A. J. TOWNSEND.

SHEET METAL EDGING MACHINE.

APPLICATION FILED MAY 26, 1917.

Patented Jan. 21, 1919.

2 SHEETS—SHEET 1.

1,292,157.

Fig. 1.

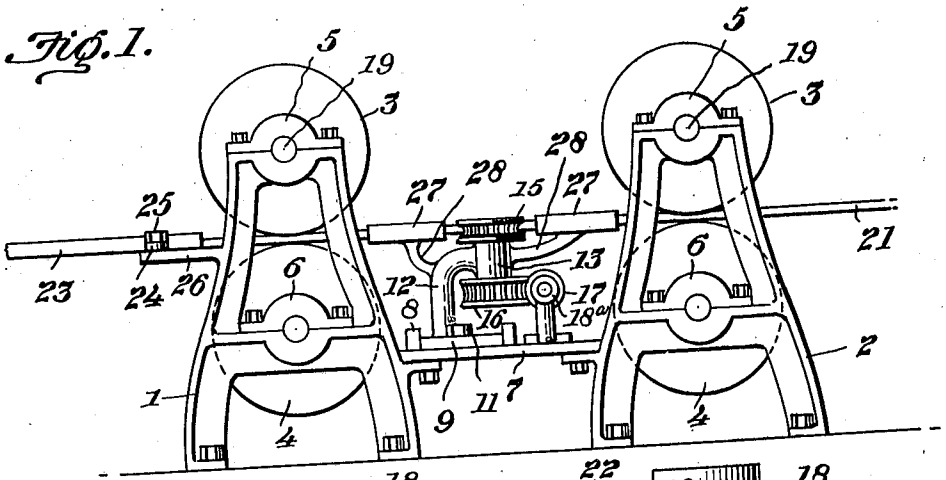


Fig. 2.

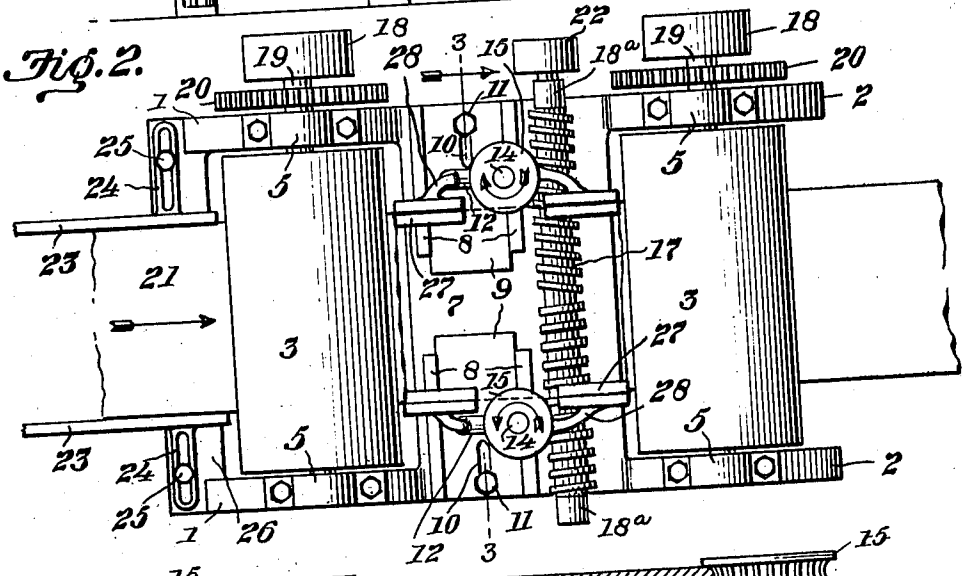
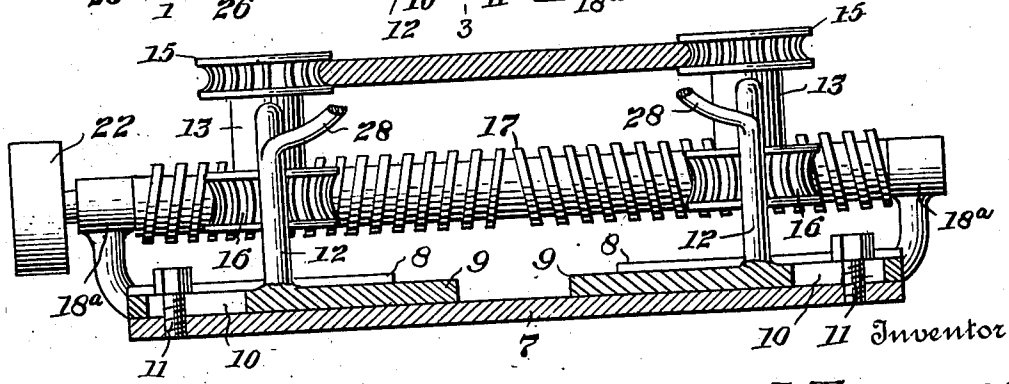


