

(No Model.)

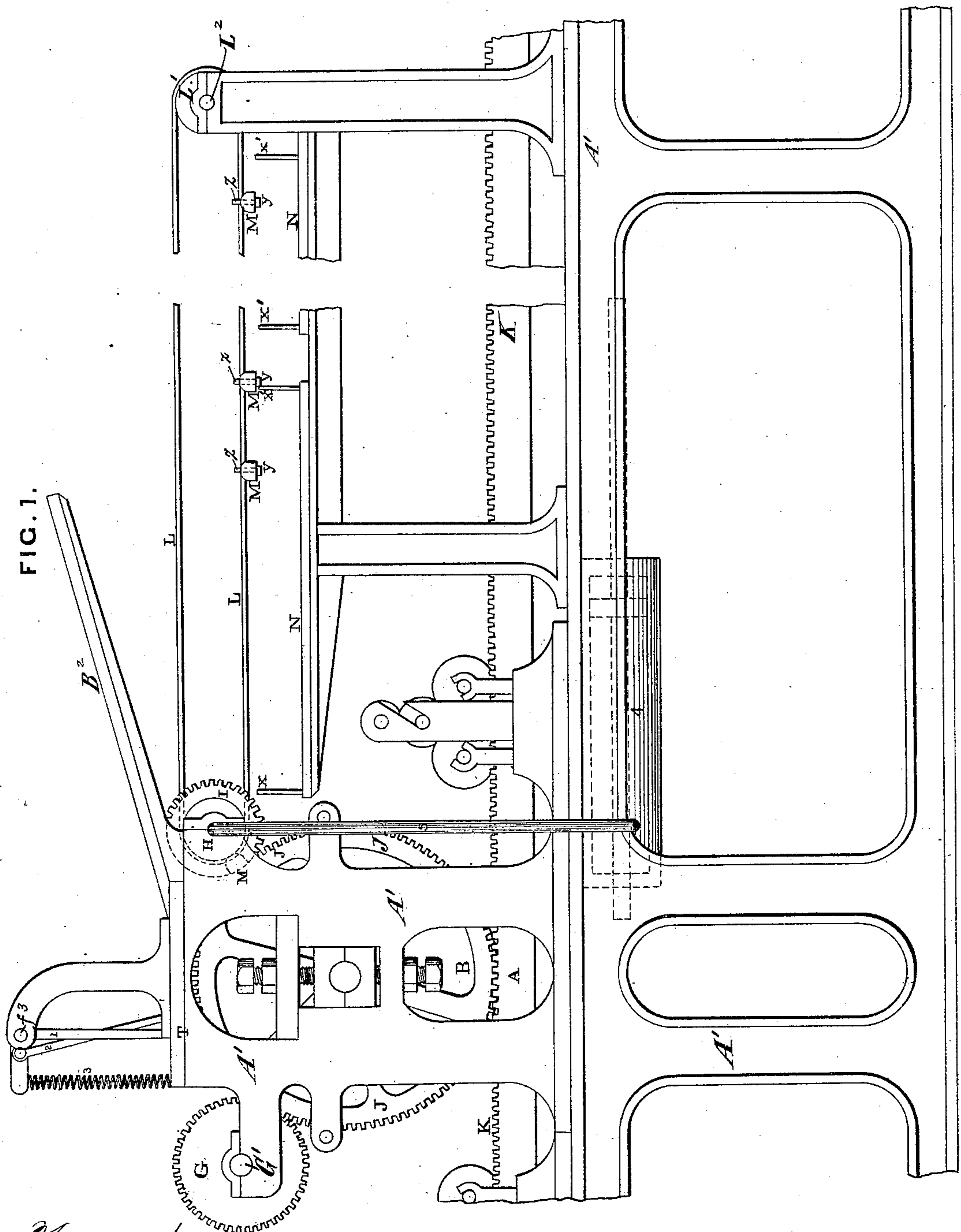
4 Sheets—Sheet 1.

W. RUMBLE.

PRINTING PRESS.

No. 245,871.

Patented Aug. 16, 1881.



*Geo. Haynes*  
*Thomas C. Birch.*  
WITNESSES.

*Wm. Rumble*  
*By Rumble & Co. attys* INVENTOR.

(No Model.)

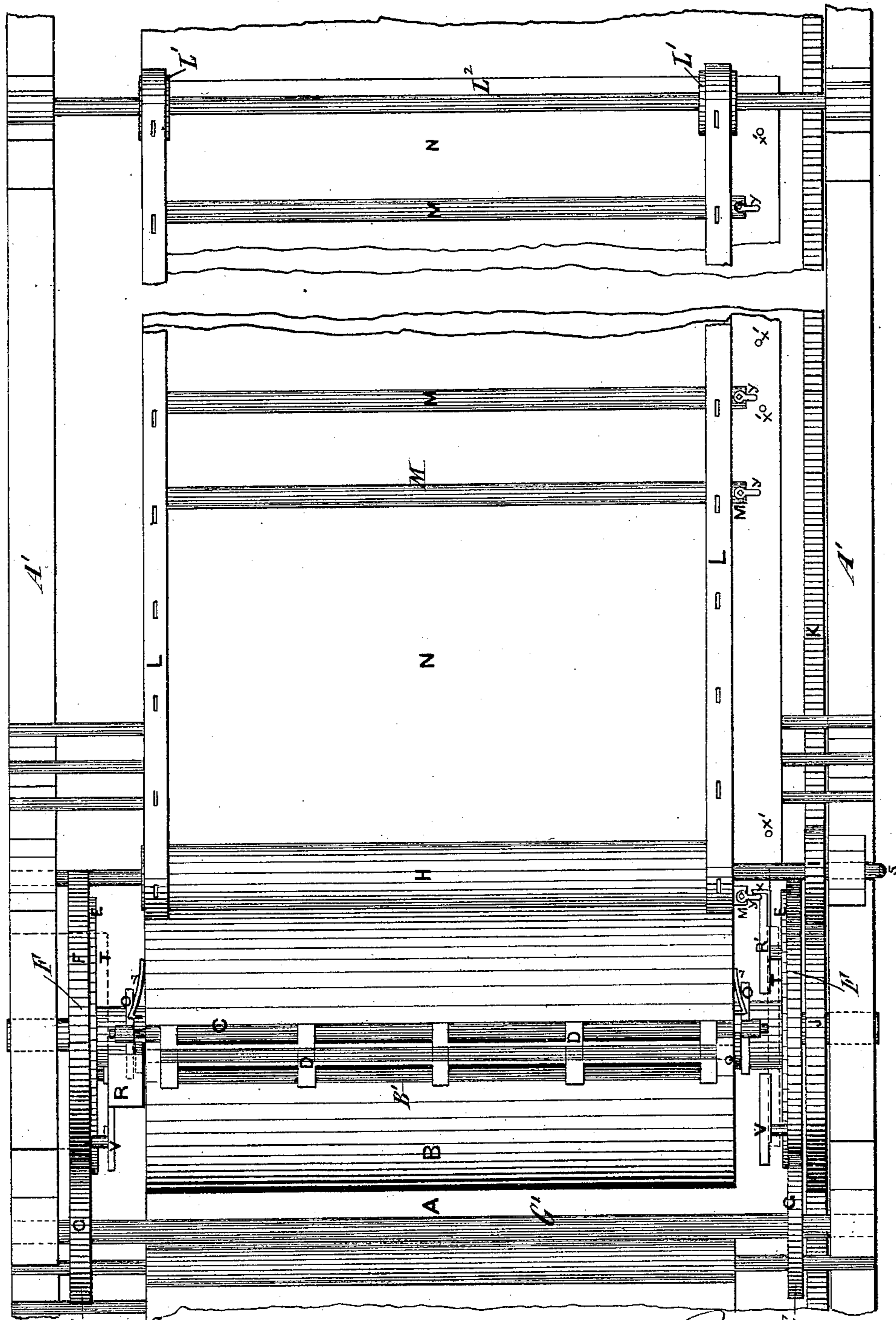
4 Sheets—Sheet 2.

