

Dec. 23, 1958

W. L. McKENNA

2,865,608

CORE BARREL

Filed Feb. 7, 1957

2 Sheets-Sheet 1

Fig. 1

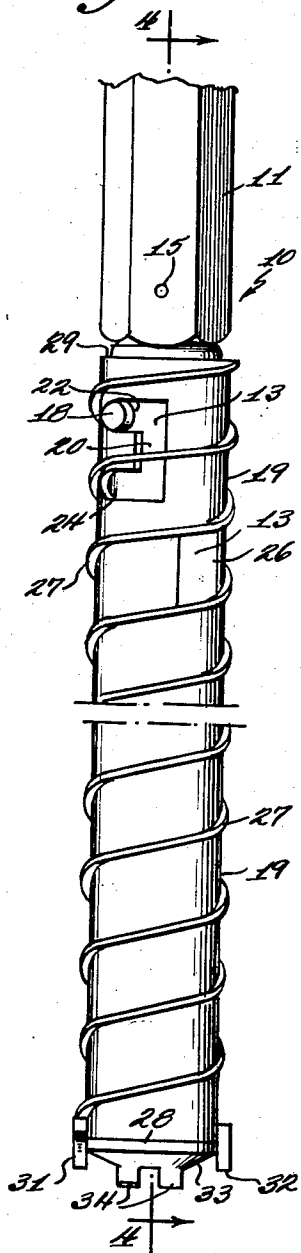


Fig. 2

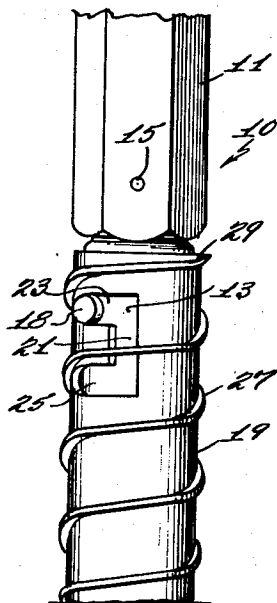
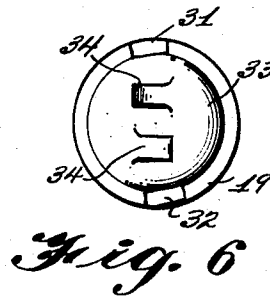
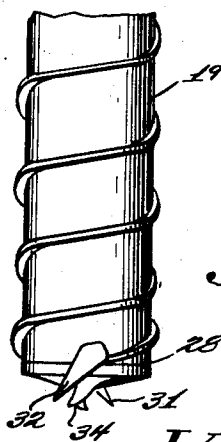


Fig. 3



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Fig. 4

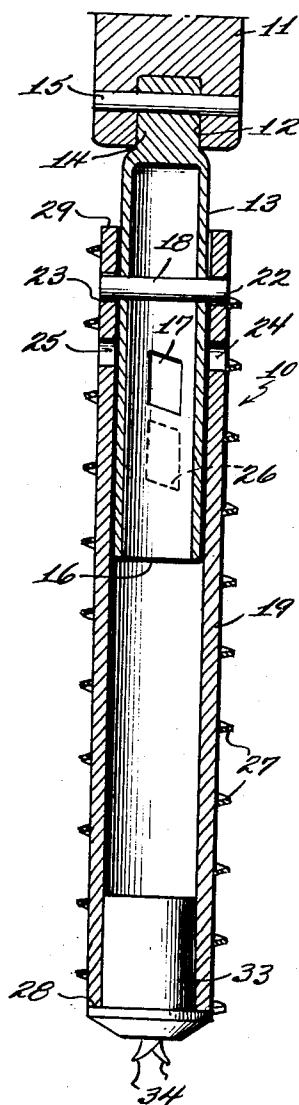


Fig. 5

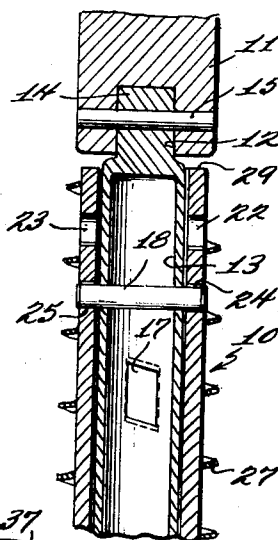
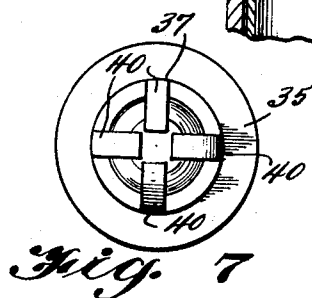


