

No. 841,644.

PATENTED JAN. 15, 1907.

R. L. DENNISON.

MACHINE FOR MAKING FENCE POSTS.

APPLICATION FILED APR. 24, 1905. RENEWED AUG. 1, 1906.

4 SHEETS—SHEET 1.

Fig. 1

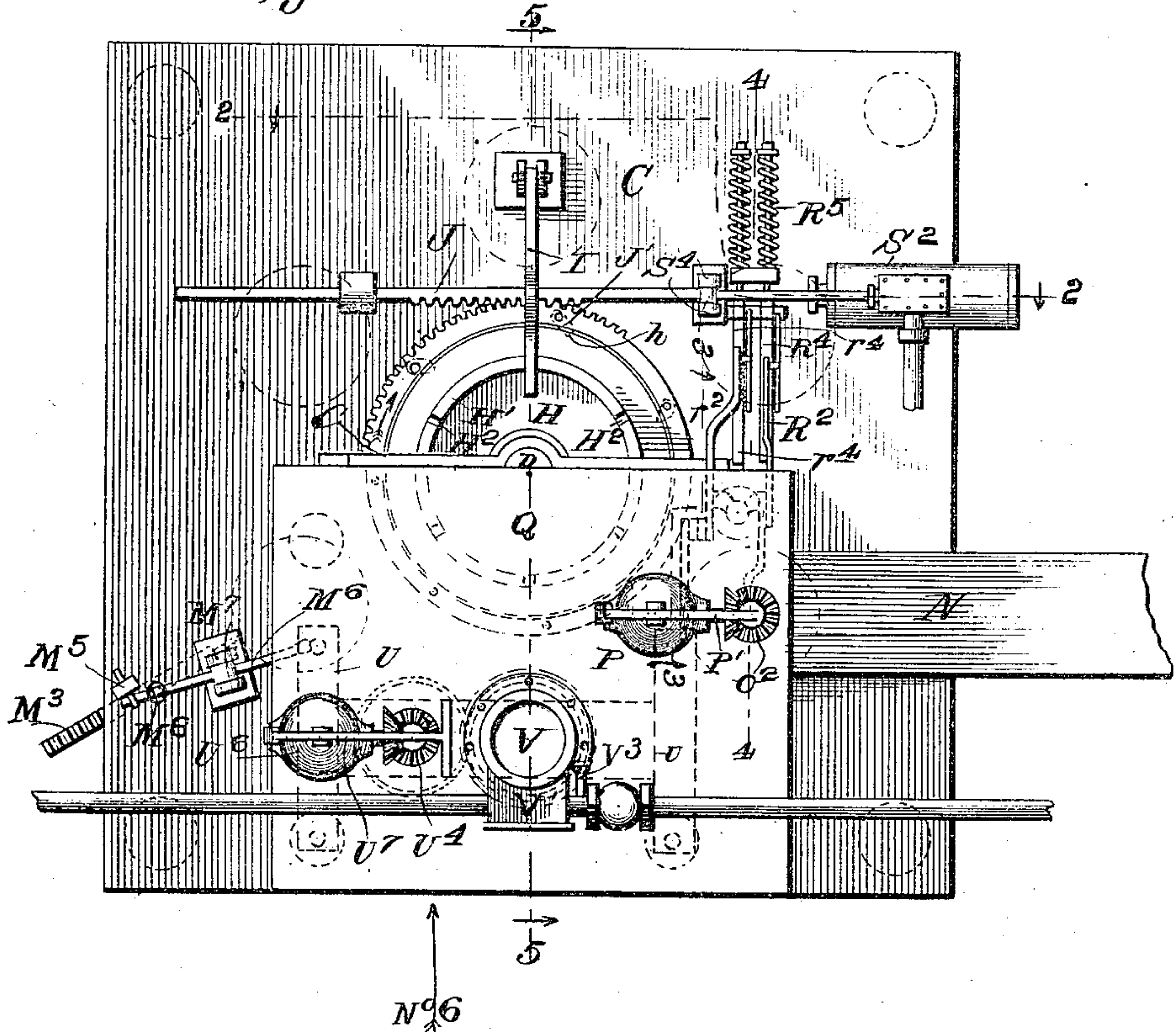


Fig. 2

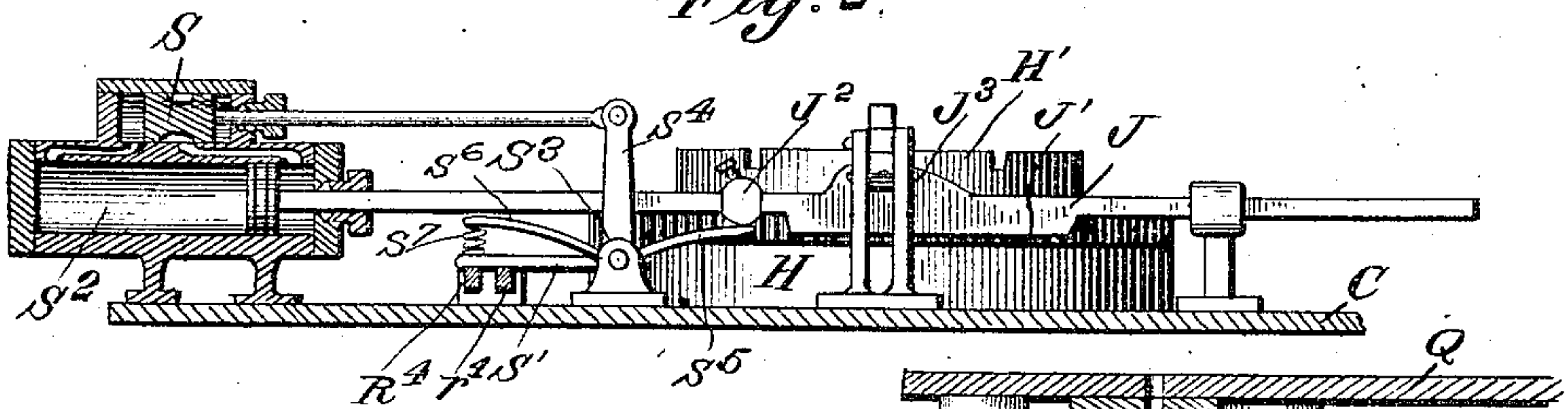
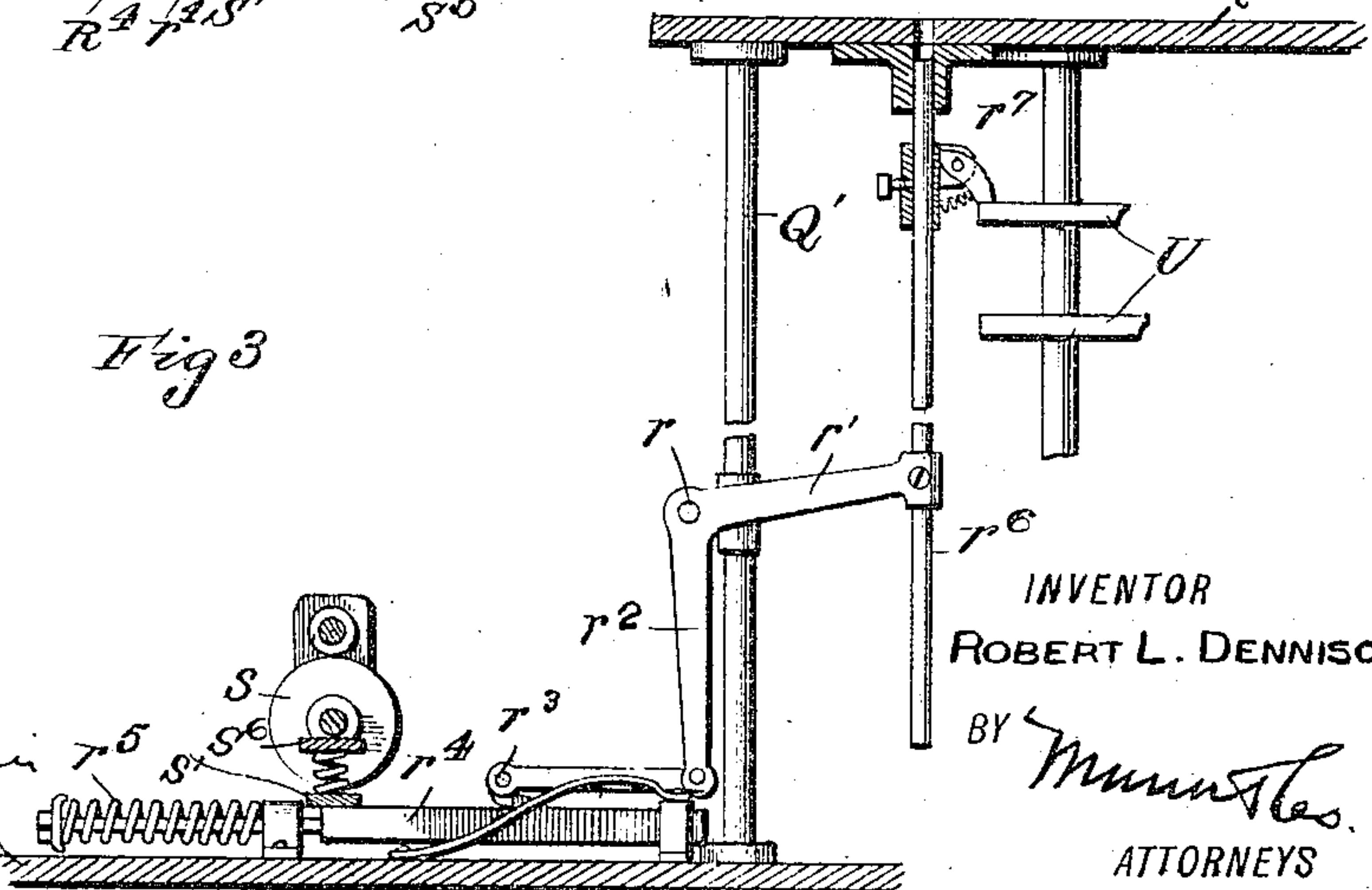


