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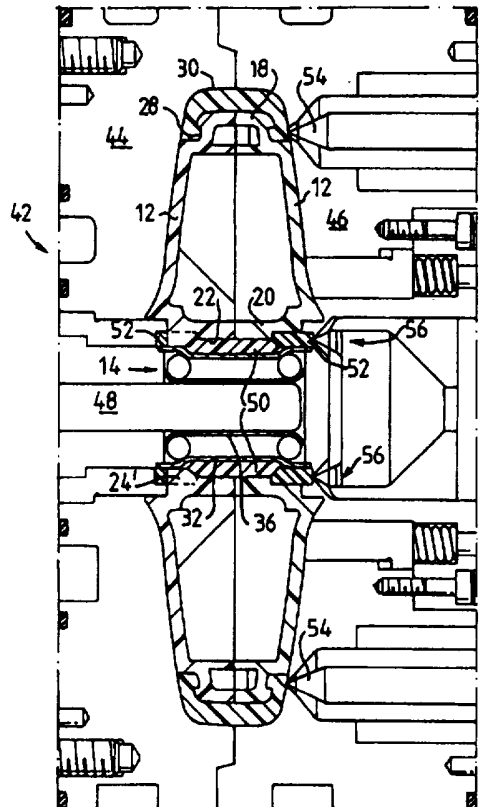
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(54) Title: METHOD FOR MOUNTING OF A BEARING IN A WHEEL HUB, AND A WHEEL MANUFACTURED BY THE METHOD

(57) Abstract

The invention concerns a method for mounting a bearing in a wheel hub, and a wheel manufactured by the method. In the method a wheel body (12, 12) is placed in a mould (44, 46) with a tubular-shaped bearing (14) placed in a hub part (20) of the wheel body. An annular tread (30) is die cast around the outer periphery (18) of the wheel body (12, 12), preferably at the same time as the bearing (14) is fixed in the hub part of the wheel body (20) by a die casting (50) at least partly surrounding the bearing. The hub part (20) in the wheel according to the invention comprises axially separated, annular arranged support members (24, 24') having at least one axial opening (26) and engaging radially a casing part (32) of the bearing (14). The bearing is thereby axially fixed by means of a die cast, elastic plastic material in a space (50) between the outer casing part (32) and an inner wall surface (22) of the hub part (20).



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Method for mounting of a bearing in a wheel hub, and a wheel manufactured by the method

The present invention concerns partly a method for mounting of a tubular-shaped bearing in a hub part of a wheel, the bearing having an elongated cylindrical casing part, which is shaped to be radially supported by axially separated, annular arranged support members in the wheel's hub part, and partly a wheel comprising a wheel body with a hub part, which contains a cylindrical, tubular-shaped bearing.

During the manufacturing of wheels for carts, light freight vehicles and the like, for example wheels for shopping trolleys which are normally found in shops and supermarkets, various separate sub-operations are required for the manufacturing of the wheel body itself, the moulding and the fastening of a tread as well as the mounting and the attachment of wheel bearings.

A general purpose of the present invention is to achieve a simplification in, and a reduction of the cost of, manufacturing such a wheel .

In its broadest sense, this is achieved according to the invention by axially fixing the bearing in the hub part by introducing an elastic plastic material, via at least one axial opening in at least one of the annular support members, into a space defined by the casing part and an inner wall surface of the hub part between the axially separated support members. An annular flange element can also be shaped around the casing part axially outside the annular support members. In this way an extremely good axial fixing of the bearing is achieved.

Preferably, the wheel body in this method has two complimentary wheel halves and a tubular-shaped bearing placed in a hub part jointly formed by the wheel halves, where the bearing has an elongated cylindrical casing part with parts shaped to be radially supported by axially separated, annular support members arranged in the wheel's hub part, wherein the method comprises the steps of jointly fixing the wheel's hub part by axially fixing the bearing in the hub part by means of an elastic plastic material, which is introduced, via at least one axial opening in at least one of the annular support members, into a space defined by the casing part and an inner wall surface of the hub part between the axially separated

support members, and preferably simultaneously die casting around the outer periphery of the wheel halves an annular tread holding the wheel halves' peripheries together.

