A SIMPLIFIED AND CHEAP TRIPPING MECHANISM FOR OCEANOGRAPHIC AND LIMNOLOGICAL STUDIES

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ABSTRACT

Experiencing serious financial difficulties in obtaining basic oceanographic instruments, attempts were made to design and fabricate a Van Dorn sampler, a mechanism for closing net and a messenger utilizing locally available components. Apart from the low cost of production, the mechanism involved is very simple. The description of these instruments is given.

Key Words: Van Dorn, closing net mechanism, messenger.

RESUMO

Um mecanismo de disparo simplificado e barato para estudos oceanográficos e limnológicos. Devido a sérias dificuldades financeiras em obter instrumentos oceanográficos, tentou-se desenhar e fabricar uma garrafa de Van Dorn, um mecanismo de disparo para fechamento da rede e um mensageiro utilizando materiais disponíveis no mercado. Além do baixo custo de produção, o mecanismo envolvido é bastante simples. É apresentada a descrição dos instrumentos.

Palavras-chave: Van Dorn, mecanismo de fechamento, rede vertical de estrangulamento, mensageiro.

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INTRODUCTION

In oceanographic studies a variety of instruments are employed to collect a wide range of data relating to organic and inorganic components. These include basic and simple instruments such as the "Secchi disc" as well as highly sophisticated collecting and measuring instruments. The cost of these varies according to their sophistication. An institute intending to conduct oceanographic studies will have to take into consideration the financial resources at its disposal and the availability of the instruments. It is not seldon that these two conditions are not favourably met in developing countries. Consequently, the programme of research to be carried out will have to be suitably adapted taking into consideration the existing limitations.

It is often possible that some of the less sophisticated oceanographic instruments can be designed and made with locally available material at a fraction of the cost of a similar instrument sold in a shop. Our experience in the construction of a Van Dorn sampler, a tripping mechanism for a closing net and a messenger* substantiates this view.

VAN DORN SAMPLER

For the construction of this sampler (Fig. 1, A & B; Fig. 2), a PVC tube (11.3cm diameter and 5mm thick) 43cm long was used which has a capacity to hold about 4.3 litres of water. It is closed at either ends with a rubber plunger (used to clean blocked sink), termed here valve, having a diameter of 15cm. These two are held in position inside the PVC tube by an elastic rubber band (surgical). A nylon string from each of these valves is provided with a metalic ring at their free end, which when hooked to the tripping mechanism leaves the two valves open for sampling.

* A description of these instruments was submitted to INPI for patenting (MU 6800334, MU 6800335 & MU 6800336).

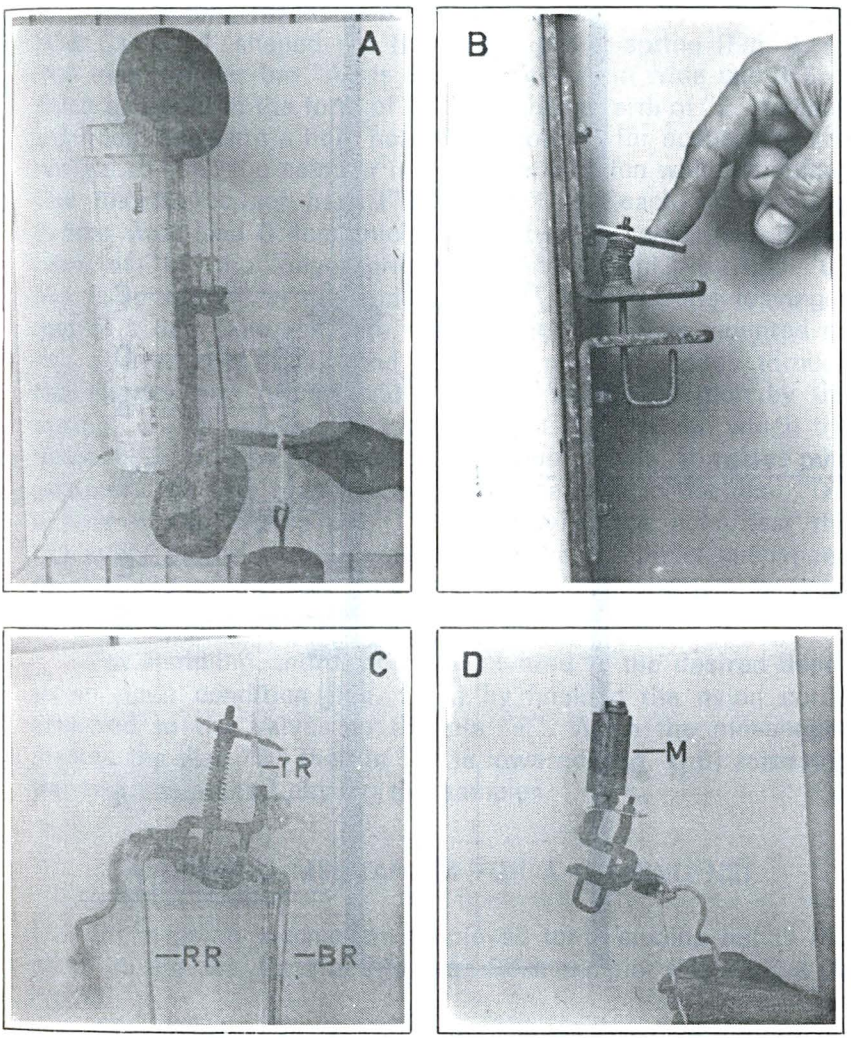

Fig. 1 — A: Van Dorn sampler ready for operation.
B: Tripping mechanism.
C: Tripping mechanism for closing net ready for operation. TR = tow rope. RR = throttle rope. BR = briddle.
D: Tripping mechanism of closing net after messenger activates the mechanism. M = messenger.

