

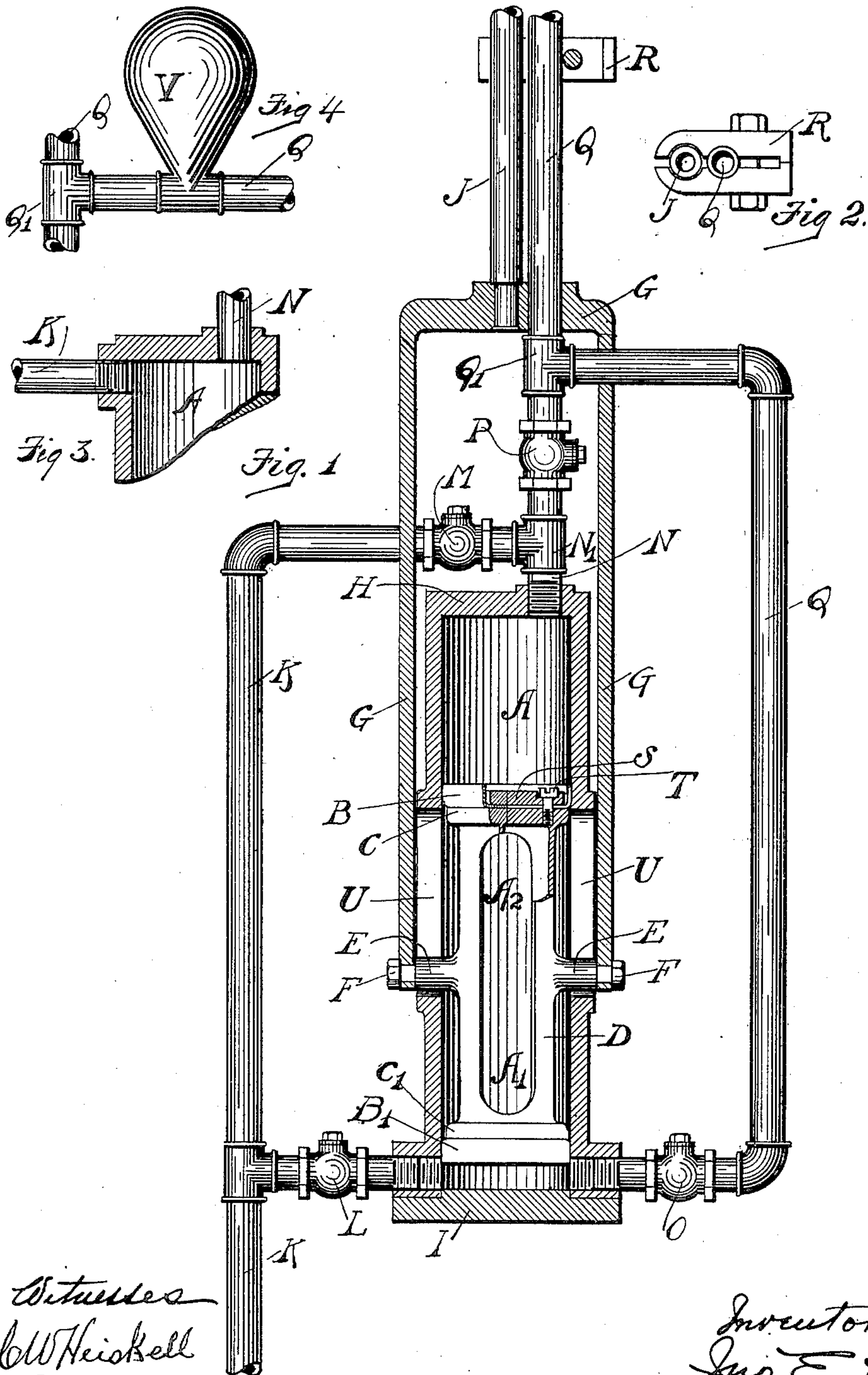
No. 661,259.

Patented Nov. 6, 1900.

J. E. ELAM.  
PUMP.

(Application filed Dec. 29, 1899.)

(No Model.)



Witnesses  
C. W. Heiskell  
J. W. Heiskell

Inventor  
J. E. Elam  
by  
J. W. Weatherford  
his atty.



# UNITED STATES PATENT OFFICE.

JOHN E. ELAM, OF WHITEHAVEN, TENNESSEE.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 661,259, dated November 6, 1900.

Application filed December 29, 1899. Serial No. 741,925. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. ELAM, a citizen of the United States, residing at Whitehaven, Shelby county, State of Tennessee, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to double-acting pumps in general, and more particularly to pumps for comparatively deep wells, in which the cost of removing the pump for repairs becomes quite an item.

The objects of my invention are to produce a pump which may be manufactured at a low cost, which is extremely simple in operation, positive in action, has no stuffing-boxes to be cut out when the pump is fouled with sand or to be kept tight when in use, one which will last for the greatest length of time without requiring to be repaired, and finally one which can be repaired without great cost or expensive tools. I accomplish these objects by the various details of construction hereinafter set forth in the drawings, description, and claim.

In the drawings, Figure 1 is a vertical longitudinal section on the center line, which view illustrates the principal features of my invention. Fig. 2 is a detail. Figs. 3 and 4 illustrate modifications.

