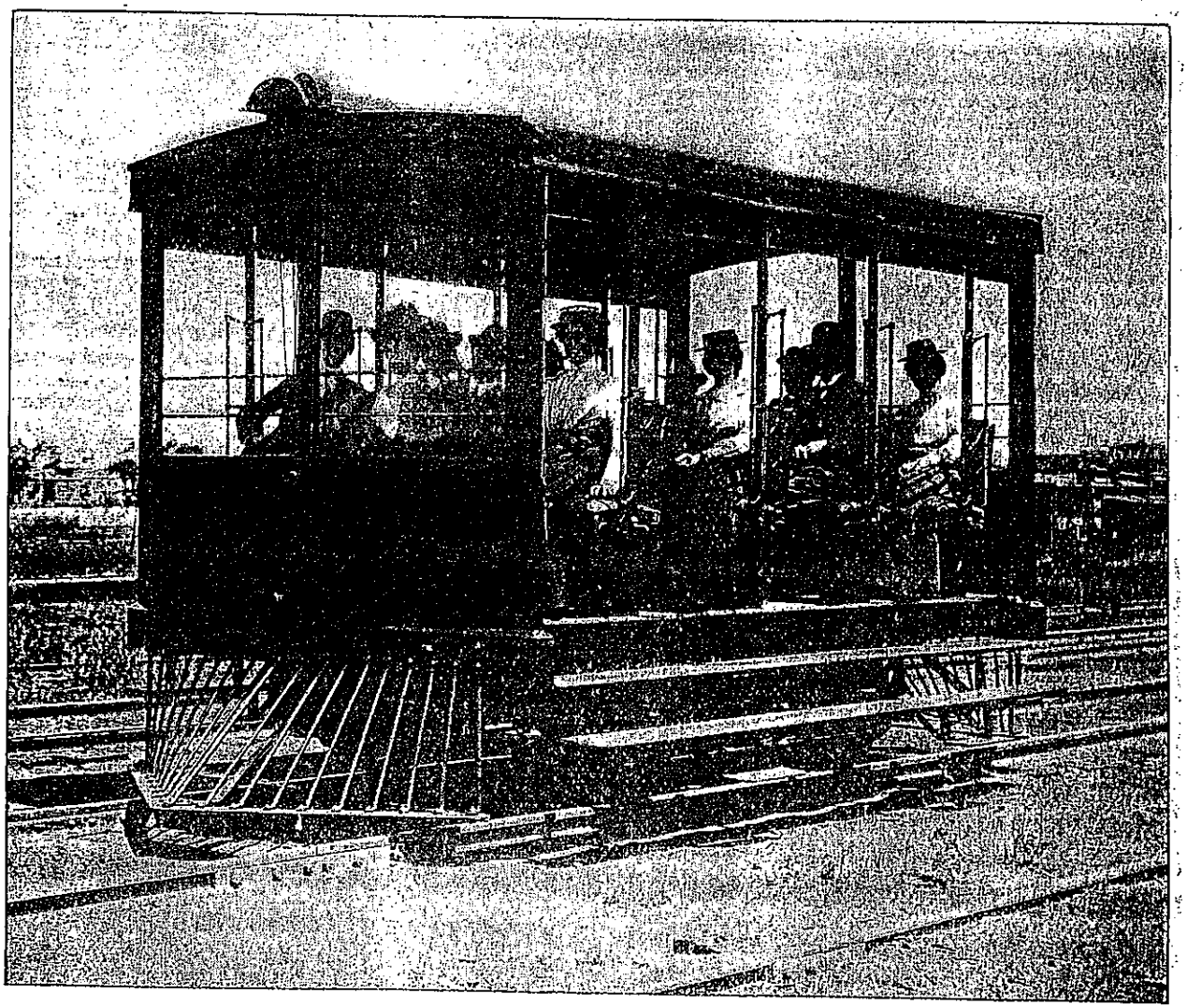
CANADIAN PACIFIC RAILWAY

SELF-PROPELLED CARS

C. H. RIFF



CANADIAN PACIFIC RAILWAY MOTOR CAR FOR USE ON THE MOUNTAIN SECTION.

The C.P.R. has built a motor car for use on its mountain section in Alberta and British Columbia, an illustration of which is given on page 277. Its length is 13½ ft. over body of car, and 20 over all. Width, 20 feet. It has a four-wheeled truck, 25½ in. steel-tired wheels, and a 20 h.p. gasoline engine fitted up with an electric spark. The engine carries 20 gals. of gasoline, which will run the car 300 miles. On the level this engine is capable of 30 miles an hour. It is powerful enough to climb any of the mountains. The car carries three brakes, an emergency and two handbrakes, so that should one fail either of the remaining two are strong enough to hold it in check. The car carries lights at the corners and has an electric gong at each end. The car resembles the ordinary electric motor. It is open at the sides, cushioned seats running across as in the street cars, save in the centre, where there is an open space for the engineer. The ends are closed with large sheets of plate glass, and heavy curtains along either side serve as protection from the sun or shelter from rain. The machinery is of English manufacture, though of Canadian design, the car body being constructed at the Co.'s Montreal shops, where the motor parts were also assembled. The whole affair weighs four tons, and can be easily moved without the assistance of the machinery. The seating capacity is for 14, with lots of elbow room for all. We are informed that the car will at first operate between Banff and Hector, and ultimately between Banff and Field on a regular schedule.

