

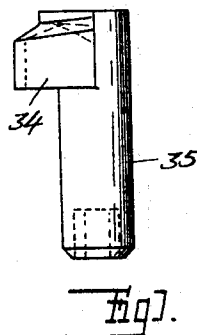
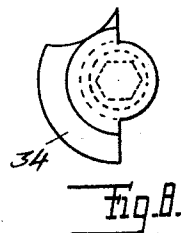
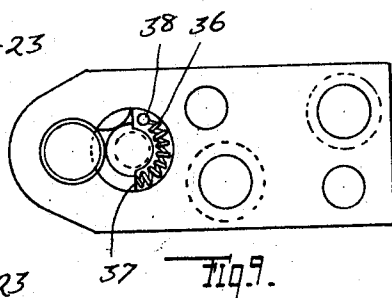
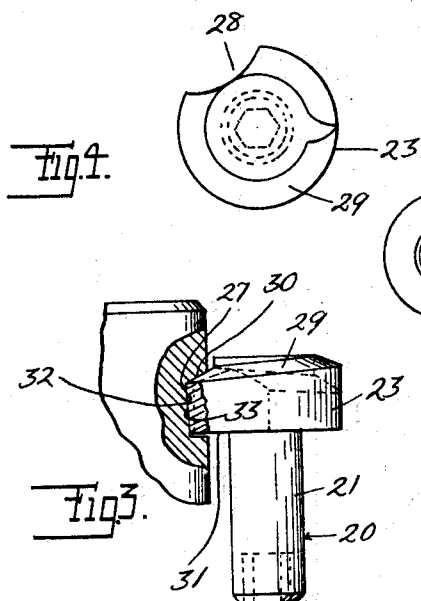
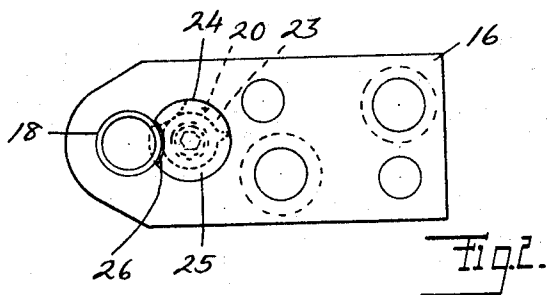
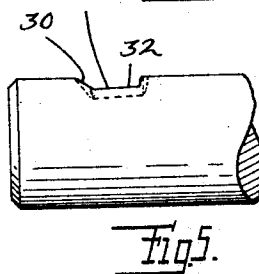
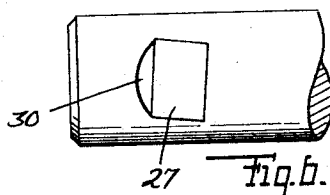
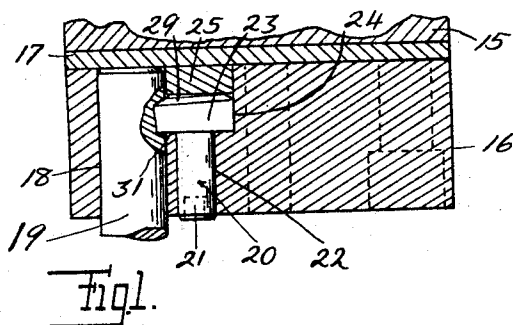
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1,899,326

TOOL HOLDER

Filed May 11, 1931



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TOOL HOLDER

Application filed May 11, 1931. Serial No. 536,646.

This invention relates generally to tool holders and has particular reference to a construction and arrangement of parts tending to simplify, render more efficient and improve generally devices of this character.

One of the principal objects of this invention is to provide a tool holder or retainer distinguished by the novel and expedient manner in which the same may be manipulated to interchangeably receive tools of the desired size or type.

Another advantageous feature of this invention resides in the provision of a retainer equipped with a locking device constructed to effectively hold the tool against axial and rotative movement relative to the retainer and in addition designed to prevent accidental rotation thereof relative to the retainer when in operative position.

A further advantageous feature of this invention is to associate supplemental means with the retainer and locking device preventing any possibility of the latter turning during operation.

The foregoing as well as other objects will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein:

Figure 1 is a fragmentary sectional view through a punch press equipped with a tool holder constructed in accordance with this invention;

Figure 2 is a plan view of the tool holder shown in Figure 1;

Figure 3 is a side elevational view of the locking device for the tool holder;

Figure 4 is a plan view of the device shown in Figure 3;

Figures 5 and 6 are fragmentary elevational views of the tool shanks with which the retainer shown in Figure 1 is adapted to be used;

Figures 7 and 8 are views similar to Fig-

ures 3 and 4 showing a slightly modified form of construction;

Figure 9 is a view similar to Figure 2 showing the locking device illustrated in Figure 7 in assembled relation with a retainer.

