

Nov. 3, 1925.

1,559,658

A. B. UNDERWOOD
PRESS FOR EMBOSsing METAL

Filed Oct. 1, 1923

2 Sheets-Sheet 1

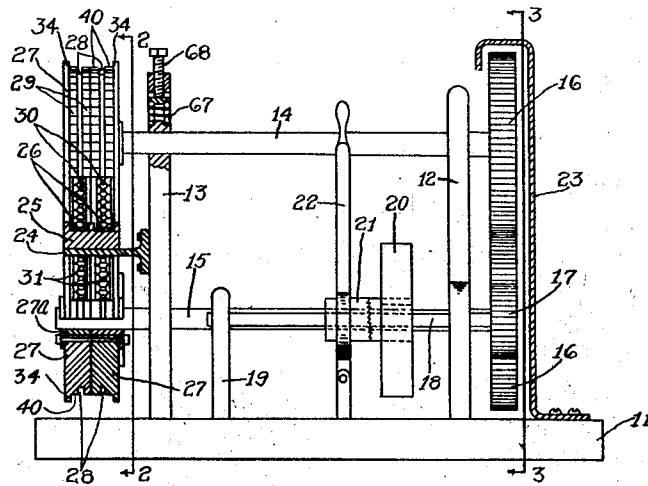


Fig. 1

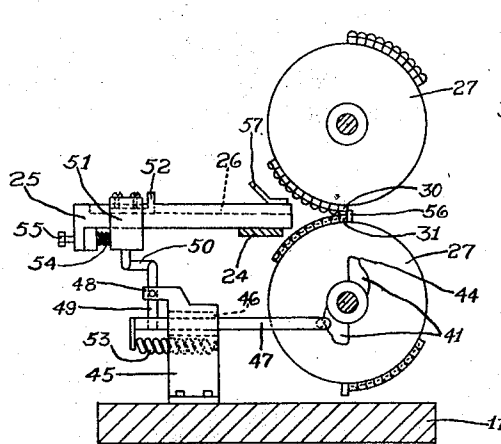


Fig. 2

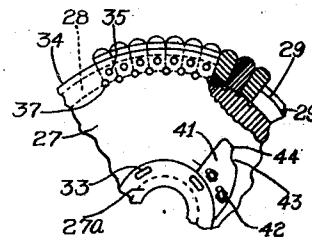


Fig. 4

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2 Sheets-Sheet 2

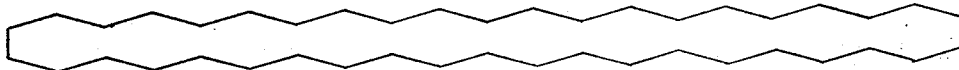


Fig. 5.

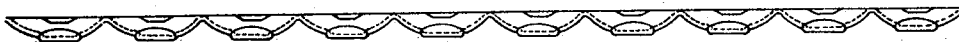


Fig. 6.

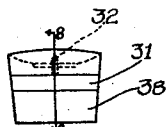


Fig. 7.

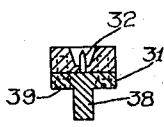


Fig. 8.

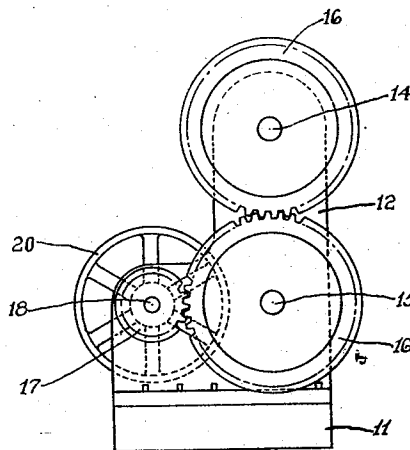


Fig. 9.

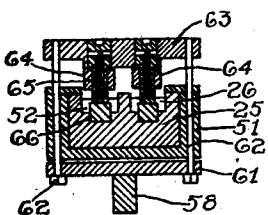


Fig. 10.

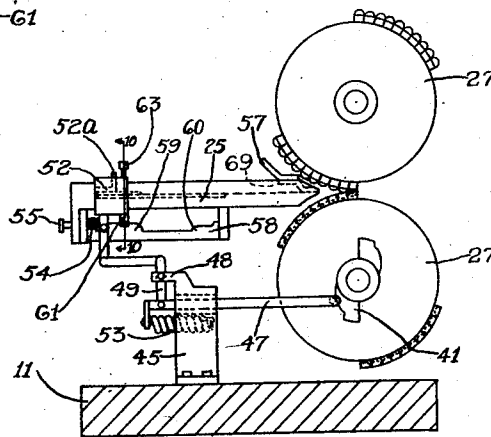


Fig. 11.

