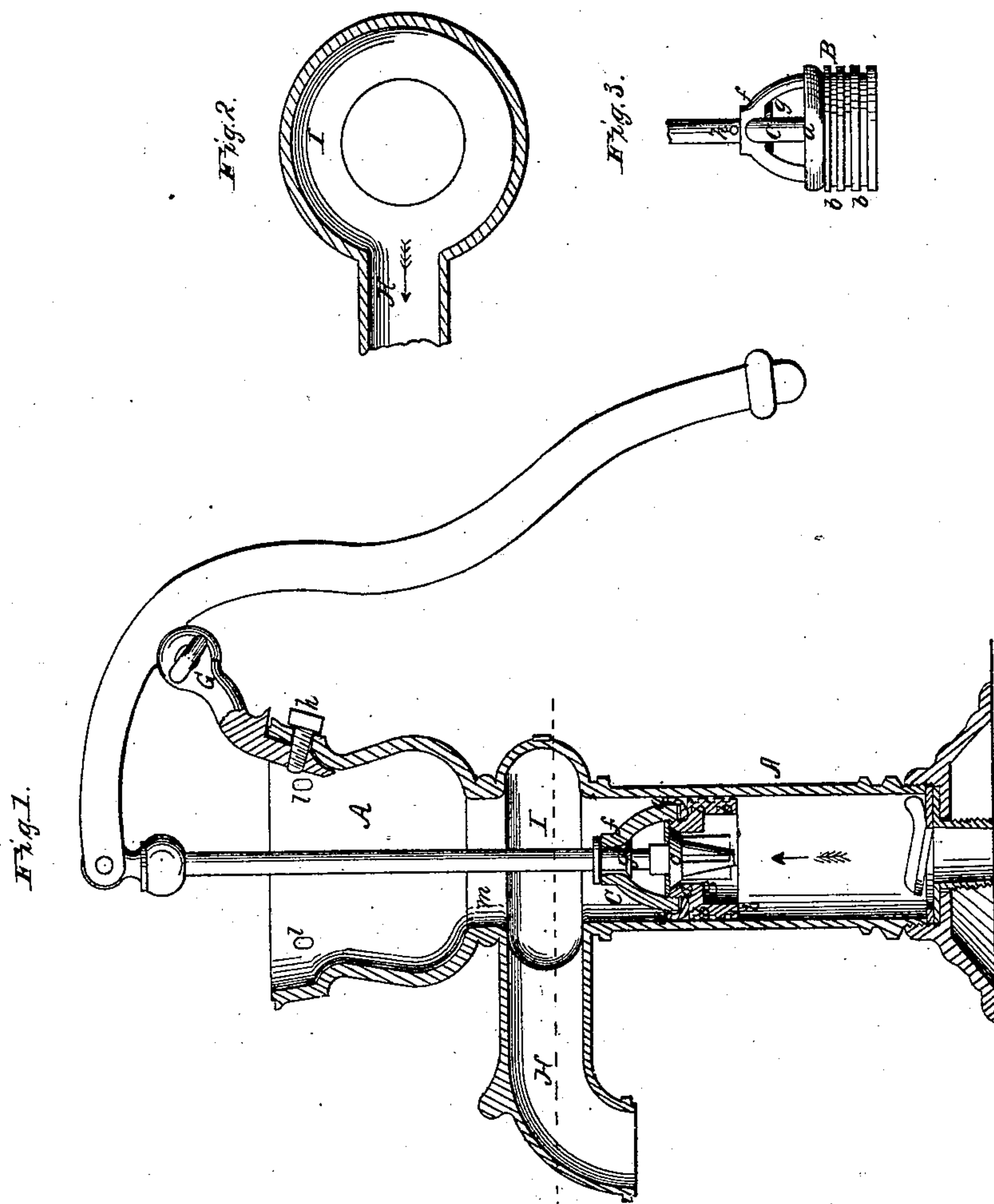


W. Race,
Pump Lift,
N^o 39,065. Patented June 30, 1863.



Witnesses

R. I. Osgood
W. A. Goden.

Inventor

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UNITED STATES PATENT OFFICE.

WASHBURN RACE, OF LOCKPORT, NEW YORK.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 39,065, dated June 30, 1863.

To all whom it may concern:

Be it known that I, WASHBURN RACE, of Lockport, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Pumps; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a central vertical section of my improved pump; Fig. 2, a transverse horizontal section of the same through the plane of the red line, Fig. 1; Fig. 3, an elevation of the piston detached.

Like letters of reference indicate corresponding parts in all the figures.