In general, the present invention consists in the provision of a retainer of conventional design provided with a cylindrical bore for receiving the shank of a tool and having a locking device journaled therein for rotation about an axis parallel to the axis of the tool for locking the same in the retainer. As will be more fully hereinafter described, the locking device performs a three-fold function in that it not only effectively holds the punch against axial and rotative movement with respect to the retainer, but also is provided with means cooperating with means on the retainer for positively preventing rotation thereof relative to the retainer.

While it will be apparent as this description proceeds that the various tool holders shown herein are capable of numerous and diversified applications, nevertheless, for the purpose of illustration I have shown the same as used in connection with a punch press fragmentarily shown in Figure 1 and designated by the reference character 15. Referring now more in detail to the particular construction of the tool holder shown in Figures 1 to 6, inclusive, it will be noted that the same comprises a tool retainer 16 having a backing plate 17 secured to one side thereof and having a bore 18 therein for interchangeably receiving the shank portions 19 of suitable tools.

In order to lock the tools within the retainer 16, I provide a locking device or member 20 having a shank portion 21 journaled within a bore 22 formed in the retainer with its axis substantially parallel to the axis of the bore 18. The locking member 20 is further provided with a substantially cylindrical enlarged head portion 23 arranged

within a correspondingly shaped recess 24 formed in the upper surface of the retainer 16. The recess 24 communicates with the bore 18 at the upper end of the latter and is normally closed by means of a plug 25 having a pressed fit with the upper end of the cylindrical recess and relieved as at 26 to provide clearance for the shank portions 19 of the tools. Thus, from the foregoing it will be apparent that the locking member is mounted for rotation about an axis substantially parallel to the axis of the shank portions of the tools and moreover, that the locking member is permanently fixed within the retainer.

The relative positions of the two bores 18 and 22 within the retainer and the diameter of the substantially cylindrical head 23 of the locking member is such that a portion of the periphery of the latter projects into the bore 18 as clearly shown in Figure 1. Accordingly, the shank portions of the tools are slotted as at 27 for the reception of the peripheral portions of the substantially cylindrical head 23. However, in order to permit the tools to be assembled with or removed from the retainer, a portion of the cylindrical head 23 is radially cut as at 28 on a radius coincident with the radius of the bore 18 so that when the locking member is rotated to its inoperative position, the radial cut 28 registers with the bore 18 to provide an unobstructed passage therethrough. Rotation of the locking member 20 to its various adjusted positions may be effected in various different ways. However, as shown herein, the lower end of the shank 21 is provided with a counterbored portion suitably fashioned to receive a socket wrench or the like. Thus, it will be seen that the locking member 20 may be readily moved from its operative position shown in Figure 1 wherein the tool is held in assembled relation with the retainer to its inoperative position wherein the radial cut coincides with the retainer bore and thereby permits removal of the tool.

As previously stated, the locking member 20 serves to effectively hold the shank portions of the tools against axial or rotative movements relative to the retainer and furthermore, prevents accidental rotation thereof when in operative position. In order to accomplish this result, the upper end of the enlarged head 23 is provided with a small helical plane surface 29 inclining upwardly from the radial cut 28 comparable to a certain extent to a screw thread. The spiral or lead of the helix 29 is such that as the locking member 20 is rotated in a counter-clockwise direction from its inoperative position, the helical plane surface engages a corresponding surface 30 formed on the upper walls of the notches 27 in the tool shanks 19. It will be apparent that movement of the locking member as specified above wedges or cams the upper end of the tool shanks 19

into positive contact with the under surface of the backing plate and thereby prevents axial displacement of the shanks relative to the retainer. While the helical surface 29 may be perpendicular to the axis of rotation of the locking member 20, nevertheless, it is preferable to incline the same downwardly at a suitable angle so that rotation of the locking member to its operative position will not only cam the shank portions into engagement with the backing plate, but also urge the same into wedging engagement with the side wall portions of the bore 18 opposite the locking member 20. It will be apparent from the foregoing that by reason of the cooperative helical bearing surfaces upon the tool shanks and locking member 20, the former are not only held against axial and rotative movement relative to the retainer, but accidental rotation of the locking member relative to the retainer is also prevented owing to the pressure and friction between the two engaging surfaces when in operative position. It will further be apparent that the enlarged substantially cylindrical head portion 23 of the locking member provides a relatively large bearing surface 31 for engagement with the retainer, with the result that any stripping load will be transmitted from the locking member directly to the retainer.

When performing certain classes of work, it may be desirable to supplement the action of the helical surface aforesaid in preventing accidental turning of the locking member while the tool is in actual service. The foregoing may be accomplished by providing cooperating angular conical surfaces 32 and 33 on the inner wall of the punch notch and on the periphery of the locking member, respectively. The surfaces 32 and 33 are preferably set at a wedging angle with the axis of the locking member so that as the locking member is rotated to lock the punch and as the punch shank approaches the seat against the backing plate, the aforesaid complementary surfaces contact with each other and the friction between them due to the pressure exerted prevents the locking member from rotating in its forward direction. However, the construction is such as to permit the locking member to be readily rotated in the reverse direction by an external force to disengage the surfaces.

