

(No Model.)

J. G. MOOMY.
PNEUMATIC TIRE.

No. 518,849.

Patented Apr. 24, 1894.

Fig. 1

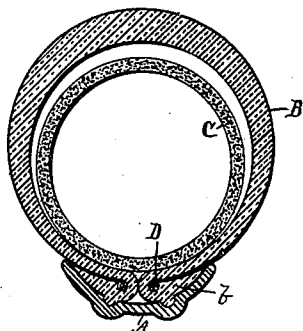


Fig. 2

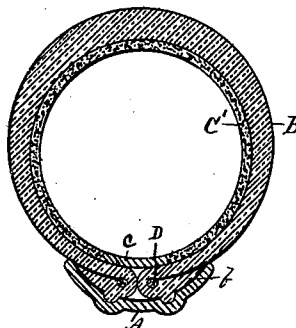


Fig. 3

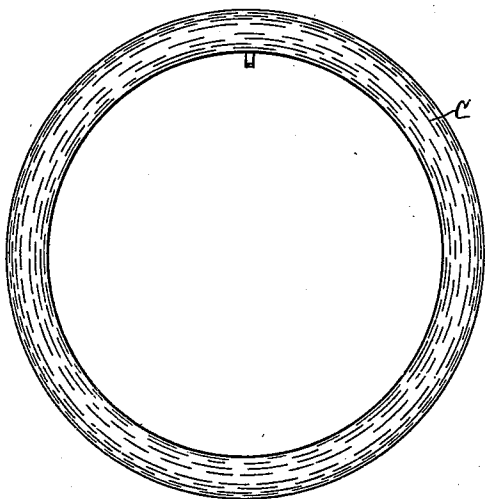
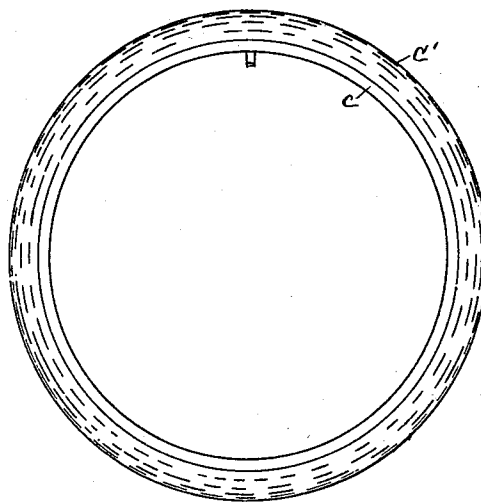


Fig. 4



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PNEUMATIC TIRE.

SPECIFICATION forming part of Letters Patent No. 518,849, dated April 24, 1894.

Application filed November 20, 1893. Serial No. 491,464. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH G. MOOMY, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Pneumatic Tires; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to pneumatic tires, and consists in certain improvements in the construction thereof, as will be hereinafter fully described and pointed out in the claims.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a transverse section of the tire in place on the rim, and a deflated inner tube therein. Fig. 2 shows a like view, the inner tube being inflated and of a modified construction. Fig. 3 is a side elevation of the inner tube. Fig. 4 is a like view, showing a tube of the construction shown in Fig. 2.

A marks the rim of the wheel; B, the casing; b, the binder flaps thereon; D, the binder; and C, the inner tube as shown in Figs. 1 and 3. The inner tube is made of such length that in its normal condition, its outer periphery will just fit snugly against the inner side of the outer periphery of the tire casing. It is so constructed as to be inelastic longitudinally, but has its full expansibility transversely. Where the tube as commonly constructed is elastic both longitudinally and transversely, its longitudinal circumference increases with inflation, and whatever force there is to this tendency is sustained by the binder or the outer periphery of the casing; and when the tube is made inexpandible both longitudinally and transversely, as is the case where canvas is used in its construction, it is very difficult to make it of the proper size to snugly and smoothly fit in the casing. By making the tube inelastic longitudinally, the tendency of the tube to increase in longitudinal circumference as it is inflated is obviated, and the force sustained by the tube itself, so that the binder is relieved of this strain; and as the outer circumference of the tube cannot increase with inflation, the expansion of the tube with inflation must be inwardly, and the flaps and inner periphery of the casing

