

I. A HORIZONTAL WATER SAMPLING BOTTLE

Introduction

In recent years much progress has been made in oceanographic instrumentation. Most of the instruments connected with water sampling, such as the Ekman reversing bottle, the Nansen reversing bottle, Bathythermograph sampler, Sigsbee and Buchannan water samplers and the samplers developed by Pettersson, Krimmel, Kemmerer and Spilhaus etc. (Sverdrup *et al*, 1942; Hutchinson, 1956, Paul S.H. Welch, 1948) are designed for oceanic depths. Their large dimensions very often make them less suitable for operation in estuaries and shallow seas. Little progress has been achieved with regard to a water sampler suitable for the estuaries. Some samplers such as the Hytech Frautschy, Rutner water sampler, Uttermohl water sampler, Knudsen bottom water sampler ('Hydro-Bios') which are in current use are sent vertically down and the closing mechanism during the collection of water at a desired depth is operated in a vertical position. This leads to an error in depth of the collection in shallow areas as the length of the sampler itself is not taken in account.

It was, therefore, felt necessary to develop a sampling device which will conveniently collect water samples, most representative of the depth in shallow waters. Thus a horizontal type of water sampler became an obvious necessity. It has been designed to be used in a horizontal position like the Wohlenberg Schweder horizontal water sampler (Hydro-Bios) and the water samplers

developed or described by the T.S.K., R.P. Howmiller, John T. Conover and Leonard but this design has been particularly adapted for work from small boats in shallow estuaries.

Description

In general, the water sampling devices are broadly classified as plug valve types and plate valve types. The bottle described here comes under the latter category. It is made of brass, weighing about 3 kg, and consists of a cylindrical tube, having a capacity of about one litre, with brass plates on either side fitted with rubber gaskets. These plates are provided with two sliding rods on each side which move within a specified gap by the tension of 4 uniform springs, wound around each rod and mounted in between two fixed hooks (Fig. 1). The releasing mechanism is fixed at the centre of the cylinder. The bottle is made to open by holding it in a horizontal position and pulling out the side plates. The side plate at each end works on a single lever pivoted at the centre and the two plates automatically take their positions by holding the rods. While in operation the bottle is held in a horizontal position by the release frame through which the wire rope passes (see Fig. 1), but, when a messenger strikes the releasing device, it releases the springs and the water sampler gets closed at both ends. For simultaneous collection of water samples, a number of bottles can be attached to the same wire rope. After reaching the desired depth and waiting for about 3 minutes to ensure complete filling of the sampler, a messenger weight is sent down the rope which strikes the release catch of the first bottle. After working the first

bottle, the messenger releases another messenger that is attached to the wire clamp before lowering. This second messenger operates the next lower bottle, and so on. The cylinder is provided with two water taps for the withdrawal of water samples (Fig. 1). As soon as the bottle is brought up, water could be drawn through one tap after releasing the second.

The sampler is particularly useful for estuaries and shallow regions of the sea. It has been tested satisfactorily for its reliable performance. Apart from

its usefulness in collecting water samples precisely from different depths, it could also be used for the collection of water samples from very near the bottom. Since in an estuary the changes in the hydrographical factors are large with depth and seasons, the use of this sampler is particularly recommended. As the bottle is sent down horizontally, it maintains a continuous flow when it is lowered. Practical tests conducted in the laboratory and also in the field with this bottle show that a thorough flushing of the water takes place when it reaches the desired depth.

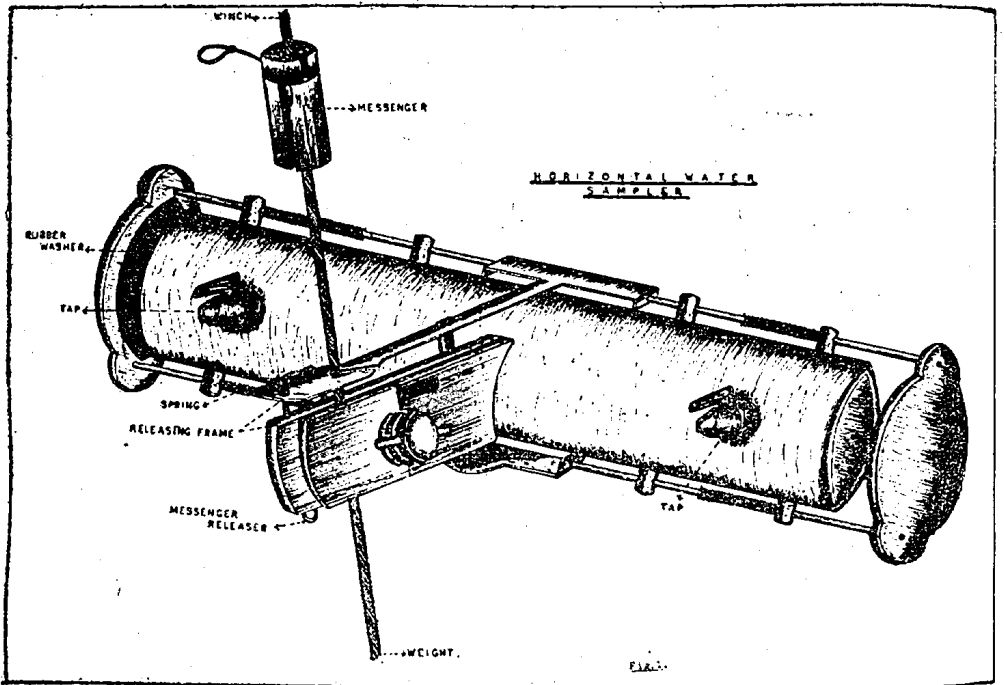


Fig. 1.

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