No. 737,274. PATENTED AUG. 25, 1903.

G. C. RICHARDS.

PUMP.

APPLICATION FILED NOV. 10, 1902.

NO MODEL.

Fig. 3.

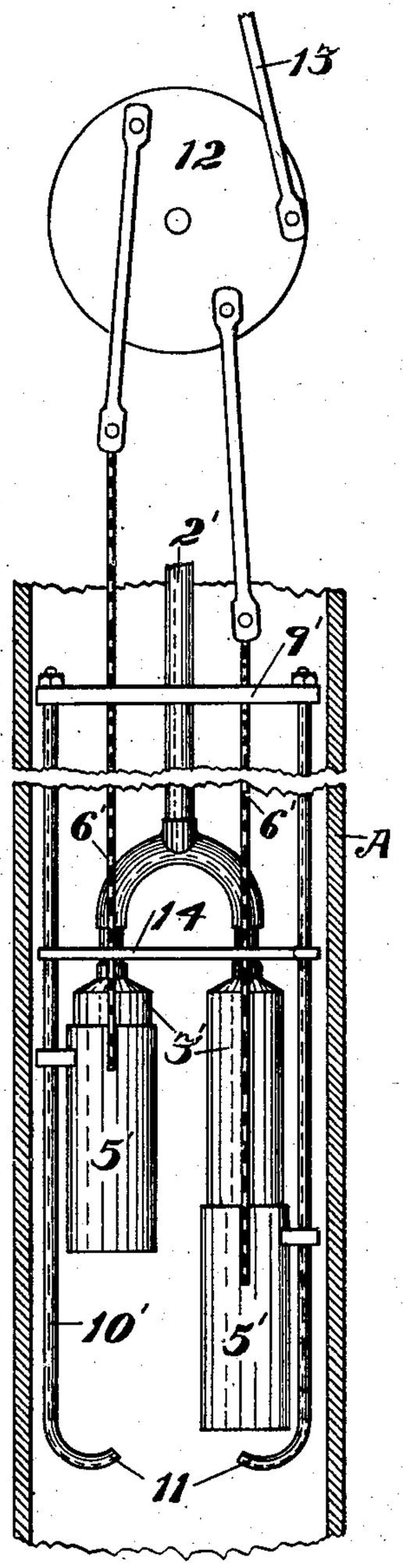


Fig. 1.

