Our Ref: 419877

P/00/001
Section 29

AUSTRALIA

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651861

PATENT REQUEST : STANDARD PATENT

I/We, being the person/s identified below as the Applicant, request the grant of a patent to the person/s indicated below as the Nominated Person/s, for an invention described in the accompanying standard complete specification.

Full application details follow.

[71] [70] Applicant/s and Nominated Person/s:
Pierre Abel Martin,
of Quartier les Roches, LORIOL, 26270, FRANCE,
Christian Pascaud,
of 8, rue Jules Ferry, LE POUZIN, 07250, FRANCE,
Jean-Marie Riffard,
of 7, Les Charmilles, LIVRON, 26250, FRANCE

[54] Invention Title:
Wheel rim made of composite materials for cycles and the like

[72] Name/s of actual inventor/s: (optional)
Pierre Abel MARTIN; Christian PASCAUD; Jean-Marie RIFFARD

[74] Address for service in Australia:
DAVIES COLLISON CAVE, Patent Attorneys
10 Barrack Street, SYDNEY NSW 2000 Attorney Code : CA

BASIC CONVENTION APPLICATION/S DETAILS:

[31] Appln No.:	[33] Country:	Code:	[32] Date:
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Drawing number recommended to accompany the abstract:

DATED this THIRD day of FEBRUARY 1992

Pierre Abel Martin, Christian Pascaud, Jean-Marie Riffard
By Patent Attorneys
DAVIES COLLISON CAVE

Hector Cumming

HECTOR CUMMING, FIPAA

Fee: $ 192.00

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Section 29(1)
Regulation 3.2(2)

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NOTICE OF ENTITLEMENT

We, PIERRE ABEL MARTIN, CHRISTIAN PASCAUD and JEAN-MARIE RIFFARD being the applicants/Nominated Persons in respect of Application No. 10632/92 state the following :

The Nominated Persons are entitled to the grant of the patent because the Nominated Persons are the inventors.

The Nominated Persons are entitled to claim priority from the basic application listed on the patent request because the Nominated Persons are the applicants in respect of the basic application and because the basic application was the first application made in a Convention country in respect of the invention.

Dated this 31st day of May, 1994.

.....

a member of the firm of
DAVIES COLLISON CAVE
for and on behalf of
the applicant(s).

AU9210632

(12) PATENT ABRIDGMENT (11) Document No. AU-B-10632/92
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 651861

(54) Title
WHEEL RIM MADE OF COMPOSITE MATERIALS FOR CYCLES AND THE LIKE

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(71) Applicant(s)
PIERRE ABEL MARTIN; CHRISTIAN PASCAUD; JEAN-MARIE RIFFARD

(72) Inventor(s)
PIERRE ABEL MARTIN; CHRISTIAN PASCAUD; JEAN-MARIE RIFFARD

(74) Attorney or Agent
DAVIES COLLISON CAVE , GPO Box 3876, SYDNEY NSW 2001

(56) Prior Art Documents
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EP 0195418
GB 2097729

(57) Claim

1. A wheel rim for cycles and the like, comprising at least two box structures each formed by a core made of a material of cellular strucutre closely bonded to a substantially rigid outer wall formed by composite textiles of impregnated and polymerised synthetic fibres,

one of the box structures forming a rim body, whilst another of the box structures, forming an outer box structure, defines an outer peripheral rim section for receiving a tyre.

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Regulation 3:2

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ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Applicant(s): Pierre Abel Martin
Quartier les Roches
LORIOL 26270
FRANCE
Christian Pascaud
8, rue Jules Ferry
LE POUZIN 07250
FRANCE
Jean-Marie Riffard
7, Les Charmilles
LIVRON 26250
FRANCE

Address for Service: DAVIES COLLISON CAVE
Patent & Trade Mark Attorneys
Level 10, 10 Barrack Street
SYDNEY NSW 2000

Invention Title: Wheel rim made of composite materials for cycles and the like

The following statement is a full description of this invention, including the best method of performing it known to me.-

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FIELD OF THE INVENTION

The present invention relates to the domain of cycles in general, i.e. velocipedes, bicycles, even mopeds, without it being considered, a priori, that the domain of the invention excludes motorcycles.

The invention aims more particularly at improvements in the constitution of the wheels of such vehicles.

BACKGROUND OF THE INVENTION

Wheels of cycles and the like conventionally comprise a hub, an intermediate connecting part and a rim defining a section adapted to support and retain a peripheral tyre, whether the latter be of the solid or inflatable type.

Ordinarily, such wheels are constructed from metal pieces shaped specifically for the intrinsic function of the three constituent elements.

