Sept. 13, 1938. J. B. NEWSOM 2,130,192

CORE DRILL

Filed July 9, 1937

FIG_1_

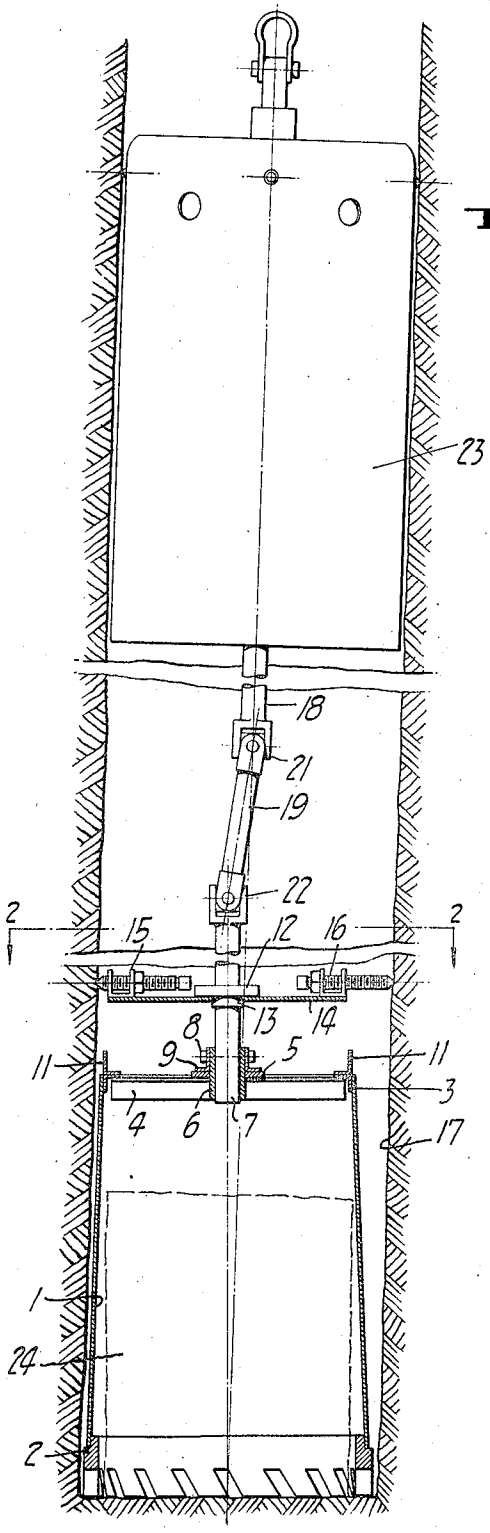
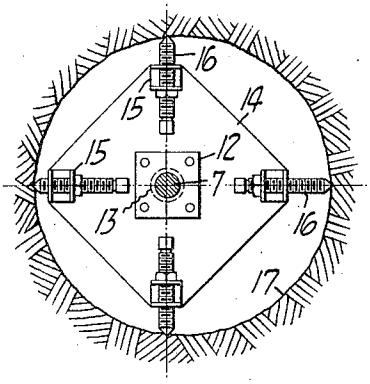


FIG_2_



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Patented Sept. 13, 1938 2,130,192

UNITED STATES PATENT OFFICE

2,130,192

CORE DRILL

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Application July 6, 1937, Serial No. 152,027

3 Claims. (Cl. 255—72)

This invention relates to core drills and in particular to a core drill for straightening drilled shafts or bores.

Under some conditions a drilled shaft will turn off slightly from the vertical. In vertical shafts closely controlled by surveys, this is of course an extremely serious objection.

The object of this invention is the provision of a core drill which may be maintained in a centered position with respect to a vertical line while it is being rotated in order to straighten the shaft.

More specifically, the object of this invention is the provision of an upwardly converging core drill adapted to be aligned within a drilled shaft or bore and secured to the main drive shaft by means of toggle joints.

The invention possesses other advantageous features, some of which with the foregoing will be set forth at length in the following description where that form of the invention which has been selected for illustration in the drawing accompanying and forming a part of the present specification is outlined in full. In said drawing, one form of the invention is shown, but it is to be understood that it is not limited to such form, since the invention as set forth in the claims may be embodied in a plurality of forms.

Referring to the drawing:

Figure 1 is a vertical section taken through a core drill embodying the objects of my invention, in its operative position within a drilled shaft or bore which has turned off slightly from the vertical.

Figure 2 is a section taken on the line 2—2 of Figure 1.

As shown in Figure 1, the object of my invention may be embodied in a core drill comprising an upwardly converging core barrel 1 provided at its lower end with a cutting shoe 2 and secured at its upper end to a downwardly flanged ring 3. Welded to the under side of the flanged ring 3 are a pair of spaced angle irons 4 extending parallel to a diameter of the ring 3. Secured to and supported by the angle irons 4 is a ring 5 which in turn is secured to or made integral with a sleeve 6. Snugly disposed within the sleeve 6 is a core drill shaft 7 which may be secured to the sleeve 6 by a bolt 8 passing through the shaft 7, the sleeve 6, and a flanged ring 9. Also supported on the downwardly flanged ring 3 is a pair of diametrically opposed sections of angle irons 11.

