June 14, 1927. 1,632,373

C. C. HANSEN

STEEL RETAINER

Filed July 15, 1926

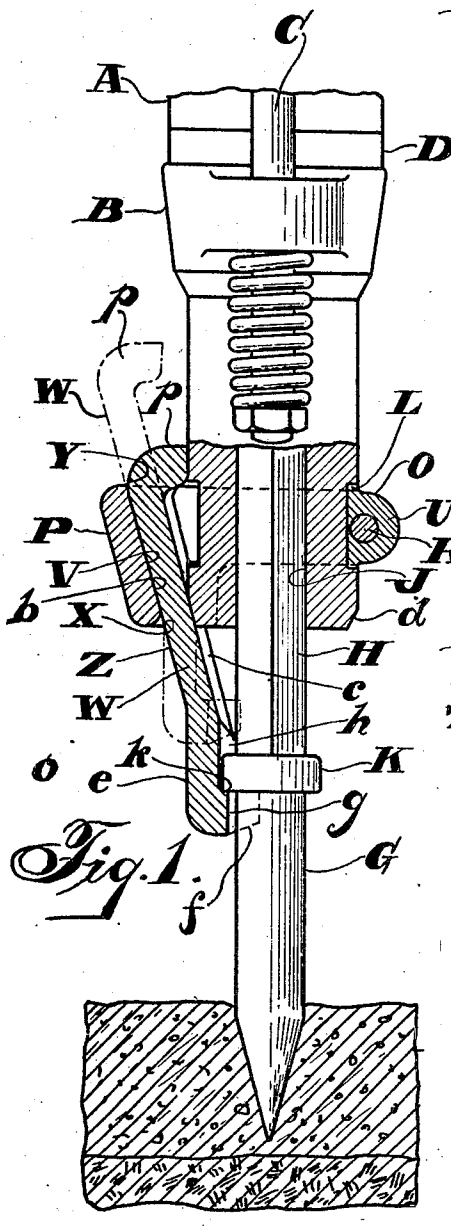


Fig. 1.

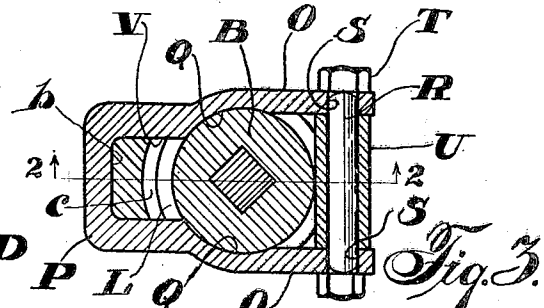


Fig. 3.

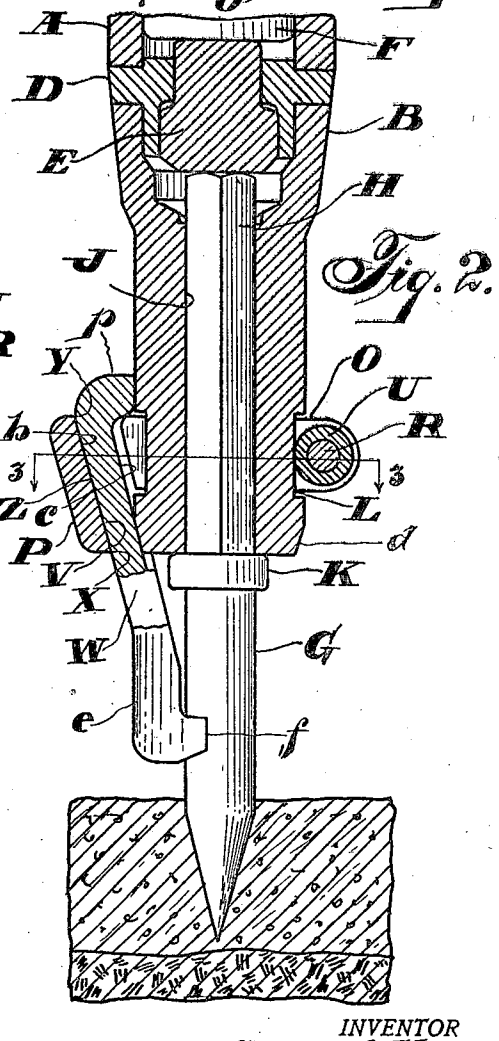


Fig. 2.

