

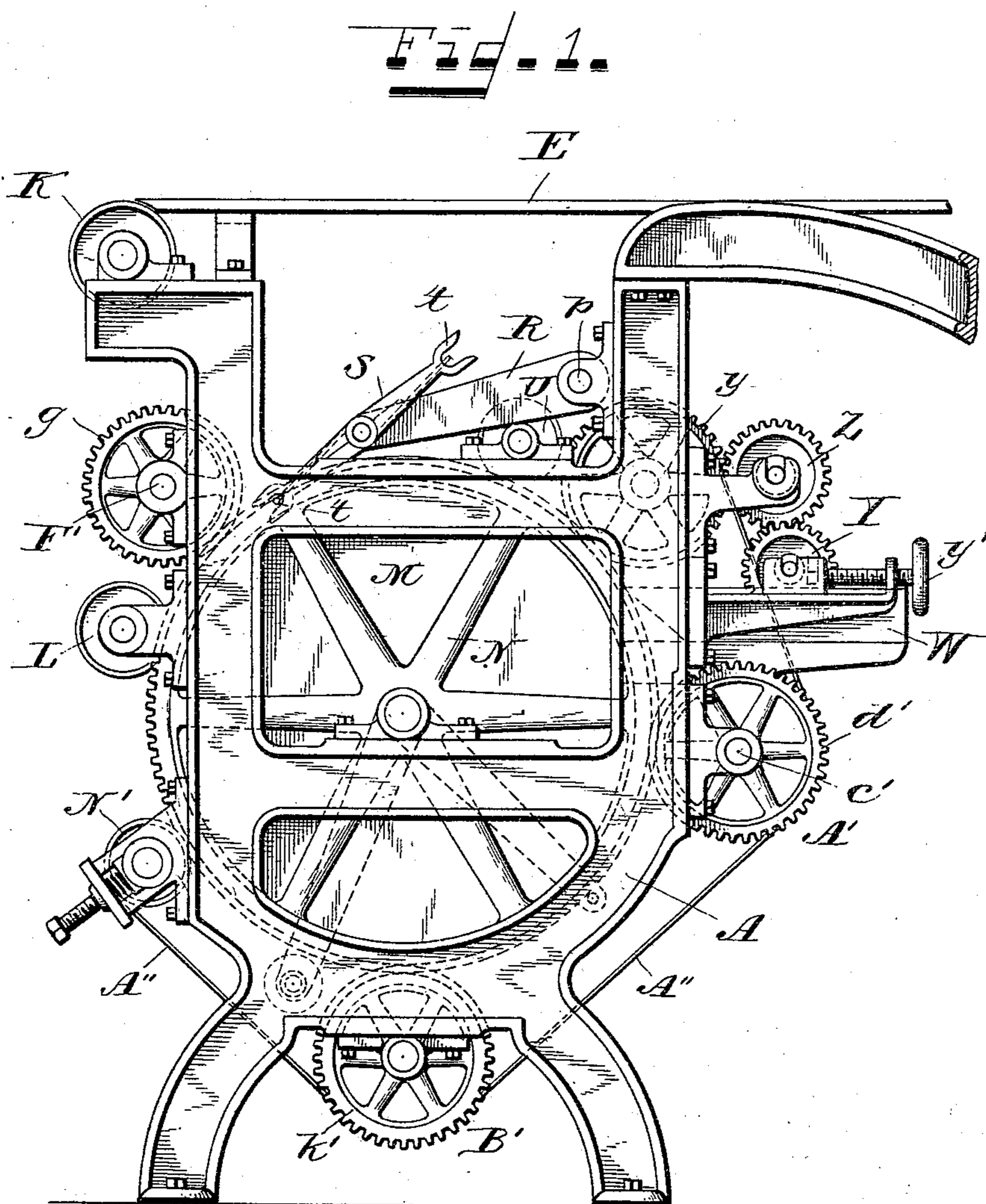
(No Model.)

8 Sheets—Sheet 1.

C. CRIST.
PAPER BAG MACHINE.

No. 543,571.

Patented July 30, 1895.



Witnesses.
Thomson Cross
George Aidman.

Inventor
Charles Crist
by Stew & Allen
Attorneys.

