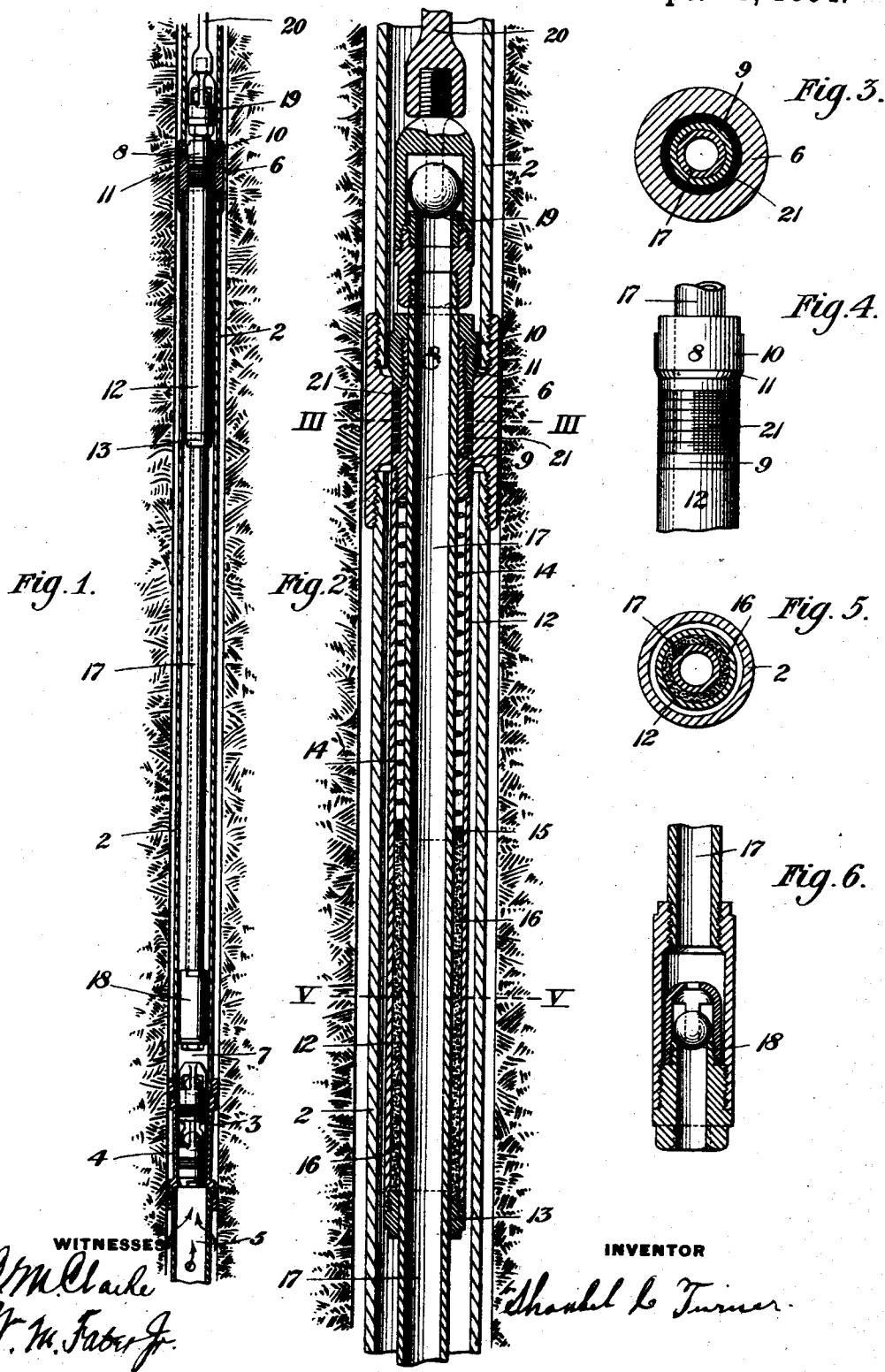


(No Model.)

S. C. TURNER.
PUMP FOR OIL WELLS.

No. 525,728.

Patented Sept. 11, 1894.



UNITED STATES PATENT OFFICE.

SHOUBEL C. TURNER, OF OAKDALE, PENNSYLVANIA.

PUMP FOR OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 525,728, dated September 11, 1894.

Application filed March 28, 1894. Serial No. 505,511. (No model.)

To all whom it may concern:

Be it known that I, SHOUBEL C. TURNER, a citizen of the United States, residing at Oakdale, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful Improvement in Pumps for Oil-Wells, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a vertical section through the casing of a well illustrating my improved pump in position and ready to operate. Fig. 2, is a similar view, on an enlarged scale, showing more particularly in detail the construction of the pump, manner of securing it in position, location of the valves, &c. Fig. 3, is a cross sectional view taken on the line III III of Fig. 2. Fig. 4, is a detail view, in illustration of the outside of the upper end of the plunger packing case. Fig. 5, is a cross sectional view taken on the line V V of Fig. 2. Fig. 6, is a sectional view of the lower plunger valve.

Similar numerals of reference refer to like parts wherever used throughout this specification.

My invention relates to an improvement in pumps for deep wells, particularly oil wells, and it has for its object the construction of such a pump so that it may be inserted in a string of tubing at any predetermined height from the bottom and operated, and withdrawn if desired, without the removal of the tubing.

