

No. 618,793.

Patented Jan. 31, 1899.

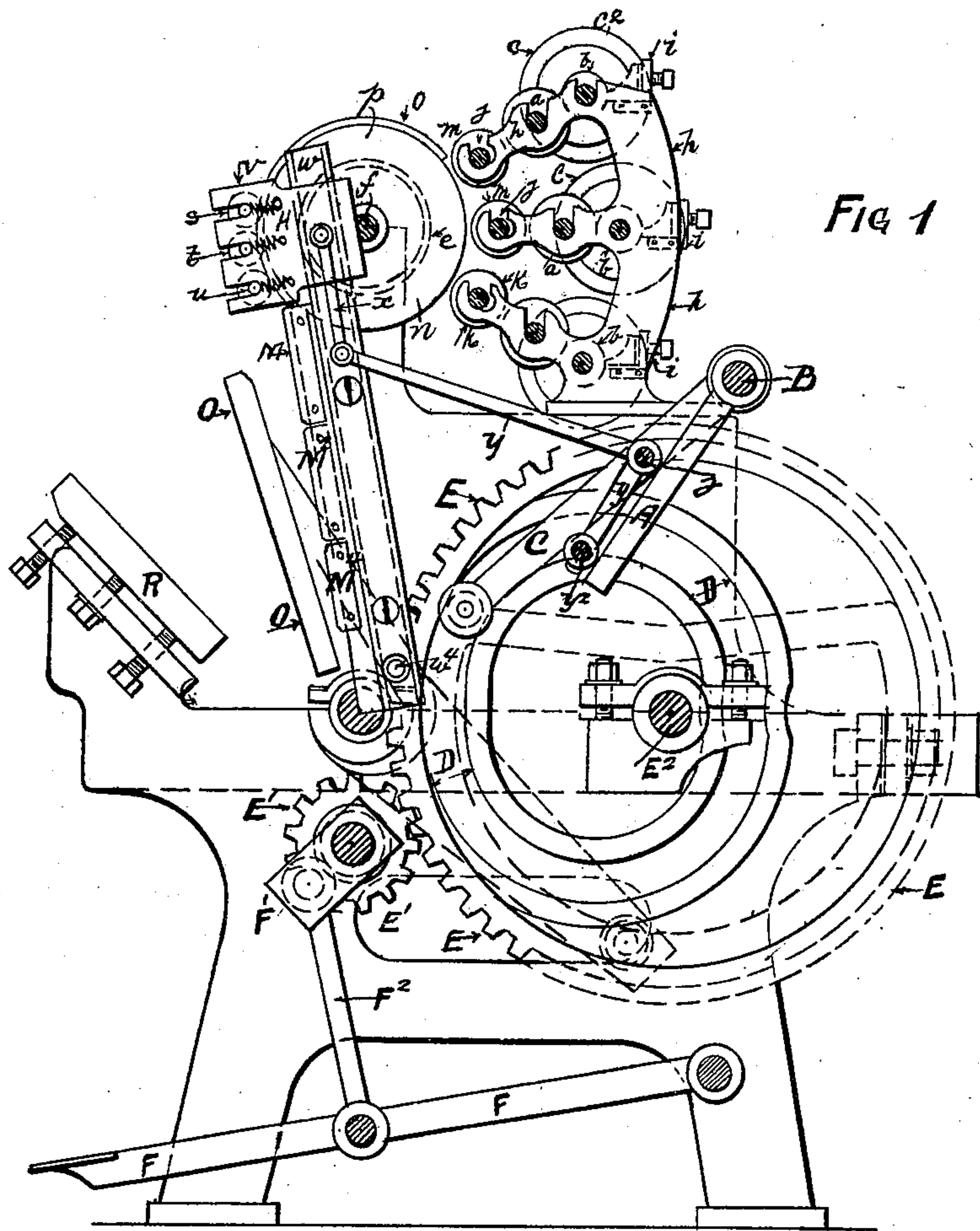
J. A. GLEDHILL & J. C. WHITNEY.

PRINTING MACHINE.

(Application filed Dec. 24, 1896.)

(No Model.)

8 Sheets—Sheet 1.



Witnesses

James William Fielden
George William Jackson

Inventors.

John Adam Gledhill,
Joshua Charles Whitney

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8 Sheets—Sheet 2.

