No. 701,221. Patented May 27, 1902.

A. H. RAY.

WEB TREATING MACHINERY.

(Application filed July 11, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 7.

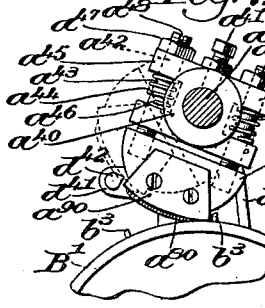

Fig. 8.

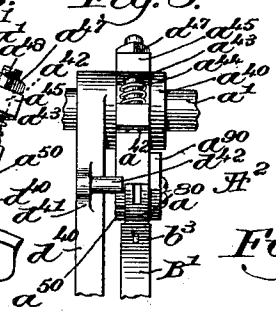

Fig. 1

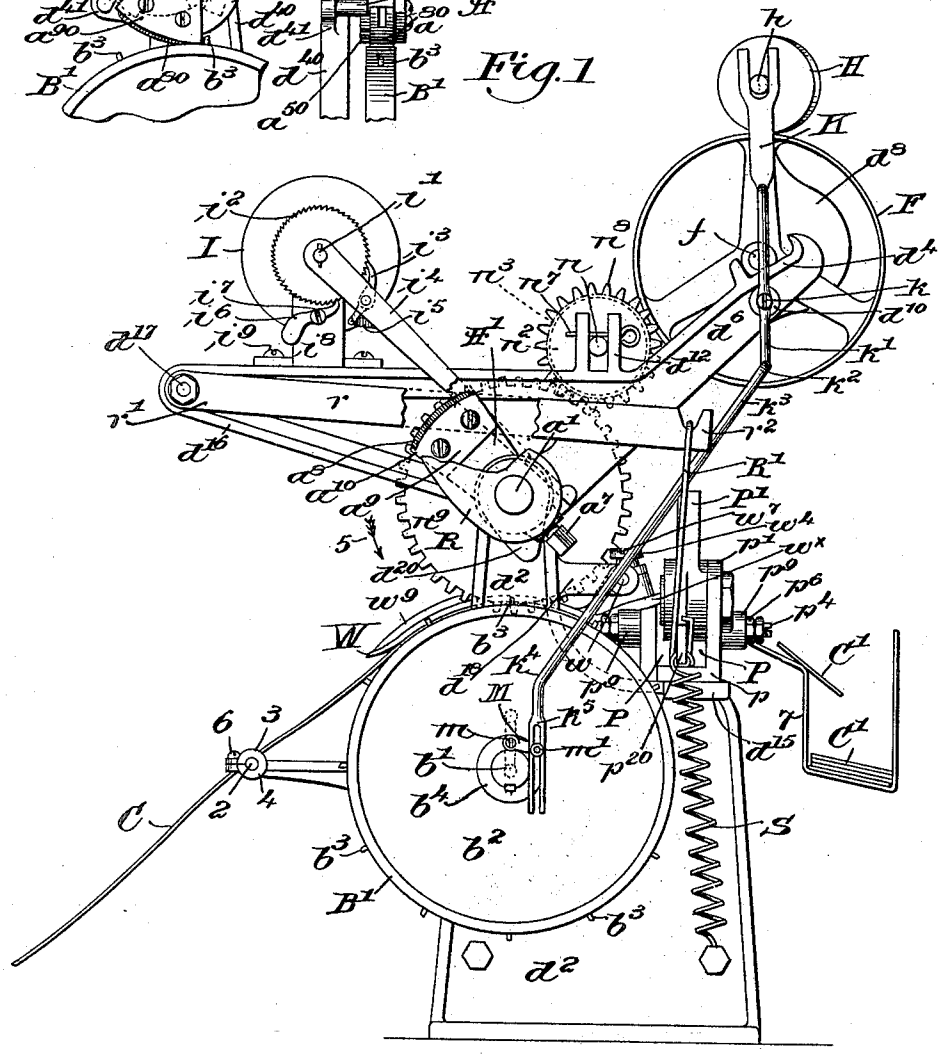

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Fig. 2

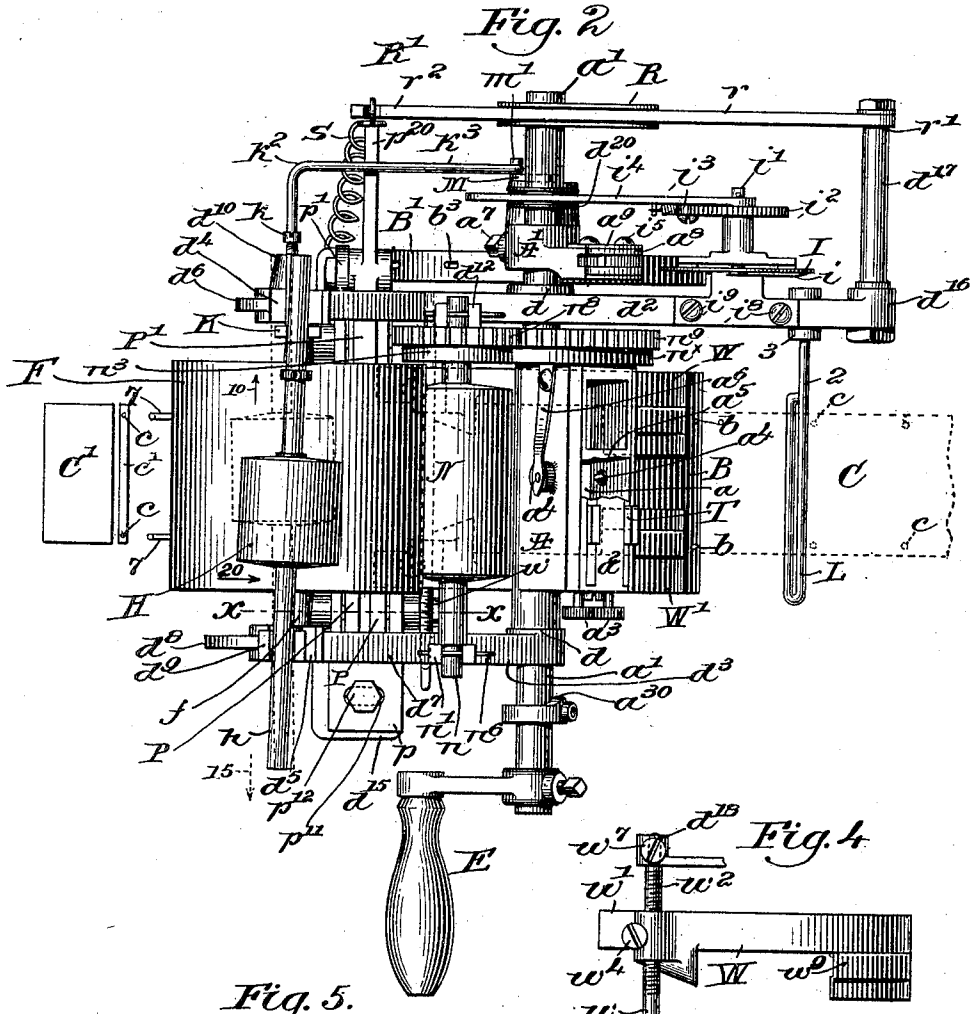


Fig. 4

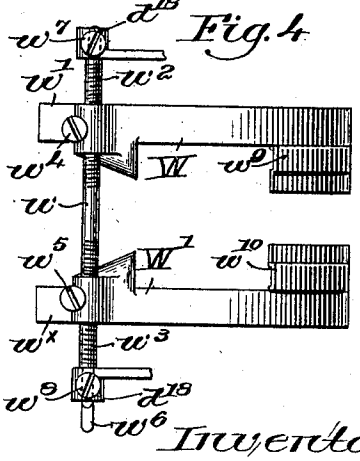
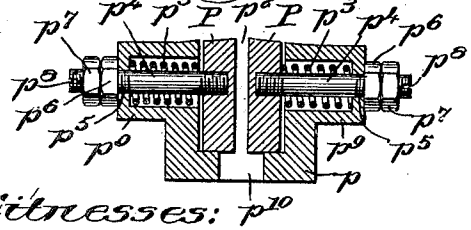


