

## THE FIRST 3000-VOLT LOCOMOTIVE FOR THE CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY

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The trip of the first 3000-volt electric locomotive from Erie to the West attracted such wide attention that it is worthy of special note in the REVIEW. Beside recording the interest displayed en route the author cites interesting data concerning the locomotive. The regeneration of power is a feature that will attract world wide attention.—EDITOR.

Interest in the approaching electrical operation of the transcontinental lines of the Chicago, Milwaukee & St. Paul Railway has been greatly increased by the exhibition tour of the first locomotive over the railway company's lines. The "big motor" as it is called by the railway men was taken in charge by the railway company at Chicago and has been exhibited at all the principal cities on the system between Chicago and Tacoma. The great interest displayed indicates popular approval of the electrification project from every quarter. The contract made on November 25, 1914, called for the delivery of the first locomotive in ten months and it is worthy of record that this date was promptly met, shipment being made on September 25, 1915. That this quick delivery is remarkable can be appreciated when it is understood that the design is entirely new, that the capacity exceeds that of any electric locomotive ever built, that the voltage of the system is higher than any direct current system for commercial operation, and that the system of control is entirely new, being designed for regenerative braking. Since the first delivery several additional locomotives have been shipped so that electrical operation of the first division between Deer Lodge and Three Forks is expected to begin about December 1st.

These locomotives may be properly termed the first transcontinental type, since no electrification now in operation involves such continuous heavy service over long distances. The lines now being electrified include 440 miles of route, carrying both freight and passenger traffic over three mountain ranges all within the territory known as the Great Continental Divide. It is also intimated that electrification to the Pacific Coast is contemplated, which will give a continuous electrified stretch of 850 miles. Transcontinental electric train operation has never before been undertaken on so large a scale. Exhaustive tests were made by the manufacturing company's engineers before shipment and the locomotive performance easily

exceeded the expectations of the designers. Tests made on the regenerative braking equipment were especially gratifying to the engineers and the hauling capacity of the locomotives was demonstrated to the satisfaction of all concerned.

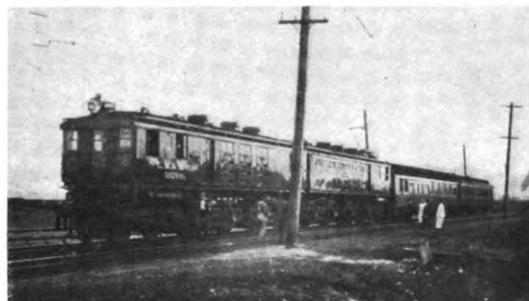


Fig. 3. The Locomotive on a Trip from Butte to Durant and Return on the B., A. & P. Rwy. with the C., M. & St. P. President's Special

