in the centre, leaving only 8 feet from centre of the arch to the chord chains. A greater height, as we have before seen, would be more economical as regards vertical strength; but this proportion is thought to have a better appearance, and, as the arches have no extraneous support laterally, it is best not to carry them too high, whereby they would be made top-heavy and unsteady. I would recommend the height of truss on this plan to be from $\frac{1}{4}$ to $\frac{1}{2}$ of the length, for road bridges, and a little more for rail roads; although for rail roads, I prefer the cylindrical arch pieces, except, perhaps, for spans of 50 feet or less.

**Cylindrical Arch Pieces.**

LV. I proceed to describe those parts of the truss with the cylindrical arch pieces, which differ from corresponding parts of the truss above described.

The cylinders are cast with a length from 15 to 20 times the diameter, and a thickness from $\frac{1}{6}$ to $\frac{1}{2}$ of the diameter. The ends are beveled to the radius of the arch, and are about double thickness for 3 or 4 inches from the joint, with semi-circular notches, so as to form a round hole at the joint for a horizontal pin to pass through, to hold the vertical and diagonal parts, passing in by notches or openings in the under sides of the cylinders at the joints.

Fig. 16, Pl. 2, shews a side view and section of the joint of the arch, with its pin hole, and the connections of the verticals and diagonals. The top end of the vertical is forked, so as to admit the diagonals side by side between the branches of the fork, thus bringing the action of all the forces acting on the arch, to meet near the centre of the cylinders.

The ends of the cylinders resting on the abutments, are beveled to a horizontal plane, or adapted to foot piece so beveled, with a large pin hole, by means of which the ends of the chord chains are connected with the extremeties of the arch as seen in Fig. 17, Pl. 2.