Dec. 15, 1931. P. CHRISTENSEN 1,836,703

WELL DRILLING BIT SET

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Fig. 1.

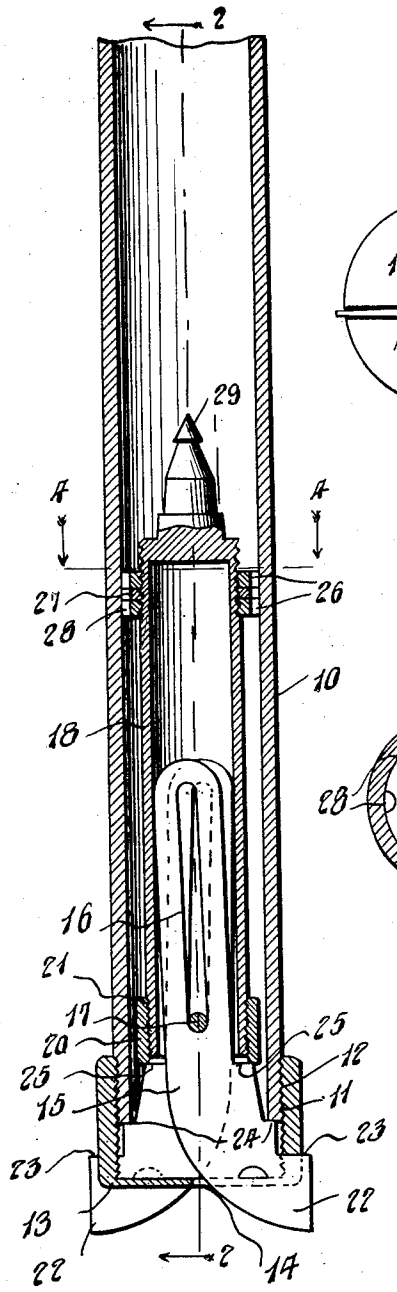


Fig. 3.

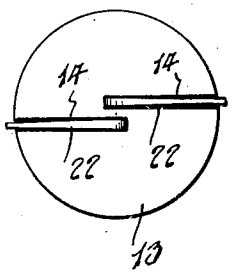


Fig. 4.

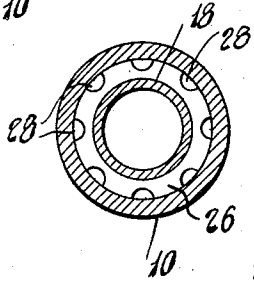
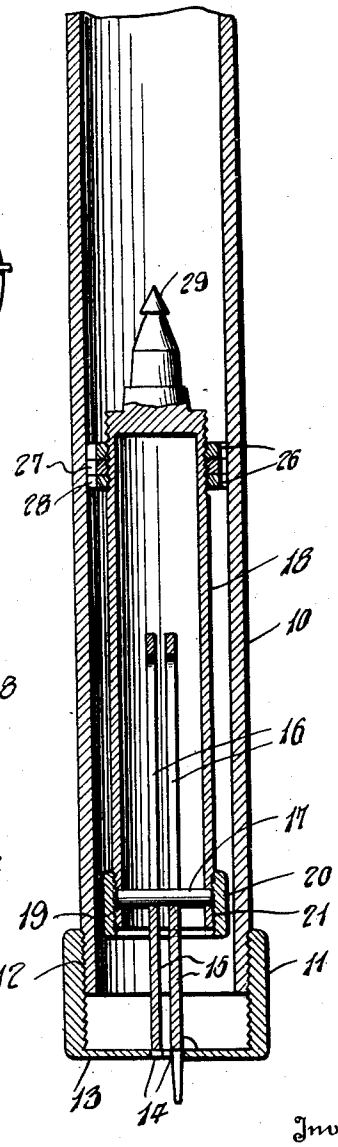


Fig. 2.



Inventor

P. Christensen.

By L. F. Randolph Jr.

Attorney

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Fig. 5.

