

No. 759,480.

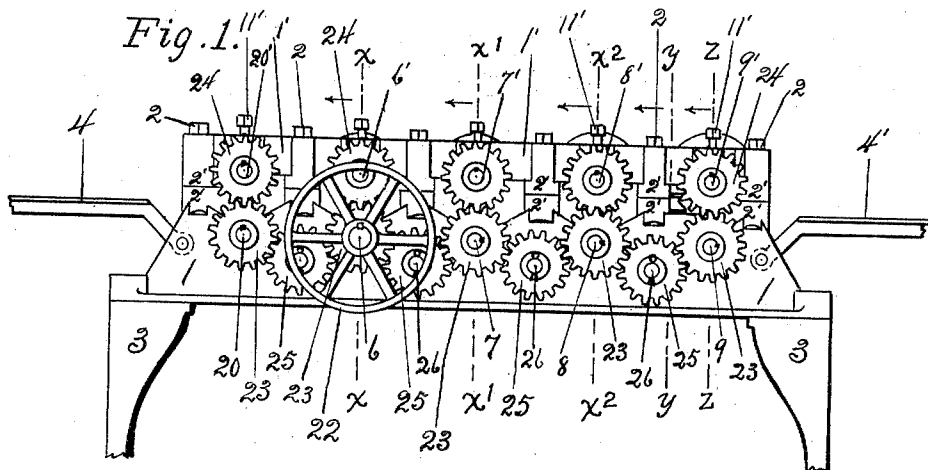
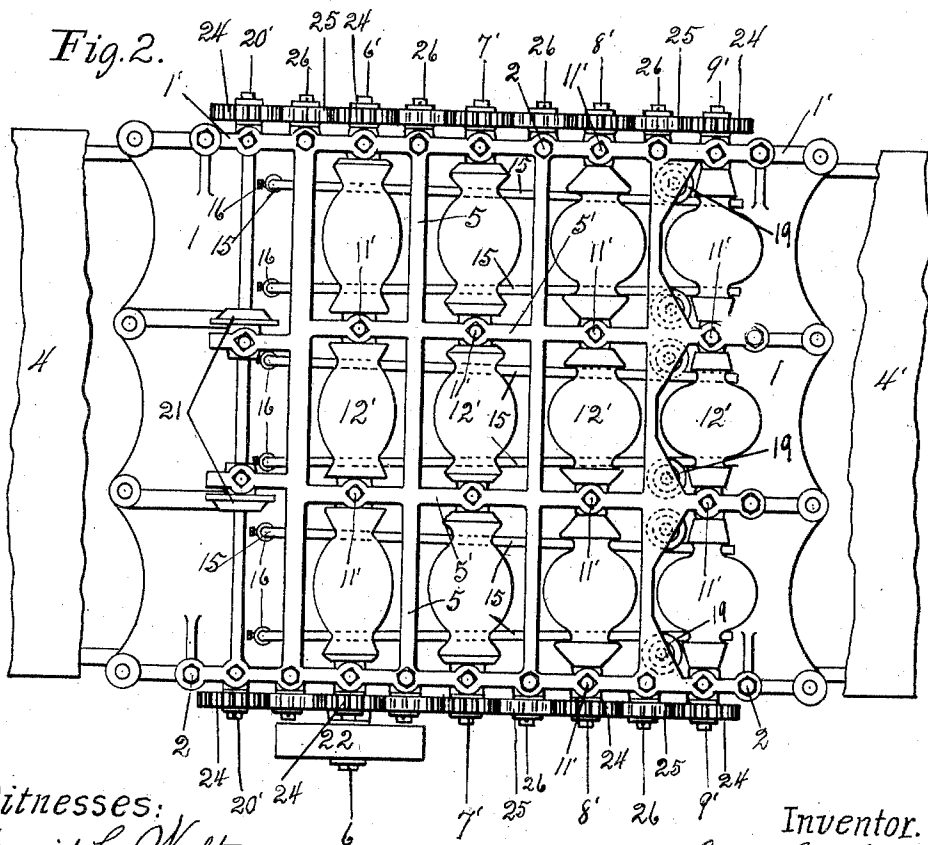
PATENTED MAY 10, 1904.

