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Tread for motor vehicle tire.

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Description

The present invention relates to a tread for a motor vehicle tire, of the type having circumferential grooves and transversal grooves which define two rows of shoulder blocks, distributed along the respective opposite side edges of the tread, and one or more rows of central blocks, distributed between said rows of shoulder blocks, each of which said blocks being provided with auxiliary incisions having a reduced width.

The rolling surface, or tread, of tires for road vehicles, is provided with a conformation having reliefs, suitable for conferring to the tread itself the desired usage characteristics, among them road-holding capability, both on dry terrains and on wet or snow-covered terrains, the elimination of water or of other materials collected, resistance to wear and so on.

To obtain the above performance the surface of the tread is in general provided with grooves having a direction with a component that is transversal to the circumference, delimiting full portions, which on the whole have suitably designed dimensions, arrangement and contour, usually in the form of blocks and grooves arranged on one or more circumferential rows, equal to one another or not, to cover the overall width of the tread.

The geometrical configuration of the grooves is on each occasion selected and designed in relation to the characteristics of functional behaviour to be conferred upon the tire, according to the type of use for which it is destined.

In this respect, the dimensions and the orientation of the grooves, upon which there also follows the geometrical configuration of the grooves, are designed so as to ensure an effective drainage of the water in the areas of contact with the ground during operation on wet roads. At the same time, the geometrical configuration of the grooves is a determining factor for the purpose of road-holding capabilities, in particular as regards the generation of drift forces, that is, forces directed in a direction parallel to the tire's rolling axis during operation.

In a particularly widespread embodiment the blocks are distributed so as to form at least two rows of shoulder blocks, extending circumferentially along the opposite edges of the tread, and several rows of central blocks, located between the shoulder rows and arranged symmetrically with respect to the tire's equatorial plane.

The presence of blocks and grooves is, however, a source of noisiness and vibration during rolling, due to the periodic contact between the blocks and the ground, which can be irksome for the user.

With the object of limiting such events it is known that it is possible to make auxiliary incisions with a reduced width, in general not greater than one fifth of the width of the transversal grooves, commonly known as blades to the technicians of the sector, which enhance the deformability of the individual blocks, substantially reducing the intensity of the impacts and the sliding actions of the blocks on the ground in the area of contact.

Normally, the auxiliary incisions are oriented in a direction perpendicular to that in which the sliding actions which it is required to eliminate tend to occur. According to the individual case, the auxiliary incisions can also communicate with the tread's transversal grooves by means of at least one of their extremities.

The presence of such auxiliary incisions or blades, on the other hand, increases substantially the deformability of the tread in the presence of lateral drift forces, as is the case when driving in a curve and thus limits the applicability of (sets of blades) in tires destined for high performance.

With a view to limiting such events the known art has accomplished blades having an orientation at a large angle to the direction of rolling of the tire, but reducing the effectiveness of the set of blades, or it has accomplished blades having a curvilinear design, suitable for creating surfaces which come into contact with one another in the presence of drift forces, thus limiting the overall deformability of the tread.

The known treads thus represent a solution of compromise between the effectiveness in the reduction of the noisiness and of the rolling vibrations and the performance in terms of road-holding capability and accuracy of driving, especially on a dry road.

In this respect, it should be noted that the presence of the blocks on the tread always gives rise to a certain rolling noisiness of the tire, due to the impact of the edges of the individual blocks on the ground during operation. This problem, up to not long ago, had but a relatively modest importance since the noisiness of the tire had a somewhat limited influence on the motor vehicle's overall noisiness. Now, with the appearance on the market of quieter motor vehicles thanks to the progress of aerodynamic and engine technologies, the rolling noisiness of tires assumes a substantial importance.

A tire according to the preamble of claim 1 is known from US-A-4 055 209.

Thus, the main object of the present invention is substantially that of creating a tread which, thanks to a rational arrangement of the auxiliary incisions in the blocks, allows a considerable cutback of the rolling noisiness of the tire without penalizing its driving characteristics.

This object and still others, which shall appear more clearly during the course of the present de-
scription, are substantially attained by a tread for a motor vehicle tire, characterized in that the auxiliary incisions of the central blocks extend in a rectilinear direction parallel to one another and according to an inclination, with respect to the direction normal to the rolling direction of the tire, that is greater than the inclination of the auxiliary incisions of the shoulder wedges.

