

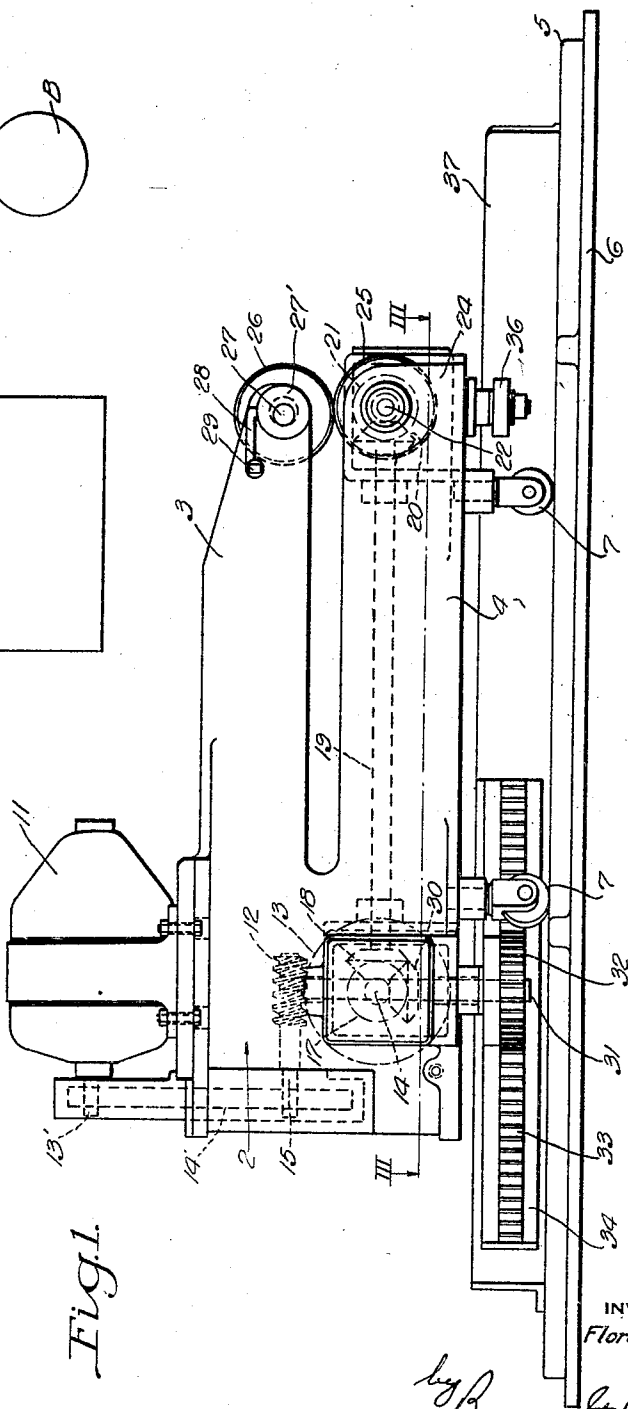
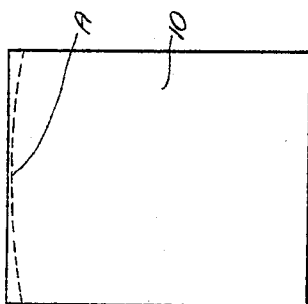
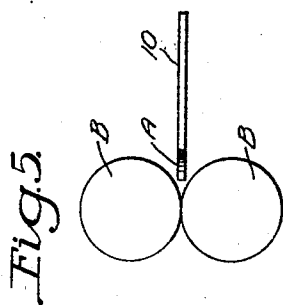
Feb. 17, 1931.

F. C. BIGGERT, JR

1,793,208

ROTARY END TRIMMING SHEARS

Filed Aug. 8, 1928 2 Sheets-Sheet 1



INVENTOR  
Florence C. Biggert, Jr.

by *Reginald Stebbins & Karmalen*  
his attorneys

Feb. 17, 1931.

