(No Model.) 2 Sheets—Sheet 1.

W. K. PATRICK.

EDGE TURNER FOR SHEET METAL ROOFING.

No. 392,132. Patented Oct. 30, 1888.

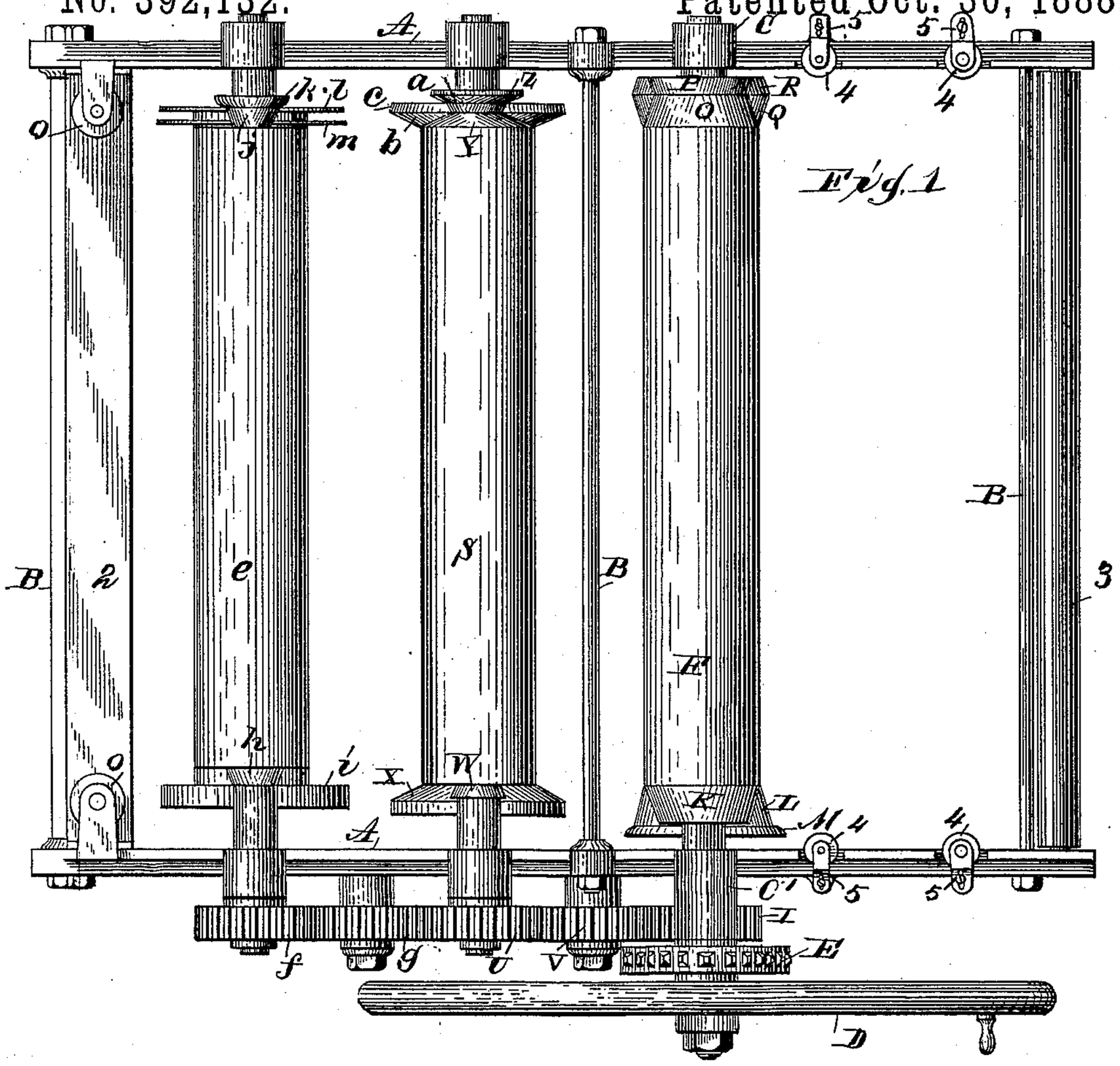

Fig. 1

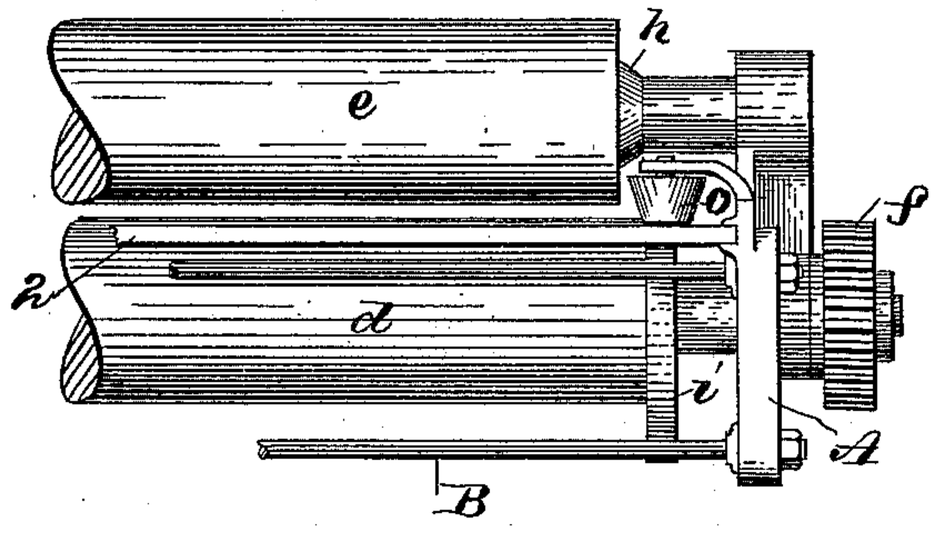

Fig. 2

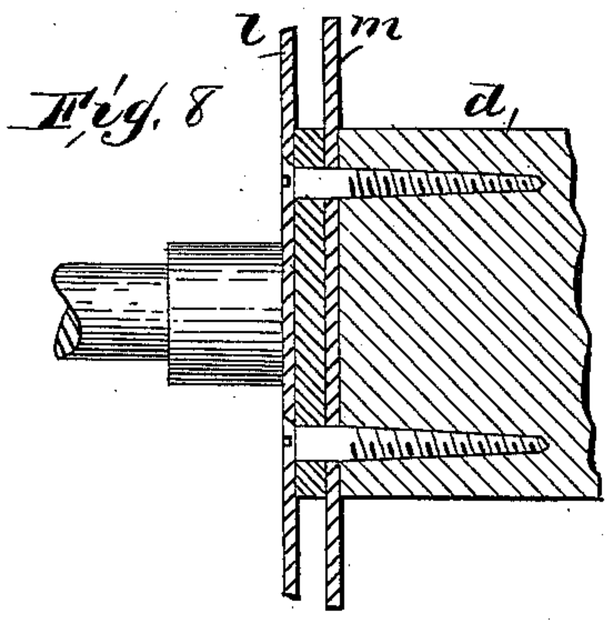