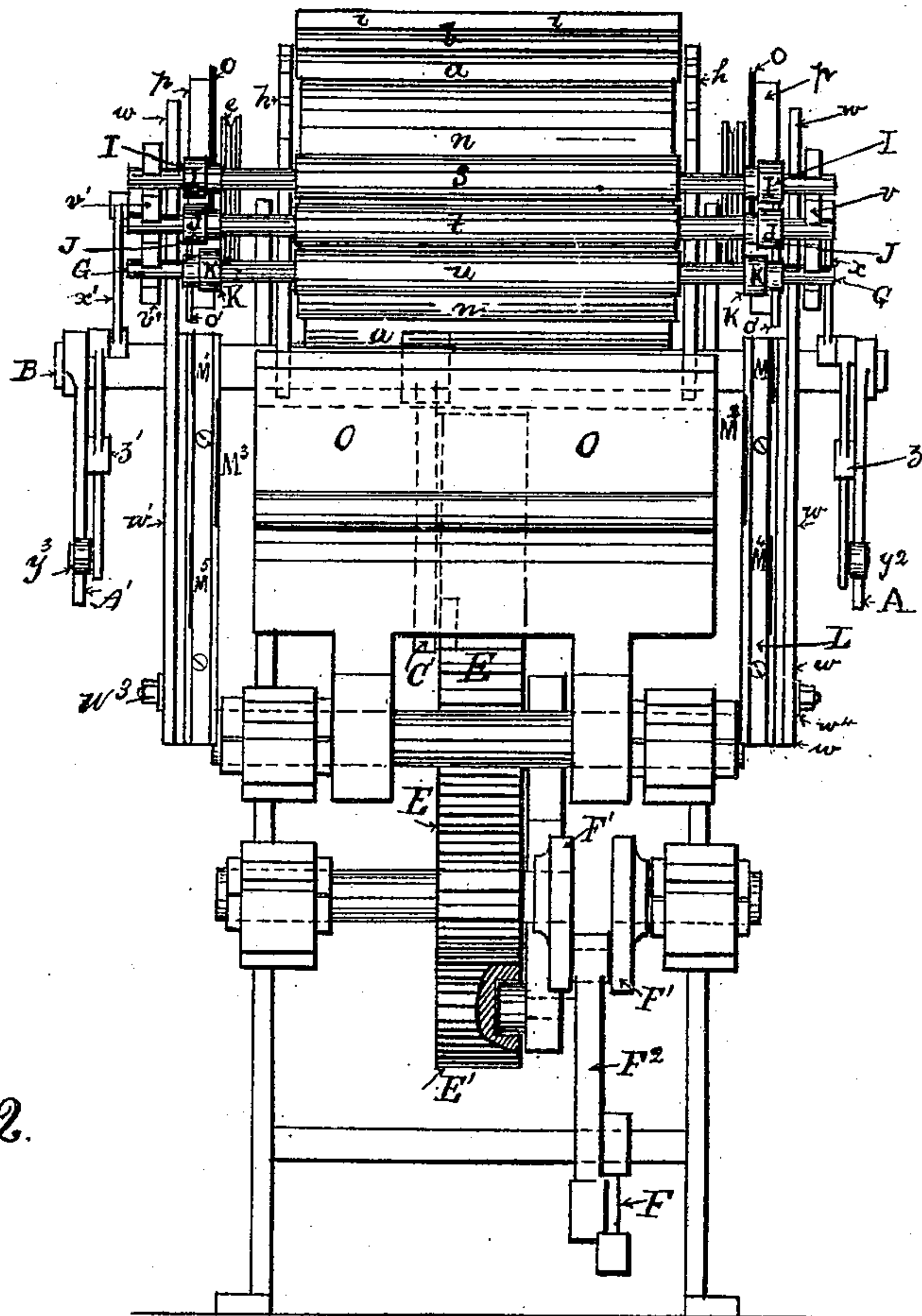


Fig. 2.

Witnesses.