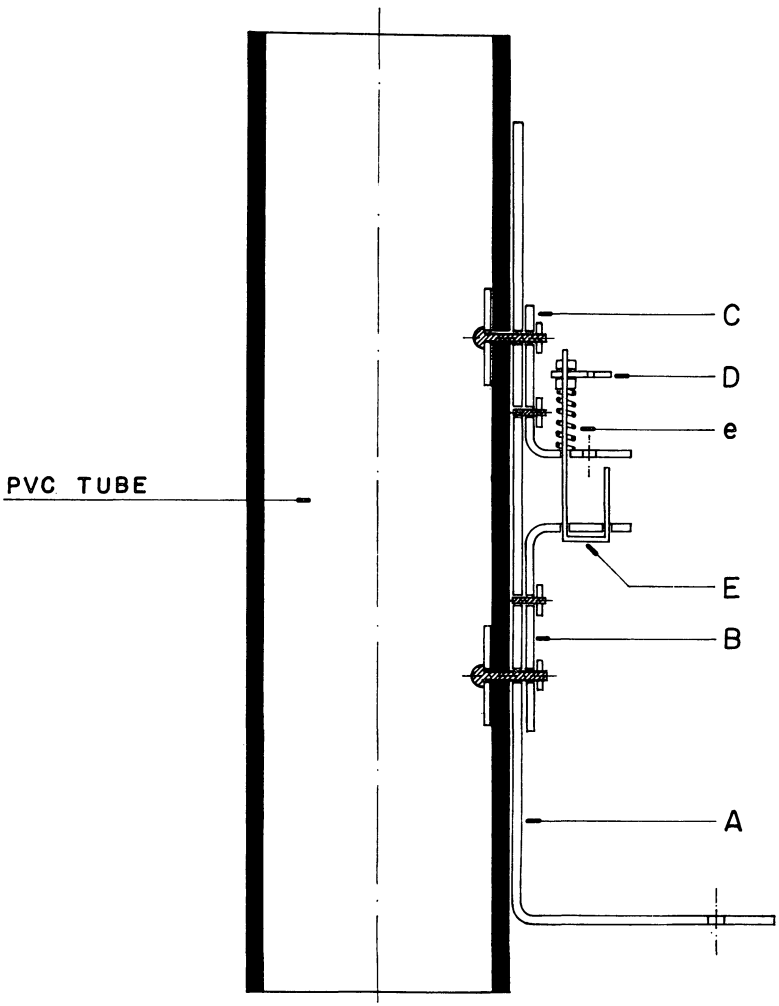

Fig. 2 — A longitudinal section of Van Dorn sampler, without valves. "A", "B" & "C" copper bars. "D" disc which receives messenger. "E" J-shaped pin. "e" spring.

The closing mechanism is made of copper bars (Fig. 2, A, B & C), a "J" shaped pin (Fig. 2, E) and a spring (Fig. 2, e). The main copper bar "A" is 50cm long, 3.7cm wide and 0.5cm thick and bent in the form of "L"; the shorter arm of "L" measuring 15cm and with a hole near the extremity for suspending the weight to keep the sampler in a vertical position while sampling. The shorter copper bars ("B" & "C") are each 14.cm long, 2.5cm wide and 0.4cm thick. These two are also bent in the form of "L", the longer arm measuring 9.0cm. "B" and "C" are fixed to "A" in the middle of "A" by two bolts leaving a gap of 1.5cm between. The tripping mechanism is mounted on the shorter arm of "B" and "C". The pin "E" passes through the shorter arm of "B" and "C" and held in position by the spring "e". The pin at the top carried a disc "D" on which the messenger strikes to release the two valves to close the sampler. The tow rope passes through a hole in the disc "D", a hole in the middle of "C"' and through the hole near the extremity of the shorter arm of "A"; the weight is suspended at this end of the tow rope. The tripping mechanism is fixed to the PVC tube by two nuts and bolts.

For sampling, the sampler is lowered to the desired depth in an open condition (Fig. 1, A) by hooking the nylon cords attached to the valves to the pin "E". When the messenger strikes the disc "D" the pin "E" is lowered (Fig. 1, B) releasing the two valves and closing the sampler.

A TRIPPING MECHANISM FOR A CLOSING NET

The tripping mechanism employed for a closing net is the same as the one described for Van Dorn sampler (Fig. 1, C & D; Fig. 3).

