June 6, 1944. P. S. PICKARD 2,350,530

PLATE BENDING MACHINE

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Fig. 1

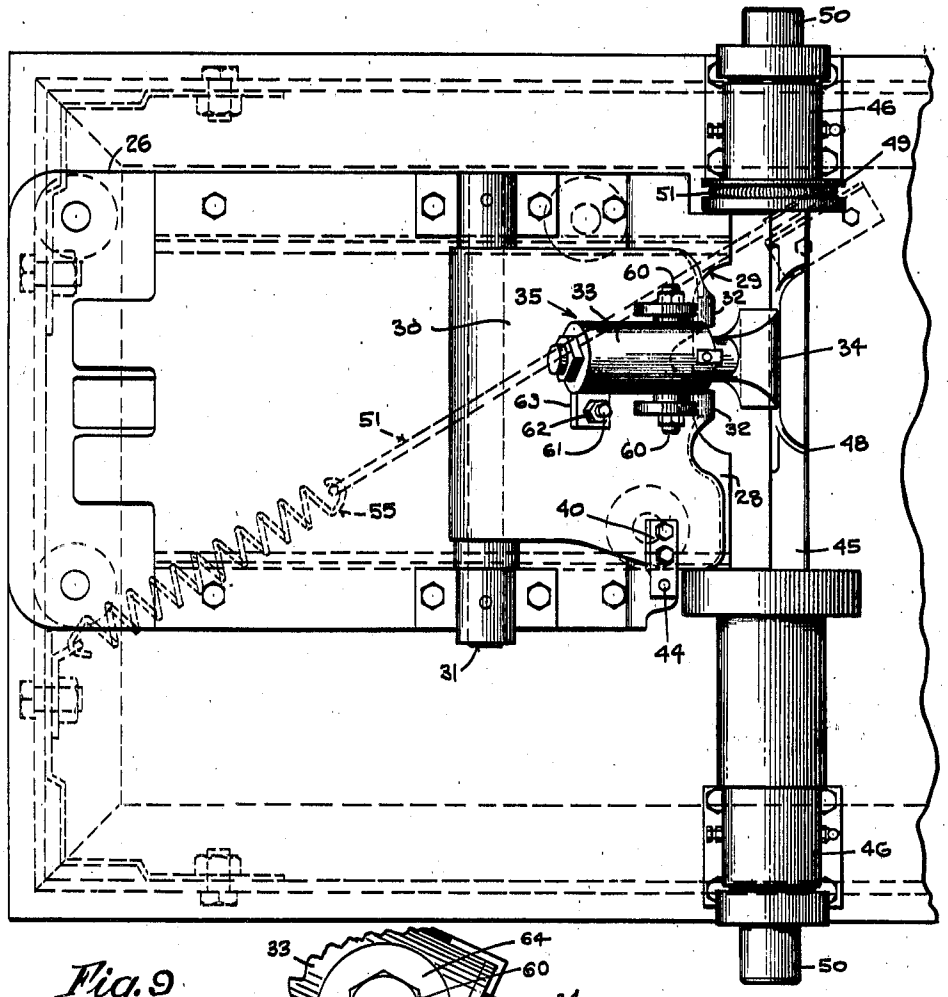
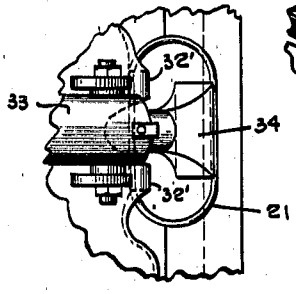


Fig. 9



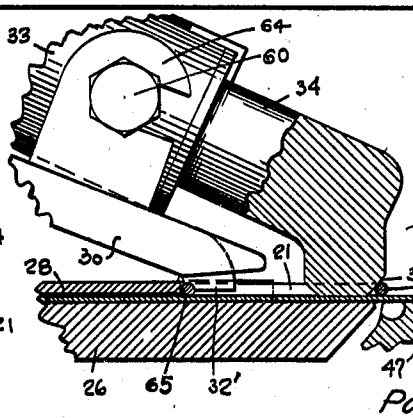


Fig. 10

INVENTOR
Paul S. Pickard
BY
D. Verner Smythe
ATTORNEYS.