F. C. BIGGERT, JR

1,793,208

ROTARY END TRIMMING SHEARS

Filed Aug. 8, 1928 2 Sheets-Sheet 2

Fig. 2.

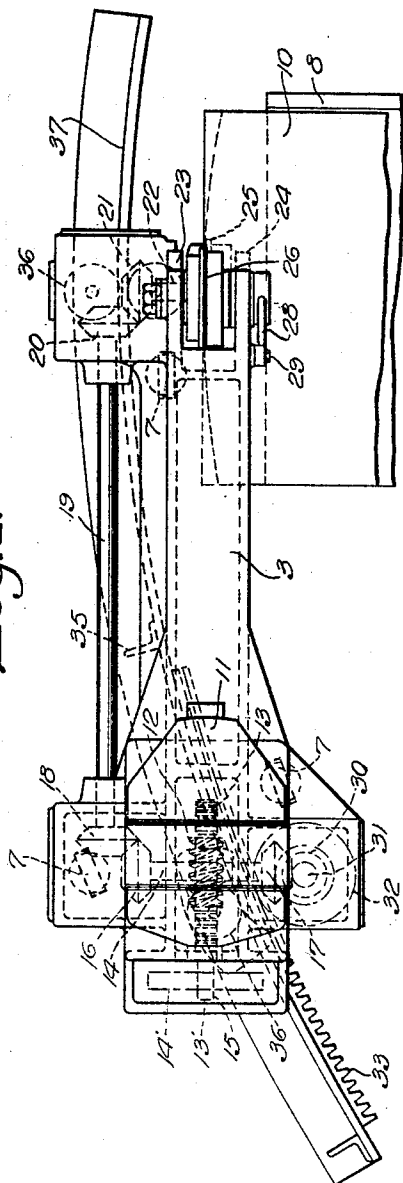
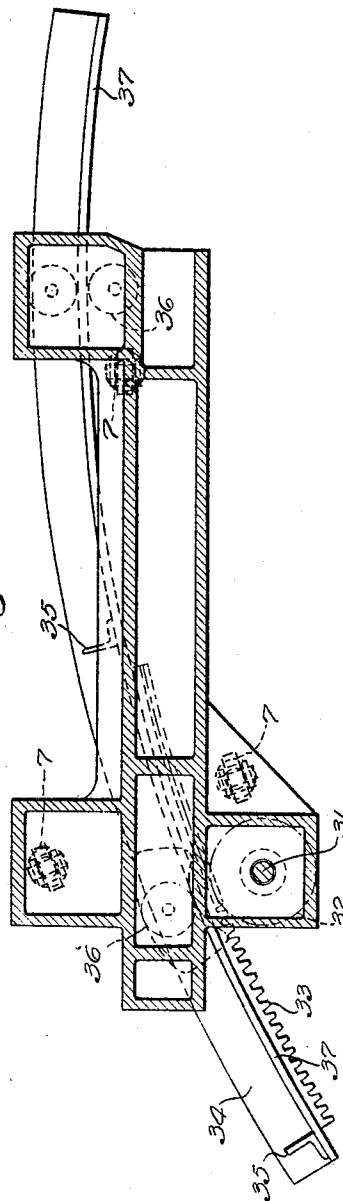


Fig. 3.



INVENTOR

Florence C. Biggert, Jr.,  
by Byrnes, Stebbins & Carmichael  
his attorneys

# UNITED STATES PATENT OFFICE

FLORENCE C. BIGGERT, JR., OF CRAFTON, PENNSYLVANIA, ASSIGNOR TO UNITED ENGINEERING & FOUNDRY COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

## ROTARY END-TRIMMING SHEARS

Application filed August 8, 1928. Serial No. 298,313.

This invention relates generally to devices for cutting sheets and more particularly to rotary end trimmers particularly adapted for forming curved ends on metal sheets in order to facilitate entry of the sheets between the rolls of a rolling mill.

