W. H. BAZLEY.

STRIP FEEDING MECHANISM.

APPLICATION FILED APR. 25, 1911.

1,019,295.

Patented Mar. 5, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

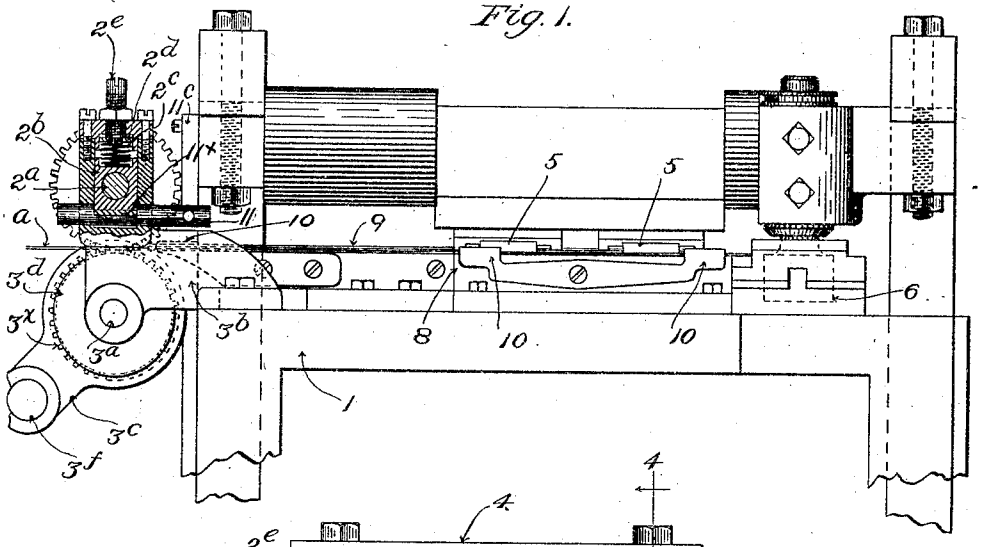

Fig. 2.

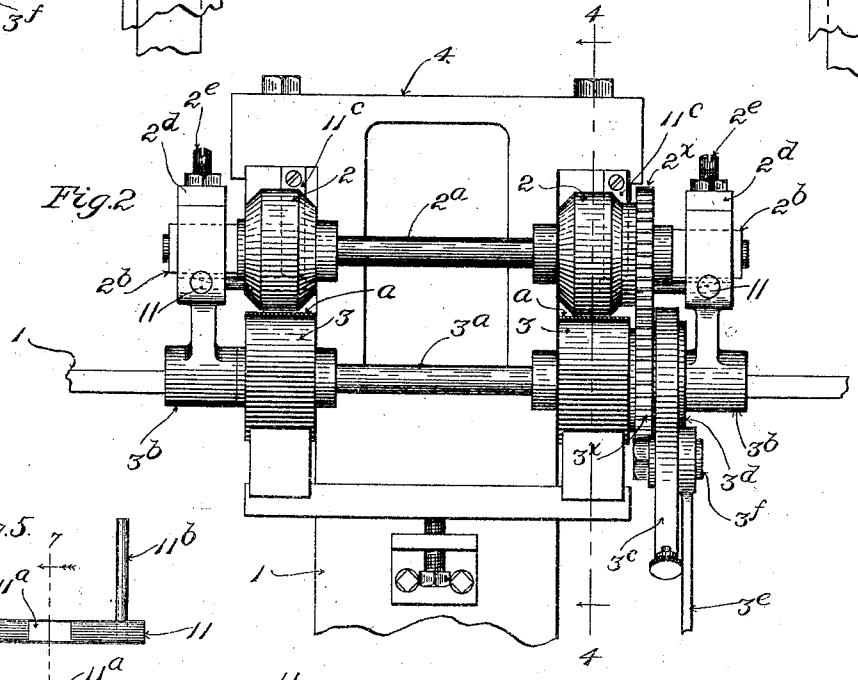

Fig. 5.

