

The McKeen Motor Car

Stanley T. Borden

The McKeen motor car was the first self contained unit to successfully use a gasoline engine for propulsion to be built in sufficient numbers to introduce a new era in railroad transportation. It was designed and developed by William R. McKeen, Jr., superintendent of motive power and machinery for the Union Pacific Railroad, who built his first car in 1905 at their erecting shops in Omaha. The car was to supplant steam passenger trains on lightly traveled branch lines and local runs. Mr. E. H. Harriman, who controlled the Union Pacific and Southern Pacific at this time, was his most enthusiastic backer and it is not known whether McKeen sold his idea to Harriman, or whether Harriman assigned the motor car problem to McKeen.

This first McKeen car became UP Motor Car 1, it was 31 feet long and had four 42 inch wheels, with only the front pair powered. It had a wooden body with a pointed front, square windows and doors at the rear. It was powered by a 100 hp. marine type gasoline engine built by the Standard Motor Works of Jersey City, N. J., and was the most powerful one at that time. It had six cylinders which were eight-by-ten inches, and was mounted across the car. The M1 was placed in service on the branch between Kearney and Gallaway, Nebr., where for years it alternated with the M2. With the hazards of the wooden body, the hot engine and the acetylene gas lighting, the M1 burned while on the employees' run between Omaha and Council Bluffs. It was rebuilt with a box type body and continued in employees' service.

The M2 was a double truck, eight wheel car with a 55 foot steel body with a pointed front, square windows and doors at the rear. The front axle on the front truck had 42 inch wheels which were powered by the gasoline engine which was mounted crosswise on the truck, the back axle and the rear truck had 33 inch wheels, this arrangement was adopted for all subsequent McKeen cars. The M2 saw service on the Callaway branch until it caught fire and was scrapped. The M3 ran on the Southern Pacific Lines in Texas and then was returned to Omaha and not used again. The M4 ran on the Chicago & Alton and was lettered for that road, but it was returned to the UP and ran on the Callaway and Loup City branches. It was damaged in an acetylene gas light explosion, it was rebuilt and then ran until worn out. The M5 was used for a while west of Salt Lake City on the old San Pedro, Los Angeles & Salt Lake, then used on the Callaway and Loup City branches. The M6 was also used on these branches.

The M7 was the first car to have the distinctive design which became standard on most succeeding cars, the round port hole windows, center doors, round back and pointed front. It made an extensive tour through the east before being placed in road service. The M8 was the first car to have a McKeen built engine and it was rated at 200 hp. The M9, although begun before the M8, was delayed by the late arrival of a 150 hp. Sament engine, it had square windows. The M10 was the first car to use an electric generator and to have the motorman's door on the left side. The M21 was the first car to be 70 feet long and the M23 had the first 300 hp. engine.

By 1907 the UP was operating McKeen cars in Nebraska on the Kearney-Callaway branch; the Beatrice-Lincoln branch; the Loup City-St. Paul branch; and in Kansas on the Lawrence-Leavenworth line. Mr. McKeen, who always supervised the testing and breaking in of the cars, had twenty-two cars under construction.

The growing demand for McKeen cars led in July 1908 to the formation of the McKeen Motor Car Company with Mr. McKeen as its head. The company was a subsidiary of the UP which owned over half of the stock, the remainder being divided among Mr. McKeen and his associates. The new company was capitalized for a million dollars and took over the old UP shops at Omaha. The employes were always paid by UP checks. The cars were made available to all railroads, the Southern Pacific purchased nine motor cars and six mail-baggage trailers that year and by 1911 had 39 motor cars, 10 mail-baggage trailers and two passenger trailers in service.

