

Aug. 26, 1924.

W. F. TRAUDT

1,505,982

ROTARY PUMP

Filed June 16, 1921

2 Sheets-Sheet 1

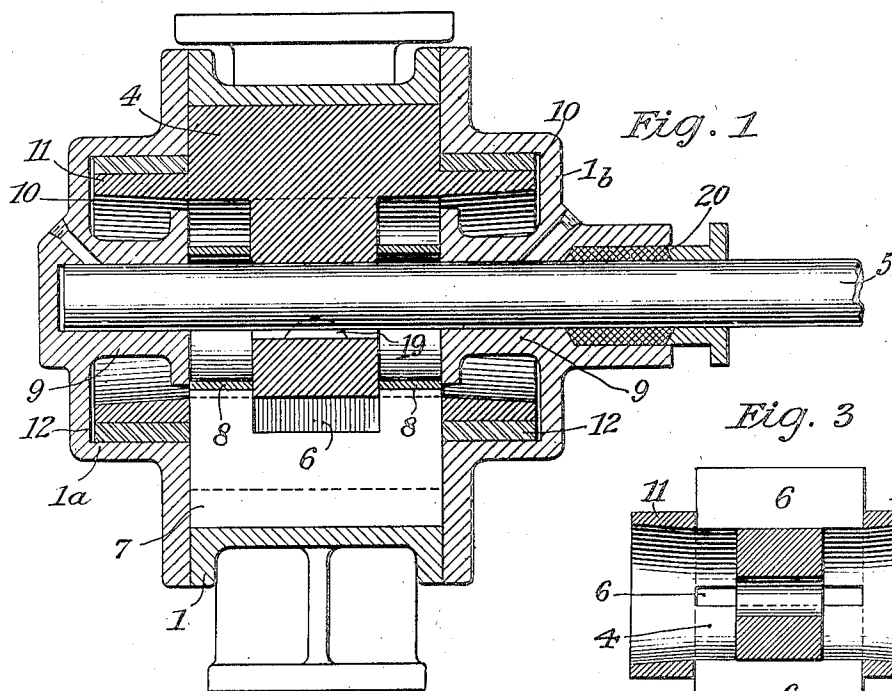
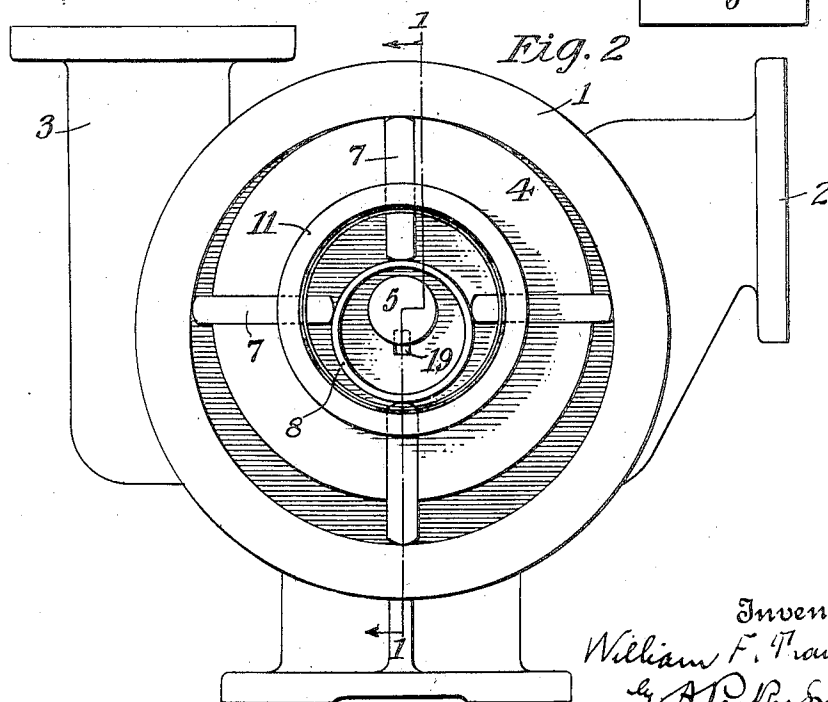
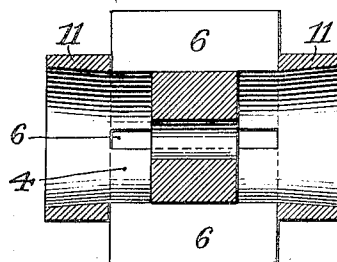


