B. T. Trimmer,

Rotary Pump,

No. 21,632. Patented Sep. 28, 1858.

Fig 2.

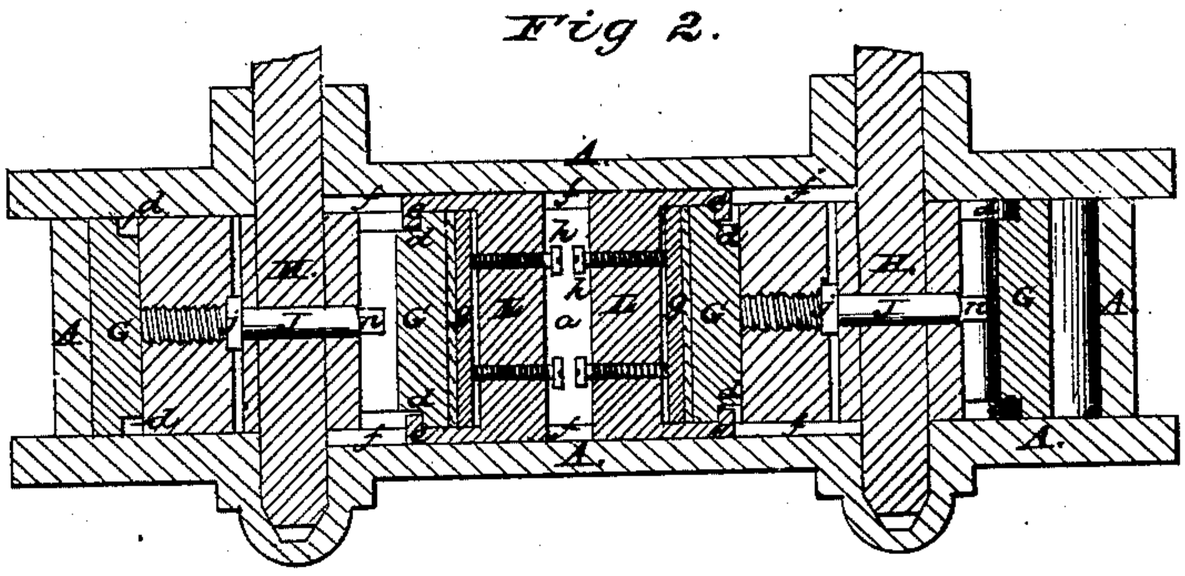


Fig. 3.