I. J. SHIFLEY.
EAVES TROUGH FORMING MACHINE.

APPLICATION FILED NOV. 9, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
David C. Walter
Louis Schreiber.

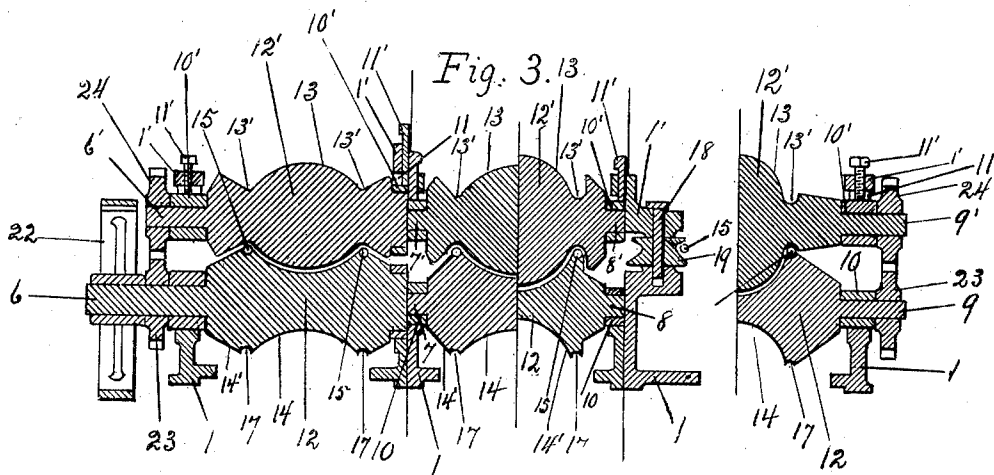
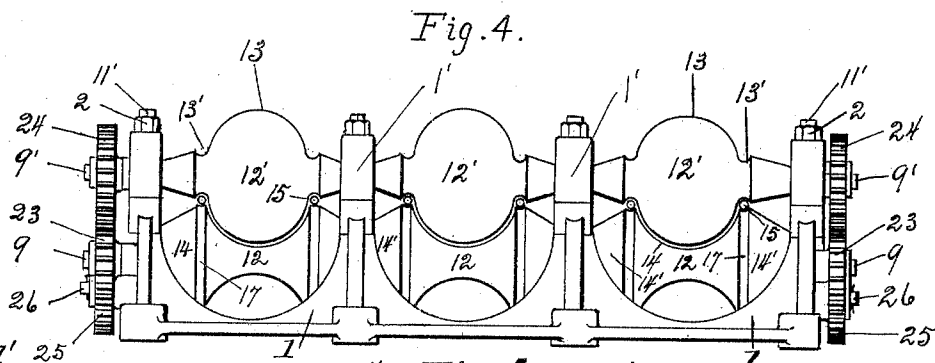
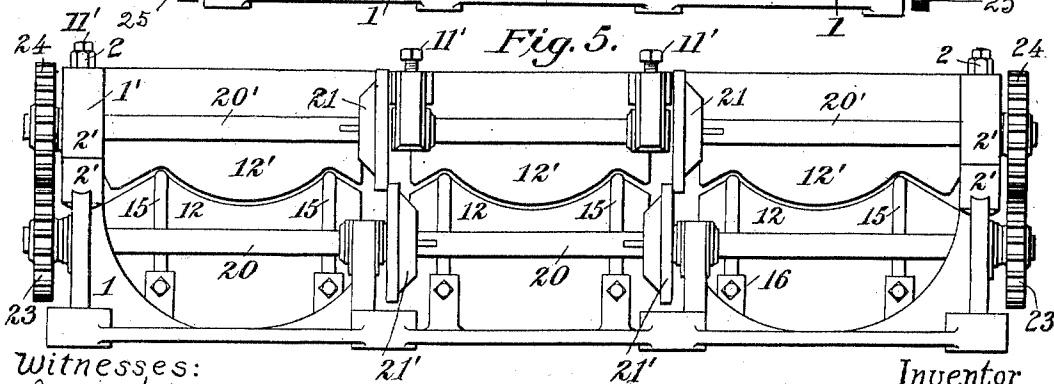
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Isaac J. Shifley,
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

