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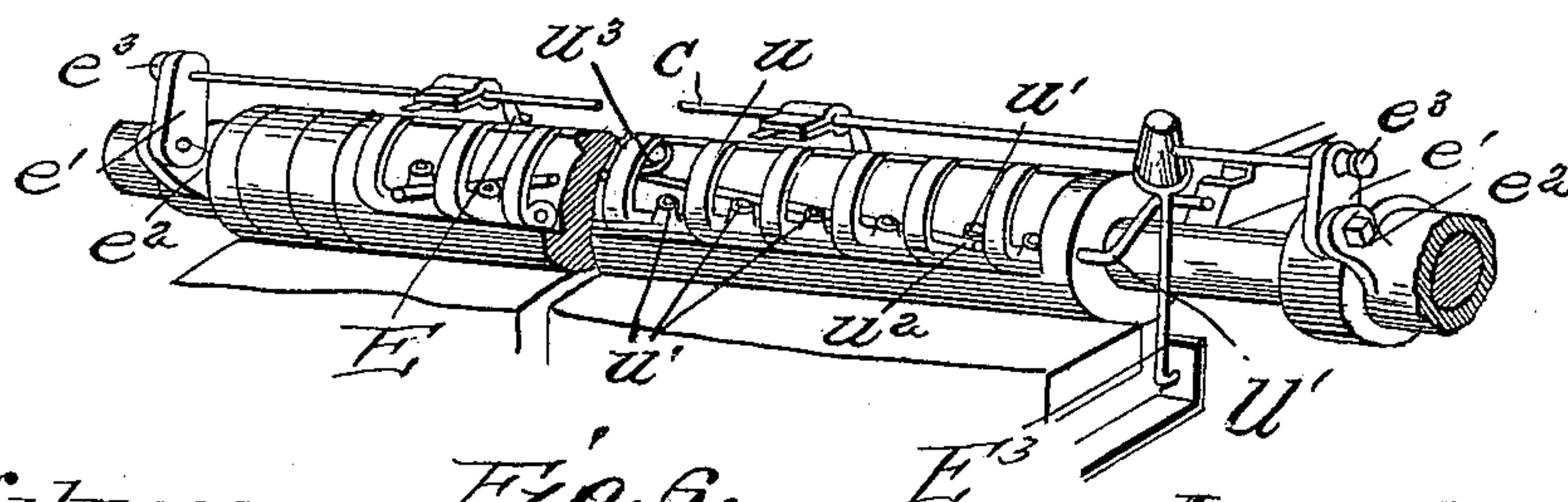
