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PIN RETAINER FOR TOOL HOLDERS.

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1,423,595. Patented July 25, 1922.

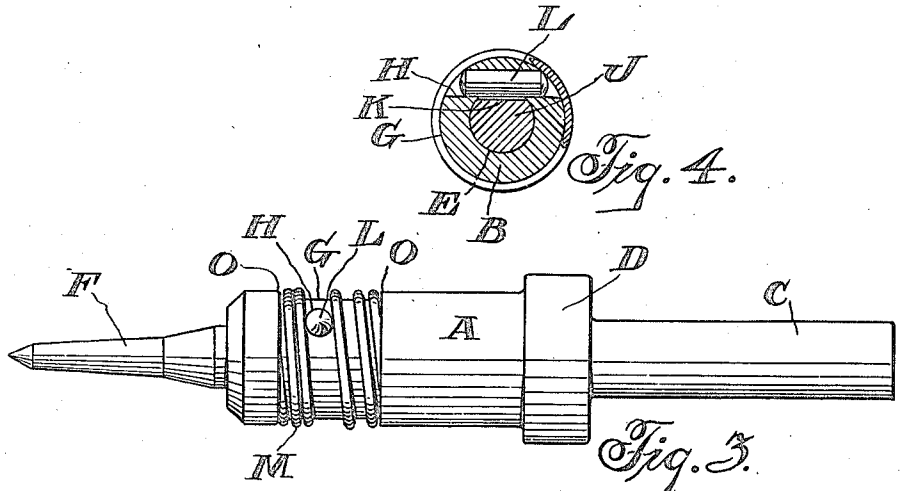


Fig. 4.

Fig. 3.

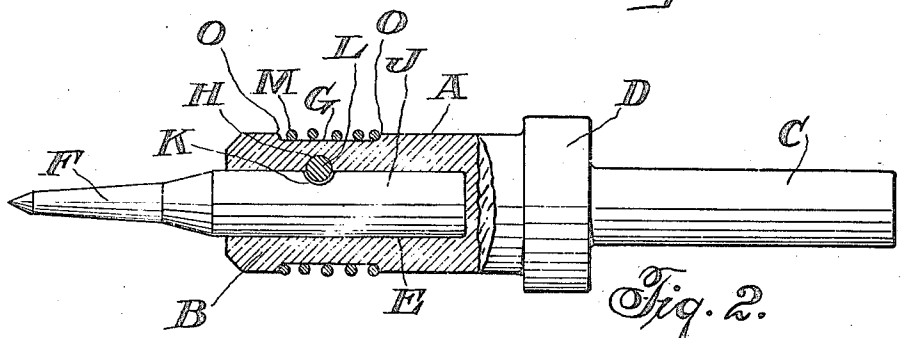


Fig. 2.

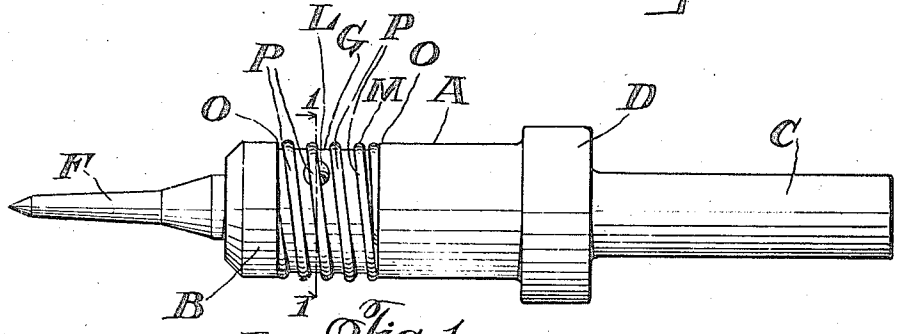


Fig. 1.

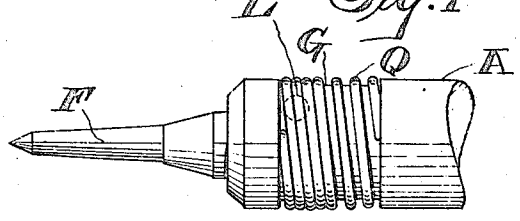


Fig. 5.

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PIN RETAINER FOR TOOL HOLDERS.

1,423,595. Specification of Letters Patent. Patented July 25, 1922.

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To all whom it may concern:

Be it known that I, LEWIS C. BAYLES, a citizen of the United States, and a resident of Easton, county of Northampton, and State of Pennsylvania, have invented a certain Pin Retainer for Tool Holders, of which the following is a specification accompanied by drawings.

This invention relates to devices for removably retaining a punch or similar tool in a holder, but more particularly to an improved form of retainer for holding in position the key or pin which engages both the holder socket and the shank of the tool, in such types of machinery as drilling or punching machines whether or not of the hammer type, but subject to excessive vibration, although the invention may be used wherever found applicable.

