shut they point downward at about an equal angle. The beam connecting them carries a metal plate, E, of about thirty square inches area, secured by a pin, F, round which it moves freely through two right angles, when pushed upward; but when pulled downward it is arrested in a position at right angles to the beam by a tongue, G, resting upon a spring, H, the strength of which is such that, before giving way, the rush of the water past the plate will shut the stop-cocks. The plate then passes the spring, and any reversal of the motion of the apparatus will only reset the plate, and, on heaving up, shut the stop-cocks closer. As the water is thus hermetically inclosed, it is necessary to provide for its expansion on coming to the surface. This is secured by means of a safety-valve, K, the tube L of which penetrates well into the interior; so that, supposing the water to be overcharged with gas, it would, on coming to the surface, only suffer *water* to escape, the gas remaining at the top of the instrument. Brass funnels, M, M, are fitted at top and bottom, so as to give a greater draw through. They unship, and can be replaced by nozzles, N, screwing down upon washers air-tight, to the top of one of which can be affixed a gas-collecting apparatus, such as Bunsen used for boiling the gases out of water. The brass water-bottle thus replaces the flask ordinarily used, and renders transvasing unnecessary. In order that the instrument may answer this purpose, the parts must be fitted with the accuracy of an air-pump. Unfortunately, those in use on board the *Challenger* had to be finished so hastily that this condition could be only imperfectly complied with.

The instrument arranged for sinking is represented in Fig. 12, I; in Fig. 12, II, in section, when the line is checked on commencing to haul in; and in Fig. 12, III, in perspective, after it has been brought up, and with one of the funnels replaced by a nozzle. Care is necessary, in using the instrument, to see that the stop-cocks work easily, but not so easily as to make