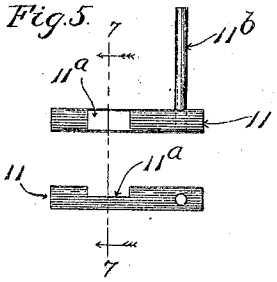

Fig. 6.

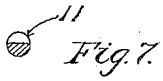

Fig. 7.

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3 SHEETS—SHEET 2.

Fig. 4.

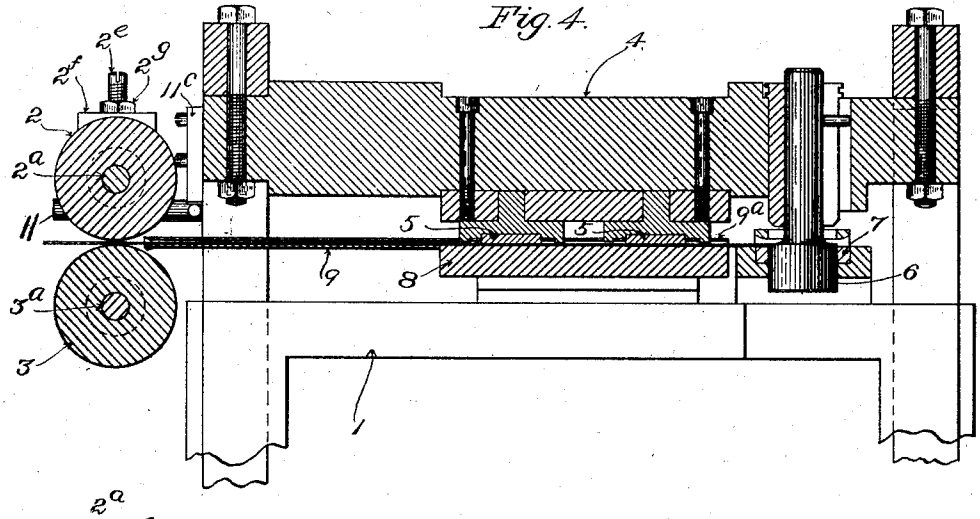
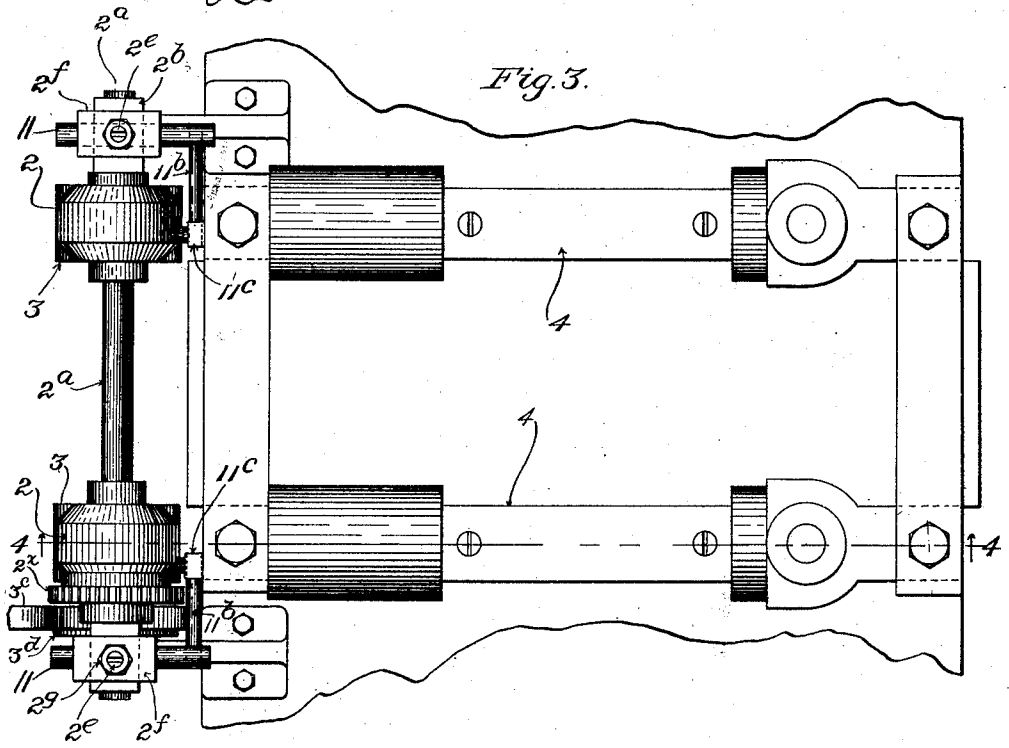


