

Fig. No. 4. The brace is hinged at the rear, and the centre line of its hinges is made to coincide with that of the horizontal rear boom hinge, in order that the brace and hinge may rise together without friction. The brace is so supported on the bracing of the tower that it does not follow the boom to a horizontal position, but remains about four feet above. The vertical forks at the end, however, always project below the boom, and, since they flare downward, guide it to a central position as it rises, though they permit its free lateral movement when the crane is in operation. The action of this brace is evident from an examination of Figs. Nos. 1 and 4. The brace prevents the boom from turning over when being folded, as it has a tendency to do, since the centre of gravity is well above the points of support. At the extreme rear the boom is hinged in two directions, so that it is free to be folded and to swing sidewise in either direction within the range permitted by the front legs of the tower.

The boom is supported entirely by the wire rope guys and on a combined vertical and horizontal hinge at the rear. This arrangement permits the boom to swing freely when a load is being lifted from a point not directly beneath it, minimizes the effect of the shock from the accidental dropping of a load, and substantially eliminates the danger of damage from collision between the masts of a vessel and the boom. Lateral guy ropes limit the horizontal movement of the boom when it reaches the opposite front leg of the tower.

The removable hopper is so designed that it may be lifted by the crane and dropped into its working position. Bulk freight may be delivered from it into cars on the track in front of the crane or the first track beneath it. This material may be weighed as delivered if desired.

A water main is carried along the entire length of the pier just beneath the floor, and at intervals hose connections just above the floor are provided. Each crane is provided with two universal nozzles, one on top of each front corner of the engine house, from which duplicate pipes lead to the middle of the strut connecting the rear trucks, where coupling is made by means of flexible hose to the couplings on the pier. Thus each crane is made a veritable fire engine.

The cranes were designed to operate on their tracks at a speed of about 180' per minute under the greatest estimated resistance. The motors are, however, under series parallel of control and operate together at full or half speed. The resistance is normally far below the maximum, consequently the speed of operation is commonly much greater than 180' per minute. In fact the mobility of the cranes is astonishingly great. On this account it has, in operation, been found