Further characteristics and advantages shall appear more clearly from the detailed description of a preferred but not exclusive embodiment of a tread for a motor vehicle tire, according to the present invention, given hereinafter with reference to the enclosed drawings, provided purely as a non-limiting indication, wherein:

Fig. 1 is a perspective view illustrating a tire provided with a tread according to the present invention;

Fig. 2 is an enlarged and interrupted view of the tread under examination;

Fig. 3 illustrates schematically a detail of Fig. 2, highlighting the geometrical characteristics of the blocks constituting the central rows;

Fig. 4 is an interrupted sectional view taken along the line IV-IV of Fig 2;

Fig. 5 shows a possible variant of the embodiment of the blocks constituting the central rows;

Fig. 6 is a diagramme comparing the noise-ness of a tire with a tread according to the present invention, in relation of the peripheral rolling speed, under new and worn conditions;

Fig. 7 is a diagramme comparing the noise-ness of a tire with a tread having blocks that are the same as those of the tread under examination, but cut with auxiliary incisions according to the known art, under new and worn conditions;

Fig. 8 is a schematic representation of a tread design with blades according to the invention, on blocks having a different perimetal contour, in the presence of two rows of central wedges;

Fig. 9 is a tread with three rows of central blocks.

With particular reference to Fig.s 1 and 2, there has been indicated as a whole with 1 a tread for a motor vehicle tire, according to the present invention.

In a known and conventional manner, the tread 1 is applied circumferentially onto the crown of a motor vehicle tire 2, not described in that it is known and conventional in itself. The tread 1 defines the rolling surface of the tire and is in general designed to guarantee good adhesion to the road surface, as regards both tractive and road-holding capability, and to ensure, in case of operation on a wet surface, an effective elimination of water between tire and road surface.

For this purpose, the tread 1 is conventionally provided with a plurality of circumferential grooves 3 and with transversal grooves 4 suitably shaped and intersecting the circumferential grooves themselves.

The combination between the circumferential grooves 3 and the transversal grooves 4 gives rise to a pair of rows of shoulder blocks 5, arranged along the respective opposite lateral edges of the tread 1, and to one or more rows of central blocks distributed between the rows of shoulder blocks and shaped differently with respect to the latter.

More in particular, as is shown in Fig. 2, the shoulder blocks 5 are to have a substantially parallelepiped configuration. The central blocks 6, on the other hand, each have, along its perimetal length, a pair of longitudinal sides 7, defined by the circumferential grooves 3, oriented substantially along the direction of rolling of the tire 2 and a pair of transversal sides 8, defined by the transversal grooves 4, oriented transversally to said direction of rolling.

Such transversal sides, in the illustrated embodiment, each have two parallel lateral segments 8a, between which there extends an intermediate segment 8b oriented to form an obtuse angle with the lateral segments themselves. Conveniently, the lateral segments 8a each have an inclination, with respect to the direction normal to the direction of rolling, that is less than that of the intermediate segment 8b.

Along the outer edges of the tread 1 there is possibly provided for a pair of rows of auxiliary blocks 10 having a parallelepiped shape, side by side with the shoulder blocks 5.

The shoulder blocks 5 and the central blocks 6 are provided with respective auxiliary incisions 11, 12, called (blades), having limited width.

The width of such blades is preferably restricted to the minimum value compatible with the accomplishment of the corresponding dies and preferably is not greater than one fifth of the width of the transversal grooves 4 or, as an alternative, not greater than 1.5 mm.

In a manner similar to what can be observed in treads of a known type, these auxiliary incisions 11, 12 perform the task of enhancing the elastic deformability of the blocks 5, 6 in certain directions, to restrict their sliding action on the road surface during operations, so as to limit the overall noisiness of the tire 2.

More in particular, provision is made in this respect for the auxiliary incisions 11, 12 belonging to the shoulder blocks 5 and to the central blocks.
6, respectively, to extend in a substantially rectilinear direction parallel to one another, according to a pre-determined inclination with respect to the direction normal to the direction of rolling of the tire 2. More accurately, the auxiliary incisions 12 belonging to the central blocks 6 extend along the entire width of the corresponding blocks, and their inclination, indicated by the angle \(\angle(\omega)\) in Fig. 2, is greater than the inclination \(\angle(\omega')\) of the auxiliary incisions 11 belonging to the shoulder blocks 5. Preferably, the angle of inclination \(\angle(\omega)\) of the auxiliary incisions 11 has a value ranging from 10° to 35°. In the illustrated example, the angle \(\angle(\omega)\) is equal to about 12°.