August 1902

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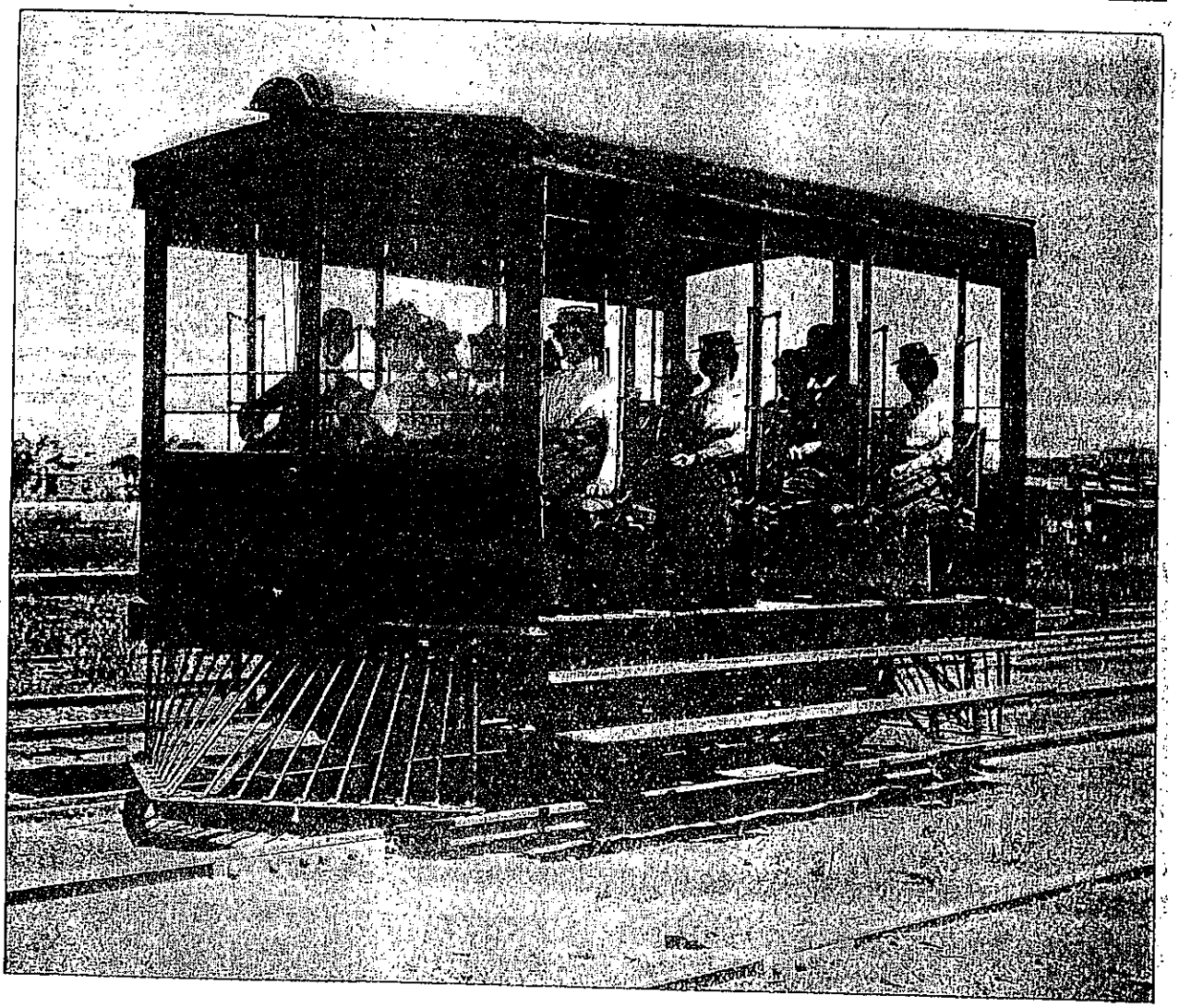
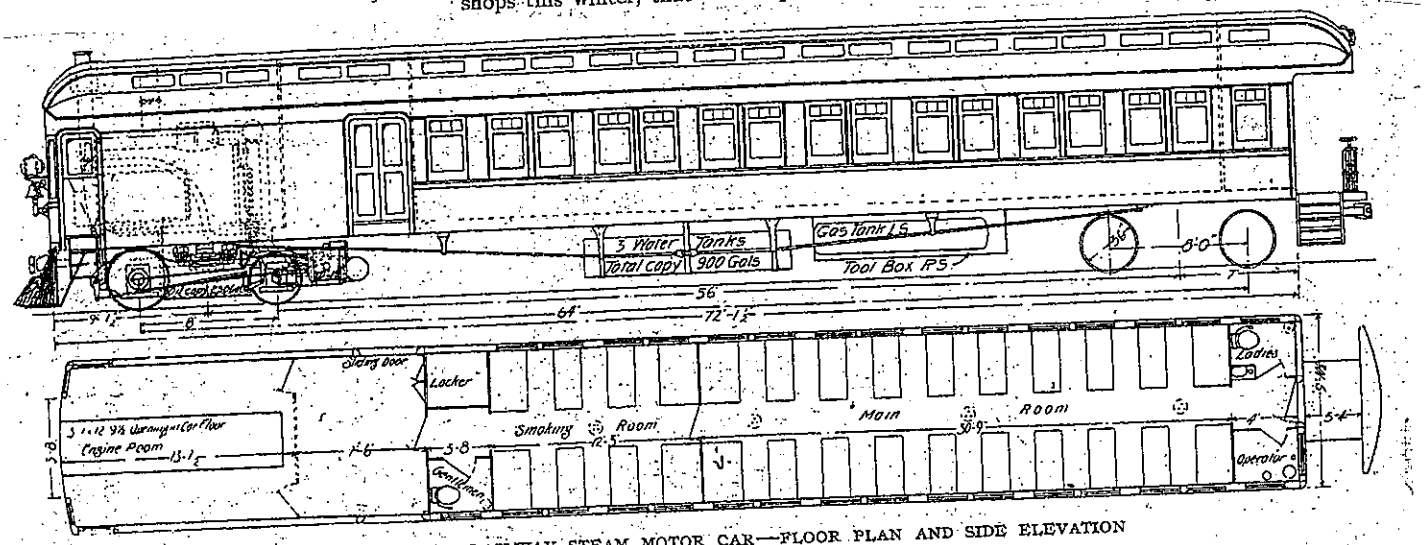


CANADIAN PACIFIC RAILWAY MOTOR CAR FOR USE ON THE MOUNTAIN SECTION.

August 1902

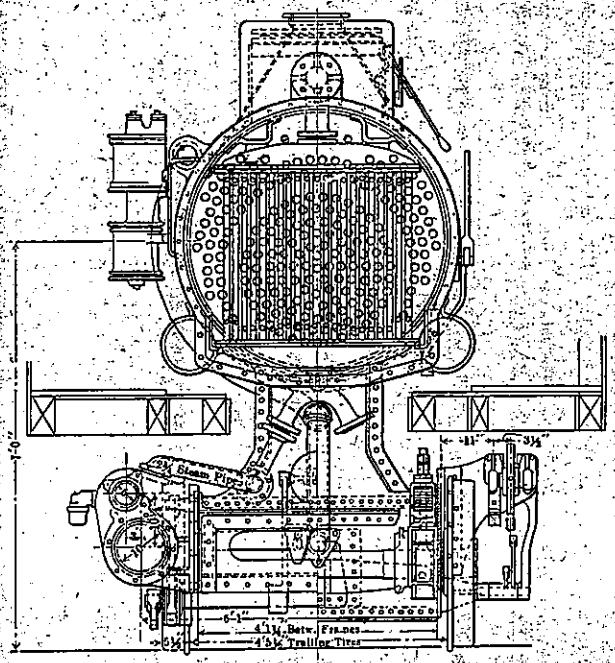
The C.P.R. steam motor car which is in operation between Montreal and Vaudreuil, was very fully described in our Aug. issue, pg. 437, and Sept., pg. 515 and 525. Additional illustrations are given on this page and page 595.

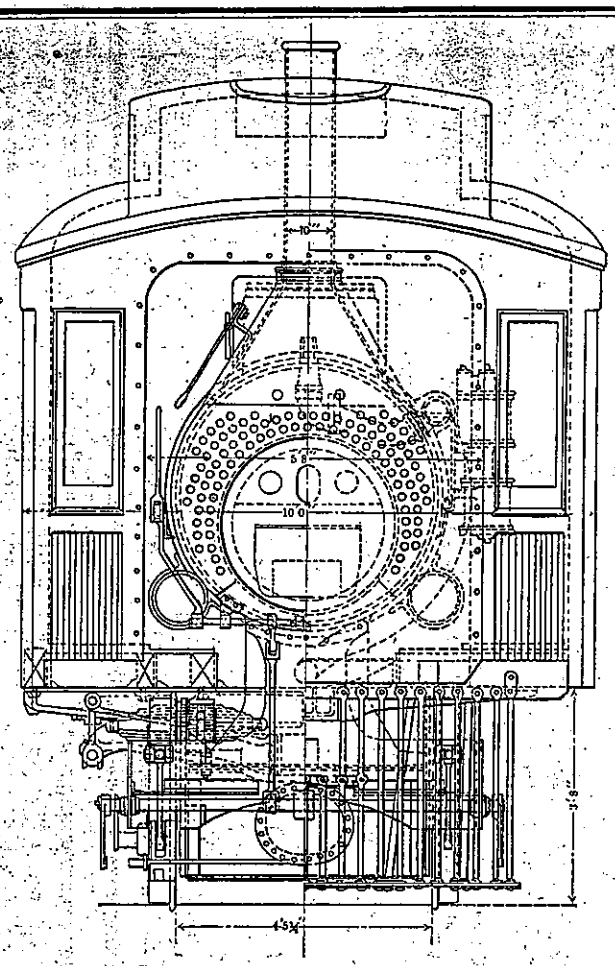
We were officially advised Sept. 8, respecting the press reports to the effect that the C.P.R. was making preparations for the building of two more motor cars at the Angus shops this winter, that "the report that we



