

WATER CLEANER AND DRAINING VALVE WITH AUTOMATIC EXHAUSTING AND LEAK-STOPPING CAPABILITY

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BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a valve, and in particular, to a
10 water cleaner and a draining valve with automatic exhausting and leak-
stopping capability.

2. Description of Related Art

[0002] Since the water resource has been gradually polluted, people
15 are becoming more concerned about the quality of water. Especially, people
are worried about the quality of tap water, so that sometimes a water cleaner
(filter) is utilized in order to ensure a clean water supply. The conventional
water cleaner includes a base, a filter core, and a casing. The filter core and
the casing are connected to the base. The filter core is sheathed with the
20 casing. The base is used to connect an inlet pipe and an outlet pipe, so that
the un-filtered water can be inputted from the base to the filter core for
filtration. Then, the filtered water is outputted to the outside via the base for
use.

- [0003] In order to exhaust the air within the water cleaner smoothly so as to prevent the accumulation of air within the water cleaner and prevent the formation of vacuum within the water cleaner, which would deteriorate its function, an exhaust device is usually mounted in the water cleaner, thereby exhausting and breaking the vacuum. Taiwan Patent Publication No.M262256 discloses a filter, which includes a separate cylinder, a filter core, a first cover, and a second cover. The filter core is disposed in the cylinder. The cylinder and the cover are combined with the first cover. The top surface of the first cover is formed with a circular protrusion. The second cover is assembled with the circular protrusion. The second cover is provided with an inlet pipe and an outlet pipe. Such a filter is characterized in that the second cover is provided with an exhaust device.
- [0004] The exhaust device constitutes a screw rod, an annular gasket, a spring, and a button, which has a complicated structure and higher production cost. Further, such a filter cannot be assembled easily.

SUMMARY OF THE INVENTION

- [0005] The objective of the present invention is to provide a water cleaner and a draining valve with automatic exhausting and leak-stopping capability. The present invention has automatic exhausting, leak-stopping, and draining capability, whereby the water cleaner can filter the water

normally. Further, the present invention has a simple structure and reduced production cost. Also, the present invention can be assembled easily.

5 **[0006]** To achieve the above-mentioned objective, the present invention provides a water cleaner, which includes a base; at least one filter core connected to the base; at least one casing connected to the base, the filter core being accommodated in the casing; at least one draining valve with automatic exhausting and leak-stopping capability, the draining valve
10 having a valve body and a float, the valve being provided on the casing and protruding into the casing, the interior of the valve body being formed with an accommodating space, the inner edge of the accommodating space being formed with a positioning portion, a row of exhausting holes being provided above the accommodating space, the positioning portion separating the
15 accommodating space into a first position in the lower portion of the accommodating space and a second position in the upper portion of the accommodating space, the float being disposed in the accommodating space, the float being located at the first position or the second position selectively.

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[0007] The present invention further provides a draining valve with automatic exhausting and leak-stopping capability, the draining valve having a valve body and a float, the interior of the valve body being formed with an accommodating space, the inner edge of the accommodating space being

formed with a positioning portion, a row of exhausting holes being provided above the accommodating space, the positioning portion separating the accommodating space into a first position in the lower portion of the accommodating space and a second position in the upper portion of the accommodating space, the float being disposed in the accommodating space, the float being located at the first position or the second position selectively

10 **[0008]** The present invention has advantageous features as follows. The present invention is provided with a draining valve having automatic exhausting and leak-stopping capability. The float of the draining valve can be ascended or descended according to the water level within the water cleaner, thereby achieving the automatic exhausting, leak-stopping, and
15 draining function, and maintaining the normal water-filtering effect of the water cleaner. Further, the structure of the present invention is simplified greatly, so that its production cost is reduced and it can be assembled easily.

20 **[0009]** In order to further understand the characteristics and technical contents of the present invention, a description relating thereto will be made with reference to the accompanying drawings. However, the drawings are illustrative only but not used to limit the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

5 **[0010]** FIG. 1 is an exploded perspective view showing the water cleaner of the present invention;

[0011] FIG. 2 is an assembled perspective view showing the water cleaner of the present invention;

10 **[0012]** FIG. 3 is a perspective view showing the base of the present invention;

[0013] FIG. 4 is a perspective view showing the base of the present invention taken from another viewing angle;

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[0014] FIG. 5 is a cross-sectional view showing the water cleaner of the present invention;

[0015] FIG. 6 is a perspective view showing the draining valve with
20 automatic exhausting and leak-stopping capability according to the present invention;