Various forms of spring retainers have been devised for holding a transverse locking pin or key in position in a tool holder, but difficulty has been experienced in breakage of the spring retainer, permitting the tool to become loosened, and causing damage to the machine or to the work. Such retainers should be strong and at the same time light in weight, but in order to obtain sufficient lightness, a sacrifice has been made in strength. Furthermore it has usually been necessary to remove the retainer from the holder in order to insert or remove the locking pin, and the retainers become lost or broken.

The objects of the present invention are to improve upon the construction of such pin retainers, secure a retainer which is less liable to breakage under the severe vibration to which it is subjected in a punching machine of the hammer type for instance, and enable the retaining pin to be inserted and withdrawn through or past the retainer without removing the retainer from the holder.

Another object of the invention is to devise a pin retainer which may surround or encircle the tool holder and be held thereon with limited longitudinal movement but which shall be at the same time longitudinally displaceable or separable, so that the key or pin may be inserted and withdrawn through or past either side of the retainer by displacing the retainer or by parting or separating sections or portions of the retainer.

Further objects of the invention will hereinafter appear and to the ends set forth the invention consists of the features of construction and combinations of parts described and claimed in the following specification and shown on the accompanying drawing, forming a part hereof, illustrating one preferred practical embodiment of the invention, in which—

Figure 1 is a side elevation of a tool holder showing the retainer in operative position retaining a punching tool in its holder.

Figure 2 is a view similar to Figure 1, partly broken away in longitudinal section,

Figure 3 is a view similar to Figure 1, showing the retainer in a position permitting removal or insertion of the pin,

Figure 4 is a cross sectional view on the line I—I of Figure 1, looking in the direction of the arrows, and

Figure 5 is a side view partly broken away of a modification.

In the drawings is shown a tool holder, of the type adapted for use in a percussive punching tool, and comprises an anvil block or punch holder A adapted to be mounted in a percussive tool (not shown) and moved forwardly and rearwardly by movement of the percussive tool. The holder A has a socket or tool holding portion B, an end extension C which receives the blows of the reciprocating element of the percussive tool, and a flange or portion of larger diameter D which limits the movement of the holder in the percussive tool. The socket portion B is centrally bored forming a longitudinal hollow portion or socket E for the reception of the shank or securing end of the punch or similar tool F.

On the external surface of the socket portion B of the holder A, at its forward end, a peripheral annular groove G is formed or other means provided for holding a key retainer on the socket portion. The socket portion B is provided with a transverse aperture or cross-hole H which also extends transversely through the hollow socket E. The shank or securing end J of the punch or similar tool fits in the socket E and is formed with a transverse groove K on its outer surface adapted to register with the intersecting aperture H of the socket portion B. The aperture H and groove K may be circular, angular, or of any other desired cross section. The groove K is of slightly

larger diameter than the intersecting aperture H, for a purpose which will presently appear.

The punch or similar tool F is secured in the socket E of the holder A against longitudinal or rotative movement by means of a key or pin L which is adapted to loosely enter the aperture H of the holder and engages the surface of the aperture H, thus locking the punch F in the holder A. The pin L may be of any desired form but is shown as cylindrical with rounded ends. As the aperture H conforms to the shape of the pin L and is preferably of uniform diameter, the pin is subject to movement as the tool vibrates, and might drop out at either end of the aperture, unless retained in position.

To retain the pin in place a circular longitudinally extensible retaining member in the form of a helical coiled spring M, which may be circular, flat, or of any other desired form, is lodged in the peripheral annular groove G surrounding the holder portion B over the ends of the pin L. The ends O of the groove G limit the longitudinal movement of the spring on the periphery of the holder and prevent it from slipping off the holder, the ends of the spring engaging the shoulders or ends O of the groove G under slight compression, so that it will at all times remain within the groove G. Other suitable means could be provided for this purpose.

The spaces between the turns P of the spring M are of less width than the diameter of the pin L, hence one or more turns of the spring engage the pin L at each end and retain the pin in position.

When it is desired to remove or insert the pin L in order to withdraw the tool F, the adjacent turns P or the spring M contiguous to either end, or at both ends, of the pin L, are displaced being spread apart or separated and extended longitudinally sufficiently to permit passage of the pin L through and past the convolutions P, as shown in Figure 3. The rounded ends of the pin L enable the pin to be readily slipped out, through or past the retaining means, thus releasing the tool F.

With the pin and retaining means in place as shown in Figure 1, the tool F is securely held in the holder A. However, the difference between the respective diameters of the groove K and aperture H permits a limited amount of play for the tool in the socket, as shown in Figure 2, which it has been found facilitates the operation of the punching tool and prevents any possible fracture, shearing or jamming of the pin, as is liable to occur when the connection is absolutely rigid.