Fig. 3



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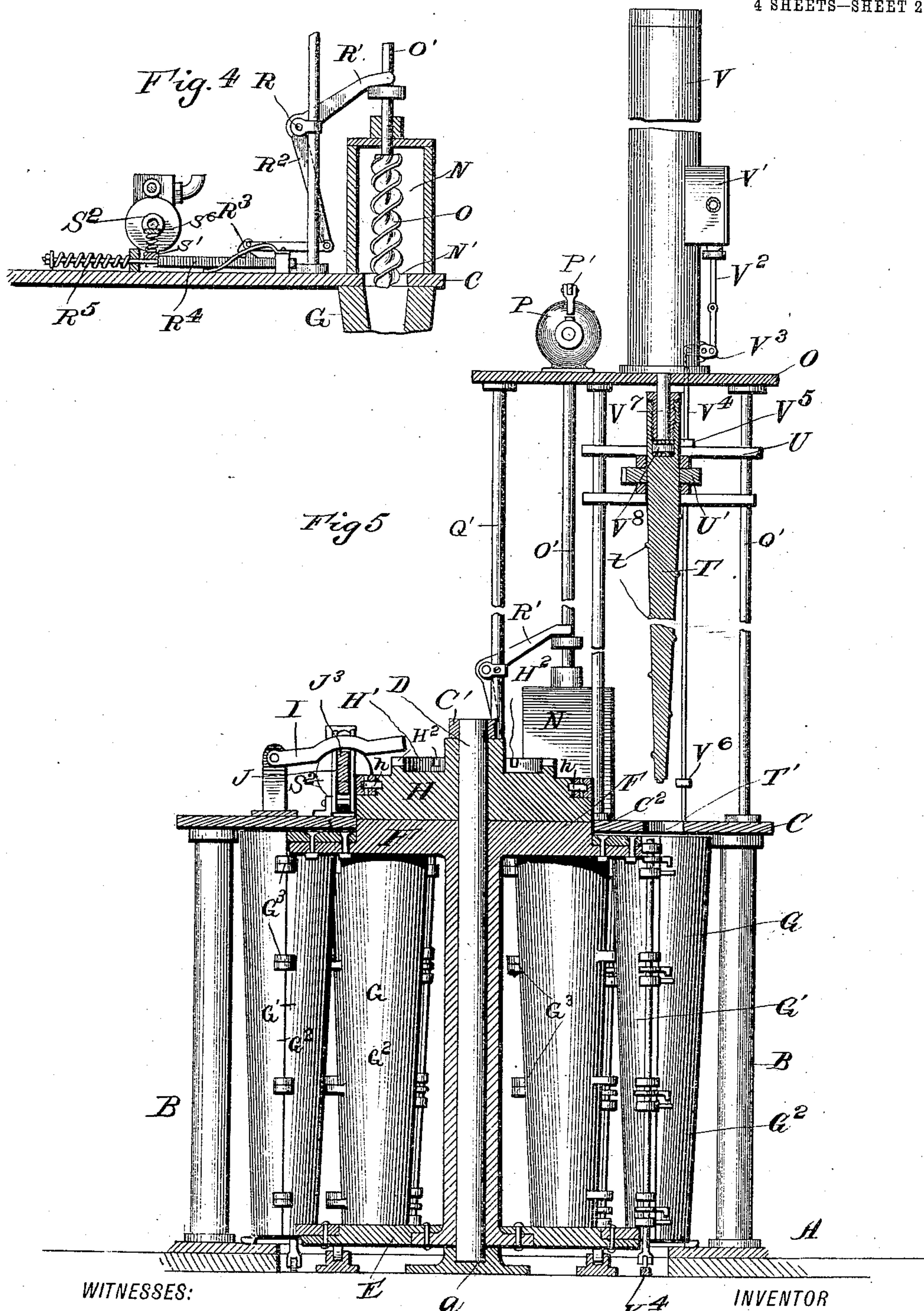
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4 SHEETS—SHEET 2.