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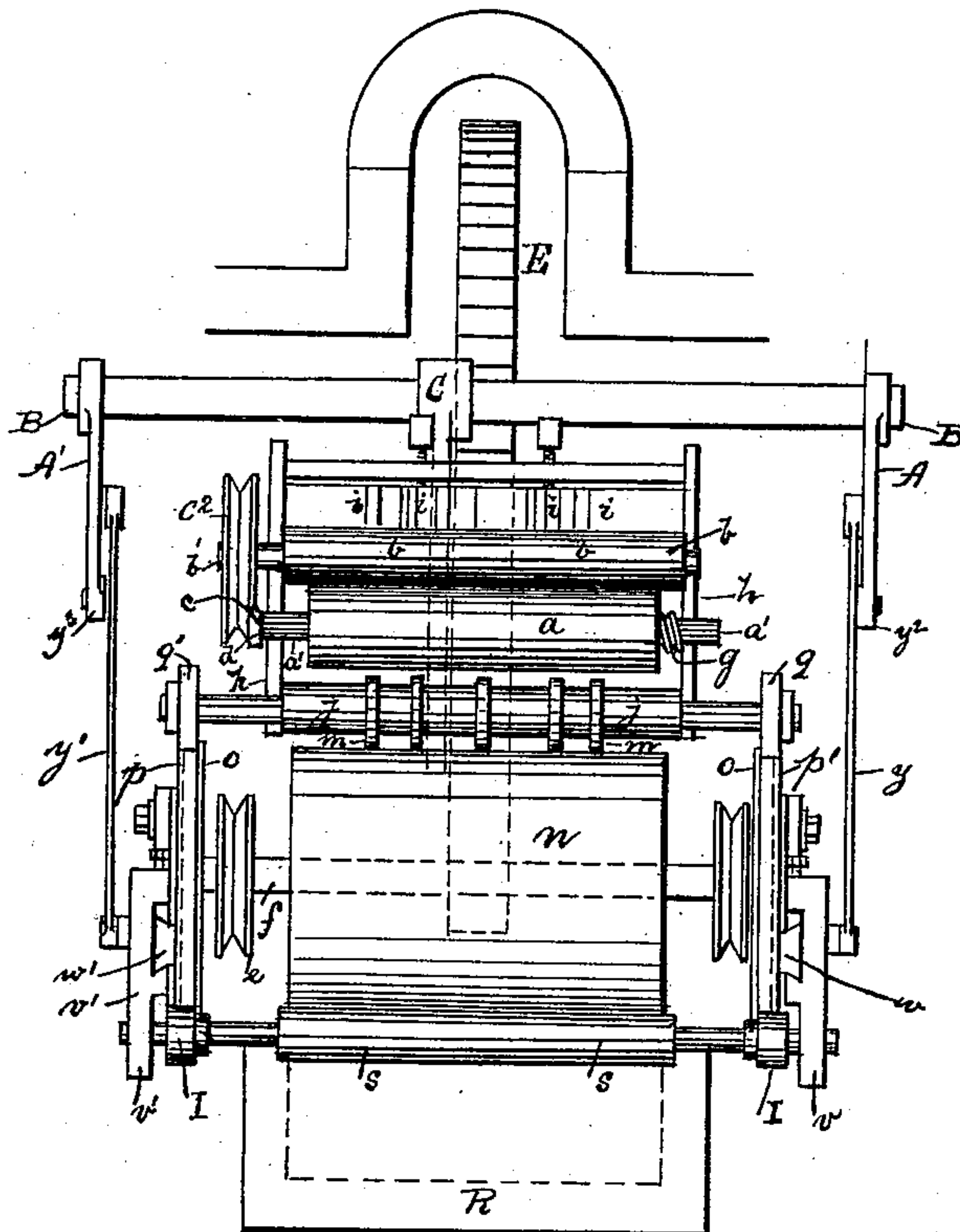
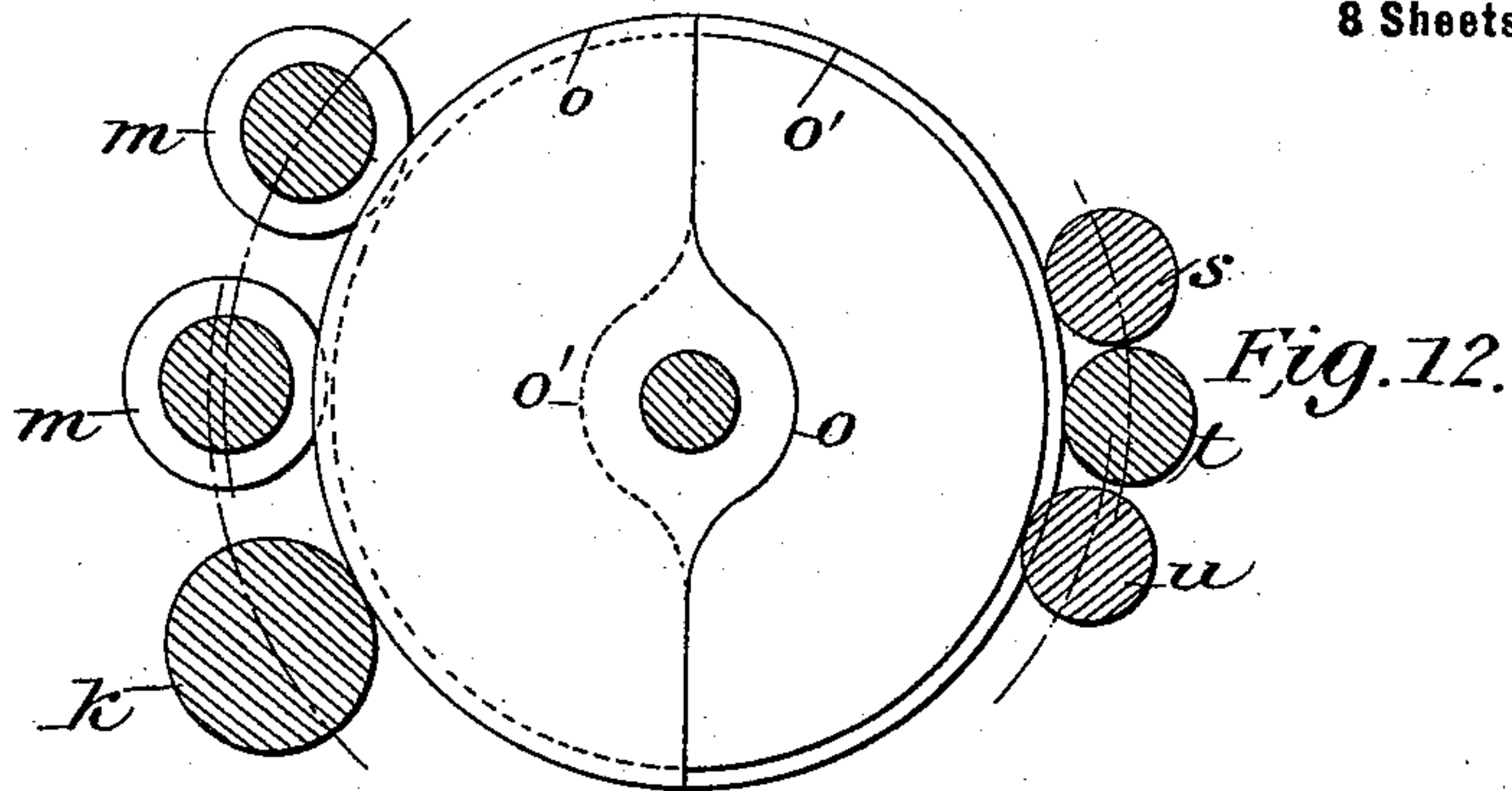
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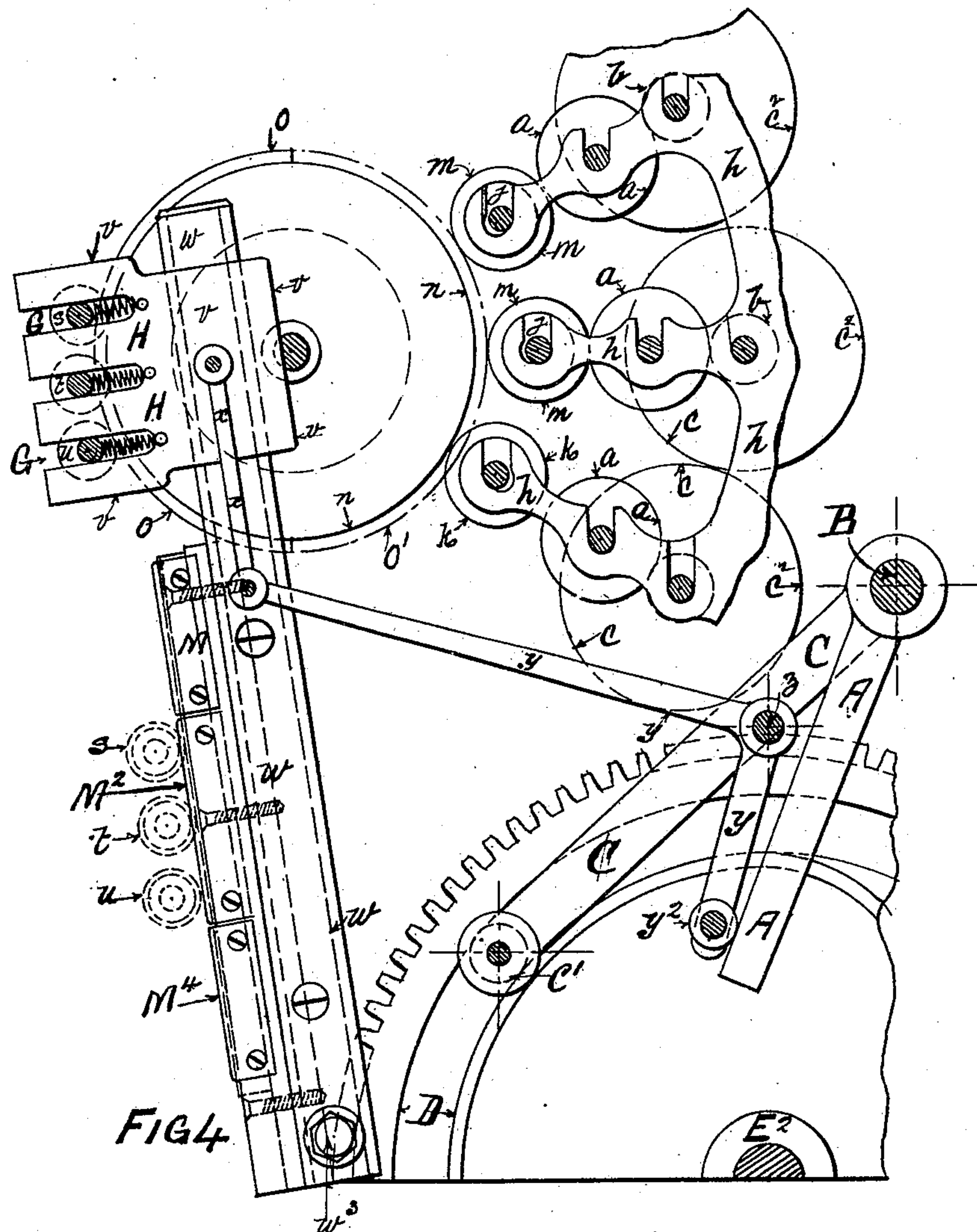
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8 Sheets—Sheet 4.



