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(54) **AERATING OR AIR BUBBLE COLLECTING DEVICE**

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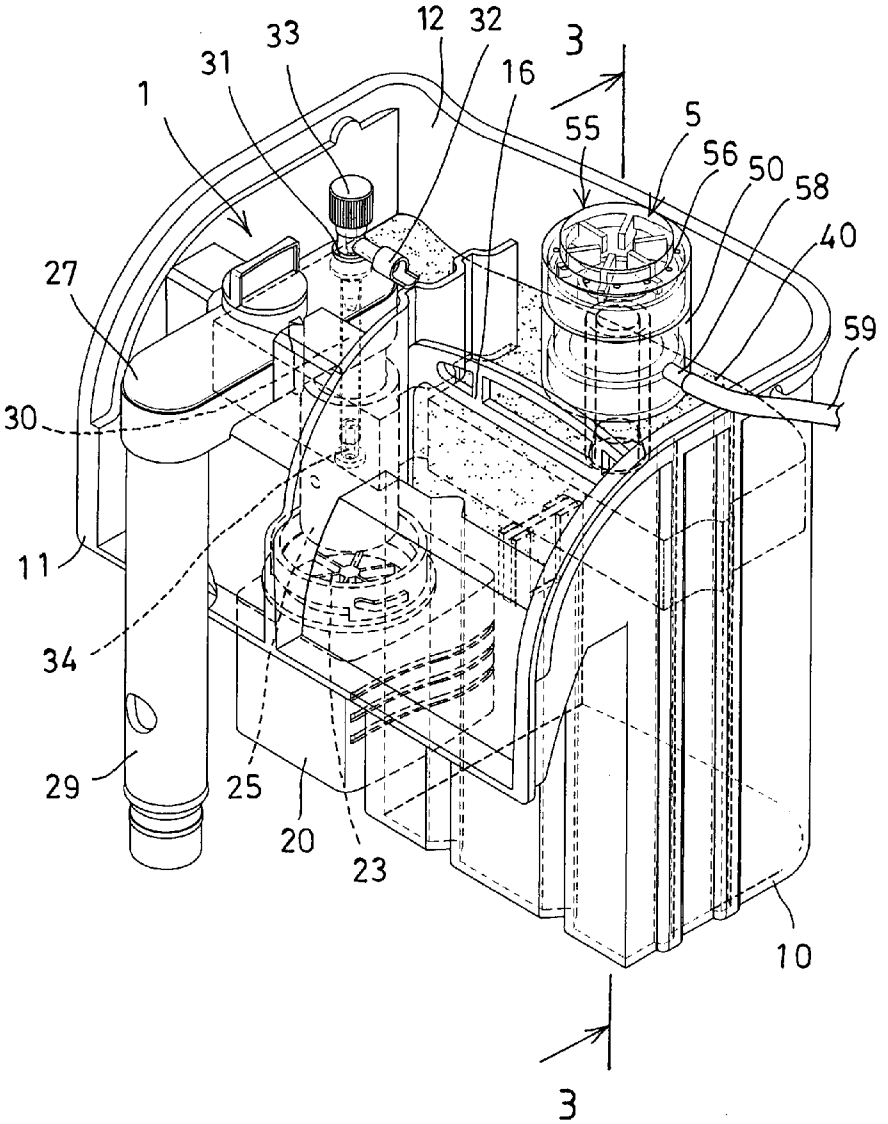
(57) **ABSTRACT**

An aerating device for an aquarium includes a carrier, a pumping device attached to the carrier and having a motorized impeller for pumping a water and for minimizing the air in the water into a number or reduced air bubbles, a siphon tube coupled to the pumping device and having a tube member engaged into the aquarium for allowing the water to be drawn into the siphon tube and drawn into the carrier by the impeller, and a partition engaged into the carrier and having a passage for collecting the bubbles, and a receptacle disposed above the passage of the partition for receiving and collecting the bubbles and the dirt or protein carried by the bubbles.



