the cylinders, and the spaces being filled in with Portland cement.

The pressure or weight on the concrete at various points in the columns is as follows:

On the top of a column there may be the total permanent and rolling loads, say 2 tons per foot run = 107 ft. x 2 = 214 tons. The columns are 7 ft. diameter at top = 38 sq. ft. area, and $\frac{214}{38} = 5.6$ tons per square foot at top.

Where the columns are enlarged to 8 ft. diameter = 50 sq. ft. area, there is in addition to the above load 50 tons of concrete, &c., to be supported, making 264 tons in all, or $\frac{264}{50} = 5.3$ tons per square foot at this section.

Where the columns are 9 ft. diameter = 63.6 sq. ft. area, there is a further load of 64 tons of concrete, &c., to be carried, making $264 + 64 = 328$ tons, or $\frac{328}{63.6} = 5.2$ per square foot at this section.

At the bottom where the columns are 10 ft. in diameter, or have an area of 78.5 sq. ft., the total load is $328 + 145 = 471$ tons, thus giving a load per square foot of $\frac{471}{78.5} = 6$ tons.

The pair of columns which form each pier are connected at the top by two transverse bed girders, on which the main girders rest on chairs. The main girders are on the Warren principle, each 103 ft. long, and have a vertical depth of 9 ft. 11 in., centre to centre of pins. The triangles of the girders are kept together by Bessemer steel pins 4$\frac{1}{2}$ in. diameter; the tension bars are solid rolled, the struts being formed of angle irons and plates. The roadway consists of cross girders, which are carried on the top of the main girders, and upon which are placed longitudinal timbers forming the rail bearers. The rails are of the double-headed section, and weigh 68 lb. to the yard; they are laid to a gauge of 5 ft. 6 in., in chairs fastened to the longitudinal timbers, these timbers being covered with galvanised sheet iron, as a protection against both fire and wet weather. The flooring of the bridge consists of wrought-iron bars, 6 in. by $\frac{3}{4}$ in. thick, rivetted at the ends to the cross girders, which are placed 5 ft. 8$\frac{1}{2}$ in. from centre to centre. This method of forming the flooring of the bridge has been resorted to in consequence of the scarcity of timber in India, and is, we believe, the first example of the kind in that country. The viaduct is 15 ft. in width between the parapet railings, and is furnished with stand-byas at each pier. The bed girders, to which we have referred, are each held down to the stone caps on the tops of the piers by four bolts, each 5 ft. 6 in. long, and 2 in. in diameter. Each of the main girders is fixed at one end, the other end being free to move on Bessemer steel rollers 6 in. long and 3 in. in diameter. There are three sets of rollers to each girder, six rollers constituting a set, and these travel on wrought-iron planed plates. The holes in the roller frame for the spindles of the rollers are elliptical, so that the latter are not fastened to the frame. The fixed and movable ends of the girders occur on alternate piers, the latter thus alternately carrying the fixed and rolling ends of two pairs of girders. The abutments, which are of masonry, do not carry the superstructure, but act simply as retaining walls, and enclose the end piers.

The rolling load in this structure is taken at 1.25 tons per foot run on one line, or 0.625 ton per foot on one girder $\times 103$ ft. = 64.375 tons.

The permanent load is taken at one ton per foot run on one line, or 0.5 ton per foot on one girder $\times 103$ ft. = 51.5 tons.

The total load is taken at 2.25 tons per foot run on one line, or 1.125 tons per foot on one girder $\times 103$ ft. = 115.875 tons.

A special apparatus has been designed for erecting the