May 2, 1961 O. R. BONNER 2,982,331

PORTABLE ROLLING TOOL

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Fig 1

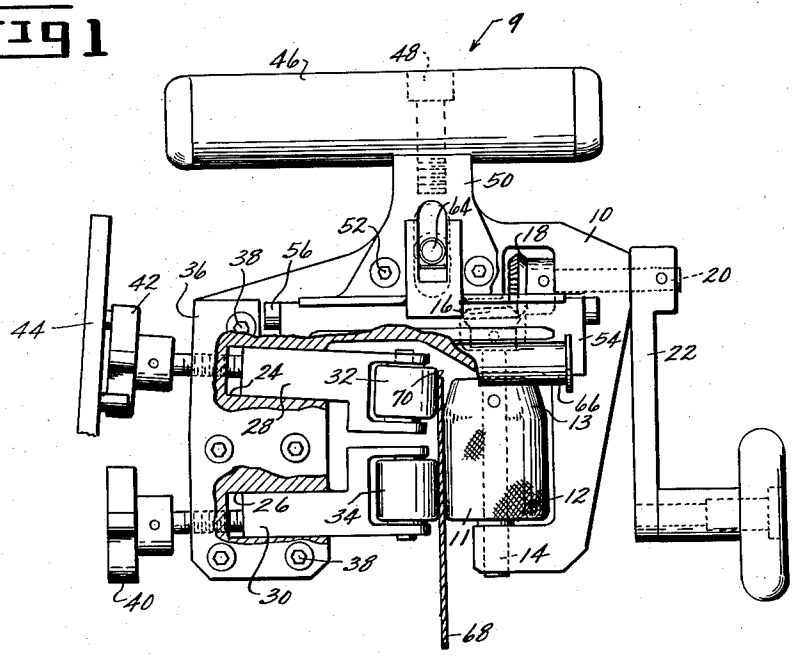

Fig 2

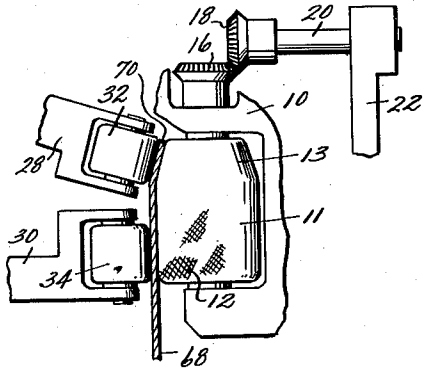

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Fig 3

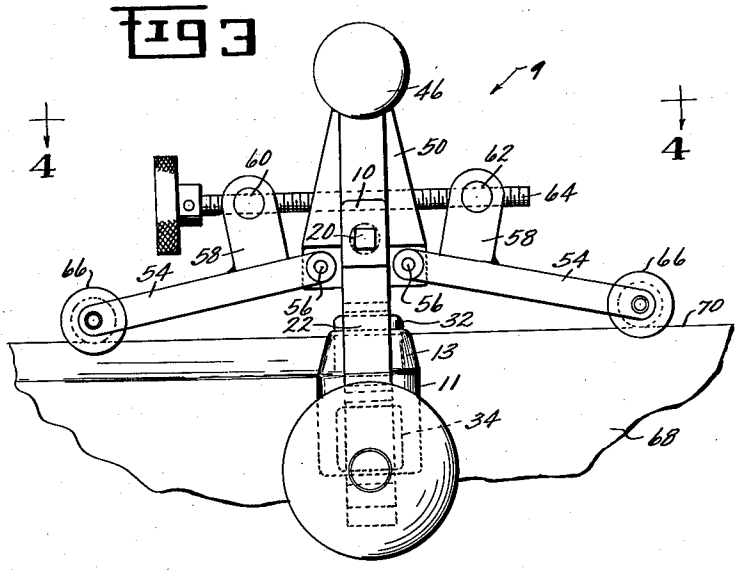
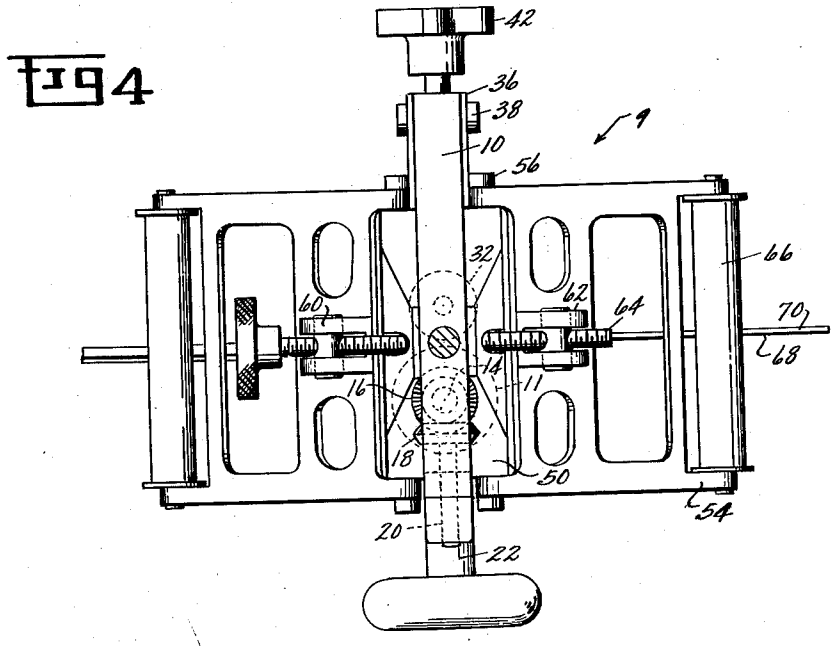


