UNITED STATES PATENT OFFICE.

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SHEET-METAL-TURNING MACHINE.


Application filed April 28, 1916. Serial No. 94,137.

To all whom it may concern:

Be it known that I, CLINTON DE WITT WAGNER, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Sheet-Metal-Turning 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.

This invention relates to machines used by tinsmiths and others for turning beads and narrow flanges in sheet metal, and the object of the invention is to provide such an improvement in the rolls and machine as will admit of the formation in a single operation and at one setting of the machine, of beads suitable for adjustable pipe elbows and the like.

The nature of the invention is fully disclosed in the description and claims following, reference being had to the accompanying drawing, in which—

Figure 1 is a side view of a turning machine embodying my improvements. Fig. 2 shows the outer faces of the rolls. Fig. 3 is an enlarged fragmentary side view, showing the formation of a bead. Fig. 4 shows fragments of matching beads in perspective. Fig. 5 is a section showing intermeshing beads of a steeper angle than is shown in the other views.

The invention is very simple, but is adapted to produce results not hitherto attainable in turning machines, these being the formation of perfect marginal beads such as are used in the intermeshing parts of adjustable elbows for hot air and smoke-pipes, in one setting of the beading rolls. The work has of course been done heretofore, and very perfectly, but by successive settings of the rolls. In no machine with which I am familiar has it been possible to produce a perfect bead by running the metal once through the machine. Either the metal would draw away from the guide and run out edgewise, spoiling the bead, or if held forcibly in its proper course it would form a bead of sufficient depth, but with a cramped and unsightly edge unsuited to prevent leakage of air or smoke. These advantages are fully realized in the device I will now describe.

In the drawing the numeral 1 denotes a turning machine of a familiar type, needing no description. This has the usual mandrels 2 and 3 for the attachment of flanging or beading rolls as desired. A gage 4 regulates the depth of the bead or flange from the edge of the sheet. The depth of impression is regulated by raising or depressing the upper mandrel by means of a screw 5. The only change required in the machine itself is to provide for longitudinal movement of the lower mandrel. This is done by slightly shifting the position of the collar 6 on the mandrel 3, and setting it by means of a set-screw 7, leaving a short gap between the collar and the end of the adjacent bearing, as shown in Fig. 1. To hold against end-thrust it is preferable to use two set-screws, but one of which is shown, or provide a seat for the end of the screw, if but one is used. If the machine is to be used solely for beading, pipe elbows and the like, the collar might be dispensed with altogether, as in this operation there is no end-thrust on the mandrel 3. The case is different, however, when the machine is used for flanging, when the outer flange of the female roll alone forces the sheet metal into the angle formed by the body of the male roll 10 and the outer boss 13, and the collar then becomes necessary, as in many other operations for which the machine is designed.

To the lower mandrel is attached the female beading roll 7. This is preferably provided with a groove 8 near each end, one being wider than the other so as to make a wider bead. In practice the grooves are rectangular, as shown, for a purpose which will presently appear. The male, upper roll 9 has a body 10 slightly thinner than the width of the narrower groove, so as to bottom, or nearly bottom therein, with a thickness of sheet metal at either side. This body terminates in an angled edge 11. Projecting from the opposite face is a boss 12 with preferably a right-angled face 13 practically coinciding with the outer flange of the under roll. In practice the beveled face of the male roll is placed inside, that is to say, toward the machine and the operating handle thereof.

To form a bead such as is shown in Figs. 3 and 4 the gage is set about as shown in Fig. 1. The operator then inserts his metal sheet between the rolls and against the gage. He then turns the screw to depress the upper roll to the proper depth, easily determined in each case by the position of the screw handle, and forms the bead by turning the
mandrel crank in the usual way. Immediately thereupon the mandrel, if in the position shown in Fig. 1, will slide over to the left, taking the position shown in Fig. 3, and without the volition of the operator. A fairly broad face is thus left at 14 to support that portion of the sheet which is approaching the rolls, and it is accordingly kept in proper position for the action of the rolls, and does not run out sidewise and so spoil the bead. But if for any reason, the mere sticking of the mandrel in its bearings, for example, the mandrel fails to so shift sidewise, it is practically impossible to hold the sheet as to produce perfect work.

Constructed as so shown and described, the rolls in cooperation with the mandrels will in a single operation, once through, produce a perfect bead, having a clean, smooth outer edge, as shown at 15. The inner matching bead 16 is produced in the same way, the sheet being reversed. It is therefore possible for the workman in the shortest possible time, and with no care except to bring the screw-handle to a predetermined position, to run through an indefinite number of similar-sized pieces and have them fit precisely.

In case of variation in the thickness of material the depth of bead will vary. Should the depth happen to be too great, as shown in Fig. 5, the inner section of elbow will be too loose. In such a case the operator need only run the inner one through again, depressing the mandrel a little more, and holding the work at a slight incline, as indicated by the dotted lines in Fig. 8. This will turn up the outer flange of the inner bead to a steeper angle, thus securing a nice fit. If the outer bead is too small, making the fit too tight, a little depression of the upper mandrel of course cures the fault.

It is to be noted that the bead is formed without a hump at 17. This is almost always present in work formed in the usual way, and makes it difficult to pull the outer and inner sections of elbow to interlocking position, with a neat fit when so interlocked.

In forming deeper and more abrupt beads, as required in fitting bottoms to vessels, and the like, the square groove of the female roll allows both for the greater depression of the male roll, and for the lateral movement of the female roll.

The boss 12 serves as a stiffener of the 55 roll, rendering it less liable to warp in tempering, and also as a right-angle flanging member in cooperation with the outer flange of the female roll.

Having thus described my invention, I claim:

1. In a sheet metal turning machine, a pair of beading rolls, the female roll having a rectangular peripheral groove, and the male roll having an inclined edge, and mandrels carrying said rolls, one of the mandrels having an unobstructed endwise movement.

2. In a sheet metal turning machine, the combination of a male roll having an inclined edge, a mandrel therefor, a female roll having a peripheral rectangular groove to cooperate with the male roll, and a mandrel therefor having a limited and unobstructed endwise movement, substantially as and for the purpose set forth.

3. In a sheet metal turning machine, the combination of a male roll having an inclined edge, a mandrel therefor, a cooperating female roll having a peripheral rectangular groove to receive said inclined edge, and a mandrel therefor, one of said mandrels having unobstructed end-play in the direction to bring the inclined face of the male roll toward the adjacent flange of the female roll.

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

CLINTON DE WITT WAGNER.
Witnesses:
ALICE SLOCUM,
CHARLES G. NAVRA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D.C."