Dec. 1, 1942. C. L. BEARD 2,303,814

CRIMPING TOOL

Filed Oct. 29, 1941

FIG. 1.

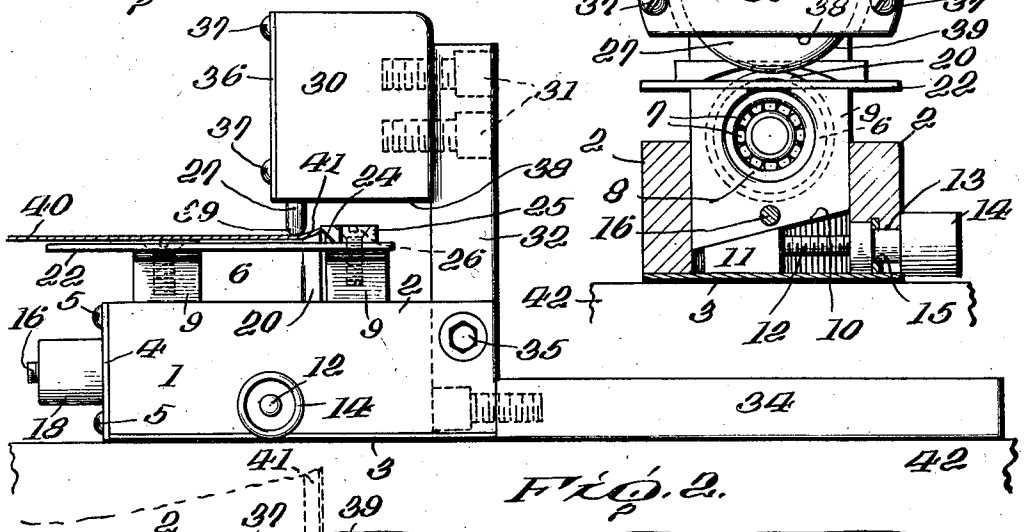


FIG. 4.

FIG. 2.

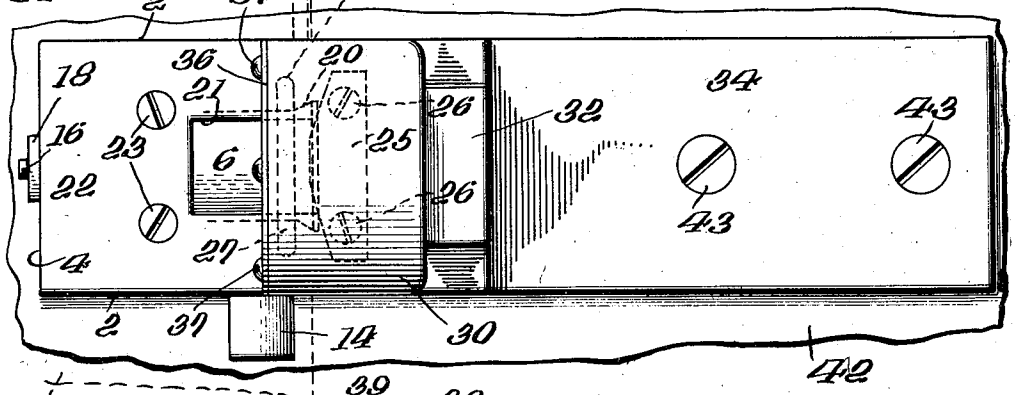
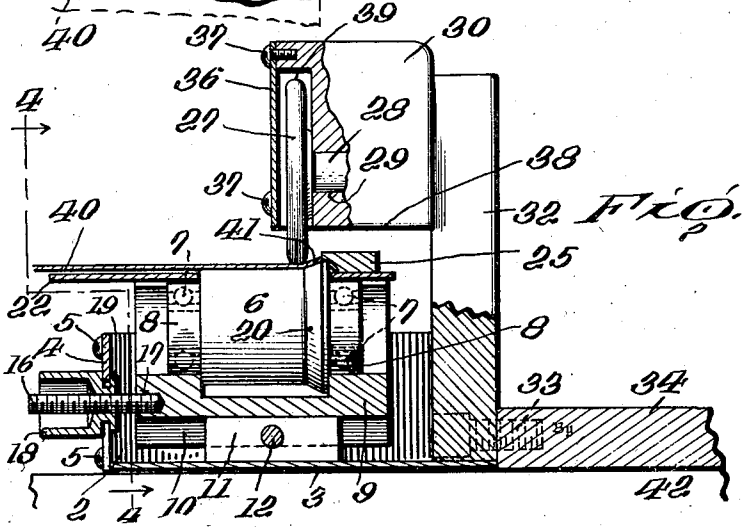


FIG. 3.



INVENTOR
Charles L. Beard
By Britton Moore
ATTORNEY

Patented Dec. 1, 1942

2,303,814

UNITED STATES PATENT OFFICE

2,303,814

CRIMPING TOOL

Charles L. Beard, Lancaster, Pa.

