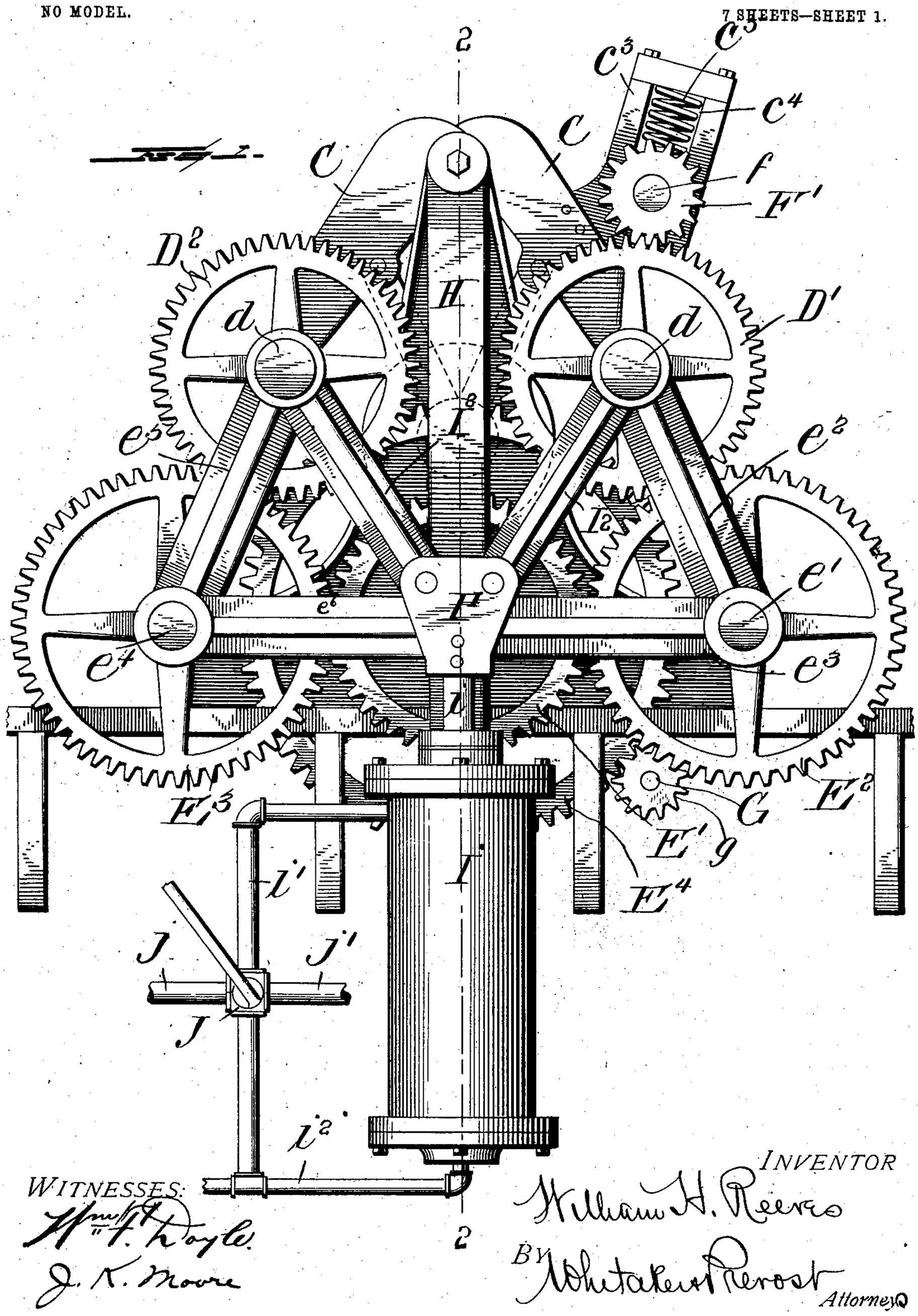
No. 721,325. PATENTED FEB. 24, 1903.

W. H. REEVES.

COTTON BALING PRESS.

APPLICATION FILED AUG. 31, 1901.

NO MODEL. 7 SHEETS—SHEET 1.



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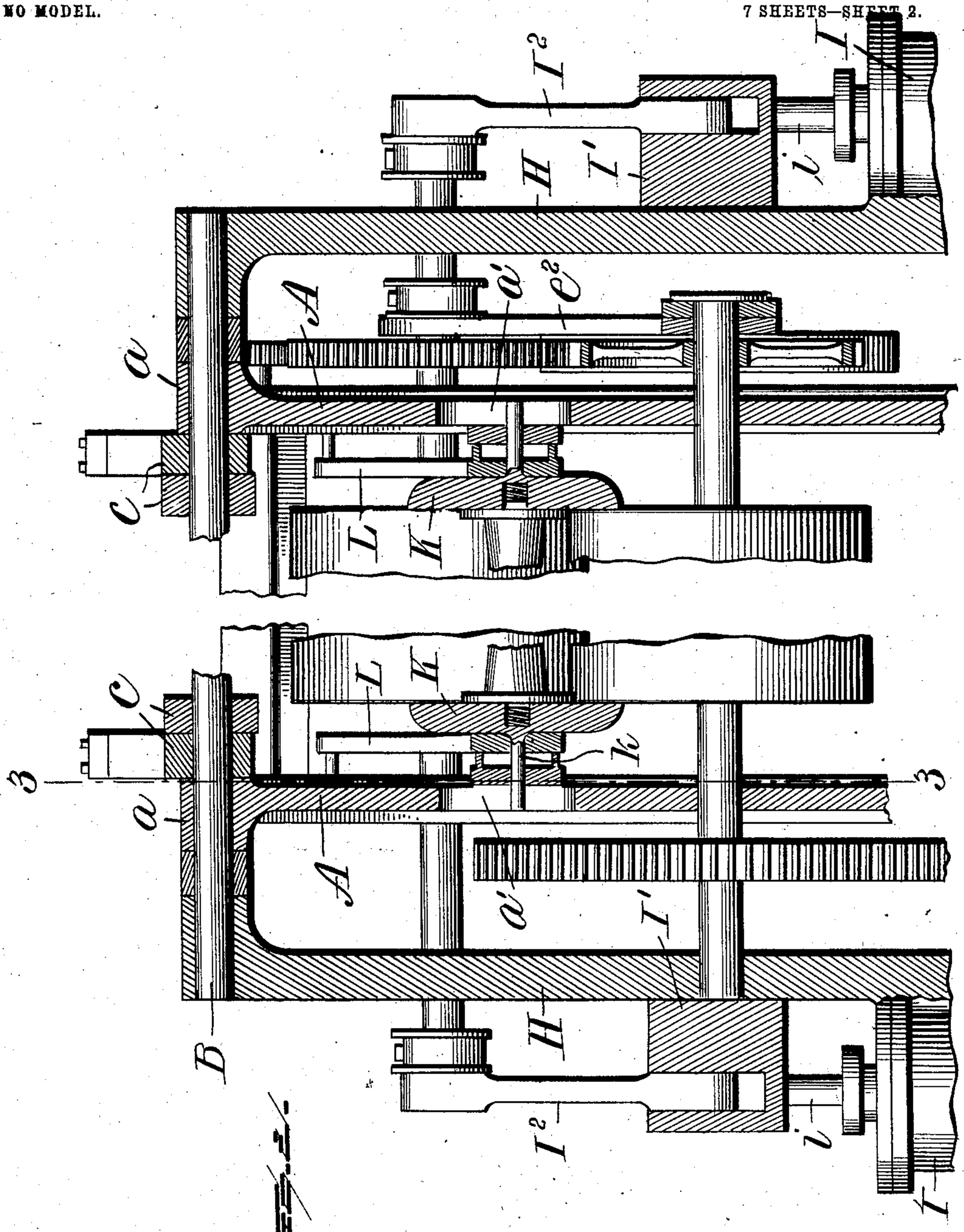

