

AN IMPROVED WHEEL RIM

FIELD OF TECHNOLOGY

This invention relates to vehicle wheels for automobiles such as passenger
5 cars, trucks, buses, motor cycles and the like and more particularly to a
modified wheel rim for such vehicles that minimise the damage incurred to a
tyre when punctured.

BACKGROUND ART

Most automobile wheels have rims which are manufactured to an internationally
10 recognised standard, an example of which is shown in Figure 1 of the
accompanying drawings within this specification wherein a rim is attached to a
central disc to form the wheel. The purpose of the standardised rim profile is to
provide compatibility with the specifically designed tyre sizes and also to ensure
that adequate provision is also made for the mounting and demounting of tyres
15 to and from the rim.

Cover plates, hub caps or the like have been developed to improve the
aesthetic appearance of a wheel, by clipping on to the outer edge of the rim so
that the entire rim profile is hidden.

Following international standards the wheel rim must be designed for the
20 support of the bead of the tyre when the tyre is fixed to the rim and also allow
the mounting and demounting of the tyre from the rim. Accordingly each
standard wheel rim has a continuous circumferential bead seat which is of
comparable dimensions to the tyre to which must be fitted securely thereon the
rim.

25 These bead seats of the wheel rim are characterised in having opposed
shoulders which radially extend out from the same axis and are of the same

general height. Nonetheless the problems with these arrangements is that once a tyre is punctured and begins to deflate, the respective shoulders of the bead seat collapse down on top of the deflated punctured tyre.

5 The result is the collapsed tyre is sandwiched between the wheel rim and the road.

As is to be expected in many instances the automobile is inadvertently driven some distance after the puncture whether it be on purpose or otherwise. This can result in permanent damage to the tyre and it cannot be repaired and must be replaced. Even of greater concern is that the tyre can be damaged to the
10 extent that it comes off the rim which can then lead to a puncture blow out causing the driver to lose control of the vehicle.

Still further again as is to be expected, a car with a punctured tyre using these traditional wheel rims cannot be driven all that far in an emergency situation if damage to the tyre is to be avoided.

15 Therefore there remains a need in the field of providing wheel rims that can still meet the international rim standards in order to appropriately fit and contain a tyre thereon for use, but at the same time overcome the problem of substantially damaging such a tyre when punctured.

It is therefore an object of this invention to provide an improved wheel rim that
20 meets the international rim standards but still provide a rim profile that can ensure adequate provision in the securing, mounting and demounting of a tyre, to and from the rim, however at the same time substantially ameliorate the damage caused by such a rim profile when the tyre becomes punctured.

SUMMARY OF THE INVENTION

Accordingly in one form of the invention there is provided a wheel rim adapted to support a ground engaging tyre, said wheel rim including:

- 5 a tyre rim profile circumferentially positioned about the periphery of the wheel rim to provide adequate provision for support, mounting and demounting of tyres to and from the rim,

 said tyre rim profile including a bead seat, said bead seat having opposing shoulders that provide a fitment of the tyre to the wheel rim,

- 10 said bead seat further characterised in defining a radially extending protrusion from said bead seat,

 such that in the event of a tyre puncture the integrity of the tyre is maintained by virtue of the radial extended protrusion taking the weight of the vehicle during subsequent ground engagement thereafter puncture.

- 15 An advantage of such an arrangement is that as bead seat does not have the opposing shoulders that support the tyre of the same radial dimensions from the central axis, for example the same height, means that in effect one of the shoulders will extend out over the fitted tyre greater than the other.

- Consequently, if the tyre is punctured, rather than both shoulders equally
20 pressing down on the deflated tyre, what will happen is that the radially extended protrusion from one of the shoulders of the tyre bead seat, will in fact begin to ground engage the ground, thus taking away the vehicle support from the wheel of the tyre.

- As the radial extension protrudes from just the one shoulder, the opposing side
25 shoulder of the bead seat can then allow part of the deflated tyre to move in to

that empty space created by the height discrepancies between the respective shoulders.

As the person skilled in the art will appreciate that as the shoulders of the bead seat of the rim profile are of unequal heights with one higher than the other,
5 when the tyre is deflated during puncture, the weight of the car will be supported on this extended shoulder of the rim meaning that the tyre will be prevented from deflating or collapsing completely.

As is to be expected with such an important feature of the radially extended protrusion from one of these shoulders of the tyre bead seat of the rim profile,
10 means that the tyre is not likely to be damaged if the car needs to be driven some distance to safety or otherwise after the tyre becomes punctured.

In preference the radial extended portion from the bead seat, extends from the inner shoulder of the wheel rim.

An advantage of such an arrangement is that when fitted on the car and the tyre
15 is secured within the rim profile, the actual wheel rim will look on casual inspection just like any other international standard rim design.

As the person skilled in the art will appreciate the inner rim and the extension there from by virtue of the radial protrusion is not easily visible from outside of the vehicle so it will not alter the look in any way of the vehicle to which this
20 improved wheel rim has been installed.

In preference the radial extended protrusion from the bead seat would extend such that it is approximately one third of the height of the inflated tyre which has been mounted to the wheel rim.

Hence as can be seen from above in the broad description this invention, the
25 improved wheel rim has a very wide application as most transportation vehicles

run on pneumatic tyres mounted to standard rims, of which such tyres are frequently punctured.

While other alternatives have been presented in the past to try and improve vehicle safety when a tyre is punctured, including amongst other examples
5 installing a tyre within a tyre, as well as placing a special coating inside the tyre which may then minimise leakage if the tyre is penetrated by a nail or sharp object, these kinds of solutions are either very expensive or not useful if the particular nail or sharp object is too long or big.