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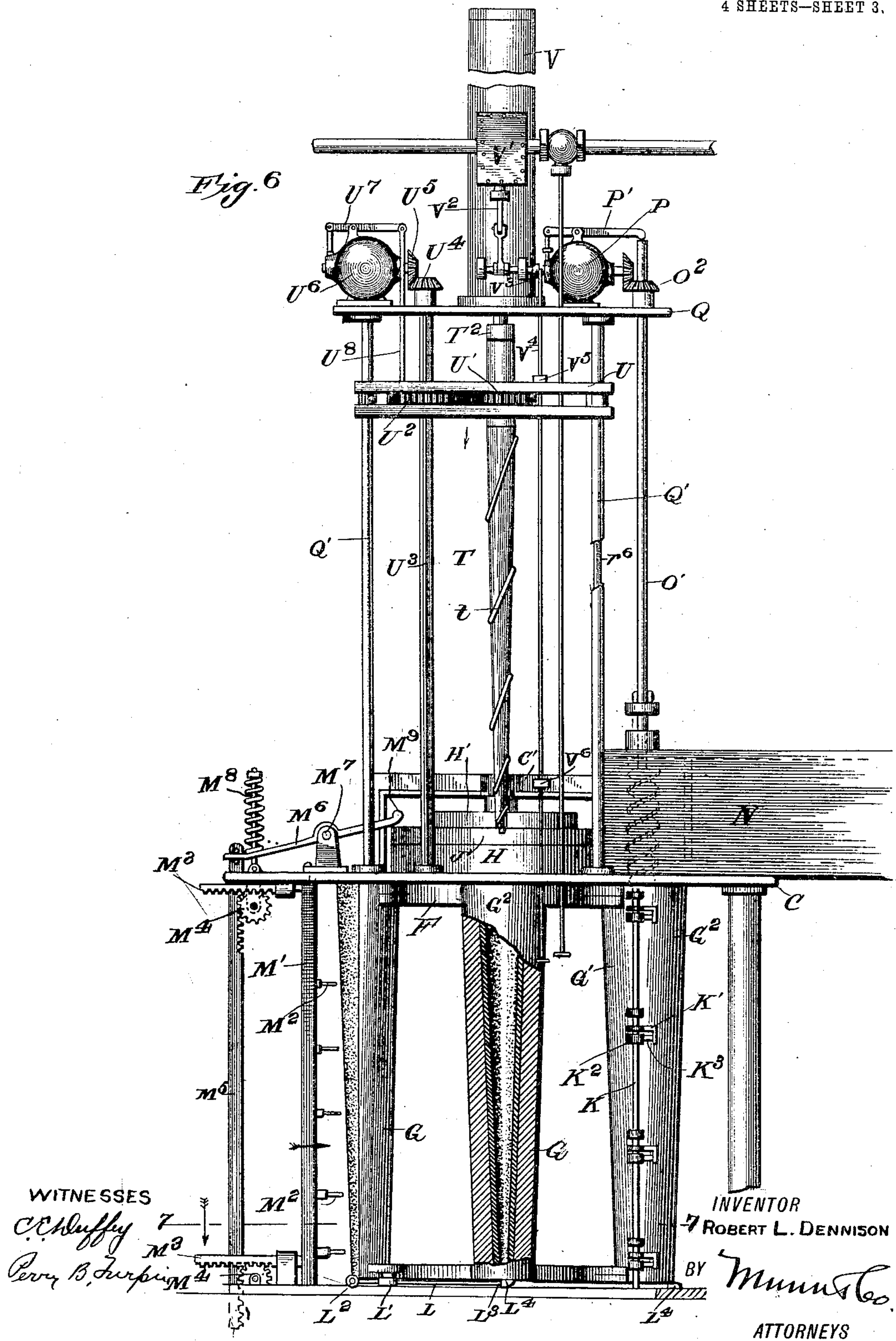
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4 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

ROBERT L. DENNISON, OF KANSAS CITY, MISSOURI.

MACHINE FOR MAKING FENCE-POSTS.

No. 841,644.

Specification of Letters Patent.

Patented Jan. 15, 1907.

Application filed April 24, 1905. Renewed August 1, 1906. Serial No. 328,763.

To all whom it may concern:

Be it known that I, ROBERT LEE DENNISON, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have made certain new and useful Improvements in Machines for Making Fence-Posts, of which the following is a specification.

This invention is an improvement in machines for making concrete articles, and is especially designed for the manufacture of fence-posts from shale and any other plastic material; and the invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a top plan view of a machine embodying my invention. Fig. 2 is a partial vertical section on about line 2 2 of Fig. 1. Fig. 3 is a detail vertical section on about line 3 3 of Fig. 1. Fig. 4 is a detail vertical section drawn through the packer and the tripping devices operated thereby on about line 4 4 of Fig. 1. Fig. 5 is a side elevation, partly in vertical section, of a machine embodying the invention, such Fig. 5 being taken in the direction of the arrow No. 5 on Fig. 1. Fig. 6 is a side elevation, partly in section, of the machine, taken in the direction of the arrow No. 6 on Fig. 1. Fig. 7 is a cross-section on about line 7 7 of Fig. 6. Fig. 8 is a detail side elevation of a fence-post formed by the machine. Fig. 9 is a detail top plan view of the top plate of the revolving carrier. Fig. 10 is a detail enlarged section showing the antifriction-bearings for the revolving former, and Fig. 11 is a cross-section on about line 11 11 of Fig. 10.

In carrying out the invention there is provided a carrier revolving about a vertical axis and having a series of mold-boxes whose outer halves or sections are hinged and can be opened when the latch devices are released by means of certain tripping devices, and this revolving carrier presents its mold-boxes successively to a packing and filling device by which the shale or other material is fed into the mold, then to a forming device, then to latch-releasing devices and to means for opening the outer sections or doors of the molds, and then to piercing devices by which to form the holes and seats for the wire in the post, means being provided for properly timing the several operations and for locking the means for turning the carrier against

moving from one position to another until the operations which it is desired to effect have been completed.

In carrying out the invention I provide a foundation A, on which are mounted the posts B, which support the bed-plate C at a sufficient height above the foundation to permit the carrier to operate its molds between the bed-plate and the foundation, as shown in Figs. 5 and 6. The foundation A has at a step-bearing for the lower end of the carrier-shaft D, the upper end of said shaft journaling in a yoke C', mounted upon the bed-plate C. This shaft D, it will be noticed, forms a part of the carrier, and by journaling the upper and lower ends of the shaft in practically fixed bearings I am able to secure an accurate turning of the carrier within the frame, so that the mold-boxes may be presented successively in true register with the openings for the former and for the packer, as presently described.

