

A Literature Survey on Automatic Fish Feeder

Sneha D. Dhavale¹, Aishwarya C. Sagar², Mohini S. Chavan³, S. C. Jagtap⁴

^{1,2,3}Student, Department of E & TC, BMIT, Solapur, India

⁴Assistant Professor, Department of E & TC, BMIT, Solapur, India

Abstract: This section reviews some of the existing automatic fish feeder systems. In most of the automatic fish feeder systems, it is not easy to control the quantity of food that was released. For indoor fish feeding system such as aquarium, a small device is suitable but the outdoor ponds might require to build a bigger system with big water storage. The size of the water storage and the dense of the fish determine the number of times the fish owner needs to do disperse the fish food.

Basically, there is a lot of inventions had been made and been classified as “automatic fish feeder”. From those previous designs, a few are chosen due to their criterions which are quite interesting and also useful.

Keywords: Fish Feeder, adjustable counterbalance weight, vibratory feeding device, balancing arms.

1. Introduction

An automatic fish feeder is a device that automatically feed the fish at a predetermined time. In a way, it is to control the fish feeding activity by using a fish feeder that combined the mechanical system and electrical system to form a device instead of manually feeding the fish by hand. Fish owners whom are away for a long time will have trouble feeding to fish. The purpose of this research is to reduce the manual work and save time through making system automated. The principle of the working model is based on controlling the amount of food fed in the fish tank unit at different intervals of time. The uses the concept of servo motor forgiving precise amount of food output in proper time thus, saving time. This helps in order to get good spreading of food across the water body and by own it feeds the fishes after a day, thereby making the system reliable and accurate.

2. Models

A. Model 1

The first design is by David C. Smeltzer which is patented in 4th April 1985. His design is capable of dispensing feed having various sizes of grains over a wide range of dispensing volumes with a high degree of accuracy. The device was able to do this by utilizing an adjustable counterbalance weight which the amount of water required are changeable to produce a dispensing action and simultaneously adjusts the vibration movement made by the fish feeder to differentiate the amount of food given out [1].

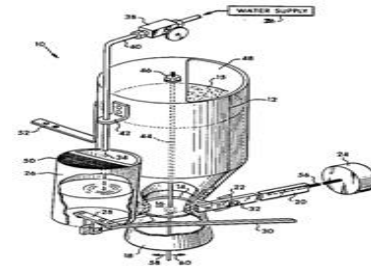


Fig. 1. Model developed by smeltzer.

1) Disadvantage

- Efficiency is less.
- Larger in size
- Accuracy is less.

B. Model 2

U.S. Pat. No. 3,865,278 issued to Gallati discloses a vibratory feeding device which utilizes an electromagnet connected to an AC power supply to generate avibratory motion to dispense feed [2].

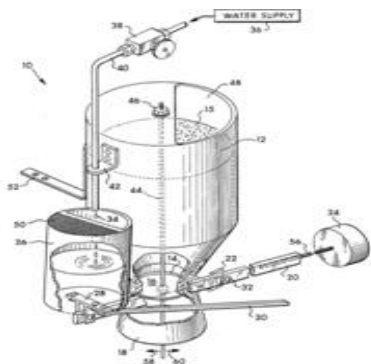


Fig. 2. Model developed by Gallati

1) Disadvantage

- Accuracy is less.
- AC power is used.

C. Model 3

U.S. Pat. No. 4,130,089 Moran discloses an aquarium feeding device which utilizes balancing arms 15 having a feeding bowl 30 at one end and an evaporation cup 35 at the other end. As water evaporates from evaporation cup 35, feed is dispensed into the aquarium [4].

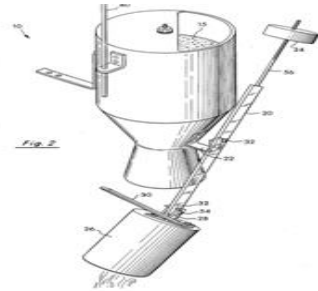


Fig. 3. Model developed by Moran

1) *Disadvantage*

- Error rate is high.
- Hardware complexity.

