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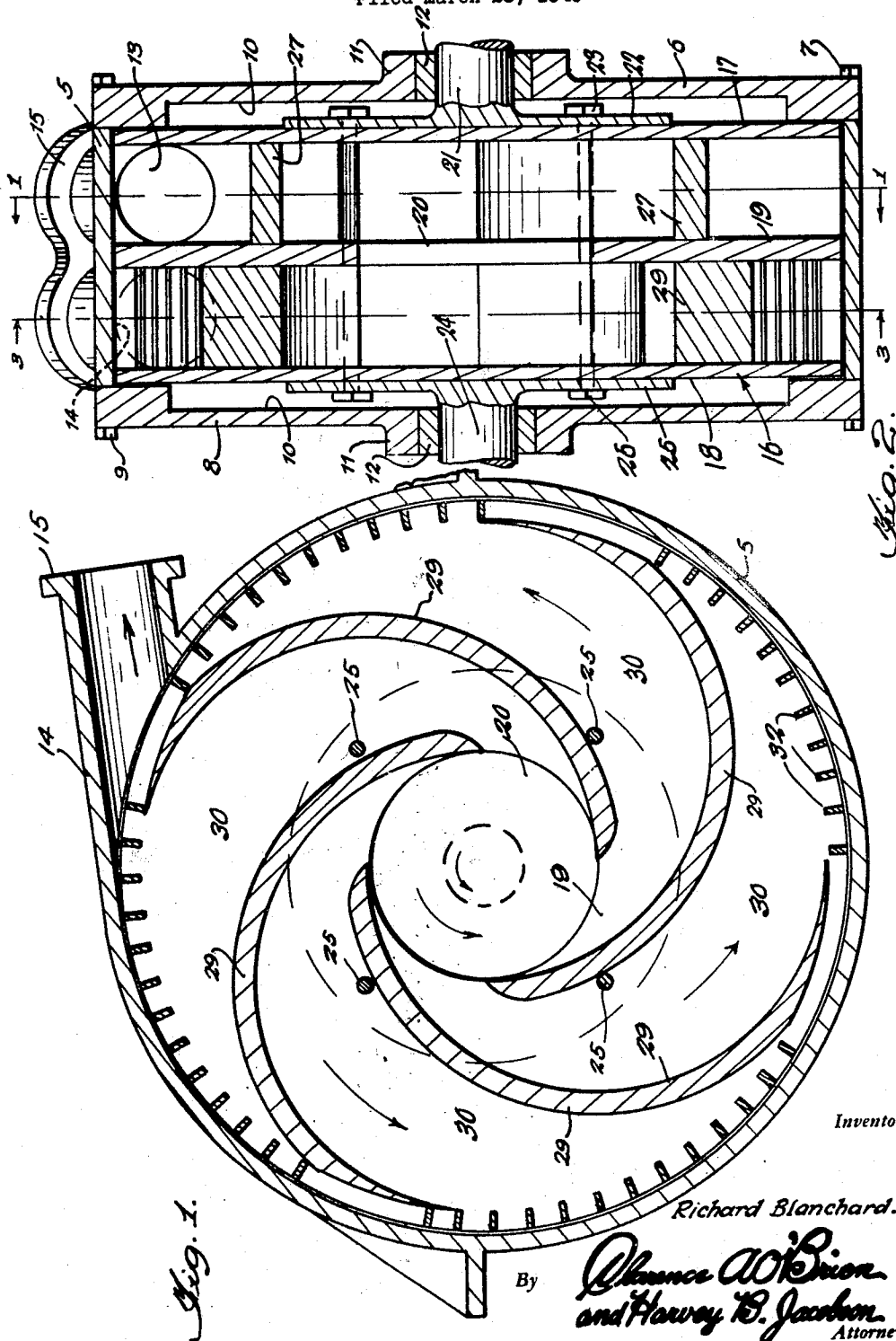
R. BLANCHARD

