

(No Model.)

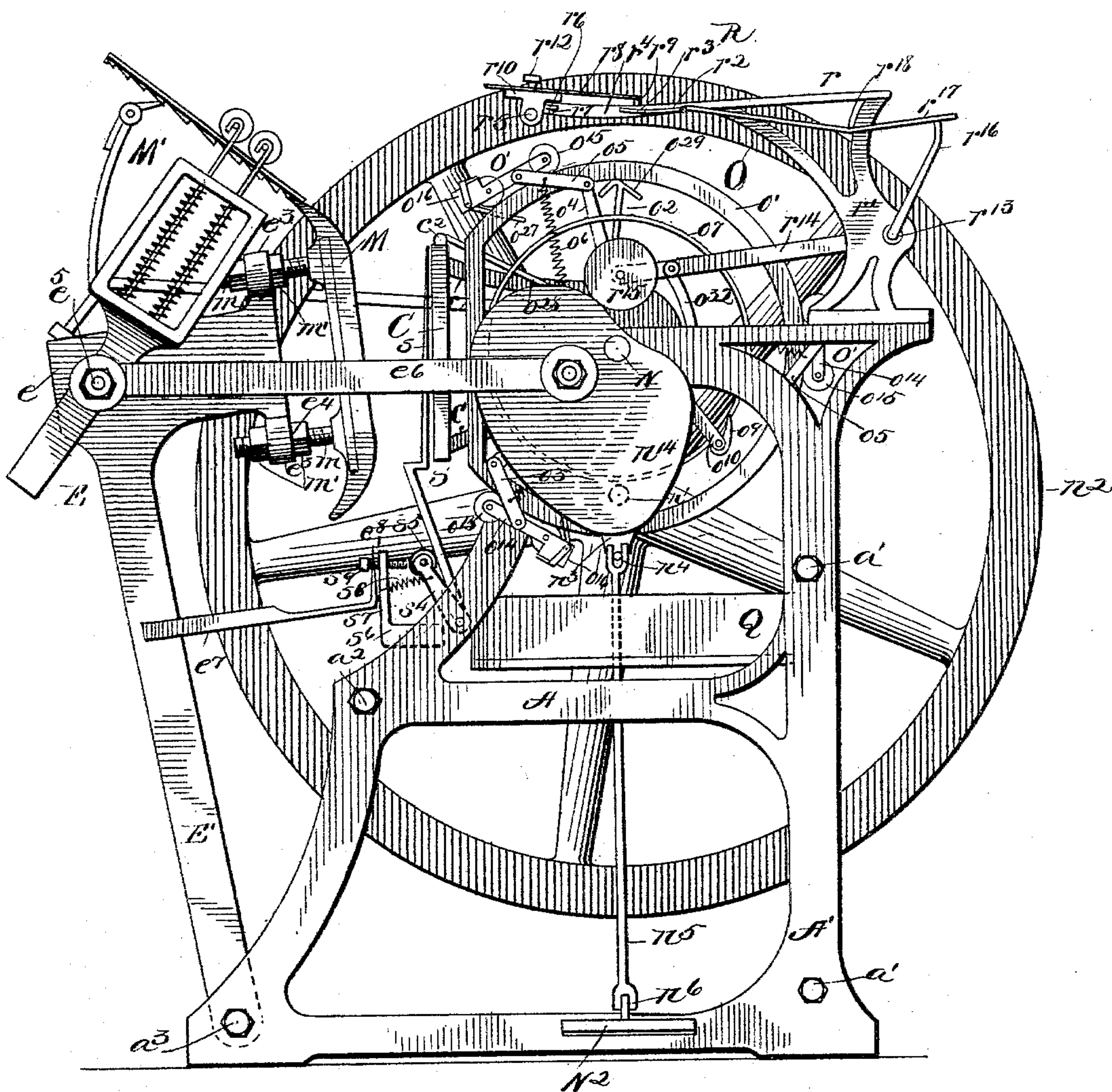
6 Sheets—Sheet 1.

O. S. BOWMAN.
PRINTING MACHINE.

No. 597,944.

Patented Jan. 25, 1898.

Fig. 1.



Witnesses:
J. M. Fowler Jr.
Garrie Brennan

Inventor
Oliver S. Bowman,
by *Chas. S. Sturtevant*
his Attorney

(No Model.)

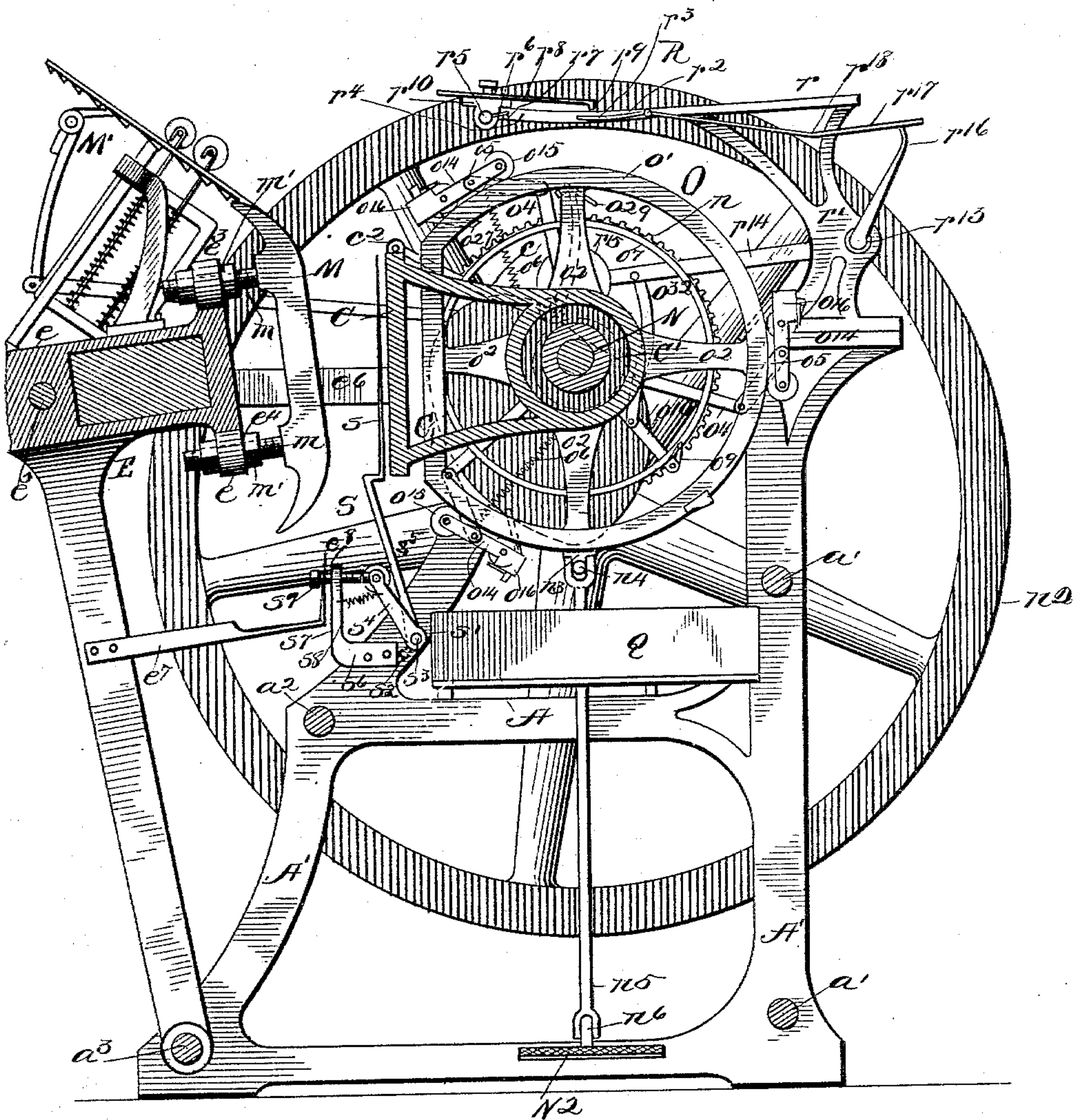
6 Sheets—Sheet 2.

