

April 4, 1944.

J. M. CAMP

2,345,699

RETRACTABLE CORE HEAD

Filed April 20, 1942

2 Sheets-Sheet 1

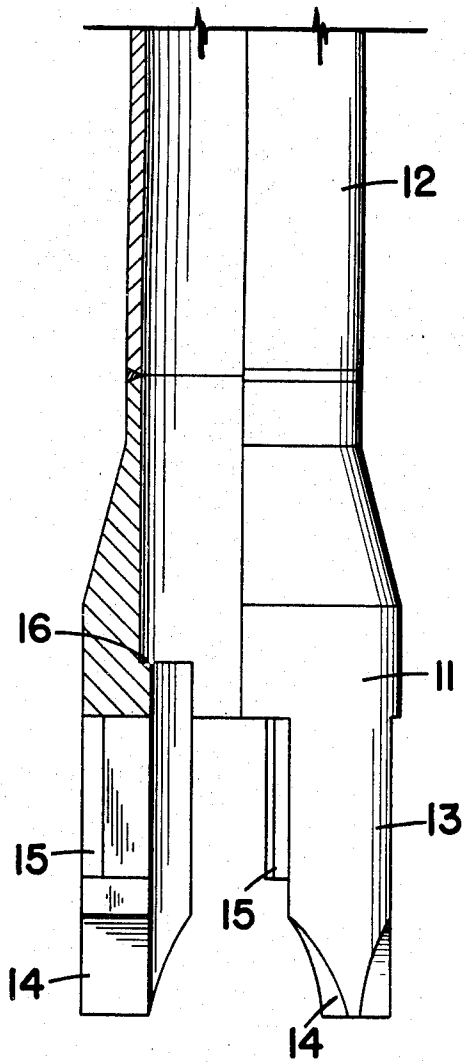


FIG. 1.

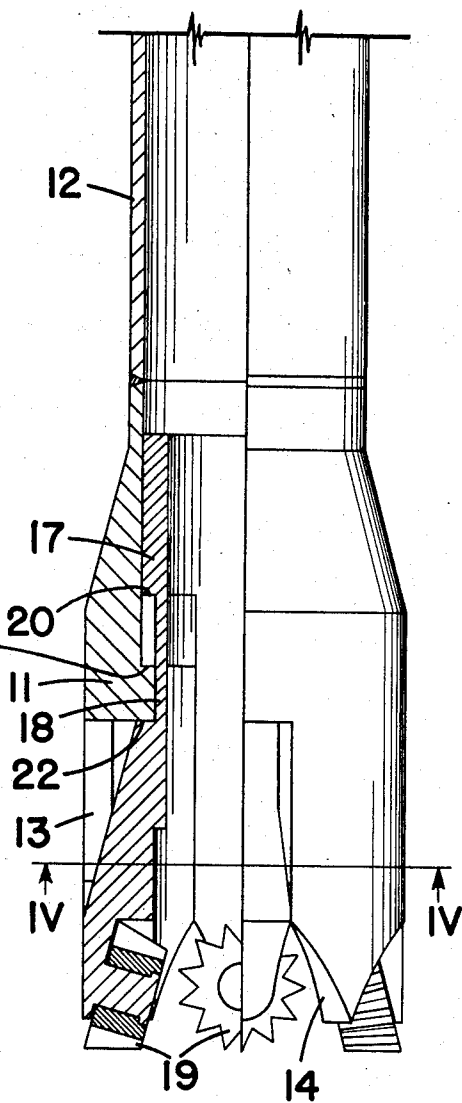


FIG. 2.