5 Preferably, the moulding of the tread and the attachment of the bearing is accomplished with the same kind of material. The mouldings material used can be made of an elastic plastic material, such as an elastomer, which can be a synthetic rubber, for example polyurethane rubber or the like.

10 The wheel according to the invention is characterized in that the hub part comprises axially separated, annular arranged support members having at least one opening and engaging radially a casing part of the bearing, and that the bearing is axially fixed in the hub part by a die cast, elastic plastic material in a space defined by the casing part and an inner wall surface of the hub part.

15 Further details and features of the invention will become evident below with reference to the attached drawings, in which:

fig. 1 is a perspective view of a wheel composed of two wheel halves having a tubular bearing placed therein;

fig. 2 is a side elevation of one wheel half seen from the outside;

20 fig. 3 is a side elevation of the wheel half from fig. 2 seen from the inside;

fig. 4 is a cross-section through a moulding tool in which two complimentary, identical wheel halves are placed with a tubular bearing mounted in the hub section; and

fig. 5 is a longitudinal section through the tubular-bearing of the wheel.

25 Fig. 1 shows a wheel generally denoted 10, which is made of two preferably identical, complimentary wheel halves 12 (fig. 2 and 3), and a single tubular-shaped bearing 14 in the hub section of the wheel 10. The wheel halves 12 have a disc shaped radial part 16 with an outer peripheral part 18 and an inner hub part 20 and are preferably formed of a thermosetting plastic or another material which is shape stable after being formed. Each hub part 20 comprises a cylindrical inner wall surface 22 with radial support flanges 23 (fig. 3)  
30 and an annular support member situated axially externally thereof for radial support of the tubular bearing 14. In the shown embodiment, the annular support member has the shape of a ring 24 extending radially inwardly relative to the cylindrical inner wall surface 22 and

in which a number of recesses 26 are distributed around the circumference, thereby forming a number of annular arranged radial support bosses 24' for the tubular bearing 14. The peripheral part 18 of each wheel half 12 has a circumferential groove 28 which forms an anchoring groove for a tread 30 (fig. 4), such as is more closely described below.

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As shown in fig. 5, the type of bearing 14, which is used in the wheel 10 according to the invention, is a tubular-shaped roller bearing, which comprises an outer, elongated cylindrical bearing casing 32 having two outer bearing races 34 situated at the ends, and an inner cylindrical bearing casing 36 having inner bearing races 38 at the ends, a respective row of ball shaped bearing bodies 40 being disposed in between the outer and inner bearing races 32, 38. The outer diameter (at 34) of the outer bearing casing 32 substantially corresponds to the inner diameter of the annular support members 24, 24' of the wheel hub.

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During the manufacture of a wheel 10 according to the invention the wheel halves 12 are first die cast in a separate mould (not shown) wherein, for example, a thermosetting plastic is used so that the wheel halves 12 will become light, strong and shape stable. Then, two wheel halves 12 are laid mirror inverted towards each other in a moulding tool generally denoted 42 (see fig. 4) which comprises two mould halves 44, 46. A tubular bearing 14 is held centrally placed in the hub jointly formed by the wheel halves 12 by means of a fixture 48, so that the bearing's outer bearing races 34 are held in a position opposite to the radial support members 24, 24' in the wheel hub. In a subsequent operation a die casting material is injected into a mould cavity defined by the wheel's peripheral part 18 and the mould halves 44, 46 to form a tread 30 joining the wheel halves 12, and into a space 50 defined by the inner wall surface 22 in the hub part 20 and the outside of the outer casing part 32 of the bearing 14, via cuts or openings 26 in the ring-shaped support member 24.

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Simultaneously, ring flanges 52 are also formed axially outside the support bosses 24', as shown in fig. 1 and 4. The injection of the moulding material for the moulding of the tread and the axial bearing attachment takes place at circumferentially separated spots both for the moulding of the tread 30 and for the bearing attachment, as is shown by nozzles 54 resp. 56 in fig. 4.

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During the assembly of wheel halves 12 in the moulding tool 42 the radial support bosses

24' of the wheel halves 12 can be so displaced in the circumferential direction relative to each other that the support bosses 24' in one wheel half axially confront an opening 26 in the other wheel half, such as indicated in fig. 4. In this manner the strength of the axial attachment of the bearing 14 in the hub 20 can be improved by means of the cast material.