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Fig. 2



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(No Model.)

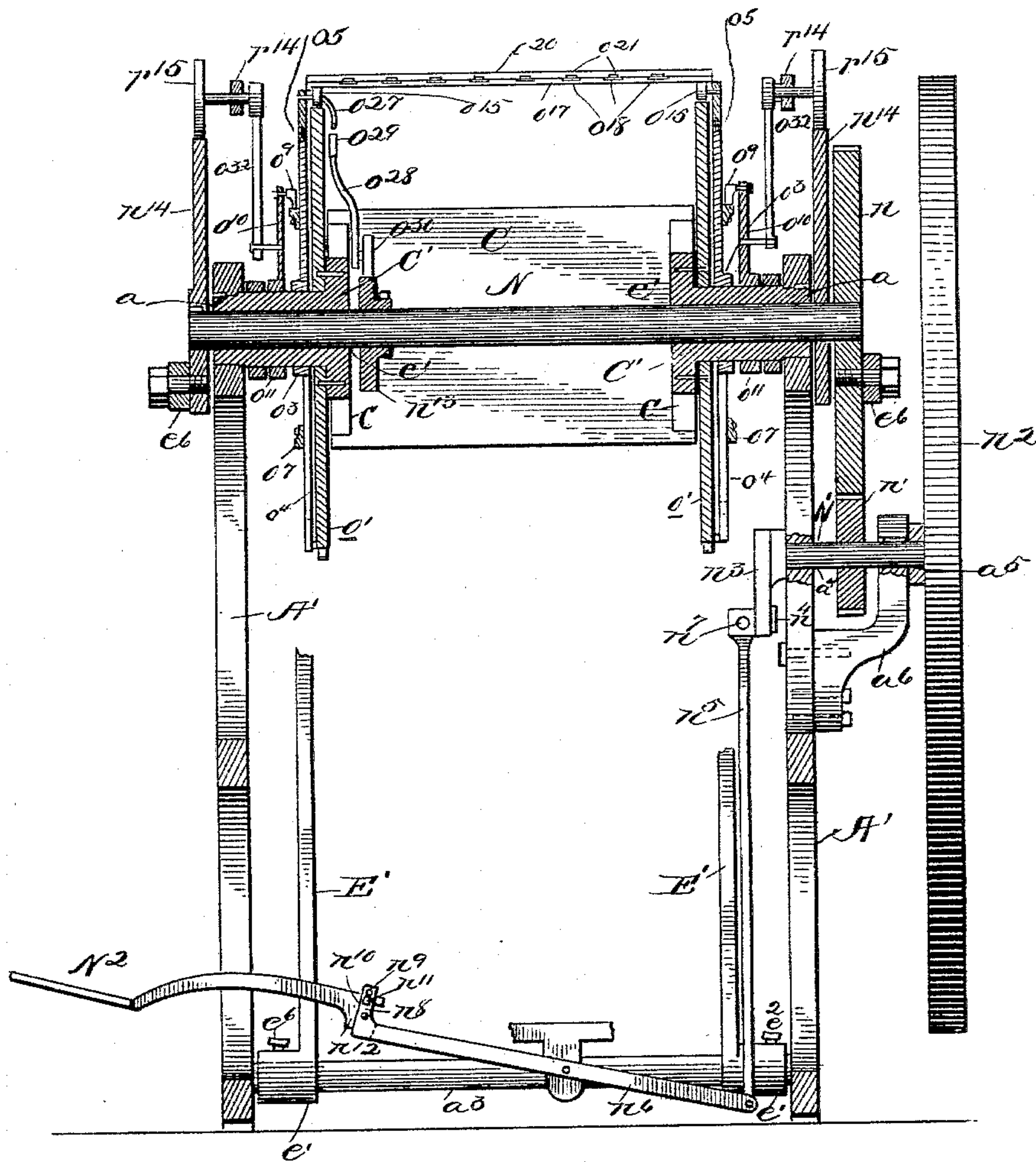
6 Sheets—Sheet 3.

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Fig. 3.



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(No Model.)

