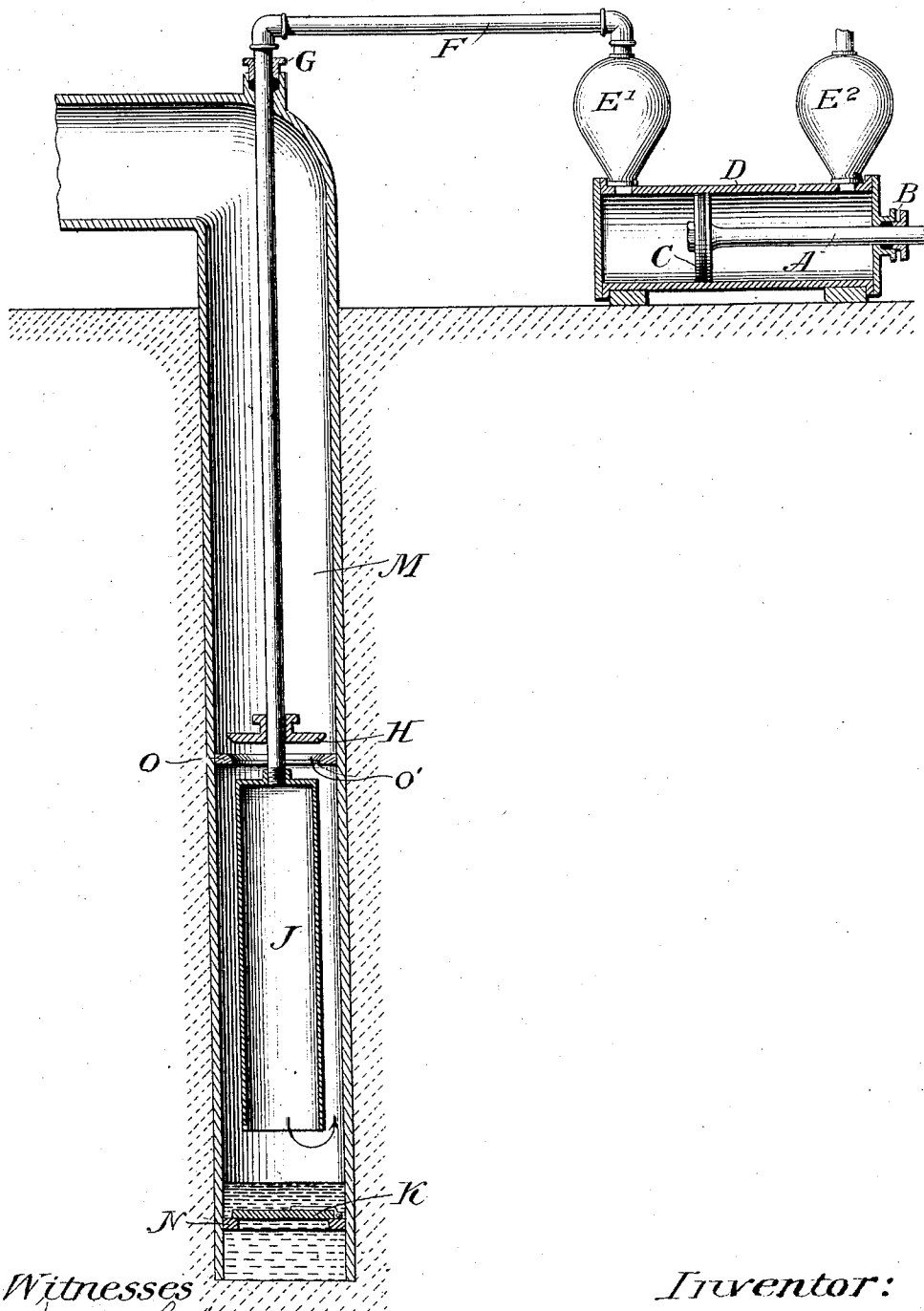


No. 830,484.

PATENTED SEPT. 4, 1906.

W. A. MITCHELL.
PUMP.

APPLICATION FILED MAY 11, 1904.



Witnesses
H. H. Hite
G. G. Cook

Inventor:
Wiley A. Mitchell

UNITED STATES PATENT OFFICE.

WILLEY A. MITCHELL, OF AIKEN, SOUTH CAROLINA, ASSIGNOR OF SIXTY ONE-HUNDREDTHS TO G. L. TOOLE AND W. H. HITE, OF AIKEN, SOUTH CAROLINA.

PUMP.

No. 830,484.

Specification of Letters Patent.

Patented Sept. 4, 1906.

Application filed May 11, 1904. Serial No. 207,484.

To all whom it may concern:

Be it known that I, WILLEY A. MITCHELL, a citizen of the United States, residing at Aiken, in the county of Aiken and State of South Carolina, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

This invention embodies means for elevating water, oil, or other liquids, and is especially designed for use in mines, deep and crooked wells, or the like, wherein ordinary pumps are objectionable because of the angle lifting and of little value.

The invention utilizes a suitable pump which supplies a fluid-pressure medium for forcing the liquid upward and creates a vacuum which draws the liquid into the well-tubing preparatory to its elevation.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawing.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment thereof is shown in the accompanying drawing, in which—

The figure of the drawing is a sectional view showing the application of the invention.

Corresponding and like parts are referred to in the following description and indicated in the drawing by the same reference characters.