As it is possible to observe from Fig. 2, each of the central blocks 6 is traversed by a pair of auxiliary incisions 12 each of which extends in alignment with one of the lateral segments 8a on the corresponding transversal side 8. The auxiliary incisions 12 of each of the central blocks 6 are distanced one from the other according to a maximum amount, indicated with \(\angle(\text{A})\) in Fig. 3, equal to the distance \(\angle(B)\) between two of the opposite lateral segments 8a belonging respectively to two contiguous central blocks 6.

In the variant of the embodiment indicated in Fig. 5, in the case of blocks having a substantial extension in the circumferential direction, provision is made for each of the central blocks 6 to be traversed by a third auxiliary incision 13, parallel to and at an equal distance from the auxiliary incisions 12 arranged in alignment with the lateral segments 8a.

In this case, the incisions 12 and 13 are spaced one from the other by a distance \(\angle(C)\) preferably not less than three fifths of the distance \(\angle(B)\).

Preferably, as clearly highlighted by Fig. 4, each of the incisions 12, 13 belonging to the central blocks 6 has two lateral portions 12a with a depth \(\angle(E)\) ranging from one third to two thirds (in the case illustrated equal to one half) of the depth \(\angle(D)\) of the circumferential grooves 3, as well as a middle portion 12b having a depth \(\angle(F)\) substantially equal to the depth \(\angle(D)\) of the circumferential grooves 3. As can easily be observed from Fig. 4, the lateral portions 12a have a width \(\angle(G)\) substantially equal to the width \(\angle(G')\) of the central portion 12b.

Now with particular reference to the shoulder blocks 5, it is provided for each of them be equipped with auxiliary incisions 11 (two in the example illustrated) whose inclination \(\angle(\omega)\) with respect to the direction normal to the direction of rolling of the tire 2 is less than that of the auxiliary incisions of the central blocks and ranges from 4° to 15°. In the case illustrated, the angle \(\angle(\omega)\) is equal to about 12°. In the case illustrated, each auxiliary incision 11 extends from an external side 5a of the respective shoulder block 5 up to the proximity of the opposite internal side 5b of the same block.

More in particular, in the case illustrated, each auxiliary incision 11 has a main rectilinear section 11a which extends from the external side 5a of the respective shoulder block 5, according to an angle of 4.5° with respect to the direction normal to the direction of rolling of the tire 2, followed by a terminal rectilinear section 11b, slightly at an angle to the main section and extending up to the proximity of the internal side 5b of the shoulder block 5. Preferably, the terminal section 11b of each auxiliary incision 11 extends in a direction parallel to and aligned with at least one of the auxiliary incisions 12 belonging to the central blocks 6.

It is also preferable that, in the presence of incisions 11c in the shoulder blocks, the auxiliary incisions 11 be arranged along the extension of same, so that the same incisions 11c can constitute a portion of the auxiliary incisions.

Each shoulder block 5 can also be provided with a blind auxiliary incision 14 extending from the internal side 5b of the block itself in a position intermediate between the terminal sections 11b of the incisions 11 and having a width that is substantially equal to that of the incisions 11c.

As an alternative the incisions 11 can extend in a perfectly rectilinear direction, and can go right through the respective shoulder blocks 5.

With the object of restricting the rolling noising of the tire 2 it is also provided for that the distance between the auxiliary incisions 11, 12 of each block 5, 6 be subject to variation on the circumferential length of the tread 1. This characteristic is clearly visible when comparing the distances \(\angle(A)\) and \(\angle(A')\) between the central blocks 6 represented in Fig. 3. Preferably, the variation of the distance \(\angle(A), \angle(A')\) is limited to a range between a maximum value and a minimum value equal to four fifths of the maximum value.

It has been observed that the technical solutions adopted in the accomplishment of the auxiliary incisions 11, 12 according to the invention allow a substantial reduction in the rolling noising of the tire 2.

