thickness that the distance between the flange angle-irons is not greater than thirty to thirty-five times that thickness, no stiffeners will be required. Since there is no difficulty in obtaining the pieces composing a compound girder in one length between bearings, nothing has been said about joints. Should these occur, either in flange or web, pains must be taken to have splices of ample size, and a full complement of rivets, to thoroughly transmit the strength of the solid sections so united. Solid rolled beams are 10 per cent stronger than riveted beams, but are much more expensive per pound, the difference at present (1875) being 25 per cent and upward.* Such beams, in double-track roadways, from their shallowness, spring too much, throwing the trusses into an annoying vibration, to say the least, even from light passing loads, and conveying an idea of weakness, which the structures may not really possess.

The connection of the floor-beams to the trusses, for deck-bridges, is a very simple matter, as they are then directly bolted to the top chord. For through bridges, or half-deck bridges, they are either hung from the pin by means of hanger-bolts, or they are riveted or bolted to the posts. When hung from the pin, the hangers are best of the \( \text{n} \) form, the legs being long enough to pass down the full depth of the floor-beam at that point, through a washer-plate (by preference of wrought-iron)

* Since the above was written, the price of beams has been reduced fully the amount of this difference.