of the circle of rollers. The rollers may either turn upon pins through their centres, and through said rings, or the pin or shaft may be fast in the roller, and turn with it upon journals running in gudgeon boxes attached to or formed in the circular frame $f$. The pins or axles may be quite small (say 1″ to 1$\frac{1}{2}$ in diameter), as they support but a nominal weight, and are only required to maintain the proper positions and directions of the axes of the rollers.

The roller frame, as well as the upper circular rail running upon the rollers, must be connected with a central hub for each (as they do not turn together), turning upon a journal or pivot attached to the masonry of the supporting pier. The rails, or surfaces between which the rollers work, are beveled to fit the conical faces of the rollers, and, in order to work in the most perfect manner, they should be of cast iron, and turned off by a tool carried by the arm of a heavy revolving vertical shaft.

The diameter of the circle should not probably be less than $\frac{1}{8}$ to $\frac{1}{4}$ the span of the water channel, nor less than $\frac{1}{2}$ to $\frac{3}{4}$ the width of superstructure, and the diameter of the rollers, not greater than $\frac{1}{10}$ to $\frac{1}{8}$ of the radius of the circle upon which they travel. Greater diameter would give so much obliquity of face as to produce too strong a centrifugal tendency. The face of the rail should have a width of 2$\frac{1}{2}$ to 3 inches generally, and for some 30° opposite each king post (transversely of the bridge) when the draw is in position, a width about twice as great, and as great as the face of the rollers. This is to give sufficient bearing surface while loads are passing, when nearly the whole weight will be concentrated upon two or three rollers near each of those positions.