Application October 29, 1941, Serial No. 417,041

4 Claims. (Cl. 153—29)

This invention relates to a device for crimping or bending aircraft sheet metal.

The principal object of the present invention is to provide a crimping tool for crimping or bending aircraft sheet metal to assure of a tight joint being formed when the metal is riveted in place.

Another object is to provide a crimping tool particularly adaptable for field service repair work in that the same may be readily operated by even an unskilled mechanic to uniformly and accurately crimp or bend the edges of sheet metal.

Another object is the provision of a crimping device which is adaptable to be used as a stationary tool or as a portable tool for crimping sheet metal.

A further object is the provision of a crimping tool for uniformly crimping the edges of aircraft sheet metal, used, for example, in patch and other repair or maintenance work, wherein it is essential that the edges of the metal be evenly and uniformly crimped or bent to effect an air tight joint when the sheet is riveted to the plane structure.

A still further object is to provide a crimping tool which may be readily adjusted to adapt the tool for crimping varying thicknesses of metal and crimps of varying widths and depths.

A still further object is the provision of a crimping tool adaptable for crimping either straight or curved sheet metal edges, which may be operated by running the material through the device or pushing the latter over the material.

Still another object is to provide a crimping tool having means for crimping thin or soft sheet metal without scratching, scoring or otherwise damaging the surface thereof.

These and other objects and advantages will be apparent as the specification is considered in connection with the accompanying drawing, wherein:

Figure 1 is a front elevation of the crimping tool with a sheet of metal in crimped position;

Figure 2 is a plan view of the tool with the sheet removed therefrom;

Figure 3 is a front elevation of the tool, partly broken away to illustrate the crimping and forming rollers; and

Figure 4 is a section on the line 4—4 of Figure 3.

Referring more particularly to the drawing, wherein like reference characters refer to similar parts throughout the several views, the numeral 1 designates generally a housing having a pair of sides 2, bottom 3 and end 4, the latter being removably secured to the sides by screws or the like 5. A relatively wide bottom or forming roller 6 is journalled, by means of ball bearings 7, in a pair of bearings 8, formed on a base plate 9. The underside of the base plate 9 is tapered, as at 10, and slidably engages with a tapered wedge 11, formed on the inner end of a screw 12 which extends through an opening 13 in one of the side housing walls 2. The outer end of the screw 12 threadedly engages with a threaded cylindrical adjusting nut 14, suitably journalled, as at 15, in the opening 13. Upon rotation of the nut 14, in the appropriate direction, the wedge 11 is moved along the tapered bottom 10 of the base plate and vertically moves the base and forming roller 6, relative to the housing, in an obvious manner. The base plate 9 and forming roller 6 are also adapted to be adjusted longitudinally of the housing 1, for a purpose presently to be described, by means of a screw 16, threadedly positioned in a hole 17 in the outer end of the base plate 9. The screw projects outwardly through a threaded cylindrical nut 18, rotatably mounted in an opening 19 in the end wall 4 of the housing. Rotation of the nut 18 in the appropriate direction, causes the base plate 9 and forming roller 6 to be moved longitudinally of the housing, in an obvious manner.

An annular flared shoulder 20 is formed on the roller 6, and the roller and shoulder project through an opening 21 in a flat cover plate 22, suitably secured by screws or the like 23 to the housing 1. The peripheral edge of the annular flared shoulder 20, of the forming roller 6, engages with a beveled face 24 on the underside of a relatively small stop block 25, suitably secured by screws or the like 26 to cover plate 22 thus, the flared shoulder and roller are held in true alignment with respect to the sheet of material being crimped.

A vertical crimping disc 27, carried by a stub shaft 28, is rotatably mounted in an opening 29 of a block 30, which is suitably secured by screws or the like 31 to the upper end of an upright or post 32, suitably secured, as at 33, to a substantially flat base plate 34. The upright 32 is also attached to the side walls 2 of the housing by screws or the like 35. A cover plate 36, secured by screws or the like 37 to the front of the block 30, encases the crimping disc 27 and the latter extends below the bottom 38 of the block 30. The periphery of the disc 27 is curved or rounded, as at 39, for frictionally engaging a sheet of substantially flat aircraft metal or like material 40, which is positioned on the flat cover plate 22, of the housing 1, and supported by the forming roller 6.

