thereof shall be admitted as evidence or used for any purpose against such railroad so making such report in any suit or action for damages growing out of any matter mentioned in said report.

Sec. 4. "That the Interstate Commerce Commission is authorized to prescribe for such common carriers a method and form for making the reports in the foregoing section provided."

Approved, March 3, 1901.

New C., M. & St. P. Ore Dock at Escanaba, Mich.

There has recently been completed at Escanaba, Mich., for the Chicago, Milwaukee & St. Paul Ry., an ore dock of modern design, which, in point of capacity and in respect of the engineering work involved, takes rank with the most noted structures of this class in this country. The dock has been built to handle the ore business of the C., M. & St. P. Ry., which will be delivered to it over the new line of this company (the Escanaba & Lake Superior Ry.) from Channing to Escanaba. The dock proper is 750 ft. long, 52 ft. wide on top, 59 ft. wide out to out of fender rails and 66½ ft. high above the water. It has 120 pockets and its capacity is 28,000 tons of ore. A general view of the dock is shown as Fig. 1 of the accompanying illustrations. The trestle approach to the dock is 3100 ft. in length, making the combined length of the dock and approach, which also appears in the figure, practically three-quarters of a mile. Figure 2 is a view of the east end of the dock, and Fig. 3 is a cross section showing the general dimensions and framing.

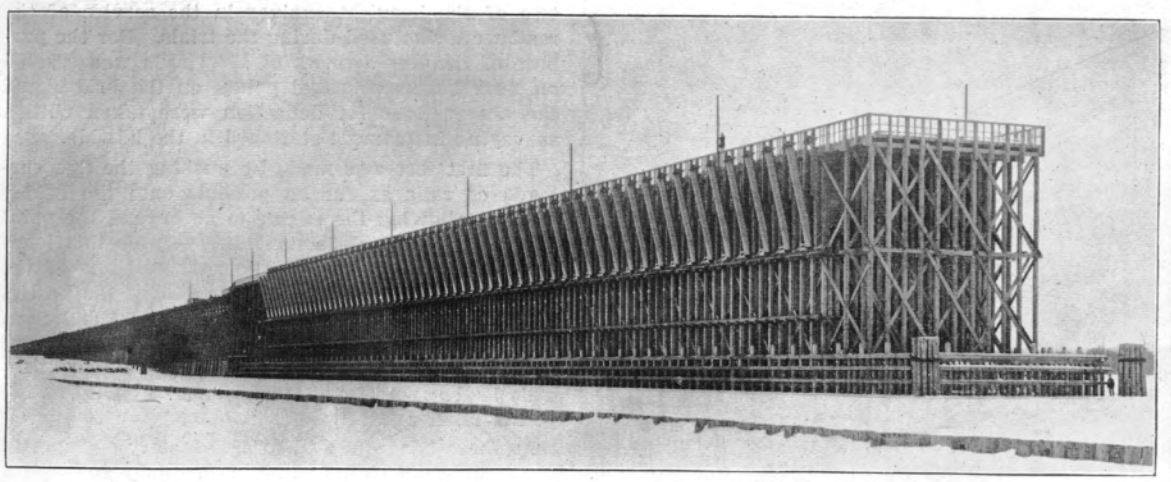

FIG. 1—GENERAL VIEW, NEW C., M. & ST. P. RY. ORE DOCK, ESCANABA, MICH.

At the time work was started on this dock, about one year ago, the low-lying land surrounding the site of the dock and the approach to the same was covered thickly with second-growth trees and underbrush, thus necessitating the clearing of a considerable area of land. A very essential feature of the work, preliminary to that of building the dock, was the laying out of a temporary timber yard for handling, storing and framing the very large quantity of timber required in construction. This yard is illustrated in Fig. 4. It consisted of four tracks, of a combined length of about 2½ miles. All these tracks appear in the figure. The inbound lumber was brought over the two tracks which appear at the left, and between these two tracks there was a saw mill where all the timbers were cut to length for framing, and numbered for the exact position in the dock. The boiler and part of this saw mill appear at the left, in the view. The next track to the right, or the third one from the left, was the loading track, between which and the second track were greased ways laid to a slight down grade over the intervening space, which was about 100 ft. The loading track was depressed about 2½ ft., an arrangement by which the work of moving the timber from the ways and onto the cars was much facilitated. The curved track branching out from this loading track was the spur over which the timber was moved for delivery to the dock. This track extended along the north side of the dock its whole length. The track at the extreme right was used for the delivery of material which required to be stored. The series of dark objects appearing along this track were heaps of spouts for the pockets. Large quantities of other material was also temporarily stored along this track. This yard stood near the water, at right angles to the general direction of the dock and approach. The view was taken from the approach to the dock, the latter being toward the right hand, in the picture.

