March 11, 1941. J. C. STOKES 2,234,286

CORE CATCHER

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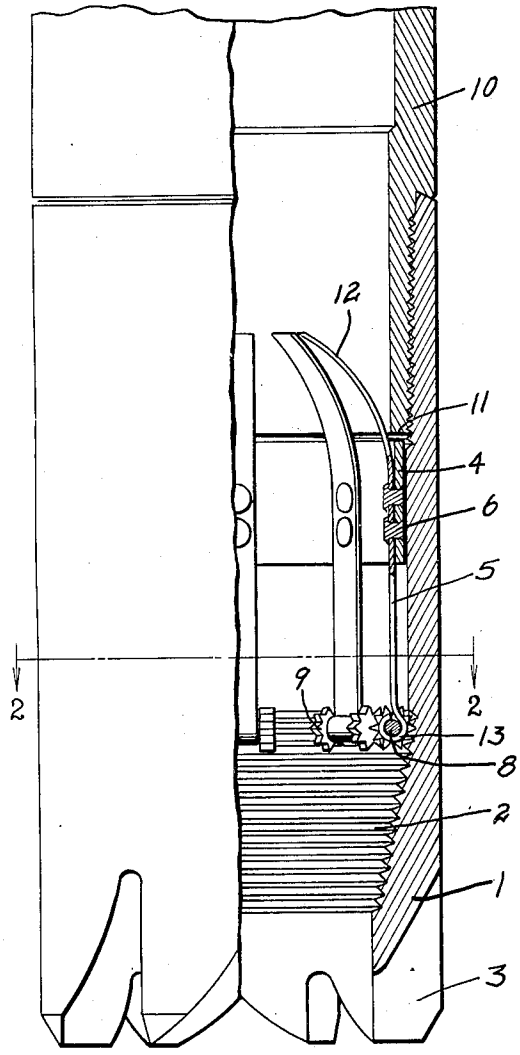


Fig. 1.

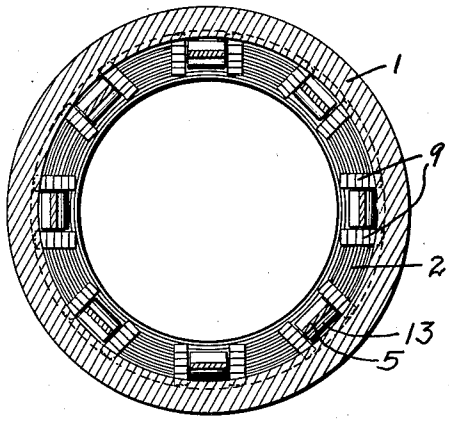


Fig. 2.

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CORE CATCHER

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4 Claims. (Cl. 255—72)

This invention relates to core catchers for cutter heads or bits used in drilling wells or the like.

The principal object of the invention is to provide a cutter head with a core catcher that will grip and take either a hard or a soft formation core, the improvements being particularly designed for efficient operation with a hard or rock core.

A further object of the invention is to provide a structure which can be easily or cheaply made, embodying catchers in the form of rollers, pinions, or toothed wheels which can conveniently be cut from stock pinion wire, and these cooperate with an inclined grooved surface the grooves of which can be hob cut quite cheaply.

Other features of advantage will be apparent from the following description and the accompanying drawing in which—

Fig. 1 is a side elevation partly in section of a cutter head provided with one form of the improvement;

Fig. 2 is a section on the line 2—2 of Fig. 1.

Referring specifically to the drawing, 1 indicates the hollow rotary cutter head screwed as usual to the lower end of the core barrel 10 and shown with conventional teeth 3. Near its lower end the hollow head is inclined or tapered vertically and the tapered part is internally and circumferentially grooved as indicated at 2, forming a tapered circular rack. It may be noted that these grooves are circular, not threaded.

Mounted within the hollow of the head, above the inclined rack is a ring or band 4 which has limited movement up and down, the upward movement being stopped by the shoulder 11 at the end of the core barrel 10. A plurality of vertical flat springs 5 are riveted to the ring as indicated at 6, and the portion of the springs above the ring 4 are bent inwardly to form fingers 12 which act as the core catcher for soft formations. The part of the springs 5 depending below the ring 4 each terminate in a loop 13 through which passes a small shaft 8 having at each end a small pinion or toothed wheel 9, in position to engage the tapered circular rack 2 as shown.

The grooves 2 allow the cutter head to rotate in its cutting operation while the catcher remains stationary with the core. As the core enters the bit and moves upwardly therein the catcher will be moved upwardly to its uppermost position both by the contact of the core with the spring fingers 12 and also by the contact of the core with the innermost teeth of the pinions or wheels carried on the lower ends of the spring arms. When the coring has been completed and the bit is raised to break off the core and remove the same from the well the spring fingers will tend to dig into the core and move the core catcher downwardly with respect to the bit and ordinarily will break off a soft core. In the event that the core is hard, or if for some other reason the spring fingers do not dig in, the upward movement of the bit with respect to the core will, through engagement between the core and the pinions or toothed wheels referred to, cause the pinions to rotate and to travel downwardly along the rack 2 formed inside the cutter head. This will move the entire core catcher relatively downwardly and the pinions will in such downward movement also move radially inwardly to more tightly grip the core and finally break off the same, for removal with the head in the usual manner.

It will be seen that the gripping action of the catcher is automatic with the lifting movement of the head and the rollers grip by their teeth as well as by wedge action incident to the movement.

The invention may be embodied in various other forms within the scope of the following claims.

I claim:

1. A hollow core cutting head having a tapering shoulder on the inner surface thereof, the surface of said shoulder tapering toward the cutting edge of the hollow head and toward the axis thereof, said shoulder having a plurality of axially spaced circumferentially extending grooves in the surface thereof, a core catcher sleeve rotatably and axially slideably mounted within said hollow head, said core catcher sleeve having a plurality of flexible arms mounted thereon and extending substantially in an axial direction relative to the hollow head, and a plurality of toothed rollers carried by said flexible arms below the sleeve and meshing with the circumferential grooves in the surfaces of said tapering shoulder.

2. A hollow core cutting head having a tapering shoulder on the inner surface thereof, the surface of said shoulder tapering toward the cutting edge of the hollow head and toward the axis thereof, said shoulder having a plurality of axially spaced circumferentially extending grooves in the surface thereof, a core catcher sleeve rotatably and axially slideably mounted within said hollow head, said core catcher sleeve having a plurality of flexible arms mounted thereon and extending substantially in an axial direction relative to the hollow head, and a plurality of toothed

rollers carried by said flexible arms below the sleeve and meshing with the circumferential grooves in the surfaces of said tapering shoulder, the upper internal diameter of the tapering shoulder being substantially the same as the external diameter of the sleeve.

3. A core catcher adapted to be mounted within a hollow core cutting head comprising a ring, a plurality of resilient core engaging arms mounted on said ring, the ends of said arms being bent into shaft receiving and supporting loops, a shaft mounted in each loop, and a toothed core engaging roller mounted on each end of each shaft.

4. A hollow core cutting head having a tapering shoulder on the inner surface thereof, the surface of said shoulder tapering toward the cutting edge of the hollow head and toward the axis thereof, said shoulder having a plurality of axially spaced circumferentially extending grooves in the surface thereof, a core catcher rotatably and axially slideably mounted within said hollow head, said core catcher having a plurality of flexible arms extending substantially in an axial direction relative to the hollow head, the ends of said arms being bent into shaft receiving and supporting loops, a shaft mounted in each loop, and a toothed core engaging roller mounted on each end of each shaft and meshing with the circumferential grooves in the surface of said tapering shoulder.

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