

**Pneumatic Tires — A Great Idea:** Before World War I, a trip in an automobile was always an adventure, and those who engaged in one expected the worst while thoroughly enjoying the experience. Most trips were not overnight but rather a Sunday experience from May through October. The trip may have been to visit friends or relatives in the country or tour 25 miles or less to a pleasant spot to enjoy an outdoor picnic. As was usually the case in the early 20<sup>th</sup> century, the man of the house was in complete charge, but his wife had to pack the lunch, dress the children, and have a plan for keeping the family intact when roadside emergencies occurred. She was often located on the windy back seat of an open touring car, giving way to one of the older children who rode in front with his father, the driver.

The success of the excursion had a lot to do with the owner/operator's ingenuity and mechanical skills. While ordinary tools and a very few spare parts might be carried for expected engine problems, tire tools, a good mechanical jack, and at least one good inner tube, if not a spare tire, were essential. The chances were about 50/50 that you could make the round trip without tire problems. Despite all this travail, the experience of early motoring was more fun than can be imagined today and ranked near the top for those of all ages who were lucky enough to experience it.

Why so much tire trouble? It was remarkable that pneumatic tires worked at all, but from the very first road vehicles built in the late 1890s, they were considered superior to solid tires. The first pneumatic tires were simply a large rubber hose, sealed at the ends to hold air pressure and bolted to the rim of the wheel, contoured to hold the tire in place. Running over a nail, a projecting stone in the unpaved road, or another sharp object, would puncture the tire, and the air would escape. Soon tires became more complex with cords or plies formed to hold the pressure, with a layer of rubber laminated to the cords, and extra rubber added to the outside circumference to form the tread that touched the road surface. Since these tires were much heavier and stiffer than the old single-tube type, light rubber inner tubes with a valve stem protruding through a hole in the rim of the wheel were required to hold air pressure. These inner tubes alone would blow out with probably 10 pounds pressure, but confined within the casing of a much heavier tire, they would hold 70 or 80 pounds pressure, which was often recommended. A tiny check valve called a Shrader valve screwed tightly into the valve stem. After more than 100 years, this system for adding air is still used.

Between 1900 and 1910, the system above was used with what was called a clincher rim. The tire itself, while stiff, was made with a bead on each side that could be stretched over a steel rim contoured to accept these beads. To hold the beads of the tire firmly in place on the rim, high tire pressure was required, usually 40 pounds or much more, depending on various things. These rims did not detach from the wheels, and a wheel was almost never removed from the car to change a tire.

Soon after 1910, "straight-side" tires and rims began to replace clinchers. Instead of flexible beads, this portion of the tire had a very stiff cord molded in that could not be stretched.

Instead, the rim was made in two or more pieces, with removable lock rings that permitted the tire to come off the side. There were many types of "quick-detachable" straight-side rims, depending on the manufacturer. An inner tube, and often a protective flap, was used as with the clincher type. Some of these rims would accommodate an old-fashioned clincher tire or a straight-side tire by simply turning the lock rings in or out.

By 1914, demountable rims were the latest and best innovation. With this system, the car carried an inflated spare tire and rim, and the whole rim was changed on the wheel when a blow-out or puncture required it. Again, there were a multitude of rim designs, slightly improved upon until the mid-1930s. By the mid '20s, however, the whole wheel and rim became the "spare." In mounting, these rims were dangerous. If the lock rings were not firmly in place, the tire could blow off the rim when air pressure was applied, seriously injuring those nearby. After the mid-1930s, only trucks stayed with this type of rim.

A great improvement occurred with the invention of the “drop-center” rim, which came into common use on most American pleasure cars in the mid ‘30s. The rim and disc wheel were made in one piece with a design that allowed the heavy inside bead of the tire to “drop” into the center of the wheel/rim to allow clearance to get the outside bead in place. Tires were improving rapidly as well, and many claimed treads touching the road that were good in slippery conditions. “Balloon” tires gradually took over, which were nothing more than larger tires on smaller-diameter rims, with much lower tire pressure (sometimes only 24 pounds).

Finally, tubeless tires came into being in the early 1950s. Nothing was really new except the bead of the tire itself had to make the seal with the rim, eliminating the need for an inner tube. Manufacturing improvements made the wheel/rim and the tire bead smooth enough to make the system practical — what a *great improvement*.

In 1910, however, the head of the family still used his portable jack frequently as he wrestled with changing early tires and tubes along the side of the road. Modern drivers would not put up with these inconveniences, but neither do they have so much fun.