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PLATE BENDING MACHINE

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Fig. 2

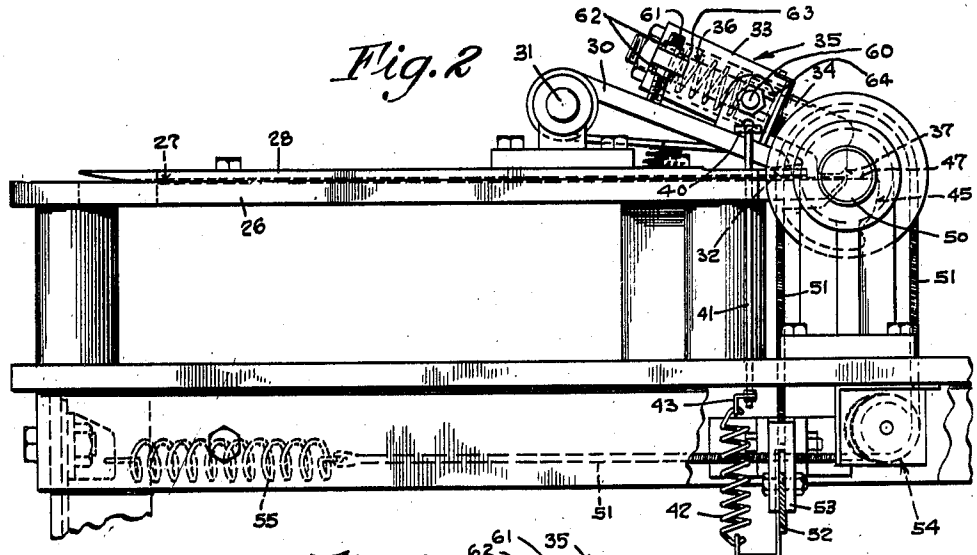
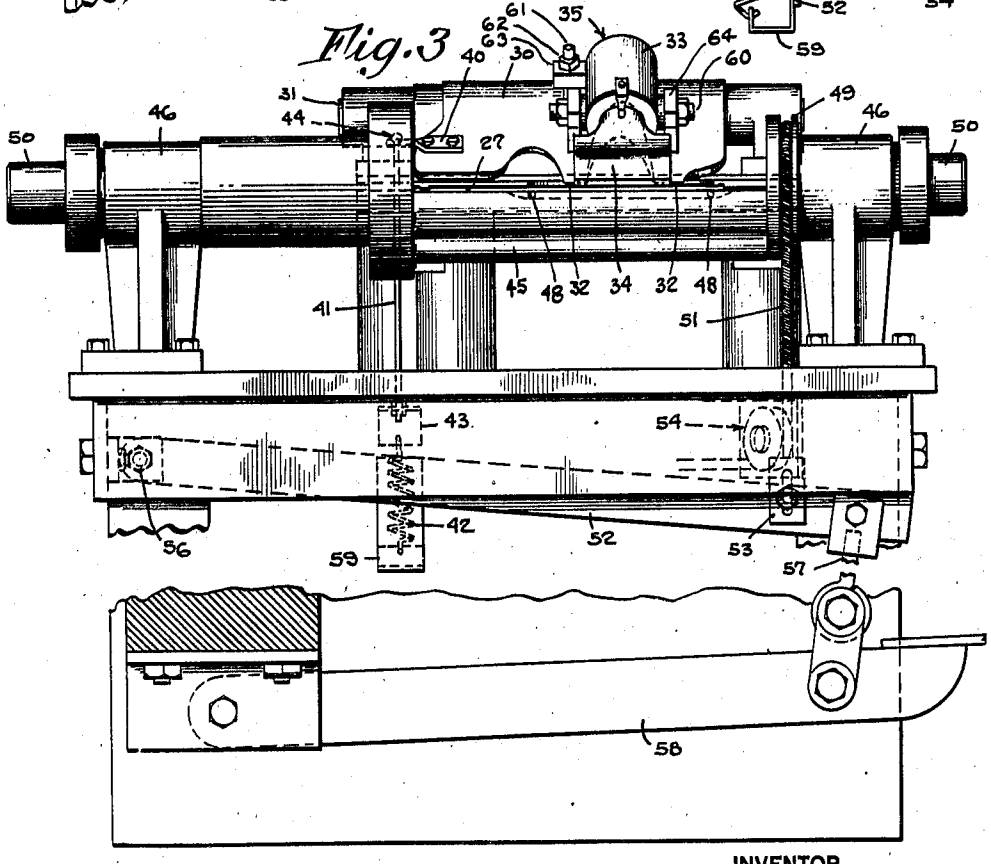


