

the top of the lower chord. The floor is of two-inch oak plank laid on the oak track stringers, and pine floor joists. There is no separate footway on the draw. The turn-table is formed of an external drum thirty feet in diameter, and a central shell of cast-iron, hung by ten bolts on one of Sellers' patent pivots ; the drum and shell are connected by a pair of plate girders under the centre posts, and a set of radial rods. The bolts are adjusted so as to throw almost the entire weight on the centre, the drum serving only as a guide and balancer. The draw is easily opened by four men, with levers attached to two pinions on the drum, in two minutes, but as a precaution against wind and other dangers, it is to be fitted with a steam-engine. The latch is worked from the centre by a hand-lever ; a bearing is secured by wedges which are driven under the four end-posts, the four being worked by a single central lever. The amount of material in the draw, including both trusses and turn-table, is as follows : Timber (in floor), 26,025 feet B. M. ; wrought-iron, 495,575 pounds ; cast-iron, 122,041 pounds.*

In proportioning the draw, it was supposed to carry the whole dead load on the central bearing when swung, and each arm was supposed to carry its share of the dead load, and a moving load of one ton to the foot when closed, no allowance being made for the continuity of the chords. Though this has been the method by which most of the large iron draws lately built have been proportioned, the engineers were convinced that it is a method of computation which gives very erroneous results, showing the central strains, especially in the web, to be much less than they really are, with corresponding excesses in other parts ; a set of calculations believed to be based on a more correct hypothesis will be found in a subsequent chapter. The distribution of strain is regulated by the proportion of the total weight thrown upon the end piers, and is therefore largely dependent on the form of latch used. The wedges under the end posts have but a small lifting power, as is fully proved by the action of the draw under a passing load, a heavy freight train, covering one arm only, causing the further end to rise from its bearings $\frac{7}{8}$ of an inch. A set of hydraulic jacks are to be substituted for the wedge plates, the jacks being placed within the hollow end-posts and worked from the turn-table by pumps driven by the steam-

* The Plans of the Draw are given on Plate XL.