6 Sheets—Sheet 4.

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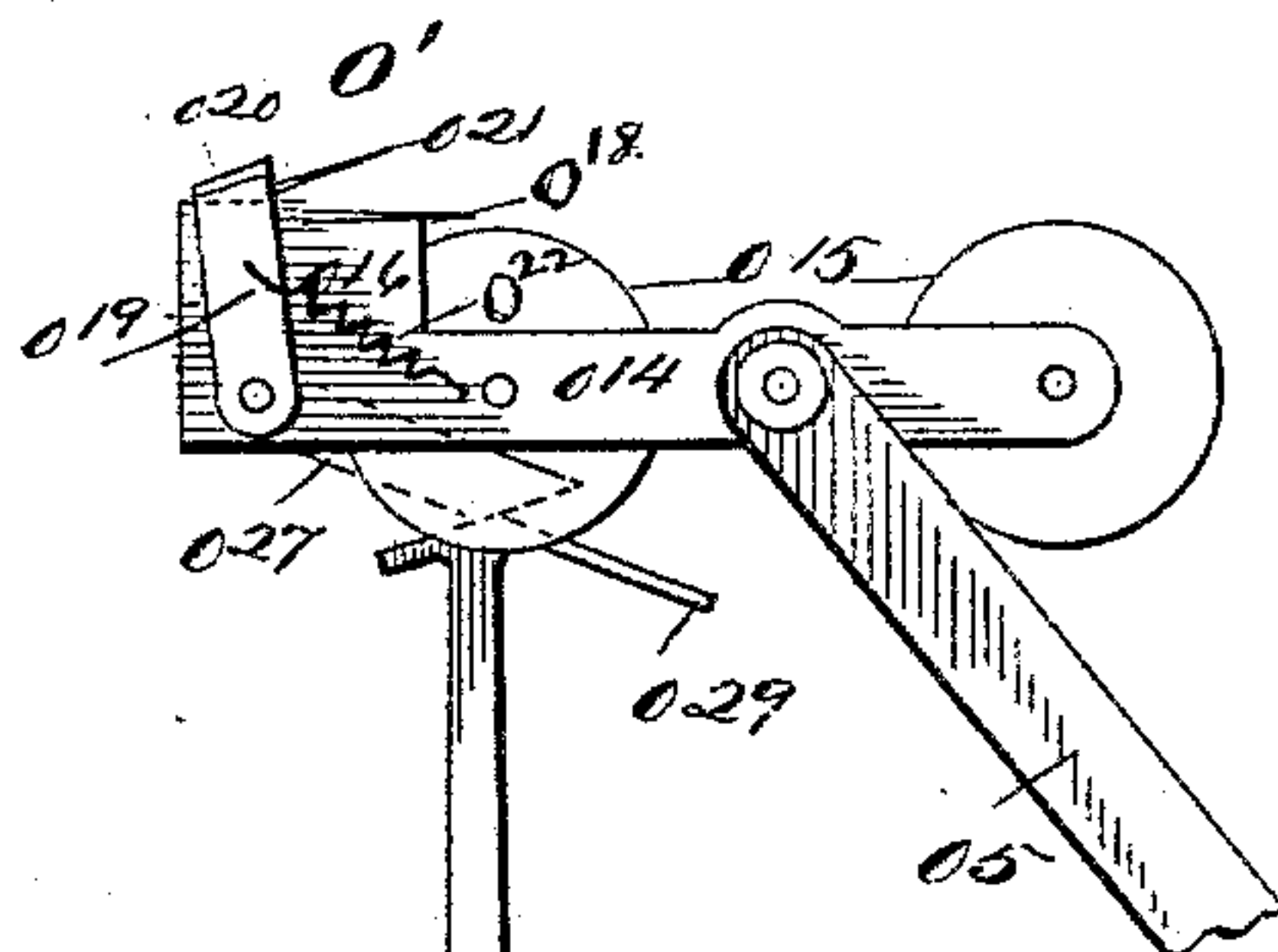
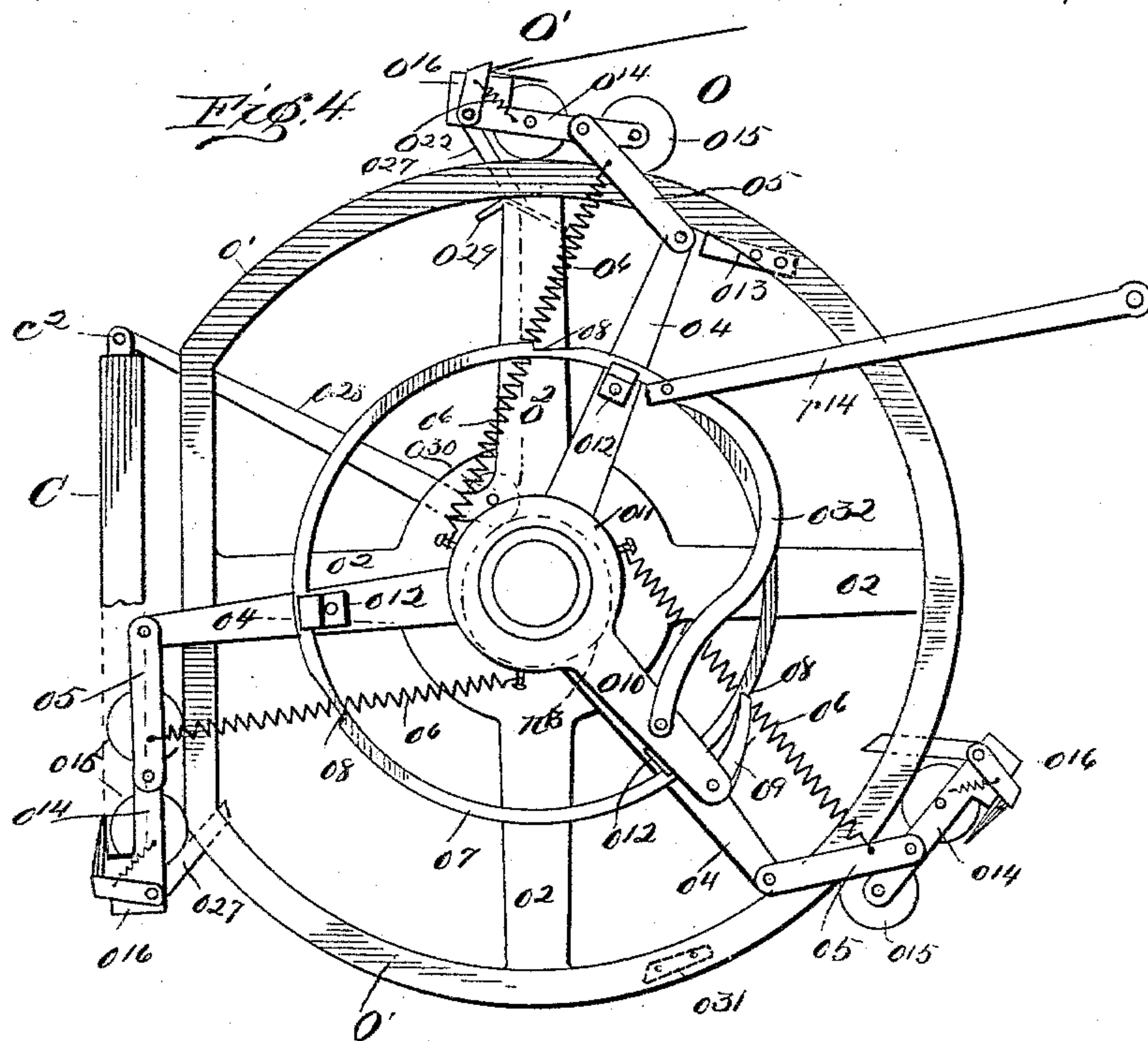
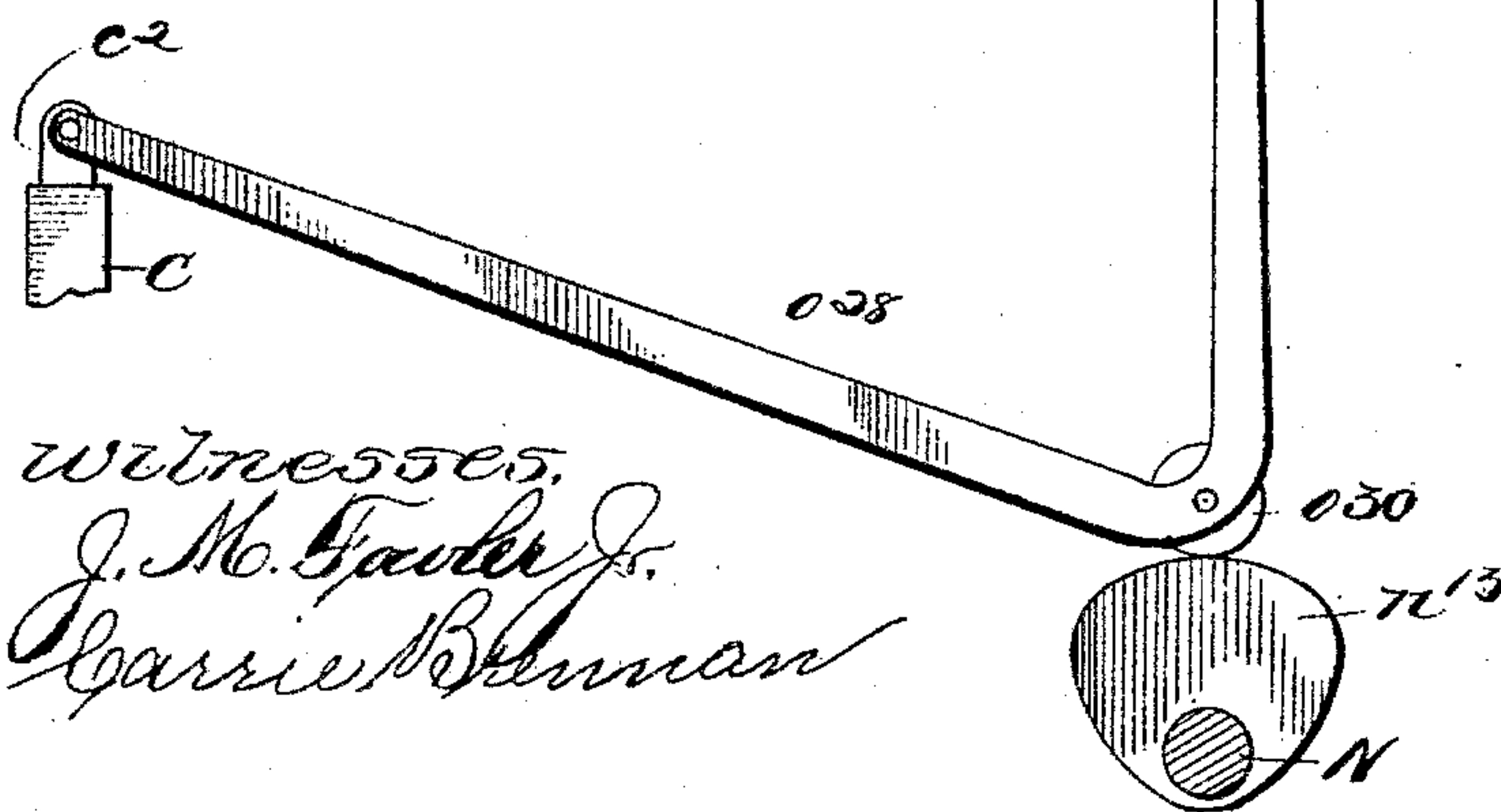


Fig. 5.



