

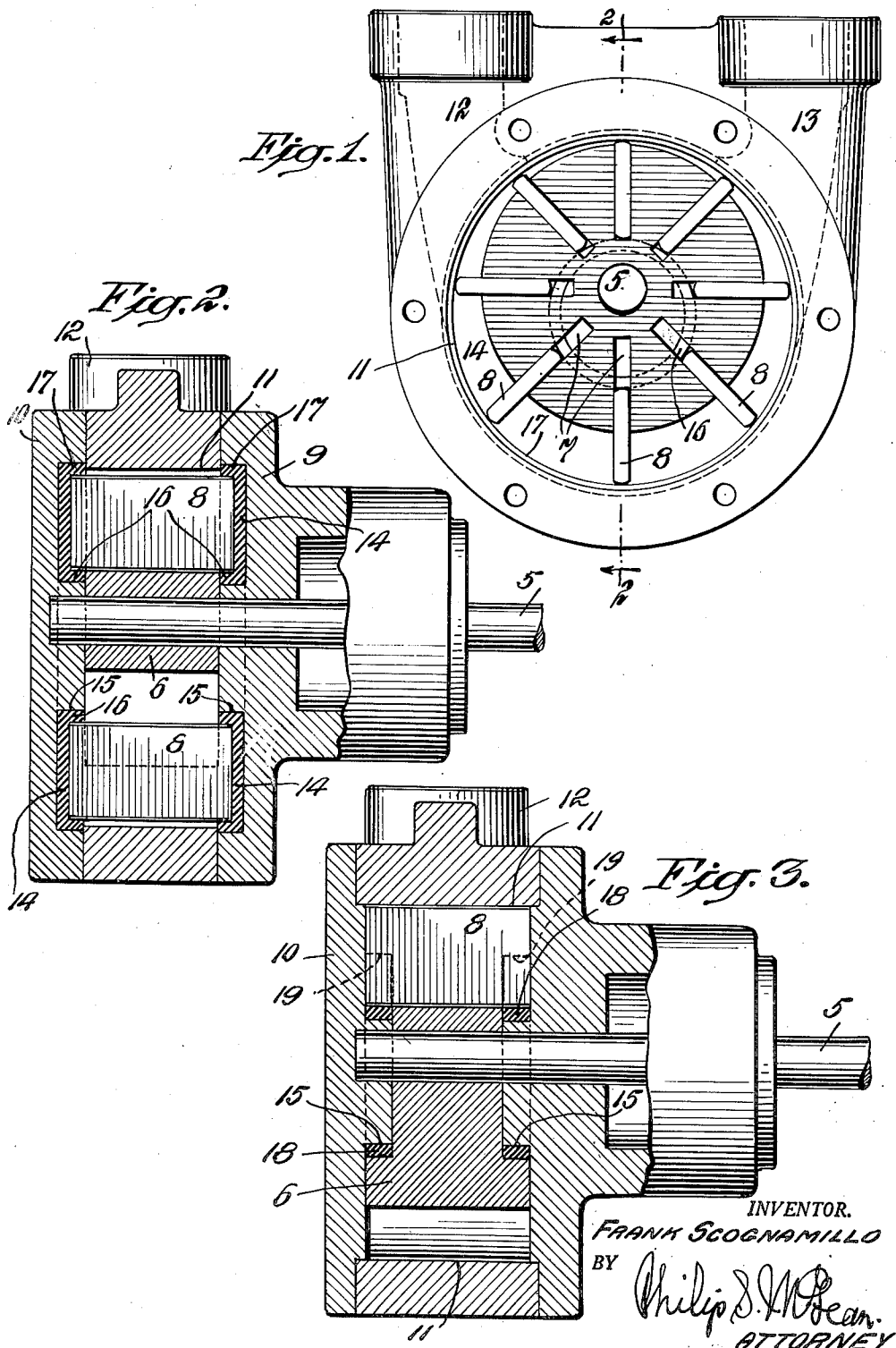
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F. SCOGNAMILLO

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ROTARY PUMP

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2,590,728

ROTARY PUMP

Frank Scognamillo, Fair Lawn, N. J., assignor to
Scognamillo Engineering Company, Bronx,
N. Y., a company of New York

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1 Claim. (Cl. 103—136)

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The invention disclosed in this patent application relates to rotary pumps of the type disclosed in Salvatore Scognamillo Patent No. 2,443,994 of June 22nd, 1948, and co-pending patent applications of Salvatore Scognamillo, Serial No. 33,407, filed June 16th, 1948, and Serial No. 66,098, filed December 18th, 1948, and Frank Scognamillo, Serial No. 77,649, filed February 21st, 1949, and Serial No. 87,658, filed April 15th, 1949, wherein the blades of the pumps are slidably confined in slots in rotors, operating eccentrically in the pump chambers.

Objects of the present invention primarily are to accurately control radial movement of the blades in the pump chambers to maintain either a desired clearance or close fitting engagement of the blades with the walls of the chamber and to accomplish all this with a minimum of friction and in a desirably simple, inexpensive form of construction.

Further objects of the invention are to attain the ends mentioned with a construction of few parts and of rugged design, adapted for continuous operation without servicing or other attention.

Other special objects of the invention are to maintain effective control of the pump blades inwardly as well as outwardly of the rotor structure, and this without applying undue frictional loads on the blades or other portions of the pump.

Other desirable objects attained by the invention are set forth or will appear in the course of the following specification.

