

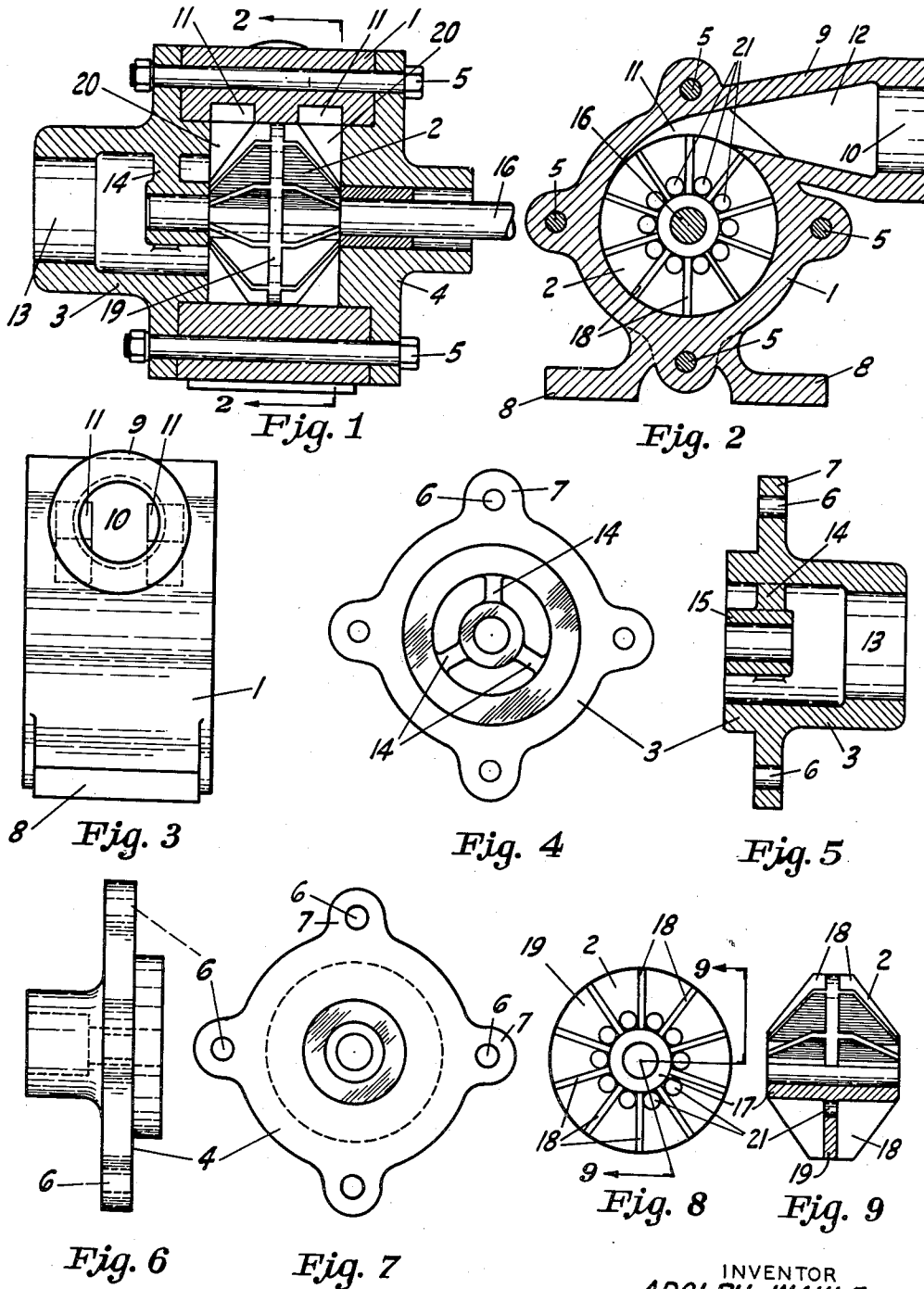
Jan. 1, 1952

A. WAHLE

2,581,055

CENTRIFUGAL PUMP

Filed Sept. 3, 1946



INVENTOR
ADOLPH WAHLE

BY

Merrill M. Blackburn.