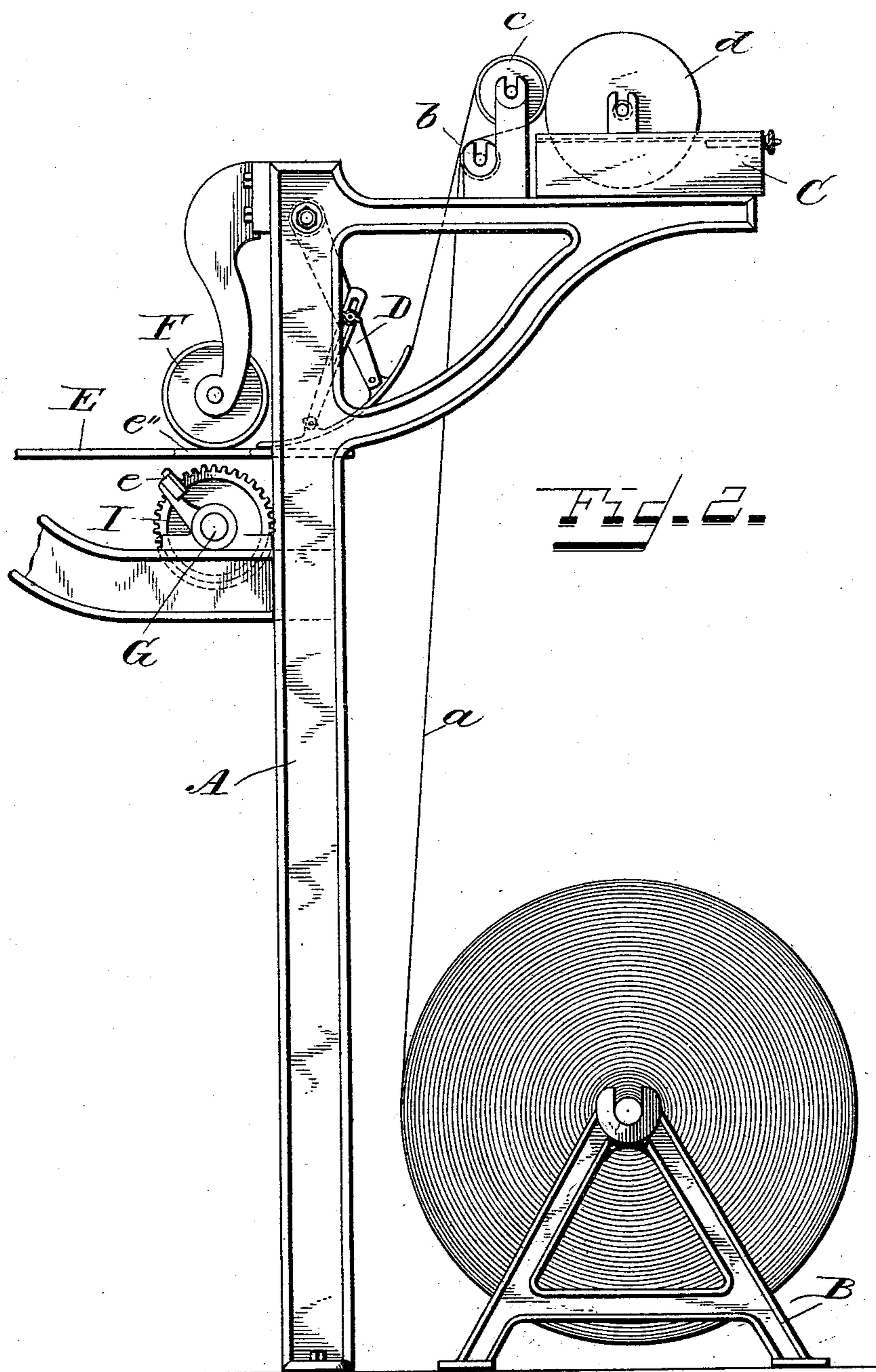
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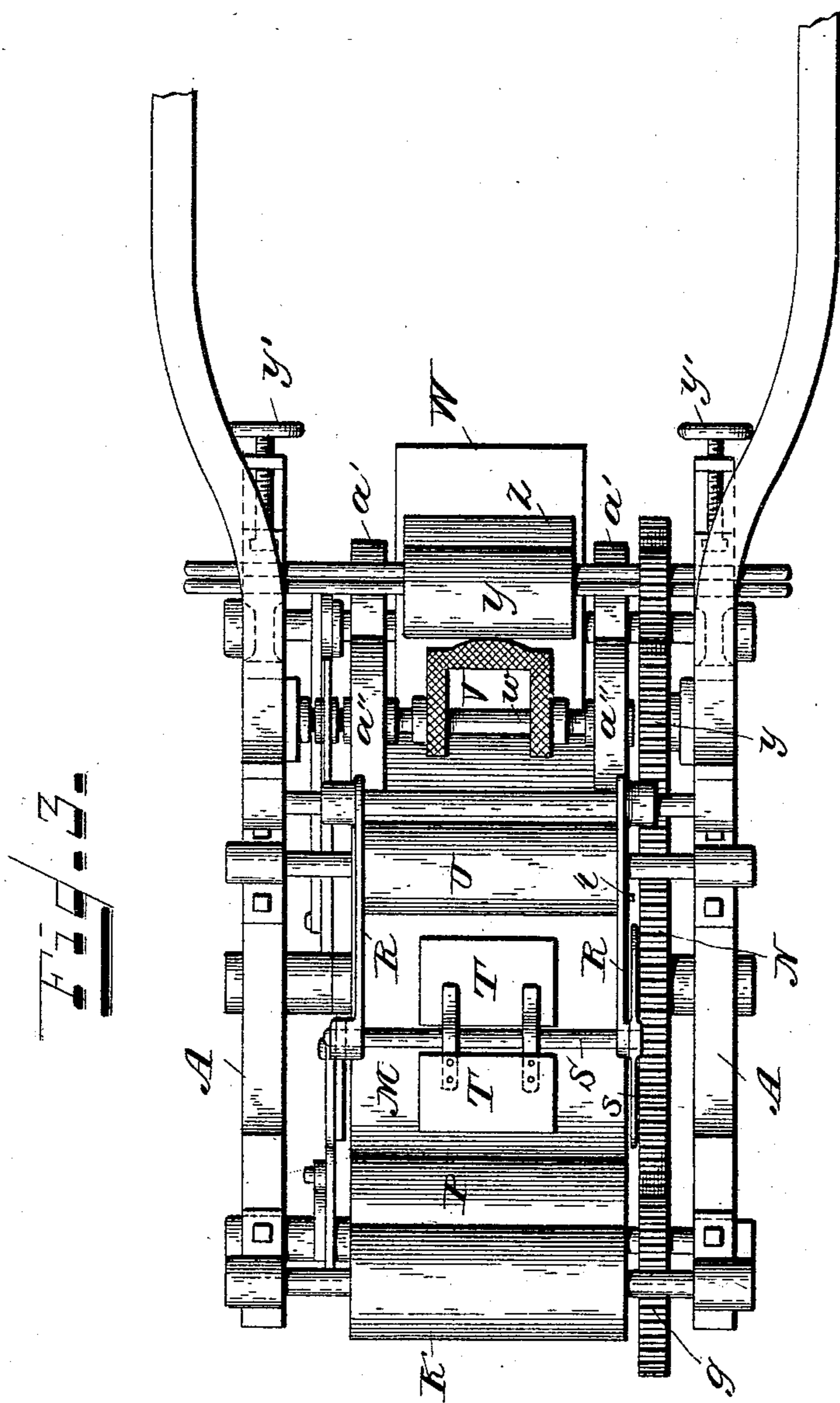
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