

No. 688,616.

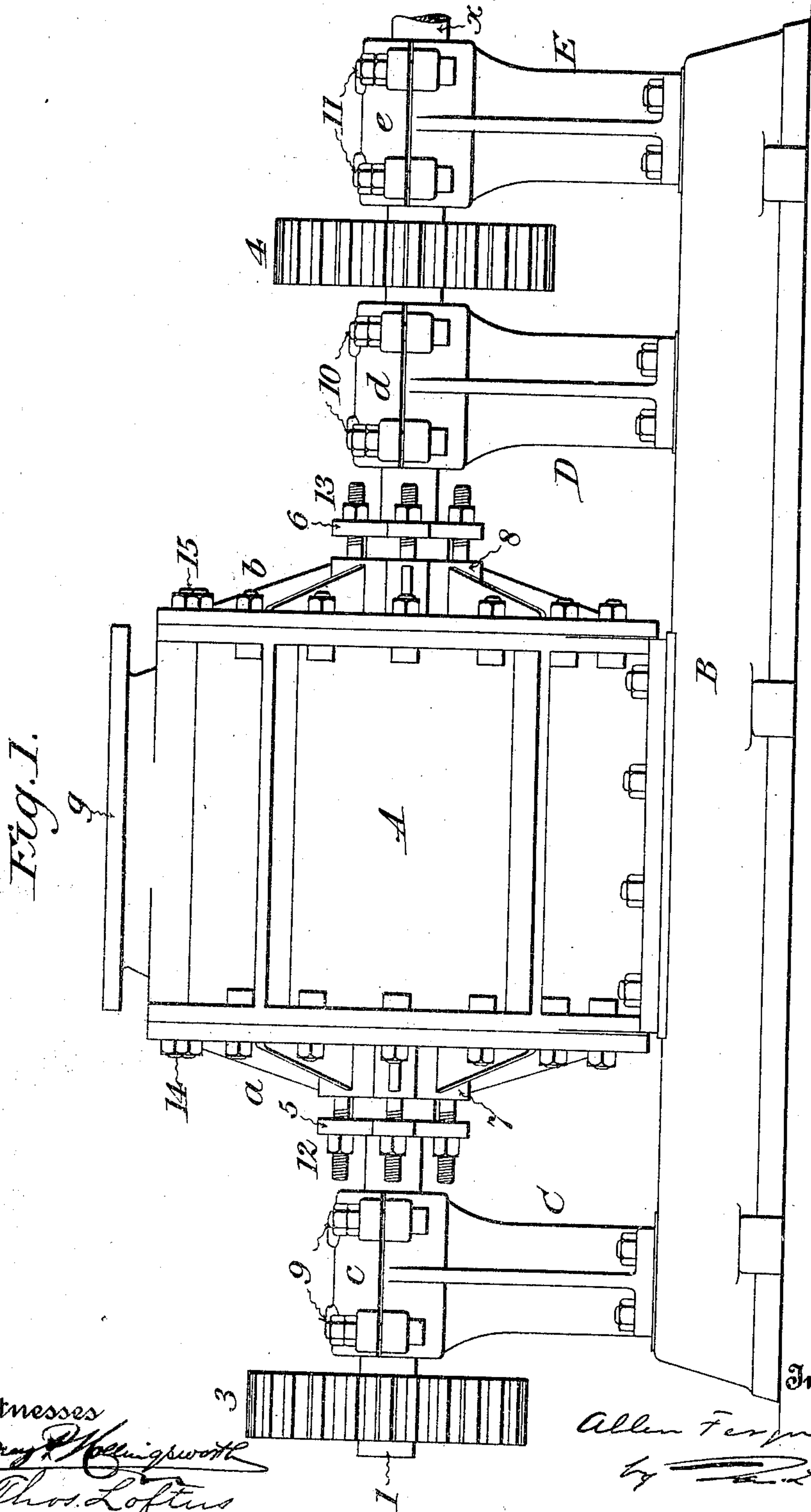
Patented Dec. 10, 1901.