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2 Sheets-Sheet 2

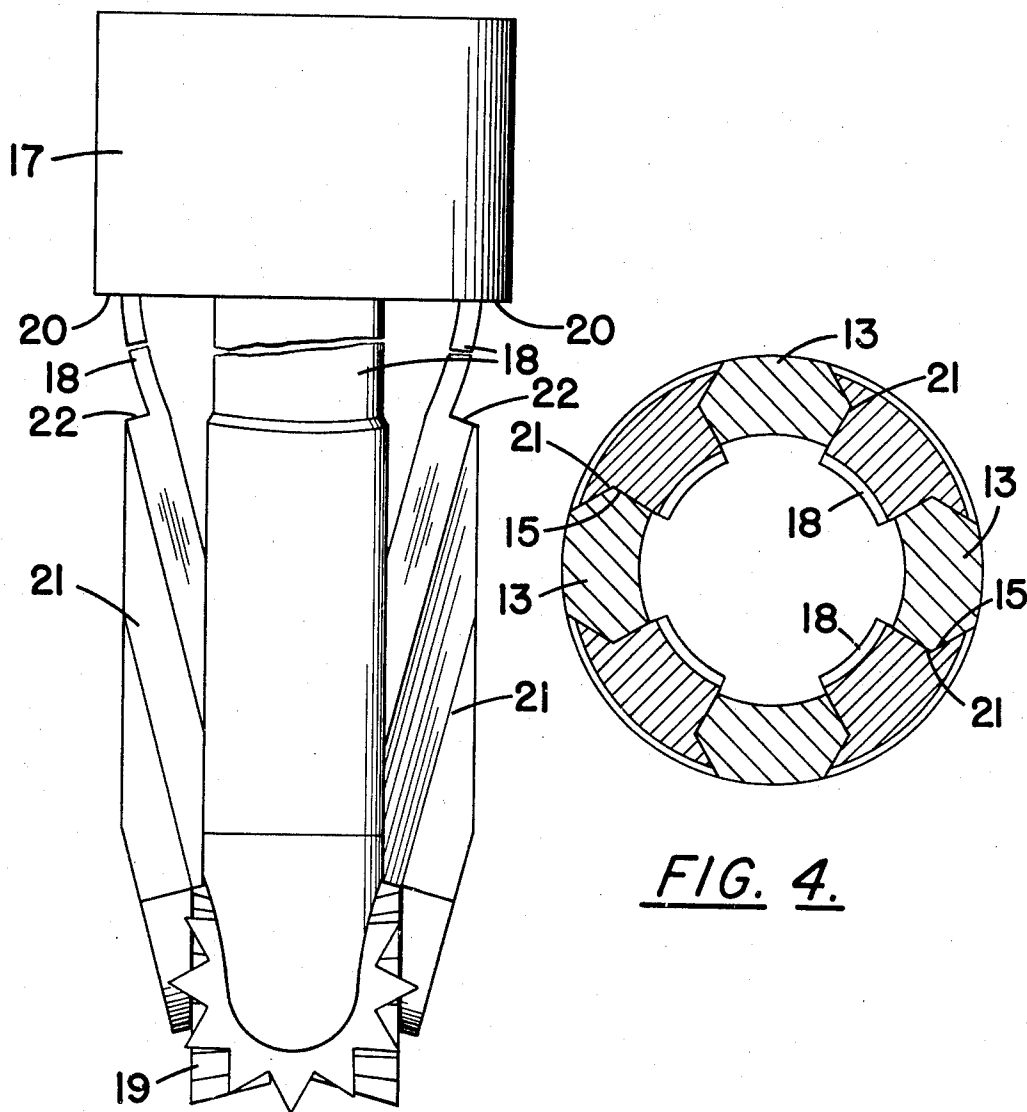


FIG. 3.

FIG. 4.

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UNITED STATES PATENT OFFICE

2,345,699

RETRACTABLE CORE HEAD

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Application April 20, 1942, Serial No. 439,666

2 Claims. (Cl. 255-72)

The present invention is directed to a core head designed for passage through a drill string and for latching to the drill string for taking cores. It is an object of the present invention to design a wire line retractable core head.

A further object of the present invention is to design a retractable core head which optionally may be provided with cutters particularly suited for drilling either hard or soft formations.

Other objects and advantages may be seen from the description taken in conjunction with the drawings in which

Fig. 1 is an elevation, partly in section, of a shoe suitable for attachment to the lower end of a drill string for receiving a retractable core head;

Fig. 2 is an elevation, partly in section, of the shoe shown in Fig. 1 with a retractable core head in position;

Fig. 3 is an elevation of the retractable core head before it is latched to the shoe; and

Fig. 4 is a section taken along line IV-IV of Fig. 2.

