Feb. 21, 1950 L. F. CLERC 2,498,029

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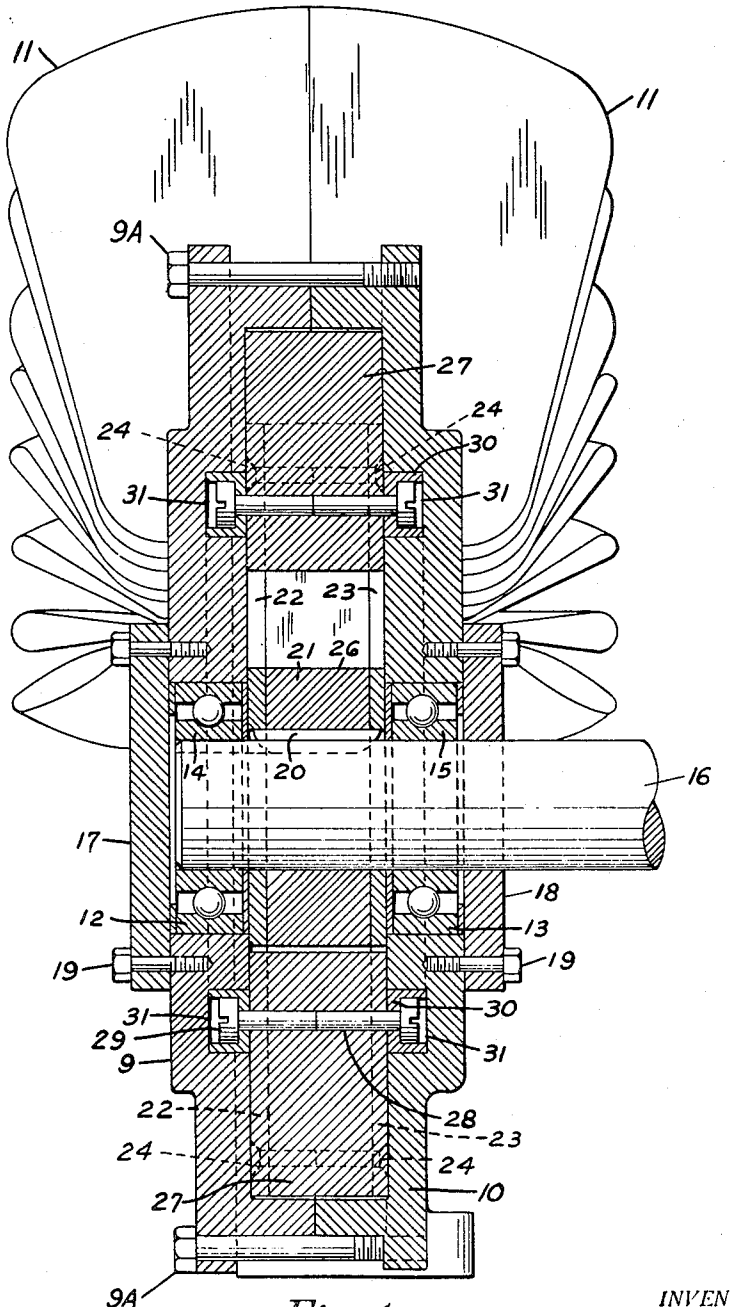