For handling cars of timber to and from the yard a switch engine was constantly at the service of the erecting force. All boring, both at the mill and on the dock, was done with pneumatic boring machines. Compressed air was supplied from a heat and light tender formerly used on the vestibule trains of this company between Chicago and Minneapolis. This car was set up between the yard and the dock, and it also furnished light, by both arc and incandescent lamps, for the night operations, the work on the dock being prosecuted both night and day.

The work of driving piles for the foundation of the dock was started April 5, 1900, at the east end of the dock. All of the piles in the water, for both the dock and the adjoining end of the approach, were driven by water jet, two track pile drivers being rigged up with apparatus for this purpose. In the erection of the dock each of the four tiers of bents (the A-frame and pockets counting as two bents) was erected separately. The general direction of the dock is east and west. The work of erecting the bottom tier of bents was started at the east end, or that which shows at the right hand in Figs. 1 and 2, and proceeded toward the west. The erecting derrick was then jacked up to the next level and run back to the east end, where it started on the erection of the second tier of bents. At the completion of this tier the dock derrick was lifted up to the third level by a derrick on the approach, and then the dock derrick began the erection of the A-frame, moving from the west toward the east and followed by the approach derrick, which was used in erecting the top. The work of erection in progress is shown in Fig. 5. The traveling derrick appears on the second level, erecting the second tier of bents, from the east toward the west. The temporary track on which the timbers were delivered within reach of the derrick appears in the view.

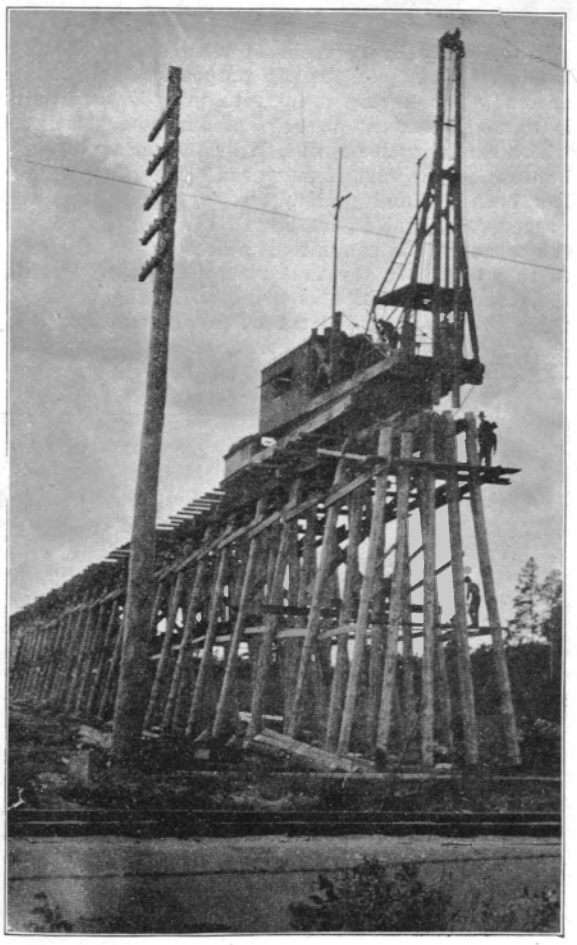

FIG. 6—PILE DRIVER AT WORK ON THE APPROACH, ESCANABA ORE DOCK.

