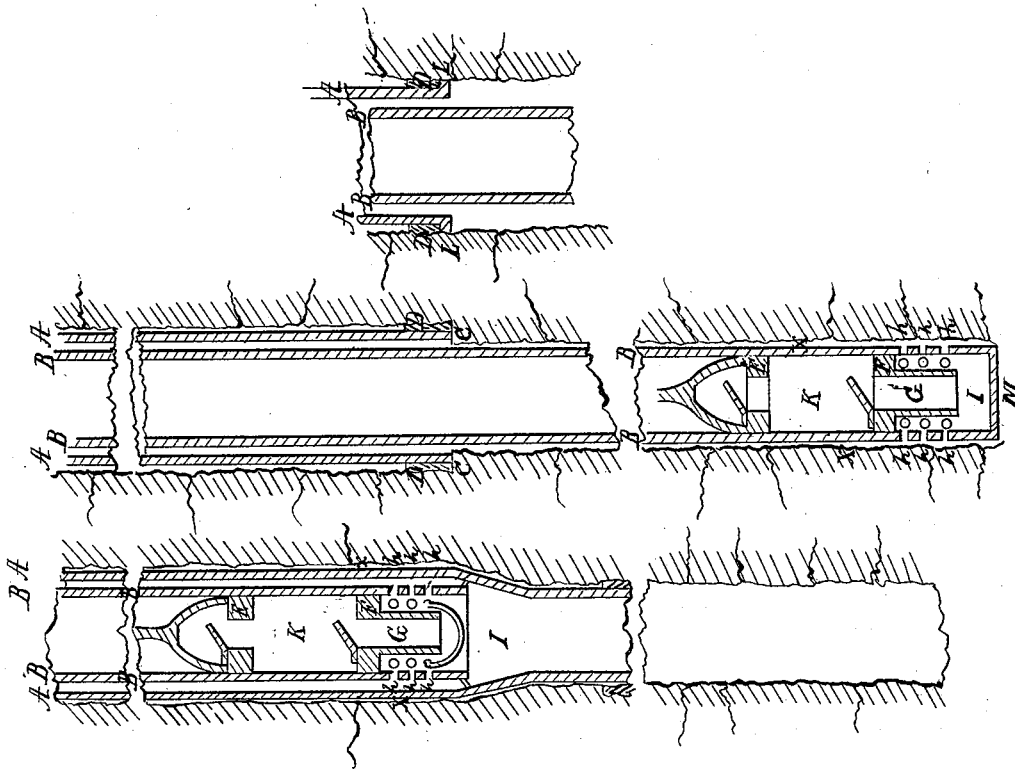


*S. H. Early,*

*Oil Pump,*

*Nº 53,128.*

*Patented Mar. 13, 1866.*



*Witnesses:*

*Inventor:*

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# UNITED STATES PATENT OFFICE.

SAMUEL H. EARLY, OF LYNCHBURG, VIRGINIA.

## IMPROVEMENT IN PUMPS FOR DEEP WELLS.

Specification forming part of Letters Patent No. **53,128**, dated March 13, 1866.

*To all whom it may concern:*

Be it known that I, SAMUEL H. EARLY, of Lynchburg, in the State of Virginia, have invented a new and useful Improvement in Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification.

My invention has reference more particularly to the salt and oil wells where pumps are used. In these the practice heretofore has been to place the pump-boxes in the tubing with which the well is lined. Between this tubing and the sides of the well as left by the borer there is a space, in which spring-water can descend to the salt-water or oil below where it is not wanted. To prevent this it is customary to pack the tubing below the inlet of the springs which it is desired to exclude by surrounding it there with a wrapping consisting of a bag filled with linseed, which, expanding when wet, forms a packing that retains the objectionable water above it; but the jar of the pumping tends constantly to wear and injure this packing until it becomes leaky, and the water from above it passes through, to the detriment, if not to the destruction, of the well. When the tubing is withdrawn so that the pump may be repaired this packing has been found to interpose serious difficulty, and in some instances wells have even been rendered useless in this way. Under the most favorable circumstances the withdrawing of the tubing causes loss of time and a delay that it is important to avoid.

In both salt and oil wells there is a flow of gas which is inconvenient and injurious. Entering the well below the packing around the tube, it cannot escape upward between the tube and the sides of the well; and entering the chamber between the upper and lower boxes of the pump, it interferes with the action of the pump and operates a general derangement. The flow of few wells requiring pumping is equal to the capacity of the pump, so that when the plunger or upper box is lifted the chamber between them is not filled with liquid, but gas enters it, and when the plunger descends and the lower valve is closed there is a space of time until the plunger is lifted again during which neither water nor oil can enter the chamber.