Fig. 1

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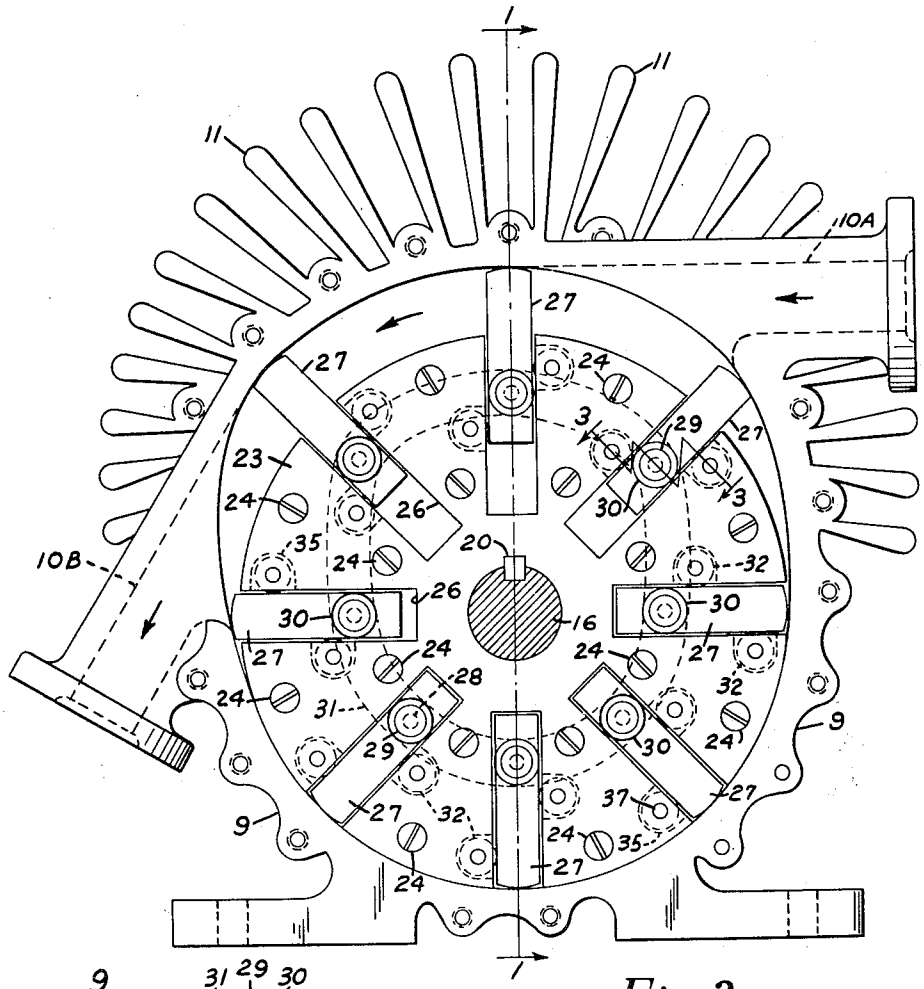


Fig. 2

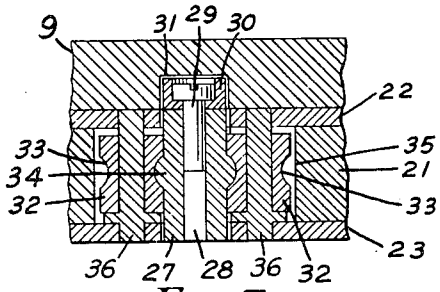


Fig. 3

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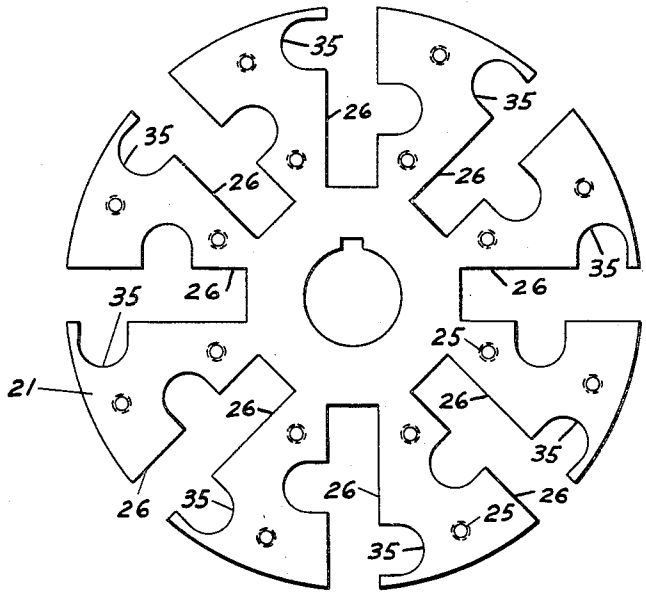