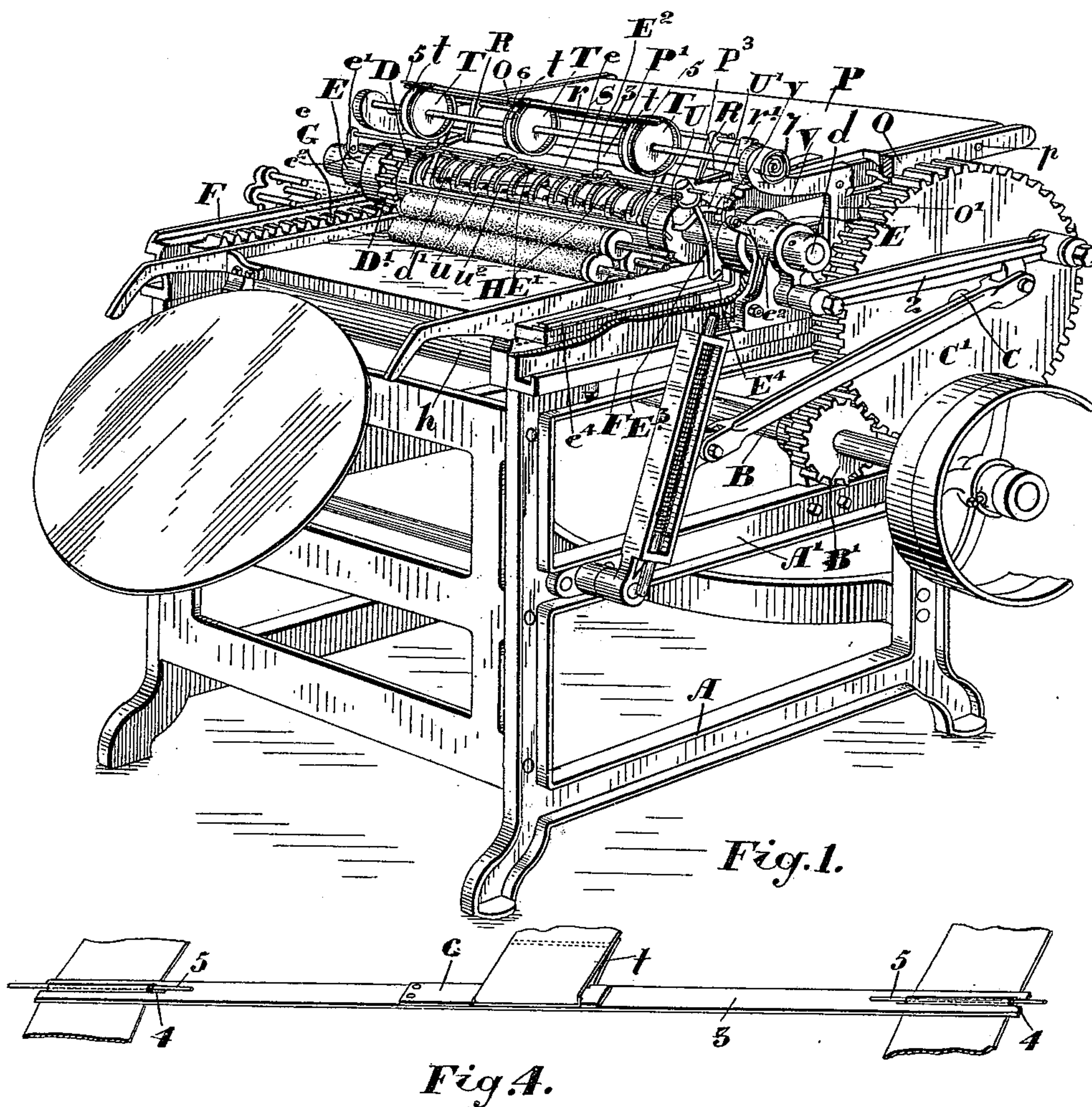
Patented Apr. 4, 1899.

