

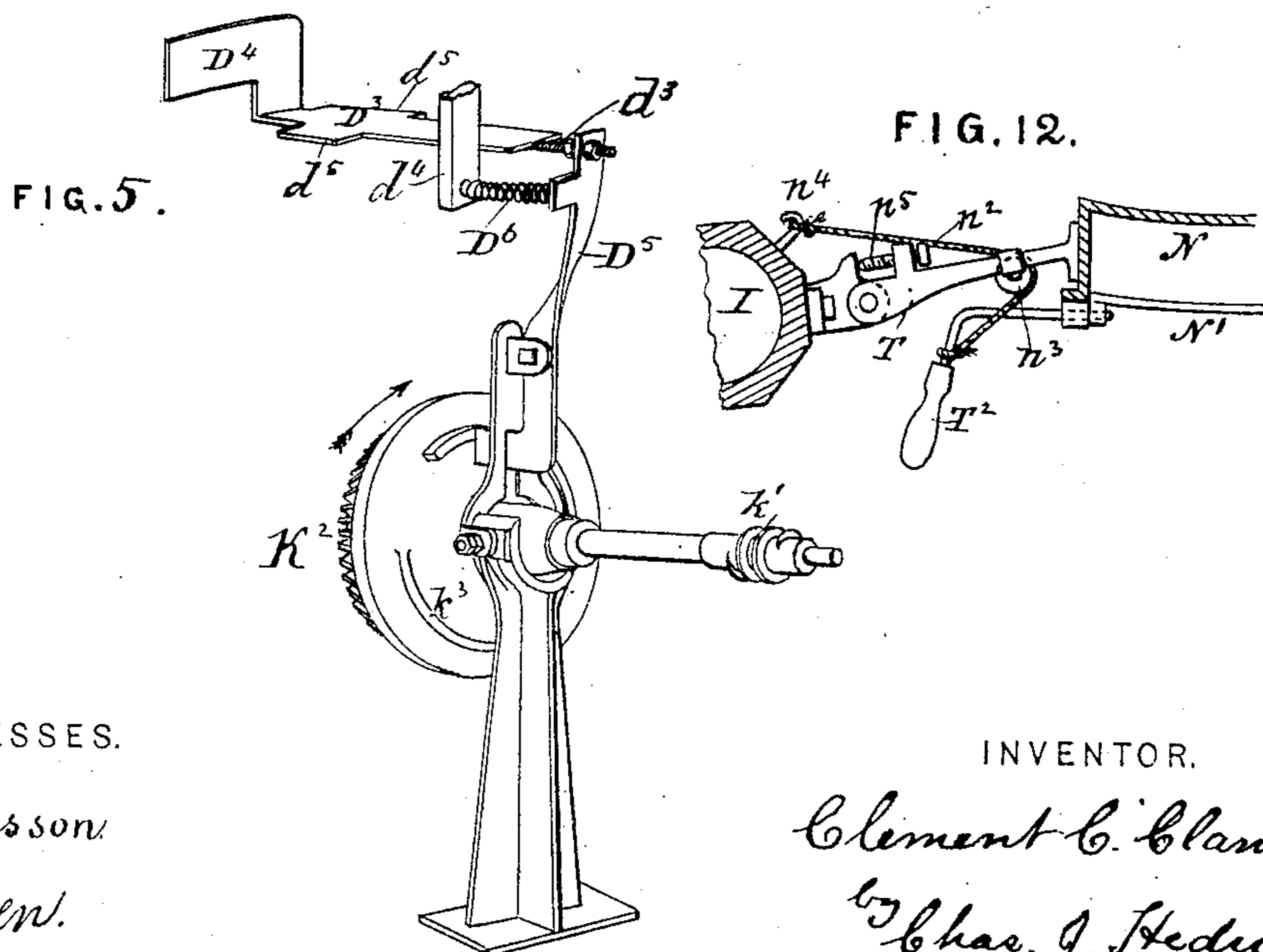
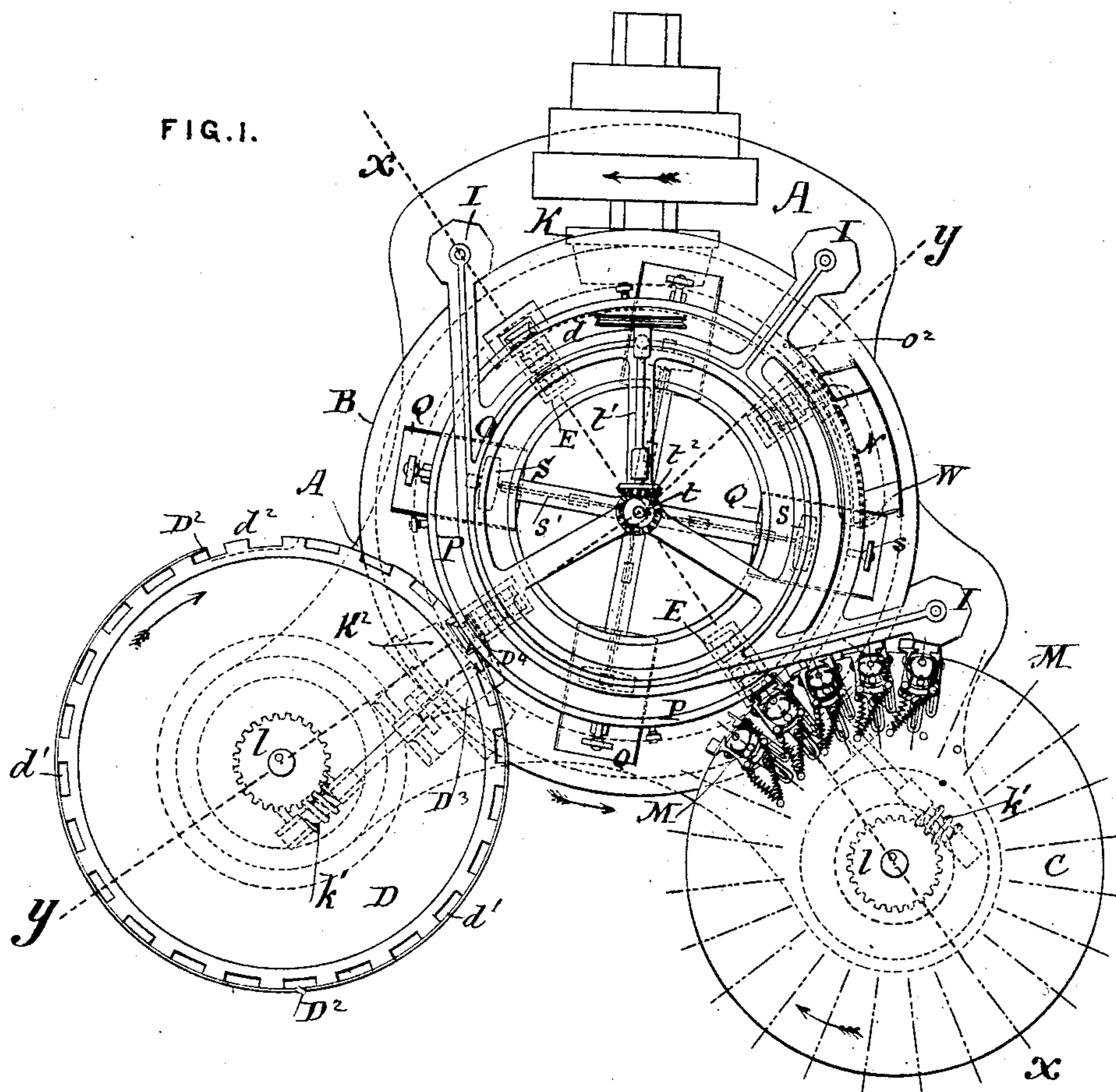
(No Model.)

C. C. CLAWSON.  
Tobacco Packing Machine.

6 Sheets—Sheet 1.

No. 240,968.

Patented May 3, 1881.



WITNESSES.

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W. E. Borren.

INVENTOR.

