Jan. 28, 1941. J. C. CURTIS 2,230,046

DRILL STEEL RETAINER

Filed June 24, 1938

Fig. 1.

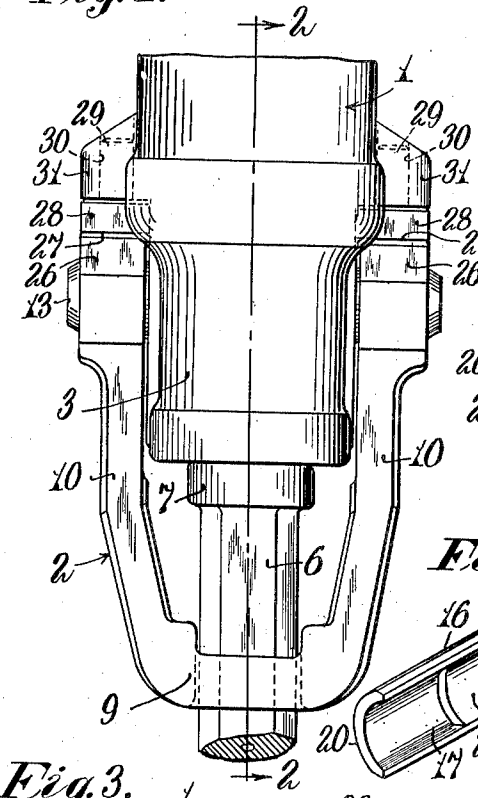


Fig. 2.

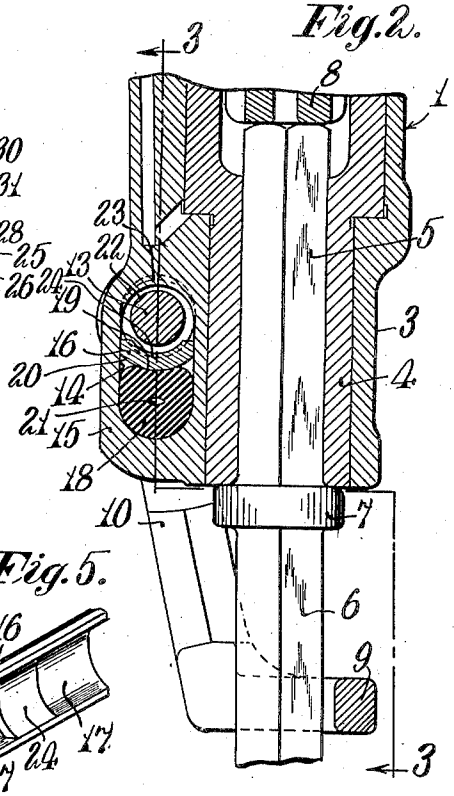


Fig. 5.

Fig. 3.

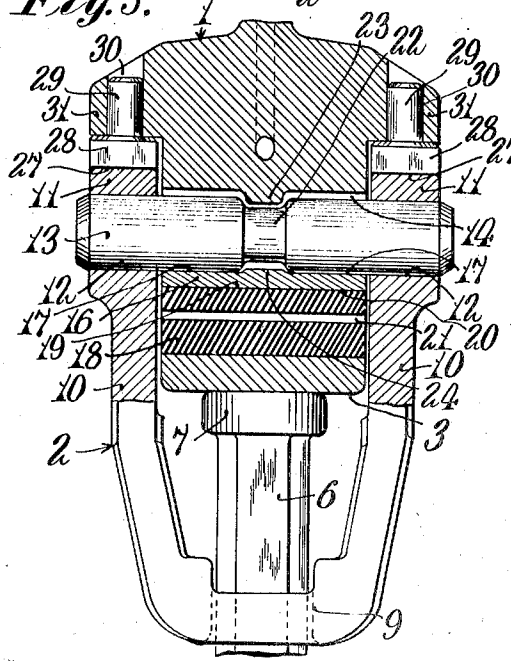
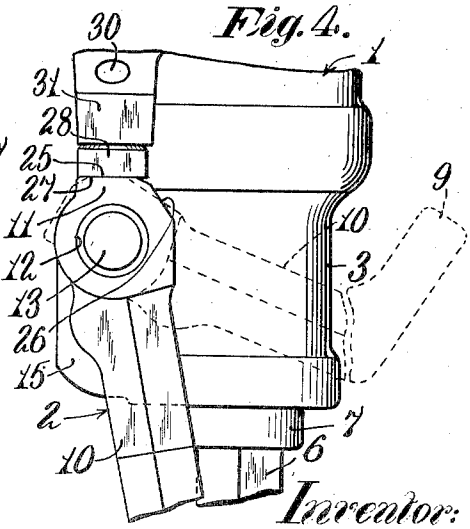


