

July 16, 1957

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2,799,188

MEANS FOR CLINCHING NUTS ON METAL PANELS

Filed April 5, 1956

2 Sheets-Sheet 1

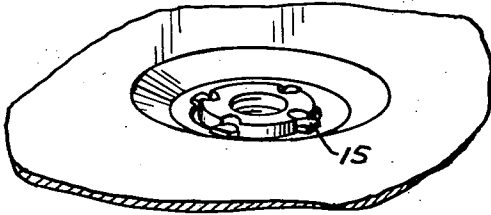


FIG. 1

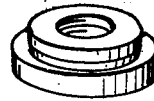


FIG. 2

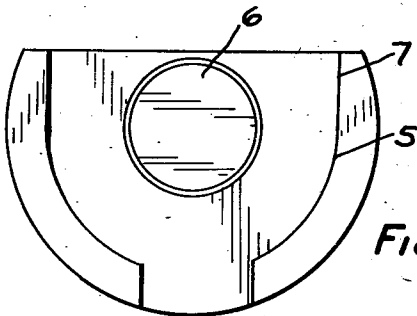


FIG. 4

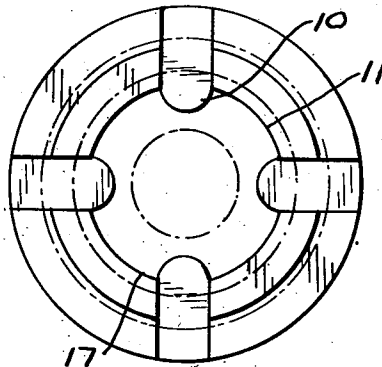


FIG. 3

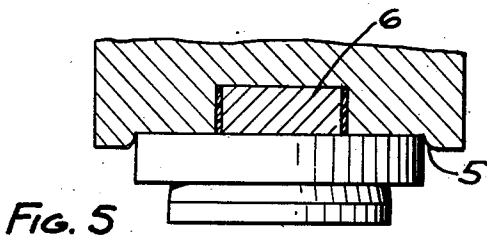


FIG. 5

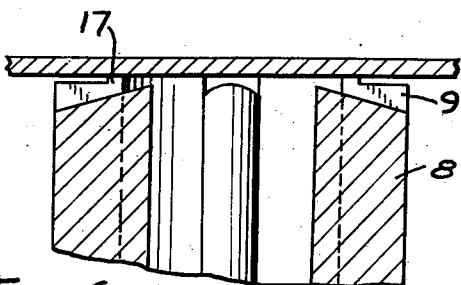


FIG. 6

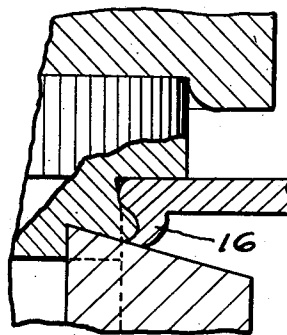


FIG. 7

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2 Sheets-Sheet 2

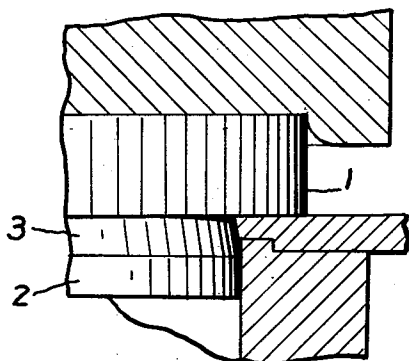


FIG. 8

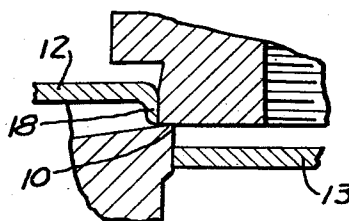


FIG. 9

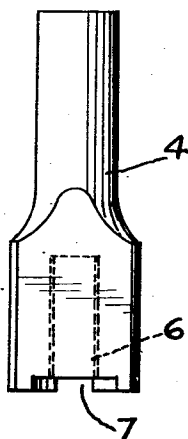


FIG. 11

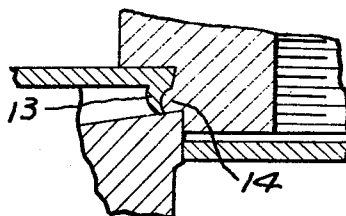


FIG. 10

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2,799,188

MEANS FOR CLINCHING NUTS ON METAL PANELS

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Application April 5, 1956, Serial No. 576,334

4 Claims. (Cl. 78—46)

This invention relates to apparatus and the method of punching flange nuts through a metal panel and clinching the nut on the back of the panel all in one stroke. In my prior application, Serial No. 386,224, filed October 15, 1953, I have described a method and apparatus for doing this work. The present invention is an improvement on the apparatus and method described in this prior application.

