

No. 607,131.

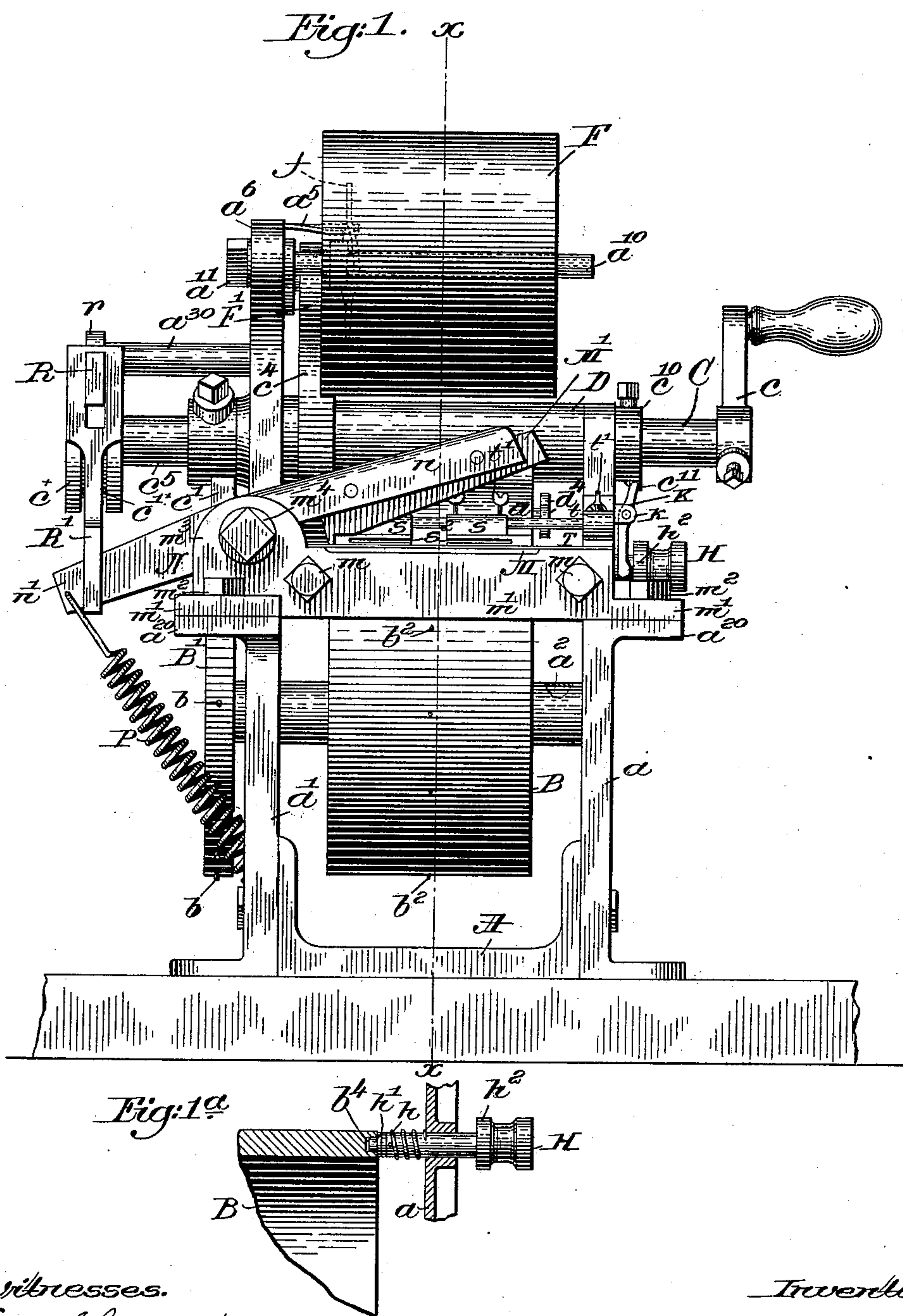
Patented July 12, 1898.

A. H. RAY.
PRINTING MACHINE.

(Application filed Sept. 30, 1896.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses.

