No. 647,310. Patented Apr. 10, 1900.

J. MAST.

MACHINE FOR FORMING BEADED EAVES TROUGHS.

(Application filed Jan. 23, 1900.)

(No Model.)

Fig. 1.

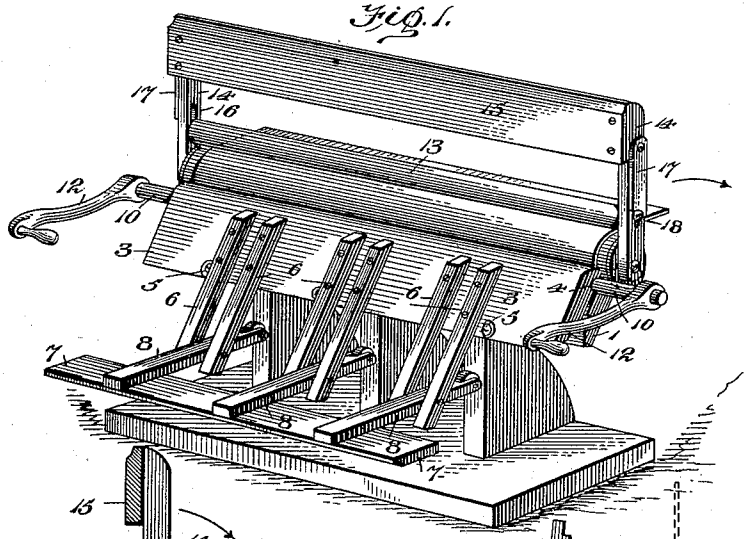


Fig. 2.

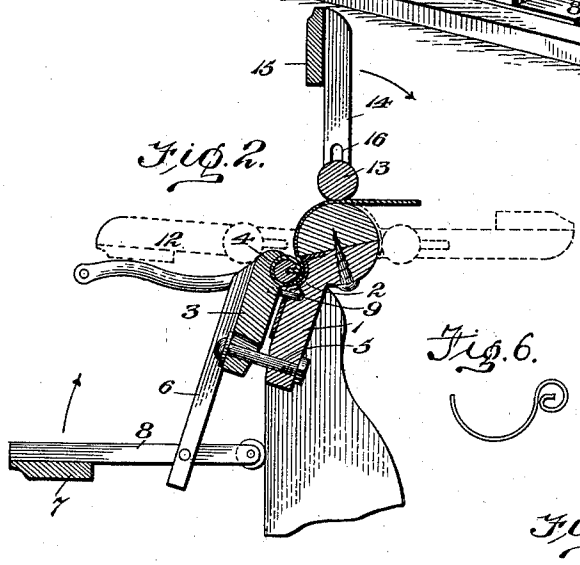


Fig. 6.



Fig. 3.

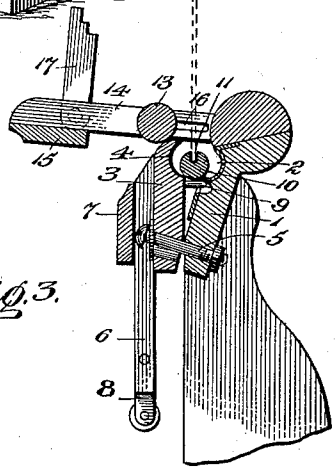


Fig. 4.

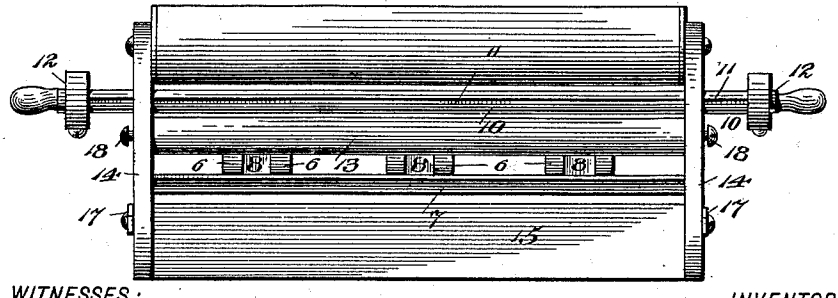
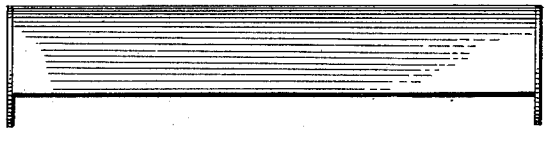


Fig. 5.



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# UNITED STATES PATENT OFFICE.

JOHN MAST, OF COLUMBIAVILLE, MICHIGAN.

