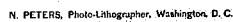


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UNITED STATES PATENT OFFICE.

JOHN A. MURRAY, OF TUCSON, ARIZONA TERRITORY.

PUMP.

SPECIFICATION forming part of Letters Patent No. 384,706, dated June 19, 1888.

Application filed December 1, 1887. Serial No. 256,720. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. MURRAY, of Tucson, Pima county, Arizona Territory, have invented an Improvement in Pumps; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of pumps, and it consists in the construction and combination of devices, which I shall hereinafter fully describe and claim.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is an elevation of my pump. Fig. 2 is a vertical section through one of the plungers. Fig. 3 is a detail showing the manner of uniting the meeting ends of the stem or rod.

A is the cylinder of the pump.

B is the lower piston or plunger, having a rod, *b*, and C is the upper piston or plunger, having a rod, *c*. The stem or rod *b* of the lower piston passes through the upper piston or plunger and through its rod or stem *c*, which is made hollow for this purpose. The lower piston or plunger is provided with upwardly-swinging valves *b'* and the upper piston or plunger with upwardly-swinging valves *c'*, the particular construction of these valves and the plungers being hereinafter more fully described.

To the back of the cylinder is secured a fixed standard, D, the upper portion of which is bent over toward the vertical center of the cylinder, and is provided with a guide arm, *d*, through which the rod or stem *b* of the lower piston or plunger passes and by which it is guided.

In the lower portion of the standard D is journaled a shaft, E, having on each side of its bearing cranks *e*, separated by 180 degrees, and, also, as here shown, a crank, *e'*, or other suitable power device, for operating the said shaft. With one of the cranks *e* a pitman, F, is connected, the upper end of which is connected with a wrist-pin, *f*, extending from the side of the stem or rod *b* of the lower piston or plunger, while the other crank, *e'*, is connected with a pitman, G, the upper end of which is connected with a wrist-pin, *g*, extending from the hollow stem or rod *c* of the upper piston or plunger. It will now be seen from this construction that when the shaft E is rotated the

directions—that is to say, when the piston B moves up the piston C moves down, and vice versa. The effect of this is that when one piston—say, for example, the lower one—moves down its valves open to admit a fresh charge of water, while the upper piston, moving up, its valves close and raise the charge above it, and when the upper piston moves down its valves open to receive a fresh charge, while the lower piston, moving up, raises the water above it and forces it up through the upper piston. In this way I am enabled to have a double-acting pump in a single cylinder, and without any stationary valves. But in case I wish to convert it into a single pump I have but to disconnect one piston—either one—and hold it stationary, whereupon the other piston will act, the difference being only in the amount of work performed.

The cranks *e* are so constructed that when raising their pitmen they are in the vertical center plane of the cylinder, so that they lift in line and thus avoid any cramping.

The pistons or plungers are made as follows: The body of the piston is made of a metal band, H, having upwardly-extending side wings, *h*. A leather band, *h'*, is fitted around the metal, and its lower portion is bound in to the circumference of the upper portion by an encircling metal ring, *h''*, which is bolted through and through, and the upper portion of the leather is bolted to the body-band. A metal bar or stirrup, *h'''*, has its ends bolted within the body-band, its top traversing diametrically the top of the band and having bolted to it a valve-leather, *h''''*, the side wings, *b'* or *c'*, of which are seated on the side wings, *h*, of the body-band and have secured to their tops metal pieces *h''''''* for weighting them. To the top center of the valve-leather and to the top of the metal stirrup *h'''* is bolted a cross-bar, *h''''''*, to which the stems of the valves are secured. This construction of the piston and valve is simple and durable and works easy in the cylinder.

In opening, the valves turn on their hinges toward the center, so that in discharging they give room for the passage of the water. In the operation of the pump it will be seen that the lower piston or plunger takes the place, when acting as a double-acting pump, of the ordinary check-valve. The two plun-

gers or pistons are auxiliary; but at the same time either one can be stopped or held stationary and not interfere with the working of the pump, except, as before stated, as to the quantity of work performed. In order to prevent the rods from becoming unscrewed and lost when many lengths are used, as in deep wells, the rods of the lower piston have left-hand threads, while those of the upper piston have right-hand threads. The lower piston-rod is made flat where it passes through the upper piston-valve, which prevents its turning and also gives more room for water to pass on each side. The arms or wrist-pins F and G, to which the crank-rods also connect, also prevent the piston-rods, to which they are attached, from turning. The discharge takes place through a spout at the top of the pump-cylinder and is continuous while the pump is in motion. By having the crank-shaft journaled as shown, and below the top of the cylinder, it leaves the upper end and discharge free and unimpeded, and it also enables the operator to work it conveniently either by hand or power, as may be desired.

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

1. In a pump, a valved plunger or piston consisting of the metal body-band H, having upwardly-extending side wings, the wings b' and c' , seated on said side wings, the leather band h' , encircling the body-band, the ring h^2 , bolted to said body-band and confining the leather band, and the stirrup h^3 , having its ends bolted within the body-band, substantially as described.

2. In a pump, the combination, with a single cylinder, of a valved plunger or piston having a hollow stem or rod, a second valved plunger or piston below the first with its stem or rod passing through the stem or rod of the first plunger, said rod being flattened where it passes through the upper valve and having its lengths joined by screw-threads cut in opposite directions from those which unite the lengths of the upper piston-rods, substantially as herein described.

In witness whereof I have hereunto set my hand.

J. A. MURRAY.

Witnesses:

S. H. NOURSE,
H. C. LEE.