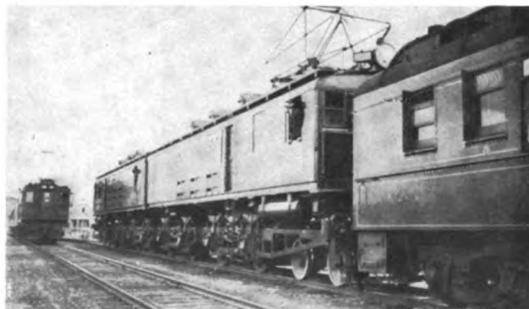
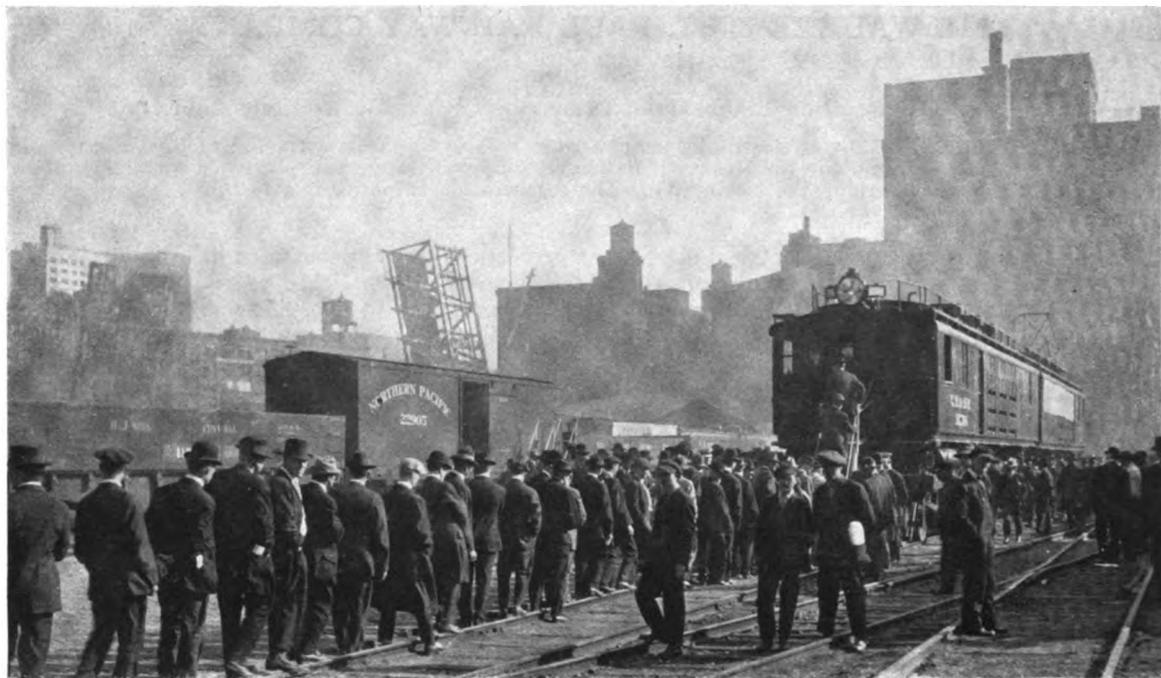
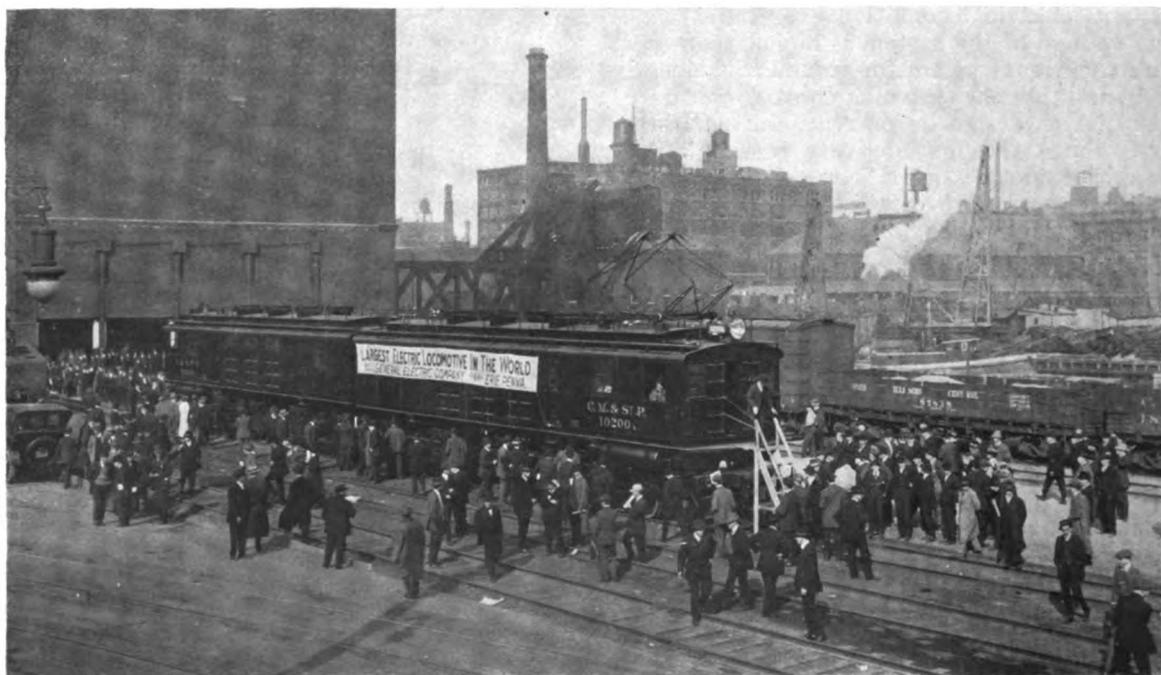