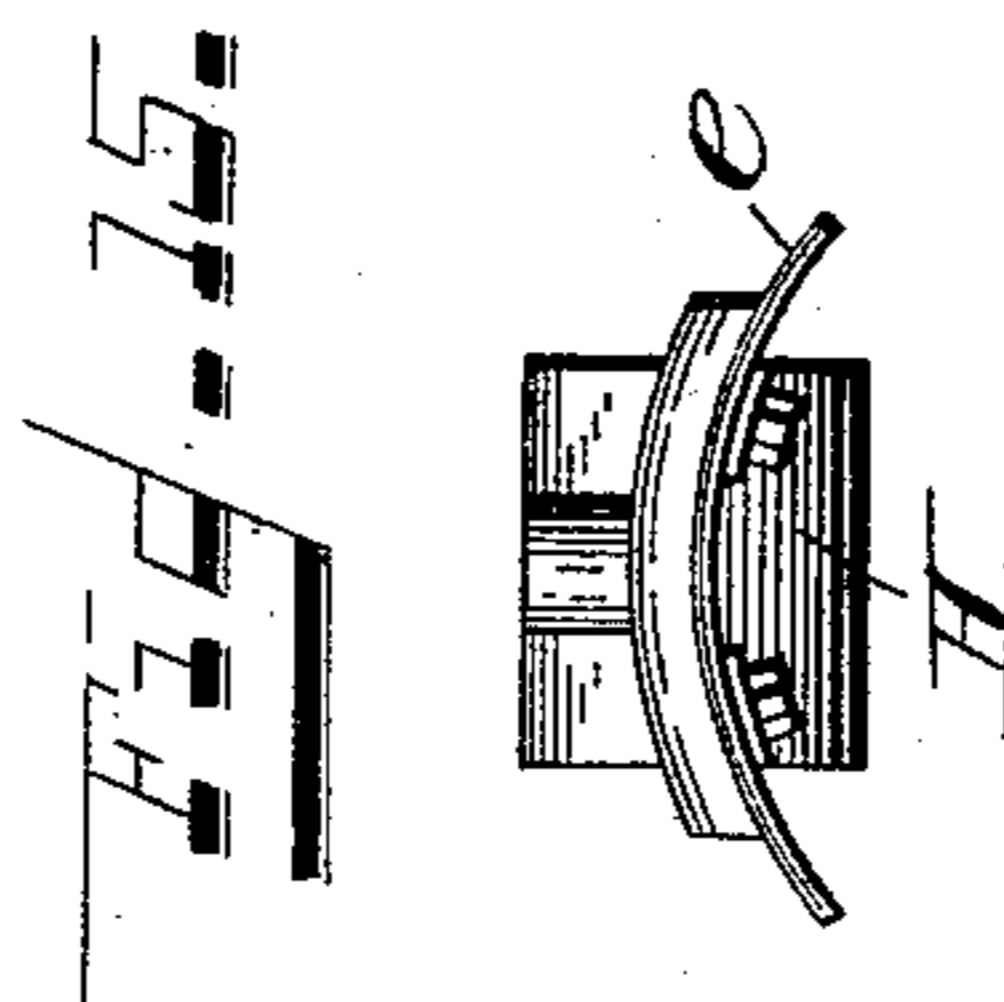
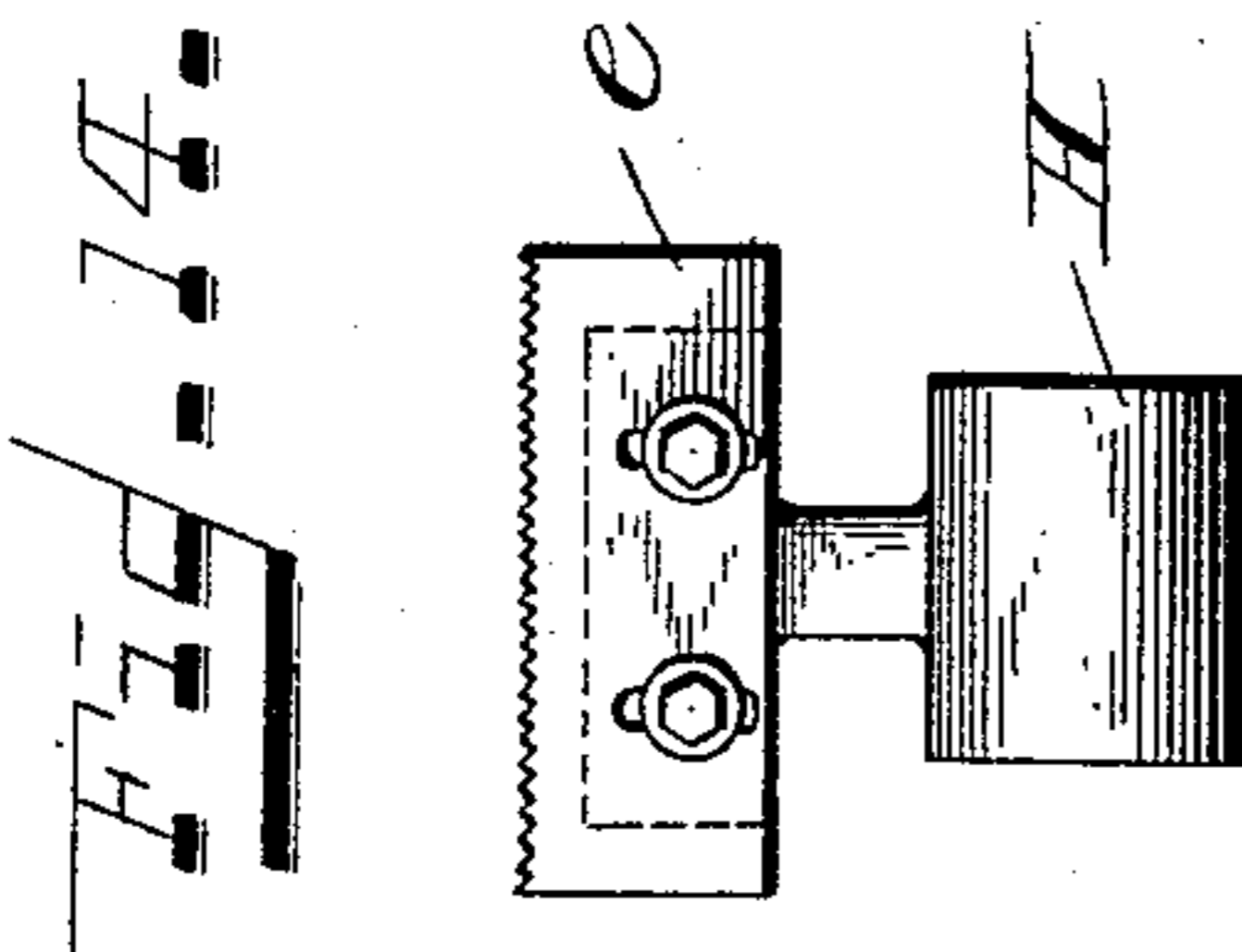
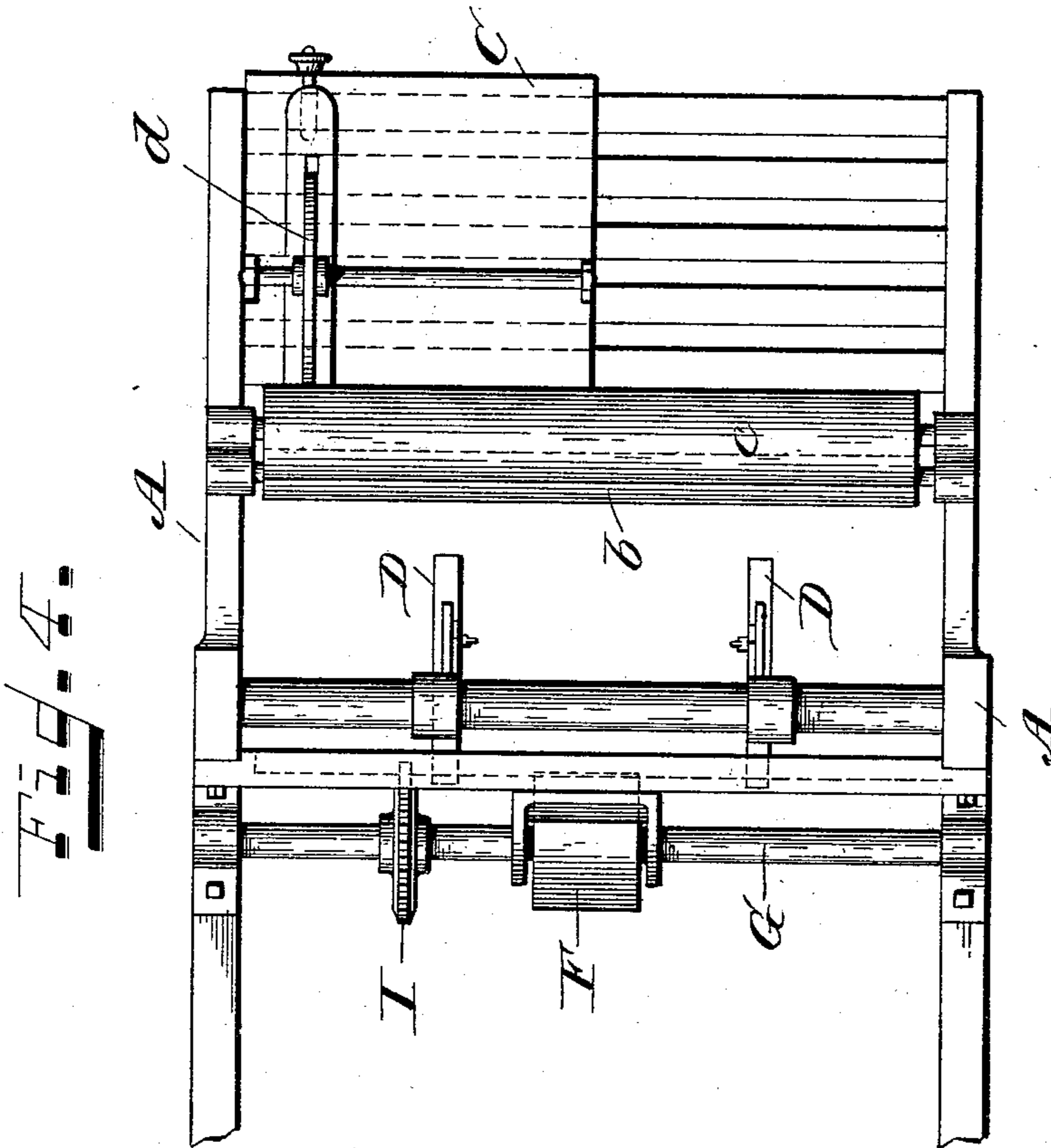
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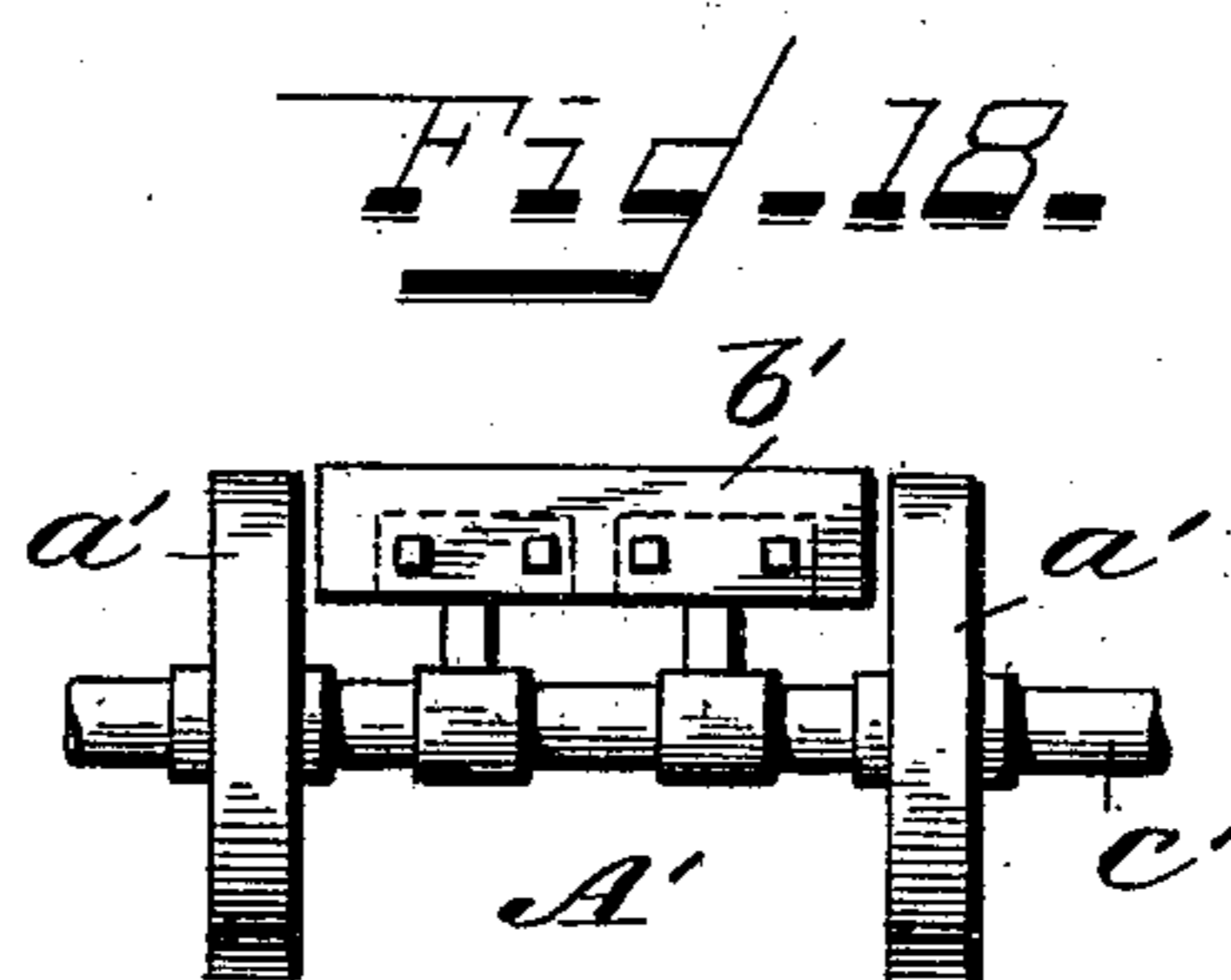
