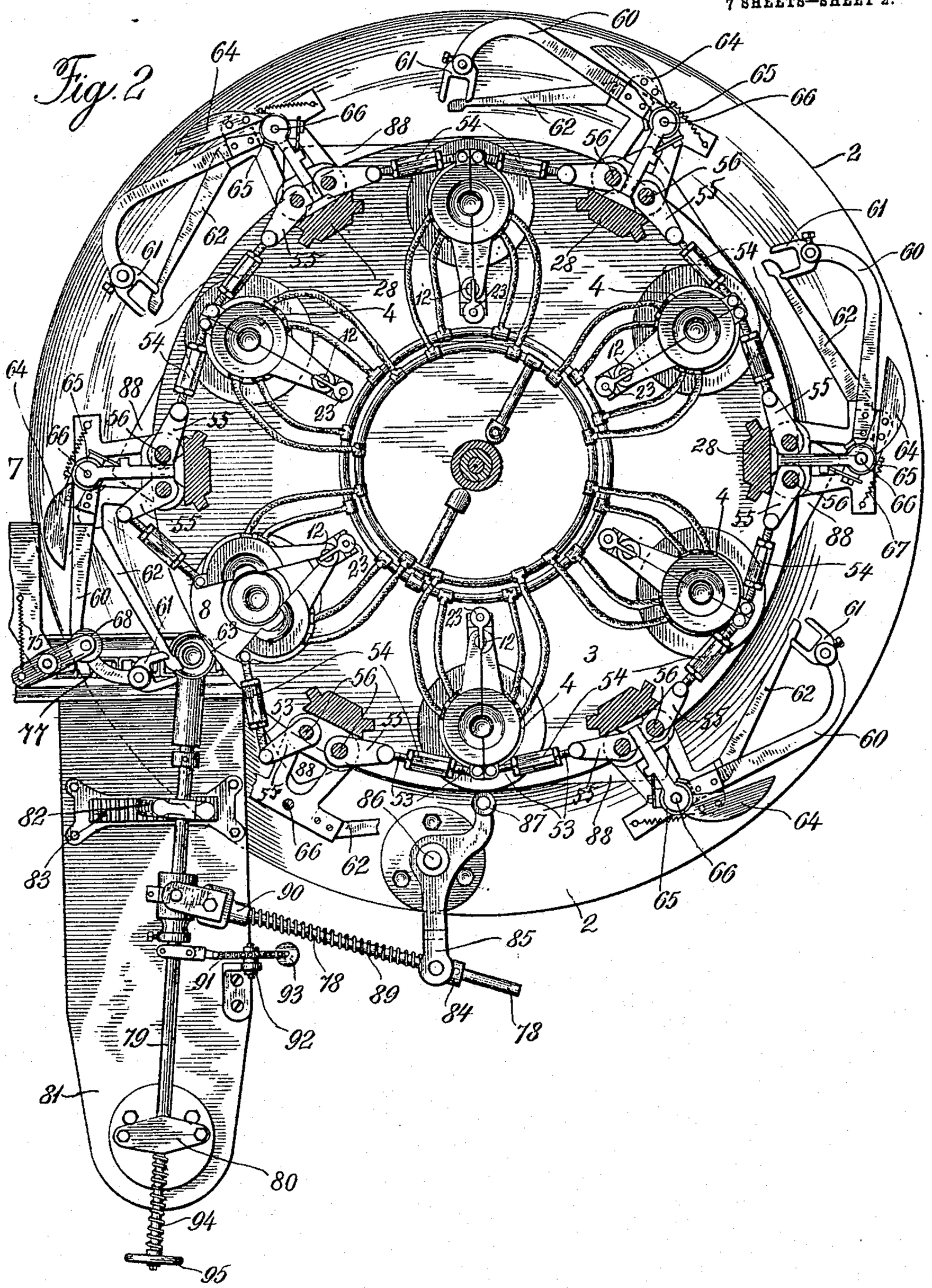
7 SHEETS—SHEET 2.

Fig. 2



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Screw Threading Presses,
Screw Threading.

Draftsman.

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7 SHEETS—SHEET 3.

