Nov. 29, 1966 M. FREY 3,288,294

PUMP AND STRAINER COMBINATION

Filed Jan. 14, 1964 3 Sheets-Sheet 1

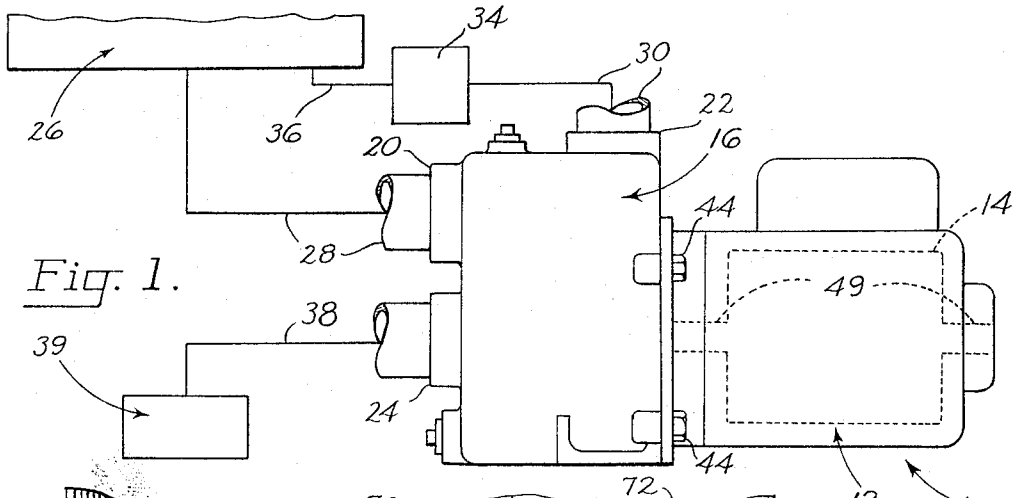


Fig. 1.

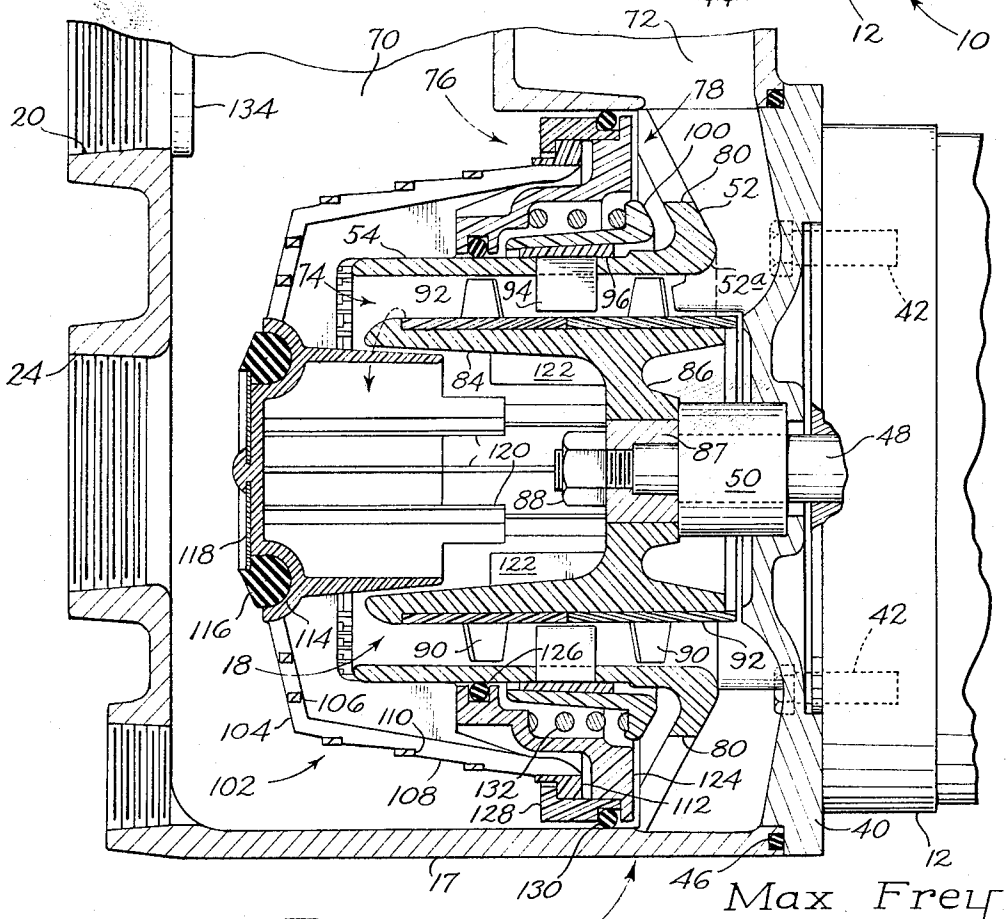


Fig. 2.

