This gives 3,024 cubic feet of concrete required. In the actual case the chosen depth of the block was 10′ 6″, affording an excess volume of 1,344 cubic feet.

The front leg thrust equals 315 tons; 285 tons vertically and 140 tons horizontally. The sectional area of the top block of the counterfort, about 11′ 3″ below the coping, as shown in the diagram, is about 400 sq. ft. (dimensions 16 × 25). This gives, therefore, 0.35 tons per sq. ft. as the force tending to cause the block to slide. As 1 ton per sq. ft. is safe against this shearing, the factor of safety is sufficient.

Referring again to the diagrams of Fig. 1, one shows the shear-legs run in until the weight hangs over the centre of the track. The stresses at intervals from Fig. 1, 1a to 7, as the thrust block is run backward on the screw, are given. In this case the pull from the winches is taken into account, thereby increasing these stresses. At the points 1a to 7 are shown the resultant vertical stresses, 26 tons, or one-half the weight of the back leg being deducted when the leg is in tension, and added when in compression. This gives the lines *BC* and *CD* when in compression and tension respectively, *C* being the neutral point.

The diagram thus supplies the following data: The block 37′ 0″ in length represents the amount of concrete affected, which also must shear before failing. The pyramid is really a trial block giving a factor of safety of 3.

There are 1,200 cubic yards of concrete in each counterfort wall of the actual case to which this design applied. This includes the basin wall between it and its face. The concrete for the back leg foundations and the two connecting struts amounts to 1,180 cubic yards.

The plan in Fig. 1 also shows the position of boiler, engines and steam winches. They are equipped with centre tunnels, as shown, to provide access to bolts and plates in their foundation beds, it being most important to have all hoisting apparatus carefully and properly fixed in position.

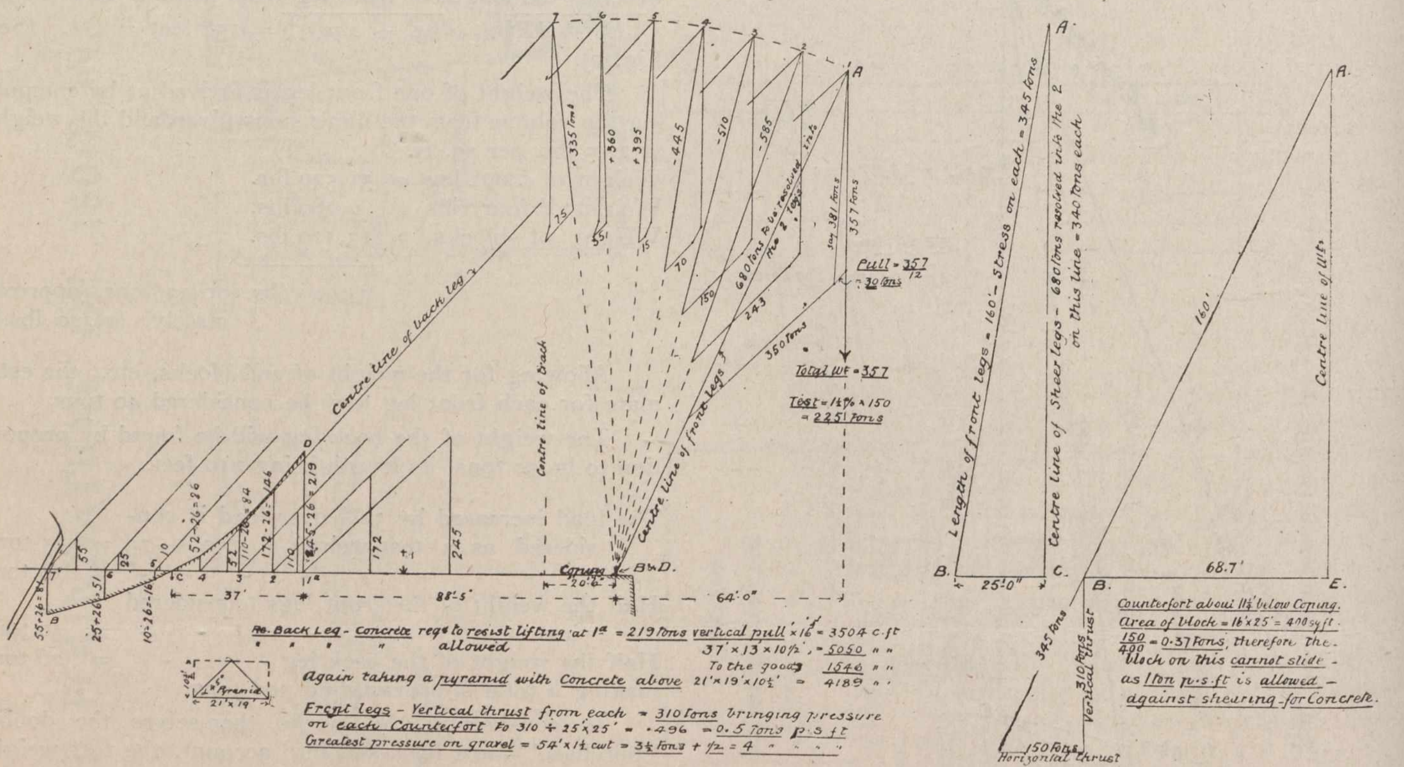

Fig. 3.—Stresses in Members, Including Pull of Winch.

GERMANY'S IRON AND STEEL EXPORTS.

The scale of progress which Germany is making as an exporter of iron and steel is illustrated in the following table, where quantities are in kilograms per head of population, and show a fast increasing margin between home consumption and total output:—

January to May.	Output of blast furnaces.	Home consumption.
1907	85.87	60.64
1908	81.77	52.83
1909	81.69	51.50
1910	92.95	56.28
1911	98.60	59.71
1912	107.83	62.88
1913	119.13	68.08

The most notable example of existing train ferries in Europe are those which have been established by the Danish State railways. The geographical conditions in Denmark have made train ferry transport a necessity for through communication. These ferries give unbroken railway transport over distances ranging from 1½ miles to 26 miles. One, the Sallingsund ferry, has been in operation since 1872, and that across the Storabelt, at a point where the arm of the sea is 16 miles wide between Korsoer and Nyborg since 1883. There is a train ferry between Copenhagen and Malmoe, a distance of 19 miles. The longest of the ferries, that which crosses the Baltic between Warnemunde and Gjedser, carries trains for 26 miles over waters where heavy seas are not infrequent. Some of the Danish ferries provide uninterrupted railway communication only between the separated parts of Denmark; others, of which that from Gjedser to Warnemunde is the most important, provide through railway connection with the railway systems of Europe, with all the accompanying advantages of unbroken goods and mail transport and sleeping-car accommodation for passengers.