

O. Palmer
Rotary Pump

No 18,986.

Patented Dec. 29, 1857.

Fig. 2

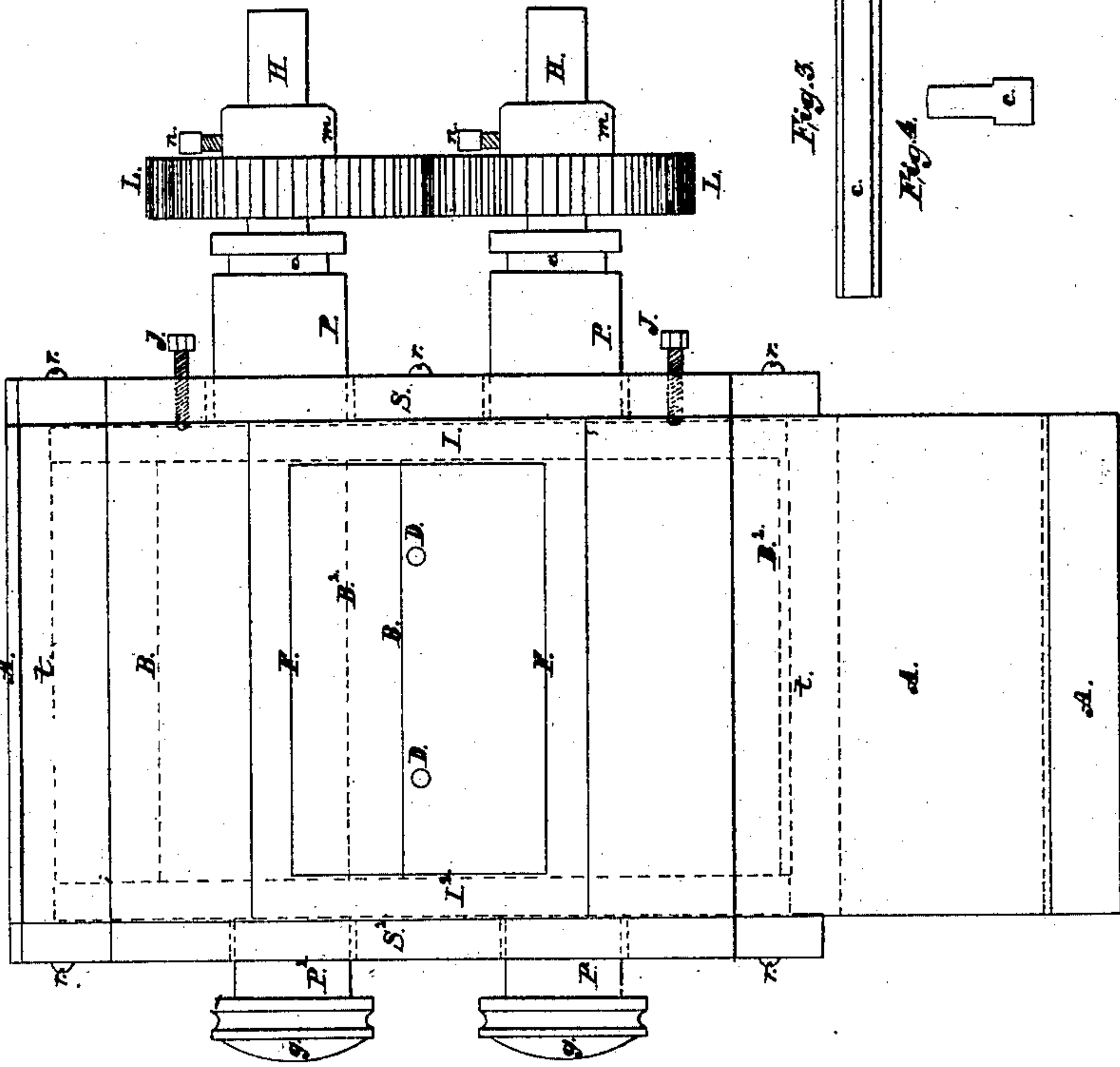


Fig. 3



Fig. 4