Fig. 3



INVENTOR
Paul S. Pickard
BY
Dewey Smythe & Co.
ATTORNEYS

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PLATE BENDING MACHINE

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Fig. 4

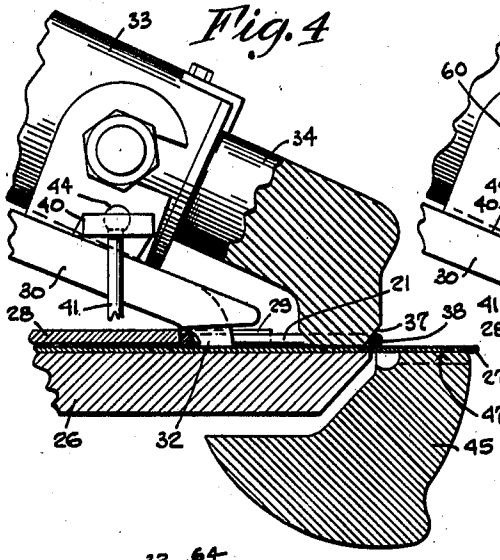


Fig. 5

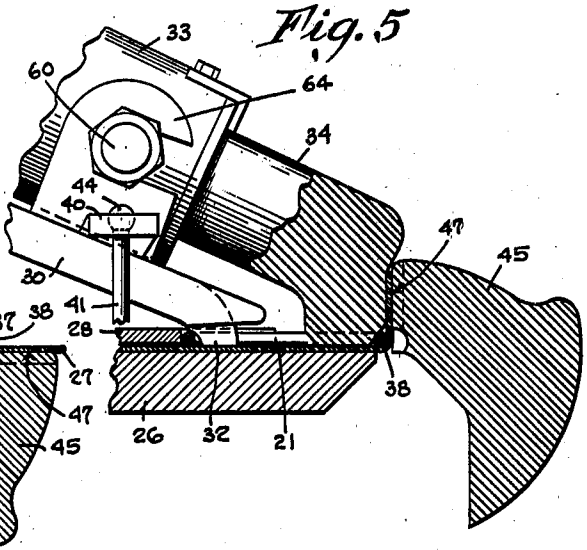


Fig. 6

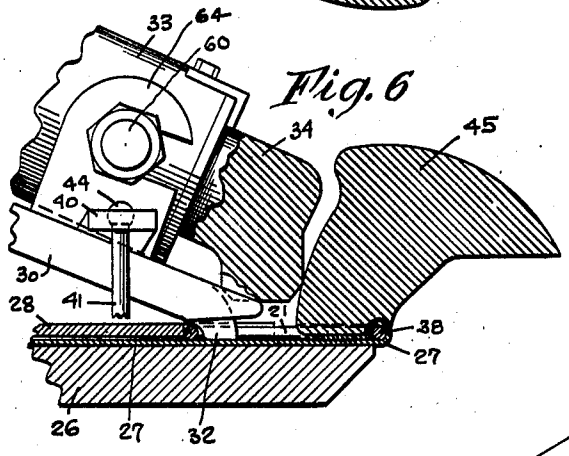


Fig. 7

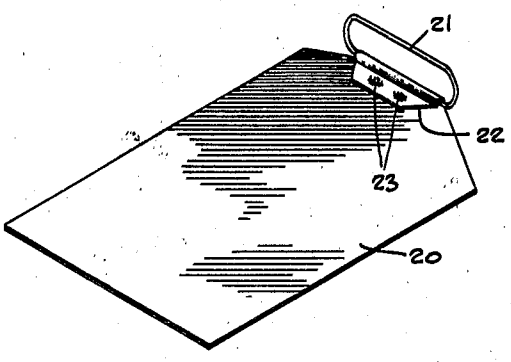
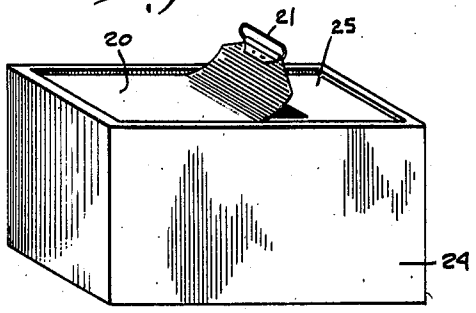


Fig. 8



INVENTOR
Paul S. Pickard
BY
D. Tenney Smythe
ATTORNEYS

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2,350,530

UNITED STATES PATENT OFFICE

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PLATE-BENDING MACHINE

Paul S. Pickard, Lakewood, Colo., assignor to Remington Arms Company, Inc., Bridgeport, Conn., a corporation of Delaware

Application July 24, 1942, Serial No. 452,127

6 Claims. (Cl. 153—1)

This invention relates to a device for bending metal around an article positioned thereon, and, particularly, for the bending of a metal plate around a portion of a handle or bail. One use of such a plate with handle attached is in ammunition box liners.

The usual small arms ammunition box is made of wood with a metal waterproof liner such as terneplate or other similar material. Such a liner generally has a cover affixed thereto by solder after the box has been filled and a handle is provided on the cover strip so as to facilitate opening of the liner. The attaching of the handle to the plate by bending a portion of the plate around the handle is frequently a difficult and tedious operation. This same problem arises in other arts in the attaching of a handle or similar article to a plate.

One of the purposes of the present machine is to facilitate the positioning and bending of the metal around a part of the handle. The other objects of the invention will appear from the drawings and description following but it is to be understood that they are merely exemplary.

In the drawings:

