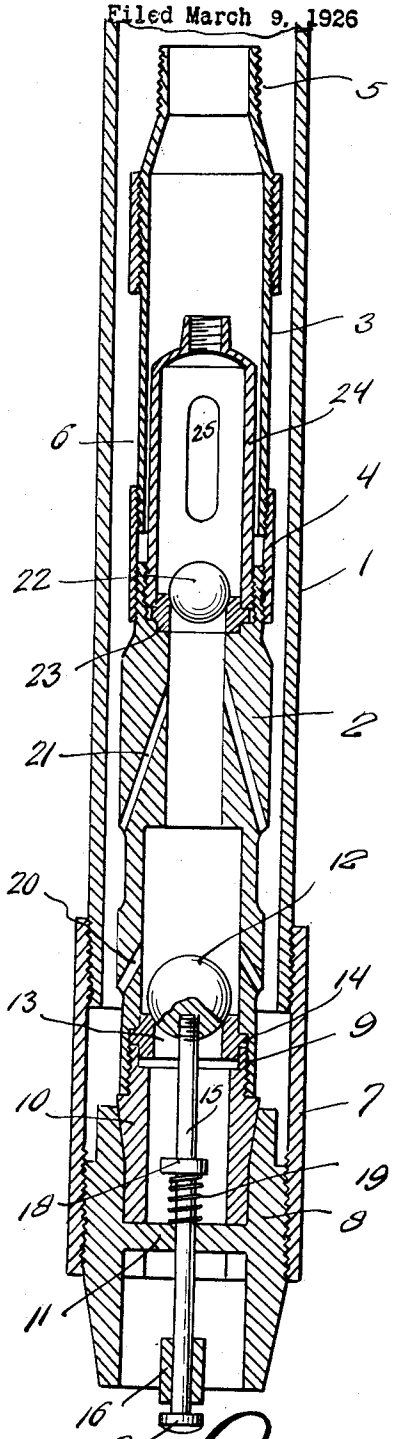
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FLUID ELEVATOR

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FLUID ELEVATOR.

Application filed March 9, 1926. Serial No. 93,468.

The present invention relates to improvements in fluid elevators, and has for its principal object to provide a highly novel and efficient means for raising oil or water from wells.

One of the important objects of the present invention is to provide a device of the above mentioned character which may be used in either deep or shallow wells and is further of such construction as to enable either gas, oil, or water to be used as the lifting medium.

A still further object is to provide a fluid elevator of the above mentioned character wherein the same includes a lifting pipe which is arranged within a casing in spaced relation thereto so as to provide a passage way for the lifting fluid, said lifting pipe being provided at spaced intervals with valves which are adapted to be unseated by the action of the lifting fluid entering the lifting pipe through suitable ports provided therefor in the pipe, and which suction aids in raising the fluid upwardly through said pipe.

A further object is to provide a fluid elevator of the above mentioned character which is simple in construction, inexpensive, strong. and durable, and further well adapted to the purpose for which it is designed.

Other objects and advantages of the invention will become apparent during the course of the following description taken in connection with the accompanying drawing.

In the accompanying drawing forming a part of this application, and in which like numerals designate like parts throughout the same:

The figure represents a central vertical sectional view through the device embodying our invention.

In the drawing, wherein for the purpose of illustration is shown the preferred embodiment of our invention, the numeral 1 designates a cylindrical casing which may be of any desired length, the lower end of which is threaded for a purpose hereinafter more fully described. Arranged within the casing 1 and preferably within the lower portion thereof is the tubular body portion 2 which forms a part of the lifting pipe. The sections of piping 3 is connected with the upper end of the tubular body portion 2 through the medium of the coupling sleeve 4 and the upper end of this section of piping may be connected to similar sections (not shown), the upper end of the section 3 being provided with a nipple 5 to afford such a communication or connection with the adjacent end of a similar section of piping.

This lifting pipe is adapted to extend upwardly through the casing 1 and above the surface. Furthermore, the lifting pipe is of such diameter as to be spaced from the inner wall of the casing 1 whereby to provide a passage way 6 for the lifting fluid which is employed in connection with the device and which fluid may be either air, gas, oil, or water, it being understood of course that the lifting fluid enters the passages 6 at a point adjacent the upper end of the casing and is forced downwardly around the lifting pipe under pressure.

A short section of piping such as is shown at 7 has its upper end threaded on the lower end of the casing 1 and the lower portion of the tubular body 2 of the lifting pipe extends downwardly into this section of piping. A closure for the passage way 6 is provided at the lower end of the body portion 2 of the lifting pipe, and to this end, we provide a shoe which has its intermediate portion externally threaded for engagement with the internally threaded lower end of the section of piping 7. The lower end of the tubular body portion 2 is provided with the enlarged internally threaded bore 9 and into which is threaded the upper end of the guide member 10, the major portion of which extends downwardly within the upper portion of the shoe 8.