Fig. 3

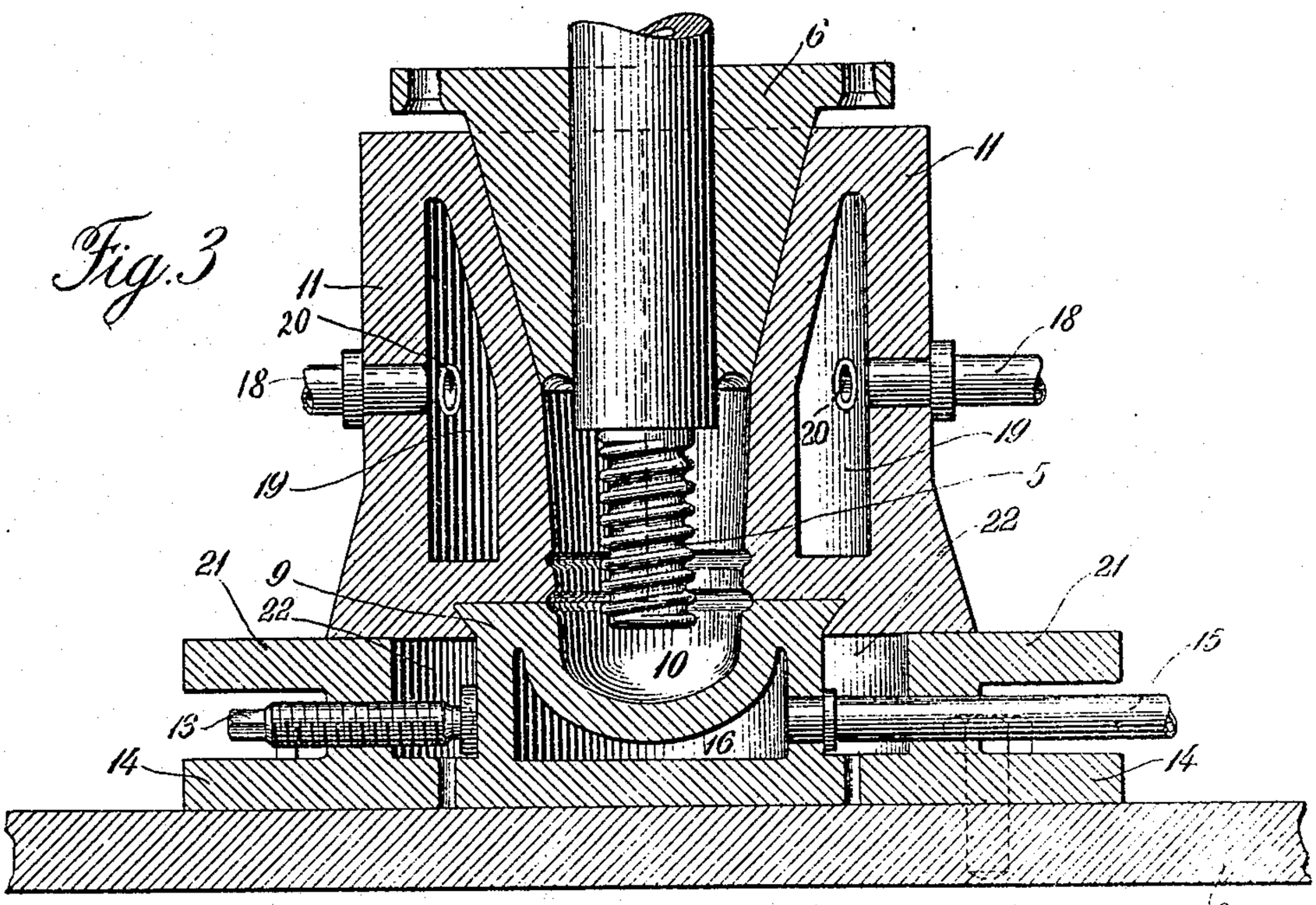
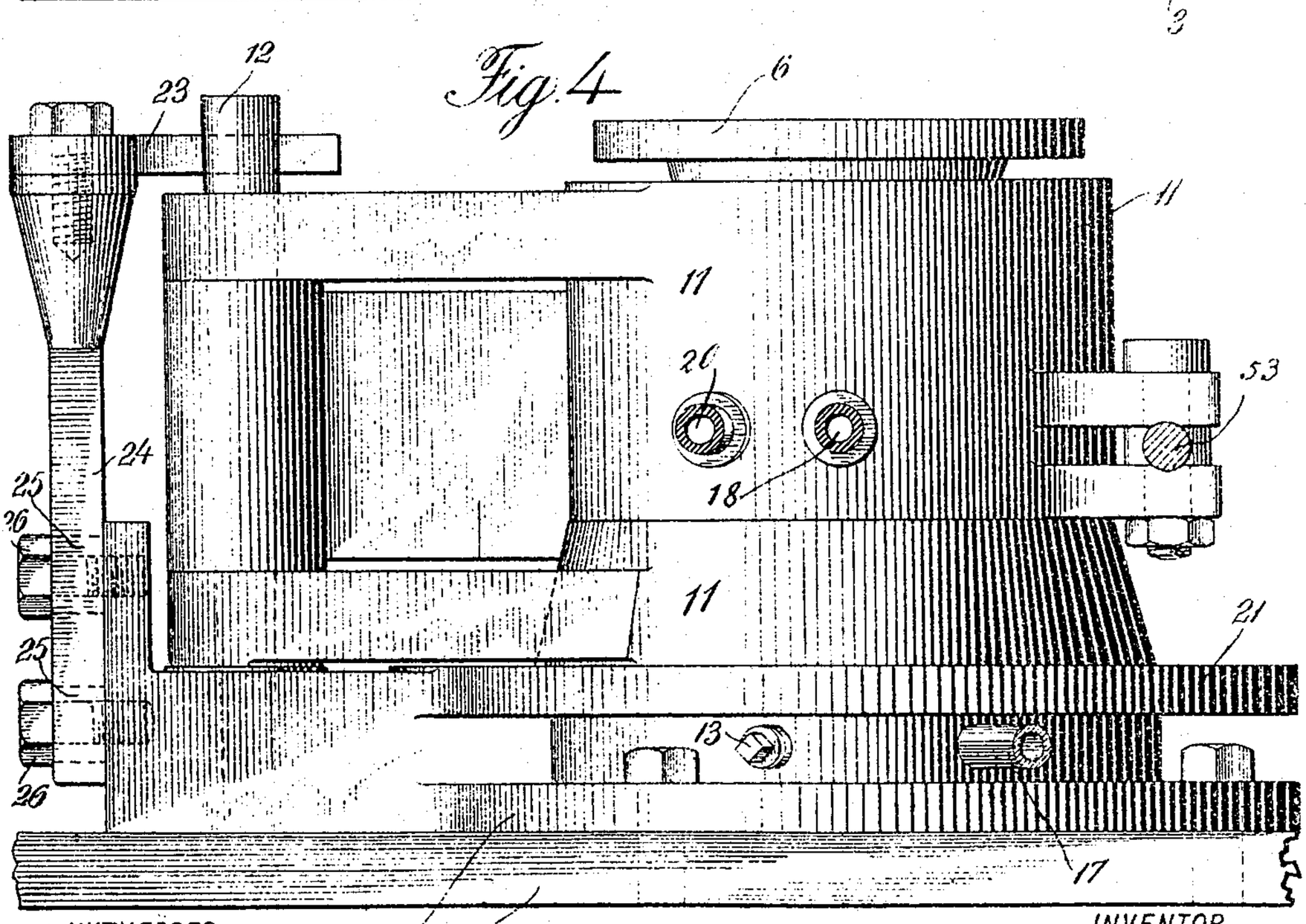