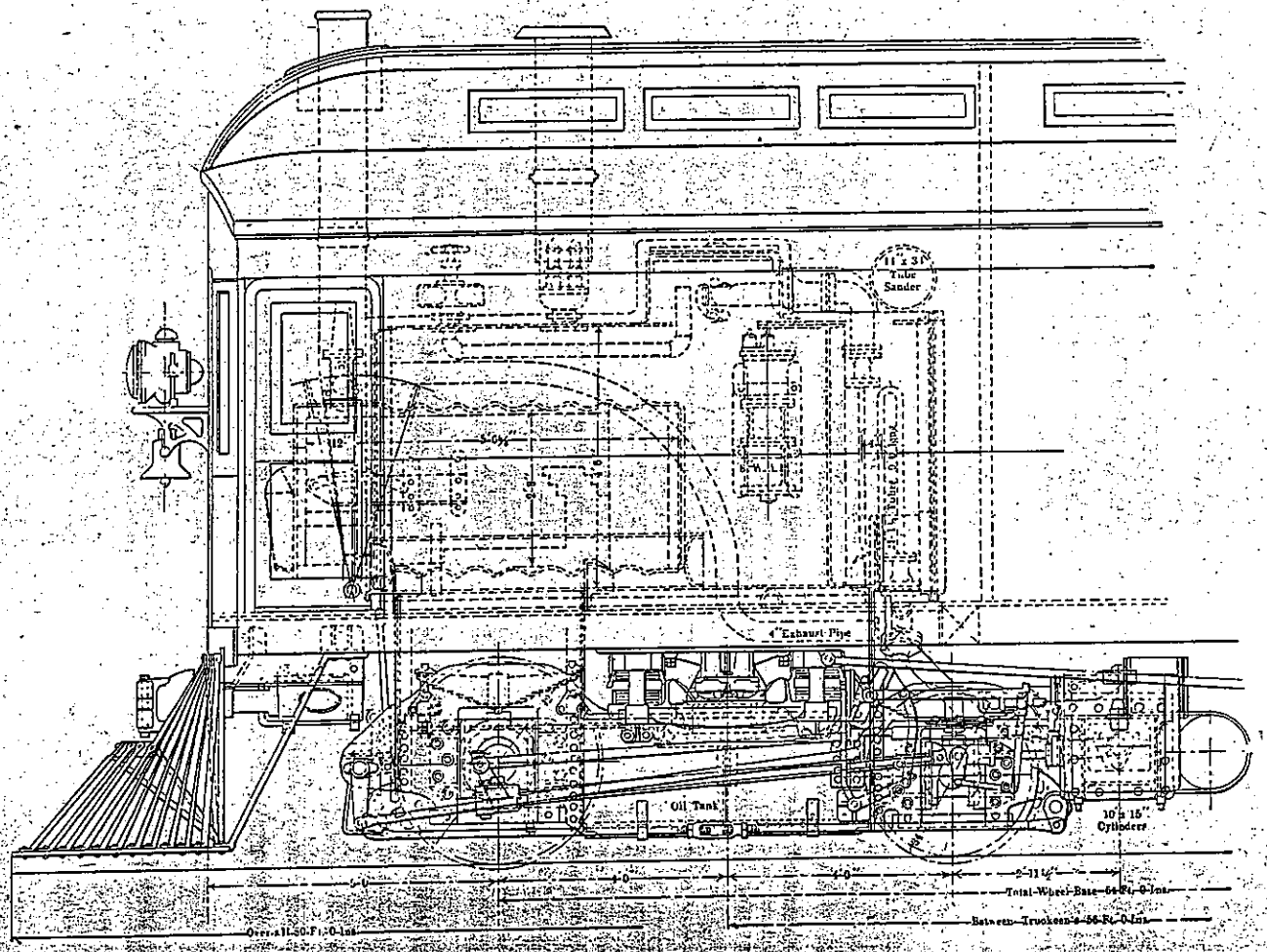
CANADIAN PACIFIC RAILWAY STEAM MOTOR CAR—FLOOR PLAN AND SIDE ELEVATION

are to build two more motor cars at the present time is incorrect."





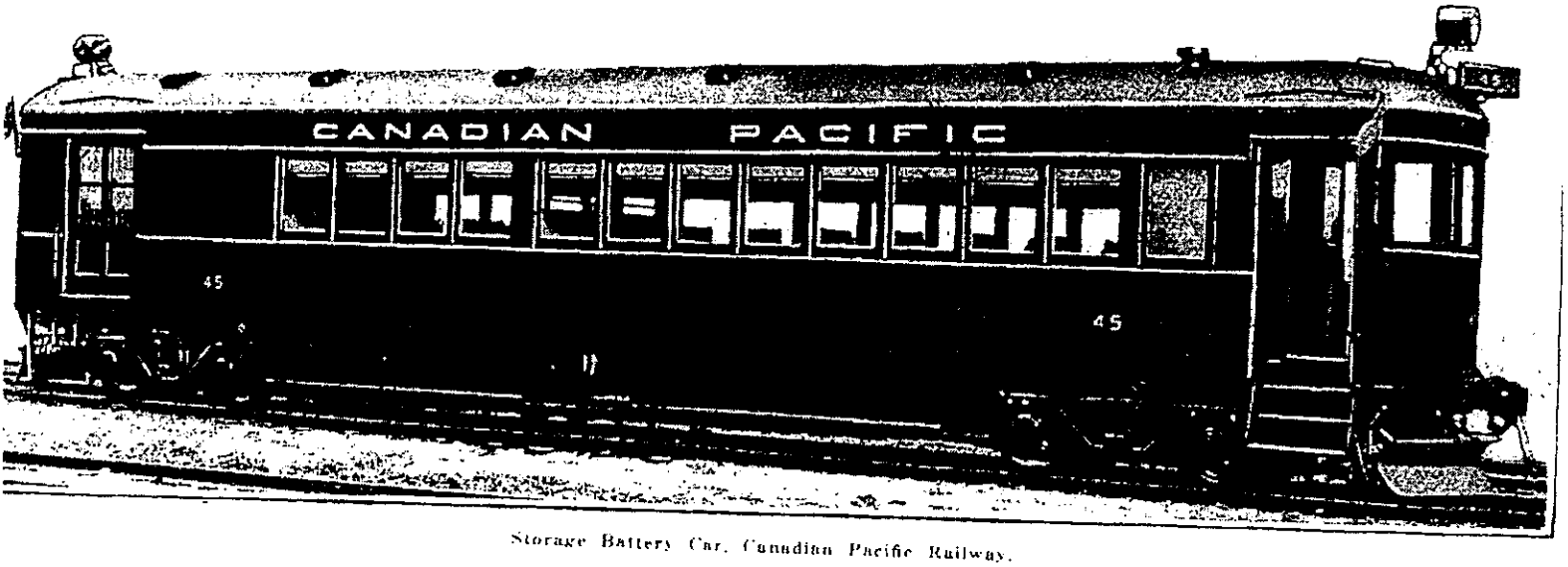
CANADIAN PACIFIC RAILWAY STEAM MOTOR CAR—END VIEW AND SECTION



CANADIAN PACIFIC RAILWAY STEAM MOTOR CAR—ENGINE ROOM AND DRIVING TRUCK

LAKE LOUISE TRAMWAY
CARS No. 50 AND 51. E.O. 2200.

NEG. No. M-94
ANGUS. MAY. 1925.



Storage Battery Car, Canadian Pacific Railway.

and afterwards between Toronto and Oakville, has been laid up temporarily.

A recent London, Ont., press dispatch stated that the Canadian National management was considering placing a self-propelled car in operation between London and Stratford.

A St. John, N.B., press dispatch states that the C.N.R. will place a storage battery car in operation between Fredericton and Centreville, N.B., 88.58 miles, on the Centreville Subdivision, Edmundston Division, Atlantic Region.

The Canadian Pacific Ry. placed in operation on May 18, between Galt and Hamilton, Ont., a storage battery car, similar to the 6 acquired by the Canadian National, and described above. An illustration of this car is given herewith. The run between Hamilton and Guelph Jct., 16.4 miles, is on the Hamilton-Goderich Subdivision, and from Guelph Jct. to Galt, 18 miles, on the Galt Subdivision, London Division, Ontario District. The car makes 2 round trips daily, leaving the Grand River Ry. Main St. station at Galt at 8.35 a.m., arriving at Hamilton at 10 a.m., connections being made at Guelph Jct. with Goderich-Toronto train 638 and Toronto-Goderich train 637. It leaves Hamilton at 10.50 a.m., connection being made with the New York-Toronto train 752, and arrives at Galt

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-in St. station at 12.20 p.m. On the second trip it leaves Galt at 4.10 p.m. and arrives at Hamilton at 5.35 p.m. making connection at Guelph Jct. with Goderich-Toronto train 640 and Hamilton-Guelph train 647. Returning, it leaves Hamilton at 5.40 p.m. making connection at Guelph Jct. with Toronto-Goderich train 639, and arriving at Galt Main St. station at 7.15 p.m.

The Eastern British Columbia Associated Boards of Trade passed resolutions urging upon the C.P.R. management the use of self-propelled cars on branch lines in B.C. A recent Victoria press dispatch stated that D. C. Coleman, Vice President, Western Lines, told officers of the Boards that the feasibility and desirability of using gasoline cars was receiving the management's attention; that such a car was on order, and that if experiments with it are satisfactory, the company would be in a position to consider equipping routes in British Columbia. We were officially advised, on May 12, that a self-propelled car is being built for the C.P. by Ottawa Car Mfg. Co., and that it will be placed in operation between New Westminster and Vancouver.