In the construction of pumps for a similar purpose heretofore, the practice has been to insert in the line of tubing a section of pipe known as a "working barrel" in which are located and operated the standing valve and the plunger valve, necessary for the operation of the pump, in addition to the usual standing valve at the bottom of the tubing. Such a construction, while giving satisfactory results when in perfect working order, is apt to become inefficient from the wearing of the packing, and when this is the case, the entire string of tubing must be withdrawn from the well, in order to get at the working barrel for purposes of repacking or repair, and again lowered into position, entailing much loss of time, cost and trouble. My improvement is designed to obviate these difficulties, and to

provide a pump which shall be easy and cheap to construct, not liable to get out of order, and which shall be capable of being inserted and withdrawn from the well without disturbing the tubing. In practice I have found it to possess these qualities in a marked degree, and I shall now proceed to describe its construction, with reference to the drawings.

In general terms, the pump consists of a hollow plunger supplied with working valves at both ends, inclosed in a packing chamber designed to fit closely into and be tightly embraced by a special coupling located at a convenient level in the well for effective operation, preferably a short distance above the oil bearing sand.

At the lower end of the tubing 2 is removably located in the usual manner the double standing valve 3, inserted within the shell 4, constituting a coupling below which extends for a distance of from ten to twenty-five feet the perforated piece of tubing 5, into the oil bearing sand. 6 is the special coupling located at a distance above the standing valve 3, slightly greater than the length of the plunger, so that, as shown in Fig. 1, there will be a short space 7 between the lower working valve and the top of the standing valve. 8 is the head of the packing chamber, consisting of the hollow cylindrical shell 9, snugly fitting around the plunger and being tapped into the upper head piece 10 provided with the shoulder 11, somewhat larger than the reduced annular opening through the special coupling 6, thereby preventing the head from passing down through and maintaining it in a fixed position. It will be observed that the annular opening through the coupling 6 is considerably less than the internal diameter of the tubing, and inasmuch as will be seen, the diameter of the packing chamber, with the exception of the head, is the same as the annular opening, the passage of the entire pumping apparatus in the process of lowering into position, will be free from impediment.

Attached to the lower extremity of the shell 9 is the packing chamber, consisting of the long cylindrical case 12, provided at the bottom with a gland 13 screwed into the case 12 and closely embracing the hollow plunger. 14 is a spiral spring surrounding the plunger, bearing at its upper end against the bottom

of the shell 9, and at its lower end upon the follower 15, between which and the gland 13, is interposed the packing 16. The plunger, 17, consists of a hollow rod or tube provided with the ordinary working valves 18 and 19, and is several feet in length to permit of extended stroke. The sucker rod 20 connects the plunger with the necessary operating machinery at the top of the well. When lowered into position in the well for operating, the head 8 will maintain its position within the coupling 6 by reason of the shoulder 11 bearing against the top edge of the reduced annular opening through the coupling, and the weight of fluid in the well for several hundred feet above will prevent the frictional action of the plunger from raising it. In order to increase this binding action I prefer to employ a series of leather rings 21 surrounding the shell 9, as shown, and bearing against the interior of the annular opening in the coupling, thus tending to hold the head 8 against dislodgment in the ordinary operation of the pump. When it is desired to withdraw the pump from the well the plunger is raised by the sucker rod 20 until the upper shoulder of the valve 18 strikes the gland 13, when the entire packing chamber may be raised out of the well, leaving it free and unobstructed. It is obvious that the pump may as readily be again lowered into position, very little time being consumed in either operation.

The operation is as follows: When the hollow plunger commences to rise in the position shown in Fig. 1, the upper and lower plunger valves, will remain closed and the standing valve will open, allowing fluid to pass up through it into the tubing above the valve, until the plunger has reached the limit of its stroke, when it will begin to descend, closing the standing valve, opening the working valves of the hollow plunger and allowing the fluid to flow up through the hollow plunger and into the upper sections of the tubing, through which it is successively raised, and finally discharged through the repeated action of the plunger.

The advantages of my improved pump will be appreciated by those skilled in the art of operating oil wells. It obviates the necessity

of using working barrels, the disadvantages of which I have already set forth. This I consider one of the principal features of advantage over pumps heretofore used for this purpose, and the substitution of my improved pump, for the "working barrel" at present employed, will be appreciated by those accustomed to its use. It is easy and cheap to construct, not liable to get out of order, and in practice has been found to give the most satisfactory results.

The use of the removable packing chamber, surrounding the hollow plunger, and inclosing a spring bearing against a follower and compressing the packing, I consider a valuable and novel feature of my invention, and thereby secure a perfect oil tight joint for the plunger to work in.

Having described my invention and in what manner it is constructed, what I claim, and desire to secure by Letters Patent, is—

The combination, with a string of tubing, of a coupling joining two sections of the tubing, of an internal diameter less than the internal diameter of the tubing: a hollow cylindrical shell within the coupling, provided with encircling leather rings for frictional contact against the coupling: a hollow head screwed to the upper end of the cylindrical shell and constituting an enlarged shoulder bearing against the upper neck of the coupling: a cylindrical casing screwed to the lower end of the cylindrical shell, constituting a packing chamber extending downwardly for a considerable distance, and provided at the bottom with a gland, a packing substance within the casing, a gasket and spiral spring arranged to compress the packing, as shown, and a hollow plunger, inclosed within the lower head, shell, and downwardly extending packing chamber, provided with working valves at each end, and with a threaded extension at the upper end for the sucker rod, all substantially as shown and described.

In testimony whereof I have hereunto set my hand this 22d day of March, 1894.

SHOUBEL C. TURNER

Witnesses:

F. K. MCCANCE,
C. M. CLARK.