J. E. MacMURRAY.

MACHINE FOR MAKING SHINGLE BANDS.

APPLICATION FILED SEPT. 7, 1906.

965,311.

Patented July 26, 1910.

3 SHEETS—SHEET 1.

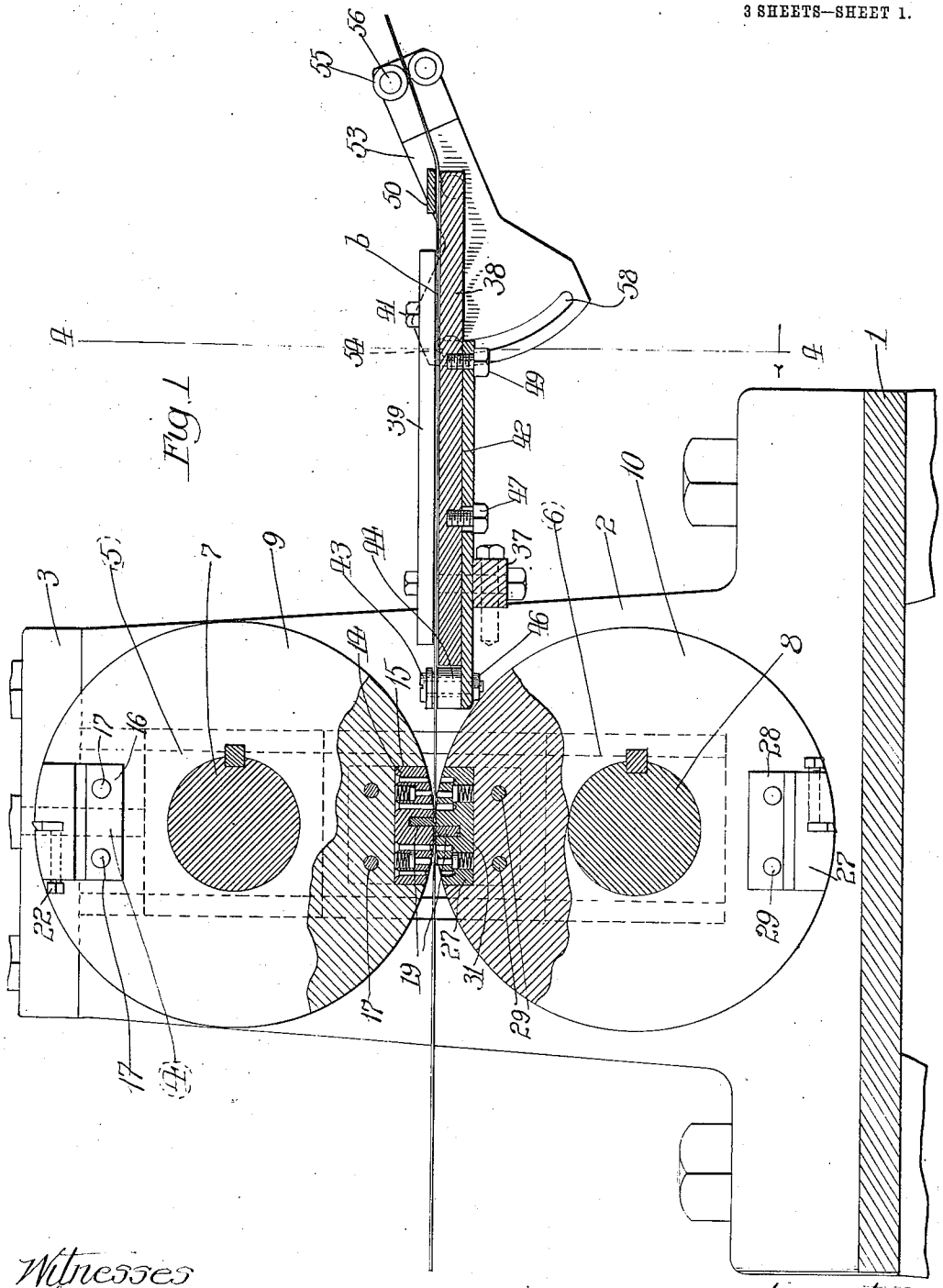

Fig. 1.