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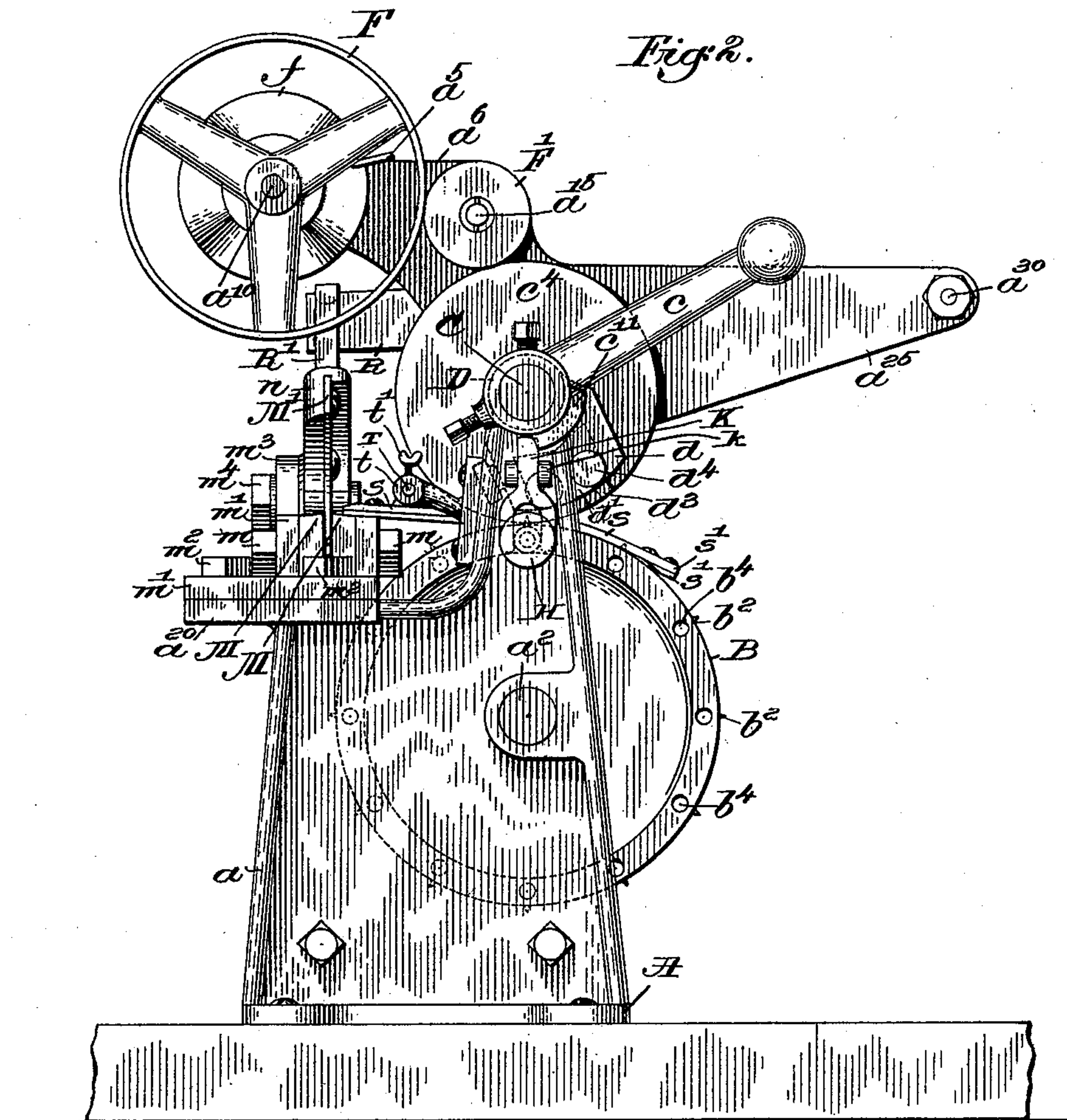
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4 Sheets—Sheet 2.



Witnesses.