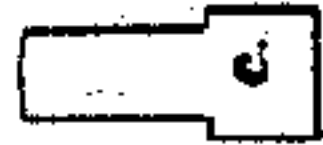
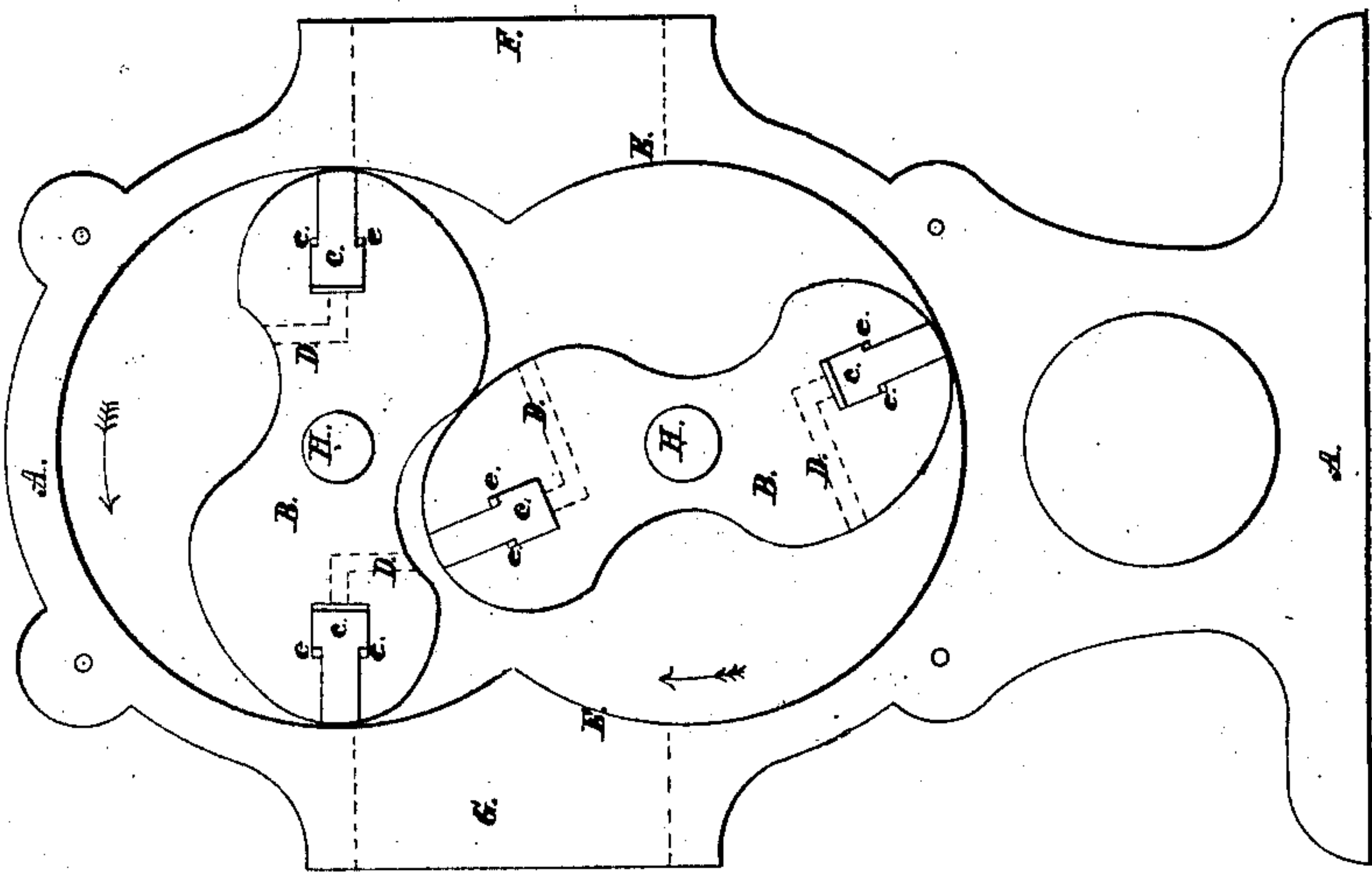


Fig. 1



Attest:

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ROTARY PUMP.