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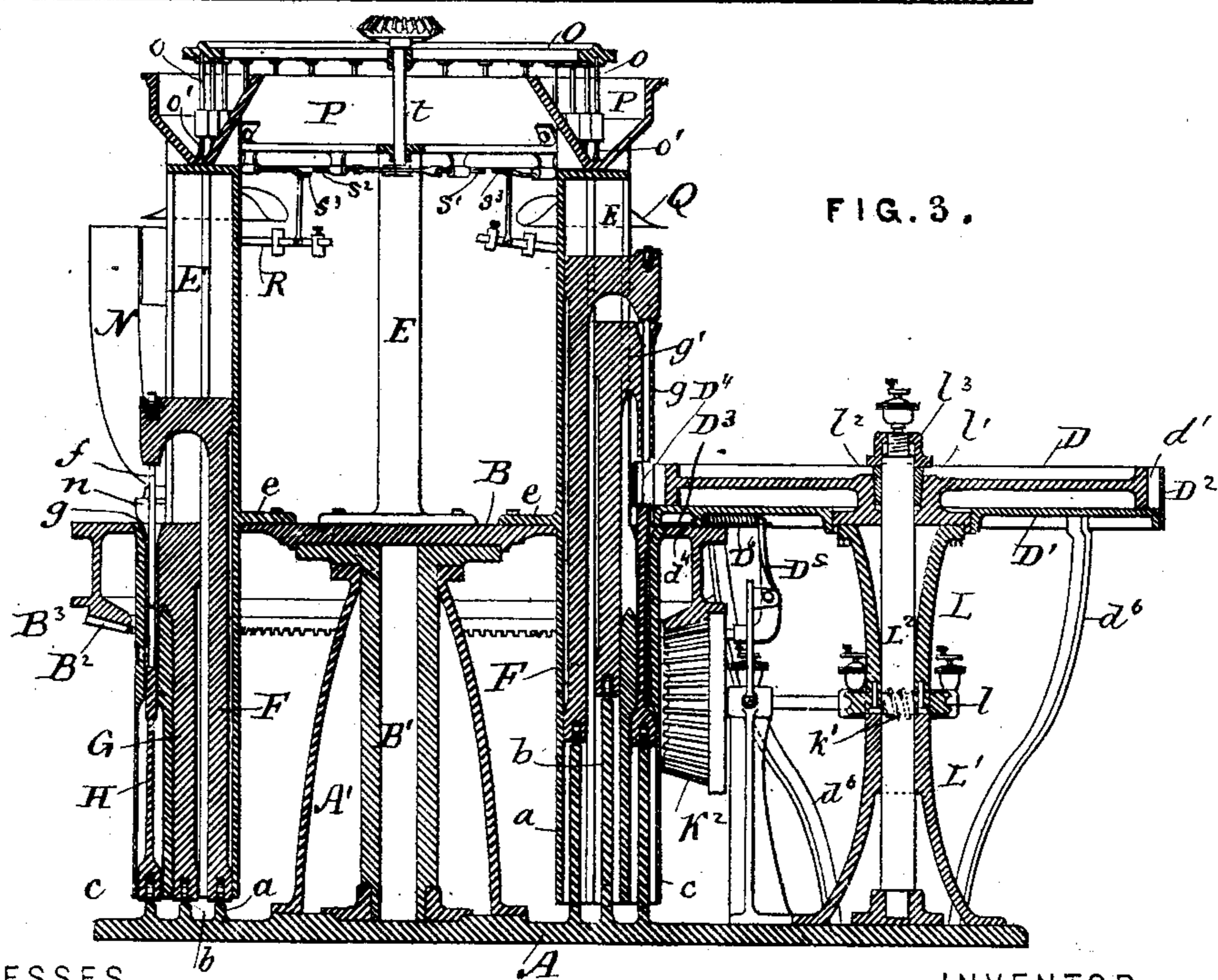
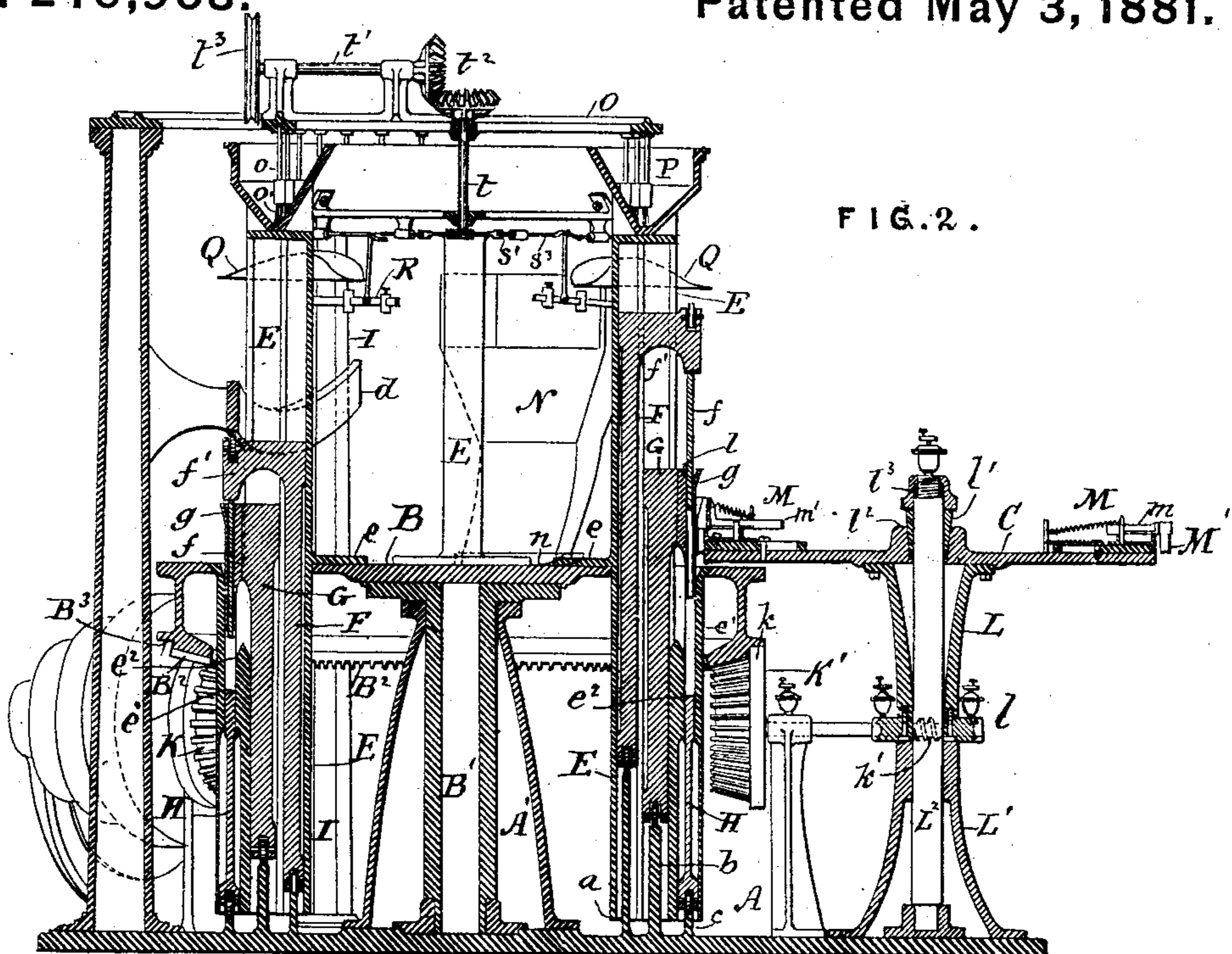
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FIG. 4.

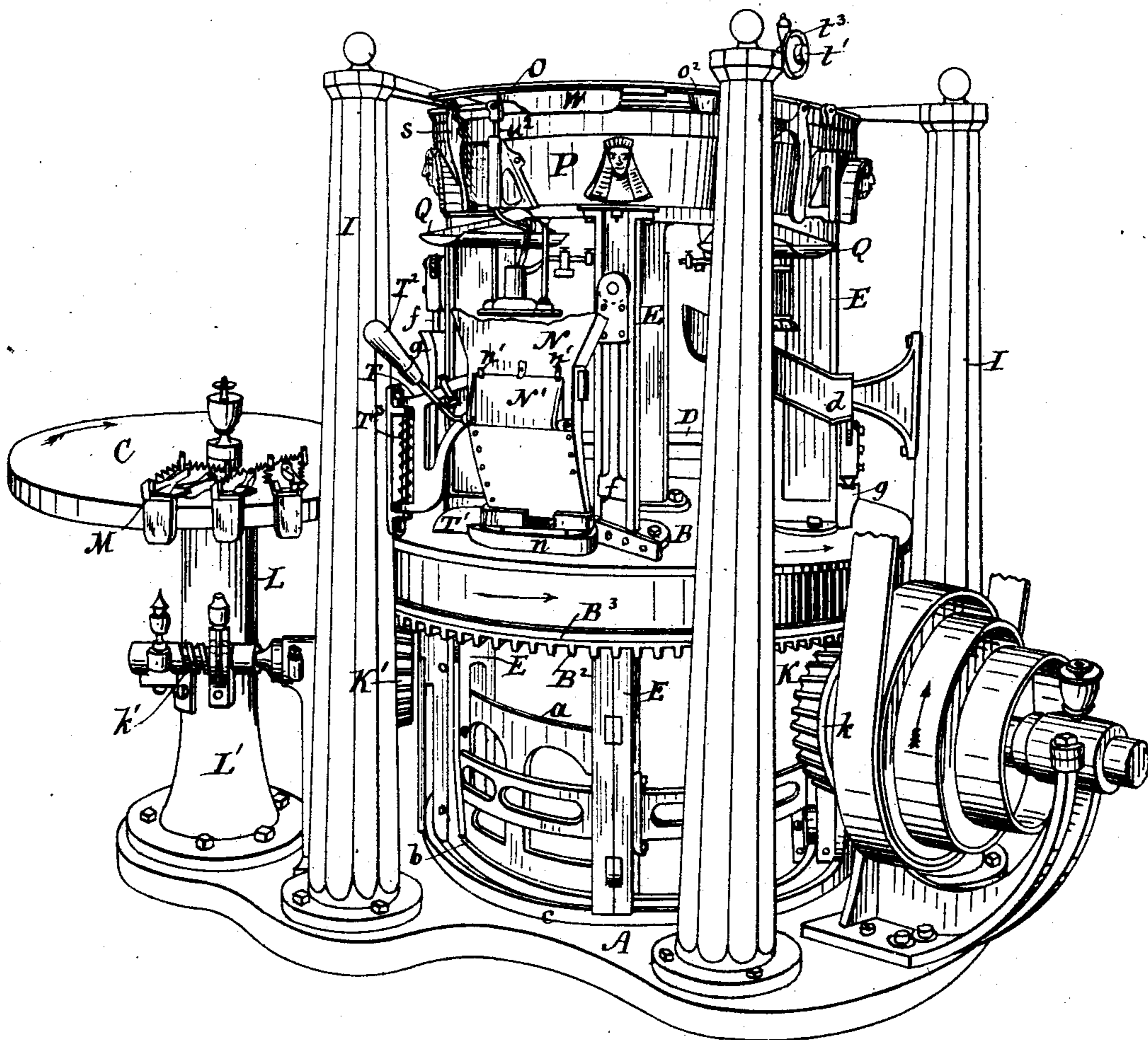


FIG. 10.