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Patented June 14, 1927. 1,632,373

UNITED STATES PATENT OFFICE.

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STEEL RETAINER.

Application filed July 15, 1926. Serial No. 122,677.

This invention relates to rock drills, but more particularly to a steel retainer for fluid actuated rock drills of the hand held type.

The objects of the invention are to prevent accidental ejection of the drill steel from the front head of the rock drill, to render the retaining means capable of being at all times adjusted to the most advantageous position on the front head, and to enable the retaining element to be readily moved into and out of retaining position.

Other objects will appear hereinafter.

To all these ends the invention is shown in one of its preferred forms in the accompanying drawings, in which

Figure 1 is an elevation, partly in section, of the front end of a rock drill showing the front head equipped with a retainer constructed in accordance with the invention,

Figure 2 is a sectional elevation taken through Figure 3 on the line 2—2 looking in the direction of the arrows, and

Figure 3 is a transverse sectional view taken through Figure 2 on the line 3—3 looking in the direction of the arrows.

Referring to the drawings, A represents the front end of a rock drill cylinder to which is secured a front head B by spring pressed side bolts C, only one of which is shown. A front cylinder washer D is interposed between the cylinder A and the front head B to form a closure for the front end of the cylinder. In this instance the front cylinder washer D also serves as a seat for an anvil block E interposed between a hammer piston F in the cylinder A and a drill steel G in the front head B for transmitting the blows of the hammer piston to the drill steel.

The drill steel G may be of any suitable type but its shank H is preferably of polygonal cross sectional form to cooperate with a corresponding bore J in the front head B for preventing relative rotation between the front head and the drill steel. A collar K formed at the juncture of the drill steel G and the shank H serves to limit the distance which the shank may extend into the drill steel. The shank H is preferably of such length that its rearward end may at all times abut the anvil block E and thus force the said anvil block rearwardly into the path of the hammer piston F.

In accordance with the practice of the invention, an annular groove L is formed in the outer periphery of the front head B near the front end thereof to loosely receive arms O of a yoke P. The arms O are preferably provided with partly annular recesses Q near the juncture of the arms and the yoke. These recesses conform to the front head and the radii on which they are formed are preferably slightly longer than one half the distance between the inner faces of the arms O, so that it will be necessary to spread the arms slightly when assembling the yoke on the front head.

Additional means are provided for securing the yoke on the front head. In the present instance such means consist of a bolt R which extends through apertures S in the ends of the arms O and a nut T is screwed on the bolt to prevent spreading of the arms. A spacer U interposed between the arms is bored to receive the bolt R and serves to prevent the arms from being clamped too tightly against the front head.

Formed in the yoke P is a longitudinal slot V to receive slidably a retainer arm W. The slot V in this instance is inclined from the longitudinal axis of the front head to form a narrow opening X in the front end of the slot and a relatively wide opening Y in the rearward end thereof.

The retainer arm W in this instance is of a width to cooperate closely with the sides of the slot V, whereby it is guided and has a flat side Z corresponding to a surface *b* of the yoke P and has an inner curved surface *c* to correspond to a bevel surface *d* formed on the front end of the front head B. The retainer arm W preferably comprises a straight portion *e* adapted to lie parallel to the drill steel G and has a hook *f* at its front end which extends into the path of the collar K of the drill steel. In this instance the hook *f* has an annular recess *g* to conform to the shape of the drill steel G. The straight portion *e* of the retainer arm W is preferably recessed as at *h* to prevent contacting between the retainer arm W and the collar K. In this way also is formed a shoulder *k* which acts as a stop for the collar K. The rearward portion Q of the retainer arm W is inclined from the straight portion *e* to conform to the inclination of the slot V and carries at its rearward end a lateral projection *p* which, when the retainer arm is in its

retaining position, will bear against the side of the front head rearwardly of the groove L to hold the said retainer arm against accidental removal from the path of the drill steel, and to hold the yoke P immovable on the front head.

