Nov. 20, 1923. 1,474,708

J. W. W. DRYSDALE

CENTRIFUGAL PUMP

Filed March 17, 1922 2 Sheets-Sheet 1

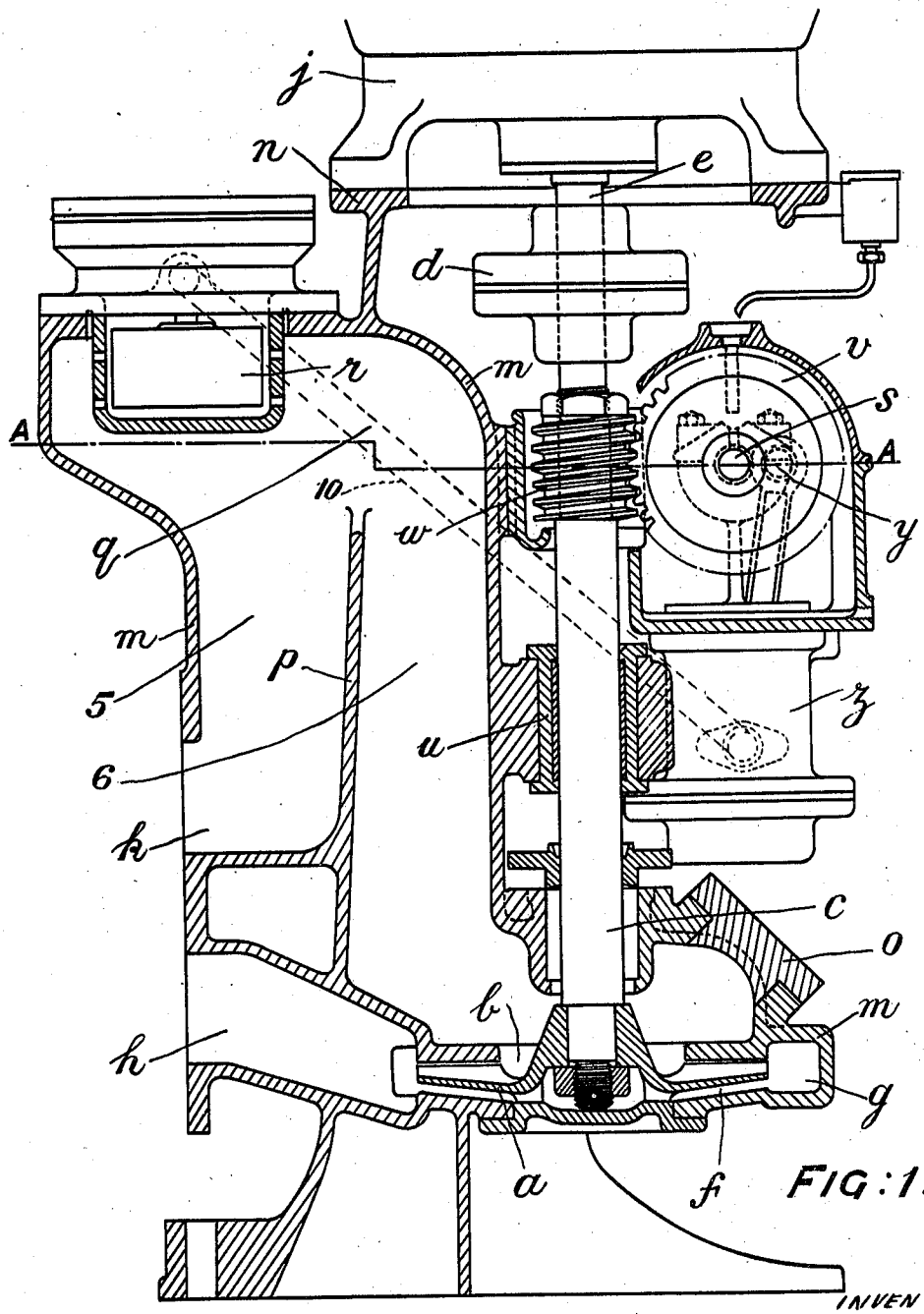


FIG: 1.

