

UNITED STATES PATENT OFFICE

2,073,876

CORE BARREL

Guy C. Oliver, Glendale, Calif.

Application December 4, 1935, Serial No. 52,820

13 Claims. (Cl. 255-72)

This invention relates to core barrels.

The general object of my invention is to provide a core barrel including a bit head and a novel core receiving member.

5 A further object of my invention is to provide a core barrel with novel means for providing circulation within the barrel.

A further object of the invention is to provide a core barrel including an outer and inner barrel 10 so constructed and arranged that circulation is provided between the inner and outer barrel and wherein the discharge of fluid from between the barrels is effected in a novel manner.

15 Another object of the invention is to provide novel means for supporting a core so that friction between the core barrel and core is reduced to a minimum.

20 Another object of the invention is to provide novel means for adjusting the position of the inner core barrel relative to the bit.

Other objects and the advantages of this invention will be apparent from the following description taken in connection with the accompanying drawing, and wherein:

25 Fig. 1 is a central sectional view of a core barrel embodying the features of my invention;

Fig. 2 is a fragmentary view similar to Fig. 1 and on a larger scale showing the lower end of the core barrel;

30 Fig. 3 is a side elevation showing the bit;

Fig. 4 is an end view of the core barrel; and

Fig. 5 is a section taken on line 5-5 of Fig. 2.

Referring to the drawing by reference characters I have shown my invention as embodied in a core barrel which is indicated generally as at 10. As shown the core barrel is suspended by a sub 11 which is suspended at the lower end of a drill string 12.

30 The core barrel 10 includes a shell 13, the lower end of which is connected to a collar 14. The collar 14 has a bit 15 secured at the lower end thereof.

The bit 15 comprises a body having an annular flange 16 thereon which is threaded to the lower end of the collar. The bit also has cutting teeth 17 on the lower edge thereof which are arranged in a circular fashion and also has reamer blades 18 thereon, which blades have sharpened lower cutting surfaces 19. I preferably provide 50 four of these reamer blades and their outer surfaces are eccentrically disposed, as shown in Fig. 4, while the cutting surfaces 19 are disposed at varying distances above the lower end of the bit.

55 The body of the bit is provided with a plurality of downwardly directed fluid apertures 20. These

apertures at their upper ends terminate in shoulders 21, and at their lower ends merge into apertures 22 which apertures 22 at their inner ends terminate at the inner surface 23 of the bit. The apertures 22 at their outer ends open through the side of the bit behind the reamer blades 18. 5

The interior of the bit is threaded as at 24 just below the shoulder 21 and the threads 24 engage the threads of an outer barrel 25. The outer diameter of the barrel 25 is less than the internal diameter of the shell 13 so that a circulation space is provided for the normal pump circulation which passes through the space 26 and into the apertures 20 as will be presently explained. 10

Mounted upon upper end of the barrel 25 I mount a threaded cap 27 which has a threaded aperture 28 therein, and in this threaded aperture 28 I mount a stem 29 which has a wrench engaging portion 30 on the upper end thereof. A hollow lock cap 31 is mounted on the stem 29 and when this cap is tightened it locks the threaded stem 29 in adjusted position. 15 20

The stem 29 has a flange 32 on the lower end thereof. This flange 32 includes a skirt 33 which is threaded in the end of a coupling member 34 and which engages one element of an anti-friction bearing 35. The anti-friction bearing rests on an internal flange 36 on the coupling member 34. A post 37 passes through the flange 36 and the upper end of this post has a nut member 38 thereon which engages the anti-friction bearing 35 to thereby rotatably support the post. 25 30

The post 37 is provided with a depending skirt 41 which is provided with circumferentially arranged apertures 42, and the lower end of the skirt is threaded as at 43. An inner barrel 44 has its end threaded to engage the threads 43. The outer diameter of the skirt 41 and inner barrel 44 is less than the inner diameter of the barrel 25 so that a space 45 is provided between the two barrels. The upper end of the space 45 communicates through the apertures 42 with the interior of the inner barrel, while the lower end of the aperture 45 communicates with the inner end of the apertures 22. 40 45