F. J. HARBRIDGE.
PRINTING PRESS.

(Application filed Sept. 30, 1897.)

(No Model.)

2 Sheets--Sheet 1.



Witnesses
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2 Sheets—Sheet 2.

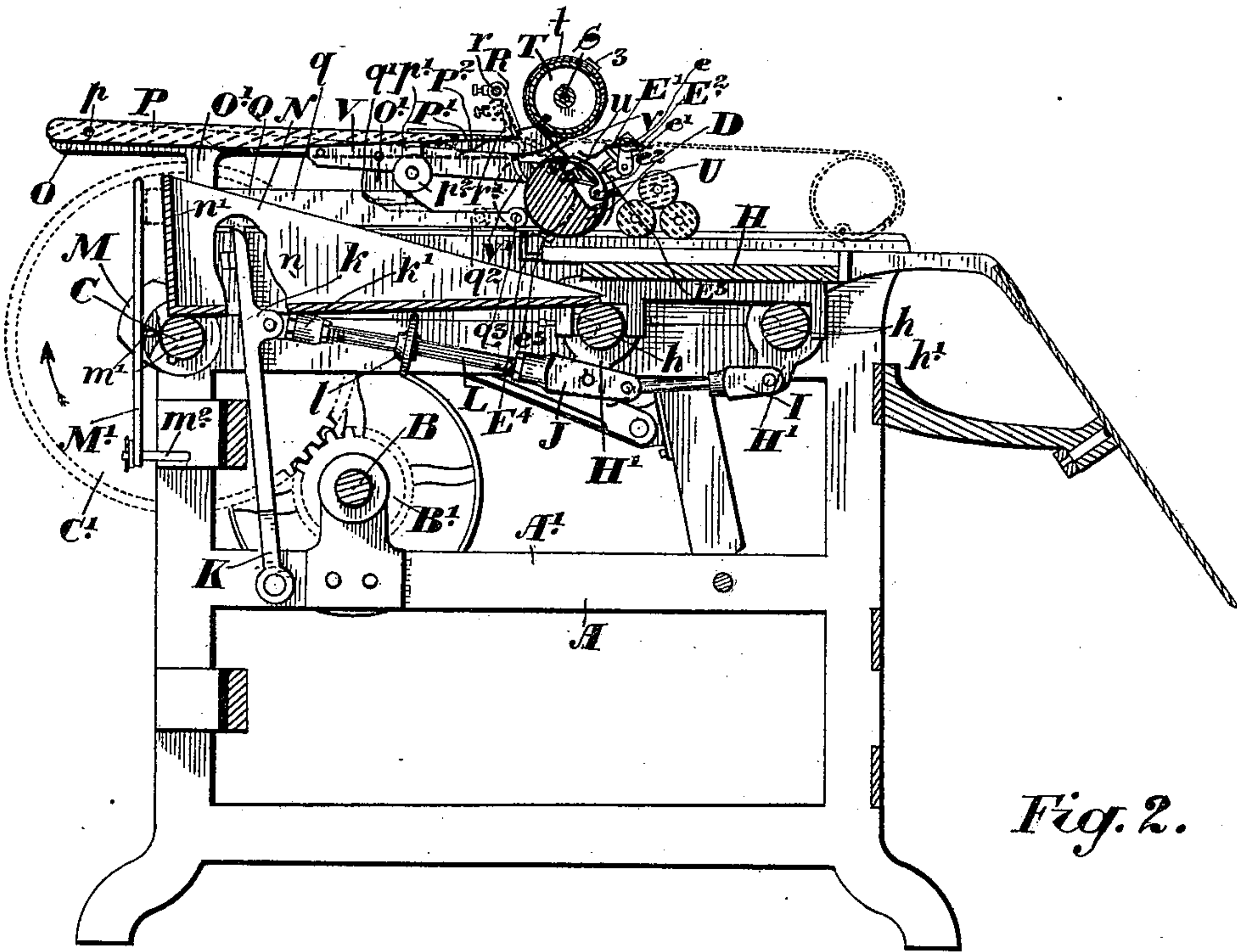


Fig. 2.

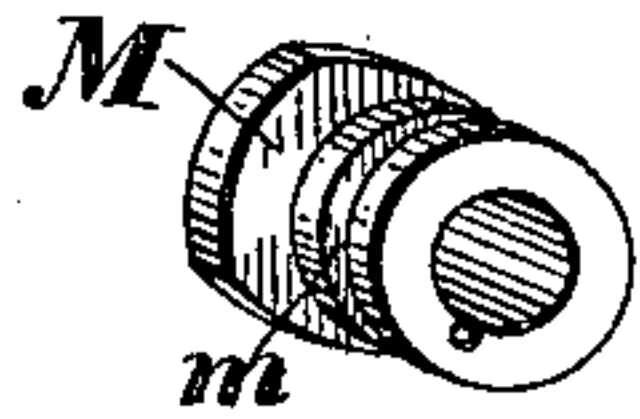


Fig. 5.

