L. W. BODINSON.

CENTRIFUGAL PUMP.

APPLICATION FILED JULY 13, 1912.

1,136,928.

Patented Apr. 27, 1915.

2 SHEETS—SHEET 1.

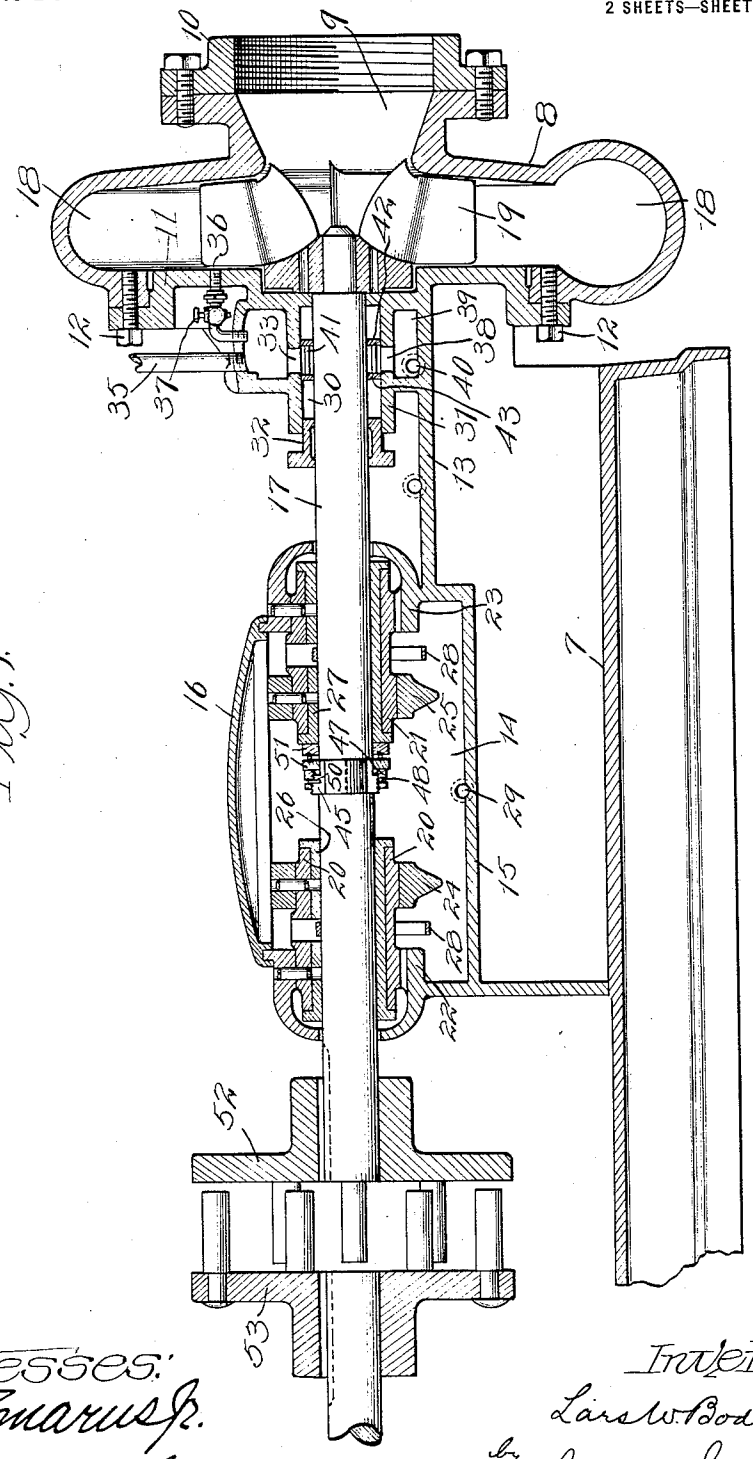


FIG. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

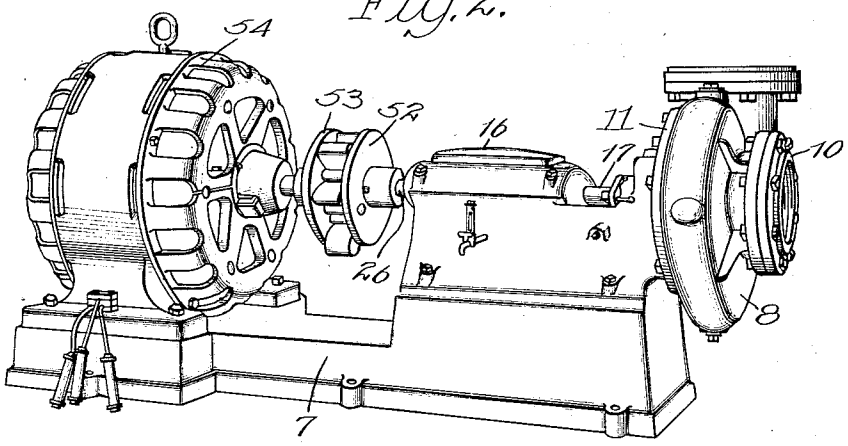


Fig. 3.

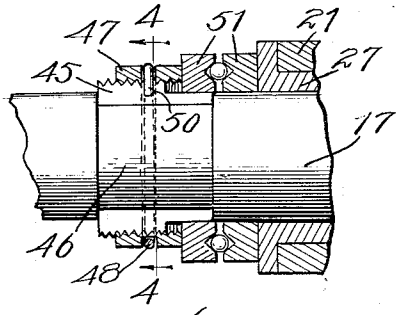


Fig. 4.

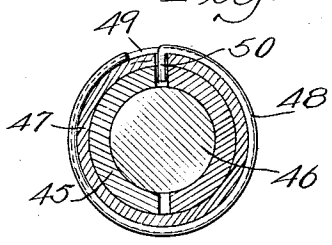


Fig. 5.

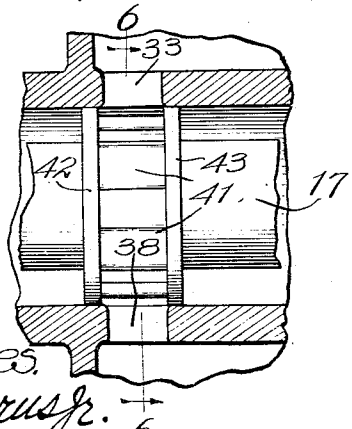
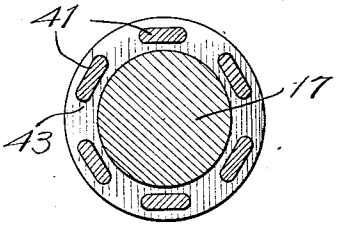


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

LARS W. BODINSON, OF AURORA, ILLINOIS, ASSIGNOR TO THE AMERICAN WELL WORKS, OF AURORA, ILLINOIS, A CORPORATION OF ILLINOIS.

CENTRIFUGAL PUMP.

1,136,928. Specification of Letters Patent. Patented Apr. 27, 1915.

Application filed July 13, 1912. Serial No. 709,131.

To all whom it may concern:

Be it known that I, LARS W. BODINSON, a citizen of the United States, residing at Aurora, in the county of Kane, in the State of Illinois, have invented certain new and useful Improvements in Centrifugal Pumps, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to centrifugal pumps and has for its objects to provide an improved mounting for the pump shaft by which said shaft is supported in a bearing or bearings located at a distance from the pump runner and the chamber in which the runner operates, thereby permitting the use of more efficient packing devices between the bearings and the pump chamber, and preventing any grit or other injurious matter from gaining access to the bearings from the pump chamber; also to provide an improved water-seal around the pump shaft adjacent to the pump chamber thereby preventing leakage around the pump shaft and also preventing the admission of air to the pump chamber, which would interfere with the proper action of the runner by reducing the operative effect of the suction created by its rotation; also to provide improved means for preventing endwise movement of the pump shaft when in operation. I accomplish these objects as illustrated in the drawings and as hereinafter described.

What I regard as new will be set forth in the claims.

In the drawings, Figure 1 is a longitudinal vertical section illustrating my improvements; Fig. 2 is a perspective view showing my improved pump and the motor which operates it; Fig. 3 is an enlarged detail being a vertical sectional view illustrating the thrust bearings and devices for holding them in position; Fig. 4 is a vertical cross-section on line 4—4 of Fig. 3; Fig. 5 is an enlarged detail, being a partial vertical section through the packing chamber which forms the water-seal, showing the lantern-ring; and Fig. 6 is a vertical cross-section of the lantern-ring on line 6—6 of Fig. 5.

