Automobile Tires

One would suppose that, after the experiments and tests made in the manufacture of bicycle tires, there would be little room for invention in automobile tires. This is not, however, the case. The latter tire, on account of the weight which it sustains and the strains to which it is subjected in rapid traveling, must be more heavy and more securely fastened to the rim. At the same time it must be capable of a certain degree of emergency repair in case of puncture. These requirements have been met in a number of inventions, and it is interesting to note that, while in the automobile, as in the bicycle, solid tires have been practically discarded in favor of single and double tube tires, yet there is this difference, that the single tube tire has taken precedence in bicycles, whereas the present tendency is to favor double tube tires for automobiles.

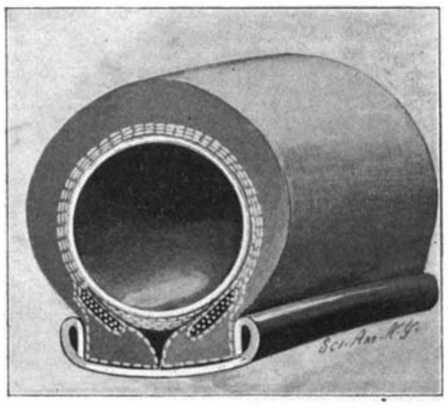

Fig. 1.—Double-Tube Tire with Woven Wire Clinch.

In our first illustration we have a double tube tire of the clincher type. The inner tube is protected by an outer tube or casing having a U-shaped cross-section and made of interlaid rubber and fabric. The retaining device consists of two strips of woven wire embedded and vulcanized within the casing. These wire strips are so woven as to expand laterally when the tire is inflated, causing a powerful contraction in the circumference of the tire. This contraction, it is claimed, is sufficient even when the tire rim is partly deflated, to hold it tightly against the rim without the use of lugs or cement. In case of puncture it is an easy matter, the tire of course being entirely deflated, to pry out one side of the casing in the region of the puncture, thus giving free access to the inner tube. After the repairs are made and the casing snapped back into place, it is only necessary to inflate the tire, and it will be ready for use.

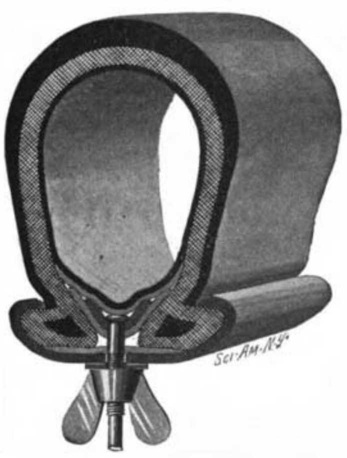

Fig. 2.—Double-Tube Clincher Tire with Locking Bolts.

Some manufacturers claim that a tire needs to be fastened to the rim just as securely when deflated as when inflated. The point is a good one, for in case of a bad puncture when running at high speed, it might be impossible to stop the machine before the tire was entirely deflated; in which case, unless it was securely held, it would probably slip off, exposing the rim to injury.

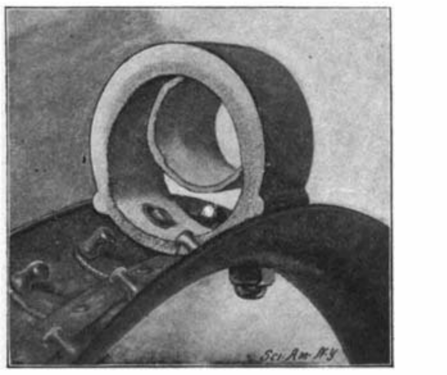

Fig. 3.—Double-Tube Tire; Outer Tire Buttons to Rim.