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PUMP AND STRAINER COMBINATION

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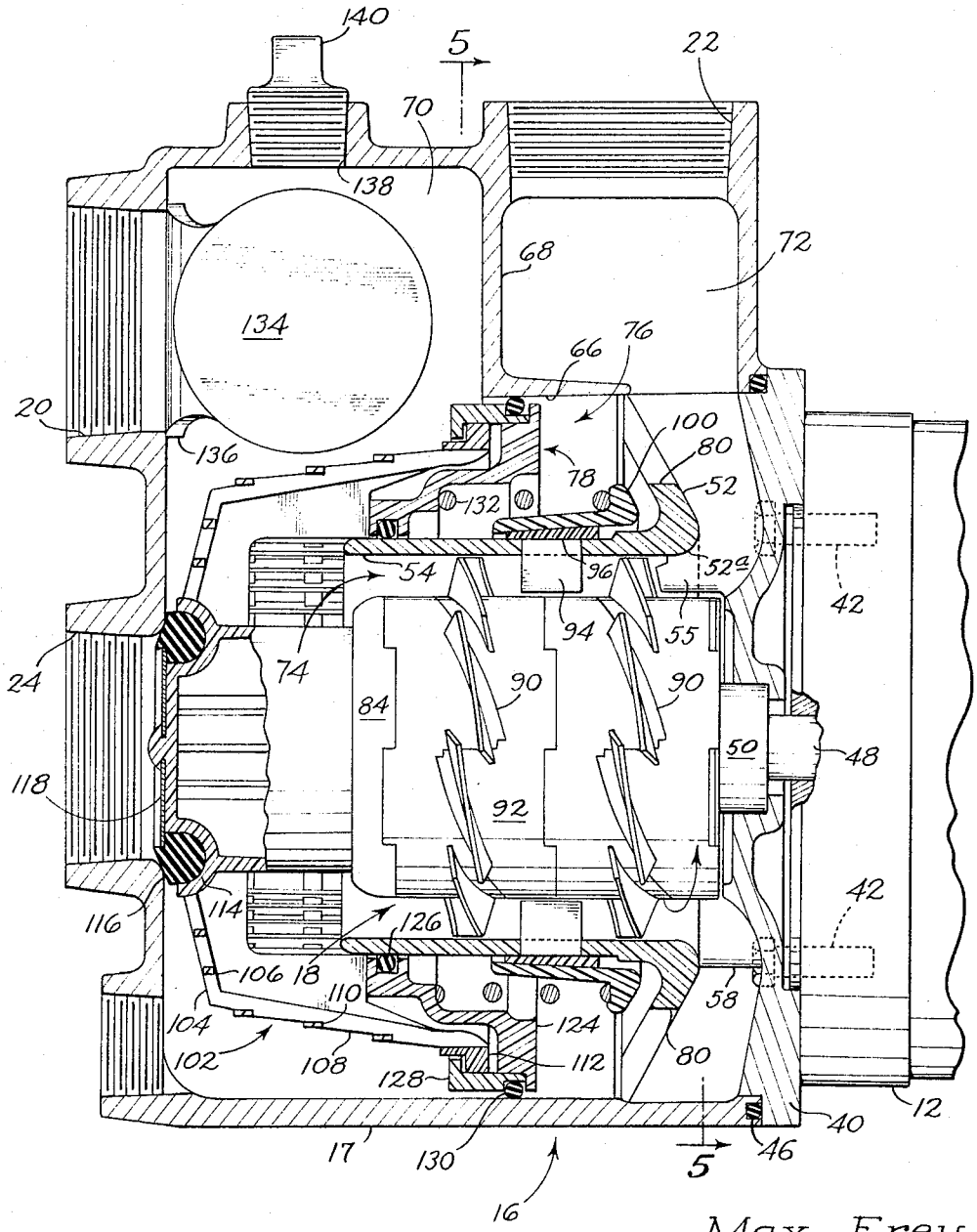


Fig. 3.

