into a dock at high water, so as to be brought over the keel blocks, on which it then settles down as the tide recedes, and at low water the dock is left dry, and the vessel exposed for repairs, the sluices being then closed exclude the water, so that the succeeding tides cause no interruption to the work. Where the tide is but small, after the tide has receded, the water remaining in the dock has to be pumped out. This was done at the dock for which these calculations were made.

Where docks are hewn out of the solid rock and "faced" there are none of the dangers to be apprehended of settlement or of blowing up the bottom that exist where the dock is built in an excavation made in the earth, which is of an extremely treacherous character at river sides.

It is hoped that these calculations and remarks will be of service to those about to be engaged on work of this kind.

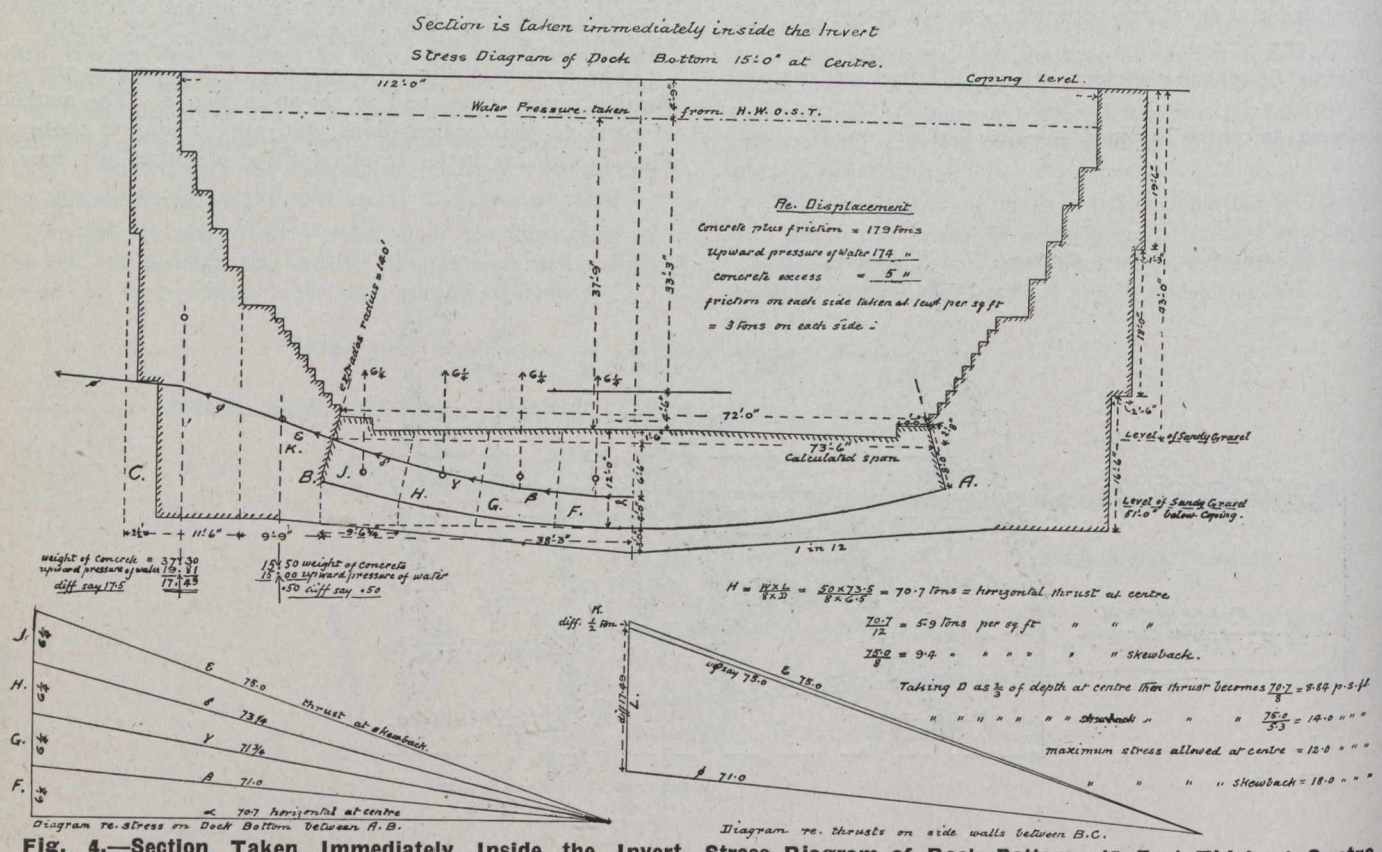

Fig. 4.—Section Taken Immediately Inside the Invert. Stress Diagram of Dock Bottom; 15 Feet Thick at Centre.

A NEW METHOD OF ELECTRO-PLATING.

A particularly interesting invention is that of "Voltite" by Mr. Arthur T. Firth, of New Zealand, which in brief is a method for the electro-plating of one metal on another by frictional precipitation. "The electro-plating of metals has grown rapidly to an industry of great importance," says Mr. Carl F. Woods, secretary of Arthur D. Little, Inc., of Boston, "but up to the present time there has been a great deal of economic waste owing to the practical difficulties in the way of replacing the electro-deposited metal which is lost by the friction of constant use. A number of attempts have been made to solve this problem and several patents have been issued, but in most instances the coating possible of application to the metal by this process is so thin as to be of little value.

A recent patent was issued for the deposition of nickel and other metals by friction which created considerable discussion in the electro-metallurgical world, but after a series of careful experiments it was found that the energy used in the process was so great in proportion to the results that the process possessed more theoretical than practical value.

The process invented by Mr. Firth is electrolytic like other electro-plating operations, but very much simplified and it is claimed for the invention that anyone of ordinary intelligence can operate the process successfully. The compound itself, water and the slight friction used in applying it form a voltaic action, the metallic powder forming the anode and the article on which it is to be deposited the cathode; hydrogen is developed, which reduces the salt to a metallic state upon the article itself. The operation is applicable to gold, silver, nickel, copper, tin and brass, and one of the most interesting applications is that of silver direct to steel. Perhaps the biggest field for its application lies in household use. The constant cleaning of silverware results in the removal of the deposited metal, whereas the use of "Voltite" is claimed to increase the thickness of the metal instead of decreasing it and at the same time to preserve the desired appearance of the article."

The coal production for 1912 is estimated at 550,000,000 tons by the United States Geological Survey. This amount compares with 496,221,168 tons for 1911, 392,722,635 tons for 1905, and smaller amounts for years before that. The production of anthracite shows a decrease on account of the suspension of operations during the wage controversy in April and May. There were, however, increases in almost all of the bituminous districts