Nov. 16, 1943. F. H. MUELLER ET AL 2,334,278

DRILLING APPARATUS

Original Filed July 17, 1940

FIG. 1.

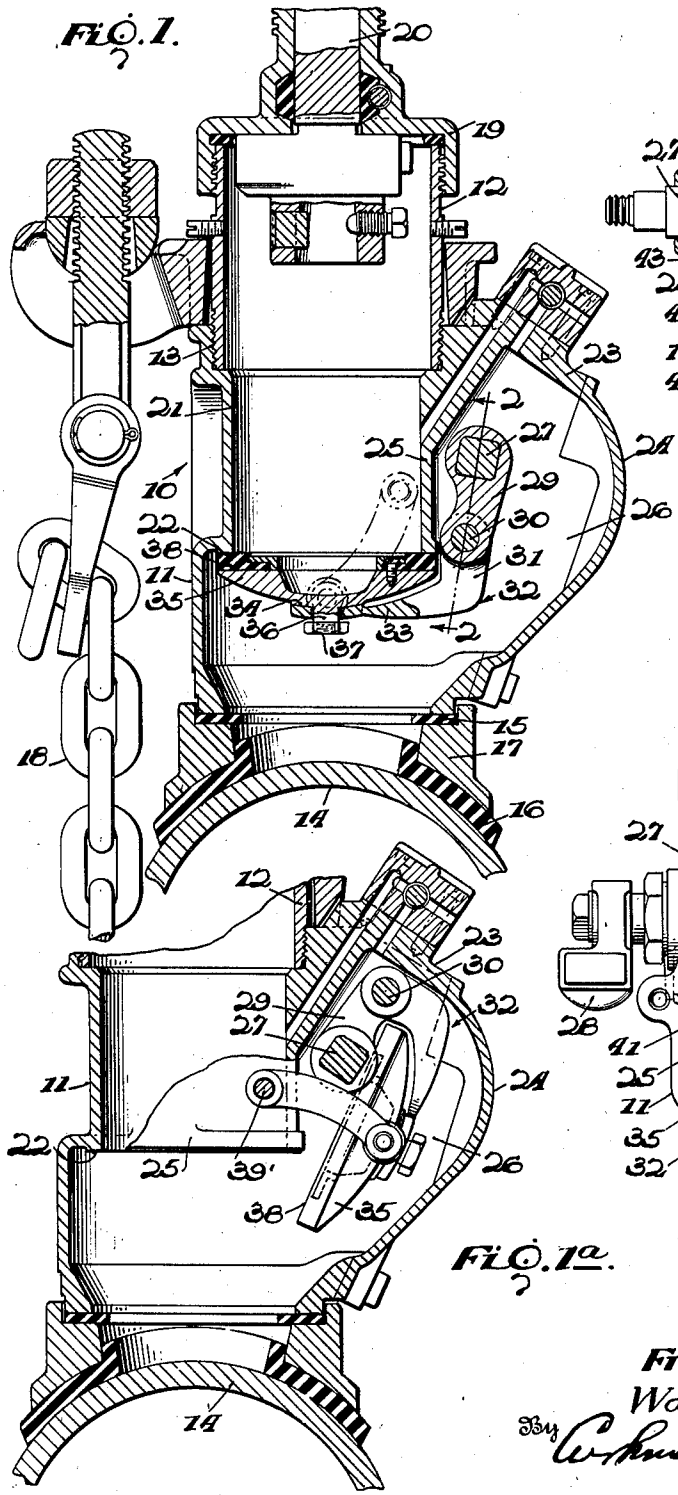


FIG. 2.

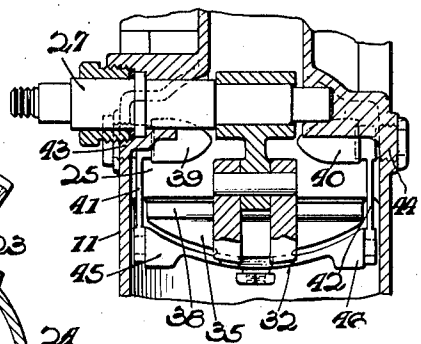


FIG. 3.

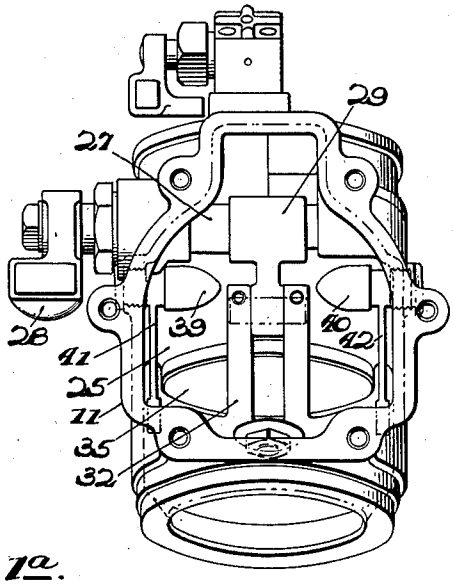


FIG. 1a.

