centrated load of truss A. Various studies were made to attain some thoroughly practical arrangement by which the load could be spread. After careful consideration being given to several schemes, among which may be mentioned a series of radiating struts from the outer extremity of the end post, it was decided to place along the whole bearing surface a 48-inch x 1-inch continuous distributing plate whose edge would be faced to bear on the filler or skin plate lying behind the 18-inch x ¾-inch bed plate between the caisson and its seal-strip angles. This plate was reinforced at varying centres on the outside by pairs of stub angles 5 inches x 3½ inches x ¾ inch, about 4 feet long. On the inside, similar stub angles were placed at frequent intervals. The object of this whole construction was to insure, if possible, that the load, undoubtedly having a tendency to enter the skin plate, would in turn be taken from these skin plates to the long reinforcing plate because of the greater stiffness of the latter due to its continuity. This quality in the reinforcing plate would then, of course, assure the distribution of the load to the oak and thence to the sills.

It was felt that the question of the freezing of the caisson to the sills might seriously interfere with

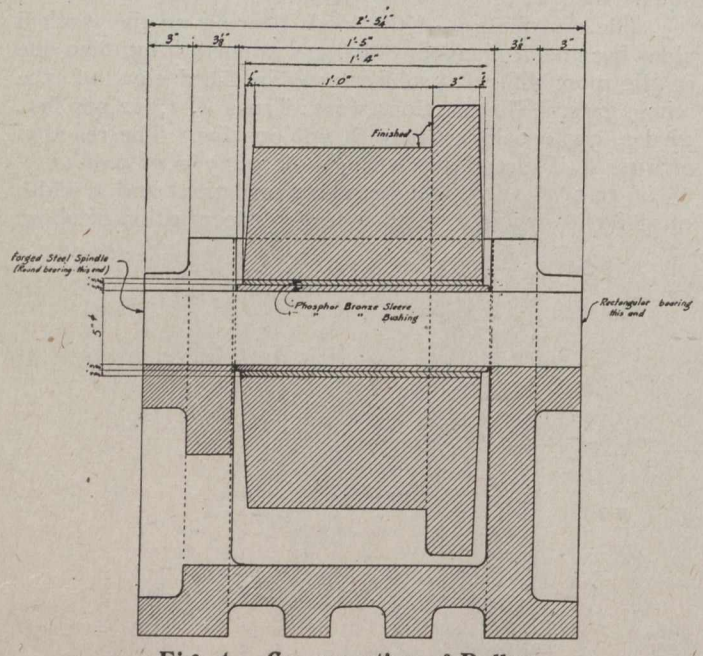

Fig. 4.—Cross-section of Roller.

the satisfactory operation by preventing the hauling mechanism starting the gate after a prolonged contact between it and the sills had been made. This might either overload the hauling devices or else necessitate the installation of heavier units than should be needed, consequently an electric thawing strip has been designed which will run completely around the oak-bearing pieces.

In Fig. 3 will be seen a cross-section of the whole bearing corner. In it can be noted the 48-inch x 1-inch distributing plate, the 18-inch x ¾-inch bed plate, the stub angles, the oak-bearing piece and the thawing strip.

In addition to taking precautions against freezing the caisson to its masonry bearing, it was decided to instal a mechanical device by which the caisson could be moved away laterally from contact with the sills before starting to roll it inwards. By this means no heavy frictional load due to the intimate nature of the contact between caisson and walls would be thrown on the hauling mechanism. In addition, this device could be used to push the caisson against the sills preparatory to its being used as a stop gate. This would prevent the violent jar that would inevitably result were the gradually increasing hydrostatic pressure allowed to finally and suddenly overcome the static friction between the gate and its rollers. Hence a toggle arrangement was designed capable of performing the two above-mentioned duties.

On the berth side of the gate the space between the main bridge longitudinals and the side is filled with 5/16 inch checkered plate. This runs the whole length of the caisson, and constitutes the operating platform or deck. The motor, with its control and rheostats, etc., in a watertight box, all the floor-stands and all hand-wheels for valves, etc., are brought up to this deck and operated therefrom. With this arrangement it is never necessary for a man, for operating purposes, to climb from the bridge to the open parts of the caisson where a slip would probably result in a fatal fall. Thus the safety of the operators during the handling of the caisson has been provided for.

The manholes are two in number. At the lower end they terminate at the girder, and at the upper end, in a watertight hatch about 2 feet 6 inches below the bottom of the wooden bridge. Each manhole affords access, even when the caisson is in service, to the ballast chamber without unwatering the tidal chamber. They are also large enough to permit the big valves being taken up for repairs.

The bridge deck, of wood, is 8 feet 6 inches wide and is carried by two 10-inch @ 35 lbs. I-beam stringers resting in small supporting castings through which run the floor beams of round cold-rolled steel shafting 2¾ inches in diameter. These floor beams lead into the bridge posts, which are flats with forged eye heads at points of floor beam attachment and also at their lower extremities where they are fastened to longitudinal supporting stringers of 10-inch @ 20 lbs. ship channels with flanges turned inwards. This fastening is such that the post may swing in vertical arcs through an angle of about 80 degrees. The upper extremities of these posts are fastened by pivoted connections to fence railings of 3-inch x ⅜-inch flats. Thus the whole system may, owing to absence of stiffening bracing, swing downwards until it lies completely under the top or clearance line of caisson. When in this position the caisson may roll into its recess with no post above the recess cover. In order that the bridge shall not be free to fold by gravity only, counterweights are supplied in three sets of bridge posts which are then extended below the ship channels to receive the counterweight box. The extensions are accomplished by means of special posts of 12-inch @ 25 lbs. channels.

As the only occasions when the bridge must be folded occur when it is in its recess, it was decided to make this folding automatic.

The skin plates are designed to figure as small strips of unit width acting as continuous beams over a large number of supports $\frac{1}{12} \cdot wl^2$ being the moment formula used. No attempt was made to combine bending stresses in skin plates in the vicinity of the trusses with the main chord stresses induced in them in virtue of certain portions being taken as chord material.

The draw bar pull is exerted on the end of the caisson by means of a large bracket bolted with twelve 1¼-inch diameter bolts, and knee-braced below. These bolts are 3 feet ½ inch long and, passing through the skin plates, engage a steel anchorage that thoroughly distributes the load. By means of a 15-inch horizontal channel a certain proportion of it is conveyed to a number of the small vertical channels, but the major portion of the draw bar