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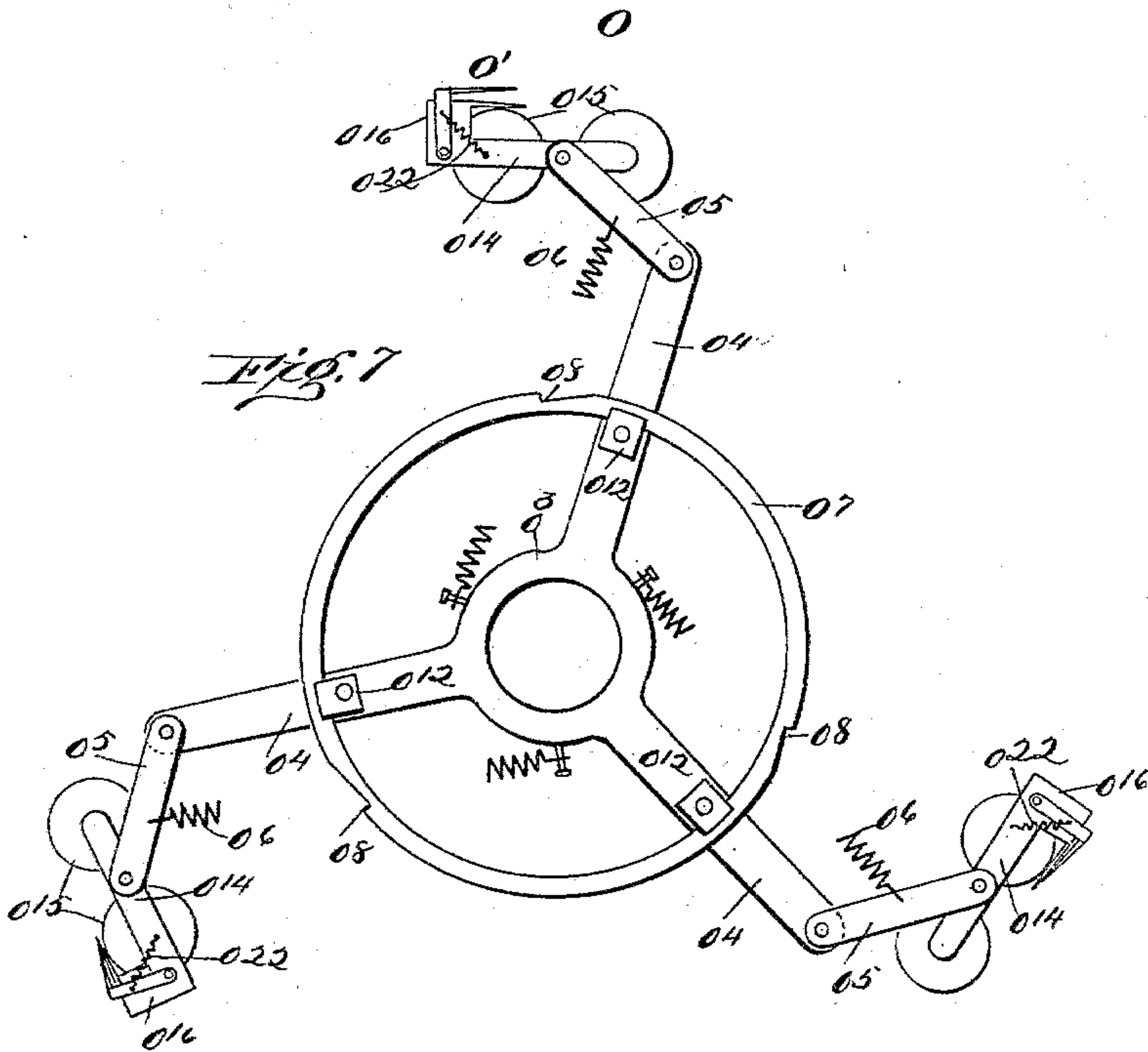
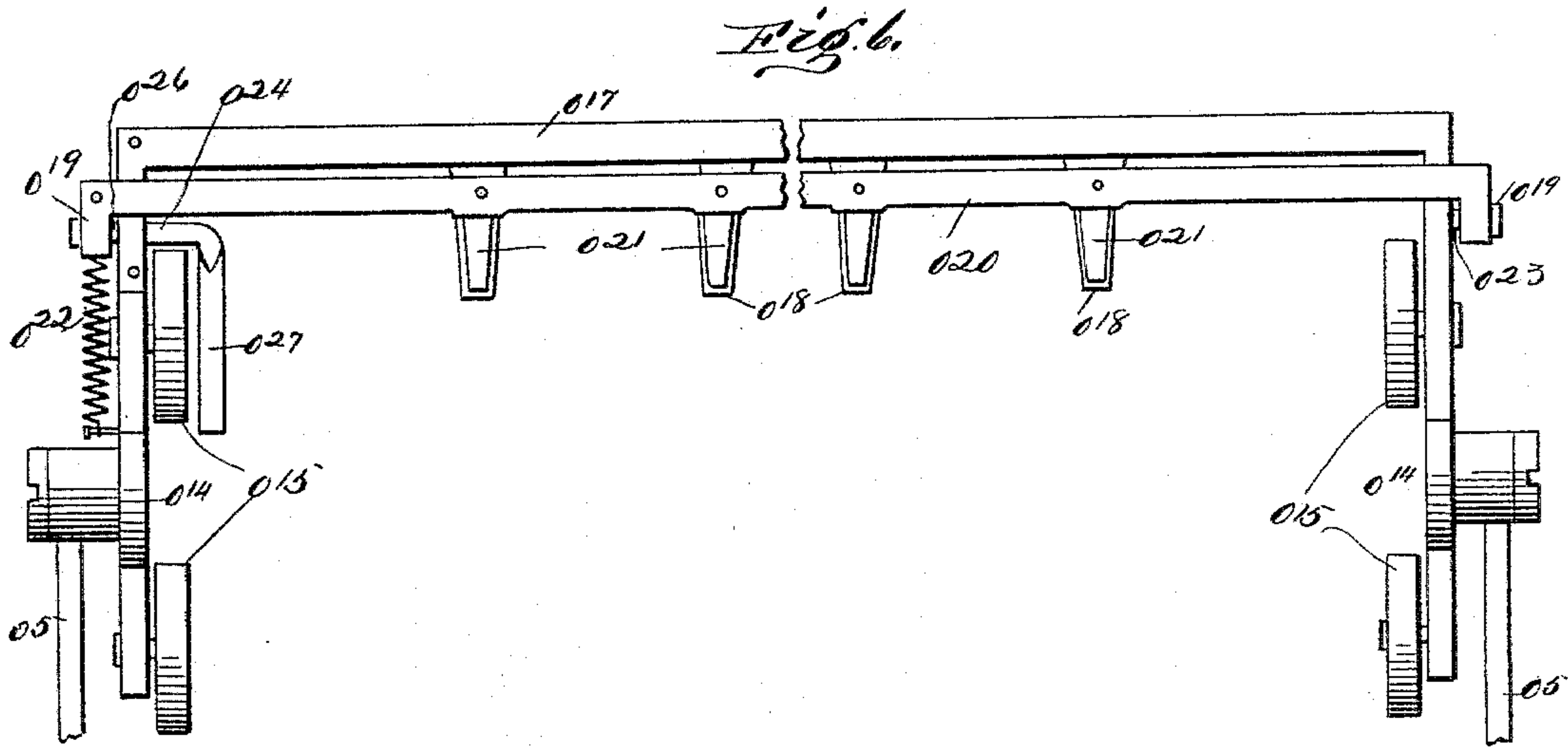
(No Model.)

6 Sheets—Sheet 5.

O. S. BOWMAN.
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(No Model.)

6 Sheets—Sheet 6.

O. S. BOWMAN.
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Patented Jan. 25, 1898.

Fig. 8.