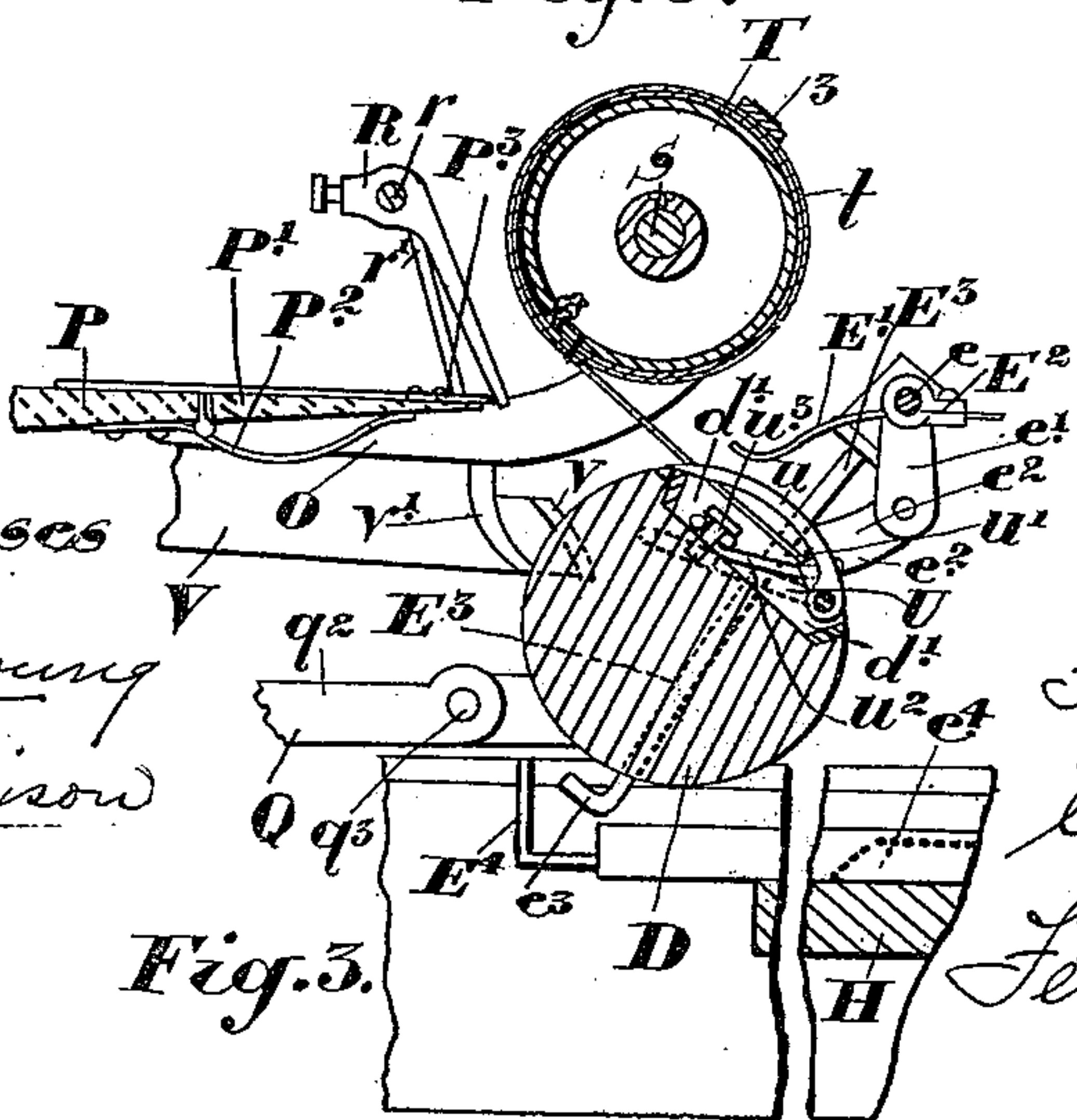


Fig. 3.

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UNITED STATES PATENT OFFICE.

FREDERICK JOHN HARBRIDGE, OF GRAVENHURST, CANADA.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 622,427, dated April 4, 1899.

Application filed September 30, 1897. Serial No. 653,612. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK JOHN HARBRIDGE, printer, of the town of Gravenhurst, in the district of Muskoka, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Printing-Presses, of which the following is a specification.

