

TWO-WAY CIRCULATING PUMP AND ENGINE OIL PURIFICATION SYSTEM

FIELD OF THE INVENTION

[0001] The present invention relates to the field of lubricant purification equipment in a machine or an engine, in particular to a two-way circulating pump and an engine oil purification system.

THE RELATED ART

[0002] At present, typical pumps are all one-way pumps. When circulating the engine oil for purification, it is required to run two pumps simultaneously, one is used for pumping the engine oil to be purified from a container into a filter to be filtered and purified, and the other is used for pumping the filtered and purified engine oil back to the container. The two pumps are operated simultaneously, which increases not only the equipment cost but also the energy consumption and thus is not good for environmental protection.

SUMMARY OF THE INVENTION

[0003] In view of the above described disadvantages, the technical problem to be solved by the present invention is to provide a two-way circulating pump and an engine oil purification system, which integrate two pumps into a single one and thus can decrease not only equipment cost but also energy consumption.

[0004] To solve the above technical problem, a two-way circulating pump provided in the present invention includes an upper seat, a middle seat, a lower seat, a first main wheel, a first accessory wheel, a second main wheel and a second accessory wheel, wherein, the first main wheel and the first accessory wheel are meshed with each other and are mounted within a first chamber, which is constituted by the upper seat and the middle seat and is provided with a first oil inlet and a first oil outlet, through rotating shafts respectively, the second main wheel and the second accessory wheel are meshed with each other and are mounted within a chamber, which is constituted by the middle seat and the lower seat and is provided with a

second oil inlet and a second oil outlet, through rotating shafts respectively, the rotating shaft of the first main wheel is provided with a recess, and the rotating shaft of the second main wheel is provided with a protrusion that is socketed within the recess, the first main wheel is drivingly connected to a motor.

[0005] Preferably, the two-way circulating pump further includes a pressure regulator for pressure regulating.

[0006] Preferably, the two-way circulating pump further includes a controller.

[0007] Preferably, the motor is an induction motor.

[0008] In addition, the present invention also provides an engine oil purification system including a two-way circulating pump described as above, a filter and an auxiliary box, the first oil outlet of the two-way circulating pump is connected to the filter, the filter is connected to the auxiliary box, the auxiliary box is connected to the second oil inlet of the two-way circulating pump, and the first oil inlet and the second oil outlet are connected to a container for containing the engine oil to be purified.

[0009] Preferably, the auxiliary box is provided with a sensor and a control valve, which are connected to the controller of the two-way circulating pump.

[0010] With the two-way circulating pump provided in the present invention, the first main wheel and the first accessory wheel are meshed with each other and are mounted within a first chamber, which is constituted by the upper seat and the middle seat and is provided with a first oil inlet and a first oil outlet, through rotating shafts respectively, the second main wheel and the second accessory wheel are meshed with each other and are mounted within a chamber, which is constituted by the middle seat and the lower seat and is provided with a second oil inlet and a second oil outlet, through rotating shafts respectively, the rotating shaft of the first main wheel is provided with a recess, and the rotating shaft of the second main wheel is provided with a protrusion that is socketed within the recess, the first main wheel is drivingly connected to a motor. This two-way circulating pump integrates two separately operated pumps into a single pump and shares one motor. The motor simultaneously drives the first main wheel and the second main wheel to rotate, thus decreasing not only the equipment cost but also the energy consumption.

[0011] In addition, the present invention also provides an engine oil purification system

including the above described two-way circulating pump.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 is a structural schematic view of a two-way circulating pump in the present invention;

[0013] Fig. 2 is an exploded structural schematic view of the two-way circulating pump of Fig. 1;

[0014] Fig. 3 is a structural schematic view showing another side of the two-way circulating pump in the present invention;

[0015] Fig. 4 is an exploded structural schematic view of the two-way circulating pump of Fig. 3;

[0016] Fig. 5 is a structural schematic view of a second main wheel of Fig. 4;

[0017] Fig. 6 is a top view of the second main wheel of Fig. 5;

[0018] Fig. 7 is structural schematic view of a second accessory wheel of Fig. 4;

[0019] Fig. 8 is a top view of the second accessory wheel of Fig. 7;

[0020] Fig. 9 is structural schematic view of a first main wheel of Fig. 4;

[0021] Fig. 10 is a bottom view of the first main wheel of Fig. 9;

[0022] Fig. 11 is structural schematic view of the second accessory wheel of Fig. 4;

[0023] Fig. 12 is a top view of the second accessory wheel of Fig. 11; and

[0024] Fig. 13 is a working principle diagram of the engine oil purification system in the present invention, in which the single-head arrow indicates a direction along which the engine oil flows.

DETAILED DESCRIPTION OF THE INVENTION

[0025] In order that those skilled in the art can understand the technical solution of the present invention better, descriptions will be given below with reference to particular embodiments.