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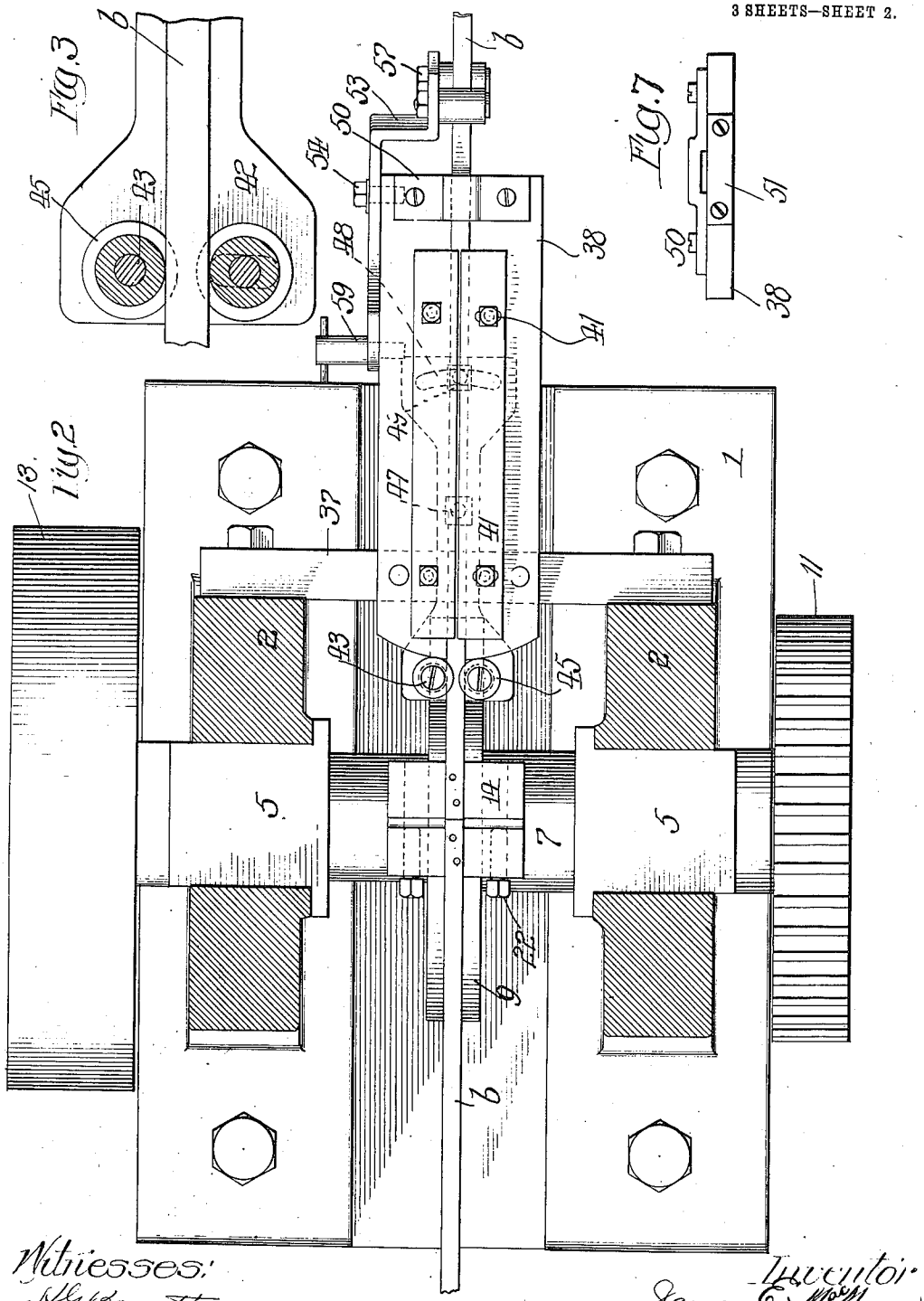

