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Fig. 3.

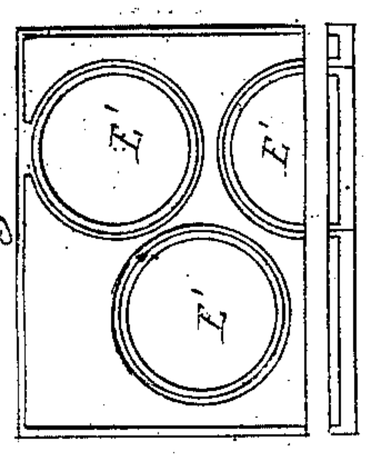

Fig. 5

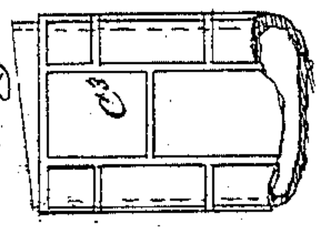

Fig. 4.

Fig. 1.

Attest
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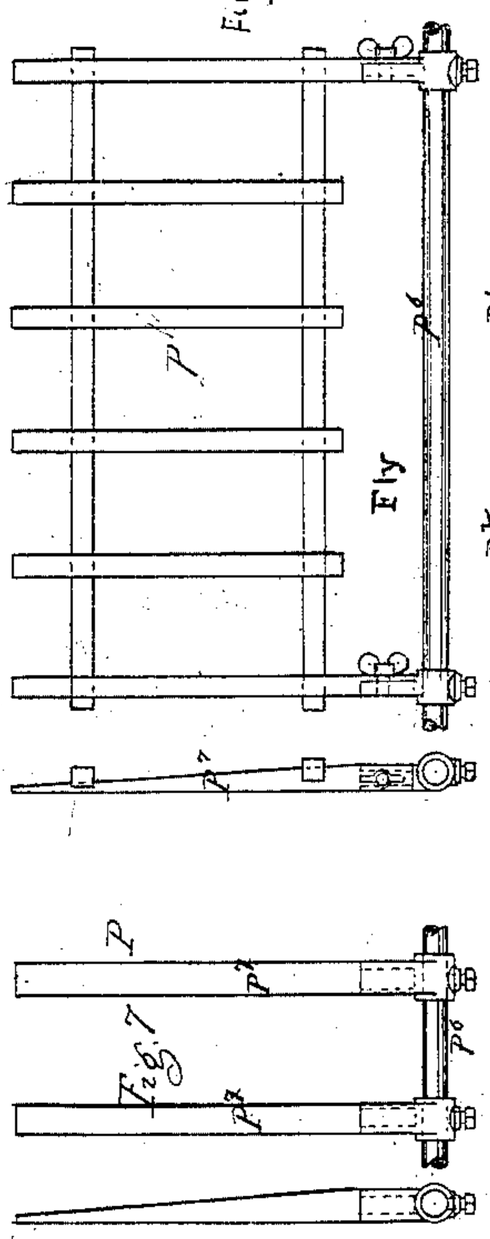
Fig 6