are pinched between the rim of the wheel and the inflation force of the inner tube, so that the inflation of the tube, instead of straining the binder, reinforces it to some extent; and as the tube can fully expand transversely it fills the casing completely and smoothly. A further advantage of this construction is that it is less liable to creep in the casing, for, as it is inelastic longitudinally, to move at any one point, it must move throughout its circumference, and as the tube is expanded by its inflation transversely against the casing, the frictional contact is so strong as to make its movement next to impossible. With the ordinary tube, it being expansible longitudinally, when there is a tendency at any point, caused by the tread or otherwise, to creep, the longitudinal elasticity of the tube at that point allows it to move in the direction of the tendency, and the tube as it becomes normal, will have moved its position slightly in the direction of the movement of the initial point.

To make a tube having the qualities hereinbefore described, I mix a fiber (preferably raw cotton, carded or uncarded) with the rubber. This mixture is then calendered, care being taken to always run it in the same direction. This process makes the finished material substantially inelastic lengthwise, that is, in the direction it has been passed through the calenders. The explanation of this effect, is that the process of calendering undoubtedly brings the bulk of the fiber to one general direction. This leaves the material in the transverse direction substantially free from the influence of the fiber, so that the rubber in this direction has nearly its natural elasticity.

In making the tube, the material is so placed that the inelastic direction is lengthwise of the tube.

In the drawings, (Figs. 1 and 2) the dots in the cross sections of the tubes marked c' indicate the fibers in cross section, and the dash lines in Figs. 3 and 4 indicate the general direction of the bulk of the fiber. This makes a tube which is substantially inexpandible longitudinally and expansible transversely. By adding a raw fiber to the material from which the tube is made, the tube is made much less penetrable than is the case with rubber alone or rubber with a woven fabric.

Of the fibers known to me, I prefer ordinary cotton fiber, on account of its well known impenetrable quality when in its unwoven state. This quality seems to be enhanced in connection with the rubber.

In Figs. 2 and 4, an alternative construction is shown. In this construction an unfibered strip, *c*, is placed in the inner periphery of the tube. This gives the necessary transverse elasticity to the tube, while its longitudinal elasticity is inoperative, being on the inner periphery, and the circumferential strain being on the outer periphery of the tube. The fibered portion is preferably calendered as heretofore described, as it insures against longitudinal elasticity. This construction will still be operative, as to the central idea of my invention, if there is sufficient fiber running longitudinally to prevent longitudinal elasticity.

What I claim as new is—

1. In a pneumatic tire, the combination with the casing thereof; of an air tube constructed substantially as shown and described and that is substantially inexpandible longitudinally throughout its transverse circumference, and is expandible transversely.

2. In a pneumatic tire, the combination with the outer casing thereof; of an air tube constructed substantially as shown and described and that is substantially inexpandible longitudinally, and is expandible transversely throughout its transverse circumference.

3. In a pneumatic tire, the combination with the outer casing thereof; of an air tube

constructed substantially as shown and described and that is substantially inexpandible longitudinally throughout its transverse circumference and is expandible transversely throughout its transverse circumference.

4. In a pneumatic tire, the combination with the casing thereof; of an air tube formed of material composed in part of an elastic substance, such as rubber, and in part of an unwoven fiber, the general direction of which is longitudinal of the tube, said tube expanding against, and being limited by, said casing.

5. In a pneumatic tire, the combination with the casing thereof; of an air tube formed of material composed in part of an elastic substance, such as rubber, and in part of a raw fiber, the general direction of which is longitudinal of the tube, said tube expanding against, and being limited by, said casing.

6. In a pneumatic tire, the combination with the casing thereof; of an air tube formed of material composed in part of an elastic substance, such as rubber, and in part of a raw cotton fiber, the general direction of which is longitudinal of the tube, said tube expanding against, and being limited by, said casing.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH G. MOOMY.

Witnesses:

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