Aug. 9, 1960 G. A. KERR 2,948,323

CLAMPING AND BENDING IMPLEMENT

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Fig. 1

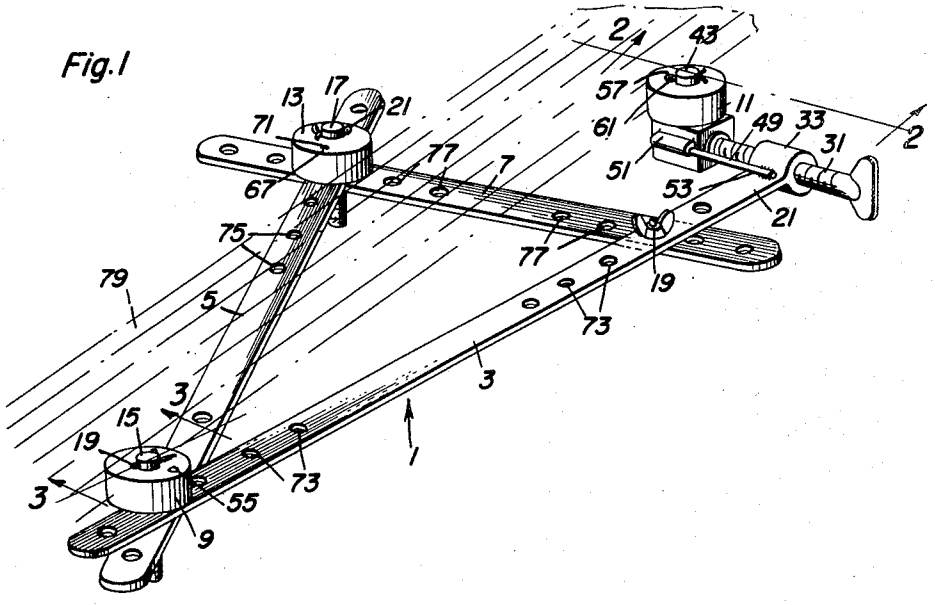


Fig. 2

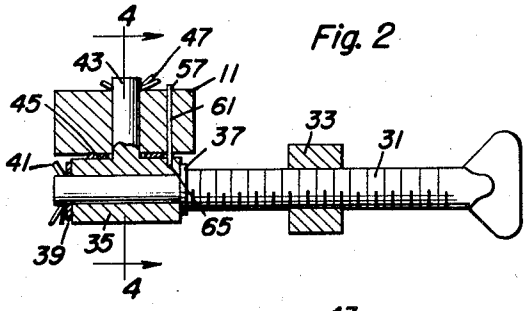


Fig. 3

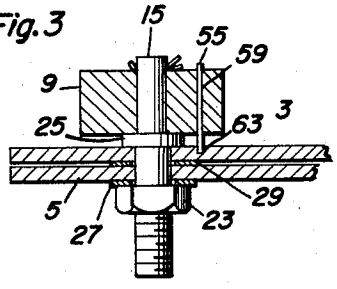


Fig. 4

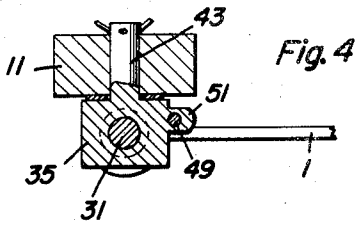
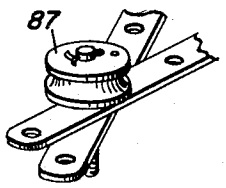