The difficulties here enumerated I propose to overcome by my invention. For this purpose two things are necessary: first, to make the packing permanent, so that it can neither be affected by the pumping nor require removal; second, to prevent the gas from entering the chamber of the pump between the upper and lower boxes along with the oil and salt-water without impairing the efficiency of the pump.

To accomplish the first I make my pump of two tubes—one, in which is the pump-chamber and upper and lower boxes, reaching to the bottom of the well and resting on it, and the other reaching so far down only as to have its lower rim below the inlets of the water which it is desired to exclude.

My invention is best applied where the well is bored with an offset or shoulder below the inlets last aforesaid, formed by using a smaller borer in the lower than in the upper part of the well, for on this shoulder the outer tube of the pump may rest and the packing be at the bottom of it, supported by the offset against the downward pressure of the water above it; or the well may be uniform in its diameter, in which case there should be a flange at the lower end of the outer tube on which the packing would rest, the whole tube being sustained from the top by a flange there, or by any other well-known mechanical contrivance.

In the accompanying drawings, Figure 1 represents portions of a well, the sides of the bore being shown by the irregular lines, where the springs are indicated by lateral lines.

A A is the outer tube of the pump, resting on the shoulder C, where is seen the packing D. B B is the inner tube, extending to and closed at the bottom of the well at M. It will be seen that it is separate from the outer tube. The pumping-gear is seen in the lower section of B B, where E is the plunger or upper box; F, the lower box, from the valve in which projects downward the tube G into the chamber I below the lower box. In this chamber, and communicating with the space between the inner tube and the sides of the bore, are the openings *h h h h*, all of which must be above the lower end of the tube G.

Fig. 2 represents an alternative construction, where the well is of a uniform diameter from

top to bottom, showing the flange L at the bottom of the outer tube.

The operation of my invention will be readily seen from an inspection of the drawings.

No matter what the jarring of the inner tube while the pumping is going on, it cannot affect the packing outside of the outer one. Neither when the inner tube is withdrawn for any purpose can the packing be affected, while the packing effectually excludes the water that enters the well above it from passing downward to the salt-water or oil. It will be seen, too, that the salt-water or oil entering the well below the packing finds its way into the chamber I through the holes *h h h h*, from whence it is pumped through the tube G. Should gas enter the well from the sides or bottom, it will ascend through the space X between the inner tube, B, and the sides of the well into the open air, passing as it goes through the space between the inner and outer tubes above the packing at B. Should any enter the chamber I, it can only do so through the holes *h h h h* above the bottom of the tube G, and must rise and escape through the same holes. Without this tube G it will be at once seen that the gas entering at the holes *h h h h* would pass upward into the pump at K along with the oil or salt-water, and so cause one of the troubles which it is the object of my invention to obviate. It will also be seen that not only the chamber I forms a reservoir to pump from, but that the space between the inner tube, B, and the well is a reservoir also, in which the salt-water or oil may accumulate, facilitating as it rises the action of the pump; and, further, it will be seen that if the well is a flowing one, into which a pump has been introduced, the space between the inner tube, B, and the sides of the well, and between the two tubes A and B

above C, afford it a way of escaping to the surface.

In the case of salt-wells the bore or diameter of the well is less in the lower portion of it, and here it would be the outer tube which descended the lowest or was the longest, as shown in Fig. 3, the diameter of the tube being diminished to correspond with the diameter of the bore of the well and the packing being below the springs intended to be excluded. The inner tube containing the pump proper would in this case be supported where the change in the diameter of the outer tube takes place; and here, in place of closing the bottom at M of the chamber I, Fig. 1, it may be left open and a cup be placed, as shown at Fig. 3, below the chamber, the lip of the cup being above the level of the bottom of the tube G, so that any gas flowing in, in place of passing downward over the edge of the cup to ascend into the pipe G, Figs. 1 and 3, would pass upward between the two tubes to the surface, while the salt-water flowing into the cup would be pumped out.

The essence of my invention, however, is independent of the actual position of the pump in the well, or whether one tube or the other is the longest, or whereabouts on the outer tube the packing is placed.

What I claim, and desire to secure by Letters Patent, is—

The combination with and arrangement of a pump-tube having the interior tube, G, and the openings *h* in relation to each other and to the valves, of the tube A and packing D; all substantially as and for the purpose described.

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