ATTORNEY

UNITED STATES PATENT OFFICE

2,581,055

CENTRIFUGAL PUMP

Adolph Wahle, Davenport, Iowa, assignor, by
direct and mesne assignments, of one-half to
W. H. Martin, Davenport, Iowa

Application September 3, 1946, Serial No. 694,606

4 Claims. (Cl. 103—103)

1

My present invention pertains to pumps and more specifically to pumps of the centrifugal type. Among the objects of this invention are the provision of a centrifugal pump having greater operating efficiency than its predecessors in this field; the provision of an improved type of centrifugal pump; the provision of a pump which will furnish a greater volume of fluid discharge per unit of power input than previous pumps of the centrifugal type; and such further objects, advantages, and capabilities as will hereafter appear and as are inherent in the construction disclosed herein. My invention further resides in the combination, construction, and arrangement of parts illustrated in the accompanying drawings and, while I have shown therein what is now regarded as the preferred embodiment of this invention, I desire the same to be understood as illustrative only and not to be interpreted in a limiting sense.

In the drawings annexed hereto and forming a part hereof,

Fig. 1 represents a vertical longitudinal section through a pump in accordance with my present invention;

Fig. 2 represents a transverse section through a pump in accordance with my invention, approximately along the plane indicated by the line 2—2, Fig. 1;

Fig. 3 represents an elevation of the structure shown in Figs. 1 and 2, looking toward the discharge end thereof, with the heads omitted;

Fig. 4 is an internal face view of one of the heads, detached from the body;

Fig. 5 represents a vertical central section through the structure shown in Fig. 4;

Fig. 6 is an edge view of the second head, detached from the body;

Fig. 7 is an external face view of the head shown in Fig. 6, looking at that figure from the left;

Fig. 8 is an end elevation of the rotor; and

Fig. 9 is an edge view of the rotor, partly in section, taken approximately along the broken plane indicated by the line 9—9, Fig. 8.

Reference will now be made in greater detail to the annexed drawings for a more complete description of this invention which comprises a body 1, a rotor 2, and heads 3 and 4. These heads are shown in the present drawings as being attached to the body by means of bolts 5 passed through openings 6 in the ears 7 projecting laterally from the main body of the head. The pump body 1 is provided with legs 8 by means of which it may be mounted upon any suitable sup-

2

port. Extending tangentially from the body is a discharge 9 which has a discharge opening 10 to which any suitable hose or other tubular means may be attached for carrying away the fluid delivered by this pump. A pair of grooves 11 are formed on the inside of the body to receive fluid forced out by the rotor 2. These grooves or channels 11 are combined into one common discharge opening 12 which leads to the discharge opening 10.

The head 3 at the inlet end of the pump has an inlet opening 13 for taking in fluid. Inside of this are a plurality of arms 14 which are connected to a bushing or support 15 for the end of the drive shaft 16. On this drive shaft 16, either formed integrally therewith or securely mounted thereon, is the rotor 2, which engages, at its ends, the heads 3 and 4. The shaft 16 extends out and serves as a means for applying a driving torque to the rotor to cause turning thereof.

The rotor will be next described as an entity entirely separate from the shaft 16 and, as such, it is seen to have a central sleeve 17 from which radiate vanes 18, preferably formed integrally with the web 19 arranged at a right angle to the shaft 16. It will of course be understood that this rotor may be built up from separate units or may be formed as a unit and machined to the desired shape. The rotor is of the open face type and the blades are so cut as to form grooves or channels 20 between the rotor and the heads which are V-shaped in cross-section. This provides a body of fluid surrounding the rotor against which the fluid entering the opening 13 and thrown off centrifugally by the rotor may build up a pressure. This pressure forces the fluid out of the discharge opening 10 under a considerable pressure. The channels 20 and grooves 11 are connected into a single discharge opening 10, the diameter of which equals approximately twice the width of the periphery of the rotor. Openings 21 extending through the web permit fluid entering through opening 13 to pass to the opposite side of the rotor where it will be acted upon by the blades 18.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of this invention as disclosed in this specification and as defined in the appended claims.