Fig. 1 is a plan view of the machine.

Fig. 2 is a side view of the machine.

Fig. 3 is a front elevation view of the machine.

Fig. 4 is an enlarged fragmentary side view partially in section showing the roller and clamping parts for the plate before the bending operation is started.

Fig. 5 is similar to Fig. 4 after the bending roll has been rotated approximately 90°.

Fig. 6 is similar to Figs. 4 and 5 with the exception that the bending is complete.

Fig. 7 is a perspective view of a plate with the handle attached thereto.

Fig. 8 is a perspective view of one type of ammunition box with the liner torn open.

Fig. 9 is a fragmentary top view of a modification.

Fig. 10 is an enlarged fragmentary side view partially in section of the modification shown in Fig. 9.

Referring to Figs. 7 and 8, the top plate which is soldered on a terneplate liner is shown at 20 with the handle 21 attached. The part of the plate which is bent back over a portion of the handle may be fastened to the plate by spot welding as at 23 or by soldering, riveting or in any other suitable manner. In Fig. 8, the wooden box 24 has the liner 25 with the plate 20 soldered thereon. The box is shown in a partially open condition which has been accomplished by grasping the handle 21 and pulling upwardly. Usually such a box has a wooden cover which is not shown.

In general, in order to operate the machine, a plate is placed on a table and then a handle placed in position on top of the plate. The mechanism is then operated, which turns the edge of the plate over the handle so that it may be fastened in any manner desired. The machine serves to clamp the plate in place on the table when the bending means starts to operate and also to hold the handle in place until the bending means has bent the metal sufficiently far so that the handle-holding means can be retracted. The retraction of the handle-holding means is necessary in order to complete the bending of the plate.