The carrier is shown as provided with a bottom plate E, a top plate F, the mold-boxes G, and a top or crown H, mounted on the top plate F, the latter fitting snugly within a central opening C² in the bed-plate C, as shown. The crown H is provided with an upwardly-projecting annular rib or flange H', which is notched at intervals at H², corresponding to the respective mold-boxes G, for engagement by the stop-bar I, which operates to lock the carrier from movement when desired. The crown or top portion H is also provided with notches at h for engagement by pawls J' on a rack-ring J, which encircles the top portion of the carrier and may be moved in the direction of the arrow in Fig. 1 to turn the carrier in a corresponding direction by the operation of the rack-bar presently described, but may be moved in the reverse direction without disturbing the position of the carrier, as will be understood from Figs. 1 and 5, the operation of the rack-bar J being effected through a cylinder and piston, as shown in Fig. 2, as will be more fully described.

The mold-boxes G are made with the inner halves or sections G', fixed to the main frame of the carrier, and with the outer halves or sections G², which are hinged at G³ (see Fig. 7) to the inner halves or sections and may be opened or closed, as will be understood from the said Fig. 7.

The sections G' and G² are held together

at the swinging edge of the section G^2 by latch projections K' on an upright rod K , movable longitudinally in guides K^2 on the inner section G' , the latch projections K' being arranged to engage over lugs K^3 on the section G^2 in the position of parts shown in Fig. 6 and to be freed from such engagement before the mold-box reaches the position shown at the bottom of Fig. 7 by the engagement of the lower end of the rod K upon the inclined tripping device K^4 , whereby to push the rod K up and to force its latch projections from engagement with the lugs K^3 on the mold-section G^2 , so the opening device may operate to open the section G^2 , as illustrated in Fig. 7 of the drawings. This opening device is shown as a lever L , pivoted at L' between its ends, actuated at one end by a spring L^2 to cause its other end L^3 to occupy the position shown in Fig. 7, in which it will engage a projection L^4 on the outer side of the mold-box section G^2 and open the mold-box after its latch devices have been released by the operation before described. As the mold-box travels by the movement of the carrier past the opening-lever L , such mold-box will be spread wide open in order that the formed fence-post may be exposed to the action of the piercing devices M (illustrated in Figs. 6 and 7) and including the upright bar M' , provided on its inner side with the projecting spikes or points M^2 , arranged to enter the formed posts, together with means whereby the piercing-bar M' may be actuated in both directions. These preferably include rack-bars M^3 , projecting horizontally outward from the bar M' and meshing with toothed pinions M^4 , which in turn are meshed by rack-teeth on an upright rack-bar M^5 , with which is connected one end of a lever M^6 , pivoted between its ends at M^7 , having its outer end actuated by a spring M^8 normally to the position shown in Fig. 6, in which the piercing-bar is retracted and arranged to be operated in the reverse direction to move the piercing-bar inwardly to operate upon the fence-post by the engagement of the cross-head presently described, upon the inner end M^9 of the lever M^6 , when said cross-head approaches its lowermost position, as will be more fully described hereinafter. I have now described the means for moving the carrier step by step in order to present the mold-boxes successively to the packing and forming devices, and to open said mold-boxes and to subject the formed posts therein to the action of piercing devices for the purpose of producing the openings shown at m in the fence-post, (illustrated in Fig. 8,) such openings being useful for attaching the wires of the fence, as will be understood by those skilled in the art.

It should be understood that the interiors of the mold-boxes are conformed to the post which it is desired to produce, and therefore

taper from end to end, and for convenience in operation are arranged with their larger ends uppermost.

The material is supplied from any suitable pug-mill or other suitable mixing means or appliance to a box or hopper N and is fed thence through an opening N' in the bed-plate C to the mold-box G by the action of the packer O , which is in the form of a screw, as shown, and has its shaft O' movable vertically, so the screw may rise and fall in the operation of the machine. This screw O is operated from an electric or other motor P , mounted on a platform Q , supported by posts Q' above the bed-plate C , and this electric or other motor may be controlled by suitable switch mechanism from a lever P' , whose outer end is arranged for engagement by the upper end of the shaft O' of the packer, so that when the packer rises to its uppermost position its shaft O' will trip the lever P' and stop the motor P , the shaft of the motor being geared with a bevel-gear O^2 , through which the shaft O' may move longitudinally and which is keyed to the said shaft, so that the shaft O' will be operated by the turning of the gear O^2 in the operation of the invention.

In the operation of the invention when the packer O rises to its uppermost position it trips its motor P , and the devices for moving the mold-carrier are operated to move the same, so that the packer O will rest at its lower end at h^2 upon the upper surface of the top plate of the packer-carrier and will be supported thereon until the next mold-box is presented in position to be filled through the opening N' . The packer will then drop by gravity through the opening N' and will operate upon the material until the mold-box is filled, when the continued revolution of the packer will cause the same to ride upwardly out of the mold-box and trip its motor to stop the revolution of the packer until the latter again drops by gravity into the next succeeding mold-box. When the packer rises to its uppermost position, as shown in Fig. 4, it operates upon one arm R' of a bell-crank lever, which is pivoted at R and whose other arm R^2 engages at R^3 the safety-bar R^4 , which is movable longitudinally to the position shown in Fig. 4 by the action of a spring R^5 , in which position the bar R^4 bears beneath the fixed arm S' of the bell-crank lever for operating the valve S , controlling the admission of steam to the cylinder S^2 , for feeding the mold-carrier step by step in the operation of the invention, as presently described. When the bell-crank lever is rocked by a further upward movement of the packer beyond the position shown in Fig. 4, it will draw the safety-bar R^4 out from beneath the arm S' of the bell-crank lever for operating the valve, and said arm S' may be forced down upon the spring supporting-rod of the safety-bar,

which movement will be sufficient to shift the valve S (shown in Fig. 2) in order to secure the reverse movement of the piston in the cylinder S², as will be more fully described hereinafter. The purpose of this construction is to prevent any movement of the devices for feeding the mold-carrier step by step until the packer has completed its packing operation and is moved upwardly clear of the mold-box in which it has just effected the packing operation as desired.

