

AQUARIUM TANK

The matter contained in the present specification forms part of the matter contained in UK Patent
5 Application No. 9220889.1.

The present invention relates to an aquarium tank for keeping or raising aquarium fish, e.g. freshwater or tropical fish, and particularly to an aquarium tank comprising a tank body and a lid which is attached to the
10 upper portion of the tank body and in which an illuminator is accommodated.

In typical aquarium tanks, a glass lid having an edge opening for supplying food into the tank is attached to the front portion on the upper surface of an upper
15 frame of the tank body. The lid is equipped with fluorescent lamps for illumination. A filter device filled with a filter material is placed on the rear portion of the upper surface of the upper frame.

For example, Japanese Patent Public Disclosure No.
20 3-195434 discloses an aquarium tank designed with emphasis on aesthetic appearance and for enabling an illuminator to be attached with ease. This prior art aquarium tank comprises a tank body having a transparent glass or synthetic resin frame member of a substantially
25 U-shaped sectional profile attached watertightly to a synthetic resin main frame member open at the front, top and part of the opposite sides thereof, and a lid attached to the upper surface of the tank body. The lid is a saucer-shaped synthetic resin frame open at the
30 bottom and including a lid member provided on the front side so as to be openable and closable for supplying food into the tank body, a housing portion provided on the rear side for accommodating an illuminator therein and a plug socket portion provided on the back side and

connected to a power source for a heater etc. With this arrangement, since the open top of the tank body is tightly closed by the lid, heat is likely to accumulate in the tank body. Thus, owing to incident sunlight, the ambient temperature and heat generated by the illuminator in the tank, the temperature of the water in the tank becomes 3 to 5°C higher than the ambient temperature particularly during the summer season. This temperature rise adversely affects the fish and hydrophytes in the tank and should be avoided. On the other hand, during the winter season, a heater is used for maintaining the water in the tank at a prescribed temperature. The lower the water temperature, the higher the amount of power consumption. For this reason, there is a strong demand for aquarium tanks excellent in heat retaining property during the winter season. In typical aquarium tanks, the illuminator has pores formed in an inclined surface thereof for expelling radiant heat of the illuminator. however, since the pores do not communicate with the space above the water in the tank, they do not serve to ventilate this space.

According to the invention defined in UK Patent Application No. 9220889.1, there is provided an aquarium tank which comprises a tank body and a lid attached to the upper portion of the tank body and having an illuminator accommodated therein and which is characterised in that the lid is provided on the side wall thereof with a vent portion and a register for opening and closing the vent portion for establishing and severing communication between the interior of the tank body and the outside.

According to the present invention, there is provided an aquarium tank which comprises a tank body and a lid attached to the upper portion of the tank body and



having an illuminator accommodated therein and which is characterised in that a vent frame having a vent portion is interposed between the tank body and the lid.

5 The air introduced into the tank body through the vent portion suppresses water temperature increase in cooperation with the heat of vaporization. When the vent portion is closed by the register or when the vent frame is removed, the communication between the interior of the tank body and the outside is cut off, thereby enhancing
10 heat retention.

UK Patent Application No. 9220889.1 describes an aquarium tank as illustrated in Figures 1 to 8 in which:

Figure 1 is a perspective view illustrating the aquarium tank;

15 Figure 2 is a side view illustrating the upper portion of the aquarium tank;

Figure 3 is a side sectional view illustrating the upper portion of the aquarium tank;

20 Figure 4 is a front sectional view illustrating the upper portion of the aquarium tank;

Figure 5 is a side sectional view illustrating the upper portion of the aquarium tank, with the lid open;

Figure 6 is a front view illustrating the bottom of the open lid.;

25 Figure 7 is a partially cutaway sectional view illustrating a vent portion formed in the side wall of the lid;

Figure 8 is a sectional view taken along line VIII-VIII in Figure 7;

30 Referring now to Figure 1, there is shown an aquarium tank 1 which comprises a tank body 2 and a lid 3 detachably attached



to the tank body 2. The tank body 2 comprises a main frame member 1 of synthetic resin open at the front, top and part of the opposite sides thereof and a transparent frame member 5 of glass or synthetic resin having a substantially U-shaped sectional profile and attached watertightly to the main frame member 4 with adhesive. As shown in Figure 3, the upper end of the transparent frame member 5 is pinched between the upper end 4a of the main frame member 4 and an abutment member 6 fitted on the upper end 4a of the main frame member 4. The abutment member 6 has a stopper piece 6a engageable with the lower edge 3a of the lid 3. The tank body 2 may be formed by attaching a plurality of transparent glass or synthetic resin panels to one another.

