STEEL COACH FOR THE UNION PACIFIC.

The most recent introduction of steel into the construction of railway rolling stock by the Union Pacific Railroad has been made in the building of an all-steel, fireproof passenger coach which has been turned out of Omaha shops and placed in service between Omaha and North Platte.

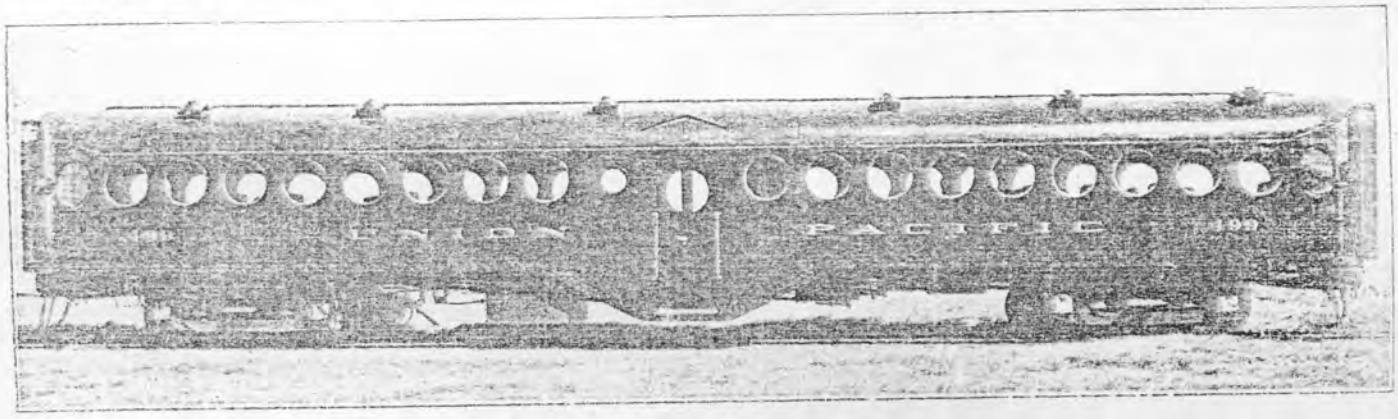
This coach bears very little semblance to the ordinary passenger coach, and has been constructed on entirely new lines. The usual upper deck has been superseded by a semi-circular roof, similar to that of Union Pacific gasoline motor cars. A reduction of 24 inches in the distance from rail to roof is thus secured. The ends of the coach are also round in order to lessen the wind and air resistance.

The rectangular sashes and gothic window sashes are display, and in addition the best fixtures are used throughout.

The drinking water is contained in a large, flat, galvanized tank, set vertically, and placed back of a removable partition at the center of the car. From this tank, which is filled by a hose fastened at a connection at side sill of car, the water flows through a coil of pipe placed in an ice box within the vertical tank, to the water alcove, inside of car at center vestibule.

The vapor system of steam heating has been installed, the apparatus being furnished by the Chicago Car Heating Company.

The system of ventilating used in this car is worthy of note. Cottier suction ventilators of an improved design are placed at intervals on the roof, along each side of center line of car. In the fresh air system air is admitted at the circular



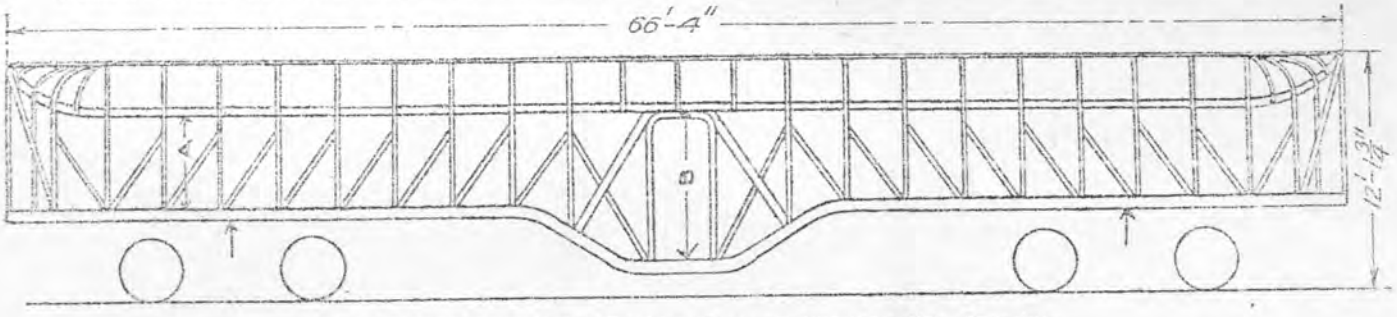
Steel Coach for the Union Pacific—Side View.

placed by round metal sashes, 24 inches in diameter, which form absolute dust and water proof windows.