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DRILLING APPARATUS

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Original application July 17, 1940, Serial No. 346,052. Divided and this application December 12, 1941, Serial No. 422,774

9 Claims. (Cl. 77—40)

This invention relates to drilling machines of the type adapted to operate on mains containing pressure fluid. Machines of this kind comprise a barrel adapted to be secured at one end against the main, the barrel having an internal seat intermediate its ends faced toward the main and with which is cooperable a flop valve so that the inner and outer portions of the chamber can be isolated from each other when necessary. The flop valve ordinarily includes an extension fixed on an operating shaft whose axis lies somewhat above and outwardly of the seat, rocking of the shaft enabling the valve proper to be moved between a position wherein it hangs substantially longitudinally of the barrel at one side of the seat and a position wherein it engages the seat. In order to accommodate this swing the barrel has to have a substantial clearance below the seat.

These machines freqently have to be used in very cramped quarters and anything that can be done to decrease the barrel height adds to their usefulness. The present invention has as its principal object to so mount the flop valve as to enable the necessary clearance below the seat to be materially reduced and an at present preferred manner of accomplishing this result is illustrated in the accompanying drawing in which:

Figure 1 is an axial section of the lower portion of a machine equipped in accordance with the invention, the machine being shown in operative position relative to a main which appears in partial transverse section.

Figure 1*a* is a section like that of Figure 1, partially broken away, showing the parts in a different relation.

Figure 2 is a section substantially on line 2—2 of Figure 1.

Figure 3 is an elevation of the lower barrel portion which appears in Figures 1 and 1*a*, a cover plate appearing in those figures being removed and the barrel portion being shown as tilted somewhat away from the vertical.

Referring to the drawing, the barrel, generally designated by the reference numeral 10, Figure 1, has an inner or lower portion 11 and an upper or outer portion 12, the two portions being threaded together at 13. The lower barrel portion 11 is supported on the main 14 through the intermediary of sealing gaskets 15 and 16 and a saddle 17 and is secured in position by means of a chain or other suitable means 18 which is passed under the main and has its ends anchored to the barrel. Barrel portion 12 has a cap 19 threaded thereon, this cap having a bore in which is rotatable and reciprocable the boring bar 20.

As here shown, the barrel portion 11 has a cylindrical throat 21 which terminates downwardly in a shoulder 22 constituting a valve seat. The barrel portion 11 includes at one side an enlargement 23 constituted in part by a removable cover plate 24 and this enlargement, as here shown, extends from below seat 22 nearly to the upper end of the barrel. The throat 21 is constituted in part by a cylindrical web 25 constituting a boundary of the chamber portion 26 which extends to both sides of the web portion 25.

Journaled in the enlargement 23 above seat 22 is a rock shaft 27 having a projecting end to which is secured an operating handle 28. On a squared portion of shaft 27 is an arm 29 to the free end of which is pivoted on a pin 30 the short arm 31 of a substantially L-shaped (in side elevation) member or carrier 32 whose long arm 33 has at its free end a substantially cylindrically hollowed seat 34 on which is seated the mating boss portion of a valve disc 35, the latter having a threaded stem 36 passing, with some clearance, through an opening in the seat 34 and being provided at its extremity with a non-binding retaining nut 37. This mounting gives the disc a limited range of universal rockability relative to the carrier. The valve disc 35 includes an annular gasket 38 adapted to engage the seat 22 as shown in Figure 1. The diameter of the disc is greater than the spacing of the inner end of enlargement 26 from the adjacent edge of seat 22 so that the disc could not be passed face-wise through this space.

Formed on the web 25 are opposite protuberances 39 and 40, Figures 2 and 3, which are provided with oppositely faced coaxial bores receiving pivot pins as at 39', Figure 1*a*, carried by the ends of arcuate links 41 and 42, the pins being insertable, in assembly, through openings in the barrel walls, these openings being subsequently sealed by plugs 43 and 44, Figure 2. The axis of the pivot pins is parallel to the axis of shaft 27 and is disposed toward the latter away from the axis of throat 21. Carrier 31 has lateral extensions 45 and 46 at its free end and to these are pivoted the lower ends of links 41 and 42 on a common axis parallel to their upper axis.

In Figure 1*a* the valve member 35 is substantially completely within the chamber 26 and arm 29 is in an upwardly extending collapsed relation with the portion 31 of carrier 32. If shaft 27 is turned in a clockwise direction the valve disc moves with the carrier 32 as guided by the

links 42 and 43, this movement being in an arc which carries the disc downwardly, across the valve seat, and then upwardly against the seat to the position shown in Figure 1. Since the disc is capable of some movement universally relative to the carrier by reason of the loose fit of stem 36, the disc is enabled to seek its own adjustment against the seat. In view of the fact that the disc passes from the chamber 26 to the seat by a sidewise movement, it will be evident that the clearance below the seat can be reduced considerably as compared to that heretofore necessary to accommodate the swing of the usual flop valve as described at the outset.

