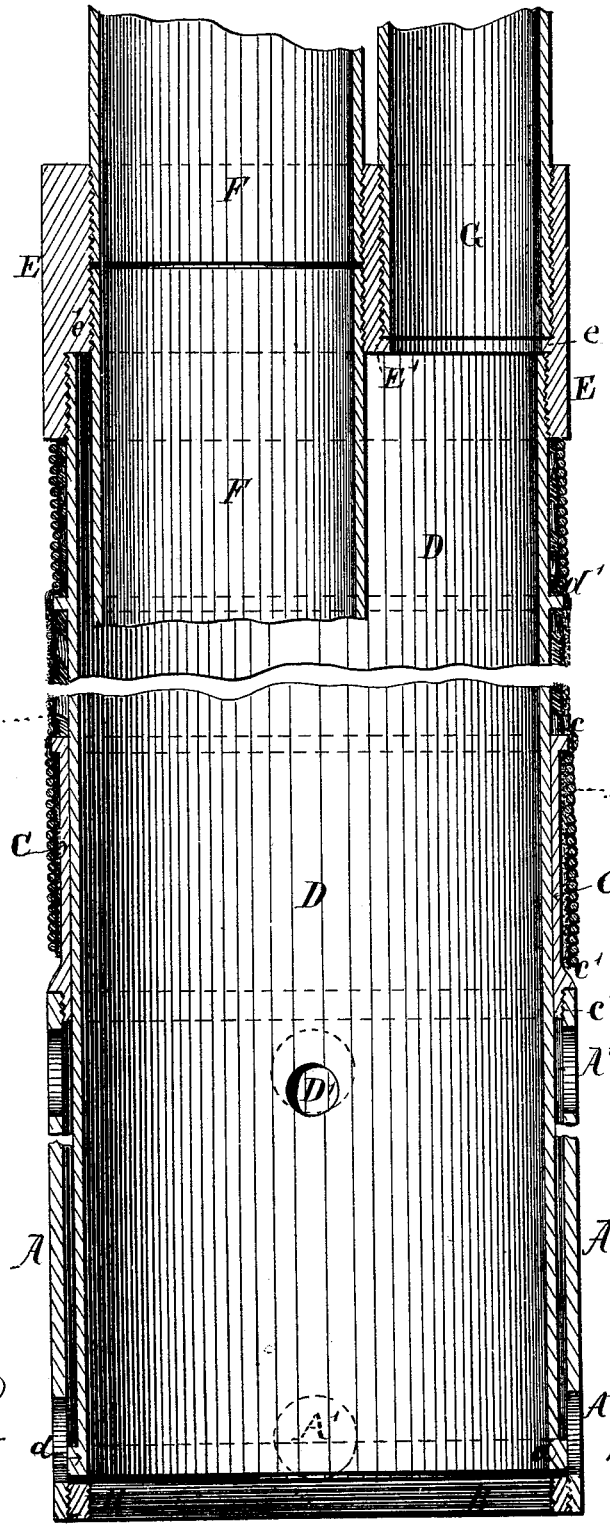
L. STEWART.

PACKERS FOR PETROLEUM WELLS.

No. 187,990. Patented March 6, 1877.



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LYMAN STEWART, OF TITUSVILLE, PENNSYLVANIA.

IMPROVEMENT IN PACKERS FOR PETROLEUM-WELLS.

Specification forming part of Letters Patent No. **187,990**, dated March 6, 1877; application filed February 25, 1876.

To all whom it may concern:

Be it known that I, LYMAN STEWART, of Titusville, in the county of Crawford and State of Pennsylvania, have invented certain new and useful Improvements in Packers for Petroleum-Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

The object of the first part of my invention is to construct a packer by means of which two or more tubes, arranged side by side, may be conveniently and securely "packed" in an Artesian well; and to this end this part of my invention consists in combining, with the tube or tubes to be packed, a packing shell, case, or cylinder, the lower end of which opens into or communicates with the well below the packer, and is adapted to receive and carry with it into the well a suitable packing material interposed between such cylinder or case and the wall of the well.

The object of the second part of my invention is to construct a packer for an Artesian well in such manner that a pumping-tube, a gas-escape pipe, and a steam-pipe arranged within the gas-escape pipe (these several pipes or tubes being of a practicable working size) may be conveniently packed within an Artesian well; and to this end the second part of my invention consists in providing the upper end of the above-described packing case or shell with a removable coupling-cap having a screw-thread, by means of which the cap may be attached to the cylinder, and one or more screw-threaded seats or sockets to receive the tubing which is to be packed.

The invention further consists in certain other features of construction, which will be explained.

The usual diameter of a petroleum-well is five and one-half inches; but as the walls or bore of the well is frequently left in a rough condition, or the bore is made slightly tapering toward the bottom, the largest size of tube that it is practicable or safe to introduce under ordinary circumstances is one which does not exceed five inches in external diameter.

Having thus determined the external size of the largest tube that I can ordinarily introduce to a point near the bottom of a well, I will now describe the construction of my packer.

