

The forms of the frame for the reversing thermometer are various, one of the forms largely used by the Scottish Lake Survey having been designed by the late Mr Parsons (see fig. 35), at one time engaged on the Survey, and afterwards principal mineral surveyor in Ceylon; but the essence of all the frames is that on a spring catch being released the thermometer is inverted. In the usual form of frame the spring is released by allowing a weight, called a messenger, to slide down the sounding-line till it strikes the thermometer frame. The form of messenger to which I am most partial is a bar of metal twisted into a spiral, which can then be wound on to or off the sounding-line without fear of loss (see fig. 36). This form of messenger was designed by Mr William Macdonald, my boatman and observer on Loch Garry. By means of these thermometers observations may be rapidly taken, the rapidity being increased by attaching thermometers to the sounding-line at intervals; two or three or more thermometers may be used on one line at the same time, and thus simultaneous observations of temperature at the several depths may be obtained. The thermometers had, of course, to be immersed for some time to allow of their taking up the temperature of the water surrounding them; and it was found by experiment that, where there were no great differences of temperature in the course of the observations, three minutes was sufficient time to allow.

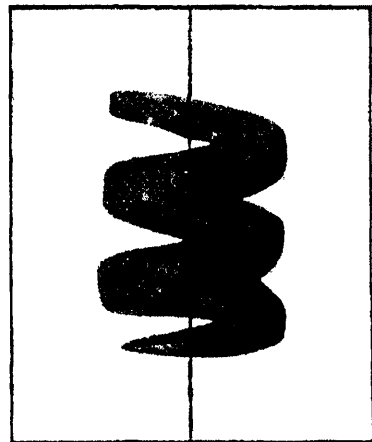


FIG. 36.

The early observers worked under great disadvantages, having to use an ordinary thermometer in one of two ways. In one method a thermometer, with many coats of non-conducting material, was lowered to the desired depth, and left for many hours to take up the temperature of the surrounding water. The protective coatings prevented any appreciable alteration in the temperature while being raised to the surface, and the thermometer could then be read. The other method was to bring up a sample of water from the desired depth in a suitable form of bottle or bucket, and then measure the temperature of the water when it reached the surface. It will be at once apparent that these methods were far from perfect, but in the hands of observers like Saussure they were used with great accuracy, and the observations may be relied on implicitly.

Subsequently many varieties of self-registering thermometers adapted for observing deep-water temperatures were designed, but in connection with these it is only necessary to mention the names of Cavendish, Six, and Aimé. The Millar-Casella maximum and minimum thermometer, which is a form of Six's thermometer, is