Fig. 4



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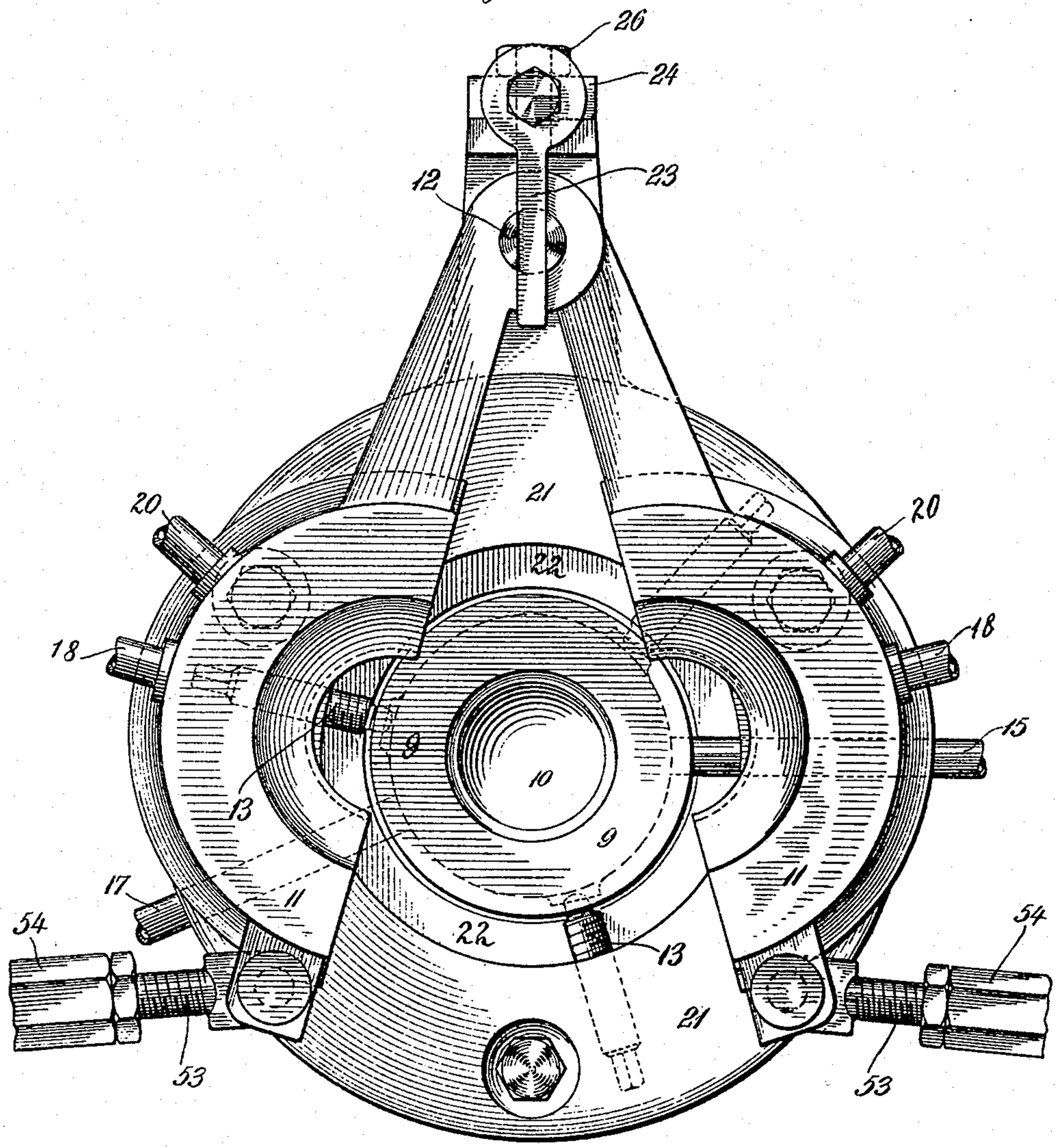
7 SHEETS—SHEET 4.

Fig. 5



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7 SHEETS—SHEET 6.

Fig. 6

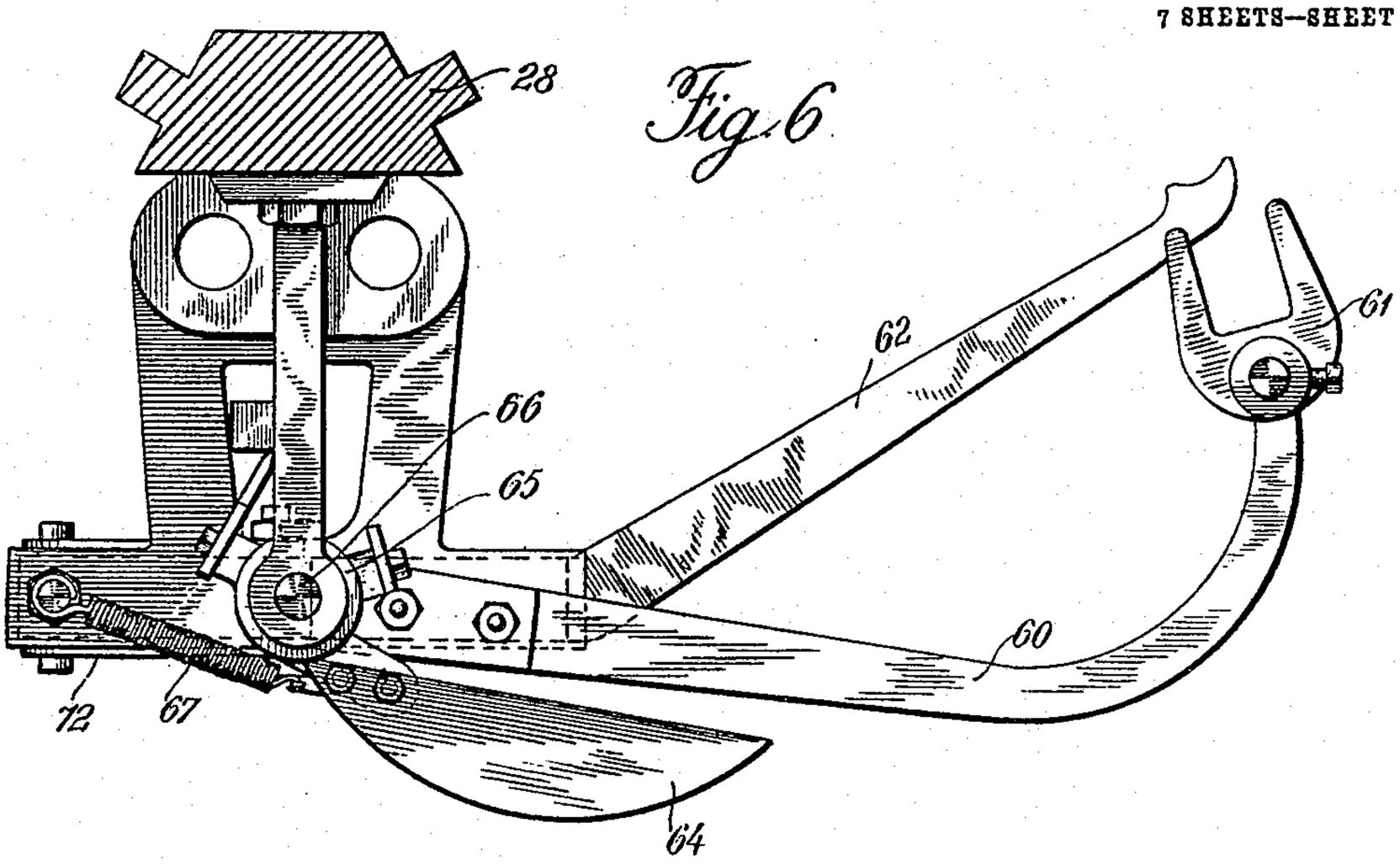
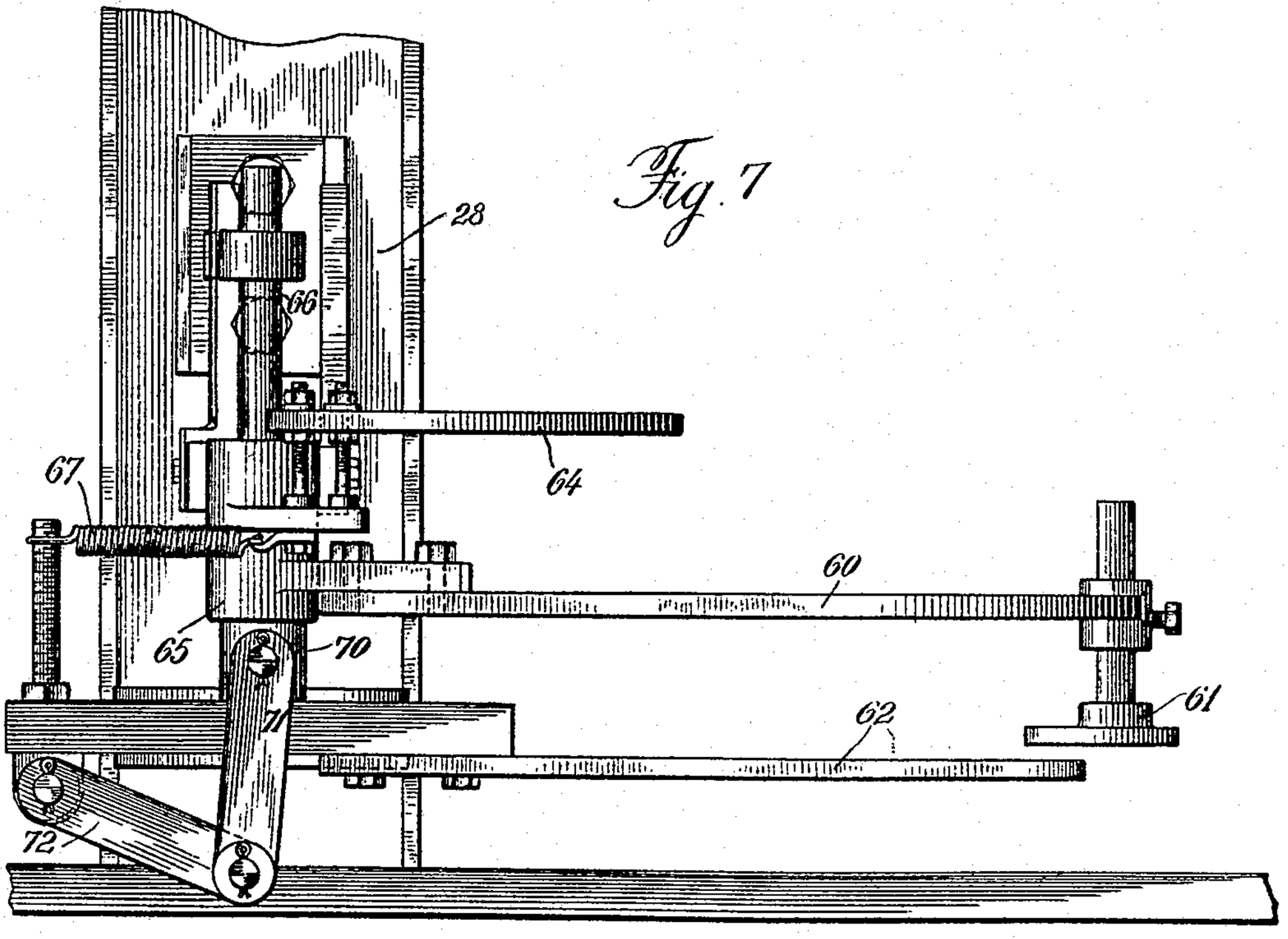