In the McKeen car the gasoline engine was mounted crosswise as an integral part of the motor truck and swung with the truck on curves. The front axle had 42 inch wheels, which had spokes and steel tires, and the rear axle had 33 inch wheels. The front axle was powered via a Morse silent chain drive through a two speed transmission and connected to the engine by an air operated clutch. To reverse the car, the engine had to be stopped and the cam shaft shifted, then the engine started in reverse, although a skilled motorman could accomplish this by throwing in the clutch, he would also use considerable ingenuity to avoid reversing. The engine was started by compressed air, the cam shaft was shifted to convert three of the six cylinders into a two-cycle air engine. The air pump was driven by the crank shaft and the water pump by a chain, both located on the right side. Later cars were equipped with an auxiliary air pump designed by Mr. McKeen, it was a one-cylinder gasoline engine in which the one piston also served to compress the air on the down stroke. The engine's fly wheel protruded beyond the left truck frame. The cooling coils were located under the floor behind the front truck and the exhaust pipe extended from the engine under the floor to the rear of the car.

The cars were available in 55 and 70 foot lengths, with various combinations of passenger, smoker, mail and baggage compartments, with seating capacities up to 105. A 50 foot passenger trailer and a 31 foot mail-baggage trailer were also manufactured, the latter originally had four wheels but due to rough riding was soon changed to double truck. The earlier cars had a wedge front which was later changed to a parabolic front. The 24 inch round port hole windows were hinged at the top and when raised, automatically locked to the car ceiling. The windows had an annoying habit of coming unfastened when open and swinging down with a dull thud on the head of a passenger. In later cars it was optional to have square windows with rounded transoms. A unique feature in those days of wooden cars, was the McKeen's strong all steel body. An advantage obtained by the use of round windows was the enormous gain in the strength of car framing which permitted the utilization of the car side as a combination plate and truss girder.

The first cars were lighted by acetylene gas and some of the later cars were lighted by gasoline, with a carburetor using forty pounds of air pressure, which was located in a box under the rear of the car. Most of the later cars were equiped with electric lighting from batteries which were charged by a generator on the engine. The car was heated by the hot water from the engine cooling system, which was successful in moderate climates but was useless after the car had laid over all night in sub-freezing weather, so a stove was also installed. Later UP cars were equiped with small boilers in the baggage compartments.

The 55 foot cars weighed about 62,000 pounds and the 70 foot cars about 73,000 pounds, with a 200 hp. engine the tractive effort was about 5,000 pounds and since the drive was only on two wheels, the cars were not over powerful, on level runs they could pull one or two trailers. Though there are reports of speeds up to 75 mph., the top speed was usually around fifty. The cost of operating the cars was reported as to 14 to 18 cents per car mile and the cars averaged about three miles to a gallon of gasoline.

One car was a twin-engine McKeen, equiped with two 300 hp. engines and could pull twenty box cars. The story is told that someone in 1941 started the two engines in opposite directions and let in the clutches, thus bringing its usefulness to an end. Late in 1916 a McKeen "Mallet" car was built for the Southern Utah Railway, which had heavy grades, it had a six wheel front truck with a four wheel drive, the 42 inch drivers were outside connected with side rods. Several freight motors were built and also one locomotive was known to be built, there may have been others, it was a 0-4-2 from which the "Mallet" was copied, it ran on the Motley County Railroad in Texas.

After 1914 the demand for McKeen cars fell off, probably because of their unreliability or at the least cantankerous behavior due to lack of tractive power, the mechanical imperfections of the early gasoline engine and especially the clutch which had to handle the 200 or 300 hp. of the engines. The last McKeen car was built late in 1916. During the first World War the shops turned out war material and afterwards the UP took over the shops for other purposes.

The railroads made various changes in the cars to suit their operating conditions, changing headlights, adding bells, running the exhaust pipes through the roof and many were converted to gas-electric drive with the long pointed front removed. The Chicago Great Western converted one unit into a gas-electric and two units into trailers to make the name train "The Blue Bird" which had coach, lounge, buffet and sleeper sections. The Union Pacific converted their M23 into a gas-electric and with a trailer, was painted in streamliner colors and named the "Capitol Cities Streamliner", it operated between Lincoln, Nebr. and Manhattan, Kans. Some of the McKeen cars ran for many years, the SP scrapped the last of their cars in 1936, the Rock Island in 1939 and on the UP and CGW, cars were operated into the late 1940s.