

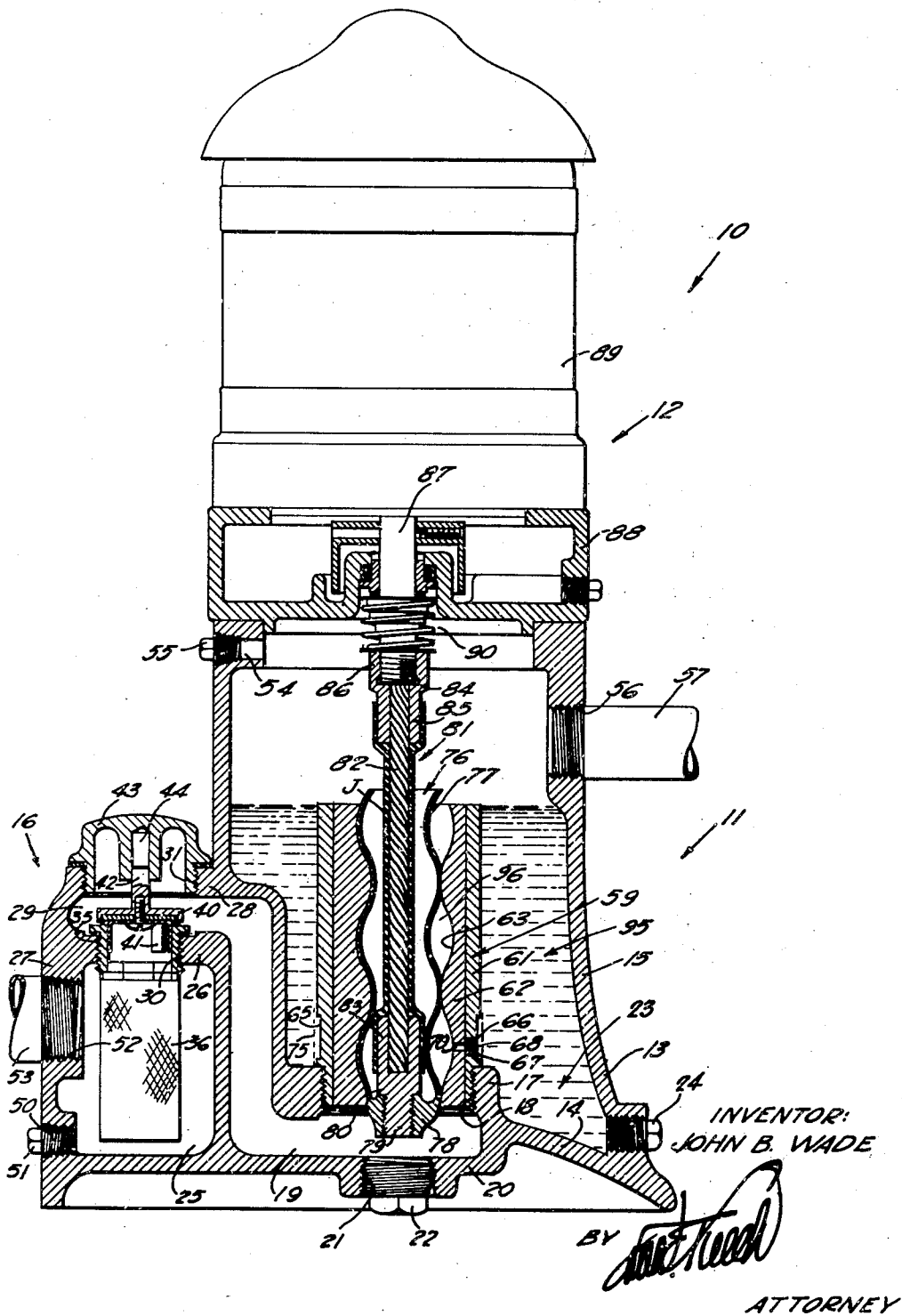
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J. B. WADE

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MOTOR PUMP WITH SAND TRAP AND PRIMING MEANS

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MOTOR PUMP WITH SAND TRAP AND
PRIMING MEANS

John B. Wade, Arcadia, Calif., assignor to Food
Machinery and Chemical Corporation, San
Jose, Calif., a corporation of Delaware

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This invention relates to pumps and particularly to pumps of the Moineau type which are disclosed in U. S. Patents Nos. 1,892,217 and 2,028,407.

It is an important object of this invention to provide a Moineau type of pump which is self priming.