Fig. 7



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Welding, Process,
Screw threading.

No. 835,236. PATENTED NOV. 6, 1906.

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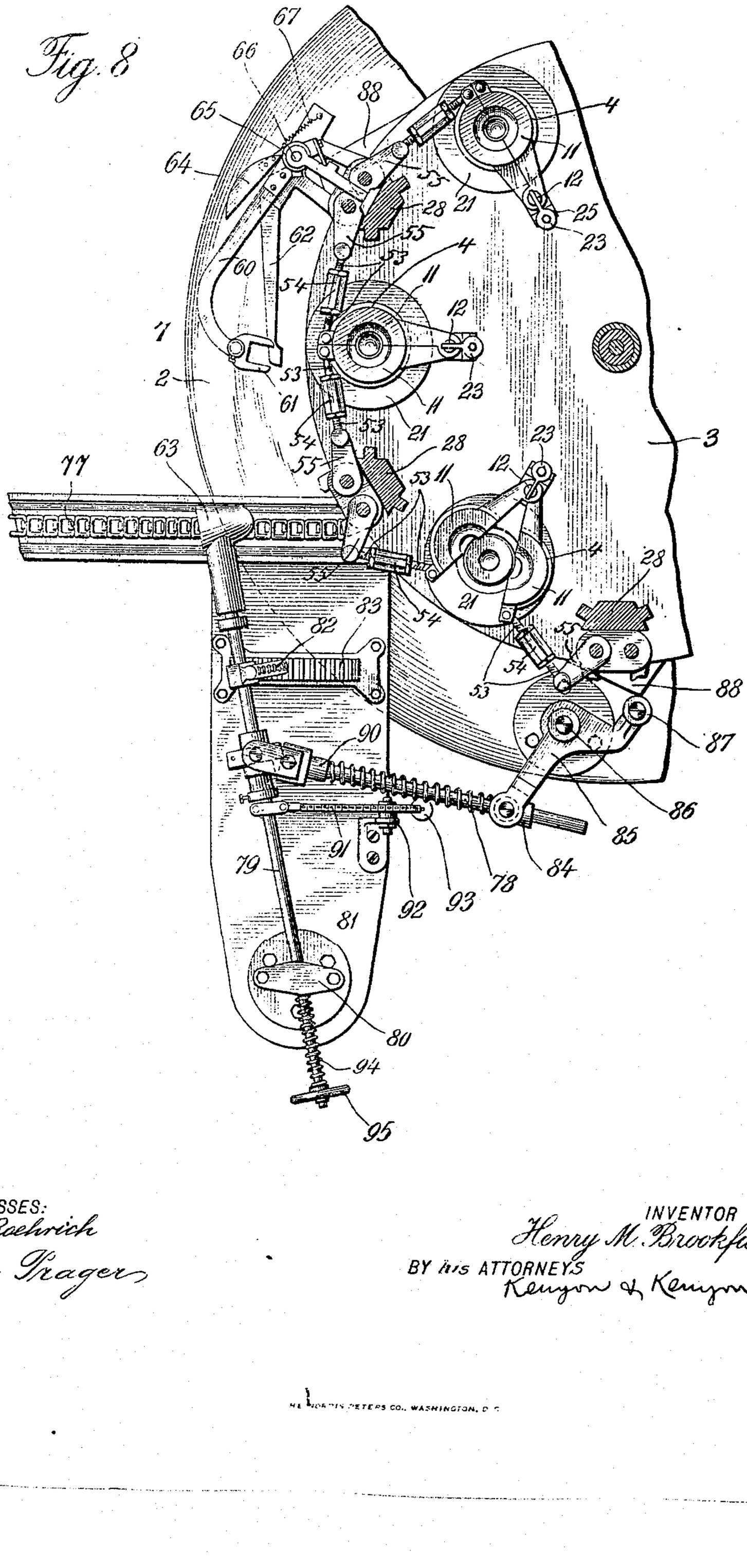
APPLICATION FILED AUG. 10, 1905.

