

No. 823,207.

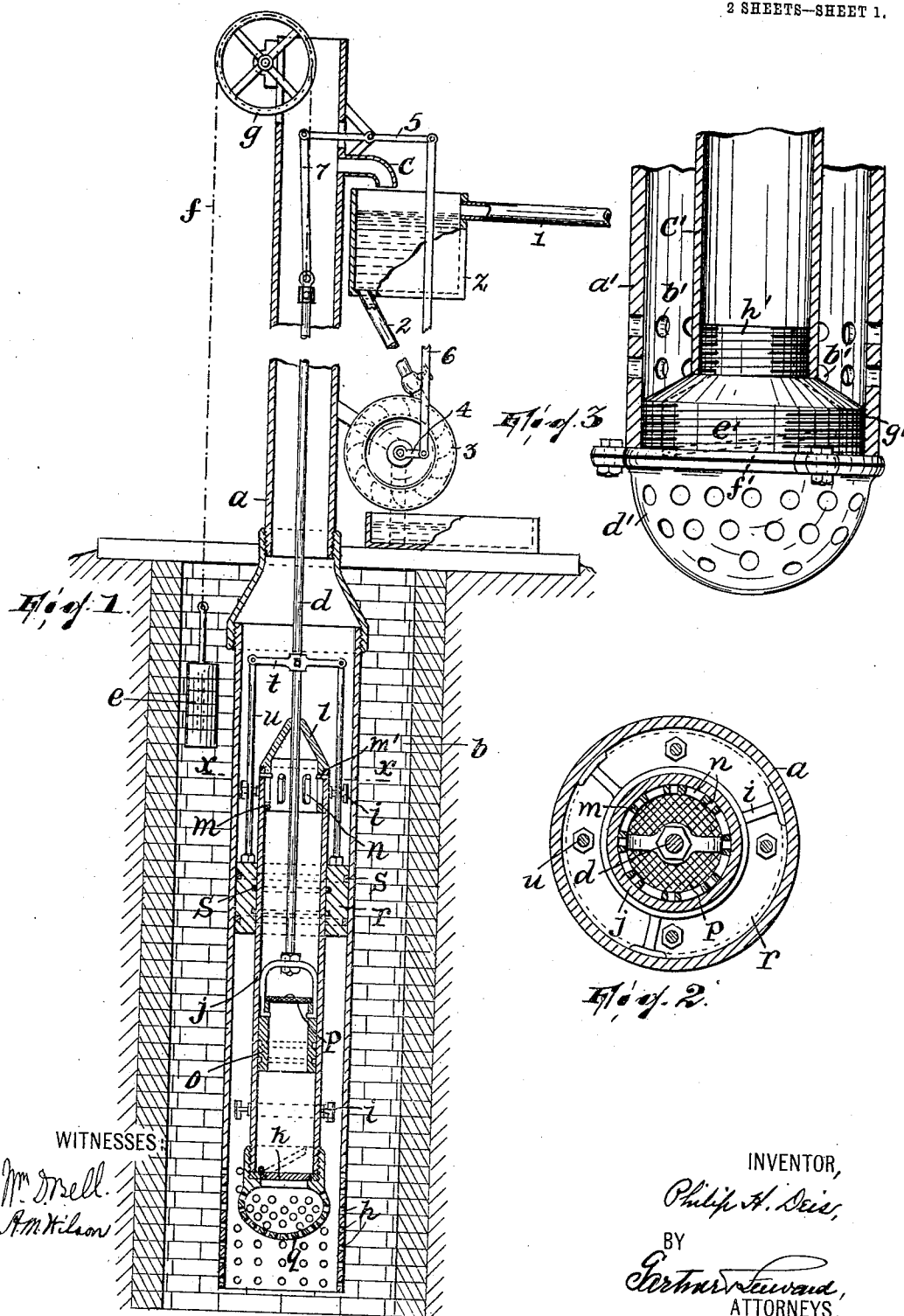
PATENTED JUNE 12, 1906.

P. H. DEIS.

PUMP.

APPLICATION FILED JUNE 5, 1906.