Fig. 5



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Fig. 6

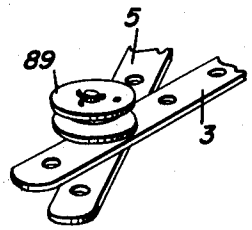


Fig. 7

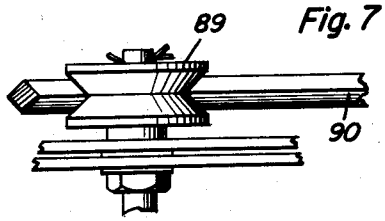


Fig. 8

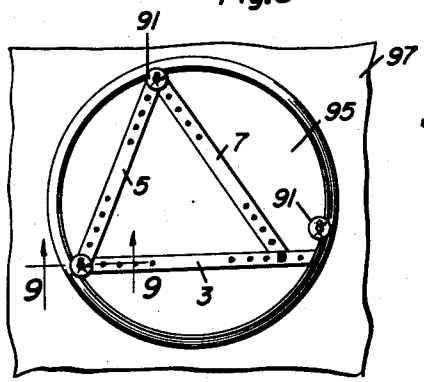


Fig. 9

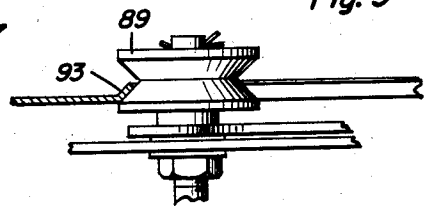


Fig. 11

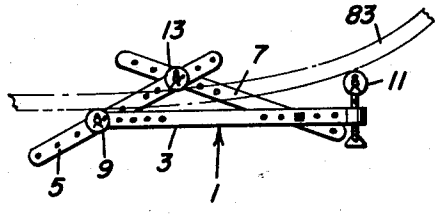


Fig. 10

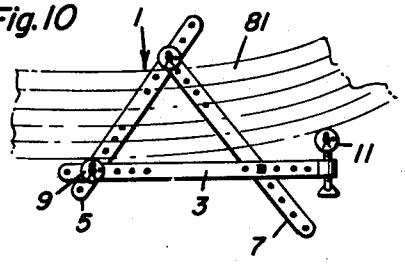
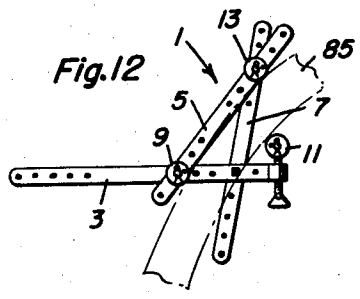


Fig. 12



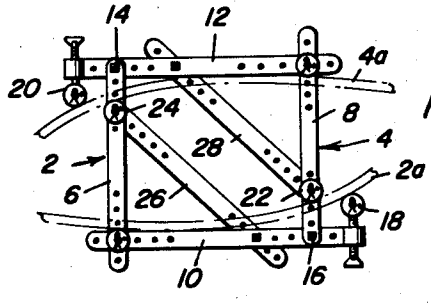


Fig. 13

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CLAMPING AND BENDING IMPLEMENT

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Filed Feb. 10, 1958, Ser. No. 714,185

3 Claims. (Cl. 153—38)

My invention relates to improvements in work clamping and bending implements for exerting pressure at a plurality of spaced points against the work for clamping and bending operations thereon.

The primary object of my invention is to provide an inexpensive simply constructed and easily operated implement for applying pressure at three points against bendable metal stock such as bar stock, round or flat or polygonal or tubular in cross section to variably bend the same or against steamed bendable flat strip wood stock laminated or solid for bending the same or clamping the laminations together for gluing and which is adapted for use in reaming a flange around a hole in flat stock and for a wide range of adjustments for such operations on such stock or to ream a flange around holes of different sizes.

Still another object is to provide an implement in accordance with the foregoing equipped with clamping and bending rollers having flat treads for clamping or bending flat stock, or with concave rollers for bending round stock or with V-grooved rollers for bending stock of polygonal cross section.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of my improved implement equipped with flat faced clamping and bending rollers and adjusted for clamping together laminations of a laminated strip of one size;

Figure 2 is an enlarged fragmentary view in vertical cross section taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged fragmentary view in vertical cross section taken on the line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary view in vertical cross section taken on the line 4—4 of Figure 2;

Figure 5 is a fragmentary view in perspective on a smaller scale of a portion of the implement equipped with a concave roller for bending round or tubular stock;

Figure 6 is a fragmentary view in perspective on a smaller scale of a portion of the implement equipped with a V-grooved roller for bending bar stock of rectangular cross section;

Figure 7 is an enlarged fragmentary view in side elevation partly in section of the same;

Figure 8 is a plan view on a smaller scale of the implement adjusted and equipped with V-grooved rollers and illustrating its use in reaming a flange around a circular hole in flat stock;

Figure 9 is an enlarged fragmentary view in vertical longitudinal section taken on the line 9—9 of Figure 8;

Figure 10 is a plan view on a smaller scale of the implement adjusted for clamping and/or bending laminated stock after steaming;

Figure 11 is a plan view on a smaller scale of the implement adjusted and operated to bend bar, or round, or tubular stock of one size;

Figure 12 is a plan view on a smaller scale of the implement adjusted and operated to bend a larger size of bar, or round, or tubular stock in a different manner, and

Figure 13 is a plan view on a smaller scale of a modification of the invention.

