A refrigerator capable of fabricating a carbonated water includes a water vessel (14); a mounting area for mounting therein the water vessel (14); and a dispenser unit (1) for carbonizing the water in the water vessel (14), the mounting area having a changeable vertical distance. Further, the mounting area has a first area with a specific height and a second area (24) a predetermined height formed under the first area, the second area (24) being selectively opened to communicate with the first area.
Description

[0001] The present invention relates to a refrigerator equipped with a carbonated water fabricating unit; and, more particularly, to a refrigerator having a carbonated water fabricating unit capable of fabricating a carbonated water in a variety of vessels, e.g., a glass cup or a polyethylene terephthalate, as well as a vessel for exclusive use in fabricating the carbonated water.

[0002] In general, a carbonated water fabricating unit for use in a refrigerator includes a vessel for exclusive use in fabrication the carbonated water (hereinafter, simply referred to as an exclusive vessel or an exclusive cup) and a gas injection nozzle provided with a sealing member for sealing an entrance side of the vessel. In the refrigerator having such a carbonated water fabricating unit, a carbonated water is fabricated by sealing the vessel accommodating therein water via the sealing member and injecting the carbon dioxide into the water of the vessel at a predetermined pressure level ranging from 1 to 10 atmosphere through the gas injection nozzle to be dissolved therein.

[0003] However, in the conventional refrigerator having the carbonated water fabricating unit described above, the exclusive vessel is only used to fabricate the carbonated water. For this reason, an area for receiving the exclusive vessel formed at the refrigerator has a specific vertical position.

[0004] Therefore, the conventional refrigerator has drawbacks in that other vessels, e.g., a general cup or a polyethylene terephthalate, having a height more than that of the exclusive vessel cannot be used.

[0005] It is, therefore, an object of the present invention to provide a refrigerator equipped with a carbonated water fabricating unit capable of allowing a user to readily fabricate a carbonated water by an exclusive vessel as well as a general cup, a polyethylene terephthalate or the like.

[0006] In accordance with a preferred embodiment of the present invention, there is provided a refrigerator capable of fabricating a carbonated water, including: a water vessel for accommodating therein water; a mounting area for mounting therein the water vessel; and a dispenser unit for carbonizing the water in the water vessel, wherein the mounting area has a changeable vertical distance.

[0007] In accordance with another preferred embodiment of the present invention, there is provided a refrigerator capable of fabricating a carbonated water, including: a dispenser unit; a carbon dioxide supplying nozzle portion, provided at the dispenser unit, for supplying a pressurized carbon dioxide into a water vessel; and a driving unit capable of adjusting a height of the nozzle portion, wherein the nozzle portion has a nozzle for injecting the carbon dioxide into the water in the vessel and a cover for airtightly sealing an entrance side of the water vessel while the carbon dioxide is injected into the water.

[0008] The above and other objects and features of the present invention will become apparent from the following description of preferred embodiments given in conjunction with the accompanying drawings, in which:

Fig. 1 is a schematic configuration of a refrigerator having a carbonated water fabricating unit in accordance with a first preferred embodiment of the present invention;

Fig. 2 sets forth a partial configuration of a height adjusting mechanism of the carbonated water fabricating unit shown in Fig. 1;

Fig. 3 shows a partial cross sectional view of a structure of the support plate portion of the carbonated water fabricating unit shown in Fig. 1 whose height can be adjusted;

Fig. 4 provides an enlarged cross sectional view of a assembling structure of a guide member for preventing a rotation of a tubular member of the carbonated water fabricating unit shown in Fig. 1;

Fig. 5 is a partial cross sectional view describing a case where a carbonated water is fabricated in a vessel having a height more than that of an exclusive vessel; and

Fig. 6 offers a schematic cross sectional view of a carbonated water fabricating unit in accordance with another preferred embodiment of the present invention.

Fig. 7 provides a partial cross sectional view (taken along the line A-A in Fig. 6) of the carbonated water fabricating unit shown in Fig. 6.

[0009] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings. Here, parts identical to those described in the prior art will be assigned like reference characters, and detailed description thereof will be omitted.

[0010] Fig. 1 shows a refrigerator having a dispenser unit in accordance with a preferred embodiment of the present invention. A dispenser unit 1 is provided with a water supplying nozzle 3 through which water supplied from a water tank 2 and a carbon dioxide supplying nozzle portion 5 connected to a pressurized carbon dioxide container 4. A pair of valves 7 are respectively provided at a pair of pipes which connect the water tank 2 to the water supplying nozzle 3 and the pressurized carbon dioxide container 4 and the carbon dioxide supplying nozzle portion 5, respectively.