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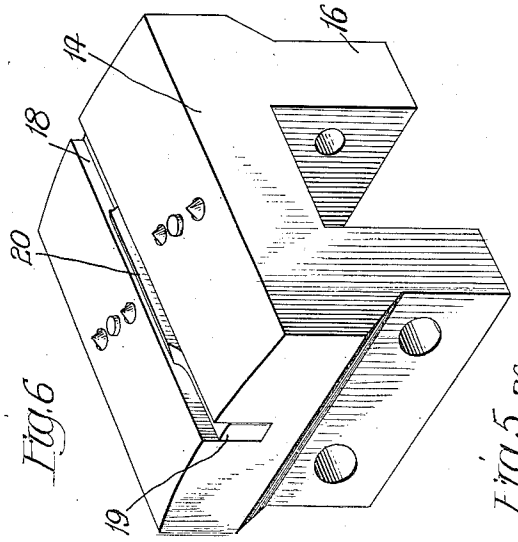


Fig. 6

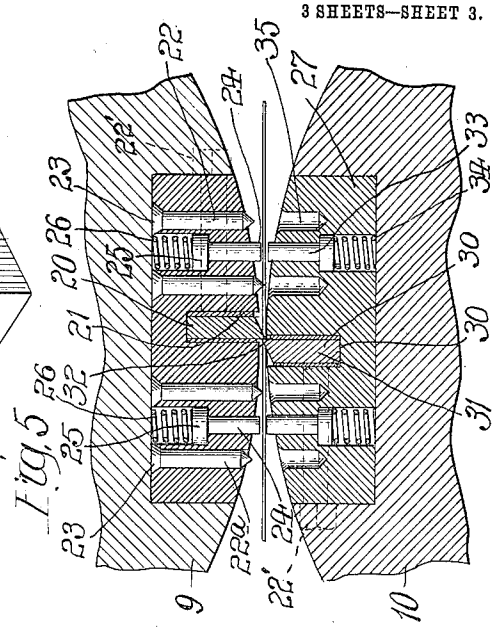
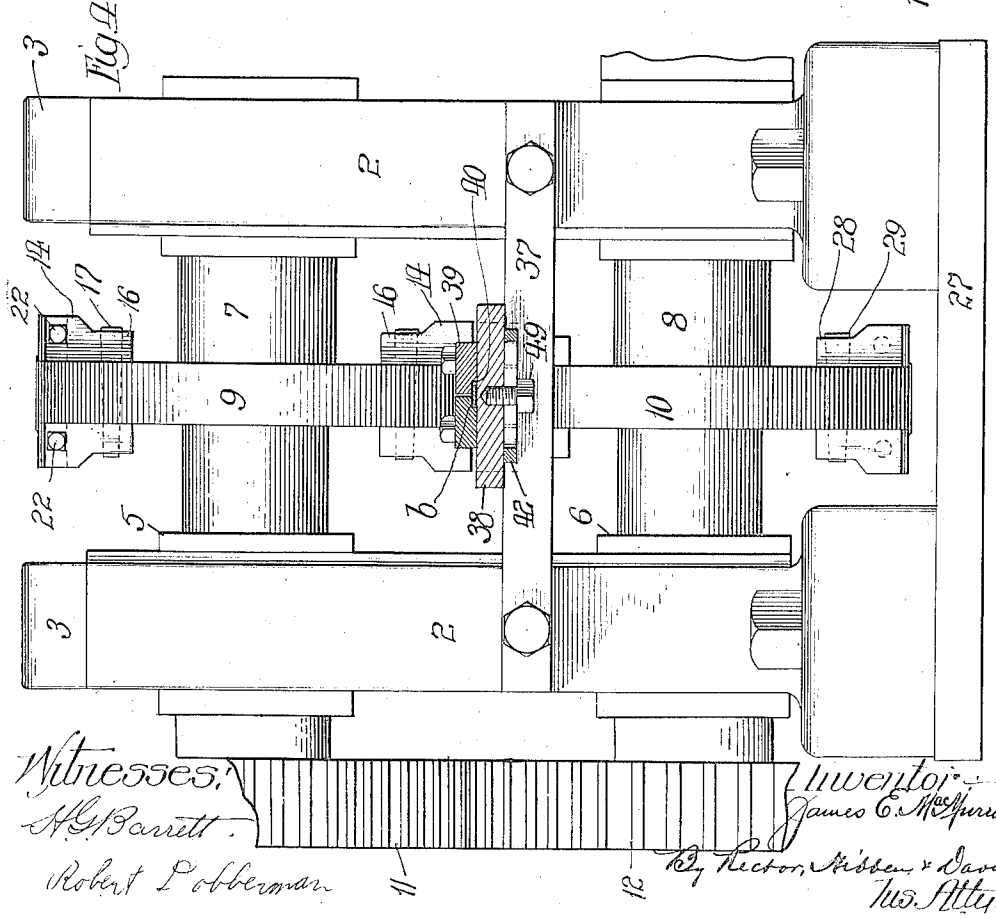