Fig. 8

Fig. 7.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3

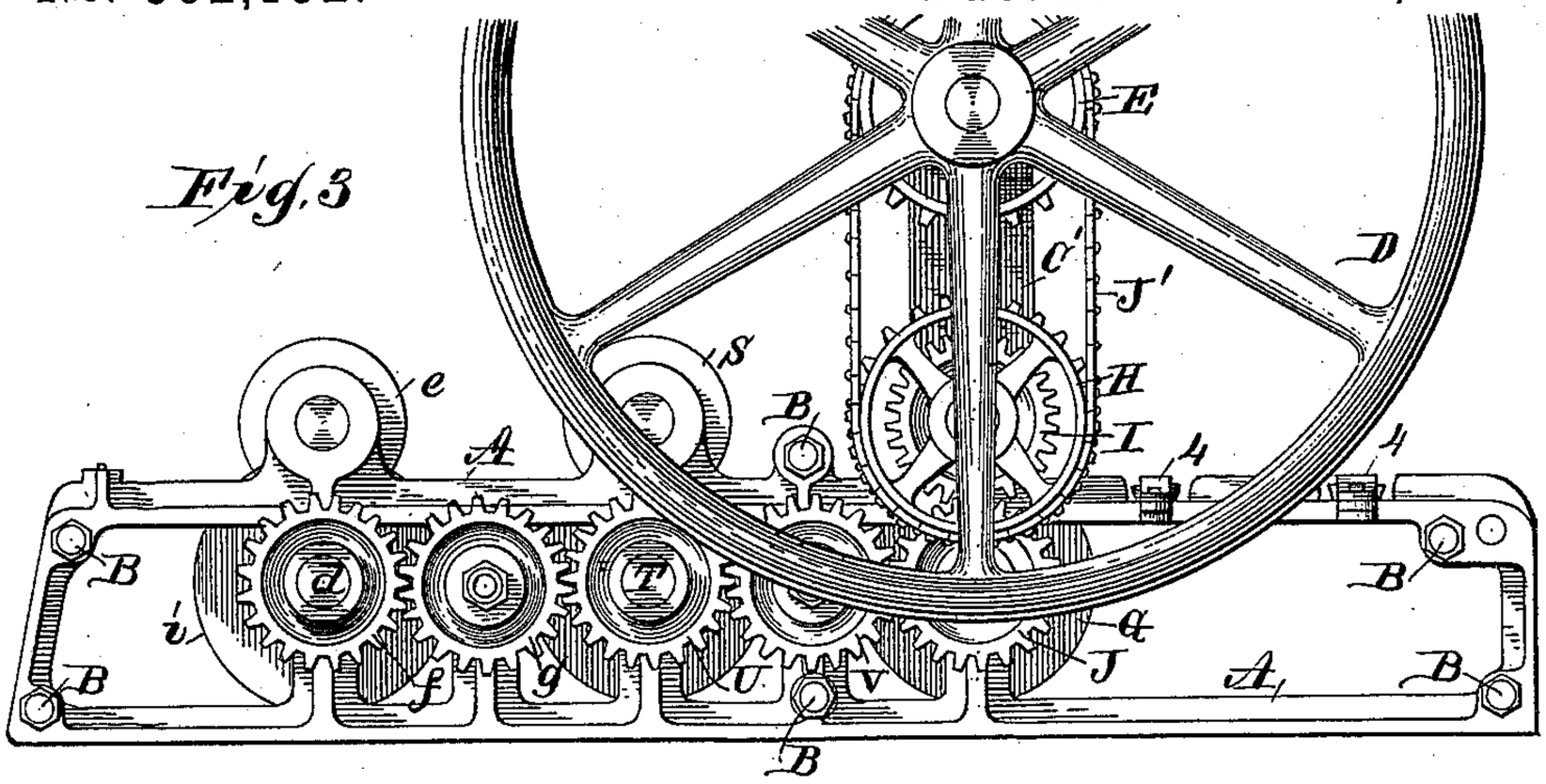


Fig. H

