35.48 respectively. Similarly find the weights of earth prisms which are 4.66, 17.53, 39.20, and 85.41, and C.Gs of the prisms of earthwork which press against the sections of walls respectively, as mentioned, and whose angles of rest are represented by the lines a'a', b'b', c'c', and d'd'. From the C.Gs of these four prisms draw the stress diagrams, as shown, having their weights as data, and from these C.Gs draw lines parallel to the angle of rest until they cut the vertical lines drawn through the C.Gs of the wall sections. From these points of intersection construct the stress diagrams, as shown with the weights of the wall sections and earth thrusts found by the first stress diagrams as data.

Through the points of intersection of the third sides of these last stress diagrams, and the base of each wall section draw in the curve which is the least line of resistance.

representing their pressures, viz., 1.3, 4.9, 11.2 and 24.0 until they cut the vertical lines drawn through the C.Gs of the wall sections, as in the last case. From these points of intersection construct the stress diagrams, as shown, with the weights of the wall and the hydrostatic pressures as data. Through the points of intersection of the third sides of these last stress diagrams, and the base of each wall section draw in the curve which is the least line of resistance. It will be seen that the pressure per square foot on the base of each wall section, as in the case for earth pressure, leaves a good margin of safety.

The next step is to make a trial calculation for the bottom, which was drawn to a thickness of 12 feet at centre in diagram in Fig. 4, and the radius of the extrados as 14 feet, the depth at the skewbacks A and B became 8 feet.

Strength necessary to resist Water Pressure.

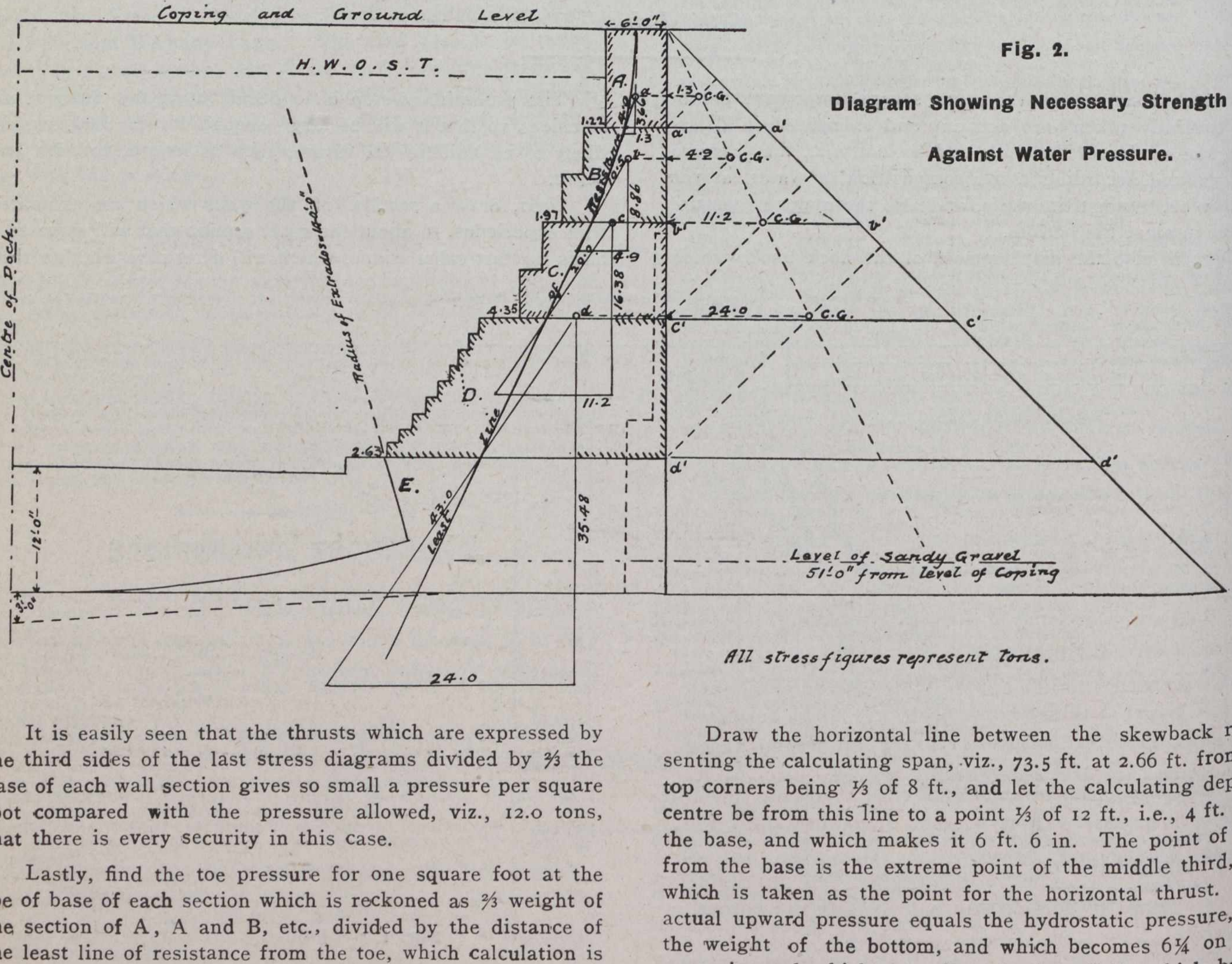

Fig. 2.

Diagram Showing Necessary Strength Against Water Pressure.

All stress figures represent Tons.

It is easily seen that the thrusts which are expressed by the third sides of the last stress diagrams divided by ⅔ the base of each wall section gives so small a pressure per square foot compared with the pressure allowed, viz., 12.0 tons, that there is every security in this case.

Lastly, find the toe pressure for one square foot at the toe of base of each section which is reckoned as ⅔ weight of the section of A, A and B, etc., divided by the distance of the least line of resistance from the toe, which calculation is shown on the diagram in each case. These pressures are seen to be well within that allowed, viz., 12 tons per square foot, and having a good margin of safety, will allow these walls to be reduced, when the calculation for displacement is being carried out.

Next draw the hydrostatic pressure for water, as in Fig. 2, as follows:—

Draw the diagram representing these pressures on the walls A, A and B, A, B and C, and A, B, C and D, as shown, their bases being a'a', b'b', c'c' and d'd' respectively, and which are subtended at loping level by an angle of 45° 00' common to all; and from their C.Gs draw the horizontal lines

Draw the horizontal line between the skewback representing the calculating span, viz., 73.5 ft. at 2.66 ft. from the top corners being ⅓ of 8 ft., and let the calculating depth at centre be from this line to a point ⅓ of 12 ft., i.e., 4 ft. from the base, and which makes it 6 ft. 6 in. The point of 4 ft. from the base is the extreme point of the middle third, and which is taken as the point for the horizontal thrust. The actual upward pressure equals the hydrostatic pressure, less the weight of the bottom, and which becomes 6¼ on each voussoir, and which acts through their C.Gs which brings the total upward distributed load of 50.0.

$$\text{Now, } H = \frac{W.L.}{8.D} = \frac{50 \times 73.5}{8 \times 6.5} = 70.7 \text{ horizontal thrust}$$

at the centre. Produce this thrust by a line α until it meets the vertical line through the C.G. of voussoir F, and from this point of intersection draw a line β parallel to the line β in the stress diagram for the dock bottom until it meets the vertical line through the C.G. of voussoir G. and continue, as shown, to the skewback, which gives a thrust of 75 feet.