

No. 642,901.

Patented Feb. 6, 1900.

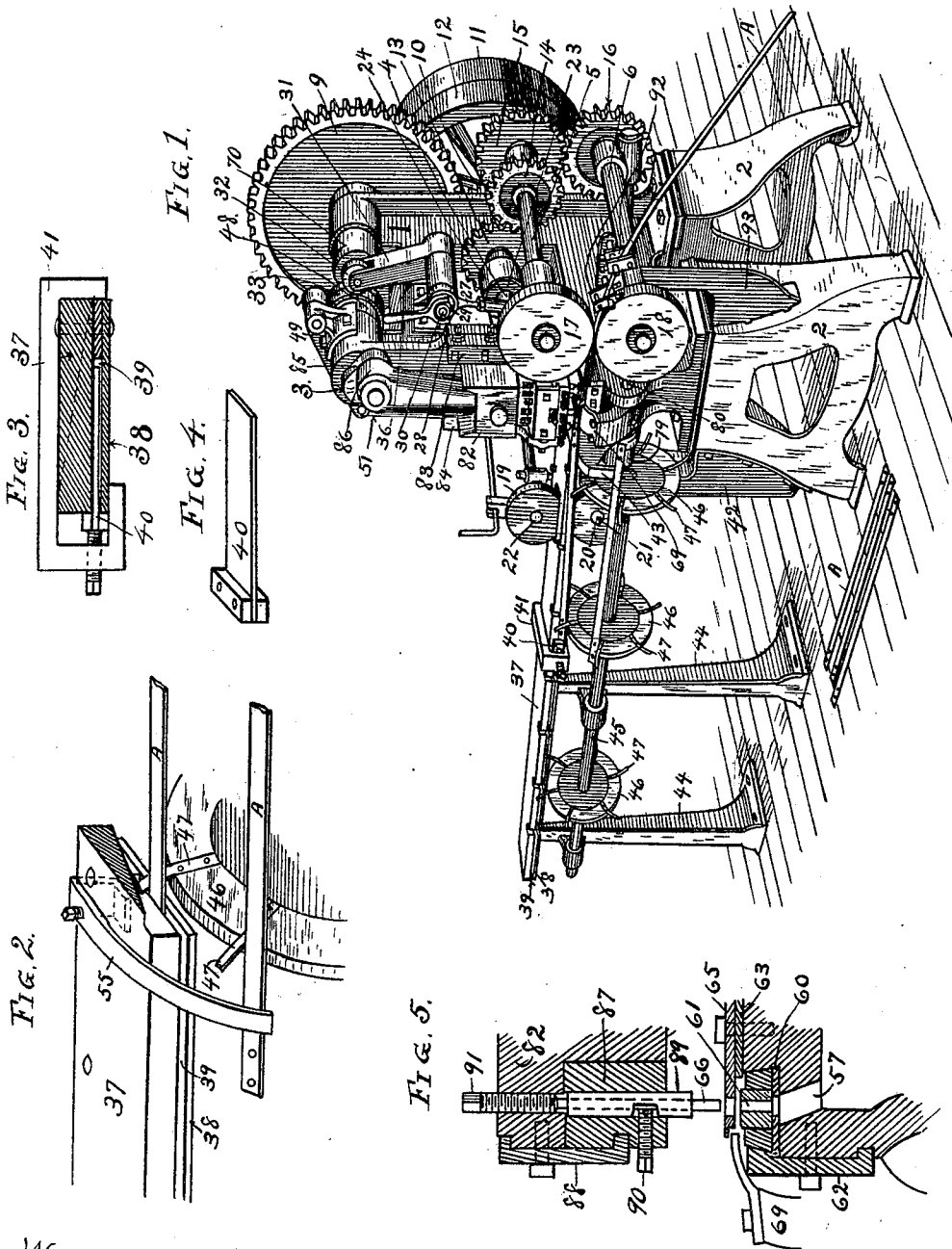
W. GLADER.

HOOP CUTTING AND PUNCHING MACHINE.

