

Sept. 8, 1925.

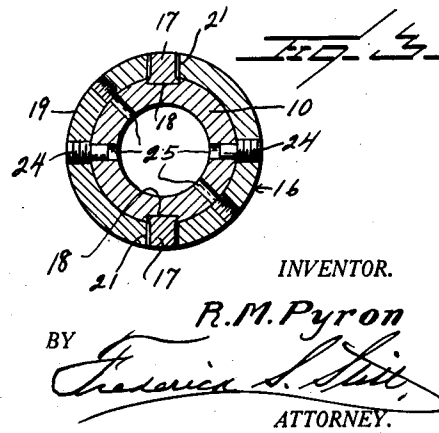
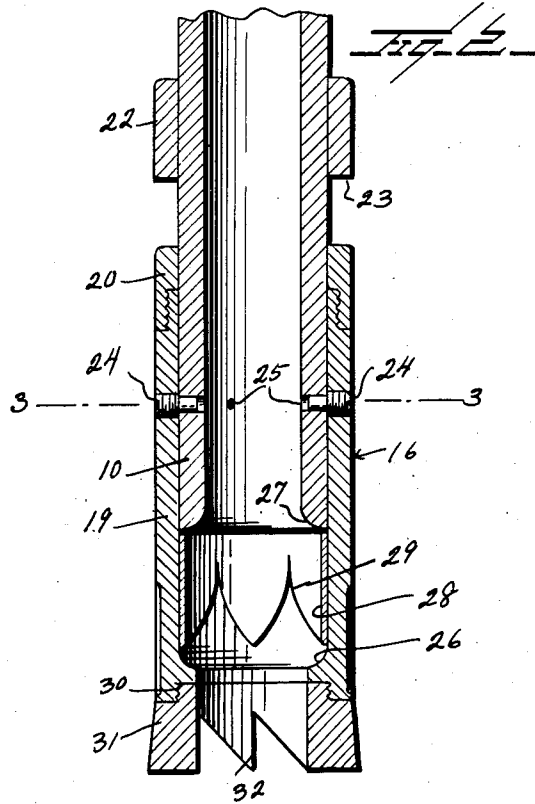
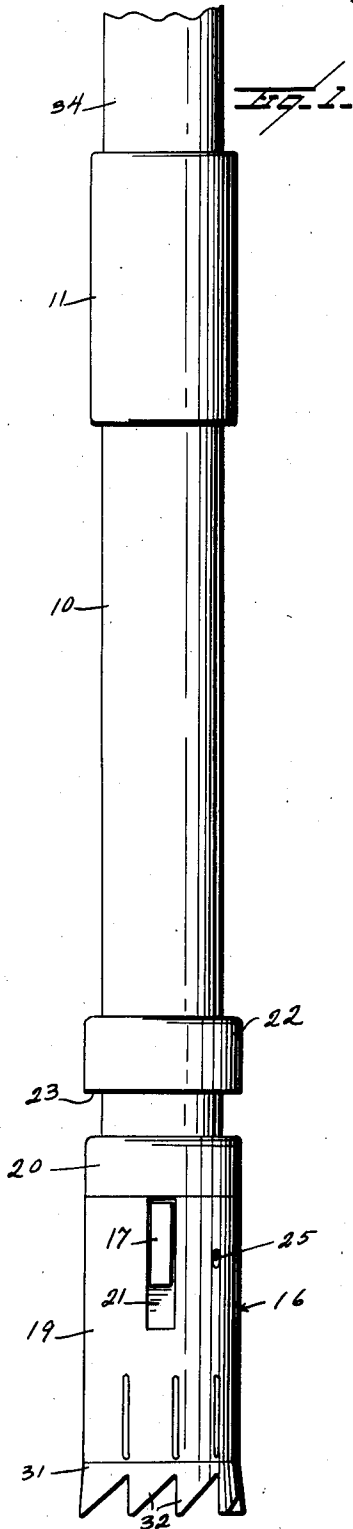
R. M. PYRON

GORE DRILL

Filed April 30, 1923

1,552,755

2 Sheets-Sheet 1



Sept. 8, 1925.