Referring to the drawings: 7 indicates a supporting base which may be of any suitable shape and material.

8 indicates an annular shell of the type usually employed in centrifugal pumps, having an axial inlet opening 9 on one side adapted to be connected in any suitable way, as by a coupling 10, with the well or other source of water supply. At the opposite side the shell 8 is adapted to fit upon a circular head 11 which is secured by bolts 12 so as to form a water tight joint. The head 11 is preferably formed integral with the base 7 and carried by a horizontally disposed web 13, best shown in Fig. 1.

14 indicates a lubricating chamber which is preferably formed integral with the base 7, the bottom 15 and sides of said lubricating chamber being continuous with the web 13.

16 indicates a separable cover for the lubricating chamber 14.

17 indicates the pump shaft which extends through the lubricating chamber 14 and through the head 11 into the pump chamber 18, where it carries a runner 19 of any suitable type.

20—21 indicate bearings for the shaft 17 arranged at opposite end portions of the lubricating chamber 14 and supported by the end portions 22—23 of said chamber and by transversely disposed supports 24—25, which may be formed integral with the walls of the chamber.

26—27 indicate sleeves, of Babbitt, or other suitable anti-friction material, interposed between the bearings 20—21 and the shaft 17.

28 indicates rings which hang loosely suspended upon the shaft 17 and are arranged intermediately of the two sleeves 26—27 in such manner that they extend down into the lubricant in the chamber 14 and by the rotation of the shaft operate to carry up the lubricant and apply it to the bearings.

It will be noted that by the construction described the shaft 17 is supported upon bearings which are removed quite a distance from the runner chamber 18, a portion of the pump shaft 17 between the runner chamber and the nearest bearing 21 being exposed so that there is no communication between said bearing and the runner chamber, and consequently grit or other injurious matter cannot pass from the runner chamber to the bearings. Furthermore ample space is provided for a water-seal around the pump shaft adjacent to the runner chamber, as will hereafter be described.

29 indicates a discharge pipe leading from

the lower portion of the lubricating chamber 14 for drawing off the contents thereof when desired.

30 indicates a chamber provided around the pump shaft 17 adjacent to the runner chamber, such chamber being formed by providing a sleeve 31 which is arranged concentric with the head 11 around the pump shaft 17 and is provided with a gland 32 which closes its outer end. The chamber 30 is provided with openings 33 and 38 which lead to an annular supply or settling chamber 39. The said supply chamber entirely surrounds the chamber 30 and in the construction shown is provided with a pipe 35 through which water can be supplied from outside sources. The chamber 39 is also connected by a pipe 36 and valve 37 with the runner chamber 18, to receive a supply of water under pressure therefrom. The chamber 39 is further provided with a drain or washout opening 40, through which sediment or grit can be washed out.

41 indicates a lantern-ring arranged in the chamber 30 opposite the openings 33—38 which are in line with each other. Said lantern-ring is composed of side members or rings 42—43 connected by cross-pieces 44 arranged at intervals, as best shown in Figs. 5 and 6. Said rings 42—43 fit closely between the pump shaft 17 and the inner surface of the sleeve 31, as best shown in Fig. 5, and consequently divide the chamber 30 into three compartments, an inner compartment which is next to the runner chamber, an intermediate compartment, comprising the space between the rings 42—43, and an outer compartment comprising the space between the ring 44 and the gland 32. The rings 42—43 do not form bearings for the shaft 17, but merely serve as dividing means to separate the packing adapted to be placed in the inner and the outer compartments of the chamber 30. The provision of the lantern-ring structure 41 in the intermediate compartment also serves to expose the shaft 17 to the water in the chamber 39, thus preventing the admission of any air to the runner chamber through the packing in the end compartments of the chamber 30. By providing the lantern-ring construction dividing the chamber 30 into three compartments as above described with the opening 38 communicating with the chamber 39, any grit that may pass out of the runner chamber through the pipe 36 will settle in the chamber 39 and will not become imbedded in the packing, the shaft being thus protected against undue wear. In case clean water under pressure is supplied to the chamber 39 through the pipe 35, any gritty water that may be inclined to flow from the runner chamber around the shaft 17 will be forced back, keeping the packing in the chamber 30 clean. Whenever desired the discharge pipe 40 may be opened for washing out the chamber 39 and the middle compartment of the chamber 30.

