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CENTRALIZER FOR DRILL STEELS

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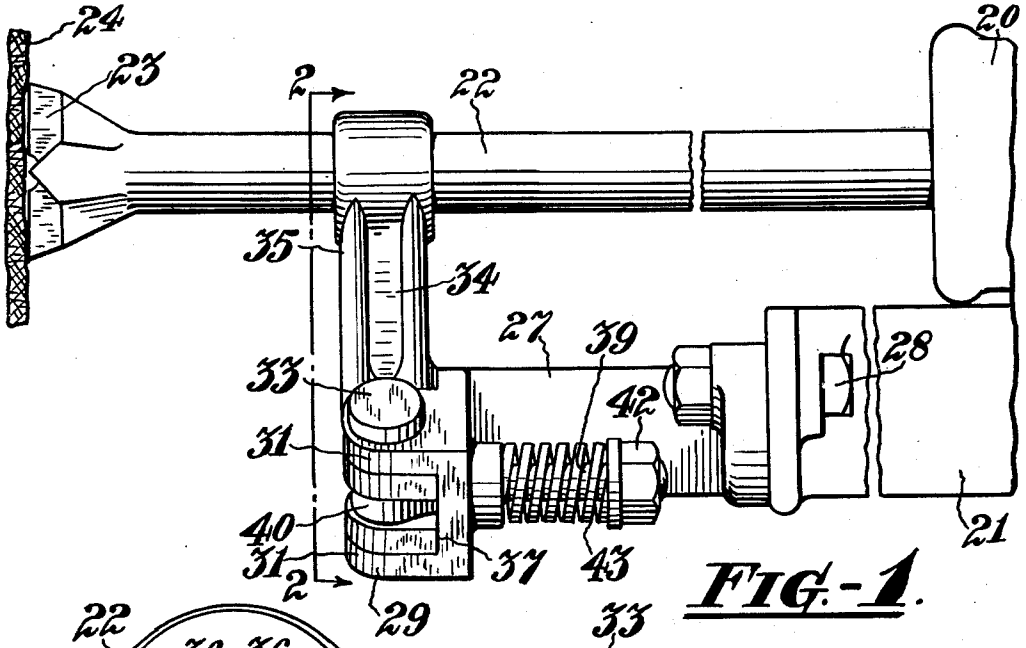


FIG.-1.

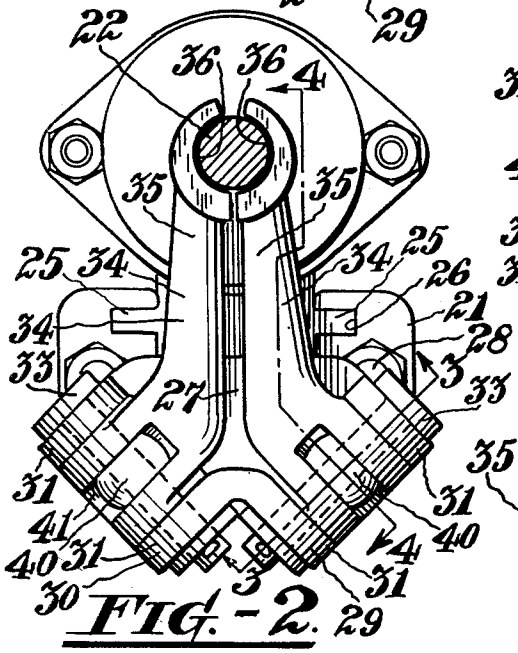


FIG.-2.

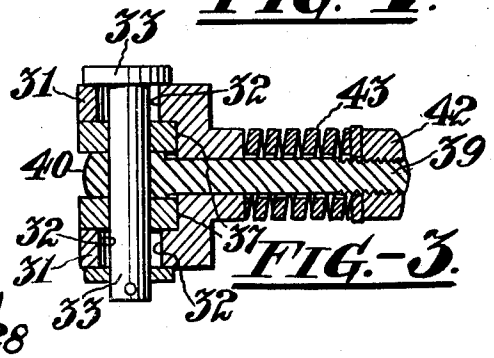


FIG.-3.

