E. Perry,

Centrifugal Pump.

No. 44,337. Patented Sep. 20, 1864.

Fig. 2.

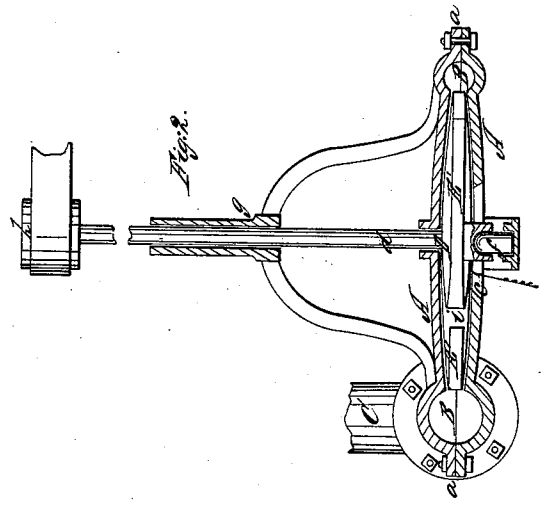

Fig. 3.

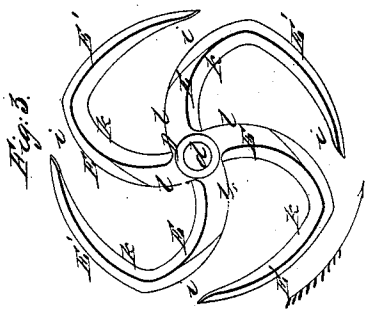

Fig. 1.

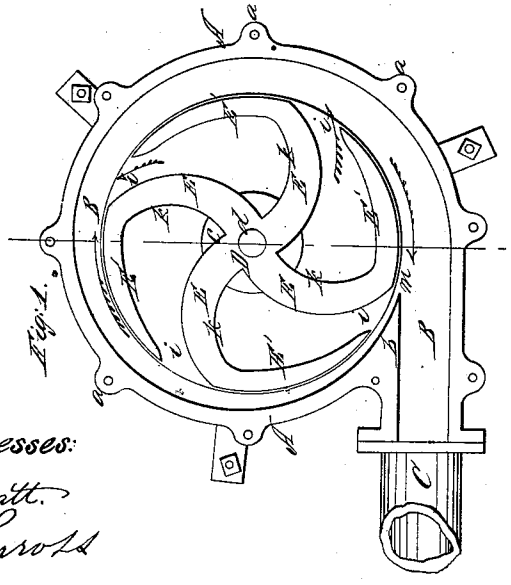

Fig. 4.

Witnesses:

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UNITED STATES PATENT OFFICE.

ELI PERRY, OF BALDWINSVILLE, NEW YORK.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 44,337, dated September 20, 1864.

To all whom it may concern:

Be it known that I, ELI PERRY, of Baldwinsville, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Centrifugal 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 plan of my improved pump, with the top plate of the case removed for the purpose of showing the interior arrangement; Fig. 2, a central vertical section; Fig. 3, a bottom view of the piston opposite to the view of the same in Fig. 1; Fig. 4, a diagram showing a cross-section of one of the wings of the piston and a portion of the case, and exhibiting more especially the sharp edge of said wing, employed for the purpose of cutting off such foreign matter as would otherwise tend to obstruct the wings.

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

My invention consists in the peculiar construction and arrangement of the wings of the piston, and in the leaving of an open space between the wings and abutment for the escape of gravel, sticks, &c., that would otherwise obstruct or break the wings.