Having now described my invention, I claim:

1. A double centrifugal pump, for liquids, of the open face type having heads and an inlet through one of the heads of the pump, said pump having a cavity, and a rotor in the pump cavity,

3

said rotor comprising a power shaft, a sleeve surrounding said shaft between said heads, a web extending transversely thereto and rigidly joined to the sleeve, substantially in the middle of the pump cavity, and vanes radiating from the sleeve upon opposite sides of the web and rigidly connected to the sleeve and web, said pump having a housing surrounding said rotor, said web having apertures therethrough between the vanes and in proximity to the shaft, the housing being provided with a tangential outlet from the rotor cavity for the discharge of fluid, there being channels between the rotor and the two heads of the pump, said channels being V-shaped in cross-section, the vanes being longest along the sleeve and trapezoidal in form, the rotor engaging the heads.

2. A centrifugal pump, for liquids, comprising a body, a pair of heads, and a rotor, said body having a cavity therein which is approximately cylindrical, said rotor comprising a shaft, a web extending transversely thereto and arranged to be located substantially centrally within the body cavity, a sleeve surrounding said shaft and substantially contacting the heads, said web having apertures therethrough adjacent the sleeve, and vanes radiating from the shaft and attached to the sleeve and to the web, one head having a fluid-admission opening extending therethrough into the body cavity and the other head having a shaft bearing mounted therein through which said shaft extends and in which it rotates, said body having a pair of fluid exits spaced from each other and adjacent the heads, said exits opening into a common discharge, the spaces between the rotor and the respective heads being ring-shaped and, in cross-section, approximately V-shaped between the body, the rotor, and an adjacent head, the vanes being trapezoidal in form and being wider along the sleeve than at the periphery of the rotor.

3. A centrifugal pump, for liquids, having a body opening in which is mounted a rotor, the ends of the body opening being closed by heads, a shaft mounted rotatably in said heads and carrying said rotor, a sleeve surrounding said shaft in the body opening, blades extending radially from said sleeve, said blades being wider adjacent said shaft than at their peripheral edges, the body opening being shaped to leave substantially identical channels which are V-shaped in cross-section, located between the heads and the rotor, one of the heads having an

4

inlet opening therethrough, and a web having openings therethrough between the blades and adjacent the sleeve whereby to permit part of the fluid entering through one of the heads to pass through the web into the opposite side of the pump to be discharged centrifugally thereby, said pump having a tangential discharge opening.

4. A double centrifugal pump for liquids, comprising a substantially cylindrical housing having axially spaced apart heads with substantially flat inner faces and shaft-receiving portions, a rotor comprising a pump shaft within said housing and having a sleeve surrounding said shaft and fixed thereto, vanes of trapezoidal formation fixed to said sleeve to rotate with the latter and said shaft, each of said vanes having its inner portion co-extensive axially with said sleeve and a radially outer edge materially shorter than the axial width of said housing, a central web carried by said vanes and said sleeve, an inlet through one of the heads, and a tangential outlet structure carried by said housing and having a discharge opening, the diameter of which equals approximately twice the width of the periphery of said rotor in an axial direction, said discharge opening having a central dividing wall portion lying circumferentially about the radially outer ends of said vanes across the passage between the interior of said housing and said discharge opening, the width of said dividing wall being substantially equal to the axial width of said vanes at their radially outer ends.

ADOLPH WAHLE.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
Re. 119	Alden	July 11, 1848
346,471	Falcon	Aug. 3, 1886
607,133	Richards	July 12, 1898
1,295,621	Simond	Feb. 25, 1919
1,543,740	Wahle	June 30, 1925
1,573,973	Lamontagne	Feb. 23, 1926
2,293,590	Chance	Aug. 18, 1942
2,393,127	Summers	Jan. 15, 1946

FOREIGN PATENTS

Number	Country	Date
7,192	Great Britain	May 3, 1884
28,980	Great Britain	Dec. 22, 1911