[0026] Referring to Figs. 1-12, Fig. 1 is a structural schematic view of the two-way circulating pump in the present invention; Fig. 2 is an exploded structural schematic view of the two-way circulating pump of Fig. 1; Fig. 3 is a structural schematic view showing another side of the two-way circulating pump in the present invention; Fig. 4 is an exploded structural schematic view of the two-way circulating pump of Fig. 3; Fig. 5 is a structural schematic view of a second main wheel of Fig. 4; Fig. 6 is a top view of the second main wheel of Fig. 5; Fig. 7 is structural schematic view of a second accessory wheel of Fig. 4; Fig. 8 is a top view of the second accessory wheel of Fig. 7; Fig. 9 is structural schematic view of a first main wheel of Fig. 4; Fig. 10 is a bottom view of the first main wheel of Fig. 9; Fig. 11 is structural schematic view of a second accessory wheel of Fig. 4; and Fig. 12 is a top view of the second accessory wheel of Fig. 11.

[0027] The two-way circulating pump S1 provided in the present invention includes an upper seat 1, a middle seat 2, a lower seat 3, a base plate 4, a first main wheel 6, a first accessory wheel 7, a second main wheel 8 and a second accessory wheel 9. A gear 61 of the first main wheel 6 and a gear 71 of the first accessory wheel 7 are meshed with each other. The first main wheel 6 and the first accessory wheel 7 are mounted within a first chamber, which is constituted by the upper seat 1 and the middle seat 2 and is provided with a first oil inlet and a first oil outlet, through a rotating shaft 62 and a rotating shaft 72, respectively. A gear 81 of the second main wheel 8 and a gear 91 of the second accessory wheel 9 are meshed with each other. The second main wheel 8 and the second accessory wheel 9 are mounted within a second chamber, which is constituted by the middle seat 3 and the lower seat 4 and is provided with a second oil inlet and a second oil outlet, through a rotating shaft 82 and a rotating shaft 92, respectively. The rotating shaft 62 of the first main wheel 6 is provided with a recess 63, and the rotating shaft 82 of the second main wheel 8 is provided with a protrusion 83 that is socketed within the recess 63. The first main wheel 6 is drivingly connected with an induction motor. The base plate 4 is connected to the lower portion of the lower seat 3. The upper seat 1, the middle seat 2, the lower seat 3 and the base plate 4 are sequentially connected and fixed by a bolt 10. For a secure fixing, a washer 11 is further provided on the bolt 10.

[0028] The two-way circulating pump S1 further includes a controller and a pressure regulator 5 for pressure regulating. The pressure regulator 5 is constituted by a pressure valve 51, an extended decompression valve 55, a spring 52, a pressure regulating screw 53, a valve

cover 57, a flat washer 54 and a flat washer 56.

[0029] Reference is made to Fig. 13, which is a working principle diagram of the engine oil purification system in the present invention, in which the single-head arrow indicates a direction along which the engine oil flows.

[0030] In addition, the present invention further provides an engine oil purification system including the above described two-way circulating pump S1, a filter S2 and an auxiliary box S3. The first oil outlet of the two-way circulating pump S1 is connected to the filter S2, which in turn is connected to the auxiliary box S3. The auxiliary box S3 is connected to the second oil inlet of the two-way circulating pump S1, the first oil inlet and the second oil outlet are connected to a container S4 for containing the engine oil to be purified.

[0031] The auxiliary box S3 is provided with a sensor and a control valve which are connected to the controller of the two-way circulating pump S1.

[0032] The two-way circulating pump provided in the present invention integrates two separately operated pumps into a single pump and shares one motor. The motor simultaneously drives the first main wheel and the second main wheel to rotate, decreasing not only the equipment cost but also the energy consumption.

[0033] Certainly, the above description is only given as preferred embodiments of the present invention. It is noted some variation and modifications can further be made by those skilled in the art without departing from the principle of the invention. Those variation and modifications should also be considered within the scope of protection of the present invention.

What is claimed is:

1. A two-way circulating pump, characterized in that, comprising an upper seat, a middle seat, a lower seat, a first main wheel, a first accessory wheel, a second main wheel and a second accessory wheel, wherein, the first main wheel and the first accessory wheel are meshed with each other and are mounted within a first chamber, which is constituted by the upper seat and the middle seat and is provided with a first oil inlet and a first oil outlet, through rotating shafts respectively, the second main wheel and the second accessory wheel are meshed with each other and are mounted within a chamber, which is constituted by the middle seat and the lower seat and is provided with a second oil inlet and a second oil outlet, through rotating shafts respectively, the rotating shaft of the first main wheel is provided with a recess, and the rotating shaft of the second main wheel is provided with a protrusion that is socketed within the recess, the first main wheel is drivingly connected to a motor.
2. A two-way circulating pump according to claim 1, characterized in that, further comprising a pressure regulator for pressure regulating.
3. A two-way circulating pump according to claim 1, characterized in that, further comprising a controller.
4. A two-way circulating pump according to claim 1, characterized in that, the motor is an induction motor.
5. An engine oil purification system, characterized in that, comprising a two-way circulating pump according to claim 1, a filter and an auxiliary box, the first oil outlet of the two-way circulating pump is connected to the filter, the filter is connected to the auxiliary box, the auxiliary box is connected to the second oil inlet of the two-way circulating pump, and the first oil inlet and the second oil outlet are connected to a container for containing the engine oil to be purified.
6. An engine oil purification system according to claim 5, characterized in that, the auxiliary box is provided with a sensor and a control valve, which are connected to the controller of the two-way circulating pump.