(Application filed Mar. 31, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES.
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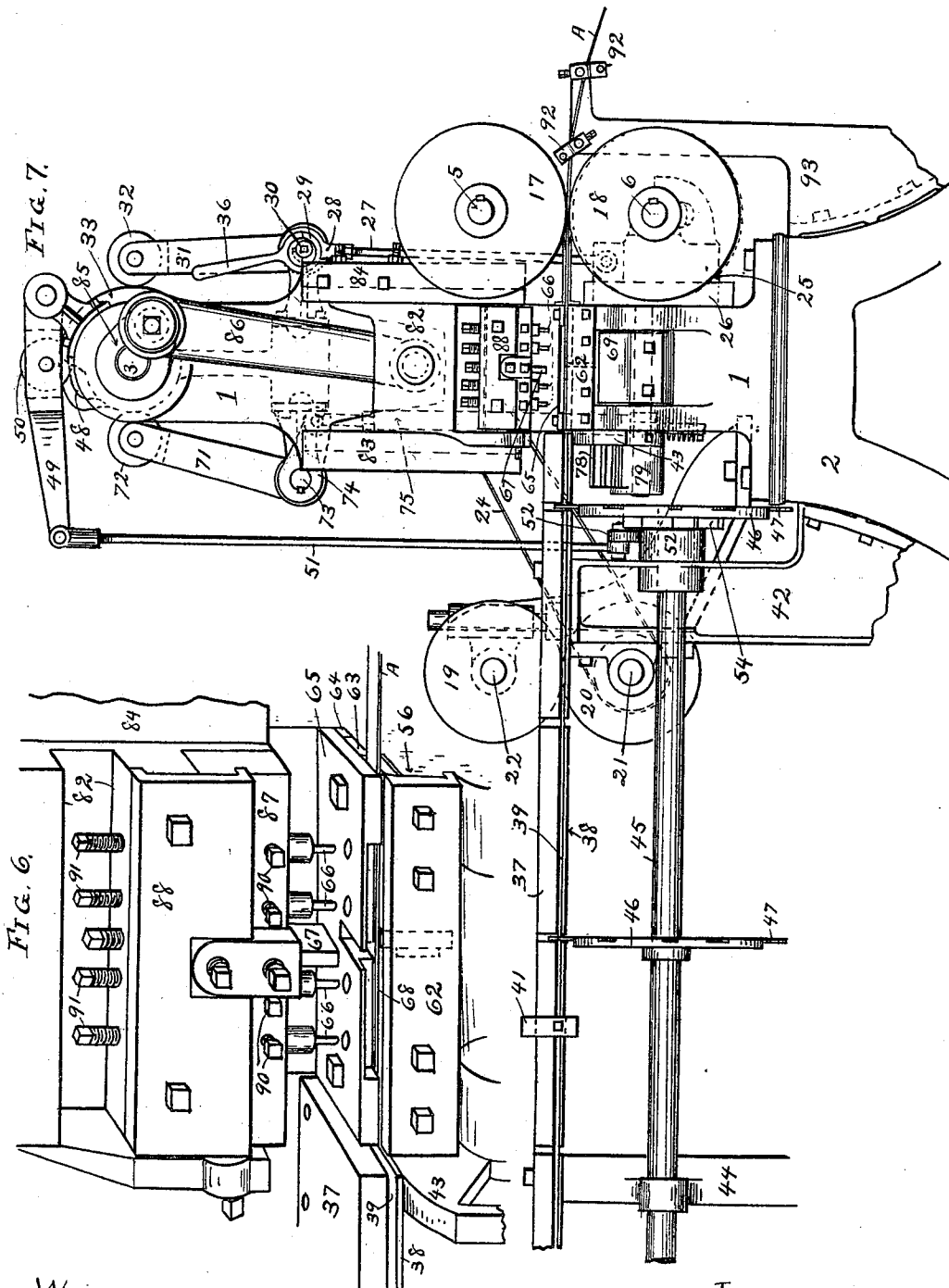


FIG. 6.

FIG. 7.