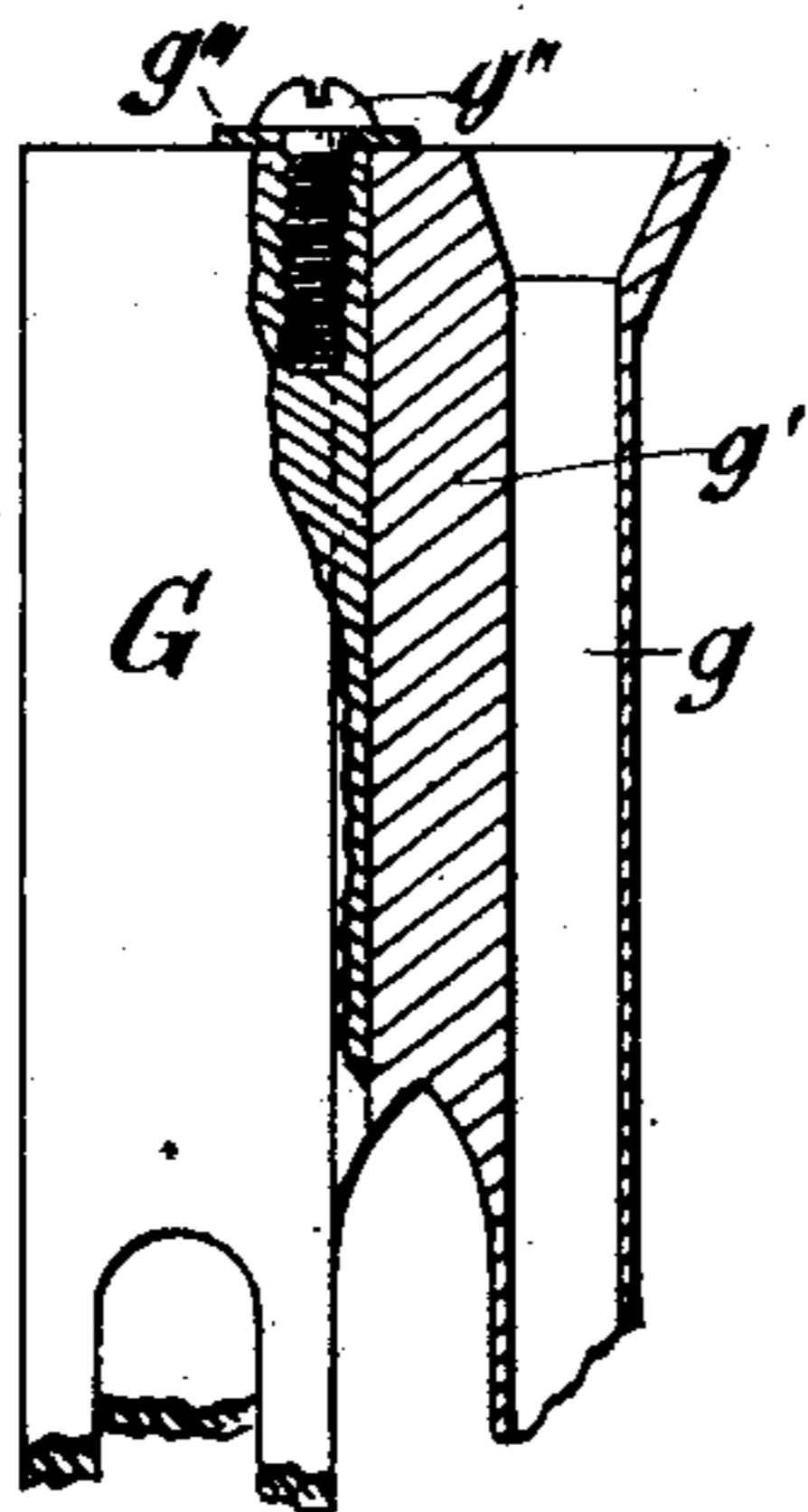
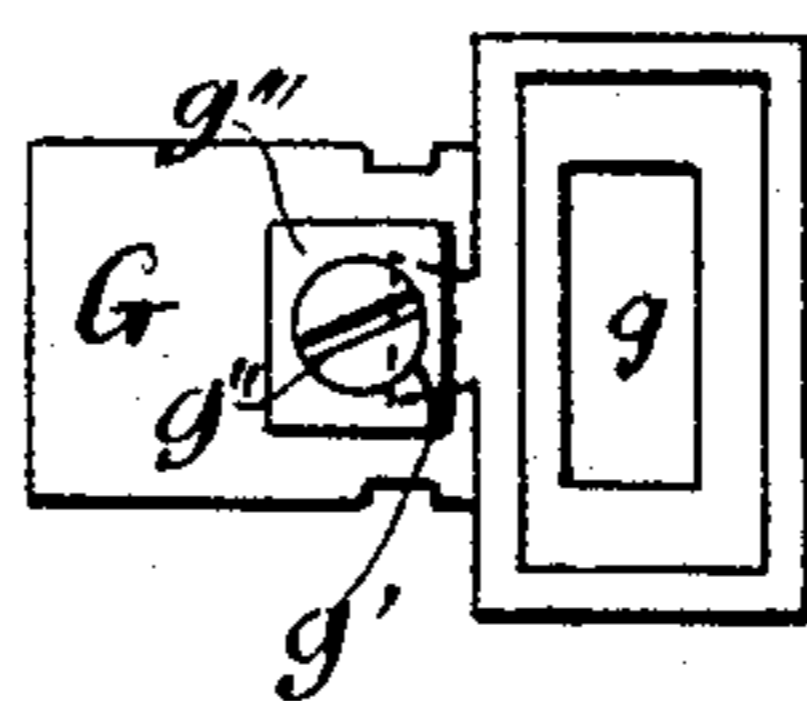


FIG. 11



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FIG. 6.

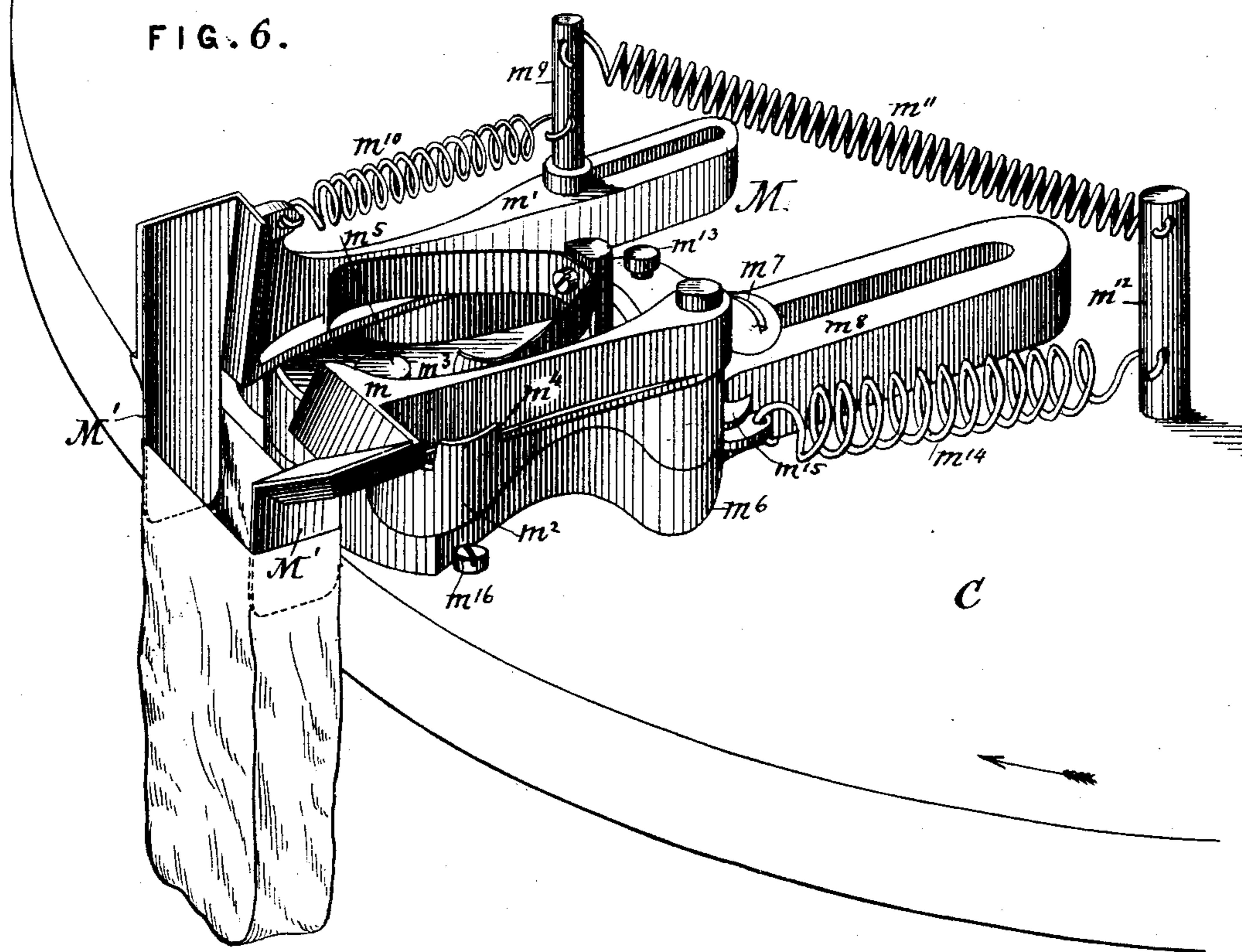
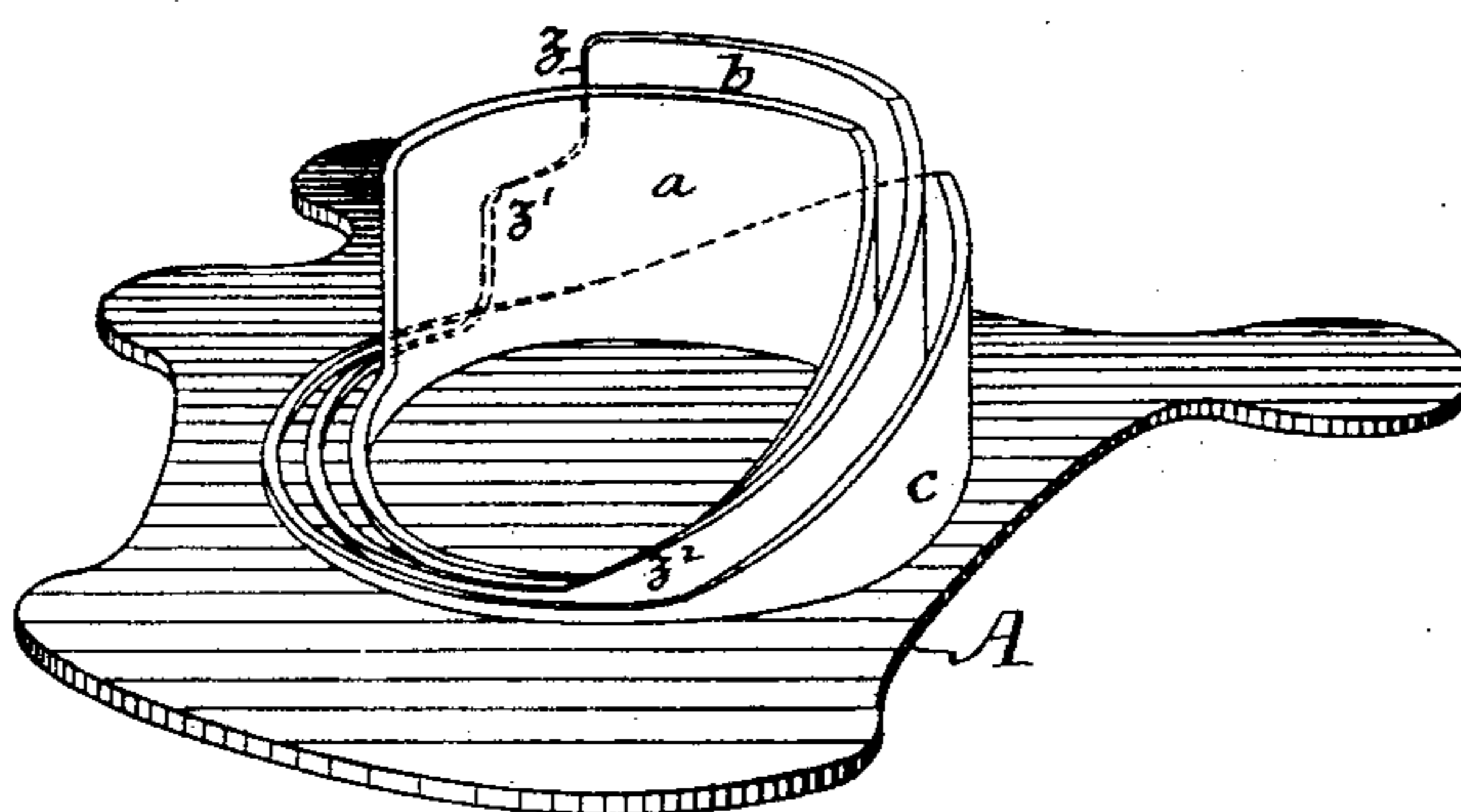


FIG. 7.