Fly

Fig. 7

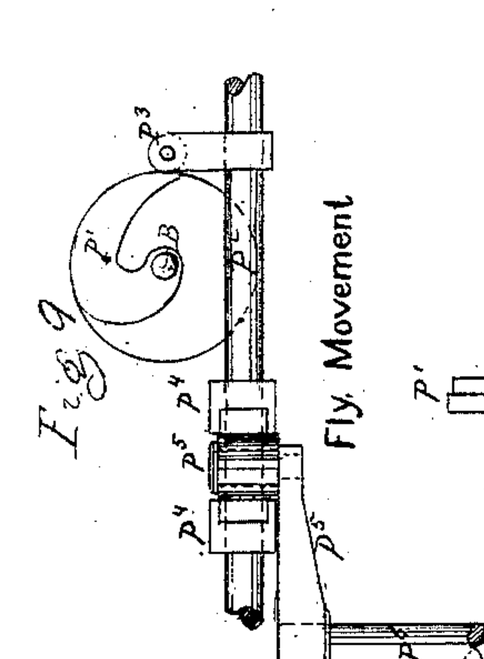


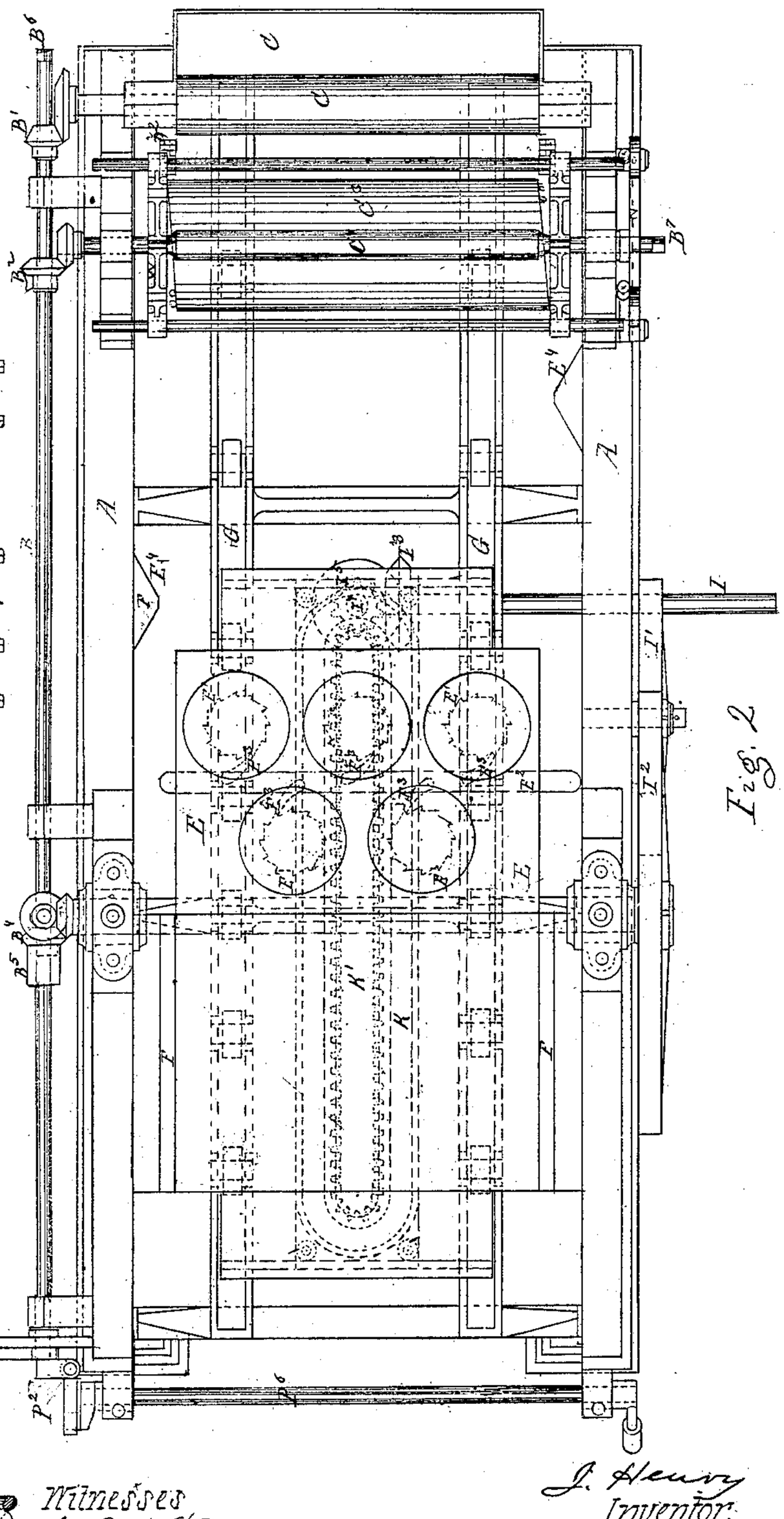
Fig. 8

Catch on side shaft

Fig. 9

Fly. Movement

Fig. 2



Witnesses
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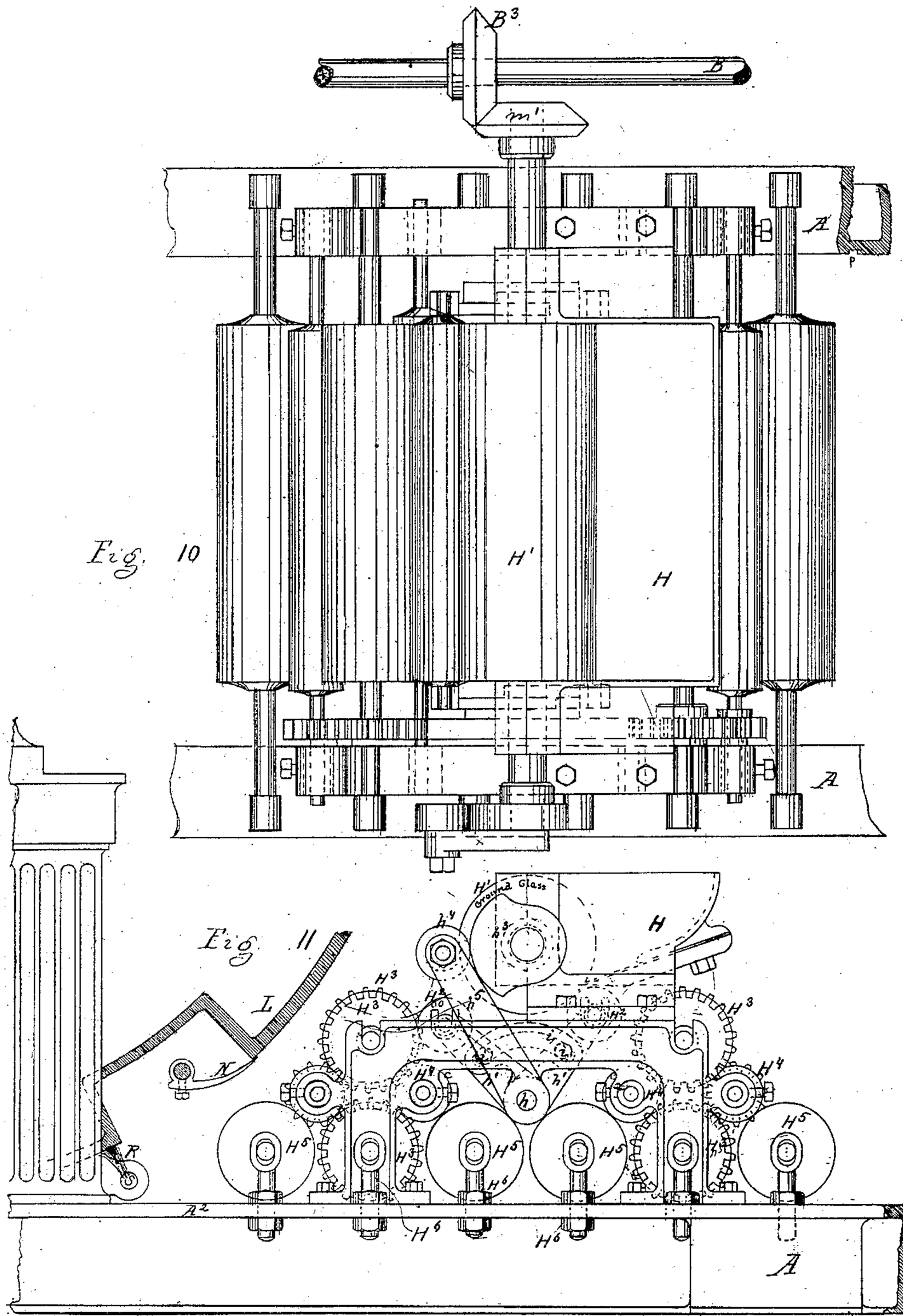

