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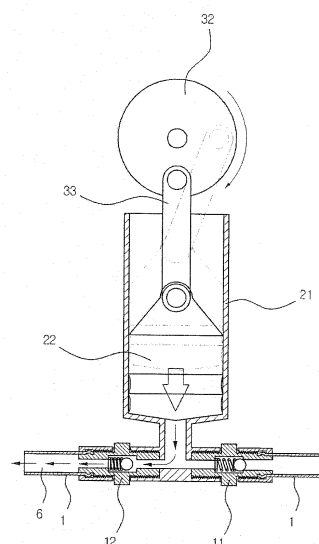
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(54) **CONDENSATE DRAIN PUMP FOR AN AIR CONDITIONER**

(57) The present invention is related to a drain pump for discharging condensate of an air conditioner. A conventional drain pump for discharging condensate generated from an air conditioner has a merit that much waters are discharged for a short time, but had shortcomings that big noises are generated and a drain pressure is low. Therefore, the present invention is devised in order to solve these problems, and is related to a drain pump for discharging condensate of an air conditioner comprising a condensate discharge hose including two check valves which are formed in neighboring places, respectively and are extended to a storage tank where generated condensate is stored and a place where the condensate is discharged, so that inhaled condensate can be discharged via a check valve if a piston moves toward only a direction to which the condensate is discharged in the middle between the storage tank and the place, and the inhaled condensate cannot be discharged to the storage tank by the check valve; a pumping device including a cylinder having one opened end and the other end connected to a position between said two check valves, and the piston inserted from an open position of the cylinder for executing reciprocating motions while maintaining water tightness; and a driving device including a crank axis rotated by a low speed motor, and a connecting rod having one end connected to the crank axis and the other end connected to the piston for converting rotation movements of the low speed motor into rectilinear reciprocating movements of the piston.

FIG. 4



Description

Background of Invention

1. Field of Invention

[0001] The present invention is related to a drain pump for discharging condensate of an air conditioner, and in particular, it is related to a drain pump for discharging condensate of an air conditioner which reduces generation of noises remarkably and increases a discharge pressure for discharging condensate easily to a great distance or a higher place while discharging the condensate generated from an air conditioner.

[0002] Further, the present invention is related to a drain pump for discharging condensate of an air conditioner, wherein the noises can be reduced by driving a motor having small output and a series of devices including a drain pump can be miniaturized even if there is a need to drain waters to a high place.

2. Description of Related Art

[0003] In the prior art, a system has been employed, wherein when operating an air conditioner, the condensate generated at the same time when a heat exchange is performed in an evaporation coil is accumulated and in particular, if a temperature difference between an inside and an outside is tremendous large, or an air conditioner has a very high output, since extremely huge amount of the condensate is discharged, a separate drain pipe for discharging the condensate and/or a pump for draining the condensate is arranged and thus, the condensate is discharged if a constant amount of condensate is accumulated.

[0004] In particular, when an air conditioner is arranged in a basement and a user wants to discharge the condensate to an outside place higher than the basement, it is very crucial to connect a drain pump to a system for draining waters by sensing this accumulated condensate if a constant amount of condensate is accumulated, and operate the drain pump.

[0005] However, in case of a conventional drain pump, a system for inhaling and discharging the condensate by using an impeller rotating at a high speed was arranged and thus, there was a merit that much amount of waters can be discharged for a very rapid time. But, there was a problem that much noises were generated during operations.

[0006] Especially, there was a demerit that the noise is getting larger and larger as the time passes by.

SUMMARY OF THE INVENTION

[0007] The present invention is devised in order to solve the above-mentioned problems and the object of the present invention is to provide a drain pump which does not almost generate noises during operation of a

drain pump for discharging the condensate of an air conditioner.

[0008] Further, another object of the present invention is to provide a drain pump for discharging waters to a high place at a high pressure even if a motor having a small output is employed.

