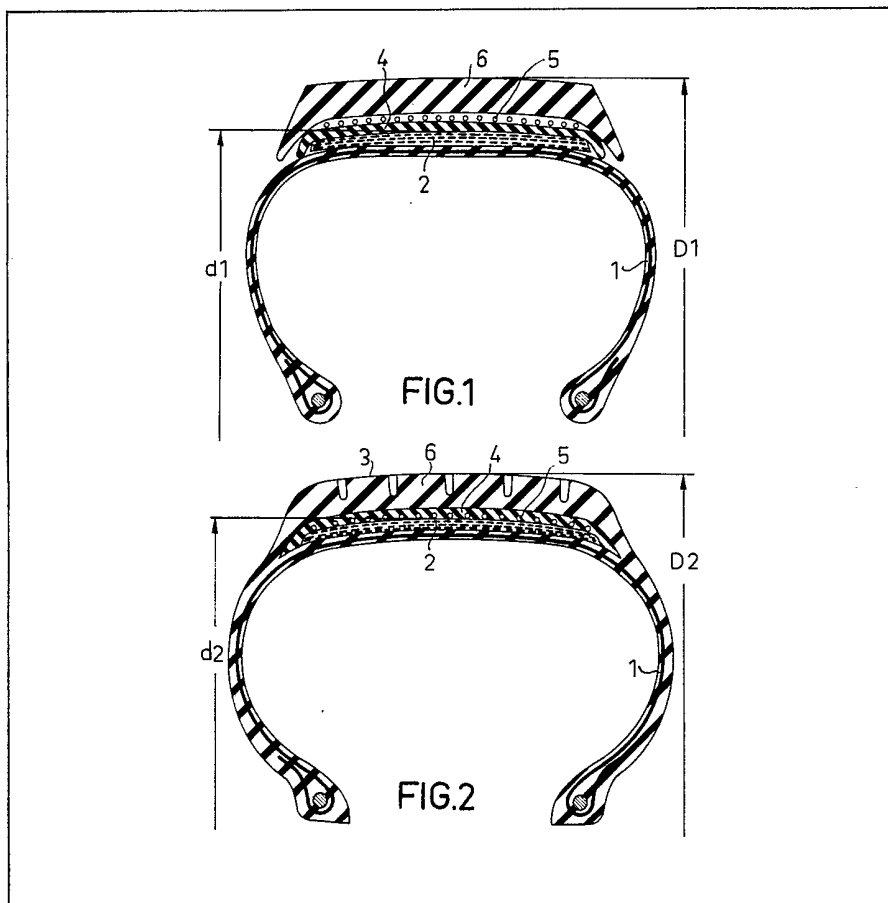


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(54) Method of making a pneumatic tyre

(57) A pneumatic vehicle tyre is produced by a method in which the crown portion of the tyre carcass (1) has firstly a layer (4), secondly reinforcing members (5), and then the tread strip (6) applied thereto, the tyre blank so formed then being placed in a vulcanizing mould in which the diameter of the crown portion is increased. As a result of the diameter increase and because the reinforcing members (5) are substantially parallel to the mid-circumferential plane, the layer (4) formed of a plastics adhesive mixture is forced outwardly between the reinforcing members (5). As illustrated the tyre includes an expansible belt 2.