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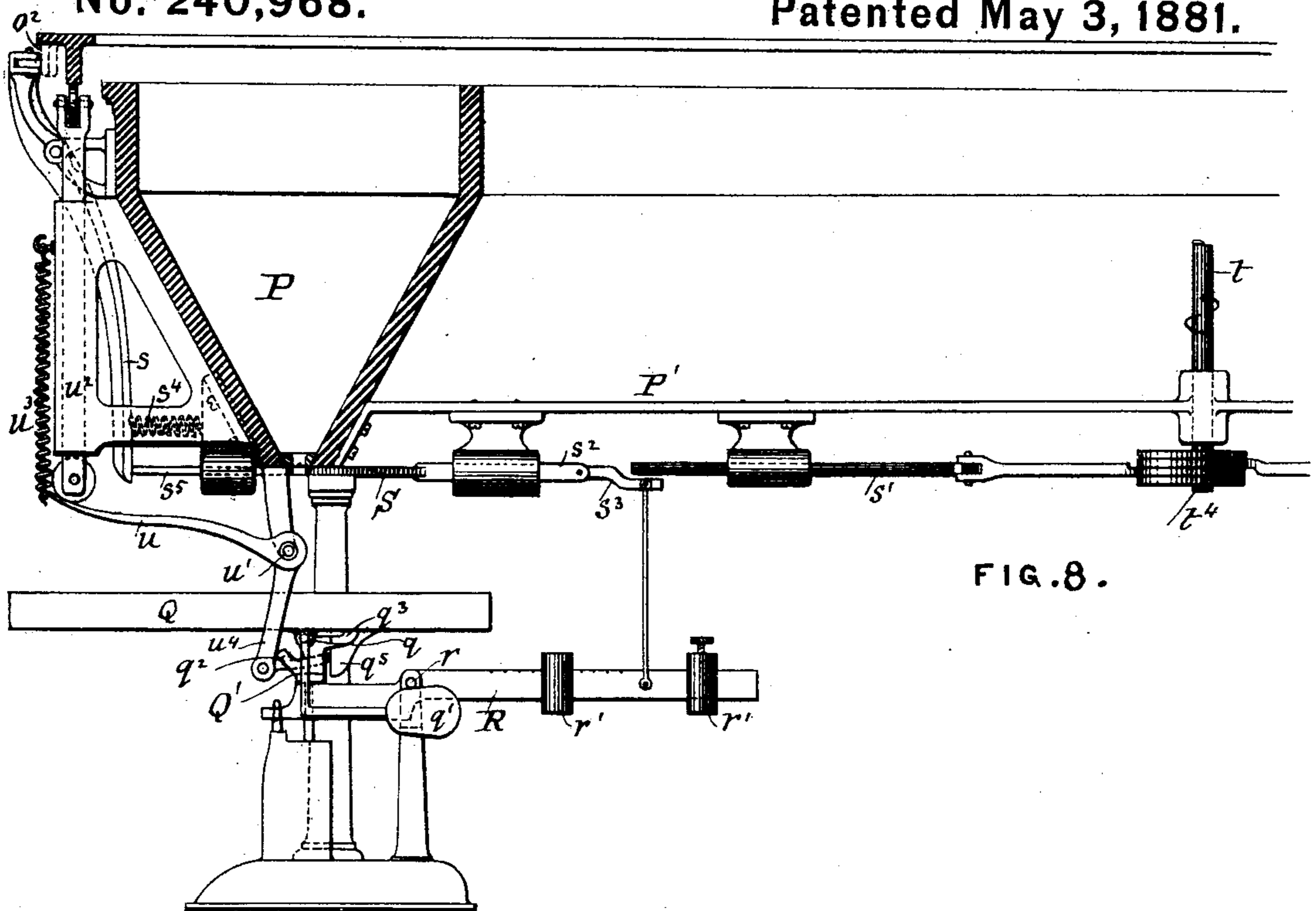


FIG. 8.

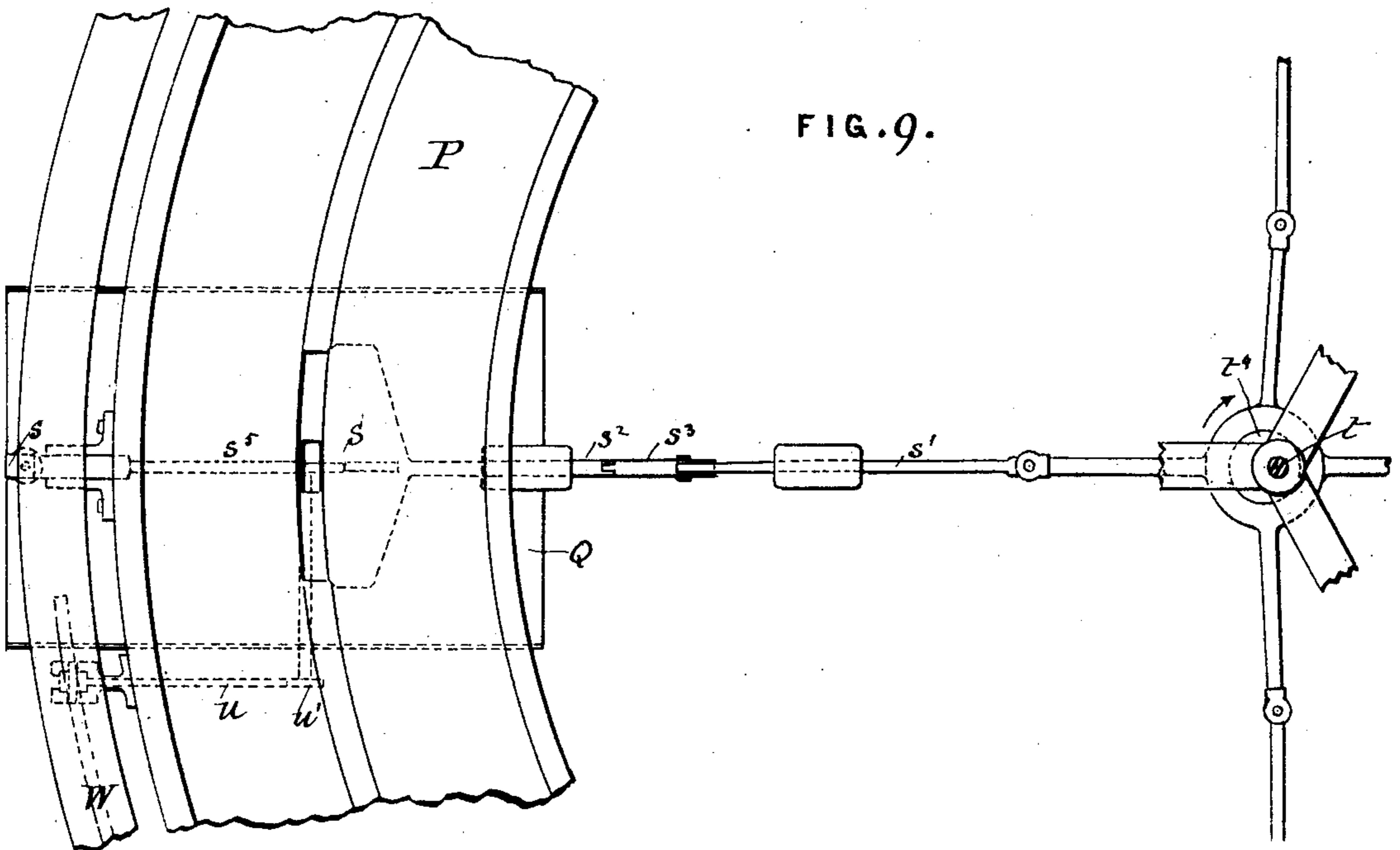


FIG. 9.

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6 Sheets—Sheet 6.

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Tobacco Packing Machine.

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FIG. 1<sup>a</sup>

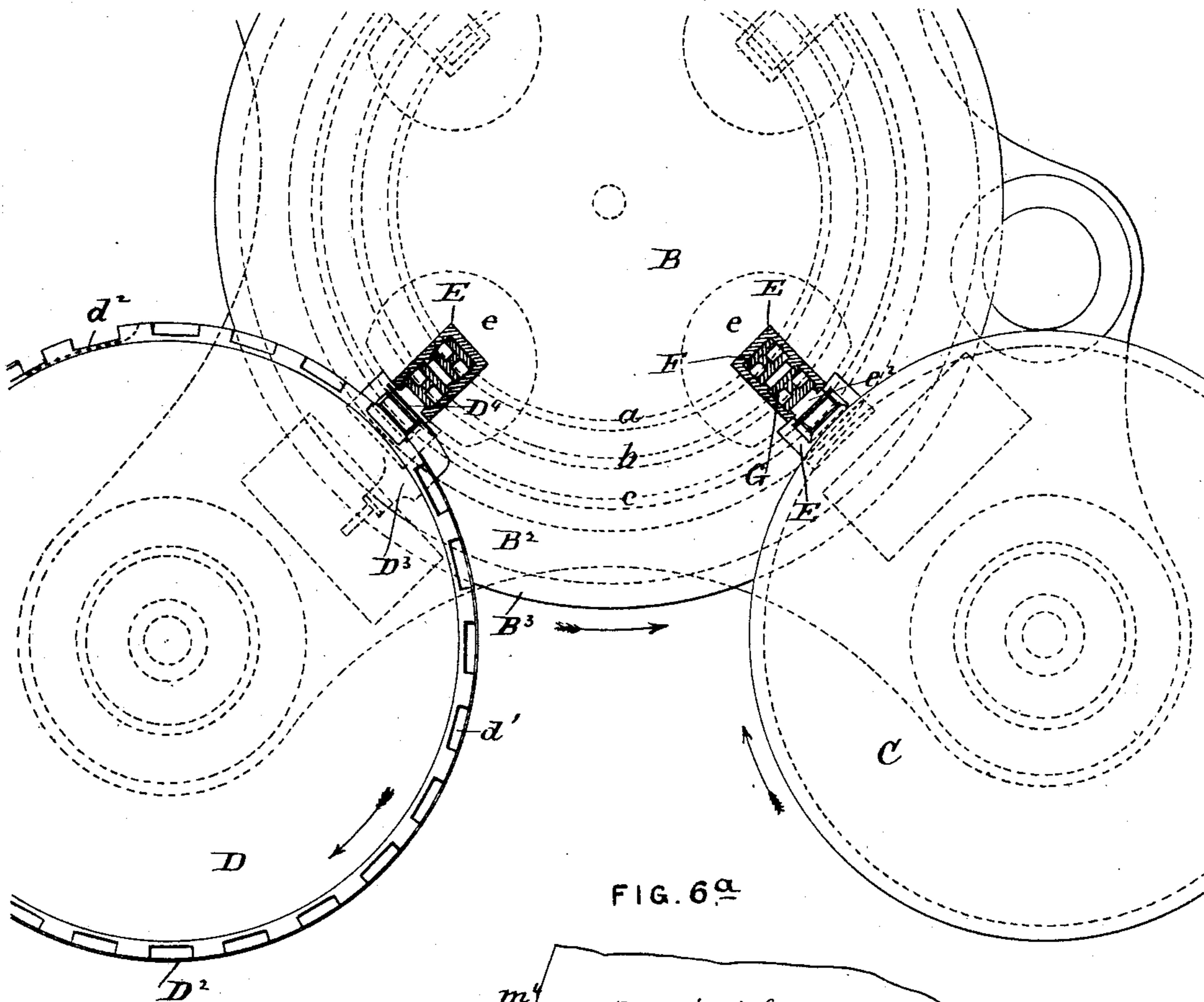
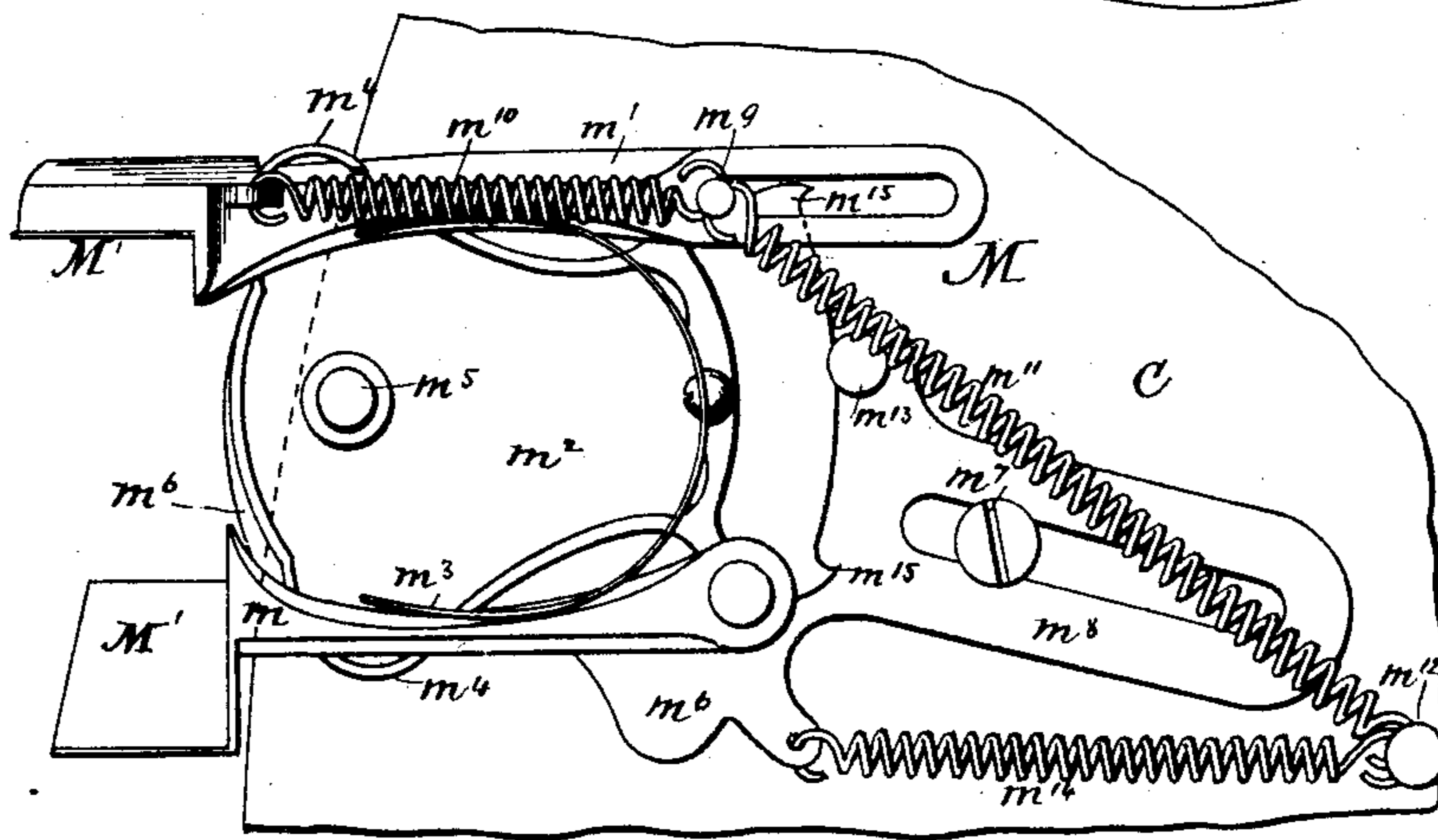