The modified form of construction illustrated in Figures 7 to 9, inclusive, differs from the one previously described in that means is provided for normally urging the locking member in its locked position. As shown in the aforesaid figures, the enlarged head portion 34 of the locking member 35 is semi-circular as distinguished from the cylindrical head portion 23 in the first-described form of the invention so as to provide a space for receiving the coil spring 36. The coil

spring 36 is preferably of the compression type and is arranged in the assembly in such a manner that one end of the same engages the shoulder 37 formed by the head portion 34 and the opposite end of the same engages a suitable stop 38 pressed into the retainer as clearly shown in Figure 9.

Referring now briefly to the operation of the tool holders specified above and assuming that the locking members are in their inoperative positions and it is desired to secure a tool in place, the operator merely inserts the shank of the desired tool within the bore 18 until the upper end of the shank engages the backing plate 17 and the notch in the punch shank is aligned with the locking member. When this is accomplished, a suitable socket wrench or other tool is engaged within the polygonally-shaped recess in the lower end of the shank and the latter turned in a counter-clockwise direction to move the radial cut portions of the head out of registration with the bore and to subsequently engage the helical surfaces of the head portion within the notch in the shank. Owing to the configuration of the helix on the head portions of the locking members, the latter upon continued rotation in a counter-clockwise direction urges the upper end of the shank into wedging engagement with the side walls of the bore and with the backing plate as previously set forth. In the modified form of the construction, movement of the locking member to its operative position is assisted by the action of the coil spring 28.

Thus, from the foregoing it is believed obvious that I have provided an extremely simple and readily operable means for interchangeably receiving tools of the desired size or type and to effectively hold these tools in operative positions.

What I claim as my invention is:

1. In a tool holder, a body having a bore for receiving the shank of a tool, a seat for the shank at one end of the bore, and means for holding the shank in the bore against both axial and rotary movements including a substantially cylindrical member mounted for rotary movement in the body and having an enlargement movable transversely of the bore, having an inclined surface engageable with the shank to force it against the seat, and having another inclined portion for forcing the shank against a wall of the bore.
2. In a tool holder, a body having a bore extending through one side thereof for receiving the shank of a tool, a seat for the shank at one end of the bore, and means for holding the shank in the bore against said seat, including a rotary member journaled in the body at one side of the bore, accessible and operable from the side aforesaid of the body, and having a portion within the bore actuable by the member for engagement with a notch in a shank in the bore, the inner wall of the notch and the periphery of the said portion having cooperating curved surfaces set at a wedging angle with the axis of the rotary member so that as the latter is rotated to operative locking position the friction between the curved surfaces will be such as to cause the parts to be firmly held in locked position.
3. In a tool holder, a body having a bore for receiving the shank of a tool, a seat for the shank at one end of the bore, and means for holding the shank in engagement with said seat including a rotary member journaled in the body and having a head extending into the bore for engagement with a tool shank therein, said head having a notch in its periphery to permit a tool shank to be moved longitudinally of the bore toward and away from the seat, and said head also having a helical cam surface operable after the tool shank has been moved toward its seat to cam the said shank axially into firm engagement with said seat, and yieldable means within the body and associated with the head for maintaining the cam surface thereof in engagement with said tool shank.
4. In a tool holder, a body having a bore for receiving the shank of a tool, a seat for the shank at one end of the bore, and means for holding the shank in the bore against both axial and rotary movements including a substantially cylindrical member mounted for rotary movement in the body in substantially parallel relation to the bore and having an enlargement movable transversely of the bore, provided with a groove that is registrable with the bore to permit the shank of a tool to be moved longitudinally of the bore into engagement with said seat, and having means adapted to have a binding engagement with said shank.
5. In a tool holder, a body having a bore for receiving the shank of a tool, a recess intermediate the ends of and opening into one side of said bore, and a second bore substantially parallel to the first and opening into the recess, a seat for the shank at one end of the first mentioned bore, and a locking member mounted to turn in the second bore and having a substantially circular head in the recess and first mentioned bore, having means registrable with the first mentioned bore to permit a tool shank to be moved longitudinally of the bore toward and away from said seat, and having other means for forcing the tool shank against said seat and a wall of said bore.
6. A tool holder comprising a retainer having a bore therein for interchangeably receiving the shanks of tools, a substantially cylindrical member journaled within the retainer for rotative movement relative thereto about an axis substantially parallel to the axis of the bore and having an enlarged portion bearing against the retainer and adapted

to transmit stripping loads thereto, the axis
of rotation of said enlargement being coin-
cident with the axis of rotation of the mem-
ber, said enlargement being movable in the
5 bore by the member, having a relief regis-
trable with the bore in one rotative position
of the member to permit a tool shank to be
inserted into and removed from the bore, and
having means for holding a tool shank in the
10 bore.

In testimony whereof I affix my signature.
FERRIS T. HARRINGTON.

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