May 15, 1928. 1,669,812

C. S. CRICKMER

SWAB ASSEMBLY

Filed Sept. 2, 1926

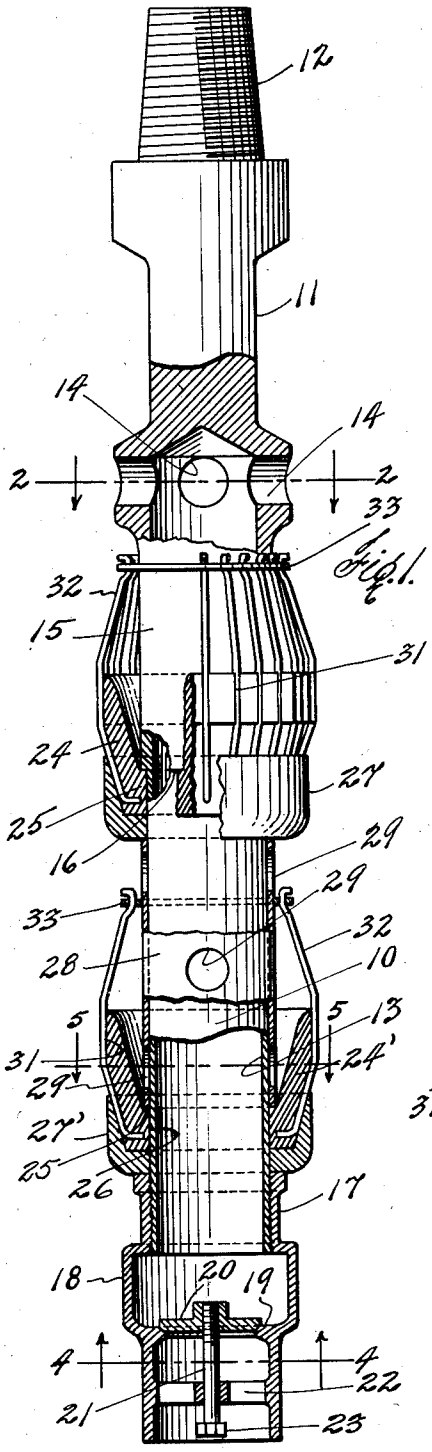



Fig. 1.

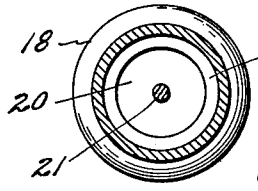



Fig. 4.

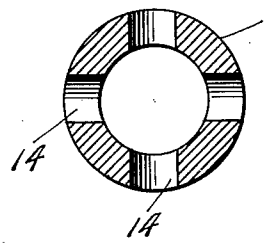



Fig. 2.

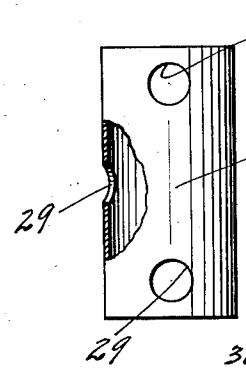



Fig. 3.

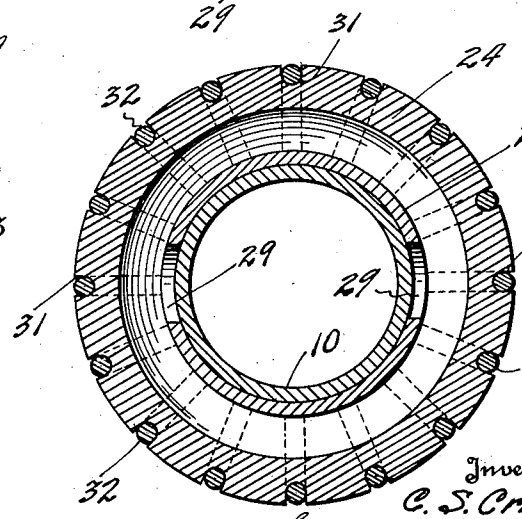



Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## SWAB ASSEMBLY.

Application filed September 2, 1926. Serial No. 133,124.

This invention relates to new and useful improvements in swab assemblies.

The object of the invention is to provide a single continuous tubular mandrel having a plurality of swab cups mounted thereon and spaced apart, in a simple and efficient manner and whereby said cups may be readily removed from the mandrel when desired.

A further object of the invention is to mount swab cups and spacing sleeves on a mandrel in superimposed order and to secure the same against movement on the mandrel by a simple fastening, to slide the entire assembly of cups and sleeves from the mandrel.

Another object of the invention is to provide a tubular mandrel with a solid tool connection at its upper end having ports communicating with its bore, thus making for strength, simplicity and efficiency.

A further object is to construct the mandrel with a maximum bore, thus permitting the swab to drop more rapidly through the fluid.

A still further object of the invention is to provide the spacing sleeve with ports, whereby the sand may be washed out.