Specifically describing the invention as illustrated, the letter M designates the well-tubing which constitutes the pump-barrel in the embodiment of the invention. The tubing M leads at its upper end to any suitable outlet for the liquid which is elevated in the working of the device. At the lower end portion of the tubing M is provided a valved partition N, a flap-valve K of the ordinary type being shown hinged to said partition, said valve being adapted to open upwardly. It will be noted that the tube M is provided at its upper end with an elbow, and a fluid-pressure pipe F leads through a stuffing-box G, fitted to this elbow, extending downwardly in the tubing M and terminating adjacent the

lower extremity of the latter. The lower end of the pipe F is provided with a fluid-chamber J, the latter being of a larger diameter than the pipe F; for purposes which will appear hereinafter. The chamber J consists of a cylinder or casing open at its lower end and closed at its upper end, the pipe F leading into the chamber J at the upper end thereof having threaded connection at this point. Above the upper end of the chamber J is provided a second partition O, the latter having a valve-seat O' upon which a check-valve H is adapted to close or seat itself. The check-valve H is peculiarly mounted, being provided with a central opening which receives the lower end portion of the pipe F, the latter forming a guide which insures accurate seating of the valve H in a manner clearly apparent. The mounting of the valve H is advantageous because of its simplicity in avoiding use of parts which are likely to become out of order in the use of the device. The upper end of the pipe F leads off to the pump by which the air or fluid pressure is supplied to the chamber J. The pump is preferably comprised of a cylinder D, in which operates a piston C, actuated by a piston-rod A. The piston-rod A extends from one end of the cylinder D, a suitable packing-box B being provided at this end in the usual manner. At opposite ends of the cylinder D are located domes E' and E², the piston C operating or moving between said domes. The domes E' and E² communicate at one end with the cylinder D, and the pipe F' of the well before described leads into the other end of the dome E'. The dome E² is ordinarily similarly connected with a second well.

In practice the dome E' is filled with a liquid, such as water, when the piston C is at the limit of its movement toward the end of the cylinder D, provided with the said dome E'. Upon the movement of the piston in the opposite direction water flows from dome E' into cylinder D, leaving an air-space in dome E' behind it. If dome E' is at least equal in capacity to cylinder D, said cylinder will always be full of water; otherwise not. Thus by reciprocation of the piston air will be alternately compressed and rarefied in the chamber J and pipe F. The functions of the dome E' and the chamber J are simply to provide adequate space, one for the water-

piston, the other for the required volume of air, which must be so confined as not to be carried off with the water pumped.

When only one well is to be operated, dome E² is filled with a liquid, such as lubricating-oil, and the small pipe which enters said dome E² is plugged or otherwise closed at some distance from the said dome, thereby admitting of the pressure of the air, materially assisting in the return of the piston C to a normal position, thus preventing a heavy pulsation on the driving power.

The following may be mentioned as some of the advantages resulting from the peculiar structure: A soft expansion and contraction of the air in the chamber J and pipe F prevents beating the valves in a way to soon render them unfit for effective service. The piston C can travel a short distance with slow speed and with but little friction while the air-piston in the chamber J is traveling a long distance at high speed and giving the cubic feet of water.

The range of usefulness of the mechanism is materially increased because the wear and tear incident to the pounding of valves is obviated.

Having thus described the invention, what is claimed as new is—

30 1. In means for elevating liquids, the combination of well-tubing provided adjacent its lower end with a suitable check-valve, a pump, a fluid-pressure pipe leading into the tubing and terminating above the check-
35 valve aforesaid, a fluid-pressure chamber at the lower end of the fluid-pressure pipe and comprising a casing spaced from the sides of the tubing, a partition above the fluid-
40 valve chamber and provided with a valve-seat, a check-valve adapted to open upward from the last-mentioned partition and mounted upon the fluid-pressure pipe aforesaid.

2. In means for elevating liquids, the combination of well-tubing provided adjacent its lower end with a suitable check-valve, a
45 pump, a fluid-pressure pipe leading into the tubing and terminating above the check-valve aforesaid, a fluid-pressure chamber at the lower end of the fluid-pressure pipe and of larger diameter than said pipe, and a
50 check-valve in said tubing operating above the fluid-pressure chamber and guided in its movement by the fluid-pressure pipe.

3. In means for elevating liquids, the combination of a well-tube, a check-valve at the lower end portion of said tube governing ingress of liquid thereto, a fluid-pressure pipe leading into the well-tube and terminating above the check-valve aforesaid; a fluid-pressure chamber at the lower end of said pressure-pipe and of larger diameter than said
60 pipe, said chamber being closed at its upper end and open at its lower end and a valved partition in the well-tube at a point above the lower open end of the fluid-pressure
65 chamber.

4. In means for elevating liquids, the combination of a well-tube or the like, a check-valve at the lower end portion of said tube, a valved partition disposed above said check-
70 valve, a fluid-pressure pipe leading into the well-tube, a fluid-pressure chamber at the lower end of said pipe and interposed between the check-valve and the valved partition aforesaid, and a pump, said pump
75 embodying an engine-cylinder, domes at opposite ends of said cylinder, one of said domes being connected with the fluid-pressure pipe, and a piston operating between the domes.

WILLEY A. MITCHELL.

Witnesses:

G. L. TOOLE,
JASON W. WOODWARD.