Sept. 30, 1958 E. D. KENNELL 2,854,238

TOOL RETAINER WITH ROTARY SLEEVE

Filed March 22, 1956

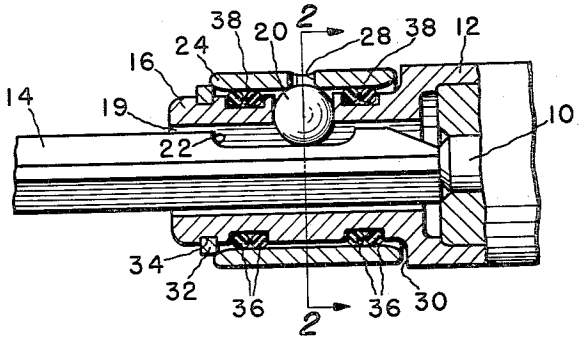


FIG. 1

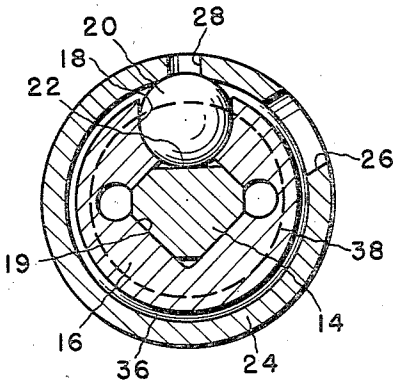


FIG. 2

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United States Patent Office 2,854,238 Patented Sept. 30, 1958

2,854,238

TOOL RETAINER WITH ROTARY SLEEVE

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Application March 22, 1956, Serial No. 573,182

5 Claims. (Cl. 279—81)

This invention relates to holders and more particularly to a tool holder of the type that is manually operable to release the tool.

It is one object of the invention to provide such a retainer in which a cushioning element prevents excessive wear of the holder parts due to vibration of the tool in the holder.

A further object of this invention is to provide a holder of relatively simple and inexpensive construction.

Further objects will become obvious from the following specification and drawings in which:

Figure 1 is a longitudinal elevation, partly in section, showing a preferred embodiment of the invention adapted to a tool, and

Fig. 2 is a cross sectional view of Figure 1 taken along the line 2—2 looking in the direction of the arrows.

Referring to the drawings, and particularly to Figure 1, the holder is shown adapted to a riveting machine, shown in part only, which includes a piston 10 reciprocal in a cylinder 12 and arranged to strike a series of blows on a tool 14.

The holder includes a casing 16 mounted on the front end of cylinder 12 and loosely encircling the tool 14. Formed through the casing 16 is an opening 18 for holding a locking element, such as the ball 20, a portion of which extends into a notch 22 in the tool 14 to positively limit the longitudinal movement of the tool 14 relative to the casing 16. It is to be noted that the cross sectional form of the opening 18 (see Fig. 2) substantially conforms to the ball 20 and that the inner end of the opening is smaller in diameter than the diameter of ball 20 so that the ball cannot fall through the opening 18 into the casing when the tool 14 is removed.

The ball 20 is held against movement of the notch 22 by means of a retainer 24 here shown in the form of a sleeve loosely encircling the casing 16. An opening 26 is provided in the retainer for receiving the ball 20. The diameter of this opening is slightly less than the diameter of the ball 20 to prevent the ball from falling out of the retainer when the hole 26 is positioned in alignment therewith. At the same time the diameter of the hole is sufficiently large to permit the ball to move outwardly a distance greater than the depth of the notch 22 so the tool 14 may be withdrawn. The retainer is assembled by placing the ball 20 in the opening 26 prior to sliding the retainer sleeve 24 over the casing 16.

This opening 26 is normally angularly displaced from the ball 20 (see Fig. 2) and is held in such angular displacement by means of a small hole 28 through the retainer 24 arranged to engage the ball so as to prevent relative rotation between the casing 16 and the retainer 24. The retainer is held against longitudinal motion relative to the casing by being positioned between a shoulder 30 and a snap ring 32 fitted in a groove 34 in the casing 16.

