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PARTITION PANEL ADJUSTER IN AQUARIUM TANK

This invention relates to an adjuster for a partition panel used for dividing the interior of an aquarium tank for raising tropical fish etc. therein.

Generally, aquarium tanks are provided with an illuminator, a filter device and a heater. An aquarium tank of this type is disclosed in Japanese Patent Public Disclosure No. 3-195434, for example. This prior art aquarium tank comprises a tank body consisting of a plastic base frame open at the front, part of the opposite sides and top and a U-shaped transparent glass or plastic frame attached watertightly to the base frame, a lid unit provided with an illuminator and attached to the top of the tank body, and a functional unit provided with a filter device, a heater, etc. and disposed within the tank body. The interior of the tank body is divided by a partition panel, serving concurrently as the base panel of the functional unit, into a life area in which fish can swim about and an equipment area in which the filter device, heater, etc. are accommodated. The partition panel is inserted into the tank body from the open top of the tank body, with the lid unit removed, and therefore has a width slightly smaller than the distance between the opposite side walls of the tank body. In addition, the distance between the opposite side walls of the tank body

is slightly larger at the open top than that at the bottom. Moreover, some variance in such distances arises between different tank bodies when the tank bodies are fabricated. For these reasons, gaps form between the inner side walls of the tank body and the opposite side ends of the partition panel inserted into the tank body. In the prior art aquarium tanks, therefore, fry and small fish in the life area may enter the equipment area via the gaps and the water in the life area flows into the equipment area, disrupting the flow of water in the filter device.

The present invention is proposed in view of these disadvantages encountered by the prior art aquarium tanks.

The main object of the present invention is to provide a partition panel adjuster in an aquarium tank, which enables gaps between the opposite side walls of a tank body and the opposite side ends of a partition panel to be kept sealed.

According to the present invention, there is provided a partition panel adjuster in an aquarium tank, comprising a pair of adjuster panels laterally slidably attached to the opposite side ends of a partition panel inserted between the opposite side walls of a tank body, guide means for guiding the adjuster panels to slide laterally, and biasing means for biasing the adjuster panels away from each other to closely contact the opposite side walls of the tank body.

When the partition panel is inserted into the tank body, the adjuster panels slidably mounted on the opposite side ends of the partition panel are biased outwardly by the biasing means to closely contact the inner side walls of the tank body, thereby keeping the gaps between the partition panel and the opposite side walls of the tank body sealed.



The above and other objects, features and advantages of the present invention will become apparent to those skilled in the art from the following description of the invention with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view showing an aquarium tank;

Figure 2 is a schematic perspective view of a functional unit;

Figure 3 is a partially cutaway front view showing one embodiment of the partition panel adjuster according to the present invention; and

Figure 4 is a perspective view showing another embodiment of the partition panel adjuster according to the present invention.

The present invention will now be described with reference to the illustrated embodiments.

Figure 1 shows an aquarium tank 1 comprising a tank body 2, a lid unit 3 detachably attached to the top of the tank body 2, and a functional unit 4 accommodated in the tank body 2. The functional unit 4 is as shown in Figure 2.

The tank body 2 comprises a base frame 2a made of a synthetic resin material and open at the front, part of the opposite sides and top, and a transparent frame 2b made of glass or a synthetic resin material and having a substantially U-shaped sectional profile. The two frames 2a and 2b are attached watertightly with adhesive and assembled into a box having a top opening.

As shown in Figure 2, the functional unit 4 comprises a base panel serving concurrently as the partition panel 5, a plurality of partition walls 6a, 6b, 6c and 6d disposed upright from the base panel, a bottom panel 7 having a plurality of bottom slits 17 and 18, and an underwater pump 8, a first filter layer 9, a second

filter layer 10 and a heater 11 which are accommodated in the spaces defined by the base panel, partition walls and bottom panel.

The first filter layer 9 is formed of relatively coarse non-woven fabric 9a of vinyl chloride and nylon and fine non-woven fabric 9b of polyvinylidene chloride to effect physical filtration and is disposed between the partition walls 6a and 6b. The base panel (partition panel 5) of the functional unit 4 is formed at a position between the partition walls 6a and 6b with upper slits 12a and lower slits 12b for permitting water from the life area to pass through the first filter layer via these slits 12a and 12b. The second filter layer 10 is formed of activated carbon 10a and non-woven fabric 10b of polyvinylidene chloride to effect deodorization and biological filtration and is disposed between the partition walls 6b and 6c.

