H. F. BEAM.

SWAB UNLOADER.

APPLICATION FILED JUNE 15, 1915.

1,156,657. Patented Oct. 12, 1915.

FIG. 1.

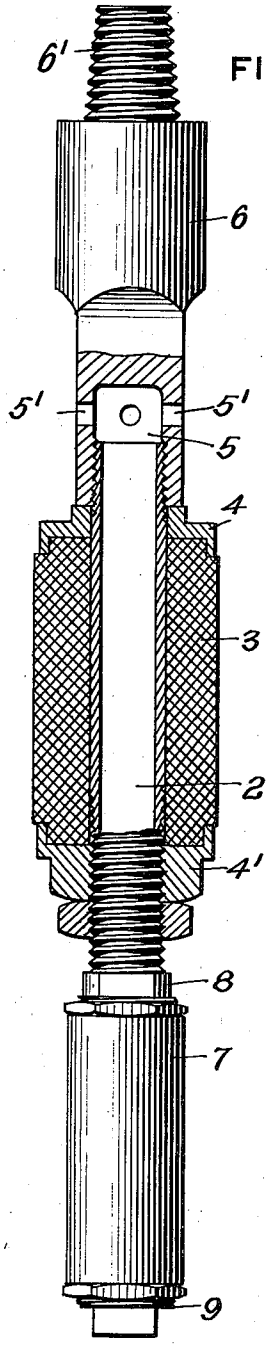
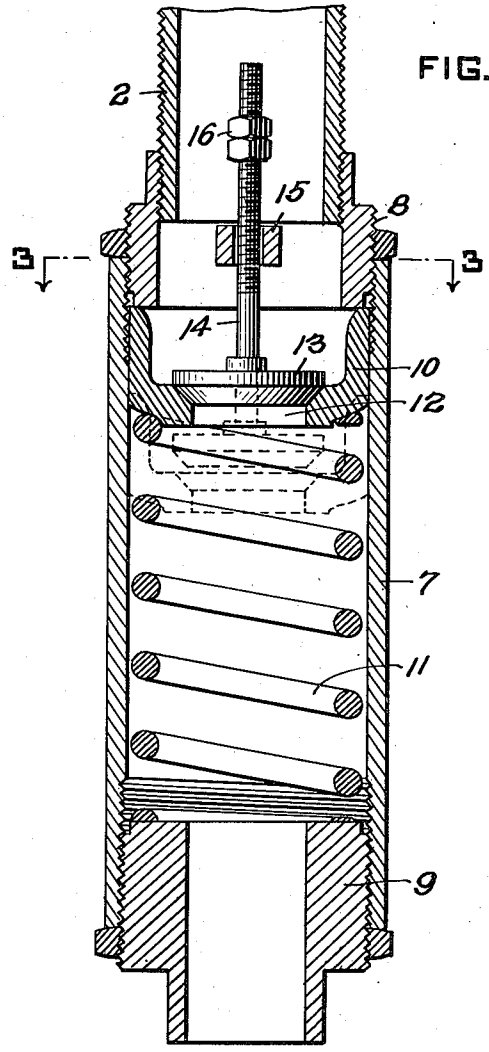


FIG. 2.



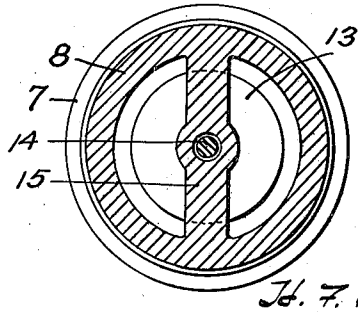


FIG. 3.

WITNESSES:

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SWAB-UNLOADER.

1,156,657. Specification of Letters Patent. Patented Oct. 12, 1915.

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To all whom it may concern:

Be it known that I, HOWARD F. BEAM, a citizen of the United States, and resident of Harmony, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Swab-Unloaders, of which the following is a specification.

The object of this invention is to provide an unloading device of simple and efficient construction for relieving fluid containers or carriers of excessive weight or pressure.

The invention is designed primarily for use with a well swab, whereby when water is admitted above the swab in excess of that which may be safely and conveniently withdrawn from the well the excess is released, thereby reducing the load to the amount the swab is capable of lifting.

The invention is embodied in a structurally novel device which includes means for varying the load, as may be desired.

In the accompanying drawings, Figure 1 is a view partly in elevation and partly in section of a swab provided with the improved attachment. Fig. 2 is a vertical section of the unloading device. Fig. 3 is a sectional plan on line 3—3 of Fig. 2.

Referring to the drawings, 2 designates the vertical tubular body of a well swab having the rubber annulus 3 confined thereon in the usual manner by top and bottom heads 4 and 4′, respectively. The threaded upper extremity of body 2 is secured to the tubular lower end 5 of stem 6, the latter provided at its upper end with coupling pin 6′. The tubular lower portion of the stem is ported laterally at 5′. The parts thus far described are of usual and well known construction.