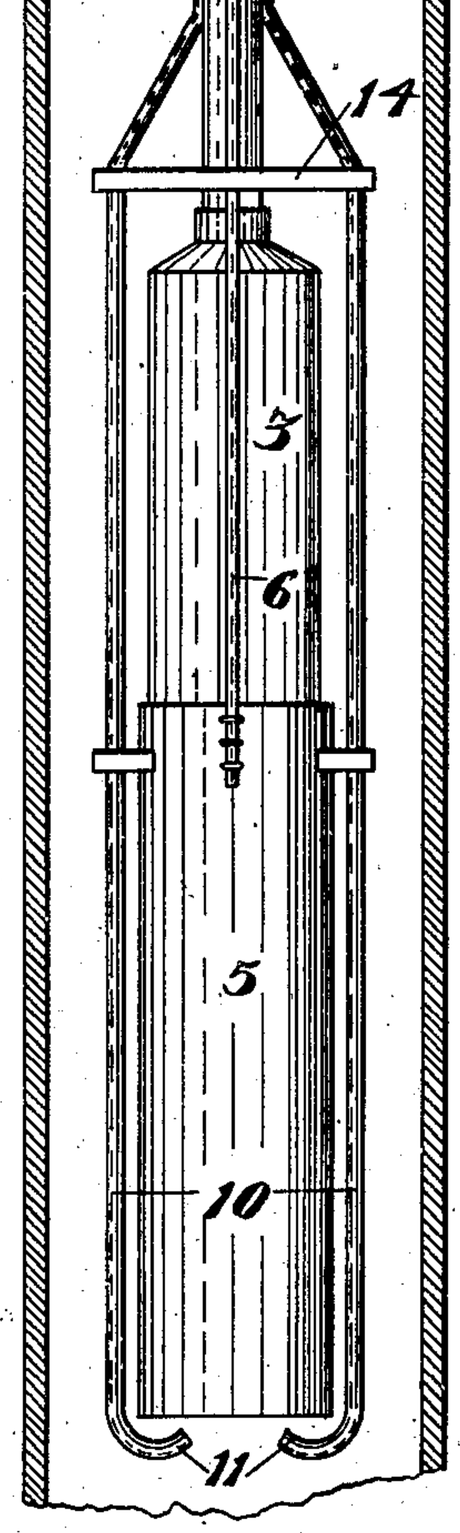
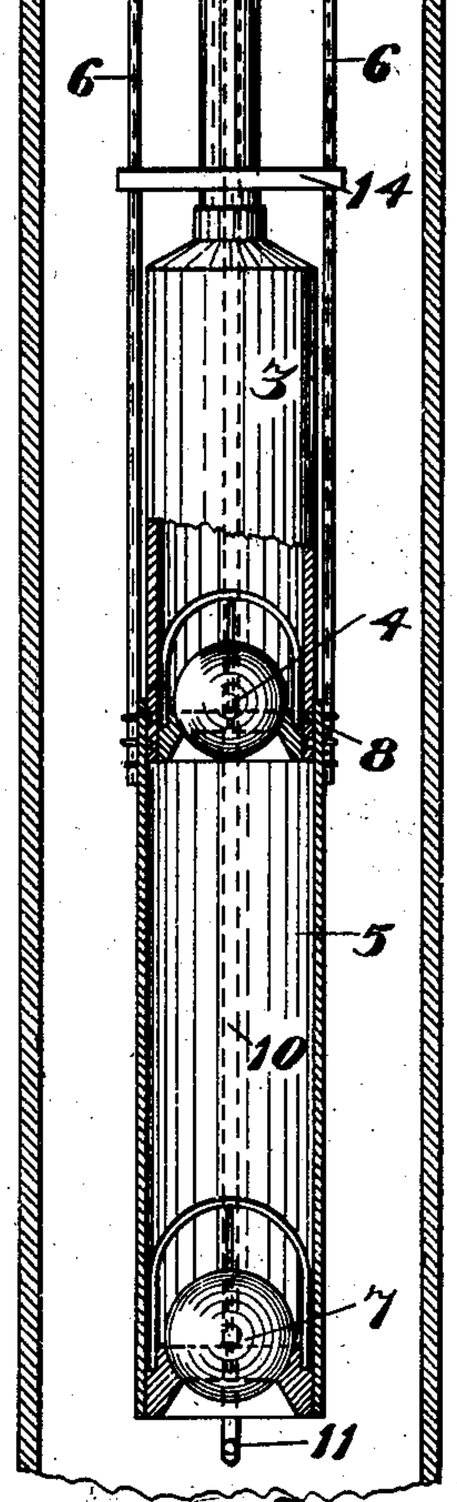


Fig. 2.



Witnesses,
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No. 737,274. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

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PUMP.

SPECIFICATION forming part of Letters Patent No. 737,274, dated August 25, 1903.

Application filed November 10, 1902. Serial No. 130,728. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. RICHARDS, a citizen of the United States, residing at Berkeley, county of Alameda, State of California, have invented an Improvement in Pumps; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in pumping apparatus. Its object is to provide a pump of simple construction which is adapted for use particularly in oil-wells, where great difficulty is experienced in lifting heavy oils and those containing considerable quantities of sand and like gritty foreign substances.

The invention consists of the parts and the construction and combination of parts, hereinafter more fully described, having reference to the accompanying drawings, in which—

Figure 1 is a side view of my invention. Fig. 2 is a front view of same in partial section. Fig. 3 is a modification of same.

In oil-well pumping as ordinarily conducted at present a bucket-valve attached to a sucker-rod reciprocable within a stationary pump-barrel and discharge-pipe is used. This bucket-valve being disposed above the inlet-valve in the bottom of the pump-barrel is frequently rendered inoperative by the sand settling on the latter or packing about the end of the barrel, necessitating the use of sand-buckets and sometimes even the withdrawal of several hundred feet of pipe from a well in order to free the inlet-valve. Moreover, the heavy viscous character of much of the oil, particularly where it carries considerable sand in suspension, offers great resistance to the downward stroke of the valve, which must open to allow the fluid to pass upward. The resistance is not infrequently great enough to cause a sucker-rod to buckle and rub against the casing, with consequent undesirable wear on the latter and on the rod. Much of the difficulty suggested is obviated by the following construction:

As illustrated in the drawings, A represents the usual well-casing, and 2 the main pipe, through which the oil or other fluid is discharged from the well. The lower end of pipe 2 terminates in a pump-barrel or cylinder-section 3, having a suitable inlet-valve 4 at its lower end. A bucket or cylinder 5 is bored to have a snug moving fit on the outside of barrel 3 and is reciprocated by means of the rods 6, operated from any suitable source of power. Cylinder 5 projects always below the lower end of barrel 3 and has a suitable valve 7 at its lower end. If desired, the barrel may be turned down on its periphery to receive the packing-rings 8, by which a tight joint will always be maintained between the cylnder 5 and the barrel.

