

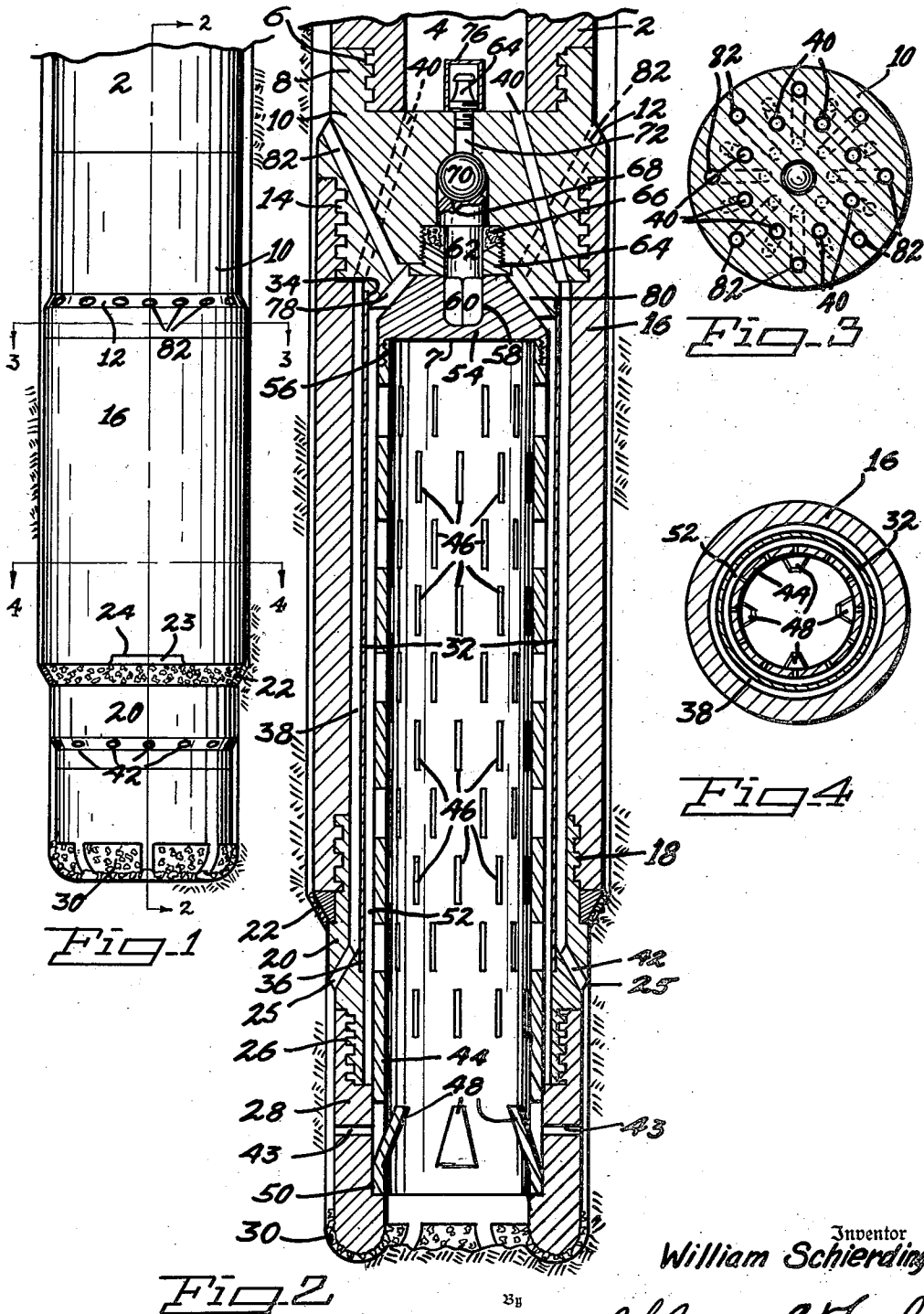
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BORING TOOL

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BORING TOOL

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1 Claim. (Cl. 255—72)

1

My present invention relates to an improved boring tool of the type customarily employed in mining and similar operations where it is desired to remove a solid core of earth and/or rock for testing purposes to ascertain the character and content of the various sub-surface stratum.

In the conventional drill now in use it is usual to force water under pressure down through the hollow bit and the water returns up past the exterior of the bit.

According to my invention among other improvements I propose to supply the water exterior of the bit proper and pass the water through the bit wall up through concentric passages to be exhausted well above the bit.

In so doing I preserve the drilled core without loss or alteration and the removal of the intact core will result in more accurate determination of the matter below the earth's surface.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention according to the best mode I have thus far devised, but it will be understood that various changes and alterations may be made in the exemplified structure within the scope of the appended claim.

In the drawings:

Fig. 1 is a side elevational view of the drill bit of my invention.

Fig. 2 is an enlarged vertical sectional view thereof.

Fig. 3 is a sectional view at line 3—3 of Fig. 1.

Fig. 4 is a sectional view at line 4—4 of Fig. 1.

In the accompanying drawings I have illustrated one complete example of the present preferred form of my invention wherein I employ a drill rod 2 having a center bore 4 to which is threaded at 6 a flange ring 8 of head 10.

The head 10 is fashioned with a tapered shoulder 12 and below, the head is threaded at 14 to the tubular body 16 which in turn is threaded at 18 to the reduced diameter sleeve 20. A diamond cutting ring 22 may be positioned in the offset formed by the difference in diameter between the body 16 and the sleeve 20 and the ring 22 is formed with tips 23 to fit into recesses 24 of the body 16.

