

[54] **WHEEL**
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3,348,597 10/1967 Goldberg 301/63 PW
 3,582,141 6/1971 Kelsey 301/64 R

FOREIGN PATENTS OR APPLICATIONS

59,480 6/1938 Norway 301/63
 578,256 9/1924 France 301/63 DS

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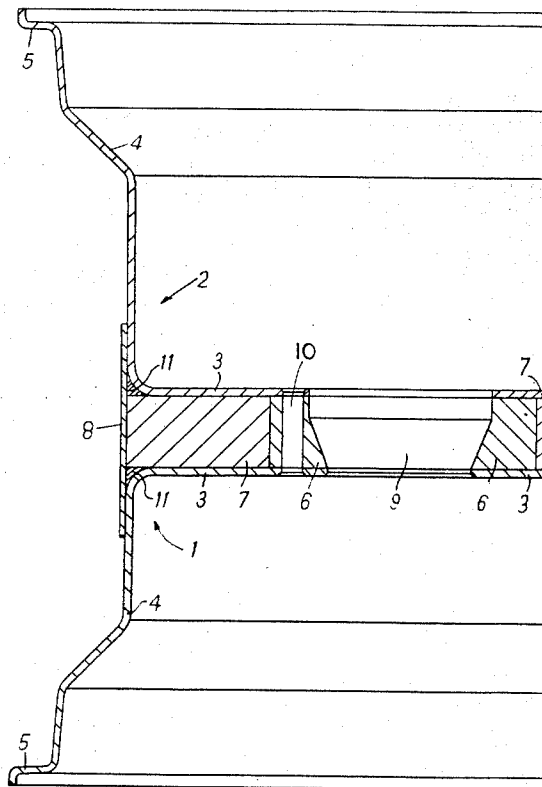
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[57] **ABSTRACT**

The present invention relates to a vehicle wheel and more particularly to a light-weight wheel for high performance cars such as racing and sports cars. The wheel is constructed from wrought metal, which is better able to withstand stresses than the same metal which have been cast, by securing together, base to base, two generally dish-shaped members with a light-weight spacer means located between the bases.