Although constructions with hub, spokes or fairing and metallic sectioned rim have given satisfaction, it has been found that they did not respond positively to the requirements of performances, due either to their weight, to their suppleness or, on the contrary, to their too great rigidity.

It is to that end that, among a certain number of solutions of improvements, a construction has appeared, based on synthetic material including, most often, a metal hub or hub casing, embedded in a body of the fairing type with walls which are parallel or convergent with respect to the plane of the wheel. Such a fairing is most often made from composite materials including two walls based on impregnated and polymerized fabric reinforcing and stif fening a structural core of foam, generally of the closed cell type. Such a wheel

is completed by a belt or hoop defining an outer profile of rim type most often allowing a glued tyre to be fitted.

Such a construction makes it possible to obtain a light, resistant wheel which, however, presents two drawbacks preventing it from being marketed on a large scale.

The first follows from the dynamic reaction of the wheel in movement and, more particularly, from its sensitivity with respect to the side wind, due to the presence of the fairing.

The second is economic and follows from the high cost of producing such a wheel.

It should, in addition, be indicated that such a wheel, despite the presence of the inflatable tyre, is characterized by a certain stiffness often incompatible with the domains of use when not racing.

It is an object of the invention to overcome the drawbacks set forth hereinabove by proposing a novel wheel rim structure of composite materials, more particularly adapted for cycles and the like and which can be produced at a reasonable cost price for all domains of use and application, and to provide a particularly robust and reactive rim, especially of considerable solidity and lightness never attained up to the present time.

Another object of the invention is to propose a novel rim structure which may be employed equally well for a wheel with spokes, rods, and even fairings, and to receive tubeless or inner-tube type tyres provided that the basic structure has been slightly modified.

SUMMARY OF THE INVENTION

To that end, the wheel rim made of composite materials, for cycles and the like, is characterized according to the invention in that it comprises

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a wheel rim for cycles and the like, comprising at least two box structures each formed by a core made of a material of cellular strucutre closely bonded to a substantially rigid outer wall formed by composite textiles of impregnated and polymerised synthetic fibres,

one of the box structures forming a rim body, whilst another of the box structures, forming an outer box structure, defines an outer peripheral rim section for receiving a tyre.

Preferably, the outer wall is in the form of en envelope.

The invention also relates, by way of novel industrial product, to a wheel for cycles and the like, comprising a rim according to the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more readily understood on reading the following description with reference to the accompanying drawings, in which:

Figure 1 is a partial transverse section of the rim according to the invention.

Figures 2 and 3 are partial transverse sections illustrating two variant embodiments.

Figure 4 is a partial transverse section showing, on a larger scale, another embodiment of the rim.

Figure 5 is a view similar to Figure 4, showing a possible detail of embodiment of the rim.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to the drawings and to the first embodiment illustrated in Figure 1, the rim, generally designated by reference 1, is made of composite materials and presents in transverse or radial cross section a structure composed of two adjacent box-like structures 2 and 3, separated by a common wall 4 and respectively defining a rim body and a rim section.

The box structure 2 comprises a core 5 of

a material of cellular structure, with closed cells, for example made of rigid polycryinide foam. The core 5 is closely surrounded by an envelope 6 partly forming the common wall 4 and entirely surrounding the core 5 to which it is closely bonded. The envelope 6 is preferably constituted from textiles of glass and carbon fibers, impregnated with a thermosetting resin polymerized to give the envelope 6 a rigid character. The thickness of the envelope is preferably included between 0.5 and 1 millimetre, a thickness close to 0.75 millimetre generally being suitable. The thickness of the envelope 6 may advantageously be constituted by the draping of several constituent sheets of pre-impregnated composite textiles or of dry textiles which are intimately bonded by the addition of a complementary resin such as an epoxy resin.

It must be considered that the technological characteristics of the sheets of composite textiles and the pre-impregnation or impregnation resins are known to the man skilled in the art as far as the conditions of implementation are concerned.

The box structure 3 is made, in similar manner to box structure 2, from the same constituent products and consequently comprises a core 7 closely surrounded by and bonded to an envelope 8 partly defining the common wall 4. The thickness of the envelope 8 and that of the common wall 4 are preferably greater than that of the envelope 6 and, for example, included between 2 and 3 millimetres, a thickness of 2.5 millimetres being particularly suitable.

The box structure 3 is produced so that, by the annular outer periphery 9 that it defines, it forms a bearing surface of concave cross section

adapted to support and retain a tyre 10 of the inflatable type.