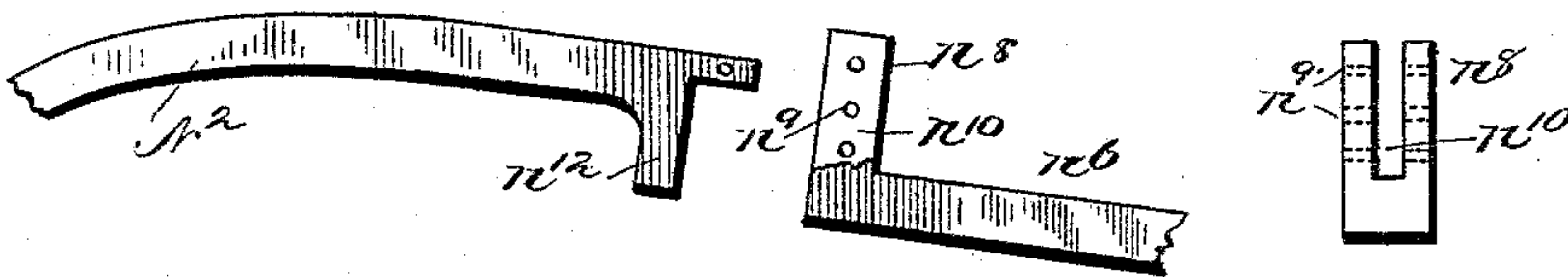
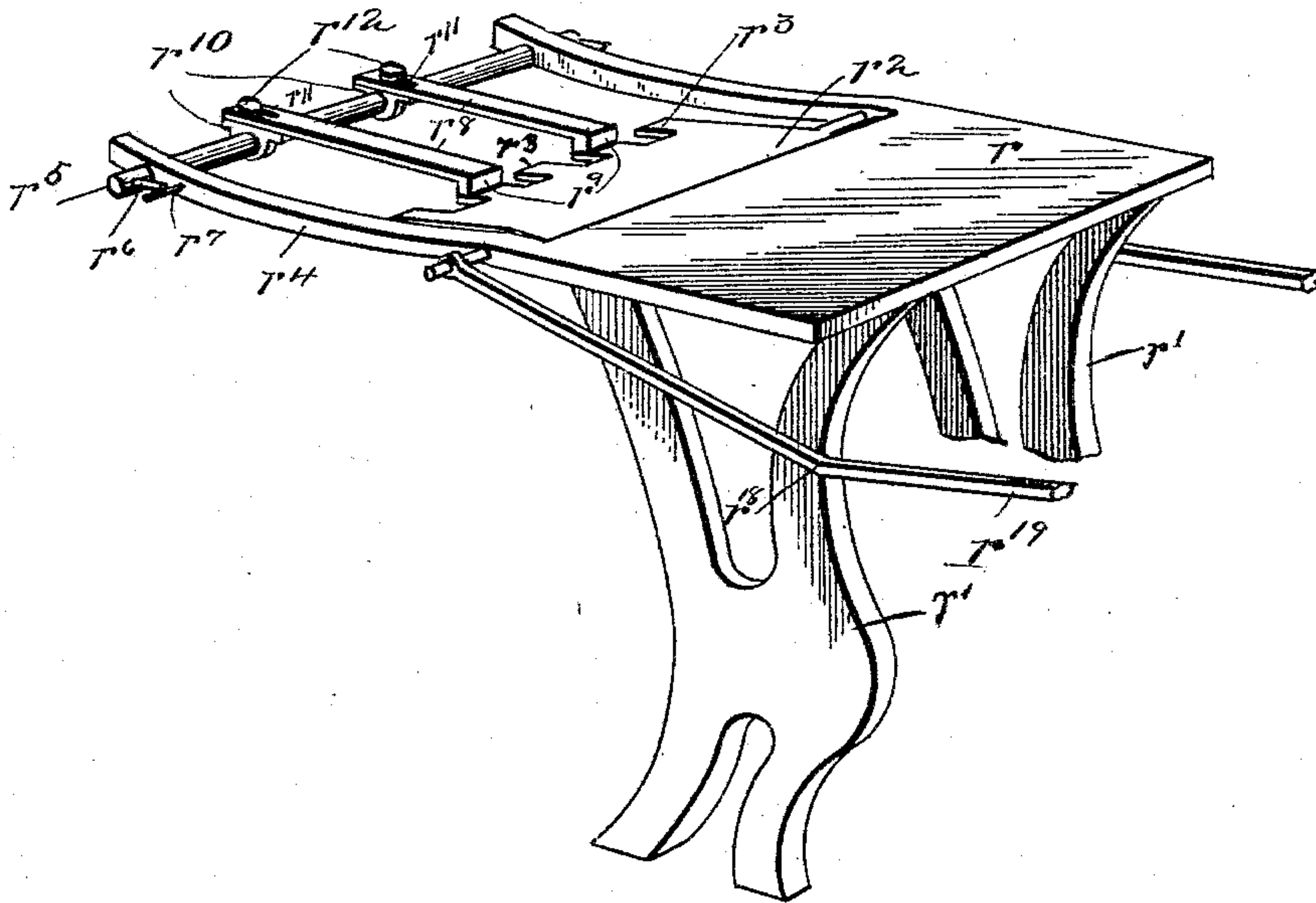


Fig. 9.



WITNESSES

J. M. Fowler
Walter B. Payne

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UNITED STATES PATENT OFFICE.

OLIVER S. BOWMAN, OF SALT LAKE CITY, UTAH.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 597,944, dated January 25, 1898.

Application filed August 11, 1896. Serial No. 602,447. (No model.)

To all whom it may concern:

Be it known that I, OLIVER S. BOWMAN, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake, State of Utah, have invented certain new and useful Improvements in Printing-Machines, of which the following is a description, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The present invention relates to printing-machines, and more particularly to bed and platen presses used for jobwork.

My object is to provide a machine of simple and durable construction in which the printing is done expeditiously and accurately with the use of no great amount of power, the aim in the present device being to arrange the parts compactly and in the best working relations to one another, to provide for accurate and ready adjustment, and to afford mechanism for feeding and delivering the paper quickly and with precision.

With these objects in view and also with a view of generally improving the construction and efficiency of this class of machines the invention consists in the various matters hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a similar view, parts being shown in section. Fig. 3 is a central vertical transverse sectional view. Fig. 4 is a side elevation of the paper-feeding carriages, their operating mechanism, and ways. Fig. 5 shows one of said carriages and the mechanism for releasing its paper-gripping jaw. Fig. 6 is a plan of one of said carriages. Fig. 7 is a view similar to Fig. 4, the ways and operating mechanism being omitted. Fig. 8 is a detail view showing the treadle adjustment. Fig. 9 is a detail perspective showing the feed-table and its connected sheet-delivering devices.

Referring now more particularly to the drawings, A indicates the main frame or standard of the machine, upon which all of the parts are supported. The frame comprises side uprights A', which are connected at the rear by cross-rods a' and at the front by similar cross-rods a^2 and a^3 , the latter of which is located near the bottom of the uprights and is seated to turn therein. Suit-

ably keyed into the sides or otherwise firmly held upon the frame, as at a , is the platen C of the machine.

The bed M of the machine and its attendant parts are carried by a frame E, the bed being of course so placed that in the operation of printing it registers fairly with the platen. The bed-frame comprises side uprights E', secured at their lower ends by means of collars e' and set-screws e^2 upon the cross-rod a^3 and connected at their upper ends by a suitable cross-head e . It will be seen that by reason of the collars and set-screws lateral adjustment is afforded the bed-frame.

The bed M is carried upon the cross-head e and in order to regulate the impression is adjustable thereupon. The construction whereby the adjustment is effected comprises lugs e^3 , extending vertically from the cross-head and provided with openings e^4 , said openings being adapted to receive threaded projections or screws m , extending from the back of the bed. These screws are provided with nuts m' , located upon each side of the lugs e^3 , so that they can firmly embrace said lugs and clamp them between them in a manner well understood. The inking mechanism M' is also carried by the cross-head, the roller-frames being pivoted upon a shaft e^5 , extending therethrough, and as this inking mechanism is of the usual well-known construction it is not thought necessary to more specifically describe it.

Such being the general nature of the printing members of the present machine, it will be seen that upon the application of power to the frame E the bed M is carried to the platen C and the impression effected. Of course this power can be transmitted in many ways; but in order to best adapt this transmission of power to the frame E to the other working parts of the present machine I employ the arrangement of members illustrated in the accompanying drawings, and attention is now directed to these driving members.

It will be noticed that the platen C has projecting from its back arms c , which carry hubs C', extending outwardly, and it is through these hubs that the platen is connected to the frame A, while openings c' , formed through them, afford journals for the main driving-shaft N. Upon one end of this shaft is keyed

a gear n , while at its other end is keyed a cam-disk n^{14} , to be more fully hereinafter referred to, and to these two members—viz., the gear and the disk—are pivoted connecting-rods e^6 , which have their opposite ends pivoted upon the shaft e^5 through the cross-head e . It is therefore through these connecting-rods that the frame E receives its motion.