[56] **References Cited**
UNITED STATES PATENTS
 3,153,557 10/1964 O'Brien 301/6

15 Claims, 2 Drawing Figures



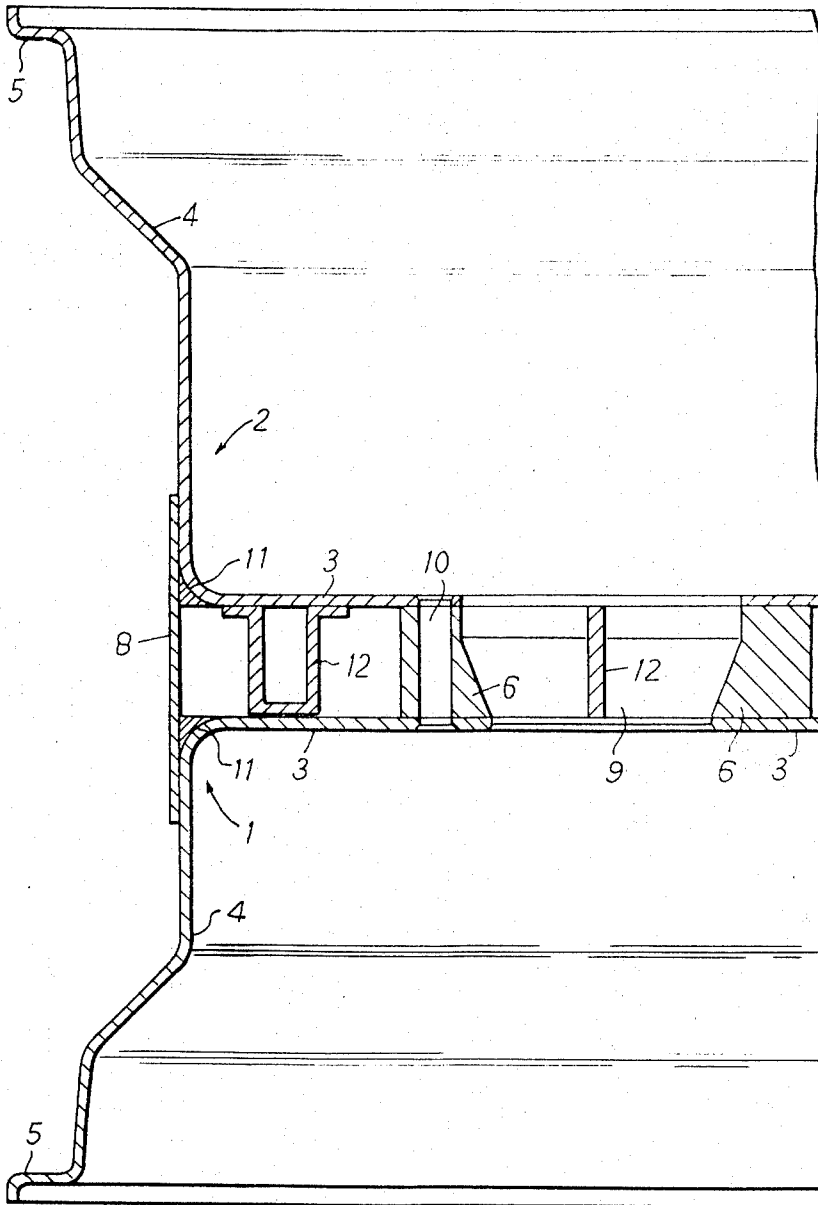


Fig. 2

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WHEEL

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BACKGROUND OF THE INVENTION

Wheels for high performance cars have a wide rim width usually ranging from 8 1/2 inches to 18 inches and are manufactured individually from a light-weight alloy such as a magnesium alloy. Each wheel is cast in the selected alloy and machined to meet the requirements of the user. Generally, because of the wheel design, only the rim can be machined economically and so weight reduction at low stress areas in the region of the hub is limited by the minimum castable thickness. As a consequence the wheels are not only expensive to make but are heavier than strength and rigidity requirements dictate. Further, cast alloys, are not able to withstand stresses as well as the same alloys that have been wrought, that is shaped by pressing or spinning from rolled sheet or forged from a cast billet.

SUMMARY OF INVENTION

According to the present invention a wheel comprises a pair of circular, wrought metal dishes each having a base integral with a wall portion terminating in an outwardly projecting circumferential rib, the dishes being arranged base to base with the wall portions extending away from each other and spacer means located between the bases, a hub portion and a circumferential tension plate extending between the wall portions. At least part of the hub portion may extend between the opposed faces of the dish bases.

Preferably the spacer means is a disc-like packing piece and is advantageously formed of an expanded material for example, expanded plastics such as expanded polyurethane or polystyrene or of a material having a honeycomb structure formed from plastics material or of a light weight metal such as aluminium or aluminium alloy.

Preferably, all the parts forming the wheel are adhesively bonded one to the other, suitable adhesives include epoxy resin adhesives and an adhesive known as Redux BSL 312. Any gaps between one part and another are advantageously filled with a foaming adhesive such as Redux BSL 204.

BRIEF DESCRIPTION OF DRAWING

So that the invention may be clearly understood embodiments of a wheel according to the invention, together with a method of constructing it, is now described by way of example, reference being made to

FIG. 1 shows a part of an axial section of the wheel according to one embodiment of the present invention; and

FIG. 2 shows a part of an axial section of the wheel similar to that in FIG. 1, but according to an alternative embodiment of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The wheel, as seen in the embodiment of FIG. 1, comprises an inboard dish 1 and an outboard dish 2. By 'inboard' is meant a part which when mounted on a car is adjacent the car body and by 'outboard' is meant a part which when mounted on a car is remote from the car body.

The dishes 1 and 2 are formed from a magnesium alloy by a conventional pressing technique. Each dish comprises a base 3 with integrally formed wall portion

4 terminating in outwardly projecting circumferential rib 5. The dishes 1 and 2 are arranged base to base with their wall-portions 4 outwardly directed. The dish bases are spaced by a hub portion 6 also formed of magnesium alloy and by a disc-like packaging piece 7 constituted by an aluminium honeycomb. A tension plate 8 is located circumferentially of the hub 6 and packing piece 7 and extends transversely into contact with the wall-portion 4 of each of the dishes 1 and 2.

The hub 6 has a central passageway 9 to receive a drive-shaft (not shown) and four equi-angularly spaced passages 10 on centres concentric with the passageway 9 to receive bolts or studs (not shown) for securing the wheel to a drive-shaft in known manner.

The parts of the wheel just described are all secured one to the other by means of a suitable adhesive.

To construct a wheel according to the invention one of the dishes, say dish 1, is placed on a horizontal surface with its base portion 3 uppermost. The base portion 3 is coated with a layer of adhesive, for example, an adhesive known as Redux BSL 312. The hub 6, coated round its periphery with the same adhesive, is placed centrally on the base portion 3. The disc-like packing piece 7 of honeycomb aluminium which has a central aperture snugly to receive the hub 6, is located about the hub 6 on the base portion 3. The uppermost surfaces of the hub 6 and the packing piece 7 are coated with the same adhesive as before and the other dish 2 is located base portion 3 downwards on the hub 6 and packing piece 7 co-axially with them. The wall-portions 4 adjacent the packing piece 7 of both dishes 1, 2 and the periphery of the packing piece 7 are coated with the same adhesive as previously used, and the spaces 11 between the peripheries of the base portions 3 and the peripheral edges of the packing piece 7 are filled with a foaming adhesive such as Redux BSL 204. The tension plate 8 is wrapped round to engage the periphery of the packing piece 7 and the adjacent, adhesive coated parts of the wall portions 4 of both dishes 1 and 2. The whole assembly is clamped together to maintain the parts co-axial and the adhesive is caused to cure by heating. Once the adhesive has cured the assembly is unclamped and the wheel is complete by passageway 9 and the four passageways 10.