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An elastic plastic material, for example an elastomer such as polyurethane rubber or similar material, is preferably used as the moulding material for the tread 30 and the axial bearing attachment. The moulding of tread 30 and the axial bearing attachment is preferably performed at the same time and with the same material. It is however possible within the scope of the invention to use different materials for the tread 30 and the bearing attachment and to perform the moulding of these at different times, even if this is a less satisfactory alternative. It is likewise possible that instead of using hollow complimentary wheel halves 12 to use a single solid wheel body.

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By means of the method according to the invention it is therefore possible during the manufacture of a wheel in the one and same operation to form on the one hand a tread, which joins together the wheel's two wheel halves, and on the other hand to fix an elongated cylindrical tubular bearing in the wheel hub with the one and same elastic material.

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Claims

1. Method for mounting of a tubular-shaped bearing (14) in a hub part (20) of a wheel (10), where the bearing (14) has an elongated cylindrical casing part (32) with parts shaped to be radially supported by axially separated, annular support members (24, 24') arranged in the hub part of the wheel, **characterized** by axially fixing the bearing in the hub part by introducing elastic plastic material, via at least one axial opening (26) in at least one of the annular support members (24, 24'), into a space (50) defined by the casing part (32) and an inner wall surface (22) of the hub part between the axially separated support members (24, 24').
2. Method according to claim 1, **characterized** in that the elastic plastic material is made of a elastomer, such as a synthetic rubber, for example polyuretane rubber or the like.
3. Method for manufacturing a bearing-equipped wheel (10), which has two complimentary wheel halves (12) and a tubular-shaped bearing (14) placed in a hub part (20) jointly formed by the wheel halves (12), said bearing (14) having an elongated cylindrical casing part (32) with parts shaped to be radially supported by axially separated, annular support members (24, 24') arranged in the wheel's hub part, **characterized** by the steps of jointly fixing the hub part (20) of the wheel by axially fixing the bearing (14) in the hub part by introducing an elastic plastic material, via at least one axial opening (26) in at least one of the annular support members (24, 24'), into a space (50) defined by the casing part (32) and an inner wall surface (22) of the hub part between the axially separated support members (24, 24'), and preferably simultaneously die casting around the outer periphery (18) of the wheel halves an annular-shaped tread (30) holding the wheel halves' (12) peripheries together.
4. Method according to claim 3, **characterized** by forming axially outside the annular support members (24, 24') an annular flange element (52) by the elastic plastic material around the casing part (32).
5. Method according to claim 3, **characterized** by forming the tread (30) and the attachment of the bearing (14) by the same kind of material.

6. Method according to claim 3, **characterized** in that the elastic plastic material is made of an elastomer, such as a synthetic rubber, for example polyurethane rubber or the like.
7. Wheel for carts, vehicles or the like, comprising a wheel body (12, 12) with a hub part (20), which contains a cylindrical, tubular-shaped bearing (14), **characterized** in that the hub part (20) comprises axially separated, annular arranged support members (24, 24') having at least one axial opening (26) and engaging radially a casing part (32) of the bearing (14), and that the bearing is axially fixed to the hub part by a die cast, elastic plastic material in a space (50) defined by the casing part (32) and an inner wall surface (22) of the hub part (20).
8. Wheel according to claim 7, **characterized** in that the bearing (14) is also axially fixed by a respective annular flange element (52) made from the elastic plastic material around the casing part (32) axially outside the annular support members (24, 24').
9. Wheel according to claim 7 or 8, **characterized** in that the axially separated radial support members (24, 24') for the bearing (14) each have the shape of a radially inwardly directed ring flange.
10. Wheel according to claim 9, **characterized** in that the ring flange (24) has a plurality of axial openings (26) distributed around its circumference.
11. Wheel according to any of claims 7-10 in which the wheel body consists of two complimentary wheel halves (12, 12), **characterized** in that portions of the wheel halves (12) forming the hub part (20) are axially joined by the elastic plastic material (50, 52), and that outer peripheral parts (18) of the wheel halves (12) are joined by a tread (30) of elastic plastic material of preferably the same type as that which fixes the bearing and the hub part.