In this respect, Figs. 6 and 7 show two comparison diagrams which have been obtained by measuring, at different operating speed, the rolling noising of a tire equipped with a tread according to the invention and of another tire whose tread has the same characteristics in relation to the geometrical configuration of the longitudinal grooves 3 and transversal grooves 4, respectively, but has a different arrangement of the auxiliary incisions.

After measuring the noising of tires with the respective new treads, curves indicated with \(\angle(a)\)
and \(\langle a'\rangle\), respectively, in Figs. 6 and 7 have been plotted. By measuring, on the other hand, the noisiness of tires with a worn tread after covering about 10,000 km, the curves indicated with \(\langle b'\rangle\) and \(\langle b''\rangle\) have been obtained.

As can easily be observed, the curve \(\langle b\rangle\) of the tire provided with the tread under examination detects a maximum noisiness which, even after covering a distance of 10,000 km, is less than that detected by the curve \(\langle a'\rangle\) of the tire with a new conventional tread.

The invention thus attains the proposed objects. In fact, the arrangement and the geometrical configuration of the auxiliary incisions of the tread under examination allow the attainment of an appreciable reduction in the rolling noisiness of the tire, without this, on the other hand, penalizing performance.

In Figs. 8, 9 there are illustrated two alternative embodiments of tire treads according to the invention, wherein the perimetral profile of the blocks of the central rows is identified generically; in such embodiments the secondary grooves, or blades, are oriented in a direction parallel to the transversal sides.

In the case wherein the transversal sides of the blocks have a varying profile, constituted by more than one side portion, the secondary grooves are preferably arranged in a direction parallel to one or more of the portions of the transversal sides of the blocks that have the lesser inclination with respect to the transversal to the direction of rolling of the tire.

Such side portions in fact normally make a contribution to noisiness and to the so-called \(\langle\text{roughness}\rangle\) of operation that is prevalent with respect to the side portions having a greater inclination.

More in general, according to the spirit of the present invention, in the case wherein such portions having a lesser inclination have an extension that is significantly lower than the other portions of the transversal sides, so that it is the latter to make the greatest contribution to noisiness, the secondary grooves shall in any case be parallel to those portions of the transversal sides responsible for the greater inconvenience in rolling.

It can be seen that the profile of the blocks of Fig. 2 is a particular case of the blocks of Figs. 8, 9: in fact the profile of the central blocks of Fig. 2 can be obtained by eliminating from the generic envelopment contour of a central block 6a represented in Fig. 8 the dotted portions 15, as indicated in the figure itself.

As shown by Fig. 8, there can be two rows of central blocks, 6a, 6b, in combination with the shoulder blocks 5; there is shown in Fig. 9 a different embodiment, comprising three rows of central blocks, 6a, 6b, 6c.

The central blocks can all have secondary grooves with the same inclination and with an inclination in agreement with that of the shoulder blocks, according to the diagramme of Fig. 8, or inclinations other than those of the shoulder blocks, as represented in Fig. 9; according to the tire’s usage characteristics, it is also possible, within the scope of the present invention, to have tread designs of the directional type, that is that are a mirror-image of them with respect to a middle plane and with inclinations of the opposite sign for the transversal sides corresponding to the central and shoulder blocks, or mixed, that is with variations in the sign of the angle of inclination of the transversal sides of the blocks (and, as a consequence, of the angle of the corresponding secondary grooves) for each row of central and shoulder blocks.

Naturally, several changes and variants can be made to the invention conceived in this way, all falling within the scope of the inventive concept as defined in the claims.

Claims

1. Tread for a motor vehicle tire, having circumferential grooves (3) and transversal grooves (4) which define two rows of shoulder blocks (5), distributed along the respective opposite side edges of the tread (2), and at least one row of central blocks (6) distributed between said rows of shoulder blocks (5), each of which said blocks (5, 6) being provided with at least one auxiliary incision (11, 12) having a width not greater than one fifth of the width of said grooves (3, 4), characterized in that the auxiliary incisions (12) of the central blocks (6) extend parallel to one another in a rectilinear direction, along the entire width of the respective blocks and according to an inclination, with respect to the direction normal to the rolling direction of the tire, that is greater than the inclination of the auxiliary incisions (11) of the shoulder blocks (5).

