FIFTEEN-GALLON WATER-BOTTLE

by

RICHARD VAN CLEVE

(Reproduced from the *Journal du Conseil*, Vol. XII N° 2, *Conseil Permanent International pour l'Exploration de la Mer*, Copenhagen, Aug. 1937, p. 174 — published by permission of the International Fisheries Commission of the United States and Canada).

The use of a constant-temperature apparatus for the experimental rearing of halibut eggs has made it necessary to devise a convenient method of obtaining comparatively large quantities of sea water (several hundred gallons at a time) from the depths at

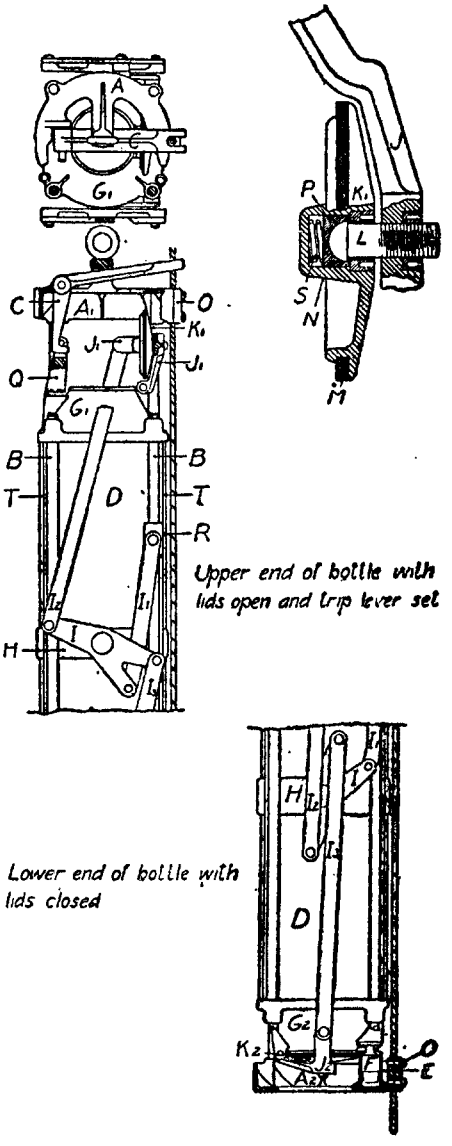

FIG. 1.

Sketch of the General Plan of Construction. The details of the suspension of the top lid are shown to the upper right.

which the eggs normally develop. After a consideration of the cost of construction and ease of operation of different types of apparatus, including various types of pumps, it was concluded that a water bottle of large capacity would be the most efficient in obtaining water from the required depths of 50 to 200 fathoms.

Because of the size of the mechanism and the conditions under which it was to be used, its structure was necessarily very heavy, its weight coming to 235 pounds when empty. This has not been found to be excessive, however, and while it is difficult to handle in very stormy weather it has been successfully used in the Gulf of Alaska throughout the winter season.

The plan of construction is shown by the sketch in Fig. 1 which includes the details of the mechanism within the upper lid. Fig. 2 shows the bottle in the open and closed positions. The cable clamps are seen to the right on the upper and lower collars.

Specifications for the bottle are:.

Water capacity : 15 gallons (56.8 litres).

Total length over all : 68 inches (172.7 cm.).

Weight of bottle complete (without water) : 235 pounds (106.6 kgs.).

Diameter of cylindrical portion of bottle : 10 3/4 inches (27.3 cm.).

Length of cylindrical portion of bottle : 36 inches (91.4 cm.).

Diameter of end opening : 5 1/2 inches (14.0 cm.).

The essential features of the bottle are a rigid outer frame consisting of two bronze ring castings (A_1 and A_2, Fig. 1) bolted at either end of four heavy stainless steel rods (B), and a cylindrical bottle (D) of slightly over 15 gallons capacity which slides up and down upon the rods. Hinged lids (K_1 and K_2) mounted on the end castings (G_1 and G_2) of the cylinder are opened and closed by means of two bell cranks (I) which are mounted on either side of the centre band (H) of the cylinder and attached to the lids by connecting rods (I_2 and I_3) and the arms (J). A driving rod (I_1) from each of the cranks is clamped to the frame (B) at R. The movement of the bottle up and down on the frame activates the bell crank mechanism.