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PUMP AND STRAINER COMBINATION

Filed Jan. 14, 1964 3 Sheets-Sheet 3

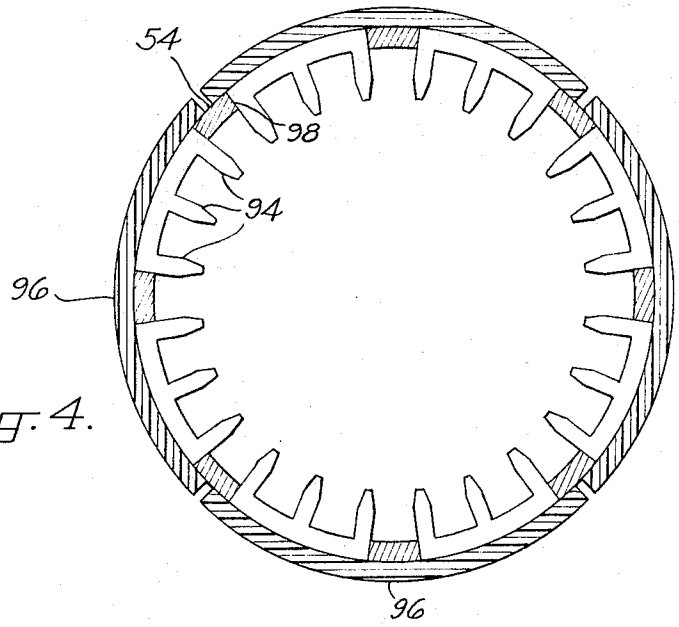


Fig. 4.

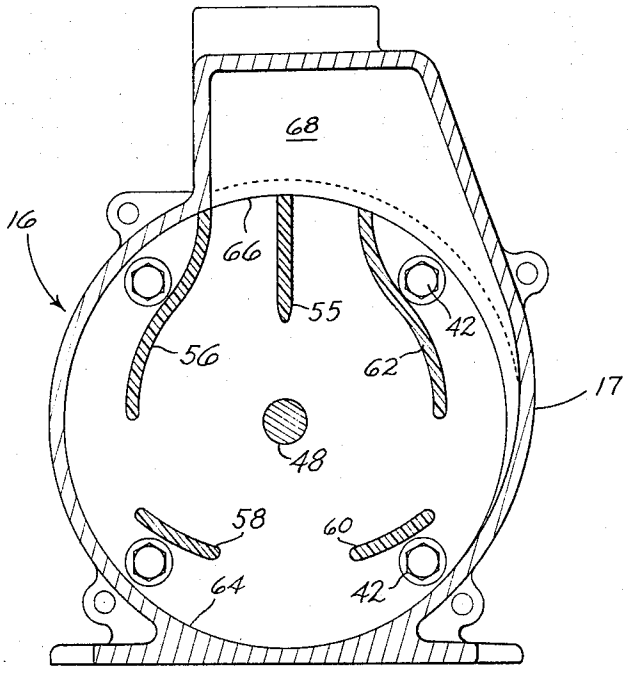


Fig. 5.

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United States Patent Office 3,288,294 Patented Nov. 29, 1966

3,288,294

PUMP AND STRAINER COMBINATION

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10 Claims. (Cl. 210—134)

This invention relates to motor-driven pump units, and more particularly to such apparatus which includes an impeller which is rotatable in either of opposite directions to change the direction of flow through the pump, and mechanism which is shifted in position by reversing the impeller rotation direction, whereby a number of unique and highly advantageous operations are performed within the pump.

The motor-driven pump unit of the invention has particular utility in fluid-handling applications where it is desired to circulate fluid as through a filter, and periodically to reverse the flow of fluid whereby fluid flows backwardly in the system so as to produce backwashing of components in the system. Thus, the unit may be incorporated in the filter system of a swimming pool, where it is desired for the most part to filter the water, but also to backwash periodically the filter and strainer elements in the system with pool water. While the pump unit is described below in such an organization, obviously it may be installed in other fluid handling systems where similar operating conditions are involved.

A general object herein is to provide a novel pump which includes a strainer for straining fluid pumped thereby, and novel means whereby said strainer is effectively cleared of foreign matter after an operating period.

Another object is to provide a pump including a strainer which is reliable in operation, and easily disassembled and repaired in a short time, in the event such becomes necessary.

The pump may be inexpensively produced, and many parts therein may be made of plastic.

Briefly describing a preferred embodiment of this invention, the pump may be an axial flow pump, and includes an impeller which may be rotated forwardly or in reverse, to produce flow in opposite directions. With forward rotation of the impeller, it functions to withdraw fluid from an inlet chamber provided in the housing for the pump on the suction side of the pump, and force such fluid at a higher pressure into an outlet chamber within the housing. A strainer within the housing strains fluid flowing between the chambers, and catches foreign material carried by the fluid thus to prevent the travel of such material over the impeller and into the outlet chamber. When the pump is employed to circulate water in a swimming pool, the outlet chamber containing fluid under pressure may be connected through a conduit containing a filter system to the pool, such conduit functioning to return clean water to the pool. The inlet chamber may be connected by a suction line to the pool, whereby water is withdrawn from the pool.

The strainer is preferably a concavo-convex or cup-shaped member, and is mounted with its outer or convex side facing the inflow of fluid, during forward rotation of the impeller. With forward rotation of the impeller, the strainer is stationary, and a seal mounted on the strainer closes a drain outlet or port in the pump housing. Mounted on the strainer element is novel piston structure, which responds to a change in the fluid pressure in the two chambers described.

