

over into the position Fig. 9. In getting into this position the weight drags the sling

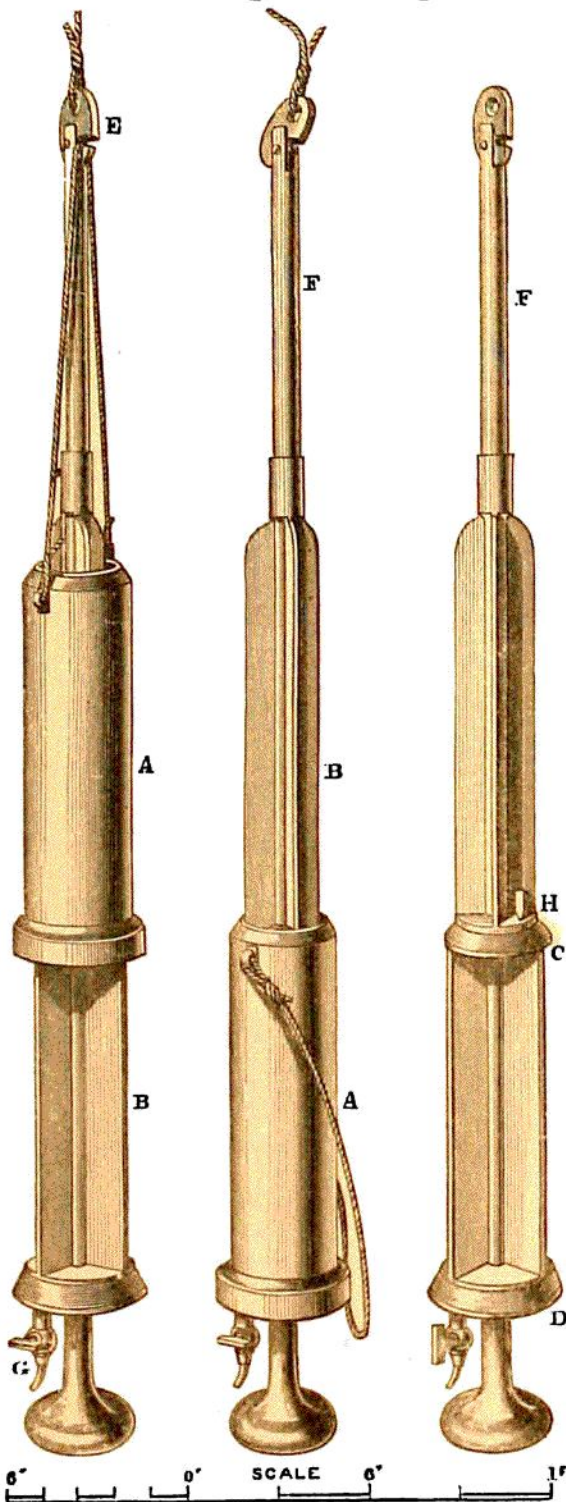


FIG. 11.—The Slip Water-Bottle.

A, brass cylinder sliding up and down the metal shank B, attached by a wire to the slipping arrangement E, fixed to the end of the rod F. When the apparatus reaches the bottom the cylinder is released and falls down to the lower part, where it rests on the lower of two accurately ground valves C and D; the water enclosed is removed by the tap G.

routine work of running a line of soundings the smaller size should be used and without

out of the notch *b*, and it falls into the notch *c*. Here it remains as long as the tube is at the bottom, exerting all its weight in pushing it into the ground. On heaving in, the tumbler is drawn into an upright position; when the sling slips free and the tube is brought up without the sinker. When it has been brought to the surface, it is found that the mud tube B is filled with a compact cylinder of mud, which by its weight has kept the india-rubber valves closed by drawing them tight down on their seats, and has therefore insured that the water enclosed at the bottom has not been contaminated by admixture with other water on the way up.

The localities, even in mid ocean, where the bottom is "hard ground," are by no means rare, and if the tube just described be dropped on it with a 50 lb.¹ sinker, the mud tube will be much disfigured; but if there be any loose material at all, such as gravel or coral, a little of it will probably be entangled behind the comb valve. In the absence, however, of a mud plug, the bottom water will be valueless. As a rule, the bottom of the deep sea consists of mud sufficiently soft and tenacious to fill the mud tube throughout the greater part of its length with a compact plug, and if the tube B be screwed water-tight into the lower part of the tube A, it is retained in it just as a liquid is retained in a pipette. In soft ground, clays and most Globigerina Oozes, it is better to discard altogether the comb valve L, because it always offers some resistance to the entrance of the mud, and is not wanted to keep it in. The instruments are fitted with mud tubes of two sizes, namely, the smaller 1 inch² in diameter, and the larger 1 $\frac{3}{4}$ inches³ in diameter. In the ordinary

¹ 22·8 kilogrammes.

² 25·4 mm.

³ 44·45 mm.