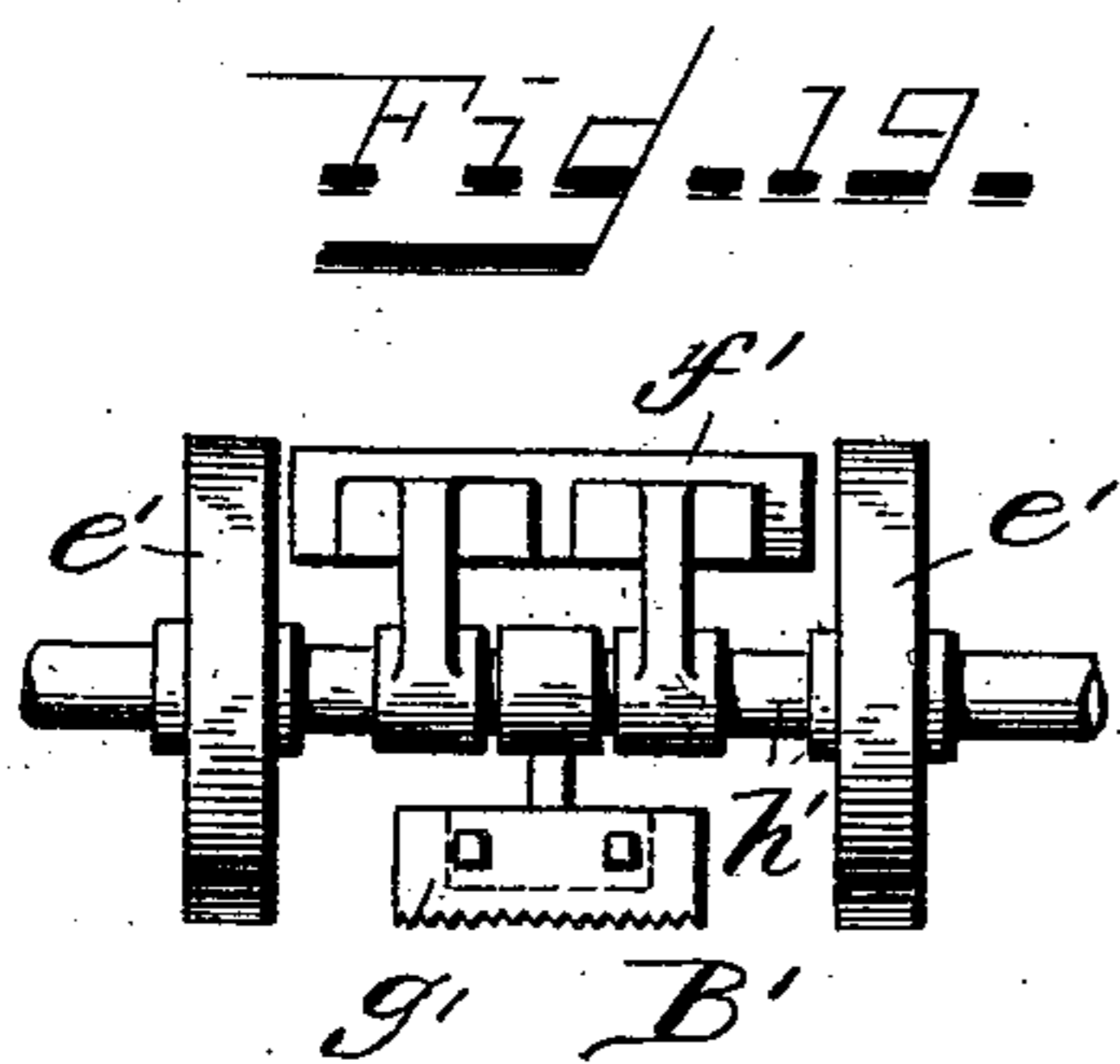
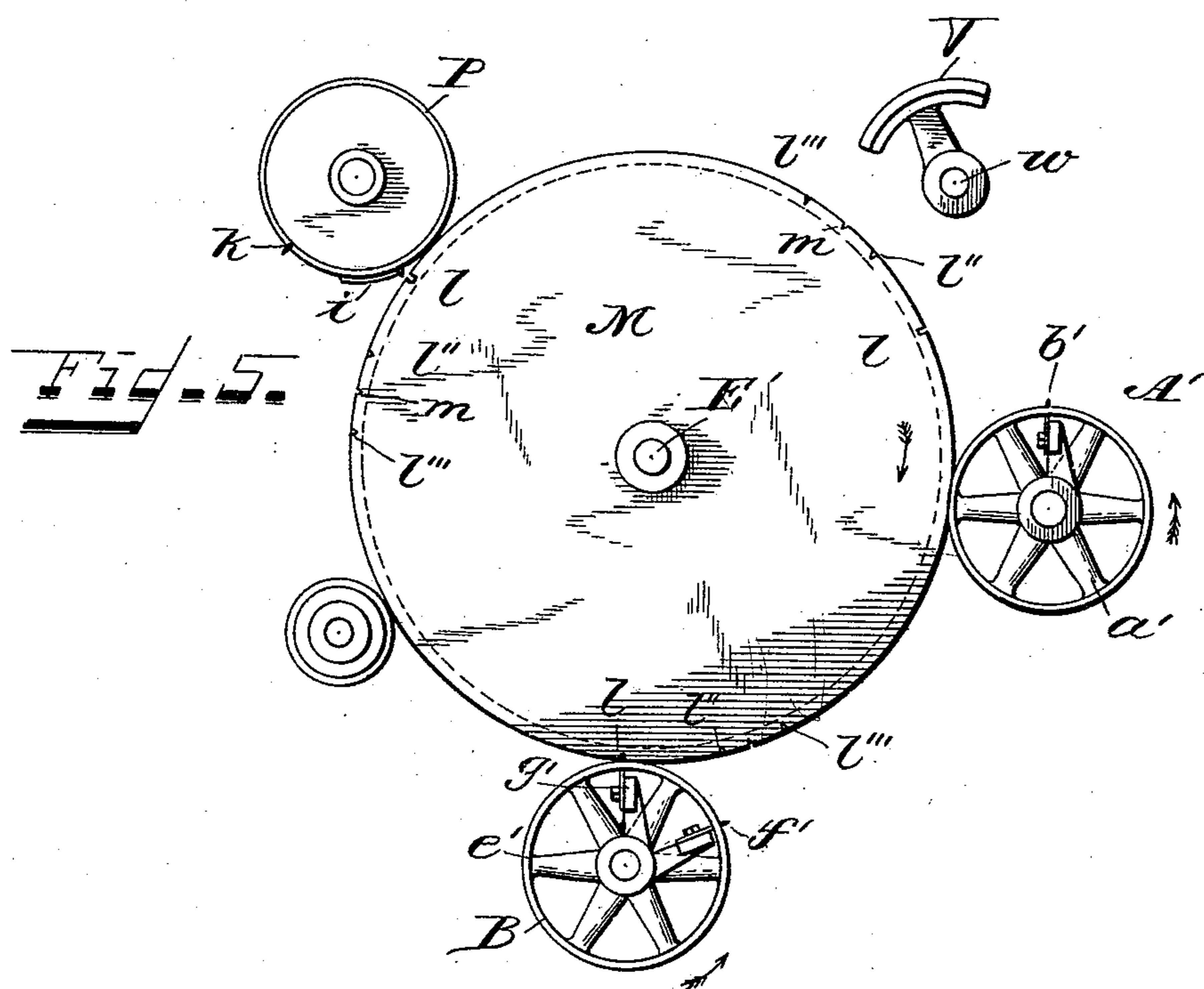
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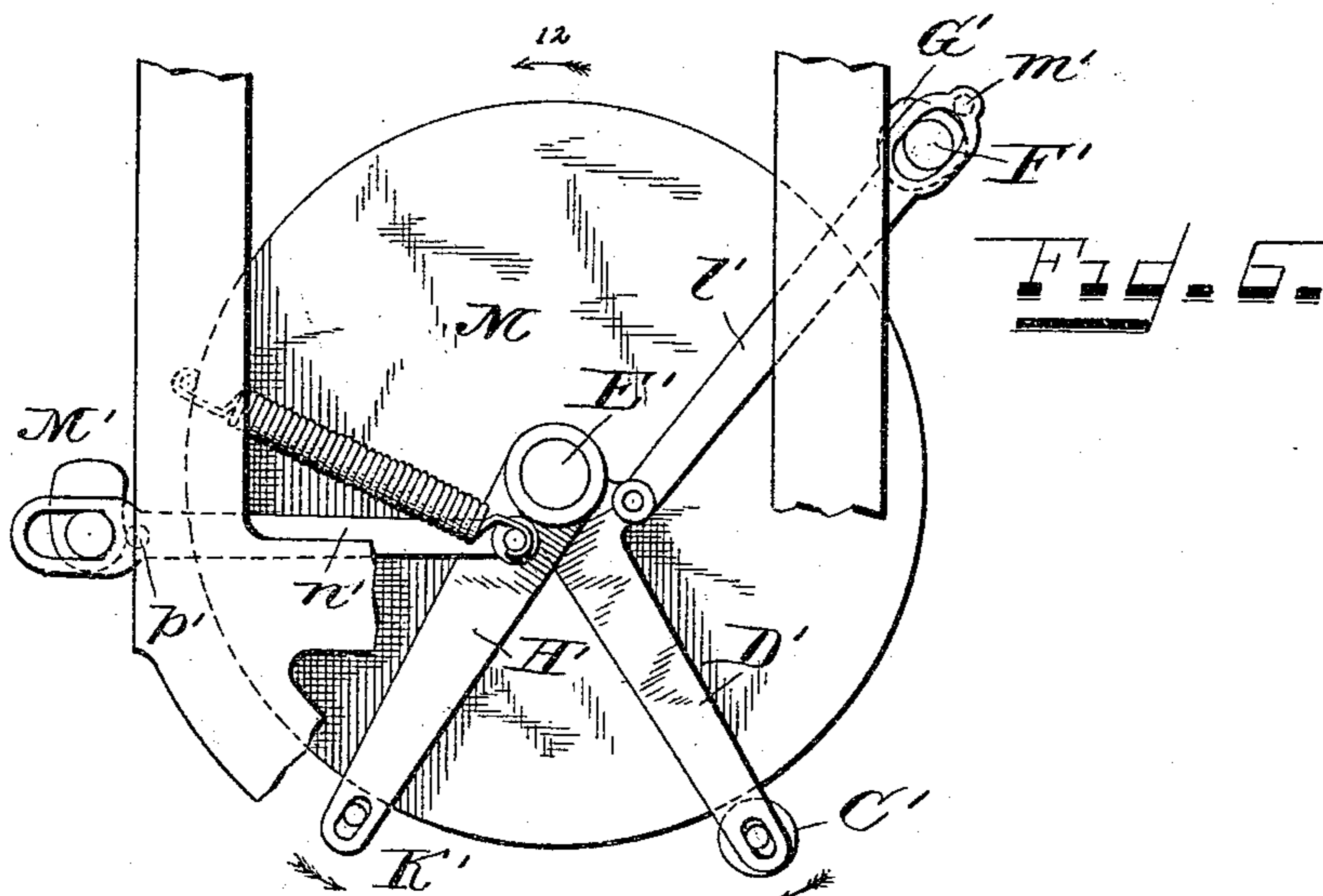