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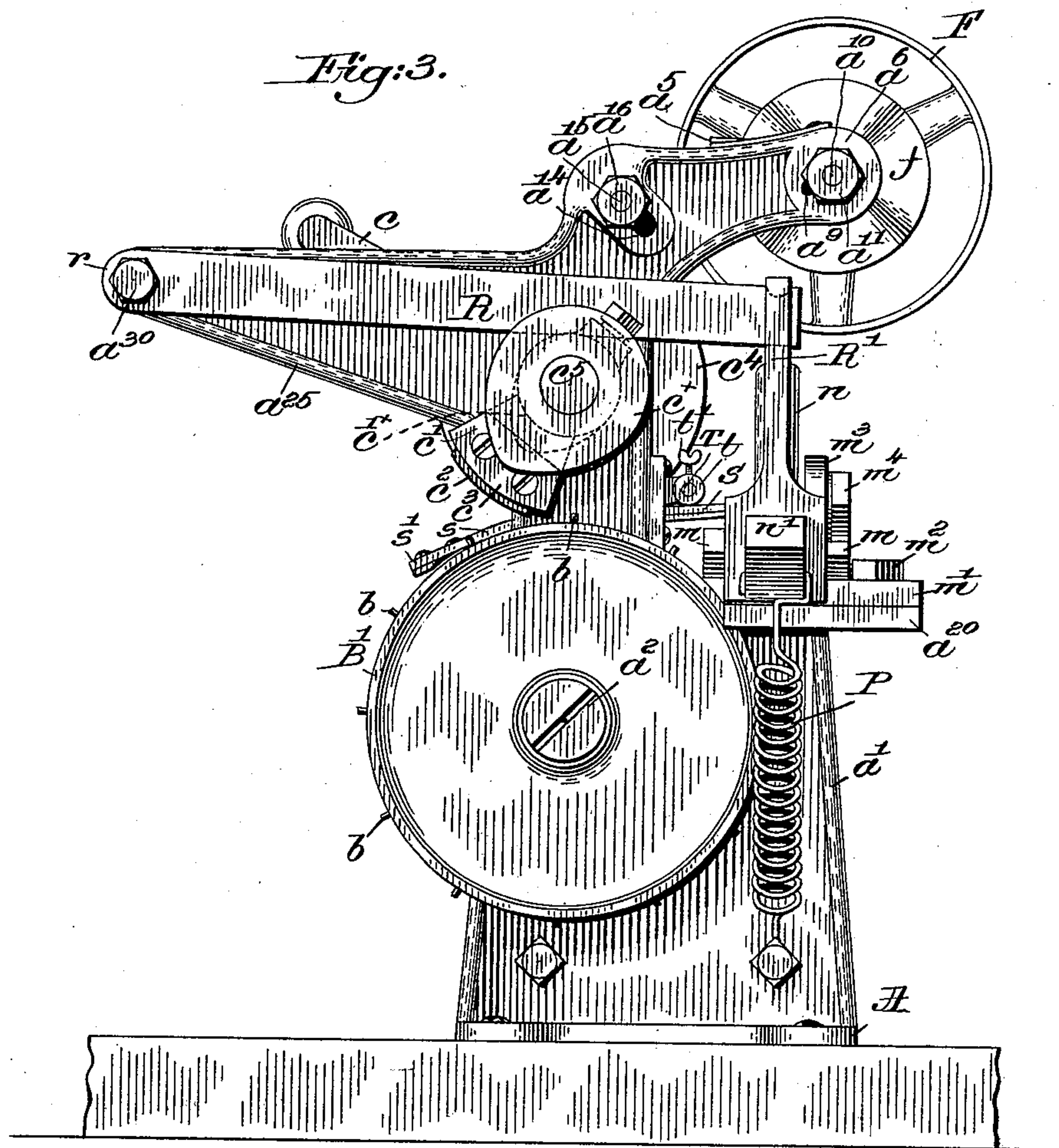
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4 Sheets—Sheet 3.



Witnesses.