Fig 4



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2,982,331

PORTABLE ROLLING TOOL

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2 Claims. (Cl. 153—29)

This invention relates to rolling tools and, more particularly, to a rolling tool for flaring or expanding the edge of a cone, band, cylinder or other sheet metal object.

It is frequently desirable to form a flare to enlargement on the edge of a sheet metal cone, band, cylinder or other object. This is especially true of cones, bands and cylinders of a relatively large diameter where it is desired to join the cone, band or cylinder to an adjoining or mating part by overlapping the edge and subsequently welding or joining the edges in some other suitable manner. The present methods of forming such a flare or enlargement require the use of large and cumbersome machines which are usually designed to form a flare or enlargement only of a single size.

One object of this invention is to provide an improved portable rolling tool for forming flares and enlargements on sheet metal parts.

Another object of this invention is to provide a lightweight and portable hand rolling tool capable of being conveniently carried from one job to the next.

Another object of the invention is to provide a rolling tool for forming flares and enlargements which has replaceable and changeable rollers so that various sizes and types of flares and enlargements may be formed.

The objects of my invention may be realized through the provision of a tool comprising a frame and having a sizing roller mounted for rotation in the frame including means for driving the sizing roller. A clamping roller and a bevel roller are adjustably mounted in the frame and act in cooperation with the sizing roller to hold the work piece and form the bevel, flare or enlargement on the edge of the work piece while the rollers are being rotated. A pair of locating rolls are pivotally mounted on opposite sides of the frame in order to limit the engagement of the work piece between the other rollers.

My invention will be better understood from the following description taken in connection with the accompanying drawings and its scope will be pointed out in the appended claims.

In the drawings, Figure 1 is a front elevation, partly in section, of the tool; Figure 2 is a fragmentary view of the rollers and drive means therefor; Figure 3 is a side elevation of the tool; and Figure 4 is a top view of the tool taken along the lines 4—4 of Figure 3.

Referring first to Figures 1 and 2, the tool is shown generally at 9 and comprises a frame or body 10, and a sizing roller 11 rotatably mounted in the frame 10 by a suitable shaft 14 mounted in bearings contained in the frame 10. The sizing roller 11 is comprised of a straight portion 12 which may be knurled and a smooth bevel portion 13. The shaft 14 has the bevel gear 16 attached to it at its upper end. The bevel gear 16 is drivingly engaged with the bevel gear 18. A shaft 20 is connected to the bevel gear 18 and is mounted within the frame 10 for rotation therein. A hand crank 22 is connected to the shaft 20 for the purpose of rotating the shaft 20

and thereby driving the sizing roller 11 through the bevel gears 16 and 18.

The frame 10 is provided with the slots 24 and 26. A pair of adjustable slides 28 and 30 are slideably mounted in the slots 24 and 26, respectively, for movement toward and away from the sizing roller 11. A bevel roller 32 is rotatably mounted at one end of the adjustable slide 28. A clamping roller 34 is rotatably mounted at one end of the adjustable slide 30. The adjustable slides 28 and 30 are kept within the frame 10 by means of the cover plates 36 best shown in Figure 4. The cover plates 36 may be secured to the frame 10 by means of the screws 38. An adjusting screw 40 is threadingly engaged in the frame 10 in order to move the adjustable slide 30 laterally within the slot 26. An adjusting screw 42 is threadingly engaged in the frame 10 in order to motivate the adjustable slide 28. A handle 44 may be provided to engage the adjustable screw 42 and thereby increase the amount of force that may be exerted on the adjustable slide 28 as will be appreciated by those skilled in the art.

A suitable handle 46 may be provided at the top portion of the tool in order to make the tool adaptable for convenient handling. The handle 46 may be secured by means of the screw 48. A pair of brackets 50 are mounted on either side of the upper portion of the tool as will be better seen by referring to Figure 3. The brackets 50 may be secured by means of the screws 52. The purpose of the brackets 50 will hereinafter become readily apparent.

A pair of arms 54 are pivoted to the brackets 50 by means of the pivot pins 56. The arms 54 are each provided with a clevis 58. The clevises 58 are provided with the pivot screws 60 and 62. The pivot screws 60 and 62 are free to rotate in the clevises 58. The pivot screw 60 is provided with a right hand thread and the pivot screw 62 is provided with a left hand thread. An adjusting screw 64 having a right hand thread where it engages the pivot screw 60 and a left hand thread where it engages the pivot screw 62 is provided connecting the pivoted arms 54. As will be apparent to those skilled in the art, this mechanism will result in equal raising and lowering of the arms 54 by means of turning the adjusting screw 64. The locating rolls 66 are rotatably mounted at the outer ends of the arms 54.