Mounted on the lower end of the bit I show a core catcher assembly 46 which is provided with a plurality of slots 47 in its lower end. In each of these slots 47 I pivotally mount a catch member or dog 48. These dogs 48 have bevelled inner faces 50 and are normally urged to the position shown in Fig. 2 by springs 51. Mounted on the lower end of the core catcher assembly 46 I show a flanged collar 52 which fits within the bit and which has a lower end which closes 55

the slots 47. The core catcher assembly has a bevelled face 53 to direct fluid into the apertures 22. The interior of the core catcher assembly is provided with a plurality of resilient fingers 54 which are secured at their lower ends as by rivets 54'. The core catcher assembly 46 is preferably made of bronze and has a rubber sleeve 55 vulcanized therein. The sleeve 55 includes a bead 55' which fits in an annular groove 10 in the core catcher assembly. The rubber sleeve protects the core from injury due to heat developed by friction while the core is being taken.

The lower end of the inner barrel 44 fits in a rabbet 56 in the wall of the core catcher assembly 15. The interior diameter of the core catcher assembly is approximately the same as that of the core which is cut by the bit, while the interior diameter of the inner barrel 44 is greater than that of the core. As a result there is but 20 very little friction between the core and the core barrel and this amount of friction is confined to the portion adjacent the core catcher assembly 46. Since the portion above the core catcher assembly is of greater diameter, the core moves 25 free in this portion. This prevents destruction or damage of the core.

In operation my core barrel is secured to the end of the drill string and the normal circulation passes down the drill string and through 30 the space 26 between the outer core barrel and the interior of the shell and passes through the apertures 20 thence to the hole. Some of the circulation fluid will pass with the core into the inner barrel 44 and the fluid in this barrel rises 35 until it passes through the apertures 42 thence it passes downwardly through the space 45 between the inner and outer barrel and out through the apertures 22. The main circulation, of course, is through the apertures 20 and the current of fluid moving through apertures 20 creates an injector effect thus maintaining the discharge opening from the end of the apertures 22 unobstructed and to a slight extent drawing the fluid through the apertures 22.

After the desired length of core has been secured the core barrel is withdrawn from the well and removed from the drill string. The bit is then removed and following this the core catcher assembly 46, which has a tight sliding fit with 50 the inner barrel, is withdrawn and the core removed.

In assembly the parts are positioned as shown in Fig. 1 with the cap 31 removed. The stem 29 is then turned until the collar 52 engages the shoulder at the lower end of the bit. After this the stem 29 is slightly unscrewed until the inner barrel rotates freely and after this the lock cap 31 is inserted.

With my invention the circulation is maintained through the core barrel by the main fluid circulating through the apertures 20 so that there is no stoppage of apertures 22. The apertures 22 are disposed at the rear of the reamer blades 18 and this causes more or less of a swirling action 65 adjacent the apertures 22 to thus further assure that the circulation will be maintained. In addition to the apertures 22, I may provide apertures 57 in front of each reamer blade. These apertures 57 communicate with the space 26 but 70 not with the space 45.

With my core catcher assembly 46, I can readily remove a core and the rubber sleeve within the core catcher assembly prevents burning of the core.

From the foregoing description it will be ap-

parent that I have provided a novel core barrel which can be economically manufactured and which is highly efficient in use.

Having thus described my invention I claim:

1. In a core barrel, a bit having a central core 5 opening therethrough, an outer core barrel mounted on said bit, an inner barrel rotatably mounted on said outer barrel, said inner barrel throughout its length being arranged within and spaced from said outer barrel, means affording 10 communication between the interior and the exterior of the inner barrel, means affording communication between the interior of the outer barrel and the exterior thereof, and a core catcher assembly mounted on the inner barrel, said core catcher assembly having an aperture there- 15 through which is of substantially the same diameter as that of the bit core opening, both of said apertures being of less size than that of the interior of the inner barrel. 20

2. In a core barrel, a bit having a central core opening therethrough, an outer core barrel mounted on said bit and extending thereabove, a cap secured on the upper end of said outer core barrel, an inner barrel rotatably mounted on said 25 cap, said inner barrel being spaced from said outer barrel, means affording communication between the interior and the exterior of the inner barrel, means affording communication between the interior of the outer barrel and the exterior thereof, a core catcher assembly mounted on the 30 lower end of said inner barrel, said core catcher assembly having an aperture substantially equal in size to the bit opening, said aperture being of less size than the interior of the inner barrel, and a rubber sleeve vulcanized in said core catching 35 assembly.