In its retaining position the curved surface *e* of the retainer arm W will bear tightly against the bevel surface *d* of the front head and, as before stated, the lateral projection *p* will bear against the body portion of the front head B. In this way the flat side Z will be pressed firmly against the surface of the yoke P for holding the retainer arm W in retaining position.

In assembling the retainer on the front head, the retainer arm W is first inserted in the slot V and the arms O may then be placed in the annular groove L. Thereafter the spacer U and the bolt R may be placed in position and the nut T is screwed on the bolt to press the arms O firmly against the spacer U.

In the operation of the drill whenever it is desired to remove a drill steel from the front head, the drill steel may be moved rearwardly into the front head as illustrated in Figure 2 and the retainer arm W may then be moved rearwardly to the position indicated in dot and dash lines in Figure 1. In this position of the retainer arm, the hook portion *f* will be withdrawn out of the path of the collar K of the drill steel and the drill steel may be freely removed from the front head and another drill steel inserted therein. After the insertion of such drill steel in the front head, the retainer arm may again be moved forwardly into its retaining position.

The foregoing described retainer comprises only a few simple parts which may be cheaply constructed and possesses the desirable qualities of durability and simplicity of operation. Owing to the manner in which the yoke P is mounted on the front head, the retainer may readily be adjusted to the most advantageous position. This is particularly desirable in drilling operations where it is necessary to drill closely to curbstones, building foundations and the like. By rendering the retainer arm slidable in the yoke, the said arm will be at all times protected against breakage frequently caused by the impact of the retainer against the material being drilled.

I claim:

1. In a rock drill, the combination of a front head having an annular groove, a drill steel in the front head, a yoke loosely engaged by the groove, said yoke having an inclined longitudinal slot, a retainer arm slidable in the slot whereby it is guided into positions for retaining the drill steel in the front head and for releasing the drill steel therefrom, and means integral with said retainer arm for limiting longitudinal movement of the retainer arm.

2. In a rock drill, the combination of a front head having an annular groove, a drill steel in the front head, a collar on the drill steel, a yoke in the groove and having a rearwardly outwardly inclined longitudinal slot, a retainer arm in the slot to cooperate with the collar for preventing ejection of the drill steel from the front head, and means on the retainer arm cooperating with the front head for holding the yoke in placed position.

3. In a rock drill, the combination of a front head having an annular groove near its front end, a drill steel extending into the front head, a collar on the drill steel, a yoke having arms extending into the groove, means for holding the arms in spaced relation with respect to each other, said yoke having an inclined longitudinal slot, a retainer arm slidable in the slot cooperating with the collar for preventing withdrawal of the drill steel from the front head, said retainer arm having an inclined portion corresponding to the inclination of the slot, and means on the retainer arm cooperating with the front head for holding the yoke in placed position.

4. In a rock drill, the combination of a front head having an annular groove near its front end, a drill steel slidable in the front head, a collar on the drill steel, a yoke, arms on the yoke in rotative engagement with the groove, means for holding the arms in spaced relation with respect to each other, said yoke having an inclined longitudinal slot, a retainer arm slidable in the slot, a hook on one end of the retainer arm adapted to cooperate with the collar for preventing ejection of the drill steel from the front head, and means at the other end of the retainer arm cooperating with the front head rearwardly of the groove for holding the yoke in placed position.

5. In a rock drill, the combination of a front head having an annular groove near its front end, a drill steel slidable in the front head, a collar on the drill steel, a yoke, arms on the yoke in rotative engagement with the groove, means for holding the arms in spaced relation with respect to each other, said yoke having a longitudinal slot, a retainer arm slidable in the slot, a hook on one end of the retainer arm adapted to cooperate with the collar for preventing ejection of the drill steel from the front head, and a lateral projection at the other end of the retainer arm adapted to be forced against the front head for holding the retainer arm in retaining position.

In testimony whereof I have signed this specification.

CHARLES C. HANSEN.