A copper bar 14.0cm long, 3.8cm wide and 0.6cm thick is bent in the form of "⌐" (Fig. 3, "A"). A hole sufficiently large to pass the tow rope is made in the part "a" (Fig. 3) of the bar; the part "d" has two holes to fix a "U" shaped shackle (Fig. 3, "C" for securing the throttle rope (Fig. 1, C — "RR"). The "J" shaped pin "B" passes through a hole in the part "b"

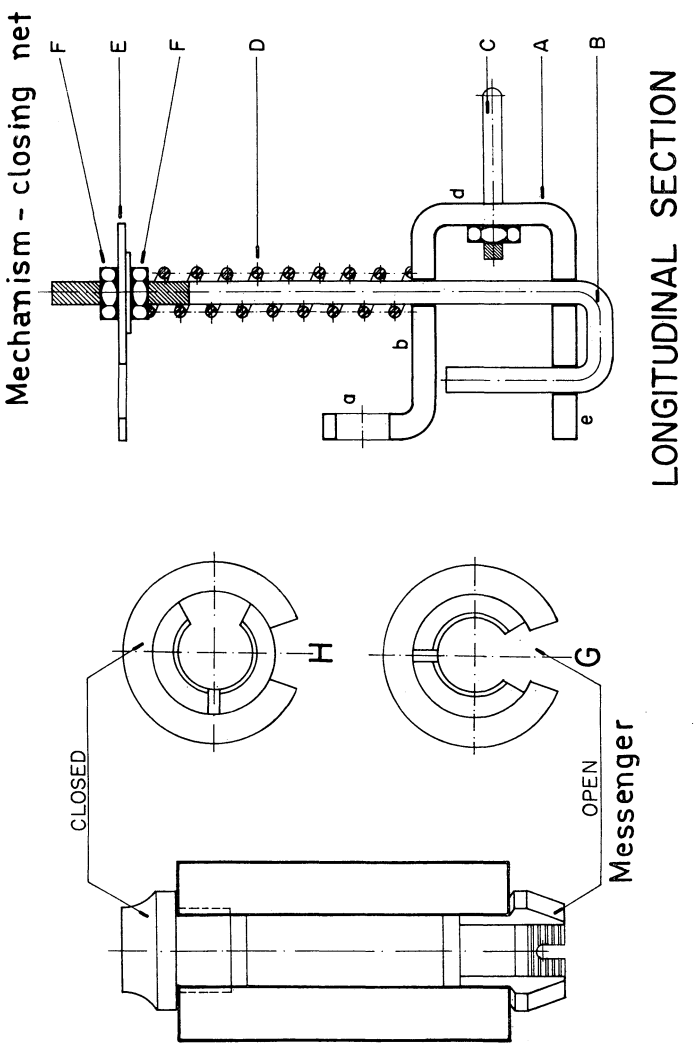

Fig. 3 — Messenger. "G" & "H" open and closed position of rings. Mechanism — closing net. "A" copper bar. "B" J-shaped pin. "C" shackle for securing throttle rope. "D" spring. 'E" rectangular plate to receive messenger. "F" nuts to hold "E". "a" part where tow rope is secured through a hole "b" part where upper part of pin passes through a hole "d" part where shackle is fixed. "e" part where lower part of pin passes through two holes.

and two holes in the part "e" (Fig. 3). The pin "B" is held in position by a spring "D" and at the top of the pin a rectangular plate "E" measuring 5.5cm x 3.5cm is fixed which has a hole to pass the tow rope. Two nuts "F" secures the plate "E" in position on the pin.

For operating the closing mechanism, the tow rope (Fig. 1, C — "TR") of the net passes through the hole in the plate "E" and through the hole in the part "a" of the copper bar "A". The throttle rope (Fig. 1, C — "RR") is secured to the shackle (Fig. 3, "C") and the briddle (Fig. 1, C — "BR") is hooked to the pin (Fig. 3, "B"). The net is lowered to the desired depth attaching adequate weight to the cod end. Ehe net is hauled up vertically and at the desired depth it is closed by dripping the messenger (Fig. 1, "M") through the tow rope wich strikes on the plate "E" thereby releasing the briddle of the net (Fig. 1, D). Consequently, the whole weight of the net is taken up by the throttle rope which closes the net.

A SIMPLIFIED MESSENGER FOR TRIPPING MECHANISM

A messenger (Fig. 1, D; Fig. 3) simple to make and operate was made locally using a cylindrical bronze rod (3.8cm in diameter and 7.5cm long). A hole 1.7cm in diameter is drilled through the middle of the rod. Subsequently, a longitudinal opening 1.7cm in width is cut through the whole length of the rod. At either ends of the rod threading is made to which a ring is screwed on. These rings have longitudinal slits of the same size as that on the main rod. To slide the messenger on to the tow rope, the two rings are turned in such a way that the longitudinal slits on the rings and the main cylinder are in one line (Fig. 3, "G" — open). After the messenger is slid on to the tow rope, the two rings are given a turn (Fig. 3, "H" — closed) so that the tow rope remains secured inside the messenger. The messenger is then ready to slide down the tow rope to activate the tripping mechanism.

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