The bottle is attached to the cable by a clamp (O) on each of the ring castings (A_1 and A_2). When the bottle is ready to be put overboard the cylinder is slid up on the frame and is hung by the roller (Q) upon the hook of the trip lever (C), thus opening the lids (Fig. 2, left). When the trip lever is struck by a messenger the cylinder is dropped, and it slides down the frame thus closing the lids (Fig. 2, right). It comes to rest with its entire weight hanging upon the two driving rods (I_1), and the weight is transmitted to the lids through the bell crank mechanism, effectively sealing the water sample within the cylinder.

The small cylinder (E, Fig. 1, lower right) which is an integral part of the lower end casting (A_2) of the frame receives the piston (F) which is mounted on the lower end (G_2) of the bottle, and acts as a hydraulic shock-absorber. The mechanism is thus relieved of the shock which would otherwise result from the fall of the heavy bottle.

A spring (S, Fig. 1, upper right) is placed beneath the piston (P) within the cylinder (N) in the upper lid (K_1) in order to facilitate the seating adjustment. The spring makes it possible to adjust the top lid to seat first, when the bottle closes, and then by the compression of the spring the weight of the bottle comes to rest upon the lower lid. Both lids are free to rotate through a small angle in a vertical plane on the head of the set screw (L) in order to ensure proper seating, and a rubber washer (M) is provided to make a tight seal when the bottle is closed.

The entire outer surface of the bottle and all of the working parts are heavily nickel plated. All the inner surfaces including the lids and spigots which come into contact with the water sample are heavily silver plated.

A reversing frame for thermometers was not included on the original bottle but could be added with very little extra cost.

The details of construction and design of the bottle have been carried out by the Northwest Instrument Company of Seattle, Washington, U.S.A.

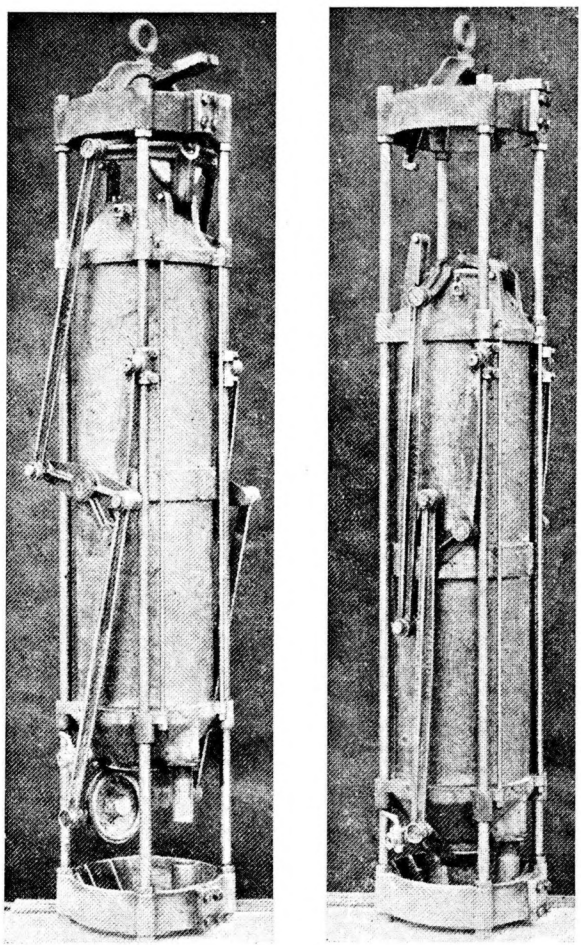

FIG. 2

Photographies de la bouteille dans sa position fermée (à droite) *et dans sa position ouverte* (à gauche)

Photographs of the bottle in closed (right) *and open* (left) *positions.*