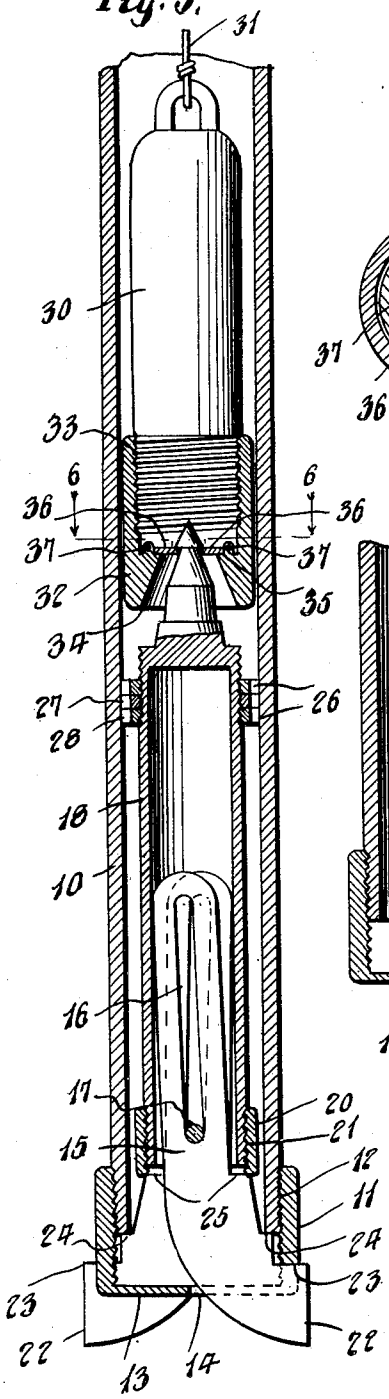


Fig. 6.

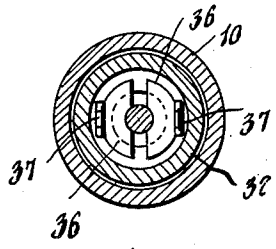


Fig. 8.

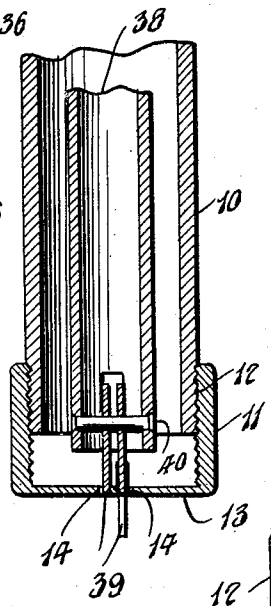
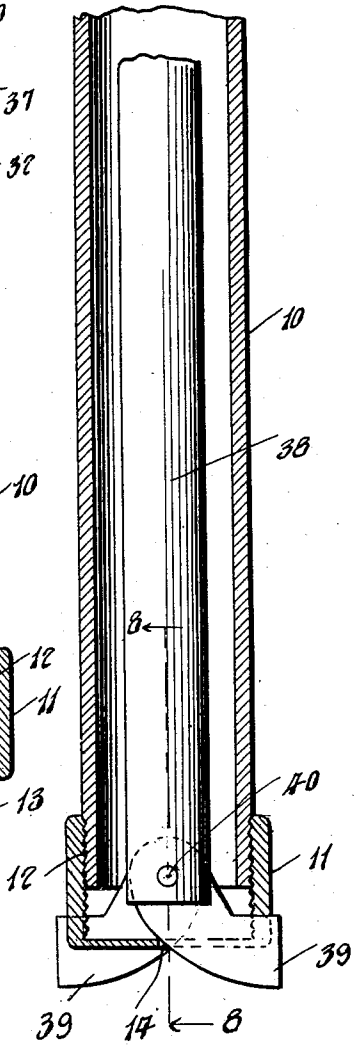


Fig. 7.



Inventor

P. Christensen,

By

Attorney

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UNITED STATES PATENT OFFICE

PETER CHRISTENSEN, OF KINGSVILLE, TEXAS

WELL DRILLING BIT SET

Application filed September 11, 1930. Serial No. 481,302.

This invention relates to a well drilling bit combination.

A prime object of the invention is to provide a means whereby a bit may be so associated with the usual well casing that the latter constitutes the stock of the bit, overcoming the necessity of using a separate stock or of using casing after operation of the bit.

It is further aimed to provide a novel means forming the bit consisting of a plurality of elements and mounting means, in combination with a shoe for attaching the same to the casing.

It is also aimed to provide a novel construction which may be readily fished.

In addition it is aimed to provide a novel tool to permit disconnection of the casing and shoe after removal of the bit.

Various additional objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:—

Figure 1 is a view in vertical section illustrating the invention,

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1,

Figure 3 is a bottom plan view of the invention,

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 1,

Figure 5 is a view similar to Figure 1 but showing a fishing tool applied,

Figure 6 is a cross sectional view taken on the line 6—6 of Figure 5,

Figure 7 is a vertical sectional view showing the use of a shoe-removing tool, and

Figure 8 is a vertical sectional view taken on the line 8—8 of Figure 7.

