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G. O. CHRISTENSON

2,237,069

DRAW PUNCH

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Fig. 1.

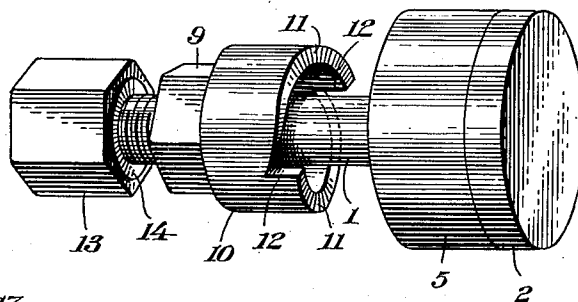


Fig. 5.

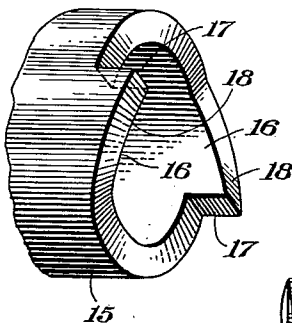


Fig. 2.

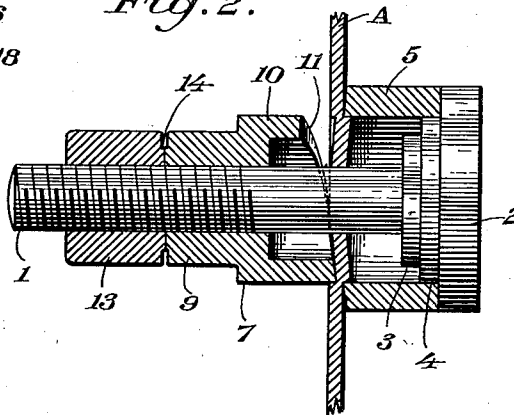


Fig. 3.

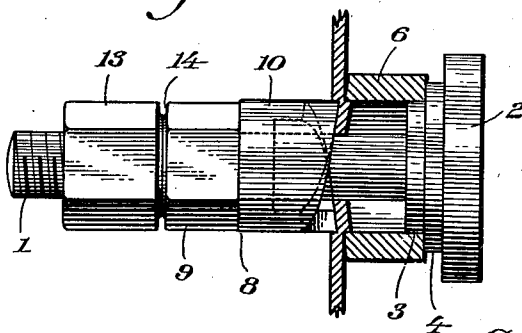
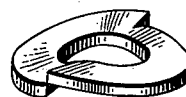


Fig. 4.



Gustaf O. Christenson:
INVENTOR

BY *Victor J. Evans & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE

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DRAW PUNCH

Gustaf O. Christenson, Brooklyn, N. Y.

Application August 16, 1940, Serial No. 352,971

2 Claims. (Cl. 164—101)

This invention relates to draw punches and its general object is to provide a punch that is primarily designed for enlarging holes in sheet metal, particularly in places inaccessible to large and bulky tools, as my punch can be used in any place that will allow for the partial turning of a wrench or the like, and which will accommodate a small drill, in the event an initial hole is not already present, as will be apparent.

A further object is to provide a draw punch that is especially desirable for enlarging holes in electric outlet and junction boxes, after they have been installed, as the holes can be enlarged in an easy and expeditious manner without removing the boxes.

An important object is to provide a draw punch that is capable of cutting holes of various diameters.

A further object is to provide a draw punch, that is simple in construction, inexpensive to manufacture and extremely efficient in operation, use and service.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawing wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a perspective view of the punch which forms the subject matter of the present invention.

Figure 2 is a view partly in longitudinal section and illustrates my punch in use.

Figure 3 is a similar view, but illustrates dies of a smaller size than those shown in Figure 2.

Figure 4 is a perspective view of a slug cut from the metal by my punch.

Figure 5 is a fragmentary enlarged view of a modified form of male die designed for cutting extra large holes, with the use of a bolt of the same length as that used with the smaller dies.

Referring to the drawing in detail and particularly to the form of Figures 1 to 3, the reference numeral 1 indicates a bolt threaded for a portion of its length in the form shown, and having a disk like head 2 shaped on its inner face in stepped formation to provide annular shoulders 3 and 4, the shoulder 4 being adapted to receive a female cutting die 5, as shown in Figure 2, while the shoulder 3 is to receive a female cutting die 6 of a smaller size, as shown in Figure 3. The dies

5 and 6 are otherwise identical and of cylindrical formation to snugly fit the inner portions of the shoulders and have flat abutting ends to bear against the outer portions of the shoulders, while the opposite ends of the dies 5 and 6 are beveled to provide cutting edges.