Fig. 3



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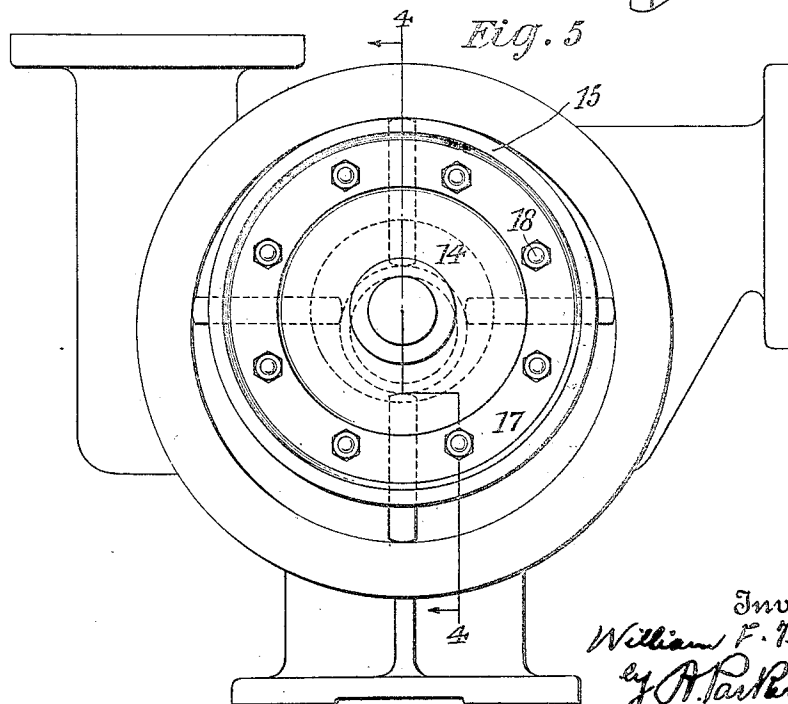
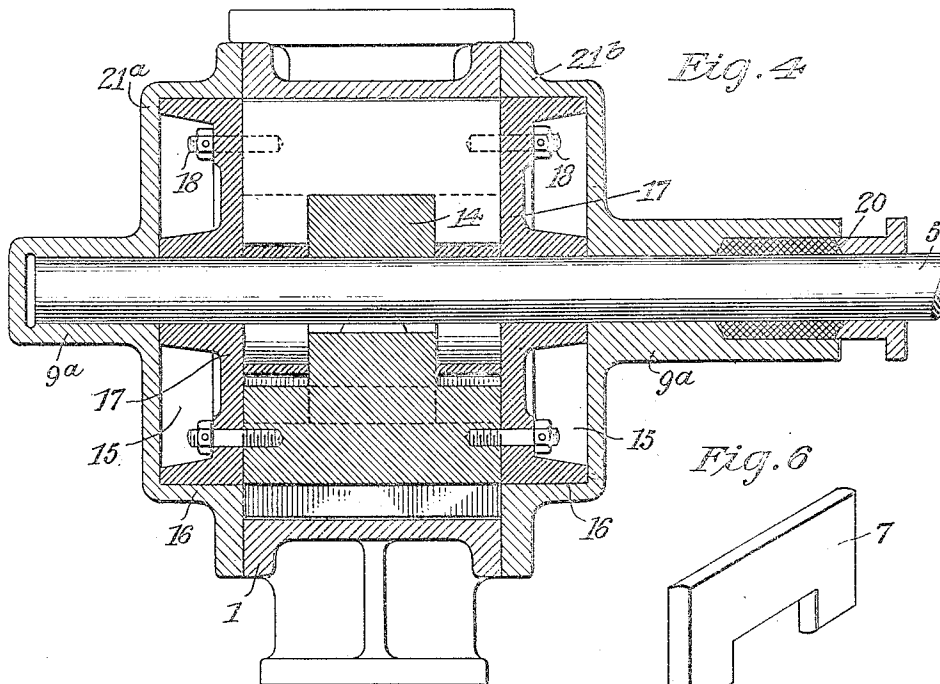
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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ROTARY PUMP.