Fig. 7

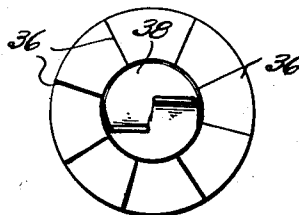
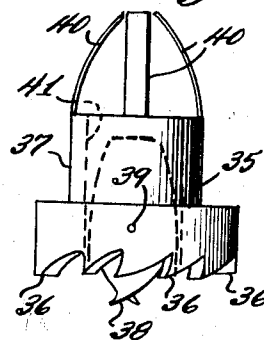


Fig. 9

Fig. 8



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CORE BARREL

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Application February 7, 1957, Serial No. 638,762

3 Claims. (Cl. 255—72)

The present invention relates to core barrels, and more particularly to core barrels for taking core samples in earth borings.

The present invention has for its primary object the provision of a core barrel which is adapted to take core samples from which the loose cuttings have been eliminated.

Another object of the invention is to provide a core barrel which is adapted to take core samples from the bottom of the well and from the sides of the well.

A further object of the invention is to provide a core barrel having means associated therewith for protecting the core after it has been cut and collected thereby.

A still further object of the invention is to provide a core barrel of the class described above which is inexpensive to manufacture, simple to use and which will produce core samples of an exceedingly accurate nature.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings, in which:

Figure 1 is a side elevation of the invention partially broken away for convenience of illustration.

Figure 2 is a fragmentary rear elevation of the invention.

Figure 3 is a fragmentary side elevation of the invention.

Figure 4 is a vertical transverse cross-section taken along the line 4—4 of Figure 1, looking in the direction of the arrows.

Figure 5 is a view similar to Figure 4 illustrating a second position of the core barrel.

Figure 6 is a bottom plan view of the invention.

Figure 7 is a top plan view of a bit adapted to be used with the invention.

Figure 8 is a side elevation of the bit illustrated in Figure 7.

Figure 9 is a bottom plan view of the bit illustrated in Figures 7 and 8.

Referring now to the drawings in detail wherein like reference characters indicate like parts throughout the several figures, the reference numeral 10 indicates generally a core barrel constructed in accordance with the invention.

The core barrel 10 comprises an upper fitting 11 adapted for attachment to the lower end of a drill stem by any conventional means (not shown), and having the hexagonal drive socket 12 axially opening through the lower end thereof, for reasons to be assigned.

An upper cylindrical barrel member 13 is positioned below the fitting 11 and is provided with an upwardly extending hexagonal stem 14 projecting into the hexagonal socket 12. A transverse pin 15 extends through the lower end of the fitting 11 and the hexagonal stem 14 locking the upper barrel 13 to the fitting 11.

The upper barrel 13 is closed at its upper end by the shank 14 extending upwardly therefrom. The upper barrel 13 has its lower end open at 16, for reasons to

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be assigned. An aperture 17 is formed in the lower portion of the upper barrel 13 through the side wall thereof. A pin 18 extends transversely through the upper barrel 13 and projects at each end thereof beyond the walls of the upper barrel 13.

A lower barrel 19 of generally cylindrical cross-section is telescopically engaged over the upper barrel 13 and is arranged to slide thereon. The lower barrel 19 is provided with a pair of oppositely disposed slots 20 and 21 having upper horizontal slots 22 and 23, respectively, and lower horizontal slots 24 and 25, respectively, communicating therewith in spaced vertical relation.

The pin 18 has its opposite end portions engaged in the slots 20 and 21, respectively, and the lower barrel 19 can be adjusted with relation to the upper barrel 13 by moving the pin 18 from the upper horizontal slots 22 and 23 to the lower horizontal slots 24 and 25, as desired.

The lower barrel 19 is provided with a window aperture 26 which is arranged so as to be in registry with the aperture 17 when the pin 18 is engaged in the lower horizontal slots 24 and 25 and out of registry therewith when the pin 18 is engaged in the upper horizontal slots 22 and 23.

A spiral thread 27 is secured to or formed on the outer surface of the lower barrel 19 from the lower end 28 to the upper end 29 thereof. A pair of cutter teeth 31 and 32 are secured to the lower end of the lower barrel 19 so as to extend below the lower end 28 of the lower barrel 19. A plug 33 having a pair of oppositely disposed cutter teeth 34 formed thereon is adapted to be telescopically received in the lower end 28 of the lower core barrel 19.

