B. F. KELLEY.

COMBINED SWAB AND VALVE FOR WELLS.

APPLICATION FILED DEC. 27, 1920.

1,421,248. Patented June 27, 1922.

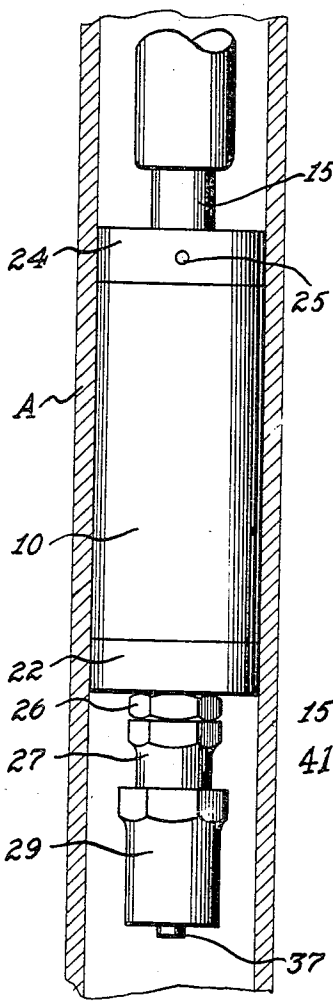


Fig. 1.

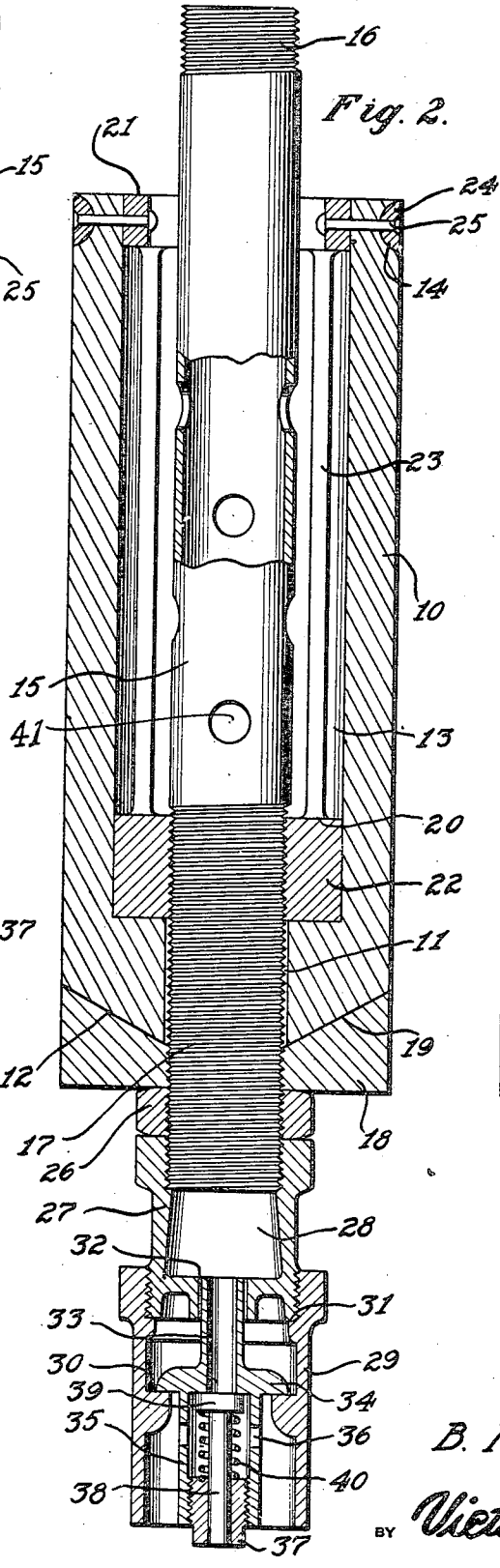


Fig. 2.

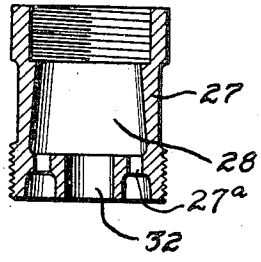


Fig. 3.