In the drawing, which is a vertical section of my invention, A is the lower tube or anchor, provided at the bottom with an internal screw-thread, and, when preferred, with an internal screw-threaded ring, B. The anchor is perforated, as at A′. C is a ring, having external ribs c c^1, and is screwed into the upper end of anchor A, the lower end of ring C forming a shoulder within the anchor, as at c^2. D is a packing-tube, arranged to slide within ring C. d is a rib or collar, formed upon, or attached to, the exterior of packing-tube D, at its lower end. D′ is a hole in packing-tube D. d' is a rib on the packing-tube. E is a coupling-cap, screwed to the upper end of packing-tube D. F is a pumping-tube, both sections of which are screwed into a thread in the coupling-cap E. G is a second tube, also screwed into the coupling-cap.

A suitable packing, H, is to be attached to the packing-tube above the rib d', and also to the ring C between the ribs c c^1. In practice, I prefer to use for that purpose the woven or braided fibrous packing set forth in my patent of December 28, 1875; but any of the rubber or other flexible packings which can be applied may be used, or any desired or preferred packing may be substituted therefor.

From the above description it will be seen that when the anchor A, or an extension thereof, rests upon the bottom of the well, and the weight of the tubing F and G rests upon the coupling-cap E and the packing H, which is attached to ring C, and the packing-tube D, such packing will be tightly compressed between the packing-tube and the wall of the well, and that the tubes F and G are protected from this packing, and may be removed without disturbing the packing.

I will now proceed to describe the second part of my invention. As above stated, the outside diameter of anchor A is practically limited to five inches. As the weight of tub-

ing which is supported by the anchor, the ring C, and the packing-tube D is frequently very great, I have found that half an inch in horizontal section at the point indicated at c^2 is required, including the thickness of the anchor, the ring C, the packing-tube D, with the needed screw-threads, and sufficient space between the parts to insure the requisite freedom of movement to insure that the telescopic joint shall always operate. This half-inch upon each side reduces the inner diameter to four inches.

The external diameter of the pumping-tubes in common use is two and three-eighths inches, the external diameter of the couplings on the same being about three inches.

The smallest pipe that it is practicable to use as a gas-escape in combination with a pumping-tube, when it is desired to introduce a steam-pipe within said gas-escape, is one and one-quarter inch, internal diameter, the external diameter of said gas-escape being about one and five-eighths inch, the couplings on same being about two inches external diameter.

Thus it will be seen that the external diameter of the pumping tube, added to the external diameter of the gas-escape tube, makes four inches, and that if both of them be introduced within the packing-cylinder they will extend entirely across the internal diameter of this cylinder. But it is impracticable to do this, from the fact that there must be sufficient space between the sockets or seats in the cap at E′ to insure sufficient strength at this point; and in order to retain the desired amount of metal here I have decided to arrange the socket for the steam-pipe so near to the outer edge of the cap that this tube cannot be introduced through the cap into the interior of the shell or cylinder.

It will also be seen that by dividing the pumping-tube at the coupling-cap, and screwing one end of each section into the cap, I save some space, and increase the thickness of the metal at E′, as the threaded end of the pipe is of less diameter than the remaining portion, and much larger pipes can be employed than could be if thimbles or nippers projecting from the cap or end of the cylinder were employed as support for the tubes.

While I have given the sizes of tubing which I prefer to employ, for the purpose of illustrating the capabilities of my invention, yet I do not wish to be confined to the dimensions here given, nor to have the scope of my invention in any manner limited thereby.

Sometimes, in drilling wells, they are reduced in size, or made tapering at or near the point where the oil-bearing rock is entered, and in applying my packer to wells of this character the lower end of the anchor may come in contact with the walls and be supported thereby, the rock in this case forming such a seating for the packer that no other support will be needed, in which case the lower part of the anchor would be rendered useless, and could, therefore, be dispensed with, as the ring C, being of the same external diameter as the anchor, would, of course, be seated upon, and supported by, the walls of the well.

What I claim is—

1. The combination, in a packer for an Artesian well, of the following elements, namely: a cylindrical packing case or shell, which is open at its lower end, one or more pipes or tubes connected to the upper end of the packing-case, but not extending within the cylinder or shell, and a packing interposed between the packing-case and the walls of the well, substantially as set forth.

2. The combination, in a packer for an Artesian well, of a cylindrical packing case or shell, a coupling-cap provided with an internal screw-thread, for connecting it to the packing-case, a screw-threaded seat or socket adapted to receive the ends of the upper and lower sections of the pumping-tube, and with a seat adapted to receive a gas-escape or other auxiliary pipe, substantially as set forth.

3. In a packer for an Artesian well, a cylindrical packing case or shell, provided near its upper end with a ring adapted to receive and support the packing, in combination with a coupling-cap, E, attached to the upper end of the packing-case, and which can be removed without disturbing the packing, substantially as set forth.

In testimony that I claim the foregoing as my own I have affixed my signature in presence of two witnesses.

LYMAN STEWART.

Witnesses:

SAMUEL GRUMBINE,

MILTON STEWART.