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(54) Title: WHEEL WITH RIM HAVING SEATS SLOPING OUTWARDS

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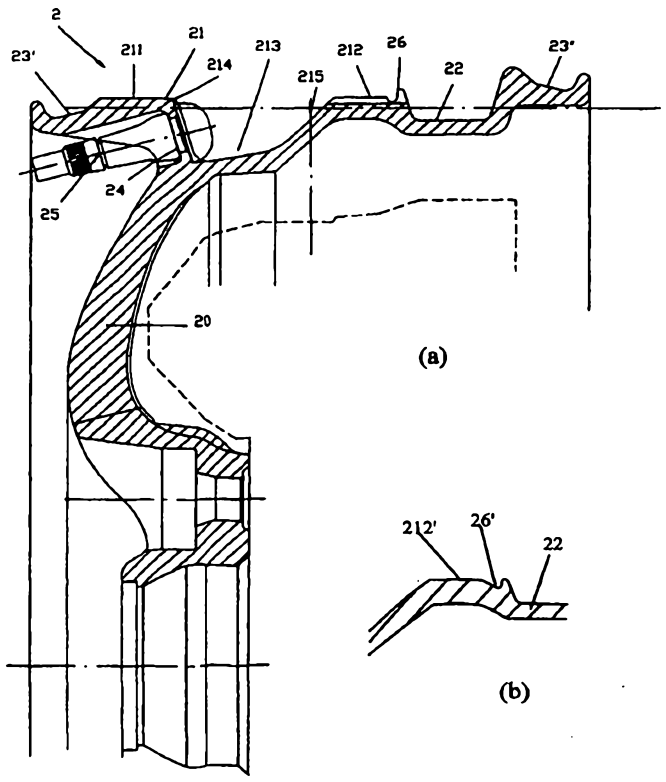
(57) Abstract

The invention concerns a wheel R consisting of a rim (51) having first (23') and second (23'') rim seats, at least the first rim seat having a generatrix whereof the radially outer end is on a circle with a diameter smaller than the diameter of the circle whereon is located the radially inner end, said first seat (23') being extended axially outwards by a low protuberance or hump, and axially inwards by a bearing designed to receive a ring supporting the running tread, and a wheel disc (52), assembled on the side of the first rim seat to the radially inner wall of the rim. The invention is characterised in that the rim bearing consists of first and second support zones separated by a circumferential groove emerging radially outwards.

(57) Abrégé

Roue R composée d'une jante (51) avec un premier (23') et un deuxième (23'') sièges de jante, au moins le premier siège de jante ayant une génératrice dont l'extrémité axialement extérieure est sur un cercle de diamètre inférieur au diamètre du cercle sur lequel se trouve l'extrémité axialement intérieure, ledit premier (23') siège de jante étant prolongé axialement à l'extérieur par une saillie ou hump de faible hauteur, et axialement à l'intérieur par une portée destinée à recevoir un anneau de soutien de bande de roulement, et d'un disque de roue (52), réuni du côté du premier siège de jante à la paroi radialement intérieure de la jante, caractérisée en ce que la portée de jante est constituée d'une première et d'une seconde zones d'appui séparées par une gorge circonférentielle débouchant radialement extérieurement.



[Translation from French]

WHEEL WITH RIM HAVING SEATS INCLINED TOWARD THE OUTSIDE

The invention concerns a wheel consisting of a disk and a rim for a tire and capable of possibly forming with a support ring of the tire tread and the tire, a rolling assembly that can be useful in case of running when the inflation pressure drops abnormally below the normal pressure of use, called nominal service pressure, which can even become nil.

The principal difficulties encountered in case of running flat or at low pressure involve the risks of unseating of the beads of the tire and, in particular, of unseating of the bead situated on the outer side of the tire mounted on the outer side of the vehicle on making a turn.