ISAAC J. SHIFLEY, OF TOLEDO, OHIO.

EAVES-TROUGH-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 759,480, dated May 10, 1904.

Application filed November 9, 1903. Serial No. 180,334. (No model.)

To all whom it may concern:

Be it known that I, ISAAC J. SHIFLEY, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Eaves-Trough-Forming Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in the class of machines particularly adapted for making or forming eaves-troughs or other analogous articles from a single strip of metal, and has for its object to provide a machine of simple construction that is adapted by a single continuous operation to receive and cut a sheet of metal or other suitable material into either a single or plurality of strips of suitable width and to bead and form the same into eaves-troughs of any desired shape or size, the beads formed thereon being either single or double, as may be desired.

It is also the object of my invention to provide a machine of this class that is so constructed as to adapt the same to be easily taken apart to enable the rolls therein to be removed and others of divers shapes and sizes substituted therefor, thereby enabling the same machine to be readily changed to form troughs of oval, octagon, or other desired shapes.

The invention is fully described and finally claimed in the following specification, of which the accompanying drawings form a part, in which—

Figure 1 is a side elevation of the machine embodying my invention; Fig. 2, a plan view thereof, showing the feeding and delivery tables partly broken away. Fig. 3 is a partly vertical longitudinal sectional view of a portion of the rolls employed in my machine, taken on the dotted lines $x x$, $x' x'$, $x'' x''$, $y y$, and $z z$ of Fig. 1 and showing the different degrees of convexity and concavity of each. Fig. 4 is a rear end elevation of my

machine, and Fig. 5 is a front end elevation thereof.

Referring to the drawings, 1 represents the lower and 1' the upper portions comprising the frame of my machine, the same being rigidly secured together by means of the bolts 2, which pass through suitable supporting-bosses 2' provided in said parts. 3 represents the standards or legs for supporting said frame, and 4 and 4' the feeding and delivery tables, which are secured to the rear and front ends of said frame, respectively. I have shown the upper portion 1' of the frame as being divided into a plurality of rectangles or spaces by the transverse and longitudinal strips 5 and 5', which are formed integral therewith.

A series of shafts 6, 7, 8, and 9, which are arranged transversely of the frame of my machine at suitable distances apart, are journaled in the bushings 10, which rest in suitable seats or slots (not shown) provided in the frame portion 1, and a similar set of shafts 6', 7', 8', and 9', which are mounted in the portion 1' of the frame, are journaled in suitable bushings or bearings 10', the same being adapted to have a vertical movement in the slots 11, provided in said frame, and are each in vertical alignment with the companion shafts 6, 7, 8, and 9, respectively. These shafts 6', 7', 8', and 9' are retained in proper adjustment to said companion shafts 6, 7, 8, and 9 by means of the binding bolts or screws 11', which bear against the bushings 10', as shown in Fig. 3.