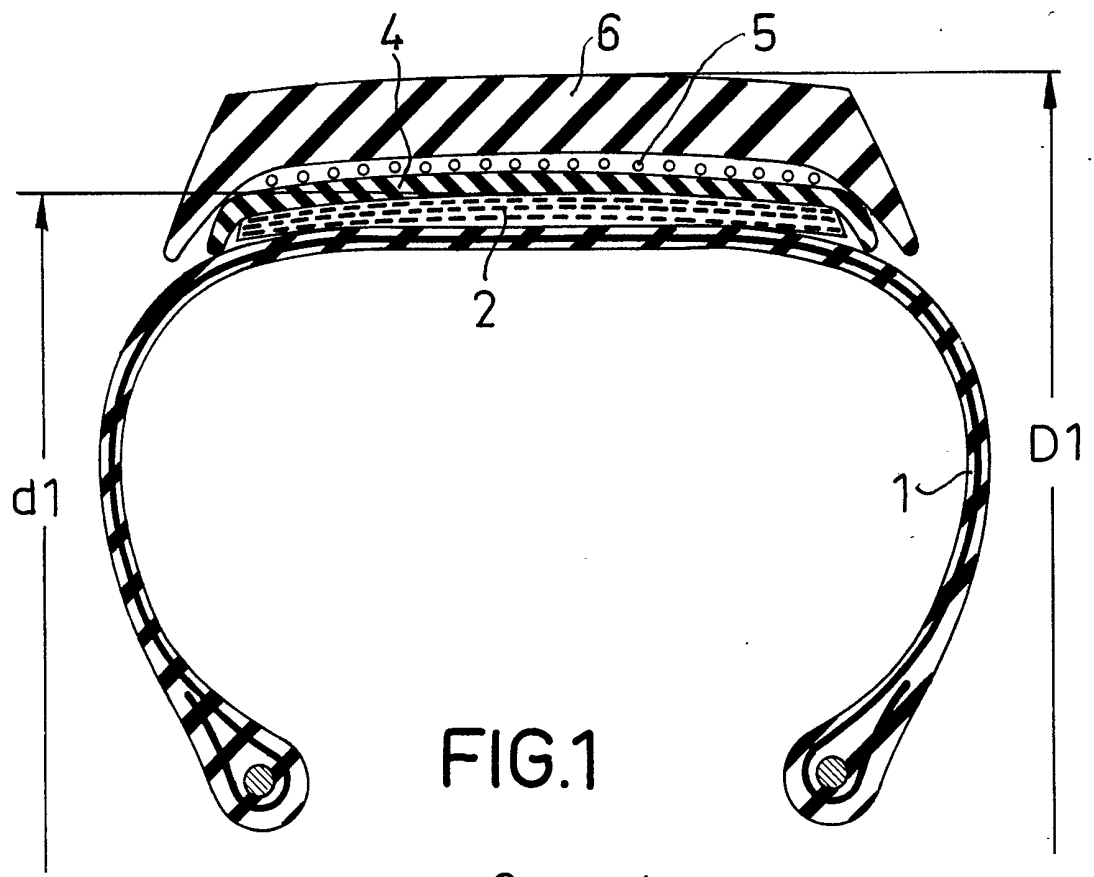


FIG. 1

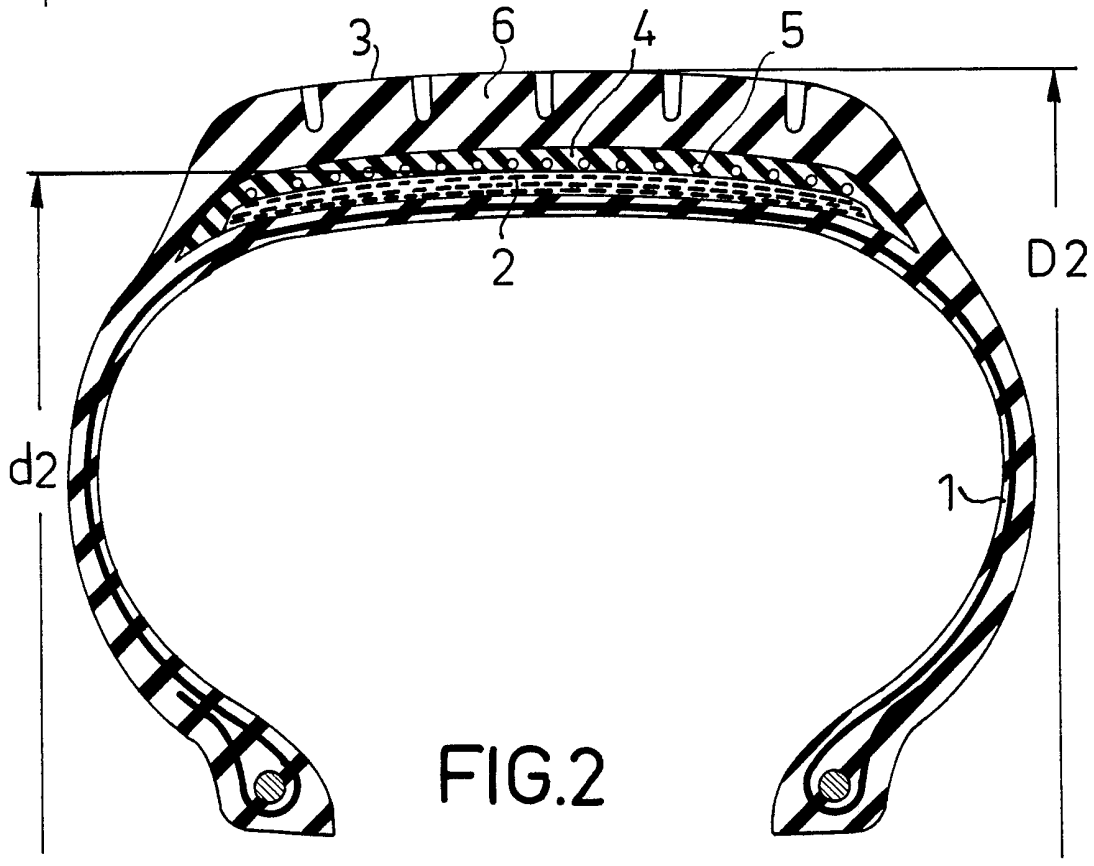


FIG. 2

SPECIFICATION

Method for the production of a pneumatic vehicle tyre

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The present invention relates to a method for the production of a pneumatic vehicle tyre, wherein the crown portion of the tyre substructure substantially of U-shaped cross-section has firstly reinforcing members and then the tread strip applied thereto, whereupon the so fashioned tyre blank is placed in a mould where it has its diameter increased so that it receives its tread surface profiling.

The invention, moreover, preferably also relates to such a pneumatic vehicle tyre which is additionally provided with a belt, which is preferably so equipped, e.g. by the use of intersecting filament-like reinforcing plies extending diagonally to the circumferential direction of the tyre, that with the so-called "residual elevation" of the tyre blank in the mould can have its diameter correspondingly increased.

In such tyre belts, a change of diameter is possible because the individual reinforcing plies can change their angle with respect to the circumferential direction of the tyre. On the other hand, the manufacture of such tyres causes difficulties which are particularly associated with reinforcing plies in the tyre crown portion, which reinforcing plies extend circumferentially at least at such an angle relative to the circumferential direction of the tyre that a diameter increase is no longer possible under the aforesaid conditions.

It is an object of the invention to provide a method which permits the use of reinforcing plies in the tyre crown portion extending at a small angle relative to the circumferential direction of the tyre, but at the same time permits the vulcanizing and pressing of the tyres in a mould which requires a so-called residual elevation or a diameter increase for moulding the tyre profile. The invention at the same time aims at a method which produces a useful tyre of considerable durability.