My invention consists, first, in the combination, with a metallic water-packing piston, of a leather packing, or equivalent, in such a manner that while the metal receives the most of the wear, the leather produces a more perfect water-tight fit; second, in the employment of a groove or enlargement in the pump stock, for preventing the water from overflowing, for forming a reserve-chamber, and for producing a greater pressure and consequent discharge from the spout. The pump-stock A is of usual form, the top being open as represented. Within the cylinder plays a piston formed of a metallic guiding portion, B, and a leather packing, *a*, or equivalent, constructed, arranged, and operating substantially as follows: The metallic portion B is made of sufficient depth to not only secure the proper bearing in the cylinder, but also to furnish sufficient space on the periphery for a set of transverse grooves, *b b*, to produce the water-packing, as clearly represented in Figs. 1 and 3. The middle is provided with a seat, in which fits the ordinary valve *c*. A central screw-portion, *d*, Fig. 1, projects from the top of the metallic portion, on which screws the usual connection C, for securing the piston with its rod. Between the base-ring of the connection C and the top of the metallic piston fits the packing-ring *a*, of leather, or its equivalent, turning up in the usual manner, for bearing against the sides of the pump-cylinder. The metallic portion of the piston, by playing easily but closely in the cylinder, forms a guide and receives most of the wear, while the leather portion forms a more perfect packing than can be produced by metal

alone, and, by being subject to but little friction, the leather is much more enduring than the ordinary piston, where the leather forms the whole bearing and must consequently be exposed to the whole friction and wear. By this device the metallic portion can rest more loosely in the cylinder than is usually the case where no leather is used, thus saving labor and expense in fitting the parts accurately, and at the same time, by the use of the water-packing grooves *b b*, the same is made comparatively tight, independent of the leather-packing. By the addition of the leather, the packing is made so tight that there can be no escape, thereby producing a more perfect arrangement, and obviating the necessity of priming at any time for starting the pump. By fitting the metallic portion loosely in the cylinder, it cannot become rusted tight by long disuse, as is the case where a close-fitting metallic piston is used. The addition to the metallic piston B of the usual leather piston *a* secures all the advantages above described. The top of the connection C is provided with a socket, *f*, through which passes the piston-rod, having a shoulder, *g*, below, and a pin, *h*, passing through the rod above, or their equivalents, for holding the socket in place as represented in Figs. 1 and 3. The socket is of such size as to allow some play to the parts. In the ordinary rigid connection of the piston to its rod there is an extra amount of wear on two opposite sides of the same, from the fact that the rod does not preserve a vertical position at all heights, but inclines to one side or the other, according as it is raised or lowered. By connecting the piston with the rod, as above described, this difficulty is avoided, for the piston is allowed to follow in the cylinder easily, while the rod can incline in either direction by means of the joint formed at the socket. Thus, a long stroke is produced without unequal wear, instead of a short one by the ordinary rigid piston. The grooved piston has so deep a bearing in the cylinder that it can trip the induction-valve, to allow the escape of water, without being tripped or inclined, which effect cannot be accomplished in ordinary arrangements without making the connection rigid, on account of the small bearing of the piston. An important advantage secured by this connection, is that a universal joint is formed, and play is allowed to

the piston on all sides—laterally as well as in a plane with the operating-lever. Thus, if the lever has any unequal lateral action on its fulcrum, the piston will not be affected by it. My pump is so constructed that the lever can be moved or adjusted to any position on the pump-stock by means of an adjustable fulcrum, G, secured in place by a screw, *k*, passing through any one of a set of holes, *l l*, made at proper distances apart around the top. In changing the position of the lever, the universal-joint connection of the piston and rod are of the greatest importance, as thereby the piston itself is not turned, but rather the piston-rod in its socket. In pumps of the ordinary kind it is necessary to pull the piston out to turn it, as the rod cannot be easily supported in a vertical position for the purpose, and there is great friction between the packing and cylinder, especially where the diameter is large, as in some varieties of pumps. By my arrangement the position of the lever can be expeditiously changed without removing the piston, or even turning it, and without producing any friction, the rod merely turning in its socket. This effect could not be produced either by a rigid connection or by a simple joint turning only in the plane of the operating-lever, which latter device I am aware has been in use. On the same horizontal plane with the spout H the pump is enlarged, as represented in Figs. 1 and 2, forming a groove or chamber, I, around the whole circumference, and usually of the same depth as the spout, though, if desired, it may be larger. The passage or throat *m* above the groove, and leading to the open top of the pump, is made narrow or of less diameter than the other portion, as clearly represented in Fig. 1. As the water is raised, it flows into this enlargement, and

as the pressure forces it still higher, instead of passing vertically into the throat, it is deflected at an angle, or in an inclined direction, by the angular sides of the groove, the currents from every side thus intermingling and breaking each other and preventing an overflow, as would be the case if the water were raised in an unbroken body. By allowing a body of water to constantly rest in the groove or enlargement, and by thus directing and breaking the flow in the center at the throat, the resistance to the upward current is increased, and consequently, with the same power, a greater pressure and a greater discharge is produced at the spout. The enlargement retains a surplus of water at all times, which is drained off at the spout.

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

1. The combination of the grooved metallic water-packing piston B and leather packing *a*, or its equivalent, arranged in such a manner that the metallic portion slides easily in the cylinder and forms the guide, while the leather portion produces a more perfect packing without being subject to great wear, substantially as herein set forth.

2. The groove or enlargement I in the pump, with the contracted opening *m* above, by which means the water is prevented from overflowing, and a greater pressure is produced in the spout, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WASHBURN RACE.

Witnesses:

S. R. C. MATHEWS,
W. H. EAGER.