My invention relates to improvements in printing-presses; and the object of the invention is to design a simple, cheap, and easy-running foot or power press which may be run at a much greater speed than the ordinary presses now commonly in use and be limited only by the quickness with which the sheets may be fed; and it consists of the construction hereinafter set forth, and particularly pointed out in the claims.

Figure 1 is a general perspective view of a printing-press constructed according to my invention. Fig. 2 is a longitudinal section through the press, looking from the opposite side to that shown in Fig. 1. Fig. 3 is an enlarged sectional view showing the cylinder and the parts coacting therewith. Fig. 4 is a detail of the clamp for holding one edge of the paper to the cylinder. Fig. 5 is a detail of the cam and collar. Fig. 6 is a detail view.

In the drawings like letters and numerals of reference indicate corresponding parts in each figure.

A is the frame of the machine, which is preferably rectangular in form.

B is the main driving-shaft, which is suitably journaled in bearings secured to the intermediate bars A'.

B' is a pinion secured in the end of the main shaft B and meshing with the gear-wheel C', secured on the counter-shaft C.

D is the cylinder, the end spindles *d* of which are journaled in the bearing-standards E E, slidably supported upon the tongue side bars F F of the machine.

D' is a pinion which is secured to one of the end spindles of the cylinder and meshes with a rack G, located to the inside of one of the tongue side bars F.

H is the bed-plate for the chase, which is supported on the eccentrically-journaled rollers *h h*.

H' are arms secured to the rollers *h h*, depending as shown.

I is a forked connecting-rod pivotally connected to the lower end of one arm and having the other end pivotally secured in the fork J, which is pivotally connected to the front arm H'.

K is a lever pivoted in the frame of the machine and provided with lugs *k* at the upper end thereof, between which is secured the bracket *k'*.

L is a screw-spindle provided at one end with a right-hand thread and at the other with a left-hand thread and at the center with the hand-wheel 1. The screw-spindle extends at one end through the bracket *k'* and at the other end into the fork J. At each end the spindle L is provided with suitable nuts, and by loosening them and adjusting the spindle the position of the eccentrics *h* may be adjusted.

M is a cam secured to the shaft C. The cam M is designed to impart a rocking movement to the lever K, so as to raise and lower the chase bed-plate H. The adjustment of the screw-spindle L serves to limit the amount of upward throw the cam M will impart to the chase bed-plate H. The collar of the cam M is provided with a groove *m*, into which fits a pin *m'*, attached to a lever M', which is pivoted on the rod *m*², extending into the frame of the machine, as indicated. By tilting the lever *m'* laterally the cam may be thrown to one side of the lever K, which is of a limited width, and thereby no upward motion is communicated to the chase bed-plate H. This is necessary should the operator neglect or misfeed a sheet into the machine, as otherwise the type would print on the cylinder.

N is a delivery-table provided with suitable inclined sides *n* and high back *n'* and open rear end. The delivery-table is supported on the shaft C and front roller *h*.

O are supplemental horizontal side bars at the upper front end of the machine, such side bars being supported on the main frame by the uprights O'.

P is a feeding-table pivoted on the rod *p*, extending between the side bars O.

P' is a flap hinged, as indicated, at the feeding end of the table P next the stop-fingers. The flap is normally held up by the tension of a flat spring P². P³ is a projecting plate located, preferably, at one side of the flap P',

at the outer edge thereof. One side of the feed-table is provided with a hanger p' , having journaled in the bottom end thereof the roller p^2 .

5 Q is a side bar provided with a raised portion q , an inclined portion q' , and a low portion q^2 , which is connected by a pin q^3 to the bearing-standard E.

Although I show only one roller and side
10 bar Q, it will of course be understood that there is preferably one provided at the opposite side of the machine, which is of course not shown.

R are stop-fingers which are secured on the
15 rod r , which is held in bearings r' , secured to the top of the feeding-table P.