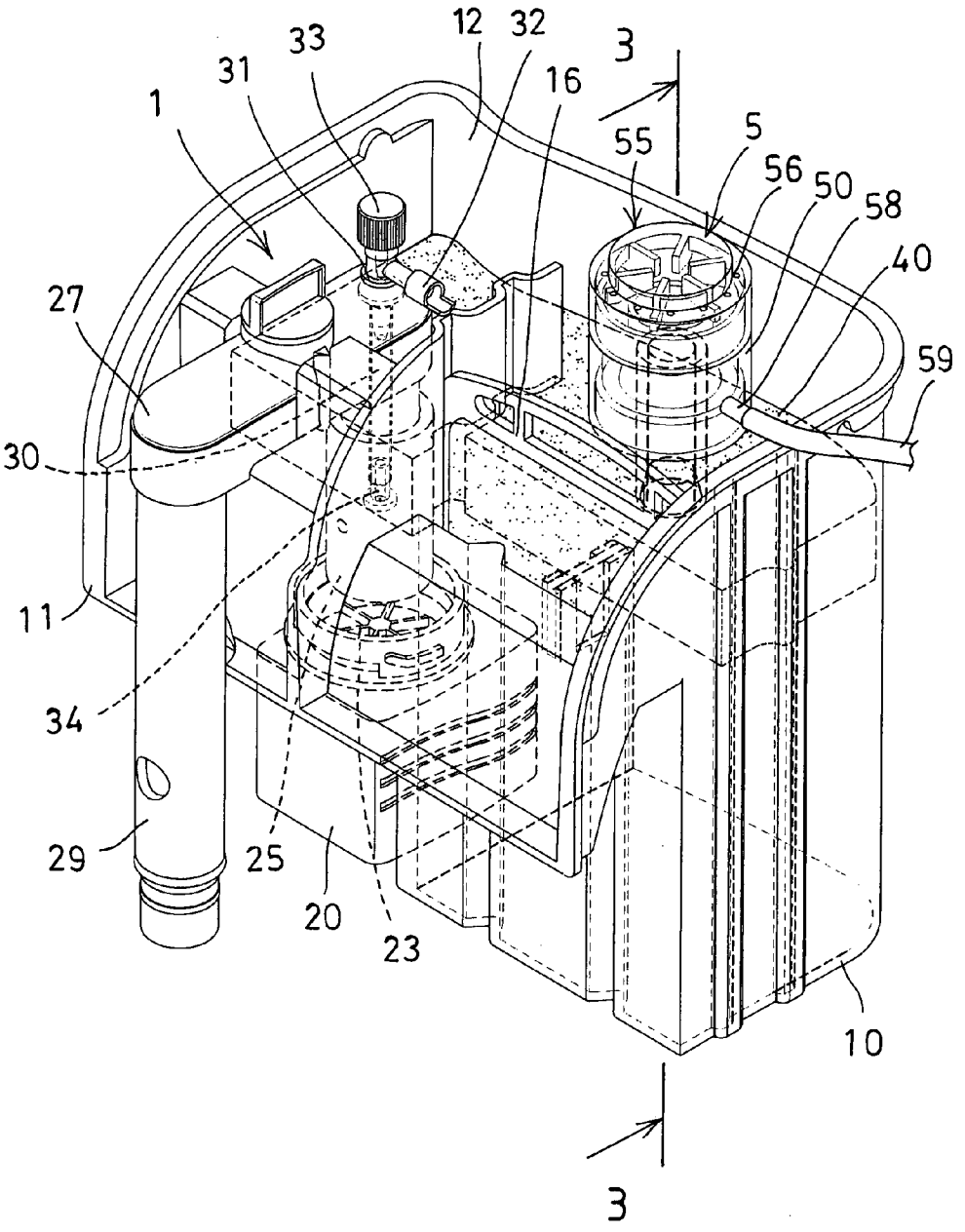


FIG. 1

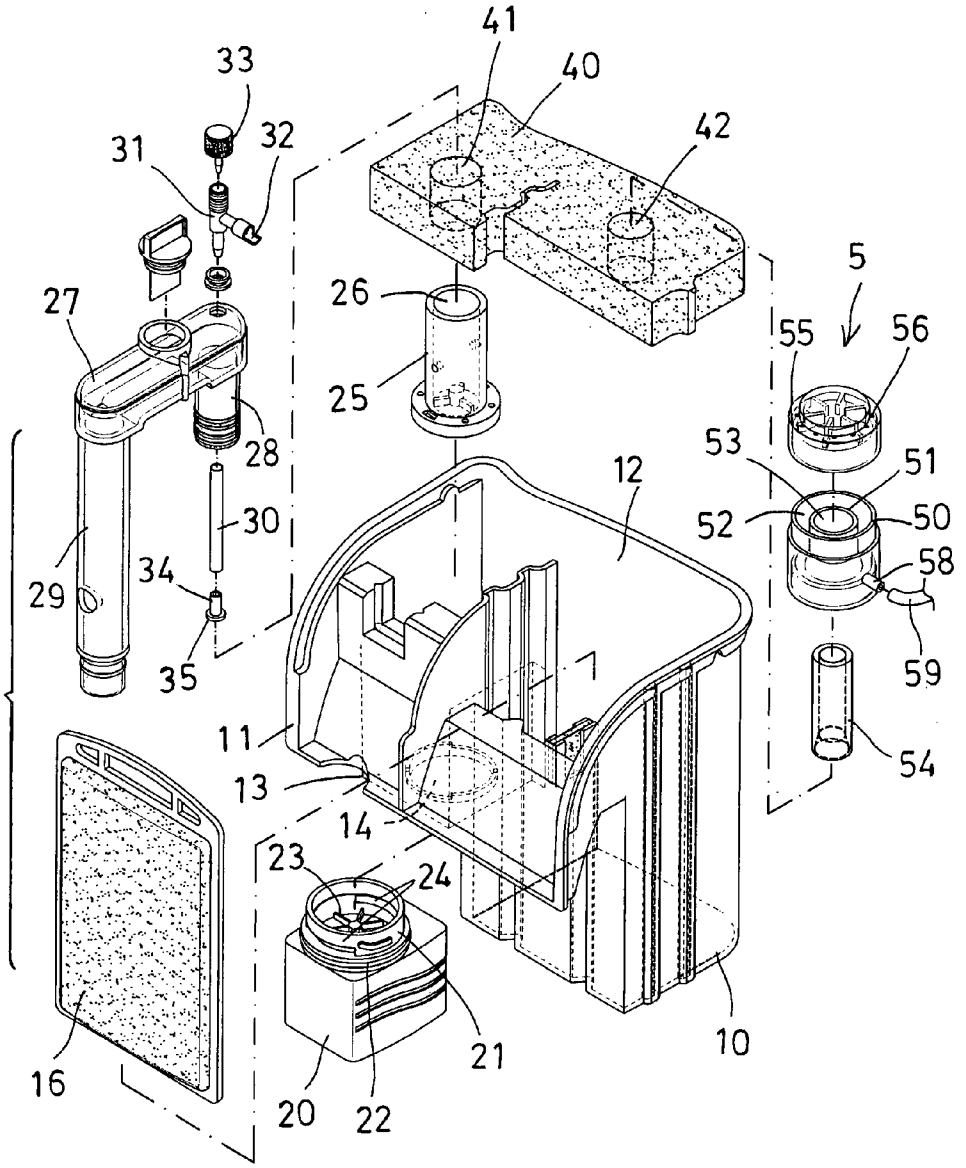

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FIG. 2

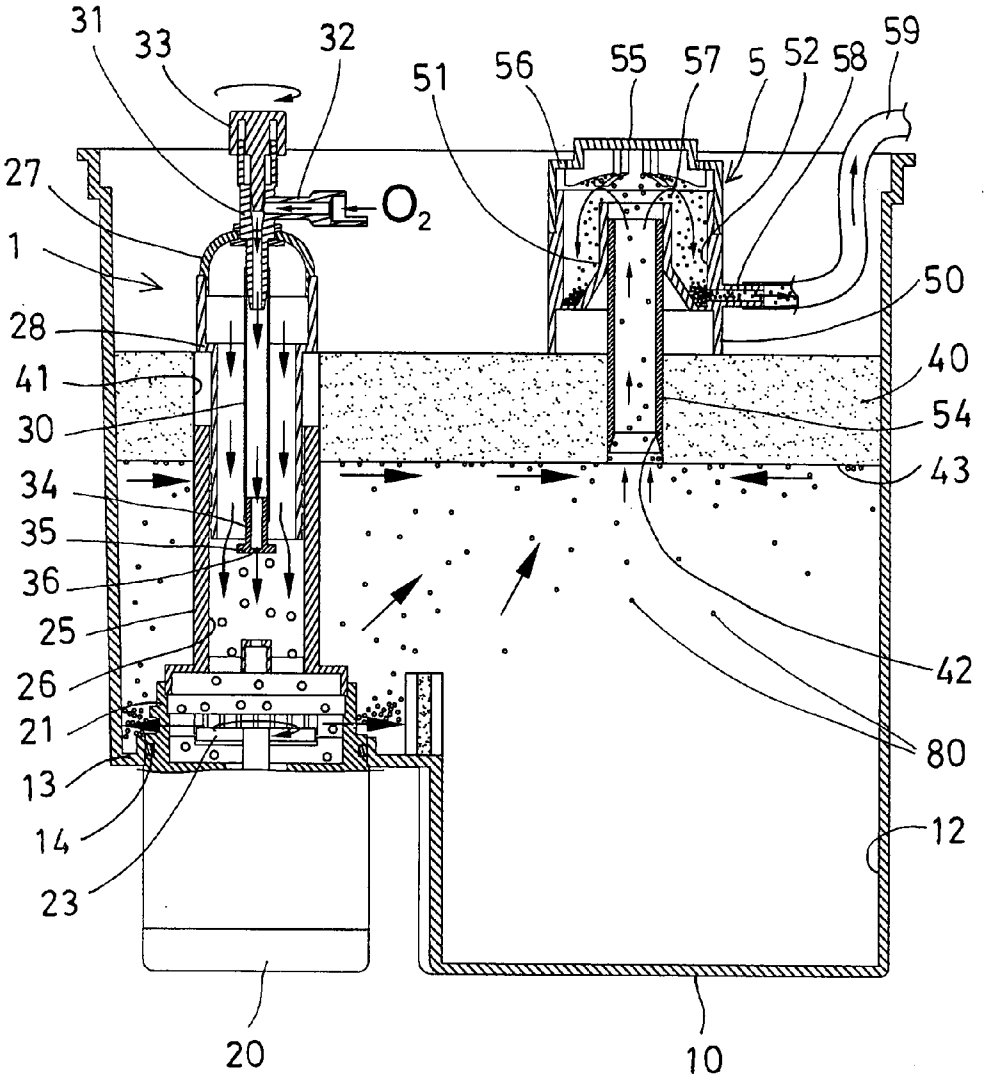