[0011] The carbon dioxide supplying nozzle portion 5 serves to supply a carbon dioxide from the pressurized carbon dioxide container 4. As shown in Fig. 2, the carbon dioxide supplying nozzle portion 5 is provided with a nozzle 15 and a cover 6 disposed at an upper side of the nozzle 15, the cover 6 having an arc cross section. A tubular member 8 for transferring the carbon dioxide has one end connected to an upper portion of the nozzle 15 and is extended into a door disposed at an upper side.
of the dispenser unit 1.

[0012] A holder 9 is fixed at the tubular member 8 and screw-coupled to a screw 10 driven by a motor 16 capable of rotating forwardly and backwardly. Accordingly, if the screw 10 is rotated in a screwing direction by a rotation of the motor 16, the holder 9, the tubular member 8 and the carbon dioxide supplying nozzle portion 5 are moved downwardly. On the other hand, if the screw 10 is rotated in an unscrewing direction, the holder 9, the tubular member 8 and the carbon dioxide supplying nozzle portion 5 are moved upwardly.

[0013] Reference numeral 11 designates a guide member. The carbon dioxide is supplied from the pressurized carbon dioxide container 4 to an upper portion of the tubular member 8 via a flexible hose although it is not shown in the drawing.

[0014] The cover 6 has at an upper part a curved metal plate and at a lower part a resilient sealing material attached to the metal plate, e.g., a rubber, a silicon, a urethane foam or the like. When the tubular member 8 is moved downwardly, the cover 6 can airtightly seal an entrance side of a vessel 14, e.g., a cup, shown in Fig. 2.

[0015] Further, a pressure valve 20 is provided at the cover 6 and the carbon dioxide is injected into a cup or a vessel at an atmospheric pressure ranging from 1 to 10. Since, however, a breakdown of the cup or the vessel may be generated at an atmospheric pressure ranging from about 7 to 10, it is preferred to reduce the pressure inside the vessel 14 by opening the pressure valve 20.

[0016] As shown in Fig. 3, a prop 21 on which the vessel 14 is put is installed at a bottom of the dispenser unit 1 under the carbon dioxide supplying nozzle portion 5, the prop 21 being rotatably installed at a hinge 22. A blind opening 24 (second area) is formed on an outer side of the blind opening 24 and a pair of protrusions 13 are respectively formed on both sides of the blind opening 24 and a pair of protrusions 13 are respectively formed on an outer side of the support plate 26. The protrusions 13 are inserted into the grooves 12, thereby allowing the support plate 26 not to rotate but to move only vertically.

[0017] Conventionally, a vertical space (first area) from the bottom of the dispenser unit to the nozzle is just enough to accommodate a cup but a vessel having a height more than the height from the bottom of the dispenser unit to the nozzle cannot be used. Meanwhile, since the support plate 26 in accordance with the present invention is provided under the prop 21 in such a manner as to move downward, a gas injecting process can be performed via the carbon dioxide supplying nozzle portion 5 while a lower portion of the vessel is inserted into the blind opening 24 under the bottom of the dispenser unit 1.

[0018] In the refrigerator in accordance with the preferred embodiment of the present invention, a user can directly fabricate a carbonated water by injecting the carbon dioxide into the water in the vessel on the dispenser unit 1.

[0019] Accordingly, in case of using the exclusive cup or the vessel of the size equal thereto, a user fills the cup with water via the water supplying nozzle 3 and put it on the prop 21 under the carbon dioxide supplying nozzle portion 5. Thereafter, the screw 10 is driven by the rotation of the motor 16 to allow the carbon dioxide supplying nozzle portion 5 to move downwardly as shown in Fig. 2 while a general switch or lever provided at the dispenser unit 1 is operated. At this time, the carbon dioxide of an atmospheric pressure ranging from 1 to 10 is injected into the water of the cup via one end of the nozzle 15 immersed in the water of the cup and dissolved therein while the entrance side of the cup is airtightly sealed by the lower side of the sealing material of the cover 6, thereby fabricating a carbonated water.

[0020] Further, in case of using a large vessel, e.g., the polyethylene terephtalate having a 1.5 liter volume, a specific amount of water is filled into the vessel via the water supplying nozzle 3 and the vessel is put on the support plate 26 after pivotally rotating the prop 21 under the carbon dioxide supplying nozzle portion 5. The switch is turned on to allow the carbon dioxide supplying nozzle portion 5 to move downwardly as described above while the lower portion of the vessel is inserted into the blind opening 24 by slightly pushing the vessel put on the support plate 26. Then, as shown in Fig. 5, the pressurized carbon dioxide is injected into the water via one end of the nozzle 15 immersed in the water of the cup to be dissolved therein, thereby fabricating a carbonated water.