INVENTOR

John W. W. Drysdale.

By William C. Linton

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Nov. 20, 1923.

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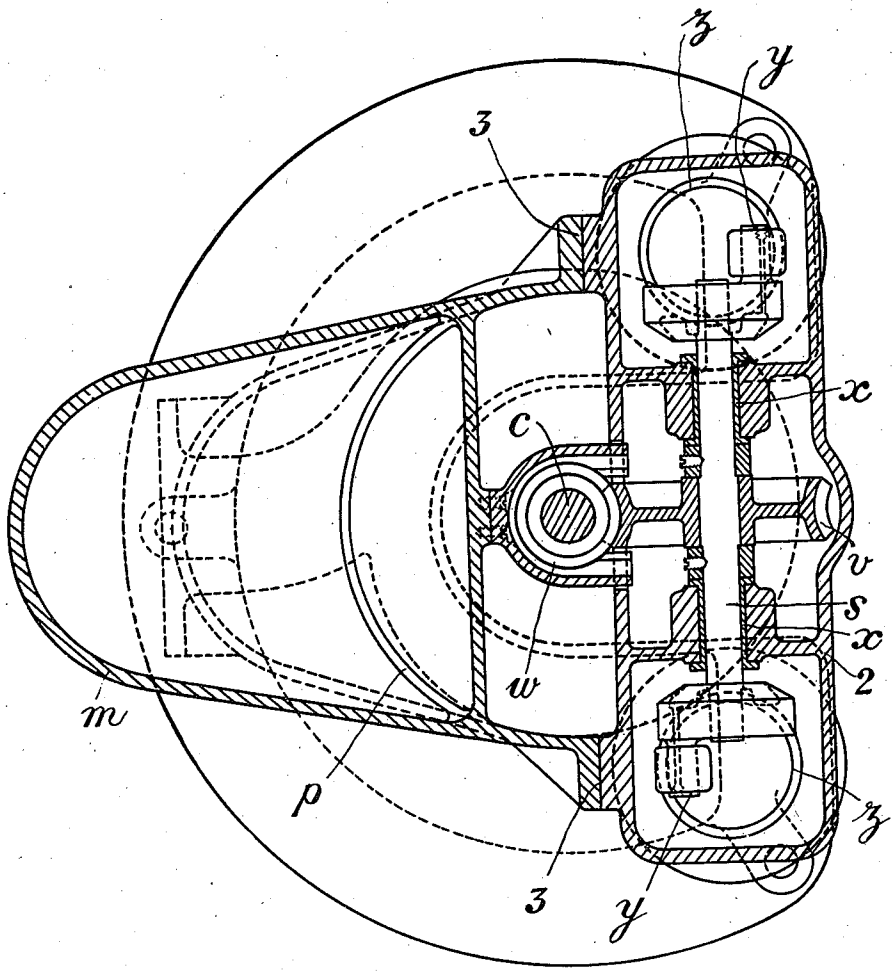


FIG: 2.

INVENTOR.

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Patented Nov. 20, 1923. 1,474,708

UNITED STATES PATENT OFFICE.

JOHN WHITEHEAD WILSON DRYSDALE, OF YOKER, NEAR GLASGOW, SCOTLAND, ASSIGNOR TO DRYSDALE & COMPANY, LIMITED, OF YOKER, NEAR GLASGOW, SCOTLAND.

CENTRIFUGAL PUMP.

Application filed March 17, 1922. Serial No. 544,483.

To all whom it may concern:

Be it known that I, JOHN WHITEHEAD WILSON DRYSDALE, a subject of the King of Great Britain and Ireland, residing at Bon-Accord Works, Ferry Road, Yoker, near Glasgow, Scotland, have invented certain new and useful Improvements in Centrifugal Pumps; and I do hereby declare the following to be full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The present invention relates to vertical centrifugal pumps, the impellers or rotors of which are driven by direct connection to the rotor of an electric motor, or other rotary motor, placed above the pump.