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FIG. 3

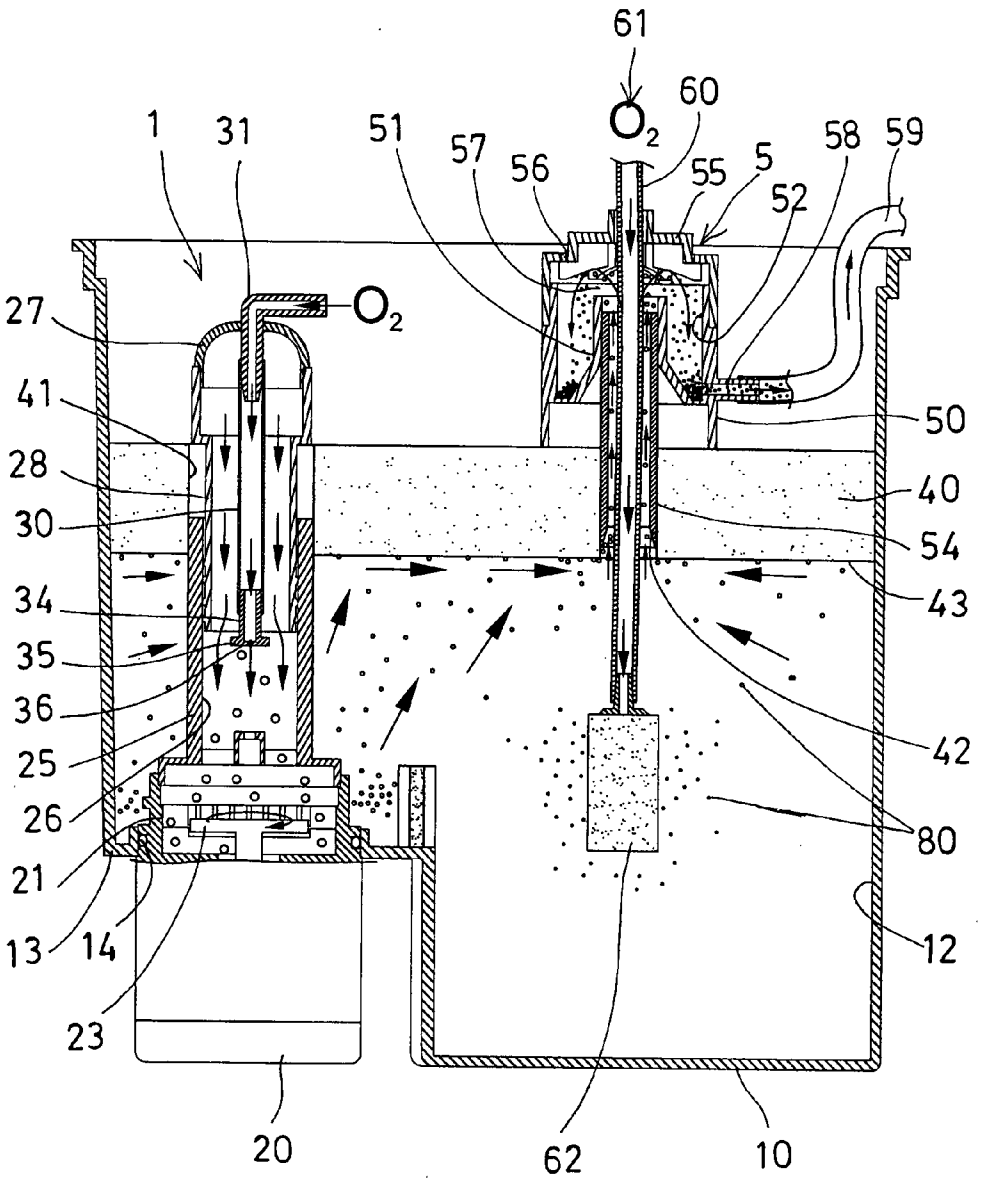
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FIG. 4