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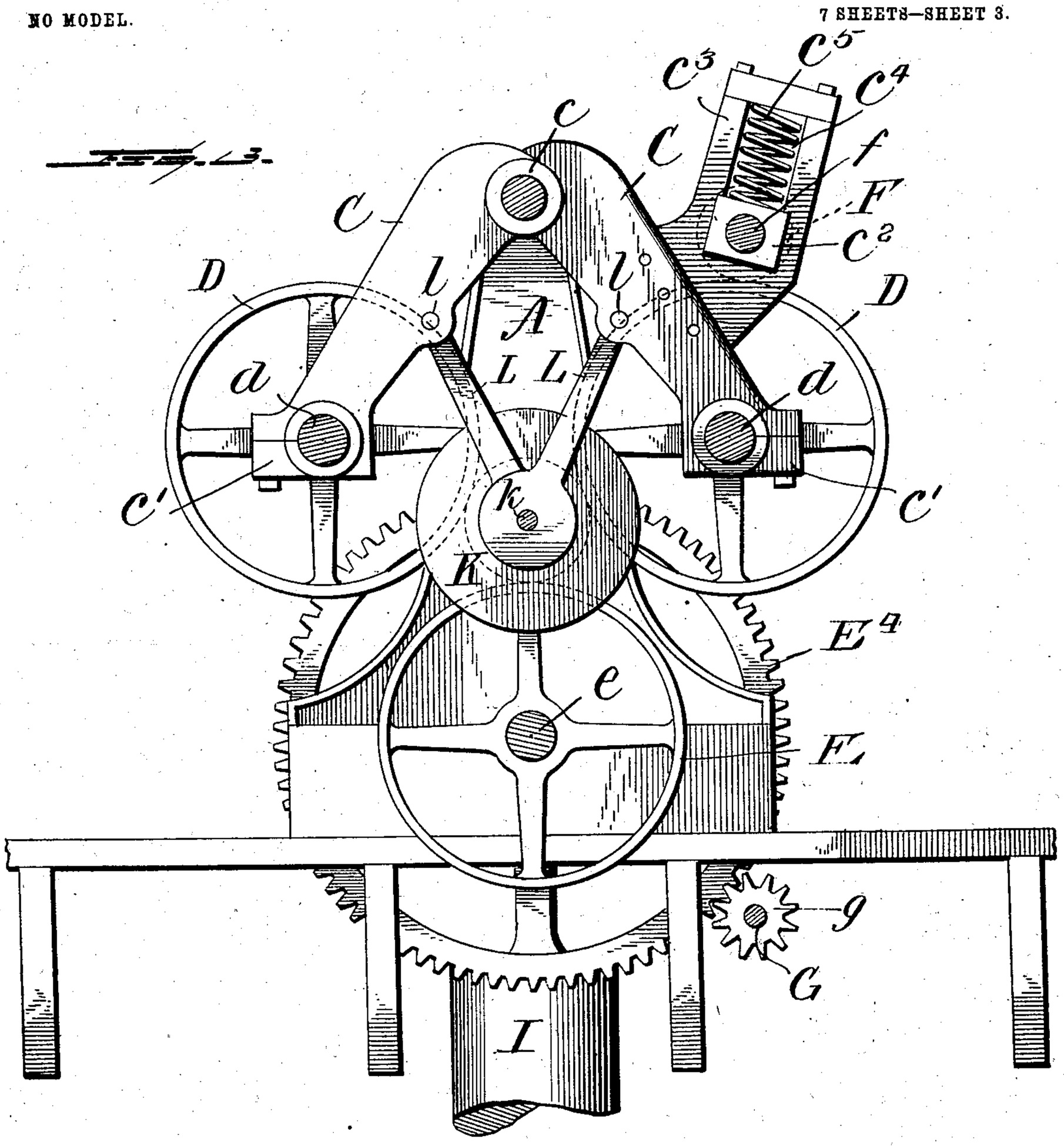
NO MODEL. 7 SHEETS—SHEET 3.

Fig. 3.



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NO MODEL. 7 SHEETS—SHEET 4.

Fig. 4.

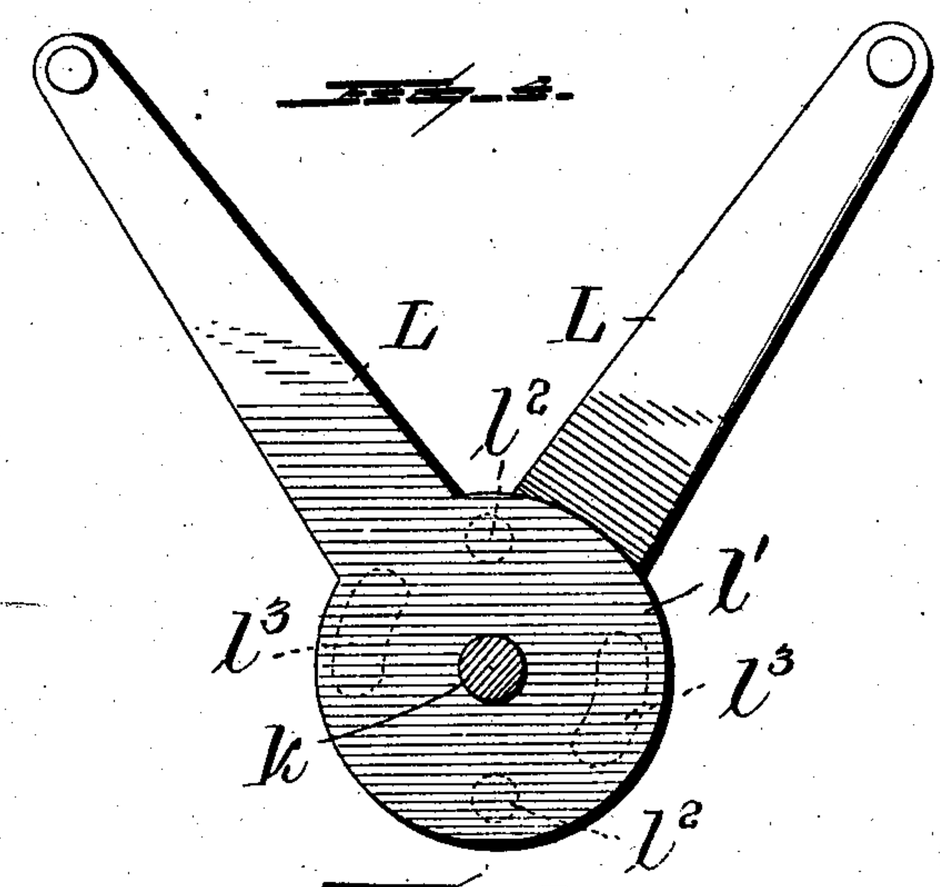


Fig. 5.