S is a spindle journaled at each end in the curved rear end of the side bars O. The spindle has secured to it a plurality of grooved
20 wheels T, in which are fastened tapes t of cotton or any other suitable material. I preferably use three wheels, and the ends of the tapes are fastened and wound around the grooves when the cylinder is in its normal position, the other ends of the tapes being fastened around the rod U, upon which the arc-shaped gripping-fingers u are secured.

3 is a clamping-bar, which is provided with end notches 4 and spring-fingers 5, extending
30 over such notches, the tape being designed to be passed through the notches and up over the spring-fingers, so as to hold the clamping-bar 3 in any desired position on the tapes. A central tape t may be also provided where the
35 sheets of paper are of unusual length, the ends of this tape being looped over a flat spring-finger 6, secured to the clamping-bar.

The rod U and gripping-fingers are held in a recess d' in the cylinder D, the rod U extending through the ends of the cylinder and being journaled therein. The gripping-fingers when closed, as indicated in the drawings, form an arc of the circle of the cylinder and are of any desired number, extending
45 across through the recesses d' . These gripping-fingers u are held to the rod U by set-screws u' , extending through the hubs of the fingers, and the combined fingers on the rod are spring-held in the recess by the spring u^2 ,
50 which is fastened to a pin u^3 in the center and has the ends passing to the outside of the set-screw u toward each end, as indicated in Figs. 1 and 3.

V is a bar secured to one of the side bars
55 O and provided at the rear end, near the cylinder, with two guiding-ribs separated from each other—viz., v and v' . One end of the rod U is bent into the form of a crank-arm U' (see full lines, Fig. 1, and dotted lines, Fig. 3)
60 and is designed to coact with the ribs v and v' , for a purpose which will hereinafter appear.

e is a cross-rod which is secured on the end of the arms e' , which are pivotally but stiffly held in the ends of the arms e^2 , attached to or forming part of the bearing-standards E.
65

E' are spring-fingers provided with curved ends, which are secured in the clamps E^2 , se-

cured to the cross-rod e . These spring-fingers are designed to be brought down against the paper as it passes onto the cylinder by
70 the arm E^3 , having bent end e^3 , which engages with the L-shaped projection E^4 as the cylinder is being caused to move toward the feeding-table. As the pivotal connection between the arms e' and e^2 is a rigid one, held so by
75 jam-nuts on the end of the pivots which connect said arms, which bind against the arms e^2 , it will be seen that the spring-fingers as the cylinder recedes will maintain the same position to which they are set, which will be
80 close upon the cylinder, and will thus serve to keep smooth the sheet of paper which is being fed onto such cylinder.

When the cylinder reaches the limit of its rearward movement, the bent end of the arm
85 E^3 comes in contact with the inclined projection e^4 and thereby tilts the arms e' , and consequently throws the rod and the fingers away from the cylinder, so that as the cylinder is returning to normal position the fingers E'
90 do not come in contact with the now-printed matter on the cylinder, which should they do would have a tendency to smudge it.

Having now described the principal parts involved in my invention, I shall briefly describe the feeding and the printing of the
95 paper.

The paper is fed in sheets upon the table B and pressed against the stop-fingers R. At the period the sheet comes against the stop-fingers the pitman 2, connected to the gear-wheel C' and the bearing-standards, is so timed and arranged that the cylinder starts to move from the position shown in full lines in the drawings to that indicated by dotted
105 lines at the left, (see Fig. 2,) when the roller p^2 will roll down the incline q' of the bar Q and thereby serve to bring the table and the sheet of paper beneath the stop-fingers into close proximity with the cylinder. At this
110 moment the gripping-fingers of the cylinder, moving in the direction indicated by arrow, Fig. 2, are caused to open by the end of the crank-arm traveling up the outer rib v of the bar V, such fingers then serving as
115 the cylinder rotates in the direction indicated by arrow to grip the sheet off the end of the flap P'. After the end of the crank-arm U' has traversed the front rib v , so as to open the grippers, the plate P³ of the flap P' will
120 have arrived underneath one of the end grippers and will then momentarily serve to hold down the flap P' while the edge of the paper is passing underneath the stop-fingers. When this particular gripper has passed the plate,
125 the rib v' serves to allow the arm to come down gradually, and thereby close the gripping-fingers gradually upon the paper without any danger of cutting it. The paper now being grasped by the gripping-fingers, the cylinder is caused to rotate in the opposite direction to that indicated by arrow, Fig. 2,
130 and pass with its bearing-standards rearwardly on the machine, the pinion D' mesh-