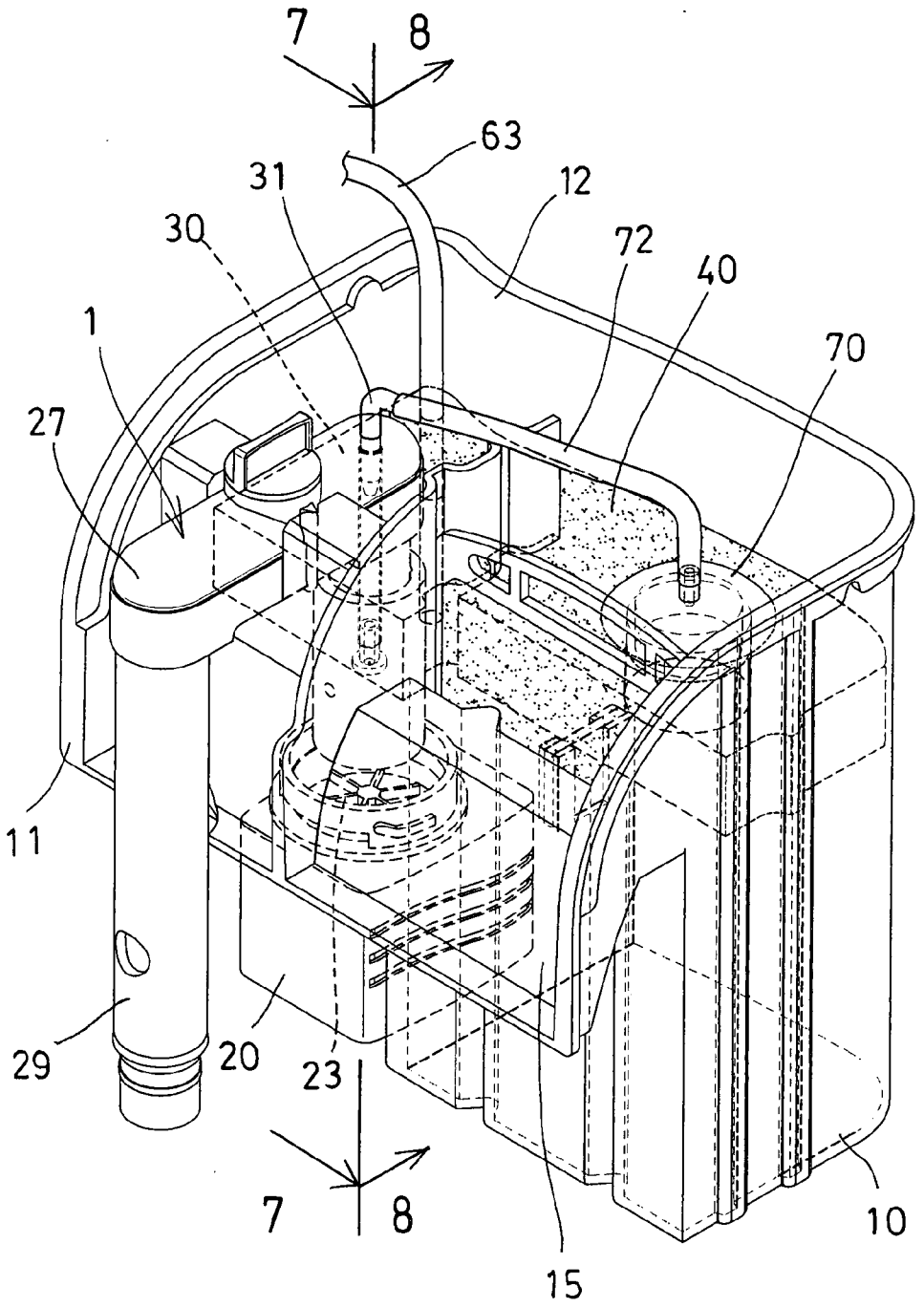

FIG. 5

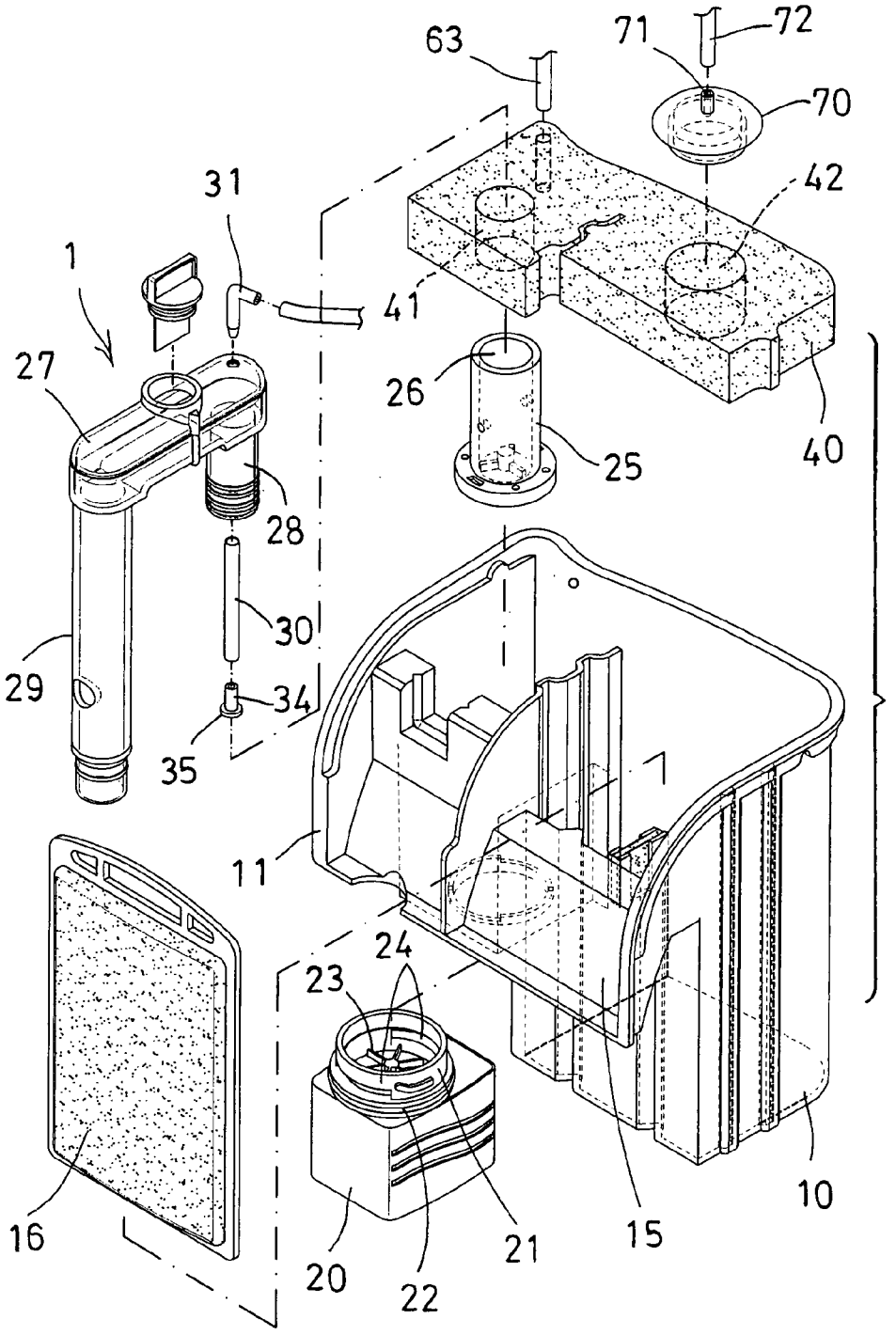
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FIG. 6