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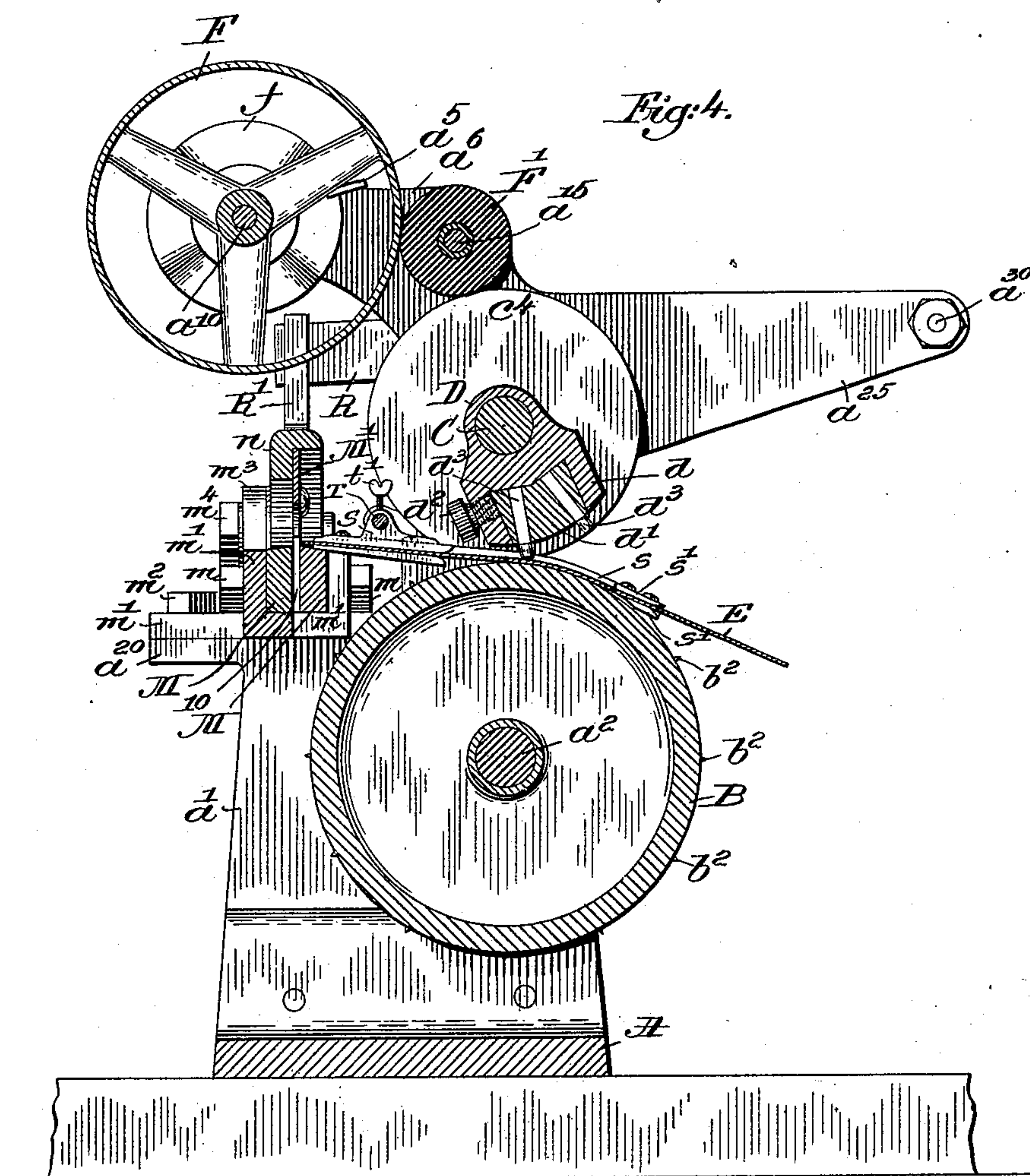
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(No Model.)

4. Sheets—Sheet 4.



witnesses.

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UNITED STATES PATENT OFFICE.

ALBERT H. RAY, OF ASHLAND, MASSACHUSETTS.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 607,131, dated July 12, 1898.

Application filed September 30, 1896. Serial No. 607,429. (No model.)