In order to take the end thrust and prevent longitudinal movement of the pump shaft, I provide a split collar 45, which fits in a reduced portion 46 of the shaft 17, placed adjacent to the bearing 26. The members of said split collar are fitted upon the reduced portion of the shaft 17, and are held together by a ring 47 which screws upon the members of the collar as shown in Fig. 3. As therein shown said split collar is, for a part of its length, of the same diameter as the main portion of the pump shaft 17, the screw-threaded portion, however, being of greater diameter so that it projects beyond the surface of the shaft, and the ring 47, which screws upon the split collar, is, therefore, adapted to be projected over the reduced portion of said split collar in the manner illustrated in Fig. 3. The ring 47 is locked in position by means of a spring retaining device 48, which fits in a groove 49 in said ring 47 and has an inturned end 50 which extends down between the abutting faces of the sections of the collar as shown in Fig. 4. The inner margin of the ring 47 bears against the outer member of the ball-bearing 51, which in turn, bears against the adjacent end of the bearing 26, as shown in Fig. 3. Thus the end thrust of the shaft 17 is taken by the ball-bearing 51. I do not wish to limit myself to the use of a ball-bearing as any equivalent device may be employed. By adjusting the position of the ring 47 upon the split collar 45 the position of the pump shaft may be longitudinally adjusted, it being necessary only to remove the ring 50 in order to permit the ring 47 to be shifted upon the split collar by rotating it.

52 indicates a coupling member, which engages a coöperating member 53, by which the pump shaft is connected with the motor 54 which drives it. The source of power, and the connections between the pump shaft and source of power, form, however, no part of my present invention.

What I claim as my invention and desire to secure by Letters Patent is,—

1. In a centrifugal pump, the combination of a runner chamber, a shaft extending into said chamber, a runner mounted on said shaft, a packing chamber adjacent to the runner chamber and surrounding said shaft, inlet and outlet openings for said packing chamber, and a lantern-ring in said packing chamber opposite said openings.

2. In a centrifugal pump, the combination of a runner chamber, a shaft extending into said chamber, a runner mounted on said shaft, a packing chamber adjacent to

the runner chamber and surrounding said shaft, inlet and outlet openings for said packing chamber, a lantern-ring in said packing chamber opposite said openings, and means for causing water to flow into and out of said packing chamber through said lantern-ring.

3. In a centrifugal pump, the combination of a runner chamber, a shaft extending into said chamber, a runner mounted on said shaft, a packing chamber adjacent to the runner chamber and surrounding said shaft, inlet and outlet openings for said packing chamber, and means between said openings and the outer end of said packing chamber dividing said chamber into separate compartments.

4. In a centrifugal pump, the combination of a runner chamber, a shaft extending into said chamber, a runner mounted on said shaft, a packing chamber adjacent to the runner chamber and surrounding said shaft, means for dividing said packing chamber into three separate compartments, and inlet and outlet openings for the intermediate compartment.

5. In a centrifugal pump, the combination of a runner chamber, a pump shaft extending thereinto, a runner mounted on said shaft, a packing chamber adjacent to the runner chamber and surrounding said shaft, said packing chamber having inlet and outlet openings, and a pipe for supplying water from the runner chamber to said packing chamber.

6. In a centrifugal pump, the combination of a runner chamber, a shaft extending into said chamber, a runner mounted on said shaft, a packing chamber adjacent to the runner chamber and surrounding said shaft, and a water chamber surrounding said packing chamber and communicating therewith.

7. In a centrifugal pump, the combination of a runner chamber, a shaft extending into said chamber, a runner mounted on said shaft, a packing chamber adjacent to the runner chamber and surrounding said shaft, a settling chamber surrounding said packing chamber and communicating therewith, and means for admitting water from said runner chamber to said settling chamber.

8. In a centrifugal pump, the combination of a runner chamber, a pump shaft extending into said chamber, a runner mounted on said shaft, a packing chamber surrounding said shaft adjacent to said runner chamber, a bearing for said shaft separated from and out of contact with said runner chamber and said packing chamber, a settling chamber surrounding said packing chamber and communicating therewith, means for admitting water to said settling chamber, and other means for discharging water therefrom.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."