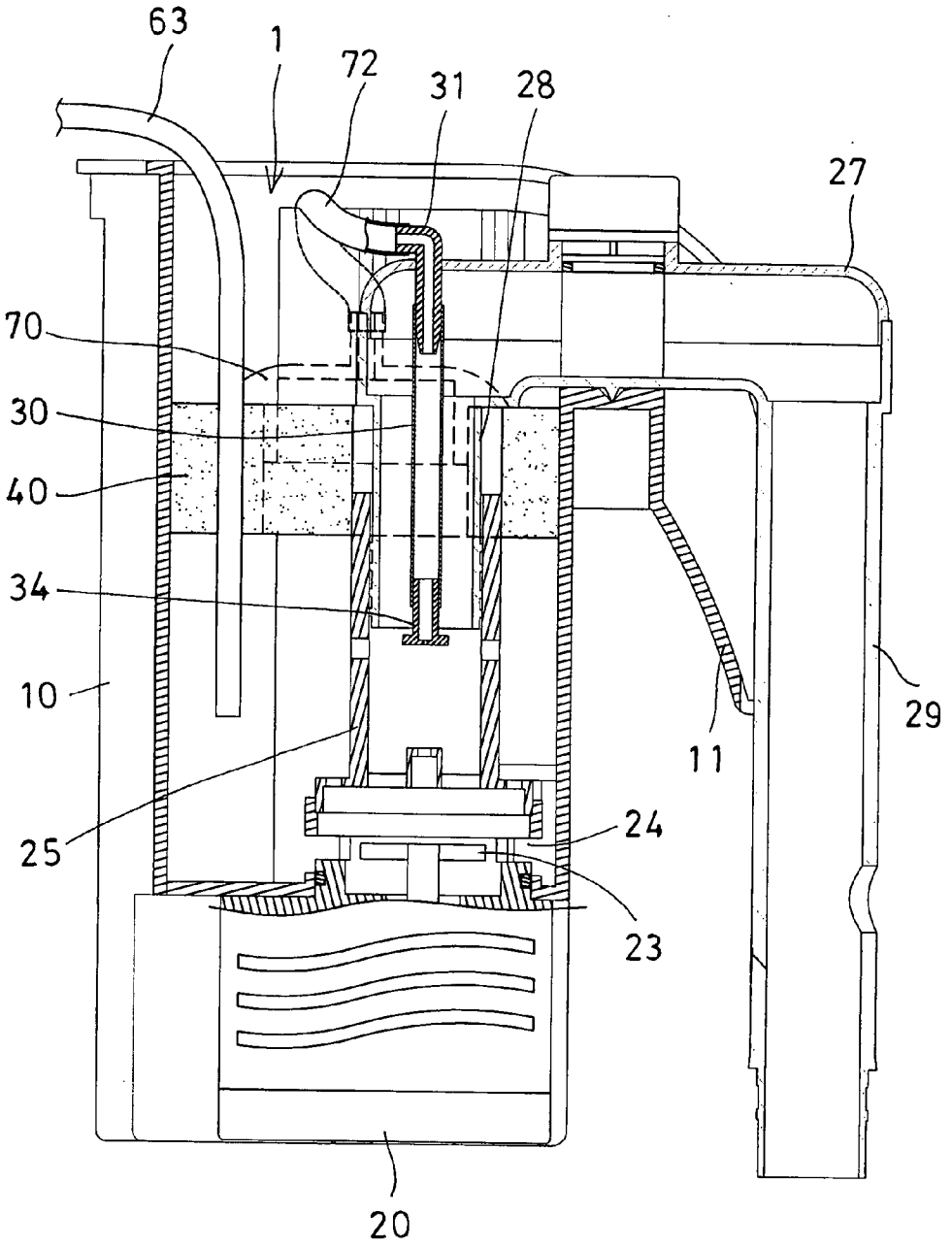

FIG. 7

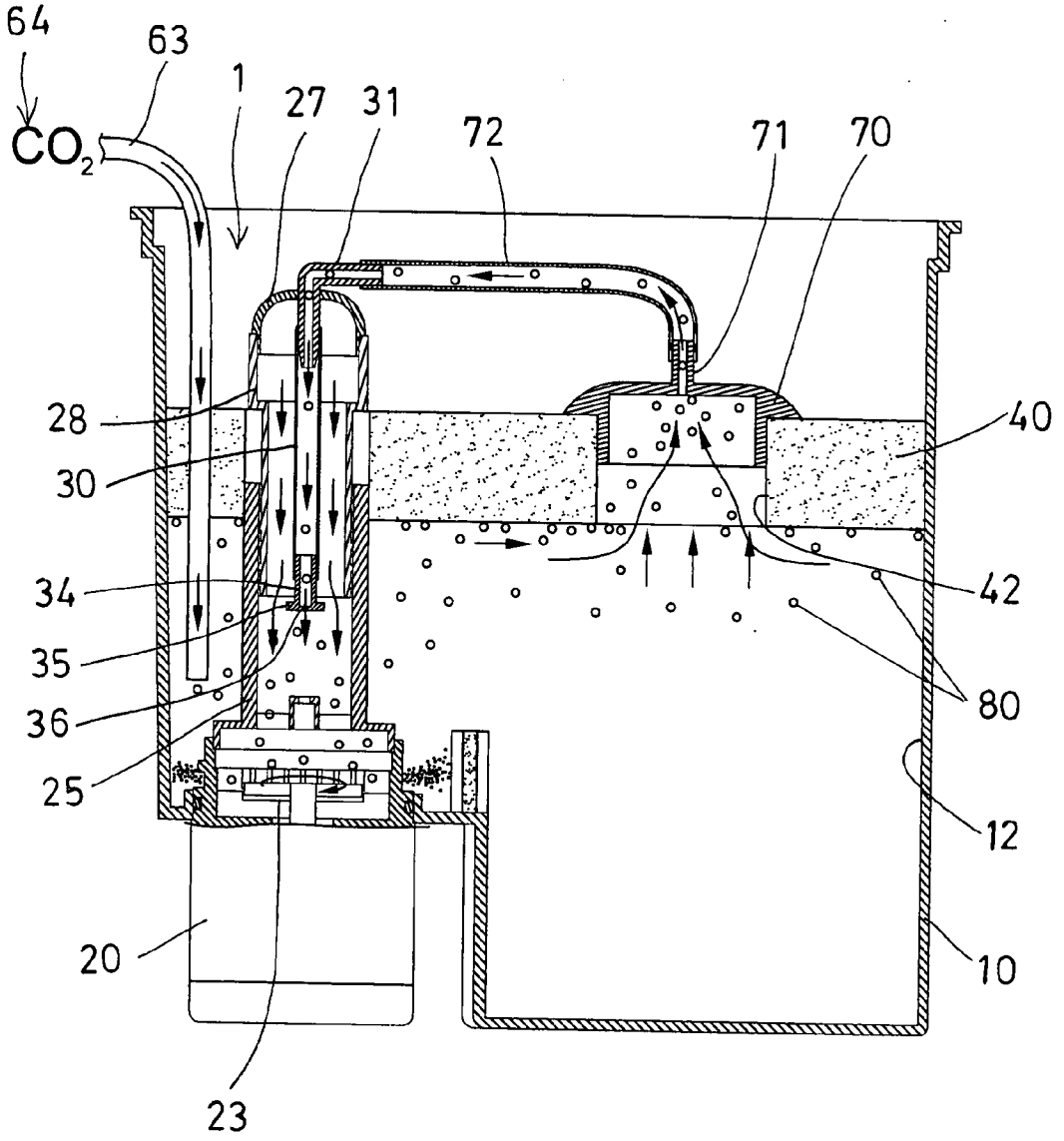

FIG. 8

AERATING OR AIR BUBBLE COLLECTING DEVICE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an aerating device or air bubble collecting device for an aquarium, and more particularly to an aerating device or air bubble collecting device for attaching to an aquarium and for suitably collecting the carbon dioxide and/or the air bubbles and/or for recycling the air bubbles and/or for collecting the dirt or the protein contained in the water within the container of the aquarium.

[0003] 2. Description of the Prior Art

[0004] Typical aquarium facilities comprise a pump disposed in a chamber of a container for circulating the water contained within the container and for pumping fresh air or carbon dioxide into the container and thus for airing or aerating purposes.

[0005] For example, U.S. Pat. No. 7,011,748 to Tsai discloses one of the typical aquariums having an air pumping device and comprising a paddle wheel disposed in a chamber of a container and arranged for impelling the water, and fresh air or carbon dioxide selectively pumped into the container.

[0006] However, the air pumping device may only be used to supply the air into the water that is received within the container, but may not be used to suitably minimize and supply the carbon dioxide and/or the air into the water contained within the container and also may not suitably supply the carbon dioxide and/or the air to the water plants or the water weeds received in the container; i.e., the carbon dioxide and/or the air may not be suitably recycled, and the dirt or the protein contained in the water within the container of the aquarium may not be suitably collected.

[0007] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages of the conventional water aerating assemblies for aquarium facilities.

SUMMARY OF THE INVENTION

[0008] The primary objective of the present invention is to provide an aerating device or air bubble collecting device for attaching to an aquarium and for suitably collecting the carbon dioxide and/or the air bubbles and/or for recycling the air bubbles and/or for collecting the dirt or the protein contained in the water within the container of the aquarium.

[0009] The other objective of the present invention is to provide an aerating device or air bubble collecting device for minimizing and supplying the carbon dioxide and/or the fresh air into the water and for allowing the air and/or the carbon dioxide and/or the oxygen to be suitably supplied to the water plants or the water weeds received in the container.

