

No. 777,898.

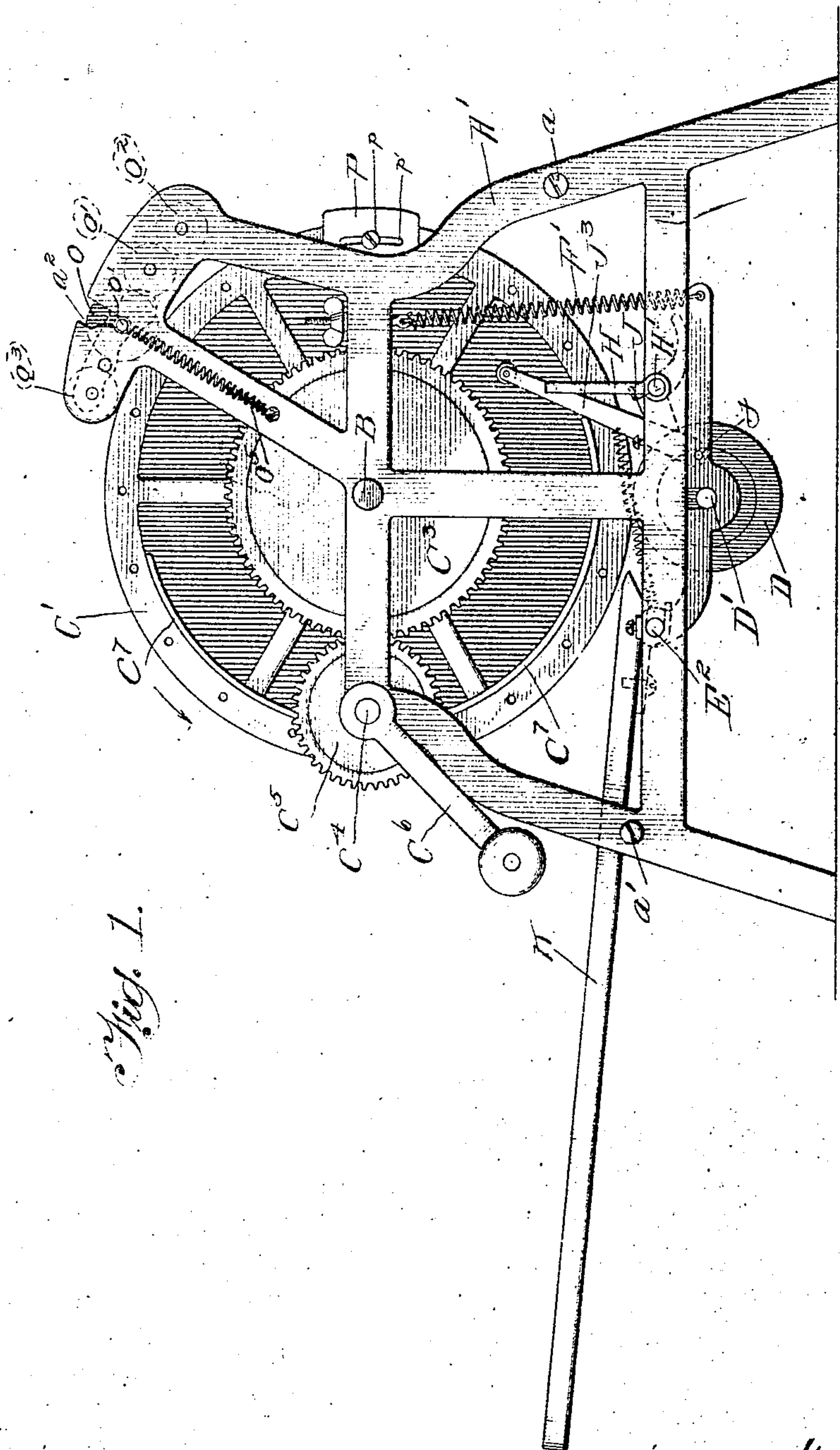
PATENTED DEC. 20, 1904.

C. W. HOUGHTON.
PRINTING MACHINE.

APPLICATION FILED JULY 27, 1903.

NO MODEL.

7.SHEETS--SHEET 1.



1. *Fig.*

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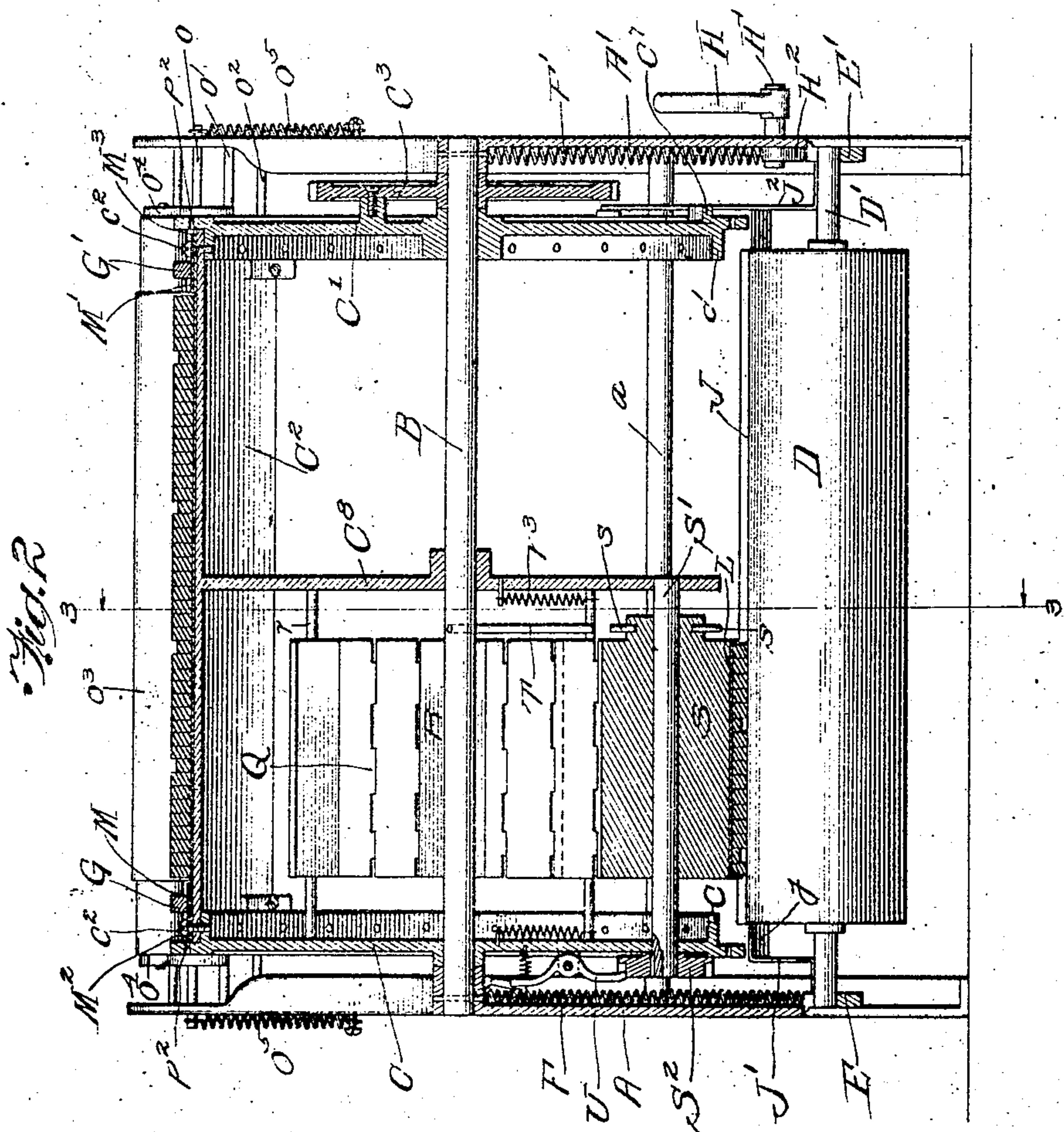
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7 SHEETS—SHEET 2.