ing with the rack G and serving to prevent any slipping of the cylinder. The paper as it passes around the cylinder is smoothed over by the spring-fingers U³, and the tapes *t* pass from off the grooved wheels T, as indicated by dotted lines in Fig. 2, until the clamping-bar 3 passes onto the opposite edge of the paper. During this rearward and rotary movement of the cylinder and the paper around it the type on the chase is brought up and held by the cam M, so that the impression is transferred to the sheet. When the cylinder has reached the limit of its rearward movement, the arm E³ rises on the inclined block E⁴ and then relieves the spring-fingers E' from contact with the now printed paper on the cylinder. Upon the cylinder returning to its former position the arm U' rises upon the guiding-ribs *v'* and causes the gripping-fingers to release this edge of the paper, which drops onto the delivery-table N, and as the tapes *t* are rewound upon the wheels T the clamping-bar 3 releases the other edge of the paper.

It will of course be understood that the clamping-bar is situated at the proper distance along the tape from the gripping-fingers to grasp the other edge of the paper of whatever width may be used.

To rewind the wheels after the tape has been drawn out from them by the rearward movement of the cylinder, I provide, as shown, a helical spring 7, which is secured at one end to the end of the spindle S and at the other end to the bearing of such spindle, as indicated in Fig. 1. This spring winds up as the tapes are being withdrawn and of course exercises a winding movement upon the tapes as the cylinder is being restored to its normal position.

Among the advantages arising from the use of my machine it will be apparent that the feed is necessarily much quicker than in the ordinary press, where the feeding and the delivery of the sheet have to be accomplished upon the same table, that the feeding of the sheet is very simple and positive, and that the affixing of the sheet to the cylinder is also very secure, so that there will be no slipping during the time that the sheet is being printed. It will also be seen that very effectual means are provided, whereby if a sheet is not fed the cylinder is not spoiled or defaced by being printed upon.

What I claim as my invention is—

1. In a printing-press in combination the traveling cylinder, the feeding-table arranged to deposit the sheet upon the cylinder to be printed, and a delivery-table located underneath the feeding-table having one end extending beneath the cylinder when said cylinder is in its rearward position suitably supported and arranged to receive the sheet directly from said cylinder after being printed as and for the purpose specified.

2. In a printing-press, in combination, the cylinder, the feeding-table pivotally supported at the front end on the frame and hav-

ing a pivoted flap the end of which extends into proximity with the cylinder and means for tilting the table with the flap on its pivot to lower the rear end of the feeding-table to deposit the sheet upon the cylinder and for raising it to allow of the depositing of the printed sheet upon the delivery-table as and for the purpose specified.

3. In a printing-press, in combination, the cylinder, bearing-standards for the end spindles thereof, guideways for the bottoms of such standards upon which they have longitudinal movement, forwardly-extending bar attached to one standard and having an inclined intermediate portion, the feeding-table pivotally swung on the frame, the hanger and roller designed to have movement upon the inclined way of the bar attached to the bearing-standards as and for the purpose specified.

4. In combination in a printing-press, a traveling cylinder, means for rotating the same during its traveling movement, the feeding-table, and tapes secured at an end to said cylinder adapted to wind around the same to grip the paper in one movement thereof and to unwind from the cylinder in its reverse movement, substantially as described.

5. In combination in a printing-press, the traveling cylinder with means for imparting a rotary movement thereto during its traveling movement, the delivery-table, the grippers adapted to grasp the edge of a sheet, and the supplemental holding means for said sheets comprising the tapes designed to wind around the cylinder, as the cylinder rotates, substantially as described.