Fig. 4.



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UNITED STATES PATENT OFFICE

2,230,046

DRILL STEEL RETAINER

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Application June 24, 1938, Serial No. 215,663

6 Claims. (Cl. 279—19.1)

This invention relates to retainers for working tools, and more particularly to improvements in a drill steel retainer for the drill steel of a hammer rock drill.

An object of this invention is to provide an improved drill steel retainer. Another object is to provide an improved drill steel retainer having an improved pivotal mounting structure. A further object is to provide an improved drill steel retainer having an improved yieldable mounting structure whereby the impact blows imparted thereto by the drill steel of a rock drill with which the retainer is associated, are to a substantial extent cushioned, thereby substantially to eliminate the possibility of retainer breakage. Yet another object is to provide an improved yieldable mounting structure for a drill steel retainer wherein a rubber buffer is employed to cushion the shocks imparted to the retainer by the drill steel of the rock drill. Still another object is to provide an improved pivotal mounting and cushioning structure for a drill steel retainer and having embodied therein improved means for holding the retainer in its different positions of adjustment. A still further object is to provide an improved pivotal mounting and cushioning structure for a drill steel retainer and having embodied therein improved locking means for holding certain of the component parts thereof in operative relation when the retainer is assembled on the drill. Other objects and advantages of the invention will, however, hereinafter more fully appear.

In the accompanying drawing there is shown for purposes of illustration one form which the invention may assume in practice.

In this drawing:

Fig. 1 is a front elevational view of the forward portion of a hammer rock drill with which an illustrative embodiment of the improved drill steel retainer is associated.

Fig. 2 is a central, longitudinally extending sectional view taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a longitudinally extending sectional view taken substantially on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary side elevational view showing a portion of the pivotal mounting structure for the retainer yoke, the released position of the retainer yoke being indicated in dotted lines.

Fig. 5 is a perspective view of the pin-engaging shoe.

In this illustrative construction, the reference character 1 generally designates a hammer rock drill with which the improved drill steel retainer, generally designated 2, is associated. The hammer rock drill, of which only the forward portion is shown, comprises a front chuck housing 3 containing a chuck member 4 for receiving the shank 5 of a conventional collared drill steel 6, the latter having a collar 7 which limits rearward movement of the steel shank within the chuck member; and the improved steel retainer cooperates, as later explained, with the steel collar for preventing ejection of the steel shank from the chuck member. The hammer motor of the rock drill includes a motor cylinder to which the chuck housing is secured and which contains a reciprocatory hammer piston, and this piston has a striking bar 8 (see Fig. 2) for delivering impact blows to the shank of the drill steel, in the manner well known to those skilled in the art.

