

Automatic Pellet Dispenser for Experimental Feeding of Fishes

In experiments relating food availability to behavioral thermoregulation in fishes, we needed an automatic feeder that would (1) deliver cylindrical pellets of food on electronic command; (2) accommodate a sufficient supply of pellets to dispense one pellet (3 mm long and 3 mm in diameter) about every 5 minutes for 12 hours without refilling; (3) be convenient in size and shape for use with a 60-liter aquarium; and (4) be inexpensive to construct and easy to maintain. Because such a feeder was not available commercially, we designed one and constructed 10 units for use in our experiments.

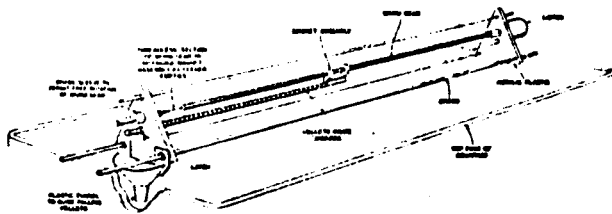
Each feeder consisted of a glass tube (1 meter long, 4 mm ID), a 0.5-rpm synchronous reversible motor, a threaded brass rod (1 meter long, 6 mm diameter, 7.9 threads/cm), a pair of rod-shaped permanent magnets (each 25 mm long, diameters 3.5 and 6 mm), and a supporting frame of brass rods and acrylic plastic. The glass tube served as a magazine for the food pellets. The motor turned the threaded rod, which acted as a worm gear. The larger magnet, cemented to a pair of brass nuts threaded on the worm gear, made contact with the magazine's outer wall and moved along the magazine as the worm gear rotated. Food was pushed out

the open end of the magazine, one pellet at a time, by the smaller magnet as it was moved along by the larger magnet. The magnets traveled 38 millimeters per hour; so, on the average, one pellet was dispensed every 4.7 minutes. The actual time interval between successive pellets was variable because the pellets varied in length.

The feeders can be turned on and off electronically by controlling (with a timer, for example) the 110-volt a.c. power to the motors. In our application, the fish turned the feeders on and off. Movements of the fish were sensed by photocells and interpreted by an electronic monitoring system. Output from the monitoring system controlled a relay in the circuit supplying power to each feeder.

Our feeders proved to be both dependable and inexpensive. Construction of each feeder required about \$20 in parts and 3 hours of labor with ordinary power tools.

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