

AUTOMATIC EDUCTOR FISH FEEDING SYSTEM 15 JAN 2000

This invention relates to an automatic fish feeding system that can be mounted at the side of a pond or even on top of a fish tank. The system modifies a simple "T-joint" as an eductor that would convert the air output from a blower or pump into a vacuum that can be used to convey fish pellets into a pond or a fish tank.

BACKGROUND

Rearing fishes has become a hobby for many people. This hobby takes up a lot of time from a person as he or she would need to periodically maintain the pond or tank and feed the fishes. Nowadays fishponds and tanks are fully equipped with pump and filtration systems that would keep the water clean for at least a month without requiring further maintenance. The only part left is to automate the feeding of food for the fishes.

Presently, there is a handful of electrically controlled fish-feeding systems that automate the food feeding process for fishes. These systems require a control centre to govern their operations and most of them use motors as their output devices to carry out the feeding function. As there are lots of moving parts in the system, maintenance of the system is of prime concern. Moreover, the many components required in the construction of the system would also incur high costs, making it unpopular among fish enthusiasts.

If somehow, there are ways to minimize or remove the moving parts as well as to reduce the number of components in the automatic fish feeding system, the amount of money and time saved would be considerable.

OBJECTIVES OF THE INVENTION

The objectives of the automatic eductor fish feeding system are as follows:

- i. To minimize or remove human intervention from the fish feeding process,
- ii. To minimize or eliminate totally any maintenance required for this automatic system, and
- iii. To lower the cost for the entire system.

SUMMARY OF THE INVENTION

There are 5 main parts to the automatic eductor fish feeding system: the eductor, the hopper, the blower/air pump, the timer relay and the tubing connections.

The eductor, which is modified from a "T-joint", draws in the fish food pellets due to a pressure difference and conveys the pellets through the downstream line into the fish tank/pond. The eductor has three connections as shown in Figure 1 as follows: the air inlet, the suction or pellets inlet, and the discharge.

The modified eductor converts the output of the blower/air pump into a vacuum inside the joint, which would feed pellets into a pneumatic conveying system. Due to the fact that there is no moving parts involved in the automatic eductor fish feeding system, the system can therefore operate entirely maintenance-free.

A hopper, which is connected to the suction or pellets inlet, stores the fish pellets. The hopper, which can be conical in shape or any other shapes, enables gravitational force to act on the pellets as the eductor sucks the fish pellets through the pneumatic conveying tubing into the fish pond/tank. The air jet in the eductor is directed towards the discharge to ensure that there is no blow back from the hopper.

The blower or air pump, selected based on its discharge rate, is connected to the air inlet of the eductor. Filtering is required at the inlet of the blower/pump to prevent dust and particles from being sucked into the system. The compressed air will be conveyed through the up-stream tubing into the eductor. The conveying rate depends on the diameter of the tubing and the eductor.

The timer relay controls the switching "on" and "off" of the blower or air pump. This would eventually control the amount of fish feeds to be given to the fishes per day.

Figure 1 shows the eductor wherein

- 31 Air inlet
- 32 Suction or pellets inlet
- 33 Discharge
- 34 Nozzle

Figure 2 shows the diagram of the whole system wherein

- 10 Timer Relay
- 20 Blower/Air Pump
- 30 Eductor
- 40 Hopper
- 50 Tubing
- 60 Fish Pond/Tank

DETAILED DESCRIPTION OF THE INVENTION

With reference to the Figure 1, a block diagram of the eductor is shown. The eductor, which is modified from a "T-joint", has a nozzle attached to the inlet 31. With this nozzle attached, the venturi principle of suction is applied. A jet of air from the inlet 31 directed to the discharge 33. The increase in velocity of air stream as it passes through the nozzle causes a drop in local pressure around the nozzle tip. This generates a vacuum in the inner body of the eductor. The difference in pressure between the atmospheric pressure and that inside the eductor causes the pellets to be sucked into the eductor body which is then expelled out through the discharge 33 by the high velocity air stream into the fish tank/pond. The eductor has three connections which are shown in Figure:

- 31 Air inlet,
- 32 Suction or pellets inlet, and
- 33 Discharge.

With reference to Figure 2, this modified eductor 30 converts the output of the blower/air pump 20 through the nozzle into a vacuum inside the joint. The food pellets, which are contained in the hopper 40, will be sucked into the pneumatic conveying system that transports the amount of food pellets to the fish pond/tank 60. Due to the fact that there are no moving parts involved in the automatic eductor fish feeding system, the system can therefore operate entirely maintenance-free.

The hopper 40, which is connected to the suction or pellets inlet, stores the fish pellets. It is designed to store a substantial amount of fish feed required for a few days or weeks. The hopper 40, which can be conical in shape or any other shapes, enables gravitational action on the pellets as the eductor 30 sucks the fish pellets through the pneumatic conveying tubing into the fish pond/tank 60.

The air jet in the eductor 30 is directed towards the discharge to ensure that there is no blow back from the hopper 40. When empty, manual pouring of the fish feed into the hopper 40 is required.

Blower or air pump 20 is selected based on its discharge rate. It is connected to the nozzle at the air inlet side of the eductor 30. The more energy supplied to the blower/air pump 20, the more fish feed is conveyed. The approximate range of fish feed flow rates can be controlled by carefully adjusting the throttling valve in order to obtain the most desirable flow rate when conveying the fish pellets. A filter is required at the inlet of the blower/pump 20 to prevent dust and particles from being sucked into the system. The compressed air flows through the up-stream tubing into the eductor 30. The diameter of the tubing as well as the diameter of the eductor 30 will also affect the conveying rates.

An electronic timer relay 10 connects to the blower/air pump 20. The electricity to switch on the blower/air pump 20 is governed by the setting on the timer relay 10. The switching "on" and "off" of the blower or air pump 20 is controlled by the timer and is

manually adjusted based on the feeding cycle. This would eventually control the amount of fish feeds to be given to the fishes per day.

When all the devices are connected together, the automatic eductor fish feeding system is complete. The following operational sequence would be observed as follows:

- i. Pour the amount of fish feed into the hopper.
- ii. Set the timer relay to the required feeding timing.
- iii. Switch on the timer relay.
- iv. Manually pour fish feed into the hopper if empty.

CLAIMS

1. An automatic eductor fish feeding system comprising:
 - Timer relay,
 - Blower/air pump,
 - Eductor,
 - Hopper, and
 - Tubing.
2. An automatic eductor fish feeding system, as claimed in Claim 1, wherein compressed air is used to transport fish pellets to the fish pond or fish tank some distance away.
3. An automatic eductor fish feeding system, as claimed in Claim 1, wherein the eductor is a modified "T-joint".
4. An automatic eductor fish feeding system, as claimed in Claim 3, wherein the eductor consists of 3 connections: air inlet, suction or pellets inlet and discharge.
5. An automatic eductor fish feeding system, as claimed in Claim 4, wherein a blower/air pump is connected to the air inlet connection.
6. An automatic eductor fish feeding system, as claimed in Claim 4, wherein a hopper to store fish food is connected to the suction of pellets inlet.
7. An automatic eductor fish feeding system, as claimed in Claim 4, wherein tubing is connected at the discharge connection, to transport the fish pellets to various locations in a fish pond or fish tank.