In operation the pump is lowered into the well to submerge the barrel and the surrounding cylinder sufficiently. When the cylinder is forced down through the fluid, valve 7 opens by reason of the vacuum formed behind it to allow the cylinder to fill. On lifting the fluid is forced upward past valve 4 to the surface. The fact that the movable part 5 is of greater area than the stationary part 3 and that it carries the larger valve affords, in the first instance, a relatively greater lifting force on valve 4 than where the movable part is incased within the barrel, and, in the second instance, less resistance is offered by the fluid on the downstroke. Consequently less power is required to actuate a bucket and the liability of bending the sucker-rods is lessened.

Straps or guides 9 are secured at intervals to pipe 2 to steady the rods and keep them out of contact with the casing and pipe. Guide-rods 10 may be riveted to pipe 2 above where cylinder 5 works, extending downward exterior to the cylinder and terminating in the inwardly-curved ends 11 to prevent the cylinder from coming in contact with the bottom of the well and to prevent the cylinder falling from the end of the barrel and being lost in the well in case it should for any reason become detached from the rods. Again, by reason of a reciprocable part, as 5, operating below the pump-intake a constant agitation is kept up in the well, and the sand is prevented from settling and packing about the end of the pump-barrel.

In Fig. 3 is shown a modification adapted as a compound pump to be used in conjunction, for example, with windmills. In this case the main delivery-pipe 2′ branches at its lower end to form the pump-barrels 3′, and the pump-cylinders 5′ are movable upon these barrels in the manner as first described. By imparting an alternating reciprocating mo-

tion to these barrels a practically continuous stream may be discharged through pipe 2′. In the present instance I have shown the following means for causing this alternate reciprocation: 12 is a disk suitably journaled in line above the cylinders and to which the sucker-rods 6′ are pivoted at opposite points on the disk. 13 is a rod connecting with the windmill-crank and adapted by the revolution of the latter to impart an oscillating movement to disk 12 and cause the pump-cylinders 5′ to act alternately, as readily understood. The sucker-rods 6′ are guided in the cross-head 9′, secured on pipe 2′, and are attached to a ring or flange part 14, screwed upon the upper end of each of cylinders 5′. Guide-rods 10′, secured to the cross-head 9′, extend down through guides 14 beneath the ends of the cylinders similarly and for the same purpose as were rods 10 in Fig. 1.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination in a pump, of two telescoping cylinders, one movable in relation to the other and projecting below the lower end of the latter, and inwardly-opening valves in each of said cylinders, and means extending into the path of the lower end of the movable cylinder adapted to prevent the end of the cylinder coming in contact with the bottom of the well.

2. The combination in a pump, of a stationary pump-barrel, a valve therein, a discharge-pipe therefor, a cylinder reciprocable on the outside of said barrel and having a snug fit therewith, a valve in said cylinder, sucker-rods exterior to the discharge-pipe, guides for said rods, and guides extending from a point above down along the cylinder and into the path of the latter and serving to support the cylinder should it become detached from the rods limiting the downward movement of said cylinder.

3. The combination in a pump, of a stationary cylinder, a discharge-pipe therefrom, a movable cylindrical section telescoping said stationary cylinder and projecting below the lower end of the latter, upwardly-opening valves in the lower end of each cylinder, and guide-rods secured to the pipe and extending into the path of the movable cylinder below the lower end of the latter for the purposes set forth.

4. The combination in a pump of a main discharge-pipe, a plurality of pump-barrels on the end thereof, cylinders reciprocable on the outside of said barrels, valves in said barrels and cylinders, means for giving said cylinders an alternating reciprocating movement, and guides supported from above and extending beneath the lower end of the cylinders and serving to suspend the latter should they become detached.

In witness whereof I have hereunto set my hand.

GEORGE C. RICHARDS.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.