Witnesses.

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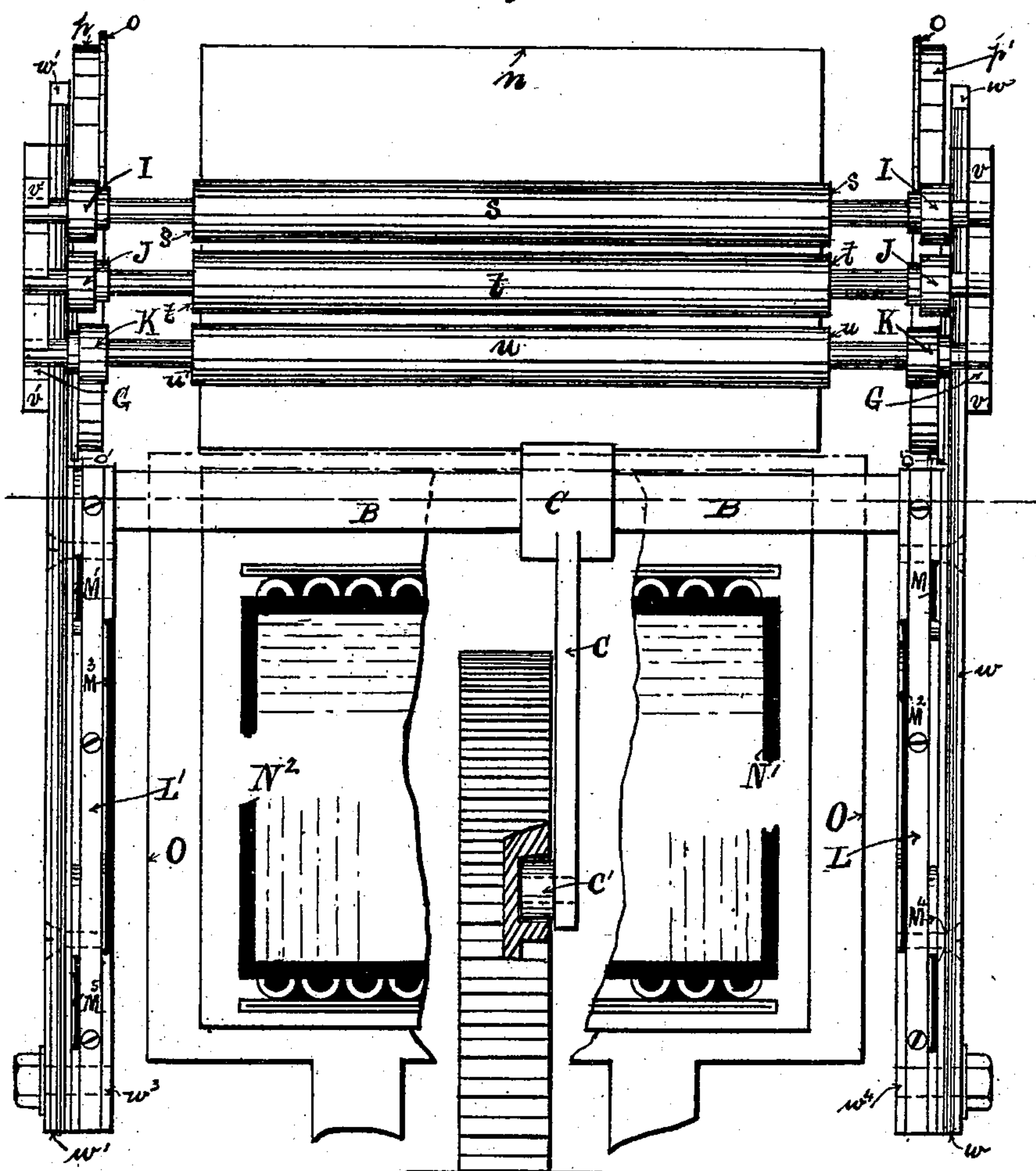
PRINTING MACHINE.

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(No Model.)

8 Sheets—Sheet 5.

Fig 5.