JUNE 1924

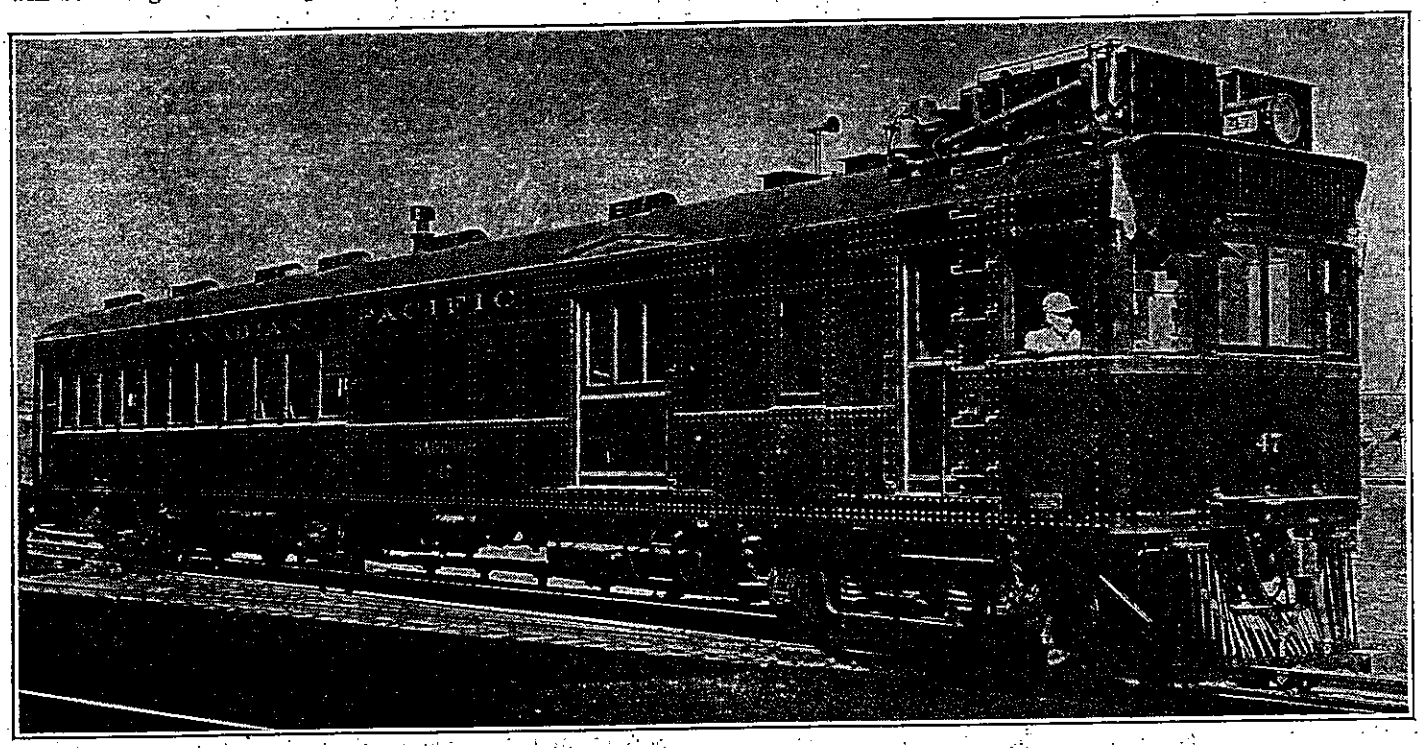
Gas-Electric Rail Motor Cars, Canadian Pacific Railway.

The two gas-electric rail motor cars, which the Canadian Pacific Ry. has ordered from Ottawa Car Mfg. Co., will be, in all essential particulars, duplicates of the two secured in 1930, which were built by St. Louis Car Co., and supplied through International Equipment Co., and which were described and illustrated in Canadian Railway and Marine World for Aug., 1930, pg. 495. The two ordered recently, however, will include numerous details which will be made in Canada instead of the United States, thus providing cars of 90% Canadian manufacture. The only change of consequence will be the substitution of ET-6 airbrake equipment in place of the schedule AML combined automatic and straight air equipment.

The principal dimensions of the cars will be:—length inside coupler knuckles, 74 ft.; truck centers, 52 ft. 10 in.; width over side sheeting, 9 ft. 9⅝ in.; height, rail to top of floor, 4 ft. 4 in.; height, rail to top of roof, 13 ft. 1¼ in.; length of engine room, 15 ft. 10 in.; length of baggage room, 20 ft. 2½ in.; length of smoking room, 8¾ ft.; length of main room, 23 ft. 4 in. The car framing will be of steel construction throughout. A wide vestibule will be provided at the rear end, with side and trap doors, and a two-fold canvas diaphragm with light vestibule face plate; the passenger room will be finished in mahogany and the baggage room with corrugated steel sheets. The headlining will be 0.06 in. sheet aluminum finished in cream enamel. Seating capacity for 50 will be provided, 36 in the main room and 14 in the smoking room. Seats will be fixed, the car being intended for front end operation only, and, in the main room, will be arranged to seat 3 persons on one side of the aisle and 2 on the other. All sash in the passenger end of the cars will be of brass. The cars will be heated by hot water, fin piping to be used throughout, and the circuit to be connected to the gasoline engine circulating system. A 32-volt lighting system will be employed, with Exide m.v.a.h. cells, which will also provide current for engine starting.

The trucks will be of cast steel type, the front one to carry the engine and motors and to have 6 x 11 in. journals; the rear truck, a trailer, will be fitted with 5 x 9 in. journals. The wheels will be of rolled steel type, 36 in. diam.

The power plant will consist of a 400 h.p. engine of 8-cyl. type, with cylinders 8 in. bore and 10 in. stroke, of Winton Engine Co. manufacture. Special winding built into the generator will make it adaptable for starting the engine from the batteries. Provision will also be made to use an air starting system when the air reservoirs on the car are charged. Two gasoline tanks will be provided, each of 200 gall. capacity. The light weight of car will be about 136,600 lb. Further particulars as to equipment, relating to the preceding two cars, given in our Aug., 1930, issue, apply also to the cars about to be built, with the exception of the change in air brake schedule as stated above. The cars will be sent to Winnipeg upon completion.



Gas-electric Rail Motor Car, Canadian Pacific Railway, obtained in 1930.

Coal Consumption, Canadian National Rys.—The Minister of Railways and Canals, Dr. Manion, stated in the House of Commons recently, in answer to questions by R. K. Smith, Conservative, Cumberland, N.S., that the C.N.R. used, from April 30, 1930, to March 31, 1931, 2,433,300 tons of bituminous, 50,400 tons of sub-bituminous, and 161,300 tons of lignite coal, produced in Canada, 1,937,500 tons of bituminous and 9,900 tons of anthracite produced in the United States, and 7,900 tons of bituminous produced in Great Britain. The quantity of coal consumed by the C.N.R. on U.S.A. lines in the same period was 719,600 tons.

Rail and River Coal Co. and Canadian National Railways.