The male dies 7 and 8 are likewise substantially identical in shape and each includes a collar portion 9 having a bore of a diameter to snugly fit the bolt for slidable movement thereon, and the collar portion is provided with flat outer faces for receiving a wrench or other tool for a purpose which will be later described.

Formed on the collar 9 is an enlarged cutting head 10 of a diameter to be spaced from the bolt, and the cutting face of the head 10 is shaped to provide a pair of helical surfaces 11 of equal pitch, the faces being curved inwardly from the outer to the inner ends of diametrically opposed straight shoulders 12, as well as being beveled inwardly to provide cutting edges, as clearly shown in Figure 2.

The die 7 which has the larger cutting head cooperates with the die 5, while the die 8 cooperates with the die 6.

The nut 13 for the bolt 1 is provided with an annular bearing flange 14 formed on its inner face for engagement with either of the male dies for moving the same into cutting position for cooperation with their female dies, in a manner as clearly shown in Figures 2 and 3, from which the use of my punch will be obvious, but it might be mentioned that when it is desired to enlarge a hole that has been previously drilled or otherwise made in a piece of sheet metal, such as indicated by the letter A, one of the female dies is applied to the bolt 1 to bear against its shoulder of the head. The bolt is inserted through the hole and then the companion male die is applied to the bolt. The nut is applied and threaded by a wrench or the like against the female die for urging the cutting face thereof against the metal to cut the enlarged hole. While the complete enlarged hole can be cut, by a single cutting operation, especially when small holes are being made, less effort is required to cut large holes, by two cutting operations, because the resistance increases, as the width of the metal to be cut away increases, and when cutting large holes by two operations, a semi-circular cut is made first, thence the nut and male die are backed off for removing the cutting face from the first cut and the cutting face is again applied but arranged to another position for completing the cut, which will result in a slug shaped as shown in Figure 4.

In Figure 5 I have illustrated a modified form of cutting face for a male die, for cutting unusually large holes, and while the die 15 of this form is of much greater diameter than that of the other forms, it can be made of the same length for use with a bolt of the same length as that used with the other dies, and for that purpose, it will be noted that the cutting face of the die 15 is provided with a pair of diametrically opposed teeth 16 of substantially triangular formation having flat portions 17 providing shoulders and from the outer ends of which extend elongated inwardly beveled helical cutting portions 18 that merge into flat surfaces of the cutting face between the teeth and which provide outer cutting edges. When using the form of Figure 5, it will be obvious that while the bolt can be of the same length as that of the other forms, the head for the bolt must be larger, to accommodate a companion female die, and due to the provision of a pair of teeth, several cutting operations will be required in cutting a hole. However, the die of Figure 5 can be made with any number of teeth, and it will be understood that the head of the bolt can be made with any number of shoulders to accommodate female dies of various diameters.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:

1. A draw punch for enlarging a hole in sheet metal, comprising a threaded bolt for disposal through the hole and including a head having a

stepped inner face providing annular shoulders of different sizes, cylindrical female dies of different sizes for fitting the shoulders, any one of the dies adapted to be mounted on the shank of the bolt to bear against its shoulder and having a beveled cutting face, male dies of different sizes, one for each female die, and a companion male die adapted to be mounted on the shank and provided with a cutting face having beveled helical surfaces for cooperation with the cutting face of the mounted female die, and a nut threaded on the shank and engaged with the mounted male die for moving the latter and its female die against the opposite sides of the metal for severing the same.

2. A draw punch for enlarging a hole in sheet metal, comprising a threaded bolt for disposal through the hole and including a head having a stepped inner face providing annular shoulders of different sizes, cylindrical female dies of different sizes for fitting the shoulders, any one of the dies adapted to be mounted on the shank of the bolt to bear against its shoulder and having a beveled cutting face, male dies of different sizes, one for each female die, and a companion male die adapted to be mounted on the shank and having a cutting face provided with a pair of diametrically opposed substantially triangular shaped teeth having outwardly extending flat portions and elongated beveled helical cutting portions extending inwardly from the outer ends of the flat portions for cooperation with the cutting face of the mounted female die, and a nut threaded on the shank and engaged with the mounted male die for moving the latter and its female die against the opposite sides of the metal for severing the same.

GUSTAF O. CHRISTENSON.