In rolling sheet metal, if the forward end of the sheet is formed on a straight line, considerable force must be exerted on the sheet in order to force it into the rolls. Sheet metal is practically never entirely flat, there always being some irregularities or curvature to the sheet. The more buckled or warped the sheet is, the more pressure is required in order to force the sheet between the rolls. In order to decrease the amount of force necessary to make the sheet enter between the rolls, I cut the forward end of the sheet in a curve as indicated at A in Figs. 4 and 5. The forward edge of the sheet therefore enters the rolls B progressively. When the sheet enters the rolls in this manner, any buckle in the sheet is progressively ironed out, so that the force necessary to cause the sheet to enter the rolls is much less than if the whole forward edge of the sheet were to strike the rolls at the same time.

The device hereinafter more fully described provides a machine which accomplishes the cutting of the sheets along a curved path in a very efficient manner.

In the drawings which show the present preferred embodiment of my invention,

Figure 1 is a side elevational view of a rotary and trimmer embodying my invention,

Figure 2 is a plan view of the device shown in Figure 1,

Figure 3 is a longitudinal sectional view taken on the line III—III of Figure 1,

Figure 4 is a plan view of a metal sheet, the dotted line indicating the line of cut adjacent the forward edge of the sheet; and

Figure 5 is an end elevation of the rolls of a rolling mill, showing the sheet about to enter the pass of the rolls.

Referring to the preferred embodiment of the invention shown in the drawings, a rotary end trimmer which comprises a carriage 2 having an upper arm 3 and lower arm 4 is adapted to roll on a track 5 mounted on a base

6. Rollers 7 are connected to the lower arm 4 of the carriage and operate in the usual manner in conjunction with the track 5.

A table 8 which is adapted to support a sheet 10 is arranged adjacent the right hand end of the rotary end trimmer as shown in Figure 2.

A motor 11 is supported on the upper arm 3 of the carriage and is adapted to rotate worm 12 through motor shaft 13', chain 14' and worm shaft 15. The worm 12 meshes with a worm gear 13 which is connected to a shaft 14. The shaft 14 is provided at its opposite ends with bevel gears 16 and 17. (Fig. 2). The gear 16 meshes with a bevel gear 18 connected to one end of a shaft 19. The opposite end of the shaft 19 is provided with a bevel gear 20 which meshes with a bevel gear 21 connected to one end of a shaft 22. As shown in Figure 2, the lower arm 4 is bifurcated adjacent its right hand end to provide arms 23 and 24 which receive the shaft 22. A rotary cutting wheel or trimmer 25 is mounted on the shaft 22 between the arms 23 and 24.

As shown in Figure 1, an upper rotary trimming shear 26 is mounted on the upper arm 3. No means for rotating this shear from the motor 11 is provided, the rotation of the upper shear being dependent on its contact with the sheet 10 which is sheared. As shown, the shear 26 is connected to a shaft 27 mounted at its ends in eccentric bearings 27'. By rotating the eccentric bearings, the shaft 27 and shear 26 may be lowered in order to compensate for wear on the shear. An arm 28, pivotally mounted as at 29 is provided to maintain the eccentric in adjusted position.

The bevel gear 17 which is connected to the shaft 14 at the end opposite the bevel gear 16 meshes with a bevel gear 30 which is connected to the upper end of a shaft 31. The lower end of the shaft 31 is provided with a gear 32 which meshes with a rack 33 arranged on one side of a guide 34 formed from an angle iron. The guide 34 which, in the preferred embodiment, forms an arc of a circle is braced at intervals by means of small angle irons 35. Rollers 36 which are

connected to the carriage contact with the opposite sides of the vertical rib 37 of the guide 34 in order to guide the movement of the carriage 2.