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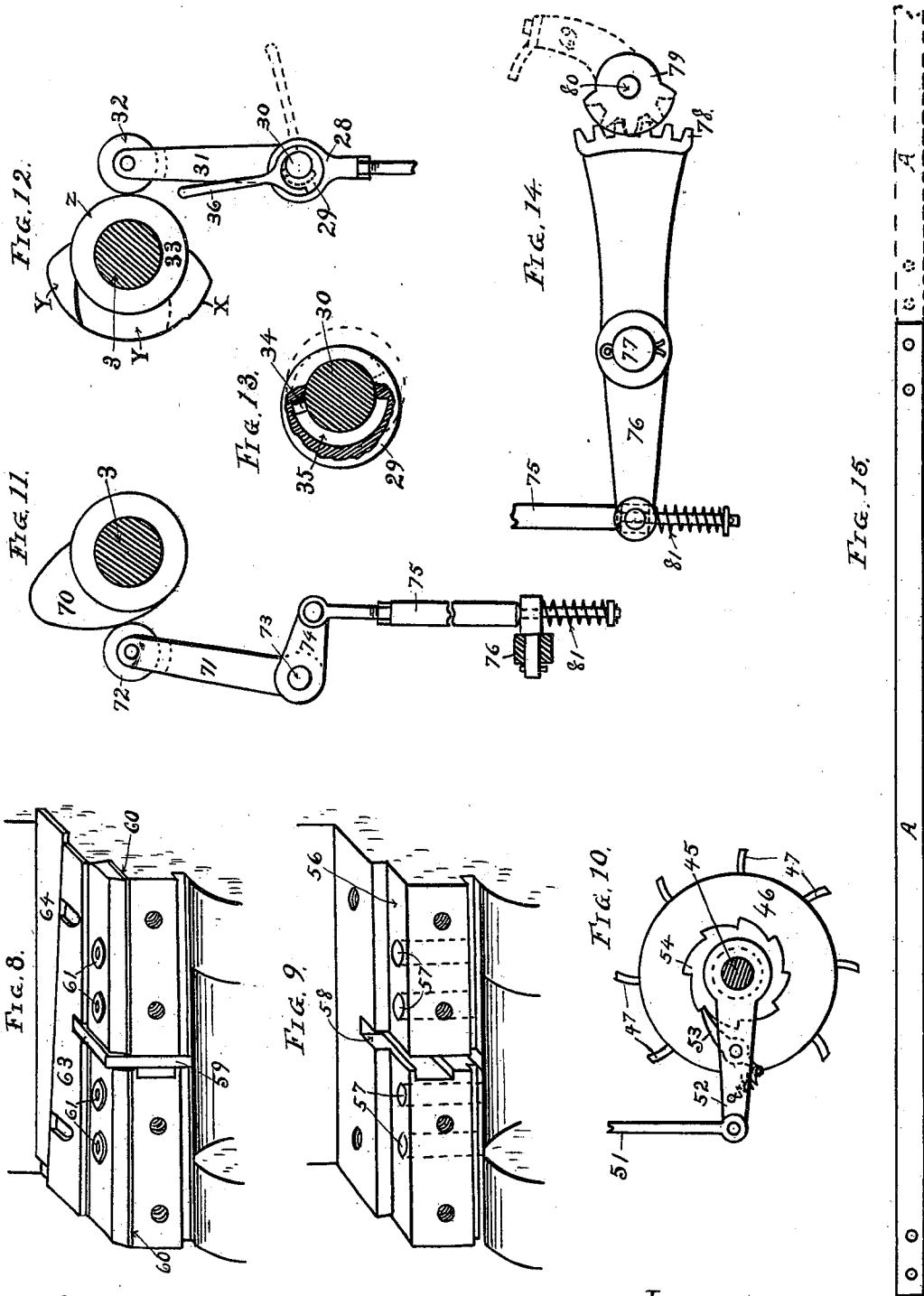
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UNITED STATES PATENT OFFICE.

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HOOP CUTTING AND PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 642,901, dated February 6, 1900.

Application filed March 31, 1899. Serial No. 711,216. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GLADER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Hoop Cutting and Punching Machine, of which the following is a specification.