7 SHEETS—SHEET 6.

Fig. 8



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PRESS FOR MAKING INSULATORS OR SIMILAR ARTICLES.

APPLICATION FILED AUG. 10, 1905.

7 SHEETS—SHEET 7.

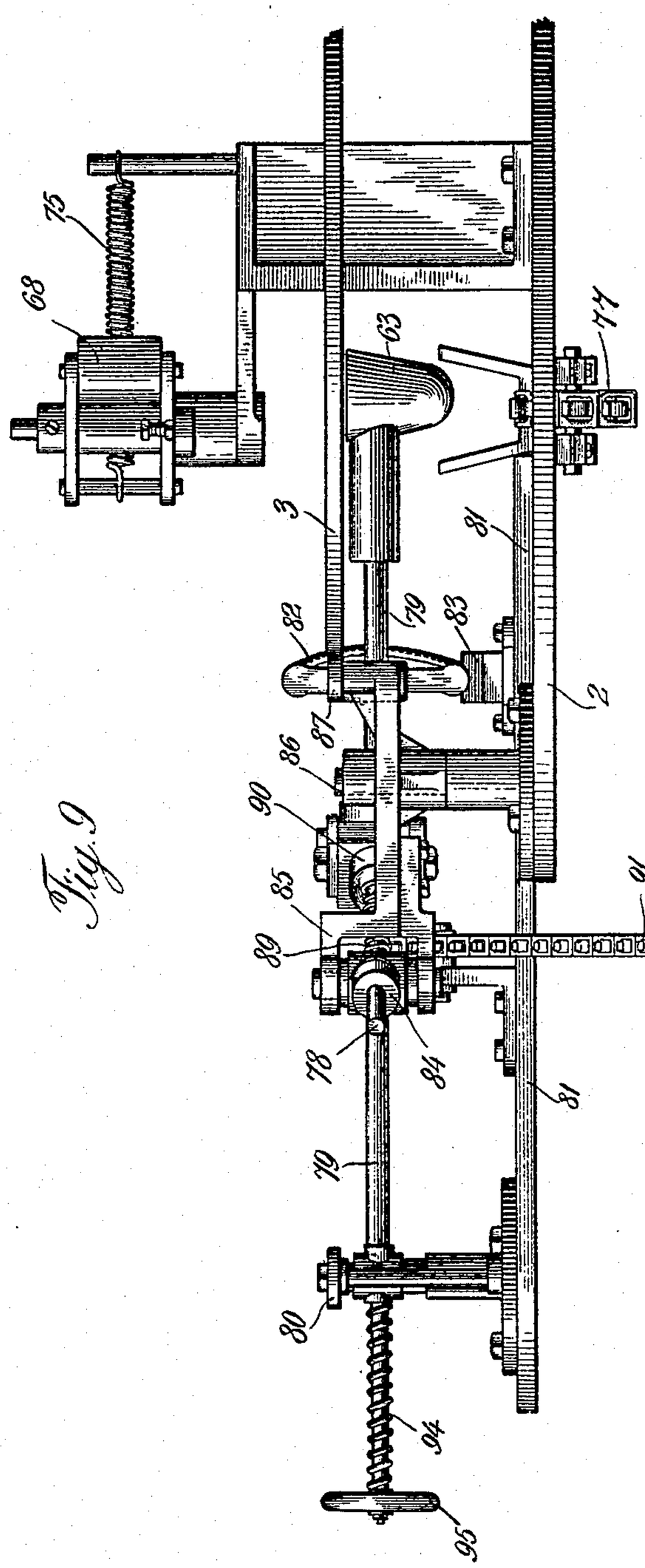

Fig. 9

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UNITED STATES PATENT OFFICE.

HENRY M. BROOKFIELD, OF NEW YORK, N. Y.

PRESS FOR MAKING INSULATORS OR SIMILAR ARTICLES.

No. 835,236. Specification of Letters Patent. Patented Nov. 6, 1906.

Application filed August 10, 1905. Serial No. 273,563.

To all whom it may concern:

Be it known that I, HENRY M. BROOKFIELD, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Presses for Making Insulators or Similar Articles, of which the following is a specification.

My invention relates to presses for making insulators or similar articles, and it has especial reference to the molds used in such presses and the appurtenances connected therewith. It is of especial value in connection with automatic presses, although some features of my invention are capable of being used with presses that are not automatic.

The objects of my invention are to improve and simplify the molds of such presses, to make them more accurate and certain in operation, to improve the insulators or other articles made on them, and to make them more perfect and serviceable, to provide means for preventing clogging of the molds, also to provide means for removing the insulators or similar articles from the molds, and to convey them to the leer, and to do this without injury to such articles, also to make the operation of such presses and their appurtenances more rapid, and generally to improve the operation of such presses.

My invention consists in the novel devices and combinations herein shown and described.

In the drawings accompanying this specification and forming part hereof I have shown my improvement as connected with an automatic press for making insulators, although its use is not confined to the press shown and described, as it may be used with other automatic presses and in some of its features with presses that are not automatic.

Referring to the specific form of devices shown in the drawings, which represent my improvement in its preferred form, Figure 1 is a side elevation of an automatic press embodying my improvement in its preferred form with some of the parts omitted for the purpose of clearness. Fig. 2 is a horizontal section on the lines 2 2 of Fig. 1. Fig. 3 is a central vertical section through my improved mold, the follower and former and the screw-plunger being shown in molding position in the mold. Fig. 4 is a side elevation of the mold. Fig. 5 is a plan view showing the mold open. Fig. 6 is a plan of the means for removing the insulator from the mold, and Fig. 7 is a side elevation of the same. Fig. 8 is a plan of the turning-over cup for placing the insulators on the endless chain, and Fig. 9 is a side view of the same.

The press shown in the drawings is entirely automatic.

1 is a stationary frame supporting the other parts of the press, carrying a stationary table 2.

3 is a rotary turn-table upon which are mounted the molds 4. As shown in Fig. 2, six molds are provided, although, of course, the number of molds may be varied to suit the particular circumstances.

5 is the screw-plunger, and 6 the follower and former, which are here shown in one piece. In the form shown in the drawings the rotary table 3, with its molds and other parts carried by it, are rotated continuously, although, if desired, this motion could be made intermittent.