Fig. 5

Fig. 4



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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING SHINGLE-BANDS.

965,311. Specification of Letters Patent. Patented July 26, 1910.

Application filed September 7, 1906. Serial No. 333,633.

To all whom it may concern:

Be it known that I, JAMES E. MacMURRAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Making Shingle-Bands, of which the following is a specification.

The general object of the present invention is to provide a machine which can be run continuously at high speed to turn out automatically lengths of metal strip ready for use as shingle bands.

The invention provides for feeding a continuous metal strip from a reel into the machine, straightening the strip as it enters, and guiding it accurately into the bite of rolls which carry knives for cutting the strip into lengths and punches and dies for perforating the strip on opposite sides of the cut. Provision is made for adjustment to secure the correct degree of bending to take out the reel curve, and also for accommodating different widths of metal strips. Furthermore provision is made for adjustment to accurately gage the strip as it enters between the punching and severing rolls so as to insure the strips being cut squarely across and perforations being uniformly located.

As before stated the strip is made perfectly straight before being subjected to the action of the cutting-off and perforating rolls. It should be added that the invention provides means for preventing bending of the cut-off length of strip or the following portion of the strip by reason of adherence to the punches or dies and corresponding tendency to follow the rolls.

Through means of the character above indicated the invention provides for turning out a uniform product in the form of a perfectly straight, flat length of metal strip cut off squarely at the ends and perforated alike at both ends ready for use as a shingle band by wrapping the same around a bundle of shingles and bringing the perforations into registry for the reception of a fastener, the product as turned out by the single automatic machine of the present invention requiring no further operations to be performed upon it but being in the proper condition for packing and shipping or otherwise handling in any desired quantities.

In the accompanying drawings which illustrate a preferred form of embodiment of the invention hereinafter specifically described, Figure 1 represents a central longitudinal vertical section of an assembled machine; Fig. 2 represents a top plan view of the same with the upper or punch-carrying roll removed and certain housings in horizontal section; Fig. 3 represents in detail on an enlarged scale and in horizontal section certain strip guiding rollers and a portion of the holder or adjustable bracket supporting the same together with an illustration of a section of metal strip passing between said rollers; Fig. 4 represents a vertical cross-section taken substantially on the line 4—4 of Fig. 1; Fig. 5 represents in vertical longitudinal section on an enlarged scale knife, punch, and die carrying portions of the rolls relatively positioned as when the metal strip is being severed; Fig. 6 represents in perspective on an enlarged scale one of the punch and knife-carrying blocks; and Fig. 7 represents in end elevation certain strip-guiding and straightening devices.