Although this has not been shown, the rim 1 may present, at least locally, an opening, passage or well, for example made in the plane of symmetry P-P', to allow, if necessary, a valve for inflating the tyre 10 to be positioned.

The rim described in Figure 1 is characterized by the association of two box structures of solid, closed type, adjacent each other and joined, each comprising a core and an outer envelope closely and intimately bonded thereto.

Such a structure is characterized by a high mechanical strength, by a maximum lightness, particularly by reason of the choice of the structural material and its low density.

The character of undeformability is completed by a resistance to chemical aggressions, rendering the rim not subject to deterioration.

It should be noted that the envelope 8 defines, between wall 9 and wall 4, two lateral walls or flanks 11 stiffening the box structure 3 and which may advantageously be used as friction areas for the application of brake blocks, if necessary.

Figure 2 shows a variant embodiment wherein the box structure 2 is formed by two elementary box structures 2a and 2b which are separated by a common wall 12 of the type of wall 4. In this embodiment, the rim 1 comprises three successive box structures disposed radially, box structure 3 still performing the function of support for the tyre 10 and of presenting side walls 11 for possible braking.

Figure 3 shows a second variant embodiment, in which the box structure 2 defining the rim body

is constituted by two elementary box structures 2_1 and 2_2 which, this time, are juxtaposed on either side of a common wall 12 which they define and which is located in plane P-P'. The wall 12 is constituted as described hereinbefore and is joined to the wall 4 common to box structure 2 and to box structure 3.

Figure 4 shows another embodiment of the box structure 3 which may be retained whatever the embodiment of box structure 2 or even an association of box structures 2a, 2b or 2_1, 2_2.

In this embodiment, box structure 3 is of the open type and is defined by wall 4 and the two lateral flanks 11 which are shaped at their ends to present two inner shoulders 13 adapted to allow the beads 14 of a conventional inflatable tyre, associated, or not, with an inner tube, to be positioned and retained. In this case, the rim section is completed by a recess 15 in the core 7, so as to define to some extent a section bottom 16 on which, for example, an air tube within the tyre 10 may bear.

A rim of the type described hereinabove may be used for constituting a wheel comprising a hub (not shown in the drawings), to which the rim is connected by an appropriate means, such as rods 20 shown in Figure 1. It is obvious that rods 20 may be replaced by a fairing 21 or by spokes 22. In such a case, as illustrated in Figure 5, it is advantageous to provide the rim, whatever the structure presented, with passages 25 opening out and traversing right through the rim, for example in plane P-P', for the positioning of spokes of which the screwed heads may occupy recesses 26 made coaxially to passages 25, more particularly

in the outer peripheral box structure 3.

Such recesses advantageously allow the head nut of the spoke to abut during tightening either on the outer wall 9 or on the adjacent wall 4 which is in any case made in order to be located concentrically to the axis of the wheel.

A preferred application of the invention lies in the constitution of racing cycle wheels.

The invention is not limited to the examples described and shown, as various modifications may be made without departing from the scope thereof.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the of any other integer or group of integers.

The claims defining the invention are as follows:-

1. A wheel rim for cycles and the like, comprising at least two box structures each formed by a core made of a material of cellular strucutre closely bonded to a substantially rigid outer wall formed by composite textiles of impregnated and polymerised synthetic fibres,

one of the box structures forming a rim body, whilst another of the box structures, forming an outer box structure, defines an outer peripheral rim section for receiving a tyre.

2. Rim according to claim 1, characterised in that it comprises three box structures disposed successively in the radial direction.

3. Rim according to claim 1, characterised in that it comprises two juxtaposed box structures separated by a common wall located in the plane of the wheel, and a third, comprising said outer box structure, joined to the two others and defining the rim section.

4. Rim according to one of claims 1 to 3, characterised in that the outer box structure is of the closed type and defines, by its outer peripheral wall, a bearing surface of concave cross section adapted for the fit of a tyre of the tubeless type.

5. Rim according to one of claims 1 to 3, characterised in that the outer box structure is of the open type and forms, from a section bottom, two internally shouldered flanks for the fit of the beads of a tyre of the type with inner tube.

6. Rim according to claim 5, characterised in that the section bottom is defined by a foam core.

7. Rim according to one of claims 1 to 6, characterised in that it is connected to a hub by rods.

8. Rim according to one of claims 1 to 6, characterised that the box structures are traversed by through passages for the assembly of spokes for connection to a hub.

9. Wheel for cycles and the like, comprising the rim according to one of claims 1 to 8.

10. Wheel rim for cycles and the like substantially as hereinbefore described with reference to the accompanying drawings.

