

necting-rod would do. This style of engine is commonly used for pumping, the pump-rods being attached to the guide on the opposite side from the piston-rod. At one end of the crank a small toothed wheel is fixed, which drives one thrice the multiple on a horizontal shaft, extending nearly across the deck, and about 3 feet 6 inches above it. At each end of this shaft a large and small drum are fixed, the larger having three sheaves cast upon it, of different sizes, the lesser being a common barrel only. It is to these drums the line is led, two or three turns being taken round the drums selected. In hauling in, the dredge-rope is taken to a gin-block, secured to a span on the fore-castle; then aft to the drum of the donkey-engines on the port side; then to a leading block on the port side of the quarter-deck, and across the deck to a block on the star-board side; then to the drum of the donkey-engines on the starboard side, corresponding in diameter with the drum used on the port side; and from this it is finally taken and coiled. The strain is of course greatest at the yard-arm and the first leading-block; and by this arrangement it is gradually diminished as the wire passes round the series.

One slight change has been made in the handling of the dredge which has certain advantages. Instead of attaching the weights directly to the dredge-rope and sending them down with the dredge, as was our former practice, a "toggle," a small spindle-shaped piece of hard wood, is attached transversely to the rope at the required distance, 200 to 300 fathoms, in advance of the dredge. A "messenger," consisting of a figure of eight of rope, with two large thimbles in the loops, has one of the thimbles slipped over the chain before the dredge is hung, and the other thimble made fast to a lizard. When the dredge is well down, and has taken its direction from the drift of the ship, the weights, usually six 28-lb. deep-sea leads, in three canvas covers, are attached to the other thimble of the "traveler," which is then cut adrift from the lizard, and allowed to spin