3. In a core barrel, a bit having a central core opening therethrough, an outer core barrel mounted on said bit and extending thereabove, 40 a cap on said outer core barrel, a coupling member supported by said cap, an anti-friction member engaging said coupling member, a post engaging said anti-friction member to rotatably support said post, an inner barrel secured on said 45 post, said inner barrel being spaced from said outer barrel, means affording communication between the interior and the exterior of the inner barrel at the top thereof; and a core catcher assembly including a part inserted in the lower end of said inner barrel, said core catcher assembly having an aperture substantially equal in size to the bit opening, said aperture being of less size than the interior of the inner barrel. 50

4. In a core barrel, a bit having a central core opening therethrough, an outer core barrel 55 mounted on said bit and extending thereabove, a cap secured on the upper end of the outer core barrel, an inner barrel rotatably mounted on said cap, said inner barrel being spaced from said 60 outer barrel, means affording communication between the interior and the exterior of the inner barrel, means affording communication between the interior of the outer barrel and the exterior thereof, a core catcher assembly mounted on the 65 inner barrel, said core catcher assembly having an aperture therethrough which is of substantially the same diameter as that of the bit core opening, said aperture being of less size than that of the interior of the inner barrel and a rubber 70 sleeve in said core catcher assembly.

5. In a core barrel, a bit having a central core opening therethrough, an outer core barrel mounted on said bit and extending thereabove, a cap secured on the upper end of said outer core 75

barrel, a coupling member adjustably supported by said cap, an anti-friction member engaging said coupling member, a post engaging said anti-friction member to rotatably support said post, an inner barrel secured on said post, said inner barrel being spaced from said outer barrel, means affording communication between the interior and the exterior of the inner barrel at the top thereof, a core catcher assembly including a part inserted in the lower end of said inner barrel, said core catcher assembly having an aperture substantially equal in size to the bit opening, said aperture being of less size than the interior of the inner barrel, a plurality of spring pressed dogs in said core catcher assembly, a plurality of spring fingers in said core catcher assembly and a rubber sleeve vulcanized in said core catcher assembly.

6. In a core barrel, a bit having a central core opening therethrough, an outer core barrel mounted on said bit and extending thereabove, an inner barrel rotatably mounted on said outer barrel, said inner barrel being spaced from said outer barrel, means affording communication between the interior and the exterior of the inner barrel, said bit having a plurality of reamer blades thereon, said bit also having a plurality of apertures therein and extending downwardly and outwardly therethrough, said apertures being disposed adjacent to the rear of said reamer blades and communicating with the space surrounding the outer barrel, said bit having a second plurality of apertures therein, said second plurality of apertures intersecting said first apertures and being disposed adjacent the lower end of the bit and affording communication between the space between said inner and outer barrels and the exterior of the bit.

7. In a core barrel, a bit having a central opening therethrough, a shell on which said bit is supported, an outer core barrel threadedly mounted on said bit and extending thereabove, a cap secured on the upper end of said outer core barrel, said cap having threaded apertures in its end wall, a stem having threads thereon and fitting said cap aperture, a lock cap engaging said stem and said cap, said stem having a depending skirt thereon, a coupling member threadedly engaging said skirt, an anti-friction member engaging said coupling member, a post passing through said anti-friction member and having a nut member thereon engaging said anti-friction member to rotatably support said post, said post having a depending skirt thereon, an inner barrel secured to said depending skirt, said inner barrel being spaced from said outer barrel, said skirt having a plurality of radial apertures therein affording communication between the interior and the exterior of the inner barrel, the lower portion of said inner barrel being of reduced diameter, a core catcher assembly including a part inserted in said portion of reduced diameter, said core catcher assembly having core engaging means therein.