W. RUMBLE.  
PRINTING PRESS.

No. 245,871.

Patented Aug. 16, 1881.

FIG. 2.



*J. H. Haynes*  
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*Wm Rumble*  
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*att'd*

(No Model.)

4 Sheets—Sheet 3.

W. RUMBLE.

PRINTING PRESS.

No. 245,871.

Patented Aug. 16, 1881.

FIG. 4.

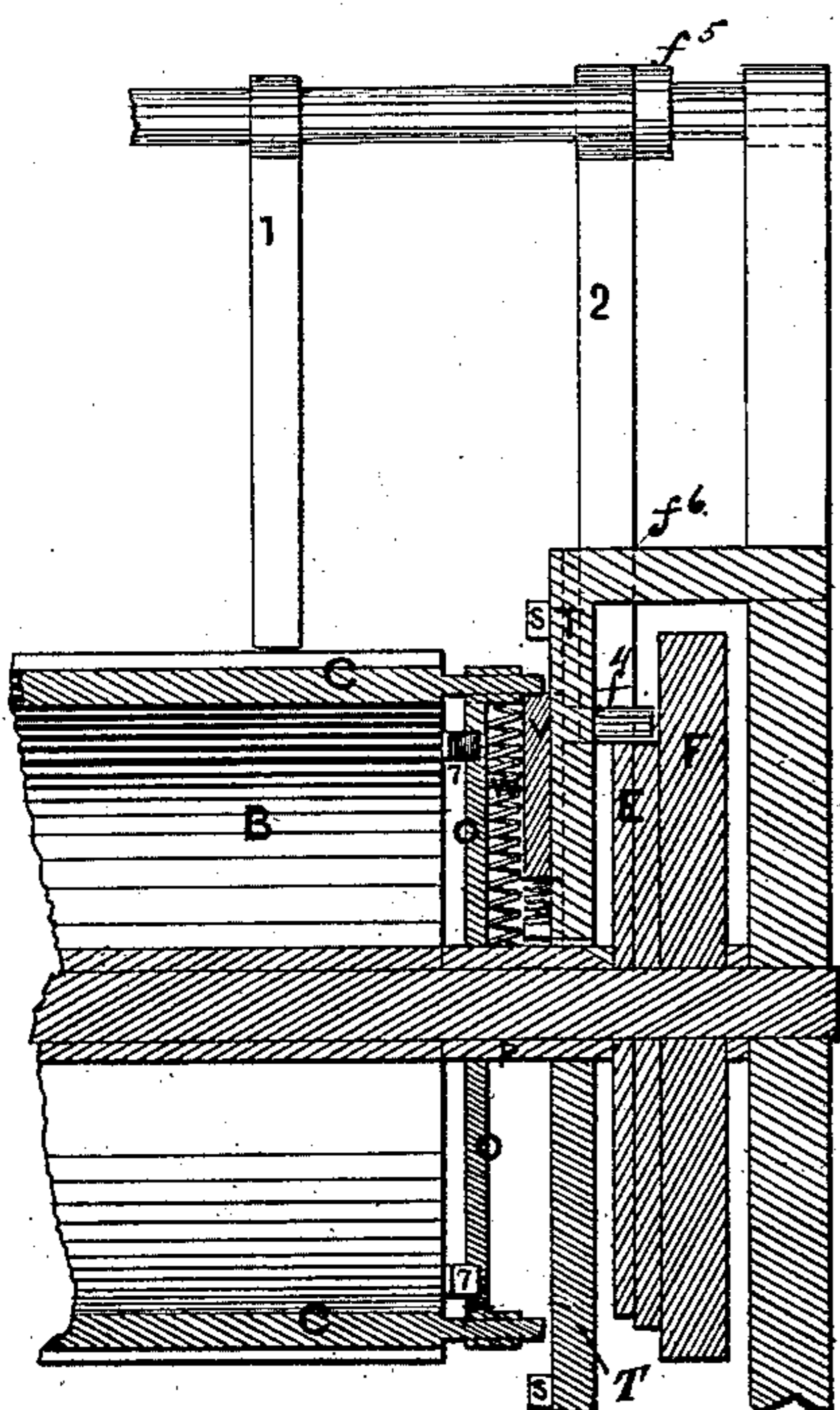


FIG. 3.