A. FERGUSON.
ROTARY PUMP OR MOTOR.

(Application filed Oct. 9, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
 Edwin H. Hogginsworth
 E. Thos. Loftus

Inventor
Allen Ferguson
by W. L. Lewis
Attorney.

No. 688,616.

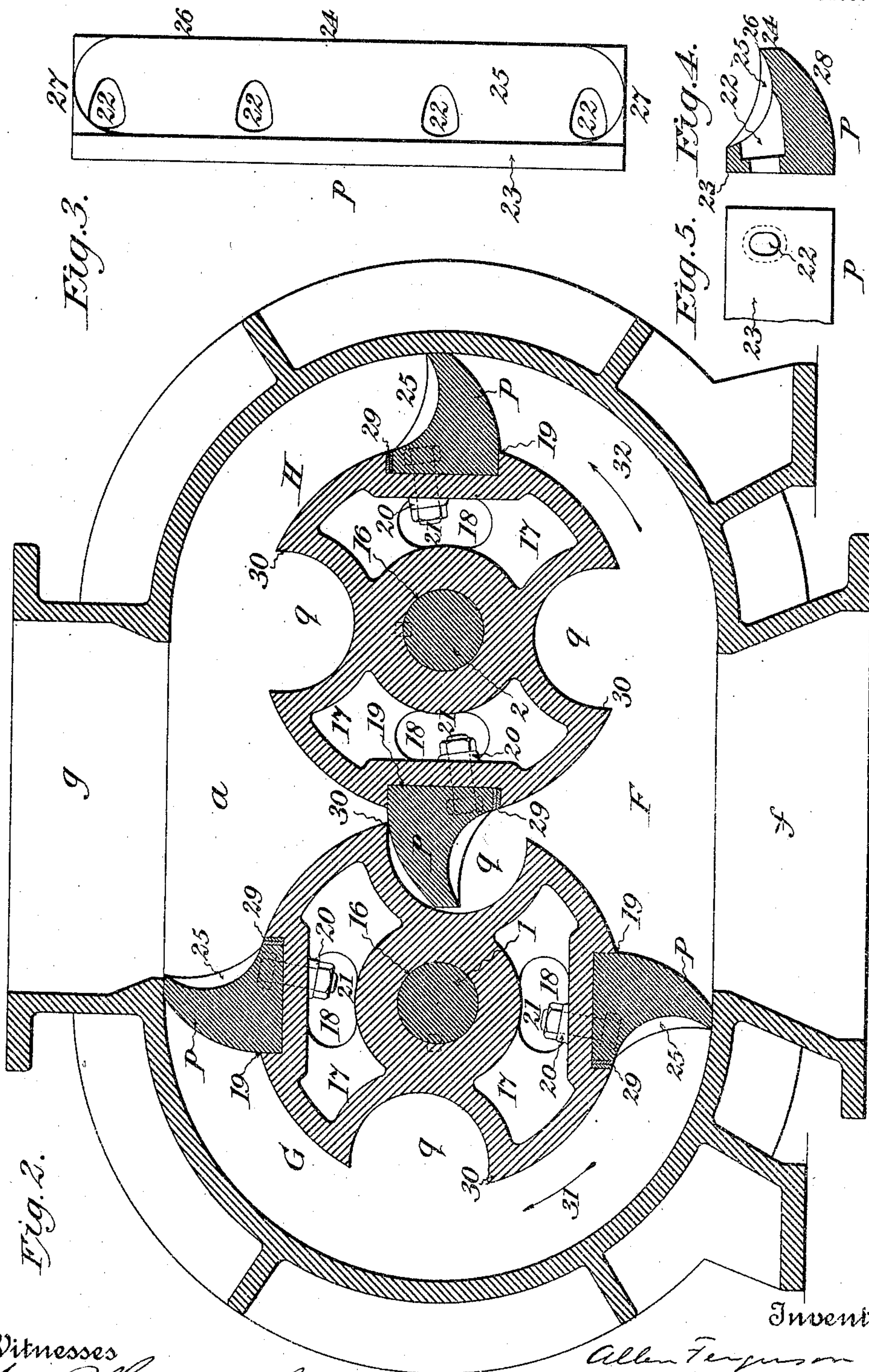
Patented Dec. 10, 1901.