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 3

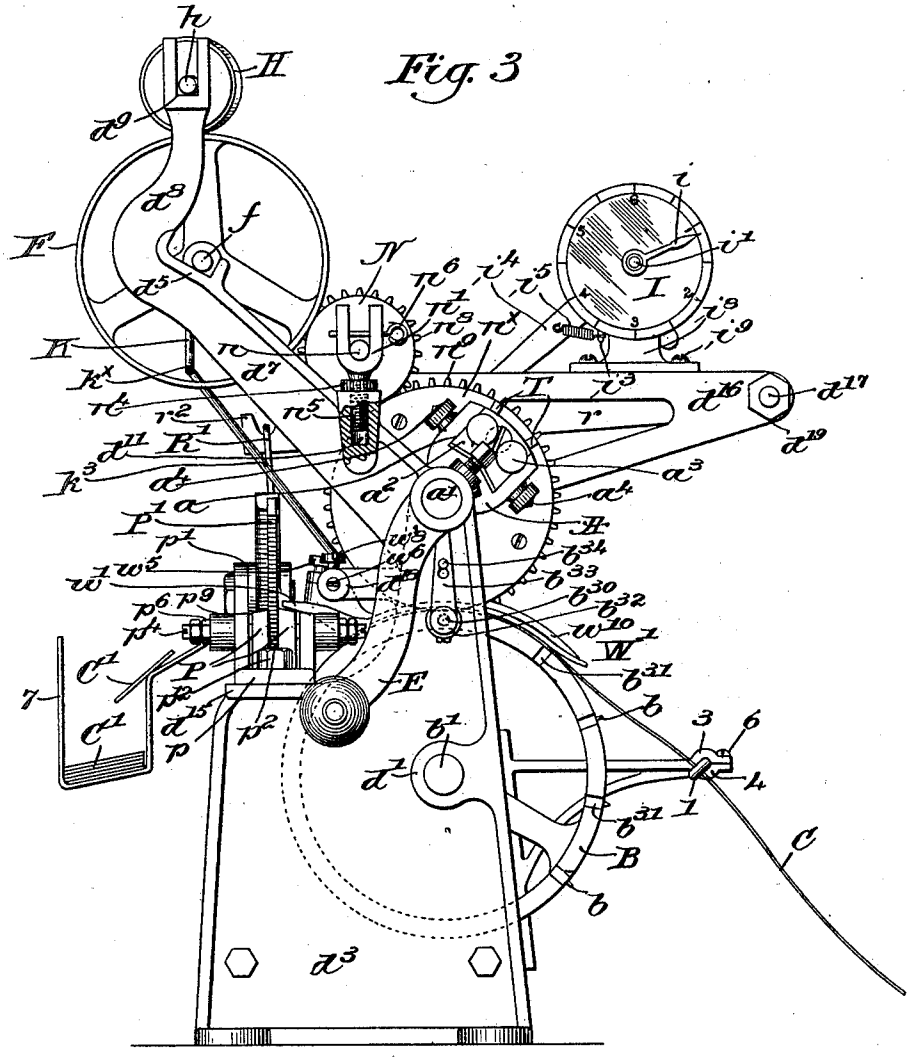
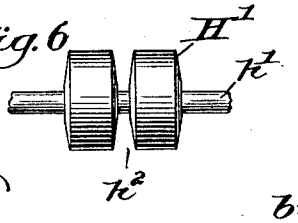


Fig. 6



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UNITED STATES PATENT OFFICE.

ALBERT H. RAY, OF ASHLAND, MASSACHUSETTS.