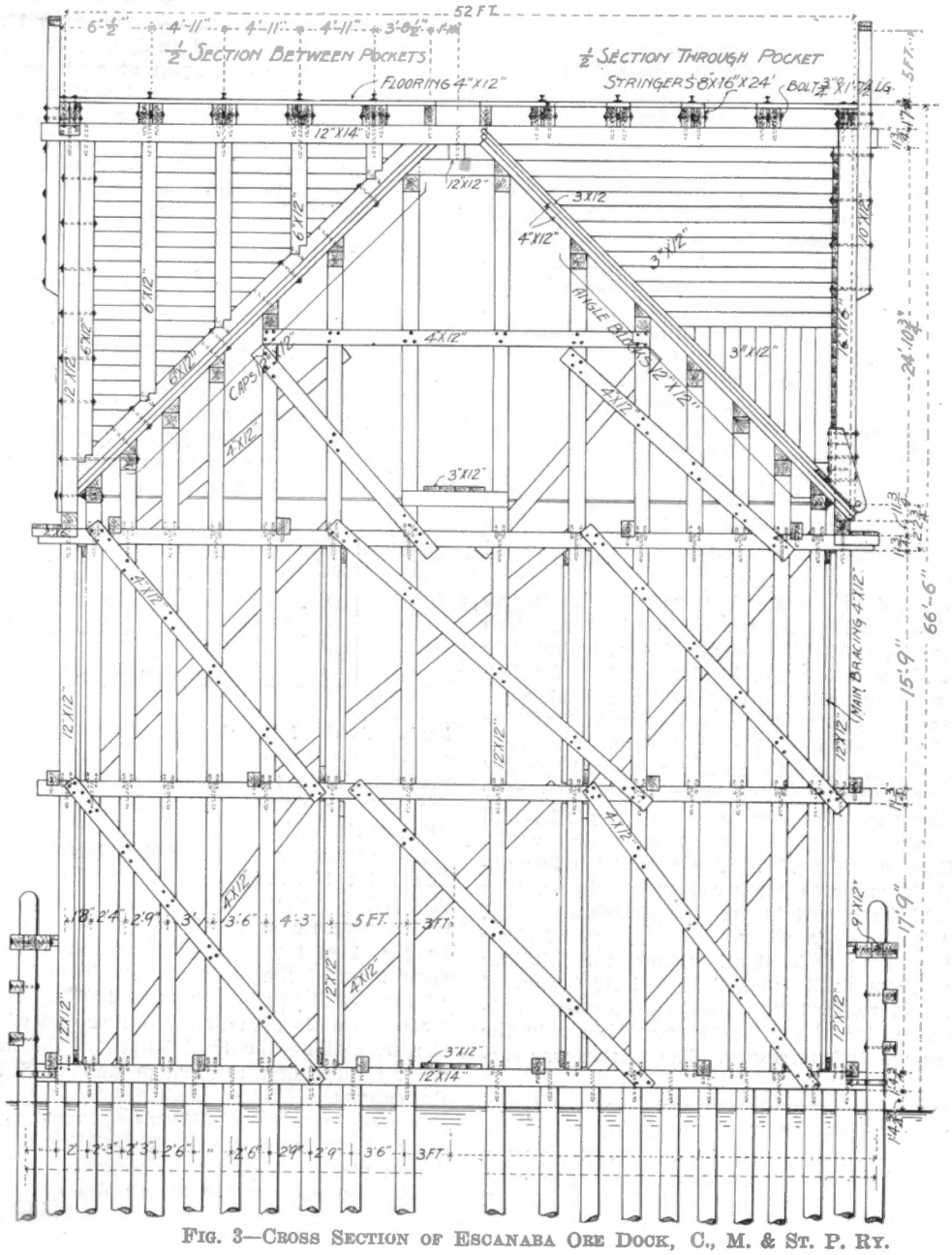

FIG. 3—CROSS SECTION OF ESCANABA ORE DOCK, C., M. & ST. P. RY.