FIG. 6<sup>a</sup>



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# UNITED STATES PATENT OFFICE.

CLEMENT C. CLAWSON, OF RALEIGH, NORTH CAROLINA.

## TOBACCO-PACKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 240,968, dated May 3, 1881.

Application filed January 15, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, CLEMENT C. CLAWSON, of Raleigh, in the county of Wake and State of North Carolina, have invented a new and useful Improvement in Machines for Packing Tobacco and other Materials, which improvement is fully described in the following specification.

This invention relates to apparatus by which tobacco or other suitable material or article is accurately gaged, weighed, or measured and packed into bags or other suitable packing-envelope, and is more particularly intended as an improvement on the machine invented by me and patented January 1, 1878, No. 198,793, reissued April 27, 1880, No. 9,172. In said patented machine the operations are continuous, the plunger and forms being carried by the table in which the molds are placed, and reciprocated by stationary cams. The bags are placed upon bag-holders, and the hollow forms in turn automatically descend and carry them into the molds, to be subsequently filled and packed and delivered to a side table. In the improved machine the same general system of operations is retained, the object of the improvement being to lighten the labor of the attendants or to enlarge their capacity, to obtain increased accuracy in the gaging of the amount of material in each package, and, generally, to secure the more efficient action of the machine itself and its several parts. The bag-holders, instead of being located on the main table, as before, are placed upon a separate table. This being revolved at a comparatively low speed, the workman is enabled to place the bags in position much more easily, rapidly, and perfectly than would otherwise be possible. To facilitate the placing of the bags, and to adapt them to use in connection with the forms carried by the main table, the bag-holders or "tongs," as they are called, are of special construction. They are all substantially alike, and in general consist each of a pair of holding-blades, retained in their normal position by springs, and so connected with the tong-table that while the hollow form is passing between them and is removing the bag held open on said blades they adjust themselves to the changing position of the form without undue strain on the bag, and after the latter is removed are released and return to their normal position. The measuring or gaging of the quantity of the

article to be compressed in each package is shown in my aforesaid patent as accomplished by the form itself. By this improvement it is effected independently of the size of the form by apparatus which determines the quantity of each charge and empties it into a hopper or chute, to be delivered into the bag placed on the lower end of the form. With tobacco, the packing of which is more particularly the object of the present invention, it is, as I have found, very difficult or impossible to regulate the charges satisfactorily by bulk. This is owing to the nature of the material, and also to the very small variations allowed in packages by the revenue laws. By weighing each separate charge the uniform character of the packages can be insured. With some materials, or with tobacco when so great a degree of uniformity in the packages is not required, the charges may be measured.

Heretofore automatic measuring apparatus has been combined with the elements of a packing-machine of the ordinary construction operating intermittently; and it has also been proposed to employ an automatic weighing and dumping scale to regulate the charges in the same class of machines.

The present invention comprises the combination, with the parts of a continuously-operating machine, having the forms and plungers movable with the mold-table, of gaging apparatus for regulating the charges delivered to said forms, and specially of apparatus for regulating said charges by weight.

It further comprises particular combinations, as hereinafter specified, of gaging apparatus and of automatic weighing-scales with the elements of packing-machines of ordinary or suitable construction, whether continuous or intermittent in operation, and also of the various parts of the weighing-scales with each other and with co-operating devices in the machine. The tobacco or other material to be weighed is delivered from a supply receptacle or hopper through an opening provided with a gate or valve.

In order to secure the certain, prompt, and uniform stoppage of the supply at the proper time, motion is communicated to the gate to close the same by power mechanism, which is brought into action by the depression of the scale-pan, and the device by which said action

is determined is itself moved positively by direct connection with the weighing-lever supporting the scale-pan. The opening of the gate is effected periodically, and so, also, is the emptying of the charge weighed. The dumping or tilting of the scale-pan by devices which do not interfere with the accurate weighing of the scales is the means adopted for this last purpose.

In combining weighing-scales or gaging apparatus generally with machines employing a series of similar packing devices, it is preferable to use a number of scales or gaging apparatus which successively receive and deliver their charges. This is important particularly with weighing-scales, as it allows the time necessary to insure efficient operation of the several parts. The gaging apparatus is made to revolve with the mold-table. With the weighing-scales a rotary supply-receptacle or hopper is employed, so that the delivery opening or openings are always over the scale-pans. This hopper is annular and V-shaped in cross-section, and with it are combined stationary stirrers provided with brushes at their lower ends. The latter keep the delivery-opening from becoming clogged. The use of stationary stirrers with the revolving hopper is found to agitate and keep loose the mass of material much better than when the hopper or receptacle is stationary and the stirrers revolve.

It may sometimes happen that on account of a defect or break in the bag, or for other reason, it is desirable for the charge not to pass into the bag, as it would then fill the mold and have to be removed before the operation of the machine could proceed. To obviate this difficulty a valve is arranged in the chute, so that by turning it in the proper position a charge may be delivered outside the machine onto the floor or into a receptacle placed to receive it. After a bag has been packed the string has to be tied by hand. In order that this may be done with the least difficulty each package is automatically received in a pocket in a suitable position. The pockets are formed by recesses in a revolving table, and the latter is so constructed and arranged that the bags are all carried to a determined part of the periphery, and there dropped into a receptacle, if it be so desired.

The means used for attaching the forms to the sliding rods, the shaft-connections for operating the tong-table and receiving-table, and particular constructions and combinations of parts as well in the machine generally as in different portions thereof, also form part of the present invention, and will be hereinafter more fully set forth.

That the invention and the manner of carrying the same into effect may be more fully understood, a machine embodying said invention will now be described in connection with the accompanying drawings, which form a part of this specification, and in which the same letters of reference indicate like parts wherever they occur in all the figures.

Figure 1 is a plan view of the machine; Fig. 1<sup>a</sup>, a plan view, partly in section, drawn on a larger scale, and showing portions only of each table; Figs. 2 and 3, views in a vertical section, and Fig. 4 a perspective view of the same. In Figs. 2 and 3 the sections are taken, respectively, on lines *x x* and *y y*, Fig. 1, the right-hand side of the machine in both views being supposed to be moved forward to bring the center of the form over the section-line. This line is not in either view a straight line, but is turned aside in both in order to show more clearly the operation of the machine. Fig. 5 is a perspective view of the means used for delivering the packages to the receiving-table; Fig. 6, a similar view of a bag-holder or pair of spring-tongs, and Fig. 6<sup>a</sup> a plan of the same, showing the supporting-plate swung to one side and the base-plate drawn out from the center of the table. Fig. 7 is a perspective view of the cams under the main or mold table for operating the sliding rods. Figs. 8 and 9 are views, in sectional elevation and plan, respectively, of the weighing apparatus, and Figs. 10 and 11 detail views, in sectional elevation and plan, illustrating the manner of attaching the forms to their rods. Fig. 12 is a horizontal section, illustrating the means for supporting the chute and for operating the valve therein.

A is the bed-plate of the machine; B, the main or mold table; C, the tong-table, and D the receiving-table. Upon the bed-plate are fixed the cams *a b c*, the shape of which is clearly shown in Fig. 7. Upon standards I, supported by the bed-plate, the cam *d* is fastened by suitable braces.

In the main table are openings through which pass the guides E. These are securely fastened to the table B by means of flanges *e* and bolts, and are slotted at the lower end for the passage of the cams *a b c*. The guides E are all alike, and in their interior slide rods F G H.

