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TOOL HOLDER

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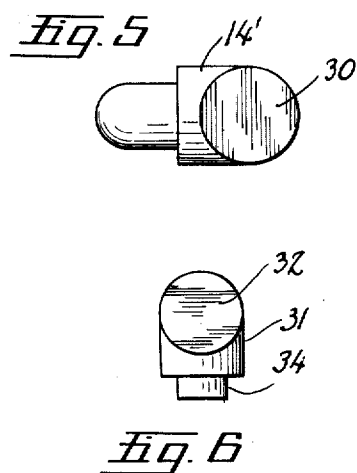
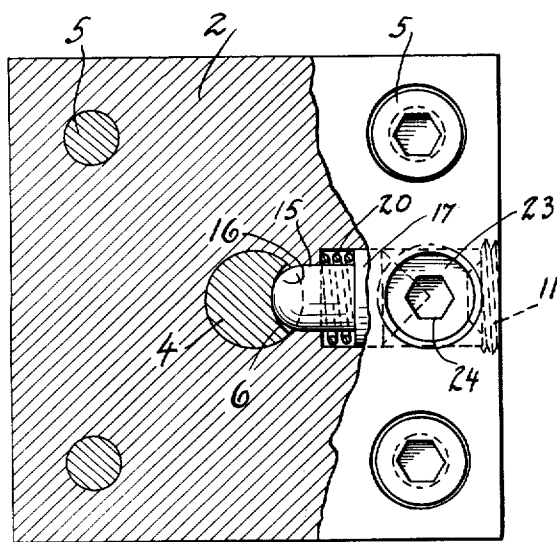
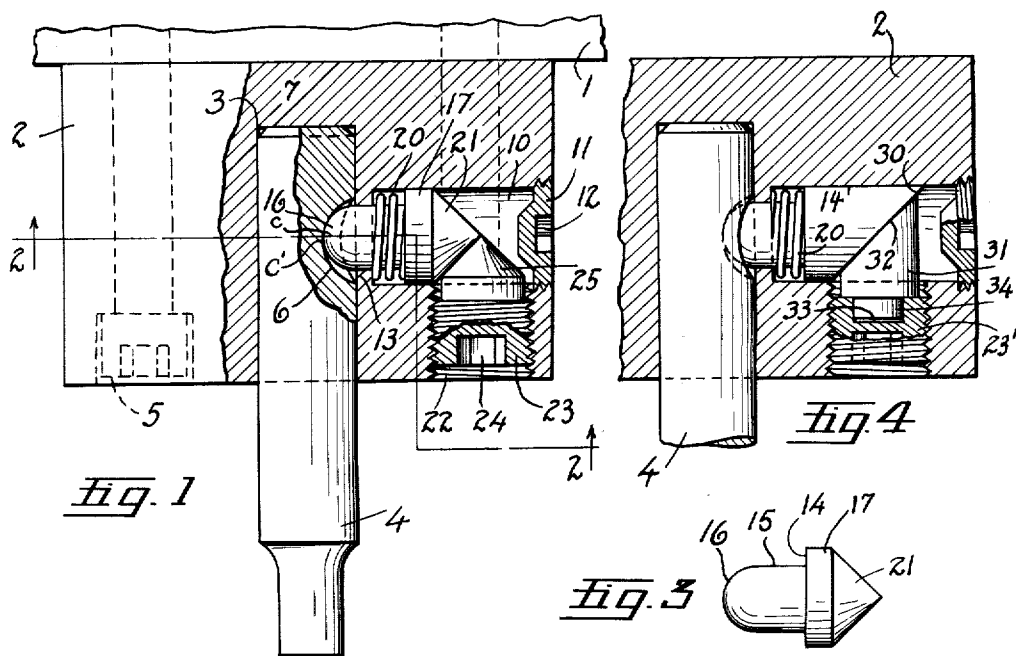


Fig. 2

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TOOL HOLDER

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2 Claims. (Cl. 279—76)

This invention relates to a tool holder and has to do especially with a holder particularly adapted for use with punches or the like.

Punch holders or tool holders of the type with which the present invention is concerned usually take the form of a block or body of metal for holding the punch, which block is suitably attached to the base of a machine, such as a punch press. Heretofore these tool holders embodied certain instrumentalities for gripping the punch, and the arrangement has been that some of these instrumentalities were placed into bored out or otherwise fashioned cavities or apertures in the block from the side thereof which goes up against the base of the punch press. As a result the aperture or bore for receiving the punch extended entirely through the block. This necessitated the use of what is known as a backing plate positioned between the tool holder and the base of the punch press. The punch therefore backed up against this backing plate. If, for any reason the instrumentalities in the tool holding block were required to be moved, replaced or otherwise adjusted, it was necessary to remove the block from the machine so that access could be had to the back side thereof. In considering this it should be understood that the front side of the tool holder is considered that side from which the punch projects and the back side is the one which is set up against the backing plate.