Witnesses.
A. Ruppert
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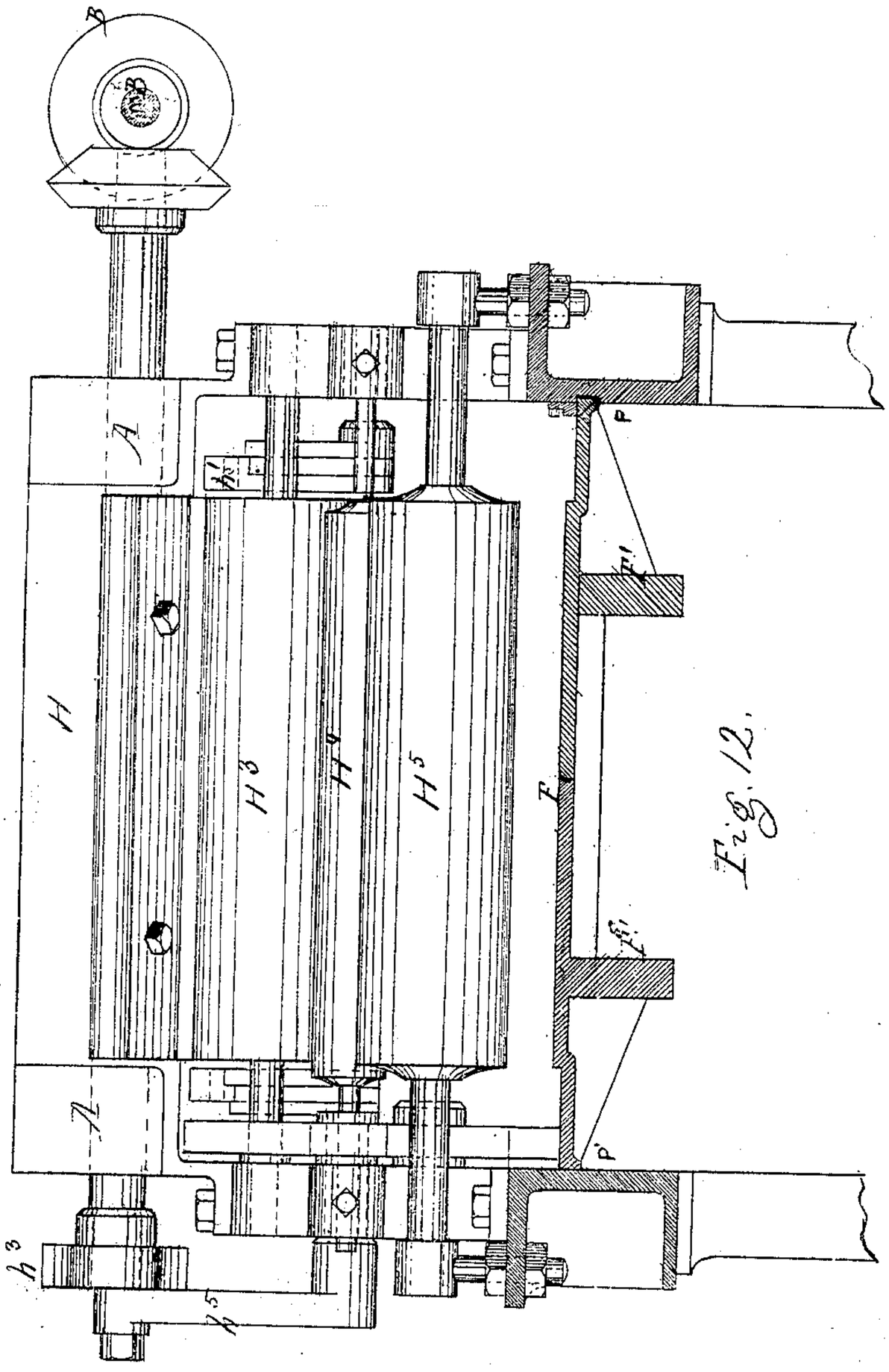

Fig. 12.

Witnesses
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Fig. 14.

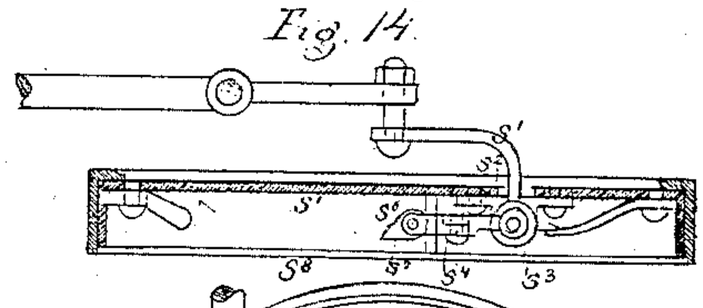

Fig. 16

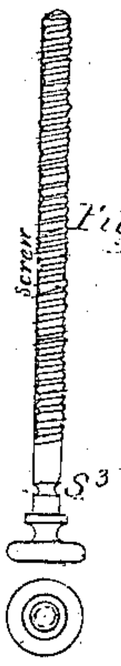

Fig. 15.

