



Oscillator-amplifier unit
in the carrier system

will continue to dissipate through several track circuits by discharging through a lightning arrester at each consecutive track cut.

Two Copperweld ground rods, $\frac{5}{8}$ in by 6 ft., are driven at the line pole and one such rod is driven at the instrument housing at each C.T.C.



Pole line down mountainside

code location. A $\frac{9}{32}$ -in. hole is drilled through the rod, 1 in. from the top, the ground wire being con-

nected to the rod by driving a channel pin in this hole.

On account of the scarcity of aluminum due to the war program, the practice of using aluminum paint on signaling equipment has been abandoned on the Southern Pacific. For this reason, a new type of enamel made by the National Lead Company, and known as "S.P. Co. Silver Gray Exterior Eggshell Synthetic Enamel No. 8x59," was used for painting the signals, instruments cases, etc., on this project. This enamel is gray, being

slightly darker than aluminum. It is easily applied with a brush or a spray. Enamel of this type, which has been in service now for a year or more, seems to maintain a good appearance and render satisfactory service.

This installation of centralized traffic control was planned and installed by the signal forces of the Southern Pacific under the direction of R. D. Moore, signal engineer. The major items of signaling equipment were furnished by the Union Switch & Signal Company.

Lap Order Results In An Accident

On December 11, 1942, a head-on collision occurred between two freight trains near Tebbetts, Mo., on the Missouri-Kansas-Texas. The following information concerning this accident was abstracted from a report by the Interstate Commerce Commission.

In the vicinity of the accident this line is single-track, over which trains are operated by time table and train orders, no block system being in service. During the 30-day period preceding the day of the accident, the average daily movement in the vicinity of the accident was 21.46 trains.

At Hartsburg, 22 miles south of Tebbetts, the northbound freight train, Second 72, received train order No. 57 reading as follows: "Second 72 Eng. 737 wait Tebbetts 12:10 p.m. for Extra 853 South."

This northbound train Second 72 departed from Hartsburg at 11:29 a.m., and, while traveling at an estimated speed of 35 to 40 m.p.h., it collided head-on with Extra 853 South 3.8 miles south of Tebbetts.

At Mokane, 6.1 miles north of Tebbetts, the southbound freight train Extra 853 South, received a copy of train order No. 57, previously quoted, directing that train to wait at Tebbetts until 12:10 p.m. On arrival at Tebbetts, this southbound train received train order No. 61 reading in part as follows: "Extra 853 South has right over Third 72 Eng. 892 Tebbetts to Boughner and has right over Fourth 72 Eng. 898 Tebbetts to Easley Second 72 wait Hartsburg 12:45 p.m. for extra 853 South."

The northward train Second 72 did not receive a copy of train order No. 61, in the meantime was proceeding northward between Boughner and Tebbetts on the authority of train order 57 which gave up to 12:10 p.m. for this train to arrive at Tebbetts.

On the authority of train order No. 61, the southbound train Extra 853

South left Tebbetts at 11:55 p.m. The first that the members of the crew knew that anything was wrong was when the engineman saw Second 72 approaching at a distance of about 800 ft., and he immediately moved the brake valve to the emergency position. He stated that the speed had been reduced to about 3 to 5 m.p.h. when he jumped off just before the collision occurred. The point at which the members of the engine crew of Second 72 first saw the other train cannot be determined because both the engineman and fireman were killed in the accident.

According to the statement of the train dispatcher, he erroneously worded that part of order No. 61 which contained the provision for Second 72 to wait at Hartsburg. It should have read Third 72 instead of Second 72. The order was repeated as sent and he failed to detect the error. He said there was no condition in the dispatcher's office that caused him to become confused.

In the territory involved, trains are operated by time-table and train orders only. The Commission investigated a head-end collision between two passenger trains which occurred in this territory on December 17, 1941, and resulted in the death of 3 persons and the injury of 14 persons. The report of the Commission covering the investigation stated that if an adequate block system had been in use on this line the accident would not have occurred, and recommended the establishment of an adequate block system on the line involved. In the present case, if an adequate block system had been in use, the accident would not have occurred. This carrier has an automatic block-signal system in operation between Easley and Sedalia, Mo., a distance of 64.7 miles. The northern end of this system is 31.2 miles south of Tebbetts.