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2,331,555

LOCKING DEVICE

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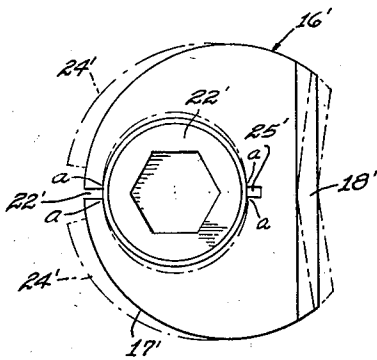


Fig. 4

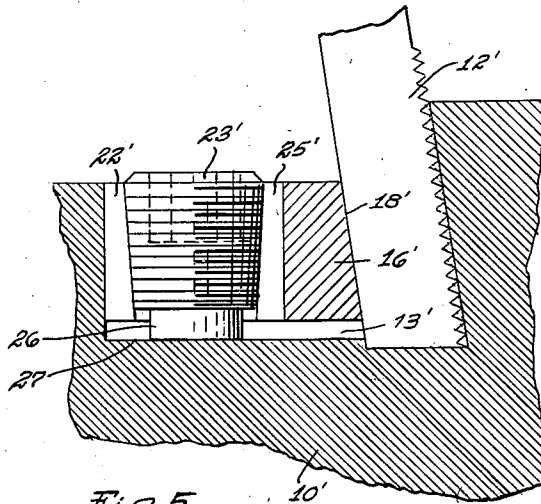


Fig. 5

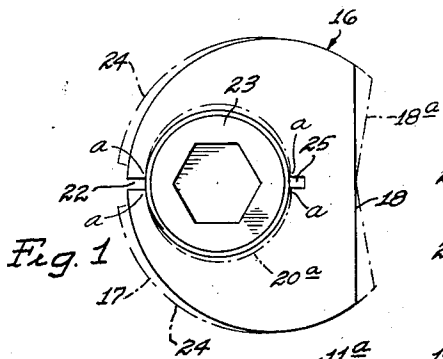


Fig. 1

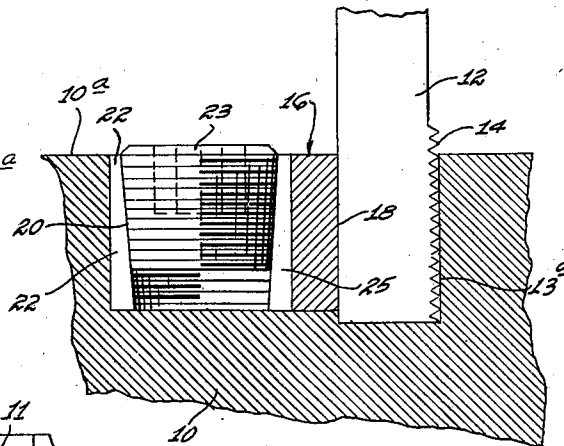


Fig. 2

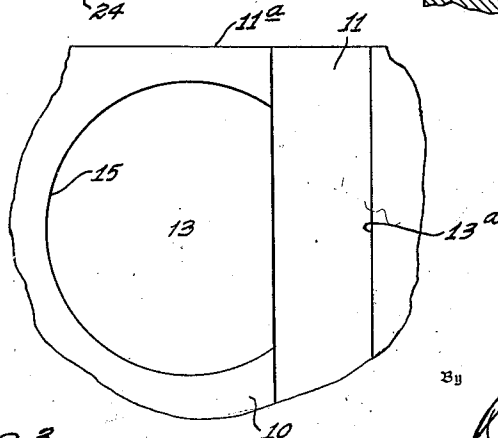


Fig. 3

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## UNITED STATES PATENT OFFICE

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## LOCKING DEVICE

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3 Claims. (Cl. 29—105)

This invention relates generally to holding devices and more particularly to devices for holding removable tools.

It is an object of the present invention to provide a new and improved holder or locking member for holding or locking a tool to a body or carrier to insure against movement of the tool relative to said body or carrier.

Another object of the invention is to provide a new and improved holder or locking member constructed to exert forces in several directions to insure rigidly securing a tool to a body or carrier.

Another object of the invention is to provide a new and improved holder or locking member constructed to expand peripherally and also to move rectilinearly in holding a tool to a body or carrier.

A further object of the invention is to provide a holder or locking member for the above mentioned purpose which is efficient for the purpose intended and one which is inexpensive to manufacture.

Other objects of the invention will become apparent from the following detailed description taken in connection with the accompanying drawing in which—

Fig. 1 is a top plan view of the holder or locking member;

Fig. 2 is a vertical central sectional view of the holder shown in position to hold a tool to a body or carrier therefor;

Fig. 3 is a fragmentary top plan view of the tool body or carrier; and

Figs. 4 and 5 are views respectively similar to Figs. 1 and 2 showing a modified form of tool holder or device.

Referring to the drawing by characters of reference and first to Figs. 1, 2 and 3, the numeral 10 designates generally a body or tool carrier having in a wall 10a thereof an opening 11 to receive a tool 12 which may be a cutting tool or any other tool or element to be releasably and rigidly held to the body 10. The tool 12 may have a serrated portion 14 for increasing its gripping power. As shown in Fig. 3, the tool receiving opening 11 is in the form of a slot which may extend through one end 11a of the body 10, the slot 11 providing a flat side wall surface 13a against which one side of the tool 12 is held. Also in the wall 10a a recess 13 is provided which intersects the slot 11, the recess 13 having a cylindrical side wall portion 15. In the recess 13 there is a holder or locking member 16 for

holding the tool rigidly to the body 10 against the wall 13a of the slot 11.