[0009] In order to solve the above-mentioned problems, the present invention provides a drain pump for discharging condensate of an air conditioner comprising, a condensate discharge hose including two check valves which are formed in neighboring places, respectively and are extended to a storage tank where generated condensate is stored and a place where the condensate is discharged, so that inhaled condensate can be discharged via a check valve if a piston moves toward only a direction to which the condensate is discharged in the middle between the storage tank and the place, and the inhaled condensate cannot be discharged to the storage tank by the check valve;

a pumping device including a cylinder having one opened end and the other end connected to a position between said two check valves, and the piston inserted from an open position of the cylinder for executing reciprocating motions while maintaining water tightness; and

a driving device including a crank axis rotated by a low speed motor, and a connecting rod having one end connected to the crank axis and the other end connected to the piston for converting rotation movements of the low speed motor into rectilinear reciprocating movements of the piston.

[0010] Further, the present invention is characterized in that the pumping device and the driving device are accommodated inside a upper case and a lower case, between which a seal for preventing leakage of water is formed at a connection portion.

[0011] Further, the present invention is characterized in that the low speed motor is accommodated in the lower case and a bottom side of the upper case is tightly sealed with the lower case except an axis hole through which an axis of the low speed motor including a mounted oil seal penetrate.

[0012] Further, the present invention is characterized in that the upper case having the sealed bottom side includes some opened portions and is covered with a transparent cover and the crank axis the connecting rod and the pumping device are accommodated inside the upper case.

[0013] As described above, according to the present invention, there are effects that waters are drained by combination of a piston and a cylinder and thus the noises generated when operating a motor are minimized so that more comfortable atmosphere can be obtained.

[0014] Further, the present invention has very advantageous effects that the noises can be reduced by driving a motor having small output and a series of devices including a drain pump can be miniaturized even if there is a need to supply waters to a high place.

Brief Description of Drawings

[0015]

Fig. 1 is a diagram illustrating one embodiment of the present invention.

Fig. 2 is a diagram an analytic diagram illustrating one embodiment of the present invention.

Fig 3 and Fig. 4 are conceptual diagrams illustrating operations of one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The present invention will be explained as follows with referring to the attached drawings so that the person in the art can understand fully and implement the invention.

[0017] Fig. 1 is a diagram illustrating one embodiment of the present invention. Fig. 2 is a diagram an analytic diagram illustrating one embodiment of the present invention. Fig. 3 and Fig. 4 are conceptual diagrams illustrating operations of one embodiment of the present invention.

[0018] A drain pump for discharging condensate of an air conditioner according to the present invention mainly consists of a condensate discharge hose 1 including two check valves 11, 12 which are formed in neighboring places, respectively and are extended to a storage tank where generated condensate is stored and a place where the condensate is discharged, so that inhaled condensate 6 can be discharged via a check valve 12 if a piston 22 moves toward only a direction to which the condensate is discharged in the middle between the storage tank and the place, and the inhaled condensate 6 cannot be discharged to the storage tank by the check valve 11; a pumping device 2 including a cylinder 21 having one opened end and the other end connected to a position between said two check valves 11, 12, and the piston 22 inserted from an open position of the cylinder 21 for executing reciprocating motions while maintaining water tightness; and a driving device 3 including a crank axis 32 rotated by a low speed motor 31, and a connecting rod 33 having one end connected to the crank axis 32 and the other end connected to the piston 22 for converting rotation movements of the low speed motor 31 into rectilinear reciprocating movements of the piston 22.

[0019] The operations of the above structure are as follows. When the piston 22 is moved backward according to driving of the low speed motor 31, the condensate 6 stored in the storage tank of the cylinder 21 is inhaled via the check valve 11. At this time, since the check valve 12 on a discharging path prevents backward flowing, the condensate on the discharging path is not inhaled.

[0020] Subsequently, when the piston 22 is moved forward, the inhaled condensate 6 is discharged via the check valve 12 and is not discharged to a direction where the storage tank is arranged by the check valve 11.

[0021] In a case that the condensate is inhaled and discharged due to an impeller embedded in a conventional motor rotating at a high speed, the motor exhibits very excellent performances in absorbing huge amount of waters and thus it has been used in most pumps.

