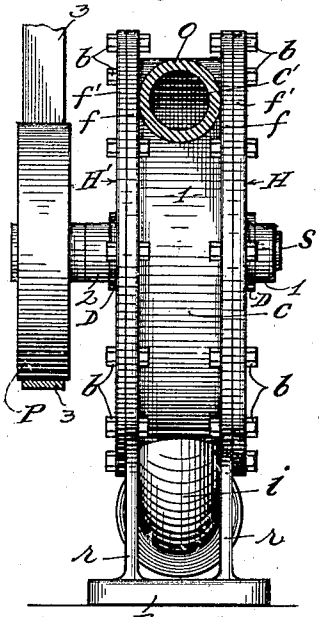
Aug. 28, 1923. 1,466,068

F. C. SMITH

ROTARY PUMP

Filed May 10, 1921

Fig.3



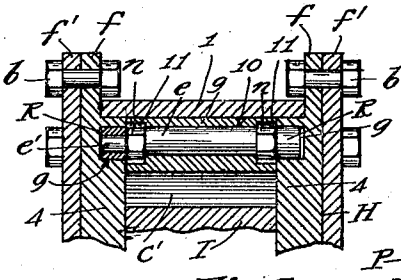


Fig.5

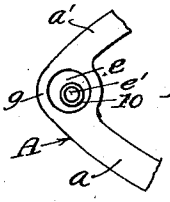


Fig.6

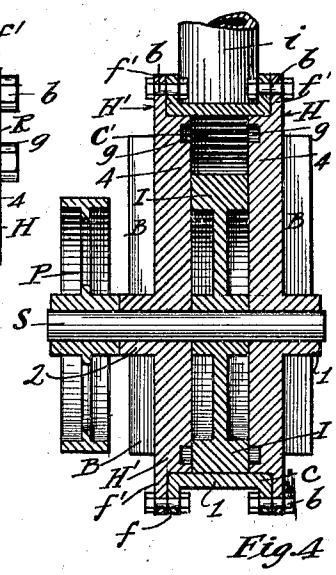


Fig.4

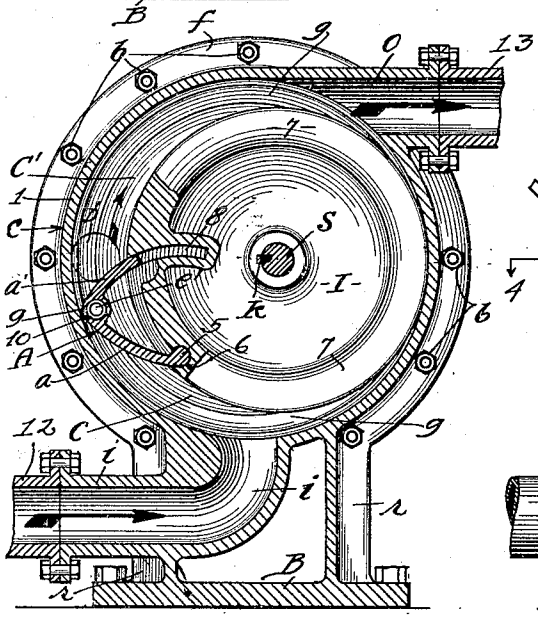


Fig.2

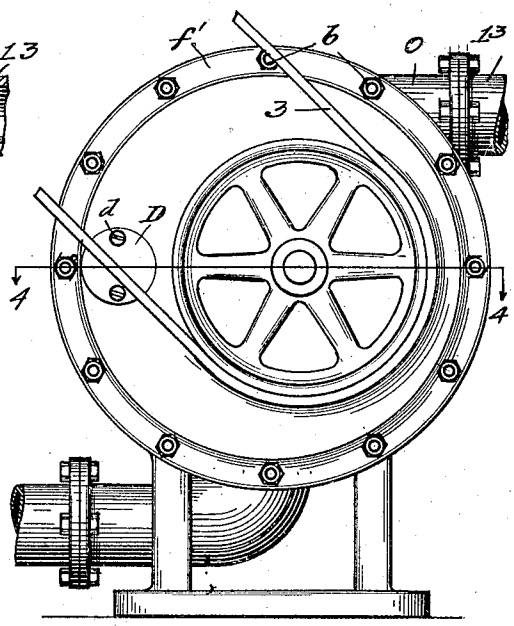


Fig.1

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Patented Aug. 28, 1923. 1,466,068

UNITED STATES PATENT OFFICE.