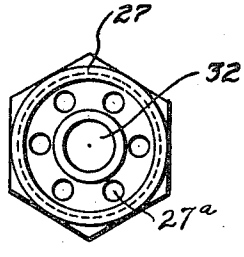


Fig. 4.

George L. Ljungloff.
J. M. Jesler
WITNESS:

B. F. Kelley.
INVENTOR
BY Victor J. Evans
ATTORNEY

UNITED STATES PATENT OFFICE.

BENJAMIN F. KELLEY, OF TULSA, OKLAHOMA, ASSIGNOR OF ONE-FOURTH TO WILLIAM K. HUGHES, OF ST. LOUIS, MISSOURI, AND ONE-FOURTH TO D. D. MYERS, OF TULSA, OKLAHOMA.

COMBINED SWAB AND VALVE FOR WELLS.

1,421,248. Specification of Letters Patent. Patented June 27, 1922.

Application filed December 27, 1920. Serial No. 433,466.

To all whom it may concern:

Be it known that I, BENJAMIN F. KELLEY, a citizen of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented new and useful Improvements in Combined Swabs and Valves for Wells, of which the following is a specification.

This invention relates to oil well devices and has for its object the provision of a device adapted for insertion within the tubing of a well whereby to swab off oil or water adhering to the tubing, the device being in the nature of a pump plunger and being formed of elastic material whereby it will expand automatically from the weight of the liquid accumulated within it so as to closely engage the tubing for effectually swabbing off liquid on the walls thereof.

An important object is the provision of a device of this character which is provided at its bottom portion with an automatically operating check valve which opens on the down stroke and closes on the upstroke of the device, this valve being moreover provided with regulating means for the purpose of obviating the danger of placing too great a load upon the device which might result in preventing its withdrawal from a well.

An additional object is the provision of a device of this character which will be simple and inexpensive in construction, easy to operate, efficient in service, durable in use, and a general improvement in the art.

With the above and other objects and advantages in view, the invention consists in the details of construction to be hereinafter more fully described and claimed and illustrated in the accompanying drawings in which—

Figure 1 is a longitudinal sectional view through a well tubing showing my device in side elevation.

Figure 2 is a longitudinal sectional view through my device on a larger scale, and

The remaining figures are detail cross sectional views.

Referring more particularly to the drawings, the letter A designates a well tubing within which my device is adapted to be used. In carrying out my invention I provide a cylindrical body 10 formed of rubber and which has one end entirely open and its other end closed except for a central opening 11. The second mentioned end is formed inclined, as shown at 12. The interior of this member constitutes a chamber designated by the numeral 13. This body 10 is formed at its upper end in its outer periphery with a groove 14 for a purpose to be described.

Extending throughout the member 10, coaxially thereof, is a pipe 15 having one end threaded, as shown at 16, for connection with another pipe and having its other end threaded, as shown at 17, and extending through the bore 11 of the member 10. Screwed onto the threaded end 17 is a clamping disk 18 of the same diameter as the cylindrical member 10 but formed of metal and having an inclined face 19 engaging the inclined surface 12 of the member 10.

Disposed within the member 10 is a cage designated broadly by the numeral 20 and this cage is formed as a single casting including ring-like heads 21 and 22 connected by longitudinal bar members 23. The head 22 is threaded onto the threaded portion 17 of the pipe 15 and seats within the bottom of the chamber 13 while the head 21 is disposed flush with the open upper end of the member 10. Seating within the groove 14 is a ring 24 through which pass rivets 25 which also pass through the member 10 and head 21 and the purpose of this ring is to hold the upper end of the rubber member 10 against splitting or tearing and likewise against displacement.

Screwed onto the portion 17 of the pipe which projects below the bottom of the clamping member 18 is a lock nut 26 and a casing 27 which has a chamber 28 communicating with the interior of the pipe 15. Secured to the lower end of this casing 27 and extending outwardly thereof, is a casing 29 which has its lower end open and which is formed intermediate its ends with an inwardly extending flange 30 constituting a valve seat and with a shoulder 31 abutting against the lower end of the casing 27. The lower end of the casing 27 is provided with a central bore 32 within which is slidably engaged the hollow stem 33 of a valve 34 normally seating against the flange 30, and is further provided with a plurality of holes 27^a. This valve member further includes a hollow stem portion 35 which is formed with a plurality of openings 36 and which is in-

ternally threaded, as shown, for engagement therein of a screw plug 37 which carries a stem 38 having an enlarged head 39 abutting normally against the valve 34. A coil spring 40 surrounds this stem 38 and abuts against the head 39 and plug 37.