Fig. 20.

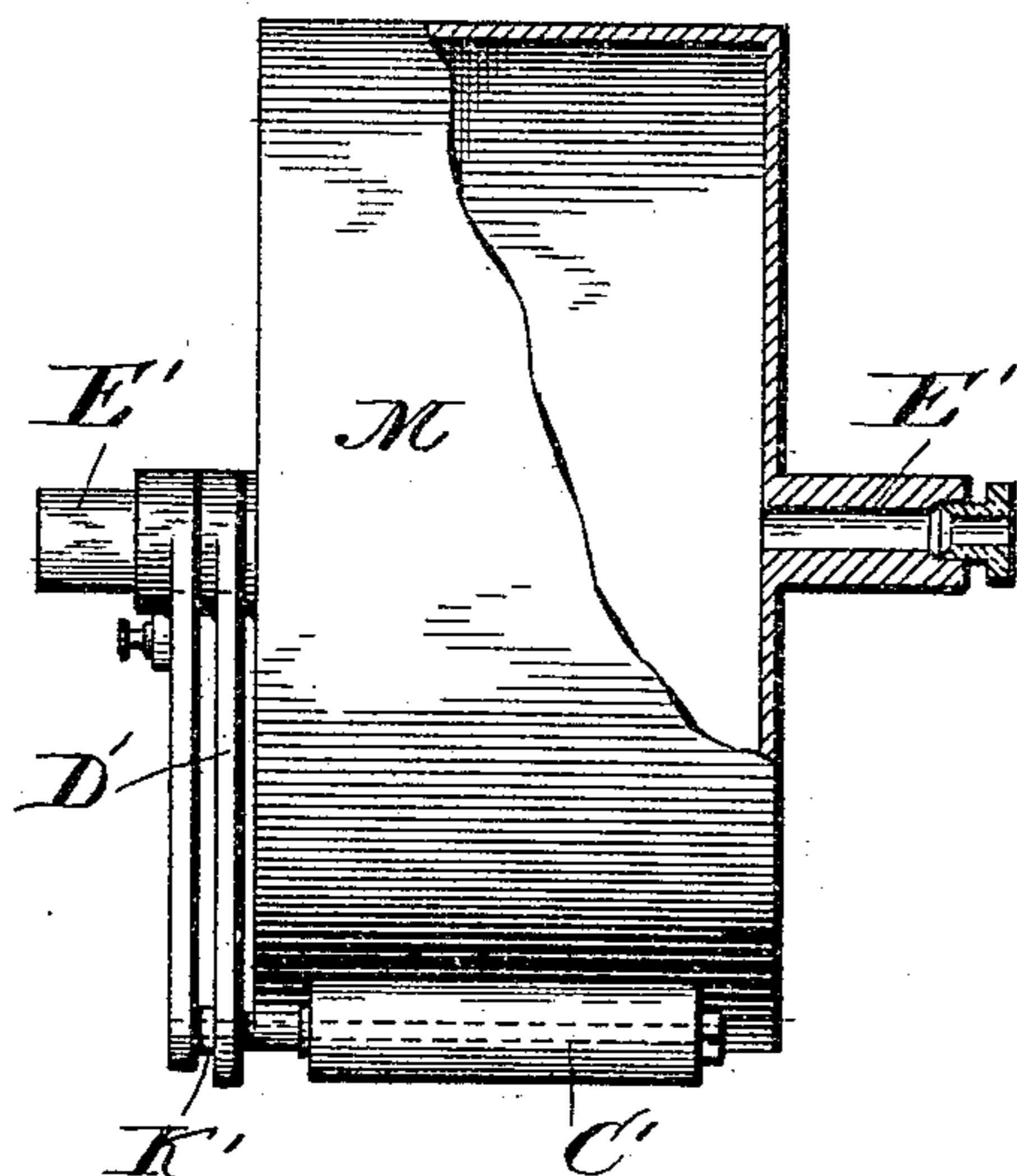


Fig. 15.

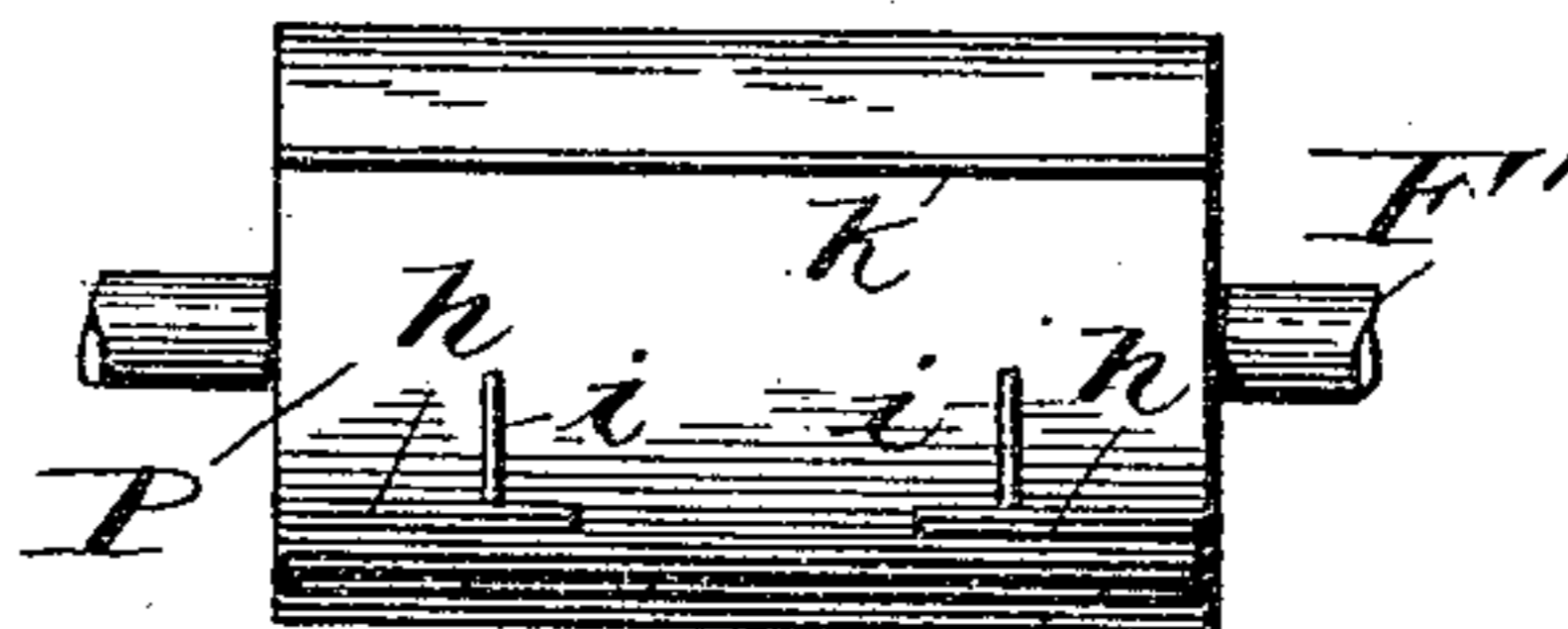
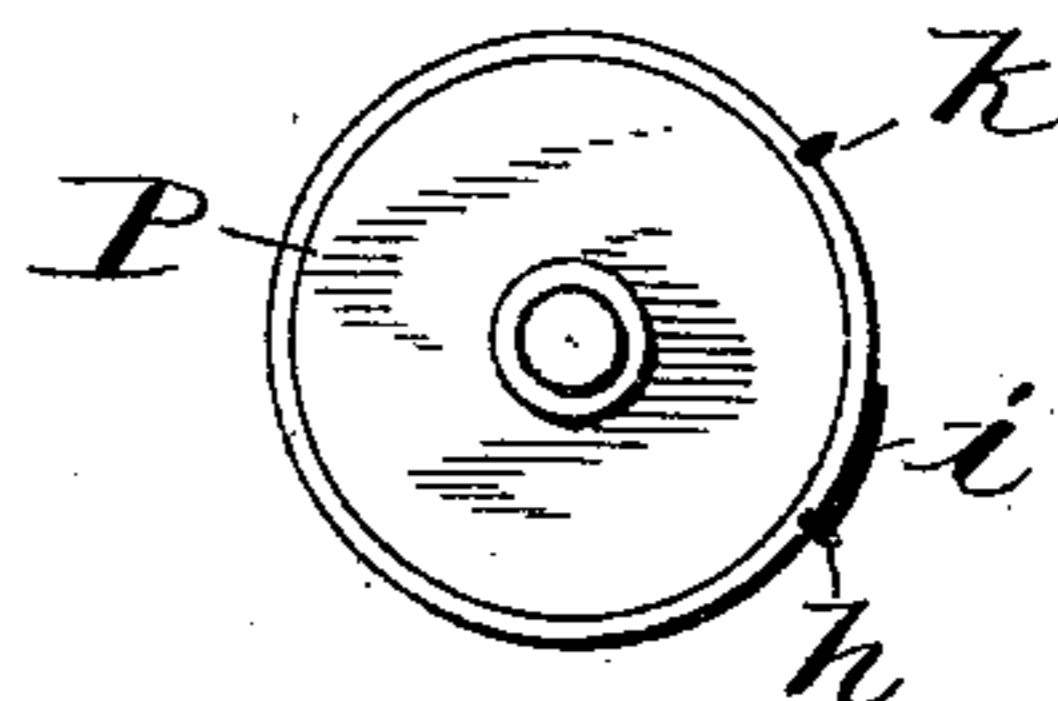


Fig. 17.