The general mode of operating the press shown is as follows: The glass is inserted at about the point 7. (See Fig. 2.) This may be done either by hand or automatically; but as this forms no part of the present invention it is not shown. The glass is inserted during the rotation of the table. Immediately after the glass is poured into the mold the screw-plunger and follower are forced into the glass. This movement is accomplished automatically by cams, as will be presently described. Very soon thereafter the follower and former are moved up out of contact with the molten glass in the mold, the screw remaining in longer until the insulator is properly set. This is also accomplished by a cam. Then the screw-plunger is screwed out of the glass in the mold and is further raised by a weight. The devices for accomplishing these two steps will be subsequently described. The next operation is to open the two upper movable parts of the mold. This operation is also performed by cams. The open position of the mold is indicated at 8. As soon as the mold begins to open a fork is automatically moved inward, grasping the insulator in one of the circular grooves near the top portion of the insulator, and as soon as the mold is fully opened the fork is raised, lifting the insulator upward from the mold, and the fork is then swung outward and the insulator disengaged from it. The insulator falls into a cup prepared

for it, and this cup turns it over, so that the petticoats will be downward, placing it upon an endless chain running into the leer.

The various devices of the press shown in the drawings will now be described in the order in which the above operations take place. My improved mold is particularly shown in Figs. 3, 4, and 5. It consists of a solid lower part 9, having a hollow cup-shaped interior 10, adapted to form the head of the insulator, as shown in Fig. 3, and of two movable upper portions 11 11, pivoted together on a pin 12. The means for opening and closing the parts of the mold will be presently described. In order to aid in centering the lower solid part of the mold 9, I preferably provide adjusting means, preferably adjusting-screws 13. As shown, there are three of these. These adjusting-screws pass through a base-plate 14, secured to the rotary table 3. I also preferably provide means for cooling the lower solid part of the mold, as well as the upper movable parts. The means shown for cooling the lower part consist of an inlet-pipe 15, connected with any suitable source of supply of the cooling medium, (not shown,) which delivers the cooling medium to a chamber 16 in the lower part of the mold. In order to provide a circulation, the cooling medium is removed from the mold by an outlet-pipe 17, which discharges the cooling medium in any suitable way. (Not shown.) The inlet-pipes 18 similarly supply a cooling medium for the interior chambers 19 of the movable parts of the mold. The outlet-orifices are indicated at 20. In the form shown the parts 21 21 of the base 14 are made to extend outward sufficiently, so that its upper surface will furnish a support to the outer ends of the movable upper parts of the mold when they are swung open into their opened position, thus relieving the strain on the pivot-pin 12. The upper outer part of the lower part of the mold and the lower inner part of each of the upper movable parts of the mold have dovetail surfaces in the ordinary way in order to insure a tight and accurate fit. Heretofore the lower part of the mold at the bottom of this dovetail has always been extended outward in a horizontal surface, such horizontal surface forming the support for the upper part of the mold when it swings outward. In such a construction the powdered glass, dust, and other material are apt to gather on this supporting horizontal surface and be forced inward into the dovetail as the movable parts move inward. This prevents the accurate registering of these parts and prevents the closing of the mold tightly. Hence the molten glass is apt to leak near the open joint and form seams on the insulator, often making them wholly unmarketable. In order to overcome this trouble, I have removed the supporting-surface from proximity to the dovetail, preferably by separating the mold from the supporting-frame 14 by means of a circular hollow space 22. Whatever refuse matter gathers on the upper part of supporting-surface 21 will fall into the pocket formed by this space, where it will give no trouble and can be cleaned out from time to time. By this improved construction I am enabled always to close the molds tightly.

Pivot-pin 12 is made in the form, preferably, of a slightly-inverted truncated cone, slightly smaller in diameter toward the bottom than at the top. Heretofore as such pivot-pins have been used they have been apt to work upward, making the joint connection between the two parts of the mold a loose one and unfitting the parts for perfect work. In order to overcome this, I preferably employ a locking-bar 23, bolted to support 24, projecting upward from base 14. The locking-bar 23 prevents upward motion of the pivot-pin 12 and also prevents its turning. Such turning tends to wear the pin and also to lift it. These troubles are overcome by my improvement. If desired, support 24 can be made adjustable vertically by means of slots 25 and support 24 and screws 26. As pivot-pin 12 wears its vertical position can be adjusted to compensate for it.

The screw-plunger and the follower and former can be raised and lowered by any suitable means. These form no part of my invention and are not shown in full detail. They are shown merely in general outline and will be only briefly described in connection with the outline features shown. Both the screw-plunger 5 and the follower and former 6 are moved downward by frame 27, moving in guides in vertical supports 28. Frame 27 is forced downward by a cam-track 29, which is dipped downward in the usual way at the point where the plunger and follower are to be moved downward at 30 into the mold. Roller 31, secured to the frame, rides on top of cam-track 29. 32 32 are two studs fast to the frame, passing through holes on the upper part of the follower and former. Springs 33 encircle studs 32 and normally tend to press the follower and former downward. They are merely for the purpose of permitting the follower and former to yield in the usual way. When frame 27 moves downward, it forces the follower and former downward through springs 32 and also forces screw-plunger 5 downward by means of the frame striking a shoulder (not shown) on the shaft of the screw-plunger 5.

Shortly after the screw-plunger and the follower have been pressed downward the follower and former are lifted upward by the raising of frame 27, through roller 31 and cam-track 29, to their normal positions. The screw is of course permitted to remain in the glass the proper length of time to set the screw-thread. It is then raised by means of

a two-part nut 34, each part of which is mounted on a spring-arm 35. These nuts are normally separated, but are brought together when it is desired to screw screw-plunger 5. As the devices for bringing the nuts together and separating them are old and well known and form no part of the present invention, they are not shown and will not be described. As soon as the nut has closed upon the screw-threaded portion of screw-plunger 5 the screw-plunger is rotated by means of a beveled gear 36 on the shaft of screw-plunger 5 and beveled gear 37, which is connected with any suitable mechanism for rotating it at the proper time. As such mechanism is old and well known and forms no part of the present invention, it is not shown and will not be described. At all times, except when the screw-plunger is to be raised, this mechanism is not operated. After the screw-plunger has left the glass it stops rotating, and it is pulled up to its normal position by means of a weight (not shown) secured to ropes 38 38, passing over pulleys 39 39 and secured to cross-bar 40, rotatably connected by collars 41 41 to the shaft of screw-plunger 5.

It will of course be understood that suitable means are provided for rotating the table 3. Any means may be employed, those shown consisting of a main driving-shaft 42, driven from any suitable source of power, having a worm 43 meshing with a worm-wheel 44, secured to the same sleeve 45 that carries the rotary table 3. It will of course be understood that cam 29 and certain other cams are stationary, the parts operated by them coming into contact with them during the rotation of the rotary turn-table and the parts mounted upon it. 46 is a chain-wheel driven by chain 47 from chain-wheel 48 on shaft 42 and through shaft 49 and gears 50 51, the latter driving shaft 52. This drives the mechanism, which rotates at the proper time the various gears 37, the latter rotating the screw-plunger 5. The clutch mechanism and the other parts intervening between shaft 52 and gear 37 form no part of the present invention and are not shown.