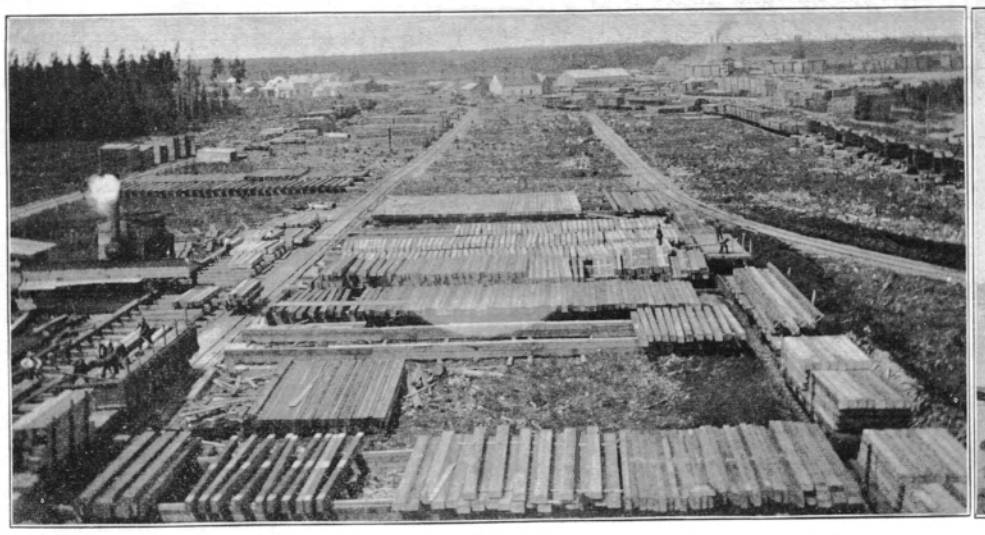

FIG. 4—TIMBER YARD FOR ERECTION OF ESCANABA ORE DOCK.

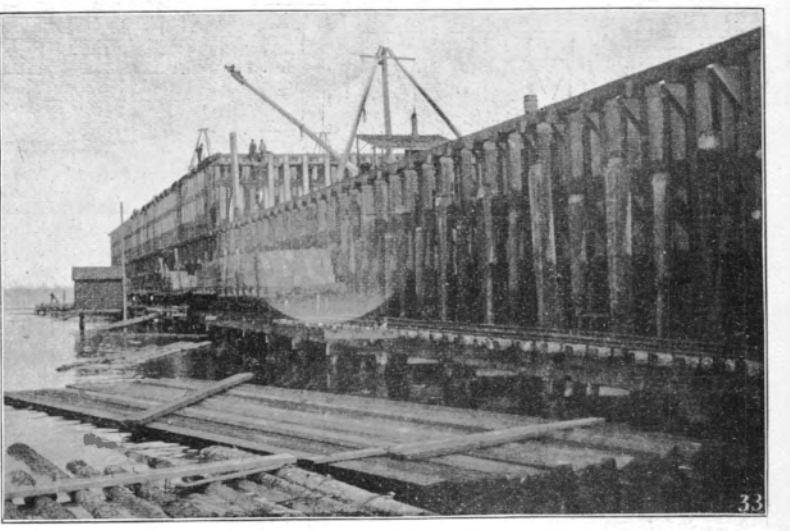

FIG. 5—ERECTION WORK IN PROGRESS, ESCANABA ORE DOCK.

The trestle approach to the dock is on an upgrade of ½ per cent. In point of construction this trestle may be divided into three sections of nearly equal length. Starting from the ground end the first section, of about 1000 ft. length, or to the point where the trestle reaches a hight of 27 ft., consists of pile bents. The remainder of the trestle, or for a distance of about 2100 ft., consists of framed bents, the second or middle section being one deck high and the third section, or that adjoining the dock, being two decks high. The pile foundations for the framed bents were cut off on a line parallel with the grade of the track, about 3 ft. above ground at the lowest framed bent. The trestle at its highest point is 65 ft. high. Figure 6 shows one of the standard track pile drivers of the C., M. & St. P. Ry. at work on the pile bents of the approach. On other parts of the approach a land driver was also used.

The framed portion of the trestle one deck high was erected by means of a traveling derrick working on the pile foundation, moving toward the east and raising the bents in the rear. On the two-deck section of the trestle the method of erection was by the same traveling derrick, working first on the top of the first deck and erecting the bents in advance, and then returning on the same level and erecting the top bents in the rear. All of the erection derricks, for both the dock and the approach, were operated by steam.