By means of the present device the punch or similar tool is removably retained in the holder and the pin is securely held against movement regardless of the extent of the vibration of the tool of which the holder forms a part.

The turns of the spring as shown in the preferred construction in Figures 1, 2, 3 and 4, constitute a plurality of integral longitudinally displaceable portions. However, the retaining spring may be constructed as shown in Figure 5, in which the portion P lying over the ends of the pin is closely coiled, the remainder Q having open coiling, so that the closely coiled portion may be forced to one side to enable the pin to be inserted or removed.

While a coiled spring has been found to be one suitable and preferred form of device for carrying out the objects of this invention, other forms of devices may occur to those skilled in the art as equivalent constructions without departing from the spirit and scope of the invention as defined in the appended claims. Hence, it is not desired to limit the invention strictly to the forms herein shown and described.

I claim:

1. A device for removably retaining a tool in a holder, comprising in combination a holder having a hollow socket portion, a tool having a shank fitting said socket, a removable transverse pin loosely engaging both the holder and tool shank, and a longitudinally displaceable retaining member having a plurality of individually and longitudinally displaceable portions upon the periphery of the holder for holding said pin in position, provision being afforded for inserting and withdrawing the pin through the retaining member by longitudinally displacing parts of said retaining member.

2. A device for removably retaining a tool in a holder, comprising in combination a holder having a hollow socket portion a tool having a shank fitting said socket, a removable transverse pin loosely engaging both the holder and tool shank, a circular longitudinally displaceable retaining member having a plurality of individually and longitudinally displaceable portions upon the periphery of the holder for holding said pin in position, and means for limiting the movement of the retaining member on the periphery of the holder, provision being afforded for inserting and withdrawing the pin through the retaining member by longitudinally displacing parts of said retaining member.

3. In a tool holder having a cross-hole, a removable locking pin loosely fitting in said cross-hole, a helical spring surrounding a portion of said tool holder, so that at least one turn of the spring lies over each end of the cross-hole, means to prevent longitudinal displacement of the spring due to vibration but permit the turns of the spring to be forced aside to allow the removal or insertion of the locking pin.

4. A device for removably retaining a tool in a holder, comprising in combination a holder having a hollow socket portion, a tool having a shank fitting the socket, a removable pin adapted to be loosely inserted transversely through the holder and tool shank, and a coiled spring surrounding the holder over said pin whereby the turns of the spring hold the pin in position but permit the insertion and removal of the pin through the coiled spring by displacing turns of the spring.

5. A device for removably retaining a tool in a holder, comprising in combination a holder having a hollow socket portion formed with an external peripheral groove, a tool having a shank fitting the socket, a removable pin adapted to be loosely inserted through a transverse aperture in the holder located in said external groove, said pin engaging the tool shank, and a coiled spring encircling the holder in the external groove over the pin, provision being afforded for inserting and withdrawing the pin through the retaining member by longitudinally displacing parts of said retaining member.

6. A device for removably retaining a tool against rotary and longitudinal movement in a holder, comprising in combination a holder having a hollow socket portion provided with an aperture extending transversely through the socket portion and intersecting the hollow portion, a tool having a shank fitting the socket and formed with a transverse groove adapted to register with the intersecting aperture, a removable pin adapted to loosely enter said aperture in the holder and engage the groove in the tool shank, a coiled spring lying on the periphery of the holder and means for retaining the coiled spring in the holder, whereby the turns of the spring hold the retaining pin in position but permit insertion and removal of the pin by spreading the turns of the spring.

7. A device for removably retaining a tool in a holder comprising, in combination, a holder having a hollow internal socket portion, a tool having a portion fitting said socket, a transverse aperture in said holder aligned with a transverse groove in said tool portion, a removable pin adapted to be loosely inserted through said transverse groove and aperture and engaging said holder and tool portion, retaining means surrounding the holder and adapted to engage both ends of the pin, said retaining means being composed of a plurality of longitudinally displaceable portions, and means for holdng the retaining means in the holder, provision being afforded for inserting and withdrawing the pin through said retaining means.

8. A device for removably retaining a tool in a holder comprising, in combination, a holder having a hollow internal socket portion, an external groove thereon, a tool having a shank fitting said socket, a transverse aperture in said holder aligned with a transverse groove in said shank, a removable pin adapted to be loosely inserted through said transverse groove and aperture and engaging both said holder and said shank, and a coiled spring in said external groove, turns of said spring being adapted to engage both ends of said pin, said turns being longitudinally displaceable whereby the pin may be inserted and withdrawn past said spring.

In testimony whereof I have signed this specification.

LEWIS C. BAYLES.