After the plastic material has been packed in the mold the latter is shifted from the packer to a position in alinement with the former T, which is directly beneath an opening T' in the bed-plate C, the former operating through the opening T' and acting upon the plastic material in the mold with a piercing and a drilling action in such manner as to secure a compression and packing of the material within the mold, so that there will be produced a molded post whose walls will be of uniform density and thickness, avoiding all inequalities of material which would have a tendency to cause cracking or other injury to the fence-post in burning the same. To this end I make the former T tapered toward its lower end or point, provide on said former a spiral rib or thread *t*, and support the said former so it may be rotated in operation and may be fed down and up in the operation of the machine. To this end I journal the former T at its upper end in a cross-head U, which is guided and moves up and down on the uprights Q' and supports gears U' and U², the gear U' being keyed upon the former T and the gear U² being keyed upon and movable longitudinally along a shaft U³, which journals at its lower end in the bed-plate C and at its upper end in the top plate Q and is provided with a bevel-gear U⁴, which is meshed with a bevel-gear U⁵ on the shaft of a suitable motor U⁶, whose switch-operating lever U⁷ is provided with a depending rod U⁸, arranged to be engaged by the cross-head U as the latter approaches its uppermost position in order to throw the motor U⁶ out of operation when the former is out of the mold-boxes.

The former T and the cross-head U are moved up and down by means of a piston operating in a cylinder V, mounted on the top plate Q and having its valve-chest V' entered by a pitman V² from a rocker V³, which connects with a depending rod V⁴, having an upper shoulder or projection V⁵ and a lower shoulder or projection V⁶, which are engaged by the cross-head near its upper and lower positions in order to operate the valve (not shown) in the chest V' to shift the same to admit steam or other power to the cylinder V in order to raise and lower the former T and its cross-head. The piston-rod V⁷ has at its lower end a head V⁸, operating in a socket T' in the upper end of the former T and re-

tained by a gland T², screwed in the socket T' and surrounding the piston-rod V⁷, balls T³ and T⁴ bearing, respectively, above and below the head V⁸ and reducing friction in the revolutions of the former T, as will be understood from Figs. 5 and 10 of the drawings. Thus in operation the former T is raised and lowered by one set of mechanism and is revolved by another set of mechanism and automatically operates to cut the said mechanism into and out of operation at the proper moment. It is also desired to control the operation of the rack-bar for giving the mold-carrier a step-by-step movement by the positions of the former T, so that the mold-carrier will not be given its advance movement until the former has been raised clear of the mold-box. In securing this result I provide a safety-bar *r*⁴, similar to the bar R⁴ and having a spring *r*⁵, operating upon the rod extending from the safety-bar *r*⁴, the bar *r*⁴ having a shoulder *r*³, arranged for engagement by a catch on a rod extending from an arm *r*² of a bell-crank lever *r*, whose other arm *r*¹ is connected with a vertical slide-rod *r*⁶, (see Fig. 3,) on which is adjustably secured a pawl or projection *r*⁷, which is engaged by the cross-head as the latter approaches its uppermost position, so the cross-head will operate to lift the rod *r*⁶ to cause the bell-crank lever *r*, through the connections described, to move the safety-bar *r*⁴ from beneath the bell-crank arm S', (see Fig. 2,) to permit the said arm S' to lower in the operation which will presently be described.

As shown in Fig. 2, the safety-bars R⁴ and *r*⁴ operate beneath the arm S' of the bell-crank lever S³. This bell-crank lever has an upwardly-projecting fixed arm S⁴, a fixed arm S', extending toward the cylinder S², and a fixed arm S⁵, extending in the opposite direction from the arm S', the arm S⁵ inclining upwardly toward its free end and being arranged for engagement by a cam or projection J² on the rack-bar J. I also provide a pressure-bar S⁶, extending over the arm S' and held normally elevated by a spring S⁷, bearing between the parts S' and S⁶ and permitting the pressure-bar to be forced downwardly by the cam or projection J² in such manner as to cause the spring S⁷ to exert a tension upon the arm S', so that the said arm S' will be lowered when the safety-bars R⁴ and *r*⁴ are both retracted by their operating devices before described. I also provide the rack J with a cam J³, bearing beneath the locking-bar I and arranged to release the same from engagement with the locking-ring H' at the upper end of the carrier preliminary to moving the carrier by the operation of the rack-bar J. Thus in operation the conventional exhaust-port functions as a steam-port, and when the parts are in the position shown in Fig. 2 it will be noticed that the safety-bars are both beneath the arm S' of the bell-crank lever, and the valve S is shifted