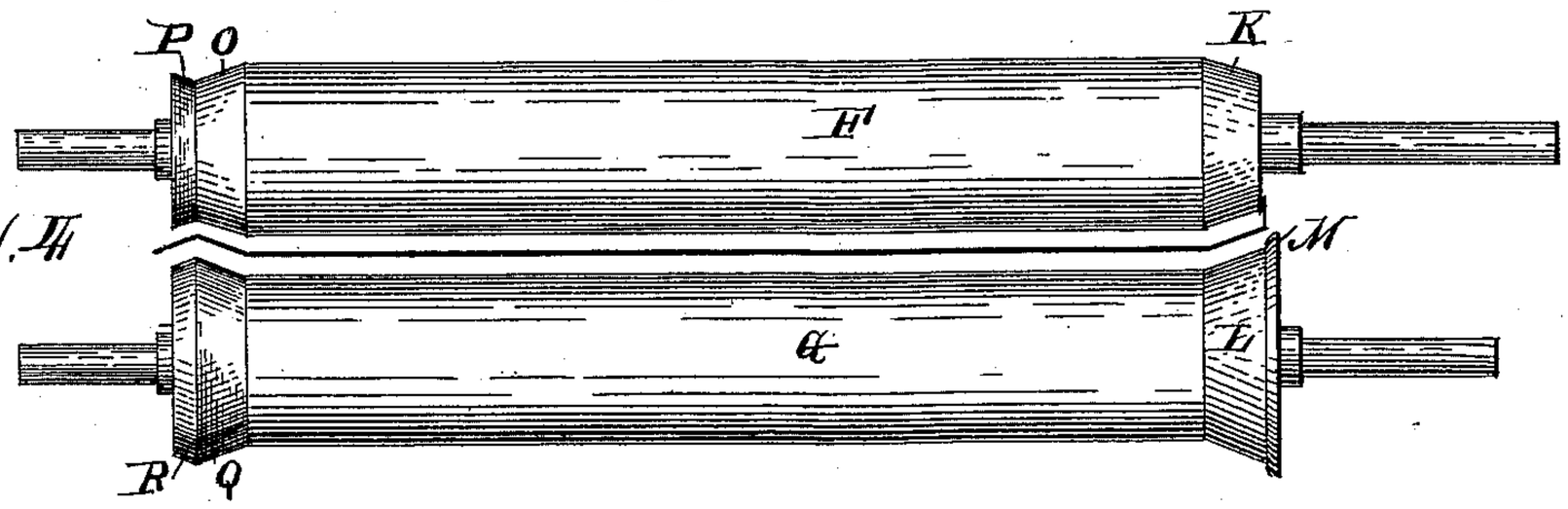


Fig. 5

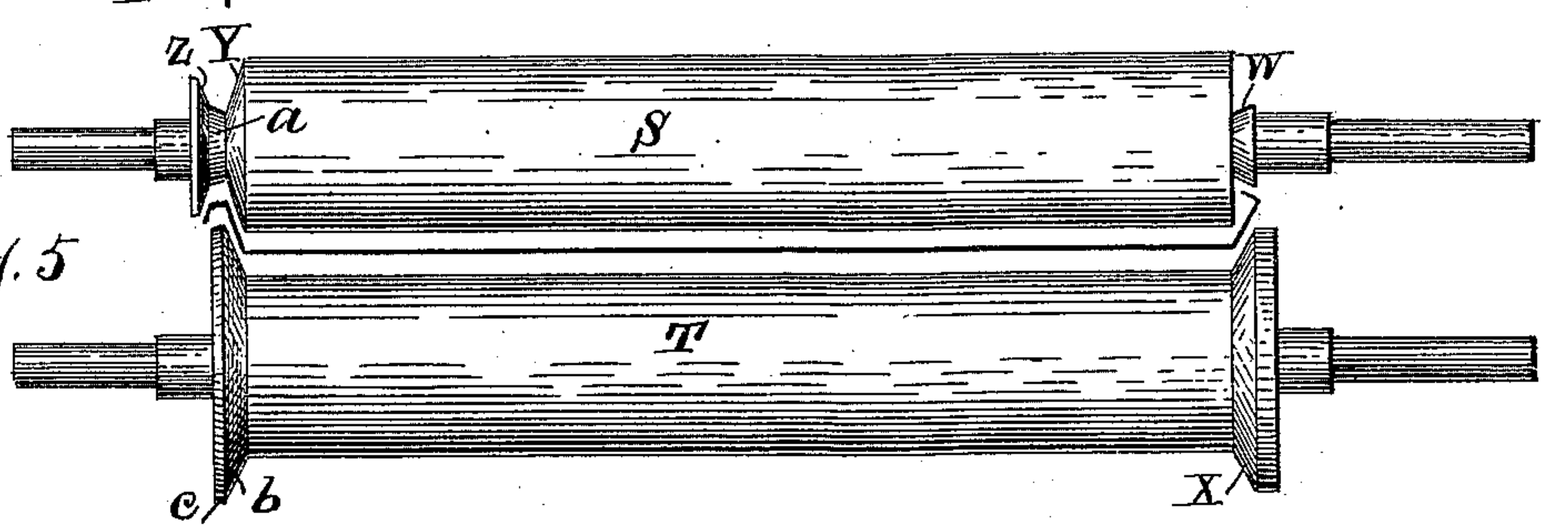
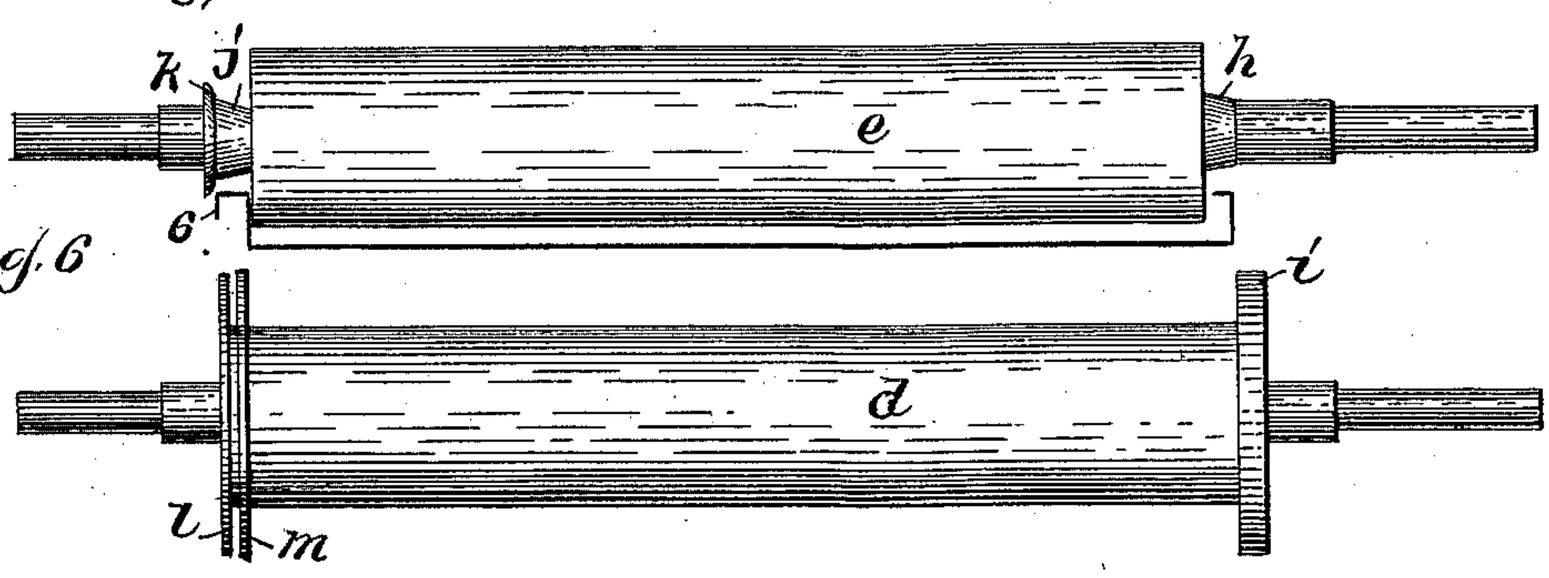