[0016] FIG. 7 is a cross-sectional view showing the draining valve with

automatic exhausting and leak-stopping capability according to the present invention;

5 **[0017]** FIG. 8 is a schematic view (I) showing the operating state of the draining valve with automatic exhausting and leak-stopping capability according to the present invention;

[0018] FIG. 9 is a schematic view (II) showing the operating state of
10 the draining valve with automatic exhausting and leak-stopping capability according to the present invention; and

[0019] FIG. 10 is a schematic view (III) showing the operating state of the draining valve with automatic exhausting and leak-stopping capability
15 according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] Please refer to FIGS. 1 to 5. The present invention is to
20 provide a water cleaner, which includes a base 1, at least one filter core 3, at least one casing 5, and at least one draining valve 7 with automatic exhausting and leak-stopping capability. The base 1 is made of stainless steel. The shape of the base 1 is not limited to any specific form and can be modified properly according to practical demands. The number and

specification of the filter cores 3 and the casing 5 can be changed properly.

The top surface of the base 1 is provided with at least one accommodating trough 11. In the present embodiment, three sets of filter cores 3 and the casings 5 are provided, therefore three accommodating troughs 11 are provided correspondingly. The accommodating troughs 11 are circular troughs 11. The center of each accommodating trough 11 is provided with a connector 12. The connector 12 is a circular hollow body. The inner edge of the connector 12 is provided with inner threads 121 for threadedly connecting the filter core 3.

[0021] The edge of the top opening of each accommodating trough 11 is formed with an annular groove 14 for accommodating a gasket 13, thereby increasing the tightness between the base 1 and the casing 5. The edge of the opening of each accommodating trough 11 is formed with a plurality of retaining plates 15 and through-holes 16 both of which are arranged at intervals. The retaining plates 15 and through-holes 16 are located above the annular groove 14. The retaining plates 15 are integrally formed with the base 1 at intervals. The through-holes 16 are formed among the retaining plates 15, that is, the retaining plates 15 and the through-holes 16 are provided at the edge of the opening of the accommodating trough 11 in an alternating manner.

[0022] The base 1 is provided with an inlet 17 and at least one outlet 18 at proper positions for connecting to the inlet pipe and the outlet pipe respectively. The inlet 17 is preferably provided at the rear side of the base 1. A plurality of outlets 18 may be provided so as to be distributed in different directions. The user may select one of the outlets and the other unused outlets are plugged up. The inlet 17 is in communication with the closest accommodating trough 11. The outlet 18 is in communication with the connector 12 that is located in the center of the closest accommodating trough 11. The base 1 is provided therein with suitable pipes 19 and 20 for connecting to the accommodating troughs 11 and the connector 12 respectively.

[0023] The pipes 19 and 20 are provided on the bottom surface of the base 1. A gasket 21 is provided to surround the periphery of the pipes 19 and 20. The bottom surface of the base 1 is further provided with a positioning trough 22. A sealing plate 23 is fitted within the positioning trough 22. The sealing plate 23 is disposed on the gasket 21. A plurality of screws 24 is used to secure the sealing plate 23 on the base 1. With the gasket 21 and the sealing plate 23 sealing the pipes 19 and 20, the interior of the base 1 can form a circulation path of water flow for connecting the filter cores 3.

[0024] The interior of the core 3 is provided with suitable filtering materials 31. The filtering material 31 is not limited to any specific material. The center of the lower end of the filter core 3 has a water-exiting portion 32. 5 The outer edge of the water-exiting portion 32 is provided with outer threads 321. With the outer threads 321 of the water-exiting portion 32 being threadedly connected to the inner threads 121 of the connector 12 of the base 1, the filter core 3 may be threadedly connected to the corresponding connector 12 of the base 1.

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[0025] The casing 5 is made of stainless steel by means of a rotating and press-forming process. The casing 5 is a hollow cylinder. The bottom of the casing 5 is formed with an opening 51. The bottom of the casing 5 extends horizontally and outwards to form a protrusion, and further extends 15 outwards to form a plurality of insertion pieces 52 that are arranged at intervals. The top of the casing 5 is provided with a mounting hole 53 for allowing the draining valve 7 to be mounted therein.