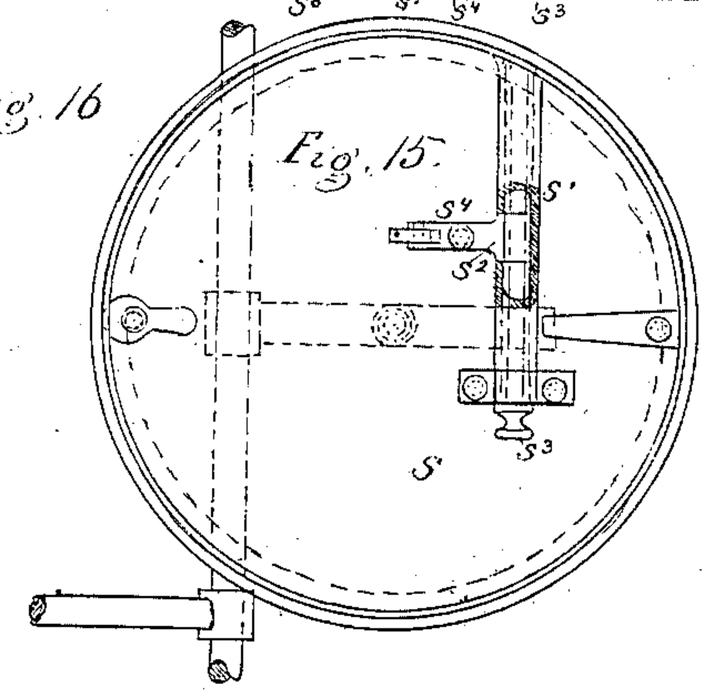

Fig. 17g

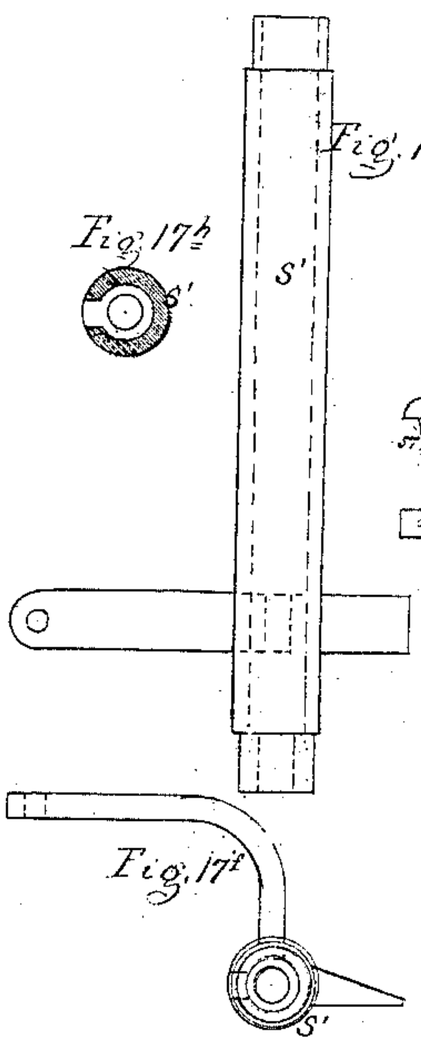

Fig. 17h

Fig. 17c

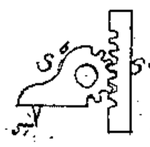

Fig. 17d

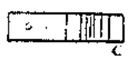

Fig. 17b

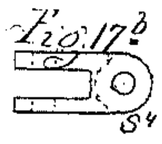

Fig. 17a

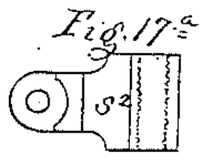

Fig. 17f

Fig. 17e

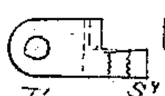

Fig. 17

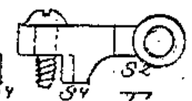

Fig. 18.

