

WHY?

won't it go!

Ever had problems getting your power filter going? Dr. David Ford, of Aquarian Laboratories, gives some tips to save time and tempers in the latest of his occasional 'Why?' series



The frustration of aquarists who cannot get their new power filter to work is often reflected in their irate letters to my Advisory Service: "Why won't the * * * thing work?"

The modern power filter, whether Atlantis, Eheim, Fluval or similar, contains an encapsulated motor. In other words, the mains electrical supply, and the motor's stator (the coil that drives the rotating parts) are deeply set in a thermosetting resin. This makes the motor completely safe for use near — and in some models, completely immersed in — water.

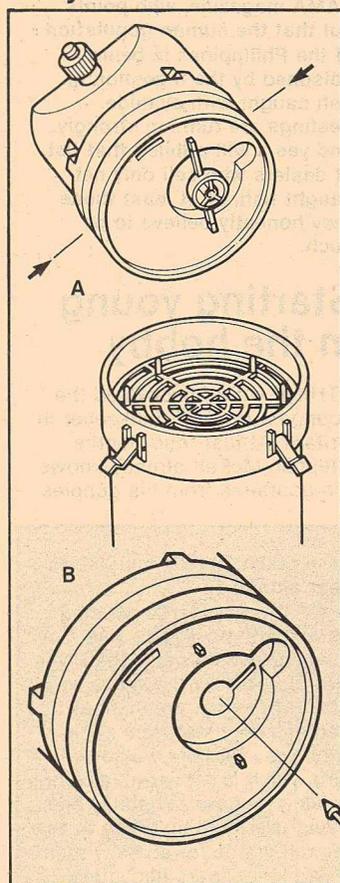
The moving part cannot be set in resin, of course, so a chamber holds a rotating permanent magnet that spins under the influence of the alternating current in the surrounding stator. To this magnet is attached a blade that pushes the water through the chamber — rather like a turbine engine. Once spinning, the impeller can really move that water, up to 600 litres per hour in some models.

This impeller is the main reason for a new pump not starting up when you switch on. Unless it is properly mounted on its shaft or bearings and free to rotate, it will not turn and start the water flowing. Although the manufacturers always check their models during assembly, subsequent travel may dislodge the impeller.

Remember that power filters are built in EEC countries or even the Far East, hence your new pump may have travelled thousands of miles. So always check that the impeller is free to spin inside its chamber when unpacking the unit, and when reassembling after cleaning.

One of the fundamental problems with machinery is inertia — the resistance to change. The impeller spins only under the influence of a magnetic field, not a direct link. Inertia makes the impeller reluctant to start moving from rest, especially with the blades held by the still body of water in the chamber. To overcome this problem, all the manufacturers have a "clutch" arrangement — just like the motor car.

The main body of the impeller (the magnet) is free to partly turn before it locates with the blades. When the power is turned on, the magnet spindle has little inertia so it starts to spin and then "kicks" the impeller blades, overcoming the water resistance, and the pumping action begins. Make sure this free play is indeed free — even a small

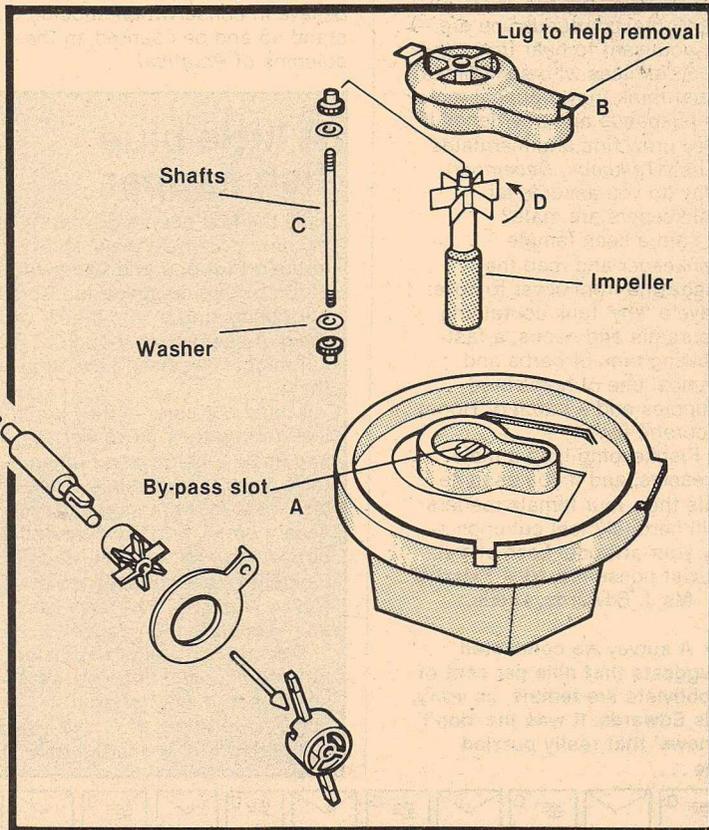


Motor head and gasket (A) of Eheim 2015/2017 power filters, dismantled (B) to show impeller and 'clutch'... a device to overcome inertia.