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UNITED STATES PATENT OFFICE.

ALBERT B. UNDERWOOD, OF CINCINNATI, OHIO, ASSIGNOR TO THE EDWARDS MANUFACTURING COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

PRESS FOR EMBOSSING METAL.

Application filed October 1, 1923. Serial No. 665,813.

To all whom it may concern:

Be it known that I, ALBERT B. UNDERWOOD, a citizen of the United States of America, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in a Press for Embossing Metal, of which the following is a specification.

This invention relates to metal working presses, especially to the type used in making embossed metal strips.

An object of my invention is to provide a device of this kind wherein embossed or beaded metal strips may be formed without waste of metal.

Another object is to provide a device of this kind that will require little skill to operate after the machine has been set up.

Another object is to provide such a device that is simple, efficient and uniform in operation.

These and other objects are attained by the means described herein and disclosed in the accompanying drawings, in which:

Fig. 1 is a side elevational view of a device of the invention, parts being shown in cross-section.

Fig. 2 is an elevational view on line 2—2 of Fig. 1.

Fig. 3 is an elevational view on line 3—3 of Fig. 1.

Fig. 4 is a fragmental detail of a feature of the invention, part being shown in cross-section.

Fig. 5 is a top view of a strip of metal to be formed.

Fig. 6 is a side elevational view of a strip shown in Fig. 5 after being formed by a device of my invention.

Fig. 7 is a side elevational view of a forming die used in the device.

Fig. 8 is a cross sectional view on line 8—8 of Fig. 7.

Fig. 9 is a side elevational view showing a modification of the feed mechanism forming part of my invention.

Fig. 10 is an enlarged cross-sectional view on line 10—10 of Fig. 9.

The press of my invention comprises a base 11, having spaced standards 12 and 13, which are provided with suitable bearing bores in which upper and lower arbors 14 and 15 are revolubly mounted. Inter-meshing gears 16 are mounted on the arbors

and one of the gears is actuated by pinion 17 mounted on drive shaft 18, which is revolubly mounted upon upright 19 and standard 12. A loose pulley 20 is freely rotatable upon drive shaft 18 and has an integral clutch member. A complementary clutch member 21 is splined to drive shaft 18 and may be engaged upon the pulley by means of clutch lever 22 as is common in the art. Power is applied to the pulley from any suitable source. A suitable guard 23 is mounted upon the base 11 adjacent the gears 16 and pinion 17. A bracket 24, mounted on the standard 13, carries a grooved guide 25 of a feed mechanism. Longitudinal grooves 26 extend along the upper face of the guide 25.

Mounted on the ends of the arbors 14 and 15 are die rollers 27. In the preferred embodiment of my invention the rollers 27 are mounted in pairs upon sleeves 27^a which are keyed to the arbors. The extreme side of each roller 27 carries a flange 34. Each roller 27 has a peripheral groove 28, and the shoulders 40 adjacent the groove are developed into a series of flats 29, which form seats upon which the shoulders 39 of the dies 30 and 31 may engage. The lugs 38 of the dies engage in the grooves 28. The flanged side of each of the rollers is provided with threaded holes 35 communicating with the groove 28 to accommodate screws which engage upon the lugs 38 of the dies thus securing the dies in position upon the rollers. The shoulders 39 of the dies rest upon the flats 29 of the shouldered portion 40 of the rollers. A series of holes 37 are provided in staggered relation to the holes 35, one of such holes 37 communicating with the groove 28 at the bottom thereof in radial alignment with the junction of each two flats 29 on the shoulder 40. The dies may readily be removed from the groove 28 by inserting some small instrument such as a screw driver or the like in one of the holes 37 and thus lifting two adjacent dies out of the groove. The male dies 30 and female dies 31 are preferably made in two parts, secured together by screws as shown in Fig. 8. This is especially desirable when an auxiliary nail hole portion 32 is used with one of the dies, as the portion 32 may be readily replaced at a negligible cost.

Inasmuch as the device may be adjusted so as to utilize uniform strips of material entirely without waste, it has been found convenient to provide adjusting means between the pairs of rollers 27, by providing the sleeves 27^a with elongated perforations 33 adjacent the hub portions of the rollers, and to pass suitable bolts through such perforations 33 to engage in threaded bores in the rollers 27.

One pair of rollers may have mounted upon it two groups of dies, each group sufficient to form a given length of metal. The other co-operating pairs of rollers will have the complementary co-operating dies mounted upon them so that when in operation four strips of metal may be formed at each revolution of the rollers. A stop 56 is provided for each group of dies.

