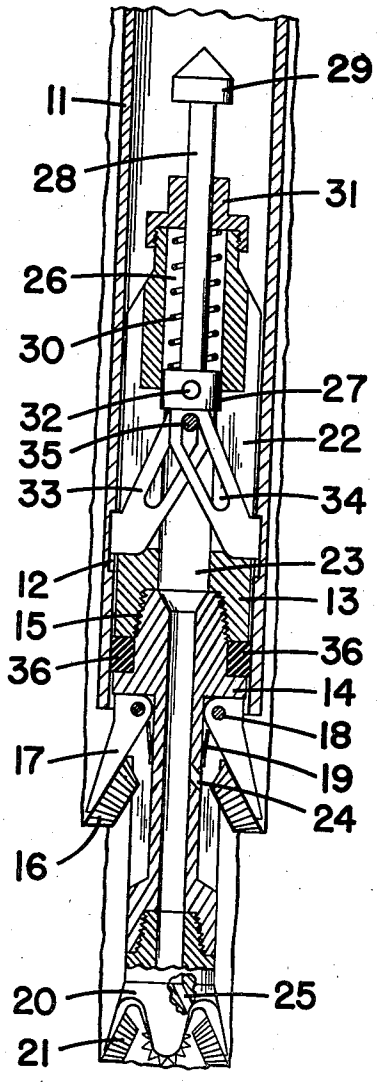
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RETRACTABLE DRILL BIT

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RETRACTABLE DRILL BIT

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3 Claims. (Cl. 255—74)

The present invention is directed to a wire line retractable drill bit.

It is an object of the present invention to produce a drilling bit which may be locked in place on the end of a string of drill pipe and which may be retracted through said drill pipe.

Another object of the present invention is to provide a retractable drill bit particularly suitable for drilling hard formations.

Other objects and advantages of the present invention may be sen from a reading of the following description taken in conjunction with the drawing, in which the sole figure is an elevation, partly in section, of a preferred embodiment of the present invention.

Referring specifically to the drawing, numeral 10 designates the lower end of a bore hole. Arranged within the bore hole is a string of drill pipe 11. It will be seen that this portion of the drill pipe is provided with a thicker section in order to give it the desired strength, and cut into this section are longitudinally extending slots 12.

Arranged with its upper portion within the string of drill pipe and its lower portion extending into the bore hole is the wire line retractable hard formation bit. The body of the bit is comprised of an upper section 13 and a lower section 14, the two sections being secured together by mating screw threads 15.

Secured to lower section 14 are the drilling means comprising reamer cutters 16 secured to arms 17, which, in turn, are attached to body 14 by pivots 18. Springs 19 are arranged to bias the arms outwardly so that the reamer cutters 16 produce a hole having a larger diameter than the diameter of the drill pipe. Arranged below the reamer cutters is rock bit 20 provided with conventional cutters 21. It will be seen that the rock bit has a smaller diameter than the interior diameter of the drill bit so that it can move readily through the drill pipe, and that the hole produced by rock bit 20 is enlarged by reamer cutters 16.

The drill bit is provided with suitable water courses, upper section 13 having water courses 22 which extend into central passage 23. Central passage 23 extends through section 14 and communicates by side passages 24, which supply cutters 16, and conventional pasages 25, which supply cutters 21.

Means for locking the bit with the drill stem so that rotation of the drill stem causes a corresponding rotation of the cutters is arranged in the upper end of the bit. A central passage 26 is provided in the upper end of section 13, and slidably arranged within this passage is cylindrical member 27. Attached to member 27 and extending upwardly therefrom is rod 28 ending in spear head 29. Arranged about rod 28 is spring 30 secured in place by cap 31. Secured to member 27 by pin 32 are dogs 33. Each dog is provided with a suitable slot 34 and passing through the slots and secured to the bit body is dog guide pin 35. The lower ends of dogs 33 are arranged to fit into longitudinal slots 12 when member 27 moves to its lowermost position under the action of spring 30.

A packing ring 36 is arranged around section 14 and secured in position by shoulders on the lower end of section 13. The packing ring is provided to prevent the leakage of drilling fluid between the drill stem and the bit, thereby insuring the proper circulation of drilling fluid during the drilling operation.

The operation of the retractable bit of the present invention is believed obvious from the preceding description. It will be apparent that upon forcing arms 17 and locking dogs 33 inwardly, the device may be passed into the upper end of the drill pipe. The device may then be allowed to fall downwardly under the force of gravity or, if desired, lowered on a wire line to the bottom of the bore hole. With the lower end of the drill stem slightly above the bottom of the bore hole, the lower end of the device will extend beyond the lower end of the drill stem, and the locking dogs will reach a position adjacent longitudinal slots 12 and expand outwardly under the force of spring 30. This will lock the device in the position illustrated by the drawing. Concurrently with the expansion of the dogs will be the expansion of reamer cutters 16 under the influence of springs 19. The device will accordingly be in position for drilling, with the body of the device locked to the drill stem through dogs 33, cutters 21 in position for producing a hole slightly smaller than the drill stem, and reamer cutters 16 in position for enlarging the hole to a size larger than the drill stem.

When it is desired to withdraw the bit, this may be accomplished by lowering a suitable grappling device on a wire line. The grappling device is allowed to latch on to spear head 29 and an upward tension is exerted upon the wire line. The tension is transmitted to the upper ends of dogs 33 and causes them to move upwardly, unlocking the lower ends of the dogs from the drill stem. The device is now unlatched from the drill stem and a continuing upward pull withdraws it to the surface.

While I have disclosed a specific embodiment of the present invention, it will be apparent that various changes may be made in the size, shape and proportion of the various parts of the device without involving invention. It is accordingly my intention to be bound only by the hereby appended claims.

I claim:

1. A retractable bit comprising, in combination, a body adapted to be moved along the bore of a string of drill pipe and provided with a central longitudinal passage and at least one passage radially extending through said body communicating with the central passage, an elongated member with its lower end slidably arranged in said central passage to be moved into an upper and a lower position and its upper end extending above said body when the member is in either position, a dog, means pivoting the upper end of said dog to the lower end of said elongated member, guide means secured to said body arranged to extend said dog through said radial passage and beyond said body with a lower surface of the dog bearing on a portion of said body when said elongated member is in its lower position, and to retract said dog within said body when said elongated member is in its upper position, and cutters carried by the lower end of said body arranged for movement through said drill pipe and for expansion to cut a hole larger than the drill pipe when the lower portion of the body is below the drill pipe.

2. A retractable bit comprising, in combination, a body adapted to be moved along the bore of a string of drill pipe and provided with a central longitudinal passage and at least one passage radially extending through said body communicating with the central passage, an elongated member with its lower end slidably arranged in said passage to be moved into an upper and a lower position and its upper end adapted for engagement with a wire line grappling tool and extending above said body when said member is in either position, an elongated dog having a longitudinally extending slot, means pivoting the upper end of said dog to the lower end of said elongated member, a pin laterally extending through the slot of said dog and secured to said body, the shape of the slot and position of the pin guiding the lower end of said dog through the radial passage and beyond said body, with a lower surface bearing against a portion of said body when said elongated member is in its lower position and retracting said dog when said elongated member is in its upper position, and cutters carried by the lower end of said body arranged for movement through said drill pipe and for expansion to cut a hole larger than the drill pipe when the lower position of the body is below the drill pipe.

3. A device in accordance with claim 2 in which a spring is arranged in the central passage of said body to bias the elongated member to its lower position.

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