One of the principal objects of the invention is to provide a tool holder with which a backing plate need not be used, and in which the aperture or bore for the punch does not go entirely through the block, and in connection with which the punch holding instrumentalities may be adjusted, removed or otherwise manipulated from the front or a side face of the tool holding block. Accordingly, the punch may be removed and the holding instrumentalities may be removed, shifted or adjusted without taking the block off the base of the punch press. It is quite customary that a single punch press be equipped with a number of punches, and it is an object of this invention to provide a tool holder which will take up a minimum amount of space so that a number of blocks may be disposed in close proximity and so that each of a number of blocks may be worked upon for the manipulation of or removal of the punch and holding instrumentalities, without substantial interference from other blocks and without requiring removal of a block from the base of the machine.

In the accompanying drawing:

Fig. 1 is a view largely in cross section illus-

trating a tool holder constructed in accordance with the invention with a punch in position.

Fig. 2 is a cross sectional view taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a detail view of one of the punch holding instrumentalities.

Fig. 4 is a view partly in section illustrating a modified form of the invention.

Fig. 5 is a detail view of one of the parts shown in Fig. 4.

Fig. 6 is a detail view of another one of the parts shown in Fig. 4.

The base of a punch press or other machine with which the holder is to be used is illustrated at 1. The device of the invention is essentially a tool holder, but since it is shown as being used with a punch it will be described as a punch holder. The holder comprises a body or block 2 provided with a recess or bore 3 for the reception of a punch 4. The punch preferably has a nice fit in the recess 3. The block 2 is to be attached directly to the base 1 without the interposition of a backing plate, and this may be done by suitable cap screws 5. The punch is provided with a recess in its side as shown at 6, which may be milled out and which may have curved walls as illustrated.

It will be noted that the bore 3 does not extend entirely through the block 2, with the result that the punch may back directly against the body of metal as shown at 7. Thus a backing plate between the block 2 and the base 1, against which the punch is to abut, is not needed.

The holding instrumentalities are located in recesses or apertures in the block. For this purpose the block may have a bore 10 extending in from one side which may be closed by a suitable screw or cap 11, equipped with a suitable tool-receiving formation 12. This bore may be substantially uniform in size, except at the point where it intersects with the bore 3, at which point the bore is reduced in size, leaving an abutting shoulder 13. A holding device is shown at 14 having a part of relatively small diameter as at 15 for projecting into the bore 3 and a suitably shaped end of rounded or curved formation as at 16 for taking into the recess 6. The device 14 may have an enlarged head 17 substantially fitting the bore 10 and a coil spring 20 may be disposed between the head 17 and the shoulder 13 which normally urges the locking member 14 in the direction which is out of the bore 3. The opposite end of the locking member 14 may be of conical form as illustrated at 21.

The block is provided with another recess or

bore which intersects the bore 10. This is illustrated at 22 and its walls are threaded for the reception of a threaded member 23 suitably fashioned as at 24 for the reception of a tool and having a pointed or conically shaped end 25.

The operation of the device is as follows: Assuming that the parts, including the punch, are in operating condition, as shown in Fig. 1, the punch may be removed by the application of the tool to the member 23, turning it on its threads to retract it. As it is retracted the conical head 25 recedes from the head 21, and the spring 20 feeds the member 14 to the right. When its end 16 has passed out of the bore 3, the punch may be removed. In mounting the punch it is first positioned in the bore 3 and then the member 23 turned in the opposite direction. The rising conical head 25 engages the head 21 with a cam action, thus forcing the member 14 to the left and ultimately binding against the punch. As the parts are tightened the punch is effectively engaged by the walls of the bore 3 on the opposite side of the locking member 14. The closure piece 11 may be removed for a removal or replacement of the locking member 14 and its associated spring.

Since the punch should be backed up solidly it may be preferred to so arrange the locking instrumentalities that the punch is urged upon its seat, that is against the metal 7, as the locking parts are tightened. To this end the center lines of the curvatures of the recess 6, and the end 16 may be slightly off center with respect to each other. That is to say, a line drawn normal to a tangent of the surface 16 and on the axis of the part 15 is normally positioned above the deepest part of the recess 6. This line is indicated at C in Fig. 1. A line drawn normal to a tangent at the deepest part of the recess 6 is positioned below this center line of the part 15 and this is indicated at C' in Fig. 1. Therefore, when the member 14 is tightened against the punch it functions on the upper half of the curved bottom of the groove 6 and tends, by a wedging action, to urge the punch on its seat. Therefore, the punch is tightened in position and capable of no axial movement which may be caused by the pulling force on the punch as it is extracted from the work. On the other hand, parts such as these in a tool holder are very accurately made and the invention will function with the center line C and C' in substantial alignment when the punch is locked in position.