5 In performing a cutting operation on a sheet, the sheet is laid on the table 8, as shown in Fig. 2, with the front portion of the sheet extending beyond the edge of the table. The motor 11 is then started. This rotates the lower shear 25 through chain 14', worm 12, worm wheel 13, bevel gears 16 and 18, shaft 19 and gears 20 and 21. The rotation of the motor also moves the carriage across the path of the sheet so that the shears follow the path indicated in Figures 2 and 4 by dotted lines. This movement of the carriage is accomplished by means of chain 14', worm 12, worm wheel 13, shaft 14, bevel gears 17 and 30, shaft 31, gear 32 and rack 33.

20 The rotation of the gear 32 while in mesh with the rack 33 causes the carriage to move across the sheet. In its movement the carriage is guided by means of the rollers 36 contacting with the upright portion 37 of the guide 34. After the shears have traversed the path indicated in Figure 2, thereby cutting the sheet so as to form a curved edge on the forward end of the sheet, the motor 11 is reversed, thereby withdrawing the carriage preparatory to cutting the next sheet.

30 In the preferred embodiment of the invention shown in the drawing, the guide 34 is formed in the arc of a circle. If desired, however, the guide may be formed in some other curve, and the path of the shears across the sheet will be modified accordingly. It is preferred that the center of the path made by the shears traveling across the sheet coincide substantially with the longitudinal center line of the sheet. By this arrangement the center of the forward edge of the sheet enters the rolls first and there is no tendency for the sheet to become out of alignment with the rolls. Some of the advantages of my invention however, are obtained by the employment of a device in which the path of the shears across the sheet is not an arc of a circle and in which the center of the curve does not coincide with the longitudinal center line of the sheet.

50 Although I have illustrated and described in detail a preferred embodiment of my invention, it is to be understood that the invention is not so limited but may be otherwise embodied within the scope of the following claims.

I claim:

1. A device for cutting sheet metal along a curve, which comprises a carriage, a plurality of shears rotatably mounted on said carriage, means including a curved guide and a rack secured thereto arranged adjacent said carriage and a pinion on said carriage cooperating with said rack for moving it across the sheet in a curved path.

2. A device for cutting sheet metal along a curve, which comprises a carriage, a plurality of shears rotatably mounted on said carriage, means including a rack and pinion for moving said carriage, and a guide shaped substantially in an arc of a circle arranged adjacent said carriage and adapted to guide said carriage in its movement across the sheet.

3. A device for cutting sheet metal along a curve, which comprises a carriage, a plurality of shears rotatably mounted on said carriage, means including a rack and pinion for moving said carriage across the path of the sheet, and a guide shaped substantially in an arc of a circle arranged adjacent said carriage and adapted to guide said carriage and shears along the arc of a circle as the shears are moved across the sheet, the center of the arc made by the shears coinciding substantially with the longitudinal center line of the sheet.

4. A rotary end shear for forming curved ends on metal sheets in order to facilitate entry of the sheets between the rolls of a rolling mill, which comprises a carriage, a plurality of shears rotatably mounted on said carriage, means for positively rotating one of said shears, means including a rack and pinion for moving said carriage, and a curved guide arranged adjacent said carriage for guiding it in a curved path across the sheet.

5. A rotary end shear for forming curved ends on metal sheets in order to facilitate entry of the sheets between the rolls of a rolling mill, which comprises a carriage, a plurality of shears rotatably mounted on said carriage, means for positively rotating one of said shears, means for moving said carriage, and a curved guide arranged adjacent said carriage for guiding it in a curved path across the sheet, the means for moving the carriage including a rack connected to said guide, a pinion adapted to mesh with said rack carried by said carriage, and a motor mounted on said carriage.

6. A rotary end shear for forming curved ends on flat bars or strips to facilitate entry thereof between the rolls of a rolling mill, which comprises a carriage having shears thereon, a motor on said carriage, means for rotating said shears from the motor, a curved guide having a rack secured thereto, guide means on the carriage, a pinion connected to said carriage, and means for rotating the pinion from said motor, said guide means and pinion cooperating respectively with said guide and rack to move the carriage across the sheet in a curved path.

In testimony whereof I have hereunto set my hand.

FLORENCE C. BIGGERT, JR.