Fig. 4. The Locomotive and Train on the B., A. & P. Rwy. at Silver Bow

On account of the very general interest in the new locomotive the officials of the railway conceived the plan of making an exhibition tour in order to explain the various novel features to both the engineering fraternity and the general public. In all cities where an exhibit was planned a three column advertisement was inserted in the local papers for a week or ten days prior to the date of exhibi-



**Fig. 5. The Locomotive on Exhibition near the Union Station, Chicago.  
Several thousand visitors inspected the locomotive**



**Fig. 6. Another View of the Locomotive while on Exhibition near the Union Station, Chicago**

tion. The newspapers were also furnished with an abridged description of the locomotive for use in their news columns.

The famous transcontinental trains "Olympian" and "Columbia" will be hauled electrically through the Missoula and Rocky Mountain Divisions and the conditions of travel will be greatly improved by the elimination of smoke, gases and noise incident to steam operation, making a trip over this beautiful scenic route a very delightful experience.

The first public inspection was held in Chicago at Fulton Street near the Union Station on October 6th, from 12 noon to 4 p.m. It was estimated that 10,000 people gathered to see the great machine and 5000 visitors actually passed through the interior. So great was the popular interest that several "Movie" operators were on hand and made films at different points which are now being exhibited throughout the country. Several photographers secured pictures, one of which shows the electric locomotive coupled to the luxurious through train Olympian. See Fig. 1.

Prominent among these visitors were many railroad officials located in Chicago and university professors; particularly those interested in engineering work at the University of Chicago and at Northwestern University. A number of students were dismissed from class work in order to give them an opportunity to examine the locomotive. Superintendents of motive power, street and steam railway officials, consulting engineers and city officials from Chicago and points within 200 miles took advantage of the opportunity to inspect the first transcontinental locomotive. Public men of every profession and city officials of Chicago were especially interested on account of the agitation in favor of electrification of the railway terminals of Chicago.

Visitors evinced great interest in the characteristics of the locomotive such as its capacity, speed, operation in cold weather, regenerating equipment, etc.

The equipment of the freight locomotive is sufficient to handle a 2500-ton trailing train on a 1 per cent grade at 16 m.p.h. and with passenger gearing an 800-ton train can be handled on the same grade at about 30 m.p.h. It weighs 282 tons and the length is 112 feet over all. Each of the eight motors has a one hour rating of 430 h.p. and a continuous rating of 375 h.p., thus providing a total of 3000 h.p. continuously. Each motor is geared to an axle by twin gears thus equalizing strains on the driving axles. The available

tractive effort at the one-hour rating is 85,000 lb., but for starting trains approximately 135,000 lb. is available at 30 per cent coefficient of adhesion.

The locomotive is equipped with two pantographs, one at each end, but one of these

**You Are Invited  
To Inspect**

**THE WORLD'S  
MIGHTIEST  
LOCOMOTIVE  
(ELECTRIC)**

**On Public Exhibition**

**Union Passenger Station**  
ST. PAUL

Tuesday, Oct. 12, 12 noon to 4 p. m.

**THE FIRST AND ONLY ONE OF ITS KIND—**  
more powerful than any steam locomotive—weight  
260 tons—eight pairs of drive wheels—112 feet long  
—every inch works—direct current 3000 volts—over-  
head trolley—uses no coal, requires no water, carries  
no tender, has no boiler—will handle uniform tonnage  
irrespective of weather conditions. By regenerative  
braking on down grades returns large part of power  
used on climb up grade. Will be used to haul pas-  
senger and freight trains over the Rocky Mountains.