In operation, the work piece 68 which may be the edge of a cone, band, cylinder or other sheet metal object, is placed in the position shown in Figure 1. This may be done by moving the bevel roller 32 and the clamping roller 34 away from the sizing roller 11 thus opening the gap between the rollers. Movement of the bevel roller 32 and the clamping roller 34 may be accomplished by rotation of the adjusting screws 40 and 42. The position of the work piece 68 longitudinally with respect to the sizing roller 11 is controlled by the position of the locating rolls 66.

As previously described, the locating rolls 66 are controlled by the adjusting screw 64. Thus in setting up the tool for operation, the adjusting screw 64 is turned to the position giving the desired width of flare or enlargement of the work piece 68. Turning the adjusting screw 64 will move the position of the work piece 68 with respect to the smooth bevel portion 13 of the sizing roller 11. The locating rolls 66 rest against the edge 70 of the work piece 68. When the tool is in operation the locating rolls 66 roll around the edge portions 70 of the work piece 68.

After the proper position of the locating rolls 66 is found for a given application, the clamping roller 34 is moved into engagement with the work piece 68 by rotating the adjusting screw 40. The clamping roller 34 is held against the work piece 68 with sufficient force so

that when the sizing roller **11** is rotated, the knurled straight portion **12** of the sizing roller **11** will have sufficient frictional force generated between its surface and the work piece **68** to move the entire tool along the edge of the work piece **68**.

The bevel roller **32** is next moved into engagement with the edge portion of the work piece **68** by means of rotataing the adjusting screw **42**. As seen in Figure 2, the bevel roller **32** is moved into engagement until the edge portion of the work piece **68** is held against the smooth bevel portion **13** of the sizing roller **11**.

Upon making all of the above adjustments, the entire edge of the work piece **68** may then be flared or enlarged by merely turning the hand crank **22** thereby moving the entire tool about the edge of the work piece **68** thereby providing a uniform flared or enlarged edge portion of the work piece **68**.

As will be evident to those skilled in the art, the width of the bevel or enlarged portion may be varied by adjusting the position of the locating rolls **66** by means of the adjusting screw **64**. In this manner the width of the work piece **68** which is in engagement with the smooth bevel portion **13** of the sizing roller **11** may be varied.

One of the advantages of my tool is that the angular displacement of the bevel or enlarged portion of the work piece **68** may be varied by the simple expedient of replacing the sizing roller **11** with another sizing roller having a smooth bevel portion **13** of a different included angle. It would, of course, also be necessary to change the bevel roller **32** so that it has a tapered surface which is parallel to the surface of the smooth bevel portion **13** of the sizing roller **11**. Thus, it will be apparent that various bevels or enlargements may be made by merely having alternate pairs of sizing rollers **11** and bevel rollers **32** available.

While particular embodiments of the invention have been illustrated and described, it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the invention and it is intended to cover in the appended claims all such changes and modifications that come within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A portable tool for flanging a sheet metal workpiece comprising, in combination; a frame; a sizing roller having a cylindrical portion and a smooth conical portion coaxial with said cylindrical portion, said sizing roller being mounted for rotation about its axis in said frame; rotary drive means connected to rotate said sizing roller to move the tool relative to the workpiece; a clamping roller mounted in said frame for rotation about an axis substantially parallel to that of said sizing roller; adjusting means for linear movement of said clamping roller in a generally radial direction with respect to the axis of the sizing roller and into proximity therewith for clamping a workpiece therebetween; a bevel roller mounted in said frame for rotation about an axis disposed at a small angle with respect to the sizing and clamping roller axes; adjusting means for linear movement of said bevel roller at an oblique angle with respect to the sizing and clamping roller axes and into proximity with said sizing roller conical portion so as to form the workpiece therebetween; a pair of locating members mounted to said frame adjacent said sizing roller conical portion and spaced along a line which lies between and substantially normal to the axes of said sizing and clamping rollers and also lies substantially normal to a line intersecting both said axes; and adjusting means for movement of said locating members axially of said sizing roller so as to control the depth of insertion of the workpiece between the bevel and sizing rollers.

2. A portable sheet metal flanging tool as defined in claim 1 wherein each of said locating members is carried by an arm pivoted to said frame, and said locating member adjusting means comprises a threaded element interconnecting said pivoted arms and providing simultaneous and equal adjustment thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

74,481	Armstrong	Feb. 18, 1868
738,428	Gabriel	Sept. 8, 1903
766,877	Dewes	Aug. 9, 1904
1,669,957	Wagner	May 15, 1928
1,753,963	Mauser	Apr. 8, 1930
1,965,533	Lyon	July 3, 1934
2,364,735	McGlone et al.	Dec. 12, 1944
2,479,200	Birks	Aug. 16, 1949
2,498,686	Johnson	Feb. 28, 1950
2,740,451	Knost	Apr. 3, 1956

FOREIGN PATENTS

515,299	Belgium	Nov. 29, 1952
749,721	Germany	Dec. 2, 1944