When the impeller is rotated in a reverse direction, to produce backwashing, such produces a higher pressure condition in the inlet chamber than exists in the outlet chamber. The piston structure discussed responds by

shifting the strainer element axially, with a number of novel results following. For one thing, the strainer is shifted so that the seal which formerly closed the drain outlet moves away from the outlet to open it. Further, the strainer becomes coupled to the impeller, whereby both rotate together. As a consequence, foreign matter which may have collected on the convex or outer side of the cup-shaped strainer is dislodged from the strainer, through the combined effects of reverse fluid flow through the strainer, and centrifugal force. This matter is carried by the fluid being pumped out through the drain outlet which is now open. With the strainer cleaned, the impeller may again be rotated in its forward direction, to establish original pressure conditions in the inlet and exhaust chambers, with the strainer then returning to its original position.

A further object of the invention, therefore, is to provide an improved reversible pump, which includes a novel strainer within the pump which is coupled to the impeller of the pump when the impeller is rotated in one direction, whereby cleaning of the strainer is facilitated.

Another object is to provide a pump of this description, where the strainer is rotated with the impeller rotated in one direction, and shifted away from the impeller to a braked position, with rotation of the impeller in the opposite direction.

More specifically, an object is to provide a reversible pump, including such a strainer, which further comprises means whereby the strainer is coupled to the impeller with rotation of the impeller in one direction, and is shifted to a stationary position closing off a drain outlet when the impeller is rotated in the opposite direction.

Yet another object is to provide, in a reversible pump, a cup-shaped strainer where straining of fluid with forward rotation of the pump impeller is performed with fluid flowing against the outer convex side of the strainer, such presenting the largest surface area upon which foreign matter may collect.

A still further object is to provide a reversible pump which includes a chamber that during reverse operation of the pump functions as a swirl chamber, said swirl chamber being unobstructed and including a drain outlet through which fluid and foreign matter carried thereby may be easily discharged.

Other objects include the provision of a housing for a pump which is relatively devoid of pockets and other spaces where foreign matter might collect; a construction where large clearances may be provided between operating parts, whereby binding of the parts is inhibited; and a pump which is easily primed on initial start up and which will remain primed over a long period of time.

Further objects and novel features of the invention will become more fully apparent as the following description is read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a side elevation illustrating a pump and motor as contemplated herein;

FIG. 2 is a cross sectional view, illustrating interior portions of the pump in the unit in FIG. 1;

FIG. 3 is another cross sectional view, illustrating interior portions of the pump in the unit in FIG. 1, with parts in the pump occupying another operative position; tion;

FIG. 4 is a cross sectional view of a cylindrical wall provided inside the pump housing, illustrating the mounting of the straighteners therein; and

FIG. 5 is a cross sectional view of the pump housing, along the line 5—5 in FIG. 3, and on a somewhat smaller scale than the scale used in FIG. 3.

Referring to FIG. 1, a motor and pump unit is indicated generally at 10. Unit 10 includes a motor housing 12,

which houses an electric motor **14**. The unit further including a pump housing **16**, which houses an impeller **18** of an axial flow pump (see FIGS. 2 and 3).

As will hereinafter become more fully apparent, the pump in pump housing **16** is a reversible pump. On forward rotation of the impeller, fluid enters the housing to the suction side of the pump through inlet port **20**, and fluid is discharged from the housing through outlet port **22**. On reverse rotation of the impeller, fluid is drawn into the housing through port **22**, and discharged from the housing through a drain outlet or port **24**.

Such a motor and pump unit may be utilized to circulate the water in a swimming pool, such as that shown schematically in FIG. 1 at **26**. A conduit **28** connects the interior of the pool and inlet port **20**. Condit **30** connects outlet port **22** with a filter **34**. From filter **34**, a conduit **36** extends, which connects the filter to pool **26**. A conduit **38** is shown connected to drain or outlet port **24**, which may discharge to a sewer or other drain facility **39**.

With such an organization, on forward rotation of the impeller, water is circulated from the pool through the pump and thence to the filter, whence filtered water is returned to the pool. On reverse rotation of the impeller, water is drawn from the pool through conduit **36** and backwashed through the filter (which cleans the filter) and this water then backwashes through parts in the pump, whence the water is discharged through the drain outlet to a sewer.

Referring now to FIGS. 1, 2 and 3, it will be noted that pump housing **16** includes a casing **17** which is secured to motor housing **12** through a pump housing plate **40**. Housing plate **40** is detachably connected to the motor housing, by means of fasteners or screws **42**. Detachably connecting the housing plate and casing are fasteners or screws **44** (see FIG. 1). Between the housing plate and casing is a seal **46**, which makes a fluid tight connection. Output shaft **48** of motor **14** extends through plate **40**, whereby an end thereof protrudes into the pump housing. The usual bearing structure **49** (see FIG. 1) journals the output shaft in the motor housing. Sealing the shaft to the plate where it extends through plate **40** is a seal **50**.