6. In a printing-press, in combination, the cylinder, means for imparting a rotary movement to the same longitudinally of the press as it rotates, the feeding-table provided with a hinged end flap spring-held, the stop-fingers, the arc-shaped spring-held gripping-fingers, the recess in the cylinder, the rod to which the gripping-fingers are secured extending through such recess and the ends of the cylinder, means for opening and closing the gripping-fingers and a projecting plate designed to come in contact with one of the gripping-fingers to momentarily depress the flap—as and for the purpose specified.

7. The combination with the impression-cylinder and gripping-fingers of the spring smoothing-fingers movable horizontally with said cylinder and means for bringing them down upon the cylinder and paper thereon after the gripping-fingers have grasped the paper and the cylinder has started to rotate in its rearward movement as and for the purpose specified.

8. The combination with the cylinder and gripping-fingers, of the spring smoothing-fingers and means for bringing them down upon the cylinder and paper thereon after the gripping-fingers have grasped the paper and the cylinder has started to rotate in its rearward movement, and means for raising the fingers when the cylinder has reached the limit of its

rearward movement as and for the purpose specified.

9. The combination with the cylinder and gripping-fingers, of the spring smoothing-fingers, the clamped cross-rod on which they are held, the end arms for the same and the bearing-standards having arms on which such arms are pivoted, the depending arm from the cross-rod, the bent projection with which the lower end of the arm is designed to come in contact when the cylinder has about reached the limit of its forward movement as and for the purpose specified.

10. The combination with the cylinder and gripping-fingers, of the spring smoothing-fingers, the clamped cross-rod on which they are held, the end arms for the same and the bearing-standards having arms on which such arms are pivoted, the depending arm from the cross-rod, the bent projection with which the lower end of the arm is designed to come in contact when the cylinder has about reached the limit of its forward movement and the raised inclined block fastened to the bed and with which the depending arm is designed to come in contact as and for the purpose specified.

11. In combination the feeding-table, the reciprocating cylinder and the gripping-fingers, the tapes attached at one end to the gripping-fingers, a rewinding means operating entirely independent of the cylinder for holding the opposite ends of the tapes and a clamping-bar secured on such tapes and designed to hold the opposite end of the sheet to that which the gripping-fingers hold as and for the purpose specified.

12. In combination the feeding-table, the cylinder and the gripping-fingers, the tapes attached at one end to the gripping-fingers, the rod and grooved wheels carrying the opposite end of the tapes, the clamping-bar se-

cured in the tapes and designed to hold upon the cylinder the opposite edge of the sheet to that which the gripping-fingers hold and a helical spring secured at one end to the rod of the grooved wheels and at the other end to a portion of the frame as and for the purpose specified.

13. In combination the cylinder, the chase, the eccentric-bars, the arms attached to same, the forked rod I, the forked bracket J, the lever K having lugs *k*, the bracket *k'*, the screw-spindle having right and left hand thread extending into the forked bracket J and bracket *k'* and means for imparting a rocking movement to the lever as and for purpose specified.

14. In combination the cylinder, the chase, the eccentric-bars, the arms attached to same, the forked rod I, the forked bracket J, the lever K having lugs *k*, the bracket *k'*, the screw-spindle having right and left hand thread extending into the forked bracket J and bracket *k'* and cam M on the main shaft for imparting a rocking movement to the lever as and for the purpose specified.

15. In combination the cylinder, the chase, the eccentric-bars, the arms attached to same, the forked rod I, the forked bracket J, the lever K having lugs *k*, the bracket *k'*, the screw-spindle having right and left hand thread extending into the forked bracket J and bracket *k'*, cam M on the main shaft for imparting a rocking movement to the lever, the annular groove in the collar of the cam and the pivoted lever with pin extending into the groove so as to impart a lateral movement to the cam as and for the purpose specified.

FREDERICK JOHN HARBRIDGE.

Witnesses:

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A. MCADAM.