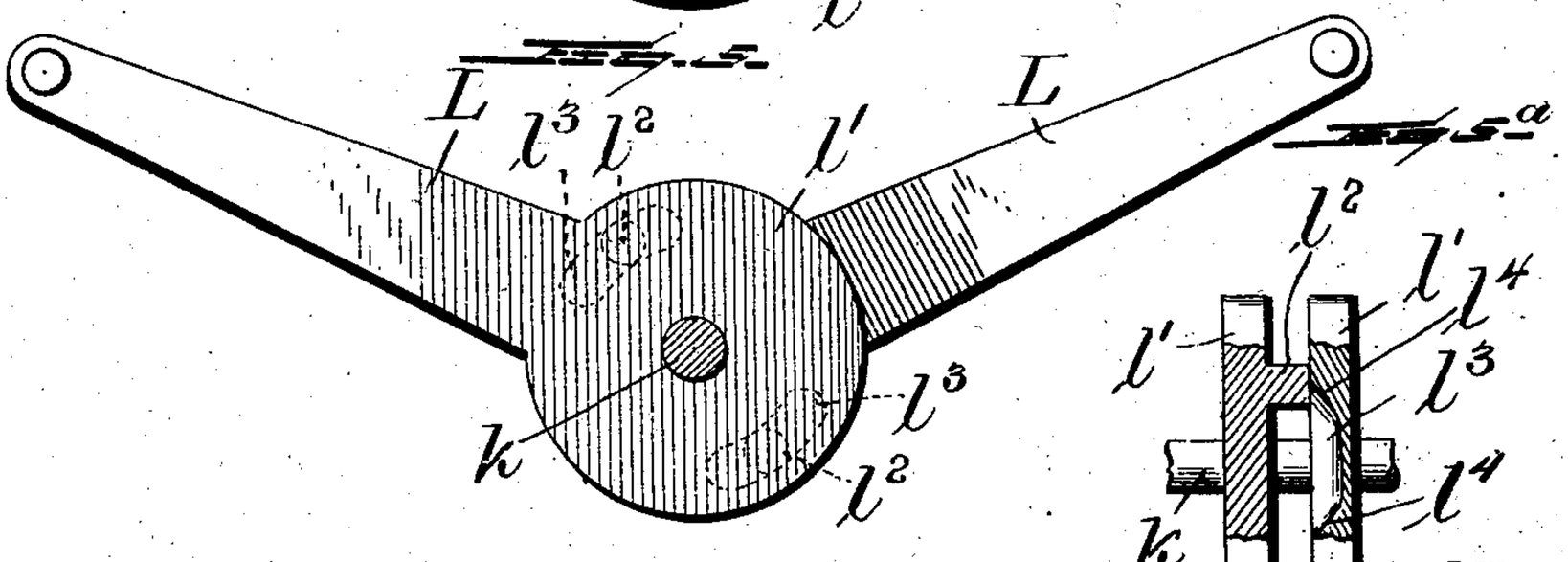


Fig. 5a.

Fig. 6.

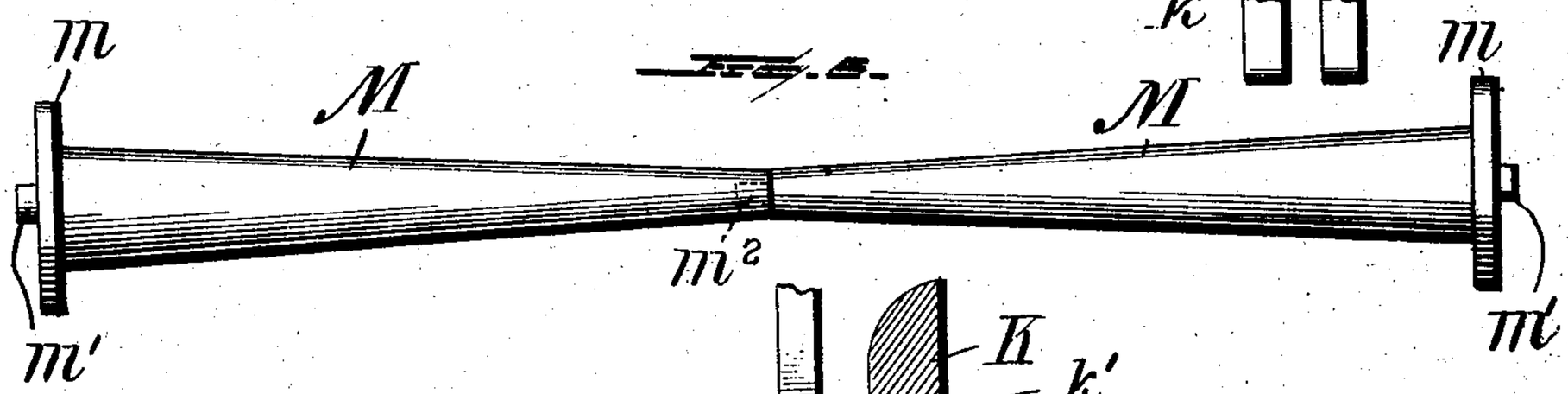
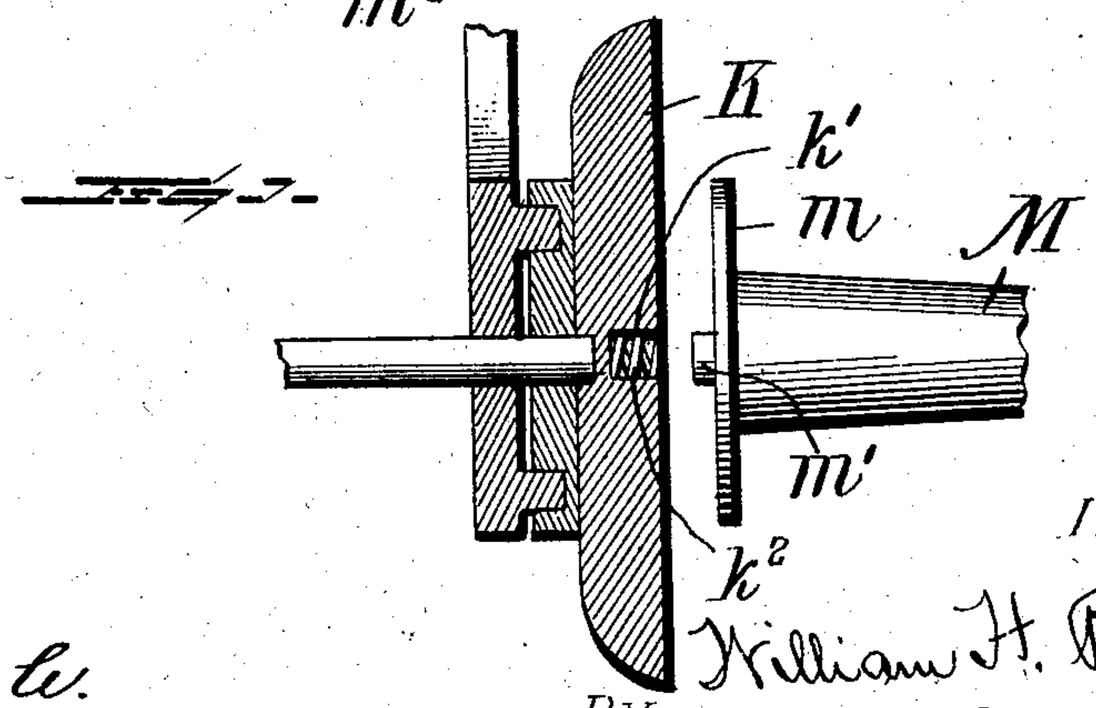