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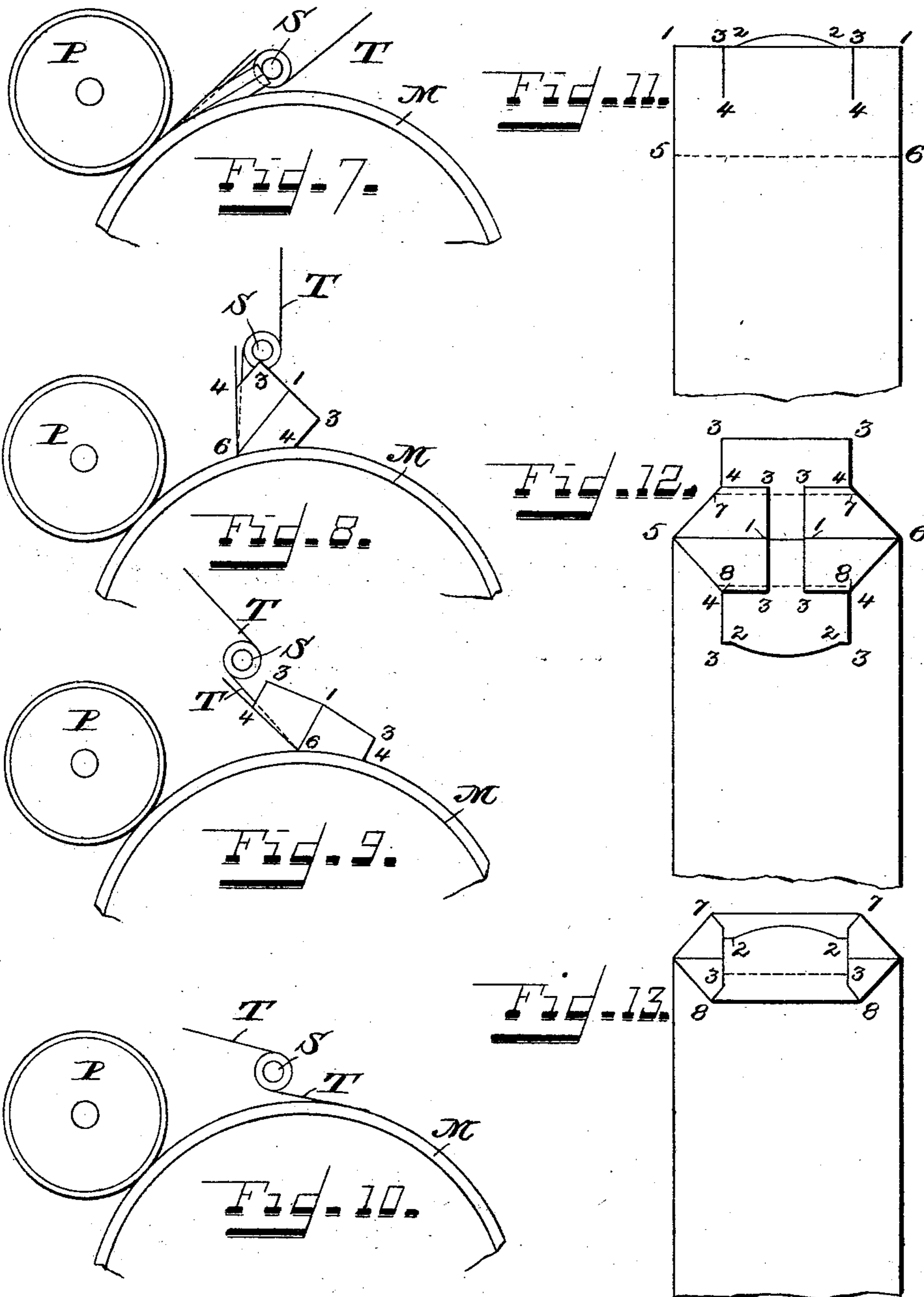
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Witnesses.

J. Thomson Cross
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(No Model.)

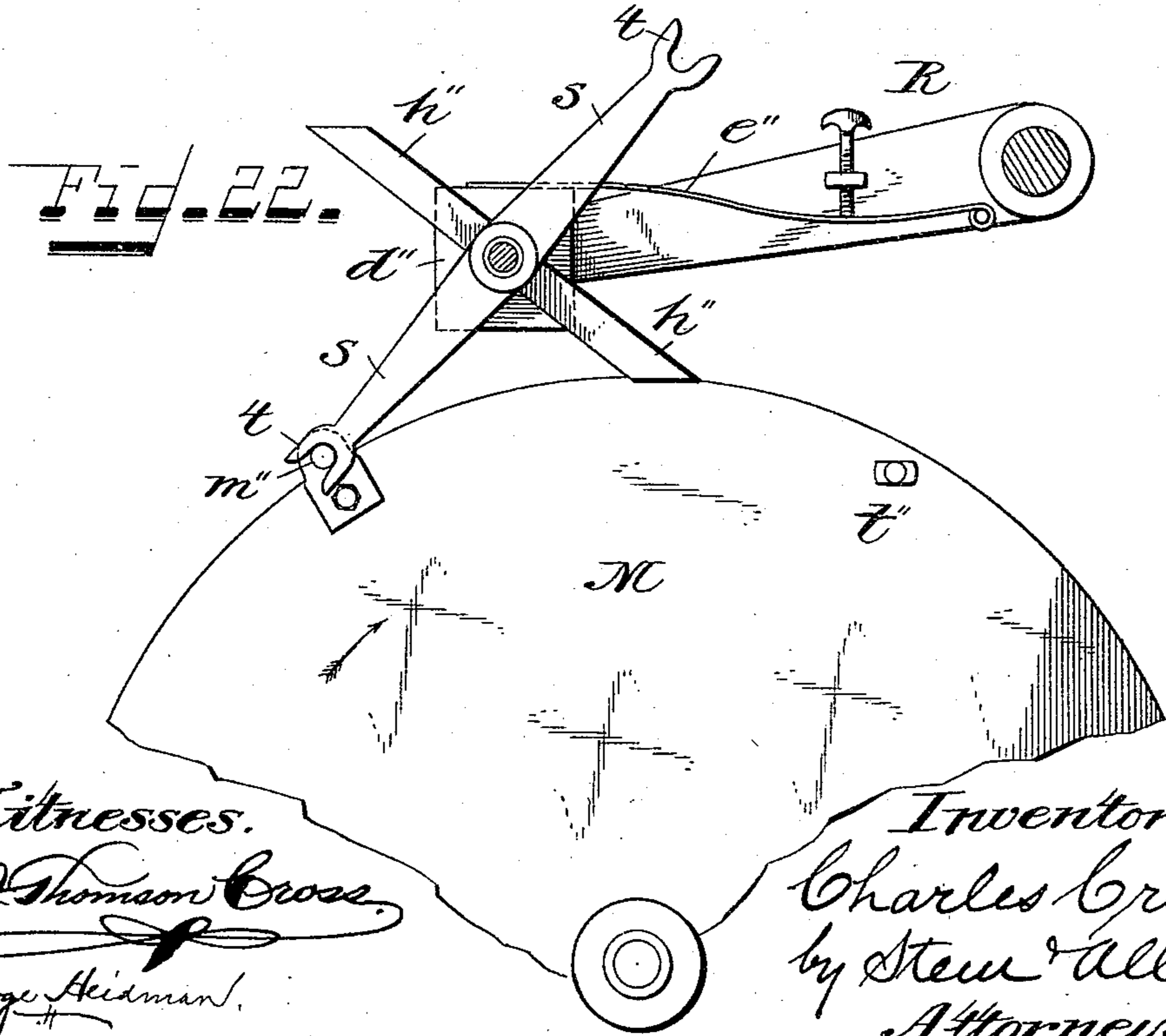
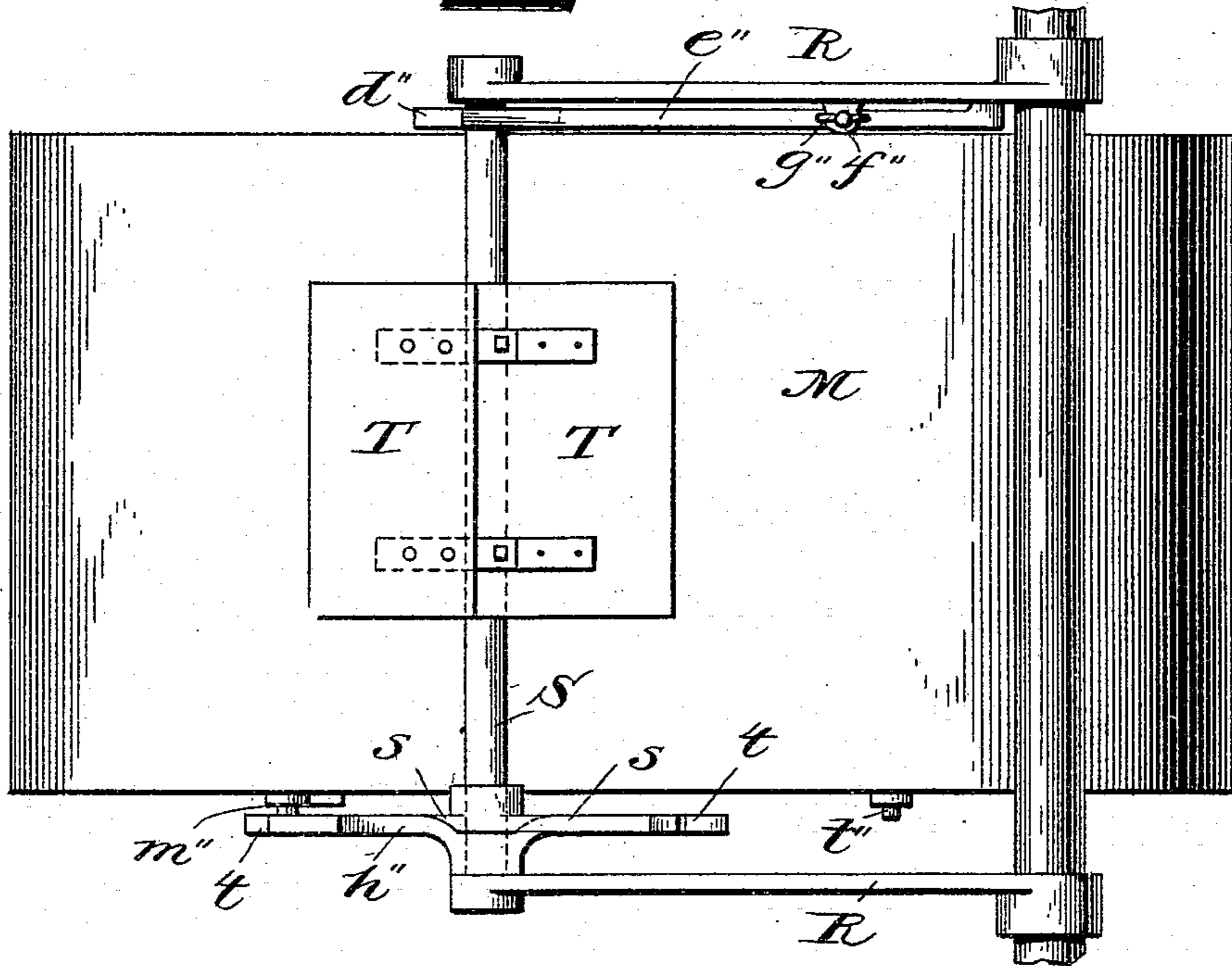
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Fig. 21.