[0022] Therefore, it has been a typical model of most pumps widely used in all industrial fields, but since the impeller runs idle as a pressure is increasing bit by bit, it was necessary to arrange a motor of a high output in order to supply the condensate 6 to a high place(that is, at a high pressure).

[0023] Further, in connection with a drain pump of an air conditioner for supplying a small amount of waters continuously at a high pressure, a pump having the same principles is used, but the effect that a time for discharging a constant amount of the condensate is shortened is not recognized as an indispensable condition.

[0024] On the contrary, there are problems such as generation of noises at the operation time, and installation of a motor of a high output for supplying the condensate to a high place.

[0025] But, as the conventional pump, according to the present invention, since the pressures of contraction and expansion of the condensate have something to do with inhalation and drainage in a cylinder, when employing a motor of the same output, the present invention can be used even under a high pressure.

[0026] That is, even under a high pressure, weights of loads are applied to a rotating crank axis and at this time, if a low speed motor having a high output is used, it stands against the loads and rotates so that smooth drain can be performed. But, in case of an impeller including a motor having the same output capacity, as mentioned in the foregoing paragraphs, there is a problem that the impeller runs idle due to a pressure.

[0027] Further, the amount of condensate generated in an air conditioner depends on the surrounding conditions and size of an air conditioner, but the amount is not so large, and thus the effect will be two-fold.

[0028] Further, as more specific embodiments of a present invention, an embodiment which is characterized in that the pumping device 2 and the driving device 3 are accommodated inside a upper case 4 and a lower case 5, between which a seal 51 for preventing leakage of water is formed at a connection portion; and an embodiment which is characterized in that the low speed motor 31 is accommodated in the lower case 51, and a bottom side of the upper case 4 is tightly sealed with the lower case 5 except an axis hole 41 through which an axis 35 of the low speed motor 31 including a mounted oil seal 34 penetrate are suggested.

[0029] In the above embodiments, it is natural that a constant case must be arranged for a drain pump, or a drain pump which is mounted separately in most cases

unlike a general air conditioner.

[0030] But, the present invention suggests an embodiment for removing the low speed motor 31 which is very vulnerable to a condensate and other humidity from this case so that water tightness can be maintained.

[0031] At this time, an idea for embedding a control plate 52 additionally on the lower case 5 for driving or stopping the lower speed motor 31 by sensing a water level of the condensate and sealing it can be devised, and the control plate can be controlled from outside according to circumstances.

[0032] Further, the upper case having the sealed bottom side includes some opened portions and is covered with a transparent cover 42, and the crank axis 32, the connecting rod 33 and the pumping device are accommodated inside the upper case so that operations of a drain pump can be confirmed from outside.

[0033] In this way, the present invention is explained by taking the preferred embodiments of the present invention as the examples, but the present invention is not limited these embodiments and is understood by the attached claims. Further, it is natural that various kinds of changes and modifications can be made by the person having a common knowledge in the art to which the present invention pertain within the technological concepts of the present invention and the scope equivalent to the attached claims

Industrial Availability

[0034] A drain pump for discharging condensate of an air conditioner according to the present invention minimizes the noises generated during operations of a motor and a pump and thereby, it can provide comfortable environments of the air conditioners for houses, offices and industrial purposes. Further, the drain pump can provide very useful industrial effects that a pump device can be miniaturized by using a motor of a small output and it is possible to discharge the condensate of an air conditioner to the distant and high places by using even a small output of a pump. Therefore, the present invention have industrial availability.