The next operation is the opening of the mold. The devices shown for this purpose are illustrated in Figs. 1 and 2 and are as follows: Connected to the outer end of each movable upper half-mold is an arm 53. For purposes of adjustment this arm 53 is made in the usual way, with two screw-threaded portions and a nut 54. To the other end of arm 53 is connected an arm 55, fast on upright rod 56, having another arm 57 adapted to engage a curved cam-surface 58, secured to frame 27. It will be understood, of course, that each half-mold is similarly connected to one side of one of the frames 27. The cams 38 are made operative by the lifting of frame 27 at the proper time. This lifting is caused by roller 31 riding up on the raised portion 59 of cam-track 29. This operation is performed shortly before the point marked 8 in Fig. 2 is reached by a mold

The next operation is the raising of the insulator out of the lower solid part of the mold. I prefer to do this by lifting it from above. The preferred devices shown for this purpose consist of a swinging arm 60, provided with a fork 61. This arm swings inward as the mold begins to open, so that the fork encircles the insulator in the groove near the upper part of the insulator. The arm is then raised vertically, lifting with it the insulator, and it is then swung outward in its raised position. As it passes outward the lower part of the insulator or the head strikes the curved surface at the end of a stationary arm 62, which forces the insulator out from the fork. The insulator then drops into a cup 63. The devices for moving the swinging arm 60 are especially shown in Figs. 1, 2, 6, 7, 8, and 9.

Arm 60 is swung inward by means of a cam-shaped arm 64, fastened to a sleeve 65, that carries the swinging arm 60. Sleeve 65 turns on a stationary stud 66, fastened to upright standard 28 on the rotary table. A spring 67 normally holds sleeve 65, so that arm 60 is in its outward position. As the rotary table rotates cam 64 comes into contact with roller 68, secured to the stationary table 2 of the machine, being supported by a bracket 69. There is only one roller 68, and with this the different cams 64 come into contact at the proper time. The action of roller 68 on cam 64 causes sleeve 65 to rotate, swinging arm 60 inward until fork 61 embraces the insulator.

Sleeve 65 and arm 60 are raised upward by means of a sleeve 70, loose on stud 66, upon which sleeve 65 rests. Sleeve 70 is raised at the proper time by means of two links 71, pivoted one at each side of the sleeve, the links being pivotally connected with two links 72, pivoted to the framework of the rotary table. Links 71 and 72 at their junction carry a roller 73. 74 is a cam upon which roller 73 rides when the proper point is reached. There is one cam 74, and it is carried by bracket 69. When a roller 73 strikes it, the roller rides up on it and lifts links 71, sleeve 70, sleeve 65, and swinging arm 60. This raises the insulator high enough so that the arm 60 in swinging outward will cause the insulator to clear the mold. A spring 75, connected with roller 68, permits that roller to give in case arm 60 is blocked and cannot move inward, and spring 76 permits cam 74 to give in a similar way should roller 73 or its connecting parts be blocked and unable to move. In both of these cases in the instances cited some part of the machine would be broken unless the roller 68 and cam 74 were permitted to yield, if required to do so. Swinging arm 60 is

moved outward, carrying the insulator by means of spring 67 whenever cam-arm 64 and roller 68 permit the movement. In practice the motion will not be a sudden one, as otherwise the insulator might be thrown out of the fork. Toward the close of this movement stationary arm 62 forces the insulator out from fork 61, whereupon it drops into cup 63, as already described.

Cup 63 is for the purpose of turning the insulator over, so that it will fall upon an endless chain 77, which passes it through the leer. The leer is not shown in the drawings, as it forms no part of the invention. If the insulator fell with its rounded head upon the chain, it would roll onto its side. This is objectionable, as the insulator is somewhat soft in this condition and the glass will settle down somewhat through its own weight, tending to make the cross-section of the interior screw-thread depart from the true circular form. This is a serious objection in practice, as many insulators will have their screw-threads so distorted that they cannot be screwed upon the wooden screw-pins intended to support them. By turning the insulator over, so that it will stand upon the endless chain upon the petticoat portion, the insulator will stand with the axis of the interior screw in a vertical position, so that there will be no departure from the true circular cross-sectional form. Any settling of the glass will be substantially at right angles to the line of the screw-thread, and in practice this leads to no objectionable result. The devices shown for upsetting cup 63 are as follows: They are particularly shown in Figs. 1, 2, 8, and 9. In Fig. 2 the cup is shown in its vertical position or the position in which the insulator is dropped into it, and Fig. 8 shows the cup has turned a quarter-revolution and in the act of spilling out the insulator upon the endless chain. It is found in practice that a quarter-turn is sufficient for the purpose. Cup 63 also has preferably a swinging horizontal movement in order to carry the insulator from the position in which it receives the insulator to a position directly over the endless chain. Both of these movements take place together. The swinging or sidewise movement is caused by means of a rod 78, pivoted to a rod 79, which supports cup 63. Rod 79 is supported toward one end in bearings 80, carried by a stationary bracket 81, projecting from the stationary table 2. It is connected with bearing 80 by means of a swivel-joint. At its inner end it is supported by a toothed segment 82, secured to rod 79 and gearing with a stationary rack 83 on bracket 81. Rod 78 passes through a sleeve 84, pivoted or swiveled to a bell-crank lever 85, pivoted at 86 in the stationary table 2 and carrying at its inner end a roller 87, adapted to engage with cams 88, one for each mold, mounted on the rotary table 3. When roller 87 engages cam 88, it forces rod 79 and cup 63 to swing outward. The motion of the bell-crank 85 to the rod 78 is communicated through a spring 89, encircling the rod between the end of the bell-crank and a shoulder 90 on the rod.

Rod 79 and cup 63 are brought back to their normal inward position by means of a chain 91, running over a pulley 92, and a chain having at its lower end a weight 93. 79 is slidingly pivoted to bearing 80, passing through a sleeve forming part of that bearing. A spring 94, encircling rod 79 between the bearing and a shoulder on the rod, holds rod 79 in its normal position, but permits it to give longitudinally should there be any blocking. This giving is to prevent a breaking of any of the parts should a block occur. 95 is a hand-wheel mounted on rod 79 to permit a manual upsetting of cup 63 should that be desired. The turning movement of cup 63 is imparted to it by toothed segment 82, running over and engaging with rack 83. I find in practice that a quarter-revolution of the cup is sufficient for the purpose. This throws the insulator out of the cup upon the chain, bringing it, with the petticoats, downward, so that the insulator will stand upon the chain with its head upward and its petticoats down. The endless chain bears it to and through the leer.