Fig. 7.



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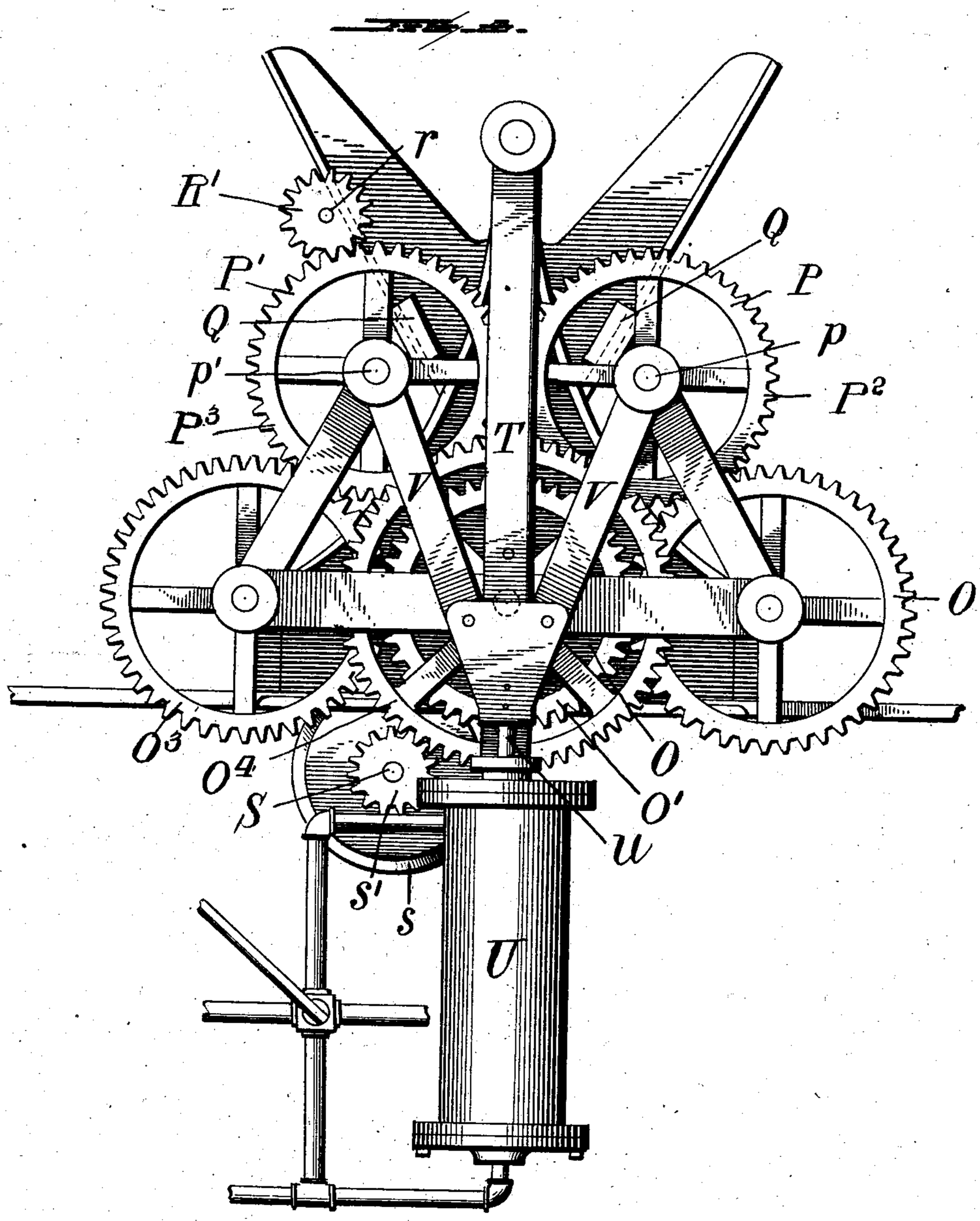
NO MODEL. 7 SHEETS—SHEET 5.