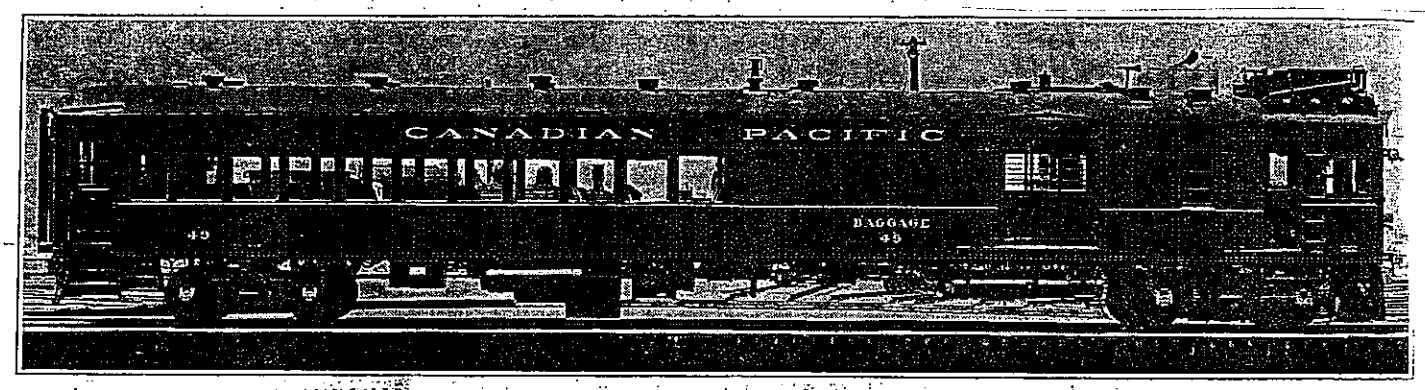
The Minister of Railways and Canals stated in the House of Commons recently in answer to questions by R. K. Smith, Conservative, Cumberland, N.S., that the Rail and River Coal Co., Cleveland, Ohio, continues to be owned by Canadian National Ry. Co., but is not operated by the parent company; that the average number of men employed during 1930 and so far in 1931 by the coal company is 1,526; that as far as the management is aware, the men are practically all union members with their locals at each mine; that coal production in 1930 by Rail and River Coal Co. was 1,856,911 tons; that the C.N.R. Canadian lines took 1,252,751 tons of coal from the company in 1930, the C.N. lines in United States taking 444,954 tons; that the price paid at the pit mouth for the coal was $1.2646 per ton; that there is no contract between the C.N.R. and the coal company for supply of coal by the latter to the former; that the C.N.R. pays nothing in the way of bond interest or maintenance and other charges in connection with the coal company; that the coal company's mines have not been idle during any part of 1929 and 1930; that the C.N.R. policy with regard to its coal areas in the United States is to use its own property in the best interests of the railway; that cost on coal mined at the pit mouth included 36c. a ton for interest on investment in the mines, exhaustion of minerals, etc., and that cost of transporting the coal by rail, from the mines to C.N.R. tracks, was as follows, per ton:—via Suspension Bridge, N.Y., $2.24; via Black Rock, N.Y., $2.24; via Port Huron, Mich., $1.67; via Windsor, Ont., $1.73; via Port Colborne, Ont., $1.76; via Niagara Falls, $2.24.

Gasoline-electric Cars, Canadian Pacific Ry.—The two gasoline-electric rail cars built for the C.P.R. by Ottawa Car Mfg. Co., which were described in Canadian Railway and Marine World for October, pg. 640, were placed in operation on Western Lines, one between Winnipeg and Arborg, Man., and the other between Regina and Weyburn, Sask. We were advised officially, Nov. 12, that one of the cars remains on the Regina-Weyburn run and that the other had been transferred to Portal Subdivision, Regina Division, Saskatchewan District, operating between Portal and Moose Jaw. The C.P.R. has ordered two more gasoline-electric cars from Ottawa Car Mfg. Co., as mentioned in our September issue, pg. 583. We were advised Nov. 12 that no definite arrangements were under way for additional cars of this type for Western Lines.

December 1931 p 757

Railway Rolling Stock Orders and Deliveries.

Canadian Pacific Ry. received recently two gas-electric rail motor cars with the following principal dimensions:—length inside coupler knuckles 74 ft.; truck centers 52 ft. 10 in.; width over side sheeting 9 ft. 9-5/8 in.; height, rail to top of floor, 4 ft. 4 in., rail to top of roof, 13 ft. 1¼ in.; length of engine room 15 ft. 10 in.; length of baggage room 20 ft. 2½ in.; length of main passenger compartment 23 ft. 4 in.



Gas-Electric Rail Motor Car, Canadian Pacific Railway.

The car framing is of steel construction throughout. A wide vestibule is provided at the rear end, with side and trap doors, and a 2-fold canvas diaphragm with light vestibule face plate. The passenger rooms are finished in mahogany and the baggage room with corrugated steel sheets. The headlining is 0.06 in. sheet aluminum finished in cream enamel. Each car has seating capacity for 50, 36 in the main compartment and 14 in the smoking room. The cars being intended for front end operation only, seats are fixed. They are covered with plush in the main room, arranged to seat 3 persons on one side of the aisle and 2 on the other; in the smoking room, they are covered with leather. All sash in the passenger end of the cars is of brass. The cars are heated by hot water from coal-fired heater, located in the baggage room; fin piping is used throughout and the circuit is connected to the radiator circulating system of the engine. Two lavatories are provided with flush hoppers and folding wash basins, with gravity water supply from overhead tanks. A 32-volt lighting system is employed, which also provides current for engine starting. The trucks are Commonwealth cast steel type; the front one, carrying the engine and motors, has 6 x 11 in. journals; the rear one is fitted with 5 x 9 in. journals. The wheels are rolled steel type 36 in. diameter. The power plant is an Electro-Motive Co. model 148, 400 h.p. engine, 8-cylinder type, with cylinders 8 in. bore and 10 in. stroke. The electrical equipment is Westinghouse, also the air brake system, having the dead man safety features. Special winding built into the generator makes it adaptable for starting the engine from the batteries. Provision is also made to use an air starter system when the air reservoirs on the car are charged. Two gasoline tanks of 200 gall. capacity are provided. The light weight of each car is 136,000 lb.

The cars were built by Ottawa Car Manufacturing Co., Ottawa, and are being operated between Winnipeg and Arborg, Man., and Regina and Weyburn, Sask., respectively.

Canadian Pacific Ry. has received 6 first class cars and 6 tourist cars, the frames for which were built by Canadian Car & Foundry Co., the cars being finished at C.P.R. Angus shops, Montreal.

Canadian Pacific Ry. has received 3 parlor lounge cars, frames for which were built by National Steel Car Corp., the cars being finished at C.P.R. Angus shops, Montreal.

Canadian National Rys.—It was stated in Canadian Railway and Marine World for September that the C.N.R. was building two oil-electric switching locomotives at its Point St. Charles shops, Montreal. It should have been stated that it had ordered two complete power plants for a 600 h.p. oil-electric switching locomotive to be built at Point St. Charles. Two oil engines for the locomotive are being built by Canadian Ingersoll-Rand

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north, and with an extension of Johnston Road on the south, the latter road leading about four miles south to the Pacific Highway. Prime Minister Tolmie, of British Columbia, is quoted as saying that if the bridge is built it will be without obligation of any kind on the part of the B.C. Government. A New Westminster, B.C., recent press dispatch stated that the Dominion order in council approving the plans for the bridge, mentioned in our January issue, makes it clear that approval was given only upon condition that the C.N.R., the riparian owner of the site, would consent to acquisition of the area required. The dispatch added that the C.N.R. had given its consent, but on the understanding that it is not interested in the railway bridge facilities to be provided. It had been reported previously that plans for the bridge had been made upon the basis of the C.N.R. using it as part of a new main entry into Vancouver.

Cowichan Subdivision Bridge.—The Board of Railway Commissioners has passed order 47,959, approving C.N.R. plans relating to reconstruction of bridge over Koksilah River at mile 51.1, Cowichan Subdivision, Vancouver Island.

Gasoline-Electric Cars, Canadian Pacific Railway.

The second of two gasoline-electric self-propelled cars ordered by Canadian Pacific Ry. from Ottawa Car Mfg. Co. was delivered Jan. 30, and placed in operation on Drummondville Subdivision, Farnham Division, Quebec District, Feb. 1, between Sutton and Drummondville, 58.8 miles, as trains 251 and 254, replacing steam trains of the same numbers. As train 251, the car leaves Sutton 8 a.m., arriving at Drummondville 12.40 p.m.; as train 254, it leaves Drummondville 2.10 p.m., arriving Sutton 7.20 p.m. Delivery of the first car of this order for two was mentioned in our February issue, pg. 73, it being stated that it had been placed in operation on the St. Guillaume Subdivision, Farnham Division, Quebec District, between Farnham and St. Guillaume.