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UNITED STATES PATENT OFFICE.

CHARLES CRIST, OF DAYTON, OHIO, ASSIGNOR TO THE CRIST MACHINE COMPANY, OF SAME PLACE.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,571, dated July 30, 1895.

Application filed August 18, 1893. Serial No. 483,435. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CRIST, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My improvements relate to machines for makingsatchel-bottom or square-bottom bags, and they consist of certain novel and useful combinations of parts to be hereinafter more particularly pointed out and claimed.

The various operations necessary in the formation of square-bottom paper bags are substantially as follows: The paper is delivered to the machine from a roll and formed into an endless paper tube, which is then delivered to the machine proper. The necessary slits to form the bottom of the bag are then cut and the first crease therefor is made. These creases that are first cut do not entirely sever the paper tube, and until the final operation is performed the bags in process of manufacture form a continuous connected series. After the first slits and creases are formed it is necessary to open out what is to be the bottom of the bag and to fold back the upper end of the paper tube.

Heretofore the portion to be opened out and folded back has been picked up by pins on the first creasing-roller, and to flatten out this portion the blank is then passed between pressure-rollers. It often happens that the pins on the creaser-roller fail to pick up the fold properly, and the blank in passing between the pressure-rollers is not folded at the right point.

One part of my improvements relates to means for insuring the proper fold in the blank, and consists of what I have called a "former"—a flat sheet of metal arranged to enter the blank and to positively fold back the proper portion thereof. After passing the pressure-roll, paste is then applied to the blank at proper points. The blank is then creased to form the two folds for the bottom of the bag. Two folding-arms at proper intervals then turn under the folds, leaving the

broadest fold on the outside. The finished bag is then cut off from the endless tube, passed between a final pressure-roller, and the pasted parts firmly pressed together. Ordinarily after this operation the bags are placed in driers and the pasted portions properly dried.

In my machine the bags are formed around a central cylinder and another element of novelty consists in forming this cylinder so that it may be filled with steam and the cylinder itself will become a drier for the bags.

There are various other novel features in my machine, which will be hereinafter more particularly pointed out, and set forth in the claims.

In the drawings, Figure 1 is a side elevation of the main portion of the machine. Fig. 2 is a side elevation of the supply-roll of paper and the tube-forming mechanism. Fig. 3 is a top plan view of the machine, as shown in Fig. 1; Fig. 4, a top plan view of the portion of the machine shown in Fig. 2; Fig. 5, a side view of the main cylinder, showing the positions of the various creasing, cutting, and paste rollers. Fig. 6 is a rear side view of the main cylinder, showing the folders for the bag-bottom. Figs. 7, 8, 9, and 10 are diagrammatic views showing the paper blank and former in their various positions during the passage of the blank. Figs. 11, 12, and 13 are diagrammatic views of the paper blank, illustrating the manner in which the bottom of the bag is formed. Fig. 14 is a top plan view of the knife which cuts the lip in the blank. Fig. 15 is a front view of same. Fig. 16 is a front view of the first cutting and creasing roller. Fig. 17 is a side view of same. Fig. 18 is a top plan view of the creasing-roller, which forms the first bottom-fold. Fig. 19 is a top plan view of the creasing-roller and cutter, which forms the second bottom-fold and cuts the bag from the blank. Fig. 20 is a front view, partly in section, of the main cylinder, as shown in Fig. 6. Fig. 21 is a top plan view of the former-plate and its operating mechanism. Fig. 22 is a side view of same.

The machine is supported in suitable framework A A. The paper *a*, from which the blanks are cut, is supplied to the machine

from the roll journaled on the standards B. Journaled in suitable standards in one end of the framework are the rollers *b c* and a narrow paste roller or wheel *d*, which dips within a paste box C. The paper is passed around these rolls *b c*, where one edge is covered with paste by the wheel *d*, and underneath the curved plate D onto the table E. Underneath the table E, journaled in the framework is a shaft G, which has mounted on it the hub H, carrying a curved serrated cutting-knife *e*. This shaft is driven by the sprocket-wheel I mounted thereon in connection with the driving mechanism of the machine. The purpose of this cutter *e* is to cut the lip *f*, Fig. 11, at proper distances in the tube blank, the shaft G being rotated at such a rate of speed that for each bag-length one of these lips will be cut. An opening *e''* is formed in the table through which the lip-cutter *e* works, acting against the rubber roller F'. The two arms or fingers for turning over the edges of the paper web to form the tube-blank I have not shown, as there is nothing novel in this portion of the machine and the above description will probably be sufficient.

The tube blank when formed passes along the table E, over the roller K, down around the roller L, and up onto the main cylinder M, these rollers L and K being journaled from side to side in the framework. The bags cut and formed from this endless tube blank are all formed around the main cylinder M, the different operations being performed at different portions of this cylinder and the size of the cylinder being such that three paper bags are in process of manufacture at the same time. This cylinder is hollow, as shown in Fig. 20, and steam is introduced through its journals, which are also hollow, so that the cylinder is at all times kept at such a temperature that the bags may be properly dried thereon in the process of manufacture. This cylinder M is driven by suitable pulleys, mounted on the cylinder-shaft in any of the well-known ways. Mounted on the cylinder-shaft is a large gear-wheel N, which turns with the cylinder and drives the various creasing and cutting-rollers. After the paper blank is fed around the roller L it passes up on the cylinder M under the roller P, Figs. 5, 16, and 17, this roller being driven by the gearing *g*, which meshes with the gear N. Secured on the face of this roller P are cutting-knives *h i* and the creasing-bar *k*, grooves *l m* being formed on the face of the main cylinder to receive the knives and creaser. The slits cut by this first set of knives are shown in Fig. 11, 1 2 3 4 being the slits and 5 6 the crease. The paper blank still being held to the cylinder by the portion of the blank ahead of it, the crease tends to throw open the cut part of the blank.