FRANK C. SMITH, OF LOS ANGELES, CALIFORNIA.

ROTARY PUMP.

Application filed May 10, 1921. Serial No. 468,373.

To all whom it may concern:

Be it known that I, FRANK C. SMITH, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to rotary pumps, and the main object is to provide a simple and effective form of pump capable of use for light or heavy duty, and embodying a stationary casing having detachable heads, and an eccentrically mounted impeller in said casing, intermediate said heads, whereby a crescent shaped chamber will be provided in said casing between the inner wall thereof and the impeller, through which a fluid may be moved as in other types of pumps.

More particularly, it is an object of my invention to provide in a pump of the character described, a casing having a cylinder with detachable heads, an impeller shaft eccentrically mounted with respect to said cylinder, and an impeller fixed to said shaft and concentric therewith, but eccentric with respect to the cylinder. It is also an object to provide in the ends of the cylinder, annular grooves concentrically formed with respect to the cylinder and eccentric with respect to the impeller, and one or more impeller blades adjustably supported on the impeller and having trunnions or other device extending into said grooves whereby said blade may be moved inwardly and outwardly from the periphery of the impeller during the rotation thereof, so as to maintain permanent contact with the inner periphery of the cylinder, and thus create suction in the space between the cylinder periphery and the periphery of the impeller, for inducing a fluid into the pump and discharging the same therefrom.

Other minor objects will appear as the description progresses.

Fig. 1 is a side elevation of my improved pump.

Fig. 2 is a sectional elevation of the same, on a plate at right angles to the axis of the pump.

Fig. 3 is an end elevation of the same.

Fig. 4 is a sectional plan on line 4—4 of Fig. 1.

Fig. 5 is a fragmentary section of the pump, showing details of the structure; and Fig. 6 is a fragmentary view of the impeller blade, showing the details thereof.

Briefly described my improvements consist of a cylinder C, provided with a base B, detachable cylinder heads H and H′ and an impeller I operatively mounted on a shaft S and having an adjustable vane A supported thereon for operation within the cylinder.

The cylinder C has an annular wall 1, with flanges *f*, *f*, integrally formed with said wall, and at the ends thereof, an inlet *i* at the bottom and an outlet O at the top, said inlet being approximately on the vertical center line of the cylinder and said outlet being tangentially disposed relative to said cylinder.

The base B, which may or may not be integrally formed with the cylinder, but is shown as such, may have ribs *r*, *r*, connecting the flanges *f*, *f*, with the base B, or otherwise formed as may be desirable or convenient.

The cylinder heads H, and H′ have flanges *f′*, *f′*, formed thereon, corresponding to and adapted to be attached to the flanges *f*, *f*, on the cylinder C by means of bolts *b*. The heads H and H′ have bearings 2 and 2 respectively, which are adapted to receive the shaft S, and the impeller I is fixed to said shaft by means of a key K, between said heads and one end of said shaft is provided with a driving pulley P which may be operated from a source of power by means of a belt 3. The central portions 4, 4, of the heads are extended inwardly from the flanges *f′*, *f′*, into the bore of the cylinder C, and a crescent shaped space C′ is provided within said cylinder between the inner periphery of the cylinder and the outer periphery of the impeller I. This crescent shaped space C′ is due to the fact that the shaft S is eccentrically mounted in the pump with respect to the cylinder C, the center of the cylinder and the center of the shaft being spaced substantially apart, but it will be understood that the impeller I is concentrically formed with respect to the shaft S.

The extended portions 4, 4, of the cylinder heads H and H′ are provided with annular grooves *g*, *g*, formed thereon in alinement, transversely across the pump. These grooves are concentrically formed in the cylinder at a point near the inner periphery thereof, and constitute guides for the impeller, as herein-

after described. The vane A is composed of two segments a and a' integrally formed. The segment a having an enlargement 5 on its inner end adapted to seat in a corresponding recess 6 on the enlarged portion 7 of the impeller I, and is pivotally held in said recess. The portion a' of said vane is arcuate in form, and is laterally disposed relative to the axis of the portion 5 of the vane, and is adapted to seat in a correspondingly formed recess 8 in the impeller. At the junction of the portions a and a', the vane is slightly enlarged, as at 9, and is adapted to receive and hold a bolt 10, which in the form of a device shown has a central enlarged and eccentric portion e, with extended ends e', e', which may carry rollers R, R. Said rollers correspond in diameter to the width of the grooves g, and the portions of the bolt 10 at the ends of central portion e may be threaded and provided with nuts N, N, which are adapted to seat in recesses 11, 11, formed in the portion 9 of the vane.