Application filed June 16, 1921. Serial No. 477,927.

To all whom it may concern:

Be it known that I, WILLIAM F. TRAUDT, a citizen of the United States of America, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

My invention relates more specifically to rotary pumps of the type in which radially sliding valves are carried in radial slots in a rotor set eccentrically to the cylindrical casing of the pump and in which said valves are forced out into contact with the cylindrical wall of the casing by means of a pair of rings located between the oppositely disposed valves and floating between the rotor and the casing. In pumps of this type the rotor is necessarily carried by a portion of the shaft on which it is mounted, separated some distance from the journal bearings for said shaft, which are necessarily outside of the spacing rings. As a result, the back pressure of the fluid being delivered by the pump, which exerts a considerable unbalanced pressure upon one side of the rotor at all times, tends to bend the shaft and subjects it and the journal bearings for the shaft, to destructive stresses. My invention overcomes this difficulty by providing large circular bearing recesses in the heads of the casing and providing the rotor with projecting hubs or flanges which revolve in said bearings and take up all the radial stresses to which the rotor is subjected in the operation of the pump, leaving the shaft the sole duty of transmitting torsional forces to said rotor.

The best form of apparatus embodying my invention at present known to me, together with one modification thereof, are illustrated in the accompanying two sheets of drawings, in which—

Fig. 1 is a broken section on line 1—1 of Fig. 2.

Fig. 2 is an end view of Fig. 1 with the left-hand head or cover of the casing shown in Fig. 1, removed.

Fig. 3 is a detailed axial section of the pump rotor on a reduced scale, the section

line passing through the slots for one pair of the opposed valves.

Fig. 4 is a section similar to Fig. 1, showing a modification.

Fig. 5 is an end view of Fig. 1, with the left-hand casing cover removed; and

Fig. 6 is a perspective view of one of the buckets on a reduced scale.

Throughout the drawings like reference characters represent like parts.

1 represents the main body of the pump casing, of cylindrical form and having the inlet connection 2 and the outlet connection 3 formed integrally therewith.

1^a is the left-hand cover or head of the casing, and 1^b is the right-hand cover or head (looking at Fig. 1) through which latter head the shaft 5 carrying the cylindrical rotor 4 extends. This rotor and its shaft are set eccentrically of the cylindrical interior of the casing and the shaft is provided with the usual journal bearings 9, 9, in the heads 1^a and 1^b. 6, 6, are the usual radial slots in the rotor 4, in which are placed the radially sliding valves or buckets 7, 7, which are held out into contact with the cylindrical wall of the casing by spacing rings 8, 8, which float between the reduced central portion of the rotor and the casing heads. The structure so far as above described, is in common use and of itself forms no part of my invention.

In the form of my invention shown in Figs. 1, 2 and 3, as applied to the foregoing type of pump, I provide circular recesses 10, 10, in the casing heads 1^a and 1^b, which are concentric with the shaft 5 but of considerably larger diameter, and I provide the rotor with cylindrical hubs 11, 11, which project into the before mentioned recesses and rotate therein on the removable anti-friction ring-shaped members 12, 12, which may be made of bronze or of softer anti-friction metal. These hubs 11, 11, serve as enlarged journals for the rotor.