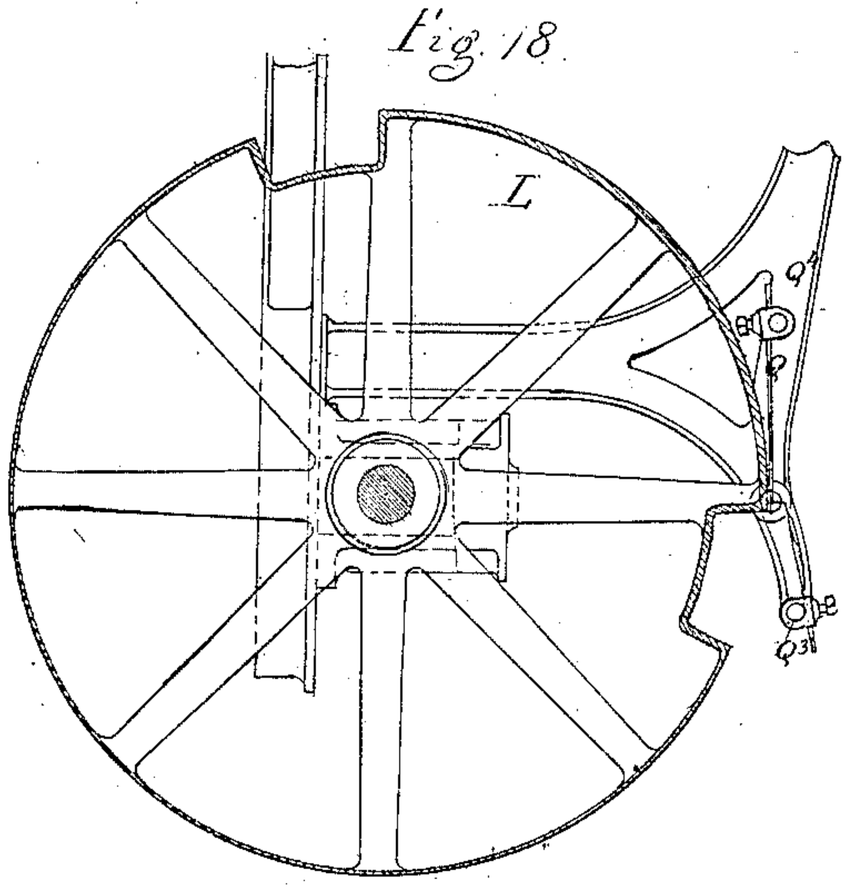

Fig. 19

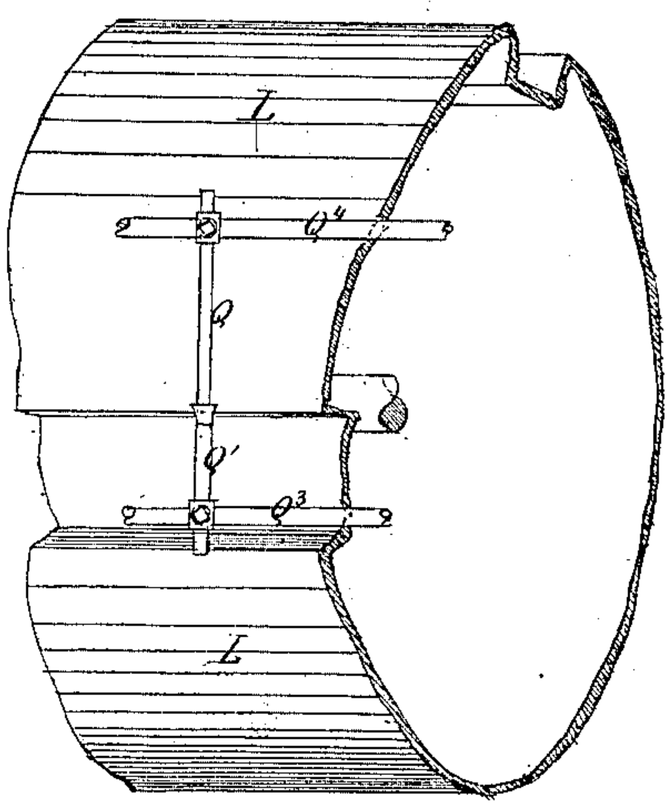

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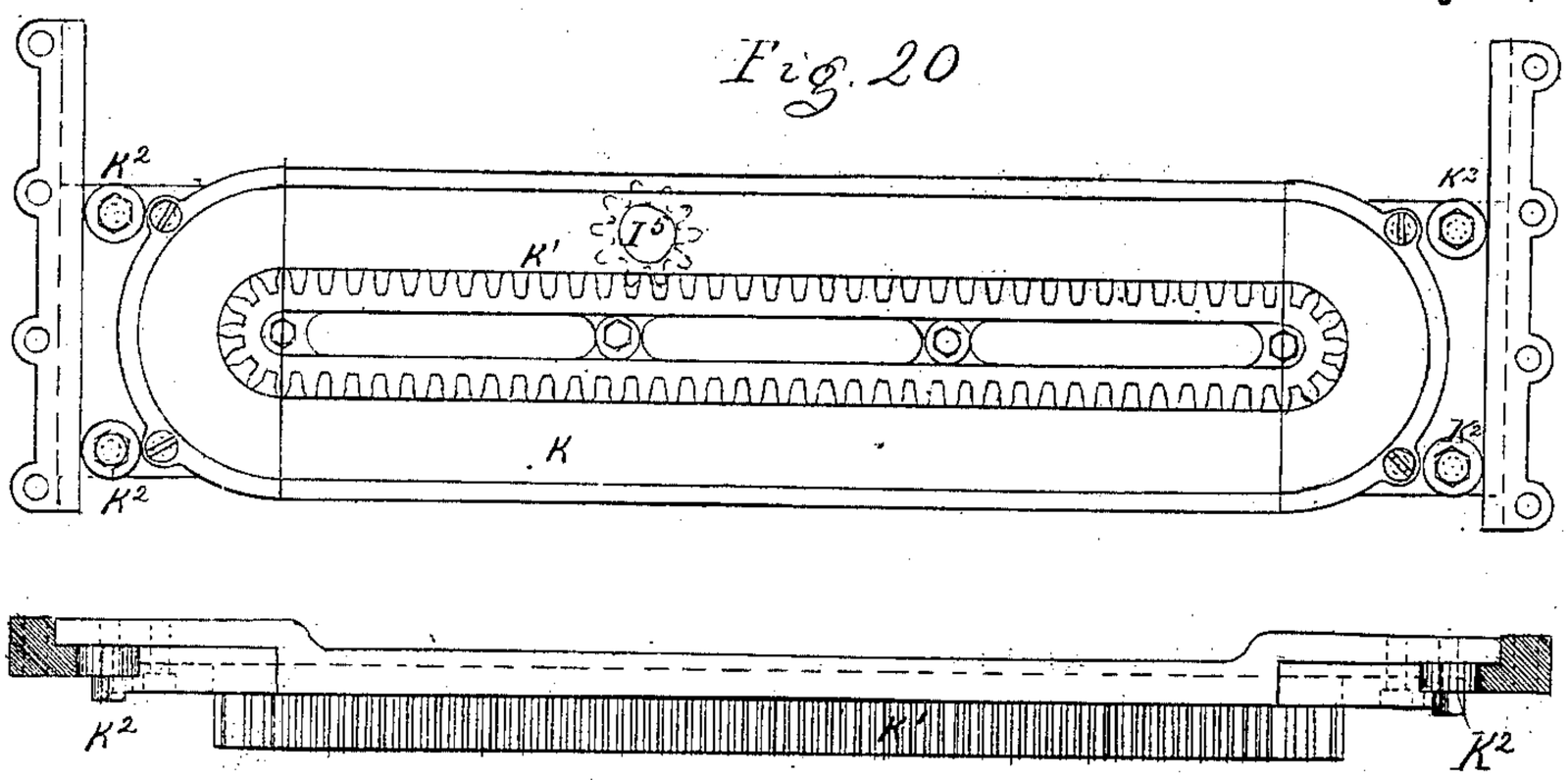
Fig. 20