The two cars' chief dimensions are as follows:—Length inside coupler knuckles, 74 ft.; truck centers, 52 ft. 10 in.; width over side sheathing, 9 ft. 9⅝ in.; height, rail to top of floor, 4 ft. 4 in.; height, rail to top of roof, 13 ft. 1¼ in.; length of engine room, 15 ft. 10 in.; length of baggage room, 31 ft. 6½ in.; length of main room, 17¾ ft. The car framing is of steel construction throughout. A wide vestibule is provided at the rear end, with side and trap doors, and a two-fold canvas diaphragm with light vestibule face plate. The passenger room is finished in mahogany and the baggage room in corrugated steel sheets. The headlining is 0.06 in. sheet aluminum finished in cream enamel. The main room has seating capacity for 25 passengers. The seats are fixed, the car being for front end operation only, and are arranged to seat three persons on one side of the aisle and two on the other. All sash in the passenger end of the cars is of brass. A 32-volt lighting system is employed, with Exide cells, which also provide current for engine starting.

The trucks are of cast steel type, the front one carrying the engine and the two motors and having 6 x 11 in. journals. The rear truck, a trailer, has 5 x 9 in. journals. The wheels are of rolled steel type, 36 in. diam. The power plant consists of a 400 h.p. 8-cyl. Winton engine, with cylinders 8 in. bore and 10 in. stroke, special winding built into the generator making it adaptable for starting the engine from the batteries. Provision is also made to use an air starting system when the air reservoirs in the car are charged. There are two gasoline tanks each of 160 gall. capacity. The light weight of car is about 139,000 lb.

The cars are equipped with the "dead man" feature, under which, if the pressure on the control levers is released, the brakes apply immediately. The engine cooling and car heating systems are combined; the car heating hot water system uses coal for fuel, but by connection of the hot water heating system with the engine cooling system, the engine provides hot water for heating the car under mild weather conditions, and the coal-fired car heating system provides for heating the engine's cooling water when the car is not in operation, during severe weather. Fin piping is used in the car heating system. Cooling coils for summer operation are located on the car roof, and can be cut in or out as required, according to weather conditions. When a section is cut out, the water is drained automatically from it to a storage tank in the engine room. Water from all radiators, whether cut in or out, is drained to the storage tank once the engine stops running. The radiators are not only cooled by natural air circulation when the car is in motion, but are also fitted with high efficiency cast aluminum disc type fan motors. The car is equipped with a motor-driven air compressor fitted with a reservoir of sufficient capacity for air brake operation and for supplying air for starting the engine. Control of the car is entirely automatic, the control handles consisting of hand-lever for control of the engine throttle and engine speed, an air-starting valve for starting the engine, and a master controller for forward and reverse operation. The large fuel tanks give the car a range of about 480 miles at an average speed of 30 m.p.h. The maximum speed attainable is from 60 to 65 m.p.h.

The cars operating on the Farnham Division are the second two gasoline-electric self-propelled cars secured by the Canadian Pacific from the Ottawa Car Manufacturing Co.; two others having been bought in 1931, and described and illustrated in Canadian Railway and Marine World for Oct., 1931, pg. 640. The cars delivered in 1931 were placed in operation on Western Lines, one between Winnipeg and Arborg, Man., and the other between Regina and Weyburn, Sask. But later the one which had been placed in operation between Winnipeg and Arborg was transferred to Portal Subdivision, Regina Division, Saskatchewan District, where it was placed in operation between Portal and Moose Jaw. These two cars, numbered 48 and 49, are still operating on those runs, one as trains 315 and 316 between Moose Jaw and Portal, and the other as trains 307 and 308 between Regina and Weyburn. The car operating on St. Guillaume Subdivision is numbered 9007; the one operating on Drummondville Subdivision is numbered 9008.

The C.P.R. now has six gasoline-electric cars in operation, two which were bought from St. Louis Car Co. in 1930 having been described and illustrated in Canadian Railway and Marine World for Aug., 1930, pg. 495. One of those cars, numbered 46, operates between Hamilton and Goderich, Ont., as trains 639 and 640; the other, numbered 47, operates on Maniwaki Subdivision, Smiths Falls Division, Quebec District, between Ottawa and Maniwaki, 80.7 miles, as trains 531 and 534, on Mondays, Wednesdays and Fridays, on Waltham Subdivision, Smiths Falls Division, Quebec District, between Ottawa and Waltham, 77.5 miles, as trains 541 and 544, on Tuesdays, Thursdays and Saturdays, and on Prescott Subdivision, Smiths Falls Division, Quebec District, between Ottawa and Prescott, 51.8 miles, as trains 552 and 553, on Sundays.

All of the six gasoline-electric cars are capable of hauling trailers, standard passenger cars being used when traffic demands make a trailer necessary.

Additional Cars Ordered.

We are advised that the C.P.R. has ordered from Ottawa Car Manufacturing Co. two gasoline-electric mail and baggage cars, to be 76 ft. long. The power plants will be duplicates of those in the cars delivered to the C.P.R. recently by the same builder, and the bodies will each have a 30 ft. mail compartment and a 30 ft. baggage compartment.

MARCH 1932

oline-Electric Cars, Canadian Paci-

:—The two gasoline-electric cars d by the C.P.R. from International nent Co., Ltd., Montreal, as men- in our April issue, pg. 196, the of which have been built by ı Car Manufacturing Co., at Ot- have been delivered to the C.P.R. ar has, in addition to the engine tment, a 30-ft. mail compartment, 30-foot baggage compartment. ill be operated between Winnipeg

September 1932 p448

Gasoline-Electric Cars, Canadian Pacific Railway.

The two gasoline-electric self propelled cars ordered by the Canadian Pacific Ry., from Ottawa Car Mfg. Co., as mentioned in our Sept., 1931, issue, pg. 583, were delivered, one on Jan. 16 and the other on Jan. 22. They are duplicates of the two delivered to the C.P.R. by the same builder last year, which were described and illustrated in our Oct., 1931, issue, pg. 640. They are 74 ft. long inside coupler knuckles, with truck centers at 52 ft. 10 in., width over side sheathing being 9 ft. 9⅝ in., and height 13 ft. 1¼ in. from rail to top of roof. The framing is of steel construction throughout. The interior is divided into a main passenger compartment, 23 ft. 4 in. long, smoking room, 8¾ ft. long, baggage room, 20 ft. 2½ in. long, and engine room, 15 ft. 10 in. long. The trucks are of cast steel type, with the front one carrying engine and motors. The engine is a 400 h.p., 8 cyl. one, with cylinders 8 in. bore x 10 in. stroke.

We are advised officially that the first of the two cars delivered began operation, Jan. 18, on St. Guillaume Subdivision, Farnham Division, Quebec District, between Farnham and St. Guillaume, 46.7 miles, as trains 261, 262, 263 and 264, replacing steam trains. Train 262 leaves St. Guillaume 7.50 a.m., arrives Farnham 9.35 a.m.; train 261 leaves Farnham 10.30 a.m., arrives St. Guillaume 12.20 p.m.; train 264 leaves St. Guillaume 2.50 p.m., arrives Farnham 4.40 p.m., and train 263 leaves Farnham 5.35 p.m., arrives St. Guillaume 7.20 p.m.

February 1932
p 73

p 510

Gasoline-Electric Cars, Canadian Pacific Railway.

We are advised officially that the two gasoline-electric cars, ordered by the C.P.R. from International Equipment Co., Montreal, have been received and placed in service between Winnipeg and Moose Jaw, the numbers 9009 and 9010 being assigned to them. They are replacing steam trains 53 and 54 between Winnipeg and Moose Jaw, and are being operated on the same schedules as the steam trains for the time being. It will be determined after they have been on the run for a while whether the running time can be decreased.

The bodies of the cars, like those of gasoline-electric cars ordered by the C.P.R. last year, were built by Ottawa Car Manufacturing Co., but these two, unlike the preceding ones, have no main passenger space, the bodies being divided into engine compartment, 30-ft. mail compartment and 30 ft. baggage compartment, the cars being intended to haul one or more passenger cars. The power plant in each car consists of a 400 h.p. 8-cyl. Winton engine, with cylinders 8 in. bore and 10 in. stroke, driving generator supplying two motors, the motors being carried on the leading truck.

Canadian Railway and Marine World

November, 1932

Gasoline-Electric Cars, Canadian Pacific Railway.