Referring to the drawings by numerals, and first to Figures 1 to 12, the implement of my invention comprises as its main components a triangular flat bar frame designated generally by the numeral 1 supporting a triangularly arranged series of coplanar pressure rollers on one and the same side of the frame and having axes at a right angle to said frame, and presently described in detail.

The frame 1 comprises a base side bar 3 and a pair of first and second auxiliary side bars 5, 7 crossing and intersecting the main bar 3 and crossing and intersecting each other at one side of the main bar 3.

The series of rollers are spaced longitudinally of the main bar 1 and comprise a first roller 9 at the intersection of the first auxiliary bar 5 and the main bar 1, a second roller 11 and a third roller 13 at the intersection of said auxiliary bars 5, 7 intermediate the first and second rollers 9, 11 and spaced further from the main bar 1 than the rollers 9, 11, and at said one side of the main bar 1.

A transverse bolt 15 pivotally connects the first auxiliary bar 5 and main bar 1 at the point of intersection thereof and journals the first roller 9 thereon. A transverse bolt 17 pivotally connects the auxiliary bars at the point of intersection thereof and journals the third roller 13 thereon. The second auxiliary bar 7 is pivotally connected by a wing nut equipped bolt 19 to the main bar 1 at the point of intersection therewith between the first and second rollers 9, 11 so that one end 21 of the main bar 1 extends beyond the auxiliary bars 5, 7. The first and third rollers 9, 13 are removably secured on the bolts 15, 17 by cotter pins 19, 21 and said bolts 15, 17 are each provided with a nut 23 and a collar 25 thereon beneath the roller for tightening the bolt on the frame 1 and with antifriction washers as at 27 and 29 one backing the nut 23 and the other between the bars through which the bolt extends all as shown in Figure 3 in connection with the bolt 15.

The second rollers 11 is removably mounted on one end of a hand screw 31 threaded transversely through a boss 33 on the end 21 of the main bar 1 for screw feed to advance and retract the second roller relative to the third roller 13. The roller 11 is mounted on the screw 31 by means of a block 35 through which said screw 31 is journaled and which is secured on said screw 31 between a collar 37 and washer 39 on the screw by a cotter pin 41 in said screw. The block 35 has a stud 43 thereon on which the roller 11 is journaled and removably secured against a washer 45 on the stud by a cotter pin 47 in the stud. A rod 49 slides in a side lug 51 on the block 35 and traverses, and is welded, as at 53, to the main bar 1 and prevents the block 35 and roller 11 from turning with the screw 31.

Means for locking the rollers 9, 11, 13 against rotation comprises pins 55, 57 removably insertable through bores 59, 61 in the rollers 9, 11 into sockets 63, 65 in the main bar 1 and block 35 and a similar locking pin 67 and bore 71 in the roller 13 the pin 67 engaging a socket not shown in the auxiliary bar 5.

The main bar 3 is provided with longitudinally spaced bolt holes 73, and the auxiliary bars 5, 7 with similarly spaced bolt holes 75, 77. The bolts 15, 19 can be inserted through selected bolt holes 73, 75 and 73, 77 and the bolt 17 inserted through selected bolt holes 75, 77. This provides means for adjusting the auxiliary bars 5, 7 crosswise and lengthwise of each other and of the main

bar 1 to vary the angular relation of said bars for varying the triangular arrangement of the rollers 9, 11, 13 for clamping and bending operations on stock of different sizes and for reaming flanges around holes of different sizes.