2 SHEETS—SHEET 1.



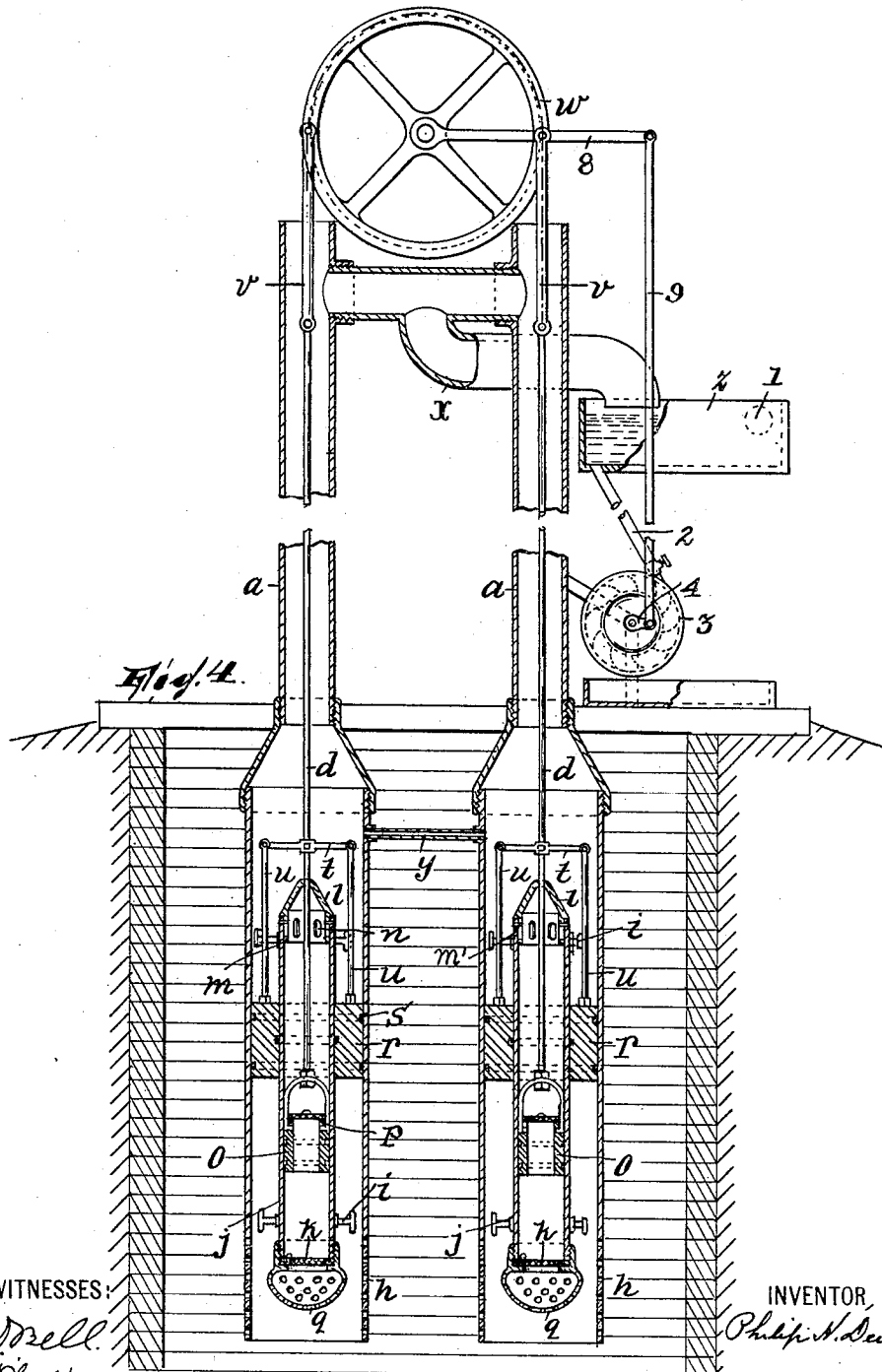
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2 SHEETS—SHEET 2.



WITNESSES:

*Wm. Drell*  
*R. M. Wilson*

INVENTOR,

*Philip H. Deis*

BY

*Arthur L. Howard*  
ATTORNEYS.

# UNITED STATES PATENT OFFICE.

PHILIP H. DEIS, OF WASHINGTON, DISTRICT OF COLUMBIA.

## PUMP.

No. 823,207.

Specification of Letters Patent.

Patented June 12, 1906.

Application filed June 5, 1905. Serial No. 263,778.

*To all whom it may concern:*

Be it known that I, PHILIP H. DEIS, a citizen of the United States, residing in Washington, District of Columbia, have invented certain new and useful Improvements in Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

My present invention is an improvement in pumps of the type particularly illustrated in my United States Letters Patent No. 759,080, in which the main water-conducting means is open at the bottom and incloses a piston which moves with the water-lifting means as the same reciprocates vertically in the water-conducting means, meeting thus water resistance in both directions, (with objects fully explained in said Letters Patent)—on the rise, that produced by the weight of the water relatively above it in said conducting means, and on the fall, that produced by the main body of water in the well, (as distinguished from ordinary lift-pumps where on the fall the resistance comes from only that portion of the water which after the change from the preceding upstroke becomes locked in the conducting means above its valved intake.)