2. Tread according to claim 1, characterized in that each of the central blocks (6), along its perimetral length, has a pair of longitudinal sides (7), oriented substantially along the direction of rolling of the tire (2) and a pair of transversal sides (8) oriented transversally to said direction of rolling and having, each, two parallel lateral segments (8a) between which there extends an intermediate segment (8b) oriented to form an obtuse angle with the lateral segments (8a), said lateral segments (8a)
having an inclination, with respect to the direction normal to the direction of rolling, that is less than the inclination of the intermediate segment (8b), each of which central blocks (6) being traversed by at least one pair of parallel auxiliary incisions (12), each of which extends in alignment with one of the lateral segments (8a) of one of the transversal sides (8).

3. Tread according to claim 2, characterized in that each of the central blocks (6) is traversed by a third auxiliary incision (13) parallel to and at an equal distance from the auxiliary incisions (12) arranged in alignment with said lateral segments (8a).

4. Tread according to claim 1, characterized in that the auxiliary incisions (12) of the central blocks (6) are inclined with respect to the direction normal to the rolling direction of the tire (2) according to an angle (α) ranging from 10° to 35°.

5. Tread according to claim 1, characterized in that the auxiliary incisions (11) of the shoulder blocks (5) are inclined with respect to the direction normal to the rolling direction of the tire (2) according to an angle (α) ranging from 4° to 15°.

6. Tread according to claim 1, characterized in that the auxiliary incisions (11) of the shoulder blocks (5) extend each from an external side (5a) of the respective block at least up to the proximity of the opposite internal side (5b) of the same wedge.

7. Tread according to claim 1, characterized in that each of the auxiliary incisions (11) belonging to the shoulder blocks (5) has a main rectilinear section (11a) which extends from an external side (5a) of the corresponding block (5) and a terminal rectilinear section (11b), slanting at an angle to the main section (11a), which extends up to the proximity of an internal side (5b) of said block.

8. Tread according to claim 7, characterized in that said terminal rectilinear section (11b) extends in a direction parallel to and aligned with at least one of the auxiliary incisions (12) belonging to the central blocks (6).

9. Tread according to claim 1, characterized in that the auxiliary incisions (11) of the shoulder blocks (5) extend along the entire width of the respective blocks.

10. Tread according to claim 6, characterized in that each of the auxiliary incisions (11) belonging to the shoulder blocks (5) has a portion of extremity (11c) having a width equal to at least twice the width of the incision itself at said main section (11a) and terminal section (11b).

11. Tread according to claim 1, characterized in that each of the auxiliary incisions (12) belonging to the central blocks (6) has two side portions (12a) with a width ranging from one third to two thirds of the depth of the circumferential grooves (3), and a middle portion (12b) having a depth substantially equal to the depth of said circumferential grooves.

12. Tread according to claim 11, characterized in that said side portions (12a) have a depth substantially equal to half the depth of said central portion (12b).

13. Tread according to claim 11, characterized in that said side portions (12a) and said central portion (12b) have substantially the same width.

14. Tread according to claim 1, characterized in that the auxiliary incisions (11, 12) of each block (5, 6) are at distance one from the other according to a measurement (A, A') which ranges from a maximum value (A) and a minimum value (A') equal to five fifths of the maximum value (A).

15. Tread according to claim 2, characterized in that the auxiliary incisions (12) belonging to each of the central blocks (6) are at distance one from the other according to a maximum measurement (A) equal to the distance (B) between two of said opposite lateral segments (8a) belonging to two contiguous blocks, respectively.

16. Tread according to claim 1, characterized in that at least the auxiliary incisions (12) of the central blocks (6) are parallel to the side transversal to the rolling direction of the tire, or to the portion(s) of such side (8a) which have a lesser inclination with respect to the perpendicular to the rolling direction or, on the whole, a larger extension in a transversal direction, or in any case to those sides or to those portions of sides which make the prevalent contribution to the rolling noisiness.
Patentansprüche