WEB-TREATING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 701,221, dated May 27, 1902.

Application filed July 11, 1898. Serial No. 685,583. (No model.)

To all whom it may concern:

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

This invention has for its object certain improvements in web-treating mechanism applicable especially to the class of printing-machines illustrated in United States Letters Patent No. 607,131, issued to me July 12, 1898, and the various features of my invention will be fully illustrated and described in the accompanying drawings and specification and set forth in the claims.

Figure 1 is a view in side elevation of a machine in the construction of which the various features of my invention have been embodied. Fig. 2 is a plan view of the same, and Fig. 3 a view in elevation of the side opposite that illustrated in Fig. 1. Fig. 4 is a plan view in detail of the web-guide; Fig. 5, an enlarged cross-sectional view of a portion of the cutting mechanism, taken on the line $x\,x$, Fig. 2; Fig. 6, a detail view of a modified form of ink-distributing means; and Figs. 7 and 8, detail views, respectively, in front and side elevation, of a modified form of one part of the actuating means for the impression member, the position illustrated in Fig. 8 corresponding to that indicated in dotted lines in Fig. 7.

In the preferred embodiment of my invention selected for illustration and description the coöperating rotary members are designated by the reference-letters A B, respectively, and are represented as constituting the rotary printing member and the rotary impression member, respectively, of the printing-couple of a web-treating printing-press. Between these is fed the web or work C, preferably controlled by suitable means on the impression member, which may take the form of a cylinder, as illustrated, while in this instance the feed-controlling means comprise teeth or projections *b*, extending beyond the periphery of the member B to enter the perforations *c*, formed in the web C—in this instance in its body—by suitable means at a prior operation. The situation and number of these apertures or their equivalents may be varied as desired within suitable limits, governed somewhat by the size and contour to be given the product finally. A frame of any suitable construction may be provided to support the couple, the members of which are shown in this instance as carried by shafts a' b', respectively, journaled in bearings d' d' in uprights d^2 d^3 of the frame.

As one form of the printing member A, I have shown the shaft a' as provided with a radially-projecting type-carrier, either integral with the shaft or connected thereto in any convenient manner and adapted, preferably, to receive a removable chase a^2, shown as contained within a groove a in the carrier, which latter is illustrated as sector-like in form and preferably of not very large area, inasmuch as abundant time between impressions should be allowed for severance of the web.

If desired, set-screws may be provided or similar means a^3 to retain the lines of type T in the chase, and suitable means to prevent accidental displacement of the chase from the groove a are shown at a^4, (see Fig. 2,) consisting in this instance of catch-pins extended through the walls of the carrier (the chase being broken away slightly at a^5 in Fig. 2 to permit the lower pin to be seen) and provided with springs or the like a^6 to bring them normally into engagement with the chase, which may, however, be withdrawn readily if the points are beveled, as shown.

Power for operating the members of the couple may be derived from any suitable source and communicated to them as found convenient, so long as provision is made for intermittent feed of the web and for rotating the impression member at the start of and during the actuative periods in peripheral unison with the face of the type. One form of such means I have illustrated in the drawings, where a crank-handle E is furnished to enable the shaft a' to be rotated by hand, such rotation being continuous in one direction, preferably—viz., in the direction of the hands of a watch—the shaft serving in such case as a driving-shaft, from which the intermittent actuation of the impression member may be accomplished conveniently

by the use of an interrupted actuating surface or member A′, taking in this instance the form of an actuating projection or arm rotatable by the shaft a' and fixed, preferably, on it, as by a set-screw a^7. This interrupted actuating-surface is of equal radius to that of the face of the type T, and its situation upon the driving-shaft a' will be a matter of convenience, since I do not limit myself to locating it outside the frame member d^2, as illustrated.