In my patent mentioned the arrangement was specifically shown with the parts of the conducting means in which the piston and lifting means were directly located separate and distinct from each other.

In the present instance as one important novel feature resulting in augmenting the advantages aimed at in the invention broadly outlined in the said Letters Patent and in making the entire structure more compact the piston and water-lifting means are both located within one and the same portion of the water-conducting means, although separated by a suitable partitioning-wall, so that provision is made for valving off the way through the conducting means which is immediately controlled by the lifting means.

Referring to the accompanying drawings, Figure 1 is a view showing my improved pump partly in vertical section and partly in side elevation. Fig. 2 is a sectional view on the line *x x* in Fig. 1. Fig. 3 shows, partly in vertical section and partly in side elevation,

the lower portion of a modified form of the pump; and Fig. 4 shows a further modification involving two pump units each balancing the other.

In said drawings, *a* is the main or well pipe, *b* the well, and *c* the discharge-nozzle of the well-pipe. *d* is the sucker-rod; *e*, a weight; *f*, a flexible connecting means between the weight and sucker-rod, and *g* a suitably-supported wheel or sheave over which said flexible device extends, said weight acting to balance or substantially balance the sucker-rod and the parts it carries, hereinafter to be described. I do not wish to be limited to the precise means, of course, whereby the balance is maintained, or, indeed, to any balancing means, for if such were omitted the advantages aimed at would be manifestly still subserved.

The pipe *a* is open in its bottom portion, as shown, through straining-apertures *h*.

Referring first to Figs. 1, 2, and 4, a tubular pump-barrel *j*, having a check-valve *k* of ordinary construction at the bottom and another check-valve *l* at the top, is supported by spiders *i*, preferably concentrically in the lower portion of the well-pipe. The check-valve *l* is preferably in the form of an inverted cone having a tubular depending portion *m*, which fits in the top of the pump-barrel, guiding the valve as the same moves vertically and formed with water-escape apertures *n*, which when the valve rises so that they are uncovered by the wall of the pump-barrel permit the water impelled upwardly through the pump-barrel and acting to raise the valve to be released. The upward movement of said valve *l* is limited by pins *m'*, carried by the pump-barrel and projecting into the apertures *n*.

The sucker-rod penetrates the valve *l* and moves freely therein. The sucker-rod carries the usual valve *o*, comprising an upwardly-opening check-valve *p*, the same being located within the pump-barrel between valves *k* and *l*. If desired, the pump-barrel may carry a strainer *q* at the bottom.

Referring now to Fig. 3, which shows the preferred arrangement of the well-pipe, the pump-barrel, the lower valve, and strainer, *a'* denotes the well-pipe, the same having intake-openings or straining-apertures *b'*. *c'* is the pump-barrel, and *d'* and *e'* the two members of a combined strainer and casing for the lower valve *f'*, which are bolted together, the lower member *d'* being the strainer

proper and the upper member  $e'$  being screwed into the lower end of the well-pipe  $a'$ , as at  $g'$ , and having a threaded reduced portion  $h'$ , which is screwed into the lower end of and thus supports the pump-barrel  $c'$ .

$r$  is a cylindrical piston arranged within the well-pipe and surrounding the pump-barrel  $j$ , (or  $c'$ .) It may have packing  $s$  on the inside and outside, so that the escape of water past the same in either direction is perfectly prevented. This piston is suspended from a cross-arm  $t$ , carried by the sucker-rod by rods  $u$ , so that it partakes of the up-and-down motion of the sucker-rod.

In Fig. 4 there are two well-pipes  $a$ , two sucker-rods  $d$ , and a duplication of the parts the latter carries, as well as of the pump-barrel and its accessories. The two pumps thus provided act to balance each other, the one rising as the other falls, by means of rods  $v$ , one of which is connected to each sucker-rod and to a wheel  $w$ , suitably journaled above the pumps. The well-pipes have a common discharge  $x$  and with a view to compensating for leakage of water above one piston  $r$  downwardly past the same more than in the case of the other piston, as when the pump is idle for an appreciable time, said well-pipes also have a restricted duct  $y$  of communication located above the uppermost limit of movement of the pistons.

