moment of a seven-eighths inch rivet, gives fifteen as the number of rivets required to resist bending. It is better to use seven-eighths inch rivets here, on account of their large bending-resistance. There is no need of calculating for bearing. To determine the dimensions of the connecting-plate, we will proceed as follows; the distance between the channels at the shoe being $12.5'' - 2 \times 2.51'' = 7.5''$.

In the accompanying diagram let us lay out a centre line $AB$, and the two parallel lines $CD$ and $EF$ each at the distance $3\frac{3}{4}''$ from $AB$. From any point $A$ lay off the lines $ACG$ and $AEH$, making angles with $AB$ equal to the inclination of the batter brace to the horizontal. Join $CE$. Draw the lines $JK$ and $LM$ parallel to $CG$ and $EH$, and ten inches therefrom: draw also the centre lines $NO$ and $PQ$. To allow sufficient clearance for the chord heads, the pin holes should be five inches and a half above the top of the shoe plate. By crowding the rivets as near as possible to the flanges of the channels, we are able to use four rows. Laying out the circles for the pin holes, and limiting distance for rivet centres, we determine the height of the box plate to be about $14''$.

If the vertical sides $KD$ and $MF$ be adopted, the shoe plate will be $28''$ long, which is probably too much. To ascertain, let us find the number, size, and arrangement of the rollers. The total pressure on one shoe is

$$\frac{1}{2} \times 160 \times \frac{1860}{2000} = 37.2 \text{ tons.}$$

Let us assume the dimensions of a roller to be $2'' \odot$ by $12''$. Turning to Table XXXIV., we find the permissible pressure on such a roller to be $4.24$ tons, which divided into $37.2$ gives nine rollers. Spacing them $3''$ centre to centre, and allowing a projection of $1\frac{1}{4}''$ at each end, would make the shoe plate $29''$ long. A plate $12\frac{1}{2}'' \times 29''$ is not a very good shape. Let us try rollers $2\frac{1}{4}'' \odot$ by $15''$, the permissible pressure for one of which is