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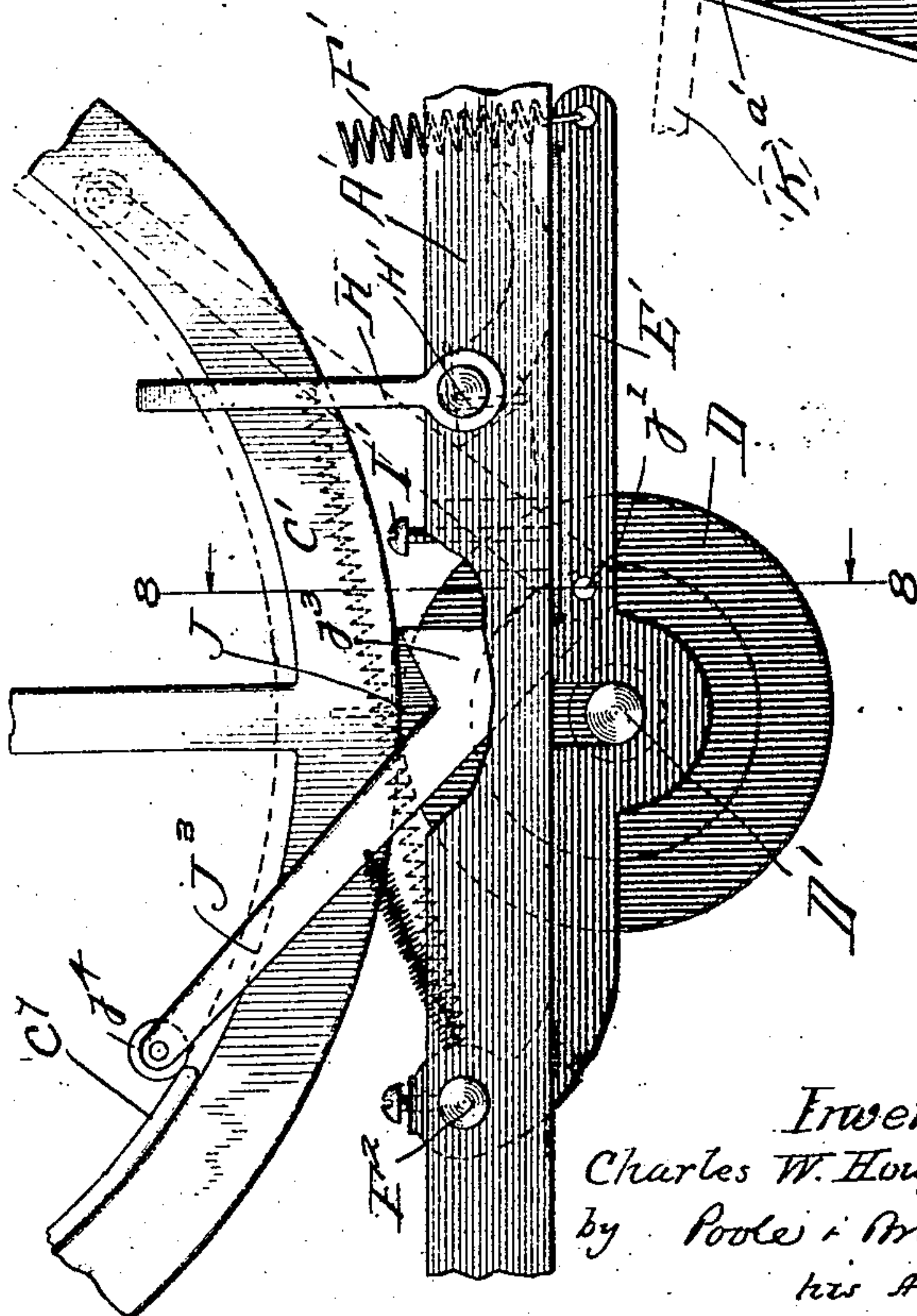
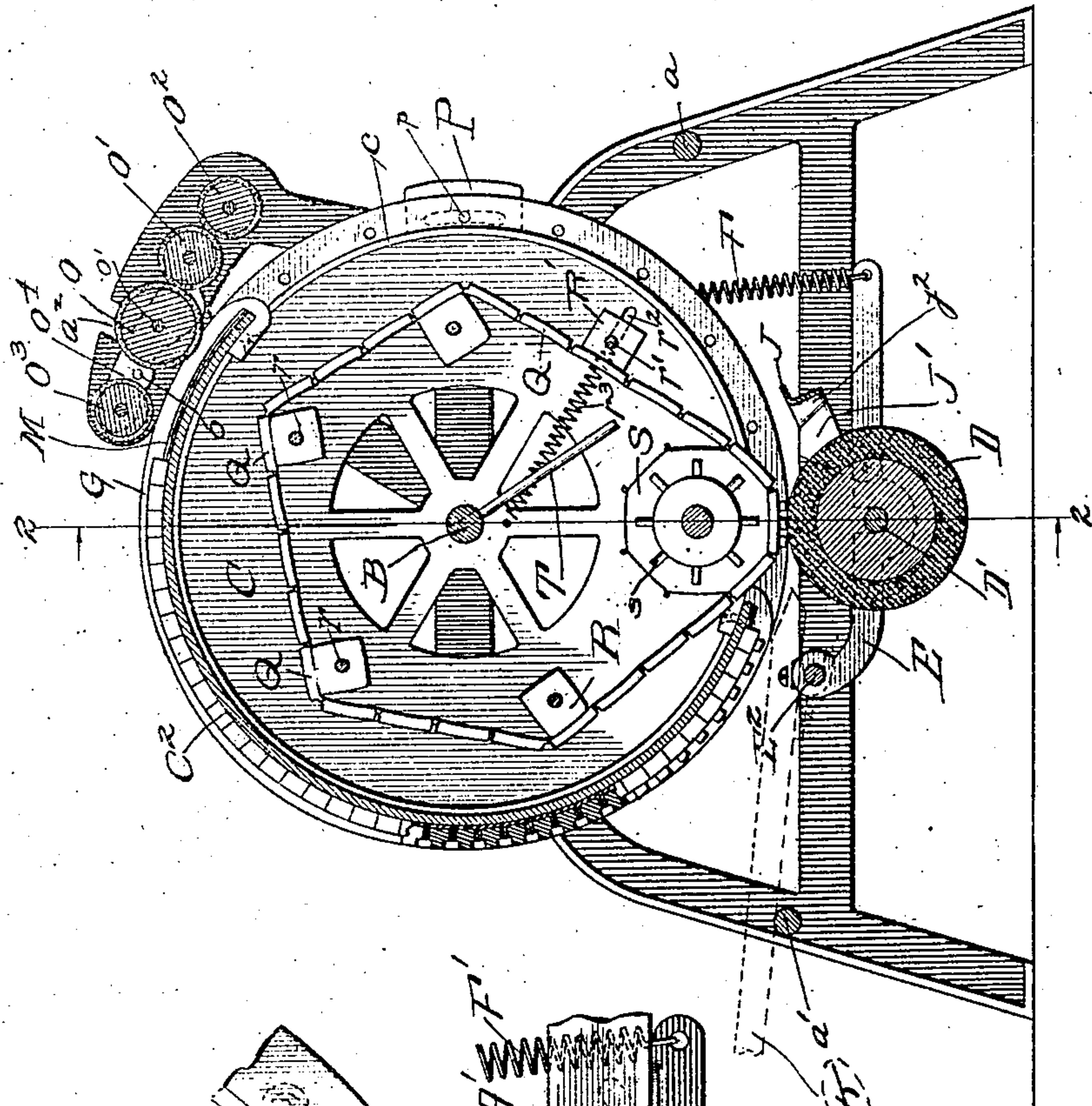
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7 SHEETS—SHEET 3.



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7 SHEETS—SHEET 4.

Fig. 5.

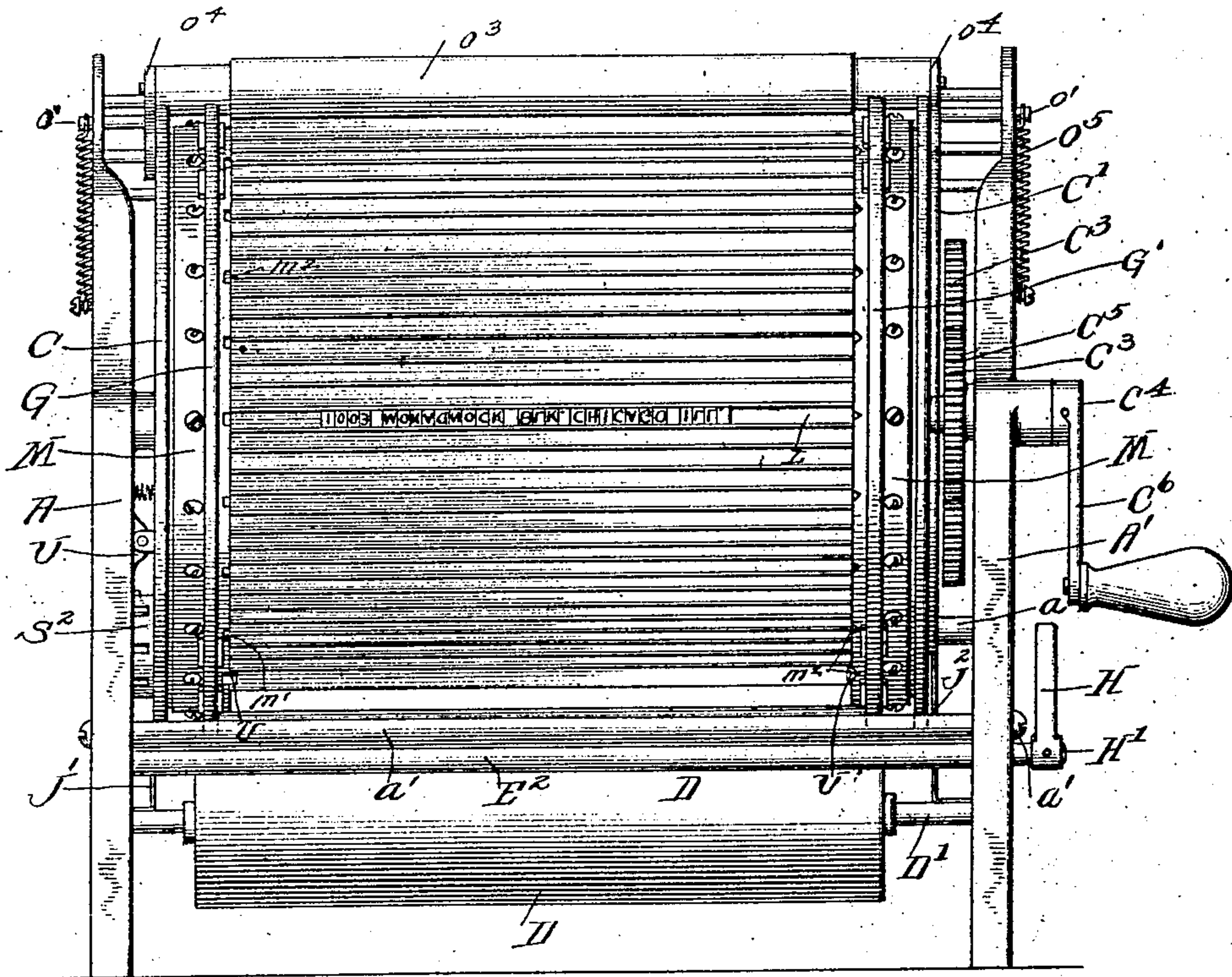
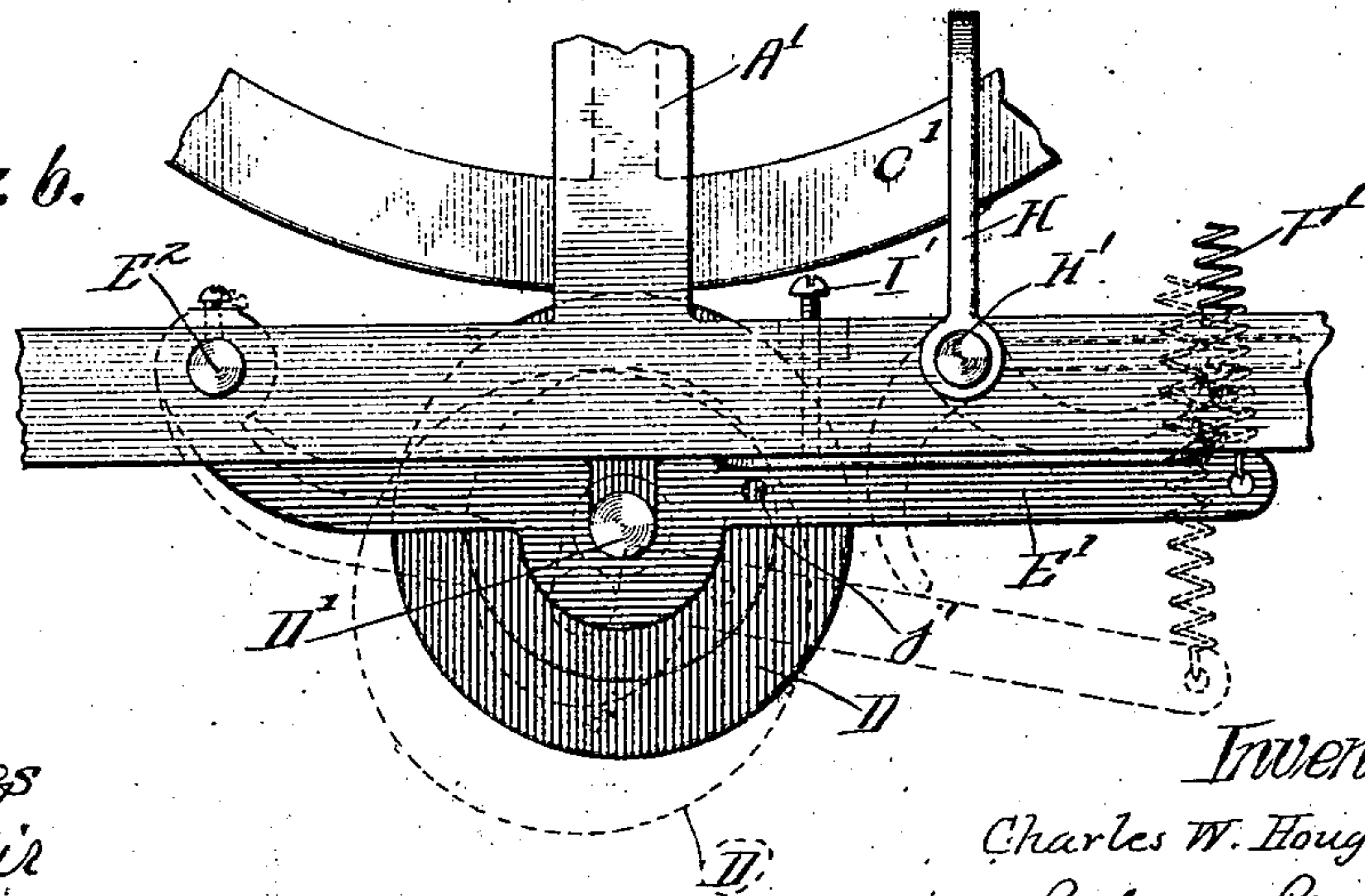


