TRAVELING CONCRETE PLANT.

Portable System for Mixing and Placing Concrete in Pier Construction.

A concrete mixing plant with elevator tower and distributing chute is being used for mixing and placing the concrete in the caisson shells and superstructures of the quay wall and pier now under construction at the Balboa terminals. Four units of the type are in use. The system has advantages of convenience, speed, and reduced labor cost.

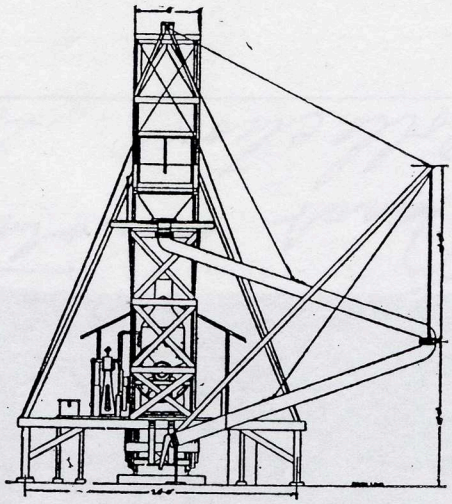
Each unit consists of a hoisting engine, of approximately 20 horse-power, steamdriven; a ½-cubic yard portable mixer; an elevator for raising the concrete so that it can be distributed from a hopper by gravity; and a jointed distributing chute, for placing the concrete from the hopper. All of these items are mounted on a single flat car, resting on a 5-foot gage track. The plant is advanced along the track with the progress of the placing. The sand, rock, and cement for the concrete may be handled to the mixer direct from cars coupled to the flat car in the rear, or from stock piles alongside the site of operations. In either case, they are carried to the mixer in wheelbarrows, over suitable staging.

The hoisting engine boiler furnishes steam for the mixer, and, by cables running over sheaves at the top of the elevator tower, raises and lowers the elevator car.

The elevator is a hollow timber framework, 4½ by six feet in plan. In the unit of which the side and front views are shown herewith, the tower rises to a height of 41 feet three inches above the deck line; in this type, the distributing chute is 52 feet long, with a distributing radius of 48 feet. In two other units of similar general design, the chute is longer, having a distributing radius of 78 feet. The elevation of the tower is determined by the requirements of distributing the concrete by gravity. In each case, the tower is braced by timber outriggers.

The elevator car is the body of an ordinary ½-yard Decauville dump car, mounted on trunnions. At an elevation determined by the length of the chute, it dumps automatically into a hopper which rests on a projection on the front side of the elevator shaft. The hopper is six by six feet in plan at its top, converging into juncture with the distributing chute. It has a capacity of about one cubic yard.

The distributing chute is of 14-inch steel pipe. It is in two sections of equal length, connected by means of a swivel joint. The upper section is known as the swivel arm, and the lower section as the nozzle arm. The upper section is connected with the hopper discharge by a swivel joint, and can swing to either side to a position at right angles with the axis of the flat car. The nozzle arm, swinging under the upper section, can describe a circle, the center of which is the joint between the two sections. This combination of motions allows the mouth of the chute to be placed over any point in the semicircle described by swinging the chute with both sections extended in the same plane.