According to the present invention there is provided a method for the production of a pneumatic vehicle tyre, wherein the crown portion of the at least pre-cambered tyre substructure has firstly reinforcing members and then the tread strip applied thereto, whereupon the tyre blank so fashioned is placed into a mould where it has its diameter increased so that it receives its tread surface profiling, in which the reinforcing members are wound onto a layer formed of a plastics adhesive mixture.

The reinforcing members applied in this manner during the manufacture of the tyre blank are penetrated in the vulcanizing mould during the so-called "residual elevation" by the plastics adhesive mixture and finally enclosed on all sides by this adhesive mixture. The base for the reinforcing members to be wound on is thus so to speak pressed through adjacent reinforcing members, the extent of this pressing through may be variable. Thus, it is possible for the thickness of the layer of plastics adhesive mixture to be such that, with the moulded tyre, the reinforcing members are located substantially on the outer surface of the belt therebelow and to a certain

extent increasable in diameter, whilst a large proportion of the adhesive mixture has been forced through the reinforcing members, in order so at the same time to form the so-called "under rubber", thus a base for the tread strip.

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It is thus not absolutely necessary to bring about the pressing through movement by means of a belt located beneath the reinforcing members. This may occur also during the corresponding development of the carcass, even if the belt blank constitutes a substantially flat structure which, subject to extensive internal pressure forces the adhesive mixture in a piston-like manner through the spaces formed between the reinforcing members, when the aforesaid residual elevation is effected. The invention is preferably used in connection with such pneumatic tyres which beneath the reinforcing members have a tyre belt extending substantially over the width of the tread strip.