The same reference characters designate corresponding parts in the several views above described and the numeral 1 designates a bed plate mounted upon suitable legs and supporting housings 2 surmounted by caps 3 carrying set screws 4 which engage the upper sides of box bearings 5 in the housings 2 above a similar pair of box bearings 6. Shafts 7 and 8 are journaled in these pairs of box bearings respectively and the punch and die rolls 9 and 10 are secured to these shafts respectively at the central portions thereof, said shafts being operatively connected by intermeshing gear wheels 11 and 12 and the lower shaft carrying a driving pulley 13. The said rolls are comparatively narrow and straddled at diametrically opposite points by blocks which occupy recesses in the rolls and constitute holders for the punches, strip severing knives and stripping plungers, the blocks on the lower roll being bored to constitute dies for coöperation with the punches.

The reference numeral 14 designates the blocks applied to the upper roll, the outer surfaces of these blocks being curved to conform with the curvature of the periphery of said roll so as to preserve the pe-

ripheral continuity when the blocks are seated in the recesses 15 of the rolls. Side flanges 16 of each block extend inwardly over the sides of the roll and the blocks are secured to the latter by taper pins 17 driven through tapered openings in said flanges and in the roll. Each block is centrally cross grooved in its outer face as shown at 18 for the reception of a knife blade 19 whose beveled cutting edge 20 projects from the face of the block when the blade is seated in said groove. For the purpose of the exact lateral adjustment of this blade shims 21 may be employed. The blade is held in place by set screws 22′ entered through tapped openings in one end of the block and bearing against one side of the blade or against the shim in case one is employed on this side of the blade. The block is bored through from its curved face to its rear side and reamed out in the latter for the reception of prick punches 22^a having conical heads 23 to seat in said reamed-out portions of the bores. When the block is in place the inner ends of these punches find a back stop in the base wall of the roll recess as clearly illustrated in Fig. 5, the points of the punches then projecting from the curved outer face of the block. The latter is further bored from the said curved face part way through and then on an enlarged diameter to the rear side for the reception of plungers 24 having enlarged heads 25 occupying the larger diameter bores. Spiral springs 26 also occupy said bores so that when the block is in place these springs will bear at the inner ends against the base wall of the roll recess and at the outer ends against said plunger heads thereby tending to thrust the plungers outwardly and project their ends from the curved face of the block as illustrated in Fig. 5. The punches and plungers are located along a central longitudinal line of the block or holder, the plungers being exactly in said line but the punches alternating on opposite sides of the same so as to stand in staggered relation to each other as clearly illustrated in Fig. 6. There is a pair of these punches projecting from the curved face of the block on each side of the beveled knife edge 20 each pair being disposed at the same angle to said edge and the members of each pair being the same distance apart and preferably equidistant from the plunger associated with them.

The blocks 27 of the lower roll 10 are exactly similar to the above described blocks carried by the roller 9 as to curvature of outer faces, side flanges 28 taken over the sides of the roll and receiving taper pins 29, cross groove 30 receiving knife blade 31 with cutting edge 32 beveled oppositely to the previously designated cutting edge 20, and bores to receive plungers 33 and springs 34. However, these blocks 27 constitute dies to coöperate with the punches 22 and to this end are bored in their curved faces as shown at 35 preferably with flaring or reamed entrance portions as shown in Fig. 5. The plungers 33 preferably have exactly the same location in the blocks 27 as the plungers 24 have in the blocks 14 and of course the die-bores 35 then stand in the same relation to these plungers 33 as the punches 22 do to the plungers 24 so that as the punches arrive successively for operation upon the metal strip each will be confronted by a die-bore to receive its penetrating point. By the use of the shims the knife blades will be closely adjusted so that their cutting edges will just pass each other when severing the strip.