8. In a core barrel, a bit having a central core opening therethrough, an outer core barrel mounted on said bit and extending thereabove, an inner barrel rotatably mounted on the outer barrel, said inner barrel being spaced from said outer barrel, means affording communication between the interior and the exterior of the inner barrel, a core catcher assembly including a part inserted in said inner barrel, said core catcher assembly having a core aperture therein, said inner barrel being of less internal diameter than said bit core

opening, said bit having a plurality of reamer blades thereon, said bit also having a plurality of apertures therein and extending downwardly and outwardly therethrough, said apertures being disposed adjacent to the rear of said reamer blades and communicating with the space surrounding the outer barrel, said bit having a second plurality of apertures therein, said second plurality of apertures intersecting said first apertures and being disposed adjacent the lower end of the bit and affording communication between the space between said inner and outer barrels and the exterior of the bit.

9. In a core barrel, a bit having a central core opening therethrough, an outer core barrel mounted on said bit and extending thereabove, a cap secured on the upper end of said outer core barrel, a coupling member adjustably supported by said cap, an anti-friction member engaging said coupling member, a post engaging said anti-friction member to rotatably support said post, an inner barrel secured on said post, said inner barrel being spaced from said outer barrel, means affording communication between the interior and the exterior of the inner barrel at the top thereof, a core catcher assembly including a part inserted in said inner barrel, said core catcher assembly having a plurality of spring pressed dogs therein, a plurality of spring fingers on said core catcher assembly and a rubber sleeve in said core catcher assembly, said core catcher assembly having a core aperture therein, said inner barrel being of less internal diameter than said bit core opening, said bit having a plurality of reamer blades thereon, said bit also having a plurality of apertures therein and extending downwardly and outwardly therethrough, said apertures being disposed adjacent to the rear of said reamer blades and communicating with the space surrounding the outer barrel, said bit having a second plurality of apertures therein, said second plurality of apertures intersecting said first apertures and being disposed adjacent the lower end of the bit and affording communication between the space between said inner and outer barrels and the exterior of the bit.

10. In a core barrel, a bit having a central opening therethrough, a shell on which said bit is supported, an outer core barrel threadedly mounted on said bit and extending thereabove, a cap secured on the upper end of said outer core barrel, said cap having threaded apertures in its end wall, a stem having threads thereon and fitting said cap aperture, a lock cap engaging said stem and said cap, said stem having a depending skirt thereon, a coupling member threadedly engaging said skirt, an anti-friction member engaging said coupling member, a post passing through said anti-friction member and having a nut member thereon engaging said anti-friction member to rotatably support said post, said post having a depending skirt thereon, an inner barrel secured to said depending skirt, said inner barrel being spaced from said outer barrel, said skirt having a plurality of radial apertures therein affording communication between the interior and the exterior of the inner barrel, a core catcher assembly including a part inserted in said inner barrel, said core catcher assembly having core engaging means therein, said bit having a plurality of apertures therein and extending downwardly therethrough, and communicating with the space surrounding the outer barrel, said bit having a second plurality of apertures therein, said second plurality of apertures being disposed adjacent the lower

end of the bit and communicating at their outer end with the outlet from said first mentioned apertures and communicating at the inner ends with the space between said inner and outer barrels.

11. In a core barrel, a bit having a central opening therethrough, a shell on which said bit is supported, an outer core barrel threadedly mounted on said bit and extending thereabove, a cap secured on the upper end of said outer core barrel, said cap having threaded apertures in its end wall, a stem having threads thereon and fitting said cap aperture, a lock cap engaging said stem and said cap, said stem having a depending skirt thereon, a coupling member threadedly engaging said skirt, an anti-friction member engaging said coupling member, a post passing through said anti-friction member and having a nut member thereon engaging said anti-friction member to rotatably support said post, said post having a depending skirt thereon, an inner barrel secured to said depending skirt, said inner barrel being spaced from said outer barrel, said skirt having a plurality of radial apertures therein affording communication between the interior and the exterior of the inner barrel, a core catcher assembly including a part inserted in said inner barrel, said core catcher assembly having a plurality of spring pressed dogs therein, a plurality of spring fingers on said core catcher assembly and a rubber sleeve in said core catcher assembly, said bit having a plurality of reamer blades thereon, said bit having a plurality of apertures therein and extending downwardly

therethrough, said apertures being disposed in the rear of said reamer blades and communicating with the space surrounding the outer barrel, said bit having a second plurality of apertures therein, said second plurality of apertures being disposed adjacent the lower end of the bit and communicating at their outer end with the outlet from said first mentioned apertures and communicating at the inner ends with the space between said inner and outer barrels.