Claims

1. A drain pump for discharging condensate of an air conditioner comprising,
a condensate discharge hose 1 including two check valves 11, 12 which are formed in neighboring places, respectively and are extended to a storage tank where generated condensate is stored and a place where the condensate is discharged, so that inhaled condensate 6 can be discharged via a check valve 12 if a piston 22 moves toward only a direction to which the condensate is discharged in the middle between the storage tank and the place, and the inhaled condensate 6 cannot be discharged to the stor-

age tank by the check valve 11;

a pumping device 2 including a cylinder 21 having one opened end and the other end connected to a position between said two check valves 11, 12, and the piston 22 inserted from an open position of the cylinder 21 for executing reciprocating motions while maintaining water tightness; and

a driving device 3 including a crank axis 32 rotated by a low speed motor 31, and a connecting rod 33 having one end connected to the crank axis 32 and the other end connected to the piston 22 for converting rotation movements of the low speed motor 31 into rectilinear reciprocating movements of the piston 22, and

wherein the pumping device 2 and the driving device 3 are accommodated inside a upper case 4 and a lower case 5, between which a seal 51 for preventing leakage of water is formed at a connection portion.

2. The drain pump for discharging condensate of an air conditioner according to the claim 1, wherein the low speed motor 31 is accommodated in the lower case 51, and a bottom side of the upper case 4 is tightly sealed with the lower case 5 except an axis hole 41 through which an axis 35 of the low speed motor 31 including a mounted oil seal 34 penetrate.
3. The drain pump for discharging condensate of an air conditioner according to the claim 2, wherein the upper case having the sealed bottom side includes some opened portions and is covered with a transparent cover 42, and the crank axis 32, the connecting rod 33 and the pumping device are accommodated inside the upper case.
4. The drain pump for discharging condensate of an air conditioner according to the claim 2, wherein a control plate 52 for driving or stopping the lower speed motor 31 by sensing a water level of the condensate is accommodated on a bottom side of the lower case 5.