Each of the shafts 6, 7, 8, and 9 and 6', 7', 8', and 9' has one or more similarly-shaped rolls 12 and 12' rigidly secured thereon, the number thereof depending upon the width of the machine and the size of metal to be fed therein. These rolls are arranged in pairs, as shown, the upper rolls 12' having the centrally-convexed peripheral portions 13, which terminate at either side thereof in the concaved or peripherally-grooved portions 13', and the lower rolls 12 thereof having the central peripherally-concaved portions 14, which terminate at either side in the conical or convex portion 14', the said convex and concave portions 13' and 14' being provided on said rolls for the purpose of forming the usual beads on

the edges of the body portion of a trough. Said pairs of rolls are arranged in sets which run longitudinally of the machine, and each successive pair of rolls has its degree of convexity or concavity varied slightly from the preceding pair, thus adapting their joint and successive operations to form a completed trough of the desired depth and size.

In order to facilitate and more perfectly form the beads on the edges of a trough, I provide the guides or forming-rods 15, which have portions bent at right angles and secured in the sockets 16 of the frame portion 1 and their horizontal portions interposed transversely between the portions 13' and 14' of the rolls 12 and 12' and seated in the peripheral grooves 17, formed in the portions 14' of the lower rolls 12, thus providing guides over which the edges of the strips being operated on are gradually looped by the coacting portions of the rolls. While I have shown each set of rolls as being provided with two bead-forming rods 15, it will be apparent that either one may be removed from the machine, and thus cause only a single bead to be formed on the trough. It will be noted that the contour of the bead-forming portions of each successive pair of rolls have substantially the same relative degree of change in their proportions as do the body portions of said rolls.

Mounted on the vertical spindles 18 between the last two pair of rolls of each set in horizontal alinement with the bead-forming portions of said rolls are the peripherally-grooved horizontally-disposed rollers 19, which coact with the rods 15, as shown in Figs. 2 and 3, and complete the bead-forming operation thereof. I have preferably shown the lower peripheral shoulder forming the groove on the rollers 19 as projecting farther therefrom than the upper shoulder in order that the edge of the bead may be forced completely in under the forming-rod 15.

A pair of shafts 20 and 20' are journaled in the frame at the rear of and in horizontal alinement with the roll-shafts 6, 7, 8, and 9 and 6', 7', 8', and 9', respectively, and have the coacting rotary knives 21 and 21', as shown in Fig. 5, rigidly secured thereon, the same being adapted to cut the large sheets of metal into strips of suitable width preparatory to their passing into the rolls to be formed.

A drive-pulley 22 is keyed on the shaft 6 of my machine and imparts motion to the various other shafts thereof through a series of spur-gears 23 and 24 and pinions 25. The spur-gears 23 are keyed to the end of the shafts 6, 7, 8, 9, and 20 and are adapted to mesh with the spur-gears 24, which are keyed to the ends of the companion shafts 6', 7', 8', 9', and 20', the said pinions 25 being loosely mounted on the spindles 26, which are secured to the frame portions 1 and adapted to mesh with the several spur-gears 23, thus connecting and

transmitting motion from the gear 23, mounted on the driven shaft 6, to the several pairs of gears 23 and 24, mounted on the other shafts of the machine.

In the operation of my machine the sheets of metal are placed on the table 4 and feed between the rotary knives 21 and 21', by which they are cut into strips of suitable width and passed on between the rolls 12 and 12' to be formed into proper shape. As these strips are passed through the machine each successive pair of rolls acts upon and slightly changes the form thereof until they are delivered from the last pair of rolls 12 and 12' with beads formed thereon and in the shape of a completed eaves-trough, which is either of oval, octagon, or other shape, according to the contour of the forming-rolls.

When it is desired to remove the rolls 12 and 12' from my machine for the purpose of being repaired or of substituting other rolls of different shapes and sizes therefor, the bolts 2 are removed and the upper portion 1' of the frame lifted off, thus enabling the rolls 12 and 12' to be easily removed from their seats in the frame and others substituted therefor.

It will be obvious that such changes in the form, proportions, and minor details of construction of the parts as fairly fall within the scope of my invention may be made without departing from the spirit or sacrificing any of the advantages thereof.