Impeller **18** is mounted on shaft **48**, and the impeller and shaft **48** are supported in proper position within the pump housing entirely by bearing structure **49** in the motor housing. Thus, any strain on the pump housing does not effect alignment of the shaft and impeller within the pump housing. This feature, and the construction selected for the pump housing and its attachment to the motor housing, contribute to ease in disassembling the unit, by permitting removal from the pump housing (which when installed preferably should remain stationary) of the motor, motor housing and impeller, as one unit, in case repair or replacement of pump parts becomes necessary.

Within pump housing **16** is an annular, frusto-conic skirt or wall **52**. This wall at the smaller diameter end **52***a* thereof joins with a substantially cylindrical wall **54**, which is concentrically positioned with respect to the axis of motor output shaft **48**. Walls **52** and **54** are supported within the pump housing by webs **55**, **56**, **58**, **60** and **62**, which extend between and join wall **52** and housing plate **40** (see FIGS. 3 and 5).

As can be seen in FIG. 5, casing **17** includes a portion **64** which curves about the base of the housing, and which is spaced radially outwardly of and is concentric with shaft **48** and thus cylindrical wall **54**. Curving about upper portions of cylindrical wall **54**, and radially spaced therefrom, is a curved inner housing wall **66**. This curved wall and portion **64** of the casing together define an annular wall which completely encompasses cylindrical wall **54**. Wall **68** joined to casing **17** supports wall **66** in the housing.

Within the housing, wall **68**, curving wall **66** and skirt **52** cooperate to define a partition separating the interior

of the housing into two chambers or cavities, indicated generally at **70** and **72**. With the impeller rotated in a forward direction, fluid on entering the housing enters chamber **70**, and thus this chamber constitutes an inlet chamber. Chamber **72** receives fluid which is to be expelled from the housing and constitutes an exhaust or discharge chamber. The inner surface of cylindrical wall **54** defines a cylindrical passage **74** interconnecting these chambers. About the outside of cylindrical wall **54** and bounded by casing portion **64** and wall **66**, is an annular space **76**. Lodged within this space is piston structure indicated generally at **78**, which will be described in greater detail. Connecting chamber **72** with annular space **76** are ports **80** which extend through and are distributed about skirt **52**.

Impeller **18** is a double-stage impeller, and is mounted within passage **74** connecting chambers **70** and **72**. Describing the impeller more specifically, it may include a cylindrical body **84**, which may be of plastic, which is joined to a hub portion **86**. This hub portion has a fitting **87** mounted thereon, which fits over the end of shaft **48**. Securing the impeller to shaft **48** is a nut **88**.

On the periphery of body **84**, two circumferentially extending rows of impeller blades **90** are provided. As best shown in FIG. 3, these rows of impeller blades are spaced axially on body **84**. The blades also may be made of plastic, and as shown, are joined to sleeves **92** which fit about and are suitably fastened to body **84**.

Forward rotation of the impeller is in the direction indicated by the solid arrow in FIG. 3, and on such forward rotation, fluid is sucked inwardly through inlet port **20** and into the inlet chamber, and thence forced into outlet chamber **72**, whence it flows out of the housing through port **22**. With such forward rotation, the pressure of the fluid contained within the outlet chamber exceeds the pressure of the fluid contained within the inlet chamber. Reverse rotation of the impeller is indicated by the dashed arrow in FIG. 2, and with such reverse rotation fluid is forced in the opposite direction through passage **74**, or from the outlet to the inlet chamber. This is accompanied with a higher fluid pressure in the inlet chamber than in the outlet chamber.

As best shown in FIGS. 2 and 4, intermediate the two rows of impeller blades, and projecting radially inwardly from the cylindrical wall **54** are a series of defusers or straighteners **94**. Each comprises a small blade lying in a plane extending radially and longitudinally of shaft **48**. The straighteners function to straighten out the fluid flowing between the two rows of impeller blades, thus to increase the efficiency of the multistage impeller. The blades may also be made of plastic, and are integrally joined to arcuately curved segments **96**. In assembling the straighteners, the straighteners are fitted through suitable rectangularly shaped apertures **98** formed in cylindrical wall **54**, with segments **96** to which the straighteners are joined then resting on the outside of this cylindrical wall. A lock ring **100** fitted about the segments holds them snugly in place against the outside of wall **54**.

As contemplated herein, a strainer is provided within the pump housing, such being indicated generally at **102**, which functions to strain the fluid circulated by the pump, whereby relatively large-sized pieces of foreign matter are prevented from traveling into filter **34**.