to admit steam to the right-hand end of the cylinder S^2 . The cam J^3 is also beneath the locking-bar I and in position to raise the said bar clear of its notches. The steam operating in the right-hand end of the cylinder S^2 will now force the piston in said cylinder to the left and the rack-bar J will travel to the left, moving with it the carrier to the extent of one step, and the cam projection J^2 will ride upon the pressure-bar S^6 and depress the same, putting its spring S^7 under tension; but the bell-crank lever will be held from movement by the safety-bars R^4 and r^4 until the latter are withdrawn by means previously described. When these bars R^4 and r^4 are withdrawn, the spring S^7 , being under tension, will force the bell-crank arm S' down, thus operating the bell-crank to shift the valve S to the left and admit steam to the left-hand end of the cylinder, so the piston will be forced to the right, carrying with it the rack-bar on its return stroke, and such bar will return the rack-ring to position to bring its pawl into engagement with the proper notches in the mold-box carrier, and the movement of the rack-bar to the right will by the cam projection operating upon the bell-crank arm S^5 shift the valve S to the position shown in Fig. 2, and the piston will be quickly forced to the left, operating to turn the carrier one step and bringing its cam projection to a point where it bears on the pressure-bar and the further shifting of the valve will be delayed until the safety-bars have been both withdrawn, as before described. It will thus be noticed that I provide for shifting the mold-box carrier step by step at intervals and also provide means whereby to control such shifting of the mold-box carrier by means of the packer and the former arranged and operating as fully set forth in the previous description.

What I claim is—

1. The combination substantially as herein described, of the foundation, the bed-plate above the same, the top plate above the bed-plate, posts supporting the bed-plate from the foundation, posts supporting the top plate from the bed-plate, the mold-boxes arranged between the bed-plate and foundation and having hinged sections or doors at their outer sides, locking devices for securing said doors, tripping devices for releasing the locking devices, a carrier movable between the bed-plate and foundation and supporting the mold-boxes, a lock for holding the carrier from movement, step-by-step devices for moving the carrier and including a rack-bar having a cam for releasing the carrier-lock, a cam or projection for operating the valve-rocker or bell-crank lever, and a piston and cylinder for operating said rack-bar, the valve for the cylinder and the rocking bell-crank lever for operating said valve having a spring-pressed pressure-bar, safety-bars for restrain-

ing the movement of said valve-rocker or bell-crank lever, a packer for filling the mold-boxes, a former for operating upon the material supplied to the said mold-boxes, intermediate devices between said packer and former and their safety-bars, whereby the movements thereof may operate the safety-bars for the valve-operating rocker, a device for piercing the molded article and intermediate devices between said piercing devices and the former whereby the movement of the piercing devices is timed relatively to the said former, substantially as and for the purposes set forth.

2. The combination with a suitable framing, of a carrier journaled vertically therein, vertically-disposed mold-boxes supported by said carrier, a packer extending into and filling said mold-boxes, a former for operating within said boxes upon material supplied thereto, a step-by-step feeding device for the said carrier, and intermediate mechanism whereby the former and the packer control the step-by-step movement of the carrier substantially as set forth.

3. A machine for molding plastic articles, comprising the mold-boxes, a carrier therefor, a former movable longitudinally within the mold-boxes, means for moving the former longitudinally, a cross-head supporting the former, gearing carried by the cross-head for turning the former, and means for operating said gearing to effect the turning of the former, substantially as and for the purposes set forth.

4. The combination of a mold-box having a laterally-opening door and a former revolving and moving longitudinally in said box, the diameter of the former being substantially smaller than that of the box whereby the former may pack the molded material laterally toward the mold-box.

5. A machine for molding plastic articles, comprising a mold-box, having a laterally-opening door and a tapered spiral former operating therein for boring out the center and building up the walls of a molded article in said box, the diameter of the spiral former being substantially smaller than that of the box whereby the former may pack the molded material laterally toward the mold-box.

6. The combination in a machine for molding plastic articles, of a carrier revolving on a vertical axis and having a series of mold-boxes comprising fixed inner sections and hinged outer sections or doors, locking devices for securing said doors and projecting downwardly below the carrier, tripping devices below the carrier for releasing the locking devices and a device along the outer side of the carrier in position to abut and open the hinged doors of the mold-boxes subsequent to the release of the locking device therefor, substantially as set forth.

7. The combination of a mold-box having

an outer hinged section or door, means for locking the door, means for releasing the door, means for opening the door subsequent to the unlocking thereof, a piercing - bar
 5 extending longitudinally alongside the mold-box and movable toward and from the same, laterally-extending racks connected with the piercing-bar, pinions meshing with said racks, and means operating the pinions whereby to
 10 move the piercing-bar toward and from the mold-box, substantially as set forth.

8. In a machine for molding plastic articles comprising a bed-plate, a top plate supported from the bed-plate, mold-boxes
 15 arranged below the bed-plate and having hinged sections or doors at their outer sides, locking devices for securing said doors, tripping devices for releasing the locking devices, a device arranged alongside the path of the
 20 mold-boxes in position to engage and open the hinged doors thereof, and a perforating device arranged to pierce the molded article in the mold-box after the door thereof has been opened, substantially as set forth.

25 9. In a machine substantially as described, the combination of a mold-box having an inner fixed section and an outer movable section or door, means for opening the outer section of the mold-box, and a piercing de-
 30 vice for piercing the molded article within said open mold-box and operating opposite the fixed mold-box section, substantially as set forth.