The operation of the device is as follows:

Any suitable length of pipe is connected with the threaded end 16 of the pipe or tool 15 and the device is lowered into the well which it is desired to swab out. The device is lowered to a desired depth and it will be seen that when the valve casing 29 encounters liquid the pressure of the liquid upwardly against the valve 34 will unseat the valve and the liquid will pass around the valve 34, through the holes 27ª of the bottom of the member 27 and into the chamber 28 and then into the pipe 15. When the device has been lowered to the desired depth it is then pulled upwardly whereupon engagement of the upper end of the member 10 with the walls of the well tubing will swab liquid adhering thereto and this liquid will of course pass into the cage member 20. The accumulation of liquid within the device will then press the rubber member 10 outwardly into close frictional engagement with the tubing so that it will have a thorough swabbing action as it is moved. The liquid accumulating within the cage member and member 10 will pass through holes 41 in the pipe 15 and the matter thus accumulated within the pipe will be forced out at the upper end thereof as it cannot pass out of the lower end owing to the fact that the valve 34 automatically seats when the upstroke starts. In this way it will be seen that the device will operate very efficiently for swabbing out a well tubing. The plug member 37 may be adjusted to place the spring 40 under considerable tension so that the valve 39 will not open unless there is great pressure exerted downwardly on the device. The reason for this is that it is necessary in order to prevent the device from being inserted too deeply into the well so that the initial flow of liquid from the bottom upwardly into the device will not cause such an accumulation of liquid as to make the device so heavy that it could not be moved upwardly.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided a simple and yet highly efficient well swabbing device which will satisfactorily perform all the functions for which it is intended.

While I have shown and described the preferred embodiment of my invention, it is of course to be understood that I reserve the right to make such changes in the form, construction, and arrangement of parts as will not depart from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A device of the character described comprising a pipe formed with a plurality of holes, a cage member secured upon said pipe, a cylindrical swab of elastic material disposed outwardly of said cage member and held against movement longitudinally of the pipe, a casing connected with the bottom of the pipe below said swab, an upwardly opening check valve in said casing, said valve being formed with a central bore, and a spring-pressed plunger engaging against the bottom of said valve for closing said bore.

2. A device of the character described comprising a pipe formed with a plurality of holes, a cage member secured upon said pipe, a cylindrical swab of elastic material disposed outwardly of said cage member and held against movement longitudinally of the pipe, a casing connected with the bottom of the pipe below said swab, an upwardly opening check valve in said casing, said cage member including upper and lower heads connected by longitudinal members, the upper head engaging against the inner periphery of the swab at the upper end thereof, and a ring disposed about the upper end of the swab and secured to the upper head.

3. A device of the character described comprising a pipe provided with a plurality of holes, a cage member secured upon said pipe and formed of upper and lower heads connected by longitudinal bar members, a cylindrical swab of rubber disposed about said cage member and having its upper end open and its lower end closed except for a hole for the passage of said pipe, a clamping disk secured upon said pipe and engaging the lower end of the swab, the upper end of the swab being provided in its periphery with a groove, a ring seating within said groove and having securing members passing through the swab and the upper head, a casing secured upon the lower end of the pipe below said disk, and an upwardly opening check valve within said casing.

4. A device of the character described comprising a pipe formed with a plurality of holes, a cage member secured upon said pipe, a cylindrical swab of elastic material disposed outwardly of said cage member and held against movement longitudinally of the pipe, a casing connected with the bottom of the pipe below said swab, an upwardly opening check valve in said casing, said valve being formed with a central bore, a spring-pressed plunger engaging against the bottom of said valve for closing said bore, and means for varying the tension of the spring pressure on said plunger.

In testimony whereof I affix my signature.

BENJAMIN F. KELLEY.