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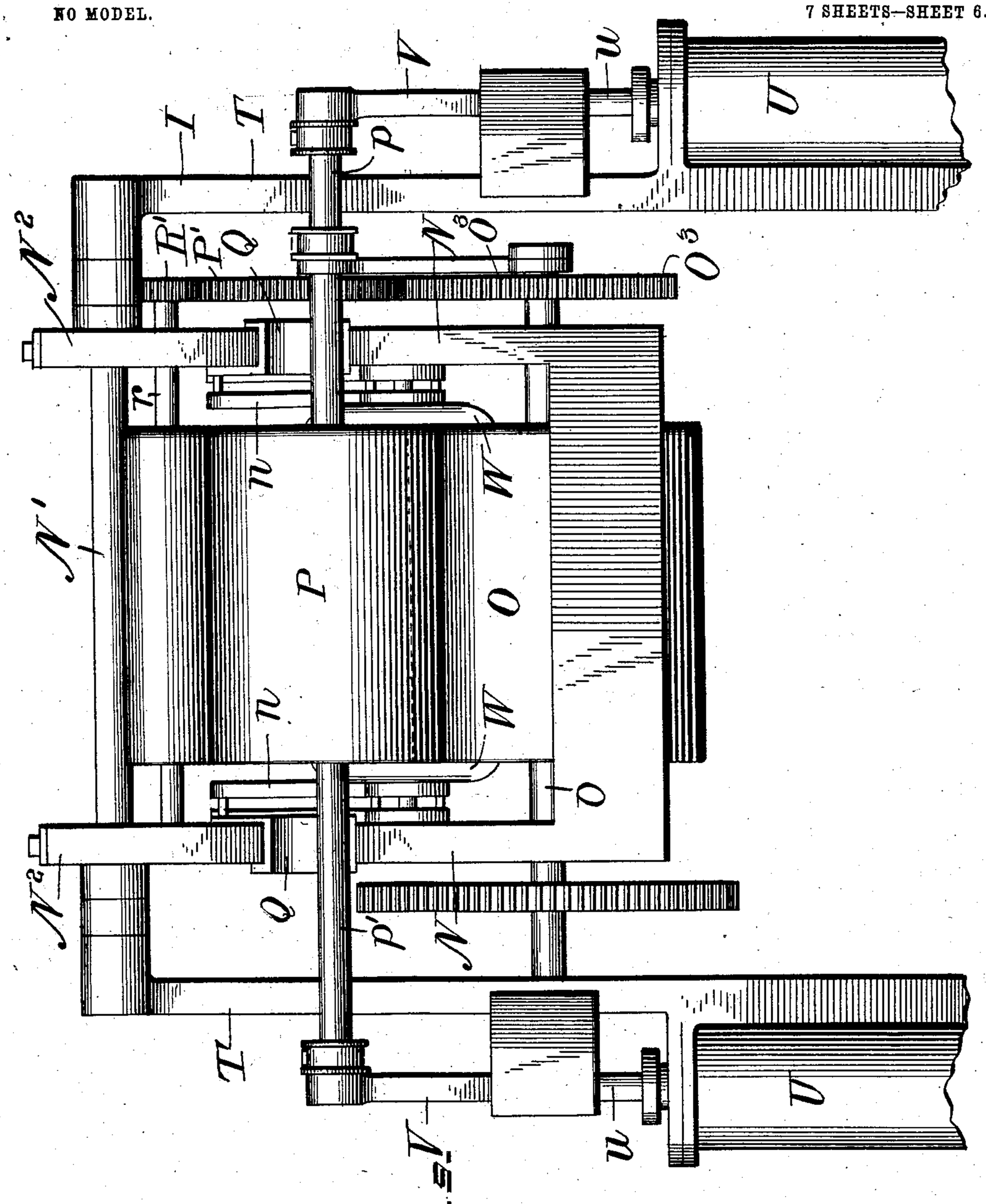
NO MODEL. 7 SHEETS—SHEET 6.



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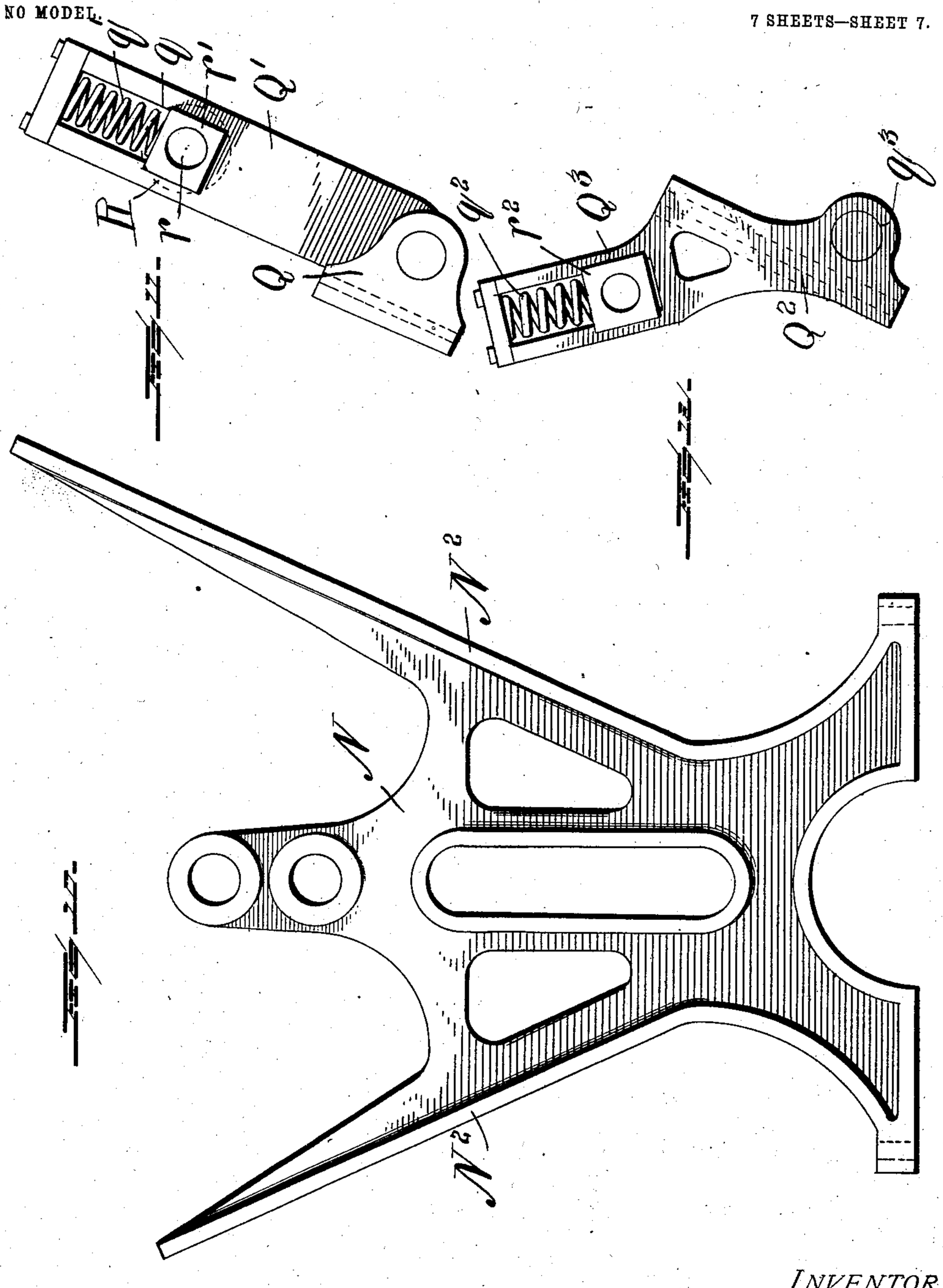
NO MODEL. 7 SHEETS—SHEET 7.



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UNITED STATES PATENT OFFICE.

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COTTON-BALING PRESS.

SPECIFICATION forming part of Letters Patent No. 721,325, dated February 24, 1903.