Fig. 6.



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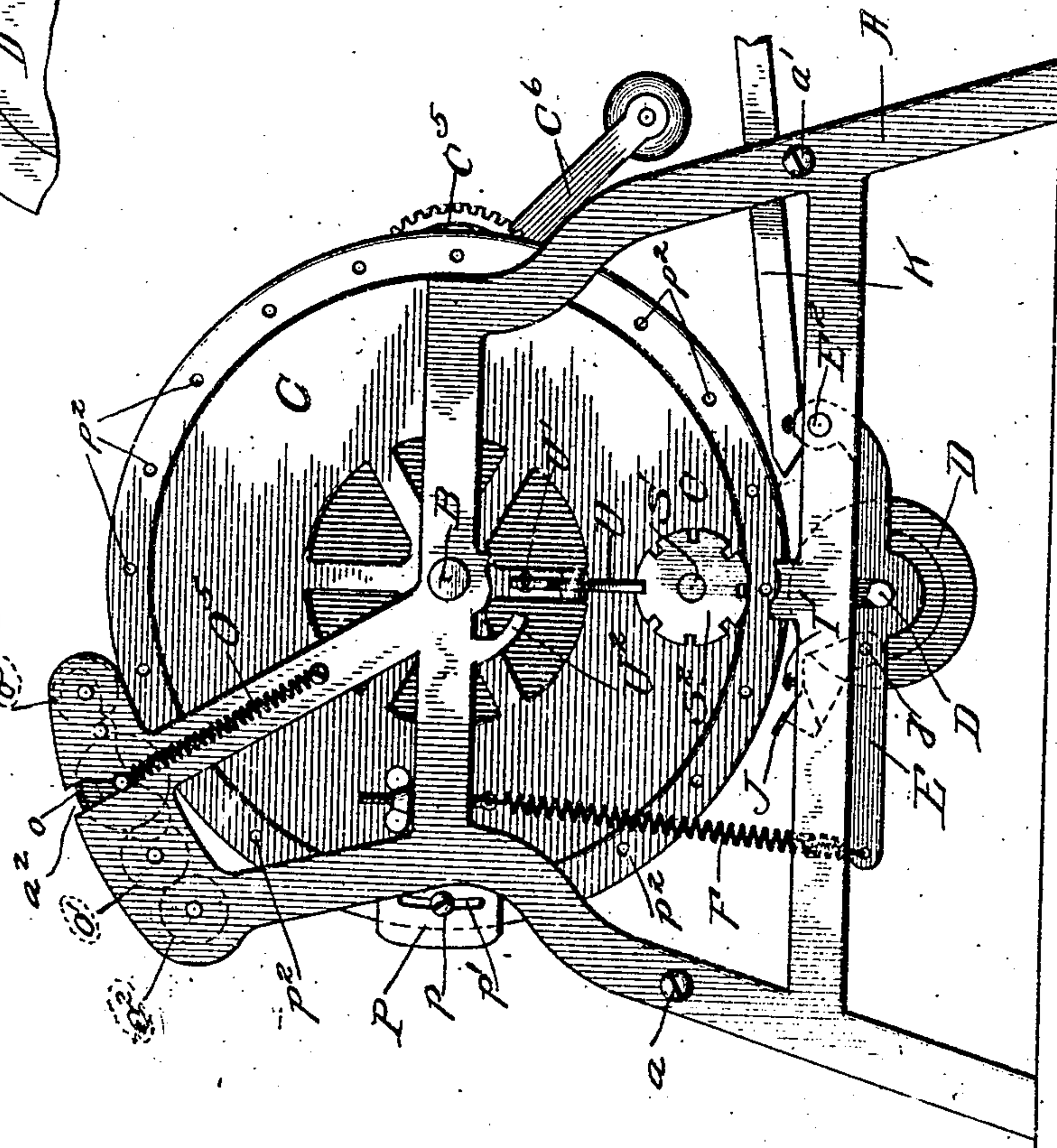
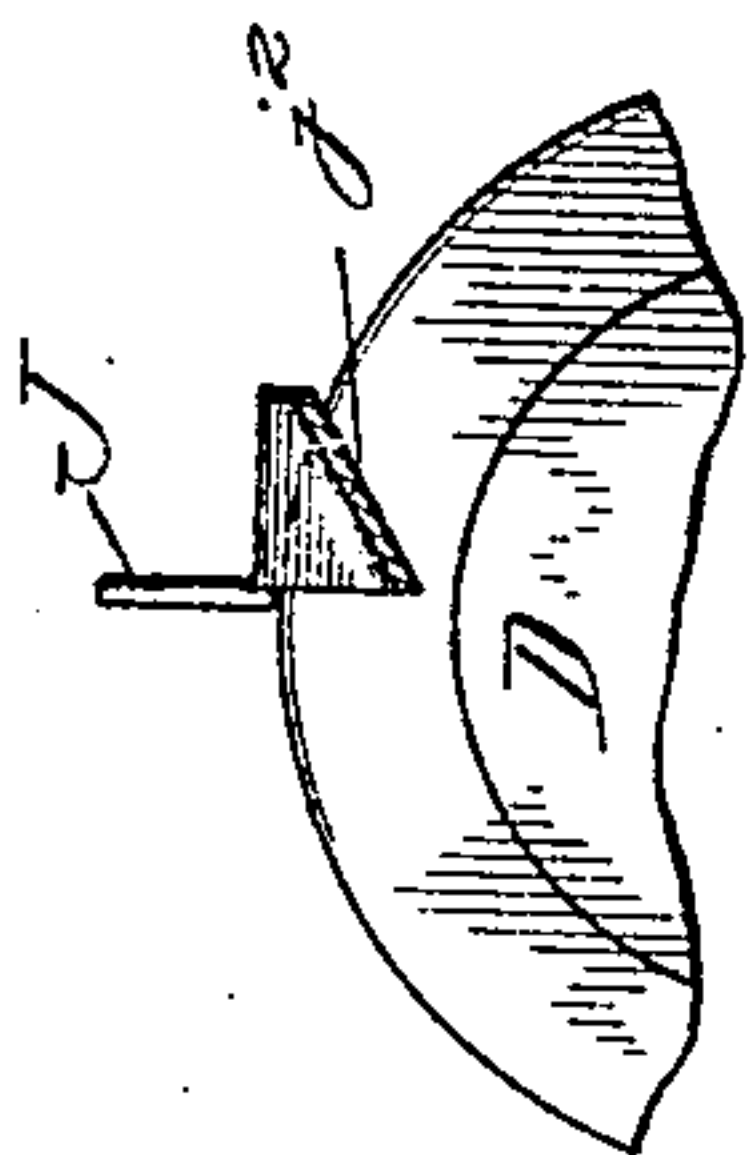
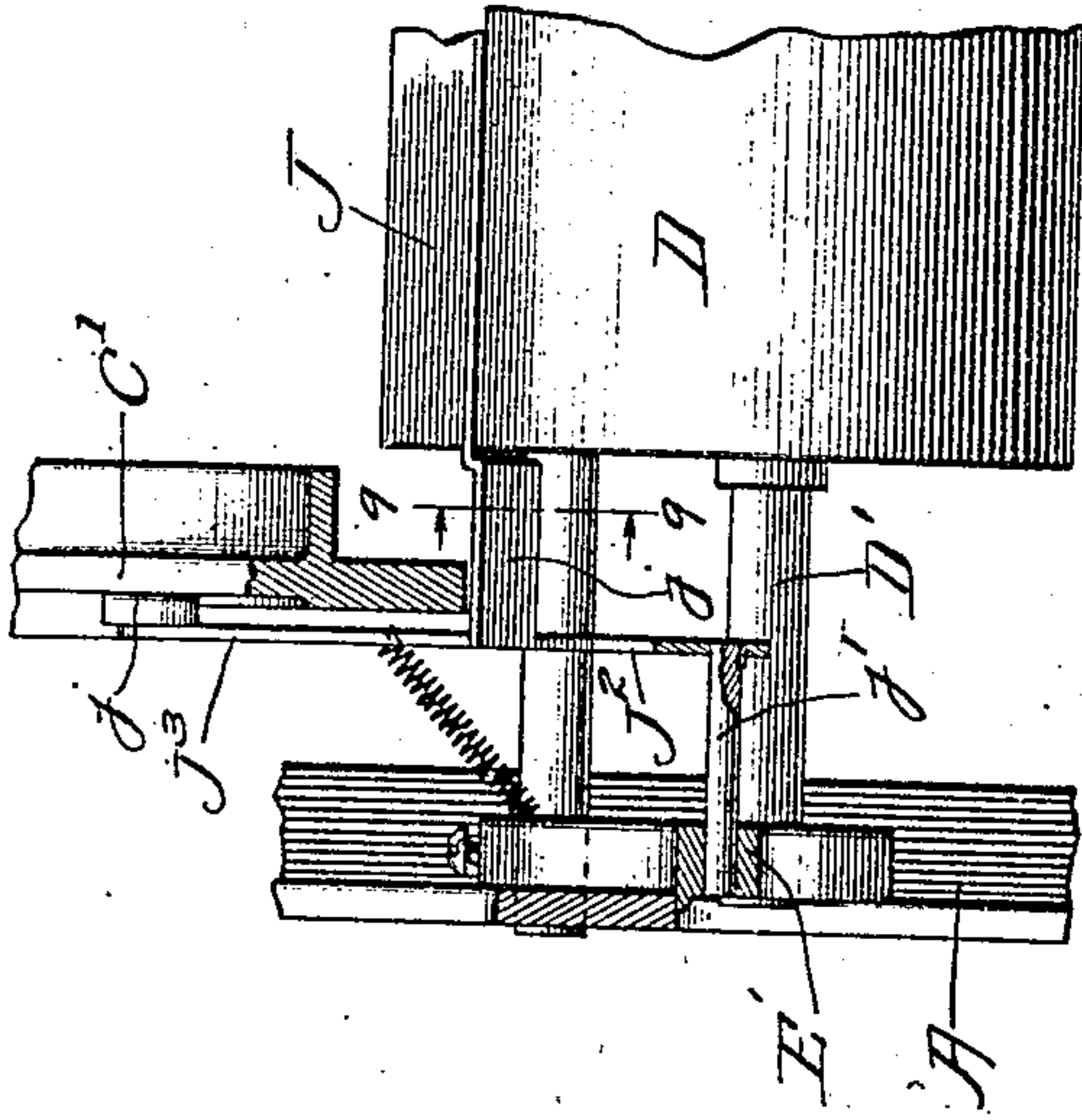
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7 SHEETS--SHEET 5.