Referring now specifically to the drawings, shoe member 11 is attached by suitable means, such as welding, to the lower end of drill string 12. The lower portion of member 11 is provided with a plurality of longitudinal slots which divide the lower portion into a plurality of segments or fingers 13. Each finger terminates in a point which preferably connects to the full sized section by arcuate surfaces 14. The sides 15 of the fingers 13 are wedge-shaped so that the slots defined by the fingers will receive and retain the blades supporting the core head, which are described in greater detail hereafter. The interior of member 11 is provided with a ledge or shoulder 16.

The retractable core head comprises a cylindrical member 17 to which are attached downwardly extending spring blades 18, with the lower end of each spring blade attached to a suitable cutter 19. In the illustration cutter 19 is of the rotary type conventionally used for drilling through hard rock, but obviously other cutters, such as those of the drag type, may be secured to spring blades 18. Member 17 is provided with outwardly projecting shoulders 20 arranged to cooperate with ledge 16 of the shoe in order to limit the downward movement of the core head.

Spring blades 18 are proportioned and arranged to lock in the slots defined by fingers 13 of the casing shoe. The sides of the lower portion of spring blades 18 are provided with V-shaped grooves 21. On the outer surface of each spring blade 18 is an outwardly extending ledge or shoulder 22 arranged to rest against casing shoe 11 when the core head is in position.

When the core head is in position.

In operation the casing shoe is attached to the lower end of the string of drill pipe and the pipe is lowered in the bore hole until the casing shoe is near the bottom of the hole. The core head will then be dropped through the drill string until the cutters extend beyond the drill collar. A suitable expanding tool will then be forced down the drill pipe and into the core head to expand spring blades 18 outwardly. The drill string is then lowered until the cutters rest on the bottom of the hole. Weight is then put on the drill string which, in turn, forces the core head upwardly with respect to said shoe. With grooves 21 of the spring arms mating with the V-shaped extensions 15 of fingers 13 the relative movement between the core head and the casing shoe will terminate when shoulders 22 of the spring arm come in contact with the upper ends of the casing shoe slots. When the core head is in this position, the expanding tool may be removed and the coring begun.

In a similar manner the core head may be removed by forcing an extracting tool down the drill stem to push the core head downward so that the spring blades may be released and allowed to contract inwardly. The cutters may then be engaged so that they will be retained in this inward position as the core head is raised to the surface of the earth.

While I have disclosed a specific embodiment of the present invention, it will be apparent to the worker skilled in the art that various changes may be made without departing from the scope of the present invention. For example, instead of using a rotary cutter, other types, such as drag type cutters or cutters built up of segments of various abrasive materials, may be employed. It will also be obvious that various means of locking the spring arms to the drill collar may be employed. For example, the slots arranged to receive the grooved part of the spring arms may have tapering rather than parallel sides.

Having thus described and illustrated the present invention, what I claim is:

1. A device suitable for taking cores comprising, in combination, a shoe adapted to be secured to the end of a string of drill pipe and provided with a plurality of downwardly extending fingers, a core head adapted for slidable movement within said shoe comprising a cylindrical member, a plurality of downwardly extending arms with their upper ends firmly attached to the cylindrical member and their lower ends movable

radially and biased inwardly, and a cutter secured to the lower end of each arm, said fingers and arms being provided with mating, longitudinally extending lands and grooves arranged for releasable engagement and to lock said head to said shoe when engaged.

2. A device suitable for taking cores comprising, in combination, a shoe adapted to be secured to the end of a string of drill pipe and provided with a plurality of longitudinally grooved downwardly extending fingers, a core head adapted for slidable movement within said

5 shoe comprising a cylindrical member, a plurality of downwardly extending arms with their upper ends firmly attached to the cylindrical member and their lower ends movable radially and biased inwardly, and a cutter secured to the lower end of each arm, said arms being provided with longitudinally extending lands, said lands being arranged to engage releasably with the grooves of said fingers and to lock said head to said shoe when engaged therewith.

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