A filter device (not shown) is detachably fitted in the tank body 2 and comprises a functional portion 7 defined by a partition wall 8 positioned on the rear side of the tank body 2 and a filter portion on the bottom of the tank body 2. Pebbles are placed on the filter portion and a heater is provided below the filter portion. A pump and a filter material are accommodated in the functional portion 7.

Part of the water pumped up by the pump is sprinkled onto the surface of the water in the tank body 2 through sprinkling holes 9a of a discharge pipe 9 disposed in a space P between the lower surface of the lid 3 and the surface of the water in the tank body 2 and the remaining pumped-up water is recirculated by being supplied onto the filter material through a branch pipe 10 disposed in the functional portion 7 of the filter device.

The lid 3 attached to the upper surface of the tank body 2 is a saucer-shaped synthetic resin frame open at the bottom and including a lid member 11 provided to be openable and closable at the front for supplying food into the tank body, a housing portion 12 provided on the rear side for accommodating an illuminator therein and a plug socket portion 13 provided

on the back side and connected to a power source for a heater etc. The lid 3 is attached openably and closably relative to the tank body 2 via a hinge member 14. Since the hinge member 14 can be disassembled, the lid 3 can be detached from the tank body 2. The housing portion 12 of the lid 3 is for accommodating therein a stabilizer and fluorescent lamps 15 constituting an illuminator. The housing portion 12 is a space defined by a peripheral wall 17 extending from a head panel 16 and is sealed watertightly by a lining panel 18. Further, as shown in Figure 6, a space 20 formed between the peripheral wall 17 and the side wall 19 of the lid 3 is divided into first wide space portions 20a disposed laterally of the fluorescent lamps 15 and second narrow space portions 20b disposed laterally of the stabilizer. Each pair of space portions 20a and 20b communicate with each other. The lining panel 18 is detachably screwed to bosses 21 formed on the lid 3.

In the aquarium tank 1, a drop catcher 22 having a draining piece 22a extends along the edge of the lining panel 18 on the side of the hinge member 14 and opens toward the open end of the lid 3. A trough having a substantially U-shaped sectional profile can be used as the drop catcher 22. The drop catcher 22 receives not only the condensed moisture adhering to the lining panel 18 when the lid 3 is rotated about the hinge member 14 to be in a substantially upright position as shown in Figure 5, but also the waterdrops splashed up by the water sprinkling. Therefore, the waterdrops neither flow out of the tank body 2 through the lining panel 18 nor wet its surroundings. The water received in the drop catcher 22 runs into the tank body 2 when the lid 3 is closed.

The aquarium tank 1 thus has the lining panel 18 provided with the drop catcher 22 and, therefore, even when the lid is opened for the purpose of cleaning the interior of the tank body 2, introducing new fish or hydrophytes into the tank body 2 and/or changing the fish or hydrophytes,

the water received in the drop catcher 22 will not flow out of the tank body 2. Therefore, no particular precaution is required when selecting a location for the aquarium tank 1. It can be placed, for example, even on an electric appliance apt to be easily damaged by moisture. A plurality of such drop catchers 22 may be disposed on the lining panel 18 in parallel with the pivot axis of the hinge member 14. Furthermore, the drop catcher 22 may be formed to have a substantially V-shaped sectional profile or the draining piece 22a may have an inclination directed downward when the lid 3 is in its closed position, whereby waterdrops can be reliably caught by the drop catcher 22 and the received water can be easily discharged.

In the aquarium tank 1 the lid 3 has a vent portion 23 formed in the side wall 19 thereof. A register 24 is fitted to the vent portion 23 so that it can open and close the vent portion 23. When the vent portion 23 is opened by the register 24, the space P above the surface of the water in the tank body 2 communicates with the outside.