Another object of the invention is to provide such a pump in which the priming automatically starts immediately upon the pump being placed in motion.

Yet another object is to provide such a pump which is rendered self priming for a relatively long period of time by a relatively small amount of water.

A further object of the invention is to provide a relatively compact motor pump unit embodying such a self priming pump.

The manner of accomplishing the foregoing objects, as well as further objects and advantages, will be made manifest in the following description taken in connection with the accompanying drawing which comprises a diagrammatic vertical sectional view of a preferred embodiment of the invention.

Referring specifically to the drawing, the motor pump unit 10 illustrated therein includes a pump 11 and a motor 12.

The pump 11 has a main casting 13 in which are integrally cast a pedestal-like base 14, a pump casing 15, and an intake valve unit 16.

The base 14 has a central boss 17 in which is formed a vertical threaded hole 18. The hole 18 communicates with an intake water passage 19 having a lower wall 20, in which a tapped drain opening 21 is formed concentric with the hole 18, this opening normally closed by a plug 22.

A sand trap 23 is provided by the space in the bottom of the casing 15 between this and the central boss 17. Access to this as for cleaning or draining purposes is provided by a plug 24.

The intake valve unit 16 includes a screening chamber 25 having a top wall 26 and an outer wall 27. Enclosed between the wall 26 and an upper wall 28 is a valve chamber 29. Formed concentrically on a vertical axis in the walls 26 and 28 are threaded openings 30 and 31.

Screwed downwardly into the threaded opening 30 is a valve seat 35 which communicates

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downwardly with a closed cylindrical screen 36 suspended thereon. Resting on the valve seat 35 is a valve 40. This has a guide spider 41 extending downwardly into the seat 35. Rising from the valve 40 is a guide stem 42. Screwed downwardly into the threaded opening 31 and closing the valve chamber 29 from above is a cap 43 having a central hole 44 in which the stem 42 is received and slideably guided when the valve 40 is moved towards or away from the valve seat 35.

Normally closing a tapped drain hole 50 in the wall 27 is a plug 51. This wall is also provided with a tapped hole 52 into which an intake water pipe 53 is screwed.

The pump casing 15 has a tapped hole 54, normally sealed by plug 55, and a tapped hole 56 for receiving a discharge pipe 57.

Screwed into the threaded hole 18 of the base 14 is a Moineau pump stator 59. This stator includes a metal shell 61 having a soft rubber liner 62 formed therein and bonded to the shell 61. The liner 62 is provided with a double threaded chamber 63 such as is characteristic of the Moineau type pump.

Formed in the outer surface of the stator shell 61 close to the lower intake end thereof is a shallow annular recess 65. Formed in the shell 61 within the recess 65, is a hole 66 into which is driven a bushing 67 having a relatively small orifice 68. The bushing 67 is preferably of stainless steel or of some similar corrosion resistant material.

Formed in the rubber stator lining 62 co-axially with the orifice 68 is a hole 70 which is preferably much larger than the orifice 68. Surrounding the stator 59 and fitting tight thereagainst while overlapping the edges of the recess 65, so as to control access of water to the orifice 68, is a fine mesh screen band 75.

Rotatably disposed in the stator chamber 63 is a Moineau pump rotor 76 which is preferably formed with a sheet metal wall 77 which has been pressed into the proper configuration with a single pitched thread suitable for cooperating with the double threaded stator opening 63 to pump water upwardly through said stator chamber when rotated therein. The lower end of the metal wall 77 has an internally threaded head 78 into which

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is screwed a stud 79 of a coupling head 80 of a flexible coupling 81. This coupling embraces a flexible steel cable 82, the lower end of which is secured as by swedging in a socket 83 provided on the coupling head 80. The coupling 81 also has an upper head 84 with a socket 85, in which the upper end of the cable 82 is secured, and a receptacle 86 into which the lower end of a shaft 87 of the motor 12 is screwed. Coupling 81 has a rubber jacket J vulcanized thereon to protect it against corrosion.

Included in this motor is a motor base 88 which rests on and is secured to the upper end of the pump casing 15. The motor base 88 is provided with a liquid tight seal 90 to prevent the escape of oil from the motor 12 downwardly into the pump 11 and to likewise keep water from getting into the motor.

