Irvin Williams, Impd Rotary Pump.

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PATENTED JAN 17 1871

Fig. 1

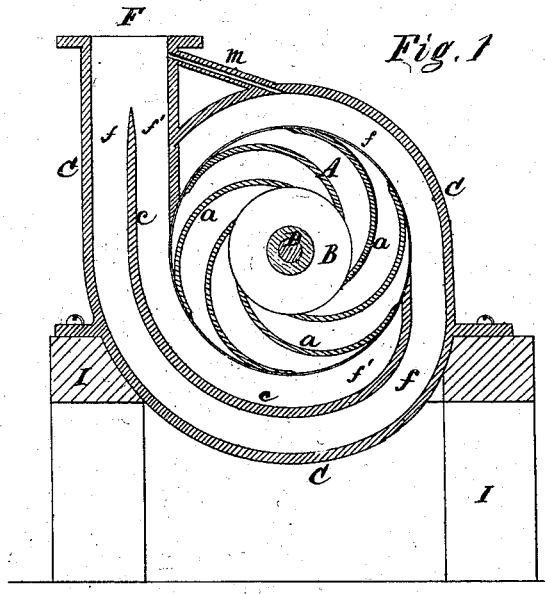


Fig. 2.

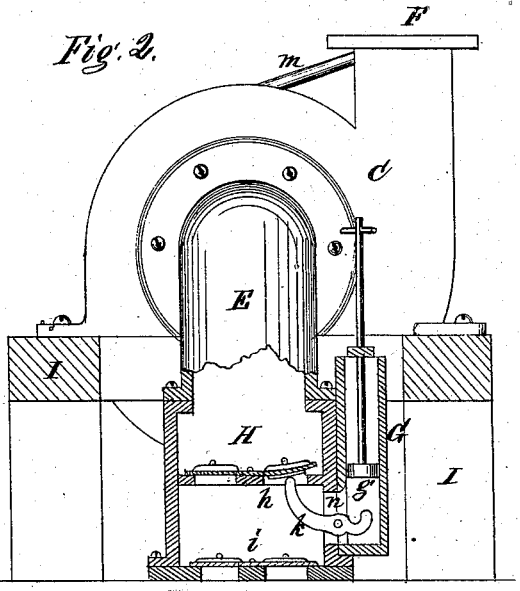
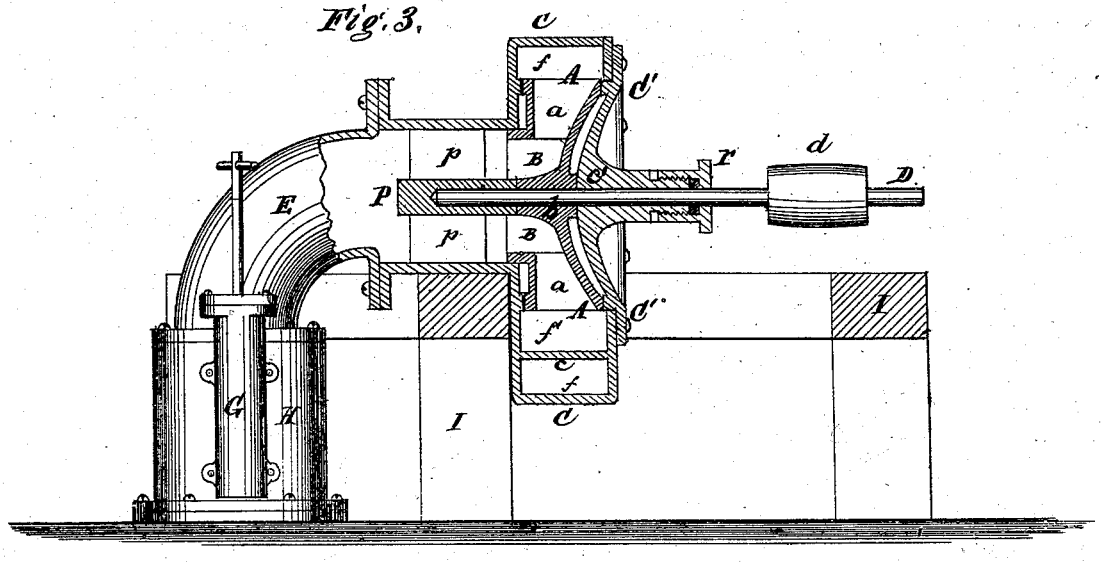


Fig. 3.



Witnesses.

R. D. Pettit

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IRVIN WILLIAMS, OF BALDWINSVILLE, NEW YORK.

Letters Patent No. 111,026, dated January 17, 1871.

IMPROVEMENT IN ROTARY-PUMPS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, IRVIN WILLIAMS, of Baldwinsville, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Rotary Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a cross-section, taken through the center of the pump;

Figure 2 is a sectional end view; and

Figure 3 is a longitudinal section.

Similar letters of reference indicate like parts in the several figures.

In the accompanying drawing—

A is a centrifugal pump, having an open center, B, and curved buckets *a a*, fig. 1;

C is the casing or outside shell;

D *d* is the driving-shaft and pulley;

E is the suction-pipe;

F is the discharge or lift-pipe;

G is a small hand-pump for priming the main pump in starting up;

H is a valve-chamber attached to the lower end of the suction-pipe E; and

I I is the supporting frame of the pump.