European application EP 0,807,539 describes, by way of example, a wheel intended to solve the above-mentioned problem efficiently. That wheel comprises, seen in meridian section, a rim with first and second rim seats, at least the first rim seat having a generatrix, the axially outer end of which is on a circle of diameter less than the diameter of the circle on which the axially inner end is located, the first rim seat being extended axially outward by a low protrusion or hump and axially inward by a bearing surface intended to receive a tread support ring, and a wheel disk, joined on the side of the first rim seat to the radially inner wall of the rim. That wheel is such that the rim bearing surface, intended to receive the support ring, is equipped with elements in relief separated by recesses or hollows.

Those recesses or hollows in the bearing surface of the support ring are intended to limit the weight of the wheel.

That limitation can, however, prove inadequate, notably in case design imperatives demand connecting the outer profile of the disk direct to the outer seat (wheel described as "full face"). That wheel also presents construction difficulties, particularly when it is desired to make a sheet metal wheel.

The invention concerns a wheel which appreciably improves the previous wheel. That wheel R is composed of a rim with first and second rim seats, at least the first rim seat having a generatrix, the axially outer end of which is on a circle of diameter less than the diameter of the circle on which the axially inner end is located, said first rim seat being extended axially outward by a low protrusion or hump and axially inward by a bearing surface intended to receive a tread support ring, and of a wheel disk, joined on the side of the first rim seat to the radially inner wall of the rim. That wheel R is characterized in that the rim bearing surface consists of first and second support zones separated by a circumferential groove opening radially outward.

The applicant found, in fact, that the presence of two support zones is sufficient to ensure good stability of certain types of support rings, without the presence of ribs being indispensable.

That wheel has the advantage of significantly reducing the weight of the wheel.

The circumferential groove can advantageously serve as a housing for a pressure monitoring device.

It is also possible to cover the circumferential groove radially on the outside, at least in part, with a cylindrical hoop-shaped support intended to receive a tread support ring.

That wheel has the advantage of presenting two support zones reduced to a minimum, which make possible a remarkable weight gain. In that wheel the bearing function of the support ring is secured by a generally ring-shaped support, containing holes or not and which can be in one piece with the wheel removably or not or even with the support ring. That makes it possible, notably, to design full-face wheels of acceptable weight.

The wheel according to the invention can have a rim made from steel or aluminum alloy sheet metal. The disk can also be made from such sheet metal. The connection between the disk and the rim is then advantageously made by insertion under the circumferential groove.

The invention will be better understood by means of the attached drawing, illustrating nonlimitative working examples of a wheel designed for mounting on a 185/610 R 400 tire, in which drawing:

- Figure 1 is a meridian and schematic view of a monobloc wheel, as described in the aforesaid European application;
- Figure 2 is a top view of the rim of Figure 1;
- Figure 3(a) is a meridian and schematic view of a monobloc wheel according to the invention and Figure 3(b) is a variant of that wheel;
- Figure 4 is a view in meridian section of a thermoplastic support ring;
- Figure 5 is a view in meridian section of a rubber support ring;
- Figure 6 is a view similar to Figure 3 of a variant of a monobloc wheel according to the invention, full face;
- Figure 7 is a view similar to Figure 3 of a sheet metal wheel according to the invention;

- Figure 8 presents a wheel identical to that of Figure 7 equipped with a pressure monitoring device.

Figure 1 presents, in meridian and schematic view, a monobloc wheel 1, as disclosed in patent application EP 0,807,539. That wheel comprises a rim 10 with two rim seats 13' and 13" of equal diameters and the generatrices of which are inclined outward. The two seats are extended outward by protrusions or humps 15' and 15". The outer seat 13' is extended axially inward by a bearing surface 11, equipped in turn on its other end with a positioning stop 16 of a support ring intended to be mounted on that bearing surface 11. The inner seat 13' is extended axially inward by a rim flange 14, delimiting with the positioning stop 16 a mounting groove 12. As Figure 2 illustrates, the bearing surface 11 is equipped with triangular-shaped recesses 111. Those recesses 111 are axially delimited axially by the transverse ribs 113 of the bearing surface and circumferentially by circumferential ribs 112.