It is not essential that the means for raising the insulator or other article from the mold operate from above and lift the insulator. By a suitable modification the device would operate from below through an opening in the mold to force the insulator up, provision of course being made to close the mold tightly for the next operation; nor is it essential that the raising means swing in and out, although I prefer to so arrange them; nor is it essential that the means for forcing the insulator out from the fork be stationary or that one be provided for each mold, as in the form shown in the drawings, as a single arm could be provided for the entire press mounted upon the stationary support at a suitable point; nor is it essential that the upsetting device be in the form of a cup, as any suitable device for that purpose may be employed and any suitable means may be provided for the upsetting operation; nor is it essential that my improved device for protecting the dovetail joint between the lower and upper parts of the mold be provided with an opening, as shown in the drawings. It is sufficient if the supporting-surface for the upper parts of the mold upon which the powdered glass and other refuse is liable to fall be not adjacent to the dovetail joint—as, for example, the supporting-surface might be the upper surface of the lower part of the mold if that were extended sufficiently outward so that the upper part of the mold in

swinging outward to its outmost limit would always be upon such support.

In general my invention is not limited to the specific form of apparatus shown in the drawings; but those may be changed or varied widely without departing from my broad invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a press, the combination of a mold for forming glass insulators or other similar glass articles having a single solid portion adapted to form the head of the insulator or other article, and a device for lifting the insulator or other article from the solid lower part of the mold, and swinging it to one side of the press to remove it from the press, and means for removing it from said lifting device into an upsetting vessel, and means for turning said vessel to upset the article upon a receiving-surface so that the petticoat or wider portion of the insulator or other article will be downward.

2. In a press, the combination of a mold for forming glass insulators or other similar glass articles having a single solid portion adapted to form the head of the insulator or other article, and a device for lifting the insulator or other article from the solid lower part of the mold, and swinging it to one side of the press to remove it from the press, and means for removing it from said lifting device into an upsetting vessel, and means for turning said vessel to upset the article upon a conveyer adapted to receive and carry it to a leer.

3. In an automatic press, the combination of a mold for forming glass insulators or other similar glass articles having a single solid portion adapted to form the head of the insulator or other article, and a device for lifting the insulator or other article from the solid lower part of the mold, and swinging it to one side of the press to remove it from the press, and means for removing it from said lifting device into an upsetting vessel, and means for turning said vessel to upset the article upon a conveyer adapted to receive and carry it to a leer, whereby the insulators or other glass articles will be automatically removed from the lower solid part of the mold, and delivered to and placed upon a conveyer with the petticoat or wider portion downward ready for passage through the leer in that position.

4. The combination of a mold for forming glass insulators or other similar glass articles, a lifting-arm adapted automatically to swing inward and grasp the insulator or other article as the mold opens, and lift it out of the mold and swing it outward free of the press, and a device for forcing the article from the grasp of the lifting-arm into a receiving vessel adapted to place it upon a conveyer adapted to carry it to the leer.

5. The combination of a mold for forming glass insulators or other similar glass articles, a lifting-arm adapted automatically to swing inward and grasp the insulator or other article as the mold opens, and lift it out of the mold and swing it outward free of the press, and a device for forcing the article from the grasp of the lifting-arm into an upsetting vessel adapted to receive it, and to upset it with its petticoat or wider portion downward upon a conveyer, adapted to carry it to the leer.

6. In a press for forming glass insulators or other similar glass articles, an upsetting vessel for receiving the molded insulator or other article adapted to upset the said article upon a receiving-surface, so that its petticoat or wider portion will be downward.

7. In a press for forming glass insulators or other similar glass articles, an upsetting vessel for receiving the molded insulator or other article adapted to turn the said article upon a receiving-surface, so that its petticoat or wider portion will be downward.

8. In a press for forming glass insulators or other similar glass articles, an upsetting vessel for receiving the molded insulator or other article adapted to upset the said article upon a conveyer adapted to carry it to the leer, so that its petticoat or wider portion will be downward.

9. In a press for forming glass insulators or other similar glass articles, an upsetting vessel for receiving the molded insulator or other article, means for turning said upsetting vessel to upset the said article upon a conveyer adapted to carry it to the leer, so that its petticoat or wider portion will be downward upon the conveyer, and a conveyer adapted to carry such article to the leer.

10. In an automatic press for forming glass insulators or other similar glass articles, the combination of a turn-table, a plurality of molds mounted and carried thereon, means for opening the molds, a lifting-arm adapted automatically to swing inward and grasp the insulator or other article as the mold opens, and lift it out of the mold and swing it outward free of the press, and a series of devices, one for each mold, mounted upon the turn-table, and each adapted to force the article from the grasp of the lifting-arm.

11. In an automatic press for forming glass insulators or other similar glass articles, the combination of a turn-table, a plurality of molds mounted and carried thereon, means for opening the molds, a series of lifting-arms, one for each mold, mounted upon the turn-table, and each adapted automatically to swing inward and grasp the insulator or other article as the mold opens, and lift it out of the mold and swing it outward free of the press.

12. In an automatic press for forming glass insulators or other similar glass articles,

the combination of a turn-table, a plurality of molds mounted and carried thereon, means for opening the molds, a series of lifting-arms, one for each mold, mounted upon the turn-table, and each adapted automatically to swing inward and grasp the insulator or other article as the mold opens, and lift it out of the mold and swing it outward free of the press, and a series of devices, one for each mold, mounted upon the turn-table, each adapted to force the article from the grasp of its corresponding lifting-arm.

13. The combination of movable parts of a mold adapted to open or close on each other, a loose vertical pivot-pin upon which said movable parts pivot, and a locking-pin adapted to engage with the pivot-pin to prevent the latter from working upward.

14. The combination of movable parts of a mold adapted to open or close on each other, a loose tapering vertical pivot-pin upon which said movable parts pivot, and a locking-pin adapted to engage with the pivot-pin to prevent the latter from working upward.

15. The combination of movable parts of a mold adapted to open or close on each other, a loose tapering vertical pivot-pin upon which said movable parts pivot, and a vertically-adjustable locking-pin adapted to engage with the pivot-pin to prevent the latter from working upward.

16. In a mold for forming insulators or similar glass articles, composed of movable upper parts and a lower part supporting each upper part, the combination of dovetailing parts, one on each upper part of the mold, and corresponding ones on the lower for permitting tight and accurate closing and registry of the movable upper parts of the mold, and supporting-surfaces on the lower part of the mold for supporting the upper parts, placed otherwise than in the dovetail joint, whereby clogging of the dovetail joint will be prevented.

17. In a mold for forming insulators or similar glass articles, composed of movable upper parts and a lower part supporting each upper part, the combination of dovetailing parts, one on each upper part of the mold, and corresponding ones on the lower for permitting tight and accurate closing and registry of the movable upper parts of the mold, and supporting-surfaces on the lower part of the mold for supporting the upper parts, provided with a cut-away portion at each dovetail joint, whereby any powdered glass or other refuse material will fall through the opening made by the cut-away portion, and will not clog the dovetail joint.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY M. BROOKFIELD.

Witnesses:

FRANK N. ROEHRICH,

DE FOREST JETMORE.