Fig. 3.



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3 SHEETS—SHEET 3.

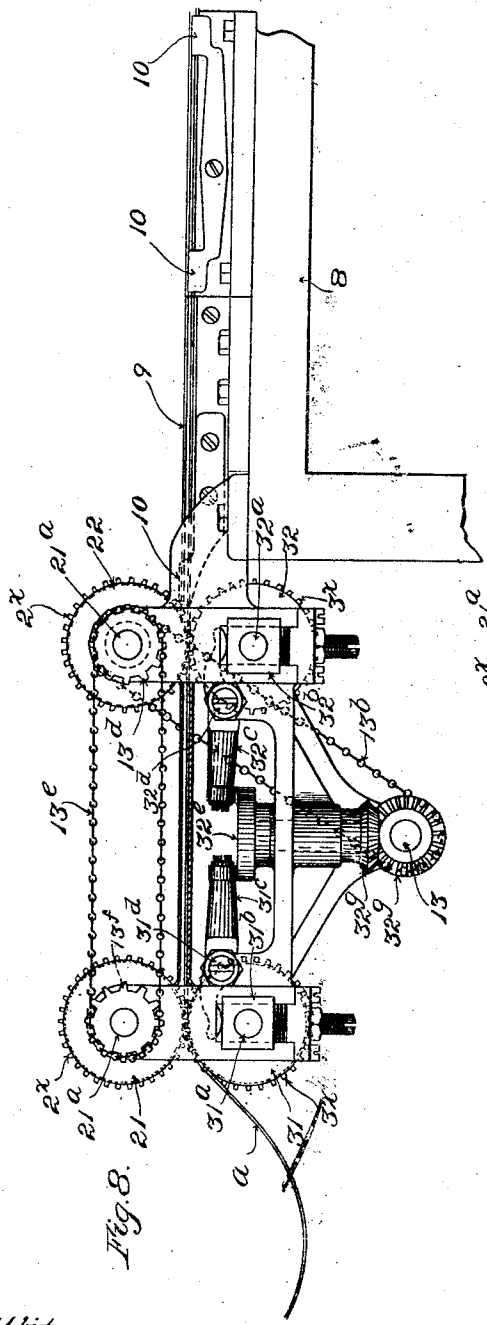

Fig. 8.