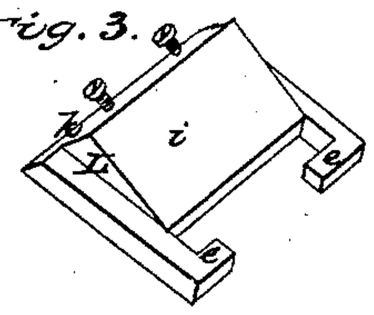
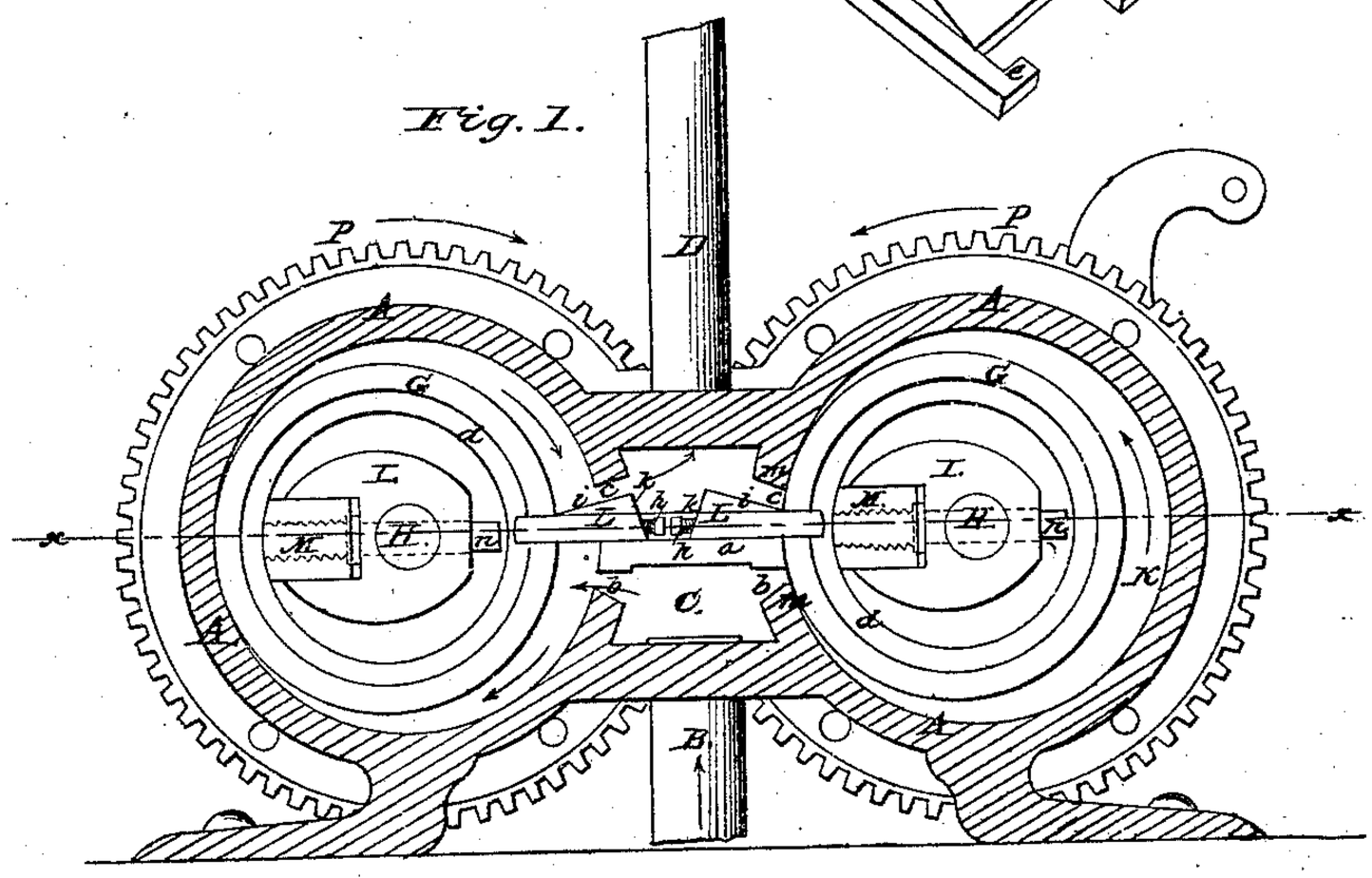


Fig. 1.



UNITED STATES PATENT OFFICE.

B. T. TRIMMER, OF ROCHESTER, NEW YORK.

ROTARY PUMP.

Specification of Letters Patent No. 21,632, dated September 28, 1858.

To all whom it may concern:

Be it known that I, B. T. TRIMMER, of Rochester, in the county of Monroe and State of New York, have invented a new and Improved Mode of Constructing Rotary Force Pumps; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon.

Figure 1, is a vertical section. Fig. 2, is a horizontal section on the line *x x* of Fig. 1. Fig. 3, is a view of one of the butments detached.

The same letters refer to corresponding parts in both of the figures.

My pump consists of two close cylindrical cases, A A, divided by a space sufficient to contain the induction and eduction pipes and chambers B C, and D E. A horizontal partition *a* divides the chambers, C and E, while openings, *b b*, communicate from the interior of the case A, to the induction chamber C, and corresponding ones, *c c*, connect the case with the eduction chamber E. The form of the pistons which I employ is annular, consisting of loose metallic rings, G, of less diameter than the cases in which they work. Their peripheries are turned or fitted to the peripheries of the cases A A, and their edges are also fitted to work tightly against the sides of the cases. A shaft, H, is provided through the axis of each case, on which is placed a cam, I, the greatest eccentricity of which is equal to the space between the shaft and the periphery of the case, less the thickness of the annular piston, G, which it consequently presses against the periphery of the case, leaving the space caused by the different diameters of the two in the opposite direction to the position occupied by the cam. Cog wheels are provided on the shafts H H, which gear together on the outside of the case, and, power being applied from any suitable source, causes both shafts to revolve at a uniform speed and in opposite directions. The cam moving with the shaft keeps the piston in contact with the case as it revolves, and, as the point of contact moves with the cam, the water in chamber K is moving in advance of it in the direction of the arrow, from the induction port *b* to the discharge opening *c*. It is not essential that the ring should revolve; indeed it is free to do so, or slide on the surfaces of the cam or case.