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CENTRIPETAL-CENTRIFUGAL PUMP

Filed March 28, 1945

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

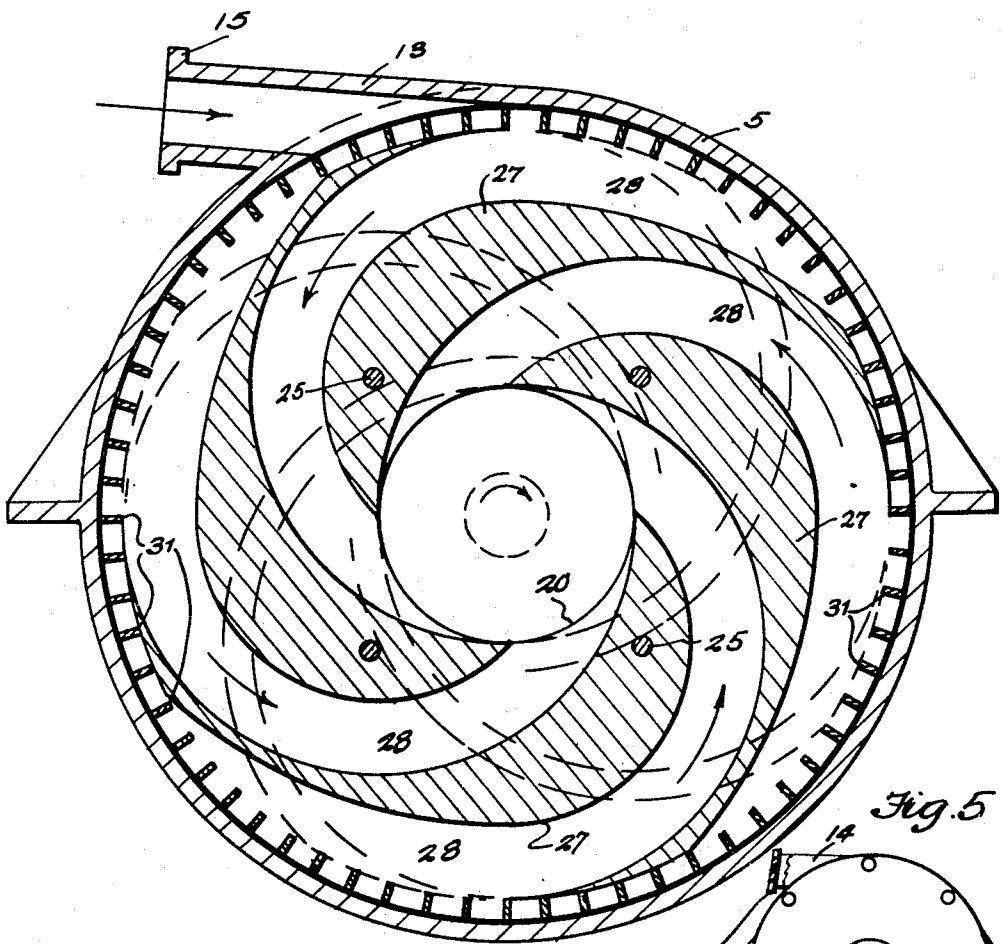
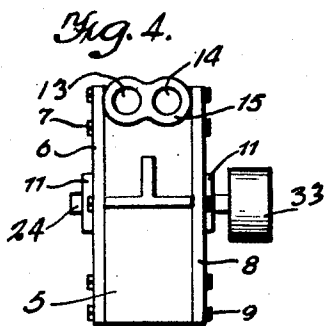
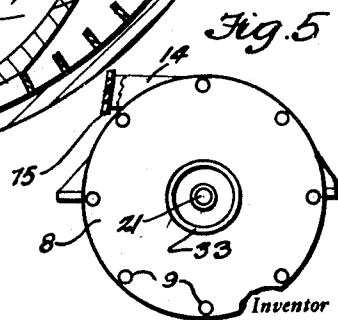


Fig. 3.