In the modified form shown in Fig. 4 many of the parts are the same and have the same reference characters applied thereto. Here, however, the primary difference lies in the shapes of the engaging heads. In this form the head of the part 14' instead of being conical, is merely cut off at an angle, as shown at 30. A screw threaded member 23' is rotatably associated with a separate member 31 with an inclined face 32 engaging the face 30. For rotatably associating parts 23' and 31, the member 23' may be formed with a recess 33 for receiving rotatably, a projecting pintle piece 34 on the member 31. The operation of this modified form is similar to that of the form heretofore described, but, of course, the member 31 cannot rotate upon its axis due to the engaging inclined flat surfaces. When the nut 23' is turned on its threads it revolves relative to the member 31.

It will accordingly be noted that the body of the tool holder is not apertured clear through, but the punch seats against the metal 7 integral

with the body 2; that no machine operations, in the way of forming recesses or the like on the back face of the body 2, are resorted to; and that the holding instrumentalities are completely accessible and capable of manipulation from the front face, and one side face of the block. In making ordinary operations, such as the removal and replacement of punches, the only access required is to the member 23 on the front face of the block. The holding instrumentalities may be entirely removed, if necessary, by removing the closure piece 11. Thus the block 2 may be fastened directly to the base of the punch press, as indicated at 1, and no backing plate need be used between the tool holder proper, that is the block 2, and the base of the punch press.

This invention is particularly advantageous in certain classes of work; for example, work of a precision nature and work on thin stock. Falling in these classes of work, are such items as lock tumblers and operating pieces for cash registers and adding machines and the like. This work must be carefully performed, and there must be no burr left by the punch. Also, where the stock is thin, irrespective of the type of work, difficulty is encountered in the elimination of a burr. It is, of course, not new, basically, to provide a holder for removably holding a punch. However, with those holders heretofore used and with those holders heretofore known, as pointed out in the early portion of this specification, the punch is not held sufficiently tight in its socket, with the result that the punch may move somewhat when subjected to the pressure which accompanies a punching operation. This causes the leaving of a burr on the punched edge, which is not acceptable for fine or precision work; therefore, with this class of work it has not been feasible heretofore to use holders which removably held the punches in place; that is to say, a holder from which the punch could be removed without removing the holder from the base of the machine. As a result, on work of this nature tight or fixed holders have been used of necessity. Such holders may merely comprise a body of metal bolted to the base of the machine to which the punch is fixedly attached or by which the punch is fixedly held, so that, in order to remove the punch, the entire holder has to be taken off the base of the machine. It is not desired to use a holder of this type, since the punch cannot be removed or replaced with facility. However, the present invention provides a holder which removably holds the punch, and the punch is held so tightly that it is incapable of movement in its holder, with the result that the holder of the present invention is admirably adapted for use with such classes of work where precision is required, where burrs must not be present, or where the stock is thin.

I claim:

1. A tool holder adapted to be attached to the base of a punch press or the like comprising, a body having a recess for the reception of a punch, the body having a bore therein intersecting the recess, a tool holding member shiftable in the bore, one end of which is projectable into the recess, the other end of said member being disposed at an angle to the axis of the bore and having a flat angular face, the body having a second bore intersecting the first, locking means in the second bore including a member screw threaded in said second bore, and another member rotatably supported by the screw threaded

member and having an angular flat face adapted to engage the angular flat face of the holding member, whereby the holding member may be projected into the recess by wedging action.

5 2. A tool holder adapted to be attached to the base of a punch press or the like comprising, a body having a recess for the reception of a punch, the body having a bore therein intersecting the recess, a tool holding member shiftable in the
10 bore, one end of which is projectable into the recess, the other end of said member being disposed at an angle to the axis of the bore and having a flat angular face, the body having a second

bore intersecting the first, locking means in the second bore including a member screw threaded in said second bore, and another member rotatably supported by the screw threaded member and having an angular flat face adapted to engage the angular flat face of the holding member, whereby the holding member may be projected into the recess by wedging action, and a spring acting upon the holding member and normally holding the inclined faces in contact
10 with each other and urging the holding member in a direction away from the said recess.

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