Application filed August 31, 1901. Serial No. 73,973. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. REEVES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cotton-Baling Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the novel features hereinafter described with reference to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention, together with a slight modification thereof, and said invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 is an end elevation of a cotton-baling press embodying my invention. Fig. 2 is a transverse vertical sectional view of the press, taken on line 2 2 of Fig. 1, the central portion being broken away. Fig. 3 represents a vertical section of the machine on line 3 3 of Fig. 2. Fig. 4 is a detail view of the arms for supporting one of the rotary heads, showing them in the position which they occupy at the commencement of the formation of a bale. Fig. 5 is a similar view showing the arms in the position which they occupy when the bale is completed. Fig. 5^a is a detail of said arms, partly in section. Fig. 6 is a detail view of the two-part core. Fig. 7 is detail view, partly in section, of portions of the supporting-arms, the rotary head, and one end of the core. Fig. 8 is an end elevation of a slightly-modified form of baling-press embodying my invention. Fig. 9 is a front view of the same. Fig. 10 is a detail view of one of the side frames. Fig. 11 is a detail view of one of the sliding blocks for carrying the shaft of one of the movable rolls and the shaft of the compressor-roller. Fig. 12 is a detail view of a modified form of slide-block for the same purpose.

Referring to the press shown in Figs. 1 to 7, inclusive, A A represent a pair of end frames supported upon a suitable base and provided at their upper ends with bearings *a*, which receive a horizontal pivot-shaft B, extending entirely across the machine and projecting at each side thereof beyond the end frames. C C represent a pair of hinged supporting-frames, preferably constructed in the form of an inverted U and provided at their upper edges with bearings *c*, engaging the pivot-shaft B, and at their lower edges, which are bifurcated, with the bearings *c' c'*, which support the shafts *d* of the movable bale-forming rollers D D. E represents the stationary bale-forming roller, which is mounted upon a shaft *e*, mounted in the end frames A A centrally thereof and in such manner that the center of said stationary rollers will be directly below the center of a line connecting the axes of the movable rollers D D. The construction is also such that when the movable rollers D are in their lowest positions and closest to the stationary roller E the distance between the two movable rollers D D will be slightly greater than the distance between either of said movable rollers and the stationary roller for the purpose of giving room between said movable rollers for the entrance of the bat to the space between the three rollers at the commencement of the formation of a bale. In a three-roller press it is very important that the three rolls should engage the bale at points as nearly as possible equidistant from each other around its periphery; but it is equally important that the space between the two movable rollers where the bat is fed in should be slightly greater than the distances between the movable rollers and the stationary rollers to allow the free admission of the bat in commencing the winding of a bale. F represents the compressor-roller, the shaft *f* of which is mounted in movable bearings c^2, supported in brackets c^3, bolted to one of the hinged frames C, said brackets c^3 being provided with slotted portions c^4 in which the bearings c^2 are mounted, and with springs c^5 engaging said bearings and normally holding the compressor-roller in its proper position with respect to the adjacent movable roller. By means of this construction the compressor-roller F is permitted to yield away from its adjacent roller D in case a bat of extraordinary thickness passes between the two rollers, thus avoiding the

straining or bending of the shaft. It also happens occasionally that a piece of iron or other hard foreign material or a tool is accidentally carried into the baling-press with the bat, and this construction permits the compressor-roll to yield to accommodate any such foreign matters without bending or breaking the shaft thereof.

The following-described mechanism is employed for driving the bale-forming rollers and the compressor-roller: The shaft *e* of the stationary roller E is provided at one side of the machine with a gear-wheel E′, and each of the shafts of the movable rollers is provided with a gear-wheel D′ and D², respectively, of the same size as the gear-wheel E′. Connection is made from the gear-wheel E′ to the gear-wheel D′ by means of an idle gear-wheel E², meshing with each of the said gear-wheels and having its shaft *e′* supported by swinging arms e^2 and e^3, connected to the shaft *d* of roller D and the shaft *e* of the roller E, respectively. In a similar manner connection is made from the gear-wheel E′ to the gear-wheel D² by means of an idle gear-wheel E³, which meshes with each of said gear-wheels and has its axle or shaft e^4 connected by swinging arms e^5 and e^6 with the shaft *d* of roller D and shaft *e* of roller E, respectively. The shaft *e* of roller E is provided also with a large driving gear-wheel E⁴, which is engaged by a driving-pinion *g* on a driving-shaft G, which is rotated in any desired way from an engine, motor, or other suitable source of power. From an examination of Fig. 1, in which this gearing is particularly shown, it will be observed that by this means the three bale-forming rollers will be simultaneously driven in the same direction, no matter what position may be assumed by the movable rollers, which are forced upwardly during the formation of the bale. The shaft *f* of the compressor-roll F is provided with a pinion F′, which engages the gear-wheel D′ of the adjacent movable roller, thereby simultaneously driving the compressor-roller in the desired direction. I also provide suitable means for retarding the upward movement of the movable rollers, and thereby applying pressure to the bale.

H H represent a pair of vertical guides arranged at opposite ends of the machine, having their upper ends secured to the shaft B and their lower ends secured to hydraulic cylinders I, in which are movable pistons provided with piston-rods *i*, connected each to a cross-head I′, arranged to slide on the vertical guide H. Each of the cross-heads I′ is connected by means of links, which I term "power multiplying-arms" I² I², with the shaft of the movable rollers. Each of the pistons I is provided with an inlet-pipe *i′* at its upper end and an inlet-pipe i^2 at its lower end, so that the fluid under pressure can be admitted to the cylinder from either side of the piston. I preferably provide a single controlling cock or valve (illustrated at J in Fig. 1) for controlling the supply of liquid under pressure, which valve is connected to both of the cylinders I and to each end thereof.

j represents the supply-pipe for fluid under pressure, and *j′* represents the exhaust-pipe.

During the formation of a bale the valve J is turned so as to admit fluid under pressure to the upper side of the piston in each of the cylinders I, the pressure of which is transmitted by the piston-rods, cross-heads, and power-multiplying arms to the shafts of the movable rollers, so that as the bale increases in size and raises the movable rollers the pressure will be applied by the rollers to the bale, thus winding the bat upon the bale under heavy pressure. In this connection it is to be noted that as the movable rollers move upward during the formation of a bale they also swing outwardly, moving upon an arc concentric with the axis of the pivot-shaft B, upon which the hinged frames which support the bale-forming rollers are pivoted. The fixed and movable rollers will therefore preserve their approximately equidistant relations, so that the three lines of contact of the said rollers upon the bale will always remain substantially equidistant, this being necessary for the formation of a satisfactory bale with a three-roller press. If the distance between any two rollers in a three-roller press becomes considerably greater than the distance between other rollers, the bale will bulge to a greater extent at such point or points, rendering the operation of the press difficult and resulting in straining or tearing the bat. It is also to be noted that as the movable rollers swing outward the leverage of the power multiplying-arms I² I² increases in proportion as the hinged frames C C approach a horizontal position, so that without the direct application of more power in the pressure-cylinders I the pressure upon the bale will be continually increased as the movable rollers move outwardly and upwardly, thereby making the bale more compact at the periphery than it is at the center, which is very desirable in the formation of cylindrical bales, as it greatly facilitates the unwinding of the bale without injury to the bat.