Forming a downward continuation of body 2 is cylinder 7 which is secured thereto by sleeve or head 8, the upper end of the cylinder being threaded internally and thereby adjustably secured to the sleeve, and the upper portion of the sleeve is internally threaded for receiving the externally threaded lower extremity of body 2. Adjustably fitting the lower end of cylinder 7 is tubular head 9, the parts being preferably threaded together whereby a range of adjustment is provided for the purpose presently to be described.

A piston 10 is fitted and movable vertically in cylinder 7 and is held normally raised and in engagement with sleeve 8 by coiled spring 11 which is confined between the piston and lower head 9. The piston is ported at 12 and the port is normally closed by the upwardly opening check valve 13. Projecting upwardly from the valve is threaded stem 14 which is movable freely through the apertured bar 15 spanning sleeve 8 and with nuts 16 adjustable on the upper portion of the stem.

In operation, upon lowering the swab in a well the fluid passes upwardly through head 9, cylinder 7 and the ported piston, the check valve opening upwardly for such passage, as will be understood. Upon elevating the swab the weight of the column of fluid thereabove is placed on piston 10, valve 13 being of course closed. If more fluid has passed upwardly through the swab than the latter has been set to lift, piston 10 lowers in opposition to spring 11, and with the downward movement of check valve 13 stopped by nut 16 engaging bar 15, the piston port 12 is opened and fluid is permitted to escape until the load has been sufficiently lightened to permit spring 11 to raise the piston sufficiently to permit its port to be again closed by valve 13. Thus it will be seen that the loading is automatically gaged and that overloading is rendered impossible. With heads 8 and 9 adjustable in opposite ends of the cylinder, the resistance of spring 11 may be varied, and movement of nuts 16 on stem 14 affords a further adjustment by varying the vertical movement of valve 13.

While the improvement is designed primarily for a well swab, it may be variously employed for relieving a fluid container or mover of undue weight or pressure, serving to unload the same until the load has been reduced to the desired point.

I claim:

1. The combination of a cylinder open at its opposite ends for the passage of liquid, a ported piston movable in the cylinder, a valve for the piston port, a spring for opposing movement of the piston in the direction in which the valve moves when closing, and means made operative by movement of the piston in opposition to the spring for opening said valve and releasing fluid confined in the cylinder.

2. The combination of a cylinder open at its opposite ends for the passage of liquid and with one end of the cylinder adapted to communicate with a liquid container, a piston movable in the cylinder, a spring for

opposing movement of the piston in response to weight or pressure of the liquid within the container, the piston being ported and a check valve for the port with said valve adapted to open toward the container, and means made operative by the spring-opposed movement of the piston for opening said valve and releasing liquid from the container.

3. The combination with a well swab having a tubular body open at its opposite ends for the admission and discharge of liquid, of a cylinder adapted to connect with the lower end of said body, a ported piston movable within the cylinder, a spring for opposing movement of the piston in direction away from the body, a downwardly closing check valve for the piston port, and means made operative by the movement of the piston in opposition to the spring and under the weight of fluid above the check valve for opening said valve and discharging sufficient liquid from above the swab to permit the piston to return to normal position under the influence of the spring and thereby close the valve and stop such discharge.

4. The combination of a cylinder open at its opposite ends for the passage of liquid, a ported piston movable in the cylinder, a spring for opposing movement of the piston, a check valve for the piston port, and means affording a limit to the movement of the check valve with the piston whereby when the piston exceeds such limit the piston port is opened for the passage of fluid.

5. The combination with a well swab having a tubular body open at its opposite ends for the admission and discharge of liquid, of a cylinder adapted to connect with the lower end of said body, a ported piston movable within the cylinder, a spring for opposing movement of the piston in direction away from the body, a check valve for the piston port having a vertical stem, and a support with relation to which the stem has limited movement whereby when the spring-opposed movement of the piston exceeds the limited movement of the check valve the piston port is opened.

6. The combination with a well swab having a tubular body open at its opposite ends for the admission and discharge of liquid, of a cylinder adapted to connect with the lower end of said body, a ported piston movable within the cylinder, a spring for opposing movement of the piston in direction away from the body, a downwardly seating check valve for the piston port, a stem extending vertically from the valve, an apertured support bridging the cylinder and with said stem movable through the support, and means for adjustably limiting such movement.

7. The combination of a cylinder, heads for opposite ends of the cylinder with means for varying the distance within the cylinder separating the heads, the heads being open for the passage of liquid, a ported piston movable within the cylinder with its movement in one direction adapted to be limited by one of said heads, a coiled spring within the cylinder and confined between the piston and the other of said heads for opposing receding movement of the piston, a valve for the piston port and means made operative when the piston is moved in opposition to the spring for opening the valve and releasing liquid confined in the cylinder by the piston.

8. The combination of a cylinder open at its opposite ends for the passage of liquid, a ported piston movable in the cylinder, an upwardly opening check valve for the piston port, a spring for opposing downward movement of the piston, and means made operative by excessive weight of fluid above the piston for opening the piston port.

In testimony whereof I affix my signature in presence of two witnesses.

HOWARD F. BEAM.

Witnesses:
W. H. GALBACH,
HARRY HOSBACH.