The sleeve 20 also has a tapered offset 25 and the sleeve is threaded at 26 to the drill bit 28 which is fashioned with a series of spaced round-ended, diamond cutting surfaces 30.

The body 16, sleeve 20, and bit 28 are hollow centrally, and within the body and the sleeve I affix a cylinder 32 spaced from the body and

2

seated in recesses 34 and 36 of the head 10 and sleeve 20, respectively.

The spacing of cylinder 32 from the body forms an annular passage 38 about the cylinder. In communication with the upper end of this passage, I employ drilled ports 40 formed through the head 10 and having upper ends communicating with the bore 4. Below, I use the drilled ports 42 extending through the sleeve to the shoulder 25, and restricted ports 43 communicate between the exterior of bit 28 and the center bore thereof.

Spaced within and concentric with the cylinder 32, I position an elongated sleeve 44 formed with vertically extending, spaced slots 46 and near the lower extremity of the sleeve and proximate the inner ends of restricted ports 43 I form spaced resilient flaps 48. This sleeve 44 has its lower end seated in the recess 50 of bit 28, and forms a passage 52 between the sleeve and the cylinder 32.

The sleeve 44 is supported by head 54 to which it is threaded at 56 and this head is formed with a squared socket 58 for the squared lower end 60 of shaft 62 which is secured by packing nut 64, and sealed by packing 66 in the head 10. The upper enlarged head of shaft 62 is concave or recessed at 68 to receive ball bearing 70 and the port 72 provides for lubrication of the bearing from grease stud 74 having a cap 76.

The lower face of head 10 is recessed at 78 for reception of the head 54 which is spaced from the wall of the recess to form passage 80 to the ports 82 which provide communication between the passage 52 and the exterior of head 10, at 12.

From the above description it will be seen that as the rod and depending elements are rotated in a hole being drilled, the bit 28 will cut a circular bore surrounding a core which moves through the central bore of the bit into the sleeve 44. The flaps 48 grip the core and prevent the core from passing downwardly out of the sleeve when the drill is removed from the drill hole.

The cutting elements 30 as shown extend beyond the periphery of bit 28 and are concentric with the sleeve 20 above the shoulder 25 and water under pressure in the hollow rod 2 will pass downwardly through ports 40 and passage 38 to ports 42 through which it flows exterior of the bit. The bulk of the water then flows downwardly about the bit 28 and inwardly under the bit 30 to the interior of sleeve 44 and thence outwardly through slots 46 to passage 52, through which it flowed upwardly to passage 78 and outwardly through ports 82 to the exterior of drill

3

rod 2. A portion of the water enters through ports 43 to provide constant flow in the event the bit becomes plugged.

When the core has filled, sleeve 44 the rod is removed from the earth and the bit and sleeve 44 may be removed and the core to be tested displaced intact from the sleeve.

The slots 46 may be of any desired size to allow passage of the water but retain the sludge from the drill, or if desired, they may be large enough to permit the sludge to pass through and out of the core barrel or sleeve 44 with the water.

Some water from ports 42 is forced upwardly between the body 16 and wall of the drill hole to lubricate the body as well as to prohibit sludge from settling and binding the rotary motion of the bit.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

A boring tool comprising a head having its upper end threaded for detachable engagement with the lower end of a tubular drill rod, a cylindrical body threaded from upper and lower ends and having its upper end removably screwed upon the lower end of said head, a coupling sleeve having a threaded upper portion removably screwed into the lower end of said body and formed with an annular shoulder spaced downwardly from the body, a cutting ring fitting about said sleeve and gripped between the shoulder and the lower end of said body, a tubular drill bit having its upper end portion screwed upon the lower end of said sleeve, there being an outwardly offset surface about the sleeve spaced downwardly from the cutting ring, the bit being formed internally with an annular recess defining at its bottom an internal annular shoulder spaced upwardly from the lower end of the bit, said drill bit being formed with circumferentially spaced ports spaced from its upper and lower ends and disposed in upwardly spaced relation to the lower end of the recess, said sleeve being formed with ports extending inwardly from its offset surface, a perforated sleeve extending longitudinally through the body and the coupling sleeve and spaced from the walls of the body and the coupling sleeve and having its lower end fitting into the recess of the bit and resting upon the shoulder at the bottom of the recess, said sleeve being cut to form openings registering with the ports in the bit and also form tongues extending up-

4

wardly at an inward incline across the said ports, said head being formed at its lower end with a recess communicating with a passage extending upwardly through the head and having its upper portion reduced and forming a grease port, a bearing ball in said passage, a shaft fitting into said passage through the lower end thereof and having its upper end engaging the bearing ball and its lower portions protruding downwardly from the head and formed with a squared end, a nut about said shaft screwed into said passage and holding the shaft in place, a cap for said perforated sleeve fitting into the recess of said head in spaced relation to the wall of the recess and having its upper end abutting said nut and formed with a socket into which the squared end of the shaft fits, a cylinder surrounding said perforated sleeve and defining longitudinally extending inner and outer annular spaces between the perforated sleeve and said body, the ports in said coupling sleeve having their inner ends communicating with the bottom of the outer space, said head being formed with vertical passages having their lower ends communicating with the upper end of the said outer space and their upper ends communicating with the hollow drill rod, and said head being also formed with other vertical passages having upper ends opening externally of the head and lower ends communicating with space in the recess about the cap and communicating with the inner space about the perforated sleeve.

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