Fig. 2 shows a tire designed to prevent such results. It is similar to Fig. 1 in cross-section, having along each edge of the outer casing a strip of hard rubber, embedded in the structure, and forming a stiff and substantial rib. At frequent intervals along the rim are the fastening devices, which consist of a metal plate, with a bolt passing through it and projecting through the rim. On this bolt is a thumbnut, which is adapted to bear against the under surface of the rim and draw down the plate against the inner edges of the casing. This acts as a wedge to distend these edges and force them under the overlapping lips of the rim. The plate and bolt head are incased in a layer of canvas and one of soft leather, in order to prevent injury to the inner tube. In case of puncture, it is only necessary to unscrew the thumbnut nearest the injured part, until it drops over the reduced portion of the bolt, when the casing can be easily pried out and the inner tube repaired.

Fig. 3 shows a tire which buttons onto the rim. In this case the rim is provided with a metal band, secured thereto at several points. On the band are two opposed series of hooks, whose claws project inwardly toward the center line of the rim. These hooks are adapted to enter and engage their respective eyelets, which are disposed along each edge of the casing. This arrangement insures a secure hold along the entire circumference of the tire, and it can be unhooked only when deflated.

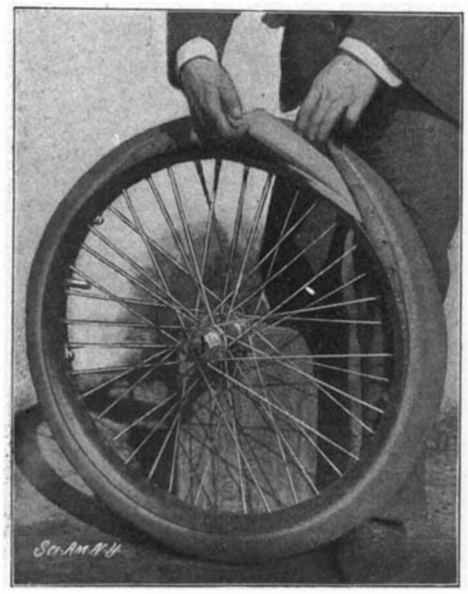

Fig. 4.—Removing Inner Tire.

Fig. 4 shows this tire unbuttoned and the inner tube exposed and ready for repairs.

In Fig. 5 we have another double-tube tire, which is secured by merely inflating it. Like the other tires mentioned the casing is constructed of rubber and fabric in layers; but it contains endless rings of wire on each side along its edges. The purpose of the rings, as in the first case described, is to insure a stiff binding to the edges; but with this difference, that the wire will not stretch, and consequently one is immediately confronted with the problem of how the tire is slipped on or off the rim, since the circumference of the wire rings is smaller than that of the edges of the rim. This problem has been cleverly solved by molding the rim with a depression or channel midway between its two edges. Now by squeezing together the wired edges of the deflated tire and pressing them down into this channel along one-half of the rim, sufficient slack is produced along the opposite arc to allow it to be slipped over the rounded edge of the rim. The inner tube when inflated tends to spread the wired edges out of the center channel, up the inclined surface of the rim, and into their proper positions against its side walls.

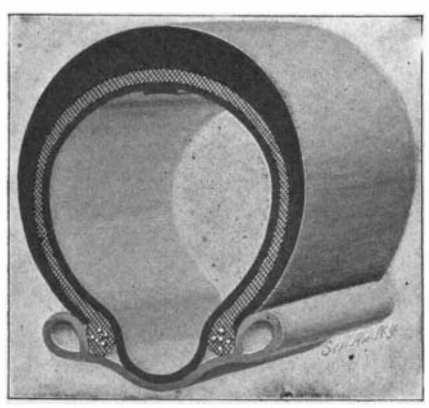

Fig. 5.—Double-Tube Tire with Endless Wire Clinch.