To all whom it may concern:

Be it known that I, ALBERT H. RAY, of Ashland, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Printing-Presses, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention has for its object the provision of a compact machine of the rotary class for printing or otherwise operating upon a web of cardboard or like material, and preferably comprising mechanism for thereafter severing the printed strip into portions of predetermined length.

The various features of my invention will be fully illustrated and described in the drawings and specification and set forth in the claims.

In the accompanying drawings, Figure 1 is a view in rear elevation of my invention, Fig. 1^a being a detail of construction, to which reference will be had later. Fig. 2 is a side elevation looking from right to left on Fig. 1. Fig. 3 is a side elevation looking from left to right on Fig. 1; and Fig. 4 is a sectional view on the line *x x*, Fig. 1, looking from right to left.

In the preferred embodiment of my invention, illustrated in the drawings and to which reference is had herein, in a frame A of suitable construction and contour is mounted between the uprights *a a'* an impression-cylinder B, fast upon a shaft *a*², extended beyond the frame to receive the studded driving-sheave B', the cylinder and sheave being of the same radius.

Parallel with the shaft *a*² is mounted the main driving-shaft C, provided with suitable driving means, herein shown as a crank-handle *c* and having near one end outside and adjacent the upright *a'* a driving arm or sector *c'*, arranged upon continuous rotation of the shaft C to be brought into position to successively engage the studs *b* on the driving-sheave B, immediately adjacent their region of union with the sheave, to impart at each of such engagements an impetus to the sheave and to maintain, respectively, the successive movements then initiated during and by subsequent frictional engagements with the said sheave, preferably through a friction-block *c*³, fastened to the sector by a screw-plate *c*³.

Fast on the shaft C, between the uprights and preferably, as shown, integral with a sleeve D, is a sector or radial projection *d*, recessed to receive a "chase" *d'*, held therein in adjusted position by means of the set-screw *d*², and in turn adapted to receive a "form" of type, the individual rows *d*³ of which are respectively secured in adjusted position by means of set-screws *d*⁴ in such manner as to insure upon operation of the machine their contact with the strip E (see Fig. 4) as it is fed over the impression-cylinder by suitable controlling means comprising, in the instance illustrated, teeth *b*³, with which the periphery of the said cylinder is provided and which are adapted to enter perforations previously formed in the web to insure proper positioning of the web during the operation of printing and severance.

As one convenient form of means to ink the form an inking-cylinder F is provided, from which the ink is taken by an inking-roller F', so positioned as to come into peripheral contact with the type substantially at the uppermost position of their arc of rotation. This ink-roll is driven by a disk *c*⁴, mounted on the driving-shaft C, and in turn drives the inking-cylinder, which is reciprocated longitudinally on its spindle *a*¹⁰ to insure proper distribution of the ink by means of a cam *f*, engaged by a notched finger *a*⁵, fast upon an arm *a*⁶ of the frame. The spindle *a*¹⁰, which carries the ink-cylinder F, is adjustable in a slot *a*⁹ in the said arm *a*⁶, being secured in adjusted position by the nut *a*¹¹, and the spindle *a*¹⁵, which carries the ink-roll F', is likewise adjustable in the slot *a*¹⁴, being secured in position by the nut *a*¹⁶.

The shaft *a*² is normally held stationary with one of the studs *b* on the driving-sheave B' in position to be engaged by the driving-surface of the sector *c'*, the holding means consisting, in the instance illustrated, of a spring-actuated stop H, (best seen in Fig. 1^a,) mounted in the upright *a* and normally held by the spring *h* with its inner end *h'* against the edge of the impression-cylinder, which latter is pierced with a series of holes *b*⁴, Figs. 2 and 1^a, adapted to receive the end of the stop, and so positioned that when the stop enters any one of the holes the driving-sheave B' will be held with one of its studs, as above described, in position to be engaged by the

driving-surface of the arm or sector c' . To disengage this stop in order to permit feed of the web, I provide the driving-shaft with a collar c^{10} , having a cam-surface c^{11} , adapted to engage one end of a lever K, pivoted at k on the frame, the other end of the lever being in position to engage a shoulder h^2 on the stop H and to force it outward when actuated by the cam so to do against the action of the spring h to withdraw the inner end of the stop from the impression-cylinder. This cam is so positioned as to disengage the stop and free the impression-cylinder just as the type-carrying sector is approaching its printing position, and immediately after the imprint has been made the cam-surface c^{11} passes the lever K the stop is released and comes into contact with the edge of the impression-cylinder, automatically entering the next hole as it is brought around.