[0010] In accordance with one aspect of the invention, there is provided an aerating device for an aquarium comprising a carrier for attaching to a container of the aquarium and including a chamber formed therein, a pumping device attached to the carrier and including a motorized impeller arranged in the chamber of the carrier for pumping and impelling a water received in the container and for generating bubbles, a siphon tube including a first tube member coupled to the pumping device, and including a second tube member engaged into the container for allowing the water in the container to be drawn into the siphon tube and drawn into the chamber of the carrier by the motorized impeller, a partition engaged into the chamber of the carrier and including a passage formed therein and communicating with the chamber of the carrier for collecting the bubbles, and a receptacle disposed on the partition and disposed above the passage of the partition for receiving and collecting the bubbles.

[0011] The receptacle includes a tubular member extended therein for forming an annular chamber between the tubular member and the receptacle, and for forming a chamber in the tubular member which is communicating with the passage of the partition for receiving and collecting the bubbles and a dirt. The receptacle includes a tube disposed in the tubular member and engaged into the passage of the partition for receiving and collecting the bubbles.

[0012] The receptacle includes a cover disposed on top of the receptacle and having a number of orifices formed therein for allowing an air to flow into the receptacle. An air supplying member may further be provided and engaged through the cover and into the receptacle and into the chamber of the carrier for supplying an air into the chamber of the carrier.

[0013] The receptacle includes an outlet port communicating with the annular chamber of the receptacle and coupled to a hose for allowing the dirt to be drawn out of the annular chamber of the receptacle. The pumping device includes a mouth, the motorized impeller is disposed in the mouth for pumping the water and for minimizing the air bubbles.

[0014] The pumping device includes at least one aperture formed in the mouth for allowing the water pumped by the motorized impeller to flow out through the aperture of the mouth and to flow into the chamber of the carrier. The pumping device includes a barrel attached to the mouth of the pumping device and coupled to the first tube member of the siphon tube.

[0015] The siphon tube includes a conduit engaged into the first tube member of the siphon tube for directing an air into the siphon tube. The siphon tube includes a valve device attached to the siphon tube and coupled to the conduit and having an entrance for allowing the air to flow into the valve device and the conduit. The siphon tube includes a valve member attached to the valve device for controlling the air into the valve device.

[0016] The siphon tube includes an outlet member attached to the conduit and having a perforation formed therein and communicating with the first tube member of the siphon tube. The outlet member includes an outer peripheral flange extended outwardly therefrom for engaging with and for agitating the water drawn by the pumping device.