A. FERGUSON.
ROTARY PUMP OR MOTOR.

(Application filed Oct. 9, 1900.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses
Sidney P. Hollingworth
E. D. Loftis

Inventor
Allen Ferguson
by *R. L. Davis*,
Attorney.

UNITED STATES PATENT OFFICE.

ALLEN FERGUSON, OF 1,000 SPRINGS, IDAHO, ASSIGNOR OF THREE-FOURTHS
TO BENJAMIN G. MULLINS, OF BLISS, IDAHO.

ROTARY PUMP OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 688,616, dated December 10, 1901.

Application filed October 9, 1900. Serial No. 32,522. (No model.)

To all whom it may concern:

Be it known that I, ALLEN FERGUSON, a citizen of the United States of America, and a resident of 1,000 Springs, Lincoln county, (Hagerman P. O.,) in the State of Idaho, have invented a new and useful Improvement in Rotary Pumps or Motors, of which the following is a specification.

This invention relates to double-piston rotary pumps that are adapted to be used alternatively as hydraulic motors.

The invention consists in certain novel features of construction involving peculiar combinations of parts hereinafter set forth and claimed.

The objects of the invention are to reduce to the utmost the wear of the working parts and to facilitate adjusting and replacing the same when worn, thus adapting the pump or motor to be advantageously employed where the water to be propelled or utilized is liable to be loaded with sand or grit, as in the operations of hydraulic mining.

Two sheets of drawings accompany this specification as part thereof.

Figure 1 of the drawings is a side elevation of the improved pump or motor in a form in which it has been practically used. Fig. 2 is a central vertical section through the piston-casing and pistons. Fig. 3 is a front elevation of one of the piston-blades. Fig. 4 represents a cross-section of a piston-blade through either of its bolt-holes, and Fig. 5 represents a back view of one end of the blade.

Like letters and numbers refer to like parts in all the figures.

In the improved pump or motor, as represented by Fig. 1, a three-part casing A is supported centrally upon a horizontal base B, the top of which is further provided with pillow-blocks C and D on the respective sides of the casing A to support a pair of rotary shafts 1 and 2 and with an additional pillow-block E at the power or driving end *x* of the shaft 1. The power or driving end *x* of the shaft 1 may be connected with a suitable motor or with the machinery to be operated in any known or improved manner. The two shafts are connected with each other on both sides of the casing A and preferably beyond

the pillow-blocks C and D by spur-gearing 3 and 4 and extend through glands 5 and 6 and stuffing-boxes 7 and 8 in the respective end plates *a* and *b* of the casing A. The casing A and pillow-blocks C, D, and E are rigidly bolted to the base B, and the caps *c*, *d*, and *e* of said pillow-blocks are removably held in place by bolts 9, 10, and 11, respectively. The glands 5 and 6 are adjustable by bolts 12 and 13, respectively, and the end plates *a* and *b* are removably attached, respectively, by bolts 14 and 15.

