

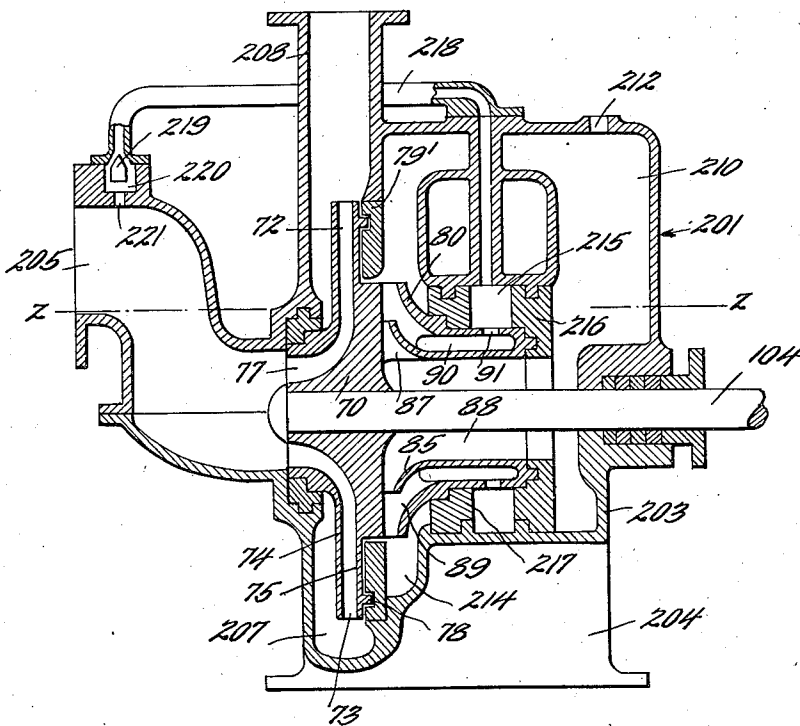
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1 Claim. (Cl. 103—113)

This invention relates to centrifugal pumps and more particularly to rotary pumps of this type which are provided with means for rendering them self-priming.

The general object of the invention is to provide a novel and improved self-priming rotary centrifugal pump of this general type which is of simple and compact construction and which is easy to build, install, and operate.

The present application is a division of my copending application Serial No. 48,411, filed November 5, 1935 which has matured as Patent No. 2,155,452 granted April 25, 1939.

In its preferred form, the invention contemplates the provision of a pump casing and a double rotor or impeller of the type described in the copending application to which reference has been made, one portion of the impeller being adapted to operate upon the main fluid being raised or transmitted and the other portion of the impeller adapted to circulate a relatively stationary body of liquid which is permanently reserved within the casing for the purpose of priming the pump or eliminating air or other gaseous fluid from the channels thereof.

Other objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawing, in which one embodiment of the invention is illustrated by way of example.

In the drawing, the figure is a vertical cross-sectional view through a pump embodying the principles of the present invention.

In the illustrated exemplary embodiment, the impeller is designated generally by the reference numeral 70. This impeller is mounted on the end of the shaft 104 and is provided with the radial passageways 72 which comprise the single fluid pump portion on the left-hand side of the impeller, as shown in the figure. These passageways may be purely radial, but are preferably curved and outwardly expanded circumferentially of the pump in a manner similar to the double fluid aspirating passageways shown in certain figures of the parent application. In general, the double impeller employed in the present arrangement is the same as that illustrated in Figure 6 of the application referred to, and reference may be had to the specification of that case for more detailed descriptions of the impeller. A cross-section of the double fluid portion of the impeller is shown in Figure 2 of that application.

The multiple fluid suction pump side 80 of the impeller is provided with the propelling or

aspirating fluid conduit 88 which leads to the short buckets 87 and the aspirated fluid enters the annular passageway 90 through the holes 91 and is drawn through the outer buckets 89 and thence through the mixing portion of the impeller and outwardly into the volute chamber of the casing.

The casing of this pump is indicated generally by the reference character 201 and is preferably composed of the upper casting 202 and the lower casting 203, the latter being provided with the suitable base 204. The main inlet conduit 205 of the pump is preferably of the shape indicated, the inlet opening being higher than the center intake passageways 77 of the rotary pump section 72. The main volute impeller chamber 207 is provided with the outlet 208 through which the fluid is centrifugally ejected. A priming water compartment 210 is provided on the right-hand side of the pump and this compartment is always filled with priming water to a level indicated by the line z—z. The compartment 210 is provided with an air vent 212 which may serve to exhaust entrapped air or gases to the atmosphere, or may be connected to a suitable container in case these gases are to be collected. The priming water in the chamber or compartment 210 is, of course, free to pass into the central conduit of the right-hand side 80 of the impeller and is also in communication with the volute chamber 214 of the right-hand pump section. The priming water chamber 210 and the volute impeller chamber 214 are both sealed off from the intermediate aspirated fluid inlet chamber 215 by the sealing and bearing rings 216 and 217 fitted to suitable seating surfaces on the casing and the impeller. This inlet chamber is connected by means of the pipe 218 with the inlet conduit 205, the mouth of the pipe being controlled by the liquid operated check valve 219 occupying the chamber 220 in the wall of the conduit 205 which connects with the interior of the conduit by means of the narrow passageway 221.

The operation of this apparatus as a self-priming pump will now be described, a body of priming water being also retained to the level z—z by means of the elevated inlet conduit 205, even though leakage should occur around the clearances between the left-hand pump section 70 and the right-hand pump section 80. Thus the right-hand portion of the pump is always primed and the priming water, being circulated continuously from the compartment 210 through the rotor or impeller through the volute cham-

ber 214 and back to the chamber 210, acts as an aspirating medium in drawing any air or gases which may be in the intake conduit 205 through the pipe 218, the chamber 215, the rotor of the pump 80 and thence into the priming water compartment 210 to escape through the opening 212. As the water level in the intake 205 rises due to the creation of a vacuum above this water level, the left-hand side 70 of the pump will receive water, and the continued rising of the water in the inlet 205 will cause it to enter the chamber 220 and move the floating check valve 219 to close the opening in the pipe 218 and prevent the by-passing of the water through this passageway and mingling with the priming water.

This arrangement can also be used as a suction operated sewage ejector, for replacing certain types of chemical pumps, for raising liquid containing entrained gases and in similar connections.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

A self-priming centrifugal pump comprising, in combination, a casing and a double integrally formed impeller member disposed therein and provided with a centrifugal liquid transfer im-

peller section and a double-bucketed aspirating section, an impeller chamber and discharge opening in said casing for said first named impeller section, an inlet conduit for liquid to be transferred by said first named impeller section; an impeller chamber for said aspirating impeller section, an inlet chamber for fluid to be aspirated thereby, an inlet chamber for the aspirating medium, a priming liquid reservoir, connections between said priming liquid reservoir and the discharge side of said impeller chamber of the aspirating section and the inlet chamber for the aspirating medium whereby the priming liquid may be recirculated during operation, a conduit connecting the upper portion of said liquid inlet conduit with the inlet chamber for the aspirated fluid in the suction pump, an enlargement in the inlet end of said conduit providing a valve chamber, a check valve body in said chamber adapted to be moved to close said conduit upon flow of liquid through said valve chamber but not moved to closed position by flow of air, said liquid actuated check valve being the sole means for controlling the flow of fluid through said connecting conduit.

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