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

1. In a forming-machine, double rows of alining shafts mounted therein, rolls having differentially-shaped forming-surfaces mounted on said shafts in sets disposed transversely thereof, the rolls mounted on one row of shafts being adapted to coact with those on the other row, forming-rods interposed between the coacting rolls of each set, a series of rotary knives mounted in advance and at the side of each set of rolls, and means for rotating said rolls and knives at an even speed.

2. In a forming-machine, a frame having a feeding and a delivery table secured thereto, a series of shafts mounted in said frame, one or more rolls mounted longitudinally of said shafts and arranged in sets transverse thereto, each of said sets having a series of coacting differentially-shaped rolls, one or more forming-rods interposed between the coacting surfaces of the rolls of each set, means for cutting the material to be formed into strips for feeding to each set of rolls, and means for rotating said shafts at an even speed, substantially as described.

3. A trough-forming machine having an upper and lower series of coacting rolls arranged in transverse horizontally-alining sets, differentially-shaped forming-surfaces on said rolls, bead-forming means interposed between

said coacting rolls, rotary cutters mounted in advance of said sets, and means for imparting an even rotation to said rolls and cutters, substantially as described.

5 4. In a trough-forming machine, a series of upper and lower horizontally-disposed coacting rolls, said rolls having trough-body and bead-forming portions and each coacting set being differentially formed, bead-forming
10 rods interposed between said coacting rolls, means coacting with said rods for completing the beads, and means for rotating said rolls, substantially as described.

15 5. In a forming-machine, one or more sets of upper and lower rolls having oppositely-formed coacting surfaces, the several coacting rolls of each set differentiating in shape, bead-forming rods interposed between said coacting rolls, beading-rollers adapted to cooperate
20 with said rods in forming a bead, rotary knives mounted in advance and at the side of each set of rolls, and means for imparting motion to said knives and rolls, substantially as described.

25 6. A shaping-machine, comprising a frame having upper and lower separable parts, a series of shafts removably mounted in each of said parts, adjusting means connected therewith, vertically-coacting shaping-rolls mounted
30 on said shafts, said rolls having trough-body and bead-forming portions and differentiating in shape, rods extending between and transversely of said coacting rolls, peripherally-grooved rollers coacting with said rods,
35 rotary knives mounted in advance of said rolls, and means for imparting motion to said knives and rolls, substantially as described.

40 7. The combination in a shaping-machine, of a plurality of pairs of rolls having differently-shaped peripheries and arranged in transverse alining sets, the rolls of each pair adapted to coact, rods transversely interposed between the pair of rolls of each set and adapted to

coact therewith in the bead-forming operation, and means for imparting even rotation
45 to said rolls.

8. The combination in a shaping-machine, of a plurality of pairs of coacting rolls arranged in transverse alining sets, the rolls of each set having differentially-shaped forming portions
50 to adapt their combined operations to form a completed article, bead-forming means cooperating with and connecting the rolls of each set, and means for imparting rotation to said rolls.

55 9. The combination in a trough-forming machine, of a plurality of pairs of coacting rolls arranged in sets and having differentially-shaped trough-body and bead-forming portions, bead-forming rods coacting with the
60 bead-forming portions of said rolls and connecting the several pairs thereof, beading-rollers cooperating with said rods, means for stripping the material to be formed, and means for rotating said rolls, substantially as described.
65

10. In a trough-forming machine, a series of upper and lower coacting sets of rolls, said upper and lower rolls having oppositely-contoured trough-body and bead-forming portions and each successive pair being shaped to
70 add a step in the forming operation, peripheral grooves provided on portions of said lower rolls, rods disposed in said grooves transversely of said rolls to aid in the bead-forming
75 operation, means coacting with said rods for completing the bead, and means for causing an even rotation of said rolls, substantially as described.

In testimony whereof I have signed my name
80 to this specification in the presence of two subscribing witnesses.

ISAAC J. SHIFLEY.

Witnesses:

C. W. OWEN,

EMIL J. VOGELSANG.