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7 SHEETS—SHEET 6.

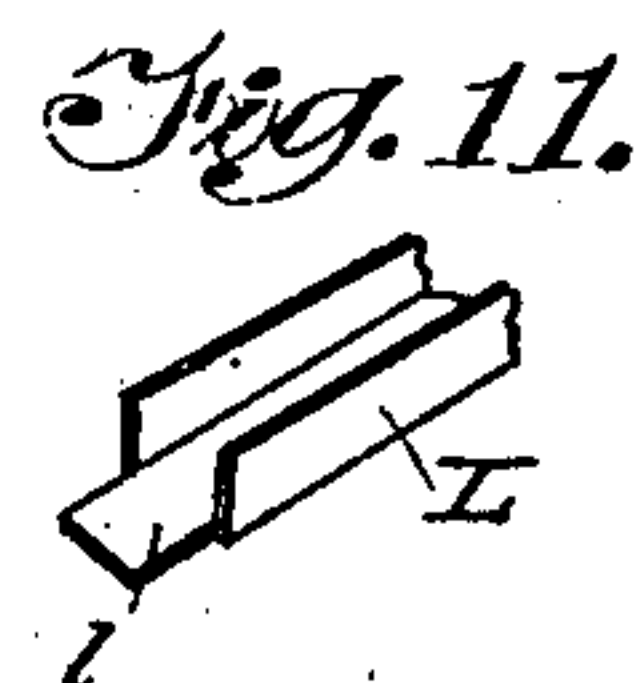
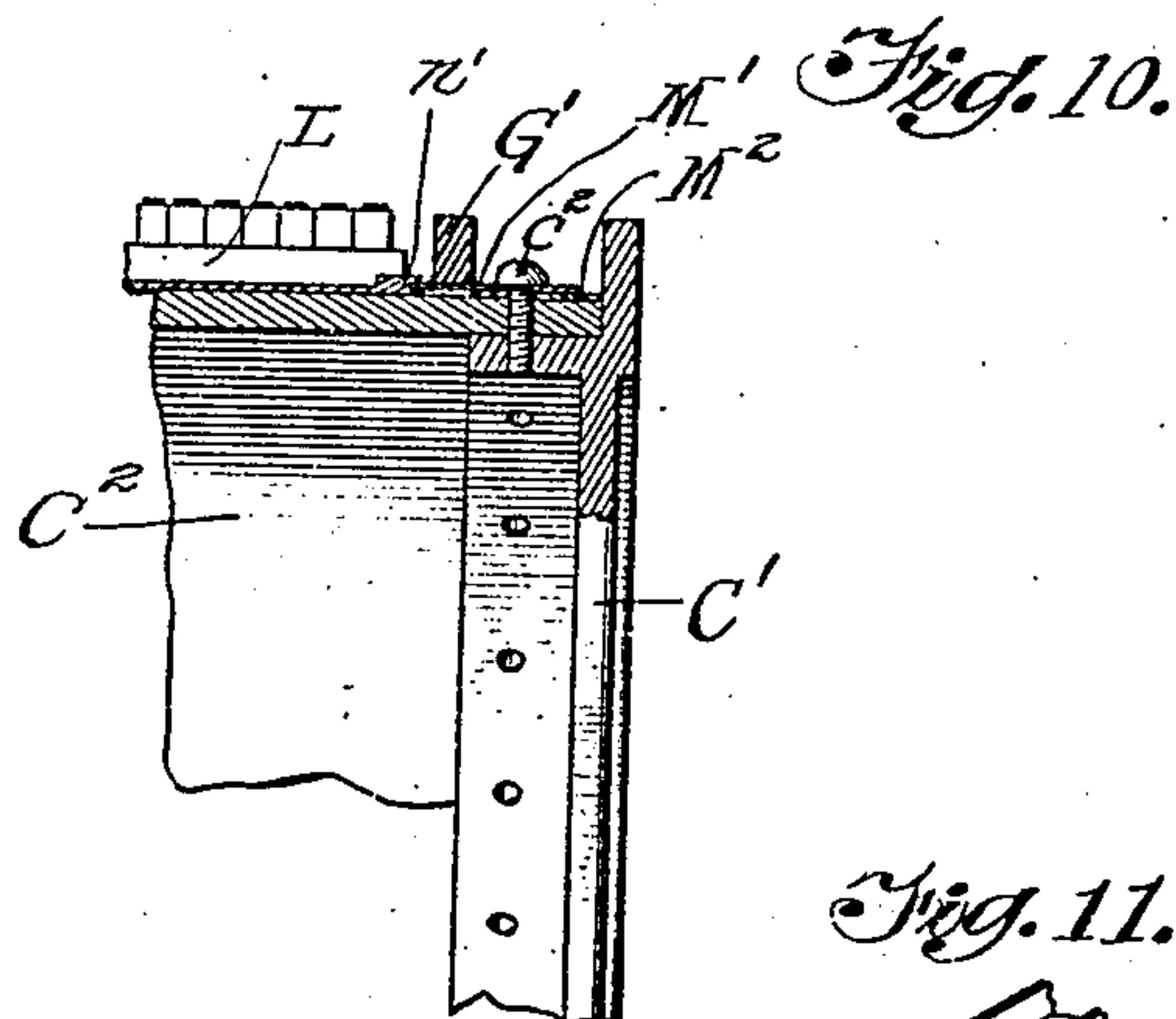
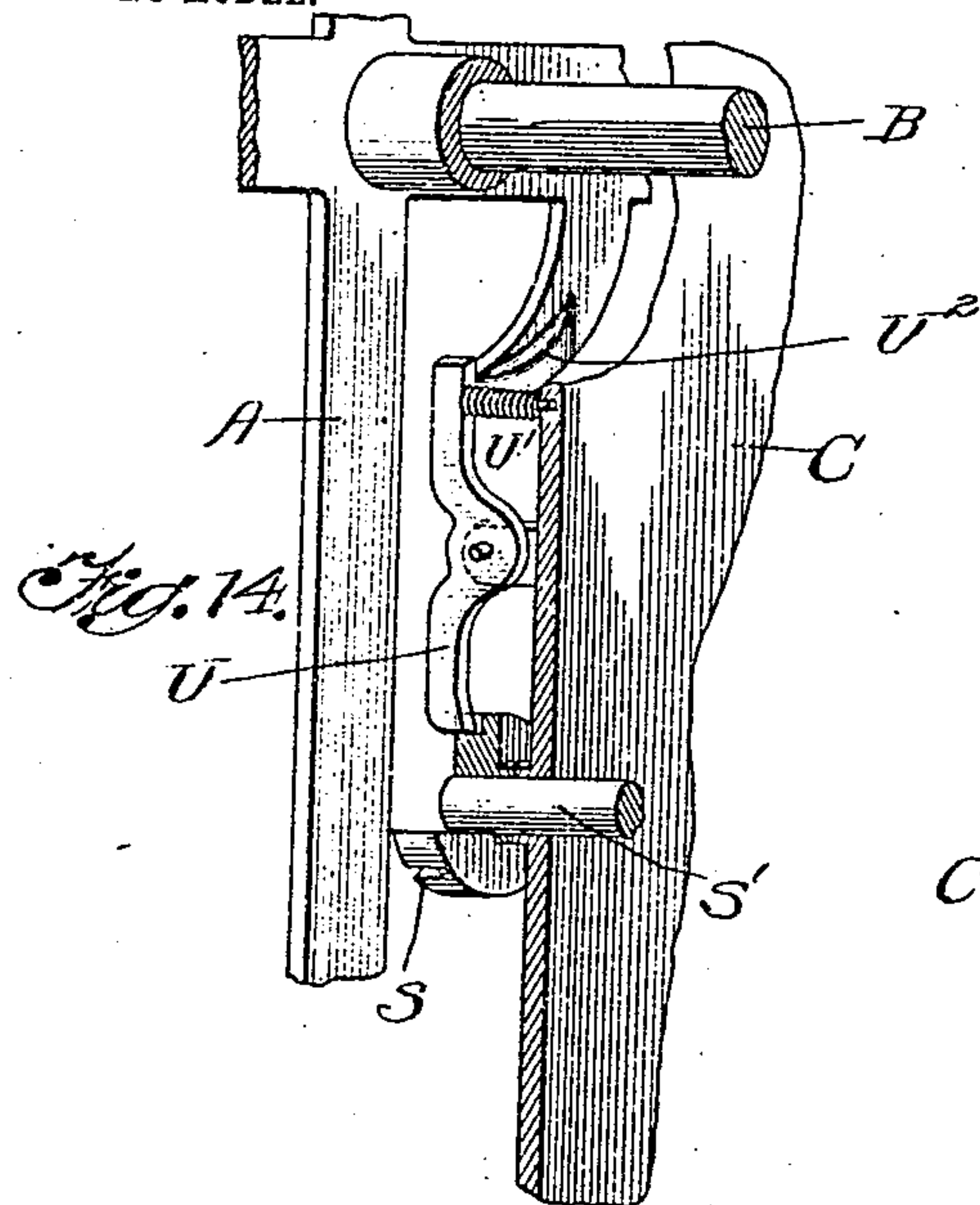