Fig. 6



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Jas. H. Mahan.
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His Attorney.

UNITED STATES PATENT OFFICE.

WALTER K. PATRICK, OF URBANA, OHIO.

EDGE-TURNER FOR SHEET-METAL ROOFING.

SPECIFICATION forming part of Letters Patent No. 392,132, dated October 30, 1888.

Application filed May 7, 1888. Serial No. 273,037. (No model.)

To all whom it may concern:

Be it known that I, WALTER K. PATRICK, a citizen of the United States, residing at Urbana, in the county of Champaign and State of Ohio, have invented certain new and useful Improvements in Edge-Turners for Sheet-Metal Roofing, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in metal-roofing machines; and the object of the invention is to so turn the edges of a continuous piece or strip of metal passed through the machine as that the edges of two such strips can be interlocked and thereafter require but two bends or manipulations to complete the seam and form what is known as the "standing lock-seam," these two latter operations being accomplished by the operation of a double-seaming tool, a mate to the present tool and the subject of an application for a patent filed even date herewith.

In the accompanying drawings, forming a part of this specification, and on which like reference-letters indicate corresponding parts, Figure 1 represents a plan view of my improved roofing-machine; Fig. 2, an elevation of a portion of the frame and of the final rollers; Fig. 3, a side elevation of the machine with a portion of the hand-wheel broken away; Fig. 4, an elevation of the initial rollers separated for convenience of illustration, with a strip of metal between them, showing their action upon it; Fig. 5, a like view of the intermediate rollers; Fig. 6, another like view of the final rollers; Fig. 7, an edge view of two strips of metal as they appear after having been treated by this machine; and Fig. 8, a detail partial section and partial side view of one of the rollers, the flanges which are at one end, and the means for securing the flanges.