Fig. 3.



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2 SHEETS—SHEET 2.

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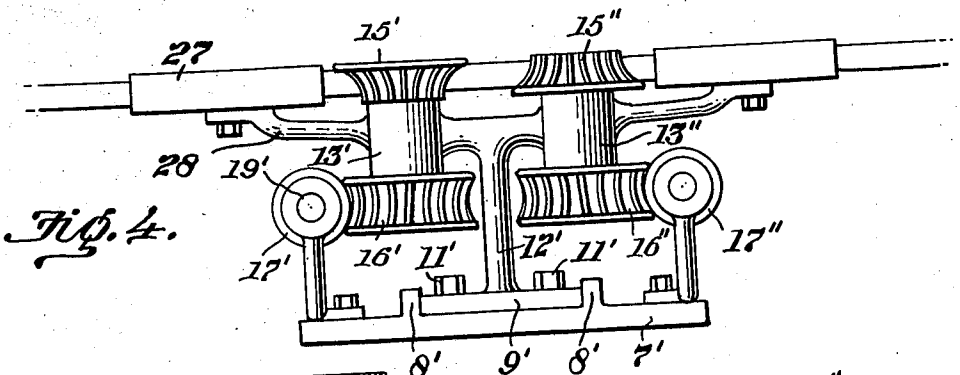


Fig. 4.

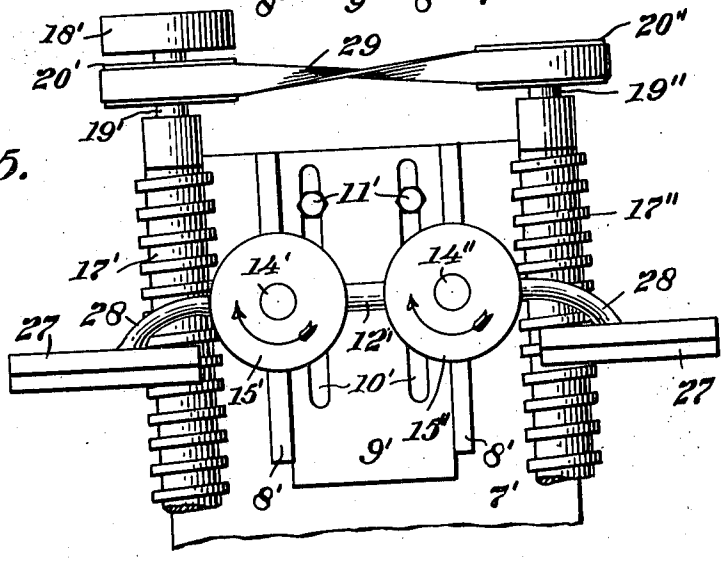
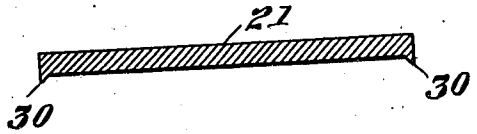


Fig. 5.

Fig. 6.