1. Lauffläche für einen Kraftfahrzeugreifen mit Umfangsrillen (3) und Querrillen (4), die zwei Reihen von entlang der jeweiliger gegenüberliegenden Seitenränder der Lauffläche (2) verteilten Schulterblöcken (5) und wenigstens eine Reihe von zwischen den Reihen von Schulterblöcken (5) verteilten mittleren Blöcken (6) bilden, wobei jeder der Blöcke (5, 6) mit wenigstens einem zusätzlichen Schnitt (11, 12) versehen ist, dessen Breite nicht größer als ein Fünftel der Breite der Rillen (3, 4) ist, dadurch gekennzeichnet, daß sich die zusätzlichen Schnitte (12) der mittleren Blöcke (6) parallel zueinander in geradliniger Richtung, entlang der gesamten Breite der jeweiligen Blöcke und entsprechend einer Neigung bezüglich der zu der Rollrichtung des Reifens senkrechten Richtung erstrecken, die größer als die Neigung der zusätzlichen Schnitte (11) der Schulterblöcke (5) ist.

2. Lauffläche nach Anspruch 1, dadurch gekennzeichnet, daß jeder der mittleren Blöcke (6) entlang seiner Umfangsfläche ein Paar von Längsseiten (7), welche im wesentlichen entlang der Rollrichtung des Reifens (2) ausgerichtet sind, und ein Paar von Querseiten (8) hat, welche quer zu der Rollrichtung ausgerichtet sind und jeweils zwei parallele Seitensegmente (8a) haben, zwischen denen sich ein Zwischensegment (8b) erstreckt, welches so ausge richtet ist, daß es einen stumpfen Winkel mit den Seitensegmenten (8a) bildet, wobei die Seitensegmente (8a) eine Neigung bezüglich der zu der Rollrichtung des Reifens senkrechten Richtung haben, die geringer als die Neigung des Zwischensegments (8b) ist, und wobei jeder der mittleren Blöcke (6) von wenigstens einem Paar von parallelen zusätzlichen Schnitten (12) gequert wird, von denen jeder in fluchtender Ausrichtung zu einem der Seitensegmente (8a) einer der Querseiten (8) erstreckt.

3. Lauffläche nach Anspruch 2, dadurch gekennzeichnet, daß jeder der mittleren Blöcke (6) von einem dritten zusätzlichen Schnitt (13) gequert wird, welcher parallel zu und in einem gleichen Abstand von den zusätzlichen Schnitten (12) vorläuft, welche in fluchtender Ausrichtung zu den Seitensegmenten (8a) angeordnet sind.

4. Lauffläche nach Anspruch 1, dadurch gekennzeichnet, daß die zusätzlichen Schnitte (12) der mittleren Blöcke (6) bezüglich der zu der Rollrichtung des Reifens (2) senkrechten Richtung entsprechend einem Winkel (ω) im Bereich von 10° bis 35° geneigt sind.

5. Lauffläche nach Anspruch 1, dadurch gekennzeichnet, daß die zusätzlichen Schnitte (11) der Schulterblöcke (5) bezüglich der zu der Rollrichtung des Reifens (2) senkrechten Richtung entsprechend einem Winkel (ω) im Bereich von 4° bis 15° geneigt sind.

6. Lauffläche nach Anspruch 1, dadurch gekennzeichnet, daß sich die zusätzlichen Schnitte (11) der Schulterblöcke (5) jeweils von einer Außenseite (5a) des entsprechenden Blocks bis wenigstens in die Nähe der gegenüberliegenden Innenseite (5b) des gleichen Blocks erstrecken.

7. Lauffläche nach Anspruch 1, dadurch gekennzeichnet, daß jeder der zu den Schulterblöcken (5) gehörenden zusätzlichen Schnitte (11) einen geradlinigen Hauptabschnitt (11a), der von einer Außenseite (5a) des entsprechenden Blocks (5) erstreckt, und einen zu dem Hauptabschnitt (11a) leicht geneigten geradlinigen Endabschnitt (11b) hat, der sich bis in die Nähe einer Innenseite (5b) des Blocks erstreckt.


9. Lauffläche nach Anspruch 1, dadurch gekennzeichnet, daß sich die zusätzlichen Schnitte (11) der Schulterblöcke (5) entlang der gesamten Breite der jeweiligen Blöcke erstrecken.

10. Lauffläche nach Anspruch 6, dadurch gekennzeichnet, daß jeder der zu den Schulterblöcken (5) gehörenden zusätzlichen Schnitte (11) einen Außenabschnitt (11c) hat, dessen Breite wenigstens doppelt so groß wie die Breite des Schnitts selbst an dem Hauptabschnitt (11a) und dem Endabschnitt (11b) ist.