Witnesses

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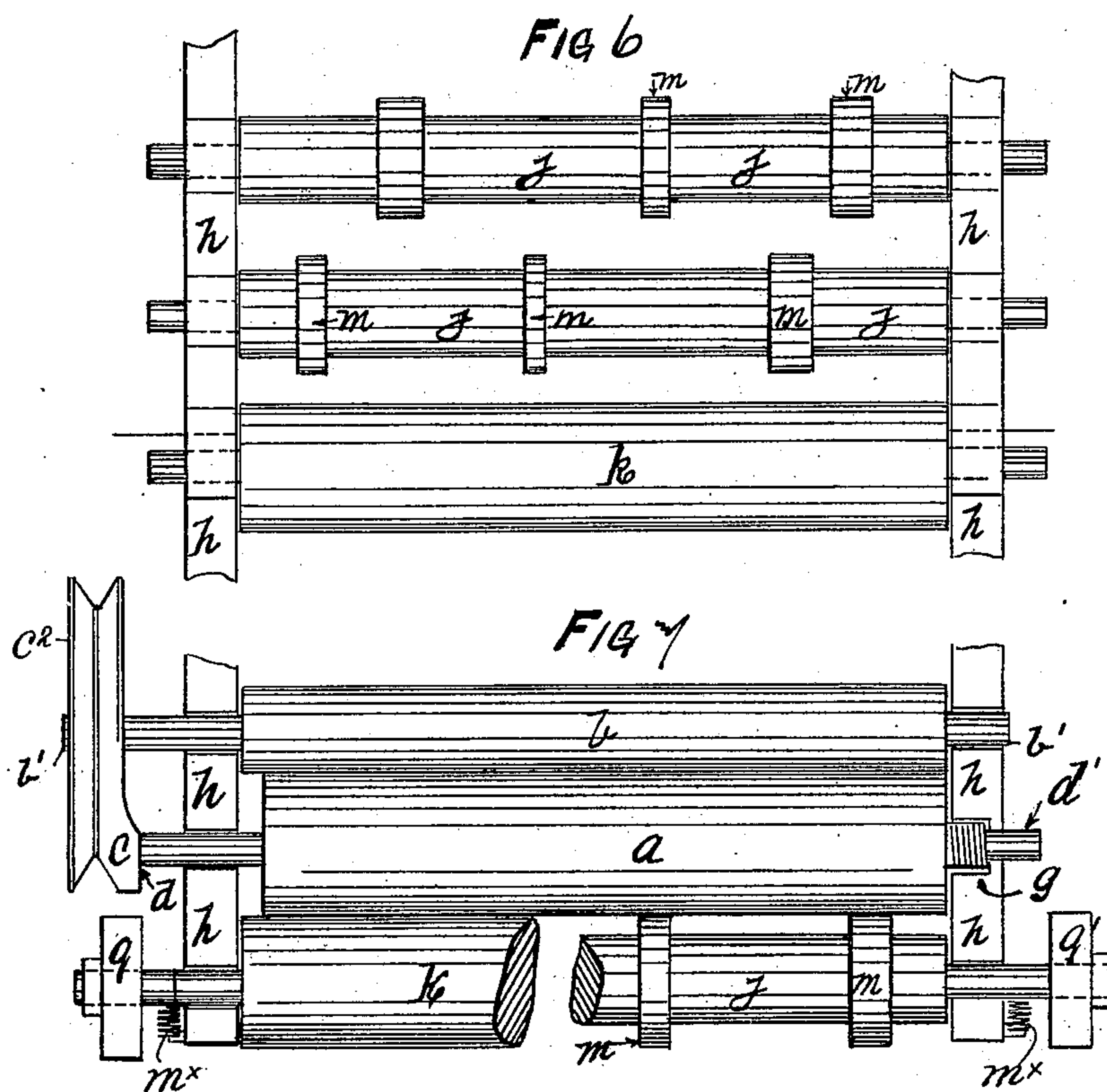
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8 Sheets—Sheet 6.



Witnesses.
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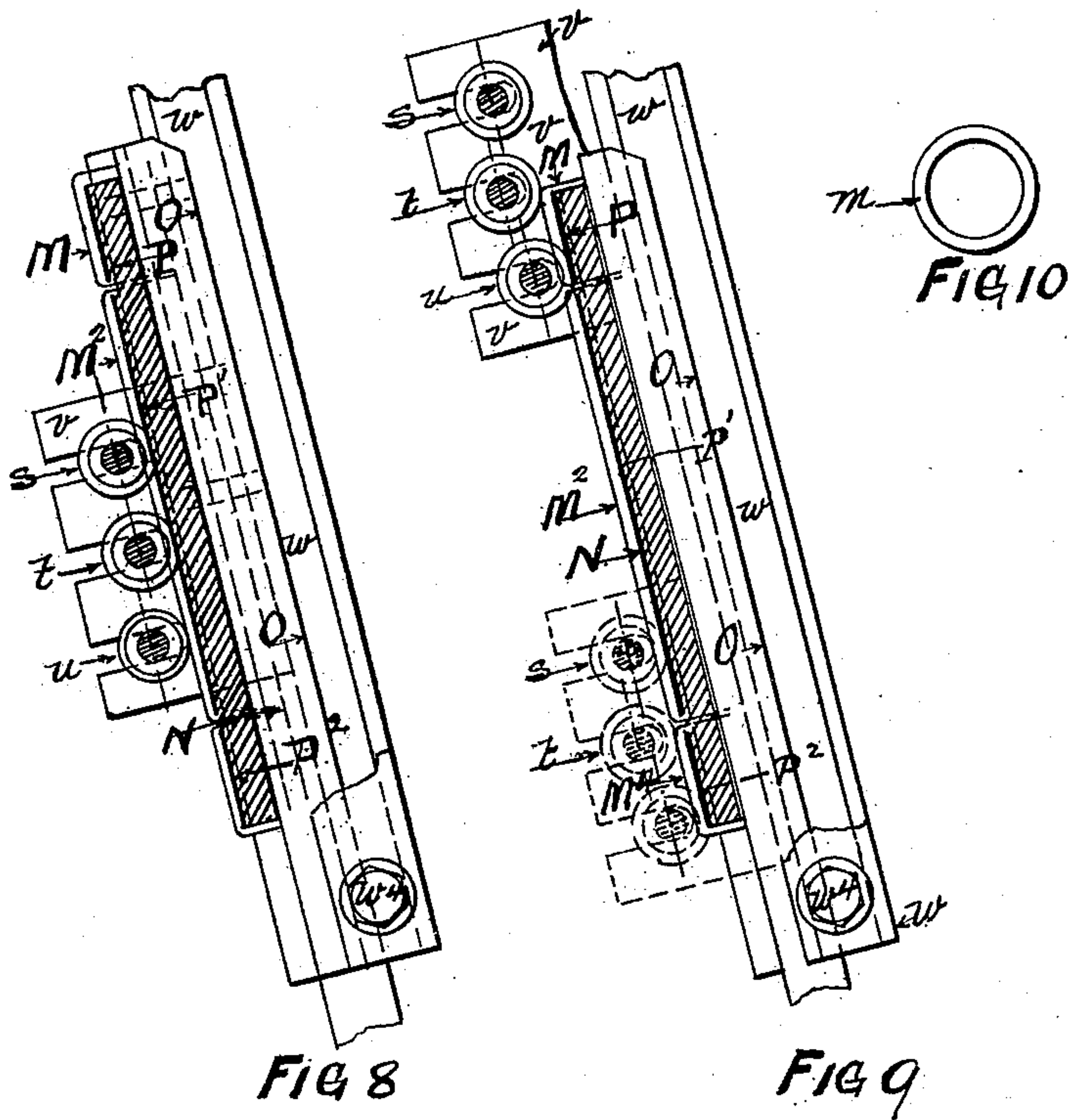
J. A. GLEDHILL & J. C. WHITNEY.