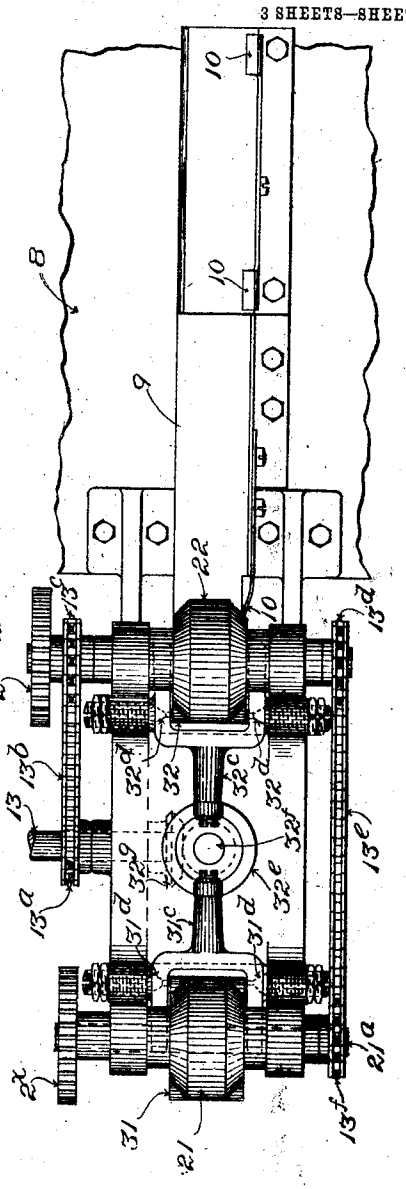

Fig. 9.

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UNITED STATES PATENT OFFICE.

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STRIP-FEEDING MECHANISM.

1,019,295. Specification of Letters Patent. Patented Mar. 5, 1912.

Application filed April 25, 1911. Serial No. 623,319.

To all whom it may concern:

Be it known that I, WILLIAM H. BAZLEY, a citizen of the United States, residing at Everett, in the county of Middlesex, State of Massachusetts, have invented a certain new and useful Improvement in Strip-Feeding Mechanisms, of which the following is a specification, reference being had therein to the accompanying drawings.

In machines of various kinds operating upon sheet-material in a strip of appreciable length, such as is called in general terms, a continuous strip, and employing feed-rolls for advancing the strip for the purpose of being operated upon, there often is experienced a marked tendency on the part of the strip to work edgewise toward one side or the other of the desired path. Various arrangements of edge-guides have been employed for the purpose of keeping the strip in its proper path, but they are not always effective, and the same is true with respect to other means intended to prevent the strip from swerving. In classes of work requiring accuracy of register in the case of the strip, lateral swerving of the latter results in bad and imperfect work and consequent loss. The crowding of an edge of the strip against a lateral guide crushes or breaks such edge in the case of some materials, such as paper, and also causes cutting of the guide. Sometimes jamming of the strip and clogging of the machine occur, with breakage of the strip in some cases. Hence, stoppages of the machine are occasioned, and time is lost while the trouble is being rectified, the output of the machine being considerably reduced thereby. I have in practice experienced these difficulties in the feeding of strips of paper, and similar difficulties in the feeding of strips of sheet-metal.

The general objects of my invention are to overcome the tendency aforesaid, and to obviate the difficulties, inconveniencies, and loss resulting therefrom, while at the same time my aim is to attain these objects in an entirely simple and practical manner.

The invention consists, essentially, in the combination with feed-rolls, of means for periodically varying the distance between the axes of the rolls to thereby release the strip which is passing between their peripheries for brief intervals from the grasp and control of the feed-rolls. The temporary release of the strip allows it to spring edgewise back to its normal path whenever it shall have become diverted therefrom, the normal path being that which is determined by the means designed to control and guide the strip as it is fed along. In many machines already in use special side-guides are provided to determine such path. In some machines, the parts which operate upon the strip possess the capacity or function of edge-guides, in addition to other special capacity or function, and therefore constitute edge-guiding means. In either case, it being assumed that my invention is embodied in a given machine, if the strip which is being operated upon in such machine works edgewise in either direction while the feed-rolls are closed together and rotating to feed the strip, so as thereby to create an edgewise tension in the strip, the moving apart of the axes of the feed-rolls, with its attendant relief of the grasp of the feed-rolls upon the strip, leaves the strip free to readjust itself, which it immediately will do, recovering its normal path.

A machine having applied thereto an embodiment of my invention will operate without interruption from lateral swerving of the strip being fed into or through the same. It will of course be understood that the temporary release of the strip by the moving farther apart of the axes of the feed-rolls is so timed that it will not interfere with the special functions of the machine.