The tracks over the pockets of the dock consist of four rails on each side (Fig. 3), all laid to standard gage, which arrangement provides three tracks, any one of which can be used by means of a three-throw switch arrangement, as described and illustrated in the Railway and Engineering Review of Dec. 22, 1900, page 719. For the protection of the dock against fire there is an elaborate fire-extinguishing system operated by a pumping plant on shore.

The spouts and hoists for the 120 pockets of the dock are of the Denton pattern, furnished by Pettibone, Mulliken & Co., of Chicago. A general view of these spouts appears in Figs. 1 and 2, and Fig. 7 is a near view showing the hoisting winches in better detail. The spouts are counterbalanced and are operated by one man. Referring to the winch for spout No. 119 (Fig. 7) the sheave for lifting the spout appears at the right. The counterbalance hangs on a conical-shaped pulley at the left, or on the opposite side of the supporting post. The spouts are wound part of the way, in moving both up and down, and the gearing is so arranged that the crank is always turned in the same direction regardless of the direction in which the spout is moving. From its upper position the spout drops as far as the horizontal by gravity, but below the horizontal it is necessary to wind it down. In lifting the spout from its lowermost position, or from the vessel, it is raised to the horizontal by the counterweight, and from the horizontal up to the upper position it is lifted by winding on the winch

The dock stands between two channels or slips dredged to a depth of 20 ft., the slip on the south side being 175 ft. wide and that on the north side 200 ft. wide. The excavation in these slips amounted to 500,000 cu. yds. The timber in the dock and approach aggregates 5,800,000 ft., B. M., and the piling measures 207,000 lineal ft.

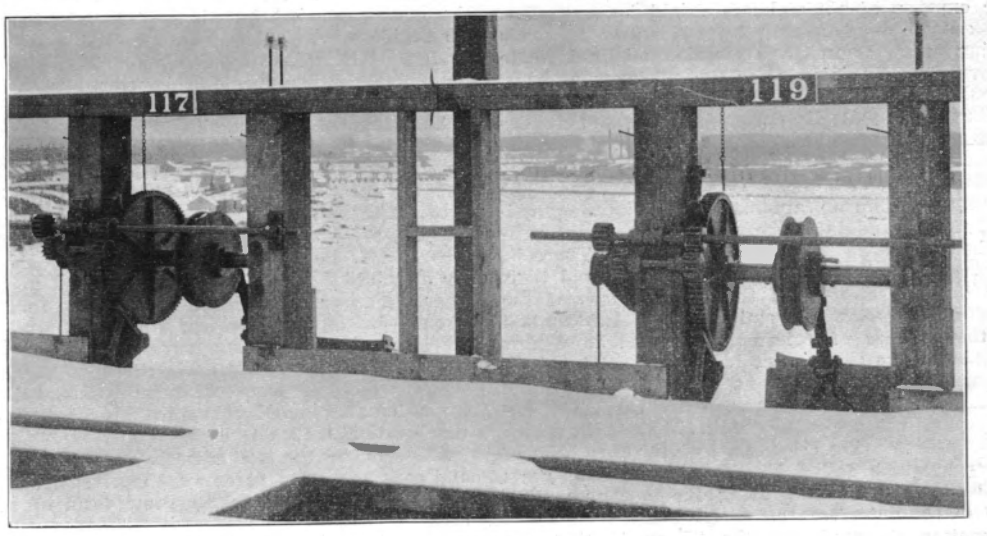

FIG. 7—WINCHES FOR HOISTING SPOUTS, ESCANABA ORE DOCK.

All the work of construction was done by the railway company's own employees. The plans for all the work were drawn under the supervision of Mr. Onward Bates, engineer and superintendent of bridges and buildings. Mr. J. C. Hain was the engineer in charge, and Mr. W. E. Smith was the superintendent of construction. We are indebted to all of these gentlemen for plans, photographs and data. The dock was completed for shipment of ore Oct. 15. 1900.