Specification of Letters Patent No. 18,986, dated December 29, 1857.

To all whom it may concern.

Be it known that I, OLIVER PALMER, of the city of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Hydraulic Force-Pumps; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

The nature of my invention relates: 1st, to the construction of two metallic pistons of peculiar form by which I am enabled to construct pistons which will revolve in contact and make a water butment with a less amount of metal and thereby obtain a larger water space in the same diameter of chamber, and also discharge more water by an equal number of revolutions of the pistons than has heretofore been accomplished by any other form of piston known to me. 2d, in supplying the extremities of the pistons with metallic packing which by centrifugal force, will be thrown outwardly, and form an air and water tight packing as between the pistons and the inner periphery of the inclosing case (or cylinder) and at the same time be self compensating, against any deficiency which may be worn from the face of the packing or the case, thereby insuring a good working condition of the pistons, at all times and rendering the pump as perfect, after years of service as when first used. By using this metallic packing in combination with the two revolving pistons, I am enabled to bring the centers of my two pistons nearer together, and thereby diminish their size, and this diminution in the size of the pistons will be compensated by the packing as it is thrown outwardly by centrifugal force against the periphery of the chamber to form the water butment, and this arrangement of the packing not only avoids all friction and wearing as between the pistons, and the inclosing case (or water chamber), but also prevents the pump from clogging or choking, for the reason that if nails, gravel, or other substances are drawn in between the pistons and the chamber, the packing will yield, and allow the obstruction to pass out freely without injury to the pump.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

Figure I, is an end elevation of my improved pump, the head and follower being

removed, to show the pistons. Fig. II, is a side elevation of the same. Fig. III, is a plan of the metallic packing which works in the pistons. Fig. IV, is an end view of the same.

Explanation of Fig. I: A, inclosing case in which the pistons work. This is made of cast iron or other metal, the inside being of a double cylindrical form adapted to the action of the pistons, with openings or ports for the induction and eduction of water. B, B², pistons. These are made of cast iron or other metal and revolve within the case upon separate shafts. Each piston differs slightly from the other in the lines of its periphery, but the periphery of each is convex and concave, and so formed that the two will revolve on their respective shafts, and keep their peripheries in contact, (or sufficiently close to each other for all practical purposes.) In that part of their revolution where the radial lines of each (drawn to the line of contact between them) are equal, the pistons roll upon each other. In all other parts of their revolution where these radial lines are unequal, they slide upon each other. The pistons should not touch the inner periphery of the case as they revolve. A space of say $\frac{1}{16}$ inch or more may be left between them. The object of this is to prevent any wear or friction or clogging between the pistons and the case. This space is supplied by the packing, as it is thrown outwardly by centrifugal force. By adopting this form of piston I gain the following advantages: 1st. I am enabled to construct my pistons with a less amount of metal, and at the same time give them a form, which will allow them to revolve in contact. 2. The pistons will occupy a less space in the inclosing case and consequently give me a larger water space in the same diameter of chamber. 3. I am enabled to discharge more water, by an equal number of revolutions, than has heretofore been accomplished by any other form of piston within my knowledge, and also provide against friction and clogging, as between the pistons and the chamber.