The principles of the invention may be embodied in a variety of ways. The drawings show one mode of applying the said principles in connection with a machine in which the feed in intermittent, and also one mode of applying them in connection with continuously-operating feed-rolls.

In the drawings,—Figure 1 shows certain portions of a machine employing feed-rolls which are rotated intermittingly, and an embodiment of the principles of the invention applied in connection with such feed-rolls, the parts being viewed from one side of the machine, and certain portions being broken away. Fig. 2 shows the parts of Fig. 1 viewed from the left-hand side in Fig. 1. Fig. 3 is a plan of the said parts. Fig. 4 is a view in section in the plane of line 4, 4, of Figs. 2 and 3. Fig. 5, Sheet 1, is a plan view of the feed-roll separating rockshaft and its transversely-projecting

pin. Fig. 6 is a side view of the said rockshaft. Fig. 7 is a view in section on line 7, 7, of Figs. 5 and 6. Fig. 8 is a side view of an embodiment of the invention in connection with continuously rotating feed-rolls. Fig. 9 is a plan of the parts shown in Fig. 8, the guides between the two pairs of feed-rolls being omitted.

Having reference to the drawings,—The machine of Figs. 1 to 7 is constructed to feed along a strip *a* of material, print or emboss the same at intervals, and punch therefrom disk-shaped portions bearing the imprints. A machine of the type of that partly shown in the said figures is adapted for the production of articles of various kinds. I have utilized the said machine in the manufacture of disk-shaped bottle-stoppers of paper materials. It comprises in its construction, among other parts and features unnecessary to be illustrated and described in this case, a stationary machine-frame 1, a pair of feed-rolls 2, 3, mounted thereon, a vertically-reciprocating head 4 carrying printing or embossing dies 5, 5, and also carrying a punch 6, a die 7 (Fig. 4) fixed upon the stationary machine-frame for coöperation with the punch, a stationary work-support 8 which supports the strip while being acted upon by the printing or embossing dies 5, 5, a strip-conducting guide 9 extending from the feed-rolls to the printing or embossing devices, and yielding edge-guides 10, 10, 10, Fig. 1. The machine is built to operate upon two strips simultaneously, the feed-rolls, printing or embossing dies, punch and die, strip-guide, and yielding edge-guides, being duplicated at the opposite sides thereof, as shown. The lower feed-rolls, 3, 3, at the respective sides of the machine are fixed upon a shaft 3^a, which extends transversely of the machine and is mounted in bearing-stands 3^b, 3^b, projecting from the stationary machine-frame. The upper feed-rolls 2, 2, are mounted upon a shaft 2^a, which at its opposite ends is mounted in boxes 2^b, 2^b, fitted in guideways in the said bearing-stands. The upper feed-rolls are pressed with yielding force toward the lower feed-rolls by means of expanding spiral springs 2^c, the latter being confined between plates 2^d and the said boxes, the said plates being engaged by adjusting screws 2^e, 2^e, working in threaded holes that are tapped in the caps 2^f, 2^f, of the said guideways. By turning the said adjusting screws the tension of the springs, and the force with which the upper feed-rolls are pressed toward the lower feed-rolls, may be varied in well-known manner. The adjusting screws are furnished with lock-nuts 2^g, 2^g, to prevent accidental loss of adjustment. The feed-rolls are operated to feed the strip *a* by means of a swinging arm 3^c and intermittent clutch-devices of any suitable character. The said arm is mounted to swing concentrically with the shaft 3^a, and the clutch-devices referred to include the disk or wheel 3^d fast on the said shaft. Swinging movement is imparted to the said arm 3^c at the proper times in the working of the machine through suitable actuating connections including a motion-transmitting link 3^e, Fig. 2, which is pivotally engaged with the said arm at 3^f. In consequence of such swinging movement of the arm, the clutch-devices rotate the shaft 3^a and lower feed-roll, and the upper feed-roll is rotated from the lower one. In the present instance the two feed-rolls of a pair are geared together by means of spur-gears 2^x, 3^x, meshing with each other.