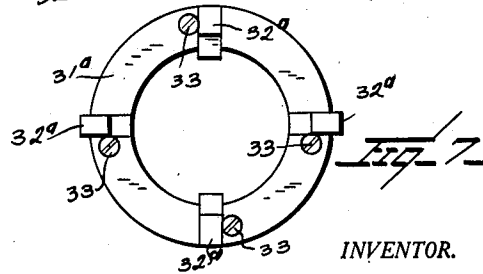
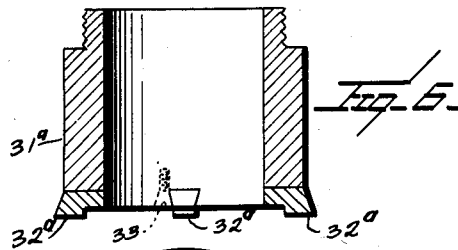
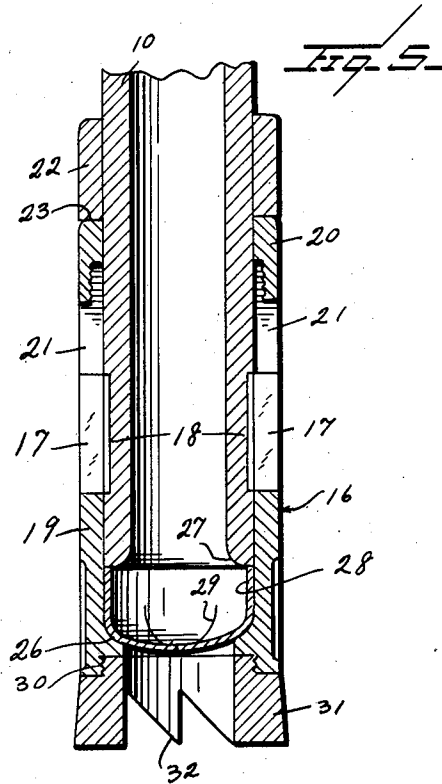
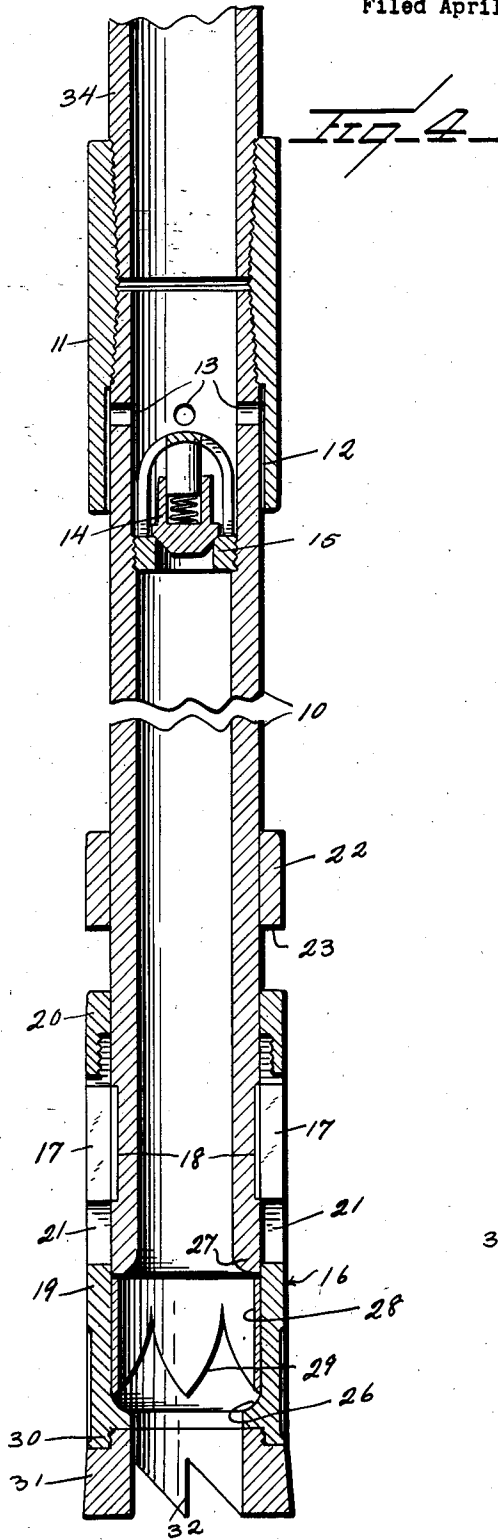
1,552,755

R. M. PYRON

CORE DRILL

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2 Sheets-Sheet 2



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Patented Sept. 8, 1925.