Having thus fully described the printing means, which, it will be understood, has been selected for illustration as constituting a typical instance of a rotary couple to which my novel actuating means may be applied with advantage in this class of machinery, I will now describe the apparatus with which the machine illustrated has been shown as provided for severing the web after it has received the imprint from the type and which constitutes one form of mechanism which may be employed.

At the rear of the impression-cylinder is mounted a shearing device, the lower member of which consists of a knife or preferably two knives M M, held slightly separated by set-screws m in a frame m' , which in turn is adjustably mounted on a bed a^{20} on the frame A by means of set-screws m^2 . This frame m' is provided at the rear of the upright a' with an upwardly-extending lug m^3 , which carries, by means of a pivot m^4 , the lever N, and on the arm n of the latter is carried the other member or knife M' of the shears, it being removable and arranged to enter the slot 10 between the lower knives M M and exercise a shearing action in connection with the latter on the web E as it is fed across the knives M M from the impression-cylinder. Normally the knife is held in its uppermost inoperative position by the force of a spring P, attached at its lower end to the upright a' and at its other end to the arm n' of the lever N and exerting a tendency to draw the latter downward.

As one means for depressing the knife M' and operating the shears against the action of the spring I have illustrated a lever R, fulcrumed at its end r upon a horizontal post a^{20} , carried by an arm a^{25} of the upright a' and having its free end connected to the arm n' by a link R'. The middle portion of this lever R is carried past the extended end c^5 of the driving-shaft and is adapted to enter a slot in and be engaged and operated by a cam c^x , carried by the said driving-shaft. The operating-surface c'^x of this cam is

brought into contact with the lever R after the type has passed the printing position, and while the stop H holds the impression-cylinder B and the web E thereon immovable for severance by the shears. After the surface c'^x is carried beyond its uppermost or operative position the spring P draws the end n' of the lever down again, raises the knife M, and the web E is again free to be fed forward during the operation of printing. As a means for guiding the said web into position for engagement of the perforations by the teeth b^2 and also to guide it from the impression-cylinder to the shears I have provided in this instance a frame-like device, herein shown as formed in two parts, separated to allow passage of the cylinder-teeth b between them. These parts are exactly similar in every respect, but are oppositely faced, one for each side of the strip to be operated upon, and each consists of a body-piece S, mounted intermediate the impression-cylinder B and shears M M' on a transverse rod T, the ends of which are supported in suitable bearings $t t$ in or attached to the frame A, while set-screws t' permit the rod and body-piece to be fixed in adjusted position relative to each other and to the bearings $t t$.

From the respective body-pieces S S are extended forward-curved arms $s s$, at the ends of which are transverse fingers $s' s'$, between which the web E passes to the feeding-teeth b^2 , and after the printing operation the web passes beyond the impression-cylinder through slots $s^2 s^2$ in the relatively broad body-pieces S S, the latter serving a function similar to that of the fingers $s' s'$ in guiding the strip onto the lower shears M M.

With an impression-cylinder very large in periphery relatively to the type area it is possible to secure a large number of impressions upon the web during a single revolution of the impression-cylinder, with consequent advantages of smooth operation and freedom from wear; but to do this it is necessary to rotate the members of the printing-couple out of phase—i. e., having different periods of complete rotation—and so far as I am aware I am the first to provide actuating means for the cylinder of sufficiently accurate operation to insure the degree of nicety requisite in producing a series of closely-spaced impressions individually small in area upon a continuous web, where the members of the printing-couple differ so considerably in area.

