tensile strength of the arches. The horizontal action upon the chords, which results from the diagonal rods in the panels, is balanced in each panel, and requires therefore but little section. More of this when I speak of these rods.

A section of 6 in. inches for the channel-bars of the upper chords will be an ample allowance. The same section may be observed throughout the length of chord. It is, however, necessary to make the splices of the lower chords as strong as the channel-bars themselves, so that they may resist a fall tensile strain, which may be brought upon them by the arches when the spans are unequally loaded.

POSTS.

The posts are of the beam section, and nine inches wide or deep. Fig. 2, Plate 5, exhibits this section on a larger scale: the weight is 25 lfs. per foot. All the posts are 22 feet long, except those in the centre span, which vary from 22 to 44 feet.

Each truss consists of two rows of posts, planted 24 inches apart, in which open spaces the cables, stays, and suspenders are freely suspended. They are firmly connected by horizontal bars 11 inches square: the ends of these bars are spread out so that they will give room for 4 rivets of 1 in. diameter, to be fastened upon the flanges of the posts. Each cross-bar is therefore held by 8 rivets.

In order to increase the lateral stiffness and stability of the trusses, the intervening space between the posts may be enlarged to 30 or 36 inches; and the connecting-bars should then be 2 inches in place of 11 square. The vertical stiffness of the posts in the direction of the trusses is aided by horizontal connecting-bars at the centre. These bars are only 1 in. diameter, pass through the web of the posts, and are simply screwed up by a nut at the end, as is clearly exhibited in Figs. 1 and 2, Plate 5. By tightening these bars uniformly, the lateral position of the posts is secured and vibration prevented. This provision is very necessary, on account of the great length of the posts.

ARCHES.

The arches are formed of channel-bars. Fig. 10, Plate 6, shows a section of half size. Plates 2 and 5 will fully explain the construction of details, without much additional verbal explanation. The posts being 20 feet apart, the channel-bars are rolled of the same length so that the splices all come upon the posts. It will be noticed that the connections with the splicing-plates are made with screw-bolts, and not with rivets. This will greatly facilitate the putting up and adjustment of the arches. One of the practical difficulties in putting up such work is to make the ends meet, and to make a tight and workmanlike fit, so important in arches and chords. This difficulty is much increased by great variations of temperature, and hence the great importance of using screw-bolts in place of rivets. The bars may at first be put together loosely and without any tight fit, by using small bolts temporarily, which are to be removed after the joints are brought to a close. Each pair of splicing-plates, opposite each other, is connected by 6 bolts of 1 inch diameter, or 3 on each side of a post; on being drawn tight, they embrace them solid and firm. In order to screw these up tight, they must not be enclosed in tubes. The remaining 4 bolts, on the other hand, are passed through gas-tubes 9 inches long and 1 inch wide, which therefore preserve the distance between the channels and serve as stay-bolts. Two small plates 4 in. x 7 in. x 1 in. thick are riveted to the post and fitted between the channels. Two of the channels are therefore firmly enclosed between these plates and the brackets. To add still further to the stiffness of the splices, the cross-channels which connect the two lines of trusses are filled in between and firmly bolted to the