It will be appreciated that the passageway 9 and the four passageways 10 may be formed in the hub 6 and matching passageways may be formed in the bases 3 of the dishes 1 and 2 prior to assembly. In many instances, it is preferable to perform the passageway forming operations before assembling and bonding the parts since the passageways can be used with an appropriate jig to facilitate locating and clamping of the parts of the wheel accurately co-axial of one another.

The disc-like packing piece 7 may be formed of a number of generally segmental pieces adhered along their contacting edges to form a disc with a central aperture. The packing piece 7 may be formed of a honeycomb of plastics material instead of aluminium, or may be made from a solid plastics foam, such as expanded polystyrene or polyurethane.

In an alternative construction, as illustrated in FIG. 2, the spacer means is formed by at least four diaphragms extending radially from the hub at equi-angularly spaced locations around the hub. The diaphragms are elongated members of generally U or Z shaped cross-section. In the case of the U-section diaphragm 12 the bight of the U is secured, for example

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by welding or rivetting, to the base 3 of one dish 1 and each arm, which has an outwardly extending flange, is similarly secured to the base 3 of the other dish 2. In the case of the Z-section diaphragm, the oppositely directed arms of the section are secured to the base of the respective one of the dishes by, for example, welding or rivetting.

In this construction the tension plate is welded to the wall portions of the dishes.

It is to be understood that welding in the present context is to include spot welding. However, when spot welding is used to secure the tension plate to the dish wall-portions a sealing compound or material will be used to form a seal between the tension plate and the wall-portions to permit the use of tubeless tyres.

Although the dishes 1 and 2 have been described as being formed from magnesium alloy, they may be made of any other suitable light-weight alloy or even a heavier metal or alloy such as steel if the weight of the wheel is not a critical factor for example when the wheel is to be used on a car other than a high performance car.

The dishes 1 and 2 may be spun instead of pressed, but pressing has certain advantages in that the male and female dies of the pressing tool may be varied in dimensions by means of packing pieces so as to increase or decrease the height of the wall-portions 4, that is the distance between the bases portion 3 and the flange 5. Thus wheels of different rim widths can be produced without the need for radical changes in the press tool.

It will be appreciated that the dish 1 is shaped to provide a wheel suitable for use with outboard brakes. However, dish 1 may be identical in shape with dish 2 if the wheel is to be used with inboard brakes.

I claim:

1. An automobile wheel comprising a pair of circular, wrought metal dishes each having a base integral with a wall portion terminating in an outwardly projecting circumferential rib for gripping the edge of a tire, the dishes being arranged base to base with the wall-portions diverging away from each other from their bases and spacer means located between the bases, a hub portion and a circumferential tension plate extend-

ing between the wall-portions.

2. A wheel according to claim 1, in which at least part of the hub portion extends between the opposed faces of the dish bases.

3. A wheel according to claim 1, in which the spacer means is a disc-like packing piece formed of a solid plastics foam.

4. A wheel according to claim 3, in which the plastics foam is selected from polyurethane and polystyrene.

5. A wheel according to claim 1, in which the spacer means is a disc-like packing piece formed from a material having a honeycomb structure.

6. A wheel according to claim 5, in which the material of honeycomb structure is formed from plastics material.

7. A wheel according to claim 5, in which the material of honeycomb structure is formed from a light-weight metal.

8. A wheel according to claim 7, in which the light-weight metal is selected from aluminium and an aluminium alloy.

9. A wheel according to claim 1, in which said spacer means and said dishes, said hub and said dishes, and said tension plate spacing means and dishes are adhesively bonded one to the other.

10. A wheel according to claim 9, in which the adhesive is an epoxy resin adhesive.

11. A wheel according to claim 9, in which the adhesive is Redux BSL 312.

12. A wheel according to claim 1, in which any gaps between one part and another are filled with a foaming adhesive.

13. A wheel according to claim 12, in which the foaming adhesive is Redux BSL 204.

14. A wheel according to claim 1, in which the spacer means comprises at least four diaphragms extending radially from the hub at equi-angular spaced locations around the hub and secured to the bases of the dishes.

15. A wheel according to claim 1, in which the tension plate is secured to the wall-portions of the dishes by welding.

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