To each of the rods F a plunger, *f*, and to each of those marked G a hollow form, *g*, is attached. The plungers are formed of plain bars of uniform cross-section. They are fastened in any ordinary or suitable way to brackets *f'*, which are preferably made in one piece with the plunger-rods F. The forms consist of hollow tubes of the same sides internally as the plungers are externally, and flared or provided with hopper-shaped openings at the top. They are each detachably secured to the rods G (see Figs. 10 and 11) by means of the brackets *g'*, fixed to said forms and fitting in a dovetail groove in the form-rod G, the plate *g'''*, which extends over the top of the bracket, and holding-screw *g''*, which passes through a hole in the plate *g'''* and screws into the form-rod.

Under each of the plungers and hollow forms is a pocket or mold, the bottom of which is formed by the top of one of the rods H, and the sides by the side walls of the guide E and the webs *e' e''*. The inner wall formed by web *e''* is slotted at the top for the passage of bracket *g'*, which is not so wide as the pocket. The

pockets, which serve as molds, correspond in general shape and size with the exterior of the forms, being enough larger to receive the latter when bags are placed over their lower ends. The rods G H are raised and allowed to drop at the proper times by the cams *b c* respectively. The plunger-rod F is acted upon below by cam *a* and above by the cam *d*. Stout rollers are introduced, as clearly shown in Figs. 1 and 2, to lessen the friction between the rods and the cams.

The main table is supported in the center by the spindle B', stepped at the lower end and turning in a sleeve or bearing in the upper part of the pedestal A' fixed to the bed-plate, the flange of the spindle by which it is fastened to the under side of the main table resting upon the top of the pedestal. Around the periphery of the table B, and attached to or made in one piece with it, is a circular rack, B<sup>2</sup>, with which the teeth of the wheels K K' K<sup>2</sup> engage. The table is also provided with a smooth track or flange, B<sup>3</sup>, which rests and travels on a smooth portion, *k*, of the periphery of the wheels K K' K<sup>2</sup>. These wheels are supported by shafts journaled in bearings in brackets fixed to the bed-plate. The shaft of K is provided with pulleys to receive a belt by which motion is communicated to the main table by the engagement of the teeth of wheel K with those of the rack B<sup>2</sup>.

Motion is communicated from the mold-table, through the wheels K' K<sup>2</sup> and their respective shafts, to the tong-table and receiving-table, so that they revolve at a lower speed than the main or mold table. As shown, the relative number of revolutions is six to one.

The manner of supporting and communicating motion is similar for the two tables. Upon the under side of each is fixed a hollow casting, L, to the lower part of which the gear *l* is attached, and this rests upon the upright casting L' attached to the bed-plate. These two castings constitute the pedestal for the table. A central spindle, L<sup>2</sup>, passes through both castings, and also through the table. It is stepped at the lower end, and has a bearing in the upper part of the casting L'. It fits accurately the opening at the bottom of casting L, and is connected with the table, so that it revolves therewith. The connection is made by means of a split cone, *l'*, that is forced by the nut *l<sup>3</sup>* into the tapered opening in the hub *l<sup>2</sup>*. The gear *l* is engaged by the endless screw *k'* on the shaft of the bevel-gear K' or K<sup>2</sup>. By the constructions indicated the tables are very solidly supported and exactly centered. The wear of the screw *k'* and gear *l* can moreover be taken up, as required, by loosening the nut *l<sup>3</sup>*, turning the table a suitable distance, and again tightening the nut.

The tongs or bag-holders M are arranged radially at the circumference of the table C, with the blades for holding the bags projecting beyond. The paths of these blades and of the forms intersect, as shown in Fig. 1, and

the number and disposition of the tongs correspond with those of the guides carried by the main table and with the relative speed of rotation of the two tables, or, in other words, with the relative times which the tables take to complete a revolution on their axes, so that as each form passes a pair of tongs is brought under it in position to allow the form in its descent to enter the bag held open on the blades.

The construction of the tongs is best shown in Fig. 6. The blades M' are attached at the outer ends of the arms *m m'*, independently jointed to the supporting or carrying plate *m<sup>2</sup>*, and pressed apart by a flat spring, *m<sup>3</sup>*, their outward movement being limited by stops formed by lugs in the supporting or carrying plate *m<sup>2</sup>*. One of these lugs is shown at *m<sup>4</sup>*. The supporting-plate is connected at *m<sup>5</sup>*, by a swivel-joint, with the base-plate *m<sup>6</sup>*, and this with the tong-table by a screw, *m<sup>7</sup>*, passing through a slot in the neck *m<sup>8</sup>* of said base-plate. The spring *m<sup>3</sup>* is attached to an upright post fastened to the swiveled supporting-plate. The arm *m* is pivoted to said plate, and the arm *m'*, slotted as shown, is connected with the same by a pin, *m<sup>9</sup>*, fixed to the supporting-plate and passing through the slot in the arm *m'*. Against this pin the arm is held by a spiral-spring, *m<sup>10</sup>*. A spiral spring, *m<sup>11</sup>*, connected at one end with the pin *m<sup>9</sup>* and at the other with the post *m<sup>12</sup>* on the tong-table, retains the supporting or carrying plate normally in the position shown. The pin *m<sup>13</sup>* projecting upward from the base-plate acts as a stop to limit the right and left motion of the supporting-plate *m<sup>2</sup>* on the swivel-joint *m<sup>5</sup>* by contact with two lugs on the inner ends of the supporting or carrying plate. One of these lugs is shown at *m<sup>15</sup>*. The spring *m<sup>14</sup>* holds the base-plate against the screw *m<sup>7</sup>*, and also against a stop, *m<sup>16</sup>*, on the table.

From the connections described the blades M' are capable of the following movements: They can be pressed together to place the mouth of a bag over them, and when released the spring *m<sup>3</sup>* will press them apart, so as to hold the bag extended, as shown in Fig. 6; they can be turned to the right on the screw *m<sup>7</sup>*, and can be drawn outward, extending the spring *m<sup>14</sup>*; they can be turned to the right and left on an axis at *m<sup>5</sup>*, and the left-hand blade, attached to arm *m'*, can be drawn out independently of the other. In other words, although carried by the tong-table, they can practically, for a short distance, follow and conform to the movement of the forms which are carried by the main or mold table. Instead of using a pin-and-slot connection, as shown, the left-hand arm *m'* was at first pivoted like the other; but while this will be found generally to answer, its operation is not so perfect under all circumstances. The object of making the right-hand arm extensible is to prevent tearing the bags should, for any reason, the form be a little slow in removing them from the blades. The left-hand blades, or rather the arms *m'*,

extend above the others, so that the forms, which are lifted by their cams high enough to clear the right-hand blades or arms  $m$ , come into contact with them. These (left hand) arms  $m'$  are each inclined at the top, to act as a guide to bring the bag more certainly under the form, and both arms, it will be seen, are shouldered on the inside to give a bearing to the front of the form.

The receiving-table D is provided on its periphery with a series of recesses,  $d'$ . Under it (see Fig. 3) is a stationary platform,  $D'$ , of practically the same radius, supported by braces  $d^6$  from the bed-plate; and to this platform is attached, at the outer edge, an upright band,  $D^2$ , which extends almost around the periphery of the revolving table D, as shown in Fig. 1, thus closing the front of the recesses  $d'$  behind it. The upper surface of the platform forms a bottom to the recesses, except at  $d^2$ , where a portion of the platform is cut away, as shown in dotted lines, Fig. 1.

On the under side of the platform, at the point nearest the main table, is placed a slide,  $D^3$ , of the shape shown in Fig. 5, the projections  $d^5$  moving in slotted bearings. The object of the slide is to deliver the packages from the main or mold table into the recesses in the receiving-table. At its outer end is a vertical plate,  $D^4$ , and at its inner end it is attached to the end of a lever,  $D^5$ , by means of an adjustable connection formed by a rod,  $d^3$ , and screw and nut at the extremity thereof. This lever is pivoted to an upright arm attached to the bracket in which the shaft of the wheel  $K^2$  has bearing. Its upper part is slightly elastic. A spring,  $D^6$ , bearing at one end against a depending projection,  $d^4$ , from the platform, and at the other against the said upper part, tends to move the lever in one direction. A cam,  $k^3$ , on the wheel  $K^2$  moves it in the opposite direction. At each revolution of the wheel  $K^2$  the delivery slide and plate are moved outward into the position shown in Fig. 3 by the cam, and then, being released, are drawn sharply back by the spring. The spring can, if desired, be made to surround the rod  $d^3$ , which would then pass through a hole in a suitable depending projection.

N is the chute for conveying the tobacco to the bags placed on the forms. It does not revolve, but is supported by a bracket, T, Figs. 4 and 12, which is hinged to one of the posts or standards I. It is large at the top and contracted toward the bottom, where it is provided with loose shoe  $n$ , which rests by its own weight on the surface of the main or mold table. The mouth of the chute is somewhat narrower and longer than the top of the form. The shoe has a cam,  $T'$ , at the forward end, (left hand in the drawings, Fig. 4.) In case a form, should, for any reason, not descend so that its top is flush with the top of the main table, the projecting portion will strike the cam  $T'$  and push outward the chute to the edge of the main table. A vertical torsion-spring,

$T^3$ , at the hinge of the bracket restores the chute after the obstruction has passed.

$N'$  is a valve, which is hinged at or near its lower edge to the chute. In its normal position it forms a part of the front of the chute, in which a rectangular opening is made to receive it. Stops  $n'$  prevent the outward movement of the valve, and a small friction-catch that can be overcome by a moderate force is or may be used to hold it against the stops, which is the normal position. By moving the top inward the valve falls across the interior of the chute, and rests against the opposite side in an inclined position. Any material introduced into the chute at this time will therefore be kept from descending to its lower end and be delivered through the opening in the front. A charge placed in the upper part of the chute will pass through the bottom into a form, or outside onto the floor, according to the position of the valve. The handle  $T^2$  for moving the valve is placed in easy reach of the person employed to place the bags on the tongs. The valve is also automatically turned inward when the chute is pressed outward by means of a cord,  $n^2$ , passing over a pulley,  $n^3$ , and suitably connected with handle  $T^2$  and with the hook  $n^4$  on the standard I or other suitable fixed part of the machine. A screw-stop,  $n^5$ , holds the chute in position against the action of the spring  $T^3$ . The object is to deliver the next succeeding charge onto the floor. The valve is restored by hand.

P is the hopper or receptacle for supplying the tobacco to the weighing-pans Q, which, in turn, dump the charges into the chute N. This hopper is annular and V-shaped in cross-sections. It is supported upon the top of the guides E and is movable with them.

Stationary stirrers  $o$ , provided with brushes  $o'$  at their lower ends, are supported in the hopper by the frame O, fastened to the top of the standard I. The shape of this frame is shown in Fig. 1. In its center is journaled a short vertical shaft,  $t$ , to which reference will be hereinafter made.