The lower end of the tubular guide member 10 rests on the upper face of the cross piece 11 which forms a part of the shoe 8 in the manner clearly illustrated in the drawing.

A ball valve 12 is arranged within the lower portion of the tubular body portion 2 of the lifting pipe 1 and normally maintained in a seated position on the seat 13 provided therefor which seat is held in position through the medium of the upper end of the tubular guide member 10 cooperating with the annular flange 14 formed on the outer peripheral face of the seat and which flange is disposed within the enlarged bore 9 of the tubular body portion 2.

The valve 12 is supported on the upper end of the valve stem 15, the latter extending downwardly through the tubular guide 10 and also through the shoe 8, the cross member 11 being provided with a central

opening to accommodate the valve stem. The lower end of the valve stem extends through a suitable guide sleeve 16 which is arranged within the lower end of the shoe 8 and a head 17 is formed on the lower end of the stem and may be in the form of an adjusting nut. A collar 18 is secured on the valve stem 15 at a point below the upper end thereof, and a coil spring 19 encircles the valve stem and is disposed between the collar 18 and the upper face of the cross member 11, this coil spring tending to normally maintain the valve 12 in its seated position.

The tubular body portion 2 of the fluid lifting pipe is provided with suitable inlet ports 20 which affords communication between the passage way 6 and the bore of the tubular body portion and as is clearly illustrated in the drawing, these ports are arranged at a point adjacent the valve 12, and are further disposed angularly. Similar ports 21 are provided in the upper portion of the tubular body but these ports are disposed at a greater angle of inclination than the aforementioned port. Any number of these ports may be provided as is desired.

A ball valve 22 is normally seated in a closed position on the valve seat 23 which is similar to the valve seat 13, the valve seat 23 being secured in the upper end of the tubular portion of the lifting pipe, and as is clearly illustrated in the drawing, the upper portion of the bore of the tubular body is reduced.

A cage 24 is provided for the ball valve 22 and is arranged within the sectional piping 3 in such a manner as to be spaced from the inner wall thereof so that the fluid which is to be raised may be discharged from the cage 24 through the opening 25 formed therein, and enter the section piping 3 so as to enable the fluid to be further elevated out of the lifting pipe.

The operation of our improved liquid elevator may be briefly stated as follows: The casing and the lifting pipe arranged therein are inserted downwardly in the well containing the oil or water which is to be elevated and then the lifting fluid which may be either air, gas, oil, or water is then admitted to the passage 6 under pressure so that the same will be forced downwardly around the lifting pipe and will then enter the ports 20 and 21 so as to cause sufficient suction to be created within the tubular body portion 2 of the lifting pipe to raise the valve 12 to an open position and thus start the flow of the oil or water to be elevated inwardly through the tubular body portion and the ball valve 22 will also be raised to an open position to permit the oil or water to travel upwardly through the lifting pipe from which it is discharged at the upper end thereof. The fluid under pressure is entirely depended upon for the entire pumping action and therefore the use of a piston above the apparatus is not necessary.

After the suction ceases, the valves 12 and 22 will return to their normally closed position on their respective valve seats.

It will thus be seen from the foregoing description that a liquid elevator has been provided which will at all times be positive and efficient in carrying out the purposes for which the same is constructed, the parts of the device being of such construction as to enable the same to be readily assembled or disassembled.

While we have shown the preferred embodiment of our invention, it is to be understood that minor changes in the size, shape, and arrangement of parts may be resorted to without departing from the spirit of the invention and the scope of the appended claim.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent is:—

In a check valve for a fluid elevator wherein the latter includes a fluid lifting pipe, a shoe supported below the lower end of the lifting pipe, a cross piece arranged in the bore of a shoe, a tubular guide member secured in the lower end of the lifting pipe, the lower portion of the tubular guide member extending downwardly into the shoe and engaging said cross piece, a ball valve, a ring like seat therefor, an annular flange on the outer peripheral face of said seat, said flange being secured between the upper end of the tubular guide and the adjacent portion of the lifting pipe for supporting the seat in the lifting pipe, a stem threaded at its upper end in the bottom of the ball valve and extending downwardly through the cross piece in the shoe, a guide sleeve for the lower end of the stem and arranged in the lower portion of the shoe, a head on the lower end of the stem, a collar secured on the stem at a point above the cross piece, and a retractile coil spring encircling the stem and secured at its opposite ends to the collar and the cross piece respectively for normally holding the ball valve seated in a closed position.

In testimony whereof we affix our signatures.

DOUGLAS B. DENNIS.
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