A modified bit 35 is provided with a plurality of annular teeth 36 on its lower end and with an upwardly extending reduced cylindrical shank 37 integrally formed therewith and adapted to be received in the lower end 28 of the core barrel 19. A central cutting member 38 is secured within the bits 35 by means of a pin 39 extending therethrough so that the cutting element 38 can be readily removed. Spring fingers 40 extend upwardly and inwardly from the shank 37 to prevent material passing through the bit 35 from dropping out therefrom.

The shank 37 of the bit 35 may be held in the lower end 28 of the barrel 19 by means of threads, locking pins, or any other suitable structure which will prevent the bit 35 from rotating with relation to the lower barrel 19 as well as securing the bit 35 in the lower barrel 19.

In the use and operation of the invention, the core barrel 10 is adapted to obtain bottom hole samples and side bore samples from a drilled well in the following manner.

In cutting and removing the bottom hole core, the plug 33 is removed and the bit 35 is secured in place in the lower end 28 of the lower barrel 19 and the fitting 11 is secured to the lower end of a drill stem. The core barrel 10 and drill stem are then lowered into the well until the core barrel 10 touches bottom. When the core barrel 10 touches bottom it is rotated by rotating the drill stem in the usual manner so that the loose cuttings in the bottom of the well, left from the drilling operation, are moved upwardly on the thread 27 so as to be removed from beneath the bit 35 and the core barrel 10. Downward pressure is then brought to bear on the core barrel 10 of sufficient intensity to force the cutter member 38 upwardly through the bit 35 into the lower barrel 19 leaving a bore 41 opening upwardly through the bit 35.

Continued operation of the core barrel 10 by rotating it with the drill stem will cause the teeth 36 or the teeth 31, 32 to cut a core from the bottom of the well

which will pass upwardly through the bore 41 and be retained within the lower barrel 19 by means of the spring fingers 40. The core barrel 10 can then be removed from the well and the core contained therein can be removed without disturbing the structural detail of the core.

In cutting a side bore sample and collecting it in the core barrel, the bit 35 is removed and the plug 33 is secured in the lower end 28 of the lower barrel 19 by any suitable means, such as threads, locking pins, or set screws, and the core barrel 10 is lowered into the well on the end of the drill stem.

In the initial lowering operation, the pin 18 is positioned in the horizontal slots 22 and 23 so that the aperture 17 is out of registry with the aperture 26. When the bottom of the well is reached by the core barrel 10, the drill stem and core barrel 10 are rotated so that the loose material in the bottom of the well will be raised upwardly on the threads 27 so as to completely clear this material from below the aperture 26 of the lower barrel 19.

After the loose material in the bottom of the well has been raised onto the threads 27, the direction of rotation of the core barrel 10 is reversed for a quarter of a turn so that the pin 18 is moved out of the horizontal slots 22 and 23 so as to drop through the vertical slots 20 and 21 onto the horizontal slots 24 and 25. The core barrel is then again reversed in rotational direction so that the pin 18 moves to the ends of the slots 24 and 25 aligning the aperture 17 with the aperture 26.

Continued rotation of the core barrel 10 will cause the cutting teeth 34 and 31, 32 to cut material from the bottom of the well which will then pass upwardly around the lower barrel 19 on the threads 27 and through the apertures 17, 26 into the lower barrel 19.

After a sufficient sample has been recovered in the core barrel 10, the aperture 17 can be moved out of registry with the aperture 26 by again reversing the direction of rotation of the core barrel 10 for a quarter of a turn and pulling upwardly on the upper core barrel 13 until the pin 18 is aligned with and engaged in the

slots 22 and 23 whereupon renewed drilling can take place utilizing the bits 31, 32 and 34 until the desired depth is reached.

Having thus described the preferred embodiment of the invention, it should be understood that numerous structural modifications and adaptations may be resorted to without departing from the scope of the appended claims.

What is claimed is:

1. A core barrel comprising an elongated hollow cylindrical member, cutting means detachably secured to the lower end of said member, a spiral thread formed on the outer surface of said member from one end thereof to the other, said member having an aperture formed in the side thereof, a second cylindrical hollow member adjustably telescopically positioned within said first member, said second member having an aperture formed therein for registry with the aperture formed in said first member in one position of adjustment of said members, means for selectively securing said first member to said second member in a position with said apertures in registry and in a second position with said apertures out of registry, and means securing said second member to a drive fitting.
2. A device as claimed in claim 1 wherein the means securing said members together comprises a pin extending transversely of said second member, said first member having slots formed therein engaged by the opposite ends of said pin.
3. A device as claimed in claim 2 wherein the slots formed in said first member for engagement by said pin are each provided with upper horizontal portions, lower horizontal portions, and a vertical connecting portion communicating said upper and lower portions.

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