A construction designed to carry out the invention will be hereinafter described with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown and wherein:

Fig. 1 is a view of a swab assembly constructed in accordance with my invention, a portion being in elevation and a portion in section,

Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1,

Fig. 3 is a view of the spacing sleeve,

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 1, and

Fig. 5 is a cross-sectional view taken on the line 5—5 of Fig. 1.

This application is a continuation in part of my application filed April 13, 1926, Serial No. 101,659.

In the drawings the numeral 10 designates a mandrel having a tool connection 11 at its upper end surmounted by a tapered screw threaded pin 12. The mandrel has a comparatively large bore 13 extending from the tool connection to its lower end. Ports 14 extending radially through connection provide outlets for the fluid. Extending downwardly from the connection 11 is an integral sleeve or boss 15 having an annular shoulder 16 at its lower end.

The lower end of the mandrel is screw threaded and engages in the collar 17 of a check valve casing 18 having an annular valve seat 19. An upwardly movable valve 20 rests upon the seat 19 and has a depending stem 21 passing through a spider 22. The upward movement of the valve is limited by a stop 23 on the bottom of the stem. The bottom of the casing 18 is open.

On the mandrel is mounted a flexible swab cup 24 of the frusto-conical type as is shown in the patent issued to Mowers February 24th, 1925, No. 1,527,956. However the particular type of cup may vary. The cup 24 has an internal annular lip 25 at its bottom surrounding its central bore 26. The lower end of the mandrel is passed down through the bore and the cup slid up the mandrel until the lip 25 engages the shoulder 16. This shoulder thus acts as a stop. The bore snugly fits the mandrel below the boss 15. The cup is seated in a thimble 27 which snugly embraces the mandrel and encloses the lower portion of said cup. The thimble is less in diameter than the cup.

The thimble 27 is supported on the upper end of a spacing sleeve 28 which has a sliding engagement on the mandrel. The sleeve is provided with perforations 29, whereby sand and other foreign matter may be washed out. This sleeve rests upon the lip 25 of a second cup 24′ which is also seated in a thimble 27′, a duplicate of the thimble 27.

The collar 17 of the check valve casing 18 is screwed up against the bottom of the thimble 27′ and all of the elements between said thimble and the shoulder 16, are thus confined against longitudinal movement in the mandrel and securely held in place. To remove any of the elements thus confined, it is only necessary to unscrew the collar 17 from the mandrel and slide off the elements until the one desired is reached.

The cups 24 and 24′ are included in swab units each comprising a cup and a thimble. Each cup is shown with an annular cylindrical lip 30 above its inclined portion and provided with grooves 31 extending upward-

ly from near the bottom. Reenforcing rods 32 are embedded in these grooves and extend above the lip. The thimble encloses and secures the lower ends of the rods and their upper ends are bent inwardly above the lip and hooked into a retaining ring 33. The cup, rods and ring are made up as a unit and slipped onto the mandrel. The rod may be held in the grooves by a temporary fastening band (not shown). This assembly produces a strong and efficient swab which may be readily dismantled for replacing worn cups. Its few parts make it simple.

In using the swab its pin 12 is connected to the usual socket or coupling at the end of the line. Upon the down stroke the fluid enters the bottom of the casing 18, unseats the check valve 20, flows up the large bore 13 and discharges through the ports 14. Owing to the size of the bore the swab will drop through the fluid much faster than where standard pipe and smaller bore is used. The flexible lips 30 and rods 32 will readily pass down the casing. Upon the up stroke the valve 20 will close and the lips of the cups 24 and 24′ will expand under the weight of the liquid therein, thus efficiently carrying out the swabbing action.

Various changes in the size and shape of the different parts, as well as modifications and alterations, may be made within the scope of the appended claims.

What I claim, is:

1. In a swab assembly, a tubular mandrel having a stop at its upper portion and an imperforate lower portion, an upper swab cup mounted upon the mandrel and engaging said stop, a lower swab cup mounted upon the mandrel and formed with upwardly extending reinforcing rods, an apertured spacing sleeve between the cups slidably mounted upon the mandrel and engaging the cups to separate them a distance greater than the length of said rods, and means on the lower portion of the mandrel engaging the lower cup to permit sliding application and removal of the cups and sleeve relative to the mandrel.

2. In a swab assembly, a tubular mandrel having a stop, an upper swab cup mounted upon the mandrel and formed with reinforcing rods connected above the cup by a ring slidingly surrounding the mandrel, a lower swab cup mounted upon the mandrel and formed with reinforcing rods connected above the cup by a ring slidingly surrounding the mandrel, a slidable sleeve extending between said cups to space them a distance greater than the length of said rods, and means for securing the lower cup in position.

3. In a swab assembly, a sub-combination including a tubular cup provided with a plurality of reinforcing rods embracing the cup and having their lower ends inturned and embedded in the lower portion of the cup, a mandrel upon which the cup is slidingly mounted, a thimble embracing and removable from said lower portion, and a ring connecting the projected ends of the rods above the cup and adapted to slide upon said mandrel.

In testimony whereof I affix my signature

CHARLES S. CRICKMER.