Fig. 4

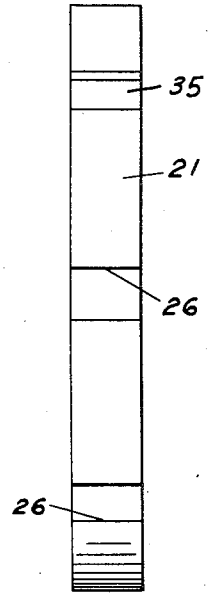


Fig. 5

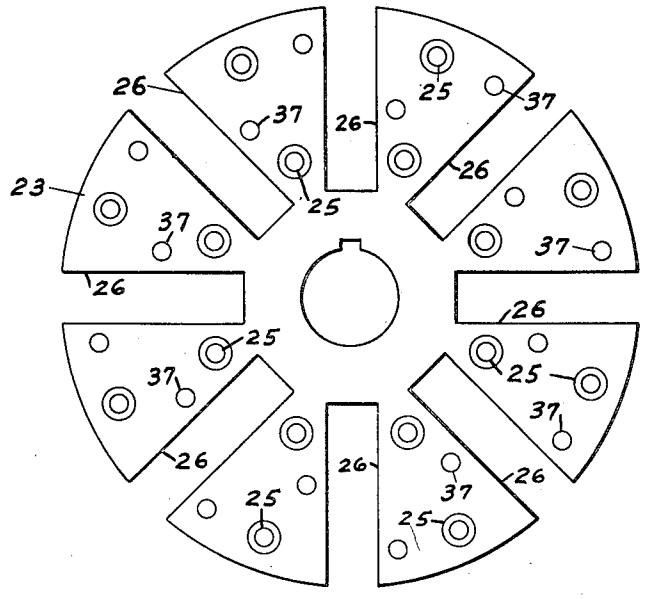


Fig. 6

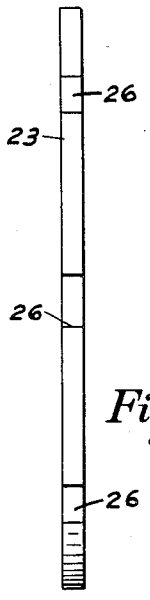


Fig. 7

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UNITED STATES PATENT OFFICE

2,498,029

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Leonard F. Clerc, Nutley, N. J.

Application December 13, 1945, Serial No. 634,745

5 Claims. (Cl. 230—152)

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This invention relates to pumps, and has particular reference to a rotary pump using reciprocating vanes.

An object of the invention is to generally improve rotary pumps and to provide a device of the character indicated, which is simple in construction, economical to manufacture, and highly efficient in operation.

Another object of the invention is to provide a rotary pump with integral cooling elements constructed and arranged to effectively dissipate the heat generated during operation.

Another object of the invention is to provide a rotary pump which has cooling fins constructed and arranged with walls of outwardly increasing cross sectional areas.

Another object of the invention is to provide a device of the character indicated, which is provided with reciprocating vanes and balanced cam means for positively moving the vanes.

A further object of the invention is to provide a pump of the character indicated, in which the vanes are positively held in predetermined position during the work cycle.

A further object of the invention is to provide a rotary pump which is constructed and arranged so that in operation, there is an impact action at the moment of intake on the leading side of the vanes followed by the creation of a vacuum immediately after on the trailing side of the vanes.

The foregoing and other objects and advantages of the invention will appear as the description proceeds, reference being made from time to time to the accompanying drawings forming part of the within disclosure, in which drawings:

Fig. 1 is a vertical section through a device embodying my invention taken substantially on the line 1—1 of Fig. 2.

Fig. 2 is a side elevational view of the device illustrated in Fig. 1, with one-half of the housing removed and showing the shaft in section.

Fig. 3 is a section taken substantially on the line 3—3 of Fig. 2.

Fig. 4 is a front elevational view of the center plate of the rotor.

Fig. 5 is a side elevational view of the plate illustrated in Fig. 4.

Fig. 6 is a front elevational view of one of the outer plates of the rotor.

Fig. 7 is a side view of the plate illustrated in Fig. 6.

Referring now more particularly to the drawings, it will be understood that in the embodiment herein disclosed, my device consists of a housing comprising matched plates 9 and 10, which are

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secured together by means of machine screws 9A, and in which are formed inlet and outlet passageways 10A and 10B (Fig. 2).

Each of the plates 9 and 10 is provided with a plurality of radial fins 11 which are cast integrally therewith, and which are formed with a comparatively thin cross sectional area at the point of attachment to the plates 9 and 10, and a comparatively thick cross sectional area at their free ends, with the result that the heat generated during the operation of the pump is more easily dissipated.