Richard Blanchard.

By *Charles A. O'Brien*
and Harvey B. Jackson
Attorneys

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CENTRIPETAL-CENTRIFUGAL PUMP

Richard Blanchard, Gardner, Mass.

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3 Claims. (Cl. 103—5)

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This invention relates to an improved centrifugal pump and its primary object is to provide a rotating member with an impeller consisting of helical vanes arranged to receive the flow direct from the intake of the pump casing, and another impeller consisting of helical vanes arranged to act upon the flow from the first set of helical vanes, the first set of helical vanes being organized to produce a centripetal flow of the fluid being pumped and the second set of helical vanes being arranged to produce a centrifugal flow to discharge of the fluid.

Another object of the invention is to provide a rotary pump with oppositely organized helical vanes, operated to produce first a centripetal suctional flow into the pump casing, and then a centrifugal discharge flow, with a rotor which includes these helical vanes, and a separating plate which is provided with an axial passage for the centripetal flow of the fluid, and with stub shafts attached to the sides of the rotor, which do not interfere with either the centripetal or centrifugal flow.

With the above and other objects in view, the invention comprises certain new and useful constructions, combinations, and arrangements of parts, fully described in the following specification, and clearly illustrated in the drawings, in which:

Fig. 1 is a vertical sectional view, through the centrifugal discharge group of helical impeller vanes, taken on line 1—1 of Fig. 2, looking in the direction of the arrows.

Fig. 2 is a vertical sectional view taken through both groups of helical impeller vanes, at the axis of the pump.

Fig. 3 is a vertical sectional view, through the helical impeller vanes of the centripetal group, taken on line 3—3 of Fig. 1, looking in the direction of the arrows.

Fig. 4 is an end view of the pump, and

Fig. 5 is a side view of Fig. 4.

Referring to the accompanying drawings, which illustrate the practical embodiment of my invention, 5 designates a casing intermediate body wall, which is shown to be approximately cylindrical, but may be of volute construction. To one side of this casing wall the end plate 6 is attached by the bolts 7, and to the other side of the wall 5 the end plate 8 is attached by the bolts 9. Each end plate is provided with a circular clearance 10, on its inner face. Each end plate is further constructed with a bearing hub 11, which is equipped with a bearing bushing 12.

The casing wall 5 is formed or provided with

an intake conduit 13, and with a separate discharge conduit 14, each of which has the usual integral coupling flange 15 thereon.

Within the casing wall 5 and between the end walls or plates 6 and 8, a rotor 16 is arranged. This rotor includes the imperforate end plates 17 and 18, and the intermediate plate 19, which is formed with a central flow opening or passage 20. The three plates 17, 18 and 19 are circular and arranged to rotate within the casing wall 5. The plate 17 is equipped with a stub shaft 21, which is shown to be connected thereto by the disc flange 22 and the bolts 23, and which engages the bearing of the end casing wall or plate 6. The end plate 18 is similarly equipped with a stub shaft 24, which is shown to be connected thereto by the disc flange 25 and the bolts 26, and this stub shaft engages the bearing of the end casing plate 8.

Between the end plate 17 and the intermediate plate 19, a series of helical intake vanes 27 are arranged, so as to provide flow channels 28 between adjacent vanes. These flow passages are helical in form and are so organized as to cause a centripetal flow of the fluid being pumped, from the intake 13 to the central flow passage 20 of the intermediate plate 19, when the rotor is turned at the proper speed of rotation.

Between the end plate 18 and the intermediate plate 19 another series or group of helical vanes 29 are organized, so as to provide helical flow passages 30 between adjacent vanes, which communicate at their inner ends with the flow passage 20 and at their outer ends with the discharge conduit 14.

A series of short radial fins 31 are arranged between the plates 17 and 19, and another and similar series of radial fins 32 are arranged between the plate 18 and the plate 19, in both cases being located outwardly of the helical vanes, for the purpose of distributing the flow from the vanes and breaking up eddy currents.