Strainer **102** comprises a concavo-convex or cup-shaped body **104**, defined by circumferentially extending ribs **106** and axially extending ribs **108**. The body may be made of plastic, with the ribs described integrally joined with each other. The strainer body resembles a basket in appearance. Fluid flow through the strainer body is accommodated through apertures **110** defined between the ribs.

It will be noted that the strainer for the most part lies within chamber **70**, and that the convex or outer side of the strainer faces inflowing fluid with forward rotation of the impeller. The concave or inside of the strainer

faces passage 74. As a consequence, the side of the strainer having the largest surface area is presented to incoming fluid, which means that maximum holding capacity for foreign matter is obtained. Lip 112 of the strainer is mounted within annular space 76.

The strainer partially surrounds and is in axial alignment with impeller 18. The base of the strainer, which is toward the left in FIGS. 2 and 3, is in front of the impeller and aligned with drain port 24.

On the outside of the strainer, and extending circumferentially around the base thereof, is an annular groove 114. Groove 114 provides a seat for a seal or sealing ring 116. The sealing ring is held in place by a disk 118, which is fastened to the strainer at the center thereof, and which extends over radially inner margins of the sealing ring.

Ring 116 is utilized to control fluid flow through drain outlet or port 24. FIG. 3 illustrates the sealing ring closing the drain outlet, and it will be noted that in FIG. 3 the strainer occupies a position adjacent the left of the housing. With the strainer shifted to the right from this position, to the position shown in FIG. 2, ring 116 moves off of drain outlet 24 and the drain outlet is opened.

On the inside of the strainer, and integral therewith, is a series of vanes 120 lying in planes extending longitudinally and radially of the axis of the impeller. Impeller body 84 also is provided with a series of vanes, shown at 122, which lie in such longitudinally and radially extending planes. Vanes 120 and vanes 122 provide means for hydraulically coupling the strainer and the impeller, whereby the two rotate together (at dissimilar speeds) when the strainer is shifted to its position closest to the impeller, or to the position shown in FIG. 2. Vanes 120 are disposed radially inwardly of vanes 122, so that coupling is produced hydraulically and not by direct engagement of the vanes.

Movement of the strainer away from the impeller, and to the position shown in FIG. 3 where sealing ring 116 closes the drain outlet, results in uncoupling of the strainer and impeller, partly because the two sets of vanes described are shifted away from each other with such movement, and partly because of the braking effect of sealing ring 116 when such engages the housing around port 24. With the strainer uncoupled from the impeller, it lodges in a stationary position.

Piston structure 78, already discussed generally, is mounted on lip 112 of the strainer. The piston structure responds to differences in the pressure of fluid in chambers 70 and 72. The strainer is shifted by structure 78 to the right or toward the impeller when a higher pressure exists in inlet chamber 70 than in chamber 72, and to the left or away from the impeller when a higher pressure exists in outlet chamber 72 than in chamber 70.

This piston structure comprises an annular part 124 mounting a ring seal 126 which is sealed to the outside of wall 54. Joined to the radially outer margin of part 124 is an annular retainer member 128. A ring seal 130 extending about retainer member 128 seals the retainer member to the surface bounding annular space 76.

A lock ring 100 has been described, which holds segments 96 in place. Interposed between this lock ring and annular part 124 is a compression spring 132. This spring functions to urge the strainer to its position closing the drain outlet, in the absence of any movement of the impeller producing closing of the drain outlet.

Inlet port 20 leading to chamber 70 is opened and closed by a diaphragm 134 hinged at 136 to the pump housing. The diaphragm constitutes check valve means accommodating the inflow of fluid only through port 20 into chamber 70. In FIG. 3, the diaphragm is illustrated swung to one side and opening the port.

With the impeller rotated in a reverse direction or as shown by the dashed arrow in FIG. 2, fluid in chamber 70 (which with such reverse operation of the impeller constitutes a swirl chamber) moves over the diaphragm by first moving over the hinged edge thereof and thence over the remainder of the diaphragm. This movement of the water assists in clearing any possible foreign matter from the inlet port which may have lodged there, whereby closing of the inlet by the diaphragm is facilitated.

Completing the description of the pump, a port 138 is provided adjacent the top of the pump housing, which may be opened, by removing plug 140, when it is desired to prime the pump. With the pump at rest, sealing ring 116 tightly closes the drain outlet, and a water level is assured in the pump housing which is at least as high as the bottom of diaphragm 134. Thus, priming is only necessary on initial start up of the unit.