## MACHINE FOR FORMING BEADED EAVES-TROUGHS.

SPECIFICATION forming part of Letters Patent No. 647,310, dated April 10, 1900.

Application filed January 23, 1900. Serial No. 2,470. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN MAST, a citizen of the United States, residing at Columbiaville, in the county of Lapeer and State of Michigan, have invented certain new and useful Improvements in Machines for Forming Beaded Eaves-Troughs, of which the following is a specification.

I have designed certain improvements in machines for the manufacture of eaves troughs or gutters wherein the blank is formed with the beaded edge and with the trough-body by the continuous operation of a bead-forming bar and the bending function of a swing trough-forming roll, both arranged in compact relation and the swing-roll in its function of forming the trough traversing a circle concentric with the trough-former, while the blank is held by the grooved bead-forming jaws.

The particular matters of novelty in my said machine will be set out in the claims concluding the specification and illustrated in the drawings, in which—

Figure 1 shows the machine in perspective with the swing-roll in the position when traversing an arc over and concentric with a former in bending the blank to form the trough over and above the bead-forming jaws. Fig. 2 is a transverse section of the same. Fig. 3 shows in transverse section the machine with the forming parts in the relation they occupy with the blank in position to be beaded. Fig. 4 is a top view of the machine, the forming parts in their relation seen in Fig. 3. Fig. 5 shows the removable trough-forming cylinder, and Fig. 6 is the beaded trough.

The forming parts are preferably mounted upon a plurality of standards fixed in a suitable base. Horizontally upon the standards is fixed a jaw 1, which terminates at the top in a cylinder over and upon which the blank is formed into a trough, and at the base of which cylinder, on its front side, is formed a semicylindrical groove 2 the full length of the jaw. This jaw is preferably mounted to stand inclined a little to the rear, and upon its front side is mounted a rock-jaw 3, along the upper part of which, on its inner side, is formed a semicylindrical groove 4, corresponding to the groove of the fixed jaw. I prefer to mount the rock-jaw upon screw-bolts 5, fixed to and projecting from the fixed jaw, whereby the front jaw is free to have a limited rock movement upon the bolt-shanks, the heads of which form stops, whereby in closing this jaw its upper grooved part is caused to be thrown inward in a way and for a purpose which I will presently state.

Extending downward from the outer side of the rock-jaw, arms 6, preferably in pairs, serve to carry a hand-bar 7, by means of arms 8, pivoted to the jaw-arms and having rolls on their inner ends which when brought into engagement with the standards by the depression of the hand-bar are thereby caused to rock and force the upper part of the jaw inward to close its groove with the groove of the fixed jaw. This construction and arrangement gives the advantage of allowing the rock-jaw to open by gravity when the hand-bar is turned up to retract its rolls from contact with the standards.

To allow the free rock of the front jaw on its bolts, the latter pass through slots in the jaw and the meeting faces of the jaws at their lower ends are beveled.

From the inner side of the front jaw, at the base of its groove, project pins 9, which, entering the holes in the fixed jaw, form a rest for the bead-forming bar 10 in placing it within the jaw-forming grooves.

The bead-forming bar is a roll having a longitudinal groove 11 and has a diameter to be snugly inclosed by the jaw-grooves when the jaws are closed upon it, as in Fig. 2. This grooved bar extends beyond the ends of the jaws and has a crank 12 at one or at both ends by which it is turned to bend the edge of the sheet-metal blank, the edge of which is first seated in the groove, into a tubular bead, and the jaws then closed, so that the turning of the bar draws the sheet into the grooves around the bar, the turning of the bar being about one revolution and a quarter. The bead being thus formed, with the sheet resting upon the trough-former above the beading-bar, the latter remains in the jaws until the trough is formed.

The provision whereby the blank is formed into the gutter or trough consists of a pressure-roll 13, mounted to travel around the former from the front to the rear side and concentric with it. For this purpose this roll

is mounted in arms 14, pivoted centrally to the ends of the fixed jaw-former, so that the roll may be swung up and forced to travel under pressure upon and around the former to thereby bend the blank into the trough, as shown by dotted lines in Fig. 2. These arms are connected by a hand-bar 15, and the roll is mounted in slots 16 in the arms, whereby in its normal position it is set away from the fixed former to uncover the bead-forming bar to place the bar in position and the blank in its groove. In this position the swing-roll rests upon the top of the rock-jaw, and the slotted arms are thereby maintained horizontal for handling them to swing the roll up against the blank to be pressed upon it to bend it down around and upon the former. In this swing of the roll it describes about three-quarters of a revolution from front to rear and is set forward in the slots to bring it against the vertical standing part of the blank and is maintained in such contact by latches 17, pivoted to the arms and engaged with the journal-pins 18 of the roll, preferably on the outer sides of the arms. In this operation the swing over of the pressure-roll by its hand-bar forces the blank to the complete trough form over and upon the former, and this swing of the roll is made after the bead has been formed and the blank held in the jaws by it. The trough having been thus formed, the jaw is opened and the beading-bar is removed with the formed trough on it and from which the grooved bar is withdrawn and the operation repeated.