PRINTING MACHINE.

(Application filed Dec. 24, 1896.)

(No Model.)

8 Sheets—Sheet 7.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN ADAM GLEDHILL AND JOSHUA CHARLES WHITNEY, OF MANCHESTER, ENGLAND; SAID WHITNEY ASSIGNOR TO GEORGE CHARLES CHALLENGER, OF SAME PLACE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 618,793, dated January 31, 1899.

Application filed December 24, 1896. Serial No. 616,913. (No model.)

To all whom it may concern:

Be it known that we, JOHN ADAM GLEDHILL and JOSHUA CHARLES WHITNEY, subjects of the Queen of Great Britain, residing at Manchester, England, have invented certain new and useful Improvements in and Relating to Letter-Press-Printing Machines, (for which we have obtained Letters Patent in Great Britain, No. 19,711, dated September 7, 1896,) of which the following is a specification.

Our invention relates to letter-press-printing machines and is applicable to platen and other types of said printing-machines.

The object of our invention is to provide a printing-machine capable of printing letter-press at one operation or impression in any number of colors required in such work, thereby avoiding the cutting of the inking-rollers into various widths or sections. The work may or may not have borders surrounding the same; but when borders are employed in such work the same may be of either one or more solid colors and may be a separate and distinct color from any used in the body of the work or letter-press.

By our invention we accomplish an effective distribution of all the colors used in the machine, whereby we obtain a uniform density or depth of each individual color throughout the work.

By our invention also the work is effected by the use of one form only instead of employing a number of forms corresponding to the number of colors used.

Our invention consists of apparatus for supplying rings or bands of colors to be used in multicolor work around and lengthwise of the ink-distributing rollers and from the latter direct to the inking-cylinder and thence to transfer the whole of the various colors used or placed thereon onto the inking-rollers which roll the form, which may be either in stereotype or electrotpe, said colors being rolled on the letter-press at one operation. The invention thus insures perfect and uniform ink distribution to the type and the border at one operation and in their different colors.

For the purpose of clearly comprehending

our invention we have hereunto annexed several sheets of drawings illustrating the same, in which drawings like letters of reference indicate like parts in all the figures.

In the drawings, Figure 1 is an elevation of an ordinary platen-machine, showing our invention applied thereto. Fig. 2 is an end elevation of Fig. 1. Fig. 3 is a plan of Fig. 1. Fig. 4 is an elevation, drawn to an enlarged scale, showing our invention detached from the machine. Fig. 5 is a front elevation of Fig. 4. Fig. 6 is a front elevation showing the color-disk rollers with the disks mounted thereon and the border-roller. Fig. 7 is a plan view showing one fountain-roller, a distributing-roller, and one of the disk-rollers with the means for imparting longitudinal movement to the distributing-roller. Fig. 8 is a detail side elevation showing the position of the form-rollers when inking the type or block of letter-press. Fig. 9 is a similar view showing the position of the said rollers when inking the border-lines inclosing or surrounding the letter-press. Fig. 10 is an elevation showing a color ring or disk. Fig. 11 is an elevation showing the application of middle tappets when an intermediate color is desired to be used in a form. Fig. 12 is a sectional view showing the relative position of the form-rollers and the inking-cylinder when our invention is in operation.

Our invention can be applied to letter-press-printing machines now in general use.

In the said drawings the reference-letters *a a a* indicate ink-distributing rollers, their surfaces being in contact with fountain-rollers *b*, which carry the ink from the ink-fountains. The said distributing-rollers are so mounted and arranged as to be capable of a longitudinal movement, which is effected by a cam *c*, projecting from the flat face of a pulley *c*², one of which is carried by each shaft *b'*, (see Figs. 3 and 7,) said cam being adapted at a certain point in its revolution to engage at *d*, Fig. 3, with the end of the shaft *a'* of one of the distributing-rollers. Motion is imparted to the fountain-rollers *b* through the pulleys *c*² by means of a band from a pulley *e*, mounted on the shaft *f* of the inking-cylinder *n*. The end of said shaft *a'* is maintained

in constant contact with the cam *c* by a coil-spring *g*, interposed between the end of the roller *a* and a side *h* of the framework. By means of the sliding movement of the roller *a* the inks carried from the fountains *i* may be distributed between the surfaces of the distributing-roller *a* and fountain-roller *b* and so transferred to the disks and form-rollers now about to be described. We may employ any number of distributing-rollers with appendant parts, but the drawings herein illustrate the employment of three.

On the framework or standard *h* we mount rollers *j* in conjunction with the distributing-rollers *a*. Also when borders are to be formed to surround the letter-press we provide an inking-roller *k*, Figs. 1 and 4. On the rollers *j* we mount disks or rings *m*, made of any suitable pliable material, having a sufficiently adhesive nature, such as rubber or composition, so as to be frictionally adjustable on said rollers. These disks or rings we make of any required width for the purpose of inking lines, rules, or type. Said rollers *j* and *k* are capable of movement within their bearings to and from the ink-distributing rollers *a* and to and from the inking-cylinder *n*, which movements are controlled by suitable semicircular eccentric parts *o o'* upon rotating disks *p p'*, mounted on the shaft *f* of the ink-cylinder *n*. These pieces or parts we term "tappets," and they have any convenient length of contact-surfaces, being usually semicircular or thereabout. Two of these tappets *o o'* are placed upon each of the disks *p* and *p'*, the tappet *o* being mounted upon the inner face and the tappet *o'* upon the outer face of each disk, Figs. 2, 5, and 12. The edge of each tappet projects suitably beyond the periphery of the disk on which it is placed, one being on one side of the axis or shaft and the other upon the diametrically opposite side of said axis. They are secured to the flat faces of the disks *p* and *p'* by any suitable means—as, for example, by screws. They may, evidently, be adjusted relatively to each other in such manner as to allow the application to the inking-cylinder *n* of separate strips of color extending over each half of the surface of said inking-cylinder or over any less extent, according to the relative adjustment of said tappets for coöperation with the disk-rollers *j* and ink-roller *k*, respectively, which is effected by pulleys or runners *q q'*, Fig. 3, mounted on the disk-roller shafts and the ink-roller shaft, respectively. The said runners *q q'* are so arranged with relation to the tappet-disks *p p'* that they effect the movement of the disk-rollers *j* from the distributing-rollers *a* to the ink-cylinder *n* at the moment when the ink-roller *k* is in the act of moving from the ink-cylinder *n* toward the distributing-roller *a*. In other words, while the disks *m* on the rollers *j* are transferring to the cylinder *n* their colored inks which they have received from the distributing-rollers *a* the ink-roller *k* is collecting its