Thus, it will be possible to adjust the rollers R, R, relative to the sides of the grooves g, g, by turning the bolt within the portion 9 when the nuts N, N, are loosened, and thereafter tightening said nuts so as to hold the peripheries of said rollers into close engagement with the outer sides of said grooves and the outer surface of the portion 9 of the vane, into contact with the wall 1 of the cylinder.

It will be understood that I may omit the rollers R, R, if desirable, and in lieu thereof form the grooves g, g, to correspond with the ends e', e' of the bolt 10, and I may also provide other means for adjusting the trunnions e', e' with respect to the grooves, and the vane A with respect to the cylinder wall. I do not consider this material to my invention and several means for accomplishing this result will readily appear to one skilled in the art.

When the shaft S is rotated by the application of power thereto, from the pulley 2 and belt 3, the impeller I will rotate within the cylinder C and move the vane A in a circular path within said cylinder, said vane being adjusted so as to closely contact with the inner surface of the cylinder wall 1, when the impeller is rotated, and induce a flow of liquid into the space C′ of the cylinder, through the inlet i, and discharge the liquid through the outlet O. Pipes 12 and 13 may be connected respectively with the inlet and outlet for delivering the liquid to and conveying the same from the pump. The trunnions e', e', mounted on the outermost portion of the vane A and operating in the grooves g, g, serve to maintain a close contact at all times between the vane of the inner surface of the cylinder wall, and thus provide ample suction in the cylinder for performing the functions of the pump. It will be apparent that as the impeller I and its vane A is rotated within the cylinder, the vane will gradually move inwardly and outwardly with respect to the axis of the impeller, and its position will be constantly changed. The portion a' of said vane, as hereinbefore stated, will be correspondingly moved into and out of the recess 8 in the impeller, as the impeller is rotated. This is due to the fact that the space C′ within the cylinder is unchanging as to its position, inasmuch as the cylinder C and the impeller I occupy fixed positions, and the position therefor of the space C′ is also fixed, the relative position of the impeller and the cylinder is such as to provide an ample area for the inlet and outlet, and so as to eliminate any back pressure which may be created. To this end the outlet O should be of sufficient area to exhaust all of the liquid moved through the space C′, and the upper portion of said outlet is preferably disposed at a tangent to the circle of the inner surface of the cylinder.

In order to make the proper adjustment for the vane A I may provide openings D′ in the cylinder heads H and H′ which may be covered by detachable blades D held on the heads by means of screws or bolts d. Thus, it would be possible by removing the blades D to gain access to the interior of the pump casing for adjusting the bolt e in the vane A.

It will be understood also that the contact between the vane A and the inner periphery of the cylinder wall, while as close as possible in order to provide a running fit, should not be so close as to cause undue wear on the casing and vane.

The several parts of my pump may be readily assembled and dis-assembled, for any purposes and because of the fact that there are no springs for holding the vane A in its extended position, little wear will be encountered, and a close contact should at all times be maintained between the abutment and the cylinder.

I may, if desirable, provide a plurality of the vanes A and correspondingly change the location of the inlet and outlet, for obtaining the best results.

Other changes may be made without departing from the spirit of my invention or enlarging the scope of the appended claim.

What I claim is:

A rotary pump comprising a cylinder, the casing having detachable ends, a shaft eccentrically mounted in said casing and journaled in said ends, and an impeller concentrically mounted on said shaft and eccentrically disposed in said casing, an arcuate recess being formed in the periphery of said impeller, a vane having a segmental portion corresponding in width to the width of said

impeller and pivotally mounted on said impeller, a segmental guide portion on said vane formed on a radius from the axis of said outer portion, and adapted to slidably seat in an arcuate slot in said impeller, concentric grooves formed in the ends of said casing, trunnions extended from the outer portion of said vane, and rollers adjustably carried on said trunnions for engaging said grooves whereby the outer portion of said vane may be adjusted relative to the wall of said cylinder.

FRANK C. SMITH.

Witnesses:
J. W. SHEELEY,
IRENE BREEN.