Referring specifically to the drawings, 10 designates well casing which in use is usually made up of a number of detachable sections as well understood in the art. According to the present invention, such casing constitutes the stock of the bit and hence a separate stock for the bit is unnecessary and the casing does not have to be applied after boring and which overcomes many of the difficulties experienced in well drilling, such as caving in of the walls of the bore.

At the lower end of the casing, a shoe 11 is detachably connected by screw threads as at 12, the same being of cap form so as to have a transverse wall 13. The shoe has two slots at 14 which extend across the wall 13 and partly up the side of the shoe.

Two cutters or bit members are provided as at 15 each of which has an elongated slot 16 through which a securing pin 17 passes. The pin 17 is carried by a sleeve 18 and is adapted to be removed therefrom in order that the bit may be detached, when necessary, from the sleeve 18 when the same is out of the well. Said pin 17 loosely engages in openings 19 in the wall of tube or sleeve 18 and it is normally held against displacement by a collar 20 which is screw threaded as at 21 to the sleeve 18 and crosses the ends of such pin.

The cutting portions 22 of the bit members 15 may be of any desired form but as shown they extend below the shoe and also laterally or diametrically beyond the same.

Attention is called to the fact that the bit members at one side thereof are stepped to provide various shoulders at different elevations as at 23, 24 and 25, to be engaged, respectively by the shoe, casing 10 and tube 18 and its collar, so that the full weight of the string of casing will rest on the bit to insure effective cutting when in use.

The sleeve 18 is suitably centered in the casing 10, guided, and constructed so that oil or fluid may pass the same. To this end, a plurality of washers 26 may be screw threaded onto the upper portion of the tube, and clamp a suitable washer 27 therebetween, which may be of rubber or any other preferred material, the elements 26 and 27 preferably being peripherally grooved or notched as at 28 to permit passage of fluid past the same.

In order that the sleeve 18 may be engaged by a fishing tool in order to remove the same and the bit, a spear or similarly shaped head 29 is provided thereon. It will be realized that the slots 16 in use are at an angle to each other and that as the sleeve 18 is elevated the

same will move initially independently of the cutter members 15, with the pin 17 travelling in the slots 16 and moving the slots to a vertical position and hence drawing the cutting ends 22 inwardly toward each other so that the same may be completely withdrawn through the slots 14.

The use of a fishing tool is suggested in Figure 5 where the tool comprises a body 30 which is suspended by a cable 31 or the like. A detachable head 32 is screw threaded at 33 on the lower end of body 30 and the same has a conical bore portion 34 and a laterally disposed shoulder 35 directly above the same upon which latch plates 36 normally rest in a horizontal position, such plates being hinged on horizontal axes 37 to the head 32. Such latches 36 are capable of vertical movement as the fishing tool is lowered over the spear 29, after which the latches will automatically move to horizontal position and engage under the shoulder at the base of the spear 29 as shown in Figure 5, so that raising movement on the cable 31 will extract the sleeve 18 and boring members.

After the parts have been removed from the shoe and casing, at the end of drilling operations, the tool of Figure 7 is used to disengage the shoe from the casing. This tool may comprise a rod or tubing 38 and at the lower end thereof have a plurality of bits 39 pivoted thereto as at 40 and adapted to enter the slots 14. In such position, turning of rod 38 will turn the shoe 11 relatively to the casing and thus detach it.

Various changes may be resorted to provided they fall within the spirit and scope of the invention.

I claim as my invention:—

1. A tool of the class described comprising a tube, cutter means, means within the tube removably suspending the cutter means, and said cutter means being overlapped and rested upon by the tube and a collar movably connected in line with the second mentioned means.

2. A tool of the class described comprising a tube, a shoe thereon having slots, a pair of cutters extending through the slots and rested upon by the tube, said cutters having elongated slots disposed at an angle to each other in operative position, a sleeve within the tube, said sleeve having a pin removably disposed in said slots for the purpose specified and a collar movably connected to the sleeve in line with the pin.

3. A tool of the class described comprising a tube, a shoe thereon having slots, a pair of cutters extending through the slots and rested upon by the tube, said cutters having elongated slots disposed at an angle to each other in operative position, a sleeve within the tube, said sleeve having a pin disposed in said slots for the purpose specified, said pin being removable, and a collar detachably connected to the sleeve in line with the pin, means on the sleeve to engage the tube to center the sleeve.

In testimony whereof I affix my signature.

PETER CHRISTENSEN.