Mounted on arms R R, pivoted to the frame at *p*, is a shaft or rod S, secured to which and extending out in opposite directions are the plates T T, of just sufficient breadth to

enter the paper blank between the slits cut by the knives *i i*. On one end of this shaft S is a double forked arm *s*, having the forks *t t* at each end thereof. On the other end of this shaft a square plate *d''* is secured, upon which square plate a spring *e''* bears to keep the shaft *s* and the former-plate in a fixed-position while at rest. This spring *e''* is secured to the arm R, and a set-screw *g''*, passing through the lug *f''* on the arm R, bears against this spring, so that its tension can be regulated. On the same end of the shaft S as the forked arm *s*, is secured a double-arm *h''*, substantially at right angles to the arm *s* and preferably beveled at the ends.

Upon the main cylinder M pins *m''* are secured just beyond the periphery of the cylinder. As my machine is arranged to make three bags at a time three of these pins are used, arranged at equal distances apart. Intermediate these three pins *m''* are three other pins *l''* secured to the side of the main cylinder. The parts are so arranged that the downwardly-extending plate T enters the opening in the paper blank and at the same moment the pin *m''* engages with the fork *t*. The revolution of the cylinder M raises the former, the arms R rocking on their journal-bearing, and the former is raised and turned into the successive positions indicated in Figs. 7, 8, 9, and 10.

The parts are so proportioned and arranged that the former will begin to rise at the moment the edge of the plate T reaches the crease 5 6 in the paper blank, and the action will be to open out and fold back the portion of the blank that has been cut by the knives *h i*. When the former reaches the position shown in Fig. 10 the arm *h''* will then be pointing downward, and its beveled end will be engaged by the pin *t''*, and the other end of the former will at once be brought down into the position shown in Fig. 7, where it is ready to enter the next bag.

The opening out of the cut portion of the blank and folding back of same draws the paper into the shape shown in diagram in Fig. 12, in which the cut lines are marked with figures to correspond with the figures in Fig. 11.

The square portion of the blank marked by the lines 3 3 in Fig. 12 it will be understood have not yet been cut, and the blank is still attached to the blank ahead of it on this line 3 3.

U is a pressure-roller journaled in the framework, and between this roller and the main cylinder the blank is passed and the folded back portion pressed out, as shown in Fig. 12.

The next operation is to apply the paste to the paper portions of the bottom of the blank. This is done by the paste-wheel V, mounted on shaft *w*, upon which the gear-wheel *y* is secured, which meshes with the large gear N and is driven thereby. This paste-wheel V is segmental in side elevation, as shown in Fig. 5, and is of the shape shown in Fig. 3, so

that the paste will be applied across the lip along the lines indicated by numbers 2 2 in Fig. 12 and across the bottom of the bag as far as the outer rectangular flap of the bottom. This paste-wheel gets its paste from the paste-box W, within which the geared roller Y dips, while Z is an intermediate roller, so that the paste may be properly distributed on the paste-roller V.

10 $y' y'$ are set-screws, by means of which the roller Y is adjusted in the paste-box, as will be readily understood. The shaft w is also provided with pulleys $a'' a''$, over which belts are run, as hereinafter described.

15 The next operation is to crease one of the bottom folds. This is done by the creaser A'. (Shown in Fig. 18.) This creaser is made up of the two pulleys $a' a'$ and the creasing-knife b' mounted on the shaft c' , upon which the gear-wheel d' is secured, which meshes with and is driven by the large gear N, the parts being so arranged that the creasing-knife b' will take within the groove l'' in the main cylinder M, and the crease formed in the blank is indicated by the dotted lines shown in Fig. 12, (marked 7 7.)

The next operation consists in cutting the blank from the bag ahead of it in forming the crease for the inner fold of the bottom and in folding both folds down into the position shown in the diagram, Fig. 13, where the paste that has been applied by the paste-wheel V will secure the parts together. The creasing and severing of the blank from the bag ahead of it is done by the creaser and cutter B'. (Shown in Fig. 19.) This creaser and cutter is made up of the pulleys $e' e'$, the creaser f' , and cutting-knife g' , all mounted on the shaft h' , upon which the gear-wheel k' is secured, meshing with the large gear N. The blank is severed by the cutter g' along the line 3 3 in Fig. 12, and the creasing-knife f' forms the crease shown by the dotted lines 8 8 in Fig. 12. The creases 7 7 and 8 8 cause the bottom folds or flaps to rise up slightly away from the face of the blank, and they are then folded down by the folders. The folder for the undermost flap consists of a roller C' extending over the cylinder M secured to an arm D', which is mounted on the main cylinder-shaft E'. This arm D' is connected with the shaft F' of the first creaser P by the connecting-link l' . Mounted on the creaser-shaft F' is a cam G', which engages with a small roller m' on the connecting-link l' , the connecting-link l' being slotted, as shown, so as to straddle the shaft F'.

The roller m' bears continuously against the face of the cam G', and the cam is of such a shape that the roller-folder is moved forward in the direction of the arrow 12 for a certain distance, then back to a certain point at the same rate of speed as the cylinder M is revolving, so that the roller moves with the cylinder. Then the movement of the roller-folder is stopped altogether to allow the bag-blank carried on the main cylinder to pass

under it, and then the roller-folder is returned to its normal position to begin its work on the next blank. The weight of the roller is ordinarily sufficient to keep the roller m' at all times in contact with the cam, but if desired a coiled spring can be attached to the arm D' and connected with the framework to insure this contact.

75 H' is another arm mounted on the shaft E', and carrying the folding-rod K', which folding-arm folds down the uppermost flap or the one with the lip. This arm H' is connected with the shaft c' of the creaser A' by the connecting-link n' . Upon this creaser-shaft the cam M' is mounted, which cam engages with the small roller e' on the connecting-link n' , the connecting-link n' being slotted to straddle the shaft c' , as in the other folder. The cam M' is of such a shape that with each revolution of the creaser-shaft c' the folding-arm K' is given a rapid forward movement. It is then held in that position for about a quarter of a revolution of the creaser and is then returned to its normal position. The results of these irregular movements given by the cams to the folders are that immediately after the bag has been severed from the blank the roller-folder C turns over and folds down the undermost or straight flap. This folder then moves with the cylinder, while the arm-folder K' advances rapidly and folds down the uppermost or lip flap. This arm-folder then retreats, the roller-folder stops altogether, and the bag carried by the main cylinder passes under the roller, when the folded parts are pressed together. The bag is then fed under the final pressure-roller N', which bears against the main cylinder, and the pasted parts are firmly secured together and the bag is delivered complete from the machine.

In order to keep the bag-blanks at all times pressed firmly against the main cylinder each of the shafts $w c' h'$ is provided with a pair of pulleys $a'' a''$, $a' a'$, and $e' e'$, around which pulleys a pair of endless belts A'' are run, the belts also being carried over similar pulleys on the final pressure-roller N'. In this way the belts are continuously pressing against the main cylinder and the bag-blanks are at all times held and fed along with the cylinder thereby.

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

1. In a paper bag machine the combination with the main rotary cylinder around which the bag is formed, of a rotating and oscillating former plate arranged to enter the cut lip portion of the blank, with cooperating mechanism in connection with said cylinder and said plate to rotate and oscillate same to open out the blank at the proper fold, substantially as shown and described.

2. In a paper bag machine, the combination, with the main rotary cylinder, of a shaft journaled in an oscillating frame, former plates secured to said shaft, and extending out in

opposite directions, forked arms therefor, and pins on the main cylinder to engage within said forks and thus to rotate and oscillate said former substantially as shown and described.

3. In a paper bag machine, the combination, with the main rotary cylinder, of a shaft journaled in an oscillating frame, former plates secured to said shaft, and extending out in opposite directions, two pairs of arms therefor, nearly at right angles to each other with pins on the main cylinder to engage with said arms alternately whereby the former may be rotated oscillated and returned to its original position substantially as shown and described.

4. In a paper bag machine, the combination, with cutting, creasing, and folding mechanism therefor, of a hollow main cylinder around which the bags are formed with hollow trunnions therefor within which steam may be introduced into the cylinder substantially as shown and described.

5. In a paper bag machine the combination with the main rotary cylinder, of a roller folder for the inner and an arm folder for the outer flap of the bag bottom, and means for operating said folders in opposite directions upon said main cylinder in conjunction with each other, whereby the roller folder may turn

down the inner flap and the arm folder the outer flap and the folded bag blank be thereupon carried by the cylinder under the roller folder, substantially as shown and described.

6. In a paper bag machine the combination with the main rotary cylinder, of a roller folder for the inner and an arm folder for the outer flap of the bag bottom, and cams for operating said folders in opposite directions upon said main cylinder whereby the roller folder may turn down the inner flap and the arm folder the outer flap and the folded bag blank be thereupon carried by the cylinder under the roller folder, substantially as shown and described.

7. In a paper bag machine the combination with the main rotary cylinder and creasers for the bottom folds, of a roller folder for the inner and an arm folder for the outer flap of the bag bottom, cams on the creaser shafts in connection with said folders whereby the rotation of the shafts will operate said folders in opposite directions upon said main cylinder to fold down the bottom flaps, substantially as shown and described.

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Witnesses:

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