Fig. 12.

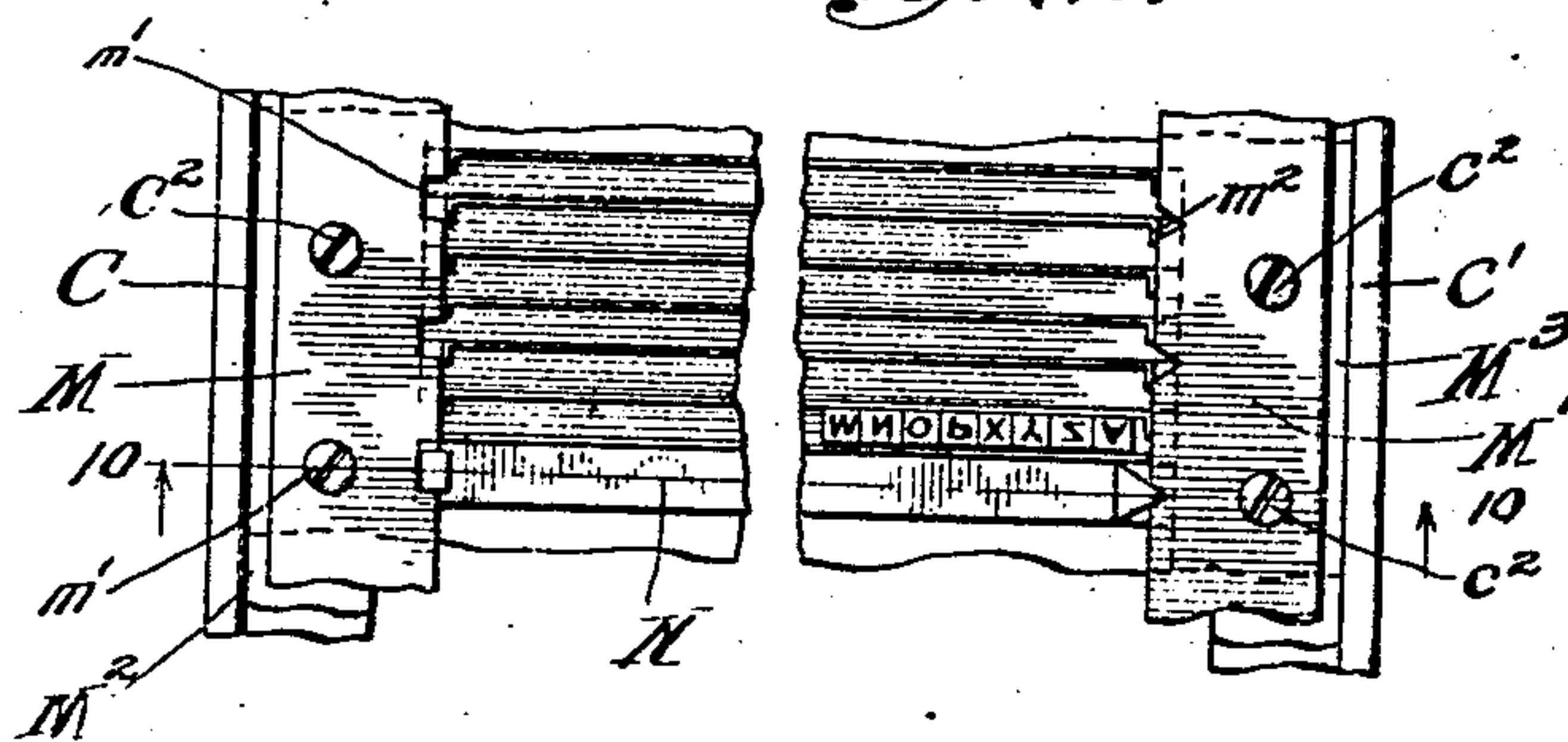
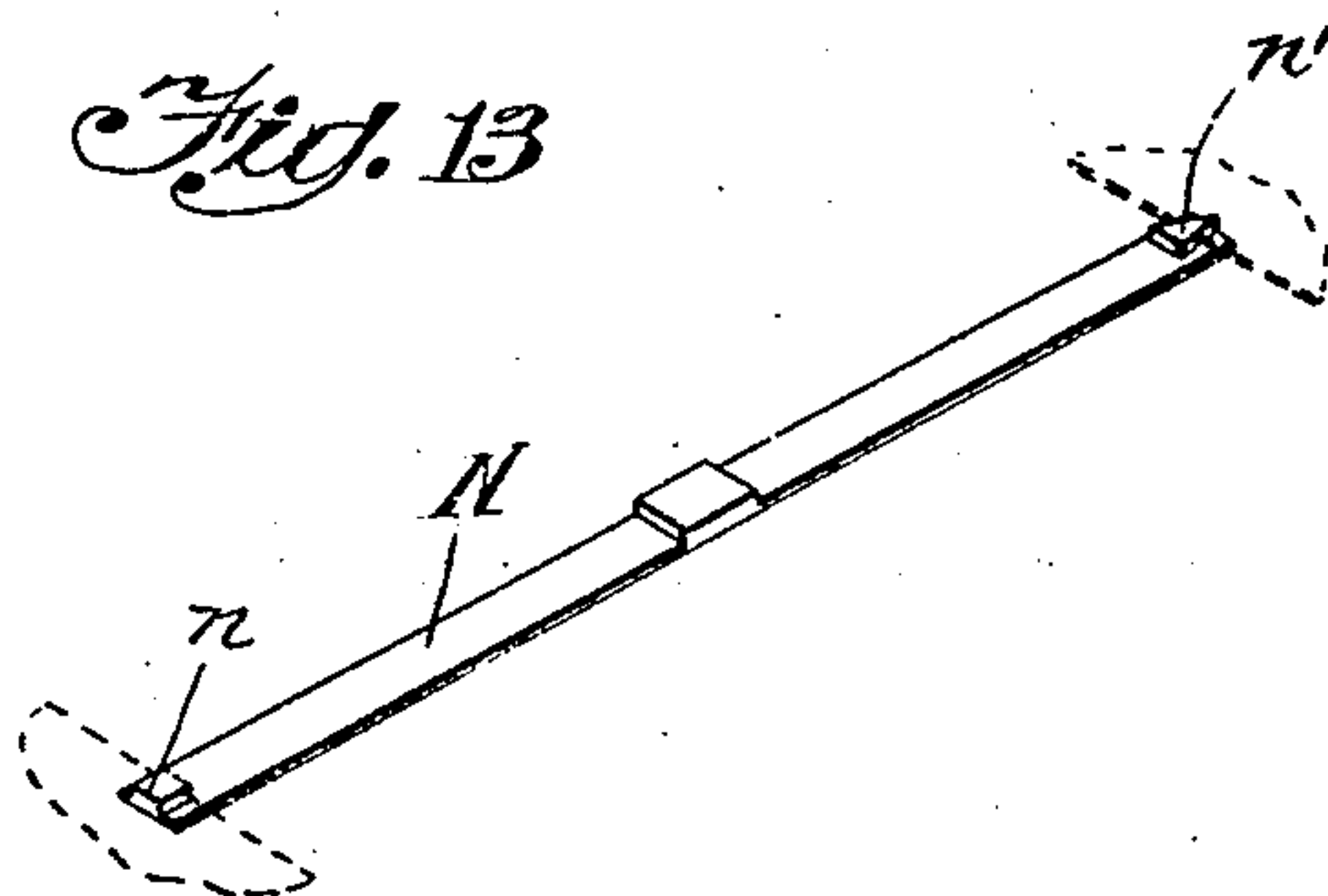


Fig. 13



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7 SHEETS—SHEET 7.