Coöperating with the interrupted actuating surface or member A′ is a surface B′, connected operatively with the impression member B and in the instance illustrated formed upon a separate member b^2, carried by the shaft b' opposite the path of the member A′, by which it is to be engaged, being of equal radius with the member B when the web C is in place on the latter, so that throughout each of the actuative periods during which the member B′ receives motion from the member A′ the members A and B are caused to rotate in exact peripheral unison, and the type T will make a clear impression upon the web on the impression-cylinder.

Suitable means may be provided to insure a perfect driving engagement between the members A′ B′—as, for example, a rubber or elastic pad a^8, secured to the member A′ by suitable means a^9, shown as a screw-plate.

One form of means to accomplish positively the start of the members in exact unison is illustrated, the same comprising peripheral projections b^3 on the member B′, extended into the path of the member A′, the head a^{10} of which engages the projections b^3, respectively, at a point distant radially from the center of the shaft a' equal to a similar radius terminating at the surface of the web C under the type.

Preferably the projections and contacting portion of the head will both be of metal for the sake of durability and the point of contact be directly adjacent the surface B′.

The intervals between the projections b^3 will be determined in length by the size of the product it is desired to turn out, and the projections should be brought respectively in succession into the line joining the shaft-centers of the members A B, suitable means being provided to secure such presentation for engagement by the member A′. One form of means for this purpose is illustrated as a bolt b^{30}, the head of which is seen in Fig. 3 extended through the frame-upright d^3 into position to engage side notches or recesses b^{31} in the periphery of the member B, a spring b^{32} tending constantly to draw the bolt against the rim of the member B and into the notches as they successively come opposite, while a lever b^{33}, hung on a pin b^{34} and operated by a cam a^{30} on the shaft a', serves to throw the bolt out of the notch upon each rotation of the shaft, freeing the cylinder B just before its actuation by the member A′ begins.

In operation as the shaft a' is rotated the interrupted actuating-surface A′ is swung around, and just before its shoulder a^{10} reaches the projection b^3 the cam 30 causes the lever b^{33} to draw the bolt b^{30} from the notch b^{31}, and then the shoulder a^{10} strikes the projection b^3, starts the member B in peripheral unison with the type T, and this unison is maintained throughout the ensuing actuative period during which the friction-pad a^8 engages the periphery of the member B′ immediately behind the projection b^3 just started forward by the shoulder a^{10}. As the member A′ passes on from the member B′ the bolt b^{30} slips into the next notch or recess b^{31} coming opposite and holds the cylinder B and web C stationary, insuring uniformity by providing for accuracy of severance, which follows as the cam R comes around and actuates the shear P′ in a manner to be described.

In Figs. 7 and 8 I have illustrated my preferred form of actuating member for the impression member in order to permit the use of a friction-pad of greater radius than can be utilized to advantage with the member A′ and furnish increased facility of adjustment. The principle upon which this modification operates involves the radial reciprocation of part of the member A^2, which in other respects is preferably the equivalent of the member A′, this reciprocation being to enable the friction-pad to be kept from contact with the surface B′ until the exact instant that the type reaches the paper, since upon withdrawal of the bolt b^{30} the cylinder B is left preferably entirely free to avoid loss of power, and very slight frictional engagement of the pad a^{80} with the surface B′ would start the cylinder too soon and tend to misplace the impression on the web. The preferred construction of this device is illustrated as comprising an attachment a^{40}, held on the shaft a' by a set-screw a^{41}, this attachment taking the form of a cross-head, in which are carried in bearings a^{42} sliding carriers a^{43}, to which is attached the head a^{50}, preferably having a pad a^{80}, held by means a^{90}, corresponding to parts a^8 a^9, described with reference to Figs. 1, 2, and 3. Suitable means a^{44}, as the springs shown, may be used to throw the head normally away from the shaft a', each bearing in this instance at one end against the shoulder a^{45} of the cross-head while the other end is inserted in a hole a^{46} in the carrier a^{43}. Adjusting means a^{47} a^{48} may be provided for the carriers, which may be formed conveniently as screw-bolts, threaded at one end to screw into the head a^{50} and at the other end to receive adjusting-nuts. Any suitable means to secure reciprocation may be adopted, one form of such being illustrated at d^{42} as a projection from the frame part d^{41} into the path of the member A^2, which rides on it when approaching the actuative position of engagement with the surface B′, (illustrated in Fig. 7,) into which position it is permitted to drop in a line perpendicular to the surface B′. By this arrangement the cushion a^{80}, however thick it may be, is pre-

vented from engagement with the surface B′ until the exact moment required.

