

thimble being let go they travelled down the curve of the rope until they were brought up at the toggle G. The dredge and rope by means of this additional weight now successively assumed the positions A C, A D, and A E, until finally the dredge reached the bottom at F, the weights being in the positions G', G'', G''', G''''.

It must be evident that, provided there were no surface or under current, the dredge would reach the bottom with the swabs trailing fairly behind it, if sufficient time were allowed for it to sink. The surface current could always be ascertained and allowed for; when the dredge, therefore, came up foul, as it occasionally did, this could only be ascribed to the influence of some under-current, which need not necessarily have been at the bottom, or to the rope when new twisting the dredge round and round with the weights on the toggle. It was found by experience that about three hours were required to sink the dredge in this manner when the depth was about 2500 fathoms. When it was once down the ship was allowed to drift broadside to the wind for a certain time, and the accumulators pointed out, by their expansion and contraction, that the dredge was being dragged slowly over the ground. When it fouled anything the strain of the ship immediately stretched the accumulators to their utmost, and the line was at once let go to prevent its carrying away, the ship being brought head to wind and kept stationary, while the rope was hove in easily. Did the dredge still continue foul, the ship was steamed ahead of and all round the supposed position of the dredge to endeavour to clear it (in the same manner as a boat's anchor is cleared when jammed on a coral reef or amongst rocks), until the dredge was freed by the stop (see fig. 19 D) breaking, or the line carrying away. Supposing no accident occurred, when the dredge had been on the bottom a sufficient time—from half an hour to an hour—the rope was brought to the donkey-engine, and the dredge hove up. It was found that the strain on the line was so great that the men could not hold on to it while it was being hove in, when turns were passed round only one drum of the engine. Fortunately, the engine was fitted with drums of the same diameter on each side of the deck, so that by taking a number of turns with the rope round the drum on one side, and then leading it abaft through two blocks across the deck, it was possible to take a number of additional turns round the drum of the engine at the other side, so that the men were enabled to hold on to it easily, and a great support was given to the bearings of the engine.

On one or two occasions, when, owing to the depth (over 3000 fathoms), sufficient time could not be spared to allow the dredge or trawl to sink in this manner, a sounding rod was fastened to the bottom of the dredge or trawl and 4 cwt. put on the rod. The dredge was then let go perpendicularly, the ship being kept stationary, until sufficient line had been paid out to allow the rod to reach the bottom and disengage the weights, when the ship was allowed to drift a little way, and then the weights were attached to the thimble and allowed to slide down the rope to the toggle. This is a very successful way of dredging or trawling quickly in deep water.