Referring now to the drawings, in which like letters refer to like parts in all the views, A A' are two cylinders preferably made integral with and connected by a middle portion A<sup>2</sup>, but, if so desired, made separate and fastened together. The upper end of the cylinder A and the lower end of the cylinder A' are closed by heads H and I, the other ends being open, as shown, and connected together by the body A<sup>2</sup>, before mentioned. I show the head H made integral with the cylinder A, and prefer to so make it, though H may be a removable head fastened in by any usual means, as is the head I. This head H is tapped for a nipple N, which by means of a T N' serves as inlet and discharge pipe. I illustrate in Fig. 3 an alternate and preferable construction, in which the inlet-pipe K is tapped into the side of the cylinder A and the T N' omitted. This construction may be used with or without the removable head and, as here shown, is not necessarily governed by

the use of said head. The head I is shown and is preferably made separate from the cylinder A', the intention being to make the casting A A' A<sup>2</sup> and the head H in one piece, with the lower end of A<sup>2</sup> open, and to then bore this cylinder from said open end and to face it, forming a seat for the head I, which is then fastened in place by such means as may seem fit. Into the sides of the lower end of the cylinder A' are tapped the inlet-pipe K and the outlet-pipe Q.

For a piston I use a casting D, connecting two pistons C C', to which are fastened cup-leathers B B', turned, respectively, toward the closed ends of the cylinders A A', respectively.

S is a cap, and T one of the screws, illustrating one method of holding the cup-leathers B B' in place.

To the body D, connecting the pistons, two lugs E are fastened, which lugs extend through the slots U U in the sides of the connecting portion A<sup>2</sup> of the cylinders. To these lugs I fasten, preferably by cap-screws F F, a yoke G, extending over the outside of the cylinder A. Into this yoke is fastened the pump-rod J. As a guide for the yoke G the discharge-pipe Q is extended upward slightly to one side of the pump-rod J and through the yoke G, which is free to slide thereon. R serves to illustrate a form of guide which may be clamped to the discharge-pipe Q, as shown, and serve as a guide for the rod J. This discharge-pipe Q serves also as the support for the cylinders A A' and is preferably their entire support. It is fastened to the head of the cylinder A eccentrically, as shown, and sufficiently out of the center to permit the pump-rod to be centrally located, by which construction I thus secure a direct thrust for the piston-rod in a double-acting cylinder with yoked rod, while making the pump self-supporting, and am able thereby to use a light piston-rod without having at the same time to furnish a support in the well for the cylinders. I by this means secure a pump from which not only do I dispense with the cost of making and keeping up stuffing-boxes, but I also provide at the same time a pump which can be readily removed from the well when repairs are necessary.

Taking up now the pipes and valves of the



pump, K is the inlet or intake pipe, which discharges through the valve L into the lower end of the cylinder A' and through the valve M into the upper end of the cylinder A.

5 These valves are so made that they will only permit the passage of the water in one direction, so that when the pressure reverses they close, and the water is forced to seek other exit. I illustrate the ordinary check-valve in  
10 the drawings; but any of the well-known forms of flap or ball valves may be used in their stead.

Q is the discharge-pipe. The cylinder A' discharges through the valve O and the cylinder A through the valve P into the discharge-pipe Q. In Fig. 4 I show on the discharge-pipe Q an air-chamber V to equalize the pressure.

As to the operations of this pump, the drawings show the pistons C C' at their lowest positions. An upward pull now on the rod J will raise the yoke G and attached pistons C C'. The water which is in A will be forced out through the nipple N and as the valves  
25 M and P close against pressure from that direction will go upward through the discharge-pipe Q. At the same time the piston C' by its upward movement will create a partial vacuum in the cylinder A', the valve O on the  
30 discharge-pipe Q will close, and the valve L on the intake-pipe K be opened by the inflow of water, which will fill the cylinder A'. Reversing the pressure at the end of the stroke or at any part thereof will cause a reverse of  
35 the cycle, the water then entering the upper cylinder A through the pipe K and the valve M and at the same time the water in the lower cylinder discharging through the valve O and the discharge-pipe Q.

40 In case the air-bell V is used it would act in the manner common to all pumps by absorbing the shock due to the change in direction of the motion and to the cessation of motion and the renewal of same and would  
45 tend to give, as is commonly the case, a more even flow of water through the discharge-pipe.

Now as to the advantages of my improved pump over those in common use: First, by  
50 making a double-ended cylinder I do away with all stuffing-box parts, which will never

stay tight and which are with great difficulty kept tight, especially in water with a small portion of sand therein, and the making of this box is also entirely avoided and a comparatively rough rod may be used; second, 55 the cylinder and effective piston being of considerable length no guides of any kind are needed for the motion, and the guiding feature of the stuffing-box is not missed; third, the pistons may be made of a rough casting, 60 the cup-leathers making the fit with the inner surface of the cylinder; fourth, the cylinder is accessible for repairs without disturbing the pipe connection thereto and without having long sections of pipe attached to 65 the removable parts. To sum up, while most of the features and parts of this pump are old in this or other arts, yet the combination of these parts and purposes in one pump is novel and has involved considerable study 70 and inventive ingenuity.

What therefore I claim, and desire to secure by Letters Patent in the United States, is—

In a double-acting pump, the combination with two single-acting cylinders disposed with 75 their open ends facing each other and connected by an integral body portion, a head for the upper cylinder integral therewith, a removable head for the lower cylinder, a double solid-end piston, suction-pipes leading 80 into the sides of the cylinders, a discharge-pipe eccentrically fastened into the solid head of the upper cylinder, to support the cylinder and act as a guide for a forked-end piston-rod, guides for the piston-rod fastened 85 to the said discharge-pipe at intervals and a discharge-pipe leading from the side of the lower cylinder into the upper discharge-pipe, of a forked-end piston-rod adapted to slide on and be guided by the discharge-pipe and 90 when so sliding to move along the center line of the cylinders, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of 95 two subscribing witnesses.

JOHN E. ELAM.

Witnesses:

H. W. LAUGHLIN,  
T. F. KELLEY.