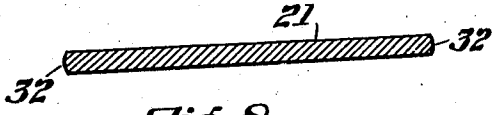
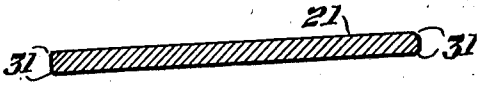


Fig. 8.

Fig. 7.



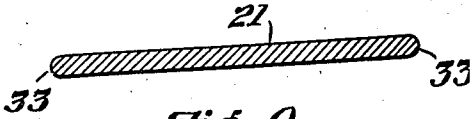


Fig. 9.

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UNITED STATES PATENT OFFICE.

ARTHUR J. TOWNSEND, OF CANTON, OHIO, ASSIGNOR TO THE NATIONAL PRESSED STEEL COMPANY, OF MASSILLON, OHIO, A CORPORATION OF OHIO.

SHEET-METAL-EDGING MACHINE.

1,292,157. Specification of Letters Patent. Patented Jan. 21, 1919.

Application filed May 26, 1917. Serial No. 171,115.

To all whom it may concern:

Be it known that I, ARTHUR J. TOWNSEND, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Sheet-Metal-Edging Machine, of which the following is a specification.

This invention relates to sheet metal edging machines and has more especial reference to a machine designed to rapidly and efficiently round or smooth the longitudinal edges of metal sheets or strips being especially adapted for trimming the roughened edges of sheets or strips as they come from the mill or smoothing the sheared edges of sheets or strips which have been sheared or slit, removing the spurs which are usually formed upon the edges of the product by means of the shears, which spurs have been found to quickly damage the dies and rolls used to form sheet metal.

The object of the present invention is to provide a machine of this character which will quickly and easily round or smooth the edges of rolled sheets or strips.

A further object is the provision of a machine of this character which may be easily and readily adjusted to accommodate sheets or strips of varying widths.

A still further object is to provide a machine of this character which will be simple and inexpensive to manufacture and which will be durable and efficient in use.

With these objects in view the invention consists in the novel construction and arrangement of parts, hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of construction may be made within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing:

Figure 1 is a side elevation of a machine embodying my invention.

Fig. 2 is a top plan view of the same.

Fig. 3 is a section on the line 3—3, Fig. 2.

Fig. 4 is a side elevation upon an enlarged scale of a portion of a modified form of the device.

Fig. 5 is a top plan view of the same.

Fig. 6 is a cross section through a sheet showing the fins which are formed thereon by the shears or slitting machines.

Fig. 7 is a cross section through a sheet which has had the corners trimmed in the edging device.

Fig. 8 is a cross section through a sheet which has had the longitudinal edges slightly rounded in the device.

Fig. 9 is a cross section through a sheet which has had the edges trimmed to a half round in the edging device.

Similar numerals of reference indicate corresponding parts throughout the several figures of the drawings.

Referring more especially to the construction illustrated in the accompanying drawings, the numerals 1—1 and 2—2, indicate spaced pairs of standards between each pair of which are journaled the upper and lower feed rolls 3 and 4 respectively, said feed rolls being for the purpose of passing the sheets or plates longitudinally through the machine as will be hereinafter described. Suitable bearings 5 and 6 are provided for the upper and lower rolls respectively.

A table 7 is supported between the standards 1—1 and 2—2, and adjustably mounted upon said table is the mechanism which smooths or rounds the edges of the sheet. The table 7 is provided with two opposite, transversely disposed pairs of guide ribs 8 and mounted between each pair of guide ribs is a plate 9, each of said plates being of the same construction. A slot 10 is provided in each plate, said slots being transversely disposed with reference to the device and a screw or bolt 11 is located through each slot and through a suitable aperture in the table 7 thus adjustably mounting the plates 9 upon the table 7 for slidable adjustment between the ribs 8.