In forming long strips, dies are mounted completely around the circumference of the rolls. One of the lower rollers 27 has mounted adjacent its hub cams 41 which are provided with elongated perforations thru which securing bolts 42 pass. This arrangement provides adjustment for the cams and the cam rod. Each cam has on the face thereof, a depression 43 immediately following which is an abrupt nose 44. Mounted on the base 11 is a bracket 45 thru which extends a rectangular hole 46 carrying cam rod 47 reciprocally mounted therein.

A lug 48 on the bracket 45 has lever 49 pivotally mounted thereto midway its ends. The lever 49 has an elongated perforation at its point of mounting on the lug 48. Cam rod 47 is pivotally mounted to the lower end of lever 49 while the upper end of the lever has a link 50 connected thereto which link is pivotally connected to a suitable lug on the feed block 51. The feed block 51 surrounds the guide 25 and carries fingers 52 which slide in the grooves 26 in the guide. The fingers 52 are adjustably mounted on block 51. A tension spring 53 serves to hold the end of cam rod 47 in engagement with the cam 41. A compression spring 54 serves to cushion the return movement of feed block 51 and may be adjusted by means of a suitable screw 55. A stop block 56 is mounted adjacent each group of dies on the rollers 27 to preclude the metal strips from being pushed beyond the dies. A hand guard 57 is mounted upon the top of guide 25 at the end thereof adjacent the rollers 27.

The modified feed and guide mechanisms shown in Figs. 9 and 10 have in addition to the structure just described a gripping means associated with block 51 and fingers 52. A bar 58 is mounted in spaced relation to the bottom of the guide 25 and has cam shoulders 59 and 60 at the ends thereof. The clamping mechanism comprises a rider 61 which engages on the bar 58. Posts 62 are secured to rider 61 on opposite sides and

slidably engage in bores in the sides of the feed block 51. A clamp bar 63 is adjustably secured to the free ends of posts 62 and carries depending lugs 64 which may be chambered to contain spring plungers 65. The lugs 64 with spring plungers 65 depend into the grooves 26.

In this modified form the rear portion of the grooves 26 are cut to a greater depth and carry splines 66. The fingers 52 have grooved blocks attached to the base thereof which slide along the splines 66 in grooves 26. The forward portion of the finger blocks are tapered to extend below the upper faces of splines 66. This structure insures the proper positioning of a strip of metal which may be dropped into the groove 26 as the tapered or inclined face of the finger block 52 will engage the end of the strip of metal and direct it to engage the shoulder or lug 52^a, of the finger 52. As the feed block 51 carrying fingers 52 is reciprocated over the guide 25 the rider 61 will raise the clamp bar 63 at the two extremes of the movement as the rider engages shoulders 59 and 60 and allow it to drop as the rider engages the body portion of bar 58. In its lower position the clamp bar brings the spring plunger 65 into engagement with the top of the finger 52 thus clamping a strip of metal and carrying it forward for a distance when the rider engages shoulder 60 which then causes the rider and clamp bar to rise allowing the strip of metal to be pulled free of the fingers as the dies on the rolls 27 engage the strip.

The spring plungers provide a uniform pressure on each strip of metal, so that in the event that two strips of metal should be dropped one upon the other in one of the grooves 26, the lugs 64 with spring plungers 65 would hold the two strips in one groove and would at the same time hold one strip of metal in the other of the grooves 26.

While the die rollers 27 are adjusted so as to roll one thickness of metal it has been advisable to provide on the upper bearing of arbor 14 on standard 13 a sliding bearing block retained in position with a heavy compression spring 67 and adjusting screw 68. This arrangement precludes springing of the arbors in the event that more than one thickness of metal be inadvertently fed between the rollers.

In operation, when it is desired to form short lengths of metal such as shown in Fig. 5, two groups of dies will be mounted on each roller 27, at opposite sides of the roller, and a stop 56 inserted at one end of each group. The purpose of the stop 56 is to cause the dies to operate to the end of the strip to be formed. The male dies 30 having been mounted on one pair of rollers 27 in groups proportionate to the length of the strips to be formed, and the female dies 31

are mounted on the other pair of rollers complementary thereto, the pairs of rollers being brought into alignment so that the groups of dies will register.