[0026] The casing 5 is assembled downwards on the base 1, so that 20 the insertion pieces 52 on the bottom of the casing 5 can pass through the corresponding through-holes 16 and rotate a suitable angle. In this way, the insertion pieces 52 are inserted into the underside of the corresponding retaining plate 15. As a result, the casing 5 is inserted into the corresponding accommodating trough 11 of the base 1 with the filter core 3

being accommodated within the casing 5. The bottom of the casing 5 abuts the gasket 13 to sandwich the gasket 13 between the base 1 and the bottom of the casing 5, thereby increasing the tightness between the base 1 and the casing 5. The filling of water within the casing 5 generates a pressure. Since the gasket 13 seals the gape between the base 1 and the casing 5, thereby the casing 5 cannot be rotated easily. If no water is filled within the casing 5, the pressure is released and thus the casing 5 can be rotated again.

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[0027] The draining valve 7 with automatic exhausting and leak-stopping capability is mounted on the top of the casing 5. The draining valve 7 with automatic exhausting and leak-stopping capability comprises a valve body 71 and a float 72 (FIGS. 6 and 7). The valve body 71 is made of rubber or silicon. The specific weight of the float 72 is smaller than that of water. The interior of the valve body 71 is formed with an accommodating space 711. The bottom of the accommodating space 711 is formed with an opening and provided with a plurality of stopping portions 712. The float 72 is disposed downwards in the accommodating space 711. The float 72 is movably disposed in the accommodating space 711 and can be stopped by the stopping portions 712, thereby preventing the float 72 from moving downwards to leave the accommodating space 711.

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[0028] The valve body 71 is provided with an exhausting hole 713. The exhausting hole 713 is located above the accommodating space 711 and is in communication with the accommodating space 711. The
5 exhausting hole 713 extends to the top of the valve body 71, so that the exhausting hole 713 is in communication with the outside. The exhausting hole 713 is located above the float 72. The inner diameter of the exhausting hole 713 is smaller than the outer diameter of the float 72. Via this arrangement, the float 72 may be used to open and close the exhausting
10 hole 713.

[0029] The middle portion of the inner edge of the accommodating space 711 is formed with a positioning portion 714 of an annular shape. The positioning portion 714 is integrally formed with the inner edge of the
15 accommodating space 711. The inner diameter of the positioning portion 714 is smaller than the outer diameter of the float 72, so that the positioning portion 714 serves as a sealing ring. With the provision of the positioning portion 714, the accommodating space 711 can be divided into a first position 711a located in the lower portion of the accommodating space 711
20 and a second position 711b located in the upper portion of the accommodating space 711. The float 72 is selectively located in the first position 711a or the second position 711b.

[0030] The valve body 71 is further formed with a fixing portion 715 of a smaller outer diameter. The fixing portion 715 is fitted in the mounting hole 53 on the top of the casing 5, so that the draining valve 7 with automatic exhausting and leak-stopping capability can be mounted on the top of the casing 5. Further, the valve body 71 protrudes into the casing 5. Via the above arrangement, the water cleaner of the present invention can be formed.

10 **[0031]** In use, the un-filtered water is delivered into the base 1 via the inlet 17. The unfiltered water is delivered to the filter core 3 via the accommodating trough 11. The water is filtered by the filtering material 31 of the filter core 3. The filtered water is outputted via the water-exiting portion 32 of the filter core 3. Via the filtration of several filter cores 3, the clean
15 water is outputted to the outside via the water-exiting portion 18 of the base 1 finally for use.

[0032] According to the present invention, the top of the casing 5 is provided with a draining valve 7 having automatic exhausting and leak-
20 stopping capability. When the water cleaner is not filled with water, the float 72 within the draining valve 7 is located at the first position 711a in the lower portion of the accommodating space 71, thereby opening the exhausting hole 713. After the water is filled, the gas within the casing 5 is pressurized due to the rising of water level. The gas is automatically exhausted via the

exhausting holes 713 on the upper end of the valve body 71 (FIG. 8), thereby exhausting the air within the casing 5. In this way, the filter core 3 can exhibit its function completely so as to increase its lifetime. When the water level rises to reach the float 72, the float 72 ascends to the location of the positioning portion 714 due to the difference of specific weight. At this time, the water pressure rises to compress the float 72 so as to pass through the positioning portion 714 to reach the second position 711b in the upper portion of the accommodating space 711. At this time, the float 72 seals the gap between the positioning portion 714 and the exhausting hole 713 to become watertight (FIG. 9), and the air therein has been exhausted. When the filling of water is stopped and the water pressure is no longer maintained, since the exhausting hole 713 has been sealed by the float 72 and the weight of water causes vacuum, the water cannot be drained. When the filter core 3 is to be cleaned, the user can press the exhausting hole 713 by his/her finger to force the float 72 to pass through the positioning portion 714 and return to the first position 711a in the lower portion of the accommodating space 711 (FIG. 10), thereby achieving the draining effect. In this way, even when the casing 5 is detached, the water may not overflow.