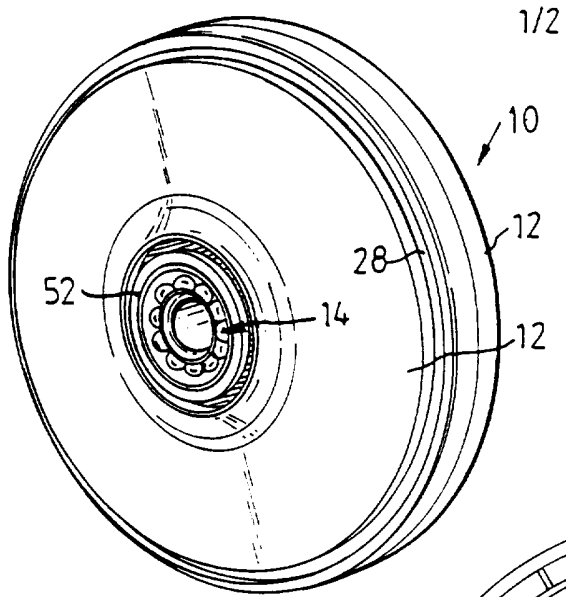


FIG. 1

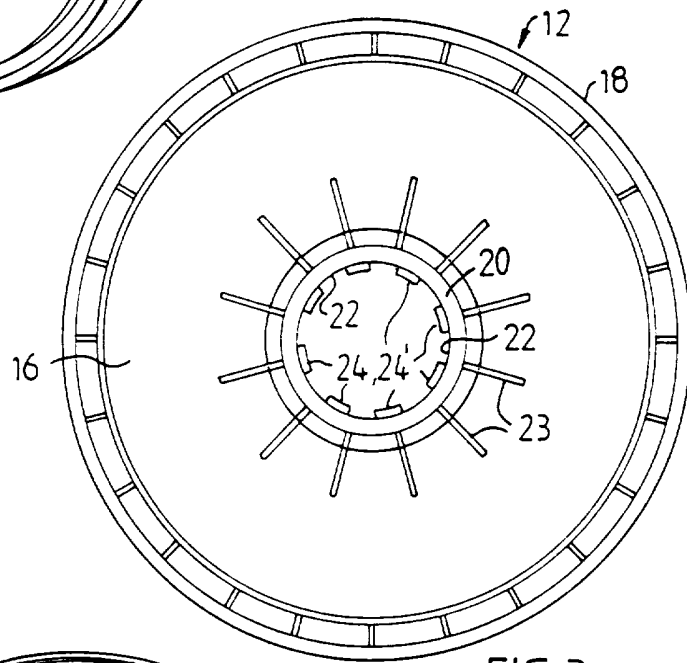


FIG. 3

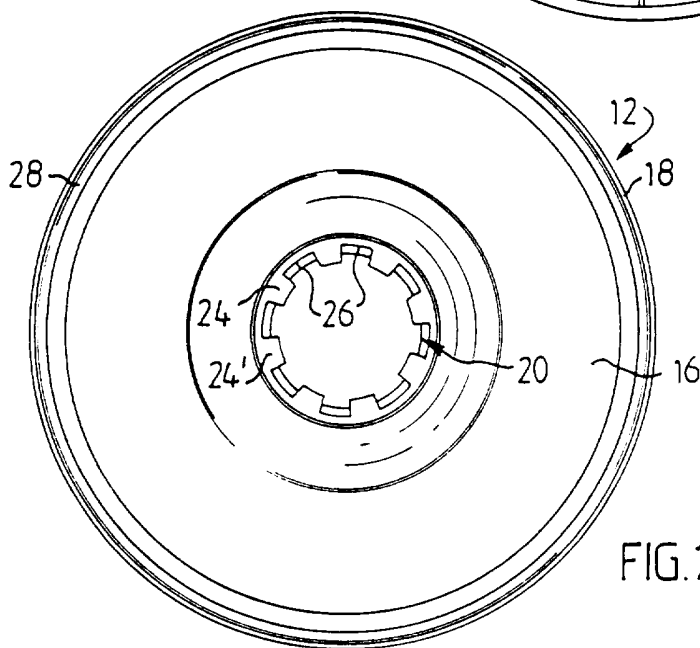


FIG. 2

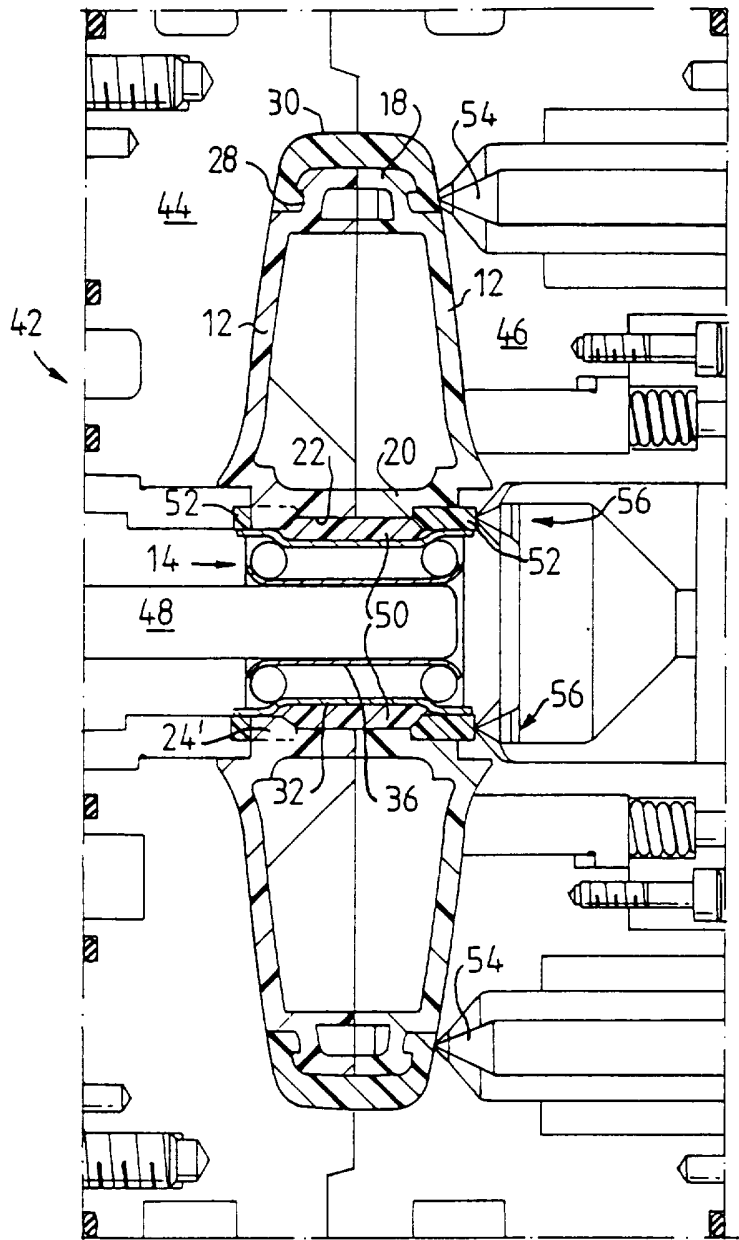


FIG. 4

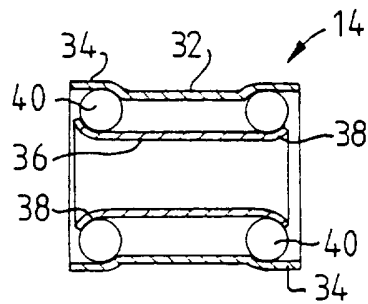


FIG. 5

# INTERNATIONAL SEARCH REPORT

International application No

PCT/SE 95/00884

**A. CLASSIFICATION OF SUBJECT MATTER**
**IPC6: B60B 5/02**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

**IPC6: B29C, B60B**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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A	US 3578812 A (FREDERICK TAUSSIG LADUE ET AL), 18 May 1971 (18.05.71) --	1

 Further documents are listed in the continuation of Box C.

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International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

02/10/95

International application No.

PCT/SE 95/00884

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