When it becomes necessary to anchor down the expanding end of a bridge, it should be done in such a manner that the shoe could not rise more than an eighth of an inch: thus the projection on the under side of the shoe plate will be prevented from being lifted out of the notches on the rollers.

Bed plates and roller plates should be anchored to the abutments by rods with nuts. When the abutments are of stone, a good method of attachment is to drill holes therein just below the anchor bolt holes in the bed plates, enlarging them, if practicable, at the bottom. Split the ends of the anchor bolts several inches, insert small iron wedges in the splits, drive the bolts into place, so that the wedges force the split ends apart, thus partially filling the enlarged bottoms of the holes, and pour in molten sulphur.

In figuring lengths of fillers for pins, a clearance of from a quarter to half an inch should be made, so as to allow for variation in thickness of eye-bar heads, re-enforcing plates, etc.: such an allowance will save a good deal of trouble in erection. When the end lower lateral strut is of such dimensions that it will not fit, without being turned from the vertical between the flanges of the batter-brace channels, filling-rings can be used between the batter-brace webs and the ends of the strut. Such rings will be necessary, if there be four chord bars in the end panel, and the outer ones be not let into the channel flanges far enough to lie against the webs.

In making turn buckles, a little expense can be saved by having only one adjusting-end; the other having a hole, through which passes one end of the rod, which is enlarged into a head. One advantage of this style is, that the turn buckle can never be lost from the rod. Such a turn buckle should always be used on portal vibration rods, for a reason that will be given in Chapter XX.

Jaws are not a very desirable detail, although so convenient that they are often employed. In the first place they have not a pleasing effect to the eye; and in the second, on account of the bent plates, are liable to be weaker than might be estimated. If the flanges of the channels be cut away, as is sometimes unavoidable, the jaw plate, from the cut flanges to the