11. Lauffläche nach Anspruch 1, dadurch gekennzeichnet, daß jeder der zu den mittleren Blöcken (6) gehörenden zusätzlichen Schnitte (12) zwei Seitenabschnitte (12a) mit einer Breite in dem Bereich von einem Drittel bis zwei Drittel der Breite der Umfangsrillen (3) und einen mittleren Abschnitt (12b) hat, dessen Tiefe im wesentlichen der Tiefe der Umfangsrillen ent-
spricht.

12. Laufläche nach Anspruch 11, dadurch gekennzeichnet, daß die Seitenabschnitte (12a) eine Tiefe haben, die im wesentlichen der halben Tiefe des mittleren Abschnitts (12b) entspricht.

13. Laufläche nach Anspruch 11, dadurch gekennzeichnet, daß die Seitenabschnitte (12a) und der mittlere Abschnitt (12b) im wesentlichen die gleiche Breite haben.

14. Laufläche nach Anspruch 1, dadurch gekennzeichnet, daß die zusätzlichen Einschnitte (11, 12) jedes Blocks (5, 6) in einem Abstand voneinander entsprechend einer Abmessung (A, A') angeordnet sind, die von einem Maximalwert (A) zu einem Minimalwert (A') reicht, welcher vier Fünftel des Maximalwerts (A) beträgt.

15. Laufläche nach Anspruch 2, dadurch gekennzeichnet, daß die zu jedem der mittleren Blöcke (6) gehörenden zusätzlichen Einschnitte (12) in einem Abstand voneinander entsprechend einer maximalen Abmessung (A) angeordnet sind, welche dem Abstand (B) zwischen zwei der zu den jeweiligen angrenzenden Blöcken gehörenden gegenüberliegenden Seitensegmenten (8a) entspricht.

16. Laufläche nach Anspruch 1, dadurch gekennzeichnet, daß wenigstens die zusätzlichen Abschnitte (12) der mittleren Blöcke (6) parallel zu der quer zu der Rollrichtung des Reifens verlaufenden Seite oder zu dem (den) Abschnitt(en) dieser Seite (8a), die eine gerin- gere Neigung bezüglich der Senkrechten zu der Rollrichtung oder insgesamt eine größere Erstreckung in einer Querrichtung haben, oder in jedem Fall zu den Seiten oder zu den Seitenabschnitten sind, welche den größten Teil zum Rollgeräusch beitragen.

Revendications

1. Bande de roulement pour un pneumatique de véhicule à moteur, qui comporte des rainures circonférentielles (3) et des rainures transversales (4) définissant deux rangées de blocs d'épaules (5) répartis le long des bords latéraux opposés respectifs de la bande de roulement (2) et au moins une rangée de blocs centraux (6) répartis entre lesdites rangées de blocs d'épaules (5), chacun de ces blocs (5, 6) étant pourvu d'au moins une incision axiale (11, 12) dont la largeur n'excède pas un cinquième de la largeur desdites rainures (3, 4), caractérisée en ce que les incisions axiales (12) des blocs centraux (6) s'étendent parallèlement les unes aux autres dans une direction rectiligne, sur toute la largeur des blocs respectifs et suivant une inclinaison par rapport à la direction normale à la direction de roulement du pneumatique qui est plus importante que l'inclinaison des incisions auxiliaires (11) des blocs d'épaules (5).

2. Bande de roulement selon la revendication 1, caractérisée en ce que chaque bloc central (6) comporte sur sa longueur périmétrale une paire de faces longitudinales (7), orientées sensiblement dans la direction de roulement du pneumatique (2), et une paire de faces transversales (8), orientées transversalement à ladite direction de roulement et comprenant chacune deux segments latéraux parallèles (8a) entre lesquels s'étend un segment intermédiaire (8b) orienté pour former un angle obtus avec les segments latéraux (8a), lesdits segments latéraux (8a) ayant une inclinaison par rapport à la direction normale à la direction de roulement du pneumatique qui est moins importante que l'inclinaison du segment intermédiaire (8b), chaque bloc central (6) étant traversé par au moins une paire d'incisions auxiliaires parallèles (12) dont chacune s'étend dans l'alignement de l'un des segments latéraux (8a) de l'une des faces transversales (8).