The press is provided with a pair of revoluble heads K K for engaging the end of the bale during its formation, so as to prevent the bale from expanding longitudinally by reason of the pressure applied transversely by the bale-forming rollers. Each of these rotary heads is mounted upon a spindle *k*, carried by a pair of arms L L, pivotally connected at *l l* with the swinging frame C C, so that as the said frames move upwardly with the movable rollers the rotary heads K will be raised, so as to keep them at all times concentrically with the bale. Each of the end frames A is provided with a vertical slot *a′*, (see Fig. 2,) into which slots the spindles *k k* extend and are guided in their vertical movements. I also provide a construction by means of which the rotary heads are permitted to move away

from the ends of the bale when the bale is finished to facilitate the discharge of the bale from the press for the purpose of applying its protecting-wrapper in the usual manner. Each of the arms L L is provided at its lower end with a disk portion l', having a central aperture through which the spindle k of one of the heads extends. One of the disks l' is provided with two or more pins or studs l^2, (two being shown,) projecting from the face thereof adjacent to the other disk, and the other disk is provided with a corresponding number of elongated recesses or pockets l^3 l^3, adapted to receive said studs l^2 l^2 when the arms L L are in the position which they occupy when the bale is completed, thereby permitting the heads to recede from the ends of the bale a distance equal to the depth of said recesses or pockets, as shown in Figs. 4, 5, and 5ª. When, however, the upper or movable rollers are lowered into the required position for the commencement of a bale, the said pins or studs l^2 will be disengaged from the pockets or recesses l^3 and will force the inner disk portion l' of said arm inward, thus holding the rotary heads in position to engage and support the ends of the bale to prevent the longitudinal expansion thereof. The recesses l^3 l^3 are provided with inclined portions l^4 at their ends to facilitate the studs l^2 sliding into and out of said recesses, and said recesses are made of greater length than the diameter of said studs to allow for the additional upward movement of the movable rollers, as hereinafter described, for the purpose of discharging the finished bale.

The press may be used either with or without a core. I prefer, however, to employ a core of the form shown in Fig. 6. This core is formed of two parts, each comprising a tapering section M, provided at its outer end with a disk m, on the outer side of which is a central stud m'. The inner or reduced ends of the tapered section of said core are provided the one with a recess and the other with a stud m^2, which enters said recess, thus connecting the two parts of the core. Each of the rotary heads K is provided with a central recess k', in which is located a coiled spring k^2. The recess k' is adapted to receive the stud m' at one end of the core and the spring k^2 is for the purpose of expelling said stud from said recess after the bale has been formed and the studs l^2 have entered the recesses l^3 of the supporting-arms, as before described. The two parts of the core are placed together and are inserted in the press while the movable rollers are in their highest positions. As the rollers descend the heads K will be forced inward, as before described, thus taking the studs m' of the core into the central recesses k' of the head, thereby locking the core in the press. When the movable rollers are in their lowest positions, they will engage the flanges or disks m m of the core, which will also rest upon the stationary roller, so that when the rollers are first rotated for the formation of the bale they will by frictional engagement rotate said flanges m m and the core, thus effecting a continual rotation of the core while the first portions of the bat are being wound upon it, and the said core will continue to be rotated by the rollers until the bale has acquired sufficient size to engage said rollers and force the movable rollers upward and outward away from the stationary roller. When the bale is completed, the studs l^2 will enter the recesses l^3, as before described, and allow the rotary heads to recede from the bale, the springs k^2 assisting in expelling the studs m' of the core from the recesses in the heads, thus leaving the core free from said heads. To discharge the bale, it is only necessary to operate the valve J in such manner as to admit the fluid under pressure to the lower faces of the pistons in the fluid-cylinders, thereby raising the upper rollers off of the bale. The lower roller continuing its rotation will then roll the bale out of the press, when the upper rollers may be allowed to descend after inserting another core between the rotary heads. The core being made in two parts, the halves thereof are removed from the opposite ends of the bale, the tapering of the portions M M of the core serving to facilitate the removal of the parts from the bale.

In Figs. 8 to 12, inclusive, I have shown a modified form of a three-roller baling-press, in which the upper rollers instead of being mounted in swinging frames are mounted in guide-blocks adapted to slide upon inclined guides formed on the end frames of the machine, said rollers being forced to move upwardly and outwardly along said guides as the bale increases in size and preserving the desired distances between them and the stationary roller. In these figures, N N represent the two side frames connected at the top by a cross-bar N′, each of said frames being provided with upwardly and outwardly extending guides N^2 N^2. (See Fig. 10, in which one of said frames is shown in detail.) O represents the stationary roller mounted on shaft o, and P P′ are the movable rollers the shafts p p' of which are mounted in bearings attached to sliding blocks Q Q, arranged to slide upon the guides N^2 of the side frames. The guides N^2 are preferably dovetailed, and the recesses in the blocks Q, fitting said guides, are correspondingly shaped. The blocks Q for one of the rollers (in this instance the roller Q′) are provided each with an extension-bracket, provided at its upper end with a slot q, which receives a sliding bearing r', in which the shaft r of the pressure-roller R is mounted. These bearings r' are capable of moving up and down in the slots q, and each bearing is provided with a spring q', holding the roller R in proper relation with the roller P′. This form of bracket is shown in Fig. 11, and in Fig. 12 I have shown a modified form in which Q^2 is

the block, Q^3 the bracket carrying the bearing r^2, in which the shaft of the compressor-roller is mounted, and q^2 represents the spring engaging said bearing. The block Q^2 is provided with a bearing Q^3 for the shaft of the bale-forming roller. The arrangement of gearing for driving the bale-forming rollers and the compressor-roller is exactly the same as that previously described, and it will be unnecessary to do more than indicate the various gears thereof. O′ is the gear on the shaft of the stationary roller, connected by idler O^2 with gear P^2 on the shaft of movable roller P. O^3 is an idler connecting the gearing O′ with the gear P^3 on the shaft of roller P′, and R′ is a pinion on the shaft r of the compressor-roller gearing with the gear-wheel P^3. S is the driving-shaft, provided with a drive-pulley s and pinion s', meshing with a large driving-gear O^4 on the shaft o of the stationary roller. The mechanism for applying power to the movable rollers is identical with that previously described and comprises the vertical guides T, connected at their upper ends to cross-bar N′ and provided at their lower ends with cylinders U, the pistons u of which are connected by power or multiplying arms V V with the shaft p p' of the movable rollers. This form of press will also be provided with the rotatable heads previously described and which are illustrated at W W in Fig. 9, said heads being connected by their supporting-arms w with the sliding blocks carrying the shafts of the upper rollers. The operation of these heads and of the supporting-arms is identical with that previously described, and the press can be used with or without a core M M, as preferred. In this form of press the arrangement and construction of the guides N^2 N^2 and the sliding blocks Q Q is such that when the upper rollers are in their lowest positions there will be a greater space between the two upper rollers than that between either of said upper rollers and the stationary roller to freely admit the bale-forming bat between the upper rollers. As the bale increases in size the upper rollers will move upwardly and outwardly, following the guides N^2 N^2, the lines of bearing of the three rollers upon the bale remaining at all times substantially equidistant. The operation of this form of press in the formation and discharge of the bale is substantially identical with that previously described with reference to the form of press shown in Figs. 1 to 7, inclusive.

