

any moment than what is necessary to counteract the weight of the length of line paid out. Thomson obtained this by means of a brake, a hemp line running in a separate groove at the side of the big wheel, and passing from there to a block, through which the brake could be tightened by means of weights.

Sir William Thomson used a plummet weighing 34 lbs., and commenced his sounding with a counter-weight of 10 lbs. on it. This was sufficient to run out the line at the rapid rate of 2000–3000 fathoms in thirty to fifty minutes. Gradually, as more line was paid out, the counter-weight was increased proportionately to the length of wire in the water (12 lbs. for each 1000 fathoms of wire), and this caused the wheel to stop almost instantaneously when the bottom was reached. The depth could be ascertained from the number of revolutions on the register. If the wheel did not stop instantaneously, an error would result in the determination of the depth, and if the steel line came into contact with the bottom, it easily kinked, and the plummet was likely to be lost. To obviate this a few fathoms of hemp rope were inserted between the plummet and the steel line.

Obviously this sounding machine is a great advance on the old hemp lines.¹ Economy of space, smaller weights, greater speed, less friction in the water (and consequently a more perpendicular line, resulting in greater accuracy), are some of the advantages. For this reason attempts have continually been made to improve Thomson's machine, and in the course of time a number of very good sounding machines have been constructed, amongst others those of Le Blanc, Sigsbee, and Lucas. Sigsbee's sounding-tube is shown in Fig. 6. All of them are based

Recent
sounding
machines.

FIG. 6.—SIGSBEE'S
SOUNDING-TUBE.
(From Brennecke.)

on Thomson's model; thus Sigsbee says of his own admirable machine: "The modification or improvement made by me on the original Thomson sounding-machine lies chiefly in the employment of a peculiar kind of accumulator, and its adap-

¹ It is interesting here to observe that the "Challenger" hemp line could be used for sounding in depths down to 26,000 fathoms before reaching its breaking strain, whereas the wire could only be used down to a depth of 16,700 fathoms. Depths beyond 26,000 fathoms, should such depths exist, could not be explored by either method.