The water-chamber F, Fig. 2, within the casing A communicates at top and bottom with the interiors of flanged necks *f* and *g*, which are coupled water-tight to pipes, (not shown,) either of which may be the inlet-pipe. Within said chamber F the pistons G and H, Fig. 2, preferably of one and the same pattern, are keyed fast on the shafts 1 and 2, respectively, being constructed as follows: The body of each piston is a chambered casting having an axial bore 16 and a pair of longitudinal chambers 17 with hand-holes 18 in both ends on opposite sides of said bore. Externally each piston-body is constructed with a pair of sunken seats 19, and bolt-holes 20 extend with a slight slant from said seats through bosses within the chambers 17. The bolts 21, Fig. 2, thus provided for are accommodated by offset bolt-holes 22, Figs. 3, 4, and 5, in piston-blades *p*, a pair to each piston, which are fastened in said seats 19 by means of said bolts 21 and project rigidly diametrically opposite each other on each piston. Each of the blades *p* has a rectangular base 23, Figs. 3, 4, and 5, fitted to either of the blade-seats 19, so as to be interchangeable. Opposite the bottom of the base 23 is a peripheral surface 24, which is lathe-turned concentric with the bore 16 of the piston, and thus concentric with its shaft. The face 25 of each blade is concaved from the square edge of the base 23 to the peripheral surface 24, as shown in Figs. 2 and 4, and also from end to end, as shown in Fig. 3, sharp outer edges being formed at said peripheral surfaces, as shown at 26, Figs. 3 and 4, and also at both ends of each blade, as shown at 27 in Fig. 3. The back 28 is appropriately rounded to adapt the blades to coact with rounded

"gaps" *q*, Fig. 2, a pair of which are formed in each piston diametrically opposite each other and substantially equidistant between the blade-seats 19 to coact with the blades of the opposing piston.

Owing to the construction of the piston-blades *p*, above described, as regards their concave faces 25 and sharp edges 26 and 27, the improved pump or motor is adapted to work with water carrying a large percentage of sand or grit with a minimum of wear, the tendency of the blades to throw the sand or grit tangentially outward being thus effectively counteracted and also the tendency of the sand or grit to work in between the ends of the blades and the end plates *a* and *b* of the casing *A*. Wear of the piston-blades exceeding that of the remainder of the pump or motor is, however, inevitable, and this is further provided for by elongating the bolt-holes 22 from front to rear, as shown in Fig. 5, and by widening the blade-seats 19, so as to accommodate within them at the front of each blade a pair of adjusting-plates 29, Fig. 2, driven tightly into the seats 19. When it becomes necessary to adjust the plates by setting them out, this is done by loosening the bolts 21, placing a thin sheet of metal under each blade, and transferring one of the adjusting-pieces 29 from in front of the blade to behind the same. The adjusted blade will then have the same relation to the matching gap *q* as before its adjustment, while it will be tightened with reference to the coacting end of the chamber *F* concentric with the piston. Access to the piston-blades and their appurtenances for such adjustment or for renewal is conveniently afforded by the removably-attached end plates *a* and *b* and by the hand-holes 18 in the ends of the chambered pistons.

To prevent the piston-blades *p* from compressing the water within the gaps *q*, the lat-

ter are so formed that their walls touch the respective blades only at one point 30, Fig. 2, in each gap, being relieved from this point to the other extremity of the gap. The points of the blades *p* do not touch within the gaps *q*.

Employed as a pump the improved pump or motor receives the water through the neck *f*, and the pistons *G* and *H* turn, respectively, in the directions represented by the arrows 31 and 32 in Fig. 2.

In smaller sizes the piston-castings may be solid except their axial bores 16, tap-bolts or screws taking the place of the bolts 21, and other like modifications will suggest themselves to those skilled in the art.

Having thus described said improvement, I claim as my invention and desire to patent under this specification—

1. In a pump or motor, the combination with a casing comprising removably-attached end plates, a shaft and an opposing piston adapted to coact therewith, of a piston having a chambered body with hand-holes in its ends, peripheral piston-blade seats and bolt-holes extending into said chambers, piston-blades fitted to said seats, and blade-attaching bolts occupying said bolt-holes.

2. In a pump or motor, the combination with a casing and shaft and with an opposing piston adapted to coact therewith, of a piston fast on said shaft and provided with peripheral blade-seats, piston-blades fitted to said seats, a pair of adjusting-pieces within each seat in front of the blade, and bolts adjustably fastening each blade in its seat, said blades having offset bolt-holes elongated from front to rear to receive said bolts, substantially as hereinbefore specified.

ALLEN FERGUSON.

Witnesses:

B. G. MULLINS,
A. I. MCMAHON.