L. B. FULTON.
Oil-Well Pump.

No. 197,027. Patented Nov. 13, 1877.

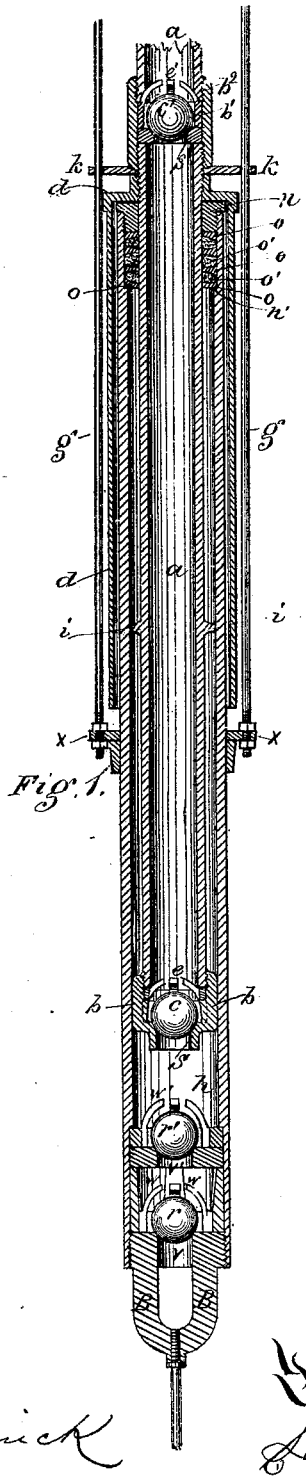

Fig. 1.

Witnesses
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LOUIS B. FULTON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO JOHN BIGGERSTAFF, OF SAME PLACE.

IMPROVEMENT IN OIL-WELL PUMPS.

Specification forming part of Letters Patent No. **197,027**, dated November 13, 1877; application filed August 20, 1877.

To all whom it may concern:

Be it known that I, LOUIS B. FULTON, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Pumps; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, which represents a vertical central section of my improved oil-well pump.

One of the principal difficulties met in pumping oil from wells is the cutting or wearing away of the bucket or sucker, and also the barrel or cylinder in which it works, by sand and other sediments, which are always more or less present. This cutting or wearing away of the pump necessitates its frequent repair, which, in deep wells, is a matter of considerable expense.

Another difficulty met is, that the sucker-rod commonly used takes up so much of the space within the tubing that the flow of oil is materially hindered thereby.

My improved pump is calculated to overcome both of these difficulties, and also to materially cheapen the cost, as compared with the ordinary construction of pumps.

In the drawing, *a* represents the well-tubing, which extends from the mouth of the well downward the desired distance, or to the working-point of the pump. This tubing *a* is of the ordinary construction, and in adapting my improved pump to apparatus already in use I propose to make use of the tubing already provided. At the lower end of this tubing I arrange a lifting-valve, *c*, which may be a ball-valve, as shown, or other known form. This valve is made to seat upon the port *s*, and lugs *b* extend out from the valve-case to form guides. The usual guards *e* are also arranged over the valve to prevent it from being lifted too far from its seat. I also arrange a check-valve, *c'*, above the valve *c*, which is constructed substantially like the valve *c*, having a case, b^1, within the coupling b^2, a seat, *s'*, and guards *e'*. The lower end of the tubing *a* works within a barrel, *h*. This barrel may be anchored to, or supported from, the bottom of the well in any convenient way, as by the standard B, which is made with suitable openings at the top, to admit oil to the lower end of the barrel.

Ordinarily the weight of the barrel will be sufficient to keep it in place when that part remains stationary in operation; but, in addition to this, it may be anchored in any convenient way.