Describing now the operation of the motor and pump unit, and how such may be used in conjunction with a swimming pool to circulate water therein, on forward rotation of the impeller water is drawn in through inlet port 20 into the inlet chamber, and thence forced by the impeller to outlet chamber 72 and outlet port 22. The impeller with forward rotation produces a high fluid pressure in chamber 72, and this fluid pressure is transmitted through ports or apertures 80 to the right side of piston structure 78 in space 76. As a consequence, the strainer is shifted axially to the left of the impeller, and toward the drain outlet, with sealing ring 116 then closing the drain outlet. With closing of the outlet, the strainer is anchored, and water flows from the outside and through the strainer to the inside of the strainer and thence into the passage 74. This water, as shown in FIG. 1, then flows to the filter, and back to the swimming pool.

On reverse rotation of the impeller, a high pressure condition is produced in chamber 70, with the result that piston structure 78 shifts the strainer to the right or toward the impeller. Diaphragm 134 swings to a position closing inlet port 20. With the strainer shifted to the right, drain outlet 24 is opened, and water together with any material that has collected on the outside of the strainer is discharged through the drain outlet to the sewer.

With the strainer axially inwardly on the impeller, as in FIG. 2, the strainer and impeller are coupled together so that the strainer rotates with the impeller. Thus, water rushing through the strainer, together with the action of centrifugal force, promotes complete clearing of material from the outside of the strainer. As a further feature, it should be noted that the impeller and strainer produce a whirl of water in inlet chamber 20, which such whirling about an axis coincides substantially with the center of the drain outlet. Chamber 20, which now functions as a swirl chamber, is unobstructed and thus is cleaned rapidly.

With forward rotation of the impeller, and the parts in the position shown in FIG. 3, the strainer is stationary, which is advantageous, as this minimizes tendencies for irregularly shaped objects to work themselves through the strainer.

The inclusion of coil spring 132 assures that the drain outlet is closed when the impeller is stopped. Thus a supply of fluid is kept in the housing whereby additional priming is not needed when the unit is restarted.

The piston structure is supported on radially inner and outer walls by seals which are off-set axially. This prevents the piston from skewing on its mounting.

The impeller parts, including the blades, the straighteners, the strainer, and the piston structure may be made of plastic material. The entire assembly is easily supported on the motor output shaft, without the need for bearings within the pump housing.

While an embodiment of the invention has been described, is should be obvious that variations and modifications are possible without departing from the invention. It is desired to cover all such variations and reorganizations as would be apparent to those skilled in the art, and that come within the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. A pump comprising a housing,
a strainer rotatably mounted in said housing,
a power-driven reversible impeller mounted in the housing for producing fluid flow through the housing,
means defining one course for fluid flow through said housing when said impeller is rotated in one direction, with fluid flow being in one direction through said strainer,
means defining another course for fluid flow through said housing when said impeller is rotated in the opposite direction with fluid flow being in the opposite direction through said strainer,
means anchoring said strainer against rotation when fluid flow is in said one direction through the strainer, and
means coupling together said strainer and impeller so that both rotate together when fluid flow is in said opposite direction through said strainer.

2. A pump comprising a housing,
a cup-shaped strainer rotatably mounted in the housing,
a power-driven reversible impeller mounted in the housing for producing fluid flow through the housing,
means defining one course for fluid flow through said housing when said impeller is rotated in one direction, with fluid flow from being the outside of the cup-shaped strainer and thence through the strainer to the inside of the strainer,
means defining another course for fluid flow through said housing when said impeller is rotated in the opposite direction, with fluid flow being from the inside of the cup-shaped strainer and thence through the strainer to the outside of said strainer,
means anchoring said strainer against rotation when fluid flow is from the ouside to the inside thereof, and
means coupling together said strainer and impeller so that both rotate together when fluid flow is from the inside to the outside of said strainer.

3. In combination with a drain, and a reservoir for holding fluid,
a pump including a housing having one port connected to said drain and two ports connected to said reservoir,
a power-driven impeller mounted within said housing which is rotatable in opposite directions,
a cup-shaped strainer within said housing,
means whereby when said impeller is rotated in one direction, fluid is drawn through one of said two ports against the outside and thence through the strainer, and then discharged through the other of said two ports, and when said impeller is rotated in the opposite direction, fluid is drawn through the other of said two ports against the inside of said strainer and thence through the strainer, whence it is discharged through said one port, and
means coupling together said strainer and impeller whereby the strainer is rotated with the impeller on rotation of the impeller in said opposite direction.

4. A pump comprising a housing,
means defining a chamber within said housing,
a pair of ports leading to the outside of said housing and communicating with said chamber,
a reversible power-driven impeller mounted in said housing operable to pump fluid from said chamber when rotated in one direction, and to pump fluid into said chamber when rotated in the opposite direction,
check valve means for one of said ports accommodating fluid flow into said chamber only,
movable strainer mechanism mounted in said chamber including closure means shiftable between positions opening and closing the other of said ports, and
means whereby when said impeller is rotated in said one direction said strainer mechanism is moved so as to shift said closure means to a position closing said other port, and when said impeller is rotated in said opposite direction said strainer mechanism is moved so as to shift said closure means to a position opening said other port.