My invention relates to improvements in machines wherein strips of hoop-iron, which, having the end thereof started in the machine, are automatically manipulated in such manner as to be cut into lengths suitable for making hoops for barrels, tubs, pails, and the like, and also punched to form holes at each end of each cut length, so that when the ends are brought about to shape the hoops the holes of their overlapping ends will register, so that rivets may be placed and secured therein to unite said ends; and the objects of my invention are to automatically perform the service of cutting, punching, and delivering the lengths of iron and to readily and quickly adjust the machine so as to cut and punch any length of iron within the limit of the machine, and thereby make it possible for the operator to readily produce such lengths of iron as may at the time be required by the consumer, and thus avoid the necessity of the consumer carrying a large stock and assortment of lengths of the cut and punched iron. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective elevation of the machine; Fig. 2, a detailed perspective of a portion of the iron-guideway and ejector which delivers the iron from the guideway; Fig. 3, a cross-section of said guideway, showing a stop placed therein and a clamp for securing said stop; Fig. 4, a perspective view of said stop; Fig. 5, a detailed sectional view of the punch-and-die mechanism of the machine; Fig. 6, a detailed front perspective view of said punch-and-die mechanism; Fig. 7, a front elevation of the machine, having a portion of its extended guideway and the lower portion of the standards broken away. Figs. 8 and 9 are front detailed views of the die-seat of the machine, the former view showing the dies and a gage-plate seated; Fig. 10, a detailed side view of the pawl-and-ratchet mechanism for operating the ejectors or deliverers of the machine. Figs. 11 and 12 are

detailed views of cam movements of the machine; Fig. 13, a detailed sectional view of an eccentric movement of the machine; Fig. 14, a side view of the toothed segments which actuate a holding-arm of the machine, and Fig. 15 is a view of the product of the machine.

Similar letters and numerals refer to similar parts throughout the several views in the drawings.

Referring to said drawings, 1 is an upright frame mounted on standards 2 2 and is provided with bearings, so as to suitably carry crank-shaft 3, a drive-shaft 4, and roll-shafts 5 and 6; also, a die table or seat 56 and guided vertically-reciprocating punch-head 82. Fixed on the rear end of crank-shaft 3 is a gear-wheel 9, which is arranged to mesh with and be driven by a pinion 10, which is fixed on the rear portion of drive-shaft 4. Said shaft 4 has placed thereon on its extreme rear end portion a loose belt-pulley 11 and a tight and heavy belt-pulley 12, about which a drive-belt is placed, and within frame 1 a gear-wheel 13, arranged to mesh with and drive a similar gear 14, which is fixed on the upper roll-shaft 5, and thus through the agency of the intermeshing gear-wheels 15 16, which are respectively fixed on the rear end of shafts 5 and 6, drive the two feed-rolls 17 and 18, which are respectively fixed on the forward end of said shafts.

At the opposite side of the machine from rolls 17 18 is a second pair of feed-rolls 19 20, fixed on shafts 21 22, respectively, which shafts are suitably boxed by means of bracket-bearings, (see Fig. 7,) and the roll 20 is driven by means of a belt-pulley 23, which is fixed on drive-shaft 4, (see Fig. 1,) through the medium of a belt 24, placed about said pulley of said roll-shaft 21, as represented by dotted lines in Fig. 7, and the upper roll 19 is driven by suitable intermeshing gears.

Roll-shaft 5 is fixedly boxed to frame 1, while roll-shaft 6 is at its forward end supported in a vertically-sliding box, (shown at 25 in Fig. 7,) which box is arranged in a guide 26 and suspended, by means of a connecting-rod 27 and strap 28, from an eccentric 29, which is arranged on the forward end of a short rock-shaft 30, which is boxed to frame 1, as shown, and bears at its rear end an up-