Right: The top of an Atlantis X300 power filter (A) turned upside down to show the impeller retainer (B) removed and the impeller assembly (C) dismantled. The magnet of the impeller (D) is free to partly turn before locating with the blades — the 'clutch' arrangement.

piece of dirt or algae may make the part stiff, and yet the whole impeller is free to turn in the chamber. Without this little kick start, the impeller will just sit there, dithering.

The next most common reason for failure to pump is an air bubble in the external models. Their motors have an impeller positioned at the very top of the filter body, so any air in the system will find its way to the impeller chamber. Once the blades find they are spinning in air instead of water, the flow stops dead — yet to the aquarist everything looks



okay. He can hear the motor working and see the tubes full of water, but nothing happens. . . . very frustrating!

The secret is to flush the unit through to remove all the air before switching on. It is no use just sucking on the outlet tube with the unit in its final position. Do the flushing thoroughly, by allowing siphon pressure to flow water through the unit until it is completely primed. Note that filter mediums such as filter fibre can trap air bubbles, which may be released later. Therefore shake the filter during the priming process.

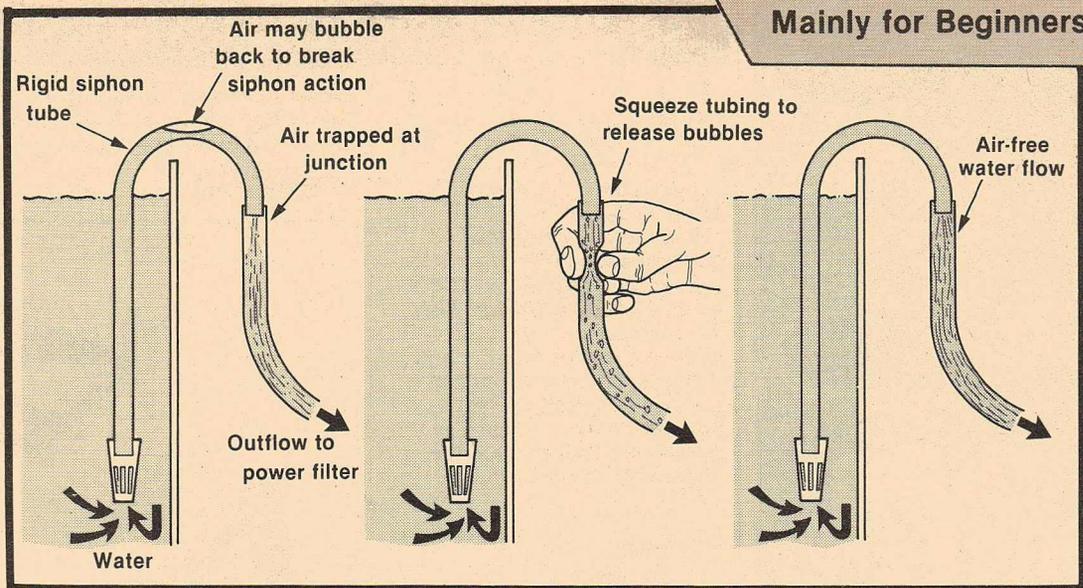
You will never get a good siphon flow if the unit is close to, or above the water surface in the aquarium. The ideal position for an external filter is alongside the tank but with the motor top about six inches (15 cm) below the water level. Even better for siphoning is to position the unit under the aquarium (although this reduces throughput when pumping, because of the head of water).

I usually place the unit on a chair or box in front of the tank. Fix the inflow pipe(s) into position and disconnect the outflow pipe from its spray bar. By sucking on this pipe, the inflow side fills with water, creating a siphon that fills the main filter body. If two inflow pipes are used make sure both are water-filled and flowing — if necessary, by pinching one tube to encourage water flow, the other. Give the container a shake as it fills.

The outflow pipe is lowered to a bucket on the floor, the large difference in height between the inlet and outlet giving a strong water flow that flushes the unit well. Allow water to pour into the bucket until obviously free of air bubbles. I usually also switch on the power to check it is pumping — again collecting the water in the bucket for eventual return to the tank. In fact, the siphoning action helps start up the impeller.