The underwater pump 8 is adapted to pump up water from below the bottom panel 7. The pumped up water flows upward in an upright pipe 13 and is divided via an elbow 14 into two streams, one in a first branch pipe 15 extending to the life area and having a plurality of water sprinkling outlets 15a and the other in a second branch pipe 16 extending to a position above the second filter layer 10 and having a plurality of water sprinkling outlets 16a, and the two streams of water are sprinkled over the life area and the second filter layer via the outlets 15a and 16a, respectively. That is to say, the water in the life area enters the equipment area through the upper and lower slits 12a and 12b, passes through the first filter layer 9, and is then guided underneath via the bottom slits 17 in the bottom panel 7 and pumped up by the underwater pump 8, whereas the water sprinkled over the second filter layer 10 passes through the second filter layer 10 and is guided underneath via the bottom

slits 18 in the bottom panel 7 and pumped up by the underwater pump 8.

As shown in Figure 1, a bottom filter 19 comprising a drainboard-like panel 19a and pebbles (not shown) laid over the upper surface of the drainboard-like panel 19a is disposed on the bottom panel in the life area. The water passing through the pebbles in the life area is guided to passageways 20 formed below the bottom panel 7 of the mechanism area as shown in Figure 3 and is pumped up by the underwater pump 8.

With this arrangement, it is necessary to separate the life area and the equipment area from each other in order to effect efficient filtration.

To attain this object, according to the present invention adjuster panels 21 are attached one each to the opposite side ends of the partition panel 5 so that they can project toward the opposite side walls 1a of the tank body 2 by an amount corresponding to the width of a gap between the side end of the partition panel 5 and the side wall 1a of the tank body 2. The adjuster panels 21 are made of a synthetic resin material and are slidable laterally, i.e. in the direction of the width of the partition panel 5 by guide means 22. The length of the adjuster panel 21 is slightly smaller than that of the end of the partition panel 5.

The adjuster panels 21 are chamfered at their respective ends from which the partition panel 5 is inserted into the tank body 2, i.e. at the lower ends thereof, so that the partition panel 5 can be smoothly inserted into the tank body 2, without requiring an operation for retracting the adjuster panels 21 inwardly, by applying the chamfered portions of the adjuster panels 21 to the top opening of the tank body 2 and lowering the partition panel 5, with the chamfered portions as guides. The upper ends of the adjuster panels 21 may also be

chamfered, as shown in Figure 2, thereby enabling the inserted partition panel 5 to be smoothly pulled up from an aquarium tank having an upper frame formed on the top opening thereof.

The aforementioned guide means 22 comprises a pin 23 mounted on the side edge of the base panel of the functional unit 4 in an upright fashion and a laterally oblong hole 24 formed in the adjuster panel 21 so that the pin 23 is loosely fitted in the oblong hole 24.

The adjuster panels 21 are biased outwardly by biasing means 25 which, as illustrated in Figure 3, comprises a stopper piece 27 formed on the base panel of the functional unit 4 and a resilient piece 26 integrally extending inward from the inside edge of the adjuster panel 21 and brought into pressure contact with the stopper piece 27. The resilient piece 26 may otherwise be abutted directly on the partition wall 6a or 6d of the functional unit 4.

In a state detached from the aquarium tank 1, the adjuster panels 21 have their respective outer side ends projecting outward slightly from the opposite side ends of the partition panel 5.

Since the resilient piece 26 is integrally molded with the adjuster panel 21 from a synthetic resin material, the number of the component parts can be minimized and the adjuster panel 21 can enjoy a long service life without suffering from rust or corrosion.