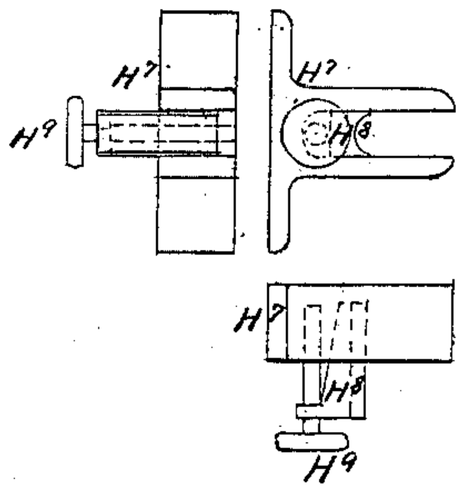
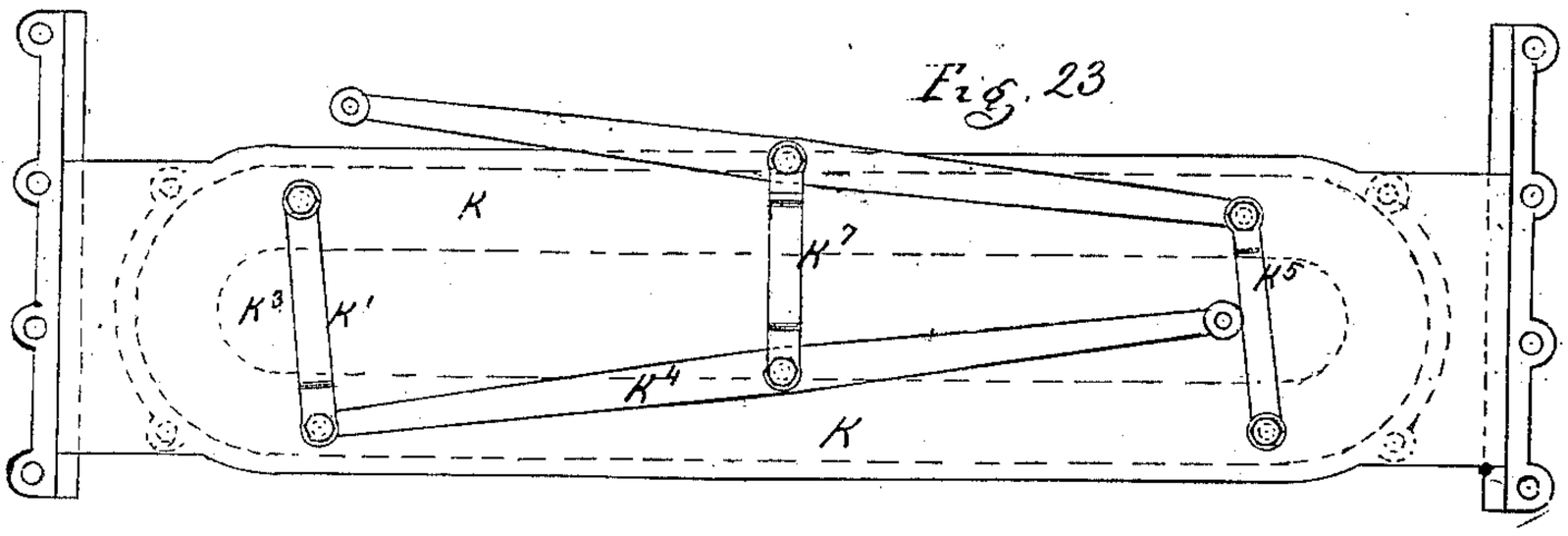


Fig. 22.

Fig. 23



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United States Patent Office.

JOHN HENRY, OF MILLBURN, ASSIGNOR TO HIMSELF AND ALEXANDER ROBERTSON, OF SUMMIT, NEW JERSEY.

Letters Patent No. 114,557, dated May 9, 1871.

IMPROVEMENT IN PRINTING-PRESSES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN HENRY, of Millburn, in the county of Essex and State of New Jersey, have invented certain Improvements in Printing-Presses; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawing making part of this specification, in which—

Figure 1 is a side elevation.
Figure 2 is a plan with the cylinder removed.
Figure 3 is a section of the inking-tablet.
Figure 4 is a vertical section of the inking-cylinder.
Figure 5 is a plan of the same.
Figure 6 is an elevation of the fly.
Figure 7 is an elevation of a fly differently arranged.
Figure 8 is a section of the catch on side shaft.
Figure 9 is an elevation of the fly movement.
Fibure 10 is a plan of the supplementary fountain.
Figure 11 is an end view of the same.
Figure 12 is a rear view of the same.
Figure 13 is a section of part of cylinder.
Figure 14 is a section of the pointing apparatus.
Figure 15 is a plan of the same.
Figure 16 is an elevation of the screw passing through the pointing apparatus.
Figure 17 shows elevations of parts of the same.
Figure 18 is a vertical section of the cylinder.
Figure 19 is a plan of part of the same.
Figure 20 is a plan of the rack and guide for moving the bed and table.
Figure 21 is a section of the same.
Figure 22 represents different views of the device for regulating the height of the rollers.
Figure 23 is a plan of another mode of operating the bed and table.

The same letters are used in all the figures in the designation of identical parts.

My invention relates to cylinder printing-presses; and my improved press is especially designed for printing in colors, and for printing fine work where perfect register and perfect distribution of inks or colors are especially desirable; and

My improvements relate especially to those parts of the press in which distribution and register are effected, the details of which will be set forth specifically in the following specification and claims.

In the annexed drawing—

A is the main frame. It is formed of rectangular sections with vertical supports, jointed by planing the surfaces coming into contact, and bolted strongly together so as to give the utmost possible rigidity to the frame.

The upper face of the frame at A^2, fig. 11, projects over the vertical stem of the top piece so as to afford means of bolting the supports of the form-rollers to the frame adjustably, as will be hereinafter described. Or, instead of the lip alone, a groove may be cut in the inner faces of the top side pieces of the frame.

Motion is communicated to the ink-distributing mechanism by the shaft B.

On this shaft are beveled wheels, B^1 B^2 B^3, by which motion is communicated to the ink-distributers.

The shaft turns within the beveled wheel B^4, and a clutch, B^5, (shown in detail in fig. 8,) gives motion in one direction to the shaft, deriving its motion from the wheel B^4 by means of the inclined faces of the parts b^1 and b^2, held in contact by the spring b, so that by attaching a winch to the end of the shaft at B^6 the shaft may be made to operate the distributing mechanism by hand when the cylinder is not running.

Another winch may be attached at B^7, fig. 2, to the shaft carrying the bevel-wheel, which gears into the wheel B^2, so that two men may unite their force in operating the distributing mechanism.

In presses as ordinarily constructed no provision is made for the independent distribution of the ink when the press is not in operation, and consequently the press has to be operated while effecting distribution preliminarily to the commencement of the work. To do this it is necessary to waste paper in receiving imperfect impressions, or, as is commonly done, run the sheets through again and again until their surfaces are softened and the fibers of the paper adhere to the face of the form, preventing a perfect impression.

By means of my improved and independent distributing mechanism this distribution can be perfected before the press is started.

C is the fountain in which the ink is placed for distribution. This is lined with porcelain or other equivalent material which will not affect the color of the ink.

The fountain-roller C^1 is made of glass when printing is to be conducted in fine colors.

This roller derives a continuous motion from the bevel-wheel B^1, and takes up the ink therefore continuously and equally upon its surface, instead of having, as in ordinary presses, an intermittent motion, the effect of which is to cause the fountain-roller to take up the ink unequally upon its surface.

