Aug. 9, 1938. C. A. WOODWARD 2,126,161

METHOD OF FASTENING STRIPS OF MATERIAL

Filed July 17, 1936

Fig. 1.

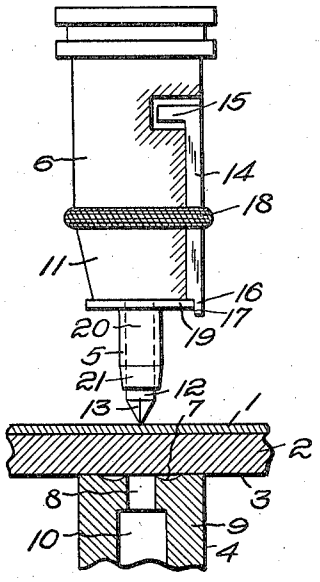


Fig. 2.

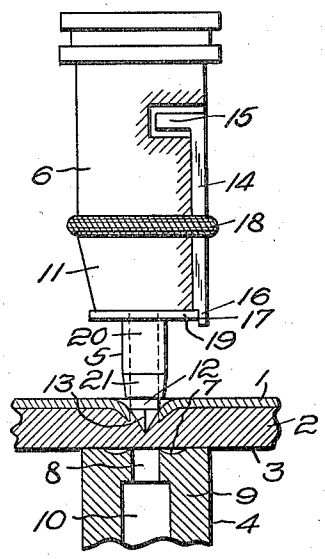


Fig. 3.

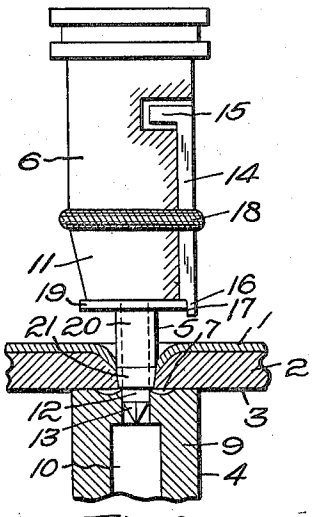


Fig. 4.

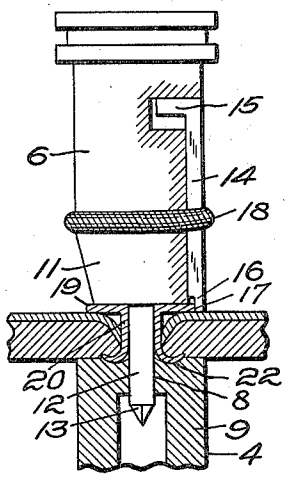


Fig. 5.

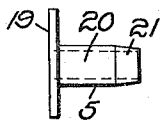
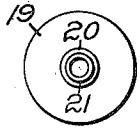


Fig. 6.



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METHOD OF FASTENING STRIPS OF MATERIAL

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Application July 17, 1936, Serial No. 91,110

2 Claims. (Cl. 218—29)

My invention relates to an improved method for fastening superposed strips of material together, one of the strips preferably being of metal material and another strip being of cardboard or a like substance.

In the drawing, which illustrates a preferred form of my invention:—

Figure 1 is a section showing two superposed strips of material supported by a die means and a punch shown in elevation carrying a fastener member about to come down on the strips of material for fastening them together by means of the fastener member;

Fig. 2 is a view similar to that of Figure 1 showing the punch in the act of piercing the superposed strips;

Fig. 3 is a view similar to that of Figure 1 showing the punch after it has passed through the strips with the fastener member about to engage a curling die;

Fig. 4 is a view similar to that of Figure 1 showing the punch at the end of its downward movement and the fastener member upset by the curling die to hold the strips together;

Fig. 5 is a front view of my fastener member per se; and

Fig. 6 is a top plan view of the fastener member shown in Fig. 5.

In Figs. 1–4 of the drawing I have shown a strip of sheet metal material 1 superposed upon a strip 2 formed of cardboard or similar material having a slight amount of resiliency with the bottom surface 3 of the cardboard strip 2 supported by a die 4. A punch 6, which may be attached to any suitable machine (not shown), is adapted to come down upon the superposed strips and pierce the same. A fastener member 5, preferably in initial assembly with the punch 6, has a free end portion constructed to pass through the strips 1 and 2 during downward movement of the punch and adapted, in the same operation by which it is carried through the strips 1 and 2, to engage a suitable portion of the die 4 and be upset thereby, as shown in Fig. 4, so as to secure the strips together.

The die 4, in my preferred construction, is provided with a curling die in the form of a peripheral groove 7 cut in the face of the die having, preferably, a bowed cross-section, as most clearly shown in Figs. 1–3 of the drawing. A piercing die 8 is located substantially in the center of the body portion 9 of the die extending axially thereinto from the face of the die and terminating in a clearance 10. The clearance 10 is adapted to receive slugs of material cut from the strips 1 and 2 during the piercing operation.