1,552,755

UNITED STATES PATENT OFFICE.

ROLAND M. PYRON, OF BEAUMONT, TEXAS.

CORE DRILL.

Application filed April 30, 1923. Serial No. 635,619.

To all whom it may concern:

Be it known that I, ROLAND M. PYRON, a citizen of the United States, residing at Beaumont, in the county of Jefferson and State of Texas, have invented certain new and useful Improvements in Core Drills, of which the following is a specification.

This invention relates to core drills and more particularly to a drill for use in drilling deep wells whereby a sampling core may be formed and removed.

An important object of the invention is to provide a device of this character having means for positively severing a formed core and for retaining the same within the core barrel as the same is withdrawn from the well.

A further object of the invention is to provide a coring drill formed to provide a housing for a collapsing core lifter, the core drill being so constructed that at a desired time and after the forming of the core, the core barrel may be actuated to collapse the core lifter and sever the formed core.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a side elevation of a coring apparatus constructed in accordance with my invention;

Figure 2 is a vertical sectional view thereof, showing the parts in a position occupied during the drilling operation;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a longitudinal sectional view through the coring device, the parts being in the position assumed during drilling, the section being taken at right angles to that shown in Figure 2;

Figure 5 is a similar sectional view of that shown in Figure 4, the parts being in the position assumed when the pins are severed; and

Figures 6 and 7 are sectional and bottom plan views of a modified form of coring shoe.

Referring now more particularly to the drawings, the numeral 10 designates a core barrel of any desired size and length having threaded upon the upper end thereof a coupling member 11, the lower end of which is counterbored to form about the pipe or tube from which the core barrel 10 is

formed an annular channel 12 which opens downwardly along the surface of the core barrel. The core barrel, adjacent its upper end, is provided with a plurality of openings 13 extending through the wall thereof and communicating with the channel 12. Interiorly and below the openings 13 the core barrel is provided with an upwardly opening check valve 14, the seat 15 of which is removable through the open upper end of the core barrel. The lower end of the core barrel has a sleeve 16 secured thereto in such manner as to permit vertical movement of the sleeve upon the core barrel but to prevent rotative movement thereof.

In the present disclosure the core barrel 10 is shown as provided upon its outer wall adjacent the lower end thereof with a plurality of outstanding flanges or ribs 17 formed by providing keys with dove tail faces, which are seated in the grooves 18 formed in the wall of the core barrel 10 and maintained in position therein by swaging or peening the material of the barrel against these flanges. The sleeve 16 is formed of a main section 19 and a retaining section 20 in the form of a collar threaded upon the upper end of the main or lower section 19. The main section 19 is formed with vertically extending slots 21 opening through the upper end thereof and into which the keys or flanges 17 extend. Above the upper end of the collar the core barrel 10 is provided with an enlargement 22, providing a downwardly directed shoulder 23, the purpose of which will hereinafter appear. The sleeve 16 is normally held in position with the lower end of the retaining collar 20, abutting the upper ends of the keys 17, by means of shearing pins 24 formed of brass or other suitable material and threaded through the sleeve 17 to engage in openings 25 formed in the core barrel.

The sleeve 16 has a major portion thereof of the same internal diameter as the external diameter of the engaged portion of the core barrel 10 but is provided interiorly, adjacent its lower end, with an inwardly directed filleted flanging shoulder 26. When the sleeve is held in position upon the core barrel by the shearing pins 24, this flanging shoulder is spaced below the lower end face 27 of the core barrel a distance equal to the length of a collapsible core lifter 28. This core lifter is made of light pipe having the

lower edge thereof serrated, as at 29, in such manner that when the serrated portions thereof are arranged at right angles they form a flange completely closing the lower
 5 end of the core tip. The extreme lower end of the sleeve 16 is adapted, as at 30, for interchangeable engagement with core cutting shoes 31. These shoes may be of any desired character, although those illustrated are preferred for use. In Figure 1 I have shown a
 10 core tip suitable for use in soft formations and in which the teeth 32 are formed integrally with the shoe. While in Figure 6 I have disclosed a shoe 31^a suitable for use in
 15 hard formations, the teeth 32^a being removably connected, as at 33, to the shoe.