The ink is transferred from the fountain-roller to the ductor-roller C^2, which is a composition roller hung upon a vibrating shaft, which brings it alternately in contact with the fountain-roller and the cylinder C^3, to which the ink is transferred.

The cylinder is of comparatively large diameter, and the rollers C^4, which have a longitudinal reciprocating motion, bearing upon its upper surface, assist in perfecting the distribution.

This reciprocating motion is given to the frame on which the rollers are carried by the action of the beveled ends of the cylinder C^3, as shown in figs. 2 and 5, against friction-rollers, shown in fig. 1 at *c*, attached to studs on the said roller-frames.

As the ends of the cylinder C^3 are beveled oppositely to one another, its revolution will cause the upper rollers to receive a reciprocating longitudinal motion.

This cylinder C^3, in chromatic presses, is covered with amalgam, to attach which the face of the cylinder may be made with recesses, as shown in figs. 5 and 6.

The ink is taken from the cylinder C^3 by the composition roller C^5, which oscillates between the cylinder C^3 and the reciprocating tablet E.

The roller C^5 is operated by a rock-shaft, D, it being attached to the arm D^1.

The ductor-roller is suspended on the rock-shaft D^2 by the oscillating arm D^4.

The roller C^1 may be attached to the rock-shaft D^2.

In the arrangement shown the arms D^3 and D^4 receive their oscillating motion from the cam D^5 on the shaft of cylinder C^3, which acts alternately on the wheels D^6 and D^7 on the arms D^3 and D^4.

These arms are connected and kept in contact with the cam by the spiral spring D^8. Any equivalent arrangement of springs or other devices may be substituted for the spring D^8.

The tablet E has a reciprocating motion upon the ways G, together with the bed-plate F, with which it is united.

In the tablet are disks E^1 which receive an intermittent rotary motion from the bar E^2, to which are attached pawls E^3, acting against ratchet-teeth cut on wheels attached to the lower face of the disks E^1.

The bar E^2 receives a reciprocating longitudinal motion from contact with inclined cam-faces E^4, attached on each side to the main frame in such position that, as the bar moves with the bed-plate and tablet, it shall be alternately thrown from side to side, causing with each movement in one direction a slight rotary motion to be given to the disks inserted in and flush with the face of the tablet, thereby giving a more perfect distribution to the ink passed from the cylinder C^3 to the tablet. Plain tablets have been heretofore used in such presses. In jobbing-presses revolving disks have been used and found to give a very perfect distribution.

My arrangement enables me to secure the advantages of this rotary distribution in application to cylinder-presses.

F is the bed-plate which carries the form, traversing in the usual manner upon the ways G.

For the purpose of effecting a more perfect distribution of the ink a supplementary fountain and distributing mechanism are placed near the cylinder.

H is the fountain, similar to the fountain C, and

H^1 is the fountain-roller, similar to roller C^1.

The ductor-rollers H^2 are attached to the V-formed arms h^1, oscillating upon the rock-shaft *h*, and deriving motion from the oscillating arm h^5, carrying the friction-roller h^4, which bears against the face of a cam, h^3, on the end of the shaft of the fountain-roller H^1.

A spring is arranged to maintain the friction-roller in constant contact with the face of the cam. A groove-cam or any similar device may be substituted for the spring.

The ductor-rollers convey the ink alternately from the fountain-roller to two cylinders, H^3 H^3, having a soft face, for which purpose a covering of felt may be used.

The ink is taken from the cylinders by wooden rollers H^4 H^4, applied to each, and having longitudinal motion communicated in the ordinary manner.

These rollers transfer the ink to the soft form-rollers H^5, of which there are three in each set. These rollers are hung upon shafts having vertical adjustment, so as to regulate their relations to the form. I have shown in fig. 11 one form of regulating the height of these form-rollers.

The standards which form bearings for the rollers pass through the lip A^2 of the frame, and may be regulated in length by two nuts, one above and the other below the frame.

Another mode of adjusting the rollers H^5 is shown in fig. 22, in which H^7 is a bifurcated pillow-block bolted to the frame, inclosing the journal-box H^8, which is wedge-formed, so that by turning the thumb-screw H^9 the journals of the rollers may be raised or lowered, thus affording a very convenient means of adjusting the height of the form-rollers.

By dividing the ink taken from the fountain and distributing it by means of two ductor-rollers, and carrying it to two cylinders and thence to two intermediate rollers, H^4, from each cylinder, and thence to three form-rollers in each set, I effect a more equal distribution.

This inking apparatus may be used independently of or as auxiliary to the apparatus first herein described.

I propose to use also diagonally-placed rollers acting on the face of the tablet, but these, being in common use, have not been shown in the drawing.

By facing the fountains and metal rollers, tablets, disks, &c., with a material not affected chemically by the ink, I am enabled to preserve the purity of the color, which is impossible to do with the rollers having an iron surface in common use, for many of the most expensive inks are, by contact with the iron surface, changed to the shade of other far less costly inks, thereby preventing the preservation of that purity of tone which is essential to fine work.

The driving-power is applied to the shaft I, fig. 1.

The pinion I^1 communicates motion through the intermediate wheel I^2 to the cylinder.

The shaft I carries also a bevel-wheel, I^3, which communicates motion through the miters to a vertical shaft, I^4, on the top of which is a spur-pinion, I^5.

This pinion drives the bed-plate and tablet through the instrumentality of the guide K, which slides transversely in ways fastened to the bottom of the bed-plate and tablet, to which it communicates motion in the following manner:

On the inner edge of this guide is a rack, K^1, engaging the teeth of the pinion I^5. The form of this rack is clearly shown in fig. 20, and by dotted lines in fig. 2. When the guide has been carried the length of the rack it is shifted by the passage of the spur-pinion at the end of the rack. It is essential that this movement should be in such manner effected that the two ends of the guide should move equally.

This I accomplish, as shown in fig. 20, by attaching to studs on the guide four friction-rollers, K^2, which, bearing against ways on the bed-plate, preserve the parallel motion of the guide.

Another mode of accomplishing this movement is shown in fig. 23, where the levers K^4 and K^6 are pivoted to the bed-plate, and the levers K^3 and K^5 are pivoted to the guide, or *vice versa*.