Under the hopper, between the guides, are suspended the weighing and dumping scales, one for each guide. These scales are alike, and consist (see Fig. 8) of a pan, Q, capable of turning upon a pivot,  $q$ , and counterbalanced by the weight  $q'$ . The piece  $Q'$ , to which the pan is pivoted, is provided with stops  $q^2$   $q^3$ , which limit the movement of the pan in dumping and righting, and is itself supported at one end of the weighing-lever R. This lever has its fulcrum at  $r$ , and is provided with adjustable weights  $r'$ . In the bottom of the hopper, over each scale-pan, is a discharge-opening, having a sliding gate, S. This gate is operated in one direction to uncover the discharge-opening by means of a lever,  $s$ , fulcrumed in a bracket on the side of the hopper, and a stationary cam,  $o^2$ , Figs. 1, 4, and 8, on the frame O, and in the other direction by a rod,  $s'$ , movable with the hopper, to which rod a constant reciprocating

movement is imparted from an eccentric,  $t^4$ , Fig. 9, on the lower end of the shaft  $t$ .

A frame,  $P'$ , is bolted to the inner wall of the hopper, and the shaft  $t$  has a bearing in the center of it as well as in the frame  $O$ . Motion is imparted to this shaft by means of a horizontal shaft,  $t'$ , bevel-gears  $t^2$ , and a belt-pulley,  $t^3$ , on shaft  $t'$ . The rods  $s'$  slide in brackets attached to the under side of the frame  $P'$ , and at their inner ends are jointed to connecting-rods, the heads of which encircle the eccentric  $t^4$ . Each of the gates is provided with an arm,  $s^2$ , also sliding in a bracket on the under side of frame  $P'$ , and having at the inner end a link,  $s^3$ . This link is connected with the weighing-lever  $R$  by a rod pivoted both to the link and to the lever. Normally the inner end of the link is below the outer end of the corresponding rod  $s'$ . When, however, lever  $R$  is tilted by the weight in the pan  $Q$  the link is brought in line with the end of the rod, and the latter, being reciprocated by the eccentric  $t^4$ , shoves outward the arm  $s^2$  and shuts the gate. The lower end of lever  $s$  is normally forced outward by the springs  $s^4$ , so that it does not interfere at all with the action just explained. When the upper end of the lever  $s$  strikes the cam  $o^2$  the spring is compressed and the arm  $s^5$  is forced inward, opening the gate to which it is attached. The dumping of the pan by turning it upon its pivot  $q$  is effected by means of the cranked lever  $u$ , pivoted at  $u'$  to a bracket depending from the hopper  $P$ . A sliding rod,  $u^2$ , with anti-friction rollers at each end, is struck in passing by a stationary cam,  $W$ , (shown best in Fig. 4,) on the under side of frame  $O$ , and forces down the outer horizontal arm of lever  $u$ . A spring,  $u^3$ , returns it when released by the cam. The vertical arm  $u^4$  is provided with a rod arranged to strike, when moved inward, a projection,  $q^5$ , from the bottom of pan  $Q$ . The vertical and horizontal arms of lever  $u$  are not in the same plane; but the horizontal arm is arranged to one side, as shown in Fig. 9, so as to be as much as possible out of the way.

It will be seen that all the movements of the gate in opening and closing are positive and are effected directly by the power which drives the machine. The weight in the pan simply sets the apparatus for closing at the proper time. This setting being effected directly through a plain rod, certainty of action and non-liability to get out of order are secured.

The operation of the machine is as follows: A sufficient supply of tobacco being placed in the hopper, motion is imparted to the machine by a belt from a suitably-disposed power-shaft to one of the driving-pulleys, so that the main or mold table revolves from left to right—that is, opposite to the hands of a watch. The tong-table and the receiving-table rotate from right to left. Motion is communicated, by a separate small belt, to the pulley  $t^3$  on shaft  $t'$ . Bags are placed on the tongs or bag-holders as may be required. As the same operation

takes place in succession with each of the guides and scales, the description will be principally confined to one. As the table revolves the upper end of the lever  $s$  strikes the cam  $o^2$ , Figs. 1, 4, and 8, and the gate  $S$  is opened, so that the tobacco begins to run out slowly into the pan  $Q$ . As the hopper revolves, the mass of tobacco is prevented from choking by the stationary stirrers, and the delivery-opening is kept clear by the brushes at the end of said stirrers. When the pan has received its charge of tobacco it turns its lever  $R$  and raises the link (see Figs. 2, 3, and 8) in line with rod  $s'$ , so that on the forward motion of the latter the gate is closed and the delivery of tobacco stopped. The reciprocation of the rods  $s'$  is sufficiently rapid to effect this with uniformity, so that the weighings are always the same. Inasmuch as the gate may be closed at any point of the revolution of the main table, it is evident that the slowness or rapidity of working will not affect the accuracy or certainty of the weighing, provided only that sufficient time is given for the pan to fill and tilt its lever. The charge weighed by any pan is packed by means of the succeeding form, mold, and plunger. As each guide  $E$  comes opposite the tong-table the form  $F$  descends and enters between the holding-blades  $M'$  of the tongs over the mold in the main table and removes the bag held on the blades, carrying it into the mold below. The relative position of the form-rod, plunger-rod, and discharger at this time is shown at the right in Fig. 2. In removing the bag the form-rod descends the incline  $z$  on the cam  $b$ . (Shown in Fig. 7.)

While the bag is on the holding-blades the latter adapt themselves perfectly to the position of the form. When it is removed the form passes out between the ends of the blades and the springs return them to their normal position. Should the form, for any reason, be a little slow in removing the bag the left-hand blade is drawn out, and all danger from this source of tearing the bag is removed. The form-rod next descends the incline  $z'$ , and the form, becoming flush with the top of the table, passes under the chute  $N$ . Meantime the scale, with its pan previously filled with tobacco, being carried around with the main or mold table, the rod  $u^2$  strikes the cam  $W$  and the pan is turned on its pivot  $q$  and deposits its charge in the upper part of the chute. The scale-pan passing on, the gate in the hopper is again opened by the cam  $o^2$ . The charge in the chute rests upon the upper part of the main table until the form passes under the chute, when it passes through the form into the bag previously taken from the holder or tongs.

The turning of the pan for emptying takes place slightly before the chute is reached, the momentum sufficing to carry it into the chute. Immediately after the guide  $E$  passes the chute the plunger-rod is released by its cam, and descends by its weight, partially packing the tobacco. It then passes under the cam  $d$ , which

completes the packing. Just before the plunger is released from the cam  $d$  the form is elevated by the rise  $z^2$  in the cam  $b$ , leaving the tobacco within the bag and between the bottom of the plunger  $f$  and the top of the discharger or rod  $H$ . All three rods,  $F$   $G$   $H$ , then rise together until the bottom of the package is even with or slightly above the top of the platform  $D'$ , Fig. 3. At this time the delivering-plate  $D^4$  has been pushed outward by the cam  $k^3$  on wheel  $K^2$ , and one of the recesses in the receiving-table is opposite said plate. When the package is carried inside of the plate the lever  $D^5$  is released by its cam, and the spring  $D^6$  coming into action carries the package into the adjacent recess. The discharger then descends, and a new bag is taken by the form, and the operation proceeds as before, the delivery of the tobacco to the scale-pan being automatically cut off. The bags or packages in the recesses of the receiving-table are carried around with the latter, and are successively tied by the attendant. When the point  $d^2$ , Fig. 1, is reached, where the outer part of the platform is cut away, they drop into a basket or receptacle placed to receive them.

The measuring apparatus which I have devised comprises a revolving measuring-wheel having a series of pockets with adjustable ends, which are all connected so that all are adjusted simultaneously and to an equal extent. The pockets successively receive their charge from a stationary hopper and deliver it to the chute. This measuring apparatus is fully described in another application, of which it forms the subject-matter. It is not specifically claimed herein; but as certain combinations are claimed which include, in connection with other elements, gaging apparatus, broadly—that is, apparatus for gaging or regulating the quantity of material for each charge or package, whether by weight or by bulk—it is deemed best to indicate the general construction of a measurer adapted to use in the improved machine. Where weighing-scales, in contradistinction to measuring devices, are intended, that term is used or suitable defining words are added.

It is obvious that modifications may be made in the machine without departing from the spirit of this invention, and that portions of the invention can be used without the others.

Automatic weighing-scales such as indicated can, for example, be arranged to weigh charges and deliver them to devices of ordinary or suitable construction, which pack or compress the material by means of molds and plungers, whether or not forms be used in connection with the said molds and plungers. Devices of this character are intended by the term "packing devices."

The main table could be provided with only one form, mold, and plunger instead of four, as shown, or any desired number could be used, the number and disposition of the bag-holders or spring-tongs and weighing-scales being suitably changed.

When a series of weighing-scales (two or more) are employed a separate supply-receptacle could be used for each; but a single receptacle with a series of delivery-openings, such as the annular V-shaped hopper, is more advantageous.

Having now described my said invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a table and one or more forms carried by it, of a separate table and bag-holders located thereon and operating in connection with said forms, substantially as described.

2. The combination, with a revolving table and one or more reciprocating forms carried by it, of a second table with bag-holders located thereon and gearing for revolving said last-named table at the proper speed relative to the first, substantially as described.

3. A bag-holder comprising a pair of arms and blades attached thereto, in combination with means, substantially as described, for holding said arms and blades in position, so that they are movable from side to side and in a direction approximately lengthwise of said arms, as set forth.

4. The combination, with a swiveled supporting-plate, of a pair of arms jointed to said plate, one arm by a slot-and-pin connection, a spring for holding in position said last-named arm, and a spring for pressing the arms apart, substantially as described.

5. A bag-holder or spring-tongs for holding a bag extended, comprising a slotted base-plate, a holding-pin working in the slot, a supporting-plate swiveled to the base-plate, holding-blades carried by arms jointed to said supporting-plate, and springs and stops, substantially as described.

6. The combination, with a table, of a series of bag-holders, comprising each a pair of blades and arms, a swiveled supporting-plate, a base-plate, and means, as indicated, for connecting the base-plate with the table and holding the parts in position, substantially as described.

7. The combination, with a table revolved by gearing and supported upon a pedestal composed of two parts, one stationary and the other attached to said table, of a central shaft supported so as to turn freely, and connected with said table by an adjustable connection, substantially as indicated.

8. The combination of the table, two-part pedestal, gear, and central shaft with the split cone and nut connecting said table with said shaft, as described.

9. The combination, with a table provided with molds or recesses, means for revolving said table, forms and plungers carried by said table, and sliding rods and cams for operating said plungers, of gaging apparatus for regulating the charges to be delivered into said forms, substantially as described.

10. The combination, with a table, packing

devices carried thereby, and means for revolving it, of a stationary chute and gaging apparatus carried by and movable with said table for supplying the charges to the packing devices through said chute, substantially as described.

11. The combination, with a weighing-scale and supply-receptacle having a delivery-opening, of a gate for said opening, power-driven mechanism for closing by positive movement the said gate, and devices, as indicated, for automatically bringing said mechanism into action by the weight of material in said scale, substantially as described.

12. A weighing-scale and means for supplying material thereto, in combination with power-driven mechanism and devices connected with the weighing-scale for bringing said mechanism into action, said parts being arranged, substantially as described, so that the power-driven mechanism is brought into action automatically by the weight of material in the scale, and acts to stop the supply positively and directly without transmission of strain through the weighing-scale, as set forth.