The outer wall surface or periphery of the locking member 16 conforms or is complementary to the cylindrically shaped portion 15 of the recess 11, the locking member 16 having a cylindrically shaped portion 17 and a flattened wall portion 18 of which the latter is arranged to engage the inner flat side of the tool 12.

A threaded, tapered bore 20 is provided through the locking member 16, the axis of the bore 20 extending longitudinally of but off center or eccentric with respect to the axis of the cylindrical portion 17 of the locking member. Preferably at the narrowest part of the wall of the bore 20, the locking member 16 is split by the provision of a slot 22 which extends longitudinally of and preferably coextensive with the bore 20. Screw threaded into the bore 20 there is a tapered screw 23 which when tightened down causes peripheral expansion of the locking member 16, which expansion is permitted by reason of the split or slot 22. This peripheral expansion of the locking member 16 is illustrated by the dot and dash lines 24. To provide desired peripheral expansion of the locking member 16, a second slot 25 preferably diametrically opposite the slot 22 is provided, this second slot extending toward but not running out of the flattened wall portion 18 of the locking member 16.

In operation, it will be seen that when the screw 23 is tightened down it will expand the locking member 16 peripherally, as illustrated by the dot and dash lines 24, and that the flat wall 18 of the locking member will be deformed, as indicated by the dot and dash line 18a, with the result that the locking member 16 will force the tool 12 laterally or to one side against the wall 13a to secure the tool rigidly to the body or tool carrier 10. As the tapered screw 23 is tightened down the bore 20 is deformed such that cross sectionally it is of general elliptical form as indicated by the dot and dash lines 20a. This results in a four point contact between the screw 23 and the wall of the bore which points of contact are designated "A" on the drawing. This four point contact is obtained by reason of the provision of the slots 22 and 25 and insures against loosening of the screw 20.

Referring now to the modification shown in Figs. 4 and 5, the body 10' is similar to the previously described body 10 but differs therefrom in that the wall 13' is angularly disposed, the wall 13' and the axis of the nut 22' tending to converge upwardly, as seen on the drawing.

Opposed to and spaced from the angularly disposed wall 13', the wall 18' of the locking member 16' is similarly angularly disposed and, consequently, the portion of the tool 12' held between walls 13' and 18' is angularly disposed with respect to the axis of the screw 23'. In this form of locking member, a lower end portion 26 of the screw 23' seats against the recessed wall 27 of the opening or recess 11 in the body 10'. As a result of the above arrangement, when the screw is tightened down, the locking member 16' is expanded thereby to urge the tool outwardly against the body wall 13 and in addition, by reason of the screw 23' engaging the wall 27, the locking member 16 is urged upwardly relatively to the body 10'. This combined peripheral expansion and upwardly or rectilinear movement of the locking member 16' results in a wedging action of the tool between the wall surfaces 13' and 18' providing for rigidly securing the tool 12' to the body 10'. As in the previously described lock 16, the flat wall 18' of the lock 16 is deformed, as illustrated, upon expansion of the lock and the screw 22' grips the wall of the bore at the points A'.

While we have shown and described our invention in some detail it is to be understood that the same is to be limited only by the appended claims for many changes may be made without departing from the spirit and scope of the invention.

What we claim is:

1. In a tool holding device, a body having an opening to receive a tool and a partially circular hole extending into said opening, a holder positioned in said hole and having a cutaway portion positioned to engage and hold the tool to said body, said holder having a tapered threaded bore, a pair of diametrically opposite slots in the wall of said bore and extending longitudinally thereof, one of said slots extending through the wall of said bore and through the outer wall of said holder, said pair of slots being directed substantially perpendicularly to said cutaway portion providing for peripheral expansion of said holder, and a tapered screw in said bore to hold said holder expanded.

2. In a tool holding device, a body having an opening to receive a tool and a partially circular hole extending into said opening, a holder positioned in said hole to engage and hold the tool to said body, said holder having a partially cylindrical outer surface portion and also having a cutaway portion for engaging the tool, slots in said holder directed substantially perpendicularly to said cutaway portion and extending longitudinally of the axis of said cylindrical portion, a threaded bore in said holder with its axis disposed eccentrically of the axis of said holder toward the side thereof remote from said cutaway portion and extending longitudinally of said slots, at least one of said slots extending through the outer periphery of said holder and into said bore to provide for peripheral expansion of said holder, and a tapered screw in said bore to expand said holder and urge the tool tightly against said body.

3. In a tool holding device, a body having an opening to receive a tool and a partially cylindrical hole extending into said opening, the wall defining said opening having a flattened portion for abutment by the tool and angularly disposed with respect to and extending longitudinally of the axis of said cylindrical hole, a holder positioned in said hole, said holder having an outer cylindrical wall surface portion and having a cutaway portion opposed to said flattened portion and engaging the opposite side of the tool, said cutaway portion being angularly disposed with respect to the axis of said cylindrical holder portion and extending substantially parallel with said flattened portion, slots in said holder directed toward said cutaway portion and providing for peripheral expansion thereof to force the tool laterally, a threaded bore through said holder with the axis of the bore extending longitudinally of the axis of said cylindrical holder portion and disposed eccentrically thereto, and a tapered screw in said bore to expand said holder and also acting to urge said holder longitudinally of the axis of said bore to aid in wedging the tool between said holder and said body.

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