The means I have shown as one convenient construction to distribute the ink or its equivalent comprise coöperating ink-receiving members in frictional contact and adapted to be moved relatively to each other, being so related and arranged as to develop by their frictional engagement during actuation a traversing movement relatively to each other and to the direction of actuative movement. The nature of the preferred arrangement by which I accomplish this end and the operation of the mechanism selected for illustration in this instance will be understood best upon reference to Fig. 2, where F and H designate the ink-receiving members, shown, respectively, as an ink-cylinder of well-known type and an ink-spreader, taking in this instance the form of a composition roller of smaller diameter than the cylinder and in frictional contact therewith, both being rotatable about their longitudinal axes and the member H also being capable of an axial movement in traverse of the member F relatively to the direction of rotation thereof. The relative angular position of the members F H may also be varied, and when they are parallel no axial or traversing movement of the member H will occur; but when the latter member is in either the full or dotted line position the peripheral frictional engagement of the members will cause the member H to creep in the direction of the arrow 10 when in full-line angular position and in the direction of the arrow 15 when in dotted-line position, the rotation of the member F being in the direction of the arrow 20. The ink-receiving members may be supported in any suitable manner and any suitable means adopted to enable variation to be made in their angular relation, the spindle or axis f of the member F in the illustrations being journaled loosely in bearings d^4 d^5 in extensions d^6 d^7 of the frame-uprights d^2 d^3, respectively, while for the support of the spindle or axis h of the member H an arm d^8, with bearings d^9, is shown on one side, and on the other a movable fork-like member K (best seen in Fig. 1) constitutes at one and the same time the support for that side of the spindle and the preferred form of device selected to illustrate means for varying the angular relation of the members F H.

As a convenient arrangement to permit ready movement of the member K for the purpose set forth it may be mounted pivotally, as indicated at k, on a suitable seat d^{10} on the frame and oscillated at times to carry its upper or forked portion to one side or the other of the plane, in which lie the axes of the members F H when in parallelism. The accomplishment of this variation at regular intervals may be found desirable and suitable means provided to accomplish it, and in order to indicate one form which such means may take I have shown a connection between the member K and the moving parts, accomplished in this instance by extending the member K downward below the pivot k, with suitable offsets and bends k^3 k^4 between the straight portion and the portion k^5 adjacent the member b^2, preferably near its hub b^4. By a connection M the rotation of the member b^2 will cause the pendulous portion of the member K to oscillate, the member M being adjustable, preferably, to permit the speed of traverse of the spreader H to be controlled. Adjustment where the member M takes the form of a crank, as illustrated, with a fastening m, (best seen in Fig. 1,) may be accomplished by loosening the fastening, swinging the crank around to any point within the range of movement indicated by dotted lines, and then setting it by tightening up the fastening, so that the crank-pin m' will be carried around in a circle corresponding to the degree of displacement of the crank from the center of the shaft b', and as it is carried around will play in the slotted head k^5 and oscillate the member K, causing the spreader to assume proper angular position to traverse the ink-cylinder and distribute the ink thoroughly over its surface. From the cylinder the ink may be transferred to the type by suitable means of ordinary or desired construction for this purpose, an inking-roller being shown as interposed between the member A and the cylinder F, contact with the latter being insured, preferably, by making the bearings d^4 d^5 for the spindle f wide and slanting, as illustrated, (see Figs. 1 and 2,) so that the cylinder rests in part on the roller N, adjustment of the latter being provided for in the instance illustrated by a jack-like bearing n' at one end of its spindle n and a disk n^2, the diameter of which may be varied at the other end of the spindle, the disk resting against a coöperating disk $n^\times$ on the member A or shaft a'. Rings of paper n^3 or the like may be added to or taken away from the disk n^2, while rotation of the nut n^4 will raise the threaded shank n^5 of the fork n' in its socket d^{11} in or attached to the frame, a pin or its equivalent n^6 retaining the spindle n in place. An auxiliary bearing d^{12}, with retaining-pin n^7, is provided, preferably, for the end of the spindle n adjacent the disk n^2, and the construction of this ink-transferring means may be varied as found suitable, the use of gears n^8 n^9 to drive the roller N having in practice been found to aid in securing thorough inking of the type.

