

PATENT SPECIFICATION (11)

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- (21) Application No. 21489/75 (22) Filed 20 May 1975 (19)
 (31) Convention Application No. 76654/74 (32) Filed 28 May 1974 in
 (33) Australia (AU)
 (44) Complete Specification published 4 May 1977
 (51) INT. CL.³ E21B 49/02
 (52) Index at acceptance
 E1F 31A 31B 31C 31D2 31F



(54) IMPROVED SAMPLING DRILL

(71) We, WALLIS GEOCHEMICAL DRILLING CO. PTY. LTD., a Company incorporated in the Northern Territory, Australia, whose registered office is situated at 3 Edward Street, Bellevue, in the State of Western Australia, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a sampling drill for obtaining samples for geological testing and exploration. The sampling drill of the present invention is particularly suitable for use in drilling through sand and other relatively soft material and in situations where water may be encountered.

The invention resides in a sampling drill comprising a plurality of drill rods coupled together to form a drill stem, the drill stem being suspended from a drill head, each of said drill rods comprising a pair of substantially concentric tubular members defining an inner central passage and an annular passage, the lower end of said drill stem being fitted with a drill bit having an inner chamber connected to the inner central passage of the drill stem, and one or more passages connected at one end to the annular passage in the drill stem and discharging at the other end into said inner chamber, said inner chamber being provided with openings located adjacent the cutting edges of the drill bit so that material cut by the drill bit can pass into said inner chamber and means for shutting off said inner central passage to prevent material which enters the inner chamber of the drill bit from entering said inner central passage.

The invention will be better understood by reference to the following description of one specific embodiment shown in the accompanying drawings wherein:—

Fig. 1 is a sectional elevation of a drilling bit suitable for obtaining core samples from mineral sands; and

Fig. 2 is an enlarged sectional elevation of the cutting component of the drill or drill bit, the section being taken at 90° to that of Fig. 1.

In this embodiment the drill rods (not shown) are formed from two lengths of tubular metal located concentrically one inside the other to provide a central circular inner passage and an annular or outer passage. One end of each of the two components of each drill rod is provided with an externally tapered thread adapted to engage a correspondingly tapered socket in the adjacent end of each of the two components of an adjacent drill rod. A drill stem is formed from an assembly of the drill rods, the lower end of the stem being fitted with a drill bit and the upper end of the stem fitted into a drill head in the usual manner. The outer face of each drill rod is fitted with auger flights in the usual manner whilst the upper end of the inner portion of the stem is fitted with a suitable controlling device. The head is also provided with means for feeding air under pressure into the annular passage between the inner and outer portions of the drill stem. As shown in the drawings the drill bit unit comprises an inner tubular member 11 adapted to be coupled to the inner central passage of the drill stem and an outer tubular member 12 adapted to be coupled to the outer component of the drill stem. The outer surface of the outer tubular member 12 is provided with auger flights 13 which form a continuation of the auger flights on the outer component of the drill stem. The drill bit proper 14 which is provided with cutting edges 15 and 16 is screwed onto the lower end of the outer tubular member 12 so as to be contiguous therewith. The bit is provided with an inner chamber 17 which is connected to the exterior of the bit through vertical openings adjacent the cutting edges 15, 16. The lower portion of the chamber 17 has a central boss 18. The inner tubular member 11 is slidably mounted within the outer tubular member and in the lowermost position as will be evident from the drawing the lower end thereof passes through the chamber 17 and rests in a recess 19 formed in the upper face of the central boss 18 of the bit. The inner tubular member 11 is provided with an outwardly projecting flange 20 which limits the upward movement of the inner tubular mem-

ber with respect to the outer tubular member 12. The neck of the drill bit through which the inner tubular member passes is provided with recesses 21 and 22 into which sealing members (not shown) are fitted. The body of the drill bit is provided with a series of substantially L-shaped passages 23 which discharge through the central boss 18 in the chamber 17 between the boss 18 and the cutting edges 15, 16 of the bit.

In the position shown in Fig. 1 of the drawing with the lower end of the inner tubular member 11 partly raised above the central boss 18, the air passing down the annular space in the drill stem passes through the annular space A between the inner and outer tubular members 11 and 12 and is discharged through the passages 23 into the chamber 17 in the drill bit. When drilling is proceeding the cuttings enter the chamber 17 and are carried upwardly through the inner tubular member 11 into the central passage of the drill stem and to the surface by the stream of air and provide a true sample of the section being drilled. When drilling stops the inner tubular member 11 is lowered to seat on the boss 18 by the action of the controlling device, the inner central passage is shut off and any water or loose material in the bottom of the hole is excluded. Whilst the invention has been described with particular reference to one particular form of bit any other suitable type of bit may be used.

WHAT WE CLAIM IS:—

1. A sampling drill comprising a plurality of drill rods coupled together to form a drill stem, the drill stem being suspended

from a drill head, each of said drill rods comprising a pair of substantially concentric tubular members defining an inner central passage and an annular passage, the lower end of said drill stem being fitted with a drill bit having an inner chamber connected to the inner central passage of the drill stem, and one or more passages connected at one end to the annular passage in the drill stem and discharging at the other end into said inner chamber, said inner chamber being provided with openings located adjacent the cutting edges of the drill bit so that material cut by the drill bit can pass into said inner chamber and means for shutting off said inner central passage to prevent material which enters the inner chamber of the drill bit from entering said inner central passage.

2. A sampling drill as claimed in claim 1 wherein the lower end of the inner portion of the drill stem is connected to a tubular member the lower end of which slidably passes through the neck of the bit in sealing engagement therewith to seat on a central boss within the inner chamber within the bit to form the means for shutting off the inner chamber from said inner central passage.

3. A sampling drill substantially as herein described and as shown in the accompanying drawings.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1977
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY
from which copies may be obtained.

