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PIERCING PUNCHES

Filed April 27, 1962

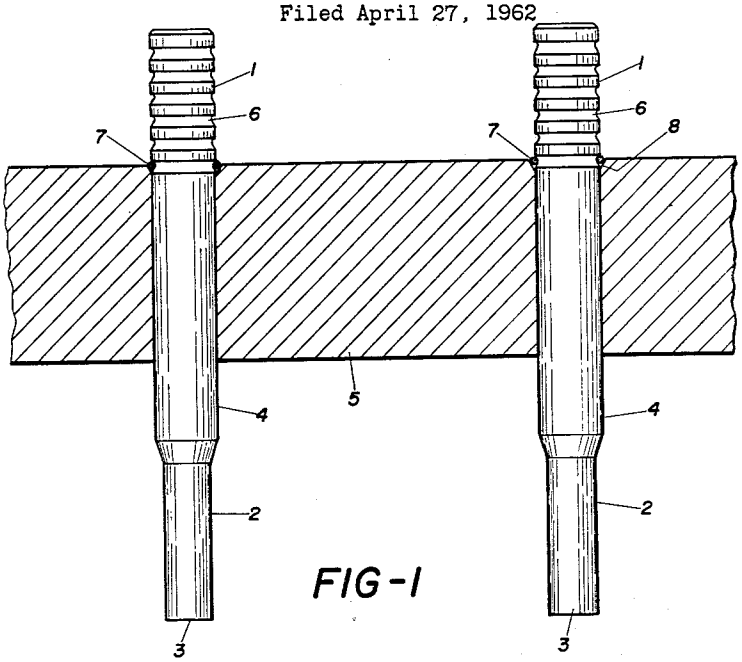


FIG-1

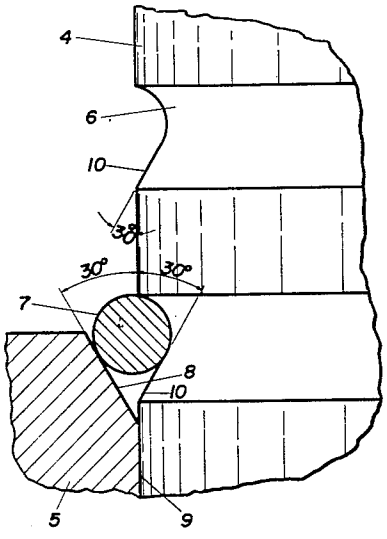


FIG-2

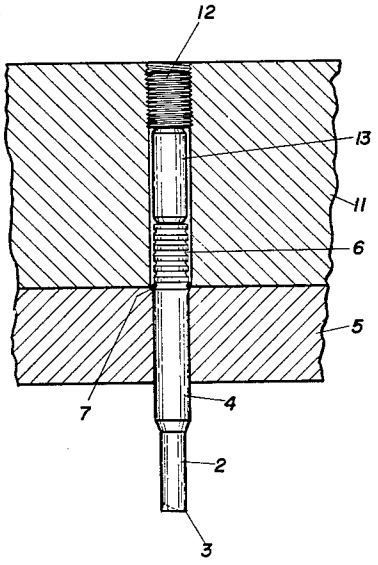


FIG-3

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PIERCING PUNCHES

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3 Claims. (Cl. 83—687)

This invention relates to new and useful improvements in piercing punches for tools and dies, more particularly to means for mounting piercing punches on a punch block to make them adjustable relative to other punches mounted in said block so that the piercing punch may be individually replaced or repaired in the event of wear or damage to the working face or end of the punch.

The invention contemplates the use of a series of annular grooves in the portion of the piercing punch that extends above the punch block in which a spring wire retaining ring is disposed to prevent the piercing punch from being drawn out of the block when the piercing punch is stripped from the material that it has punched or acted upon.

It is among the objects of this invention to provide an adjustable piercing punch which firmly secures the punch against displacement from stripping and which allows for varying the working end or face of the punch in relation to other punches mounted on the same punch block.

The invention will become more apparent from a consideration of the accompanying drawing constituting a part hereof in which like reference characters designate like parts and in which:

FIGURE 1 is a cross-sectional view of a punch block with a piercing punch shown in elevation adjustably mounted in accordance with the present invention;

FIGURE 2 is an enlarged view diagrammatically illustrating the adjustable portion of the piercing punch and the manner of supporting the same in the piercing punch block; and,

FIGURE 3 is a cross section of a punch block and punch holder assembly with the piercing punch mounted therein.

With reference to the several figures of the drawing, the numeral 1 designates a piercing punch having a piercing end 2 with the cutting face 3 at the end thereof. The piercing punch 1 is provided with a cylindrical shank 4 that is disposed in the punch block 5 and the shank is provided with a series of grooves 6 at one end for receiving a spring wire retaining ring 7.

The grooves 6 and ring 7 are more clearly shown in the enlarged view of FIGURE 2 in which it will be noted that the punch block 5 has a chamfered face 8 around the bore 9 in which the piercing punch is disposed. It will be noted in FIGURE 2 that the groove 6 is of cylindrical shape conforming to the curvature of the spring wire retaining ring 7, the curvature terminating in a straight face 10 that is disposed 30° angle from the axis of the piercing punch, as shown in FIGURE 2.

It is characteristic of a piercing punch to be drawn downward in an axial direction as it is stripped or withdrawn from the punched material and the pulling or stripping force acts upon the retaining ring 7, which in turn rests against the chamfered face 8 of the punch

block. By placing the retaining ring 7 in any of the grooves 6, the end face 3 of the punch is adjusted relative to the lower face of the punch block 5 so that a series of piercing punches carried by the same punch block are adjustable relative to each other.

If in use the end of a piercing punch is damaged, as shown by dotted line in tip of piercing punch 3 in FIGURE 3 and had to be reground (or sharpened), the punch is removed from the punch block in the usual manner. The retaining ring 7 is then removed by pressing it against the 30° angle 10 of the punch. This forces the retaining ring 7 to expand and slide over the punch (body) shank 4 for easy removal of retaining ring 7. If the punching end is ground to a distance corresponding to the spacing between the grooves 6, and the retaining ring 7 is placed in the next groove (back), the length from the retaining ring to the punch tip 3 is again the same as the original length. The punch can then be replaced in the punch block to be in exact alignment and to the same length as the tips of the other piercing punches mounted in the block.

In FIGURE 3, the piercing punch is shown mounted on the punch block 5 and in the punch holder 11 in which it is secured by a set screw 12 and spacing plug 13 or any other conventional die builder method, so that it cannot be displaced in a vertical direction, the retainer ring 7 holding it against displacement in a downward direction.

Although one embodiment of the invention has been herein illustrated and described, it will be evident to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. The combination with a punch block and punch holder having bores in alignment for receiving a plurality of piercing punches, piercing punches having a cutting face and cylindrical shanks mounted in said bores, means for adjusting the ends of said punches relative to each other and to said punch block a pre-determined distance, said means comprising grooves in the shank of said punches of pre-determined spacing corresponding to the distance it is desired to adjust the cutting faces of said punches, a spring wire retaining ring disposed in one of said grooves, a recess in said punch block constituting a seat for said ring to lock the piercing punch against movement toward the punch block and means for securing the shank of said piercing punch in said punch holder to lock the punch against movement away from said punch block.

2. The combination set forth in claim 1 in which the bore of the punch holder is of lesser diameter than the retaining ring when the latter is disposed in a groove of the piercing punch shank.

3. Adjustable piercing punches as set forth in claim 2 in which the piercing punch is backed by a spacing block and set screw provided in the bore of the punch holder.

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