The two gas-electric cars, which Canadian Pacific Ry. placed in service recently between Winnipeg and Moose Jaw, Sask., have the following chief dimensions:—

Length over body	76 ft.	2	in.
Distance between truck centers	57 ft.		
Wheelbase of leading truck	7 ft.	10	in.
Wheelbase of trailing truck	6 ft.	6	in.
Leading truck center pin to front of body	8 ft.	6	in.
Trailing truck center pin to rear of body	10 ft.	8	in.
Width over eaves	9 ft.	11	in.
Width over body	9 ft.	9⅝	in.
Height, rail to top of radiator	14 ft.	3¼	in.
Height over all	16 ft.	1	in.
Height, rail to eaves	11 ft.	2¾	in.
Height, floor to eaves	6 ft.	10¾	in.
Height, rail to top of floor	4 ft.	4	in.

As these cars were designed to haul a trailer passenger car, they have no passenger compartment, and are divided into three sections, the front one, 15 ft. 10¼ in. long, containing the power plant; the central one, 30 ft. 0½ in. long, being for the mails, and the rear one, 30 ft. 0 9/16 in. long, for baggage.

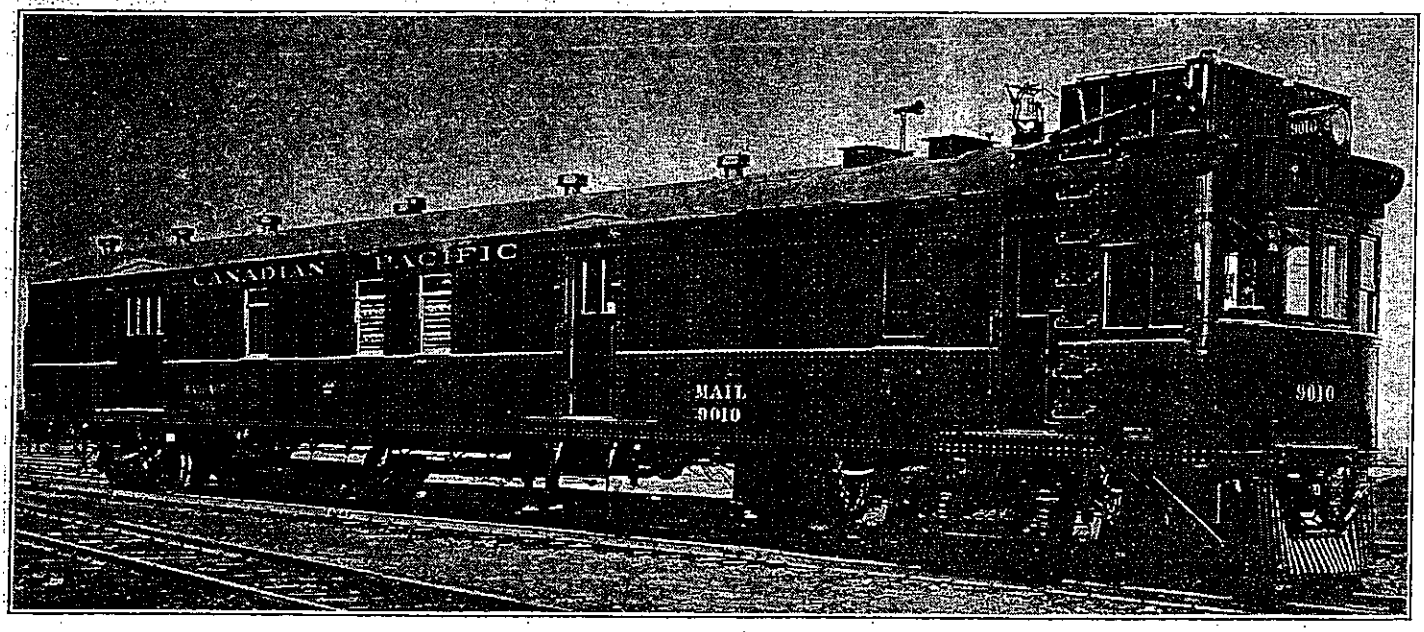
Underframe.—The center sills are 7 in. 18.8 lb. rolled channels continuous in one length from end to end of car. The cover plate, 21 x ¼ in., extends between the draft lugs and is applied on the top flanges of the center sills. The side sills are 5 x 3 x ⅜ in. angles, continuous in one piece from corner post to corner post. The bolsters, of the double diaphragm type, are pressed from ⅜ in. plate, and have 20 x ⅜ in. top cover plate and 20 x ½ in. bottom cover plate. The bolster center brace is of cast steel. A brace pressed from ⅜ in. plate is applied between the diaphragms, directly over each side bearing. Two crossbeams, fitted at each side of the front bolster, furnishing the engine support, are composed of a single diaphragm pressed from ⅜ in. plate, with a 6 x ⅜ in. top cover plate and 6 x ⅜ in. bottom cover plate. The body end castings are of cast steel. At the front end, the casting is integral with the front bumper, and the rear end casting receives the buffing mechanism. There are 26 floor beams, pressed from 3/16 in. plate. An engine support plate, ¼ in. thick, is rivetted to the top of the front bolster and crossbeams. Five crossbeams, in addition to those under the engine, are applied between the bolsters; they are pressed from ¼ in. plate, with 6 x ¼ in. top and bottom cover plates. The body center plates, of cast steel, are 14 in. diam., the locking pin being 1⅞ in. diam.

Side and End Framing.—The side posts, pressed from no. 12 U.S.S.G. steel, are U shape, with a 1¼ in. flange on each side, rivetted to the side sill, side plate and sheathing. The belt rail is of 3 13/16 x ½ in. steel, with a radius on one edge at top and bottom, and is continuous between the doors, and from the doors to the ends of the car. The side plates, made from 3 x 3 x ⅜ in. angle, are continuous the full length of the car. The end posts are 7 in. 17.6 lb. ship channels; the corner posts are pressed from 3/16 in. plate. The section between the end channel posts, at the front end of the car, is removable, to permit installation or removal of the engine. The exterior sheathing is blue annealed, roller levelled, copper bearing steel, no. 12 U.S.S.G.

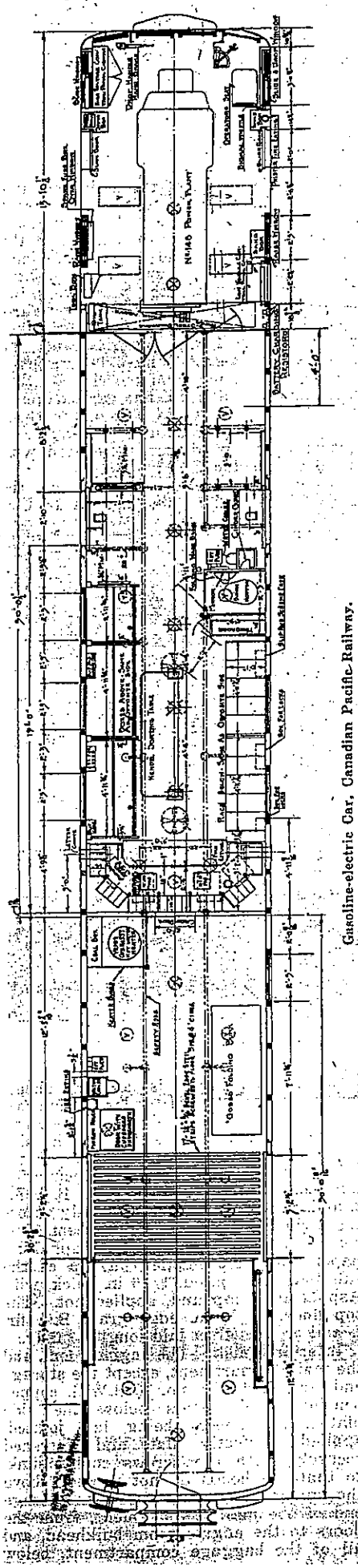
The roof is in three sections. The part over the front of the engine room, flat at the center and curved at the sides, is made up of ¼ in. plate supported by 3 x 3 x ¼ in. angles. That over the rear part of the engine room and the front four feet of the mail compartment is made up of no. 14 U.S.S.G. Toncan Molybdenum; the section over the rear of the engine room is supported on 4 x 3 x ⅜ in. angle carlines; the section over the front four feet of the mail compartment, of turtle back type, is supported on 3 x 3 x ¼ in. angles. The remainder of the room, that over the balance of the mail compartment, and the baggage compartment, is of wood, supported on angle and channel carlines, the wood sheathing being ½ in. basswood with 2½ in. face, t. and g., the angle carlines being of 2½ x 1½ x ¼ in. material and the channel carlines of 3 in. 6 lb. material. Between the angle and the channel carlines and a 2 x ¼ in. flat bar carline, a 1¼ in. wood rafter is placed, the three members being fastened securely together. The wood roof is covered with no. 6 cotton duck.