The plates 9 and 10 have central openings 12 and 13, adapted to accommodate bearings 14 and 15, in which is mounted for rotation a shaft 16.

Plates 17 and 18 are secured over the openings 12 and 13 to prevent displacement of the bearings 14 and 15. The plates 17 and 18 are secured to the housing members 9 and 10 by means of machine screws 19.

Keyed to the shaft 16 as at 20 is a rotor consisting of a comparatively thick center plate 21 and outer plates 22 and 23, which are secured together by means of counter-sunk machine screws 24, which engage suitable apertures 25 formed in the plates.

The rotor is provided with a plurality of radial slots 26, in which are adapted to reciprocate vanes 27. Each vane 27 has a transverse bore 28 adapted to accommodate shafts 29 on the ends of which are secured for rotation rollers 30. The rollers 30 are arranged to travel in cam slots 31 formed on the inside of each of the housing members 9 and 10 so that the vanes 27 are positively reciprocated in the slots 26.

In addition to the rollers 30 carried on the vanes 27, I provide a plurality of rollers 32 (Figs. 2 and 3) which serve as frictionless guides for the vanes 27. The rollers 32 are positioned on each side of the vanes 27. Each roller 32 has a peripheral groove 33 (Fig. 3) adapted to engage a longitudinal rib 34 formed on the vanes 27. The rollers 32 are adapted to rest in recesses 35 formed in the plate 21, and are secured in position by means of pins or shafts 36 which engage apertures 37 formed in the rotor plates 22 and 23.

It will be noted that the rollers 32 are in staggered relation to each other, one of the rollers being positioned near the front end of the vane slots 26 on the trailing side thereof as shown in Fig. 2.

As the rotor is moved in the direction shown by the arrow (Fig. 2), each vane 27 receives a charge of fluid as it approaches the inlet passageway 10A. At this moment, there is an impact action on the

leading side of the vane 27, which is followed immediately by the creation of a vacuum on the trailing side thereof as the vane 27 is advanced across the intake opening 10A.

The intake opening 10A is of such proportion that a vacuum may be formed simultaneously behind two vanes during their travel across the intake opening 10A. The fluid is carried ahead of each vane from the intake 10A to the outlet 10B, where it is discharged from the pump under a comparatively high pressure.

Inasmuch as the vanes 27 are positively moved in and out of the vane slots 26, I am able to maintain a slight clearance between the ends of the vane 27 and the inner periphery of the housing, which insures longer life and greater efficiency of the device. The positive movement of the vanes 27 in the vane slots 26 is made easier and with reduced frictional contact because of the guide rollers 32.

It will be seen that the vanes 27 are further balanced on opposite sides by means of the rollers 30 traveling in the cam slots (Figs. 1 and 3).

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. In a device of the character described, the combination of a housing comprising matched plates, fan shaped radial fins on each of said plates, a rotor in said housing, said rotor comprising an immediate plate and two face plates having radial vane slots therein, vanes in said slots, rollers on said vanes, and a cam slot in each of said housing plates adapted to engage said rollers, recesses in said intermediate plate and rollers in said recesses adapted to guide said vanes, said face plates being adapted to retain said last named rollers.

2. The combination defined in claim 1, including longitudinal ribs on said vanes adapted to engage peripheral grooves on said last-named rollers, and peripheral grooves on said rollers.

3. In a device of the character described, the combination of a housing comprising matched plates, said housing having an inlet and an outlet opening, fan shaped radial fins on each of said plates surrounding the area of said openings, a rotor in said housing, said rotor comprising an intermediate plate and two face plates, radial slots in said plates, vanes in said slots, rollers on said vanes, a cam slot in each of said housing plates adapted to engage said rollers, recesses in said intermediate plate and rollers in said recesses adapted to guide said vanes, said face plates having transverse bores, and shafts on said last named rollers, arranged to engage said bores.

4. A structure as defined in claim 3 in which the inlet and outlet each has an area approximately equivalent to the space between two adjacent vanes, and the outlet is positioned tangentially to the rotor.

5. The structure defined in claim 3 in which the outlet port is removed from the inlet port a distance substantially equivalent to the distance between the ends of a pair of adjacent vanes.

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