Fig. 15.

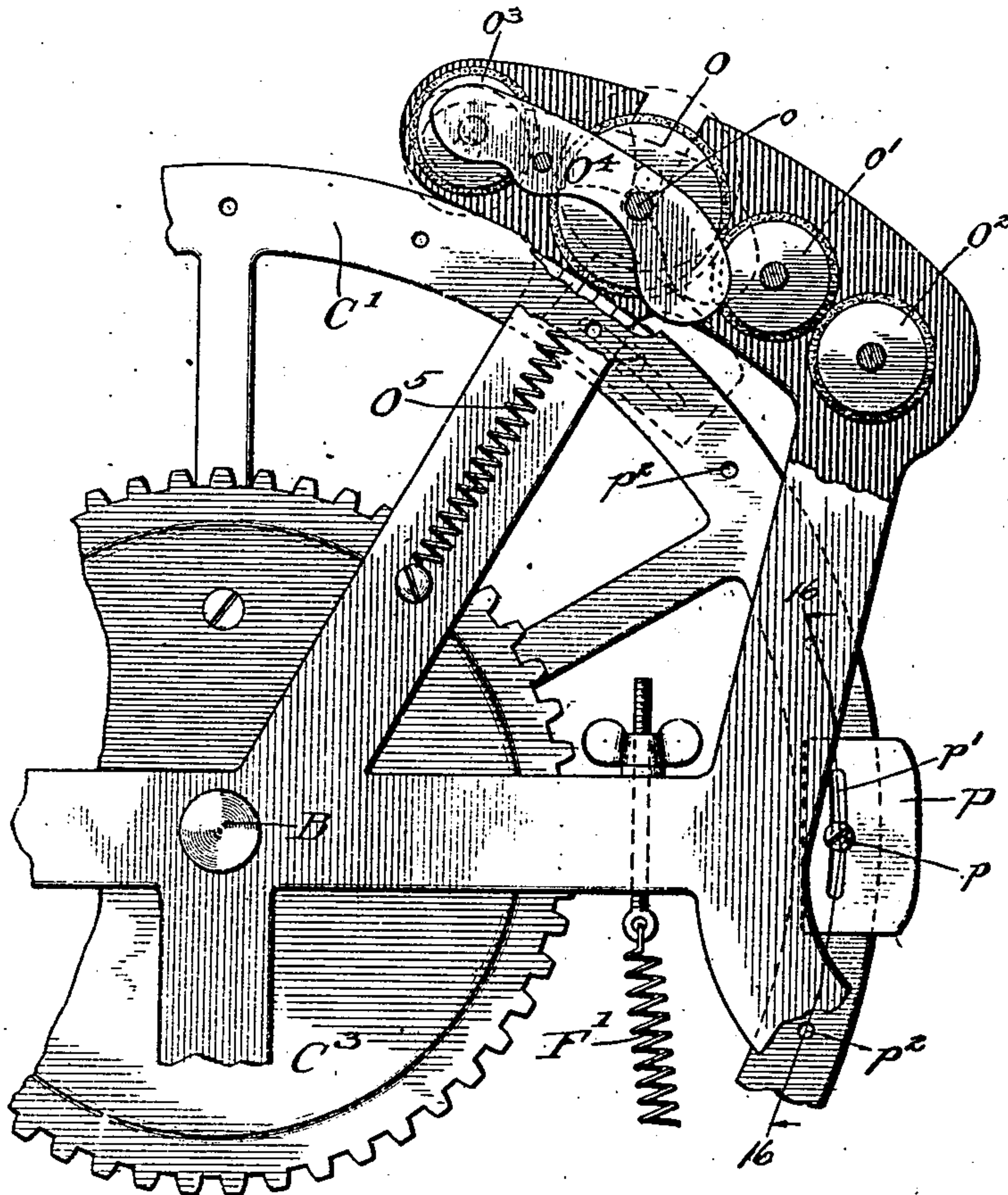
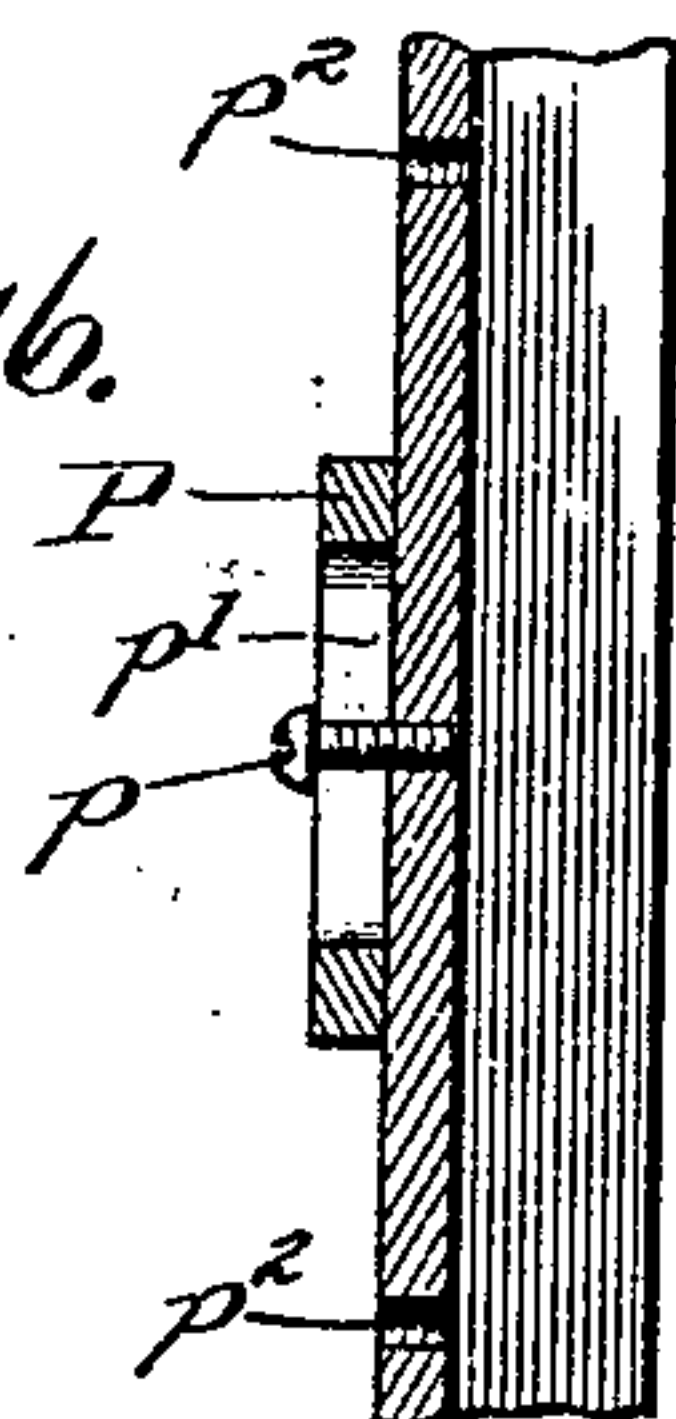


Fig. 16.



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UNITED STATES PATENT OFFICE.

CHARLES W. HOUGHTON, OF CHICAGO, ILLINOIS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 777,898, dated December 20, 1904.

Application filed July 27, 1903. Serial No. 167,078.

To all whom it may concern:

Be it known that I, CHARLES W. HOUGHTON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel printing apparatus designed more especially for the printing of letters, circulars, &c., and of that class in which the printing-type are mounted upon a rotative cylinder and in which the paper is pressed against the type by an impression-roller.

The present invention includes improvements in means for securing the type to the cylinder of such a machine, improvements in means for inking the type, means for controlling the feed of the paper to the type-cylinder, means for separately printing addresses and signatures, and to other features of construction in machines of the character set forth.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

As shown in the accompanying drawings, Figure 1 is a view in side elevation of a machine embodying my invention. Fig. 2 is a sectional view thereof, taken through the central axis of the type-cylinder, on line 2 2 of Fig. 3. Fig. 3 is a cross-sectional view of the machine, taken on line 3 3 of Fig. 2. Fig. 4 is an enlarged detail view, in side elevation, of the lower part of the type-cylinder, the impression-roller, and means for supporting the impression-roller, together with parts concerned in the control of the paper-feed. Fig. 5 is a side elevation of the machine. Fig. 6 is a detail view of the parts shown in Fig. 4 as seen from the opposite side of the machine. Fig. 7 is an end view of the machine, showing the side thereof opposite to that shown in Fig. 1, the frame being broken away to show parts behind the same. Fig. 8 is a detail view of the parts shown in Figs. 4 and 6, taken on the section-line 8 8 of Fig. 4. Fig. 9 is a detail

section taken on the section-line 9 9 of Fig. 8. Fig. 10 is a detail section taken on line 10 10 of Fig. 12 and illustrating the means for securing the type thereto. Fig. 11 is a perspective view of one end of one of the type-holding bars. Fig. 12 is a detail face view, on an enlarged scale, of part of the cylinder, showing the means for attaching the type thereto. Fig. 13 is a perspective view of a holding or securing bar by which the type-carrying bars are held in place on the cylinder. Fig. 14 is a perspective view of the parts concerned in locking from movement the rotative parts of the address-printing mechanism. Fig. 15 is an enlarged detail end view of part of the type-cylinder, illustrating the type-inking mechanism, a portion of the side frame being broken away to show the inking-rollers. Fig. 16 is a detail section taken upon line 16 16 of Fig. 15.

As shown in said drawings, the frame of the machine consists of two vertically-arranged parallel side frame-pieces A A', which are connected by cross-rods or girths a a'. Attached to and extending between said frame-pieces is a transverse horizontal shaft B. On said shaft is mounted the type-cylinder, which consists of two heads C C', which are mounted on the ends of the shaft B inside of the frame-plates A A' and turn on said shaft, and a curved type-supporting plate C², which is attached at its side edges to the said heads C C'. Said heads are shown as provided with inwardly-projecting annular flanges c c', to the outer surfaces of which the plate C² is secured by means of screws c².