The feeding mechanism in the machine illustrated is so adjusted that the imprints are made on the web E between the perforations, and by providing a broad knife M', co-operating with two knives M M, I am enabled to cut each time from the web a narrow portion, in the middle of which is one of the perforations, which latter would be unsightly if left upon the leaves after severance.

Having thus fully described my invention, I do not limit myself to the exact construction shown, for it is obvious that many por-

tions of the structure may be varied considerably without departing from the spirit of my invention, the division of parts by the frame-uprights, &c., in the preferred embodiment illustrated being to a considerable extent merely arbitrary or for convenience—as, for example, in the separation of the “sheave” from the impression member and the radial projection or rotary printing member from the actuating-arm or interrupted driving-surface.

I have used the term “sheave” not, of course, to convey the idea of a grooved pulley, but merely as a convenient term by which to designate the structure provided with a stud-bearing friction-surface, whether a separate member or not, which coöperates with the interrupted driving-surface.

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

1. A machine for operating upon a continuous web of flexible material, comprising web-severing mechanism; a rotary printing member or the like; a rotary impression member of large diameter, relatively to the effective area of the printing member, and capable of operation out of phase therewith; and means upon said impression-cylinder to engage the work and automatically position the same for a large number of printing and cutting operations during a single rotation of said impression member, substantially as described.

2. In a machine for operating upon a web; web-severing mechanism, and printing mechanism; said printing mechanism comprising a rotary printing member, and an impression-cylinder adapted to be positively actuated at times and provided with means to engage and at all times determine the position of said web, said cylinder being normally independent of the printing member but arranged to rotate, at all times during its periods of actuation, in peripheral unison with said printing member, substantially as described.

3. In a machine for operating upon a web of cardboard or similar work, said work having a series of perforations; web-severing mechanism; and printing mechanism, comprising a rotary printing member, and an impression-cylinder having peripheral projections adapted to engage the perforations in said work to position the latter, said cylinder being normally independent of the printing member, but adapted to be intermittently rotated, and arranged when rotated to move at all times in peripheral unison with the printing member, substantially as described.

4. A machine for operating upon a web; comprising a reciprocating cutting mechanism, a continuously-rotating printing member, and an impression-cylinder provided with means to engage and at all times determine the position of said web; connections whereby upon operation of the machine, the

cylinder is caused to rotate to feed the web during and for the printing operation; and means to hold the cylinder stationary at times to permit severance of the web by the cutting mechanism, substantially as described.

5. In a machine of the class described, the following instrumentalities, viz: a continuously-rotating driving-shaft; a rotary printing member fixed on said shaft; inking apparatus therefor; a combined impression and feed cylinder, adapted to be actuated from said shaft out of phase with said printing member, but at substantially the same peripheral speed therewith during the printing operation; reciprocating cutting mechanism; operating connections between said driving-shaft and mechanisms, all arranged to operate substantially as described.

6. In a machine of the class described, the driving-shaft and its driving-arm; a rotary printing member carried by the shaft; an impression-cylinder mounted parallel with said shaft; together with a driving-sheave having the same diameter as and connected with said cylinder and adapted to be peripherally engaged by said arm to provide for intermittent actuation of said cylinder by said shaft at exactly the same peripheral speed as that of said printing mechanism at all times during said engagement, substantially as described.

7. The combination with a sheave having a periphery serving as a friction-surface and provided at intervals with radial projections, of a driving-shaft having an interrupted driving-surface arranged upon continuous rotation of the shaft to be brought into position to successively engage said projections immediately adjacent their region of union with the sheave, to impart at each of such engagements an impetus to the sheave and to maintain the movement then initiated during and by subsequent frictional engagement by the driving-surface with that portion of the sheave's periphery immediately behind the projection engaged, substantially as described.

8. In a machine of the class described, a couple of coöperating rotary members, one of which is adapted to rest at times while the other is actuated, and means to impart positive rotation to said former member intermittently, said means being adapted and arranged to instantly start said former member at the exact peripheral speed of said other member at the beginning of each period of common rotation of said members, and to maintain said peripheral speed throughout each such rotative period.

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

ALBERT H. RAY.

Witnesses:

JOHN C. EDWARDS,

ALEX. C. PROUDFIT.