In the present construction motion is imparted to the driving-shaft by a treadle mechanism, although it will be understood that any other convenient construction can be employed. In this treadle mechanism a counter-shaft N' is journaled upon the frame A and extends below the gear n , said shaft having a bearing in an opening, as a^4 , in the upright A' and also having a bearing in an opening a^5 through an angle-frame a^6 , secured upon the upright A' . A gear n' upon the counter-shaft meshes with the gear n , and said counter-shaft also carries the balance-wheel n^2 .

Upon the inner end of the counter-shaft is a crank-arm n^3 , which has journaled in it a revolving pin n^4 , and to this pin the link n^5 from the treadle-lever n^6 is connected, this connection being effected by a fork upon the link n^5 , whose arms lie upon the sides of the pin n^4 , and a pin n^7 , passing through the fork sides and the pin n^4 . In this way a universal joint is provided which prevents binding of the parts.

The treadle-lever n^6 is suitably pivoted upon the frame A and has provision whereby the treadle N^2 can be adjusted upon it to a height to suit the operator. This adjustment is effected by reason of a bifurcated or slotted arm or lug n^8 upon the end of the treadle-lever, said arm being provided with a vertical series of transverse openings n^9 , and into the slot n^{10} of the arm or lug n^8 projects the end of the treadle N^2 , said end being also provided with an opening in order to permit the connection of the treadle and the treadle-lever by means of a suitable pin n^{11} . A lug n^{12} , depending from the treadle and bearing against the arm n^8 of the treadle-lever below its slot n^{10} , tends to brace the parts. It will be noticed that the treadle extends from the side of the machine, thus allowing the operator to manipulate the feeding.

The general structure of the machine having been described, together with the printing mechanism and the power mechanism, the parts for feeding and delivering the paper remain to be considered. These parts comprise four groups, viz: the traveling-feeder group O, the feed-table group R, the receiving-box Q, and the paper-holding group S. It will be understood, however, that these groups need not necessarily be combined in one machine in order to insure the proper operation of any one of them, as each mechanism is capable of use without the presence of the other mechanisms.

The first-mentioned group will be first con-

sidered, this group comprising, generally speaking, members for taking a paper sheet, carrying said sheet to the platen, and then delivering the printed sheet. More particularly describing said group, attached to the platen-hubs C' are ways o' , located at each side of the platen, upon which ways the feeders O' travel. These ways are here shown as circular, with the exception of a portion which conforms to the face of the platen, and comprise an outer rim attached to the hubs C' by spokes o^2 . The traveling feeders are carried by frames located at the sides of the ways o' , said frames each comprising a collar o^3 , rotating upon the platen-hubs, from which collars radiate arms o^4 , to which the feeders are connected by links o^5 , these links having pivotal connection with both the arms and the feeders. Springs o^6 are connected at one end with the links and at the other end with the collars, whereby the feeders are at all times held upon the ways and made to follow the contour of the same. Thus upon motion being imparted to the feeder-frames the feeders are carried around the ways o' . These feeder-frames are given a step-by-step movement, so that a feeder is brought to receive the paper, then carried to lay the paper over the platen, and then carried to the point at which the paper is to be delivered. Manifestly when the paper is over the platen it must remain at rest with relation to the platen long enough to receive the impression, but this is the only point at which it is essential that a feeder should rest. In the present construction three feeders are employed, and these are so placed that when one is receiving a sheet another is holding a sheet upon the platen and the third is delivering a sheet. All of the feeders therefore stop together and remain at rest together. It may, however, be found advantageous upon machines of different size to employ a greater or less number of feeders, in which case their movement will be correspondingly regulated, it being kept in mind that the feeder holding the sheet over the platen is the only one requiring rest.

In the present construction the movement is imparted to the feeder-frames by a pawl-and-ratchet mechanism. The ratchet is formed by rings o^7 , attached to each set of arms o^4 , said rings being provided upon their outer peripheries with the requisite number of teeth o^8 —in the present instance three. The pawls o^9 are each carried by an arm o^{10} upon a collar o^{11} , loosely fitting upon the platen-hubs C' , outside of the collars o^3 of the feeder-frames. Thus upon the proper movement being given the arms o^{10} the feeder-frames are advanced to their various positions. The mechanism for transmitting the movement to the arms can be best understood after certain other parts have been described, and the description of said mechanism will therefore be fully referred to hereinafter.

Manifestly there is more or less wear upon the parts for actuating the feeder-frames, and

in order to compensate for this wear the rings o^7 are adjustable upon the arms o^4 , and also removable therefrom by means of clamps o^{12} , by reason of which the rings can be moved around in either direction or can be removed and repaired or replaced by new ones.

In order to guard against backward movement of the feeder-frames during the backward movement of the pawl mechanism or at other times, stops are provided upon the ways o' , so placed that they lie just back of one of the arms o^4 (in the present instance the arm carrying the feeder which is to receive the sheet for printing) in its position of rest. These rests must of course be of such a nature that the arms can pass over them in their forward movement, and they are here shown as mere plates of spring metal o^{13} , attached at one end to the ways o^4 and having their free ends projecting into the path of the feeder-carrying arms. It is thought that their operation is apparent.

The feeders themselves O' are now to be considered. Each of these comprises a carriage connected to one of the links o^5 , said carriage being adapted to travel around the ways o' , grippers for the sheet mounted upon said carriage, and mechanism for opening and closing the grippers for receiving and delivering the sheets. As here shown, the carriage is composed of two parts, one of which is mounted upon each of the ways o' , and each part comprises a frame o^{14} , in which are journaled rollers o^{15} , resting upon the ways. It is to this frame that the links o^5 are pivoted. The forward end of each carriage-frame has an upward extension o^{16} , to which extensions is attached a plate o^{17} , provided with rearwardly-extending fingers o^{18} , which form the lower members of the gripper. An arm o^{19} is pivoted upon each of the carriage-frames, projecting slightly thereabove, and to these arms is secured a plate o^{20} , also provided with rearwardly-extending fingers o^{21} , these fingers registering with the fingers o^{18} and thus forming the upper members of the gripper. Movement of the arms o^{19} will therefore carry the fingers o^{21} upon and away from the fingers o^{18} , thus opening and closing the gripper, said gripper being normally held closed by means of springs o^{22} , connected to the arms and to the carriage-frames. One of the arms o^{19} is merely pivoted to a lug o^{23} upon its carriage-frame; but in order to provide for opening the gripper the other arm is keyed or otherwise firmly secured upon a shaft o^{24} , provided at its inner end with a lateral arm or crank o^{27} , said shaft o^{24} being journaled in an opening o^{26} through the carriage-frame, while the other arm of the shaft projects below the feeder when the gripper is closed. The upper fingers therefore rock with the shaft o^{24} , the arm o^{27} of which, by reason of its weight, acts with the springs o^{22} in closing the gripper.

The mechanism for opening the grippers when in position to receive a sheet of paper

comprises a bell-crank lever o^{28} , pivoted at one end to a suitable portion of the machine, (here shown as a lug c^2 upon the platen,) while its other end carries a cam-surface o^{29} , properly placed with relation to the point at which the sheet is to be received, and so placed that at such point the arm o^{27} of the shaft o^{24} rests above said cam-surface. A properly-shaped cam n^{13} is fastened upon the driving-shaft N , upon which cam rests a roller o^{30} , located at the bend in the lever o^{28} . Thus the mechanism being suitably timed, when the gripper is in position to receive a sheet the upper fingers are raised by the action of the cam n^{13} and then closed by the springs o^{22} , too rapid downward movement of the upper fingers and consequent bruising or tearing of the paper being prevented by the cam-surface o^{29} , the sides of which incline downwardly from each side of the free end of the lever o^{28} . Thus the feeder-frame being actuated by the pawl-and-ratchet mechanism a feeder is brought at the point at which the sheet is to be received, the gripper opened and closed upon the sheet when it has been placed between the fingers, the feeder then carried down the portion of the ways which conform to the face of the platen, carrying the sheet over said platen, and after the sheet is printed the feeder carries it over the point at which it is to be deposited, as the receiving-box Q , at which point the sheet is released by the gripper and dropped.