5. The pump of claim 4, wherein said last-mentioned means comprises a piston actuated by fluid pumped by said impeller.

6. A pump comprising a housing,
walls defining a pair of chambers within said housing,
passage means connecting said pair of chambers inside said housing,
a reversible power-driven impeller mounted in said housing operable when rotated in one direction to produce flow through said passage from one to the other of said chambers, with said other chamber then containing fluid at a higher pressure than said one chamber, and operable when rotated in the opposite direction to produce reverse flow with said one chamber then containing fluid at higher pressure than said other chamber,
a strainer for straining fluid mounted in a position to strain fluid flowing between said pair of chambers,
piston structure within said housing responsive to a difference in the pressure of fluid in said pair of chambers, and
coupling means having operative and inoperative positions interposed between said strainer and said impeller and operable in its operative position only to couple the strainer and impeller for rotation together,
said piston structure being operatively connected to said coupling means whereby with a higher pressure in said one chamber than said other chamber said coupling means is placed in its operative position so that said strainer and impeller rotate together, and with a higher pressure existing in said other chamber than said one chamber said coupling means is placed in its inoperative position.

7. A pump comprising
a housing,
walls defining a pair of chambers within said housing,
an inlet port and a drain port in said housing communicating with one of said chambers,
an exhaust port in said housing communicating with the other of said chambers,
check valve means for said inlet port accommodating the flow of fluid into said one chamber only,
passage means in said housing interconnecting said pair of chambers,
a reversible power-driven impeller mounted in said passage means operable when rotated in one direction to produce flow through said passage means from said one to the other of said chambers, with said other chamber then containing fluid at higher pressure than said one chamber, and operable when rotated in the opposite direction to produce reverse flow with said one chamber then containing fluid at higher pressure than said other chamber,
a piston mounted in said housing exposed on one side to said one chamber and on its opposite side to said other chamber, whereby the piston is responsive to differences in the pressure of fluid contained in said pair of chambers,
a cup-shaped movable strainer body mounted in said housing, with the convex side thereof disposed in said one chamber and with the concave side thereof facing said other chamber, operable to strain fluid flowing through said passage means,
closure means mounted on the convex side of said strainer body,
means connecting said piston and strainer body whereby when said other chamber contains fluid at a higher pressure than the fluid in said one chamber, said

strainer body is shifted to a position where said closure means closes said drain port, and when said one chamber contains fluid at a higher pressure than said other chamber, said strainer is shifted to a second position where said closure means is moved off said drain port, and

coupling means between said strainer body and impeller operable to couple the two together when said body is in its said second position, whereby both rotate together.

8. In a fluid handling system a pump comprising a housing, a strainer rotatably mounted in said housing, a rotatable power-driven impeller mounted within said housing operable when rotated to produce fluid flow through the strainer with the direction of fluid flow depending upon the direction of rotation of the impeller, and fluid pressure responsive means responsive to a pressure condition within the housing when fluid is pumped by said impeller in one direction to effect coupling together of the strainer and impeller whereby the impeller causes rotation of the strainer, said fluid pressure responsive means being responsive to a pressure condition within the housing when fluid is pumped by said impeller in the opposite direction to effect uncoupling of the strainer from the impeller and anchoring of the strainer against rotation within the housing, said fluid handling system having means defining one course for fluid flow when the impeller is rotated in one direction with fluid flow being in one direction through the strainer and means defining another course for fluid flow when the impeller is rotated in the opposite direction with fluid flow being in the opposite direction through the strainer.

9. A pump comprising a housing, means defining a chamber within the housing, a reversable power-driven impeller mounted in said housing, a drain port in said housing communicating with said chamber, movable strainer mechanism mounted in said chamber including closure means for closing off said drain port, means whereby when said impeller is rotated in one direction only said strainer mechanism is moved so as to shift its said closure means away from the drain port thus to open up the drain port, and biasing means operatively connected to the strainer mechanism operable when the impeller is stationary to bias said strainer mechanism to a position where its closure means closes said drain port.

10. A pump comprising a housing,

a strainer rotatably mounted in said housing,

rotatable impeller means for pumping fluid through the strainer in said housing in either of opposite direction,

means defining one course for fluid flow through the housing when the impeller is rotated in one direction with fluid flow being in one direction through the strainer,

means defining another course for fluid flow through the housing when the impeller is rotated in the opposite direction with fluid flow being in the opposite direction through the strainer, and

means responsive to fluid flow in one direction through the strainer operable automatically to anchor said strainer against rotation and responsive to fluid flow in the opposite direction through the strainer operable automatically to rotate the strainer.

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