FIG. 1

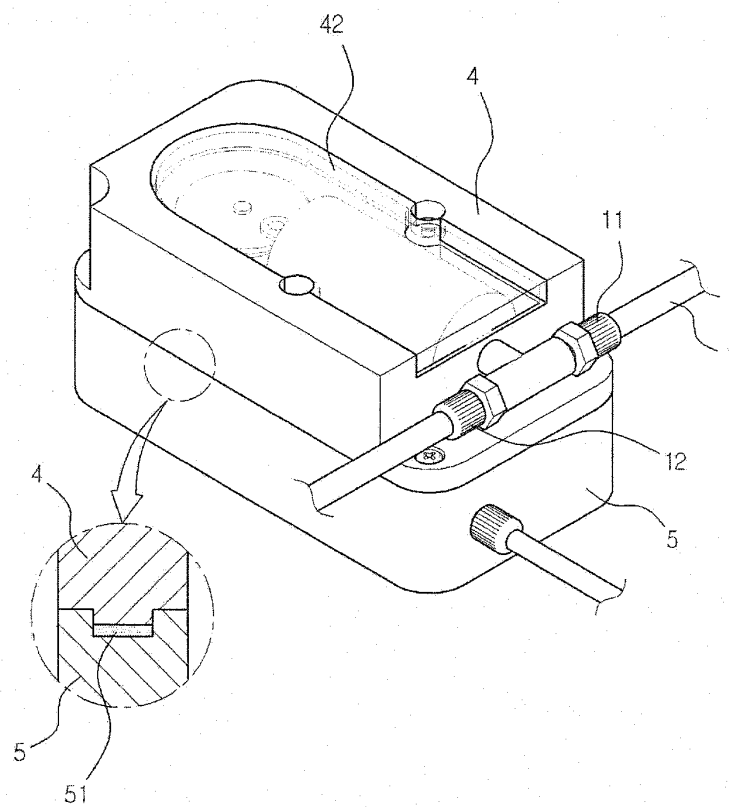


FIG. 2

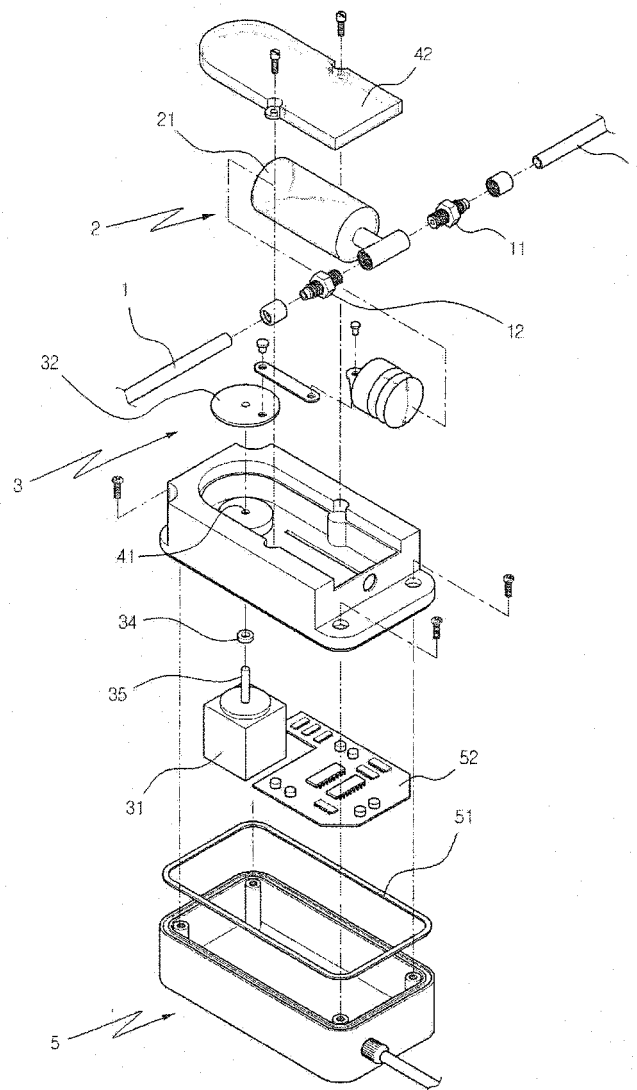


FIG. 3

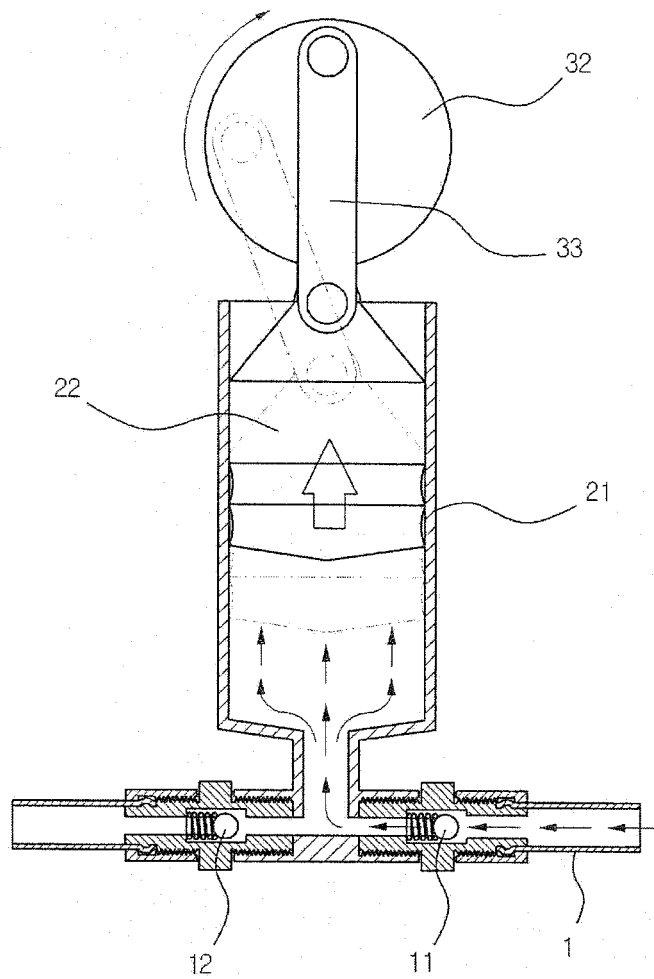


FIG. 4