Prior to crimping or bending the sheet 40, the width and depth of the crimp is first determined and the nuts 14 and 18 are rotated to adjust the base plate 9 and forming roller 6 longitudinally and vertically within the housing 1. Thus, if a relatively narrow and deep crimp is to be formed in the sheet, the nut 18 is rotated in a clockwise

direction, viewing Figure 2, which causes the base plate 9 to be pulled outwardly through the housing 1 and moves the flared annular shoulder 20 of the forming roller 6 to a point adjacent the crimping disc 27; and the nut 14 is rotated in a counterclockwise direction, viewing Figure 2, which moves the wedge 11 forwardly against the tapered bottom 10 of the base plate and elevates the forming roller to the desired distance beneath the crimping disc 27. If a relatively wide and shallow crimp is to be formed, the nuts 18 and 14 are rotated in counterclockwise and clockwise directions, respectively, thereby moving the flared portion 20 of the forming roller 6 rearwardly or away from the crimping disc 27, and lowering the roller relative to the disc. With the forming roller properly adjusted, the metal sheet 40 is pushed or pulled between the curved periphery 39 of the crimping disc 27 and the forming roller 6, with the edge of the sheet abutting the side of the stop block 25, resulting in the pressure of the crimping disc 27 forcing the straight edge of the sheet 40 against the flared annular shoulder 20 of the forming roller 6 and forming the crimp or bend 41 in the metal. Due to the application of uniform pressure from the crimping disc and forming roller and the rolling of the disc and roller over the surface of the metal, an accurate and uniform crimp will be formed. Thus, when the sheet is riveted to a surface, in the conventional manner, the crimped edge 41 will form a tight seal which will exclude all air and moisture, which would not be possible if the edge was hammered or otherwise flattened. The flat base plate 34 is preferably attached to a flat surface, such as a work bench 42, by screws or the like 43, although, the base plate may be readily and satisfactorily clamped in a vise, not shown, in an obvious manner. It may also be desirable to suitably clamp the sheet metal in place and to move the crimping tool thereover in an obvious manner, in which case this operation and the general handling of the tool may be facilitated by providing a suitable handle, not shown. It will be understood that a curved sheet of metal may be readily crimped by the tool, as it is only necessary to guide the edge of the sheet between the crimping disc and forming roller so that the edge of the sheet engages with the side of the stop block 25, which assures of a crimp of uniform width and depth being formed.

As aircraft metal is often soft, the forming roller 6 is provided with a suitable covering of paper or fabric. This covering assures of the underside of the metal sheet being free from scratches or other damage, while the same is being crimped.

While a preferred form of my crimping tool has been illustrated and described, it is to be understood that various changes and improvements may be made without departing from the scope and spirit of the appended claims.

Having thus described my invention, what I claim is:

1. A tool for crimping sheet metal of the character described comprising a housing having a base plate movably mounted therein, said base plate being formed with a tapered portion, a rotatable forming roller carried by said base plate and having an annular flared forming means thereon, a vertical support adjacent said housing having a crimping disc rotatably positioned thereon, said forming roller and flared forming means thereon cooperating with said crimping disc to crimp sheet metal being moved therebetween, and a wedge means in said housing engageable with the tapered portion of said base plate for vertically adjusting said forming roller relative to said crimping disc to regulate the depth of the crimp formed in the metal, and means for moving said forming roller longitudinally of said housing for adjusting said flared forming shoulder relative to said crimping disc to regulate the width of the crimp formed in the metal.

2. A tool for crimping sheet metal of the character described comprising a housing having a base plate movably mounted therein, said base plate being formed with a tapered bottom, a rotatable forming roller carried by said base plate and having an annular flared forming shoulder thereon, a vertical support having a vertically disposed crimping disc rotatably positioned thereon, said forming roller and flared forming shoulder thereon cooperating with said crimping disc to crimp sheet metal being moved therebetween, and a wedge member in said housing engageable with the tapered bottom of said base plate for vertically adjusting said forming roller relative to said crimping disc to regulate the depth of the crimp formed in the metal, and means for moving said forming roller in said housing to adjust said flared forming shoulder relative to said crimping disc to regulate the width of the crimp formed in the metal.

3. A tool for crimping sheet metal of the character described comprising a housing having a base plate movably mounted therein, said base plate being formed with a tapered bottom, a horizontally disposed rotatable forming roller carried by said base plate and having an annular flared forming shoulder thereon, a vertical support having a vertically disposed crimping disc rotatably positioned thereon, said forming roller and flared forming shoulder thereon cooperating with said crimping disc to crimp sheet metal being moved therebetween, and a wedge member in said housing engageable with the tapered bottom of said base plate for vertically adjusting said forming roller relative to said crimping disc to regulate the depth of the crimp, and means for moving said base plate and forming roller longitudinally of said housing for adjusting said flared forming shoulder relative to said crimping disc to regulate the width of the crimp formed in the metal.

4. A tool for crimping sheet metal of the character described comprising a housing having a base plate movably mounted therein, a rotatable forming roller carried by said base plate and having an annular forming shoulder thereon, a support adjacent said housing having a crimping disc rotatably positioned thereon, said forming roller and forming shoulder cooperating with said crimping disc to crimp sheet metal positioned therebetween, and a wedge means in said housing engageable with said base plate for vertically adjusting said forming roller relative to said crimping disc to regulate the depth of the crimp formed in the metal, a screw secured to said base plate, and means rotatably mounted on the end of said screw for moving said base plate and forming roller longitudinally of said housing for adjusting said flared shoulder relative to said crimping disc to regulate the width of the crimp formed in the metal.

CHARLES L. BEARD.