The mechanism for releasing the sheet, as here shown, comprises a lug o^{31} , located upon one of the ways o' at the point at which the sheet is to be dropped and in the path of the arm o^{27} of the shaft o^{24} .

Various means may be provided for feeding the sheets to the feeders; but in the machine here shown is illustrated the mechanism comprising the feed-table group R . Upon suitable brackets r' , resting upon the sides A' of the main frame, is supported a feed-table r , having the usual slope toward the platen, the forward portion of this latter being composed of a plate r^2 , hinged to the body of the table, said plate being preferably provided upon its free edge with fingers r^3 and having an up-and-down motion imparted to it at the proper times by mechanism to be hereinafter described. Arms r^4 , extending from the body of the table along the sides of the plate r^2 and in front of the same, have journaled in them a rod r^5 , whose movement is limited by means of pins r^6 , connected to the rod outside of the arms r^4 and normally resting upon pins r^7 , extending from said arms. Front stops r^8 are carried by this rod and normally bear upon the fingers r^3 , so that the sheet to be fed to the feeder O' can be slipped upon the fingers and rest against the stops until the time at which it is to be taken by the feeder. These stops, as here shown, are strips of metal with their inner ends bent downwardly to lie upon the fingers r^3 and present a surface against which the sheet can rest. The body of each stop is supported upon a clamp r^{10}

upon the rod r^5 and for a convenient distance over the clamp is provided with a slot r^{11} , through which passes a set-screw r^{12} , which also extends through the clamp, thus permitting the clamps to be adjusted laterally along the rod r^5 and permitting the stops to be adjusted along the fingers, in order to accommodate sheets of different sizes. Thus, the plate r^2 being held in its raised position by the mechanism to be later described and the stops being properly adjusted and lying upon the fingers r^3 , a sheet is slid against said stops, ready to be delivered to the feeder. As the feeder comes into position and has its gripper opened at the proper point under the feed-table mechanism the plate r^2 is swung downwardly upon its hinges, the paper stops following its movement, until the rotation of the rod r^5 is stopped by reason of the pins r^6 meeting the pins r^7 , and the sheet then slides between the upper and lower fingers of the gripper, which fingers are then closed and the gripper carried forward to the platen, as before explained.

The mechanism for reciprocating the plate r^2 is now to be considered, and it is from this mechanism that the pawls for moving the feeder-frames are actuated. A shaft r^{13} is journaled in the brackets r' and has extending forwardly therefrom arms r^{14} , which carry at their free ends rollers r^{15} , resting upon cams n^{14} , carried by the driving-shaft N. These cams therefore give movement to the shaft r^{13} , which carries upon it arms r^{16} , the outer ends of these arms being moved by the shaft through the arc of a circle. Other arms r^{17} are rigidly connected to the rear of the plate r^2 , these arms extending backwardly and tending by their weight to hold the plate in its raised position against the front stops. The arms r^{17} have near their outer ends a bend, as shown, thus making the lowest points r^{18} inside of the ends, and on their upwardly-inclined portions between the points r^{18} and the free ends they rest upon the arms r^{16} , attached to the shaft r^{13} . Thus the arms r^{17} resting upon the arms r^{16} , the movement of the shaft from the cams n^{14} raises and lowers the plate r^2 . The pawls are actuated through links o^{32} , pivoted to the arms r^{14} and the arms o^{10} .

There now remains to be considered the mechanism S for holding the paper firmly against the platen during the operation of printing, which mechanism comprises, broadly, fingers suitably mounted to move toward and away from the face of the platen in order to clamp and release the sheet at the proper times and means for imparting the desired motion to said fingers. These fingers are lettered s and are mounted by means of collars s' and set-screws s^2 upon a shaft s^3 , journaled in the sides A' of the main frame, this mounting permitting lateral adjustment along the shaft in order to accommodate different widths of sheets. Arms s^4 are keyed to the shaft at points opposite the side uprights E' of the reciprocating bed-frame E, and

these arms are slotted at their upper ends to receive rollers s^5 , journaled in the arms at the sides of the slots. A bracket s^6 is attached to each of the sides A', these brackets being provided with angular extensions s^7 , lying in front of the arms s^4 , and attached to each bracket and its roller-arm is a spring s^8 , which draws the arm toward the bracket, and thus normally holds the fingers away from the platen-face, the amount of forward movement of the arms s^4 (and consequently of the fingers s) being limited by set-screws s^9 , seated in the angular extensions of the brackets, the set-screws finding bearings against the arms at the sides of the rollers. Of course the arms s^4 , extending forwardly as they do from the shaft, tend by their weight to move the fingers from the platen-face and thus operate in conjunction with the springs s^8 ; but these springs have the additional function of holding the arms when the fingers are open firmly against the set-screws and in this way preventing any vibration of these fingers. The fingers are moved against the platen by means of arms e^7 , attached to the side uprights E', the ends of said arms being bent at an angle to the bodies thereof and reduced in size in order to form fingers e^8 , which bear against the rollers s^5 . The reduction in size of the fingers gives them a certain amount of resiliency and thus prevents jamming of the parts and consequent breakage.

The present machine having thus been described its general operation is as follows: A number of the sheets of paper to be printed having been placed upon the feed-board with the edges which are to be taken by the feeders toward the end of the feed-board which inclines downward and forward and the type-form having been locked at or near the bottom of the chase, as on a cylinder-press, so that the body of the form when placed on the press is downward, the mechanism is started and the sheets are gripped, printed, and delivered. In Fig. 4 the three feeders are shown in their various positions when they are at rest, one feeder (that at the top) being in a position to bring the gripper-fingers directly under the outer ends of the fingers of the feed-table plate, another being in a position with the rollers at the bottom of that portion of the ways which conforms to the face of the platen, and the third having the rollers at the bottom and backward on the ways. In the present machine the three feeders revolve together and stop together. As they approach the positions which they occupy in Fig. 4 the feed-table plate is lifted, and with it the paper-stops, this elevation taking place in order to permit the gripper-fingers of the feeders to pass under and clear the fingers of the feed-table plate. At the time this is occurring the cam n^{13} , through the connections heretofore described, raises the bell-crank lever o^{28} and brings the cam o^{29} to a point at which the lower end of the lever carrying the upper gripper-fingers en-

gages with said cam, this engagement lifting the finger-carrying lever to a sufficient height to throw the upper fingers upward and backward. While in this position the feeders stop, and the cam n^{13} is so proportioned that the upper gripper-fingers are held open for a short space of time. The sheet of paper to be printed having been slid forward and downward against the paper-stops, with the edge bearing lightly upon the feed-table-plate fingers, the edge of the sheet to be gripped is supported directly above lower gripper-fingers, the upper surface of these lower fingers being about on a level with the upper surface of the feed-table-plate fingers when in their lowest position. The feed-table plate is then lowered until the edge of the sheet rests upon the lower gripper-fingers, the paper-stops falling with the plate until almost at the end of its movement, when they are stopped by the pins in the rod coming in contact with the pins in the arms r^1 . This leaves a small space between the paper-stops and the feed-table-plate fingers for the passage of the sheet. When the sheet is still in this position and before the feeder starts forward, the cam n^{13} , continuing to revolve, withdraws the bell-crank lever and its cam from its engagement with the finger-carrying lever, and thus permits the springs upon the feeder to draw forward and downward the upper gripper-fingers, whereby the sheet is tightly gripped. After these points are closed the feeders begin to revolve, the sheet being carried forward and downward, and as the rollers traverse that portion of the ways which conforms to the platen-face the sheet is carried straight downward over the face of the platen. Meanwhile the feed-table plate has been raised to form a support for the next sheet. While the sheet is being carried downward over the platen-face the upright fingers s are held away therefrom; but as soon as the feeder carries the end of the sheet to the bottom of the platen b these upright fingers are closed firmly against the outer edges of it and hold it against the face, the feeder-gripper still retaining its hold upon the edge of the sheet. When the feeder-carriage revolves to bring the first feeder into this position, the third feeder, which was shown at the back of the ways and downward, is brought to the position formerly occupied by the first. The feeders rest in this position while the type-bed moves toward the platen and the impression is taken. As soon, however, as the impression is taken and the types withdrawn from the printed sheet a slight distance the upright fingers relax their tension upon the sheet, the feeders begin to revolve, and the sheet is carried away from the platen around under the press, and directly over the receiving-box. When in this position, the upper finger-carrying levers come in contact with the lugs upon the ways, thus opening the gripper and permitting the end of the

sheet to drop from between the gripper-fingers and be deposited in the receiving-box.