The wheel 2, shown in Figure 3(a), largely repeats the characteristics of the wheel 1 presented in Figure 1. It differs, however, in that the diameters of the two seats 23' and 23" are unequal, the first seat 23', placed on the outer side of the wheel 2, having a diameter less than that of the second seat 13". That makes it possible to reduce the depth of the mounting groove 22.

In accordance with the invention, the bearing surface 21 of that wheel 2 consists of a first support zone 211 and a second support zone 212 separated by a circumferential groove 213 opening radially outward.

That circumferential groove makes it possible to reduce substantially the weight of the wheel 2 relative to the wheel 1 and greatly facilitates construction.

The bearing surface 212 contains a radially outer protrusion 26 serving as axial stop for a support. That protrusion can also be a radially inner protrusion 26', as illustrated in Figure 3(b). In that case, the inner surface of the support contains a rib of suitable shape for being locked inside on mounting on the wheel 2. Such a support is made preferably of rubber (see Figure 5).

The wheel 2 also contains valve hole 24 placed in the outer edge 214 of the circumferential groove 213. That valve hole emerges outside the disk 20.

The two support zones 211 and 212 are adapted to bear a support ring such as that presented in meridian section in Figure 4. That support ring 3 comprises an annular crown 31 intended to come in contact with the tire tread in case of serious reduction of the tire inflation pressure. Two bases 32 and 33 extend radially inward from the crown. Those bases have their ends fitted, when the support ring is mounted on the wheel 2, to bear on the two support zones 211 and 212. Lugs 34, 35, bearing on the inner edges 214 and 215 of the support zones 211 and 212, prevent any axial sliding outward from the circumferential groove 213 of the bases 32 and 33. Those bases are evenly distributed on the circumference of the support ring. The support ring 3 can, notably, be made of reinforced thermoplastic material. The shape of the support ring makes possible its ovalization on mounting in a tire prior to mounting of the tire and support wheel assembly around the wheel 3.

Support rings essentially made of rubber can also be used, as described, for example, in application EP 0,796,747 and presented in Figure 5. Such a support ring 4 contains a generally ring-shaped base 41 reinforced by a longitudinally oriented ply 411, a roughly ring-shaped crown 42, with longitudinal grooves 421 on its radially outer wall and a

ring-shaped connecting body 43 between the base and the crown. The ring-shaped connecting body 43 contains a first solid part 431 as well as a second part 432 containing recesses extending axially over roughly more than half the body 43 and emerging on the outer side of the support. Those recesses are evenly distributed over the circumference of the body 43 and define radial walls.

For such support rings, the two support zones may have an insufficient surface and that limits the efficiency of running flat.

In that case, Figure 6 presents a monobloc wheel 5, in which the bearing surface 53 contains two support zones 531 and 532 separated by a circumferential groove 533. The two support zones serve as bearing for a support 55 of a support ring similar to that of Figure 5. The support 55 is ring-shaped and is a metal hoop with a radially outer protrusion 551 placed at its axially inner end, intended to block the axial displacement of the support ring.

The support 55 is rigidly fastened to the bearing surface 53, for example, by welding, crimping or gluing. It can also be removably fastened or form part of the support ring.

This method of construction of a wheel according to the invention makes it possible to increase the axial width of the circumferential groove 533 very appreciably and therefore to reduce the total weight of the wheel markedly. That is particularly important when designing wheels, like that of Figure 6, the disk 52 of which is connected to the rim 51 directly under the outer seat 54' (full-face wheel).

Figure 7 presents a wheel 6 similar to the monobloc wheel 2 of Figure 3, but obtained by assembly of a rim 61 and a disk 62 made from sheet steel. The assembly is carried out by inserting the disk 62 under the circumferential groove 613. As previously,

the valve 65 crosses the outer edge of the groove 613 through the hole 64 and emerges outside the disk 62. The wheel 6 can also be made of sheet aluminum.