So there still remains a clear need to come up with a simple cost effective wheel
10 rim that meets international rim standards so as to easily allow tyres to be mounted and secured thereon, but at the same time reduce the permanent damage to a tyre when it is punctured and a vehicle continues to be put in motion.

The invention introduced above and now to be described in greater detail in a
15 preferred embodiment with the accompanying illustrations achieves such objectives by virtue of introducing a very unique feature through modifying the profile of the bead seat which extends about the rim, through a radially extended protrusion, adapted to support the weight of the vehicle in the moments after a pneumatic tyre has been punctured.

20 BRIEF DESCRIPTIONS OF THE DRAWINGS

Figures 1a, 1b and 1c show cross sectional representations of the prior art, illustrating the general international standard wheel rim with a tyre mounted thereon in Figure 1b, and the puncture thereof said tyre in Figure 1c.

Figure 2 is a perspective view of the improved wheel rim provided for in this
25 invention.

Figures 3a and 3b show cross sectional views of a tyre being mounted to the wheel rim, with Figure 3b showing the tyre when punctured.

DETAILED DESCRIPTION OF THE ILLUSTRATIONS

As shown in Figures 1a there is provided an international standard wheel rim 10
 5 which has a standardised rim profile 16 to provide compatibility with the specifically designed tyre sizes 26 to allow for fitting and the straight forward mounting and demounting of the tyres to and from the wheel rim 10.

The rim profile 16 is supported about a central disc 11 of which is adapted to be mounted on a vehicle 13 (not shown).

10 The rim profile 16 runs circumferentially about the central disc 11 supported by frame 14.

Nonetheless the focus of this invention is associated with the rim profile 16 per se rather than the actual wheel rim in its entirety.

As the prior art shows, the standard rim profile includes a bead seat having
 15 opposed shoulders as shown with features 20, 22.

The tyre 26 is able to be mounted in the rim profile 16 with the tyre beads resting on shoulders 20, 22.

Nonetheless as best seen in Figure 1c if the tyre 26 becomes deflated by way of a puncture or the like, these shoulders 20,22, also sometimes referred to as
 20 flanges or extensions of the bead seat 16, as they are of the same circumferential distance from the central support, have no choice but to literally clamp down onto the deflated tyre 26, sandwiching it to the ground.

As the person skilled in the art will appreciate and as illustrated in Figure 1c, when the tyre becomes deflated, this deflated tyre still needs to support the entire weight of the vehicle, and so it will not take long after the puncture for the tyre to become unrepairable.

5 Figures 2, 3a and 3b shows the improved wheel rim of this invention.

As with other international rim standards, there is a rim profile 36 which is supported by a central disc 31 adapted to be mounted to a vehicle.

The rim profile 36 of the wheel rim in this instance is supported by the frame structure 33 extending from the central disc 31. 34 shows the external
10 circumferential edges of the frame 33.

Nonetheless what is essential to this invention is the profile of the rim or the bead seat shown at 36 not the entire wheel rim per se.

Unlike the prior art where the two opposing shoulders of the bead seat were of comparable dimensions, in this instance shoulders 40 and 42 are of differing
15 heights by virtue of the radial extended protrusion 38 coming from shoulder 42.

In this preferred embodiment the radial extended protrusion comes from the inner shoulder 42 of the wheel rim 30.

As can be seen the tyre 29 on its inner side is also cushioned up against the radial extension 38.

20 Therefore as best seen in Figure 3b if the tyre becomes punctured and begins to deflate, rather than shoulders 40 and 42 coming crashing down on the tyre thereby meaning the tyre holds all the weight of the vehicle, extension 38 begins to ground engage and therefore the tyre 29 is not sacrificed.

Advantageously as the shoulder extension 38 from shoulder 42 is at a greater height than the opposing shoulder 40, this opening provided for by the height differential between the opposing shoulders means that the deflated tyre 29 can make its way out through the open area shown as 43.

- 5 Advantageously the radial extension 38 takes the support of the vehicle while at the same time the height differential between the respective shoulders 40 and 42 accommodates spacing to allow the deflated tyre 29 to extend partially thereinto.

As the person skilled in the art would appreciate that with such an arrangement
10 the punctured tyre 29 need not be totally deflated and therefore substantial damage to the tyre is averted.

- As shown in Figure 3a when the wheel rim 30 is mounted to a vehicle by virtue of the central disc 31, and the tyre 29 begins to ground engage the ground 44, where puncture occurs and the tyre 29 deflates as in Figure 3b, the radial
15 extension 38 takes over the support for the wheel and means that by virtue of the height differential between the opposing shoulders of the bead seat, the deflated tyre is not sandwiched between the metal rim profile and the road.

CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A wheel rim adapted to support a ground engaging tyre, said wheel rim including:
 - 5 a tyre rim profile circumferentially positioned about the periphery of the wheel rim to provide adequate provision for support, mounting and demounting of a tyre to and from the rim,

said tyre rim profile including a bead set, said bead seat having opposing shoulders that provide a fitment of the tyre to the wheel rim,
 - 10 said bead seat further characterised in defining a radially extending protrusion from said bead seat,

such that in the event of a tyre puncture the integrity of the tyre is maintained by virtue of the radial extended protrusion taking the weight of the vehicle during subsequent ground engagement thereafter the puncture.
- 15 2. The wheel rim of claim 1 wherein the radially extending protrusion from the bead seat, extends from the inner shoulder of the wheel rim.
3. The wheel rim of claim 2 wherein the radially extending protrusion from the bead seat would extend such that the protrusion is approximately one third of the height of the inflated tyre which has been mounted on the wheel rim.
- 20 4. A wheel rim according to the wheel rim described and referenced with figure 2.