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ELECTRICALLY DRIVEN ROTARY PUMP.

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1,355,755. Patented Oct. 12, 1920.

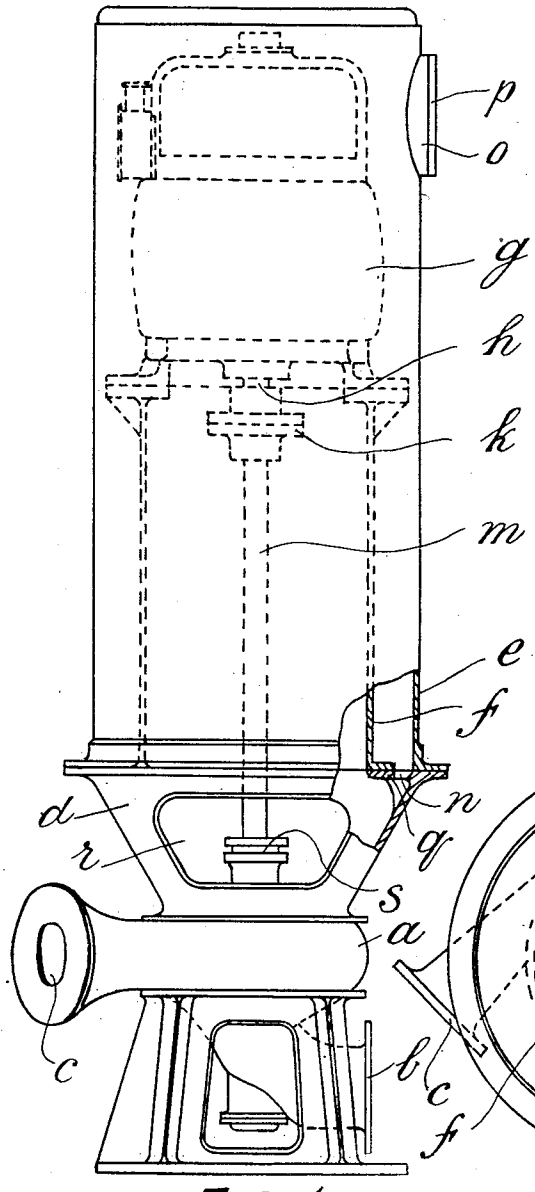


FIG: 1.

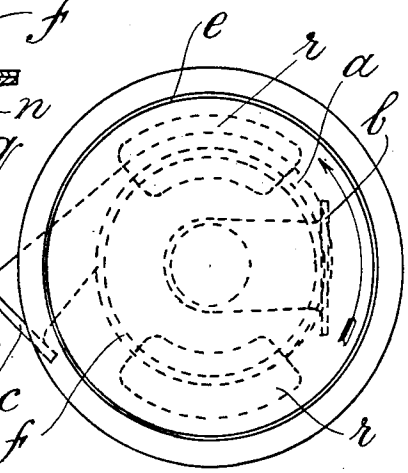


FIG: 2.

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ELECTRICALLY-DRIVEN ROTARY PUMP.

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Application filed March 15, 1920. Serial No. 366,055.

To all whom it may concern:

Be it known that we, JOHN WHITEHEAD WILSON DRYSDALE, Jr., and JOHN YOUNG, both subjects of the King of Great Britain and Ireland, both residing at Bon-Accord Works, Ferry Road, Yoker, near Glasgow, Scotland, have invented certain new and useful Improvements in Electrically-Driven Rotary Pumps; and we do hereby declare the following to be a 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.

This invention relates to electrically-driven rotary pumps which run continuously or occasionally under water with the water level at a considerable height above the top of the pump.

The object of the invention is to obviate the necessity of employing (1) a motor specially constructed to stand submersion or (2) a very long driving shaft, for the purpose of maintaining the motor above the water level while the unit is running with the water level above the top of the pump.

Our invention—which will be defined in the annexed claim—consists in a construction of electrically-driven rotary pump unit which will be described in the following specification. This construction involves the placing of the electric motor above the pump and the inclosing of it in a bell or chamber hermetically sealed except at the bottom where there passes out of it a shaft by which the pump is driven by the motor, this bell or chamber being carried down without openings to a level below the bottom of the motor and being so dimensioned that, with a water level without it above the top of the motor but within a predetermined distance therefrom, the water level within it is below the motor.

Our invention may be applied, with advantage, to electrically-driven rotary pumps employed in mine draining, deep well pumping, caisson or marine salvage pumping, or as emergency bilge pumps on shipboard. The invention may also be applied, with advantage, to electrically-driven rotary pumps operating in explosive atmospheres, the pump unit in such a case being immersed in a tank or chamber of water.

The accompanying drawing illustrates a convenient manner of carrying our invention into effect.

Figure 1 shows in elevation (with a small portion in section) an electrically-driven pump according to our invention.

Fig. 2 is a plan of the same.

a is a pump which is of the centrifugal type; *b* is its inlet port and *c* its discharge port. Mounted on the casing of the pump is a stool *d* which itself supports an outer cylinder *e* and an inner cylinder *f*. The stator of the motor *g* which drives the pump is supported on the upper end of the cylinder *f*. The rotor of the motor is keyed on the shaft *h* which is connected at *k* to the shaft *m* which carries the wheel or impeller of the pump. The pump is thus driven by the motor.

The cylinder *e* is closed at the top and acts as a bell to prevent the immersion of the motor as hereinbefore mentioned. If the motor is of a type involving a commutator or slip rings, a handhole *o*, or handholes may be provided for use in inspecting, adjusting, and replacing the brushes and gear, but, when the motor is of a type without commutator or slip rings, no handholes are furnished. When handholes are provided, they are covered by flanges *p* so as to close the holes in a water tight manner. Except for these handholes there are no openings in the sides or top of the cylinder *e*. Openings *r* are provided in the stool *d* for the purpose of gaining access to the pump gland *s*. Holes *n* are provided in the flange *q* of the stool which supports the cylinders *e* and *f*.

When the pump is submerged, water enters the openings *r* and rises within the cylinder *e* both inside and outside the cylinder *f* until the pressure of air within the upper part of the cylinder *e* is sufficient to prevent further rise of the water. The arrangement is such that the water can rise outside the cylinder *e* to a pre-determined height above the top of the motor without rising inside the cylinder *e* above a point at which it will cover any portion of the motor liable to be damaged by water. The desired effect can be obtained by restricting, if necessary, the volume of air in the upper

part of the cylinder *e*, while allowing ample volume in the lower part.

Except for the handholes *p* which, as above stated, may be omitted, there are no openings above the openings *r* by which water can gain access to the interior of the cylinder *e*.

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

The combination, with a rotary pump comprising a stator and a rotating wheel, of an electric motor comprising a stator and a rotor, a stool supported on top of said pump stator, an inner cylinder supported on the top of said stool, the motor stator being supported on the top of said cylinder, an outer cylinder inclosing said motor and said inner cylinder and hermetically sealed except at the bottom and carried down to a level below the bottom of said motor and supported on said stool, and a shaft within said inner cylinder and coupled to the said pump wheel and to the rotor of said motor.

We hereby sign our names to this specification.

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