When the functional unit 4 including the partition panel 5 is inserted into the tank body 2, the adjuster panels 21 are pressed inwardly by an amount corresponding to the interval between their chamfered portions and the side walls 1a of the tank body 2 and slide inwardly against the biasing force of the biasing means 25. Even after the insertion of the functional unit 4, since the biasing means 25 still bias the adjuster

panels 21 outwardly, the side ends of the adjuster panels 21 are brought into close contact with the inner surfaces of the side walls 1a of the tank body 2. Therefore, no gap is formed between the tank body 2 and the partition panel 5 and the fry and small fish in the life area cannot enter the equipment area. Since the lower chamfered portions are positioned below the bottom filter 19 and since the upper chamfered portions are positioned above the water surface, there is no possibility of fry and fish entering the equipment area through the chamfered portions. In addition, since water alone flows along the prescribed course into the mechanism area by the action of the underwater pump 8, filtration can be effected with high efficiency.

In the illustrated embodiment, the right and left adjuster panels 21 are the same, and a plurality of cord receivers 28 and slots 29a and 29b for the brackets of the heater 11 are provided on the partition panel 5 and on the adjuster panels 21 respectively at appropriate positions.

On the other hand, the lid unit 3 mounted on the top opening of the tank body 2 is a saucer-shaped frame body comprising an openable front lid 30 on the front side for supplying feed therethrough and an accommodation portion on the back side for accommodating therein an illuminator such as a fluorescent lamp (not shown) and a ballast (not shown). The lid unit 3 is attached to the tank body 2 via hinge members (not shown) and is detachable from the tank body 2. The lid unit 3 is provided in its side wall surface with air vents 31 and a register 32 for the air vents 31 so that the upper interior of the aquarium tank 1 communicates with the atmospheric air to keep the interior temperature from rising excessively.

Figure 4 shows another embodiment of a partition

panel adjuster according to the present invention, in which a partition panel 5 is used for dividing the life area in an aquarium tank 1 into two areas. In this embodiment, adjuster panels 21 are laterally slidably attached to the opposite side ends of a partition panel 5 by guide means 22 and biased away from each other by biasing means 25 so that they are brought into close contact with the opposite side walls 1a of the aquarium tank 1 in the same manner as in the previous embodiment. The guide means 22 comprises a laterally oblong hole 24 formed in the adjuster panel 21 and a pin 23 formed upright on the side edge of the partition panel 5 and loosely fitted into the oblong hole 24, and the biasing means 25 comprises a stopper piece 27 formed on the partition panel 5 and a resilient piece 26 extending from the adjuster panel 21 toward the center of the partition panel 5 and brought into pressure contact with the stopper piece 26.

Also in this embodiment, since no gap is formed between the aquarium tank 1 and the partition panel 5, fry and fish cannot pass from one area to the other. This embodiment can be advantageously used not only in the case where two species of fishes which are of incompatible temperament are raised in a single aquarium tank, but also in the case where a pair of fishes that do not have to go to a school of fishes are isolated from the school in a single aquarium tank.

A plurality of partition panel 5 may be used to divide the interior of the aquarium tank 1 into three or more areas.

The present invention has been described with reference to the two embodiments shown in the drawings. However, the present invention is not limited to these embodiments, but may be modified without departing from the spirit of the invention set forth in the appended

claims.

As has been described in the foregoing, in the present invention, adjuster panels are laterally slidably attached one each to the opposite side ends of a partition panel inserted between a pair of facing side walls of an aquarium tank by guide means and are biased outwardly by biasing means so that they are brought into close contact with the side walls. Thus, since no gaps are formed between the partition panel and the side walls, fry and small fish in a prescribed area are prevented from entering another area. Furthermore, since water other than that flowing along a prescribed course does not flow through filter layers, the filtration efficiency is not degraded.

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CLAIMS

1. A partition panel adjuster in an aquarium tank, comprising:

a pair of adjuster panels laterally slidably attached to the opposite side ends of a partition panel inserted between the opposite side walls of a tank body;

guide means for guiding said adjuster panels to slide laterally; and

biasing means for biasing said adjuster panels away from each other to closely contact the opposite side walls of the tank body.

2. A partition panel adjuster according to claim 1, characterized in that each of said adjuster panels has chamfered portions at its upper and lower ends.

3. A partition panel adjusted substantially as hereinbefore described with reference to Figure 1 to Figure 3 or Figure 4 of the accompanying drawings.

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