A table or support 26 is provided for carrying the plate 27 to be formed. The cover 28 is spaced from the support 26 so that the plate may be slipped between the support 26 and cover 28. The cover 28 terminates at its forward end in a shape 29 to position the article or handle as will be described presently. A clamping plate 30 may be pivotally attached to the shaft 31 in any suitable manner. The clamping plate 30 may have downwardly projecting portions 32 for the purpose of resting on the plate to be bent. In the form shown in Figs. 1–8, inclusive, the projection 32 rests directly on the plate to be bent. Mounted on top of the clamping plate 30 is the mechanism 35 carrying the retractable article-holding means 34. The article-holding plunger 34 is reciprocably mounted in the body 33 and urged forwardly by spring 36 (Fig. 2). Plunger 34 has a cutout portion 37 to fit over the portion of the handle indicated at 38 when it is placed on top of the plate preparatory to the bending operation. The spring 36 yieldably holds the article or handle 21 in position. The body 33 is pivotally mounted at 60 and is adjustable about the pivot by means of the stud 61, nuts 62 and bracket 63. The bracket 64 is so arranged as to allow removal and adjustment of the mechanism 35.

Attached to the side of the clamping plate 30 is a bracket 40. The bracket 40 carries a rod 41 which in turn is attached to a spring 42 through the bracket 43. The rod 41 may be mounted in a ball and socket joint 44 in the bracket 40. As will be explained presently, when the bending operation takes place, tension is placed on the rod 41 so as to urge the clamping plate 30 in a clockwise direction as viewed in Fig. 2. Plate 27 is clamped on the support 26 through projections 32 of the clamping plate 30 and the

handle 21 which has previously been placed in position on the plate 27 is also held in position when rod 41 is put under tension.

The bending means itself includes a bending roll 45 which is journalled in bearings 46. As the roll is turned in a counterclockwise direction (Fig. 2), the top surface 47 (Figs. 4 to 6) will bend the plate upwardly as shown in detail in Fig. 5. As the roll continues its movement, the edge thereof contacts the plunger 34 and moves it inwardly into the body 33 as shown in Fig. 6. In this manner, the metal of the plate is bent back on itself and the plunger is moved out of the way. The cam surfaces preferably are so designed that a movement of about 110 degrees takes place before the plunger is moved inwardly releasing its grip upon the handle, although the exact amount is a matter of design according to the use of the machine. In this manner, the bend is properly made around the portion 38 of the handle 21 before the handle is released by plunger 34. The continued bending movement and forming of the plate is then such that the handle will not be displaced appreciably under the continued bending. A recess 48 is cut in the top of the roll 45 so as to fit over the handle or other article to be held. It is to be understood, of course, that this recess must be shaped to fit the handle or article being inclosed by a portion of the plate.

The bending roll is rotated by means of a pulley wheel 49 located on the shaft 50 carrying the bending roll. A flexible cable 51 of suitable construction is fastened at one end 53 to the lever 52. The cable is carried around the groove in the pulley 49 and then over a suitable guide 54 to a return spring 55. The lever 52 may be pivoted to the main frame at 56 and pulled downwardly by a pull rod 57 suitably attached to a foot pedal 58.

The manner in which the clamping means is operated will now be described. The spring 42 has one end attached to the bracket 59 which in turn is fastened to lever 52. When the foot pedal is pressed downwardly, the cable 51 is moved so as to rotate the pulley 49 in a counterclockwise direction as viewed in Fig. 2. This serves to elongate the return spring 55. At the same time the bracket 59 is moved downwardly, thereby placing tension on handle 21 and clamping plate 27 firmly on the support 26. The article holding plunger 34 will hold the article in place on the plate 27. When the operation is complete, the foot pedal is released and the return spring 55 will return the bending roll to its original position as shown in Figs. 2 and 4.