In the use of the device the coupling 11 is engaged with the lower end of the drill pipe or stem 34 of the drilling machine, the sleeve
 20 16 being secured in position by the shearing pins 24. These pins are of sufficient size to support the weight of the drilling stem and core barrel which is imposed thereupon during the drilling operation and accordingly the sleeve is maintained in the position
 25 described during the operation of the drilling until a desired length of core has been formed. After the desired length of core has been formed the barrel 10 is elevated through the drill stem 34 and then allowed to drop, the excessive weight thus applied to the shearing pins causes the same to
 30 shear off, with the result that the barrel 10 moves downwardly within the sleeve 16 forcing before it the collapsible core lifter
 35 28. This downward movement of the core lifter 28 brings the serrated edges 29 thereof into engagement with the flanging shoulder 26 of the sleeve, with the result that
 40 these serrations are forced inwardly severing the core and forming about the lower end thereof a cap or supporting flange preventing the loss of the material of the core. Attention is directed to the fact, that due to
 45 the construction employed at the upper end of the core barrel 10, water may be forced through the drill stem 34 and will pass from the openings 13 and channel 12 downwardly
 50 along the sides of the core barrel to the drill shoe. Attention is further directed to the fact that by the construction hereinbefore employed a relatively heavy shoe may be
 55 used, which accordingly will not heat to the extent of the light coring shoe ordinarily employed. These last two features taken together prevent burning of the core, which is a common occurrence where hard material is being cored and a light coring shoe is in use. The burning of the core practically
 60 prevents any proper test from being made. The shoulder 23 during the severing operation acts as a safety to prevent too great a downward movement of the barrel 10 in the sleeve 16. If the downward pressure exerted is such that the flanges 17 of the

core barrel are sheared or destroyed, this shoulder 23 will come into engagement with the upper end of the collar 20 of the sleeve 16, forming a positive stop, it being of course understood that at this time the core
 70 shoe 31 at the lower end of the sleeve will be resting firmly upon the bottom of the bore. The core having been severed, the barrel 10 is withdrawn from the well and the sleeve 16 removed by disengaging the
 75 collar 20 thereof and sliding the lower portion 19 of the sleeve from the lower end of the barrel. The sleeve when removed exposes the lower or cased end of the core which may then be readily removed from
 80 the core barrel 10.

From the foregoing it is believed to be obvious that by the use of coring apparatus constructed in accordance with the foregoing, not only will burning of the core be
 85 prevented but means are positively provided whereby the core is severed and retained within the core barrel in such a manner as to prevent injury to or loss of any portion
 90 of the core during the period in which the barrel is being withdrawn from the well. I am aware that heretofore appliances have been employed for forming cores having a deformable lower end, but these appliances
 95 with which I am familiar are not dependable for the reason that they depend only upon weight to deform this lower end and provide no means for positively guiding such deformation, with the result that the
 100 deformation is often such that the lower end of the core is exposed and the large portion thereof lost during hoisting of the core through the bore of the well. Furthermore, at times these coring devices will fail altogether to break or cut the core thus causing
 105 the loss of the core and they also must be made of such light material that burning of the core is a common occurrence when they are employed. It will be obvious that many changes are possible in the construction and
 110 arrangement of the various parts hereinbefore described without in any manner departing from the spirit of my invention and I accordingly do not limit myself to such
 115 specific structure except as hereinafter claimed.

I claim:—

1. In coring apparatus and in combination, a coring barrel, means at the lower end of the coring barrel for housing and flanging a collapsible core lifter upon relative
 120 longitudinal movement of the core barrel with relation thereto, and means rendered inoperative by predetermined operation of the coring barrel maintaining the first named
 125 means and coring barrel against relative longitudinal movement.

2. In coring apparatus and in combination, a coring barrel, means at the lower end of the coring barrel for housing and flang-
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ing a collapsible core lifter upon relative longitudinal movement of the coring barrel, and frangible means connecting the first named means and the coring barrel normally maintaining the coring barrel against movement with relation to said means.

ing relative rotation thereof, an inwardly directed shoulder formed on said sleeve interiorly thereof and in spaced relation to the lower end of the coring barrel, a collapsible core lifter resting upon said shoulder and having its upper end arranged in the path of the lower face of the coring barrel, and frangible securing means extending through said sleeve and engaging in the coring barrel.