12. In a core barrel, a bit having a shell secured thereto, a core barrel mounted on said bit and spaced from said shell, said core barrel having a cap thereon, an inner core barrel rotatably mounted on said cap and adjustable therealong, said inner core barrel including a core catcher assembly, means to provide circulation between the core barrels and other means to provide circulation between the exterior of the outer core barrel and the shell.

13. In a core barrel, a bit having an outer core barrel mounted thereon, closure means for the end of said outer core barrel which is remote from the bit, an inner core barrel within said outer core barrel, means to rotatably support said inner core barrel on said closure, means disposed between said closure and said bit to afford communication between the interior of said inner core barrel and the space between said inner core barrel and said outer core barrel, said bit having an aperture therein leading from the outer surface thereof to the space between said inner and outer core barrels.

GUY C. OLIVER.

Disclaimer

2,073,876.—Guy C. Oliver, Glendale, Calif. CORE BARREL. Patent dated Mar. 16, 1937. Disclaimer filed Dec. 27, 1948, by the inventor and the assignees, Jack E. Talbot and Robert Farley Lucas.

Hereby enter this disclaimer to claim 13 in said specification.

[Official Gazette February 8, 1949.]

end of the bit and communicating at their outer end with the outlet from said first mentioned apertures and communicating at the inner ends with the space between said inner and outer barrels.

11. In a core barrel, a bit having a central opening therethrough, a shell on which said bit is supported, an outer core barrel threadedly mounted on said bit and extending thereabove, a cap secured on the upper end of said outer core barrel, said cap having threaded apertures in its end wall, a stem having threads thereon and fitting said cap aperture, a lock cap engaging said stem and said cap, said stem having a depending skirt thereon, a coupling member threadedly engaging said skirt, an anti-friction member engaging said coupling member, a post passing through said anti-friction member and having a nut member thereon engaging said anti-friction member to rotatably support said post, said post having a depending skirt thereon, an inner barrel secured to said depending skirt, said inner barrel being spaced from said outer barrel, said skirt having a plurality of radial apertures therein affording communication between the interior and the exterior of the inner barrel, a core catcher assembly including a part inserted in said inner barrel, said core catcher assembly having a plurality of spring pressed dogs therein, a plurality of spring fingers on said core catcher assembly and a rubber sleeve in said core catcher assembly, said bit having a plurality of reamer blades thereon, said bit having a plurality of apertures therein and extending downwardly

therethrough, said apertures being disposed in the rear of said reamer blades and communicating with the space surrounding the outer barrel, said bit having a second plurality of apertures therein, said second plurality of apertures being disposed adjacent the lower end of the bit and communicating at their outer end with the outlet from said first mentioned apertures and communicating at the inner ends with the space between said inner and outer barrels.

12. In a core barrel, a bit having a shell secured thereto, a core barrel mounted on said bit and spaced from said shell, said core barrel having a cap thereon, an inner core barrel rotatably mounted on said cap and adjustable therealong, said inner core barrel including a core catcher assembly, means to provide circulation between the core barrels and other means to provide circulation between the exterior of the outer core barrel and the shell.

13. In a core barrel, a bit having an outer core barrel mounted thereon, closure means for the end of said outer core barrel which is remote from the bit, an inner core barrel within said outer core barrel, means to rotatably support said inner core barrel on said closure, means disposed between said closure and said bit to afford communication between the interior of said inner core barrel and the space between said inner core barrel and said outer core barrel, said bit having an aperture therein leading from the outer surface thereof to the space between said inner and outer core barrels.

GUY C. OLIVER.

Disclaimer

2,073,876.—Guy C. Oliver, Glendale, Calif. CORE BARREL. Patent dated Mar. 16, 1937. Disclaimer filed Dec. 27, 1948, by the inventor and the assignees, Jack E. Talbot and Robert Farley Lucas.

Hereby enter this disclaimer to claim 13 in said specification.

[Official Gazette February 8, 1949.]