The letter A designates a stout metallic frame, preferably made of cast-iron and consisting of two side pieces secured together by transverse shoulder-rods B. In the upright C' of the frame is mounted the shaft of a hand-wheel, D, carrying a sprocket-wheel, E, and in the uprights C and C' is journaled the upper roller of the initial rollers F and G. On the arbor of the roller F are mounted a sprocket-wheel, H, and the pinion I. This pinion meshes with a like pinion, J, on the arbor of the roller G, which roller is mounted in the bearings in the frame proper. The sprocket-wheels E and H are connected by a sprocket-chain, J', whereby upon rotating the hand-wheel rotary motion is imparted to the roller F, and thus through said pinions to the roller G, the rollers rotating in opposite directions, so as to draw the metal in between them.

The roller F at one end is formed with a bevel, K, while the corresponding end of the roller G is formed with a corresponding bevel, L, and additionally with a bead, M. By this construction the metal is turned or bent, as seen at the right of Fig. 4, being the initial bend, which finally terminates in the shape shown at the corresponding end of Fig. 6. The other end of the roller F is provided with a double bevel, O and P, while the same end of the roller G is constructed with counter-bevels Q and R, whereby the edge of the metal is given the double bend shown at the left of Fig. 4, which is also the initial shape to that which finally develops into the forms shown at the left of Fig. 6.

The letters S and T designate the intermediate rollers, which are also mounted in the frame. The roller T is provided with a pinion, U, which meshes with an idler, V, and through it receives rotary motion from the pinion J. The roller S is rotated by the impact of the metal. The roller S at one end is constructed with a short bevel, W, while the roller T is constructed with a reverse bevel, X, which in conjunction with the end of the roller S turns the metal to the position shown at the right of Fig. 5, while the bevel W turns the extreme edge of the sheet to a right angle, or nearly so, to the portion engaged by the bevel X. The roller S at the other end is constructed with reverse bevels Y and Z and an incline or tapered portion, *a*. The roller T at this end is provided with a bevel, *b*, counter to the bevel Y, and with a tapering portion, *c*, counter to the portion *a*. These parts engage the edge of the strip and change it from the position shown at the left of Fig. 4 to that shown at the left of Fig. 5.

The letters *d* and *e* designate the final rollers, which are mounted in the frame likewise

to the rollers last described. The roller *d* is provided with a pinion, *f*, which meshes with an idler, *g*, engaging with the pinion U, by which means the roller *d* is rotated, the roller *e* being rotated by the impact of the metal. The roller *e* at one end is constructed with a slight taper, *h*, whose function is to engage the extreme edge of the strip and turn it to a slight acute angle with respect to the adjacent portion of the strip, so that when the strip is free of the machine the recoil of the metal will only take the extreme edge back far enough to leave it at a right angle with said adjacent portion. The same end of the roller *d* is provided with a flange, *i*, whose function is to bend the strip from the shape shown at the right of Fig. 5 to that shown at the right of Fig. 6, or from an obtuse angle to a right angle. The obtuse angle already existing in the strip, when the flange *i* begins to act, the metal will assume a right angle, even though the roller *e* does not extend out to the corner, where the further bend takes place. Of course it extends to quite near this corner. The other end of the roller *e* has a beveled portion, *j*, projecting from its vertical face, and also has a head, *k*, the inner face of which is preferably somewhat curved. The corresponding end of the roller *d* is provided with two flanges, *l* and *m*, which are longitudinally yielding, to allow them to press more or less out of the plane of the adjacent parts of the roller *e*, so as to accommodate different thicknesses of metal. From this it will be understood that the flange *m* and said face of the roller *e* change the strip from the shape shown at the left of Fig. 5 to that shown at the left of Fig. 6 so far as concerns the right-angle bend nearest the body of the strip. The bevel *j* forms the second right angle in the strip by first making an acute angle, the natural recoil of the metal causing the edge to spring from a slight acute angle back to a right angle. The body *k*, in conjunction with the flange *l*, makes the third right-angle bend in the strip.