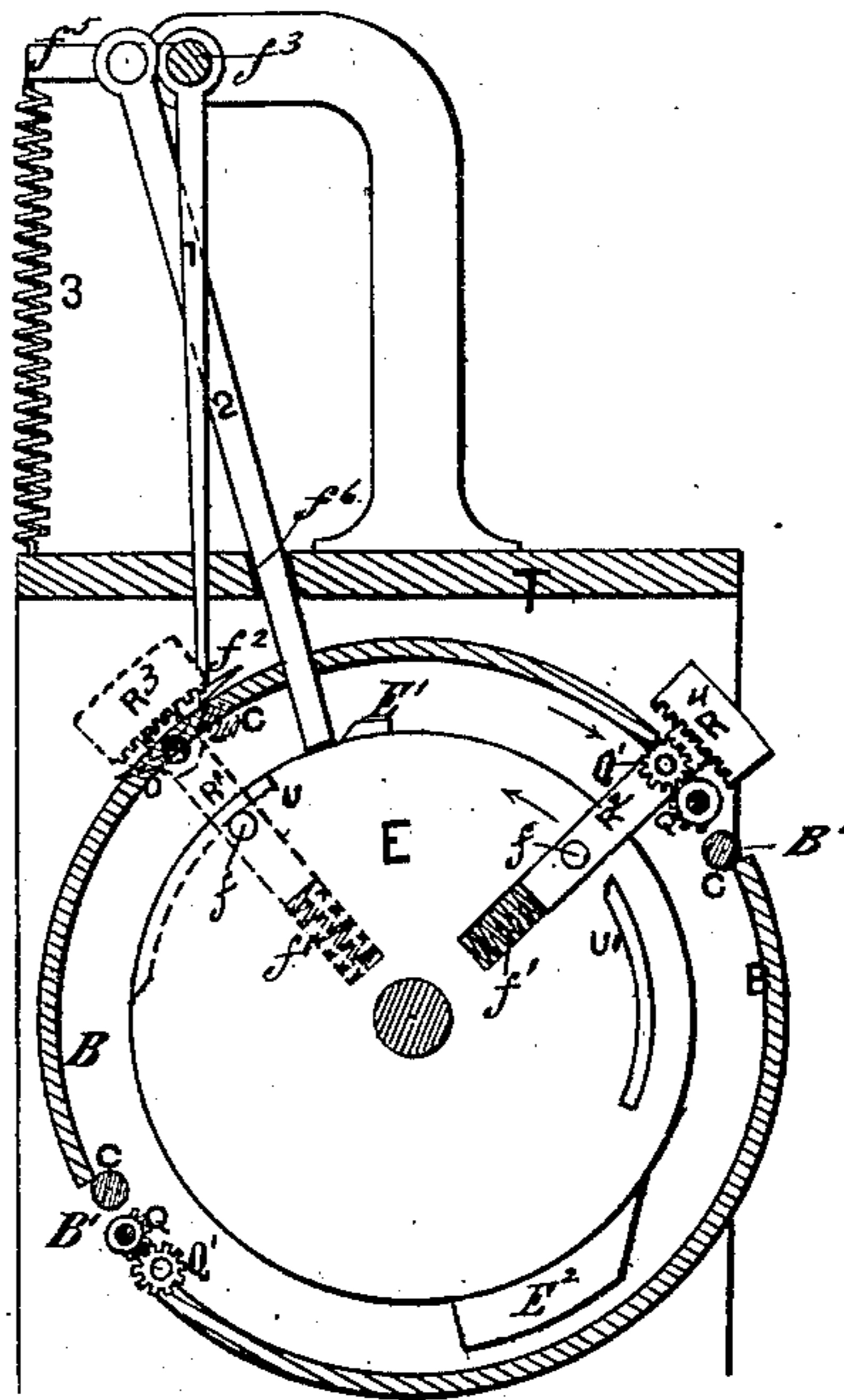


FIG. 9.

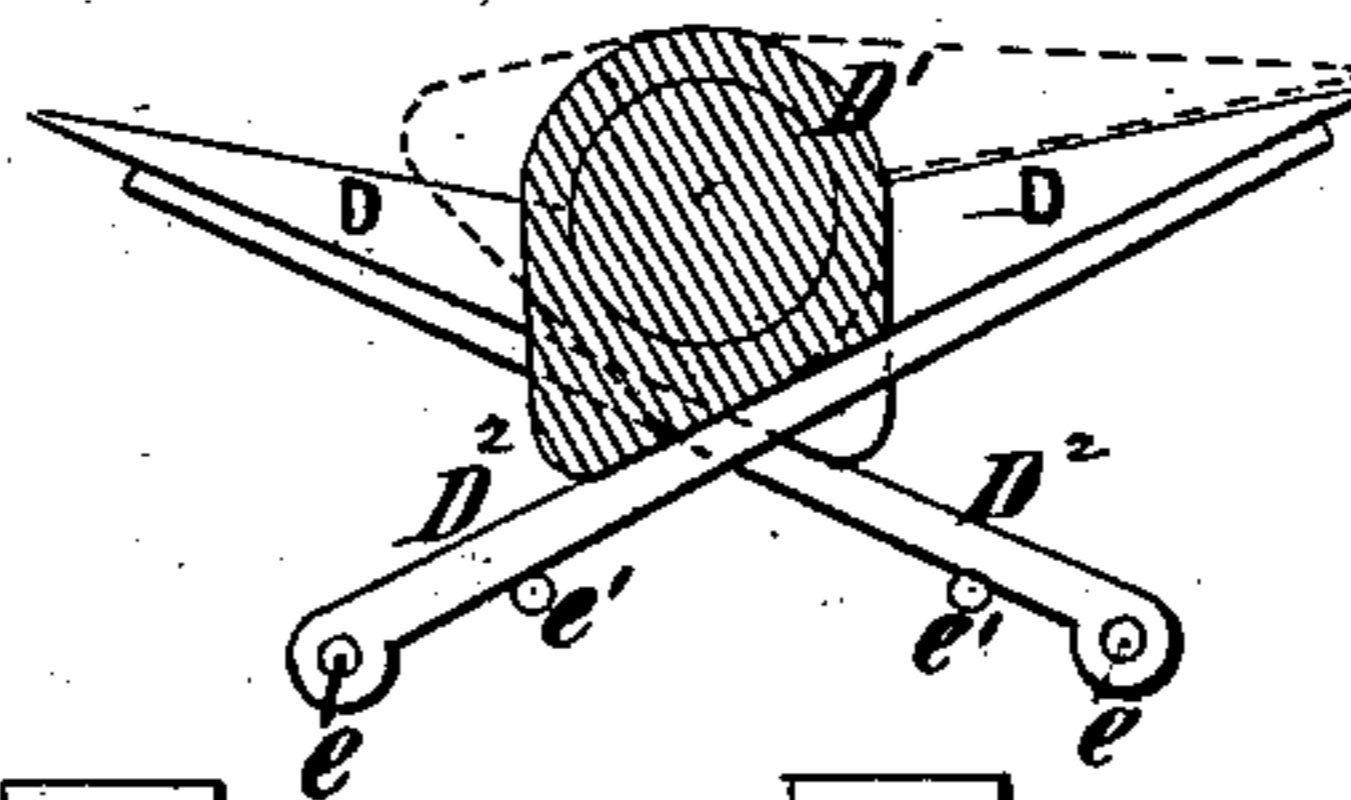
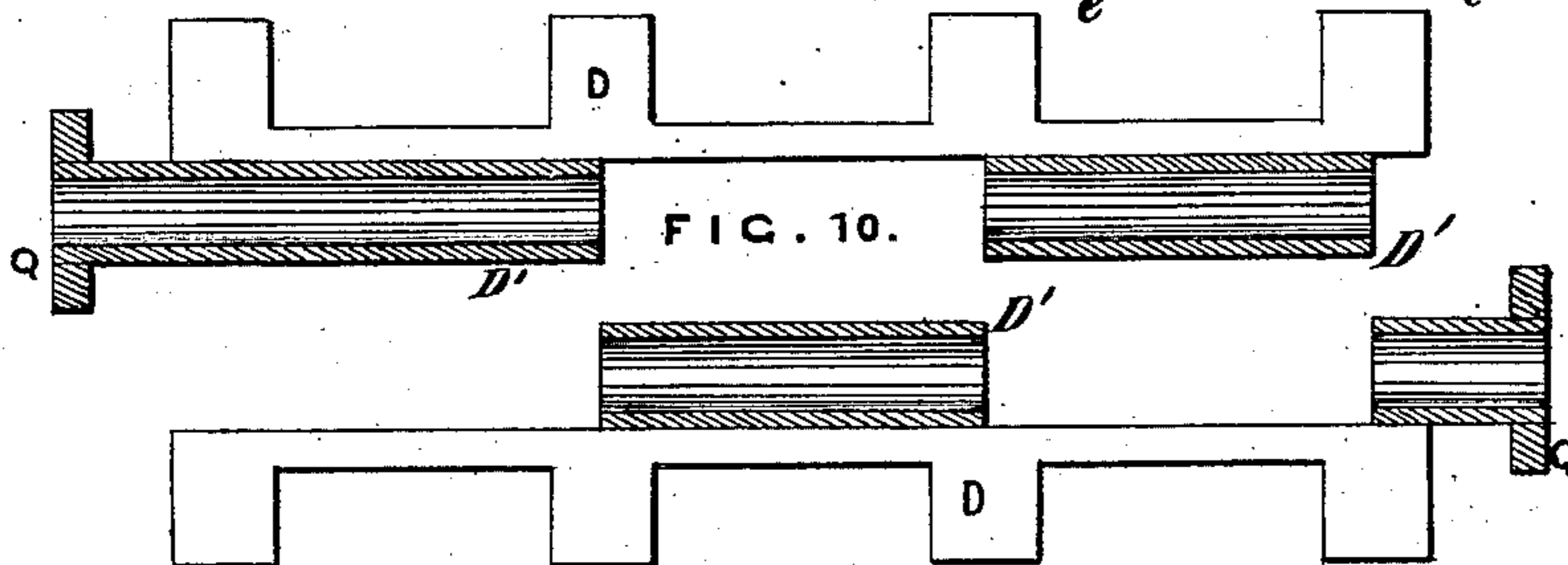


