

FILTER DEVICE FOR AQUARIUM TANK

This invention relates to a filter device for an aquarium tank, which retains a motor of a pump mechanism on its filter frame to prevent itself from lateral movement which would otherwise be caused by the vibration of the motor or possible collision of fish against part of the pump mechanism.

A filter device of the type set on the upper surface of an aquarium tank is disclosed in Japanese Utility Model Public Disclosure No. 2-123867, for example. This prior art filter device comprises a filter frame disposed on the upper surface of an aquarium tank, a pump setting portion formed on one side of the bottom of the filter frame for disposing thereon a motor of a pump mechanism, a filter section for filtering the water pumped up from the interior of the aquarium tank into a pumping-up pipe and then supplied thereto, and a filtrate outlet portion disposed on the other side of the bottom of the filter frame for permitting the filtrate (filtered water) to flow down into the aquarium tank.

With the prior art filter device of the aforementioned construction, the pump setting portion may be laterally moved or inclined by the vibration of the motor of the pump mechanism or possible collision of fish against the pumping-up pipe within the aquarium tank. This will result in positional deviation of the upper end outlet of the pumping-up pipe and consequently cause the pumped-up water to be directed to a portion different from the filter section and flow outside the aquarium tank.

This invention has been accomplished in the light of the drawbacks encountered by the prior art filter device and has as its object to provide a filter device for an aquarium tank, which protects itself from lateral movement and inclination resulting from the vibration of a motor of a pump mechanism and other external forces.

According to the present invention there is provided filter device for an aquarium tank, comprising a filter frame disposed on the upper surface of the aquarium tank, a pump setting portion formed on one side of said filter frame and provided with a plurality of engaging pieces for releasably engaging with and retaining a motor of a pump mechanism,

said filter device being characterised in that the plurality of engaging pieces comprise at least one pair of first opposed engaging pieces for retaining opposite sides of the motor and at least one pair of second opposed engaging pieces for retaining front and rear sides of the motor, that the motor is formed in at least one side with at least one recess, and that at least one engaging piece disposed on the side of the motor provided with said at least one recess is provided with a check claw releasably engaging with said recess.

The motor can thus be resiliently retained by the engaging pieces and, therefore, the filter device can protect itself from lateral movement or inclination

resulting from the vibration of the motor and other external forces.

The above and other objects, features and advantages of this invention will become apparent to those skilled
5 in the art from the description of the invention which is made hereinbelow with reference to the accompanying drawings, in which:

Figure 1 is a front view showing one embodiment of the filter device for an aquarium tank according to this
10 invention;

Figure 2 is an enlarged cross section illustrating the principal part of the filter device, with a pump mechanism shown

by a phantom line;

Figure 3 is an enlarged cross section illustrating the principal part of the filter device, with the pump mechanism set on a pump setting portion;

Figure 4 is a plan view of the pump setting portion; and

Figure 5 is a cross-sectional view taken along line V-V in Figure 4.

This invention will now be described in detail with reference to the illustrated embodiment.

As shown in Figure 1, a filter device 2 of this invention is disposed on the upper surface of an aquarium tank 1 and includes a filter frame 3 disposed on the upper surface of the aquarium tank 1 and extending in the longitudinal direction of the aquarium tank 1, a filter section 4 disposed above the filter frame 3, a pump setting portion 5 formed on one side of the filter frame 3, and a filtrate outlet portion 6 formed on the other side of the filter frame 3. The filter section 4 is positioned between the pump setting portion 5 and the filtrate outlet portion 6.

A pump mechanism 11 set on the pump setting portion 5 of the filter device 2 comprises a motor 12, a shaft tube 13 depending from the lower surface of the motor 12, a communication frame 14 provided on the lower end of the shaft tube 13, a first pumping-up pipe 15 depending from the lower surface of the communication frame 14, and a second pumping-up pipe 16 rising upright from the upper surface of the communication frame 14. When the motor 12 is driven, a shaft (not shown) inserted into the shaft tube 13 is rotated to rotate a turbine (not shown) provided within the communication frame 14. As a result, the water within the aquarium tank 1 is pumped up into the first pumping-up pipe 15, passes through the communication frame 14, is pumped up into the second pumping-up pipe 16 and is discharged from an upper end outlet of the second pumping-up pipe 16 to the filter section 4 of the filter device 2.

As shown in Figure 4, the pump setting portion 5 is formed therein with a through hole 7 for permitting the passage of the shaft tube 13 of the pump mechanism 11 therethrough and is provided thereon with two pairs of first engaging pieces 8 which are somewhat resilient and two pairs of second engaging pieces 9 which are not resilient.

One pair of first engaging pieces 8 are disposed in alignment with each other at a prescribed interval across the through hole 7 in the direction of the width of the aquarium tank 1. The other pair of first engaging pieces 8 align in the same direction as the alignment direction of the one pair of first engaging pieces 8 and are opposed to the one pair of first engaging pieces 8 so that the two pairs of first engaging pieces abut respectively against the opposite sides of the motor 12. The one pair of first engaging pieces 8 are provided on their respective distal ends with check claws 10.