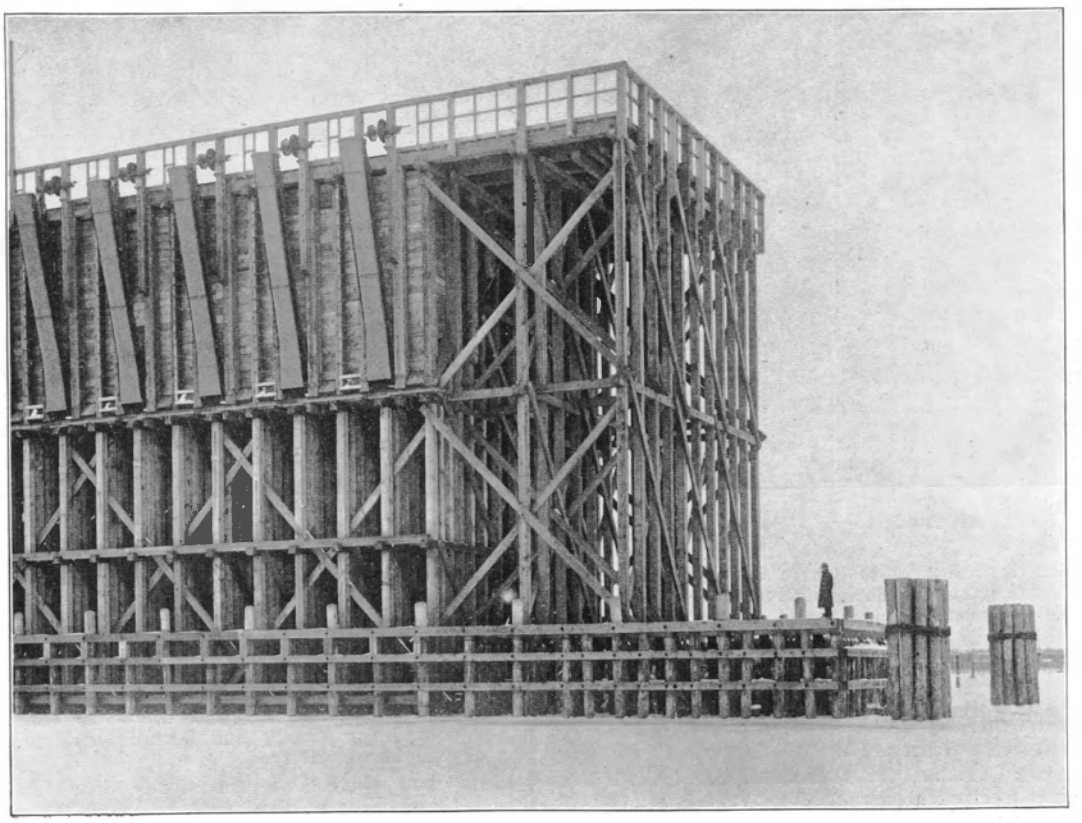

FIG. 2—EAST END OF ESCANABA ORE DOCK, C., M. & ST. P. RY.

Highway Crossings.

Committee Report to the American Railway Engineering and Maintenance-of-way Assn.

It is believed that little consideration need be given by the association to the numerous crossings of country roads on which travel is infrequent and where no special sources of danger exist. Although in certain sections, where trains are numerous and highway traffic heavy, there is a tendency to the gradual elimination of all surface crossings, the operation of a very large part of our railroad mileage causes few accidents at the less dangerous crossings, and the prospect of any general and radical change of methods is quite remote.

The theory of protection on which the state laws and, of course, railroad practice proceeds is to warn persons near the crossing of the approach of a train, by sign, whistle and bell, and then depend on them to avoid it.

The whistling post on single track is always located on the engineer's side, about a quarter of a mile from the crossing and the sign so as to be conspicuously seen from the highway. The form of the sign is necessarily modified by the requirement of the prescribed lettering, and it is not deemed desirable to recommend a standard form.

The physical condition and arrangement of the crossing should be such as to facilitate the passage of a vehicle in the shortest possible time, and with the best possible view of the track. The planking should be smooth, the drainage good, and the grades easy. In the case of those crossings where, for any reason, the whistle and bell cannot be heard, or the approaching train seen, the electric alarm bell has been resorted to with satisfactory results, giving ad-