The drawing accompanying and forming part of the specification illustrates a certain practical embodiment of the invention. Structure, however, may be modified and changed as regards the immediate disclosure, all within the true intent and broad scope of the invention as herein-after defined and claimed.

Fig. 1 in the drawing is an end view of a pump incorporating features of the invention, showing the rotor and sliding blades within the pump chamber as they appear on removal of the end or cover plate of the pump;

Fig. 2 is a broken vertical sectional view of the pump as on substantially the plane of line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2, showing a modified form of construction.

In the several views the shaft of the pump or rotary machine is shown at 5, carrying a rotor 6 having radial slots 7 slidably receiving the blades 8 which are constrained to operate concentrically in the cylindrical chamber in which the shaft is eccentrically journaled.

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This chamber is shown as made up of parallel end walls 9 and 10 connected by a cylindrical annular wall 11.

The inlet and outlet ports, which may be reversible, according to the direction of the turning of the rotor, are indicated at 12 and 13, opening directly through the cylindrical wall of the pump chamber.

Desired control of the sliding blades is effected in the first form of the invention illustrated, by having the blades extend full width beyond the ends of the rotor and by providing floating discs 14 at opposite ends of the rotor, rotating on stationary hubs 15 on the end walls of the pump chamber concentric with the surrounding cylindrical wall 11, said discs having inwardly extending annular flanges 16 at the inner edges of the same, reaching in under the extended inner edges of the blades. It will be apparent from Figs. 1 and 2 that the annular, inwardly projecting cylindrical flanges 16 of the floating end discs 14, by engagement with the inner edges of the blades projecting beyond the ends of the rotor, will hold the blades outwardly and, if desired, clear of the bottoms of the radial blade confining slots 7 in the rotor. This positively prevents the blades from sticking or jamming in the bottoms of the rotor slots.

The extent of outward radial movement of the blades is similarly definitely determined in the form of the invention shown in Figs. 1 and 2, by providing inwardly extended, annular flanges 17 on the outer edges of the floating discs 14, reaching in over the outer edges of the extended ends of the blades.

This confinement of the outward motion of the blades is particularly desirable when operating at high speeds to overcome the frictional effects of centrifugal force, and when handling liquids of high viscosity or containing a certain percentage of solids, to maintain a constant allowable clearance between the outer edges of the blades and the surrounding peripheral wall of the pump chamber.

By the substitution of different end floating discs, this blade clearance can be accurately determined and maintained.

Where it is more important to maintain desired clearances at the inner edges of the blades, a construction like that illustrated in Fig. 3 may be employed where, in place of disc formations at opposite ends of the rotor, plain, cylindrical, flat rings 18 may be substituted, riding on the stationary hubs 15 on the end walls of the pump housing and directly engaging and supporting the inner edges of the portions of the blades

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which project beyond the opposite ends of the rotor.

This is a particularly simple, inexpensive and practical form of construction, enabling maintenance of desired clearances at the inner edges of the blades by a simple substitution of different size rings on the stationary hubs of the pump chamber.

While primarily a pump construction, it will be realized that the invention is applicable to motors and rotary machines generally, operating along the lines of the principles disclosed, and it is the intent of the claims to cover such machines generally.

In the form of the invention shown in Figs. 1 and 2, the floating discs 14 engage the projecting ends of the blades and so can be constructed of a material to more effectively seal and reduce friction on the ends of the blades.

In the second form of the invention illustrated in Fig. 3, the ends of the blades engage and are sealed by the end walls of the housing. Also, as shown in this view, the blades need not extend beyond the ends of the rotor. Actually, as indicated, the blades may terminate at the ends of the rotor, leaving the ends of the rotor as well as the ends of the blades, in sealing engagement with the end walls of the housing. To permit this relation the ends of the rotor are countersunk, as indicated at 19, concentrically of the shaft, to accommodate or ride over the stationary hubs 15 and the blade supporting rings 18 mounted thereon. These blade supporting rings may be of hard bearing metal and may be either fixed or free to rotate on the stationary hubs.

What is claimed is:

A rotary machine of the character disclosed comprising a casing having opposed end walls connected by a cylindrical wall and providing a cylindrical chamber, a shaft journaled eccentric in said chamber, a rotor on said shaft, ports in said chamber opening through said cylindrical wall at opposite sides of said rotor, said rotor having radial slots therein, radially disposed blades slidably confined in said slots with their outer longitudinal edges opposed to and

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in cooperative relation to said surrounding cylindrical wall and their radially extending end edges projecting beyond opposite ends of the rotor, stationary hubs on the opposite end walls of said chamber concentric with said cylindrical wall and end discs rotatably engaged on said stationary hubs in free sliding engagement with the radially extending end edges of said blades, said discs having annular flanges at the inner edges of the same projecting inwardly toward the ends of the rotor into supporting engagement with the portions of the inner longitudinal edges of the blades which project beyond the ends of the rotor to hold the blades radially outwardly into cooperative relation with the cylindrical wall of the chamber and said discs further having annular flanges at the outer edges of the same projecting inwardly toward the ends of the rotor and engaging over portions of the outer edges of the blades projecting beyond the ends of the rotor to confine radially outward movement of the blades in respect to the surrounding cylindrical wall of the chamber and said discs being free to remain stationary with respect to the rotor and blades or to turn, independently of each other and independently of the rotor and blades, whereby to maintain a sliding sealing engagement with the ends of the blades under various conditions of operation.

FRANK SCOGNAMILLO.

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