In Fig. 6 we have a single tube pneumatic tire which is so thick as to serve as a solid tire in case of puncture. It is made up of layers of tough rubber and closely woven canvas, and it seeks to avoid puncture by the thickness of its walls, as well as the quality of structure. This permits but a slight flattening in case of puncture and it can consequently be used for a considerable distance in this condition, without danger of injury from rim cutting. The tire is secured to the rim by a number of lugs, preferably one to each spoke in the wheel, to prevent any possibility of the tire's creeping. These are embedded in the structure, and consist of a flat head and a hollow shank, projecting through the rim of the wheel. A stud is threaded into each shank, and the tire is then locked securely to the rim by the nuts, on these studs, which are screwed against the under surface of the rim.

We have shown in Fig. 7 another attempt to produce a non-puncturable tire. This also is a single tube tire.

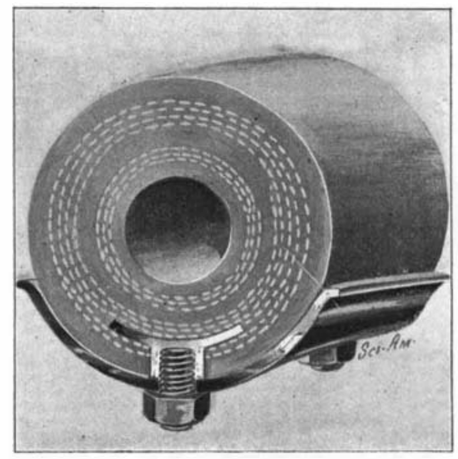

Fig. 6.—Single-Tube Tire, Showing Method of Attachment.

It contains a strip of chemically treated fiber which protects the innermost layer of rubber. This fiber acts, on the principle of bullet-proof cloth, to oppose the entrance of any penetrating object. It is also water proof, and thus prevents moisture from reaching and deteriorating the delicate innermost layer of rubber, which retains the air.

In Fig. 8 we see a very successful attempt to produce a tire which while not pneumatic, yet is very resilient. This is effected by a honeycombed elastic core, made somewhat on the principle of a truss bridge. The core is molded in halves, which are vulcanized together and then surrounded by layers of rubber and fabric, the whole tire being thus vulcanized together. Our illustration shows a tire which has had four thousand miles of wear.

Fig. 7.—Non Puncturable Tire with Layer of Fiber.

A unique and entirely practicable safety stop for electric vehicles is that of Arthur L. Stevens, of New York. It is designed to prevent the running away of the vehicle should the operator by accident be thrown from his seat or should the ordinary current controller of the vehicle become accidentally deranged. The operator's seat is hinged at the front, the rear part being movable upward by a spring placed between the frame and a lug or projection on the seat. The weight of the operator on the seat presses a vertical pin which completes a circuit, the reverse process breaking the connection. The vehicle is thus incapable of operation unless the operator is firmly installed in his place.

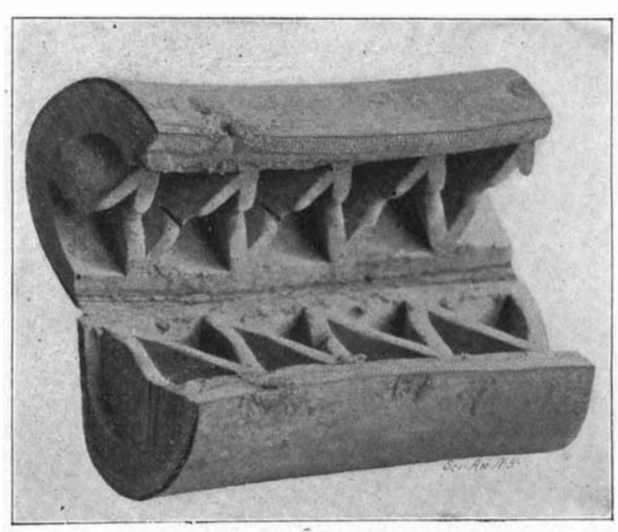

Fig. 8.—Tire with Rubber Truss Reinforcement.

Figures compiled in Paris show that 82 per cent of the road accidents of France are due to horse-drawn vehicles, 8 per cent to railroads, 5 per cent to bicycles and 5 per cent to automobiles.