One pair of second engaging pieces 9 align in the longitudinal direction of the aquarium tank 1 and are disposed at a prescribed interval on the front edge of the pump setting portion 5. The other pair of second engaging pieces 9 align in the same direction as the alignment direction of the one pair of second engaging pieces 9, are disposed on the rear edge of the pump setting portion 5 and are opposed to the one pair of second engaging pieces 9 across the through hole 7 so that the two pairs of second engaging pieces 9 abut respectively against the front and rear surfaces of the motor 12. The two pairs of second engaging pieces 9 have their respective distal ends tapered upward.

Thus, a motor accommodating portion is defined and enclosed by the first and second engaging pieces 8 and 9. The motor 12 is formed in its one side surface on the side of the one pair of first engaging pieces 8 with a recess 12' in which the check claws 10 can engage.

The filter device 2 is set on the upper surface of the

aquarium tank 1 and, in use, the pump mechanism 11 is set on the pump setting portion 5 of the filter frame 3 thereof. To be specific, the pump mechanism 11 is set in place by passing the first pumping-up pipe 15, communication frame 14, and shaft tube 13 and second pumping-up pipe 16 successively through the through hole 7 of the pump setting portion 5 until the motor 12 is retained by the first and second engaging pieces 8 and 9. At this time, the distal end outlet of the second pumping-up pipe 16 is directed to the filter section 4. The motor 12 is first guided by the second engaging pieces 9, then slid on the first engaging pieces 8 while making use of the resiliency of the first engaging pieces 8, and set in place on the pump setting portion 5 by the engagement between the check claws 10 and the recess 12' and the abutment of the first and second engaging pieces 8 and 9 against the side surfaces of the motor 12. The motor 12 thus is firmly retained on the pump setting portion 5.

After the pump mechanism 11 has been set on the filter device 2, the filter device 2 is set on the aquarium tank 1. As a result, the lower end of the first pumping-up pipe 15 is positioned under water in the aquarium tank 1. In this state, the motor 12 is driven with electricity to rotate the turbine within the communication frame 14. The water in the aquarium tank 1 is pumped up into the first pumping-up pipe 15, guided in the communication frame 14, pumped up into the second pumping-up pipe 16, discharged to the filter section 4 via the distal end outlet of the second pumping-up pipe 16, and filtered in the filter section 4. The filtrate is allowed to flow into the aquarium tank 1 via the filtrate outlet portion 6.

Since the motor 12 of the pump mechanism 11 is firmly retained by the first and second engaging pieces 8 and 9, as described above, there is no possibility of either the filter device 2 being laterally moved by the vibration of the motor 12 or the distal end outlet of the second pumping-up pipe 16 being directed to any other portion than the filter portion 4.

Therefore, the problem resulting from the movement of a pump mechanism of the prior art filter device can be solved by this invention. In this invention, the pump mechanism 11 can be detached from the pump setting portion 5 with ease by pulling the motor 12 upward to warp the first engaging pieces 8 against their resiliency and disengage the check claws 10 from the recess 12'.

This invention has been described with reference to one embodiment illustrated in the accompanying drawings. However, this invention is not limited to the illustrated embodiment, but may be modified without departing from the scope of the appended claims.

As has been described in the foregoing, according to this invention it is possible to provide a filter device for an aquarium tank, which protects itself from lateral movement and inclination resulting from the vibration of a motor of a pump mechanism and any other external forces because the motor is firmly retained at the pump setting portion of the filter device by the first and second engaging pieces. Even if relatively large fish being raised in an aquarium tank should collide against the first pumping-up pipe of the pump mechanism, since the motor is firmly retained by the engaging pieces, there is no fear of the filter device being laterally moved. Therefore, the distal end outlet of the second pumping-up pipe of the pump mechanism will not be directed to any other portion than the filter section of the filter device, and the water pumped up by the pump mechanism will not flow outside the aquarium tank. Furthermore, at the time of replacement of the pump mechanism with a new one or inspection of the pump mechanism for maintenance purposes, the pump mechanism can readily be detached from the filter device by merely pulling the motor upward. The attachment of a new pump mechanism to the filter device can also be effected with ease.



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CLAIMS

1. A filter device for an aquarium tank, comprising a
5 filter frame disposed on the upper surface of the
aquarium tank, a pump setting portion formed on one side
of said filter frame and provided with a plurality of
engaging pieces for releasably engaging with and
retaining a motor of a pump mechanism,

10 said filter device being characterised in that the
plurality of engaging pieces comprise at least one pair
of first opposed engaging pieces for retaining opposite
sides of the motor and at least one pair of second
opposed engaging pieces for retaining front and rear
15 sides of the motor, that the motor is formed in at least
one side with at least one recess, and that at least one
engaging piece disposed on the side of the motor provided
with said at least one recess is provided with a check
claw releasably engaging with said recess.

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2. A filter device according to claim 1, characterised
in that said plurality of engaging pieces comprise two
pairs of first opposed engaging pieces and two pairs of
second opposed engaging pieces, that the motor is formed
25 in said one side with two recesses, and that two first
engaging pieces of said two pairs of first opposed



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engaging pieces disposed on said one side of the motor are provided with check claws releasably engaging in said two recesses respectively.

- 5 3. A filter device for an aquarium tank substantially as hereinbefore described with reference to and as shown in the accompanying drawings.