Recesses, *d*, are formed in the edges of the rings G at their inner angles, and a hooked triangular butment L, is connected therewith as shown more clearly in the section, Fig. 2, and detached in Fig. 3. It is wider than the piston, and the hooks *e* clasp around the edge and enter the recesses *d*. The ends of these butments slide in grooves *f f* in the sides of the case, which are so arranged that the planes, or under sides, rest in contact with the partition *a*, Fig. 1. Being attached to the piston G, they slide back and forth in their bearings with the motion of the piston produced by the revolutions of the cam. The edge which is in contact with the periphery of the piston is provided with a metallic or other packing, *g*, which is adjusted by the screws, *h h*. The butments form a continuation of the partition *a* when the pistons are at their greatest distance from the openings *b* and *c*, causing the water that is drawn through chamber C to be expelled through chambers E and pipe D. It is essential, in order to prevent waste from the water running back from chamber E, that the sliding butment shall pack, not only against the piston, but against its seat, *a*. This it does, (its lower surface and that of the seat being fitted to each other,) from the pressure of the water on its two upper planes, *i* and *k*, shown more fully in Fig. 3. The weight of the main column which is passing through port *c*, rests upon the long plane *i*, while the pressure of the back, or still water, in the chamber is exerted against the plane *k*, forcing it down upon its seat in unison with the weight on *i*, and at the same time forward, so as to pack more closely on the surface of the piston. Another purpose is answered by the inclined surface *i*, that of giving a more gradual ascent and consequently easier passage of the water to the eduction pipe.

To provide against the joint between the piston and case becoming open by the wear of the parts from friction, an adjustable piece M, is fitted in a groove in the cam I, and is held by a screw on the end of the bolt J, which fills the double office of securing the cam to the shaft, and adjusting the piece M. The bolt is provided with a collar, *j*, where the screw commences, which rests against the bed of the groove in the cam, and when the bolt is turned by apply-

ing a wrench to the projecting head, *n*, the piece M, is either moved out or in as the screw is turned to the right or left. By this means no difficulty will occur in adjusting the piston to pack accurately with the case.

The cams are so arranged that while one piston is passing the butment the other is taking and discharging water by which means a continuous and regular stream is kept up without the use of air chambers.

An important advantage consists in the arrangement of the loose ring piston with the sliding butment, and their connection by means of the hooked projections, *e e*, which is that the piston is free to yield to the force exerted in driving the water before it through *c*, and drawing it in at *b* at the same time, both of which have a tendency to give a backward sliding motion to the piston. By leaving it free to slide backward when subject to these forces it prevents a severe strain on the parts, which has in pumps of similar construction been found a serious obstacle to their successful operation, often causing a destruction of some of the parts by breaking. It can be readily converted into a single acting pump, and used as such without further change than disconnecting the gear wheels P P. This should be done when the cam I, is in such a position that the piston G, closes both the induction and eduction ports of its chamber, as shown at *m m* Fig. 1, when the water will enter the chamber of the operating pump only, without waste or loss of time. Its action as a single pump will be found efficient, and the change being so readily effected, it offers many advantages. Should an accident occur, rendering the working parts of one useless no material loss would ensue, as the other would continue to act independently.

I am aware that annular pistons are and have been employed in rotary pumps, and the use of such I do not claim, except in combination with the described devices for rendering their operation durable and efficient, but

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

1. The construction of the triangular reciprocating butments L, working in groves in the case, *f f*, with arms clasping around the edge and into the annular recesses *d* of the loose piston G, to admit of the butment accommodating itself to eccentric action of the piston without materially obstructing the motion thereof, and at the same time packing against its seat *a*, and the periphery of the piston, by the pressure of the water on its double inclined surfaces *i k*; the parts being arranged and operating substantially in the manner herein described.

2. I also claim the combination and arrangement of the two cylinders or cases A A, cams I, pistons G, and butments L, with the chambers C E, and ports *b b*, and *c c*, whereby the parts will operate conjointly for the purpose described, or either cylinder work independently of the other, substantially as set forth.

B. T. TRIMMER.

Witnesses:
J. FRASER,
S. J. ALLIS.