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

1. In a cotton-baling press, the combination with the stationary roller, of two movable rollers mounted above the same, mechanism for guiding said movable rollers away from each other and from said stationary roller, during the formation of a bale, mechanism for rotating all of said rollers, a fluid-pressure cylinder, a piston therein, connections between said piston and the movable rollers, means for admitting fluid under pressure to said cylinder on one side of the cylinder to apply pressure to the bale, and means for admitting the fluid to the other side of the cylinder to raise said movable rollers out of contact with the bale and permit the continued rotation of said stationary roller to force the bale out of the press, substantially as described.

2. In a cotton-baling press, the combination with the stationary roller, of two movable rollers arranged above the same, mechanism connected with said movable rollers causing them to diverge as they move away from the stationary roller, multiplying-arms connected with said movable rollers, and pressure devices located in line with the stationary roller and connected with said power-arms, whereby the leverage on said movable rollers will increase as they move outwardly and means for simultaneously driving said rollers, substantially as described.

3. In a cotton-baling press, the combination with the stationary roller, of two movable rollers, arranged above the same, guiding devices connected to said movable rollers for causing them to diverge as they move away from the stationary roller, a hydraulic cylinder located in line with said stationary roller, a piston in said cylinder, multiplying-arms connecting said piston with said movable rollers, and mechanism for simultaneously driving said rollers, substantially as described.

4. In a cotton-baling press, the combination with the bale-forming rollers, and means for operating the same, of a core provided at one end with a friction-flange, adapted to be engaged by said rollers to rotate said core, during the winding of the preliminary lapse of the bale, substantially as described.

5. In a cotton-baling press, the combination with bale-forming rollers, of a two-part core, each part decreasing in diameter from one end to the other, and being provided adjacent to its larger end with a friction-flange, adapted to be engaged by said rollers to rotate the core during the rolling on of the preliminary lapse of the bale, the smaller ends of said parts being provided with means for connecting the two parts of the core, substantially as described.

6. In a cotton-baling press, the combination with bale-forming rollers, of a two-part core, each part being of conical form and provided at its larger end with a friction-flange adapted to be engaged by the rollers to rotate said core, said parts being provided at their smaller ends, the one with a projection and the other with a recess to receive said projection, substantially as described.

7. In a cotton-baling press, the combination with the stationary and movable bale-forming rollers, mechanism for driving said rollers and pressure devices connected with said movable rollers, of revoluble heads, supporting devices for said heads, connected with said mov-

able rollers, and mechanism permitting said heads to move longitudinally of the bale to permit the finished bale to be discharged, substantially as described.

8. In a cotton-baling press, the combination with the stationary and movable bale-forming rollers, mechanism for driving said rollers and pressure devices connected with said movable rollers, of revoluble heads, a pair of supporting-arms connected to each of said heads and to said movable rollers, one arm of each pair being provided with projecting devices adapted to enter recesses in the other arm, when the bale is completed, to allow said heads to move away from the ends of the bale, substantially as described.

9. In a cotton-baling press, the combination with the stationary and movable bale-forming rollers, mechanism for driving said rollers, and pressure devices connected with said movable rollers, of revoluble heads, a pair of supporting-arms for each head connected therewith and with said movable rollers, one of said arms being provided eccentrically to the axis of the head with projections, and the other arm being provided with recesses having inclined end portions, said recesses being normally out of engagement with said projections, but adapted to receive the same, when the rollers are raised to the position which they occupy when the bale is completed whereby said heads are permitted to move away from the ends of the bale, substantially as described.

10. In a cotton-baling press, the combination with the stationary and movable bale-forming rollers, and mechanism for operating said rollers, of rotary heads connected with said movable rollers, mechanism permitting said heads to recede in a direction longitudinally of the bale to permit the removal of the bale, and a core adapted to be secured to said heads, the ends of said core, and said heads being provided the one with a projection and the other with a recess, to engage said projection, substantially as described.

11. In a cotton-baling press, the combination with the stationary and movable bale-forming rollers, and mechanism for operating said rollers, of rotary heads connected with said movable rollers and provided each with a recess and a two-part core, each part being of conical form and provided at its larger end with a projection to engage the recess in one of said heads, said parts being provided at their smaller ends with interlocking devices for connecting the two parts during the formation of the bale, substantially as described.

12. In a cotton-baling press, the combination with the stationary and movable bale-forming rollers, and mechanism for operating said rollers, of rotary heads connected with said movable rollers, and provided each with a recess and a spring located in said recess and a two-part core each part being of conical form provided at its larger end with a projection to engage the recess in one of said heads, said parts being provided at their smaller ends with interlocking devices, substantially as described.

13. In a cotton-baling press, the combination with the stationary and movable bale-forming rollers, and mechanism for operating said rollers, of rotary heads connected with said movable rollers and provided each with a recess and a two-part core, each part being of conical form provided at its larger end with a friction-flange adapted to be engaged by said rollers, and a projection for engaging the recess in one of said heads, said parts being provided at their smaller ends with interlocking portions, substantially as described.

14. In a cotton-baling press, the combination with two movable rollers, of a stationary roller located centrally below said movable rollers, hinged supporting-frames pivotally mounted on a common axis, above said stationary roller, and supporting said movable rollers, pressure devices located centrally between said movable rollers, power multiplying-arms connecting said movable rollers and said pressure devices, and mechanism for simultaneously rotating said stationary and movable rollers, substantially as described.

15. In a cotton-baling press, the combination with stationary and movable rollers, of a compressor-roller, mounted on a movable part adjacent to one of said movable rollers, movable bearings for said compressor-roller, and springs engaging said movable bearings, substantially as described.

16. In a cotton-baling press, the combination with a stationary roller, of movable rollers, movable supporting devices for each of said movable rollers, slotted brackets secured to the supporting devices for one of said movable bearings, movable bearings mounted in said slotted brackets, a compressor-roller mounted in said bearings, and springs engaging said movable bearings, substantially as described.

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

WILLIAM H. REEVES.

Witnesses:
GEORGE S. HANNAFORD,
EDWY LOGAN REEVES.