D. *Model 4*

Malek and Gallati disclose device which require the use of electrical power for operation of the fish feeder. In large hatcheries, fish are bred in large tanks embedded in the ground. The use of power cables to operate fish feeders which are disposed adjacent to these large tanks presents a significant hazard of electrical shock to operators. Additional expense may also be incurred to provide electrical timers to operate electrically driven feeders at appropriate intervals [3].

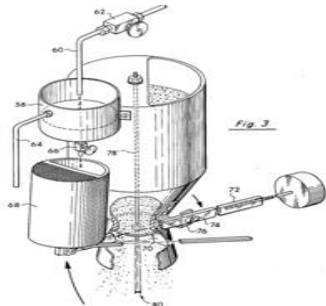


Fig. 4. Model developed by Malek and Gallati.

1) *Disadvantage*

The use of power cables to operate fish feeders which are disposed adjacent to these large tanks presents a significant hazard of electrical shock to operators.

E. *Model 5*

One of the Automatic fish feeder controlled by an AtTiny85 [2] was developed by Michael Braverman in 2012. This machine used a pair of HTX 500 Micro Servos and ATTiny85 that is been programmed by Arduino [6].



Fig. 5. Model developed by Michael Braverman.

1) *Disadvantage*

- Only a limited amount of food that can be stored in the bottle.
- The distribution of fish feeds also quite messy as some of the feeds fall to the ground.
- This system was only suitable for at most a week's supply of food before it runs out.

F. *Model 6*

The other automatic fish feeder system, All in One Box" Aquarium Feeder using Arduino which was created by Brian in 2014. He then created this machine by using Arduino and a stepper motor driver chip. The food is being placed inside a small Tupperware bin, where the drill bit inside the Tupperware slowly pushes the food out of the container, avoiding the food from being stuck [9].



Fig. 6. Model developed by Brian.

1) *Disadvantage*

- The users have to program the machine using the AC timer and if the timer is broken, the fish cannot be fed.
- It also had the possibility of tampering as the additional volt of the timer can speed up the motor.
- This can cause the food being dispersed twice the amount of the food needed and cause overfeeding.

3. Current fish feeders

A. *Botrade aquarium auto fish feeder*

The first system is the eBoTrade Aquarium Auto Fish Food Timer. This device is shown in Fig. 7 below. The eBoTrade Aquarium Auto Fish Food Timer can feed between one and four times per day, has manual and automatic capabilities, an adjustable serving size, and a ventilation system to keep the food dry. For this system, the food reservoir rotates and a door on the bottom will open to allow the proper amount of food to be released into the tank (Fish feeder, automatic fish feeder, eBoTrade aquarium tank auto fish food timer).



Fig. 7. The eBoTrade Aquarium Auto Fish Food Timer

1) *Disadvantage*

- Even at the smallest serving size it feeds too much food for a single fish, and condensation formed inside the food reservoir causing the food to rot. Also, the mounting system is not very stable so the user must be careful not to bump it, and the door would not open.

B. EHEIM automatic feeding unit

The second system is the EHEIM Automatic Feeding Unit. This device, like the one described above, rotates the food tank to dispense the food. The system is pictured in Figure 8 below. The EHEIM Automatic Feeding Unit features an adjustable opening for different serving sizes, “simple digital programming for different intervals,” a manual snack option, a food reservoir large enough to feed for six weeks, and up to eight feedings per day (EHEIM automatic feeding).



Fig. 8. The EHEIM Automatic Feeding Unit

1) *Disadvantage*

- As the device rotates it dumps some food onto the tank’s cover resulting in both a mess and waste.

4. Block diagram of automatic fish feeder using Arduino

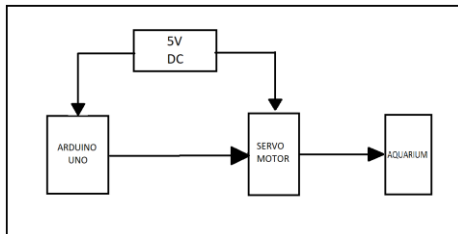


Fig. 9. Block diagram of automatic fish feeder using Arduino

1) *Advantage*

- It is cost effective.
- Simple programming.
- Efficiency is high.
- Accuracy is high.

5. Conclusion

The number of inventions related to automatic fish feeding machine has been discussed and the disadvantage has been overcome in our project.

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