10. The combination with the mold-box
 35 having a movable section or door, a lock for the door, means for releasing the lock, a spring-actuated bar for opening the door, and a piercing device for piercing a molded article within said box when the door is
 40 opened.

11. The combination of a sectional mold-box, a piercing device including a bar extending longitudinally alongside the said
 45 mold-box, laterally-extending racks connected with said bar, an upright rack, pinions meshing with said upright and lateral racks, and means for operating the upright rack, substantially as set forth.

12. The combination with a mold-box, of
 50 a piercing device including a bar extending longitudinally parallel with the said mold-box, and provided with piercing projections, and racks and pinions for moving the said bar toward and from the mold-box, substan-
 55 tially as set forth.

13. The combination of a revolving carrier, mold-boxes supported thereby and having doors at their outer sides, means for locking the doors, means below the carrier for releasing said locking devices, and means along
 60 the outer side of the carrier for opening the doors, subsequent to said unlocking operation.

14. The combination of the mold-boxes
 65 divided longitudinally into sections, upright

locking-bars for said sections, an abutment for engagement by said locking-bar, whereby to release the same, and a carrier for the mold-boxes whereby to bring the locking-bars thereof into engagement with the re-
 70 leasing-abutment.

15. The combination of the carrier provided with mold-boxes divided longitudinally into sections, means for feeding the
 75 said carrier step by step, locking-bars for the sections of the mold-boxes, an abutment for engagement by the said locking-bars to release the latter, an opening device for opening the mold-boxes, and a piercing device for
 80 piercing the molded article within the mold-box, the abutment, the opening device, and the piercing device being arranged in position succeeding each other, whereby the carrier will present the mold-boxes to the abutment, the opening device and the piercing
 85 device in the order named.

16. The combination with the horizontal bed-plate having openings for a packer and a former, and the carrier having vertically-disposed mold-boxes operating beneath the
 90 said bed-plate and registering with the said openings, of means for feeding the carrier step by step, a packer for filling the mold-boxes, and a former for operating upon the material within the said mold-boxes, sub-
 95 stantially as set forth.

17. The combination with the revolving carrier and its mold-boxes, of the piercing device, means for operating said piercing de-
 100 vice including an arm projecting into the path of a cross-head, a former for operating upon the material in the mold-boxes, and a reciprocating cross-head in connection with said former and arranged to engage and ac-
 105 tuate the arm for operating the piercing device, substantially as set forth.

18. The combination with the carrier and its mold-boxes, of a packer for filling the boxes, a former for operating upon the ma-
 110 terial in the boxes, a piercing or perforating device for operating upon the molded articles, and means for moving the carrier step by step whereby to present the mold-boxes successively to the packing, former, and
 115 piercing devices, substantially as set forth.

19. The combination of suitable framing, a carrier having the mold-boxes and provided with an upwardly-projecting annular rib notched at intervals for the locking-bar, means for moving the carrier step by step in-
 120 cluding a reciprocating bar and connections between the same and the carrier, and means whereby the said reciprocating bar may release the locking-bar from engagement with the rib or flange of the carrier, substantially
 125 as set forth.

20. The combination in a machine for molding plastic articles, of a revolving carrier having mold-boxes, a packer for filling the said mold-boxes and adapted to be
 130

forced longitudinally by the material filled into said boxes, a motor device for operating said packer, and means whereby the movement of the packer by material filled in the box will throw the motor device out of gear, substantially as set forth.

21. The combination with a revolving carrier, and its mold-boxes, and a former for operating upon the material supplied to said mold-boxes, of means for moving the former longitudinally, means for turning the former, and means whereby the longitudinal movement of the former may control the operation of its turning and longitudinally-moving devices, substantially as set forth.

22. The combination in a machine for molding plastic articles, of the mold-boxes, a tapered spiral former movable longitudinally into said boxes, a cylinder above and having its piston-rod connected with the former for moving the said former longitudinally and means for turning the former, substantially as set forth.

23. The combination with the revolving carrier, and its mold-boxes, the packer and the former, of devices for moving the carrier step by step and including a rack-bar, a piston and cylinder and valve-operating devices in connection with said cylinder and including a bell-crank lever having a rocker provided with an arm and a pressure-bar overlying said arm, and arranged for operation

by the rack-bar, safety-bars movable to and from a position beneath said arm and its overlying pressure-bar, and intermediate devices between said safety-bars and the former and packer, whereby they may be controlled respectively by the said packer and former, substantially as set forth.

24. The combination in a machine for molding plastic articles, of the carrier, means for moving said carrier step by step and including a rack-bar, a cylinder and valve-operating devices including a rocker having a bell-crank arm and a pressure-bar overlying the arm, and arranged for operation by the rack-bar, and a safety bar or bars movable to and from position beneath the arm of the bell-crank rocker, substantially as set forth.

25. The combination of a revolving carrier and its mold-boxes, a packer operating vertically in said boxes and arranged to drop by gravity into the boxes and to be fed upwardly by the accumulating material in said boxes, motor devices for revolving said packer, and means whereby said motor devices may be thrown out of operation by the packer when the latter reaches its upper position.

ROBERT L. DENNISON.

Witnesses:

SOLON C. KEMON,
PERRY B. TURPIN.