FIG. 10.



*Friedrich Hayner*  
*Thomas C. Birch.*

WITNESSES

*Wm Rumble*

*By Brown & Brown attys* INVENTOR

(No Model.)

4 Sheets—Sheet 4.

W. RUMBLE.

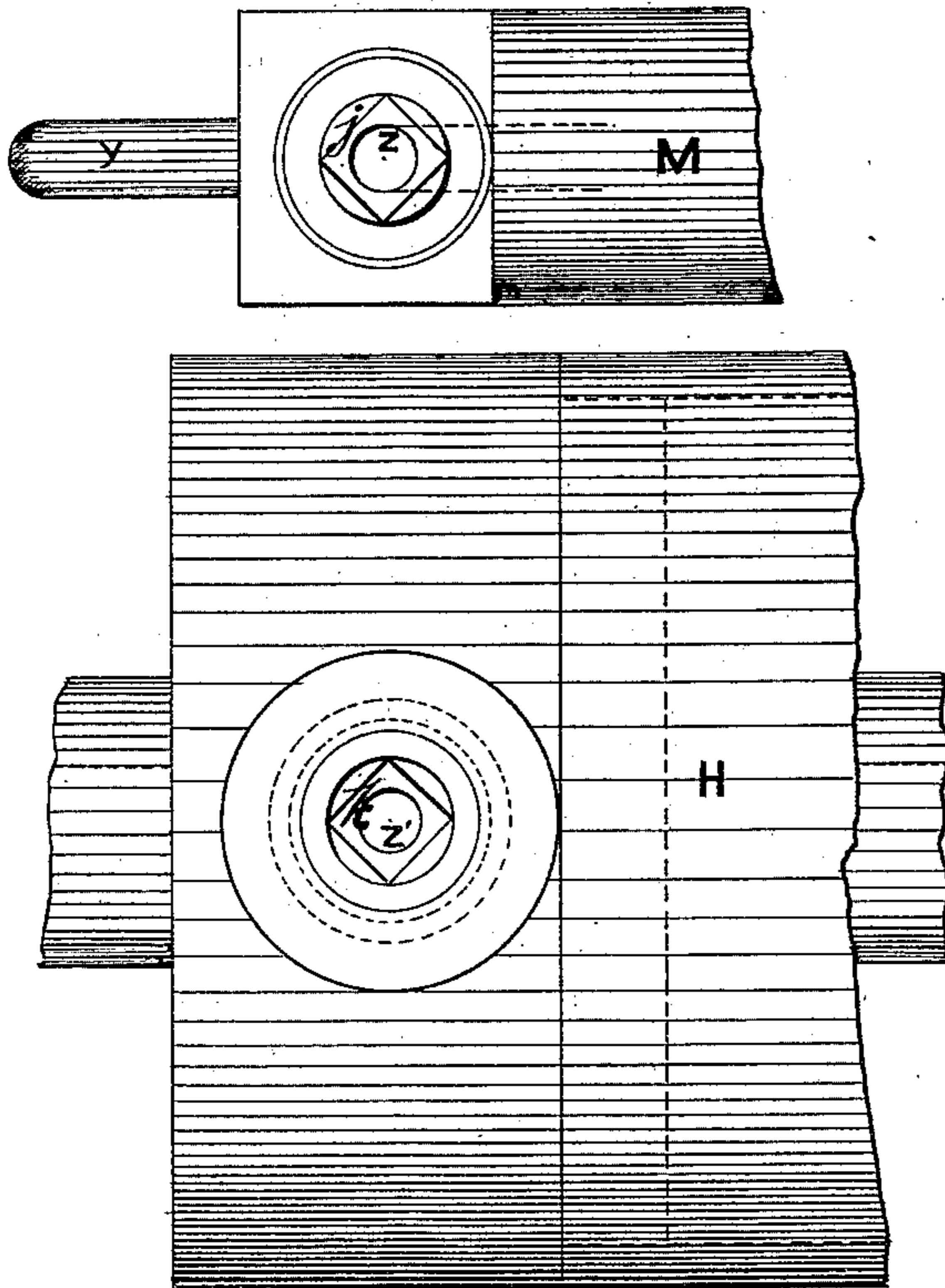
PRINTING PRESS.

No. 245,871.