3. In coring apparatus and in combination, a coring barrel, a sleeve carried by the lower end of the coring barrel and in which the lower end of the barrel is downwardly movable, a collapsing core lifter within the sleeve, a shoulder within the sleeve supporting the core lifter and flanging the core lifter upon downward movement of the barrel, and means connecting the sleeve and barrel preventing relative movement thereof and releasing upon a predetermined operation of the coring barrel.

8. In coring apparatus and in combination, a coring barrel, a coring shoe and a collapsible core lifter, a sleeve connecting the coring shoe and barrel forming a housing for the core lifter, a frangible connection between the sleeve and barrel which when broken permits downward movement of the barrel in the sleeve, and a flanging shoulder formed in said sleeve against which the barrel forces said collapsible core lifter during its downward movement in the sleeve to thereby flange the same and sever a core contained within the barrel.

4. In coring apparatus and in combination, a coring barrel, a sleeve carried by the lower end of the coring barrel and in which the lower end of the barrel is downwardly movable, a collapsing core lifter within the sleeve, a shoulder within the sleeve supporting the core lifter and flanging the core lifter upon downward movement of the barrel, and means connecting the sleeve and barrel preventing relative movement thereof and releasing upon a predetermined operation of the coring barrel, comprising shearing pins extending through said sleeve and engaging in said coring barrel.

9. In coring apparatus and in combination, a coring barrel, a coring shoe and a collapsible core lifter, a sleeve connecting the coring shoe and barrel forming a housing for the core lifter, a frangible connection between the sleeve and barrel which when broken permits downward movement of the barrel in the sleeve, said core lifter comprising a cylinder having its lower end serrated, the serrated portions of the cylinder when flanged inwardly combining to form a closure for the cylinder, and a flanging shoulder formed in said sleeve against the barrel forcing said collapsible core lifter during its downward movement in the sleeve to thereby flange the serrated portions thereof inwardly and sever the core contained within the barrel.

5. In coring apparatus and in combination, a coring barrel, a sleeve carried by the lower end of the coring barrel and in which the lower end of the barrel is downwardly movable, a collapsing core lifter within the sleeve, a shoulder within the sleeve supporting the core lifter and flanging the core lifter upon downward movement of the barrel, means connecting the sleeve and barrel preventing relative movement thereof and releasing upon a predetermined operation of the coring barrel, and means carried by the coring barrel and coacting with said sleeve for limiting downward movement of the coring barrel within the sleeve.

6. In coring apparatus and in combination, a coring barrel, a sleeve carried by the lower end of the coring barrel and in which the lower end of the barrel is downwardly movable, a collapsing core lifter within the sleeve, a shoulder within the sleeve supporting the core lifter and flanging the core lifter upon downward movement of the barrel, means connecting the sleeve and barrel preventing relative movement thereof and releasing upon a predetermined operation of the coring barrel, and a core cutting shoe mounted on the lower end of said sleeve.

7. In coring apparatus, a coring barrel, a sleeve engaging the lower end of the barrel with its upper end, a connection between the sleeve and barrel permitting limited relative longitudinal movement thereof and prevent-

10. In coring apparatus and in combination, a coring barrel, a sleeve carried by the lower end of the coring barrel and in which the lower end of the barrel is downwardly movable, a collapsing core lifter within the sleeve comprising a cylinder having its lower end serrated, the serrated portions of the cylinder when flanged inwardly combining to form a closure for the cylinder, a shoulder within the sleeve supporting the core lifter and flanging the serrated portions thereof inwardly upon downward movement of the barrel, means connecting the sleeve and barrel preventing relative movement thereof and releasing upon a predetermined operation of the coring barrel, and a core cutting shoe mounted on the lower end of the sleeve.

11. In core cutting apparatus, a core lifter comprising a cylinder having its lower end serrated, the serrated portions of the cylinder when flanged inwardly combining to form a closure for the lower end of the cylinder, and a guide and support for the core

lifter including means for cutting a core, and means for positively flanging the serrated portions of the core lifter upon a predetermined operation thereof.

- 5 12. A coring apparatus comprising a barrel including means operative upon a predetermined actuation of the barrel for severing

a core contained within the barrel and for completely closing the lower end of the barrel to prevent escape of any portion of the core therefrom.

In testimony whereof I affix my signature.

ROLAND M. PYRON.