[0021] Fig. 6 shows a structure of a height adjusting mechanism of the carbon dioxide supplying nozzle portion 5 in accordance with another preferred embodiment of the present invention. The tubular member 8 is connected to a horizontal support member 31 and supported thereon. Both ends of the horizontal support member 31 are vertically, movably supported at guide grooves 33 of vertical support members 32 provided at both sides of the dispenser unit 1. A screw 35 is extended parallel to the vertical support member 32 and is screw-coupled thereto through one end portion of the horizontal support member 31, wherein the screw 35 is rotated by a motor 34 capable of rotating forwardly and backwardly, the motor 34 being installed on one of the vertical support members 32. If the screw 35 is rotated in a screwing direction by the rotation of the motor 34, the horizontal support member 31, the tubular member 8 and the carbon dioxide supplying nozzle portion 5 are moved upwardly. On the other hand, if the screw 35 is rotated in an unscrewing direction, the horizontal support member 31, the tubular member 8 and the carbon dioxide supplying nozzle portion 5 are moved downwardly. Due to such operation, the height of the nozzle
15 can be adjusted.

[0022] The motor 34 is driven while a user is pushing the switch (not shown), but a pressure, at which the cover 6 seals an entrance side of a vessel, needs to be checked with a pressure sensor provided at the cover 6, thereby preventing damages on the vessel. Further, when the pressurized carbon dioxide is injected at an atmospheric pressure ranging from 1 to 10, the airtightly sealed state needs to be maintained in order that the carbon dioxide is not leaked. For the reason, the height of the carbon dioxide supplying nozzle portion 5 is controlled by a micro processor for controlling other units of a refrigerator in response to a signal of the pressure sensor.

[0023] As described above, since a user can fabricate a carbonated water in a vessel having a height more than that of an exclusive cup as well as the exclusive cup at the dispenser unit of the refrigerator, cost caused by providing the conventional complex carbonated water fabricating unit is considerably reduced, thereby readily and inexpensively applying the present invention to the refrigerator. Further, since a restriction of the available vessel size is relieved, user facilitation and product value of the refrigerator can be increased.

[0024] While the invention has been shown and described with respect to the preferred embodiment of the present invention, it will be understood by those skilled in the art that various changes and modifications may be made without departing from the scope of the invention as defined in the following claims.

Claims

1. A refrigerator capable of fabricating a carbonated water, comprising:
   - a water vessel for accommodating therein water;
   - a mounting area for mounting therein the water vessel; and
   - a dispenser unit for carbonizing the water in the water vessel,

   wherein the mounting area has a changeable vertical distance.

2. The refrigerator of claim 1, wherein the mounting area has a first area with a specific height and a second area a predetermined height formed under the first area, the second area being selectively opened to communicate with the first area.

3. The refrigerator of claim 2, further comprising a prop, provided between the first area and the second area, for mounting thereon the water vessel, wherein when another water vessel having a height more than that of the first area is loaded into the mounting area, the prop is pivotally rotated to communicate the first area with the second area.

4. The refrigerator of claim 3, further comprising a resilient member, accommodated in the second area, for resiliently supporting said another water vessel.

5. A refrigerator capable of fabricating a carbonated water, comprising:
   - a dispenser unit;
   - a carbon dioxide supplying nozzle portion, provided at the dispenser unit, for supplying a pressurized carbon dioxide into a water vessel; and
   - a driving unit capable of adjusting a height of the nozzle portion,

   wherein the nozzle portion has a nozzle for injecting the carbon dioxide into the water in the vessel and a cover for airtightly sealing an entrance side of the water vessel while the carbon dioxide is injected into the water.

6. The refrigerator of claim 5, wherein an upper side of the cover includes a curved metal plate and a resilient sealing material.

7. The refrigerator of claim 5 or 6, further comprising a height adjusting mechanism for controlling a height of the nozzle portion, wherein the height adjusting mechanism includes a supporting member, connected to an upper portion of the nozzle portion, for supporting the nozzle portion, a holder for holding the supporting member and a screw rotated forwardly and backwardly by the driving unit, the screw is screw-coupled to the holder.

8. The refrigerator of claim 5 or 6, further comprising:
   - a blind opening provided under the bottom of the dispenser unit;
   - a prop, provided on the bottom of the dispenser unit, for supporting the water vessel;
   - a support plate for supporting another vessel having a height more than that of the vessel while the prop is selectively opened; and
   - a resilient member provided at the bottom of the blind opening,

   wherein the prop is rotatably installed at a hinge and the support plate resiliently supports said another vessel by the resilient member.

9. The refrigerator of claim 5 or 6, further comprising:
   - a supporting member for supporting the nozzle portion;
a horizontal support member connected to the supporting member;
vertical support members provided at both sides of the dispenser unit;
guide grooves provided at one of the vertical support members; and
a screw rotated forwardly and backwardly,

wherein both ends of the horizontal support member are vertically, movably supported at the guide grooves; the screw is extended parallel to the vertical support members and is screw-coupled to the horizontal support member through one end portion of the horizontal support member.
FIG. 3
**DOCS CONSIDERED TO BE RELEVANT**

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