tions being corrected by the law of the rapidities of descent. From 400 to 500 fathoms the line begins to descend on an average in 2 minutes 21 seconds; from 1000 to 1100, in 3 minutes 26 seconds; from 1800 to 1900 fathoms, 4 minutes 29 seconds. The ratio *decreases*, therefore, in a sufficiently regular manner so long as the rope is dragged downward by the lead. When it suddenly becomes *uniform*, we may conclude that the lead has struck the bottom, and that the line continues to run out through the effect of a current. We cannot rely on the shock of the bullet against the sea-bed, for at great depths this shock is not transmitted. The uniform movement of the sounding-line is, then, the only certain indication that the bottom

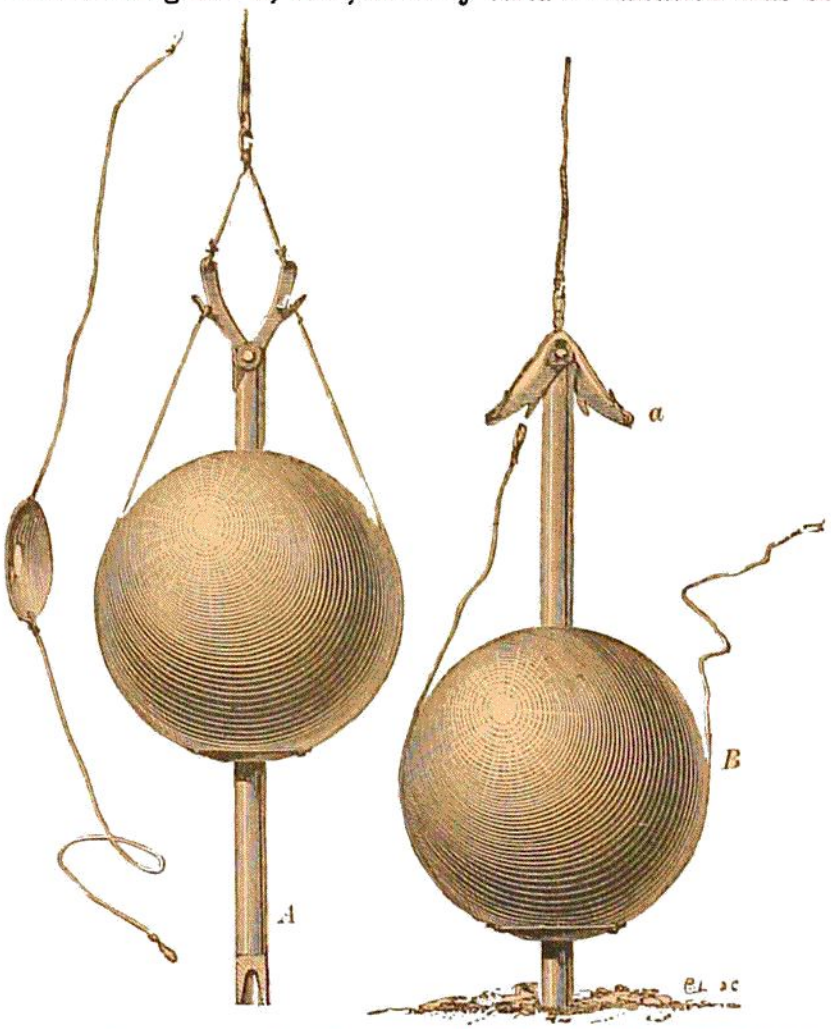


FIG. 211.—BROOKE'S SOUNDING-APPARATUS.—(*From Maury's "Physical Geography of the Sea."*)

has been reached; and, more, the ordinary sounding-apparatus cannot be recovered from any considerable depth.

But we now possess a far more perfect apparatus in the ingenious invention of Lieutenant Brooke, of the U.S. Navy, which enables us to bring to the surface specimens of the bottom of the sea. The sounding-line is attached to a heavy rod, whose extremity is hollow and covered with grease, so as to retain and bring away some fragments of the soil. The rod passes through a perforated cannon-ball, the hole being large enough to permit of the easy movement of the rod. As soon as the latter touches the bottom, the bullet disengages itself by a spring, and the sounding-line may be withdrawn with facility. We represent the apparatus in Fig. 211.