It will be seen that with the above described construction of synchronously rotating rolls a metal strip passed between them will be cut into lengths measured by one-half the circumference of a roll and each length of strip will be perforated near each end with two holes in a line diagonal of the strip as illustrated in Fig. 2, one pair of punches carried by one of the blocks 15 first operating to so perforate the advancing end of the blank strip, then the latter being advanced until a pair of punches in the opposite block or holder perforates it and then the knife of the latter block operating in the continued advance of the strip to sever the same whereupon the series of operations are immediately repeated by the other pair of punches carried by the last-mentioned block or holder followed by the other pair of punches carried by the first-mentioned block or holder and the knife of the latter, all of course in coöperation with the die-bores and knives of the lower roll. Thus in each half rotation of the rolls a complete shingle band is turned out. The spring-pressed plungers 22 and 33 prevent the metal strip from sticking upon the points of the punches or in the die-bores and following the rolls, these plungers coöperating to keep the strip straight as it passes between the rolls.

Supported by a cross beam 37 bolted to the housings 2 is a table 38 over which the metal strip *b* passes to the rolls the upper surface of said table being in the tangential plane on which the rolls meet. Flanged bars 39 are bolted to the top of this table with their flanges confronting as shown in in Fig. 4 so as to provide a guideway 40 for the metal strip, these bars being cross-slotted where the bolts pass through as shown at 41 in Fig. 2 so as to provide for lateral adjustment to suit different widths of strip. Against the under-side of this table there is pivotally supported a holder or bracket in the form of an elongated plate 42 with widened end portions one of which projects

beyond the inner end of the table. This projecting portion of said plate carries a pair of up-standing bolts 43 upon which are rotatively mounted a pair of rollers 44. The latter are circumferentially grooved as shown at 45 to receive and guide the strip *b* whose edges move against the bases of the grooves causing the rollers to rotate as the strip advances thus obviating friction and maintaining, proof against wear, a final guideway for the strip as it is delivered to the rolls. The bolts 43 occupy cross-slots in the plate 42 so as to provide for adjustment to suit different widths of strip, said bolts being shouldered to engage the upper side of said plate and screw-threaded in reduced portions which pass through the slots to receive clamping nuts 46. Said plate has a pivot hole at about the middle to receive a screw-stud 47 entering the under-side of the the table 38 and the outer widened end of the plate is formed with an arc slot 48 engaged by a screw 49 also entering the underside of said table. With this screw loosened the plate 42 can be adjusted on its pivot to secure exactly the correct lateral position of the guide rollers for properly presenting the strip to the action of the rolls, then of course being fixed at such position by tightening said screw 49.

As the metal strip is to be fed into the machine from a reel means are provided for straightening the strip as it enters the machine by bending it oppositely to the reel curve. To this end the guideway for the strip in its passage through the machine does not terminate at the outer or receiving end with that formed by the flanged bars 39 and designated by the numeral 40 but beyond the outer ends of said bars there is screwed to the upper side of the table 38 at the outer end of the latter a cross-plate 50 of hardened metal recessed in its under side to provide a continuation of said guideway 40, and another hardened plate 51 is set into the end of the table. Thus the receiving end of the complete strip guideway of the machine presents hardened metal edges over which the incoming strip may be forcibly drawn at an angle to take out any curvature which may be due to its being drawn from a reel. In order to provide for properly regulating the angle at which the strip is drawn over one hardened edge or the other a bracket 53 is pivoted by means of a screw stud 54 to one side of the table 38 and carries at its outer end a pair of rollers 55 between which the strip is guided. These rollers may be mounted to turn on bolts 56 shouldered to bear against one side of the bracket and screw-threaded in reduced portions which extend through the latter and receive clamping nuts 57. The bracket is made angular in its outer portion so as to bring its roller-carrying part in proximity to the line of strip feed allowing for variations in the width of strip, the rollers being sufficiently wide to accommodate any width of strip upon which the machine is designed to operate. The bracket 53 is pivoted intermediate its ends and its inner portion is widened and formed with an arc-slot 58 to receive a clamping screw 59 entering the side of the table. With this screw loosened it will be obvious that the bracket may be adjusted to secure the proper degree of angular advance of the strip to the receiving end of the guideway.

It will now be seen that the above described construction is well calculated to carry out the purposes primarily recited. At the same time it is to be understood that this construction is susceptible of modification within the scope of the invention.