D indicates the impression-roller, which is arranged parallel with the type-cylinder beneath the latter. Said impression-roller is attached to a shaft D', the ends of which project from the ends of the roller and which are mounted in bearing-recesses formed in two levers E E', each of which is pivoted at one end to the adjacent frame-plate of the machine and supported at its opposite end by means of a coiled spring, the springs supporting the two levers being indicated in the drawings by F F' and as made of coiled form. The roller-supporting levers E E' are shown as pivoted

to the frame-pieces A A' by means of a transverse pivot-rod E², which is attached at its ends to the said levers and which passes through bearing-apertures in the frame-pieces.

5 The levers E E' are rigidly secured to the shaft E², so that said levers will be held rigidly in parallel relation to each other, and the axis of the impression-roller will always remain parallel with the axis of the type-cylinder. The springs F F' serve to hold the impression-cylinder yieldingly against the type-cylinder during the operation of printing. In order that the surface of the impression-roller shall be maintained at a uniform distance from the type-cylinder and in proper position to press the paper against the type on the cylinder, said cylinder is provided with two strips or bands G G', which are applied over the segmental plate C² at either side of the type upon the cylinder and which form concentric bearing-surfaces adapted to come in contact with the end portions of the impression-roller D during the movement of the type past the impression-roller. The strips 20 G G' are preferably made of rubber or like yielding material. Said strips not only serve to hold the impression-roller at a proper distance from the surface of the type-supporting plate C², but also serve to insure rotation of the impression-roller, so that its surface will move at the same speed as that of the type during the printing operation. The said strips G G' may be attached to the type-supporting plate C² in any suitable manner; but as herein 30 shown, Fig. 3, the ends of the strips are carried around the opposite edges of the said plate and are secured to the inner surface of the plate by screws.

In order to enable the impression-roller to be thrown downwardly away from the type-cylinder at times when it is desired to rotate the type-cylinder without making an impression, a hand-lever H, Figs. 2 and 4, is pivoted to the side frame A' above the lever E' by means of a short shaft H', which passes through the said frame-piece, and inside the frame-piece is a cam-arm H², which is attached rigidly to the shaft H' in position to act upon the lever E'. Said hand-lever and associated 50 parts act to depress the levers E and E' and serve to hold the said levers depressed and the impression-roller in a depressed position when the cam-arm is thrown into position with its free end directed downwardly and in contact with the said lever E'.

For the purpose of positively limiting the upward movement of the levers E E' under the action of the springs F F', and thereby positively limiting the upward movement of the impression-roller, set-screws I I' Figs. 4 and 6, are inserted through lugs i i' on the inner surfaces of the frame-plates in position to bear at their lower ends against the said levers E and E'. The type-cylinder is turned 65 continuously in one direction during the op-

eration of the machine. Provision is made for rotating the cylinder by hand, embracing a gear-wheel C³, which is mounted on the shaft B between the cylinder-head C' and the frame-piece A' and is rigidly attached to the said 70 head C', and a shaft C⁴, mounted in a bearing a' on the frame-piece A' and provided inside of said frame-piece with a gear-pinion C⁵. The latter intermeshes with the gear-wheel C³, and outside of said frame-piece the shaft C⁴ is provided with a crank C⁶, by which the shaft C⁴ may be turned and the type-cylinder thereby rotated. 75

Now referring to the devices for controlling the feed of the machine so that each sheet as 80 it is fed to the machine will come in proper position with respect to the type on the type-cylinder, devices are provided as follows: J indicates a gage-bar which extends across the machine below the type-cylinder and in line 85 with the path of the sheets of paper which are fed to the machine. To facilitate the feeding of the sheets, a feed-table K is provided, the same being located in position to direct the sheets over the impression-roller D 90 and beneath the type-cylinder, as seen in Figs. 1 and 3. Said gage-bar J is provided at its ends with arms J' J². The said arms J' J² are pivoted to the impression-roller-supporting levers E E' by means of pivot-studs 95 j', as clearly seen in Fig. 8, said studs being located at points in advance (referring to the direction of motion of the entering paper) of the pivotal axis of the impression-roller. The said gage-bar is adapted to be swung upwardly 100 into a position above the impression-roller and in the path of the paper and to be thrown downwardly and rearwardly to carry it below and out of the path of the paper. Said gage-bar is shown as being made L shape in cross-section in order that it may have the necessary stiffness and as connected with the arms J' and J² by oblique portions j, the said bar, its supporting-arms, and the parts j being preferably made integral with each other or 110 of one piece of sheet metal. One of the supporting-arms, J², of the gage-bar J is provided with a lever-arm J³, which carries at its free end an antifriction-roller j⁴, and a coiled spring J⁴ is connected with said arm J³ and 115 with the frame of the machine in such manner that the spring tends to throw said arm forwardly and into position to hold said gage-bar in its operative position or in the path of the paper. The gage-bar is swung rearwardly and 120 downwardly, so as to be out of the way of the type-supporting plate C² and the type thereon during the printing operation, by the action on the arm j³ of a cam-flange C⁷, formed on and projecting outwardly from the outer face of the type-cylinder head C'. Said cam-flange C⁷ extends partially around the end of the type-cylinder and is so arranged that when the gage-bar J is in its operative position, as seen in Fig. 4, and when the type-cylinder reaches the point 125 130

where the printing is to begin the advance end of said cam-flange C' will strike said arm J^3 , as seen in Fig. 4, and by its action on said arm will throw the same rearwardly, as seen in Fig. 1, until the said advance end of the cam-flange passes beyond the end of the said lever J^3 , after which the roller j^4 on the lever will ride on the outer face of the cam-flange, as seen in dotted lines in Fig. 4, and the latter will hold the lever at its rearward limit of its movement, and thereby maintain the gage-bar J in its depressed or operative position during the time the printing is being accomplished. After the rear edge of the type-supporting plate C^2 has passed the impression-roller D and the cam-flange passes away from the roller j^4 the spring J^4 throws the gage-bar upwardly into the space afforded therefor between the end margins of the type-supporting plate C^2 and into the path of the paper.

The sheets of paper to be printed are fed to the machine one at each revolution of the type-cylinder, and the advance edges of the sheets are brought into contact with the gage-bar as the sheets are placed on the feed-table, so that the sheets will be gripped between the impression-roller and the feeding-strips $G G'$ and carried forward thereby when the margins of the sheets are in a desired position with respect to the type on the cylinder, the gage-bar being thrown backwardly and depressed out of the path of the sheets before the latter are carried forward for printing.

The apparatus shown is more especially intended for printing by the use of rubber type set up or secured in grooved type bars or holders. Each of said type-holding bars is arranged to hold a single line of type, and the several bars are adapted to be detachably secured to the face of the type-cylinder after the type have been inserted or "set up" therein. Such grooved type-holding bars are indicated in the drawings by L and are shown in Figs. 3, 5, 10, 11, and 12.

The type-holding bars L , which are preferably made of sheet metal, are of U shape in cross-sectional form and have their side walls slightly convergent inwardly, so as to form type-holding grooves of dovetail form adapted to firmly hold the rubber type inserted therein. The bases or bottom walls of the bars L are extended at the ends of the bars to form holding arms or projections l , Fig. 11, by which the bars are held or secured upon the type-cylinder. The said type-cylinder is provided on its side edges with flanges forming inwardly-facing grooves adapted to receive the said holding-arms l on the ends of the type-bars. The said flanges are conveniently formed by means of strips of sheet metal $M M'$, secured to the side margins of the type-supporting plate C^2 with their inner edges elevated above or separated from the said plate, so as to form spaces which constitute the said grooves. As shown in the draw-

ings, the strips $M M'$ are made of flat sheet metal and are superposed upon narrower like strips $M^2 M^3$ in such manner that the strips $M M'$ overhang the inner margins of the strips $M^2 M^3$, and thereby form the said grooves. The strips $M^2 M^3$ in this construction are made of metal of approximately the same thickness as that of which the type-holding bars L are formed, so that the projections $l l$ on said bars will fit closely or tightly in the grooves formed by the overhanging edges of the said strips $M M'$. The strips $M M'$ and $M^2 M^3$ are shown as secured to the type-cylinder by the screws $c^2 c^2$, which serve to secure the plate C^2 to the cylinder-heads C and C' . The bearing-strips $G G'$ are shown as applied over the strips M and M' .

The type to be used for printing are placed or set up in the grooved-type-holding bars L , and the latter are then secured to the type-cylinder by inserting the end projections $l l$ on the bars beneath the strips $M M'$, the bars being slipped sidewise until the several bars are brought together or side by side.

To facilitate the placing or assembling of the type-bars on the cylinder, the strip M at one side of the cylinder is provided at its inner edge with a plurality of notches m' , each just wide enough to permit the passage there-through of the projections $l l$ on the ends of the type-bars. The use of the said notches enables the bars to be inserted and removed with a slight lateral movement only of each bar, it being obvious that in inserting each additional bar the notch nearest the bar last inserted may be utilized. The strips $M M'$ at both ends of the cylinder may be provided with like notches $m' m'$; but this is not necessary, because in inserting each bar one end of the same may be thrust beneath the un-notched strip M' at one end of the cylinder and the other end then inserted through one of the notches m' in the opposite strip M .

For holding or confining in place the several type-bars, so as to prevent lateral movement thereof on the type-cylinder, a construction is provided as follows: N , Figs. 12 and 13, is a holding-bar made of spring or flexible metal and about equal in length to the type-holding bars. The ends of said bar N are adapted to enter the grooves beneath the strips $M M'$, and said bar is provided on its outer face near its ends with outwardly-projecting lugs n and n' . The lug n is of proper width and shape to fit within the notches m' ; but the lug n' is of triangular form and adapted to engage one of a series of triangular notches m^2 , formed in the other strip, M' , opposite the notches $m' m'$. The ends of the bar N are wider than the lugs $n n'$, so that when said ends of the bar are inserted beneath the strips $M M'$ and the lugs $n n'$ are engaged with the notches m' and m^2 the holding-bar will be rigidly held in place on the type-cylinder. The holding-bar N is made flexible, so that it may

be bent into curved form, and when so bent its ends may be inserted beneath and removed from engagement with the strips M M'.