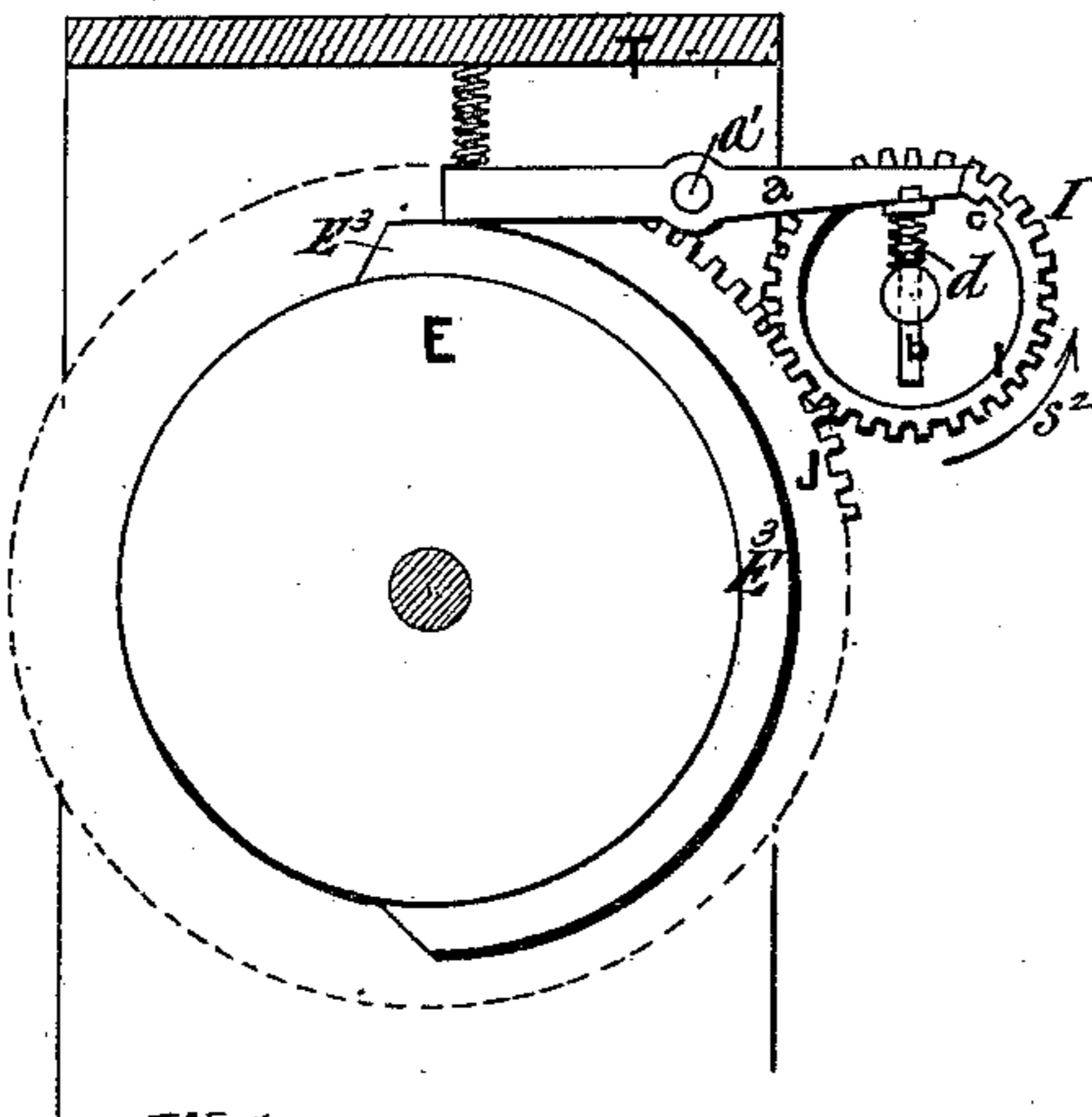
Patented Aug. 16, 1881.

FIG. 7.

FIG. 8.



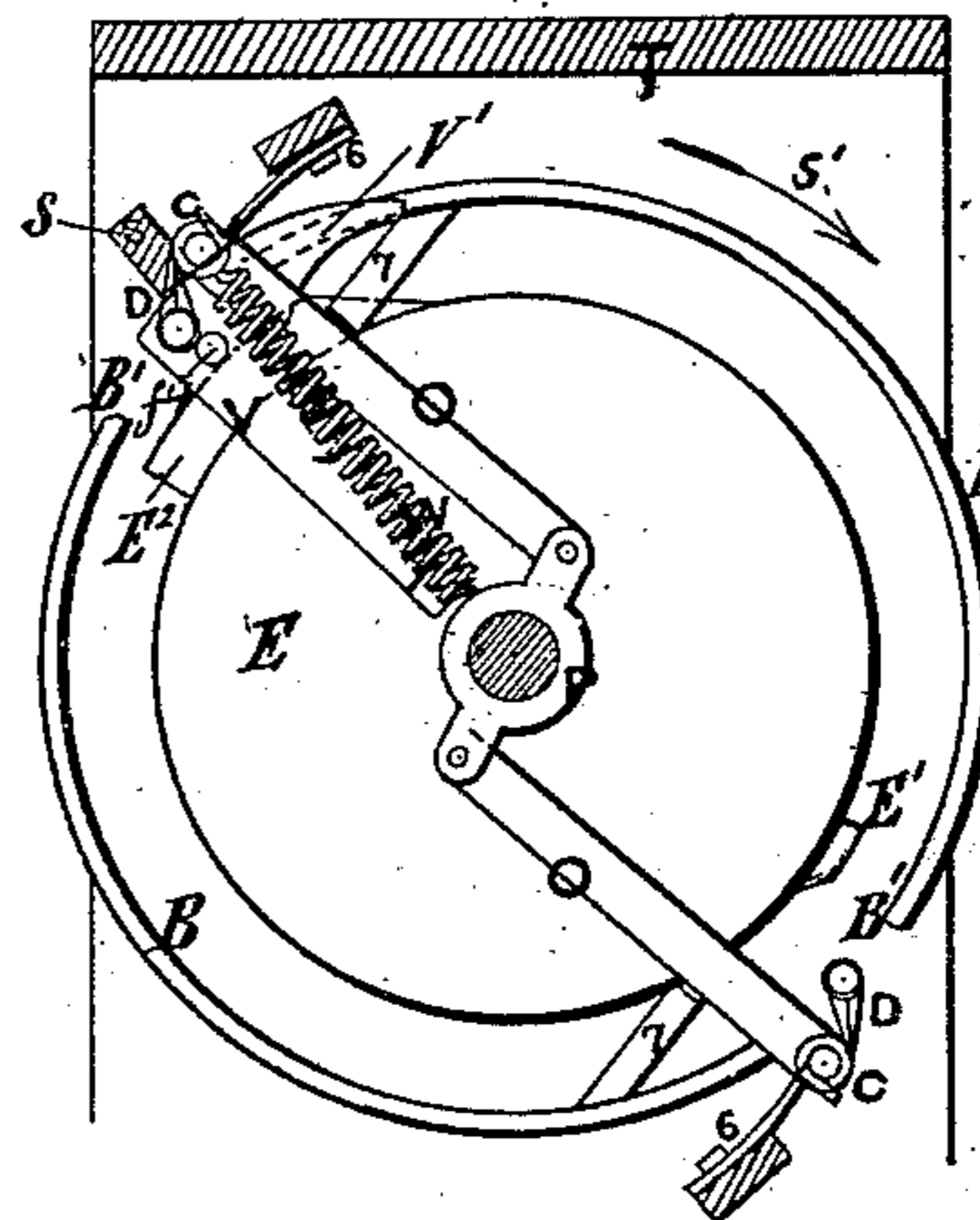
**FIG. 6.**



*Witnesses:*

Geo<sup>d</sup> Haynes  
Thomas E. Birch.