ink from the distributing-roller *a* in order to suitably operate in conjunction with the form-inking rollers *s*, *t*, and *u*, which are also actuated by the tappet-disks *p* and *p'*. The rollers *j k* are normally held in contact with the ink-cylinder *n* by springs *m^x*. (Shown in Fig. 7.) The said inking-rollers *s t u* are supported by carriers *v v'*, capable of sliding along V-shaped slides *w w'*, which are attached at convenient parts of the sides of the frame, as at *w³ w⁴*, Figs. 1, 8, and 9. The movements of the carriers *v v'* are effected by connecting-bars *x x'* and elbow-levers *y y'*, to the end of which said bars *x x'* are connected. The levers *y y'* are supported at *z z'* and are provided at the ends of their short arms with bowls *y² y³*, which rest against the levers *A A'*, mounted on the shaft *B*. Said shaft is caused to oscillate about its axis by means of an arm *C*, rigidly mounted on the shaft *B* and provided with a friction-roll *C'*, which is mounted upon a pin projecting from the end of the lever *C* into a cam-race *D* in the face of a gear *E*, which latter is driven by the driving gear-wheel *E'*. The shaft of the latter has a crank *F'*, connected to a foot-lever *F* by a bar *F²*. This arrangement of driving mechanism is well known in the ordinary platen-machines. The cam-race *D* is eccentric to the shaft *E²* of the gear *E*, and as the latter revolves the lever *C* imparts an oscillating or to-and-fro movement to the levers *A A'*, and thereby rocks the arms of the levers *y y'*. The long arms of said levers will therefore have an up-and-down movement and cause the carriers *v v'* to slide up and down the surfaces of the slides *w* and *w'*.

The inking-rollers *s*, *t*, and *u* are held in position within the slots or openings *G* by means of spiral springs *H*, the peripheries of which rollers are thus maintained in close contact with the surface of the inking-cylinder *n*. The function of these rollers is to take inks from the ink-cylinder and transfer the same to the block of letter-press hereinafter described. On the shaft of each of the inking-rollers *s t u* is mounted a pair of disks, (denoted by the letters *I*, *J*, and *K*.) These disks have extensions of less diameters, as shown in the drawings, those on the rollers *s* and *t* being upon the inner faces of the disks, while those on the shaft *u* are upon the outer faces. The said disks thus lie in the plane of rotation of the peripheries of the tappets *o* or *o'*, according to the arrangement of the extensions of the disks *I J K* inside or outside of the said disks. When the said disks *I J K* are brought into line with the tappets *o* or *o'* on the shaft of the inking-cylinder *n*, the roll *s*, *t*, or *u* is caused to move out of contact with the inking-cylinder *n* and somewhat away from the latter. When the small extensions of said disks are in line with the tappets *o* or *o'*, no effect will be produced upon the rollers and they will remain in contact with said cylinder *n*.

When the carriers vv' , with the inking-rollers stu , are caused to descend the slides ww' , the disks I J K upon the shafts of said rolls will pass upon rails L L' upon the inner faces of the slides ww' . To the rails L L' are attached adjustable projecting parts M M' M² M³ M⁴ M⁵, Figs. 2, 4, and 5, which form tappets, over which the disks I J K in their downward travel are caused to pass. If the larger diameter of the disks passes over and upon said tappets M', M², M³, and M⁴, each inking-roller upon the same shaft with said disks is moved from the letter-press, type, or block N on the press-bed O. In the drawings illustrating the platen-machine the function of the rollers s and t is to ink the type or letter-press, the function of the lower roller u being to ink the border-lines only. As an illustration, we will explain the action of roller u , as shown in Fig. 2, the action of the rollers s and t being similar.

The smaller diameters of the disks K on the shaft of the roller u pass on to the tappets M M', the roller then being in contact with the border P of the form represented in black. (See Fig. 9.) The larger diameters of said disks will then pass on to the tappets M² M³, and the roller u is thus removed from the surface P' of the form. The rollers s and t , which simultaneously operate upon the letter-press P', (see Fig. 8,) having passed from off the said tappets, the larger diameters of said disks K then pass on to the faces of the blocks, and the smaller diameters passing over the tappets M⁴ M⁵ the roller u again makes contact with the bottom border-line P², as shown in Fig. 9 in dotted lines, and the inking of the bottom border-line is thus accomplished. After completing this operation the carriers, with the rollers, are caused to move up the slides ww' , this being a repetition of the operations explained, but in the opposite direction; and thence pass back to the ink-cylinder n for the purpose of taking the various colored inks therefrom, ready for the next operation of inking the form N, during which period of taking the inks from the cylinder the impression is made in the usual manner on the paper provided.

Any number of parts or tappets may be provided on the rails L L' and of any length, according to the space occupied on the form by the border-strips and the letter-press, respectively, such variations being obvious in order to meet different requirements.

The operation of this invention is as follows: Each compartment or color-receptacle of the divided ink-fount is situated opposite to a ring or disk m , and as the fountain-rollers b revolve the different colored inks are led on to the distributing-rollers a , and by the longitudinal movement thereof the said inks are suitably distributed. The disks m are by the action of the circular tappets oo' passed into contact or engagement with the distributing-rollers to collect the lines, strips, bands, or sections of the various colored inks

therefrom for the purpose of inking the type. The ink-roller k is represented in the act of transferring a single colored ink to the cylinder n , which ink is for the purpose of inking the top and bottom of the border.