right arm 31, having a roller 32 arranged operating against the face of a peripheral cam 33, which is fixed on crank-shaft 3, the plan of said cam being shown particularly in Fig. 12 and is of such form that during the time of the machine when the hoop-iron A, which is fed into the machine between rolls 17 18, starts forward at the feeding in of each section required to form the hoop lengths, the fullest portion X of said cam will be in bearing against the roller 32 of arm 31 and hold said arm actuated, so as to have partially-turned eccentric 29 in such manner that through the agency of strap 28 and rod 27 box 25 will be held up its highest limit, and thus hold up roll 18, so as to pinch hard on the infeeding hoop-iron A, thus insuring a positive starting of said feeding operation, and as said feeding operation advances cam 33 turns, causing arm-roller 32 to ride off section X onto section Y, which is less prominent, and thereby slightly reverses the movement of eccentric 29, slightly lowers box 25, and releases the hard pinch of roll 18 against the iron A, still maintaining sufficient pinch to feed forward the unobstructed iron, but to slip the feed when the iron is interrupted by having engaged against the length-gage stop placed in the guideway, as will be hereinafter explained. The segment Y of cam 33 is of such proportion as to thus hold the feed-roll to insure a full-length feed, and when such segment has turned from arm-roller 32 said roller drops in upon cam-segments, which actuates the said eccentric so as to permit box 25 to drop lower, and thus drop roll 18 sufficiently so as not to then pinch against the iron A, and thereby interrupt the forward-feeding operation until cam 33 again comes about and repeats its service in actuating the said eccentric to start a succeeding feed. Cam 33 is made in two parts, one part having only as a prominent member a segment Y, which is for the purpose of adjusting to either contract or prolong said segment to accommodate the infeeding of short or long sections of iron A. Shaft 30 at the seat of eccentric 29 is provided with an extending pin 34, (see Fig. 13,) and the said eccentric is internally recessed, as represented at 35, and placed so said pin is within and bearing against the end of said recess, which position of parts is such as to bring the eccentric to extend toward the machine-frame 1, where the weight of the parts suspended therefrom will hold such position, and as the limit of movement necessary to actuate roll 18 is slight such suspended weight maintains such relative position; but in case it is desired to stop the forward feeding of iron A for any reason before a proper length has been fed handle 36, which is attached to said eccentric, may be grasped and turned out and down, as represented by dotted lines in Fig. 12, and thus turn said eccentric in like manner, which is permitted by the length of recess 35, and by so doing lower box 25, and

thus drop roll 18, so as to release its pinch and stop feeding.

Extending horizontally from the machine-frame opposite rolls 17 18 is a guideway 37, comprising a bar having at stated intervals bottom cross-recesses and sections of plates 38, secured to the rear bottom edge of said bar between said recesses in such manner as to form a way 39, as shown more particularly in Figs. 2 and 3, and adjustably fixed in said way is a stop 40, held by means of a clamp 41. Said guideway is supported adjacent the machine-frame on brackets 42 and 43 and at its extending portion on standards 44. Boxed to said standards and said brackets 42 is a shaft 45, having fixed thereon a plurality of wheels 46, which are stationed relative to certain of said guideway cross-bottom recesses and are provided with radially-extending fingers 47, adapted when said wheels are turned to wipe through said recesses and convey the cut and punched sections of hoop-iron from said guideway and from between rolls 19 20, which rolls operate through recesses in said guideway and frictionally aid in the feeding of the iron A, which friction is due alone to the weight of roll 19 and is sufficient to prevent back movement of iron A after the release thereof by rolls 17 18 and to fully feed in the last portion of a strip A, which has become too short to be further advanced by rolls 17 18, and as said rolls 19 20 operate continuously they slip on the iron A after it has advanced, so as to engage against stops 40 in said guideway.

Wheels 46 are actuated intermittently in alternate time with the cutting and punching mechanism of the machine by means of a cam 48, which is fixed on crank-shaft 3 through the agency of a lever 49, having a roller operating on said cam, a connecting-rod 51, and a pawl-and-ratchet mechanism 52, 53, and 54, as shown in Figs. 7 and 10, and as they advance in their operation the cut and punched sections of iron are after being wiped from the guideway successively delivered and permitted to fall upon the floor or into some suitable receptacle.

If so desired, fenders, as shown at 55 in Fig. 2, may be employed to guard against premature delivery of the sections.