[0017] Further objectives and advantages of the present invention will become apparent from a careful reading of the detailed description provided hereinbelow, with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. **1** is a perspective view of an aerating device or air bubble collecting device for attaching to an aquarium in accordance with the present invention;

[0019] FIG. **2** is a partial exploded view of the aerating device or air bubble collecting device;

[0020] FIG. **3** is a partial cross sectional view of the aerating device or air bubble collecting device taken along lines **3-3** of FIG. **1**;

[0021] FIG. **4** is a cross sectional view similar to FIG. **3**, illustrating the operation of the aerating device or air bubble collecting device;

[0022] FIG. **5** is a perspective view similar to FIG. **1**, illustrating the other arrangement of the aerating device or air bubble collecting device;

[0023] FIG. **6** is a partial exploded view of the aerating device or air bubble collecting device as shown in FIG. **5**;

[0024] FIG. **7** is a partial cross sectional view of the aerating device or air bubble collecting device taken along lines **7-7** of FIG. **5**; and

[0025] FIG. **8** is a partial cross sectional view of the aerating device or air bubble collecting device taken along lines **8-8** of FIG. **5**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0026] Referring to the drawings, and initially to FIGS. **1-4**, an aerating device or air bubble collecting device in accordance with the present invention comprises an aerating device **1** for attaching to an aquarium (not shown) which normally comprises a container including a chamber formed therein for receiving water and fish, and the aerating device **1** includes a carrier **10** having a hook or attaching means or device **11** for readily attaching to the wall or the outer portion of the container without hooks or latches or fasteners or sucking cups or the like, the carrier **10** includes a chamber **12** formed therein, and includes a panel **13** having an opening **14** formed therein (FIGS. **2-4**) and communicating with the chamber **12** of the carrier **10**. A filter sponge or member **16** (FIGS. **1**, **2**) may further be provided and disposed in front of an outlet opening **15** for filtering the water.

[0027] A pumping device **20** includes a mouth **21** for engaging through the opening **14** of the carrier **10** and for engaging into the chamber **12** of the carrier **10** and for attaching or securing to the carrier **10** with such as latches or fasteners (not shown) or a threading engagement **22**, and includes a powered or motorized impeller **23** disposed or arranged in the mouth **21** for pumping or impelling the water, and includes one or more apertures **24** formed in the mouth **21** for allowing the water to be pumped or impelled by the powered or motorized impeller **23** and to flow out through the apertures **24** of the mouth **21** or of the pumping device **20**, and then to flow into the chamber **12** of the carrier **10**.

[0028] A barrel **25** is disposed or attached onto the mouth **21** of the pumping device **20**, and includes a bore **26** formed therein for coupling to a siphon tube **27** which includes a first tube member **28** engaged into or secured or coupling to the barrel **25** of the pumping device **20**, and includes a second tube member **29** extended out of the carrier **10** (FIG. **1**) and engaged into the container of the aquarium for allowing the water in the container of the aquarium to be drawn into the tube members **28**, **29** of the siphon tube **27** and then drawn into the barrel **25** of the pumping device **20** (FIGS. **3-4**) by the powered or motorized impeller **23**, and to flow out through the apertures **24** of the pumping device **20** and then to flow into the chamber **12** of the carrier **10**, the impeller **23** may also agitate or minimize the carbon dioxide and/or the air and/or the gas in the water into a large amount of smaller air bubbles.

[0029] A conduit **30** is disposed or engaged into the siphon tube **27**, such as the first tube member **28** of the siphon tube **27**, and a valve device **31** (FIGS. **1-3**) is attached to the siphon tube **27** and coupled to the conduit **30** and includes an entrance **32** for allowing the air or the oxygen in the outer environment to flow into the valve device **31** and the conduit **30** and then to be drawn into the barrel **25** of the pumping device **20** (FIG. **3**) by the powered or motorized impeller **23**. A valve member **33** may be attached to the valve device **31** for controlling the valve device **31** and for determining the flowing quantity and/or the flowing speed of the air into the valve device **31** and then into the water that is drawn by the powered or motorized impeller **23**.

[0030] An outlet member **34** is attached to the lower portion of the conduit **30** and includes an outer peripheral flange **35** extended outwardly therefrom for engaging with or for agitating the water drawn into the barrel **25** of the pumping device **20** (FIG. **3**), and includes a perforation **36** formed therein (FIGS. **3**, **4**) and communicating with the first tube member **28** of the siphon tube **27** and the bore **26** of the barrel **25** for allowing the air to be drawn into the bore **26** of the barrel **25**. It is to be noted that the fresh air in the outer environment may be supplied or drawn into the entrance **32** of the valve device **31**, or an air or gas reservoir (not shown) may be coupled to the entrance **32** of the valve device **31** for supplying the air and/or the gas into the valve device **31**.

[0031] The carrier **10** includes a partition **40**, such as a spongy partition **40** engaged into the chamber **12** of the carrier **10** and laterally or horizontally disposed on the upper portion of the chamber **12** of the carrier **10** for closing the chamber **12** of the carrier **10**, and includes an orifice **41** formed therein for receiving or engaging with the barrel **25** and/or the first tube member **28** of the siphon tube **27**, and includes a passage **42** formed therein and communicating with the chamber **12** of the carrier **10**. As shown in FIGS. **3-4**, the air or gas bubbles **80** in the water may flow upwardly toward the bottom surface **43** of the partition **40**, and the partition **40** is arranged to have the bubbles **80** flow into the passage **42** of the partition **40**. The spongy partition **40** is arranged to allow only the greatly minimized air or gas bubbles **80** to permeate through the spongy partition **40**.

[0032] A dirt collecting means or device **5** includes a receptacle **50** to be attached or disposed on the partition **40**, and particularly disposed above the passage **42** of the partition **40**, and includes a tubular member **51** extended in such as the upper portion of the receptacle **50** for forming an annular chamber **52** between the tubular member **51** and the receptacle **50**, and for forming a conduit **53** within the tubular member **51** and communicating with the passage **42** of the partition **40**, and includes a tube **54** disposed or extended or engaged into the tubular member **51** and the passage **42** of the partition **40** for allowing the air or gas bubbles **80** to flow upwardly through the tube **54** and to flow upwardly beyond or over the tubular member **51**. The receptacle **50** may include a cover **55** disposed on top of the receptacle **50** and having a number of orifices **56** formed therein for allowing the air in the environment to flow into the receptacle **50**.

[0033] As shown in FIGS. **3-4**, the upper portion of the tubular member **51** is slightly lower than the upper portion of the receptacle **50** and/or slightly lower than the cover **55** for forming a space or a gap **57** between the tubular member **51** and the cover **55** and thus for allowing the air or gas bubbles **80** to flow upwardly beyond or over the tubular member **51**. The upwardly flowing air or gas bubbles **80** may carry the dirt and/or the protein contained in the water for moving the dirt and/or the protein over the tubular member **51** and thus for moving the dirt and/or the protein through the gap **57** between the tubular member **51** and the cover **55** and into the annular chamber **52** of the receptacle **50** and thus for allowing the dirt and/or the protein to be collected within the annular chamber **52** of the receptacle **50**.