In some models (e.g. 'Atlantis' X300 and X550) there is a control valve to stop the water flow — in other models it will be necessary to turn off the mains. Place a thumb over the outlet pipe to prevent any water escaping and lift the tube back to its connection with the spray bar. It is better if the tube and bar are positioned just under the water surface at this stage, to prevent any air getting back into the system; they can always be repositioned later. The power filter is then lifted into its permanent position.

Open the valve and/or switch on and the water should flow freely, and remain so doing for



Air bubbles may form in the tube carrying water from tank to power filter. By pinching as shown, you'll correct this potentially infuriating problem.

weeks or even months before any cleaning becomes necessary.

Sometimes tips on air bubbles: if an elbow is used, the water can flow into a flexible tube with air trapped around the joint. Later this air will escape and work its way to the impeller chamber. Pinching the tube near to the joint will release any trapped air during the siphoning stage.

Some models (e.g. 'Atlantis') have an aeration option in which a nipple on the motor top can be opened to draw in air. This is a very small opening, allowing only sufficient air to mix in the impeller chamber and not cause an air lock. Do not open this nipple during pumping (or water will just be

jetted out) and connect a short length of airline tubing so you can blow down the tube to prime it when reconnected to the mains.

Also make sure the sealing ring (called an "O" ring or gasket) around the motor's lid is properly seated — any kink will allow air to be drawn into the unit where it may accumulate and form a large enough bubble to stop the impeller....even worse, it may allow water to get out!

Another tip. Always enclose any charcoal or carbon granules in a bag (nylon tights are ideal) to prevent the carbon floating free. Even when trapped between layers of filter fibre, just one granule may

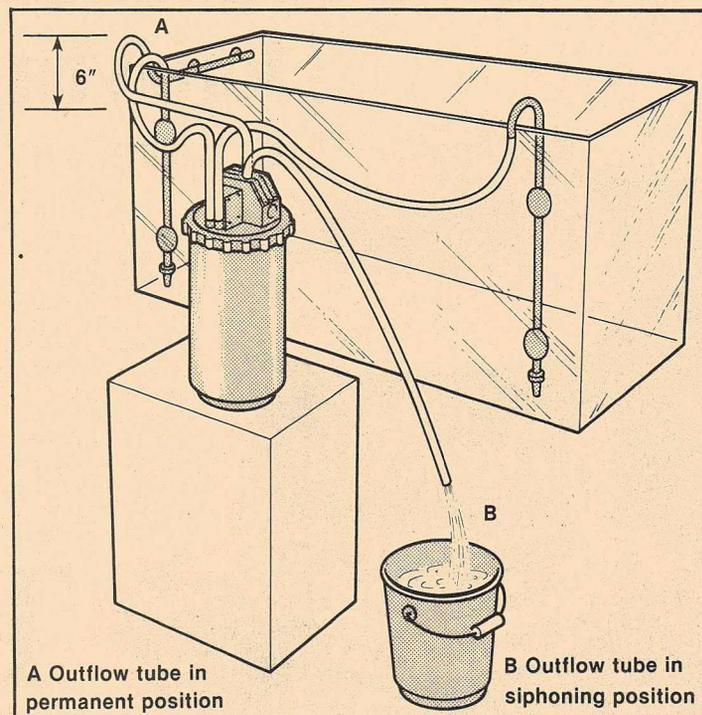
work its way up to the impeller chamber, where it will stop the pump dead.

Eventually the unit will become dirty. This can be seen by deposits inside the flexible tubing. Disconnect the power supply and open the unit for cleaning, but only use elbow grease — do not sterilise, because you need to retain the nitrifying bacteria.

Filter fibre does not clean well, so this is best replaced. The tubing can be cleaned with a pull-through brush (e.g. Atlantis Part No. 4983). This chore is important, because lumps of material within the tubing can reduce, or block the water flow. Also make sure the impeller chamber, the impeller itself and blades and clutch are clean. Scrape the magnet with a blunt tool if it is stained with hard water deposits.

Most units have a by-pass valve or slot in the impeller chamber, so make sure this is clear; one of those cotton wool buds on a stick is ideal for this job. Tube kinking will reduce water flow, and a fold may actually stop the water altogether. Therefore always assemble the external units so that the flexible tubes have smooth curves and do not sag. Cut the tubing to fit, do not just use all the length supplied. Rigid elbows or curves are available for most models.

When reconnecting, remember the sequence — position the filter beneath the tank's water level and siphon down into a bucket until every air bubble is flushed out. The power filter will then start pumping first go, saving tempers and the cost of postage to my Advisory Service! ■



Right from the start — the siphoning action ensures the tubes and body of the power filter are free from air bubbles and fully primed.