In the prior application a punch and die are described and shown in which the die is provided with a plurality of channels with projecting nubs which project in the central opening of the die. A punch is provided with a permanently magnetic core which holds a flanged nut which is fed into the punch by means of a chute. The punch with the nut comes down on the die, and the non-flanged or body portion of the nut is pressed through the metal panel and into the central opening of the die. The edges of the lands between the channels shear off a portion of the panel, and the projecting nubs cut into the body of a nut and roll up portions of the nut into the channels thereby staking the nut to the opposite side of the panel.

It is the purpose of the present improvement to have portions between the spurs or stakes that are pressed out of the panel, pressed up against the body of the nut to seal the nut against the rear of the panel to make a liquid-tight joint.

To this end I provide a special form of nut in which the non-flanged or body of the nut is tapered backward from the outer edge of the body so as to provide a dove-tail recess in which the portion of the panel between the stakes can be pressed into this recess by means of bosses on the die around the central opening.

Referring to the drawings:

Fig. 1 shows a portion of a panel with a clinched nut in place.

Fig. 2 is a perspective of a nut.

Fig. 3 is a plan view of the die.

Fig. 4 is a plan view of the punch.

Fig. 5 is a longitudinal section through the punch showing a nut in elevation.

Fig. 6 is a fragmentary longitudinal section through the die.

Fig. 7 is a fragmentary longitudinal section through the punch, the die, the nut, and a portion of the panel.

Fig. 8 is a fragmentary longitudinal section through the same showing the nut in elevation.

Fig. 9 is a fragmentary section through the same parts showing the nut as it passes through the panel and about to be acted upon by the nubs of the die.

Fig. 10 is a similar view showing the nut as it has been acted upon by the nubs of the die to roll up spurs from the body of the nut.

Fig. 11 is an elevation of the punch.

1 shows the flanged nut provided with a non-flanged body portion 2 which is tapered backwardly at 3 to form a dove-tail like groove. The punch 4 has a central cavity 5 with a permanent magnetic core 6. The nuts are fed

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continuously into the central cavity through the side opening 7 by means of a chute (not shown) in which the nuts slide into the cavity either by gravity or are projected therein mechanically. The underdie 8 is provided with channels 9 which have tongues or nubs 10 projecting into the central cylindrical opening 11 of the die.

When a nut is fed into the cavity of the punch, the punch then comes down and presses the nut through the panel 12 as shown in Fig. 9, shearing off the slug 13 from the panel and turning the lips 18 into the channel. As the nut is pressed clear through the panel and down into the die, the nubs 10 of the die bite into the body of the nut and turn the spurs 14 into the channel thereby staking the nut to the back of the panel as shown at 15 in Fig. 1 and at 16 in Fig. 7.

This much of the apparatus and method is claimed in my prior application. The present improvement consists in providing the dove-tail recess between the end of the body of the nut and the flange and providing the sharp bosses 17 on the upper face of the die between the channels. These bosses strike the edges of the opening in the panel and press the material of the panel between the spurs into the dove-tail recess of the nut and thereby seal the nut to the rear of the panel and make a liquid-tight joint at these places.

The body of the nut is shown with a truncated cone or back tapering effect, and the cross section is a circle. This is the easiest way to manufacture the nut, but obviously the body of the nut could have a different cross section. Furthermore the recess or groove might be made in some other way than back tapering the body of the nut.

I claim:

1. A punch and die for punching out a slug in a metal panel by means of pressing a portion of a flanged nut through the panel and for also in the same stroke staking the nut to the rear of the panel and pressing the edges of the panel portions between the staked portions into a groove in the body of the nut, the said punch provided with means for receiving and holding a flanged nut in a portion of the punch, and the die provided with a central opening and having on its top surface radial channels with sharp nubs on the ends of the channels projecting into the central opening which is arranged to receive the non-flanged body of the nut when the punch comes down against the die and shears a slug out of the panel, and the said nubs turning over portions of the body of the nut into the channels to thereby stake the nut to the opposite side of the panel when the nut is pressed home, and said die provided between the channels with a narrow, upstanding boss which presses the material of the panel between the stakes into the groove in the body of the nut to thereby seal the nut to the back of the panel.

2. The combination claimed in claim 1 in which the groove is formed by back tapering the body of the nut.

3. The combination claimed in claim 1 in which the body of the nut is circular in cross section.

4. The combination claimed in claim 1 in which the body of the nut is circular and the groove is formed in the body by back tapering.

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