A centrally apertured plate 12 through which the core drill shaft 7 is adapted to pass is secured to a spider 14 by means of a hub 13. The aperture in the plate 12 should be sufficiently large to permit the shaft 7 to rotate and slide easily within it. The spider 14 is provided with threaded lugs 15, and threaded in the lugs 15 are screws 16 by means of which the spider 14 and consequently the upper end of the core barrel 1 may be adjusted and maintained in any predetermined aligned position within the shaft or bore 17. The upper end of the core drill shaft 7 is secured to the main drive shaft 18 by an intermediate shaft 19 and a pair of toggle joints 21 and 22. The main drive shaft is rotatably secured within a pilot house 23 and is adapted to be rotated by means of a motor supported therein, all as disclosed in my allowed co-pending application Serial No. 112,266 filed November 23, 1936. A detailed description of the pilot house 23 and the operating mechanism therein contained is deemed unnecessary in this application, for its construction and operation are identical with the construction and operation of the pilot house 1 as shown and described in my co-pending application.

The outer diameter of the drill shoe 2 should be substantially equal to the diameter of the shaft or core being straightened, and when designed for use in conjunction with a five foot core drill as disclosed in my co-pending application above referred to, this diameter should be substantially five feet. With a diameter of this size, the length of the core barrel may be made seven feet, while its upper diameter should be approximately four feet, ten inches. The width of the drill shoe should be such that the diameter of the core cut out by it is considerably less than the upper diameter of the core barrel. It should be noted that a shoe having a width of one and one-half inches will normally cut a kerf two inches wide, and that therefore the diameter of the core cut by the shoe 2 will be somewhat smaller than the inner diameter of the shoe. When so constructed, it will be seen that the core barrel may be centered within the lower end of the shaft or bore 17 with respect to a vertical line, and maintained in such a vertical position by means of the spider 14. The rotation of the main drive shaft 18 which of course is held in alignment with the shaft 17 which has been turned slightly from the vertical, will rotate the core barrel 1 so as to continue the shaft in its new true alignment. After the shaft or bore has once been straightened, then the core barrel shown in my co-pending application above re-

ferred to can again be utilized for deepening the shaft in its corrected direction.

The operation of the device above described is as follows: When it is found that the shaft or bore has turned slightly off from a true vertical plane, the core barrel normally used in sinking the shaft and as disclosed in my co-pending application, is replaced by the core barrel 1 and its associated toggle joints as shown and described in the present application. The pilot house 23 is lowered within the shaft until the shoe 2 rests on the bottom of the shaft and is locked in place. The core barrel 1 is then aligned within the shaft 17 by means of the spider 14 so that the shaft will be continued along a true vertical line. The core barrel 1 and the shoe 2 are then rotated indirectly by means of the main drive shaft 18 until the core 24 formed by this operation is substantially equal in length to the length of the core barrel. The entire mechanism is then removed from the shaft in the manner disclosed in my co-pending application, the core is removed, and then the operation is repeated until the extended length of the shaft in its new direction is of sufficient length to determine this new direction when the core barrel normally used as shown in my co-pending application is inserted therein.

Although the mechanism above described has been shown in conjunction with turning the direction of a vertical shaft, it obviously may be used in turning the direction of a horizontal shaft or a shaft extending in any other direction.

I claim:

1 A device for straightening a bore, comprising: an upwardly converging core drill; a core drill drive shaft secured to the upper end of said core drill; a spider journaled on said drive shaft for holding said shaft in a predetermined alignment within the bore to be straightened; a main drive shaft; means for holding said main drive shaft in central alignment within said bore; means for rotating said main drive shaft; and an intermediate shaft connected at its ends to said core drill drive shaft and main drive shaft by means of toggle joints.

2. A device for straightening a bore, comprising: an upwardly converging core drill having a cutting shoe the outer diameter of which is substantially equal to the diameter of the bore to be straightened; a core drill drive shaft secured to the upper end of said core drill; a spider journaled on said drive shaft for holding said shaft in a predetermined alignment within the bore to be straightened; a main drive shaft; means for holding said main drive shaft in central alignment within said bore; means for rotating said main drive shaft; and an intermediate shaft connected at its ends to said core drill drive shaft and main drive shaft by means of toggle joints.

3. A device for straightening a bore, comprising: a core drill having a drill shoe of a greater diameter than any diameter taken through any other point in said drill; a core drill drive shaft secured to the upper end of said core drill; a spider journaled on said drive shaft for holding said shaft in a predetermined alignment within the bore to be straightened; a main drive shaft; means for holding said main drive shaft in central alignment within said bore; means for rotating said main drive shaft; and an intermediate shaft connected at its ends to said core drill drive shaft and main drive shaft by means of toggle joints.

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