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PATENT SPECIFICATION 1,016,536

DRAWINGS ATTACHED.

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Int. Cl.:—B 62 g.

COMPLETE SPECIFICATION.

Pneumatic Tire.

We, THE GOODYEAR TIRE & RUBBER COMPANY, a Corporation organized under the Laws of the State of Ohio, United States of America, of 1144 East Market Street, Akron, Ohio, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to an improved pneumatic tire.

Conventional tires made with plies of cross-biased parallel cord fabric in the carcass have a number of desirable characteristics but are well known to have relatively poor tread wear, rolling resistance, and traction as compared, for example, to belted tires which include a circumferentially inextensible band between the carcass and the tread. Such belt tires substantially increase tread wear over conventional tires as well as decreased rolling resistance and increased traction. However, belted tires, on the other hand, have a number of undesirable characteristics, including poor sidewall durability, harsher riding, higher static steering torque, and substantially increased cost of production.

An object of this invention is to provide a pneumatic tire having a lower ratio of sectional height to sectional width than conventional or belted tires characterized by substantially better tread wear than conventional tires and substantially greater sidewall durability than belted tires.

Another object of this invention is to provide a low profile tire that has greater tread wear, lower rolling resistance, and a greater bead diameter than conventional tires of equal outside diameter and equivalent load-carrying capacity.

Other objects and advantages of this invention will become apparent from the following description when read with reference to the accompanying drawings wherein;

Fig. 1 is a perspective cross-sectional view with parts broken away of the tire of this invention mounted upon a rim and shown in its inflated position;

Fig. 2 is a radial cross-sectional view containing the tire axis with parts broken away of the pneumatic tire of this invention shown in a mold.

Referring to Fig. 1, the pneumatic tire 10 shown herein comprises a reinforced carcass 11 made of a plurality of plies 12 of rubberized parallel cord tire fabric which are wrapped around inextensible bead wires 13 located at the bead regions of the tire. Each of the carcass plies 12 is made up of rubberized cord fabric composed of a plurality of parallel tire cords 14 disposed side by side to form the tire fabric, and coated on each side with a thin layer of rubber carcass stock. The carcass plies 12 are so arranged that the cords 14 extend from one bead of the tire to the other with the cords of the respective plies crossed and extending at equal and opposite angles to the tire mid-circumferential plane. The carcass 11 is formed by the "flat band" method from plies of tire cord fabric in which the cord extends initially at an angle to the edges of the plies, preferably larger than 57°. A plurality of breaker plies 15 of metal or textile parallel cord fabric, bias cut and with the cords of adjacent plies crossed, are positioned in the crown of the tire beneath the tread 16. After shaping of the carcass 11, and the application of the tread 16, the tire 10 is cured in a mold 17 so that the tire is molded at a substantially lower sectional height than its inflated sectional height.

As further shown in Fig. 2, the tire 10 is cured so that the maximum distance from

the radially outer side 18 of the crown of the carcass 11 to the base 19 of the bead, hereinafter called the sectional height and referred to by SH, is substantially smaller than the maximum sectional width or diameter, referred to as SD, measured between the axially outer surface surfaces 21 and 22 of the sidewalls of carcass 11. In accordance with this invention, the ratio of the sectional height (SH) to the maximum sectional diameter (SD) of the inflated tire is between 0.6 and 0.85. The cord angle of each of the plies 12 relative to the mid-circumferential plane 20 of the tire is between 32° and 45°, and the cord angle of the breaker plies 15 relative to the mid-circumferential plane 20 of the tire is between 20° and 27°.

The cords of the plies 12 and 15 are made of a synthetic textile material, such as rayon, nylon, or Dacron (Registered Trade Mark) but the cord of the plies 15 may alternatively be made of metallic wire or glass fiber.

When the tire of this invention is mounted on a rim and inflated, its sectional height substantially increases and its sectional diameter decreases. This characteristic of the tire of this invention is the exact converse of high molded conventional ply tires which do not increase in sectional height upon inflation and substantially increase in sectional diameter upon inflation of the tire.

As shown in Fig. 1 of the drawings, the tire of this invention having a ratio of SH to SD of greater than 0.6 but less than 0.85 when inflated, has a ratio of sectional height to maximum sectional width when molded of less than 0.7. Preferably, the molded tire has a ratio of SH to SD up to 25 per cent less when molded than when the tire is inflated. The sectional height of the tire of this invention preferably is 3 to 15 per cent greater when inflated than the sectional height of the tire when molded so that the radius from the axis of rotation of the inflated tire to the crown of the carcass is 1 to 6 per cent greater than the said radius when in the mold.

Since the inflated tire of this invention having a very low profile is molded in a mold such that the outside diameter of the tire and the sectional height of the carcass is substantially less than the SD and SH of the inflated tire, the stresses between the cords in the crown during operation of the tire are relieved as the tire passes through the road contact area because the cords in the crown of the tire are moved closer to the molded shape thereof which reduces some of the stresses caused by inflation of the tire. This is in direct contrast with conventional ply tires wherein the tire as cured in a mold has an SD equal to or greater than the SD of the inflated tire. Thus, in a conventional tire the stresses are increased upon inflation and further increased as the tire passes through the road contact area.

WHAT WE CLAIM IS:—

1. An pneumatic tire comprising in combination a carcass having spaced beads and a plurality of parallel cord plies extending from bead to bead, said carcass having a low profile in radial cross-section containing the tire axis in which the ratio of sectional height to maximum sectional width as hereindefined of said carcass when inflated is between 0.6 and 0.85, the cord angle of said plies being between 32° and 45° to the mid-circumferential plane of said tire, a plurality of breaker plies having cord angles of from 20° to 27° relative to the mid-circumferential plane of the tire, said carcass when inflated having a greater sectional height and lesser maximum sectional width than when uninflated.

2. A pneumatic tire as claimed in claim 1, wherein the tire is cured in a mould and the carcass has a ratio of sectional height to maximum sectional width when in the mold of up to 25 per cent less than the said ratio when said carcass is inflated.

3. A pneumatic tire as claimed in claim 1 or 2, wherein the tire, is cured in a mold and the carcass, when inflated, has a sectional height 3 to 15 per cent greater than when in the mold.

4. A pneumatic tire substantially as described herein with reference to the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicants.

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The cords of the plies 12 and 15 are made of a synthetic textile material, such as rayon, nylon, or Dacron (Registered Trade Mark) but the cord of the plies 15 may alternatively be made of metallic wire or glass fiber.

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As shown in Fig. 1 of the drawings, the tire of this invention having a ratio of SH to SD of greater than 0.6 but less than 0.85 when inflated, has a ratio of sectional height to maximum sectional width when molded of less than 0.7. Preferably, the molded tire has a ratio of SH to SD up to 25 per cent less when molded than when the tire is inflated. The sectional height of the tire of this invention preferably is 3 to 15 per cent greater when inflated than the sectional height of the tire when molded so that the radius from the axis of rotation of the inflated tire to the crown of the carcass is 1 to 6 per cent greater than the said radius when in the mold.

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2. A pneumatic tire as claimed in claim 1, wherein the tire is cured in a mould and the carcass has a ratio of sectional height to maximum sectional width when in the mold of up to 25 per cent less than the said ratio when said carcass is inflated.

3. A pneumatic tire as claimed in claim 1 or 2, wherein the tire, is cured in a mold and the carcass, when inflated, has a sectional height 3 to 15 per cent greater than when in the mold.

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