Mounted upon each of the plates 9 is an upwardly disposed bracket 12, each of said brackets carrying a vertically disposed bearing 13 at its upper extremity, a short shaft 14 being journaled in each bearing. A milling cutter 15 is fixedly mounted upon the upper extremity of each shaft and a worm wheel 16 upon the lower extremity thereof, said worm wheel meshing with the transversely disposed worm screw 17 journaled in suitable bearings 18[a] which are mounted upon the table 7 in any suitable and well known manner, said worm having right and left hand threads.

For the purpose of driving the feed rolls a pulley 18 is mounted upon the shaft 19 of each upper feed roll and suitable gears 20 are provided upon each adjacent upper and lower feed rolls, said gears arranged to mesh in order to drive said rolls in unison to pass the sheets or plates, indicated by the numeral 21, therethrough. In order to rotate the worm screw 17 which turns the worm wheel 16 operating the milling cutters 15, a pulley 22 is provided upon one extremity of said worm screw. The usual belts may be applied to each of the pulleys and connected to any suitable source of motive power. From the above description it will be seen that a device is provided through which rolled sheets or strips may be automatically passed and which will automatically round or smooth the longtiudinal edges of the strip or sheets as they are passed between the milling cutters. It will be, of course, understood that the milling cutters should be operated in the reverse direction from the movement of the sheet such as shown in Fig. 2 in which the sheet is moved in the direction of the arrow shown thereon and the milling cutters rotated in the direction of the arrows shown upon said milling cutters. It will also be seen that the milling cutters are easily and readily adjustable toward or away from each other to accommodate sheets or plates of varying widths, and owing to the arrangement of the worm wheels 16 which mesh with the worm screw 17 these milling cutters may be operated at any desired adjustment, it only being necessary to loosen the screws 11 and slide the plates 9 within the guide ribs 8, the worm wheels 16 always remaining in mesh with the worm screw 17 as said plates are moved, thus always holding the worm wheels in operative connection to the worm screw.

For the purpose of guiding the sheets through the feed rolls adjustable guide rails 23 are mounted at the forward extremity of the machine, each rail being provided with a slotted member 24, a bolt 25 passing through said slotted member and through a suitable bracket 26 which is carried by the adjacent standard 1. In order to guide the sheets through the milling cutters a channel shaped guide rail 27 is carried at the front and rear of each milling cutter, said guide rails being connected to the bearings or brackets which support the bearings of the milling cutters by means of suitable brackets 28. The guide rails 27 are thus adjustable with the milling cutters, in order to be always set to receive sheets of the width for which the milling cutters are set.

Figs. 4 and 5 show a modified form of the device in which a pair of milling cutters are arranged to engage each side edge of the sheet, one of said cutters being arranged to engage the upper and the other cutter the lower corner of the edge of the sheet, with which the cutters contact. This form of the device is best adapted for trimming the sheets in the manner shown in Figs. 7 and 8 of the drawings where just the corners of the sheet are removed or where a slightly rounded edge is given the sheet. The numeral 7′ indicates the table upon which the edging device is mounted, said table being provided with the transversely disposed pairs of guide ribs 8′, the plates 9′ being mounted for slidable adjustment between said guide ribs. Slots 10′ are provided in each plate, said slots being transversely disposed with reference to the device and a screw or bolt 11′ is located between each slot and through the table 7′, thus adjustably mounting the plates 9′ upon the table 7′ for slidable movement between the ribs 8′.

Mounted upon each of the plates 9′ is an upwardly disposed bracket 12′ carrying a pair of spaced vertically disposed bearings 13′ and 13″, short shafts 14′ and 14″ respectively being journaled in said bearings. The milling cutters 15′ and 15″ are mounted upon the upper extremities of the shafts 14′ and 14″ respectively, the milling cutter 15′ being arranged to engage the upper portion of the longitudinal edge of the sheet and the milling cutter 15″ to engage the lower portion thereof and worm wheels 16′ and 16″ respectively are mounted upon the lower extremities of said shafts, said worm wheels meshing with the transversely disposed screws 17′ and 17″ respectively, which worm screws are arranged to drive the milling cutters 15′ and 15″ both in the same direction, either by the mechanism and arrangement of construction shown in the drawings or by any other suitable arrangement. As shown in the drawings, a drive pulley 18′ is arranged upon the shaft 19′ of the worm screw 17′ and pulleys 20′ and 20″ are mounted upon the shafts 19′ and 19″ respectively, said pulleys being connected by a cross belt 29 in order to cause the worms 17′ and 17″ to be rotated in opposite directions and thus since the worms are located upon opposite sides of the worm wheels the milling cutters will both be driven in the same direction.