It is noted that the bore 19 of the casing 16 is of substantially square cross sectional shape and that the tool 14 is of similar cross sectional shape. Thus the tool is

held against rotary motion. The invention does not require any particular opening shape, the shape is determined primarily by the shape of the tool to be received thereby.

With the retainer construction thus far described it is clear that the ball 20 will be held in engaging position, such as shown in Figure 1, by the retainer 24 so as to prevent the tool 14 from being withdrawn from the casing 16. Experience has shown that with retainers of this type that due to the hammering action of the ball 20 against the retainer 24 resulting from the vibrations of the tool, the retainer ring is destroyed or damaged in a relatively short time. In order to avoid this problem, cushioning pieces, such as the rubber O-rings 36, are positioned in peripheral grooves 38 positioned on the opposite sides of the opening 18. These rings are of sufficient diameter, relative to the depth of the grooves 38, such that they constantly urge the retainer toward a position out of contact with the casing 16. In the particular construction shown the periphery of the casing is substantially circular, as is the inner periphery of the retainer 24, and the rings 36 hold the retainer 24 in substantially coaxial relation to the casing 16. With this construction, then, the force of the ball 20 on the retainer 24 is cushioned thereby greatly increasing the life of the retainer.

It is to be noted that the rings 36 also cooperate with the retainer so as to permit the retainer to be manually forced sideways to move the hole 28 out of engagement with the ball 20. The retainer 24 may then be rotated to register the opening 26 with the ball 20 to permit the ball to move outward to release the tool 14.

While I have shown and described a specific form of my invention, it is to be understood that various changes and modifications may be made without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A holder for a member, comprising a casing adapted to encircle the member and having an opening therethrough, a locking element in said opening adapted to engage said member to limit the longitudinal movement thereof relative to said casing, a retainer loosely encircling the casing along their co-extensive lengths and engaging said element against movement, and a cushioning piece between the retainer and casing for normally holding the retainer into a position out of peripheral contact with said casing.

2. A holder for a member having a notch therein, comprising a casing adapted to encircle the member and having an opening therethrough, a ball in said opening and adapted to extend partially through said opening and into said notch to limit the longitudinal movement of the member relative to said casing, a retainer in the form of a sleeve loosely encircling the casing and engaging the ball against movement out of said notch, and rings of elastic material mounted between said retainer and casing and on opposite sides of said ball for normally holding the retainer in spaced relation relative to the casing.

3. A holder for a member, comprising a casing adapted to encircle the member and having an opening therethrough, a locking element in said opening adapted to engage said member to limit the longitudinal movement thereof relative to said casing, a retainer loosely encircling the casing, said retainer having an opening into which the locking element is movable to release said member from the holder and a notch in the retainer into which the locking element is movable to fix the relative movement between the casing and the retainer, said notch being angularly displaced relative to the opening, and a cushioning piece between the retainer and casing.

4. A holder for a member, comprising a casing

adapted to encircle the member and having an opening therethrough, a locking element in said opening adapted to engage said member to limit the longitudinal movement thereof relative to said casing, a retainer loosely encircling the casing, a cushioning piece completely encircling said casing and normally holding the retainer into a position out of contact with said casing, and means for engaging the retainer to said locking element to hold the retainer in a fixed position relative to a casing, said retainer being manually movable to deform said cushioning piece to disengage the retainer from said element.

5. A holder for a member, comprising a casing adapted to encircle the member and constructed to limit rotational movement of said member relative to the casing and having an opening therethrough, a locking element in said opening adapted to engage said member to limit the longitudinal movement thereof relative to said casing, a retainer loosely encircling the casing and engaging the element against movement, and a cushioning piece mounted between said retainer and casing for normally holding the inner peripheral surface of the retainer in spaced relation relative to the outer peripheral surface of the casing.

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