To form troughs of different sizes, I prefer to make the trough-former with a removable cylinder-section and secure it by end plates upon the fixed jaw, and thereby provide for using different sizes of cylinders on the fixed jaw, as in Fig. 5. These plates are bolted to the ends of the cylinder and are screw-tapped to receive the pivoting-screws of the swing-frame.

I prefer to make the jaws of wood and the groove of the fixed jaw metal-lined to withstand the bead-forming operation.

Referring to Figs. 1 and 2, it is important to note that the hand-bar 7 is so pivoted to the hanging arms 6 of the rock-jaw that while the bar serves as the means for closing the jaw the arms 8 serve also as push arms or levers for locking the jaw when closed, and in this locking function the push-arms are brought from a vertical to a horizontal position with a pressing or pushing action against the frame-standards. Moreover, as the arms 6 stand down from the jaw and the push-arms 8 swing up in opening the jaw, and as these two arms are pivoted together below the jaw, the least pressure on the hand-bar 7 to swing it up causes the jaw to be rocked on its bolts and to open.

In producing the beaded trough, the bead having been formed upon the blank, the pressure-roll is set against the blank and fixed so that the operation of forming the bead and the trough is continuous. In this operation it is important that the pressure-roll carrier be maintained in a horizontal position, and for this purpose the top of the rock-jaw forms a seat on which the pressure-roll rests in position to be set against the blank, as in Fig. 3. A trough-section thus beaded and formed is ordinarily about ten feet long, and to render the pressure of the jaws uniform upon the beading-bar I prefer to provide the rock-jaw with a multiple of hanging arms and pivot to each the handle push-arm, which engages the frame standards at the ends and mediately of the length of the rock-jaw. The pressing action of the arms, however, is limited, so as to snugly hold the bar in the jaw-grooves, allowing it to freely turn in forming the bead.

The arrangement of the pivoted jaw and of the pressure-roll gives the advantage of supporting the frame of the pressure-roll in its normal position upon the top of the rock-jaw in its closed and in its opened position, so that there is no interference of the roll with the jaw, which can be opened and closed while the roll is seated upon it.

I claim as my improvement—

1. In a sheet-metal-bending machine and in combination with jaws one of which is pivoted, and a forming-cylinder, of a pressure-roll and a swing-carrier therefor pivotally mounted in the ends of the cylinder and normally supported upon the pivoted jaw and means whereby the pressure-roll is set in said carrier toward and from the cylinder.

2. In a sheet-metal-bending machine and in combination with a fixed forming-cylinder, and jaws one of which is pivoted, of arms pivotally mounted on the cylinder, connected by a handle-bar and having slots, a pressure-roll mounted in the slots and means whereby it is set and held in contact with the cylinder for bending a sheet over thereon.

3. In a machine for forming eaves-troughs and in combination with a fixed cylindrical former a bead-forming bar, a pair of grooved jaws and means for closing one of them upon the other, of a pressure-roll, a swing-frame therefor, pivotally mounted in the ends of the cylinder to carry the roll in contact therewith from the front to the rear, whereby the blank is both beaded and trough-formed.

4. In a machine for forming eaves-troughs, a supporting-frame, a pair of grooved jaws one of which terminates in a top-forming cylinder and is provided with nutted bolts upon which the other jaw is mounted to have a rocking movement, arms depending from the rocking jaw and a hand-bar pivoted to said arms and provided with rolls for engaging the frame whereby to rock and close and lock the jaw upon the bead-forming bar.

5. In a machine for forming beaded eaves-troughs a fixed forming-cylinder, a bead-forming bar and a rocking jaw supplemented by a swing-pressure roll normally supported upon the rocking jaw.

6. In a machine for forming beaded eaves-troughs and in combination, a cylindrical former, a pair of grooved jaws one of which is fixed and provided with bolts, provided with pins projecting into holes in the fixed jaw at the base of the grooves and having pivoted thereto swing-arms forming a handle for the rock-jaw, and a pressure-roll arranged for operation above the rock-jaw and normally supported upon it.

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

JOHN MAST.

Witnesses:
GEORGE CROTHERS,
JACOB F. ZEAFLA.