Floor.—Immediately on top of the underframe, a floor sheet of no. 18 U.S. S.G. galvanized iron is laid, the sheets being rivetted to the underframe cross members and center sills, and to angle brackets which are fastened to the side sills. Oak stringers were then bolted into position and Salamander insulation applied. A sub-floor of ¾ in. B.C. fir, t. and g., was then laid diagonally across the stringers, being nailed to them. One coat of no. 50 J.M. Asbestos Asphaltum paper was then applied on top of the sub-floor and coated, 1/16 in. thick, with Asphaltum compound, applied hot. The top floor, of ¾ in. edge grain B.C. fir, t. and g., was then laid longitudinally.

Interior Finish.—The engine room, and the mail compartment, except the storage end, are lined with no. 16 B.W.G. copper bearing steel sheets below the side plates, the sheets being lap jointed, applied perfectly flat, and fastened securely, with the screws countersunk, so that the heads do not project above the surface of the sheets. The storage end of the mail compartment, from the doors to the engine room bulkhead, and all of the baggage compartment, below

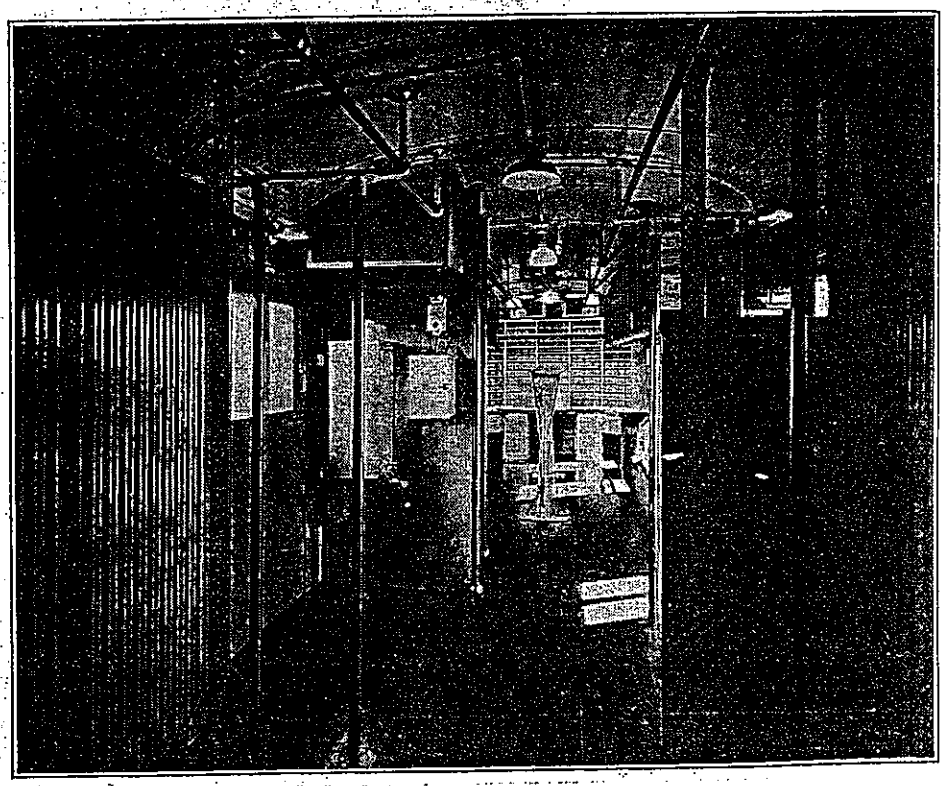


Gasoline-electric Car, Canadian Pacific Railway, operating between Winnipeg and Moose Jaw.



Gasoline-electric Car, Canadian Pacific Railway.

the side plates, are lined with no. 22 U.S.S.G. 2½ x ⅝ in. corrugated steel sheets. The edges of the sheets around the doors and windows are covered with strips to prevent any possibility of damage to baggage or mail. The ceiling sheets in both compartments are no. 16 U.S.S.G. aluminum, fastened at each carline with round head wood screws. The bulkhead between the engine room and mail compartment is of steel, covered with no. 16 galvanized steel sheets on both sides. That partition, and the doors in it, are insulated with ½ in. Insulite. The bulkhead between mail and baggage compartments is built of steel and wood. On the mail compartment side, it is finished with no. 16 B.W.G. flat sheets, and on the baggage compartment side with no. 22 U.S.S.G. 2½ x ⅝ in. corrugated sheets.



Part of mail compartment, gasoline-electric car, Canadian Pacific Railway.

The power plant consists of a 400 h.p. 8-cylinder Winton engine, with cylinders 8 in. bore and 10 in. stroke. Special winding built into the generator makes it adaptable for starting the engine from the batteries. The batteries consist of Hart cells, providing current for a 32-volt lighting system and for engine starting. Provision is also made to start the engine by an air starting system, when the air reservoirs on the car are charged. There are two gasoline tanks, each of 160 gall. capacity.

The cars are equipped with the "dead man" feature, under which, if the pressure on the control levers is released, the brakes apply immediately. The engine cooling and car heating systems are combined; the car heating hot water system uses coal for fuel, but by connection of the hot water heating system with the engine cooling system, the engine provides hot water for heating the car under mild weather conditions, and the coal-fired car heating system provides for heating the engine's cooling water when the car is not in operation, during severe weather. Fin piping is used in the car heating system. Cooling coils for summer operation are located on the car roof, and can be cut in or out as required, according to weather conditions. When a section is cut out, the water is drained automatically from it to a storage tank in the engine room. Water from all radiators, whether cut in or out, is drained to the storage tank once the engine stops running. The radiators are not only cooled by natural air circulation when the car is in motion, but are also fitted with high efficiency cast aluminum disc type fan motors. The car is equipped with a motor-driven air compressor and with a reservoir of sufficient capacity for air brake operation and for supplying air for starting the engine. Control of the car is entirely automatic, the control handles consisting of hand-lever for control of the engine throttle and engine speed, an air-starting valve for starting the engine, and a master controller for forward and reverse operation. The large fuel tanks give the car a range of about 480 miles at an average speed of 30 m.p.h. The maximum speed attainable is from 60 to 65 m.p.h. Light weight of car is about 139,000 lb.

The trucks are of cast steel type. The leading one, with 7 ft. 10 in. wheelbase, carries the two motors. Leading truck journals are 6 x 11 in. The trailing truck, an idler, has 6½ ft. wheelbase and 5 x 9 in. journals. The wheels on both trucks are of rolled steel type, 36 in. diam.

These two cars, which were ordered from International Equipment Co., Montreal, and the bodies of which were built by Ottawa Car Manufacturing Co., make eight gas-electric cars placed in operation by the C.P.R., beginning with 1930. The first two, bought from St. Louis Car Co., were described in our Aug., 1930, issue, pg. 495. One of them was placed

in service on Waltham Subdivision, Ottawa Division, Quebec District, between Ottawa and Waltham, Que., 79.1 miles, and the other on Hamilton-Goderich Subdivision, London Division, Ontario District, between Hamilton and Goderich, 114.7 miles. The second two, ordered from International Equipment Co., Montreal, and received in the early autumn of 1931, were fitted with model 148, 400 h.p. engines, the bodies being built by Ottawa Car Manufacturing Co. They were described and illustrated in our Oct., 1931, issue, pg. 640, and were sent to Western Lines, one being placed in operation between Winnipeg and Arborg, Man., 74.3 miles, and the other between Regina and Weyburn, Sask., 125.4 miles. The next two, ordered from International Equipment Co., the bodies being built by Ottawa Car Manufacturing Co., delivered in Jan., 1932, and placed in operation on Farnham Division, Quebec District, were described and illustrated in our issue of February, pg. 73, and March, pg. 123. The two cars described in the foregoing article complete the eight ordered.

CPR Car No. 9007 was assigned to the Quebec Central Railway in December 1945 and ran south from Sherbrooke along the Massawippi Valley Railway to Newport, Vermont.

It was terminated in 1951. It then went to the Foster to Waterloo, Quebec run until the mid-fifties then to St John, N.B.