Formed as a part of frame 1 is a die-table 56, located immediately below the path of the infeeding iron A and between rolls 17 18 and guideway 37 and formed, as shown in Fig. 9, with down-leading holes or exits 57 for the discharge of metal punched from the iron A in making holes therein and also having a recess 58 for holding a shear cutter 59, as shown more particularly in Fig. 8. Seated on said table upon a bottoming-plate 60 are pairs of dies 61 61, a pair at either side from cutter 59, (see Fig. 8,) which are held seated by means of a front clamp-plate 62, as shown in Figs. 5 and 6. On the ledge in rear of said dies is arranged a gage-plate 63, (shown in Figs. 5, 6, and 8,) which is made

adjustable to or from the said dies by means of a rear wedge 64 (shown in Fig. 8) for the purpose of gaging the hoop-iron, so it will be held central over the dies and made-adjust-
 5 able to accommodate different widths of hoop-iron. Secured upon and overreaching said gage is a stripper-plate 65, which hoods over the said dies, as shown in Fig. 6, and is made with holes through which punches 66 operate, a recess through which a shear cutter
 10 67 operates, and with a front under recess 68, wherein the operative end of a holder 69 (see Figs. 1, 5, and 7) enters, which holder serves to engage against the edge of the hoop-iron as it rests on the dies and hold it firmly
 15 against gage 63, so as to insure the holes being punched centrally through the iron. Said holder 69 is held off from the iron during the feeding process and brought into service
 20 during the punching process, and therefore is actuated intermittently and is given such movement by means of a cam 70 (which is fixed on crank-shaft 3) through the agency of an arm 71, having a roller 72 operating against
 25 said cam, a rock-shaft 73, to which said arm is fixed, a crank-arm 74, fixed upon said rock-shaft, and down-extending rod 75, (see dotted lines in Fig. 7,) connecting arm 74 with a lever 76 below, (see details in Figs. 11 and 14,) which lever is fulcrumed on a pin 77 and provided with a toothed segment 78, placed in mesh with a fellow segment 79, which is fixed on the end of shaft 80, which shaft also has fixed thereon the holder 69, and as a means
 35 of making said connections yielding, rod 75 is placed with its lower end portion through a hole in the pin which connects with lever 76 (see Fig. 11) and has a coil-spring 81 sleeved and retained on said depending-rod end, so the uplift of rod 75, which movement actuates holder 69 to its work, will be yielding, yet sufficiently firm to perform the required service.

82 represents the vertically-reciprocating
 45 head of the machine and is guided in ways 83 84 and operated by the crank 85 of shaft 3 through the agency of pitman 86. (See Fig. 7.) Attached to the lower portion of said head is a punch-holding block 87, wherein the
 50 punches 66 and cutter 67 are set and which block is held into position by means of a front clamp-plate 88, as shown, a peculiar characteristic of the said punches being that they are placed within tubular holders 89, as shown
 55 in Fig. 5, wherein the side of said holder is cut away at the place where the retaining set-screw 90 engages, thus permitting said screw to directly hold the punch. Above in line with each said punch, turned in a portion of
 60 head 82, is a set-screw 91 for giving down adjustment to the said punches and also in like manner adjust down cutter 67, and a peculiar feature of the movement of said head is that the stroke of crank 85 is great enough
 65 so the punches and cutter are carried a considerable distance above the dies at each receding movement, and therefore the major

portion of the stroke of said crank is consumed in bringing the punches and cutter down to their work, and but a small portion
 70 of the time of the machine is therefore consumed in punching and cutting, which is an advantage in permitting more time to the other manipulations of the iron A.

By reference to Fig. 8 it will be observed
 75 that the dies to the right are on a plane with the top of cutter 59 and that the dies at the left are a little lower, which arrangement is to prevent the bending down of the end of the iron at the left side, as would result with
 80 dies on a common plane with said cutter.

Adjacent the face of rolls 17 18 guides 92 92 are arranged, supported by means of a bracket 93, and are for the purpose of properly directing or guiding the hoop-iron A to said rolls
 85 17 18.