Operation

The motor pump unit 10 is adapted for many uses, one of which is pumping water from shallow wells in which the pipe 53 connects through an elbow with a vertical pipe extending downwardly into the well. When the pump is first installed, it is of course dry. After being connected to the well therefore, the plug 55 is temporarily removed and water poured in through the hole 54 to fill the priming chamber 95 formed between the stator 59 and the pump casing 15 with priming fluid. The pump then appears as shown in the drawing.

The motor 89 is now energized so as to rapidly rotate the shaft 87, coupling 81, and the rotor 76 mounted thereon. While rotating clockwise, the rotor 76 revolves counterclockwise eccentrically about the axis of the stator chamber 63 in the manner typical with the Moineau pump. This produces a series of closed pockets 96 between the rotor 76 and the stator 59 which travel longitudinally of the rotor and in the present case upwardly so as to pump fluid from the intake passage 19 into the upper end of the priming chamber 95.

When the pump is first started, the passage 19 and pipe 53 are filled with air and this air must be pumped therefrom and a suction created to draw water upwardly to the pump. In order for this to be done, it is necessary that the pump 60 be primed. In the present invention, this is accomplished by water being sucked through the orifice 68 from the priming chamber 95 and delivered in the form of a spray into the pockets 96 as these travel past the rubber liner hole 70. This spray of water remains in a state of suspension and travels upwardly with the pockets 96 so that practically immediately from the starting of the rotation of the pump rotor 76 the engaging surfaces of the rotor and stator are moistened sufficiently to make a good air-tight fit between these and to lubricate these surfaces so that the motor 89 may turn the rotor at maximum speed, thus speeding up the withdrawal of air from the passageways leading to the well and the delivery of water at the intake end of the pump.

It is to be noted that whenever the pump is stopped, even though water might drain down out of the pipe 53 and be drained from the passage 19 through the hole 21, a supply of water always remains in the priming chamber 95 which is adequate to keep the pump 76 primed for a relatively long period of operation while this pump is engaged in extracting air from the intake

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lines and sucking water up to the intake end of the pump.

It should also be noted that the admission of the priming fluid to the stator chamber through a very small orifice accomplishes several important purposes. By producing a spray of water in suspension in the pockets 96, the entire pump is water lubricated with the first few revolutions of the rotor.

The small size of orifice 68 also permits the pump unit 10 to be operated for several minutes and thus suck air from a relatively long intake pipe 53 without exhausting the priming fluid.

Another advantage of this orifice being small is that it does not interfere to an appreciable extent with the capacity of the pump even though it is in fact a by-pass between the pressure and suction sides of the pump.

When the pump is stopped, water collects and remains in the intake passage 19 until the pump is started again. This water primes the pump for a short time but if the pipe 53 has filled with air which must be sucked out again, priming from the orifice 68 is required before water arrives through the pipe 53 at the intake end of the pump.

I claim:

1. In a water motor-pump unit, the combination of: a pedestal-like base; a skirt-like pump casing extending upwardly from the periphery of said base; a motor mounted on top of and closing said casing, the shaft of said motor extending vertically downward into said casing; a stator mounted in said base and extending upward coaxially with said shaft, said stator having a rubber-lined female threaded chamber, there being an inlet passage formed in said base and connecting to the lower end of said chamber, the upper end of said chamber opening into said casing; an outlet pipe leading from an upper portion of said casing; a male threaded rotor revolvably disposed in said chamber and always in contact therewith in any cross section, the number of female threads of said stator exceeding by one unit the corresponding number of male threads on the rotor; a flexible coupling connecting said shaft with said rotor, rotation of the latter causing a series of closed pockets to be formed between said stator and said rotor and travelling upwardly, there being a priming hole in said stator at a level which divides the space between said stator and said casing into a priming reservoir above said hole and a sand trap beneath said hole; and a plug in said casing for cleaning said sand trap.

2. A combination as in claim 1 in which a substantial area outside said stator and adjacent said priming hole is covered by a screen to protect said hole from the admission of sand thereto.

3. A combination as in claim 1 in which a channel is cut from the outer surface of said stator in an area through which said hole extends; and a fine screen covering said channel to protect said hole from the admission of sand thereto.

4. A combination as in claim 1 in which said water inlet passage extends downwardly alongside said stator from a point located a substantial distance above the level of said priming hole.

5. A combination as in claim 1 in which said water inlet passage extends downwardly alongside said stator from a point located a substantial distance above the level of said priming hole; and a check valve provided in said base at said point.

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said inlet passage connecting with and receiving through said valve the supply of water for said pump.

JOHN B. WADE.

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