5 In bringing the rollers 27 into alignment the elongated slots 33 permit slight adjustment. The cams 41 are then positioned so that the cam rod 47 will actuate the feed block 51 and fingers 52 toward the rollers 10 27, by means of the lever 49, and link 50 just as the first dies of a group are about to engage. The abrupt nose 44 on the cam 41 imparts a more rapid motion to the feed block and fingers and a strip of metal 15 dropped into one of the grooves 26 will be pushed into engagement with the stop 56 just as the first pair of forming dies 30 and 31 engage the metal. The strips are then 20 drawn between the rollers by the dies and are discharged at the opposite side. There being four groups of dies on each pair of rollers 27, and the feed block being actuated toward the rollers twice during each revolution, a strip of metal may be dropped 25 into each of the grooves 26 and carried to the rollers 27, twice during one revolution of the rollers.

The guard 57 serves to protect the workman. The strips of metal to be formed need 30 only be dropped into the grooves 26 and the feed block 51 and fingers 52 push them forward into position between the rollers. As previously explained the feed block and fingers increase their rate of travel just as the 35 dies are about to engage upon the strip of metal, this being accomplished by means of the abrupt nose 44 on the cam 41. This action serves to bring the strip of metal against the stop 56.

40 The operation of cam rod 47, lever 49 and link 50 in producing the reciprocating motion of feed block need no further explanation. The compression spring 54 serves to cushion the return of feed block 51.

45 The modified feed mechanism operates in substantially the same manner as described, the differences being that the stop 56 on the rollers 27 may be eliminated, and as previously explained the strips of metal are 50 clamped between the fingers and spring plungers, carried forward and then released as the dies on the rollers engage the strip. Suitable holding springs 69 are provided upon the lower side of guard 57 to hold the 55 strips flat upon the bottom of grooves 26. The various elongated slots for adjusting the rollers 27, the cams 41 and fingers 52 provide very accurate adjustments, whereby the metal strips may be cut to exact 60 dimensions, run thru the machine and come out a finished product which requires no trimming.

When long strips are required it is necessary only to eliminate stop 56 and insert 65 dies completely around the circumference

of the rollers. The feed block 51 may also be disconnected for this operation.

What I claim is:

1. In a device of the class described the combination with rotatable rollers, co-operating dies mounted on the peripheries of the rollers, cams on the side of one of the rollers, a grooved guide mounted with its one end adjacent the rollers, a feed block mounted for reciprocation on the guide, fingers on the 70 block and extending into the grooves in the guide and means comprising a spring, a cam rod, a lever and a link for reciprocating the feed block as the rollers are rotated.

2. In a mounting for dies the combination 80 with a roller having a peripheral groove, shoulders adjacent the sides of the groove, said shoulders being developed into a series of flats, the sides of the roller having a series of threaded perforations extending 85 through the shoulders and communicating with the groove, and having a second series of perforations spaced in staggered relation to the first mentioned perforations and communicating with the groove adjacent the 90 bottom thereof, dies having lugs for engaging in the grooves in the roll, shoulders on the dies for seating on the flats on the rollers and screws in the threaded perforations for securing the lugs in the groove. 95

3. In a device of the class described the combination with a pair of rollers, of co-operating dies mounted on the peripheries of the rollers, a cam on one of the rollers, a guide, a feed block reciprocally carried by 100 the guide, fingers on the feed block, a rider carried by the feed block, depending lugs on the rider adapted to engage the fingers, and means associated with the feed block and actuated by the cam on the roller for reciprocating the feed block and for lifting the lugs 105 from the fingers at the opposite limits of reciprocation of the feed block.

4. In a device of the class described the combination with a pair of rollers, of complementary co-operating dies mounted on the rollers, a guide for receiving strips of materials to be operated upon by the dies, a reciprocating feed block carried by the guide, 110 a shouldered finger carried by the feed block and adapted to abut the end of a strip of material in the guide, a gravity actuated rider mounted on the feed block and adapted to clamp a strip of material upon the finger, and means for raising the rider at the opposite 115 limits of reciprocation of the feed block. 120

5. In a device of the class described the combination with rotatable co-operating dies, of a guide mounted adjacent the dies, a reciprocating feed block carried by the guide, 125 fingers on the block and engaging the guide and means for reciprocating the feed block as the dies are rotated.

6. In a device of the class described, the combination with a pair of rotatable co- 130

operating dies, of a cam on one of the dies, a
guide, a feed block reciprocally carried by
the guide, fingers on the feed block, a rider
carried by the feed block; depending lugs on
5 the rider adapted to engage the fingers, and
means associated with the feed block and ac-
tuated by the cam on the die for reciprocating

the feed block and for lifting the lugs
from the fingers at the opposite limits of re-
ciprocation of the feed blocks.

In testimony whereof, I have hereunto
subscribed my name this 21st day of September, 1923.

ALBERT B. UNDERWOOD.