ADAPTER FOR PUNCH TOOLS

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The present invention relates to punch mountings for punch tools involving adapters.

A purpose of the invention is to provide a diversity of different angular positions in which the punch tool can be placed.

A further purpose is to provide precise alignment of the punch tool angularly in any one of several different positions.

A further purpose is to adequately support and brace the punch tool against lateral forces, while permitting shifting to different angular positions and accurate keying in a particular chosen angular position.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate a few only of the numerous embodiments in which the invention may appear, selecting the forms shown from the standpoint of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

FIGURE 1 is a top plan view of a punch mounting according to the present invention.

FIGURE 2 is an axial section of FIGURE 1 on the line 2—2.

FIGURE 3 is a side elevation of the punch mounting of the invention.

FIGURE 4 is a section on the line 4—4 of FIGURE 2.

FIGURE 5 is a section on the line 5—5 of FIGURE 2.

FIGURE 6 is a bottom plan view of the punch mounting of the invention.

FIGURES 7 and 8 illustrate a variation.

FIGURE 7 is a fragmentary axial section similar to FIGURE 2 showing a variation.

FIGURE 8 is a section on the line 8—8 of FIGURE 7.

Describing in illustration but not in limitation and referring to the drawings:

In the prior art it is often desirable to use the same punch tool configuration at a variety of different angular positions.

In the prior art two such positions could be obtained, since the punch tool was frequently mounted in a square slot in the punch holder. Other angular positions of the punch tool were obtained by producing different punch tools having the same configuration but intended for mounting at different angular positions.

This procedure is subject to the disadvantage that extra punch tools must be stocked by the user, and that, therefore, the expense of maintaining an adequate supply of tools is greatly increased.

In accordance with the present invention, a single punch tool can be accurately set in any one of a variety of different angular positions, so that it is not necessary to have on hand a number of different punch tools of the same configuration to attain these angular positions. It is possible to shift the punch tool from one position to another in a very short time.

The invention will be applicable in any one of a wide variety of punch tool configurations, such as a vacuum tube socket, needle, amphenol, normal rectangular, square and other suitable configurations.

The invention is applicable to turret punch presses, and also to single tool punch presses and multiple punching presses.

The punch mounting according to the present invention includes a punch holder 20, a punch adapter 21 and a punch tool 22, having a punching end 24.

The punch holder has a head 23 at the rearward end slotted at 24, to receive the gripping mechanism on the punch ram as well known in the art.

The lower end of the punch holder 20 has a central axial bore or opening 25 which is of circular cross section and receives a suitable circular shank 26 at the rearward end of the punch tool.

The punch holder 20 has rearwardly of the bore 25 a smaller opening 27 which receives a bolt 28 threaded into the shank 26 of the punch tool, and having a countersunk head.

The punch holder, at its forward end, has a concentric sleeve portion 30 of reduced diameter terminating in a shoulder 31.

The punch adapter 21 is on the forward end of the punch holder and has a bore 32 which receives the forward sleeve portion 30 on the punch holder and abuts against the shoulder 31.

There is a central longitudinal circular opening 33 through the adapter which receives the circular portion on the tool shank 26. Forward of the shank 26 there is a rectangular (square) portion 34 on the tool shank fitting against the walls of slot 34' across the forward end of the adapter.

A suitable slot 35 extending around the periphery of the round portion of the shank of the punch tool receives a snap ring which desirably holds the punch tool into frictional engagement with the adapter, so that the punch tool and adapter can be removed and will function as a unit.

It will be evident from the standpoint of the broader aspects of this invention it is unimportant whether the punch tool and the adaptor are made in one piece or are of separate pieces as shown, with capability of separation, suitably held together by the snap ring at 25, and permitting shifting of the position of the punch tool angularly with respect to the adapter in any one of the positions permitted by the rectangular (square) cross section at the lower end of the opening in the adapter 21 as shown at 34'. The character of the parallel sides of the slot at 34' engaging the square end 34 on the forward end of the punch tool is best seen in FIGURE 6.

At one side, extending longitudinally (parallel to the axis), the punch holder 20 has a slot 36 extending to the forward end of the punch holder. At intervals around the outside of the adapter at a plurality of angular positions, there are key slots 37, which may suitably be less deep than the key slot 36. The key slots 37 are placed at a number of different angular positions, such as 45 degrees, 30 degrees, and other suitable positions as desired. Since the squared portion of the punch tool can be turned 90 degrees in the slot 34' it is therefore easy to obtain a 60 degree position. Other suitable angular positions of the slots 37 can be chosen to meet the requirements.

The key slot 36 and one of the key slots 37 is occupied by key 38 which is secured in the slots as by a bolt 40 threaded into the punch holder. The key in the form shown is conveniently reduced in thickness in the lower end at 41 and is suitably stepped at the inside at 42 so that it will bring frictional engagement against the bottom of the chosen slot 37 and tend to hold the adapter 21 on the punch holder.

If the user desires other angular positions of the slots 37 which are not available on the usual adapter furnished, such as 15 degrees, 221/2 degrees, etc., other adapters will be employed which can be interchanged with the adapter 21.

In some cases it will be preferable, instead of having the adapter surround a portion of the punch holder, to
3. A punch mounting, a punch holder adapted to be fixed to the ram of a punch press and to move longitudinally with respect to the punch press having along one side a key hole parallel with the axis of the punch, a punch adapter unit including a punch fixed in the said adapter unit at its forward end rotatably mounted on the forward end of the punch holder, the punch holder and the punch adapter unit extending one within the other, the punch adapter unit having around its circumference a plurality of longitudinal keyways which selectively align with said keyway on the punch holder with rotation of the punch adapter unit, a key in the keyway on the punch holder and in one of the keyways on the punch adapter unit, and means for fastening the punch adapter unit on the end of the punch holder to hold the punch adapter selectively rotationally fixed to said holder.

4. A punch mounting of claim 1, in which the punch adapter unit includes an adapter having a central longitudinal slot of rectangular cross section, and a punch extending through said longitudinal slot in fixed relation to said adapter and having a plurality of differently angularly disposed positions with respect to the adapter.

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