With a view to reducing the power necessary to keep the apparatus in motion I provide a tank  $z$ , having an overflow 1, which (said tank) discharges through a nozzle 2 onto a water-motor 3. Said water-motor carries a crank 4, which in the adaptation shown in Fig. 1 is connected with a suitably-fulcrumed lever 5 by a pitman 6, the lever being in turn connected with the sucker-rod by a pitman 7 and which in the adaptation shown in Fig. 4 is connected with a crank 8 on the wheel  $w$  by a pitman 9.

Operation: Assuming that the sucker-rod  $d$  is reciprocated by some suitable means or by hand, as it descends the water which on the previous upstroke became locked in the pump-barrel  $j$  (or  $c'$ ) above check-valve  $k$  (or  $f'$ ) lifts the valve  $p$ , and so assumes a position above the same. When the sucker-rod now ascends, it raises this body of water against the check-valve  $l$ , which is thereby lifted, permitting the water to escape through its apertures  $n$  and upon the reseating of said valve following on the next descent of the parts be locked above valve  $l$ . This operation is of course repeated throughout all the time that the pump is in motion. Meanwhile the water which stands above the piston  $r$  and that in the well which stands below said piston is acting against the latter in the same manner and with the same effect as described in my Letters Patent aforementioned and not necessary to be repeated herein. In the adaptation shown in Fig. 4 the

operation is the same, except that instead of the special balancing means shown in Fig. 1 being used each pump or pump unit balances the other, thus materially easing the action and reducing the power necessary to keep the apparatus in motion. While the reciprocating parts are working, the discharged water flows from the tank  $z$  onto the water-motor, which thus considerably assists the operating means, whatever that may be.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a water-conducting means open to the water-supply in its lower portion, a pump-barrel, also open to the water-supply, inclosed in said conducting means and having an upwardly-opening valve, a sucker-rod, a piston arranged in said conducting means outside of said pump-barrel and carried by the sucker-rod, and means, arranged in said pump-barrel and also connected to said sucker-rod, for forcing water into said conducting means through the pump-barrel, substantially as described.

2. The combination of a water-conducting means open to the water-supply at the bottom, a pump-barrel, also open to the water-supply, inclosed in said conducting means and having an upwardly-opening valve, a sucker-rod, a piston arranged in said conducting means outside of said pump-barrel and relatively below said valve, and carried by the sucker-rod, and means, arranged in said pump-barrel and also connected to said sucker-rod, for forcing water into said conducting means through said pump-barrel, substantially as described.

3. The combination of a water-conducting means open to the supply at the bottom, a pump-barrel, also open to the supply, inclosed in said conducting means and having upwardly-opening valves arranged the one above the other, a sucker-rod, a piston arranged in said conducting means outside of said pump-barrel and relatively below the upper valve, and carried by the sucker-rod, and means, arranged in said pump-barrel between the valves thereof and also connected to said sucker-rod, for forcing water into said conducting means through said pump-barrel, substantially as described.

4. The combination of a water-conducting means open to the supply at the bottom, a cylindrical pump-barrel, also open to the supply, arranged in said conducting means and having an upwardly-opening valve, a sucker-rod, a piston arranged in said conducting means and surrounding said pump-barrel, said piston being carried by the sucker-rod, and means, arranged in said pump-barrel and also connected to said sucker-rod, for forcing water into said conducting means through said pump-barrel, substantially as described.

5. The combination of a water-conducting means open to the supply at the bottom, a cylindrical pump-barrel, also open to the supply, arranged in said conducting means, an  
5 upwardly-opening inverted conical valve carried by said pump-barrel, a sucker-rod, a piston arranged in said conducting means and surrounding said pump-barrel, said piston being carried by the sucker-rod, and  
10 means, arranged in said pump-barrel and also connected to said sucker-rod, for forcing water into said conducting means through said pump-barrel, substantially as described.

6. The combination of a water-conducting  
15 means open to the supply at the bottom, a pump-barrel inclosed in said conducting means and having an upwardly-opening valve, a strainer device carried by said con-

ducting means, carrying said pump-barrel and affording communication between the  
20 latter and the supply, a sucker-rod, a piston arranged in said conducting means outside of said pump-barrel and relatively below said valve and carried by the sucker-rod, and  
25 means, arranged in said pump-barrel and also connected to said sucker-rod, for forcing water into said conducting means through said pump-barrel, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of  
30 June, 1905.

PHILIP H. DEIS.

Witnesses:

JOHN W. STEWARD,  
WM. D. BELL.