In the operation of this form of my invention the rigid hubs 11, 11, running in the bearings provided for them in the casing heads, will evidently absorb all radial stresses applied to the rotor 4, and provide

broad journal bearings therefor so that the shaft 5 is relieved of all radial or bending strains and is relieved of all duty except that of rotating the rotor with which it is connected by key 19. In other words, the sole duty of the shaft 5 is to transmit the torsional forces delivered to it by the prime mover (not shown) to the rotor 4, and if desired the shaft 5 may run free in its journals 9, 9, without touching the same, the stuffing box 20 serving to prevent the escape of fluid from the pump casing.

In the modification of my invention shown in Figs 4, 5 and 6, the reentrant journal bearings 9, 9, for the shaft shown in Fig. 1, are replaced by the exterior journal bearings 9^a, 9^a, and the rotor 14 instead of having hubs cast integral with it, as shown at 11, 11, in Fig. 3, is provided with removable hubs or flanges 17, 17, which are bolted to it by bolts 18, 18. These larger hubs or flanges revolve in larger journal bearings 16, 16, formed in the larger recesses 15, 15, in the casing heads 21^a and 21^b. In this form of my invention the large hubs or journals 17, firmly bolted to the rotor, absorb all the radial stresses applied to the rotor 14 and again relieve the shaft 5 of all duty except that of transmitting the torsional forces to revolve the rotor.

The advantages of my invention comprise the reduction of friction of the moving parts, due to the large and true-running bearings, the saving of wear and tear on the pump by the elimination of bending strains on the parts, and the resulting efficiency of the pump secured by reduction of slip of the fluid being pumped because of the accurate fitting together of all the parts during the pump operation.

It is evident that my invention would develop similar advantages if the apparatus described were turned into a motor by delivering fluid under pressure to its inlet connection, and that various other modifications of the shape of the parts might be made without departing from the principle of my invention, so long as the mode of operation therein described is preserved.

It is also evident that the invention might be applied to forms of rotary pumps in which the valves are not held out into contact with the casing by spacing rings, as here shown, but are so held out into such contact by other means.

One advantage of the use of the removable bearings 12, 12, arises from the possibility

of replacing them with new ones as soon as they become so worn down as to prevent them performing their proper functions.

Having described my invention, I claim:

1. In a rotary pump, or the like apparatus, comprising a cylindrical casing, a cylindrical rotor mounted eccentrically in said casing, on a shaft extending out through one head of the casing, suitable valves mounted in radial slots in said rotor, and a pair of spacing rings for said valves floating between the rotor and the casing, the combination, with said apparatus, of a pair of ring-shaped bearings in said casing of considerably larger diameter than said shaft but concentric therewith and journals on said rotor adapted to project into and revolve in said bearings.

2. In a rotary pump, or the like apparatus, comprising a cylindrical casing, a cylindrical rotor mounted eccentrically in said casing on a shaft extending out through one head of the casing, suitable valves mounted in radial slots in said rotor and a pair of spacing rings for said valves floating between the rotor and the casing, the combination, with said apparatus, of a pair of ring-shaped bearings in said casing of considerably larger diameter than said shaft but concentric therewith and journals on said rotor adapted to project into and revolve on said bearings, together with a removable anti-friction member interposed between each journal and its bearing.

3. In a rotary pump, or the like apparatus, comprising a cylindrical casing, a cylindrical rotor placed in said casing eccentrically thereof, said casing having heads provided with cylindrical recesses concentric with the rotor, a shaft journaled in the casing and connected to the rotor centrally thereof, suitable valves mounted in radial slots on the rotor and cooperating with the casing, and a pair of spacing rings for said valves floating between the rotor and casing, the combination, with the above recited apparatus, of a pair of annular hubs extending one from each end of the rotor and into the cylindrical recess in the cooperating casing head, and a pair of removable journal bearings for said hubs mounted in said head recesses, whereby said shaft is relieved of all bending strains which might otherwise arise from the necessary overhang of said shaft beyond its journal bearings and is required to transmit only torsional forces to said rotor.

WILLIAM F. TRAUDT.