It will be evident that variations in the form and arrangement of parts from the disclosure herein are possible without departure from the invention as defined in the claims.

The application is a division of our application Serial No. 346,052, filed July 17, 1940, now Patent No. 2,291,979, issued August 4, 1942.

We claim:

1. In a drilling machine, a barrel portion adapted to have one end sealed against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc; and means in said barrel portion arranged to guide said disc inwardly from a position in said chamber, across said seat, and then outwardly against said seat; said means including an operating shaft in said chamber portion, an arm fixed on said shaft, and a member pivoted to said arm and engaging said disc.

2. In a drilling machine, a barrel portion adapted to have one end sealed against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc; and means including links pivoted on said barrel portion and in connection with said disc and arranged to guide the disc inwardly from a position in said chamber, across said seat, and then outwardly against said seat; said means also including an operating shaft in said chamber portion, an arm fixed on said shaft, and a member pivoted to said arm and engaging said disc.

3. In a drilling machine, a barrel portion adapted to have one end sealed against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc, a carrier for said disc, links pivoted at one end on said barrel portion on an axis outwardly of said seat and spaced from the axis of the latter toward said chamber portion and at their other end on said carrier, and means in connection with said carrier and cooperating with said links to move said disc inwardly from a position in said chamber portion, across said seat, and then outwardly against said seat.

4. In a drilling machine, a barrel portion adapted to have one end sealed against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc, a carrier for said disc; and means including links pivoted at one end on said barrel portion on an axis outwardly of said seat and spaced from the axis of the latter toward said chamber portion and at their other end on said carrier to guide said disc inwardly from a position in said chamber portion, across said seat, and then outwardly against said seat; said means also including an operating shaft in said chamber portion rockable on an axis parallel to said link axis, and an arm fixed on said shaft and pivoted to said carrier, rocking of said shaft serving to move said disc between said positions.

5. In a drilling machine, a barrel portion adapted to have one end sealed against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc, a carrier for said disc, means supporting said disc on the carrier for limited rocking relative to the latter, links pivoted at one end on said barrel portion on an axis outwardly of said seat and spaced from the axis of the latter toward said chamber portion and at their other end on said carrier, and means in connection with said carrier and cooperating with said links to move said disc inwardly from a position in said chamber portion, across said seat, and then outwardly against said seat.

6. In a drilling machine, a barrel portion adapted to have one end secured against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc, links pivoted at one end on said barrel portion on an axis outwardly of said seat and between opposite sides of said seat and in pivotal connection at the other end with said disc, and operating means cooperating with said links to move said disc substantially sidewise from a generally longitudinally extending position in said chamber portion in a substantially arcuate path to a transverse position in which it engages said seat.

7. In a drilling machine, a barrel portion adapted to have one end sealed against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement whose inner end is inwardly of said seat, said enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc, the spacing of said inner end of said enlargement from the adjacent end of said seat being less than the diameter of said disc; and means in said barrel portion arranged to guide said disc from a generally longitudinally extending position in said chamber portion substantially side-wise inwardly through the space existing between the inner end of said enlargement and the adjacent edge of said seat, across said seat, and then outwardly against said seat; said means including a part operable from the exterior of said barrel portion.

8. In a drilling machine, a barrel portion adapted to have one end sealed against a main, an annular shoulder in said barrel portion faced inwardly toward and spaced from said end and constituting a valve seat, said barrel portion having a lateral enlargement whose inner end is inwardly of said seat, said enlargement defining a

chamber portion which extends outwardly beyond said seat, a valve disc, the spacing of said inner end of said enlargement from the adjacent edge of said seat being less than the diameter of said disc; and means including links pivoted on said barrel portion and in connection with said disc and arranged to guide the disc from a generally longitudinally extending position in said chamber portion substantially side-wise inwardly through the space existing between the inner end of said enlargement and the adjacent edge of said seat, across said seat, and then outwardly against said seat; said means also including a part operable from the exterior of said barrel portion.

9. In a drilling machine a barrel portion adapted to have one end sealed against a main, an annular valve seat in said barrel portion faced inwardly toward and spaced from said end, said barrel portion having a lateral enlargement whose inner end is inwardly of said seat, said enlargement defining a chamber portion which extends outwardly beyond said seat, a valve disc, the spacing of said inner end of said enlargement from the adjacent edge of said seat being less than the diameter of said disc, and means in said barrel portion for guiding said disc substantially side-wise from a generally longitudinally extending position in said chamber portion in a substantially arcuate path through the space existing between the inner end of said enlargement and the adjacent edge of said seat to a transverse position in which it engages said seat; said means including a part operable from the exterior of said barrel portion.

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