Now referring to the improved drill steel retainer 2, it will be noted that a retainer yoke 9 partly encircles the drill steel 6 in advance of the steel collar 7, and this yoke has rearwardly extending side arms 10, 10 disposed along the opposite sides of the chuck housing, in the manner clearly shown in Fig. 3. The yoke side arms 10 have at their rearward ends enlarged pivot portions 11 formed with alined bores 12 for receiving the outer end portions of a transverse pivot pin 13. This pivot pin is arranged in a transverse opening 14 formed in an enlargement 15 projecting laterally from the chuck housing 3, this opening being of elongated ovate shape longitudinally of the chuck housing, as shown in Fig. 2. An arcuate member 16 in the form of a shoe is arranged transversely in the opening 14 and has plane side guide surfaces slidably engaging the plane side walls of the opening 14 for guiding the shoe member for rectilinear movement in the opening relative to the pivot pin and as a result preventing sidewise displacement of the shoe member in the opening with respect to the pivot pin. The arcuate shoe member is provided with a rearward concave surface 17 engaging the forward side of the pivot pin 13, and interposed between this shoe member and the forward wall of the opening 14 is a resilient member 18 preferably in the form of a rubber buffer molded in the desired shape. The shoe and buffer are preferably of a length to extend transversely through the opening 14 substantially completely across the space between the side arms 10, 10 of the retainer yoke, as shown in Fig. 3. The rubber buffer 18 is compressed in position within the opening 14 and has a con-

cave rearward surface 19 engaging the forward arcuate surface 20 of the shoe member 16 and is transversely perforated at 21 to permit compression thereof, to absorb the shocks imparted to the retainer yoke by the steel collar and to permit swinging of the retainer yoke between its operative retaining position and its released position. If desired, the rubber buffer may be vulcanized or otherwise secured to the surface 20 of the shoe, but is preferably separate therefrom. For locking the pin and shoe in place when the retainer is assembled on the drill, the pin is circumferentially, annularly grooved at 22 midway between its ends, and the chuck housing has extending within the opening 14, an arcuate projection 23, the latter extending within the pin groove 22, and the shoe has at its rearward side a similar arcuate projection 24 extending within the pin groove so that the rubber buffer yieldingly urges the locking parts into cooperating locking relation. The buffer may be suitably interlocked with a projection at the front wall of the opening 14, if desired, to prevent unintentional displacement of the buffer from the opening. When it is desired to release the pivot pin 13 from the opening 14, it may be driven axially from the opening, the rubber buffer yielding to permit release of the locking projections from the pin groove when the pin is so driven, and in a similar manner the pin may be driven in place during assembly.

In order that the retainer yoke 9 may be maintained in either its operative retaining position or its released position, the rearward pivot portions 11 of the yoke side arms are formed with relatively inclined flat surfaces 25 and 26 (see Fig. 4) alternately engageable with the front plane surfaces 27 of a pair of abutment blocks 28, 28, these blocks preferably composed of hard metallic material and being detachably held in position on the chuck housing by integral pin-like portions 29 seated in bores 30 formed in lateral lugs 31 integral with the sides of the chuck housing 3. The rubber buffer, in addition to its shock absorbing function, through the shoe and pivot pin, yieldingly urges the pivot portions of the yoke side arms against the plane surfaces of the abutment blocks, thereby also to attain a retainer yoke holding function. When the retainer is in its operative steel retaining position, as shown in full lines in Fig. 4, the flat surfaces 25 on the retainer yoke engage the front plane surfaces 27 of the abutment blocks, and when the retainer yoke is swung into its released position, as indicated in dotted lines in Fig. 4, the flat surfaces 26 on the retainer yoke engage the abutment block surfaces 27; and in both positions of the retainer yoke, the rubber buffer yieldingly urges the cooperating surfaces on the retainer yoke and abutment blocks into engagement, thereby yieldingly to hold the retainer yoke in position.