In the lower end of the barrel *h*, I arrange a ball or other lifting valve, *r*, seating, in the usual way, upon the port *v*, and having the usual guards *w*. Also, a check-valve, *r'*, is, by preference, placed in the barrel, a little above the valve *r*, the two being constructed and operating substantially alike, *v'* being the seat, and *w'* the guards. Both the valves *c* and *r* and their check-valves *c'* and *r'* are arranged to operate in the same direction, and in substantially the same manner, the check-valves being introduced simply to act as auxiliaries in case anything, as gravel, stones, &c., should prevent the working valves from seating properly. At the upper end of the barrel *h*, and between the barrel and tubing *a*, I arrange a stuffing-box, having two or more packing-rings, *o*, with suitable packing, *o'*, between them. The lower ring *o* rests upon a shoulder, *n'*, in the barrel *h*, and the whole packing is held in place by a stuffing-nut, *n*, screwed to the top of the barrel. I am thus enabled to make a tight joint between the working barrel *h* and tubing *a*. The outer surface of the tubing *a* is polished or made smooth along that part which works through the packing or stuffing box. In order to protect this polished tube and packing from sand and dirt falling from the rock above, I make use of a cap, *d*, which is secured to the tube *a* above the polished part. The upper end of this cap is closed, and the lower end is open. Its length is not essential; but I prefer to make it extend down the barrel a distance about equal to the length of the stroke, so as at all times to cover the polished tube and stuffing-box.

If desired, small perforations may be made in the sides of the cap *d*, near the top, for escape of confined air. Lugs *i* may also be secured to the tubing *a*, just below the part which works through the stuffing-box. As the tubing is drawn from the well these lugs will come against the lower ring *o* of the packing, when

the whole pump may be drawn out together. These lugs *i* also operate as guides between the barrel *h* and tubing *a*, as in the case of the lugs *b*.

My improved pump may be operated in either of two ways. First, the tubing *a* may be raised and lowered by the driving machinery, the barrel *h* remaining stationary. In this case the tubing is attached at its upper end to the walking-beam in any convenient way. The weight of the tubing thus attached may be balanced, in whole or in part, by a counter-weight on the opposite end of the walking-beam. A suitable coupling, as a flexible pipe or tubing, connects the mouth or open end of the tubing *a* with the receiving-tank. Suitable guides may also be provided at the mouth of the well, and at proper intervals along the tubing *a*, to keep the tubing in proper place. When so arranged the tubing will be raised and lowered in the same manner as the sucker-rod is operated in the old form of pump.

The drawing shows the tubing at the lowest point of its stroke. At the next upward stroke the valve *c* or *c'* will be seated, and oil will be drawn within the barrel *h* past the valves *r r'*. With the succeeding downstroke the valve *r* or *r'* will be seated, and the contents of the barrel *h* will be forced into the tubing *a*, and through this to the discharge.

In the second method of operation the barrel *h* is worked up and down by the driving apparatus, the tubing *a* remaining stationary. The barrel *h* is worked by means of rods *g*, which are attached to the walking-beam above, and, extending down the well outside of the tubing *a*, they are attached at their lower ends to a ring or lugs, *x*, which project out from the barrel. Guides *k* may also be secured at proper intervals along the tubing *a*, through which the rods *g* are passed. The rods may thus be kept in proper working position.

In wells as now usually constructed the outer casing is considerably larger than the pump-tubing, leaving plenty of space between them for the rods *g*. By this arrangement the whole capacity of the tubing will be left free for the passage of oil, thus greatly increasing the capacity of the pump.

In both methods of working, as described, the operation of the valves will be the same, and the effect will be the same.

The special advantages secured by this construction are, that the usual sucker-rod is either dispensed with entirely, or else it is placed outside the tubing, and the efficiency of the pump thereby increased; and, also, the polished and packed parts of the pump are much better protected against sand and dirt, by which such parts would be worn away.

I claim herein as my invention—

1. The combination of tubing *a*, barrel *h*, having suitable packing between them, and cap or shield *d*, attached to and working with the tubing, substantially as set forth.

2. In an oil-well pump, a cap or shield, *d*, attached to and working with the tubing, whereby the stuffing-box and polished rod or tubing are protected from sand and dirt, substantially as set forth.

3. In an oil-well pump, the combination of tubing *a*, having one or more valves therein, barrel *h*, having one or more valves therein, a stuffing-box or packing arranged between the barrel and tubing, and suitable connections outside the tubing for working the barrel, substantially as described.

4. The combination of tubing *a* and barrel *h*, having suitable packing between them, valves *c* and *r*, and cap or shield *d*, attached to and working with the tubing, substantially as set forth.

5. In an oil-well pump, the combination of tubing *a*, having lugs *i* thereon, barrel *h*, and packing-ring *o*, substantially as set forth, whereby the whole pump may be drawn from the well together.

In testimony whereof I have hereunto set my hand.

LOUIS B. FULTON.

Witnesses:
J. J. McCORMICK,
CLAUDIUS L. PARKER.