In the operation of attaching the type-bars 5 to the type-cylinder each bar is placed with its end projections beneath the strips M M' and slipped sidewise until brought into contact with those previously inserted. When the final type-bar or the one carrying the last 10 line of the letter or article to be printed has been inserted, the holding-bar is then put in place against the said final type-bar and serves to hold or confine all of the bars in place.

An inking device is provided for applying 15 ink to the type, and in connection therewith provision is made for applying ink of different color to one or more lines of type, as is sometimes desired for printing a facsimile signature in a color resembling that of writ- 20 ing-ink. Such inking device is shown as made as follows: O is the main inking-roller, and O' O² are ink-distributing rollers, which run in contact therewith, while O³ is a separate inking-roller for applying an ink of different color. O⁴ O⁴ are two levers in which 25 the ends of the main and secondary inking-rollers O and O³ are mounted and which are pivoted between their ends to the side plates of the machine-frame, so that when one of the 30 rollers is moved outwardly the other will move inwardly, and vice versa, the said rollers being so mounted on the levers that when one roller is in position for contact with the type the other roller will be away from or clear of 35 the type. Coiled contractile springs O⁵ O⁵ are connected with the levers O⁴ O⁴ in such manner as to hold the main inking-roller O normally in position for operation. In the particular construction illustrated levers O⁴ 40 O⁴ are mounted on studs o o, which project inwardly from the side frame-plates, and the said main inking-roller O is provided with a shaft o', the ends of which extend outwardly past their bearings in the levers O⁴ and 45 through notches a² in the frame-plates. The springs O⁵ are connected with the outer ends of said shaft and operate to draw the main inking-roller O inwardly and at the same time to keep the secondary inking-roller away 50 from the type. For throwing the main inking-roller out of action and bringing the auxiliary inking-roller O³ temporarily in position for action cam-plates P P are attached to the edges of the cylinder-heads C and C', with 55 their curved outer edges in position to act on and lift or force outward the ends of the levers O⁴ O⁴ in which the said roller O is mounted. Said cam-plates P are shown as being adjustably secured to the cylinder-heads 60 by means of screws p p, which pass through curved slots p' in the plates. Each of the cylinder-heads is shown as provided with a series of screw-holes p² p², in either of which the screws p may be placed, as shown in the detail view, Fig. 16, so as to enable the cam-

plates to be placed at any desired position with respect to the type on the cylinder. The inking-rollers may therefore be actuated by the cam-plates P at any desired point in the movement of the type past the inking-rollers 70 and a line or lines of type at any point in the cylinder thereby supplied with ink of color different from that applied to the main body of the type. The device described is of especial utility in printing circulars or imitations 75 of type-written letters. In cases of this kind a facsimile signature may be used and the auxiliary inking-roller arranged to apply ink of a desired color, different from that of the body of the letter or circular, to the line of 80 type which prints such signature.

I have also provided in connection with the machine illustrated a device for printing successively on a series of sheets a series or plurality of different words, numbers, or characters—such, for instance, as names and addresses. For holding or carrying the type for printing such names and addresses I employ a chain Q, consisting of flexibly-connected type-holders, such as has heretofore 85 been used in addressing-machines. The said chain of type-holders is mounted or trained over a series of guide-pulleys R R, mounted in the interior of the type-cylinder and over a main supporting-pulley S, which is mounted 95 on the cylinder adjacent to the edge of the type-supporting plate C² and which serves to support the several type-holders in position for printing. In the machine shown, which is designed for printing circular letters, the address-printing device extends somewhat less 100 than half the length of the type-cylinder and is located near one end thereof. For supporting the several guide-pulleys R R and the supporting-pulley S the type-cylinder is provided 105 with an intermediate disk C³, located between and parallel with the heads C and C', and the pulleys R R are mounted on shafts r r, which extend between the head C and disk C³. The pulley S is attached to a shaft 110 S', which has bearings in the said head C and disk C³. The said pulleys R R and S are shown as having flat faces for engagement with the several flat type-holders constituting the chain Q. In addition to the guide-pulleys R R an idler or tightener pulley R' is provided which is located in contact with the exterior face of the chain and is adapted to take up any slack in the same. The said pulley R' is mounted in a shaft r', which slides 120 at its ends in radial slots r², formed in the head C and disk C³, and coiled contractile springs r³ r³ are applied to draw the shaft inwardly or in a direction to keep the idler-pulley in contact with the chain. 125

Devices are provided for automatically moving or shifting the chain Q so as to bring the type-holders successively in printing position and for locking or holding the holders in place during the printing operation, as follows: The 130

supporting-pulley S is provided with a plurality of radial pins or teeth s , corresponding in number with the number of flat faces thereon. These pins or teeth are located in position for contact with a stationary actuating-arm T, which is attached to the shaft B and extends therefrom far enough to reach the said teeth s . At each rotation of the type-cylinder the contact of one of the teeth s with the arm T has the effect of turning the pulley S one step or far enough to bring a new type-holder in position for printing. On the end of the shaft S' which projects beyond or outside of the head C is affixed a disk S², which turns with said shaft and the pulley S. Said disk S² is provided with a series of peripheral notches s' , Fig. 14. U is a detent-lever which is mounted on the head C and is held by a spring U' in engagement with one of said notches s' . The adjacent side plate of the machine-frame is provided with a cam projection or rib U², located in position for contact therewith of the detent-lever U in the rotation of the type-cylinder and which is so located and arranged that it acts to throw the said lever out of engagement with the disk S² and to hold it free from said disk when the supporting-pulley and disk are being turned by the action of one of the teeth s and the arm T. It will of course be understood that the devices for turning and automatically locking the supporting-pulley S are arranged to turn said pulley, and thereby shift the chain of type-holders at a time after the supporting-pulley S passes the impression-roller D and before the said pulley reaches the inking-rollers.

From the above it will be understood that in the operation of the addressing attachment described the chain of type-holders will be moved to bring the individual holders successively into position for printing, will be locked or held from movement while the impression is being made, and will then be released and again moved preparatory to another impression at each rotation of the type-cylinder. The printing of addresses may thus be automatically accomplished as the printing of letters or circulars progresses until all of the addresses set up in the holders of the chain have been printed. New chains may obviously be inserted into the machine in succession to provide for printing a larger number of addresses than can be provided for by the use of one chain only.

I claim as my invention—

1. A printing-machine comprising a rotative, segmental type-supporting plate, a yieldingly-supported impression-roller which is intermittently rotated by contact therewith of concentric segmental bearing-surfaces carried by the type-supporting plate, a feed-table arranged to direct the paper between the type-supporting plate and the impression-roller, and an inking-roller.

2. A printing-machine comprising a rotative, segmental type-supporting plate, a yieldingly-supported impression-roller, an inking-roller, a gage-bar which is movable into and out of the space between the ends of the type-supporting plate and the path of the paper, and means for operating said gage-bar.

3. A printing-machine comprising a rotative, segmental type-supporting plate, means for securing the type to said plate, an impression-roller which is movable toward and from the supporting-plate, and means for yieldingly holding the impression-roller adjacent to the type-supporting plate, said type-supporting plate being provided with concentric bearing-surfaces adapted for contact with the ends of the impression-roller to intermittently turn the latter and hold it in proper relation to the type.

4. A printing-machine comprising a rotative type-supporting plate, an impression-roller, means for holding the same yieldingly adjacent to the type-supporting plate, and strips of rubber or like material applied to the type-supporting plate and acting on the impression-roller to give intermittent rotative movement to the same.

5. A printing-machine comprising a rotative type-cylinder provided with a segmental type-supporting plate, grooved type-bars adapted to receive and hold the type, means on the ends of the cylinder adapted to engage the said ends of the type-bars to hold the same in contact with said plate, an impression-roller movable toward and from the type-cylinder, means for yieldingly holding the impression-roller adjacent to the type-cylinder and strips applied to the type-cylinder exterior to the ends of the type-bars and adapted for contact with the impression-roller to turn the latter and hold it in the proper position with respect to the type.

6. A printing-machine comprising a rotative, segmental type-supporting plate, an impression-roller located below the central axis of and vertically movable toward and from the type-supporting plate, segmental strips carried by the type-supporting plate and acting on the impression-roller to intermittently turn the latter, springs applied to lift the impression-roller toward the type-supporting plate, and set-screws in the machine-frame affording adjustable stops to limit the movement of the impression-roller toward the type-cylinder under the action of said springs.

7. A printing-machine comprising a rotative type-supporting plate, an impression-roller located below the axis of the said plate, a feed-table for directing sheets of paper over the impression-roller, supporting-levers for the impression-roller which are pivotally connected with the machine-frame and rigidly connected with each other, and springs connected with said levers for throwing the impression-roller toward the type-plate, said

type-supporting plate being provided with curved concentric bearing-surfaces adapted for contact with the ends of the impression-roller to intermittingly turn the latter.

5 8. A printing-machine comprising a rotative, segmental type-supporting plate, an impression-roller, a pivotally-mounted gage-bar which is movable into and out of the space between the ends of the type-supporting plate, and means for actuating said gage-bar to
10 throw the same into and out of the path of the paper.

9. A printing-machine comprising a rotative, segmental type-supporting plate, an impression-roller, levers pivoted on the machine-frame for supporting said roller, springs acting on said levers to throw the roller toward the type-supporting plate, a gage-bar which is pivoted to said levers and is movable into
15 and out of the space between the ends of the type-supporting plate, and means for giving oscillatory movement to said gage-bar.

10. A printing-machine comprising a rota-

tive type-cylinder provided with a segmental type-supporting plate, a yieldingly-supported
25 impression-roller located below the type-cylinder, pivotally-supported levers upon which said impression-roller is mounted, a feed-table for guiding the paper between the type-cylinder and the impression-roller, a gage-bar
30 which is pivotally mounted on said levers and is movable into and out of the path of the paper, an actuating-arm attached to said gage-bar, a spring operating on the gage-bar to throw the same into the path of the paper and
35 a cam on the type-cylinder acting on said actuating-arm to throw the gage-bar out of the path of the paper.

In testimony that I claim the foregoing as my invention I affix my signature, in presence
40 of two witnesses, this 2d day of July, A. D. 1903.

CHARLES W. HOUGHTON.

Witnesses:

WILLIAM L. HALL,
C. CLARENCE POOLE.