The levers K^3 and K^4 and K^5 and K^6 are connected by pivots, and the lever K^7, at the middle of the levers K^4 and K^6, connects them together, being pivoted to both.

By either of these devices I am enabled to place the ribs F^1, fig. 12, at such distance from the edges of the bed-plate as to give the much-needed stability to such bed-plate, so as to prevent its yielding to the pressure of the cylinder L in taking an impression.

L is the cylinder, which, being of ordinary construc-

tion, I shall not describe, except that I construct the cylinder of a continuous piece of metal, as clearly shown in the sectional fig. 18.

In ordinary presses the depressions shown in fig. 18 are open spaces. By making the cylinder continuous I give it greater stability and prevent the passage of anything through the same.

I have shown in fig. 1 two modes adopted by me for transferring the sheet to the fly without the use of tapes. One of these modes is by using two rollers, M and M′, to receive the sheet from the nippers N N′. One of these rollers is caused to revolve by means of a spur-pinion geared into the driving spur-wheel on the cylinder-shaft.

The nippers N N′ are constructed as follows:

N is the ordinary gripe-finger, actuated in the usual manner by a tumbler and studs. To the lower end is attached an arm, to which is pivoted a finger, N′, so that when the gripe-finger N is thrown up the finger N′ is pushed forward to deliver the edge of the paper between the rollers M M′.

The other mode is shown in dotted lines in fig. 1. A cylinder, O, the diameter of which must be a definite fraction of that of the cylinder L, as one-third, one-fourth, one-half, &c.; on this cylinder O are attached gripe-fingers, so as to catch the edge of the paper the instant it is delivered from the fingers N N′ and carry the sheet over the cylinder O to the fly.

The fly, and mechanism for operating it, are shown in figs. 1, 2, 6, and 7.

The fly P is operated by a cam, P^1, on the end of the shaft B.

This cam, with the revolution of the shaft, operates upon a friction-wheel attached to an arm, P^3, fastened on the shaft P^2.

On the shaft P^2 are fastened adjustably jaws P^4, between which the wrist of the crank P^5 on the shaft P^6. is confined, so that the rise and fall of the shaft P^2 communicates an oscillating movement to the shaft P^6 and fly-fingers P^7.

The fly-fingers are adjustably attached, by independent sockets with set-screws, to the shaft P^6, by which means they may be adjusted as desired. The fly is brought back to its vertical position by the ordinary counter-weight.

The guide-rests Q are attached to a rod fastened to the main frame of the feed-stand, and not to the feed-table, as is ordinarily done, so that they are not by my arrangement liable to be affected by the feed-boy leaning against the table.

The guide-toe Q^1 is of ordinary construction.

Q^3, fig. 19, is the shaft or rod to which the feed-toes are attached.

Q^4 is the shaft or rod to which the guide-rests are attached.

In order to smooth the sheet upon the cylinder and prevent the confinement of air between the sheet and the cylinder, I place a long brush, R, across the machine, so that the points of the bristles shall bear against the surface of the sheet as it passes from the feed-table to that position in which it receives the impression and smooth it perfectly against the cylinder.

It is important in securing perfect register that the sheet should be freely delivered from the feed-table, where it is held by prick-points; and, to effect this, I place upon the table, and flush with its face, a metallic disk, S^8, fig. 14, below which is put the mechanism for operating the prick-points within a cup, S.

A tube, S^1, is fastened in the bottom of the cup in bearings, permitting its oscillation.

The arm S^2 carries the prick-points, and it is adjusted in position by the thumb-screw S^3, which permits the convenient and certain adjustment of the prick-points.

To the arm S^2 is pivoted an arm, S^4, having a horizontal oscillation for the purpose of regulating the position of the prick-points.

This piece S^4 is shown in Figure 17^b, and receives within its jaws the rack S^5 and vertically-oscillating arm S^6. The rack is vertically placed, and extends down through the bottom of the cup, and is operated by levers in the ordinary manner in which the pointing apparatus is actuated in other presses.

The prick-point S^7 projects from the arm S^6 and through a slot in the cover S^8, fig. 14, said cover being flush with the face of the feed-table.

The operation is as follows:

As the rack draws the prick-points down the segment on the arm S^6 throws its point forward; and, as the prick-point is conical, it follows that when it releases the sheet it does so without strain upon the perforations, so that, in taking successive impressions, the holes are not, as in other machines, enlarged, thereby impairing the perfection of register.

The power is communicated from the cylinder-shaft to the shaft B by means of the counter-shaft T and bevel-wheels T^1 and T^2, as shown in fig. 1.

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

1. In combination with the cylinder and distributing apparatus, the shaft B and clutch B^5, so arranged that the distributing apparatus may be operated independently by hand or by the power which revolves the cylinder, substantially as set forth.

2. The roller C^3, when constructed with beveled ends, in combination with the frame carrying the rollers C^4, for communicating a reciprocating longitudinal motion to the latter, substantially as set forth.

3. In combination with the pinion I^5 and guide K revolving around it, the friction-rollers K^2 and ways against which they bear, substantially as set forth.

4. In combination with the pinion I^5 and guide K revolving around it, the system of levers K^3, K^4, K^5, K^6, and K^7, arranged substantially as set forth.

5. In combination with the cylinder L and feed-table frame, the guide-rest Q when attached to a rod or shaft fastened to the feed-table frame so as to be independent of the table, substantially as set forth.

6. In combination with the cylinder, the brush R, arranged to operate substantially as set forth.

7. In combination with the prick-points S^7 the vertically-oscillating arm S^6 and rack S^5, substantially as set forth.

8. The combination of the prick-point, the vertically-oscillating arm S^6, and horizontally-oscillating arm S^4, substantially as set forth.

9. In combination with the prick-point, and arm upon which it is carried, the set-screw S^3 for regulating the position of the prick-point, substantially as set forth.

10. The arrangement of the cam D^5, friction-rollers D^6 and D^7, arms D^2 and D^4, and rollers C^5 and C^2, substantially as set forth.

11. The fountain-roller, when made of glass with a ground surface, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN HENRY.

Witnesses:

ITHAMER W. BRUNEL,

JAMES H. EASTON.