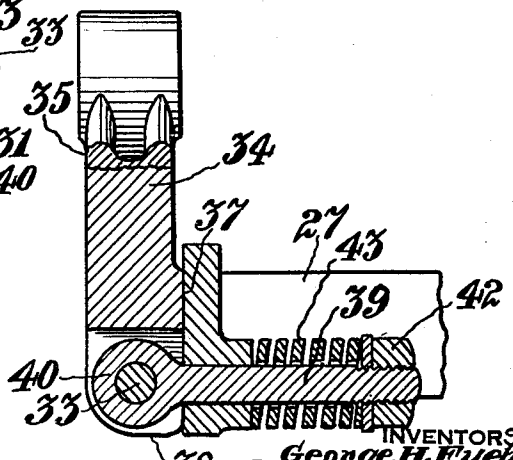


FIG.-4.

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CENTRALIZER FOR DRILL STEELS

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7 Claims. (Cl. 255—45)

This invention relates to rock drills, and more particularly to a centralizer for a drill steel actuated by a rock drill of the hammer type.

In many drilling operations it is extremely difficult to maintain the cutting bit of the working implement in coaxial alignment with the rock drill during the starting of the drill hole. This is particularly true when starting horizontal holes in uneven rock surfaces. Under such conditions the free or cutting end of a rapidly rotating drill steel describes a gyratory movement which makes it an extremely difficult matter to start the drill hole correctly.

Another factor that contributes to the erratic action of the drill steel is the clearance between the shank end of the drill steel and the chuck parts. After the chuck parts become worn and when they constitute the only bearing for the drill steel the steel tends to decline from the desired course of the drill hole and thereby speedily develop a condition in which the action of the rotation mechanism of the rock drill is hampered seriously.

Frequently these unfavorable conditions are not detected until a certain depth has been drilled or until drill steels of greater length have been substituted for the starting drill. If then the position of the rock drill is not changed to coincide with the course of the drill hole the drill steel will bind in the work and cause rapid wear of the gaging surfaces of the cutting bit. Obviously, this will lower the drilling efficiency of the apparatus and necessitate frequent reconditioning of the drill steel.

It is accordingly contemplated to stabilize the free end of the working implement and to assure coincidence thereof with the longitudinal axis of the rock drill whereby it is actuated.

Another object is to enable the centralizer to be readily rocked out of the operative position by means of the rock drill after the drilling operation has progressed to a point at which the guiding function of a centralizer is no longer essential.

Another object is to provide a rugged centralizer of simplified construction which may be easily and quickly mounted upon or removed from the drilling mechanism.

Other objects will be in part obvious and in part pointed out hereinafter.

In the drawing accompanying this specification and in which similar reference numerals refer to similar parts,

Figure 1 is a longitudinal side elevation of rock drilling apparatus equipped with a centralizer constructed in accordance with the practice of the invention,

Figure 2 is a transverse view taken through Figure 1 on the line 2—2,

Figure 3 is a longitudinal sectional elevation of a detail taken through Figure 2 on the line 3—3, and

Figure 4 is a transverse view taken through Figure 2 on the line 4—4.

Referring more particularly to the drawing, 20 and 21 designate the front ends of a rock drill and a shell, respectively, and 22 a drill steel of which the shank may extend into the front head of the rock drill 20 to receive the blows of the hammer piston (not shown). The opposite or free end of the drill steel 22 constitutes the cutting bit 23 which may be of the well known cruciform shape for drilling holes into the rock 24.

The rock drill has the usual guide ribs 25 which extend slidably into guideways 26 in the shell 21 to enable the rock drill to be advanced toward the work in accordance with the penetration of the drill steel thereinto.

The centralizer constructed in accordance with the practice of the invention comprises an extension or support 27 which seats against the front end of the shell 21 and is secured thereto, as by bolts 28. On the opposite end of the support are two groups of lugs 29 and 30 which are arranged angularly with respect to each other, preferably at right angles.

Each group consists of two lugs 31 which are suitably spaced with respect to each other and are provided with elongated apertures 32 extending longitudinally of the support to accommodate pivot pins 33. The pivot pins 33 are of a diameter slightly smaller than the width of the apertures 32 so that the pivot pins may readily slide longitudinally of the apertures.

Between the lugs of each group, and mounted upon the pivot pins 33, are guide members 34 of angular shape having arms 35 which, in the operative position, preferably lie perpendicularly of the drill steel 22 and have partly annular recesses 36 in the confronting surfaces of their free ends to receive the working implement. The recesses 36 are concentric with the portions of the rock drill supporting the shank of the working implement so that, in the guiding position of the arms 35, the working implement 22 will be retained coaxial with the rock drill, irrespective of the degree of clearance between the drill steel and the chuck mechanism of the rock drill.