The case A is of usual form and construction, being made of two halves that are counterparts, fastened together by bolts *a a* and being provided with a circular scroll or discharge passage, B, that gradually enlarges from the abutment *b* around to the eduction-pipe C, where the liquid escapes, as shown most clearly in Fig. 1. The liquid enters the case by an induction-opening, *c*, in the bottom. Between the two halves of the case is situated a piston, D, whose spindle or shaft *d* rests on a suitable step, *f*, at the bottom, and passes up through a bearing, *g*, and has a suitable pulley, *h*, driven by a band at the top, or some equivalent arrangement. This piston is of peculiar construction. It has several wings, E E, (four only being shown in the drawings,) extending outward radially from the spindle and curving in the direction opposite to their motion, or backward. At their outer extremity the wings are again turned back in a curved form, constituting arms E′ E′, that are concentric with the spindle, and respectively reach backward sufficiently near to the wings in the rear to leave only passages *i i* of proper capacity for the escape of water outward. The arms E′ E′ reach just to the inner periphery of the scroll B, and they fill the vertical space between the two halves of the case at that point in such a manner as to separate the center of the case from the scroll, as shown most clearly in Fig. 2. The wings at th ir upper surface are provided with flanges or ribs *k k*, Figs. 1, 3, and 4, of greater width than the wings proper themselves, in order to give additional strength. The lower inner edges, *l l*, of the wings that move over the edge of the induction-opening *c* in the bottom of the case are made sharp-edged, as shown in Figs. 3 and 4, for the purpose of cutting or chopping such sticks or other foreign matter as enter the pump. To prevent obstruction a space, *m*, is also left between the outer end of the wings, (when the same come in position,) and the abutment *b*, Fig. 1.

I intend this pump more particularly for coarse and rough work, where great strength is required—such, for instance, as in public works, when water mixed with mud, stones, and sticks is to be raised, or in breweries and distilleries, where the liquid to be raised is mixed with sediment. An ordinary pump will not work in this capacity, especially if it has valves. It is requisite that the passage of the liquor from the induction to the eduction be as unimpeded as possible, and therefore it requires a peculiar and characteristic arrangement of parts. The liquid, as it enters the opening *c*, is rapidly forced outward by the curved wings through the passages *i i* into the scroll, where it is carried upward through the eduction-pipe by the centrifugal action. The arms E′ E′, by fitting closely between the two plates of the case, and by extending around concentrically with the spindle in such a manner as to separate the scroll or passage B from the center of the case, except through the passages *i i*, shut off the water that is thrown out into said scroll and prevent any return of it again inside. In other words, the water situated in the scroll outside the arms is held and carried round there without possibility of escape back again. This is of the greatest importance, for it equalizes the pressure in the whole scroll, thus producing a more regular and uniform stream and increasing the discharge. On public works it is fre-

quently the case that stones the size of a man's fist are carried through the pump. Were it not for these arms E′ E′, these stones would frequently obstruct the pump by being carried around within the narrow space between the extremities of the dishing portion of the case; but in this device when such bodies are once thrown outside the arms there is so possibility of return, and no escape except through the eduction-pipe. This is also true of the sediment in breweries. The curved form of the wings insures the same being carried into the scroll, and when once there the arms retain it. While this effect is accomplished there is no obstruction of the passage of the water outward through the passages *i i*, which are made sufficiently large for the purpose.

In addition to this device for keeping the pump unobstructed, the sharp edges *l l*, passing in proximity to the bottom of the case A, serve to cut off all sticks, strings, shavings, &c., that enter into small pieces that pass easily through. In breweries especially there are many such substances mixed with the liquid, which, from their great length, are subject to become wound around the wings. By my device all difficulties of this kind are obviated. The flanges *k k* strengthen the wings in such a manner that they are enabled to sustain the great strain to which they are subject. For some uses—such, for instance, in emptying docks—a power of eight or ten horse is applied and the stream thrown is a foot or a foot and a half in diameter. In such cases, in order to make cast-iron wings sufficiently strong, these flangs are necessary.

In ordinary centrifugal pumps, where pure water is to be raised, it may be desirable that the wings shall come in close proximity to the abutment, in order to cut off entirely the passage of any portion of the water round a second time; but when gravel, sticks, &c., enter I have found that in practical operation such small bodies frequently get caught between the abutment and the ends of the wings, thereby stopping the piston, and, what is worse, frequently breaking the wings themselves. The greatest difficulty in this respect is experienced from gravel and very small stones, which enter the crack. To obviate these difficulties, I leave the space *m* at the abutment of sufficient size for such small bodies to pass, while larger bodies, such as stones, from their great weight and their centrifugal action, are carried outward and discharged.

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

1. The combination of the wings E, arms E′, and flanges *k k*, arranged substantially as herein specified.

2. Forming the under side of the wings with sharp edges *l l*, the same being used in combination with the floor of the case A, substantially as described.

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

ELI PERRY.

Witnesses:
JAY HYATT,
R. F. OSGOOD.