The vent portion 23 of the embodiment shown in Figure 1 through Figure 8 will be described in detail. As illustrated in Figure 7 and Figure 8, the side wall 19 of the lid 3 defining the housing portion 12 has a recess 25 by which it is formed into a thin portion 33. The thin portion 33 has a rectangular opening 26 at the position of the first space portion 20a. A cover panel 27 having a plurality of regularly spaced first vertically elongated through holes 28 is attached to the side wall 19 so as to cover the opening 26. The thin portion 33 also has a plurality of second laterally elongated through holes 29 at the position of the second space portion 20b. The register 24 has an operation piece 32 at one end thereof and a plurality of through holes 30 formed therein at substantially the same pitch as that of the first through holes 28 of the cover panel 27. The portions between adjacent through holes 30 of the register 24 constitute closure portions 31 for covering the

first through holes 28 formed in the cover panel 27. The operation piece 32 is used to slide the register 24 for either establishing communication between the first through holes 28 of the cover panel 27 and the through holes 30 of the register 24, i.e. establishing communication between the space above the water in the tank body 2 and the outside, or cutting off the communication. When the closure portions 31 of the register 24 cover the first through holes 28 of the cover panel 27, the register 24 and cover panel 27 cooperatively close the rectangular opening 26 of the thin portion 33 of the side wall 19 of the lid 3. As shown in Figure 8, the register 24 is slidably clamped between the thin portion 33 and the cover panel 27 by inserting engaging pieces 35 formed on the cover panel 27 into engaging holes 34 formed in the thin portion 33 at given intervals and causing engaging claws 36a of the engaging pieces 36 to engage with the rear surface of the thin portion 33 around the engaging holes 34. With this arrangement, the outer surface of the cover panel 27 becomes flush with the outer surface of the side wall 19 of the lid 3 to provide a good appearance. In addition, since the operation piece 32 of the register 24 in the illustrated embodiment is not long enough to project from the side wall 19 of the lid 3, it does not become an obstacle to packaging the aquarium tank 1. From the standpoint of operability, however, there is no problem in the operation piece 32 of the register 24 projecting slightly from the side wall 19 of the lid 3.

Thus, the space above the water in the tank body 2 can be ventilated using the vent portion 23 of the lid 3. Therefore, when the temperature of the water in the tank body 2 rises with rising ambient temperature, heat accumulation in the tank body 2 can be avoided and, owing to the cooling effect by the heat of vaporization in cooperation with the ventilation effect of the vent portion 23, it is possible to prevent the temperature from rising to an excessive degree and avoid an adverse effect

on the fish in the tank body 2. When no ventilation is required, the vent portion 23 can be closed. Furthermore, the open area of the vent portion 23 can be adjusted by operating the operation piece 32 to change the position of the register 24. In addition, since the light from the fluorescent lamps 15 does not leak from the lid 3 when the vent portion 23 is closed, it does not disturb those sleeping nearby. The vent portion 23 thus ventilates the interior of the tank body 2 and further contributes to radiant heat of the fluorescent lamps 15. When the vent portion 23 is closed during the winter season, for example, ventilation is not carried out, so that the heat retention is enhanced, the heater-operating time shortened and power consumption reduced.

There now follows a detailed description, given by way of example only, of specific embodiments of the present invention. This description is given in relation to Figures 9 to 14, in which:

Figure 9 is a schematic perspective view illustrating another vent portion and a register;

Figure 10 is a perspective view illustrating another embodiment of the aquarium tank according to the present invention;

Figure 11 is a sectional view illustrating a vent frame and its surroundings of the aquarium tank of Figure 10;

Figure 12 is a perspective view illustrating a part of the vent frame;

Figure 13 is a plan view illustrating the corner portion of the vent frame; and

Figure 14 is a front view illustrating a part of the vent frame.

In the aquarium tank shown in Figure 1 through Figure 8, the register 24 is of a slidable type. It can



be modified to be of a swingable type as shown in Figure 9. In this modification, the side wall 19 of the lid 3 is partially cut out to form a rectangular opening 26, a register 24 having an operation piece 32 at one end thereof is connected at the opposite end thereof to the upper end of the opening 26 via a deformable thin member (not shown). This arrangement enables a vent portion 23 to be formed very easily.