In using and operating the invention for clamping, for example, laminated flat strip stock for gluing or bending as shown in Figure 1, the bars 3, 5, 7 are adjusted to space the roller 13 from the rollers 9, 11 so that the implement may be placed with the main bar 3 extending along one side of the stock to engage the roller 13 with one side of the strip 79 and the rollers 9, 11 with the other side and to apply pressure to said strip at said sides at longitudinally spaced points thereon. The roller 11 is then screw fed toward the roller 13 against the strip 79 whereupon said rollers will clamp said strip between the rollers 9, 11 on the one hand and the roller 11 on the other hand with the roller 13 between the rollers 9, 11. Further feed of the roller 11 will bend the strip 79 around the roller 13 as shown in Figure 10 wherein the bars 3, 5, 7 have been shown adjusted to vary the spacing of said rollers for clamping and bending a wider laminated flat strip 81. In such operations on flat strip stock rollers 9, 11, 13 with flat treads are preferably used. In bending such and other stock the rollers are locked by the described locking means to prevent rolling thereof so that the implement will not move along the strip during the bending operation. However the rollers may be unlocked for rolling the implement 1 along the stock for progressively clamping and/or bending.

As shown in Figure 11 the bars 3, 5, 7 may be adjusted to vary the spacing of the rollers to space the roller 13 closer to the rollers 9, 11 for bending thin strip stock 83 and, as shown in Figure 12, the bars may be adjusted to space the roller 11 between the rollers 9, 13 for bending stock 85, between said rollers 9, 13.

As shown in Figure 5 concave rollers such as the roller 87 may replace the rollers 9, 11, 13 for bending tubular or round stock, and as shown in Figures 6, 7 the rollers 9, 11 13 may be replaced by V-grooved rollers, such as the one designated 89 for bending operations on rectangular cross section bars or rods 90.

As shown in Figures 8 and 9 the bars 3, 5, 7 may be adjusted to space replacement V-grooved rollers 89 apart substantially equidistantly for reaming a flange 93 around a hole 95, in flat stock 97 by screw feed retraction of one of the rollers 89 to cause the work to be bent around the hole 95 in response to rotation of the implement around the hole 95 and screw feed of the one roller 91.

As will be seen in bending strip bar or round or tubular stock the bars 3, 5, 7 may be variably adjusted to space the screw feed roller outwardly or inwardly of the third roller longitudinally of the stock for bending the stock in different curves.

In the modification shown in Figure 13 a pair of the frames designated 2, 4 are connected together by terminally pivoting the first auxiliary bar 6, 8 of each frame to the main bar 10, 12 of the other frame as at 14, 16 so that two pieces of stock 2a, 4a may be bent by the screw feed rollers 18 or 20 of the frame around the third rollers 22 or 24 of the other frame and so that the bars of the frames may be adjusted relatively like the bars 3, 5, 7 and the first auxiliary bars 6 and 8 of each frame adjusted across and longitudinally of the base bars 12, 10 of the other frame to variably space the screw feed rollers 18, 20 of either frame from said third rollers 22, 24 to increase the range of variable spacing of the rollers of the two frames for various bending and clamping operations which it is not deemed necessary to disclose herein.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A clamping and bending implement comprising a triangularly arranged series of rollers and a triangular frame, said frame comprising a base side bar for positioning alongside elongated stock and a pair of first and second auxiliary side bars intersecting the base side bar and intersecting each other at a point spaced from the base side bar, said series of rollers including a pair of first and second presser rollers spaced along said base side bar for engaging one side of such stock and a third roller at the point of intersection of said auxiliary bars for engaging the other side of such stock at a point intermediate said first and second rollers, transverse bolts connecting the first auxiliary bar to the base side bar at the points of intersection thereof and said auxiliary bars at the point of intersection thereof and having the first and third rollers journaled thereon, a transverse bolt connecting the second auxiliary bar to the base side bar at the point of the intersection therewith, said base side bar having an end portion extending outwardly beyond the second auxiliary side bar, and screw feed means mounting the second roller on said extending end portion of the base side bar outwardly of said second auxiliary side bar for advance against such stock.

2. An implement according to claim 1, and means for locking said rollers against rotation.

3. An implement according to claim 1, said screw feed means comprising a screw shaft threaded through said extending end portion of said base side bar, a block having said shaft journaled therein and said second roller rotatably mounted thereon, and means rigidly connecting said block to said base side bar to prevent said block from being rotated by said shaft.

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