This is one of the most revolutionary sights in railroading—  
the world's mightiest electric locomotive on its way to the  
greatest project in railroad electrification, that of the main  
line of the Chicago, Milwaukee & St. Paul Ry. for 440 miles  
through the Rocky Mountains in connection with its trans-  
continental service between Chicago, Milwaukee, St. Paul,  
Minneapolis and the Pacific North Coast.

The public are cordially invited to enter and thoroughly inspect the  
locomotive. Attendants will be on hand to explain details.

**Chicago, Milwaukee & St. Paul**  
RAILWAY

Fig. 7. A Typical Newspaper Notice Inviting the Public to Inspect the New Locomotive

is sufficient to collect the necessary current should occasion demand.

The most novel feature of the locomotive is the regenerative braking which enables the locomotive to hold back the heaviest trains on the long descending grades—at the same time returning power to the line. The air

brakes are thus used only for emergency service or in making the final stop. Regeneration is controlled by the engineer through an auxiliary handle on the master controller which causes the motors to return power to the trolley in the proper amount to maintain



**Fig. 8. One of the Eight, 430-h.p., 3000-volt Motors Used for Driving a C., M. & St. P. Locomotive**

any desired speed. This feature was very thoroughly tested on the General Electric Company's experimental track at the Erie Works.

The general public showed much interest in the fact that cold weather offers no obstacles to electric locomotive operation as is the case with steam engines. It was pointed out that steam locomotives are usually in difficulties in the winter time; necessitating extra leeway in the time table to take care of delays and that there will be no delays for fuel or water or cleaning fires and that the electric engine will always be ready at a moment's notice. With electric operation trains will move exactly as scheduled so the meeting and passing points may be figured to the minute. Fuel trains will be eliminated in the mountain districts thus giving room for additional trains handling revenue freight.

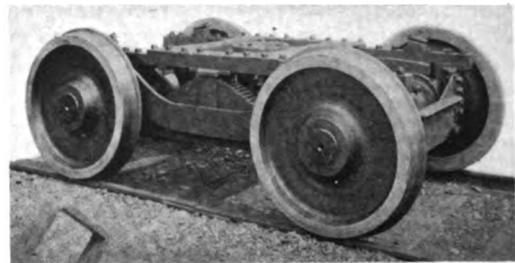
At Milwaukee an accurate count was kept and 5010 people went through the locomotive. As many more inspected the locomotive from the outside and either did not have the time or the opportunity to make an examination of the interior. Especial interest was displayed by the employes of the railway company, practically the entire office and shop force taking occasion to visit the machine.

In St. Paul 2550 visitors passed through the locomotive and in Minneapolis nearly 6000 people. Opportunity was also afforded the faculty and students of the Railway Engineering Course of the University of Minnesota to make a careful examination at a special hour.

On the trip west over the Chicago, Milwaukee & St. Paul lines stops were made at Aberdeen, Miles City, Butte and Missoula with 2000 to 3000 visitors at each stop.

At Butte, the President's special car was attached and a trip made over the lines of the Butte, Anaconda & Pacific Railway to Durant and return. It is noteworthy that the locomotive was operated under its own power as a demonstration to these officials the day it arrived at Butte after being hauled more than 2000 miles. Among the officials on the trip to Durant were President A. J. Earling; Vice President H. B. Earling; Assistant to the President, C. A. Goodnow in charge of electrification work, R. M. Calkins, Traffic Engineer at Seattle; A. M. Ingersoll, Assistant to the Vice President; R. Beuwkes, Engineer in charge of electrification; Mr. H. A. Gallwey, General Manager of the Butte, Anaconda & Pacific Railway, and many others.

Final exhibitions were made at Ellensburg, Spokane (10,000 first day), Seattle and Tacoma. The number desiring to inspect the



**Fig. 9. One of the Driving Trucks for a C., M. & St. P. Locomotive**

locomotive at both Spokane and Seattle was so large that it was necessary to allow two days at each place for the exhibition. From Tacoma the locomotive was started on its way back to Butte where it will be placed in operation about December 1st.