

The dock at zero contains 2,100,000 gallons of water when unoccupied by a vessel, and can then be emptied in 75 minutes, the pumps and engines making 175 revolutions per minute, each pump thus throwing 14,000 gallons per minute. Through the filling culvert the dock can be filled in 55 minutes. A large portion of the dock property as it stands to-day is made ground, the area being enclosed by crib-wharfing of the usual type, and filled with the materials excavated in grading the site, and from the dock pit.

The cost of the dock may be placed as follows :

Land	\$ 20,000
Dock proper	365,000
Pumps, engines, etc	26,000
Engine house.....	26,000
Caisson	18,000
Engineering and contingencies	42,000
Total.....	\$497,000

GEAR FOR A JAPANESE SUBMARINE CABLE STEAMER.

A few months ago the Japanese Government entrusted Johnson & Phillips, electrical engineers and contractors, of London and Old Charlton, England, with the construction of a combined picking up and paying out gear, together with outfit and stores for their new Submarine Cable-Laying Vessel, of which the following is a description: The gear as shown in the photographs which we reproduce, is very compact and has been constructed principally of steel so as to combine strength with lightness, the weight all told being only about 21 tons. Although specified to pick up under a strain of 25 tons at 175 lbs. pressure, the gear on official trial showed itself equal to a much greater power compared with the gear by the same makers fitted on the "John Pender," "Great Northern," "Chiltern," "Electra," "Magneta," "Recorder," "Relay," "Cita de Milano," and many other steamers; it is equally

a fixed shaft carried on two steel frames, and is arranged for four speeds. The motive power consists of one vertical compound engine having cylinders 12 inches and 24 inches diameter by 14 inches stroke, capable of developing 265 h.p. without the use of the condenser, in conjunction with which it will, however, generally be used. The engine is fitted with link motion reversing gear and also with automatic bye-pass valve for admitting high pressure steam to low pressure cylinder for starting. The crankshaft is geared to the first motion shaft of the machine by means of a double helical bevel gear. When it is desired to pay out without steam power the only moving portion of the machine is the drum, which is readily controlled by the brake.



To enable the drum to revolve independently of any other part of the gearing, provision had to be made for sliding the drum pinions out of gear, and as it was essential to keep the drums close up to the frames, these pinions have been arranged to draw through the frames. This has been effected in a very neat manner by the makers, two large holes being cut in the frame



powerful as the three first named and twice as powerful as the others, while at the same time it is infinitely more compact and lighter than any that have gone before. The gear stands on a strong steel girder bed on the main deck, and the drums, etc., project through a hatch in the spar deck, and this is fitted with covers which form the driving platform for the machine. The gear has overhung drums 6 feet 3 inches diameter by 2 feet 6 inches wide, internally geared, and running loose on

plates and a large pocket casting fitting into these carrying bearings each side of the frames, so that the pinions which gear into drums run between two bearings, the arms of the drum being set back to allow for this outer bearing, and this arrangement ensures a very substantial job. These pinions are put into and out of gear by means of a combination of handwheels, screws and bellcrank levers. All wheels are arranged to draw out of gear when necessary, so that only the particular