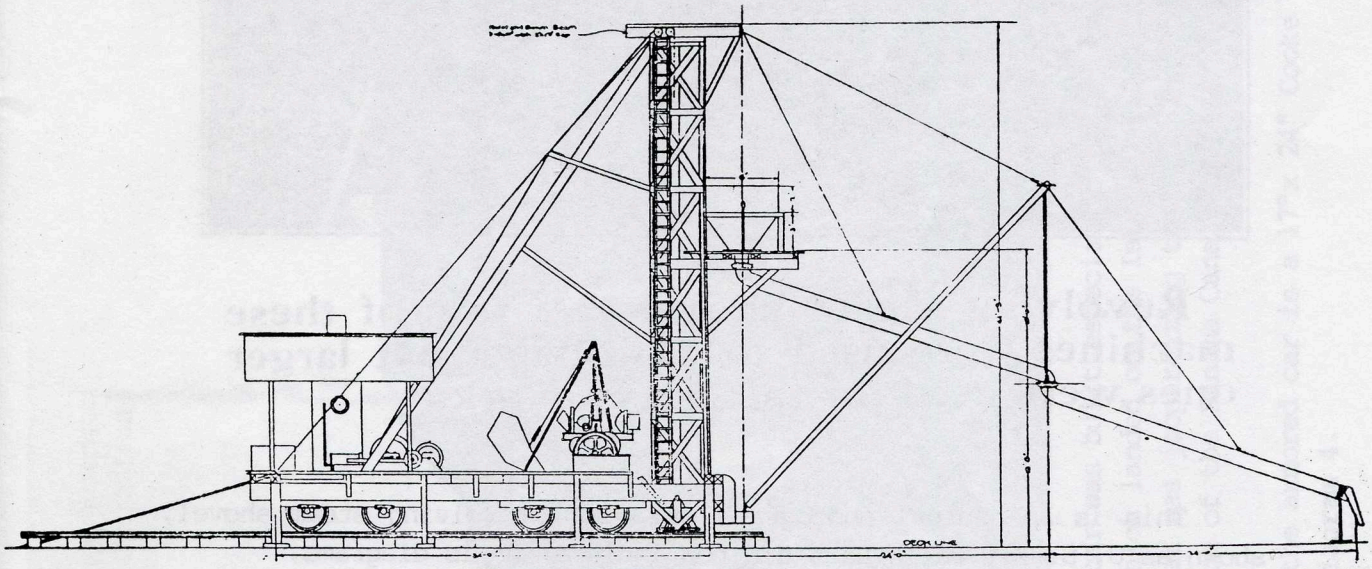
TRAVELING CONCRETE MIXING PLANT—FRONT VIEW.

The method of supporting the chute is of especial interest. Both sections of the chute are supported by means of a pivoted latticework boom, projecting outward and upward from the front of the base of the elevator tower. The timbers of the boom pass on both sides of the upper section of the chute, allowing its support to be effected by the cross pieces. In addition, the boom passes far enough beyond the upper section to allow vertical guys to be attached to the intermediate joint, and slanting guys to be extended to the end of the nozzle arm. This does away with extraneous supports for the nozzle arm, and with the services of laborers in carrying it from point to point.

The system allows the mixing and placing of from 180 to 200 cubic yards of concrete per day from the ½-yard mixer. The arrangement of the chute allows the placing of concrete all over the semicircle in front of the mixer without the use of men with wheelbarrows, operating on runways laid over the reinforcement. These features are especially desirable in the pier construction, where it is important to complete a section, including a main girder and extending half-way to the girders on either side, in one day, in order that the concrete may harden in a complete unit.

In the new pier No. 1, each section is 29 feet six inches long by 75 feet 11 inches wide, and contains 191 cubic yards of concrete. One mixing unit will complete a section a day; but in case of breakdown, another unit can be withdrawn from caisson work and sent to supplement the placing for the pier. Each outfit is practically as portable as a wrecking crane.

The force for each unit consists of approximately 30 silver employes in charge of a white foreman. Twenty-five men are engaged in wheeling materials from the cars or stock piles and supplying the mixer; one man is in charge of the mixer; one runs the hoisting engine; and three are out at the end of the chute, distributing the concrete into the forms. This arrangement makes the labor cost very low.



TRAVELING CONCRETE MIXING PLANT—SIDE VIEW.

This system is a development, for the local conditions, of the system used for the manufacture of the concrete caisson shells at Balboa, described in THE CANAL RECORD of February 19, 1913. Both systems were originated by Mr. J. A. Walker, the superintendent in charge of the construction of the Balboa terminals.

The forces of the shops and dry dock at Mount Hope have completed repairs to the tug *Rey del Rio*, which is operated at Bocas del Toro by a subsidiary corporation of the United Fruit Company. The repairs consisted principally of remedying a bent propeller shaft and a broken wheel, and required two days' work.