Fig. 4 also represents the type-inking rollers s and t in their normal position in contact with the inking-cylinder n to collect the strips or sections of colored inks previously transferred thereto by the rings or disks m . At the same time the border-roller u is removed by tappets oo' out of contact with the face of the inking-cylinder n . Thus, according to our arrangement of tappets, we have more or less extent of surface of the parts oo' around the circumferences of the disks p and p' , which are of the same diameter as the inking-cylinder n . Consequently the disk-rollers j and the ink-roller k are caused to make more or less alternate contact with the inking-cylinder n . For example, if two semicircular tappets are employed equal parts of the surface of the periphery of the inking-cylinder n or one-half thereof will be covered by strips of color and the other half will be covered with a single colored ink, such portions being taken off the cylinder n by the appointed inking-rollers stu , as described.

It is obvious that according to our arrangement of rings or disks m , in combination with the distributing-rollers and divided compartments or ink-fountains, we are enabled to employ any desired number of colored inks sufficient to satisfy all practical requirements. For example, we may by the employment of three ink-fountains divided into four compartments each use twelve different colors. The colors having been collected from the inking-cylinder n , the form-inking rollers stu then pass down to the type, and the top and bottom sides of the type or border are inked by color transferred by two rings or disks nearest to the ends of the roller upon which they are mounted. Each disk is arranged opposite one of the two sides or border-lines on the form which are awaiting the ink, and the inking-rollers being operated by the properly-adjusted tappets in the manner described the colors are transferred to the type and the borders are inked. The impression is then made in many colors at one operation by means of the platen R, and our invention is thus a multicolor printing-machine, which is capable of printing a border of one uniform or solid color distinct from any color or colors used in the letter-press or body of the work, and by the arrangement of means herein described for purpose of equal ink distribution we claim to accomplish solidity, uniformity, and density or depth of color for printing purposes.

Another modification of the application of our invention consists in the application of tappets in such a manner as to constitute middle tappets, as shown in Fig. 11, which represents three rollers s , t , and u inking a form on the bed of a platen-machine, over the

surface of which suitably-formed disks of the roller *t* pass, which roller may have received a color from the inking-cylinder to ink in certain matter in the center or other position
 5 between any lines of letter-press or type, as represented by the letter *J*². Thus the roller is provided with a middle color and is actuated by the aid of the middle tappets, so as to be removed from the surface of the type
 10 when the middle color has been transferred to its proper place on the type.

*m*⁶, Fig. 11, represents the middle tappets, with which suitably-formed disks *J'* engage during the travel of the inking-roller. Any
 15 convenient number of these may be used, and when the disks have passed from the said tappets, as shown in the figure, the inking of the portion *J*² and the portions of the letter-press within the width of the part *J*²
 20 on the form is accomplished. The part *J*² may be, for example, a woodcut, electro, or stereo of a characteristic figure interposed between the lines of letter-press, and it may be printed in any desired colored ink, as represented at *J*⁴ on the inking-roller *t*, which
 25 section of color placed thereon corresponds to the width of the part *J*² to be inked. The larger disks *J*⁵ pass over the tappets *m*⁷ when the part *J*² has been inked, and the roller is
 30 thus lifted from the surface of the type, the remainder of the lines of letter-press being inked by the other rollers *s* and *u* in their respective colors, the disks of which are formed of a diameter adapted to the tappets *m*⁸,
 35 which are so arranged that the border-roller *u* and roller *s* will pass over the middle tappets and ink the type on each side of the center piece *J*², while the roller *u* will ink the sides *m*⁹ of the border.

40 In Fig. 10 we have shown one of the rings or disks *m* that are to be mounted upon their rollers *j* in such manner as to be adjustable thereon. We may connect said rings with their rollers by any suitable means—as, for
 45 example, by making the elastic ring of somewhat less diameter than the roller. The grip of said ring by its own elastic contraction will hold it in place upon the roller under all ordinary circumstances. As they are placed
 50 on the roller spacing-sleeves of less exterior

diameter may be also slid on the roll to fill the space between and prevent the displacement of the rings by any force brought to operate thereon.

Having now described our invention, what 55 we claim as new, and desire to secure by Letters Patent, is—

1. In a printing-machine the combination with a distributing-roller *a* of a pulley *c*² having a cam *c* to act upon the end of the roller- 60 shaft, the ring or disk rollers *j*, having the rings or disks *m*, the border ink-roller *k*, the tappet-disks *p*, *p'* provided with tappets *o*, *o'*, arranged in different vertical planes, the rollers *s*, *t*, *u*, having disks upon their shafts, 65 rails *L*, *L'* having the tappets *M*, *M'*, *M*², *M*³, *M*⁴, *M*⁵, carriers *v* *v'*, for the rolls *s*, *t*, *u*, elbow-levers *y* *y'* connected to said carriers, levers *A* *A'* upon which the short arms of the levers *y*, *y'* have support, and a gear having 70 a cam-race *D* which receives a friction-roll on the end of an arm *C* which is rigid on the shaft *B* which forms the bearing for the levers *A*, *A'*.

2. In a printing-machine, the combination 75 of the press-bed *O*, the rails *L* *L'* provided with series of tappets at the sides of the press-bed, the form-rollers *s* *t* *u* having their shafts provided with disks *I*, *J*, *K*, the inking-cylinder *n* having its shaft provided with disks *p* 80 *p'* and eccentric tappets *o* *o'* attached to opposite faces of said disks, the rollers *j* provided with disks *m*, runners *q* *q'* on the shafts of said disk-rollers, the ink-distributing rollers *a*, the fountain-rollers *b*, the pulleys *c*² 85 mounted on the fountain-roller shafts and provided with cams *c* to bear on the ends of the distributing-roller shafts for imparting longitudinal movement to the distributing-rollers, and springs *g* at the opposite ends of 90 the shafts of said distributing-rollers, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

JOHN ADAM GLEDHILL.
 JOSHUA CHARLES WHITNEY.

Witnesses:

JAMES WILLIAM FULDEN,
 GEORGE WILLIAM JACKSON.