In assembling the retainer on the chuck housing of the hammer rock drill, the abutment blocks 28 are placed in position with their pin-like portions seated within the lug bores in the chuck housing, and the rubber buffer is then placed in the transverse opening 14, and thereafter the shoe may be inserted in place so that the shoe engages the buffer, in the manner shown in Fig. 2. The retainer yoke may then be suitably held in position with respect to the chuck housing and the pivot pin 13 driven axially through the yoke arm openings 12 into the opening 14 in the space between the rear wall of the opening and the surface of the shoe, the rubber buffer yielding to permit the pin to pass the locking projections 23 and 24 on the chuck housing and shoe as the pin moves axially inwardly. When the pivot pin is in its proper position within the opening 14, the projection 24 on the shoe snaps into the groove 22 and the groove engages the locking projection 23 on the chuck housing, so that the pivot pin is locked against accidental axial release. When the retainer yoke is in its operative steel retaining position and it is desired to remove the drill steel shank 5 from the chuck member 4, the retainer yoke 9 may be swung about its pivotal mounting on the pivot pin from its full line position shown in Fig. 4 to the dotted line released position shown in that figure, out of the path of the steel collar 7, thus permitting the drill steel shank to be freely withdrawn from the chuck member. The retainer yoke is held in its released position by the rubber buffer pressing the flat surfaces 26 on the pivot portions of the retainer yoke side arms into engagement with the front plane surfaces 27 of the abutment blocks. When the retainer is in its released position and the shank of a drill steel has been inserted in the chuck member 4, the retainer yoke may be swung into its operative retaining position, as indicated in full lines in Fig. 4, and may be yieldingly held in this position by the rubber buffer acting to press the flat surfaces 25 on the pivot portions of the yoke side arms into engagement with the front plane surfaces 27 of the abutment blocks. As the mode of use of the improved drill steel retainer will be clearly apparent from the description given, further description thereof is considered unnecessary. Other uses and advantages of the improved drill steel retainer will be clearly apparent to those skilled in the art.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In combination, a tool retainer having side arms provided with alined bores, a pivotal mounting for the retainer including a support having an elongated opening extending transversely thereof, a pivot pin extending transversely through said support opening and removable in an endwise direction therefrom, the end portions of said pin projecting laterally from said opening and receivable within said alined bores in the side arms of said retainer to provide a pivot for the latter, an arcuate shoe extending transversely within said opening and engaging said pivot pin, a yieldable buffer arranged and held under compression in said opening between the forward wall of said opening and said shoe for absorbing the shocks imparted to the retainer and for yieldingly urging said shoe into engagement with said pivot pin, and means for locking said pivot pin against accidental axial release from said opening comprising an annular groove surrounding the pin body midway between the ends thereof and a projection on said support projecting inwardly within said opening at the rear wall of the latter and cooperating with said groove, said buffer, upon endwise movement of said pin in said opening, compressing sufficiently to permit forward bodily movement of said pin in said opening

to release said groove from said locking projection, thereby to permit endwise removal of said pin from said opening.

2. In combination, a tool retainer having side arms provided with alined bores, a pivotal mounting for the retainer including a support having an elongated opening extending transversely thereof, a pivot pin extending transversely through said support opening and removable in an endwise direction therefrom, the end portions of said pin projecting laterally from said opening and receivable within said alined bores in the side arms of said retainer to provide a pivot for the retainer, an arcuate shoe extending transversely within said opening and engaging said pivot pin, a yieldable buffer arranged and held under compression in said opening between the forward wall of said opening and said shoe for absorbing the shocks imparted to the retainer and for yieldingly urging said shoe into engagement with said pivot pin, and means for locking said pivot pin against accidental axial release from said opening comprising an annular groove surrounding the pin body midway between the ends thereof and a locking projection on said shoe projecting rearwardly from the rear face thereof and cooperating with said groove, said buffer, upon endwise movement of said pin in said opening, compressing sufficiently to permit forward bodily movement of said shoe in said opening to release said shoe protection from said groove, thereby to permit endwise removal of said pin from said opening.