In Fig. 6 I have illustrated a form of ink-spreader adapted to facilitate the use of more than one color of ink by providing for their distribution without mixture on the ink-receiving member F, the material of the spreader H′ being recessed or divided medially, as at h^2, so that the range of oscillation of the spreader may extend to one-half the width of the cleft h^2 before one part of the spreader will encroach upon the path of another, the division of the spreader into parts being lim-

ited only by the extent of oscillation necessary to distribute the ink properly.

Any suitable cutting mechanism may be provided, if desired, and in the drawings a shearing device is illustrated at the rear of the machine, comprising one or more stationary knives or shear members P, coöperating with a movable shear P′ and preferably arranged as a "brace" or pair supported on a shear-frame p or other suitable support, which carries the bearing p' of the member P′, with an intervening space p^2, in which the member P′ plays in contact with the member P on each side. One form of means to insure a continuous cutting engagement of movable and stationary members is illustrated in Fig. 5, where the members P are shown as having resilient cushioning devices p^3, in this instance springs, intermediate the members P and the shear-frame p, their action being limited, preferably, by suitable controlling devices p^4, shown as bolts, screwed into the members P at their inner ends and extended out through apertures p^5 between the lower knives in the shear-frame p, where are provided regulating means, shown as nuts p^6 p^7 and head-slots p^8. Sockets p^9 may be provided for the cushioning means; also, an opening p^{10} to permit the cuttings to drop out of the way, and means, shown in Fig. 2 as a slot and set-screw connection p^{11} p^{12}, intermediate the shear-frame p and bed d^{15} to attach the former adjustably to the latter. The movable shear member P′ may be actuated conveniently by the means illustrated in the drawings, though any suitable means may be adopted, as desired. The means shown (best seen in Figs. 1 and 2) comprise a cam R on the actuating-shaft a', arranged to engage operatively the intermediate portion of a lever r, fulcrumed near one end r' on a suitable bracket or portion d^{16} of the frame, in this instance at the outer extremity of a post d^{17}, a link R′ serving to transmit motion from the lever end r^2 to an arm p^{20}, extended from the shear member P′ beyond its pivotal bearing p' rearwardly. This cam gives the severing stroke of the shear, a spring S serving to retract the shear to normal position. The web C is fed by rotation of the couple A B directly to the shearing device after impression, and preferably guiding means will be utilized to keep it flat and smooth in order that its progress may be unimpeded, the means illustrated appearing most clearly in Figs. 1, 3, and 4 and comprising a plurality of members W W′, preferably two in number, supported at a suitable region by an adjusting device w, from which they extend respectively forwardly to a distance suitable to insure proper engagement of the web by the teeth b^3 as the web approaches the bite of the rotary members A B, and rearwardly to and preferably slightly over the inside stationary shear member P, as at w' $w^\times$, Figs. 1 and 3. The members conform in contour to the periphery of the member B up to a point on the latter near and slightly below the level of the cutting-surface of the shears P, so that the web as it passes between the shears is canted upward slightly and prevented from catching on or sticking to the shear members P.