The pistons may be so nicely fitted to each and the case as to be steam tight, then the pump may be used as a steam engine. C, metallic packing. This is made of brass, or other soft metal. It is located in a suitable chamber in the extremities of the pistons. It is allowed to play quite loosely in the chamber so that the centrifugal force created

by the revolution of the pistons will throw the packing outwardly against the inner periphery of the case and thereby secure a water tight contact between the pistons and the case, in all parts of their revolution where the same is required. A shoulder is made on the packing as shown at *e, e*, which corresponds with a projection on the chamber so as to prevent the packing from dropping out when not in contact with the case. It has sufficient play in its chamber so that its centrifugal force will at all times insure its contact with the case (leaving a space behind it to be filled with water) and thereby the packing becomes self-compensating for any deficiency which may be worn from the face of the pistons, the packing, or the case. This packing also enables me to shorten my pistons, and bring their shafts nearer together, so that the pistons will revolve in contact and form a water butment in the central parts of the pump while the packing has sufficient outward movement to supply the space existing between the pistons and the chamber and thereby form a water butment on the periphery.

D, represents port holes, which are made in the pistons to admit water into the chamber in rear of the packing. The water rushes into these port holes, when the packing is thrown by centrifugal force outwardly against the inner periphery of the case, and supplies the vacuum or space in the rear part of the chamber occasioned thereby. The water then serves to hold the packing steadily and firmly against the case, until it has passed the line of contact with the case. As the pistons revolve, so as to bring the packing of one piston in contact with the other piston the packing by such contact is forced back into its chamber and thereby the water is forced out of the chamber through the port holes, and when the packing passes the line of contact with the piston, it is again thrown outwardly by centrifugal force so as to regain its contact with the inner periphery of the case. When the packing drops down to the bottom of the chamber it sets over the port holes so as to prevent any passage of water from the chamber through the port holes, and vice versa and this takes place in all such parts of their revolution where the port holes in connection with the chambers would lead from the suction side of the pump to the vacuum or discharge side thereof, thereby preventing any escape of water through the port holes and chambers from one side of the pump to the other. E, E, line of the inner periphery of the piston cylinder or case. This line also shows the form of the

followers, or head packing. F, opening for suction pipe. G, opening for discharge pipe. H, shafts upon which the pistons revolve.

Explanation of Fig. II: A, case. B, to B, upper piston. B² to B², lower piston. D, D, port holes in lower piston. Similar port holes are made in the opposite face of the upper piston. H, H, piston shafts, being the same shafts upon which the gear wheels work. I, follower, or head packing. The journal box is fastened to this follower. It is cast with it and forms one piece. I², follower, or head packing for the opposite head. The journal box P is cast in one piece with the follower. J, J, set screws. These screws pass through the head plate *s*, and press against the follower I. By means of these screws the follower I, can be adjusted to the ends of the pistons. The piston's shafts are also allowed a lateral movement in their journal boxes so that by turning the set screws, the follower I, may be pressed against the pistons, sufficient to move the pistons laterally, whenever the same shall be required in order to adjust the pistons to the opposite head-packing I², and thereby both followers and pistons may be conveniently adjusted, by the same set screws. F to F, opening or port, for the induction of water. L, L, true circular gear wheels of equal pitch, one on each piston shaft. Power is applied by means of a band and pulley on the upper shaft and these gear wheels will cause both shafts and pistons to revolve with equal and uniform velocity, in all parts of their revolution. M, hub on gear wheels. N, set screws, to fasten wheel on shaft. O, stuffing box. P, journal box. This passes loosely through the head S, and is securely attached to the follower I,—it being cast in one piece therewith. P², journal box. This also passes loosely through the head, S², and is cast with the follower in the same plate. Q, cap for journal box. R, bolts or screws which fasten the heads S and S² to the main case. S, head to main case, next to gear wheels. *s*, head to main case. *t* to *t*, double cylinder or inner periphery of the main case in which the pistons revolve. The pistons revolve in the direction indicated by the arrows.

Claim—

The pistons B, B², constructed as described, in combination with the metallic packing C, operating as described. Said pistons and packing revolving together in the manner and for the purpose set forth.

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Witnesses:

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