Fig. 6 shows the sheet 21 as it appears after coming from the shears or sheet slitting machine, the fins 30 being formed upon the edges of the sheet. These fins cause considerable damage to the rolls and dies such as ordinarily used for forming sheet metal and it is in order to remove these fins from the edges of the sheets that this device is used. Fig. 7 shows the sheet after it has been passed through the edging device above described, the upper and lower corners of the longitudinal edges of the sheet being beveled as shown at 31. This result is best accomplished with the form of the device shown in Figs. 4 and 5 and is obtained by adjust-

ing the milling cutters so that they will just contact with the upper and lower corners of the side edges of the sheet just removing these corners and with the corners the fins 30 shown in Fig. 6. Of course, if desired, just one milling cutter such as the one indicated by the numeral 15'' may be used to remove only the lower corner upon each side edge. Fig. 8 shows a cross section of another form of edge which may be produced by the form of the device shown in Figs. 4 and 5 of the drawings or by the form shown in Figs. 1 to 3 inclusive with the cutting edges of the milling cutters formed on a larger radius, a slightly rounded edge 32 being formed upon the sheet. Fig. 9 shows the edges of the sheet rimmed half round as indicated at 33, this edge being best produced by the form of the device shown in Figs. 1 to 3 inclusive of the drawings.

Although the drawings and above specification disclose the best mode in which I have contemplated embodying my invention I desire to be not limited to the details of such disclosure, for, in the further practical application of my invention, many changes in form and construction may be made, as circumstances require or experience suggests, without departing from the spirit of the invention, within the scope of the appended claims.

I claim:—

1. In a sheet metal edging machine, means for automatically passing sheets or strips through said machine and spaced, horizontal, rotating cutters to trim the edges of the sheets or strips as they are passed through the machine.

2. In a sheet metal edging machine, means for automatically passing sheets or strips through said machine, spaced, horizontal, rotary cutters arranged to trim the edges of the sheets or strips as they are passed through the machine and means for rotating said cutters in a direction opposite to the movement of the sheets.

3. In a sheet metal edging machine, means for automatically passing sheets or strips through said machine, spaced, horizontal, rotating cutters arranged to trim the edges of the sheets or strips as they are passed through the machine and means for adjusting said cutters with reference to each other.

4. In a sheet metal edging machine, means for automatically passing sheets or strips through said machine, spaced, horizontal, rotary cutters arranged to trim the edges of the sheets or strips as they are passed through the machine, means for driving both of said cutters in unison and means for adjusting said cutters with reference to each other without breaking the driving connection.

5. In a sheet metal edging machine, means for automatically passing sheets or strips through said machine, spaced, horizontal, rotary cutters arranged to trim the edges of the sheets or strips as they are passed through the machine and a single driving means for rotating both of said cutters in opposite direction in unison.

6. In a sheet metal edging machine, means for automatically passing sheets or strips through said machine, a rotating worm screw journaled transversely across said machine, a pair of plates mounted for sliding adjustment parallel to said worm screw, a worm wheel mounted upon each plate and meshing with said worm screw and a rotary cutter operatively connected to each worm wheel.

7. In a sheet metal edging machine, means for automatically passing sheets or strips through said machine, spaced, horizontal, rotary cutters arranged to trim the edges of the sheets or strips as they are passed through the machine, means for driving both of said cutters in unison, means for guiding the sheets between the cutters, and means for adjusting said cutters and guide means in unison without breaking the driving connection.

In testimony that I claim the above, I have hereunto subscribed my name.

ARTHUR J. TOWNSEND.