The buckets *a a* of the pump are arranged in a manner similar to the buckets of a turbine water-wheel, as seen in fig. 1, so that the buckets have a wedging action on the water in addition to the centrifugal action.

The buckets *a* are made wider on their outer ends, as shown in fig. 3, and this gives greater efficiency, and more water is delivered by the same power with such modification of buckets.

To equalize the discharge from the wheel or pump, so that it is balanced, and the wear on the bearings is not all on one side as ordinarily, I divide the discharge F, fig. 1, into two parts, *f f'*, by a partition, *c c*, and this causes the pump to deliver water equally from its opposite sides, while but one main discharge, F, is used, and by this means the wheel is so well balanced that all side strain and wear are obviated, and the pump will run a long time without getting out of order, and the loss of power by increased friction, caused by the parts wearing out of place, is also avoided.

The end of the casing, where it approaches the pump from the discharge F, terminates in a sharp point or edge, and the end of the partition *c*, where it approaches the wheel or pump, also terminates with a sharp edge, and by these means all eel-grass, &c., that enters the pump is cut up so that it cannot choke the pump; and these terminations of F and *c* also act as butments, to prevent the wheel from carrying the water around with it in the shell.

The inner ends of the buckets *a a* are also made sharp for the same purpose.

The lower end of the suction-pipe E terminates with a chamber, H, and this chamber is provided with a double set of valves, *h i*, fig. 2.

A small hand-pump, G, with a solid piston, *g*, is attached to one side of the chamber, and the lower end of this pump communicates with said chamber H by a passage, *n*, and a small curved lever, *k*, is suspended in this passage by a pivot, near its center.

When the main pump A is to be at rest for some time during cold weather, the piston *g* of the hand-pump is depressed, so as to act on the short of the lever *k* and cause the long arm of the lever to raise one of the upper valves, *h*, so that the water in pump A escapes through the said valve *h* and through the hand-pump G, the piston *g* being forced down so low that the escaping water passes above it and out through the top of the pump G.

As the apparatus is placed in the water so that the water-level is above the top of the pump G, all the water in the main pump above the water-level is allowed to escape, and by this means the pump is prevented from freezing fast; and when the pump is to be started the hand-pump is used to refill the pump A, an upward movement of the piston *g*, drawing water through the lower valves *i*, and a downward movement of said piston forcing this water through the upper valves *h* into the chamber H, and thence into the pump A.

The escape or tripping-lever *k* can be dispensed with, and a waste-cock be placed in the shell C, for emptying the pump.

To allow the air to escape from the upper part of the shell C, when the pump is being filled for starting, the upper part of the shell is connected with the discharge-pipe F by a small pipe, *m*, and this also allows the pump to be emptied more readily.

The wheel or pump-A *a*, fig. 3, is fixed on the shaft D, and this shaft has a front bearing in a box, P, that is sustained in the center of the induction-pipe, by webs or arms *p p*, but the main bearing of the shaft is in the hub *c'* of the casing

The rear face of the pump is made with such a degree of concavity that the hub *c'* extends in nearly to the center of the pump, and by this means great solidity of bearings is obtained. The outer end of the hub *c'* is provided with a stuffing-box, *r*.

The casing C is formed with an opening in its rear side, that is large enough to allow the pump A to be removed at any time, and this opening is closed by the concave disk or plate *C' c'*, which is bolted to the

casing in such manner that the wheel is removed and the whole interior of the pump exposed or made accessible in a few minutes, without disturbing the pipes, shell, or fixtures.

To make the apparatus with as few joints as possible, and to lessen the cost of manufacture, the casing C is cast complete in one piece, with exception of the removable face C′, so that no fitting is required but to chuck the casing in a lathe and bore it out.

The check-valves in the chamber H prevent the pump from losing its priming in warm weather, when there is no danger of freezing, and they also act as valves for the priming-pump G when it is used to prime or fill the main pump.

By these means I obtain a rotary pump of great endurance and efficiency.

I do not claim broadly a wheel made with curved back plate and buckets, nor a partition in the discharge-pipe, dividing the same into two water-ways; neither do I claim the application of a hand-pump, for priming, to a rotary pump, as new in itself, these features, thus considered, being old; but

Having thus described my invention,

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

1. The wheel A B, with inwardly-curved back plate and curved buckets *a*, and the casing C F, having division *c*, pipe *m*, the curved plate C′, with bearing *c′* and stuffing-box *r*, and the inner bearing P *p p*, and shaft *b*, all constructed, arranged, and operating substantially as herein described.

2. In connection with the pump G *g′* and check-valves *h i*, the tripping lever *k*, arranged and operating with relation to the pump A C, substantially as specified.

3. The herein-described rotary-pump, composed of the wheel A B *a b*, casing C *c*, curved removable back plate C′ *c′*, the shaft D *d*, stuffing-box *r*, induction and eduction pipes E F, air-pipe *m*, the valve-chamber H, bearing P *p*, the hand-pump G *g n*, tripping-lever *k*, and valves *h i*, all constructed, arranged, and operating substantially as herein described.

The above specification of my invention signed by me this 23d day of August, 1870.

IRVIN WILLIAMS.

Witnesses:

R. D. PETTIT,

F. A. MORLEY.