The main difference, outside of the method of construction of the wheel, lies in the fact that the diameter of support zone 612 is greater than that of support zone 611. Consequently, a support ring, as presented in Figure 5 and properly stiffened in order to work efficiently on bearing on both zones 611 and 612, is locked against the inner edge 614 of the groove 613 and zone 612. The base 41 of the support 4 preferably has its outer geometry adapted to bear on the edge 614 and support zone 612.

The circumferential groove of the wheels according to the invention can advantageously serve as housing for a tire pressure monitoring device. That device 8 can, notably, be fastened to the valve 65, as illustrated in Figure 8.

CLAIMS

1. Wheel R (2, 5, 6) composed of a rim (51, 61) with first (23', 54') and second (23") rim seats, at least the first rim seat (23', 54') having a generatrix, the axially outer end of which is on a circle of diameter less than the diameter of the circle on which the axially inner end is located, said first rim seat (23', 54') being extended axially outward by a low protrusion or hump (15') and axially inward by a bearing surface (21, 53) intended to receive a tread support ring (3, 4), and of a wheel disk (52, 62) joined on the side of the first rim seat (23', 54') to the radially inner wall of the rim, characterized in that the rim bearing surface (21, 53) consists of first (211, 511, 611) and second (212, 512, 612) support zones separated by a circumferential groove (213, 513, 613) opening radially outward.

2. Wheel according to Claim 1, in which the outer edge (214, 615) of the circumferential groove (213, 613) contains a hole (24, 64) emerging outside the disk (20, 62) intended to receive an inflation valve (25, 65).

3. Wheel according to one of Claims 1 or 2, in which the circumferential groove (213, 513, 613) serves as housing for a tire pressure monitoring device (8).

4. Wheel according to one of Claims 1 to 3, in which the second support zone (212), placed on the side of the second rim seat (23") relative to the groove (213), contains a radially outer protrusion (26) intended to block the axial displacement of the support ring (3, 4).

5. Wheel according to one of Claims 1 to 4, in which the second support zone (212'), placed on the side of the second rim seat (23") relative to the groove (213), contains a radially inner protrusion (26') intended to block the axial displacement of the support ring (3, 4).

6. Wheel according to one of claims 1 to 3, in which the second support zone (612), placed on the side of the second rim seat (23") relative to the groove (613), has a diameter strictly greater than that of the first support zone (611), the edge (614) connecting the circumferential groove (613) and said second support zone (612) serving to bear the support ring and to block said support ring axially.

7. Wheel according to one of claims 1 to 6, in which the said bearing surface (53) is covered radially outside, at least in part, by a cylindrical hoop-shaped support intended to receive a tread support ring (3, 4).

8. Wheel according to claim 7, in which said hoop-shaped support (55) contains circumferentially arranged holes.

9. Wheel according to one of claims 7 or 8, in which said hoop-shaped support (55) is rigidly joined to the rim.

10. Wheel according to claim 9 wherein said hoop-shaped support (55) is rigidly joined to the rim by welding, crimping or gluing.

11. Wheel according to one of claims 7 or 8, in which said hoop-shaped support (55) is removably fastened to the rim.

12. Wheel according to claim 7, in which said hoop-shaped support (55) is in one piece with the tread support ring.

13. Wheel according to one of claims 1 to 12, in which the rim (61) is made of sheet metal.

14. Wheel according to claim 13, in which the rim (61) and the disk (62) are each made of sheet metal and in which assembly between the disk (62) and the rim (61) is carried out by insertion under the circumferential groove (613).

15. A wheel substantially as described herein by reference to Figure 3(a).

16. A wheel substantially as described herein by reference to Figure 6.

17. A wheel substantially as described herein by reference to Figure 7.

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