3. Bande de roulement selon la revendication 2, caractérisée en ce que chaque bloc central (6) est traversé par une troisième incision auxiliaire (13) parallèle aux incisions auxiliaires (12) et à égale distance d'elles, placée dans l'alignement desdits segments latéraux (8a).

4. Bande de roulement selon la revendication 1, caractérisée en ce que les incisions auxiliaires (12) des blocs centraux (6) sont inclinées par rapport à la direction normale à la direction de roulement du pneumatique (2) d'un angle (α) compris entre 10° et 35°.

5. Bande de roulement selon la revendication 1, caractérisée en ce que les incisions auxiliaires (11) des blocs d'épaules (5) sont inclinées par rapport à la direction normale à la direction de roulement du pneumatique (2) d'un angle (α) compris entre 4° et 15°.

6. Bande de roulement selon la revendication 1, caractérisée en ce que les incisions auxiliaires (11) des blocs d'épaules (5) partent chacune d'une face externe (5a) du bloc respectif et vont au moins jusqu'à proximité de la face interne opposée (5b) du même bloc.
7. Bande de roulement selon la revendication 1, caractérisée en ce que les incisions auxiliaires (11) des blocs d’épaules (5) comportent une partie principale rectiligne (11a) qui s’étend depuis une face externe (5a) du bloc respectif (5) et une partie terminale rectiligne (11b), faisant un léger angle avec la partie principale (11a), qui va jusqu’à proximité d’une face interne (5b) dudit bloc.

8. Bande de roulement selon la revendication 7, caractérisée en ce que ladite partie terminale rectiligne (11b) s’étend dans une direction parallèle aux incisions auxiliaires (12) des blocs centraux (6) en étant alignée avec l’une au moins de celles-ci.

9. Bande de roulement selon la revendication 1, caractérisée en ce que les incisions auxiliaires (11) des blocs d’épaules (5) s’étendent sur toute la largeur des blocs respectifs.

10. Bande de roulement selon la revendication 6, caractérisée en ce que chaque incision auxiliaires (11) des blocs d’épaules (5) comporte une partie d’extrémité (11c) dont la largeur est égale à au moins deux fois la largeur de l’incision elle-même au niveau de ladite partie principale (11a) et de ladite partie terminale (11b).

11. Bande de roulement selon la revendication 1, caractérisée en ce que chaque incision auxiliaire (12) des blocs centraux (6) comporte deux parties latérales (12a) dont la profondeur vaut de un tiers à deux tiers de la profondeur des rainures circonférentielles (3) et une partie intermédiaire (12b) dont la profondeur est sensiblement égale à la profondeur desdites rainures circonférentielles.

12. Bande de roulement selon la revendication 11, caractérisée en ce que lesdites parties latérales (12a) ont une profondeur sensiblement égale à la moitié de la profondeur de ladite partie centrale (12b).

13. Bande de roulement selon la revendication 11, caractérisée en ce que lesdites parties latérales (12a) et ladite partie centrale (12b) ont sensiblement la même largeur.

14. Bande de roulement selon la revendication 1, caractérisée en ce que les incisions auxiliaires (11, 12) de chaque bloc (5, 6) sont espacées les unes des autres d’une distance (A, A') qui va d’une valeur maximale (A) à une valeur minimale (A') égale aux quatre cinquièmes de la valeur maximale (A).

15. Bande de roulement selon la revendication 2, caractérisée en ce que les incisions auxiliaires (12) de chaque bloc central (6) sont espacées les unes des autres d’une distance de valeur maximale (A), égale à la distance (B) entre deux desdits segments latéraux (8a) se faisant face et appartenant respectivement à deux blocs contigus.

16. Bande de roulement selon la revendication 1, caractérisée en ce que les incisions auxiliaires (12) des blocs centraux (6) au moins sont parallèles à la face transversale à la direction de roulement du pneumatique, ou à une ou des partie(s) de cette face (8a) qui présente(nt) une inclinaison moindre par rapport à la perpendiculaire à la direction de roulement ou, dans l’ensemble, une plus grande longueur dans une direction transversale que ces faces ou ces parties de faces qui apportent une contribution prédominante au bruit de roulement.