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The present invention will be further illustrated, by way of example, with reference to the accompanying drawings, in which:-

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Figures 1 and 2 each show a radial part section through a pneumatic tyre, Figure 1 showing the tyre blank before insertion in a vulcanizing mould, and Figure 2 the pneumatic tyre produced from the blank of Figure 1 in the completed vulcanized moulded state.

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A tyre belt 2 is first applied to the cambered radial carcass 1 subjected to internal pressure. The belt 2 extends substantially over the width of the subsequent tread strip surface 3. This belt, in known manner, comprises intersecting tension-resistant reinforcing plies in such a manner that the belt 2, when subject to internal pressure, may have a slight diameter increase from diameter d_1 to diameter d_2 imparted thereto. This diameter change is generally desired in order to provide a uniform belt structure.

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A layer 4 of a plastics adhesive mixture of rubber or the like material is applied on the belt 2. The thickness of the layer 4 is substantially that of the thickness of the belt 2, which in a specific manner permits adhesion to the reinforcing members, e.g. made of steel, subsequently making contact therewith.

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Tension-resistant, slightly resiliently elongatable reinforcing members 5, preferably formed of steel or the like, are then applied to the layer 4 and which are located in the tread strip region and mutually spaced from one another. A blank tread strip 6 is then placed on the reinforcing members 5 in known manner and finally rolled on. Further tyre components e.g. such for the side walls of the tyre, may also be placed on the tyre carcass 1, which is under internal pressure.

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The tyre blank in accordance with Figure 1 is now inserted into the vulcanizing mould; the external diameter is D_1 .

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The carcass 1 is now impacted from the inside of the vulcanizing mould, whereby the outer diameter of the belt 2 rises to the value D_2 , but at the same time even with a slight growth of the diameter of the reinforcing members 5, the layer 4 penetrates through the reinforcing members 5 in spaced arrangement in such a manner that finally in accordance with Figure 2, in the moulded state of the tread

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strip 6, the reinforcing members 5 are substantially arranged on the belt 2 and thereby are completely enclosed by the rubber of the layer 4.

In this final state the tread strip 6 is mouled, 5 whereby the belt 2 simultaneously has received such a diameter increase that it makes contact with the reinforcing members 5 substantially from the inside. Hence a crown reinforcement is provided which has reinforcing members 5 which extend substantially in 10 the circumferential direction of the tyre. Moreover the tyre has the usual belt reinforcement with diamond bracing.

CLAIMS

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1. A method for the production of a pneumatic vehicle tyre, wherein the crown portion of the at least pre-cambered tyre substructure has firstly reinforcing members and then the tread strip applied 20 thereto, whereupon the tyre blank so fashioned is placed into a mould where it has its diameter increased so that it receives its tread surface profiling in which the reinforcing members are wound onto a layer formed of a plastics adhesive mixture.

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2. A method for the production of a pneumatic vehicle tyre having a belt as claimed in claim 1, in which on the substructure on the tyre in known manner, there is first applied the tyre belt and then the layer of plastics adhesive mixture of such 30 thickness that, during the diameter increasing of the tyre blank to produce its tread surface profiling the outer surface of the belt either closely approaches the underside of the reinforcing members extending at least substantially in the circumferential direction 35 of the tyre, or even makes contact therewith.

3. A method as claimed in claim 1, in which the plastics adhesive mixture is applied in such quantity that, after the diameter increase of the tyre blank, it encloses the reinforcing members on all sides.

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4. A method as claimed in claim 1, in which the plastics adhesive mixture is applied in a layer of such thickness that due to a diameter increase of the tyre belt its external surface closely approaches to the underside of the reinforcing members.

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5. A method as claimed in claim 1, in which on the crown portion of the substructure of the tyre, at first a belt comprised of intersecting reinforcing members and adapted to have its diameter slightly increased, and then a plastics adhesive mixture 50 applied thereon.

6. A method for the production of a pneumatic vehicle tyre, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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7. A pneumatic vehicle tyre, whenever produced by a method as claimed in any preceding claim.