[0034] The receptacle **50** may include an exit or outlet port **58** formed or provided therein and communicating with the annular chamber **52** of the receptacle **50**, and coupled to a hose **59** for allowing the dirt and/or the protein to be drawn out of the annular chamber **52** of the receptacle **50**, and to be drawn into a dirt collector (not shown). As shown in FIG. **4**, an air or gas supplying member **60** may further be provided and engaged through the cover **55** and into the tubular member **51** and/or the tube **54** and into the chamber **12** of the carrier **10**, and coupled to an air or gas supplying reservoir or device **61**, such as an oxygen reservoir or device **61** which may supply an air or gas into the chamber **12** of the carrier **10**, and an air stone **62** may be coupled to the inner end of the air or gas supplying member **60**. The air or gas supplying reservoir or device **61** may also be coupled to the valve device **31** for supplying the air or gas into the conduit **30** of the siphon tube **27**.

[0035] In operation, the water in the aquarium may be drawn into the tube members **28**, **29** of the siphon tube **27** and then drawn into the barrel **25** of the pumping device **20** by the powered or motorized impeller **23**, and to flow out through the apertures **24** of the pumping device **20** and then to flow into the chamber **12** of the carrier **10**, the fresh air in the outer environment may be supplied or drawn into the entrance **32** of the valve device **31** and then into the conduit **30** and then into the water drawn by the powered or motorized impeller **23**, and the powered or motorized impeller **23** may also be used to minimize the air or gas bubbles **80**. The air or gas bubbles **80** in the water may then flow upwardly toward the bottom surface **43** of the partition **40** and guided to flow into the passage **42** of the partition **40**.

[0036] The air or gas bubbles **80** in the water may flow upwardly through the tube **54** and may flow upwardly beyond or over the tubular member **51**, and may carry the dirt and/or the protein contained in the water for moving the dirt and/or the protein upwardly through the tubular member **51** and then for moving the dirt and/or the protein over the tubular member **51** and thus for allowing the dirt and/or the protein to be collected within the annular chamber **52** of the receptacle **50** and thus for allowing the dirt and/or the protein to be easily drawn out of the annular chamber **52** of the receptacle **50**.

[0037] As shown in FIGS. **5-8**, the aerating device **1** may further include another air or gas supplying member **63** engaged through the partition **40** and into the chamber **12** of the carrier **10**, and coupled to another air or gas supplying reservoir or device **64**, such as a carbon dioxide reservoir or device **64** which may supply another air or gas into the chamber **12** of the carrier **10**, and may further include another receptacle or cover **70** selectively or changeably disposed on top of the partition **40**, and particularly disposed above the passage **42** of the partition **40**, and includes a port **71** coupled to the valve device **31** with a hose **72** for gathering and collecting and supplying the air or gas bubbles **80** into the conduit **30**.

[0038] Accordingly, the air bubble collecting device in accordance with the present invention may be provided for attaching to an aquarium and for suitably agitating the water and the carbon dioxide and/or the air and for suitably supplying the carbon dioxide into the water contained within the container and for suitably supplying the carbon dioxide and/or the air to the water plants or the water weeds received in the container, and/or for minimizing and supplying the reduced carbon dioxide and/or the fresh air to the water plants or the water weeds received in the container.

[0039] Although this invention has been described with a certain degree of particularity, it is to be understood that the present disclosure has been made by way of example only and that numerous changes in the detailed construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

I claim:

1. An aerating device for an aquarium comprising:

a carrier for attaching to a container of the aquarium and including a chamber formed therein,

a pumping device attached to the carrier and including a motorized impeller arranged in said chamber of said carrier for pumping and impelling a water received in the container and for generating bubbles,

a siphon tube including a first tube member coupled to said pumping device, and including a second tube member engaged into the container for allowing the water in the container to be drawn into said siphon tube and drawn into said chamber of said carrier by said motorized impeller,

a partition engaged into said chamber of said carrier and including a passage formed therein and communicating with said chamber of said carrier for collecting the bubbles which carry a dirt, and

a receptacle disposed on said partition and disposed above said passage of said partition for receiving and collecting the bubbles.

2. The aerating device as claimed in claim **1**, wherein said receptacle includes a tubular member extended therein for forming an annular chamber between said tubular member and said receptacle, and for forming a chamber in said tubular member which is communicating with said passage of said partition for receiving and collecting the bubbles and the dirt.

3. The aerating device as claimed in claim **2**, wherein said receptacle includes a tube disposed in said tubular member and engaged into said passage of said partition for receiving and collecting the bubbles.

4. The aerating device as claimed in claim **2**, wherein said receptacle includes an outlet port communicating with said annular chamber of said receptacle and coupled to a hose for allowing the dirt to be drawn out of said annular chamber of said receptacle.

5. The aerating device as claimed in claim **1**, wherein said receptacle includes a cover disposed on top of said receptacle and having a plurality of orifices formed therein for allowing an air to flow into said receptacle.

6. The aerating device as claimed in claim **5**, wherein an air supplying member is engaged through said cover and into said receptacle and into said chamber of said carrier for supplying an air into said chamber of said carrier.

7. The aerating device as claimed in claim **1**, wherein said pumping device includes a mouth, said motorized impeller is disposed in said mouth for pumping the water.

8. The aerating device as claimed in claim **7**, wherein said pumping device includes at least one aperture formed in said mouth for allowing the water pumped by said motorized impeller to flow out through said at least one aperture of said mouth and to flow into said chamber of said carrier.

9. The aerating device as claimed in claim **7**, wherein said pumping device includes a barrel attached to said mouth of said pumping device and coupled to said first tube member of said siphon tube.

10. The aerating device as claimed in claim **1**, wherein said siphon tube includes a conduit engaged into said first tube member of said siphon tube for directing an air into said siphon tube.

11. The aerating device as claimed in claim **10**, wherein said siphon tube includes a valve device attached to said siphon tube and coupled to said conduit and having an entrance for allowing the air to flow into said valve device and said conduit.

12. The aerating device as claimed in claim **11**, wherein said siphon tube includes a valve member attached to said valve device for controlling the air into said valve device.

13. The aerating device as claimed in claim **10**, wherein said siphon tube includes an outlet member attached to the conduit and having a perforation formed therein and communicating with said first tube member of said siphon tube.

14. The aerating device as claimed in claim **13**, wherein said outlet member includes an outer peripheral flange extended outwardly therefrom for engaging with and for agitating the water drawn by said pumping device.

* * * * *