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[0033] According to the present invention, the water cleaner and the draining valve with automatic exhausting and leak-stopping capability have advantageous features as follows.

[0034] (1) The present invention provides a draining valve 7 with automatic exhausting and leak-stopping capability. The float 72 of the draining valve 7 can ascend or descend according to the water level within
5 the water cleaner, thereby achieving the automatic exhausting, leak-stopping, and draining functions. In this way, the water cleaner can keep its water-filtering effect to a normal extent. Since the draining valve 7 constitutes a valve body 71 and a float 72, the structure is simplified greatly to reduce its production cost. Further, the present invention can be
10 assembled easily.

[0035] (2) The base 1 and the casing 5 of the present invention are made of stainless steel, thereby forming a rigid body of stainless steel. Thus, the present invention may not suffer damage and has a long lifetime.
15 Further, the present invention can be recycled and thus conforms to the requirements for environmental protection.

[0036] (3) According to the present invention, since the circulation path for water flow is arranged within the base 1, it is not necessary to
20 provide other pipes among the filter cores 3. Thus, the layout of pipes can be simplified and the present invention can be mounted more easily.

[0037] The above-mentioned descriptions represent merely the preferred embodiment of the present invention, without any intention to limit

the scope of the present invention thereto. Various equivalent changes, alternations, or modifications based on the claims of present invention are all consequently viewed as being embraced by the scope of the present
5 invention.

WHAT IS CLAIMED IS:

1. A water cleaner, comprising:

- 5 a base;
- at least one filter core connected to the base;
- at least one casing connected to the base, the filter core being accommodated within the casing;
- at least one draining valve with automatic exhausting and leak-
- 10 stopping capability having a valve body and a float, the valve body being provided on the casing and protruding into the casing, the interior of the valve body being formed with an accommodating space, the inner edge of the accommodating space being formed with a positioning portion, an exhausting hole being provided above the accommodating space, the
- 15 positioning portion separating the accommodating space into a first position in the lower portion of the accommodating space and a second position in the upper position of the accommodating space, the float being disposed within the accommodating space, the float being selectively located at the first position or the second position.

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2. The water cleaner according to claim 1, wherein the positioning portion is formed into an annular shape, the inner diameter of the positioning portion is smaller than the outer diameter of the float.

3. The water cleaner according to claim 1, wherein the valve body is formed with a fixing portion, the fixing portion is fitted with a mounting hole on the top of the casing, thereby mounting the draining valve with automatic
5 exhausting and leak-stopping valve to the top of the casing.

4. The water cleaner according to claim 1, wherein the bottom of the accommodating space is formed into an opening, the bottom of the accommodating space is provided with stopping portions to prevent the float
10 from moving downwards.

5. The water cleaner according to claim 1, wherein the float seals the gap between the positioning portion and the lower edge of the exhausting hole when the float is in the second position.
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6. The water cleaner according to any one of claims 1 to 5, wherein the exhausting hole extends to the top of the valve body, the inner diameter of the exhausting hole is smaller than the outer diameter of the float.

20 7. A draining valve with automatic exhausting and leak-stopping capability of water cleaner, comprising a valve body and a float, the interior of the valve body being formed with an accommodating space, the inner edge of the accommodating space being formed with a positioning portion, an exhausting hole being provided above the accommodating space, the

positioning portion separating the accommodating space into a first position in the lower portion of the accommodating space and a second position in the upper position of the accommodating space, the float being disposed
5 within the accommodating space, the float being selectively located at the first position or the second position.

8. The draining valve with automatic exhausting and leak-stopping capability of water cleaner according to claim 7, wherein the positioning
10 portion is formed into an annular shape, the inner diameter of the positioning portion is smaller than the outer diameter of the float.

9. The draining valve with automatic exhausting and leak-stopping capability of water cleaner according to claim 7, wherein the bottom of the
15 accommodating space is formed into an opening, the bottom of the accommodating space is provided with stopping portions to prevent the float from moving downwards.

10. The draining valve with automatic exhausting and leak-stopping
20 capability of water cleaner according to claim 7, wherein the float seals the gap between the positioning portion and the lower edge of the exhausting hole when the float is in the second position.

11. The draining valve with automatic exhausting and leak-stopping

capability of water cleaner according to any one of claims 7 to 10, wherein the exhausting hole extends to the top of the valve body, the inner diameter of the exhausting hole is smaller than the outer diameter of the float.