The feeding movement of the feed-rolls takes place at a time while the head 4 is elevated. Such movement operates to advance the strip *a* through the strip-conducting guide 9, and over the work-support 8 and die 7. The strip-conducting guide 9 is U-shaped in cross-section, its bend constituting a back or inner edge-guide for the strip *a*, toward and against which the strip is pressed through the engagement of the yielding edge-guides 10, 10, with the front or outer edge of the strip. The acting portions of the said yielding edge-guides 10, 10, being pressed outward somewhat beyond their normal position by the width of the strip, their tendency to return to their normal position causes them to press against the outer or front edge of the strip so as to bear the strip widthwise against the bend of the conducting guide, and against the lip 9^a, Fig. 4, at the inner edge of the work-support, constituting a continuation of the bend of the conducting guide.

In the operation of the parts thus far described, the strip is fed step by step to the printing or embossing dies and the punch and die. The extent of each feed movement is sufficient to feed successive portions of the strip *a* first to the first printing or embossing die, then to the second, and then to the punch and die, which last punch out in the form of a disk each portion which has been operated upon by the two printing or embossing dies in succession.

The parts thus far described, are not in themselves of the gist of the present invention.

Referring now more particularly to the invention itself and the embodiment of the same which is shown in Figs. 1 to 7, 11 is a small rockshaft which is mounted in bearings formed in the upright portion of a bearing-stand 3^b. This rockshaft is located below the box 2^b which is contained within the guideway of such bearing-stand. It is formed with a cam-portion 11^a. In the present instance the said cam-portion is produced by slabbing off or cutting away the

intermediate portion of the length of the rockshaft, namely that portion which is immediately beneath the box. A wear-plate 11^x, Fig. 1 is placed between the box and the cam-portion 11^a. Normally the rockshaft occupies a position in which the depressed surface of the cut away portion thereof is presented to the wear-plate and box 2^b, permitting the box to assume its lowest position under the action of the spring 2^c and the upper feed-roll to press the strip *a* against the lower feed-roll, so that the strip is gripped between the feed-rolls and when movement is given to the feed-rolls it is fed forward thereby.

A turning movement of the rockshaft will cause the eccentrically-disposed portion or cam of the rockshaft to act against the wear-plate at the under side of the box 2^b to raise the latter and the shaft 2^a and feed-roll 2, separating the feed-rolls so as to relieve the grasp or bite of the latter upon the strip *a*, leaving it free to readjust itself to its normal path in case it has swerved therefrom. The rocking movement of the rockshaft 11 is provided for in the present instance by furnishing the said rockshaft with a pin 11^b extending transversely therefrom, and mounting a striker 11^c upon the head 4. The pressure of the box 2^b against the cam-portion of the rockshaft 11 tends to rock the said rockshaft until the flat face of the same and the bottom of the box are parallel and in contact. This holds the said pin in horizontal position. The striker-piece 11^c is fixed to the head 4 in such position that as the head descends it strikes against the said pin, pressing the latter down and rocking the rockshaft so that the feed-rolls are separated from each other in the manner already described. The extent of the separating movement is very small, being merely sufficient to release the grasp of the feed-rolls upon the strip *a*, and is not great enough to take the teeth of the spur-gears 2^x, 3^x, out of mesh with one another. As the head 4 rises, relieving the pressure of the striker against the pin 11^b, the rockshaft is permitted to turn reversely under the pressure of the spring 2^c, transmitted through box 2^b and wear-plate 2^d, and acting against an eccentric portion of the rockshaft 11. This reverse turning of the rockshaft allows the upper feed-roll to close down upon the strip *a*, and also restores the said rockshaft to its normal position. In the construction shown in Figs. 1, 2, 3 and 4, the roll-separating devices are duplicated in connection with the respective pairs of feed-rolls.