Near the opposite ends and on the sides of the arms 35 adjacent the front end of the support

27 is a seating surface 37 which engages the end of the support 27 in the guiding position of the arms. The lower end surfaces of the arms, and which are arranged angularly with respect to the surfaces 37, constitute seating surfaces 38 adapted to seat against the front end of the support 27 in the non-guiding positions of the arms.

To the end that the seating surfaces 37 and 38 may be held firmly against the adjacent surface of the support 27, accordingly as the arms occupy the guiding or non-guiding positions, eye-bolts 39 are disposed slidably in the support 27 and the eye-ends 40 of the eye-bolts extend into slots 41 in the arms 35 to receive the pivot pins 33. On the opposite ends of the eye-bolts 39 are nuts 42 to serve as seats for springs 43 seating against the support 27 and encircling the eye-bolts 39.

In the operation of the device, whenever it is desired to start a new drill hole the arms 35 are rocked to the guiding positions in which the working implement 22 lies in the recesses 36. The arms will be held firmly in these positions by the springs 43 which will act to press the seating surface 37 against the front end of the support 27.

The arms remain in the guiding position during the ensuing progress of the cutting bit 23 into the rock, and when the front end of the rock drill advances into contact with the free ends of the arms said arms will be rocked out of the guiding position into a non-guiding position in which the surfaces 38 will seat against the front end of the support 27. The drill may thereafter continue operation and its advancing movement until the working implement has penetrated the rock to the limit of its extent.

The described movement of the arms 35, as will be readily understood, is made possible by the fact that the pivots 33 are capable of free movement longitudinally of the apertures 32 to permit the arms to rock, across the corner defined by the surfaces 37 and 38, from one limiting position to another. The arms 35 may remain in non-guiding position until another working implement of greater length has been substituted for the starting implement and may, if desired, be again rocked to the guiding position to stabilize the overhanging portion of the working implement.

From the foregoing description it will be readily seen that, by means of the present invention, the cutting bit of the drill steel will be held coaxial with the rock drill so that when the bit encounters abnormalities in the rock the steel will be held against departure from the desired course. This is particularly desirable and advantageous in drilling operations wherein it is essential that the holes be drilled parallel to each other, as for example where the line of cut or drilling is later traversed by a broaching mechanism for removing material between adjacent drill holes.

We claim:

1. A centralizer for drill steels, comprising a support, a pair of guide arms, pivots in the support for the arms arranged angularly with respect to each other, and yieldable means for resisting movement of the arms with respect to the pivots.

2. A centralizer for drill steels, comprising a support, a pair of guide arms, pivots in the support for the guide arms and being movable with respect to the support, and spring-pressed means acting on the pivots to hold the guide arms in guiding and non-guiding positions.

3. A centralizer for drill steels, comprising a support having elongated apertures, a pair of guide arms, pivots in the apertures for the guide arms, and spring-pressed means to resist movement of the pivots longitudinally of the apertures.

4. A centralizer for drill steels, comprising a support, a pair of guide arms, pivots in the guide arms arranged angularly with respect to each other, and spring-pressed means connected to the pivots to hold the guide arms in guiding position.

5. A centralizer for drill steels, comprising a support, a pair of guide arms each having seating surfaces arranged angularly with respect to each other, pivots in the guide arms, and spring-pressed means on the pivots slidable in the support to hold one of the seating surfaces against the support in the guiding positions of the guide arms and to hold another seating surface against the support in the non-guiding positions of the guide arms.

6. A centralizer for drill steels, comprising a support, a pair of guide arms, bearings on the support for the guide arms arranged angularly with respect to each other and having elongated apertures extending longitudinally of the support, pivots in the apertures for the guide arms, and spring-pressed means slidable in the support and engaging the pivots to maintain the guide arms in guiding and non-guiding positions.

7. A centralizer for drill steels, comprising a support, a pair of guide arms each having seating surfaces arranged angularly with respect to each other, bearings on the support for the guide arms arranged angularly with respect to each other and having elongated apertures extending longitudinally of the support, pivots in the apertures for the guide arms, plungers slidable in the support interlockingly engaging the pivots, and springs on the plunger to hold one or the other of the seating surfaces against the support accordingly as the guide arms occupy guiding or non-guiding positions.

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