In the operation of the machine, the plate to be bent is slipped between the support 26 and cover 28 until the end thereof is over the bending face 47 of bending roll 45, as shown in Figs. 2 and 4. The ring 21 is then placed in position so that the rear portion of it abuts the cut-away portions 29 on cover plate 28 and the forward portion is underneath the cut-out portion 37 on plunger 34. Then the foot pedal is pressed downwardly which starts the rotation of the bending roll 45. As the foot pedal is started in its downward movement, tension is placed on rod 41 which urges the clamping plate 30 in a clockwise direction, as viewed in Fig. 2, and firmly holds the plate 27 in position. This also serves to cause the plunger 34 to firmly engage the handle 21 and hold it in position on top of the plate as the bending takes place. Plunger 34 continues to hold the handle 21 in place as shown in Fig. 5 until part of the roll 45 engages the face of the plunger 34 and causes it to move into body 33 compressing spring 36. In this manner the article holding plunger 34 is removed out of the path of the metal being bent so that the bending may continue to the position shown in Fig. 6 until one portion of the handle is surrounded as shown.

A further modification is shown in Figs. 9 and 10 wherein the projection 32' of the clamping plate 30 rests on the rear portion 65 of the handle 31 instead of directly on the plate. The clamping force on the plate 27 is thus transmitted through the handle instead of being directly upon the plate. The other reference numerals in Figs. 9 and 10 indicate similar parts to those shown and described in the preceding figures.

It is evident that an improved device has been evolved for bending metal and particularly around handles or other articles to be fastened to a plate. The invention is not to be limited to the details and construction shown, described and illustrated but is to be construed as covering all equivalents falling within the scope of the appended claims.

What is claimed is:

1. In a machine of the character described, a support, pivoted means for clamping a plate on the support, yieldable means mounted on the pivoted means for temporarily holding an article on said plate, means to bend said plate around at least a portion of the article, operating means for said bending means, and a yieldable connection between said operating means and the pivoted means to hold the plate and article thereon when the bending means is operated.

2. In a machine of the character described, a support, pivoted means for clamping a plate on the support, yieldable means mounted on the pivoted means for temporarily holding an article on said plate, means to bend a portion of said plate around at least a portion of the article, means operable by said bending means to retract the yieldable article holding means as the plate is bent therearound, operating means for said bending means, and a yieldable connection between said operating means and the pivoted means to hold the plate and article thereon when the bending means is operated.

3. In a machine of the character described, a support, pivoted means for clamping a plate on the support, yieldable means mounted on the pivoted means for temporarily holding a ring-like handle near a margin of said plate, bending means for bending a portion of said plate around a portion of said ring, means operable by said bending means to retract the yieldable means as the plate is bent around the handle, operating means for the bending means, and a yieldable connection between the operating means and the pivoted clamping means to operate the clamping means substantially simultaneously with the bending means.

4. In a machine of the character described, a support, pivoted means for clamping a plate on the support, yieldable means mounted on the pivoted means for temporarily holding a ring-like handle near a margin of said plate, rotatable bending means over which said marginal plate portion is adapted to be placed, a recess in the face of the bending means to accommodate the ring as the bending means is operated, and means on said bending means to retract the

yieldable means as the plate is bent around the ring-like handle.

5. In a machine of the character described, a support, pivoted means for clamping a plate on the support, yieldable means mounted on the pivoted means for temporarily holding a ring-like handle near a margin of said plate, rotatable bending means over which said marginal plate portion is adapted to be placed, a recess in the face of the bending means to accommodate the ring as the bending means is operated, means on said bending means to retract the yieldable means as the plate is bent around the ring-like handle, and means to rotate the bending means including a lever and yieldable connections between the lever and the pivoted means.

6. In a machine of the character described, a support, means to position a plate on said support, means to position a ring-like handle on said plate, pivoted means having a portion adapted to apply pressure on a portion of the handle and thereby clamp the handle and plate in position, means carried by the pivoted means for yieldably clamping another portion of the handle, means to bend a portion of said plate around said last mentioned portion of the handle, and means on said bending means to retract said yieldable holding means as the plate is bent around the handle.

PAUL S. PICKARD.