The helical vanes of the intake group and the helical vanes of the discharge group, are rigidly connected to the end plates and the intermediate plate of the rotor, and the entire assembly may be cast in one unit.

One of the stub shafts is extended and provided with a pulley 33, by means of which power may be applied to the rotor to rotate the same, so that the intake group of helical vanes 27 will impel the fluid being pumped toward the center of the pump, or will produce a centripetal flow, the direction of rotation being as indicated by the

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arrow in Fig. 3, which will be opposite to the direction of the flow, also indicated in this figure by several arrows.

The intake flow therefore tends to create a vacuum within the helical intake passages 28, and thus a flow is maintained through the intake conduit. The fluid thus pumped into the casing will be caused to flow through the axial passage 20 into the discharge channels or passages 30 and thence through the discharge conduit 14, under the centrifugal pressure thus induced.

It will be seen, therefore, that the water or other fluid being pumped will be first caused to flow under centripetal pressure into the pump, and will be expelled by centrifugal pressure.

It is understood that various changes in the details of construction, their combination and arrangement, and in the use of materials required for such construction, may be made, within the scope of the invention, as defined by the claims hereof.

Having described my invention, I claim as new:

1. A rotary pump having a casing provided with end walls, each end wall having a bearing, a rotor within the casing and having end plates provided with stub shafts engaging said bearings, said rotor having an intermediate plate dividing the same into an intake flow section and a discharge flow section, helical vanes arranged in the intake flow section, helical vanes arranged in the discharge flow section in an opposite direction from the direction of the helical vanes of the intake flow section, whereby a centripetal flow is induced in the intake flow section and a centrifugal flow is induced in the discharge flow section and radial fins on the casing extending toward the rotor to inhibit the creation of eddy currents within the pump.

2. A rotary pump having a casing provided with separate intake and discharge conduits, said casing having axially aligned bearings, and a rotor arranged in the casing and provided with a stub shaft on each end thereof engaging one of the bearings of the casing, said rotor including end plates and an intermediate plate, a group of helical vanes arranged on each side of said intermediate plate and in opposite directions, so that a centripetal flow of the fluid being pumped will be induced in the casing on one side of the intermediate plate from the intake conduit and a centrifugal flow will be induced on the other side of

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the intermediate plate to the discharge conduit, the rotor having an axial flow passage establishing continuous flow from the intake conduit to the discharge conduit of the casing and radial fins on the casing extending toward the rotor to inhibit the creation of eddy currents within the pump.

3. A rotary pump comprising a cylindrical casing having a tangential intake port and a tangential outlet port, said ports being arranged side by side, a cover plate closing each end of the casing, a bearing in each cover plate, the axes of said bearings lying along the longitudinal axis of the casing, a rotor in said casing, said rotor comprising a pair of end plates lying in spaced parallel relation adjacent the end plates of the casing, a stub shaft extending axially from each end plate and mounted to rotate in the bearing carried by the adjacent cover plate, a partition plate lying in spaced relation midway between the end plates, said partition plate having a central flow opening the wall of which is concentric about the axis of the casing, helical vanes extending between the end plates and the partition plate, those vanes on the side of the partition plate which align with the intake opening being so organized that when the rotor is driven centripetal flow of fluid toward the flow opening will be created, those vanes on the opposite side of said partition plate being so organized as to create centrifugal flow of the fluid directed to the flow opening and radial fins extending inwardly from the casing toward the rotor to inhibit the creation of eddy currents within the pump.

RICHARD BLANCHARD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
863,250	Abbe	Aug. 13, 1907
1,213,889	Lawaczek	Jan. 30, 1917
1,363,315	Dron	Dec. 28, 1920
2,265,806	Goldschmied	Dec. 9, 1941

FOREIGN PATENTS

Number	Country	Date
843,638	France	Apr. 3, 1939