The most noticeable departure from common practice in wooden car construction is the absence of steps and end vestibules, the steel coach being equipped with two side door entrances. The car also has a door at each end forming a passageway to other cars.

A feature of this car is the thickness of the walls, which ends of the car, about eight feet from the rail, at each side of the end train line doors, through intakes 12 inches in diameter, covered with fine brass netting, thence downward to an air-tight galvanized sheet-iron box placed beneath car and containing two sets of removable dust collecting screens set vertically. These screens thoroughly clean the admitted air.

After passing through these screens the purified air is admitted upward to the inside of the car, along the sides,



Steel Coach for the Union Pacific—Diagram Showing Side Framing.

is only two inches from the outside sheathing to the finished surface of interior wall, a reduction of 3½ inches over the present wooden or any fireproof coach yet constructed. This affords an additional clearance of seven inches in the aisles and adds materially to the comfort of passengers. The use of wood in the construction of this car has been almost eliminated, no wood being used, with the exception of about 200 pounds of wooden filling blocks. All moldings, etc., are made of fireproof material. The lighting equipment consists of an electric generator placed on one of the trucks and belted to a pulley on truck axle. An auxiliary storage battery has been placed in steel boots below the car floor. At each seat is placed an 8-candlepower lamp, with frosted globe, located slightly above a seated passenger's head, and at side of car. Toilets, two in number, are placed at diagonally opposite sides of the steps, at the center of the car, and are provided with a very thorough system of ventilation and fresh air supply through a galvanized sheet duct having perforations at each seat. Along the outside of this fresh air duct are placed the steam heating pipes, which heat the incoming fresh air to the desired temperature. The amount of fresh air admitted to car is regulated by dampers in the intakes at the ends of the car.

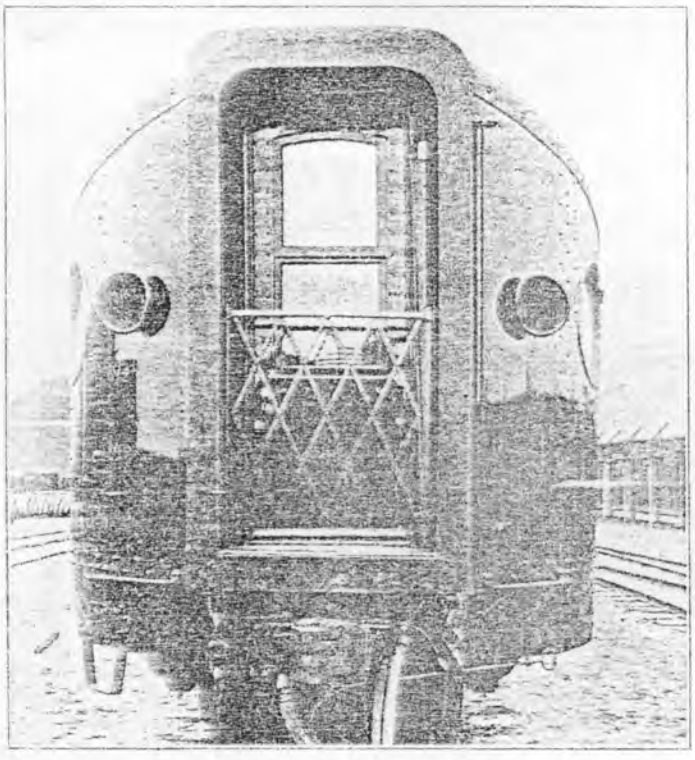
Two 12-inch I-beam center sills, 16 inches between centers, and 6 by 3½ inch angle side sills, all securely fastened by cross ties, needle beams and diagonal bracing, comprise the underframing of this coach. The 12-inch center sills are intended chiefly for the buffing and pulling stresses, and in reality do not carry any load, as they themselves are carried by the sides of the car, which are of girder design.

A single steel casting, 11 feet by 9 feet 9 inches, weighing 3,700 pounds, includes double body bolsters, end sills and the end bracing of the underframe.

Sheet steel ⅛ inch thick is riveted over the underframing

to prevent liability of fire, and on this is a layer of ⅜ inch of hair felt. On this hair felt is a flooring of fireproof composition in pressed sheets 3 feet by 4 feet by ½ inch thick, laid on nailing strips ¾ by 2 inches embedded in the hair felt. Stove bolts, with heads flush with the top of the floor, securely fasten floor construction.