In operation the strip A is first passed in through guides 92 92, thence between rolls 17 18, and brought to a position so the end thereof will rest on cutter 59, during which time
 90 eccentric lever 36 is thrown out and down, so as to actuate roll 18 and permit it to then remain sufficiently low so as not to pinch said strip. With the strip thus placed the machine is started, which results in cutting the
 95 end of the strip off properly and punching the holes in the trimmed end, whereupon the lever 36 is thrown up, which then raises roll 18, so it pinches said strip and starts the feeding process automatically, and as the strip
 100 advances in the machine it enters guide 37 and moves along therein until it engages stop 40, which is set to gage the proper length the strip-section is to be cut off. At such stage of operation the pinch of the feed-rolls on the
 105 strip is slight, and therefore as the strip engages said stop said rolls slip on the strip, the tendency of which action is to prevent back movement of the infed strip portion. The strip thus fed in, the time of the machine is
 110 such as to then bring the cutting and punching mechanism into service and cut off and punch the holes in the strip either way from the junction of the cut. Immediately after the receding of the punches the delivering-
 115 fingers are actuated and wipe the cut-off strip-section sidewise from its guide and from between rolls 19 20, and as successive like operations are made the said sections are dropped from said fingers and are thus delivered from
 120 the machine.

Having thus described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is as follows:

1. A machine for cutting hoop-iron, or flat
 125 metal strips, into lengths suitable for hoops, and punching rivet-holes in the ends thereof, comprising continuously-driven feed-rolls controlled by mechanism intermittently moving one roll toward and from the fellow roll,
 130 to pinch the strip hard at the commencement of each feed, to relax said pinch during the latter portion of each feed, and release said pinch at the conclusion of each feed; a guide

to receive the infeeding end of the strip; a punch, die, and cutting-off mechanism located between said feed-rolls and guide; continuously-operating friction-rolls arranged to receive between them the strip as it is entered into said guide; and intermittently-actuated fingers, or ejectors, arranged to take the cut and punched strips, or sections, from said guide and deliver them from the machine.

2. A machine for cutting, and punching holes in barrel-hoops, comprising a feeding device adapted to intermittently feed forward different lengths of the metal strips from which the hoops are formed; a guide arranged to receive the infeeding end of said strips; an adjustable stop arranged in said guide to determine the length of strips to be cut; a punch, die, and cutting-off mechanism located between said guide and the entrance of the hoop metal, and in the path of said metal, adapted to intermittently engage, cut off, and punch the holes in the then adjacent cut-off ends of the strip of metal, and an intermittently-actuated device for delivering the cut-off and punched sections of metal strips from the machine.

3. In the herein-described machine, in combination with the driving mechanism, and the strip-receiving guide and delivering fingers; the cam-actuated ratchet mechanism arranged to intermittently actuate said fingers, substantially as and for the purpose specified.

4. In the herein-described machine in combination with the driving mechanism and the infeeding-rolls; the cam-actuated eccentric and connecting mechanism, whereby one of said rolls is intermittently actuated toward and from its fellow roll, substantially as and for the purpose specified.

5. In the herein-described machine, in combination with the driving mechanism, and with the strip punching and cutting-off mechanism, and side gage, the holder adapted to

engage against the metal strip at the side opposite said gage, and the mechanism whereby said holder is intermittently actuated to thus hold, and release the metal strip, substantially as set forth.

6. In the herein-described machine, in combination with the reciprocating head carrying the cutter, and punches at either side from said cutter, the die-table arranged below said head, the cutter set in a recess of said table, and the dies seated upon said table at either side from said cutter; wherein the dies at one side are at a lower plane than those at the opposite side, substantially as and for the purpose specified.

7. In the herein-described machine, in combination with the operative cutter and the punches, the die-table recessed and provided with the stationary cutter set therein, and offset and provided with the dies seated on said offset; the gage-plate arranged adjacent one side of said dies; the wedge arranged in rear of said gage; and the stripper-plate fixed down upon said gage and wedge, and arranged overreaching said dies, substantially as set forth.

8. In the herein-described machine, in combination with the feeding-rolls, the actuated eccentric and roll bearing supporting connection, wherein said eccentric is sleeved upon its support and recessed internally, and held into operative position by means of a pin fixed in its support and extending into said recess; and wherein said eccentric is, by means of said recess, adapted to be thrown reversely from the position maintained during operation, substantially as and for the purpose specified.

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In presence of—

WM. J. HUTCHINS,
W. C. HUTCHINS.