The adjusting device w illustrated comprises a rod having right and left screw-threads w^2 w^3 at the region where it supports the members W W′ and coöperating with threaded bores in the latter, the material of the members being divided, preferably, to provide for clamping the members in adjusted position, screws w^4 w^5 enabling this to be accomplished in this instance. The rod is carried in suitable bearings d^{18} of the frame and may be turned therein by a flattened end w^6 or equivalent means and secured from rotation by set-screws w^7 w^8 when the guide members have been adjusted to desired position, according to the dimensions of the web undergoing operation. Housings w^9 w^{10} are formed, preferably, in the broad outer ends of the members W W′ to permit free passage of the teeth b, and the members may be cut away centrally as found necessary to permit clearance of the type.

If desired, an auxiliary guide 1 for the web may be used, a convenient form being illustrated as a wire loop, the extended shank 2 of which is supported from the frame, secured thereto by suitable means, preferably adjustably, as in members 3 4 of a bracket clamped together by a screw 6.

At the rear of the machine the severed tickets, leaves, or the like C′ may be allowed to fall and be stacked or collected in a suitable receptacle, formed in this instance by wires 7, suitably bent to retain them.

By using a double lower shear P provision may be made for cutting out narrow strips c' of the web containing the perforations c, so as to leave the finished product C′ with unbroken contour.

I have illustrated as a convenient form indicating mechanism comprising a dial with pointer i on a shaft i', actuated through the medium of a ratchet i^2, pawl i^3, and lever i^4 from a cam d^{20} on the driving-shaft a'.

It will be noticed that the levers r and i^4 and the cams R and d^{20} are broken away partially in Fig. 1 to reveal the member A′.

I claim—

1. In an apparatus of the class described; the combination with an impression-cylinder having peripheral web-controlling means, and a shear device, of a web-guide conforming in contour to, and arranged closely adjacent the periphery of, said cylinder, to maintain the web in close relation with a portion thereof; said guide having a housing to permit clearance of said web-controlling means, and being constructed and arranged to deliver said web over one of the members of said shear device to the shearing edge, at an upwardly-

inclined angle, to thereby cause the web to free itself automatically from said shearing edge after each shearing operation.

2. In an apparatus of the class described, a work-guide, comprising a carrier w, having threaded portions w^2, w^3; bearings d^{18} therefor; work-directing members W, W', carried by said threaded portions, and guide portions w', $w^\times$, on said members.

3. In an apparatus of the class described, a shaft; and a tappet thereon; said tappet comprising an attachment mounted on said shaft, a head supported by carriers extended from said attachment, means to regulate the degree of extension of said head, and means to maintain said head in extended position.

4. The combination with a driven member having a periphery adapted to be engaged frictionally and thereby actuated, of a rotating tappet or actuating member having a frictional actuating-surface, and means to prevent engagement of said periphery by said surface until said tappet has reached a rotative position insuring high frictional efficiency.

5. In an apparatus of the class described, a frame; a shaft carried thereby, and a tappet on said shaft; said tappet comprising an attachment secured to said shaft, a head carried by said attachment and movable toward and away from said shaft, and means to maintain said head in extended position; and a projection on said frame adapted to engage said head and cause retraction of the latter toward said shaft during a portion of its rotative period.

6. In a machine of the class described; a rotary printing member having a groove parallel with its axis to receive and retain a chase; an elongated chase adapted to enter said groove lengthwise and enlarged interiorly to cause its retention by the walls of said groove; and a spring device carried by said rotary member and adapted to traverse the walls of said groove and engage said chase to prevent accidental lengthwise displacement thereof from said groove.

7. A printing-machine of the class described comprising printing and cutting mechanisms constructed as specified; a printing-couple to operate upon the web and a rotating tappet having a frictionally-actuating surface to actuate the impression-cylinder of said couple; and a work-guide intermediate said printing and cutting mechanisms; said instrumentalities coöperating upon a continuous web to produce therefrom at a high rate of speed individually perfect tickets bearing printed matter corresponding exactly in alinement on the respective tickets.

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

ALBERT H. RAY.

Witnesses:
ALEX. C. PROUDFIT,
GEO. W. GREGORY.