FIG. 5.



*Inventor:*

**Inventor:**  
 J. M. P. P. P.  
 by his Attorneys  
 Brown & Brown

# UNITED STATES PATENT OFFICE.

WILLIAM RUMBLE, OF NEW YORK, N. Y.

## PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 245,871, dated August 16, 1881.

Application filed March 19, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM RUMBLE, of the city, county, and State of New York, have invented certain new and useful Improvements in Printing-Presses, of which the following is a specification.

My invention is applicable to what are known as "perfecting-presses," and relates to mechanism for opening and closing the nippers which take the sheet and draw it forward to the mechanism employed for turning the sheet upon the cylinder after one side has been printed, to enable it to receive an impression on the other side, and to mechanism for delivering the printed sheets.

The invention consists in the combination, in a printing-press, of a cylinder, nippers hinged together, each nipper having a pinion upon its axis, intermediate pinions engaging with the pinions on said nippers, sliding bars each carrying a rack at its outer end opposite one of said intermediate pinions, and mechanism for moving said bars and rack inward to engage with said intermediate pinions, to close or open the nippers as said cylinder is rotated.

It also consists in a novel construction of the hinged nippers and arrangement of spring-arms for holding them open or closed.

It also consists in the combination, in a perfecting-press, of a cylinder, means for holding the paper, one or more turning rollers or bars inside the surface of the cylinder, and devices for moving said turning rollers or bars beyond the surface of the cylinder and holding them stationary while the cylinder commences its backward movement and the paper is carried under the turning rollers or bars, thereby turning the sheets and bringing the unprinted side of the sheets outward.

It also consists in a novel manner of connecting the two turning-rollers so that they may be both moved outward simultaneously by devices acting upon one roller only.

It also consists in the combination, with the cylinder of a printing-press, of an endless belt or belts, vacuum-deliverers provided with air-valves and secured thereto and adapted to be carried in contact with the printed sheet, means for exhausting the air from said deliverers while in contact with the printed sheet, and devices by which said air-valves are opened at the proper time to admit air to the deliverers, and by destroying the vacuum therein to cause

them to drop the printed sheet. I also combine with the above a vacuum-cylinder which is constantly exhausted of air, and around which the endless belts and their attached deliverers pass, and said vacuum-cylinder is provided with air-valves, with which the air-valves of the vacuum-deliverers engage while the latter are in contact with the printed sheet, whereby both valves may be turned simultaneously and communication established between said vacuum-cylinder and said deliverers by simply turning the valves of the deliverers.

It also consists in details of construction and combinations of parts; hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side view of a press embodying my invention, portions being broken away to reduce the length thereof. Fig. 2 represents a plan thereof. Fig. 3 represents a transverse section of the cylinder, also representing mechanism for operating the nippers and other parts. Fig. 4 represents a longitudinal section of the end portion of the cylinder opposite to the end shown in Fig. 1, including the turning-rollers and devices for supporting and operating the same. Fig. 5 represents an end view of the cylinder and the devices for supporting and operating the turning-rollers. Fig. 6 represents a side view of the mechanism for imparting motion to the cylindric vacuum-chamber on a plane transverse to the axis of the cylinder. Fig. 7 represents a longitudinal section of one end portion of the cylindric vacuum-chamber and one of the vacuum-deliverers. Fig. 8 represents an exterior view of the parts shown in Fig. 7, but in a different position. Fig. 9 represents a transverse section of the nipper-hinge or knuckle-joint and a side view of the nippers and springs for holding them in place after adjustment; and Fig. 10 represents a longitudinal section of the two portions of said knuckle-joint detached from each other, with their several nippers.

Similar letters of reference designate corresponding parts in all the figures.

A designates the bed of the press, which is reciprocated by any suitable mechanism in guides or ways in the side frames, A'.

B designates the cylinder, which is adapted to rotate in bearings in the side frames, A', and which is connected with the bed A by means of a spur-gear wheel, J, upon the shaft of the

cylinder engaging with a rack, K, attached to one side of the bed; hence the cylinder is turned forward and backward as the bed is reciprocated.

5 In the cylinder B are two longitudinal openings or recesses, B', and in each recess or opening is a pair of nippers, D, which are constructed so as to fit into each other like a hinge, as seen in Fig. 10, and are fitted upon a pin or  
10 pintle extending from end to end of the cylinder. The bottoms or under side of the eyes D' of the nippers are inclined in opposite directions, as seen in Fig. 9; and D<sup>2</sup> designates spring-arms, which are pivoted at e and rest  
15 upon stop-pins e'. When one of the nippers is turned so as to impinge on the face of the other, as shown in dotted outline in Fig. 9, the spring-arm bearing upon such nipper is deflected, and after the completion of the move-  
20 ment of the nipper rises and bears upon the side thereof, thus holding it against accidental movement. Each pair of nippers must be closed to grasp or bite the sheet and subse-  
25 quently opened to release the sheet, and I will now describe the mechanism whereby this is accomplished.

F designates two gear-wheels fitted loosely upon the shaft of the cylinder, one on each end thereof, and G designates wheels engag-  
30 ing therewith and mounted upon the shaft G'. The shaft G' has motion imparted to it by any suitable mechanism, and by it the wheels F are driven continuously in one direction, while the cylinder turns backward and forward, and  
35 are driven at one-fourth the speed of said cylinder.

Upon each wheel F is rigidly secured a cylindric hub or disk, E, and each of said hubs or disks has formed upon its periphery two  
40 cams, E' E<sup>2</sup>, while the hub or disk on the side of the press shown in Fig. 1 has a third cam, E<sup>3</sup>. The several cams E' E<sup>2</sup> E<sup>3</sup> are in different planes on the face of their hubs or disks, and are shown in Figs. 3, 5, and 6.

45 Upon the inside of each of the side frames, A', is a frame or stationary plate, T, through which the shaft of the cylinder passes. In Fig. 3 this frame or plate is removed, so that the hub or disk E behind it may be clearly  
50 seen. In each of the plates T is a slot or recess which is radial to the hub or disk E, and in such slots or recesses are fitted sliding bars R' R<sup>2</sup>, in which are fixed pins or studs f, which project through slots in the plates or frames  
55 T and in the path of projections u u' upon the hub or disk E'. The projection u acts upon the pin or stud f of the bar R' to move it inward against the pressure of a spiral spring, f', and the projection u' acts upon the pin or  
60 stud f of the bar R<sup>2</sup> to move it inward against the force of a similar spring, f'. Upon the outer extremity of the bars R' R<sup>2</sup> are secured racks R<sup>3</sup> R<sup>4</sup>, which are adapted to engage with pinions Q', which are themselves in engage-  
65 ment with pinions Q upon the nippers D to turn them to close the nippers, or to open them when said bars R' R<sup>2</sup> are moved inward by the

projections u u' on the hubs or disks E. The bar R' and rack R<sup>3</sup> (shown in Fig. 3 in dotted outline) are upon the side of the press oppo-  
70 site to that shown in Fig. 1, while the bar R<sup>2</sup> and rack R<sup>4</sup> (shown in full outline in Fig. 3) are upon the side of the press seen in Fig. 1.