What is claimed is:

1. In a machine of the character described, a strip guide-way having opposed end edges between which the entering strip passes, means for directing the strip flatwise but angularly to one or the other of said edges, and means for directing the strip over such edge to straighten it.

2. In a machine of the character described, a strip guideway having opposed end edges between which the entering strip passes and guides for the strip located beyond said edges and directing the strip flatwise but angularly thereto.

3. In a machine of the character described, a strip guideway having opposed end edges between which the entering strip passes and guides for the strip located beyond said edges and adjustable to direct the strip flatwise at varying angles thereto.

4. In a machine of the character described, the combination of a fixed guideway with an end edge over which the entering strip passes, and a guide bracket adjustable transverse said guideway and carrying strip-guides outwardly beyond the latter, for the purpose described.

5. In a machine of the character described, the combination of a fixed guideway with opposed end edges over either of which the entering strip is drawn, and a guide bracket adjustable transverse said guideway and carrying strip-guides outwardly beyond the latter, for the purpose described.

6. In a machine of the character described, the combination of a fixed guideway with an end edge over which the entering strip passes, and a guide bracket adjustable transverse said guideway and carrying strip guide rollers outwardly beyond the latter, for the purpose described.

7. In a machine of the character described, the combination of a fixed guideway with an end edge over which the entering strip passes, and a guide bracket pivotally

mounted and adjustable transverse said guideway and carrying strip-guides outwardly beyond the latter, for the purpose described.

8. In a machine of the character described, the combination of a fixed guideway with opposed end edges over either of which the entering strip is drawn, and a guide bracket pivotally mounted and adjustable transverse said guideway and carrying strip-guides outwardly beyond the latter, for the purpose described.

9. In a machine of the character described, the combination of a fixed guideway with an end edge over which the entering strip passes, and a guide bracket pivotally mounted and adjustable transverse said guideway and carrying strip guide rollers outwardly beyond the latter, for the purpose described.

10. In a machine of the character described, a guideway through which the strip enters, a holder adjustable crosswise thereof and guides on said holder beyond the end of said guideway from which the strip issues.

11. In a machine of the character described, a guideway through which the strip enters, a holder pivoted for adjustment crosswise thereof and guides on said holder beyond the end of said guideway from which the strip issues.

12. In a machine of the character described, a guideway through which the strip enters, a holder adjustable crosswise thereof and a pair of guide rollers on said holder beyond the end of said guideway from which the strip issues.

13. In a machine of the character described, a guideway through which the strip enters, a holder pivoted for adjustment crosswise thereof and a pair of guide rollers on said holder beyond the end of said guideway from which the strip issues.

14. In a machine of the character described, a guideway through which the strip enters, a holder adjustable crosswise thereof and a pair of circumferentially grooved guide rollers mounted on said holder beyond the delivering end of said guideway.

15. In a machine of the character described, the combination of a guideway through which the strip enters, a holder pivotally mounted below the same and projecting beyond the end thereof from which the strip issues, and guides mounted on the projecting part of said holder; substantially as and for the purpose described.

16. In a machine of the character described, the combination of a guideway through which the strip enters, a holder pivotally mounted below the same and projecting beyond the end thereof from which the strip issues, and a pair of guide rollers mounted on the projecting part of said holder; substantially as and for the purpose described.

17. In a machine of the character described, the combination of a guideway through which the strip enters, a holder pivotally mounted below the same and projecting beyond the end thereof from which the strip issues and a pair of circumferentially grooved guide rollers mounted on the projecting part of said holder.

18. In a machine of the character described, a pair of rolls between which the strip is fed continuously, said rolls carrying coöperating strip-severing knives, and punches and dies and stripping plungers on opposite sides thereof to perforate the strip on each side of the cut and disengage it from the punches and dies.

19. In a machine of the character described, a pair of rolls between which the strip is fed continuously, one having punches on opposite sides of its knife and the other dies to receive the punches and both having spring-pressed stripping plungers to disengage the severed and perforated ends of the strip from the punches and dies.

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