13. The combination, with packing devices, of one or more automatic weighing-scales, positively-acting mechanism for emptying said scales, and means for delivering the charges to the packing devices, substantially as described.

14. In a packing-machine of otherwise ordinary or suitable construction, the combination of one or more forms, molds, and plungers and mechanism for advancing the forms and molds and operating the plungers with one or more automatic weighing-scales, devices for emptying the scales, and means for delivering the charges into said forms, said devices being connected with the aforesaid mechanism so as to empty the scales at the proper times, as set forth.

15. The combination, with a table, molds, and forms carried by said table, and means for revolving it, of automatic apparatus for weighing the material for each package, a cam and connections for discharging the weighed material, and means for delivering said material into the forms, substantially as described.

16. The combination, with a scale-pan and gate controlling the delivery thereto and lever connected with said pan, of mechanism driven by power independent of the weight in the scale-pan, and a pivoted link or similar device connected directly with said lever, and determining by its position the closing of the gate by the aid of said mechanism, substantially as described.

17. The combination, with a weighing-scale, supply-receptacle, and gate, of a cam and connections for opening said gate periodically, and mechanism for automatically closing the same when the scale has received its charge, said gate being operated in both directions by force other than that due to the weight of the charges, and applied directly without transmission through the scale, substantially as described.

18. The combination, with a weighing-scale, supply-receptacle, and gate, of a cam and connections for acting directly on said gate to open the same, power-driven mechanism for acting on said gate directly and positively to close the same, devices for automatically bringing said mechanism into action by the weight of material in the scale, and a cam and connections for emptying the scale, substantially as described.

19. The combination, with a common chute, of a series of automatic weighing-scales, and means, as indicated, for causing said scales to successively deliver their charges into said chute, as specified.

20. The combination, with a series of weighing-scales, of a cam, intermediate connections, and operating means, whereby said scales are successively emptied, as set forth.

21. The combination, with a receptacle or receptacles having a number of delivery-openings and gates or valves, of automatic weighing-scales supplied from said receptacle or receptacles, and a cam and connections for successively opening said gates, substantially as described.

22. The combination, with a supply-receptacle, a gate therefor, and means for revolving said receptacle, of a weighing-scale, and automatic devices, as indicated, for opening and closing said gate, substantially as described.

23. The combination, with one or more weighing-scales, and a hopper or supply-receptacle, of means for supporting and revolving said scales and hopper, substantially as described.

24. An annular V-shaped hopper having a series of delivery-openings, in combination with gates for said openings, and weighing-scales supplied from said hopper, substantially as described.

25. The combination of an annular V-shaped hopper having delivery-openings, and means for revolving the said hopper, of automatic weighing-scales revolving with the latter, substantially as described.

26. The combination, with an annular V-shaped hopper having one or more delivery openings or outlets, of means for revolving said hopper, stationary stirrers, and one or more weighing-scales supplied from said hopper, substantially as described.

27. The combination, with an annular V-shaped hopper having delivery-openings, of gates for said openings, substantially as described.

28. The combination, with a supply-receptacle, a gate therefor, and means for revolving said receptacle, of a weighing-scale, a cam and connections for opening said gate, and power-driven mechanism, and means, as indicated, for setting the said mechanism into action to close the gate by means of the weight in the scale, substantially as described.

29. The combination, with an annular V-shaped hopper having a series of delivery openings or outlets, gates for said openings or outlets, and means for revolving said hopper, of

a series of weighing-scales revolving with the hopper, a cam and connections for successively opening said gates, and automatic devices for closing said gates when the scales have received their charges, substantially as described.

30. The combination, with a supply-receptacle and means for revolving the same, of gaging apparatus revolving with said receptacle, substantially as described.

31. The combination, with a table provided with molds or recesses, and carrying a series of guides in which are sliding rods operated by cams and forms and plungers attached to said rods, of a series of automatic weighing-scales emptying into a common chute, from which said forms receive successively their charges to be packed by said plungers, as set forth.

32. The combination, with a gate or valve, of a rod disconnected from said gate or valve and means for reciprocating it, and a pivoted link adapted to be brought in line with said rod, so that motion is communicated from it to the gate or valve through the link, as described.

33. The combination, with a gate or valve, a rod disconnected from said gate or valve, and means for reciprocating it, and a pivoted link, of a scale-pan the delivery to which is controlled by said gate or valve, and a weighing-lever connected directly with said link, substantially as described.

34. The combination, with a series of weighing-levers, scale-pans, and valves or gates for controlling the delivery to said pans, of a series of rods arranged around and reciprocated by a common shaft, and pivoted links connected severally with the weighing-levers and adapted to operate in connection with said reciprocating rods, as described.

35. The combination, with a series of weighing-levers, scale-pans, and gates for controlling the delivery to said pans, of a series of levers, and a common cam for operating said levers successively to open the gates or valves, and a series of rods, means for reciprocating the same, and links connected with the weighing-levers for closing the gates, when each pan turns its lever, substantially as described.

36. The combination, with a hopper or supply receptacle, and a scale-pan supported on pivots and counterpoised, of a cam and connections for tilting the pan to empty it, substantially as specified.

37. An automatic weighing and delivery scale, comprising, in combination, a pivoted and counterpoised scale-pan, a weighing-lever, a delivery valve or gate, a cam and connections for opening said gate, a reciprocating rod and link connected with the weighing-lever for closing the gate, and a dumping-valve and connections for emptying the scale-pan, substantially as described.

38. The combination, with a revolving table carrying packing devices, a hopper or supply-receptacle with openings having gates or valves, weighing-scales, automatic cut-off rods, gate-opening and scale-emptying levers and connections, all revolving with said table, of a

stationary chute and stationary cams for opening the gates and for emptying the scale-pans into said chute, substantially as described.

39. The combination of the revolving annular V-shaped hopper, provided with delivery-openings having gates, stirrers, and revolving scale-pans, of a cam and connections for periodically opening said gates, and weighing-levers, reciprocating cut-off rods and links, and a cam and connections for emptying the scale-pans successively, substantially as described.

40. The combination of a table, means for revolving the same, guides or uprights carried by said table, a hopper supported on top of said guides, gates for said hopper, weighing-scales suspended beneath said hopper, and automatic devices for controlling the position of said gates, substantially as described.

41. The combination, with a hollow form having a flaring top, of a table provided with a mold also having a flaring top, and adapted to receive said form flush with the surface of said table, and a delivery-chute having a loose shoe resting upon said table, as explained.

42. The combination of the revolving table with molds, forms fastened to sliding rods, and cam for operating said rods, of a delivery-chute having a loose shoe at the bottom resting by its own weight on said table, substantially as described.

43. The combination, with molds and packing devices, and gaging apparatus for regulating the charges to be packed, of a chute for receiving the material from said gaging apparatus and carrying to said packing devices, and a gate or valve in said chute, substantially as described.

44. The combination, with a horizontal table, packing devices carried by said table, and means for revolving the latter, of a receiving-table provided with a series of recesses, means for moving said table, and delivery apparatus for carrying the packages into said recesses, substantially as described.

45. The combination, with a table carrying packing devices, of a receiving-table provided with recesses in its periphery, means for supporting said tables and revolving the same, and a delivery-slide moving in fixed bearings, substantially as described.

46. A revolving receiving-table provided with recesses on its periphery, in combination with a stationary platform and vertical plate attached thereto, and surrounding partially the periphery of said table, and a delivery-slide, substantially as described.

47. The combination of the revolving receiving-table having recesses on its periphery with the stationary platform having a portion on one side cut away, and curved upright plate, substantially as described.

48. The combination of the receiving-table provided with recesses, means for revolving said table, delivery-slide, and operating lever, cam, and spring, substantially as described.

49. The combination of a revolving receiving-table, stationary platform, upright curved

plate, delivery-slide, and lever, cam, and spring for operating said slide, substantially as described.

50. The combination, with a mold-table carrying molds and hollow forms, and plungers attached to sliding rods, and dischargers, of operating-cams, a tong-table carrying a series of bag-holders or spring-tongs, and a receiving-table with recesses and delivery-slide, substantially as described.

51. The combination, with a mold-table carrying molds and hollow forms, and plungers attached to sliding rods, of a tong-table carrying bag-holders or spring-tongs, delivery-chute and gaging apparatus for regulating the charges delivered into said forms, substantially as described.

52. The combination, with a mold-table and molds, hollow forms, plungers, and sliding rods carried by said table, of a tong-table and bag-holders or spring-tongs thereon, a delivery-chute, and automatic weighing and delivery scales, substantially as described.

53. The combination of a revolving mold-table, and packing devices carried by said table, with revolving automatic weighing-scales, revolving hopper or supply-receptacle, and stationary chute, substantially as described.

54. A packing-machine comprising a mold-table, hollow forms, form-rods, plungers, plunger-rods, and dischargers, carried by said table, and cams for operating said rods and dischargers, a tong-table with bag-holders or spring-tongs located thereon, a delivery-chute, automatic gaging or weighing apparatus, and a receiving-table with recesses and delivery-slide, substantially as described.

55. The combination, with the main table, circular racks, molds, forms, plungers, and sliding rods to which said forms and plungers are attached, of a tong-table and a receiving-table geared to said main table by means of said rack, and bag-holders carried by said tong-table, and delivery apparatus connected with the receiving-table, substantially as described.

56. The combination, with the main table, means for revolving the same, forms and molds

carried by said table, said molds being adapted to receive said forms, so that the tops of the latter are flush with said table, of a chute for delivering the charges to said forms, a hinged bracket for supporting the chute, and a spring and stop for holding it in position, substantially as described.

57. The combination, with the main table, means for revolving it, molds, forms, and form-rods, carried by said table, and means for operating the rods, of a chute, a hinged bracket supporting it, spring and stop therefor, a valve in the chute, and means, as indicated, for operating the valve by the movement of the chute and hinged bracket, substantially as set forth.

58. A packing-machine comprising a bed-plate, cams fixed to said bed-plate, a revolving mold-table, molds, forms, plungers, form-rods, plunger-rods, and dischargers, all carried by said table and operating in connection with said cams, a tong-table geared to revolve with said main table, bag-holders or spring-tongs on said tong-table, a hopper or supply-receptacle revolving with said mold-table and having delivery-openings and gates or valves therefor, stationary stirrers with brushes, pivoted and counterpoised scale-pans under said openings, gate-opening devices movable with the hopper and scale-pans, a stationary cam for operating said devices, weighing-levers arranged to be tilted by said scale-pans, pivoted links connected with said levers, reciprocating cut-off rods, scale-dumping appliances movable with the hopper and scale-pans, fixed cam for operating said appliances, a stationary chute receiving the charges weighed and conveying the same to the forms, a stationary cam for forcing down the plungers and plunger-rods, and a receiving-table geared to revolve with said mold-table, and provided with recesses and a delivery-slide, substantially as described.

In testimony whereof I have signed this specification in the presence of two witnesses.

C. C. CLAWSON.

Witnesses:

W. A. LODGE,  
JACOB KLINE.