The pinions Q' may be properly termed "intermediate pinions," as they transmit motion  
75 from the racks R<sup>3</sup> R<sup>4</sup> to the pinions Q.

The paper is fed from a feed-table, B<sup>2</sup>, and its front edge is held by hooks or prongs f<sup>2</sup> upon the lower ends of depending fingers or arms 1, fulcrumed upon a shaft, f<sup>3</sup>, above the  
80 cylinder. Upon the shaft f<sup>3</sup> is also a projecting arm, f<sup>5</sup>, to the outer end of which is attached a spring, 3, for the purpose of holding the arms 1 in such position that their hooks or prongs will receive the sheet, and to the  
85 arm f<sup>5</sup> is connected a rod or arm, 2, which projects through a slot or guide, f<sup>6</sup>, in the path of the cam E', as seen in Fig. 3. At the commencement of the forward movement of the bed A one pair of nippers are in the position  
90 shown in full outline in Fig. 3, and when they reach the position shown in dotted outline the rack R<sup>3</sup> has been moved in by the projections u u' on the hub of the disk E, and by the fur-  
95 ther movement of the cylinder is caused to turn the pinion Q', and through it the pinion Q on the pair of nippers, and thus close the nippers upon the front edge of the sheet, the arms 1 being moved forward out of the way of the sheet by the cam E' acting upon an arm,  
100 2, and through it on the shaft f<sup>3</sup>. After the cylinder has made half a revolution the other pair of nippers are brought into the position shown in dotted outline in Fig. 3, and, the rack R<sup>3</sup> being still held down, the said pair of  
105 nippers are likewise closed and a second sheet is drawn forward onto the cylinder. When the cylinder has completed the revolutions resulting from the complete forward movement of the bed, the two pairs of nippers occupy the  
110 position shown in Fig. 5. The two turning-rollers C, which are adjacent to the two pairs of nippers, are supported at each end of the cylinder B by pairs of arms O, as clearly seen in Fig. 5, which are connected at their inner  
115 ends by a collar, P, which is fitted loosely upon the shaft of the cylinder B, and it is obvious that when either turning-roller is moved radially outward from the cylinder the other will also be correspondingly moved outward. When  
120 not pressed outward, and during the whole forward movement of the bed and cylinder, the two turning-rollers C are held within the periphery of the cylinder B by a spiral spring, W, at each end of the cylinder, as seen in  
125 Figs. 4 and 5.

In lieu of the turning-rollers non-rotary bars might be employed.

In each of the plates or frames T is a recess or slideway, in which is a sliding bolt or bar, V,  
130 from which a pin, f<sup>4</sup>, projects through a slot in the plate or frame in the path of the cam E<sup>2</sup>. The bolts or bars V have long heads or outer extremities, V', curved or inclined at their outer

edges, and just before the completion of the forward movement of the bed and cylinder these bolts or bars are pressed outward by the cam  $E^2$ , so as to project beyond the periphery of the cylinder and in the path of the journals of one of the turning-rollers C, which rides up on the inclined or curved heads  $V'$  of the bolts or bars V, and thus raises said roller, and also the other turning-roller, because of its connection therewith, out of the recesses or openings  $B'$  in the cylinder and into the position shown in Fig. 5, where the cylinder and bed stop. During the outward movement of the two turning-rollers C by the bolts or bars V, the rollers have been prevented from moving backward by springs 7 upon the ends of the cylinder, which bear upon one of the arms O at each end of the cylinder, and one of the said rollers has been carried under stationary springs 6, (see Fig. 5,) which spring down behind the roller and prevent its return. The rollers C when in this position strike against stops  $s$ , between which and the springs 6 they are held.

It will be understood that during the whole forward movement of the cylinder and bed the sheets upon the cylinder have been outside the turning-rollers C, and hence when said rollers are moved outward, as just described, the sheets are raised.

Fig. 5 represents the cylinder in its stationary position just before it commences its backward movement, and when it commences its backward movement in the direction of the arrow  $s'$  it is obvious that the turning-rollers C will be prevented from moving with the cylinder and nippers, and hence the nippers will be turned over and carried under the turning-rollers C, and as they still retain their hold upon the sheet the latter will be drawn under the roller, and the two sheets will be turned completely over with the printed sides next the cylinder. By the time the cylinder has turned backward half a revolution the cams  $E^2$  have released the bolts or bars V, and the latter, and with them the turning-rollers C, are drawn in by the springs W, and the rollers drop into the recesses or openings  $B'$  in the cylinder; but the roller which was before in one of the recesses or openings is now in the other, and vice versa. The cylinder makes its revolution backward while the bed is completing its backward movement, and has thus returned to its original starting-point, where it is ready to take new sheets. During the backward movement of the cylinder the two sheets are printed upon their reverse sides, and are delivered in a manner which I will now describe.

H designates a hollow cylinder, arranged parallel with the cylinder B and constituting a vacuum-chamber. The said cylinder is exhausted of air by means of an air-pump, 4, (see Fig. 1,) which may be operated by the bed A of the press or in any other suitable manner, and which communicates with the cylinder H through a pipe, 5, which enters the cylinder through its hollow journal. The cylinder H

derives motion from the gear-wheel J through a smaller wheel, I, upon the shaft or journal of the cylinder H; but as the cylinder B moves backward and forward, while the cylinder H should go only forward, or in the direction indicated by the arrow  $s^2$ , Fig. 6, the wheel I is loose upon the shaft of the cylinder H, and is locked fast thereto by means of a bolt,  $b$ , engaging with a notch,  $c$ , in said wheel, into which it is pressed by a spring,  $d$ . During the forward movement of the cylinder B the bolt  $b$  is pressed down out of the notch  $c$  by a lever,  $a$ , pivoted at  $a'$ , and actuated by the cam  $E^3$ , and the cylinder H stands still; but when the cylinder B commences its reverse movement the bolt  $b$  is released and again engages with the notch  $c$ .

L designates the belts, which pass round the cylinder H near its two ends, and are geared therewith, so as to be moved positively, and said belts pass around pulleys  $L'$  upon a shaft,  $L^2$ , near the end of the press.