3. In combination, a tool retainer having side arms provided with alined bores, a pivotal mounting for the retainer including a support having an elongated opening extending transversely thereof, a pivot pin extending transversely through said support opening and removable in an endwise direction therefrom, the end portions of said pin projecting laterally from said opening and receivable within said alined bores in the side arms of said retainer to provide a pivot for the retainer, an arcuate shoe extending transversely within said opening and engaging said pivot pin, a yieldable buffer arranged and held under compression in said opening between the forward wall of said opening and said shoe for absorbing the shocks imparted to the retainer and for yieldingly urging said shoe into engagement with said pivot pin, and means for locking said pivot pin against accidental axial release from said opening comprising an annular groove surrounding the pin body midway between the ends thereof and projections on said support and said shoe, said support projection projecting within said opening forwardly from the rear wall thereof and said shoe projection projecting rearwardly from the rear face of said shoe, said projections cooperating with said groove, said buffer, upon endwise movement of said pin in said opening, compressing sufficiently to permit forward bodily movement of said pin in said opening to release said groove from said support projection and to permit forward bodily movement of said shoe relative to said pin to release said shoe projection from said groove, thereby to permit endwise removal of said pin from said opening.

4. In combination, a tool retainer having side arms provided with alined bores, a pivotal mounting for the retainer including a support having an elongated opening extending transversely thereof, a pivot pin extending transversely through said support opening and removable in an endwise direction therefrom, the end portions of said pin projecting laterally from said opening and receivable within said alined bores in the side arms of said retainer to provide a pivot for the retainer, an arcuate shoe extending transversely within said opening and engaging said pivot pin, a yieldable buffer arranged and held under compression in said opening between the forward wall of said opening and said shoe for absorbing the shocks imparted to the retainer and for yieldingly urging said shoe into engagement with said pivot pin, and means for locking said pivot pin against accidental axial release from said opening comprising an interlocking connection between said support, pivot pin and said shoe, said buffer, upon endwise movement of said pin in said opening, compressing sufficiently to permit forward bodily movement of said pin in said opening to release the interlocking connection between the support and pivot pin and to permit forward bodily movement of said shoe in said opening relative to the pin to release the interlocking connection between the shoe and pin, thereby to permit endwise removal of said pin from said opening.

5. In combination, a tool retainer having side arms, a pivotal mounting for the retainer including a support having a transverse opening and spaced abutments, a pivot pin arranged in said opening and removable in an endwise direction therefrom, said pivot pin providing a pivot for said tool retainer, the retainer pivotally mounted on the pivot pin and having its side arms engaging at their rear ends said support abutments, a member arranged in said opening and engaging said pivot pin, a yieldable buffer arranged in said opening for yieldingly pressing said member against said pin and the retainer side arms against said abutments, and an interlocking connection between said pin and said member for preventing accidental axial release of said pin from said opening, said buffer, upon endwise movement of said pin in said opening, compressing sufficiently to permit movement of said pin lengthwise in said opening and forward bodily movement of said member relative to said pin to release said interlocking connection, thereby to permit endwise removal of said pin from said opening.

6. In combination, a tool retainer having side arms, a pivotal mounting for the retainer including a support having a transverse opening and spaced abutments, a pivot pin arranged in said opening and removable in an endwise direction therefrom, said pivot pin providing a pivot for said tool retainer, the retainer pivotally mounted on the pivot pin and having its side arms engaging at their rear ends said support abutments, a member arranged in said opening and engaging said pivot pin, a yieldable buffer arranged in said opening for yieldingly pressing said member against said pin and the retainer side arms against said abutments, and interlocking connections between said support, pivot pin and member for preventing accidental axial release of said pin from said opening, said buffer, upon endwise movement of said pin in said opening, compressing sufficiently to permit forward bodily movement of said pin in said opening and forward bodily movement of said member relative to said pin to release said interlocking connections, thereby to permit endwise removal of said pin from said opening.

JOHN C. CURTIS.

CERTIFICATE OF CORRECTION.

Patent No. 2,230,046. January 28, 1941.

JOHN C. CURTIS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 31, claim 2, for the word "protection" read --projection--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of May, A. D. 1941.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)