Figure 10 through Figure 14 show a second embodiment of the aquarium tank 1 according to the present invention. In this embodiment, a vent frame 36 having a plurality of vent portions 23 formed therein is interposed between the tank body 2 and the lid 3. This embodiment is therefore applicable to existing aquarium tanks.

The same component parts as used in the first embodiment are denoted by the same numerals in the second embodiment and omitted from the description.

As shown in Figure 11 and Figure 12, the vent frame 36 has its lower surface formed with a loosely fitting groove 37 in which the stopper piece 6a of the abutment member 6 is loosely fitted, and has its upper surface provided with an insertion piece 39 which can be inserted into an insertion groove 38 formed between the lower edge 3a of the lid 3 and the lining panel 18. The groove 37 is formed between an outer frame panel 41 having a plurality of notches 40 disposed at regular pitch and an inner frame panel 42 facing the outer frame panel 41. The inner and outer frame panels 41 and 42 are connected to each other at their respective upper ends by a plurality of bridges 43 for keeping the interval therebetween uniform. The notches 40 and the spaces defined by the bridges 43 constitute the vent portions 23 through which the space P communicates with the



outside. The light of the fluorescent lamps 15 shining into the tank body from above is intercepted by the inner frame panel 42 and prevented from leaking from the lid 3 and, therefore, it does not disturb those sleeping nearby. The vent frame 36 has the insertion piece 39 formed continuously on the bridges 43 and has corner portions formed arcuately as shown in Figure 13 so as to conform to the configuration of the tank body 2 or the lid 3. Therefore, the vent frame 36 can be fitted relative to both the tank body 2 and the lid 3, and the lid 3 is prevented from rattling.

According to this embodiment, use of the vent frame 36 enables the inside of the tank body to be ventilated to prevent the temperature of the water in the tank body from rising to an excessive extent owing to the synergistic effect of cooling by the ventilation and cooling by the heat of vaporization. In addition, since the vent frame 36 is applicable to the existing aquarium tanks, it is highly practical. When no ventilation is required during the winter season, for example, it can be removed from the aquarium tank to enhance heat retention, decrease the heater-operating time and reduce the power consumption.

The present invention has been described with reference to the illustrated embodiments. However, it is not limited to the illustrated embodiments, but may be modified within the scope of the appended claims.

As has been described in the foregoing, since the interior of the tank body can be ventilated utilizing either the vent portion formed in the side wall of the lid, or the vent frame interposed between the lid and the tank body, the temperature of the water in the tank body can be prevented from rising by this ventilation working in cooperation with the action of the heat of

vaporization, and can maintain the water temperature suitable for keeping or raising aquarium fish. The vent portion can be closed by the register to prevent the light of the illuminator accommodated in the lid from
5 leaking outside the lid and also prevent the light from disturbing those sleeping nearby. Furthermore, since the vent frame can be applied to existing aquarium tanks and can be easily removed, it is highly practical. In addition, when no ventilation is required, the vent
10 portion can be closed or the vent frame can be removed so as to enhance heat retention, decrease heater-operating time and reduce power consumption during the winter season. Thus, the present invention can inexpensively provide an aquarium tank capable of
15 preventing the temperature of the water therein from rising to temperatures higher than that suitable for keeping or raising aquarium fish.





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CLAIMS:

1. An aquarium tank comprising a tank body and a lid
5 attached to the upper portion of said tank body and
having an illuminator accommodated therein, said aquarium
tank being characterised in that a vent frame having a
vent portion is interposed between said tank body and
said lid.
- 10
2. An aquarium tank according to claim 1, characterised
in that said vent frame comprises an outer frame panel
having a plurality of notches formed therein at given
intervals, an inner frame panel spaced apart and facing
15 said outer frame panel and a plurality of bridges spaced
apart from each other for connecting said outer frame
panel and said inner frame panel to each other at their
respective upper ends, and that the spaces between
adjacent bridges and said notches constitute said vent
20 portion.
- 25
3. An aquarium tank substantially as hereinbefore
described with reference to and as shown in Fig. 9 or
Figs. 10 to 14 of the accompanying drawings.

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