M designates two pairs of deliverers, which are attached at each end to the belts L and are carried thereby. These deliverers consist of hollow chambers, made flat upon the under side, and having in the flat side holes or perforations  $g$ . (See Fig. 7.) In the end of each deliverer is a hole or aperture,  $h$ , which is controlled by a cock or plug-valve, Z, which may be turned to open it by a handle, Y, but which is always automatically closed by a spiral spring,  $i$ , which surrounds it, and has one end fast fixed in the plug and the other in its seat. The end of the plug projects somewhat beyond the side of the deliverers M, and is squared at its end, as seen clearly at  $j$  in Fig. 8.

In the end of the cylinder H are two apertures or passages,  $h'$ , each controlled by a plug-valve or cock,  $Z'$ , which is automatically closed by a coiled spring,  $i'$ , similar to the spring  $i$ , previously described. The outer ends of the plug-valves or cocks  $Z'$  are flush with the periphery of the cylinder H, and in them are recesses  $k$ , the bottoms of which are squared and adapted to receive the squared end of the plug Z in the deliverer M.

It is obvious that when the end of the plug Z is inserted in the recess  $k$  in the plug  $Z'$  both cocks or valves may be opened by turning the handle Y and communication established between the cylinder H and the deliverer M, and also between said deliverer and the air-pump 4.

When the cylinder B has turned backward one and one-quarter revolution, the first pair of nippers D are brought to the position shown in full outline in Fig. 3, and simultaneously with its arrival in such a position the hub or disk E has, by its projection  $u'$ , moved the bar or bolt  $R^2$ , and with it the rack  $R^4$ , inward into engagement with the pinion  $Q'$ , which engages with the pinion Q of the nippers, and the continued movement of the cylinder then opens the nippers. At this time the rotation of the cylinder H and the movement of the belts L has brought one of the deliverers M into the

position shown in dotted outline in Fig. 1, with its plug-valve or cock Z in engagement with the valve or cock Z' of the vacuum-cylinder H. The handle Y of the cock Z is moved by  
 5 coming in contact with a stop, X, (see Fig. 2,) and the two cocks opened, thus exhausting the air from the deliverer M, and, by the suction produced by the holes or perforations g in the flat side thereof, drawing and holding the free  
 10 end of the printed sheet, which, as stated, has been released by the nippers, tightly upon it. The cylinder B and the deliverer M now move simultaneously, and the printed sheet is thereby removed from the cylinder. When the back  
 15 edge of the sheet reaches the cylinder H it is caught by a second deliverer, and thus entirely removed from the cylinder B. The second sheet is detached from the cylinder B in a like manner, and the two are carried off horizon-  
 20 tally by the two pairs of deliverers M.

Upon the table N are four projecting stops, X', and as the four deliverers M, carrying the two printed sheets, travel along the handles Y of the cocks or valves Z in the deliverers M,  
 25 all strike the stops X' simultaneously, thereby admitting air to the deliverers, thus destroying the vacuum in the deliverers and allowing the sheets to drop upon the table N. In turning the sheets over the turning-rollers the unprint-  
 30 ed side of the sheet is drawn over the rollers, and thereby the smearing or blurring of the sheets is prevented. In delivering the printed sheets the deliverers M are timed so as to travel at the same velocity as the periphery of the  
 35 cylinder B, and hence there is no danger of smearing or blurring the printed sheet in delivering.

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

40 1. The combination, in a printing-press, of a cylinder, nippers hinged together, each nipper having a pinion upon its axis, intermediate pinions engaging with the pinions upon said nippers, sliding bars each carrying a rack op-  
 45 posite one of said intermediate pinions, and mechanisms, substantially such as described, for moving said bars and racks inward, so as to engage with said intermediate pinions as said cylinder is rotated, substantially as specified.

50 2. The combination, in a printing-press, of hinged or knuckle-jointed nippers having eyes inclined upon their under surfaces in opposite directions, and spring-arms bearing upon said inclined surfaces and holding said nippers  
 55 closed or open, substantially as specified.

3. The combination, in a printing-press, of a cylinder, means, substantially such as described, for holding the paper, one or more turn-  
 60 ing rollers or bars inside the surface of the cylinder, and devices, substantially such as described, for moving said turning rollers or bars beyond the surface of the cylinder and holding them stationary while the cylinder com-  
 65 mences its backward movement and the paper is carried under said rollers or bars, substan-  
 tially as specified.

4. The combination, in a printing-press, with the cylinder, pairs of nippers, and turning roll-  
 70 ers or bars, of stationary frames or plates, sliding bolts or bars held therein and having in-  
 75 clined or curved outer ends, mechanism, sub-  
 80 stantially such as described, for projecting said bolts or bars, so that the turning rollers or bars will be moved outward thereby at the comple-  
 85 tion of the forward movement of said cylinder, and means, substantially such as described, for  
 90 holding said rollers or bars stationary while the cylinder commences its backward move-  
 95 ment and the nippers are carried under them, substantially as specified.

5. The combination, in a perfecting-press, with a cylinder, pairs of nippers, and two turn-  
 100 ing rollers or bars, of pairs of arms at the ends of the cylinder, carrying said rollers or bars, col-  
 105 lars or hubs, to which the inner ends of said  
 110 arms are connected loose upon the cylinder-shaft, and mechanism, substantially such as described, acting upon one roller, and thereby  
 115 moving both rollers outward, substantially as specified.

6. The combination, with the cylinder of a printing-press, of an endless belt or belts, vac-  
 120 uum-deliverers provided with air-valves and secured to the belts and adapted to be carried in contact with the printed sheet, means, sub-  
 125 stantially such as described, for exhausting the air from said deliverers while in contact with the sheet, and devices, substantially such  
 130 as described, by which said air-valves are opened to drop the printed sheet, substantially  
 135 as specified.

7. The combination, with the cylinder of a printing-press, of the vacuum-cylinder, means, substantially such as described, for exhausting  
 140 air therefrom, an endless belt or belts passing  
 145 around said cylinder, vacuum-deliverers se-  
 150 cured to said belt or belts, air-valves in said vacuum-cylinder and deliverers which engage with each other as said deliverers pass around  
 155 said vacuum-cylinder and in contact with the printed sheet, and a device, substantially such  
 160 as described, by which the air-valves in said deliverers are opened while in engagement with the valve in said vacuum-cylinder, sub-  
 165 stantially as specified.

8. The combination, with the vacuum-cyl-  
 170 nder H and the vacuum-deliverers M, of the valves Z in the deliverers, adapted to enter and engage with the valves Z' in the vacuum-cyl-  
 175 nder, substantially as specified.

9. The combination, with the cylinder B and vacuum-cylinder H, of the gear-wheel J on the  
 180 cylinder B, the gear-wheel I loose on the cylinder H, and having a clutch-connection there-  
 185 with, and mechanism, substantially such as de-  
 190 scribed, for disengaging said wheel I from the cylinder H during the forward movement of the cylinder B, substantially as specified.

WM. RUMBLE.

Witnesses:

EDWIN H. BROWN,  
 FREDK. HAYNES.