In the British Patents Numbers 167,006 and 170,494, arrangements are described for withdrawing air from the suctions of centrifugal pumps by trapping the air in a chamber containing a float adapted to operate a valve, the air being withdrawn from this chamber by an air pump which in some cases is driven from the centrifugal pump shaft.

The present invention consists in a centrifugal pump having a combination of features which will be described in the following specification, the invention being defined in the annexed claims.

The accompanying drawings illustrate the carrying of the invention into effect in one convenient manner as applied to an electrically-driven bilge and ballast pump specially intended for use on board ship.

Fig. 1 is a vertical section.

Fig. 2 is a horizontal section on the line A A of Fig. 1.

The impeller *a* is of the single-entry type with suction eye *b* looking vertically upwards. The impeller is carried on the lower end of the pump shaft *c*, and this shaft is coupled directly by a rigid coupling *d* to the motor shaft *e*. The weight of the whole rotating parts is arranged to be carried by a thrust bearing situated at the upper end of the motor shaft.

The main casting *m* includes the impeller chamber *f*, the volute *g*, the discharge port *h*, the suction port *k*, and the passage (5, 6) whereby the liquid flows from the suction port *k* to the eye (*b*) of the impeller. The said passage is divided by a wall or partition *p* into the two portions 5 and 6 so that it is necessary for the liquid, entering by the suction port *k*, to pass upwards along the passage 5, make a sharp turn over the top of the partition (*p*), and then pass downwards to the impeller along the passage 6.

The portion of the casting *m* immediately above the partition *p* is employed as an air trapping or collecting chamber *q*. The liquid passing over the partition, as just described, liberates the air which collects in this chamber *q*. In this chamber is arranged a float-controlled valve device (of which the float is shown at *r*), with a connection 10 to the air pumps (hereinafter referred to) whereby the air can be withdrawn free, or nearly free, from liquid from the chamber *q*.

The casting *m* is formed at the upper end with a seat *n* for the motor *j*; above the impeller it supports a steady bearing *u* for the pump shaft.

Above the steady bearing a worm *w* is provided on the pump shaft which worm gears with a worm wheel *v* on a transverse horizontal shaft *s*. This shaft *s* is supported in bearings *x x* carried by a front casting 2 which is bolted at 3, 3 to the main casting *m*. This shaft *s* is provided at each end with a crank *y* which, through a connecting rod, drives the piston of an air pump *z* bolted to the front casting. These air pumps are employed as hereinbefore referred to for withdrawing the air from the air collecting chamber *q*.

The impeller chamber is provided with an inspection door *o*.

The shaft *s* might if desired be driven from the pump shaft by skew wheels instead of by a worm and worm wheel.

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

1. In a centrifugal pump comprising a motor driven impeller, a casting for housing said impeller, said casting having an inlet and exhaust passage formed therein, said inlet passage being divided into two portions, the junction between said portions

being formed with an air chamber, and means for withdrawing air from said chamber.

2. In a centrifugal pump comprising a motor driven impeller, a main casting for enclosing said impeller, admission and discharge passage ways formed within said casting, a vertical web formed with said casting and extending within said admission passageway dividing said latter into an upward and a subsequent downward section, an air chamber at the junction of the said sections and above the top of said web, and means for withdrawing air from said air chamber nearly free from liquid.

3. A centrifugal pump comprising in combination a casting having inlet and outlet passage and a volute communicating with said passage, a motor driven impeller arranged within said volute, means for dividing said inlet passage into an upward portion and a subsequent downward portion, an air chamber at the junction of said portions within said inlet passage, and motor driven air pumps communicating with said air chamber, substantially as and for the purpose specified.

I hereby sign my name to this specification.

JOHN WHITEHEAD WILSON DRYSDALE.