In the mechanism illustrated in Figs. 8 and 9, the strip *a* passes through two pairs of continuously-rotating feed-rolls 21, 31, and 22, 32, on its way to the fixed guide 9. The upper and lower rolls of each of the said parts are geared together by means of spur-gears 2^x, 3^x, and the rolls are actuated from a rotating shaft 13 by means of a sprocket-wheel 13^a fixed on said shaft, a sprocket-chain 13^b passing around said sprocket-wheel and also around a sprocket-wheel 13^c fixed on the shaft 21^a of one of the upper feed-rolls, a second sprocket-wheel 13^d fixed on the latter shaft, and a sprocket-chain 13^e passing around such sprocket-wheel and also around a sprocket-wheel 13^f fixed on the shaft 21^a of the other upper feed-roll. Separating movement of the feed-rolls of each pair, for the purposes of the invention, is provided for by mounting the shafts 31^a, 32^a, of the lower feed-rolls in vertically-movable boxes 31^b, 32^b, which are acted upon by springs tending to press the lower feed-rolls toward and against the upper feed-rolls. The respective pairs of feed-rolls are alternately opened or separated for the said purposes, by means of rockers 31^c, 32^c, which are pivoted at 31^d, 31^d, and 32^d, 32^d, and a rotating cam 32^e having a prominent portion or nose which engages the rockers alternately. The said cam is fixed upon an upright shaft 32^f that is geared by bevel gear-wheels 32^g, 32^g, to the shaft 13. As the projection or nose acts upon each of the rockers in turn, it rocks the rocker so as to depress the boxes of the corresponding lower feed-roll against the resistance of their springs, to thereby separate the corresponding pair of feed-rolls. As the projection or nose passes out of engagement with a rocker, the said springs press the said boxes, the lower feed-roll, and the rocker back into their former positions. In the operation of a machine having this embodiment of the invention applied thereto, the opening apart of the pair of feed-rolls next to the guide 9 permits any edgewise tension which may have been developed in the strip to act to spring the strip edgewise toward its normal path, the action taking place between the edge-guides of the machine and extending as far as to the outer pair of feed-rolls which are still closed together. When the pair of feed-rolls which were thus opened apart are closed together and the other pair are opened apart, the self-adjusting action of the strip is permitted to take place between the pair first mentioned and the source of supply. Between the two pairs of feed-rolls upper and lower conducting guides 33, 34, are located, between which the strip passes, and by which it is controlled vertically. These guides are omitted from Fig. 9.

I claim as my invention:

1. In strip eding mechanism, the combination wit feed-rolls which advance a strip of mat al, and means acting to confine said str within a given path widthwise and pr ucing lateral tension in the

strip adjacent the rolls in case of lateral divergence of the strip from the said path, of means for periodically varying the distance between the axes of the rolls and thereby releasing the strip from the bite of the roll, whereby said tension is permitted to restore the strip to its proper path.

2. In strip-feeding mechanism, the combination with feed-rolls which advance a strip of material, and edge-guides acting to confine said strip within a given path widthwise and producing lateral tension in the strip adjacent the rolls in case of lateral divergence of the strip from the said path, of means for periodically varying the distance between the axes of the rolls and thereby releasing the strip from the bite of the rolls, whereby said tension is permitted to restore the strip to its proper path.

3. In strip-feeding mechanism, the combination with feed-rolls which advance a strip of material, and spring-actuated edge-guides acting to confine said strip within a given path widthwise and producing lateral tension in the strip adjacent the rolls in case of lateral divergence of the strip from the said path, of means for periodically varying the distance between the axes of the rolls and thereby releasing the strip from the bite of the rolls, whereby said tension is permitted to restore the strip to its proper path.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. BAZLEY.

Witnesses:

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NATHAN B. DAY.