In the machine as here illustrated the feeders are at equal distances apart and are so arranged that when the upper one is in the act of receiving the sheet the feeder which is forward and downward holds the second sheet in position upon the platen to be printed, and the feeder which is downward and backward is in the act of depositing the third and printed sheet, this arrangement practically keeping three sheets in motion at once.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the frame, its stationary platen, and the bed movable toward and from the platen, of a drive-shaft mounted on the frame in the rear of the platen, fixed circular ways concentric with said shaft and having straight portions parallel with the platen, gripper-carrying frames rotating concentric with the drive-shaft and adjacent to said ways, gripper-carriages carried by said frames and traveling on said ways, the movable grippers of each carriage being provided with an operating crank or lever, a cam-surface operated from the drive-shaft for actuating said crank or lever before each carriage registers with the platen, a lug or projection for actuating said cranks or levers after the carriages have passed the platen, and operating devices connecting the bed with the drive-shaft, substantially as described.

2. The combination in a printing-machine, with the bed, platen, and drive-shaft of the rotary series of gripper-carriages concentric with the drive-shaft for successively presenting the paper to the platen, the movable gripper-fingers of each carriage being provided with an operating crank or lever, a cam on the drive-shaft, and a lever actuated by said cam and provided with an inclined cam-surface on its free end to engage said crank or lever and open the grippers for the reception of the sheet and means for releasing the grippers after the sheet has been removed away from the platen, substantially as described.

3. In a printing-machine, of the character described, the gripper mechanism comprising the rotary frames formed of collars $o^3 o^3$ having radial arms, gripper-carriages connected to the said frames by links o^5 at the outer ends of said arms, springs drawing the links toward the collars, and ratchet-rings clamped removably and adjustably to the radial arms, substantially as described.

4. The combination with the frame, the stationary platen, the drive-shaft and the bed connected to the drive-shaft for movement toward and from the platen, of rotary frames concentric with the drive-shaft and each having an adjustable ratchet-ring, a series of gripper-carriages carried by said rotary frames, grippers on said carriages the movable grippers being provided with operating-cranks,

means for actuating said cranks at regular intervals for the purpose set forth, pawl-carrying arms pivoted concentric with said drive-shaft and provided with pawls engaging said ratchet-rings, a cam on the drive-shaft and a lever mechanism actuated from said cam and connected to the said pawl-carrying arms, substantially as described.

5. The combination with the frame, the stationary platen having side arms terminating in hubs secured in the sides of the frame, the drive-shaft journaled in said fixed hubs and provided with end cams and an intermediate cam, means for rotating the shaft and a vibrating bed, having rods or bars connected to and reciprocated by the drive-shaft, of fixed circular ways mounted on said hubs having straight portions adjacent to the ends of the platen, rotary frames on the hubs and provided with gripper-carriages traveling on said circular ways, the movable grippers of each carriage having an operating crank or lever, an elbow-lever engaging the intermediate drive-shaft cam and provided with an inclined cam at its free end to engage the gripper-operating cranks or levers as described, ratchet-rings secured to the rotary frames, vibrating arms on said hubs and provided with pawls engaging said ratchets, vibrating levers engaging the outer drive-shaft cams and linked to the pawl-carrying arms, substantially as described.

6. The combination with the platen and the bed movable toward and from the platen, of the sheet-holding fingers between the platen and bed, a rock-shaft carrying said fingers and provided with a crank-arm, and an arm projecting horizontally from the movable bed-frame and having a laterally-projecting resilient finger at its free end to engage said crank-arm and throw the sheet-holding fingers against the platen, substantially as described.

7. The combination with the platen and the bed, of the sheet-holding fingers between the platen and bed, a crank-shaft on which said fingers are mounted, a set-screw limiting the movement of the crank, a spring holding the crank against the set-screw, and an arm projecting from the movable bed and engaging the crank with its free end, substantially as described.

8. In a printing-machine, a sheet-feeding mechanism, comprising a stationary feed-table, having stationary side arms extending beyond its delivering end, a vertically-rocking plate or section pivoted at the delivering edge of said table, between said arms, a transverse rock-shaft connecting the free ends of said side arms and provided with the front stops which at their free ends overlie the vertically-rocking section and means for rocking said plate or section, substantially as described.

9. In a printing-machine, a sheet-feeding mechanism, comprising a stationary feed-table r having side arms, r^4 , extending be-

yond its delivering end, a vertically-rocking plate or section r^2 pivoted between said arms at the delivering edge of the table and having spring-fingers r^3 at its free edge, and operating-arms, r^{17} , the rock-shaft r^5 connecting the front ends of the arms r^4 and provided with a stop-pin r^6 engaging a pin r^7 , the adjustable front stops r^8 mounted on the rock-shaft and having downturned free ends resting on the fingers r^3 and means for operating the arms r^{17} , substantially as described.

10. A printing-machine comprising the frame, the stationary platen having hubs fixed in the sides of the frame, the drive-shaft rotating in said hubs and provided with end cams, the bed moved toward and from the platen from the said shaft, the rotary frames mounted on said hubs and provided with gripper-carriages, a pawl-and-ratchet mechanism for rotating said frames, a feed-table above said rotary frames and having a tilting section provided with rearwardly-extending arms and having a rock-shaft provided with the front stops, a rock-shaft below the delivery-table and provided with upwardly-extending lever-arms engaging said rearwardly-extending arms and also having forwardly-extending arms engaging said drive-shaft cams, links connecting said cam-operated arms with the pawl-carrying arms of said pawl-and-ratchet mechanism and means for opening and closing the grippers at the proper intervals, substantially as described.

11. The combination with the treadle-lever having an upwardly-extending arm provided with a vertical series of transverse apertures, of the foot plate or treadle proper having an arm provided with a transverse aperture adapted to register with any one of the first-named apertures, lug n^{12} to rest against the end of the treadle-lever and a connecting pin or bolt passed through said registering apertures, substantially as described.

12. The combination, with the frame, the stationary platen, the drive-shaft in rear thereof and provided with an operating-gear and the oscillating bed-frame provided with rods connecting it with the ends of the drive-shaft for operation therefrom, of a short shaft having a gear meshing with that on the drive-shaft and provided at its inner end with a crank-arm and at its outer end with a fly-wheel, a transverse, vertically-rocking treadle-lever n^6 pivoted between its ends in the lower portion of the frame, a vertical link or pitman connecting one end of the treadle-lever with said crank-arm, the opposite end of the treadle-lever being provided with a vertically-adjustable longitudinally-alined extension extending beyond the side of the frame and there provided with a foot-plate, substantially as described.

13. A printing-machine, comprising the frame, the immovable platen having side arms provided with hubs mounted in the sides of the frame, the drive-shaft extending through and turning in said hubs, the oscillating bed-

frame, rods operatively connecting said bed-
frame with the ends of said drive-shaft, cams
on the drive-shaft exterior to the frame, cir-
cular ways fixed to the hubs and having
5 straight portions alongside the platen ends,
frames rotating on the hubs, gripper-carriages
carried by the frames around said ways, pawl-
and-ratchet mechanism for actuating said ro-
tary frames, a feed-table having a tilting sec-
10 tion and a lever mechanism for operating said

tilting section and the frame-operating pawl-
and-ratchet mechanism, said lever mechan-
ism being in turn actuated from the end cams
on the drive-shaft, substantially as described.

In testimony whereof I affix my signature 15
in presence of two witnesses.

OLIVER S. BOWMAN.

Witnesses:

JOHN F. MCFADDEN,

JAY J. DRAKE.