The strip as shown in Fig. 6 is as completed; but owing to the recoil in the metal the first bend at the right side of Fig. 6 and the second and third bends at the left side of that figure do not make right angles after the strip passes beyond the rollers *d* and *e*. Therefore I have provided two inverted conical compressor-rollers, *o*, which engage the strip at either edge and force said bends into slight acute angles, after which the recoil of the metal leaves the bends rectangular. A transverse bar, 2, serves as a support for the metal as it passes between the compressor-rollers *o*. The construction by which the flanges *l* and *m* are secured to the roller *d* is shown in Fig. 8, and consists of a suitable number of screws and a washer intervening between the flanges to hold them the proper distance apart. Other ways may be adopted for this purpose. To more easily feed the strip from the roll of tin into this machine, I provide a loosely-mounted roller, 3. To properly direct the course of the strip as it enters between the initial rollers, I provide smaller rollers, 4, mounted in laterally-adjustable brackets 5, as seen in Fig. 1.

In Fig. 7 I have illustrated two strips of metal interlocked after having been treated by this machine, from which will be seen the utility of the configuration given the edges of the strip. It will be noted that the two edges are counterparts one of the other, with the exception of the depending ledge 6 on the one edge and the absence of it on the other. When these strips are placed upon the roof and interlocked, as seen in Fig. 7, the seam is formed by the operation of the seaming-tool above alluded to.

It will be observed that the initial rollers bend the edges of the strip into obtuse angles, that the intermediate rollers further bend said edges and make the angles less obtuse or sharper, and that the final set of rollers give one edge of the strip two right-angle bends and the other edge three right-angle bends. This latter shape makes one edge the counterpart of the other, with the exception, already noted, that an additional ledge is afforded, which by the seaming-tool is lapped under the extreme termination of the other edge.

In Fig. 8 I have illustrated the means for connecting the flanges *l* and *m* to the roller *d*, consisting of several screws and a washer between the flanges. As already observed, these flanges are constructed so as to possess a yielding quality to accommodate the machine to the increased thickness occurring at the cross-seam in a roofing-strip consisting of a series of united sheets.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a roofing-machine, the combination, with a frame, of a set of initial rollers, one of which has peripheral configurations K O P and the other of which peripheral configurations M L Q R, to bend the edges of an inserted metallic strip into the plurality of obtuse angles, and set of intermediate rollers, one of which has peripheral configurations W Y *a* Z and the other of which has peripheral configurations X, *b*, and *c*, to bend said plurality of angles into sharper angles, and a final set of rollers, one of which has peripheral configurations *h j k* and the other of which has peripheral configurations *i l m*, to bend said plurality of sharper angles into right angles, and mechanism to rotate said rollers.

2. In a roofing-machine, the combination, with a main frame, of a set of initial rollers mounted therein and having peripheral surfaces K O P and M L Q R, respectively, a set of intermediate rollers mounted therein and having peripheral surfaces W Y *a* Z and X *b* *c*, respectively, a set of final rollers having peripheral surfaces *h j k* and *i l m*, respectively, means to rotate said rollers, and guiding and pressing rollers mounted upon the frame respectively before and after the initial

and final rollers, substantially as shown and described.

3. In a roofing-tool, a pair of initial rollers having surfaces K O P and M L Q R, respectively, for the purpose of forming two obtuse angles at each edge of a metallic strip drawn between said rollers.

4. In a roofing-tool, a pair of intermediate rollers having surfaces W Y *a* Z and X *b c*, respectively, for the purpose of further bending the previously-bent edges of a metallic strip drawn between them, and whereby two angles are formed at one edge and three at the other.

5. In a roofing-tool, a pair of final rollers having surfaces *h j k* and *i l m*, respectively, for the purpose of forming two right-angle bends at one edge and three right-angle bends at the other edge of a previously-bent metallic strip.

6. In a roofing-tool, the combination, with a frame, of two conical compressor-rollers, one located at each side of the machine and adapted to press the edges of a right-angle-bent strip of metal into temporary acute angles.

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

WALTER K. PATRICK.

Witnesses:

CHASE STEWART,

JAS. H. MAHAN.