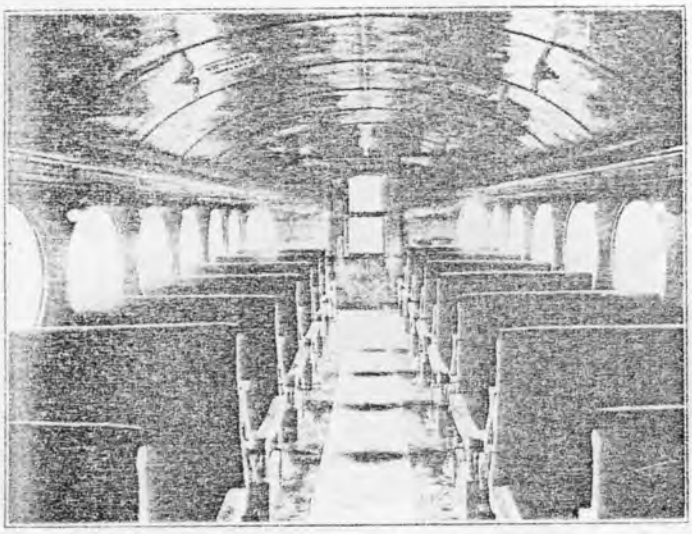
The side posts and carlines are of a continuous piece of



Steel Coach for the Union Pacific—End View.

3-inch channel, bent in the form of a letter U, inverted, extending from side sill to side plate, thence forming the contour of the half oval shaped roof and extending down to the side sills.

To these channel posts, which are formed with the flat



Steel Coach for the Union Pacific—Interior View.

side outward, is riveted the ⅛-inch steel side sheathing, which, in turn with the posts, is riveted to the angle-iron side sills. The steel sheathing extends from the botton of the side sills to the top of the 4-inch channel side plate, forming a deep, substantial girder, which is additionally stiffened by diagonal braces placed below the windows and riveted to the sheathing. Holes 25 inches in diameter are cut out of sheathing to accommodate the circular aluminum window frames.

The coach was designed and constructed at the Union Pacific Railroad shops at Omaha, Neb., and under the supervision of the superintendent of motive power and machinery, W. R. McKeen, Jr.

The principal dimensions and weight of the coach are as follows:

Actual weight	89,300 pounds
Length over diaphragms	68 feet
Height, rail to roof	12 feet 1¾ inches
Height, floor to ceiling	7 feet 8¼ inches
Width inside at wainscot	9 feet 5⅝ inches
Width of aisle between seats	3 feet 5⅝ inches
Width of car over side sills	9 feet 5⅝ inches
Roof sheets, galvanized iron	⅛ inch thick
Seating capacity of coach	78
Weight per passenger	1,145 pounds

WESTERN RAILWAY CLUB.

The regular monthly meeting of the Western Railway Club was held at the Auditorium hotel, Chicago, Tuesday evening, November 19. The secretary announced that the membership is now 1,426, so that the club ranks second in point of numbers with the other railway clubs in this country. J. G. Crawford, fuel engineer of the Burlington, read a paper on "The Influence of Heat Value and Distribution on Railway Fuel Cost." The importance of fuel economy was shown by the fact that the coal bill on railroads is about 12 per cent of the total operating expense. The paper does not discuss the economical use of coal on the locomotive, but deals more particularly with the economical purchase and supply of coal before it reaches the locomotive. In order that coal may be economically purchased and distributed, the heat value and cost must be considered.

The author prefers to obtain the heat value by actual tests on locomotives, rather than by the laboratory calorimeter, and he prefers also to make coal tests on passenger trains, rather than on freight trains, in order to have the work done rapidly. The paper contains instructions with regard to the method of making coal tests on the road.

Coals should be tested on the division where they are used and where the firemen are accustomed to them. If possible all tests on any railroad system should be made with one class of engines, so that the tests made at one end of the system may be compared with those at the other end without having to correct for the difference in evaporative efficiency of the engines. During the series of tests the same fireman should be used throughout, but it is not so important that the same engineer be employed.

The organization of the force includes a fuel tester at each terminal, who takes charge of the supply and weighing of the coal, and an engine observer, who stays with the engine until relieved by the coal weigher at the other terminal and who takes a record of the coal, water, steam pressure, stops, etc. From four to eight men are required to make the tests properly, according to whether one or two engines are used and whether they are single or double crewed. Exclusive of that used for firing up, about 150 tons of each kind of coal should be used on the test and six to eight round trips should be made with each coal. The tests are made in round trips, as those in one direction may be unduly favorable on account of grades, speed, number of cars, etc.

Having described the method of obtaining the heat value of the coal in this way, the paper deals next with the method of distribution, and this is based on various combinations of the heat value, the price and the source of supply, the latter having reference to the length of haul and based on the cost of two mills per ton-mile. A number of examples are given in which the various combinations of heat value, price and source of supply are worked out to illustrate the method, and the paper includes a number of tables showing the ordinary method of distributing coal and the cost per day, and other