The punch 6, as illustrated in Figs. 1–4, has a body portion 11 and a relatively slender piercing pilot pin 12 at one end terminating, in my preferred form, in a four-sided taper 13. In my preferred form I have shown a relatively sharp point at the outermost end of the taper 13, but I do not wish to be limited thereby because I have found that my tool means is capable of satisfactory operation if the outermost end of the taper 13 is relatively blunt. Furthermore, although I have provided four faces on the taper 13 in my preferred form, it is understood that I do not wish to be limited by any particular number of faces, or, in fact, to any faces at all, as this feature is optional depending on the materials and thicknesses of the strips desired to be pierced. In the preferred form of my device an arm 14 is provided having a lateral extension 15 at one end disposed within the body 11 of the punch 6 in such a way that the arm 14 may be moved laterally and longitudinally relative to the punch 6. At the opposite end of the arm 14 from the extension 15 I have provided an attaching portion 16 extending below the body portion 11 and of thinner construction than the arm 14 so as to provide a notch 17 adjacent to the portion 16. A spring action is given to the arm 14 through means of a continuous spring 18 normally maintaining the arm 14 in adjacent relation to the body portion 11, as shown in Figs. 1–4 of the drawing. The attaching portion 16 engages a portion of the fastener member 5 in a spring grip so as to maintain the fastener member 5 in assembly with the punch until downward movement of the punch has been completed.

The fastener member 5, as illustrated in Figs. 5 and 6 of the drawing, is in the form of an eyelet having a base flange 19 and a hollow shank 20 pressed from the flange 19. The shank 20 is preferably provided with a tapered free end portion 21 for aiding passage of the shank through the strips 1 and 2.

In operating my device to secure the strips 1 and 2 together, the strips are first placed upon the die 4 in such a way that they lie in superposed relation with the cardboard strip 2 having its lower surface adjacent the open face of the die. The fastener member 5 is then assembled with the punch 6 by slipping the flanged base 19 over the pin 12 until the base 19 lies substantially adjacent the body portion 11. At this time a portion of the base is disposed within the notch 17 of the arm 14 and engaged in a slight spring grip by

the attaching portion 16 so that the fastener member is held in assembly with the punch. The punch is then brought down upon the superposed panels 1 and 2 and the taper 13 at the free end of the pin 12 penetrates the metal sheet 1 causing the material of the sheet to commence to flow outwardly substantially as shown in Fig. 2. As the taper 13 continues through the cardboard strip 2, the tapered free end 21 of the fastener member engages the sheet metal strip 1 causing a continuation of the flow of metal material in an outward direction, as shown in Fig. 3. After the taper 13 has passed through the strips it enters the piercing die 8 which acts as a guide causing the outermost end of the taper 21 of the shank 20 to strike the curved surface of the curling die 7. As the punch reaches the end of its downward movement the free end of the shank 20 is curled back by means of the die 7 so that it engages the bottom surface 3 of the strip 2, as shown in Fig. 4. Prior to completion of the curling action, the attaching portion 16 contacts the plate 1 to move the arm 14 longitudinally of the body portion 11 of the punch so that the arm 14 takes a position substantially as shown in Fig. 4. Upon commencement of upward movement of the punch, the attaching portion 16 disengages the flange 19, and during the upward movement the action of the spring 18 causes the arm 14 to return to normal position, as shown in Fig. 1. The strips 1 and 2 are now permanently held between the base 19 of the fastener member 5 engaging the upper surface of the strip 1 and the curled portion 22 (Fig. 4) of the fastener member. Any number of fasteners may be applied to the strips for holding the same together and the fasteners may be attached to any portion of the superposed panels. It is also possible by my device to fasten more than two superposed strips together by increasing the relative lengths of the rivet and pilot pin.

While I have illustrated and described a punch having the string-actuated arm 14 for initially assembling the fastener member 5 with the punch, it is understood that the arm 14 could be dispensed with by substituting a form of automatic feed operating in such a way that the pilot pin 12 would pick up each fastener member during downward movement of the punch and carry the fastener through the strips for securing the strips together in the manner which has been described in connection with my preferred form.

As a result of my invention, I have provided an easily operated means for securing strips of material together using a rivet-like fastening means which is of comparatively simple and inexpensive construction.

Although I have illustrated and described a preferred form of my invention, I do not wish to be limited thereby because the scope of my invention is best set forth in the following claims.

I claim:

1. The method of fastening two superposed strips of material together by an eyelet member having a flanged base and a hollow shank extending from said base, at least one of said strips being of metal material, which comprises piercing, rather than punching, said strips with a suitable sharp pointed tool the size of the inside diameter of the shank of said eyelet member and, in the same operation, passing the free end of said shank through said strips and then striking said free end against a suitable die for upsetting said free end to hold said strips between said upset portion and said flanged base.

2. The method of fastening a strip of metal material to a strip of cardboard or the like material by an eyelet member having a flanged base and a hollow shank extending from said base, said shank having a tapering outside wall adjacent to its free end portion which comprises placing said strips upon a suitable die so that the strips are in superposed relation and then piercing said strips with a sharp pointed piercing pilot closely fitting the inside of the shank of one of said eyelet members and, in the same operation, carrying the tapered end of said shank through said strips so that said tapered end strikes said die and is upset thereby against the surface of one of said strips whereby said strips are held between said upset portion engaging the lower surface of one of said strips and the base flange engaging the upper surface of said other strip.

CLEMENT A. WOODWARD.