11. Wheel for cycles and the like substantially as hereinbefore described with reference to the drawings.

DATED this 31st day of May 1994.

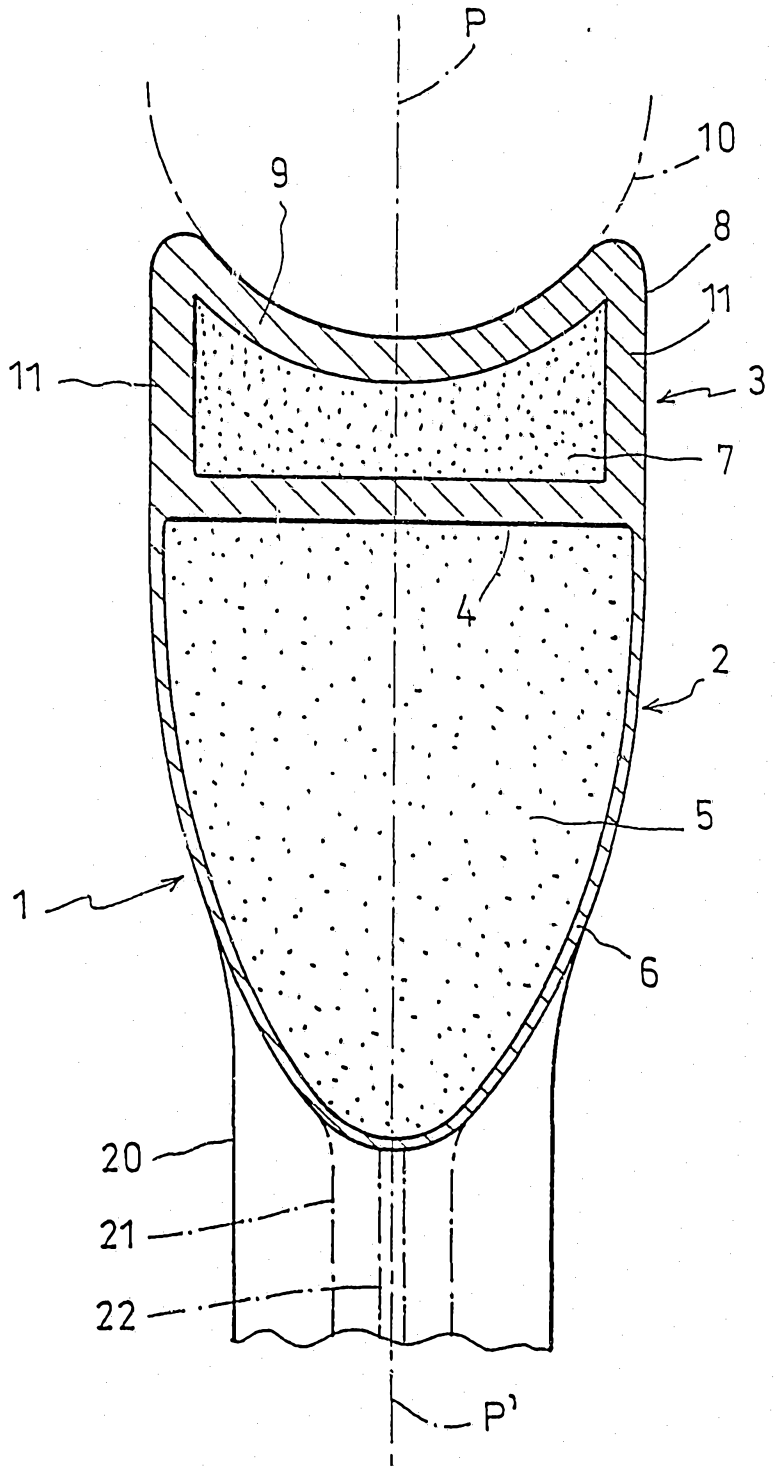
PIERRE ABEL MARTIN, CHRISTIAN PASCAUSE,
JEAN-MARIE RIFFARD
By Their Patent Attorneys
DAVIES COLLISON CAVE

ABSTRACT

A wheel rim, made of composite materials, for cycles and the like comprising at least two adjacent box-like structures (2,3) separated by a common wall (4) each box-like structure including a core, (5,7), of a material of cellular structure and an envelope (6,8) of rigid character, based on composite textiles of impregnated and polymerized synthetic fibers closely surrounding the core to which it is bonded, one of the box structures (2) constituting a rim body, whilst the other (3) defines an outer peripheral rim section intended for fit of a tyre.

10632/92

fig_1



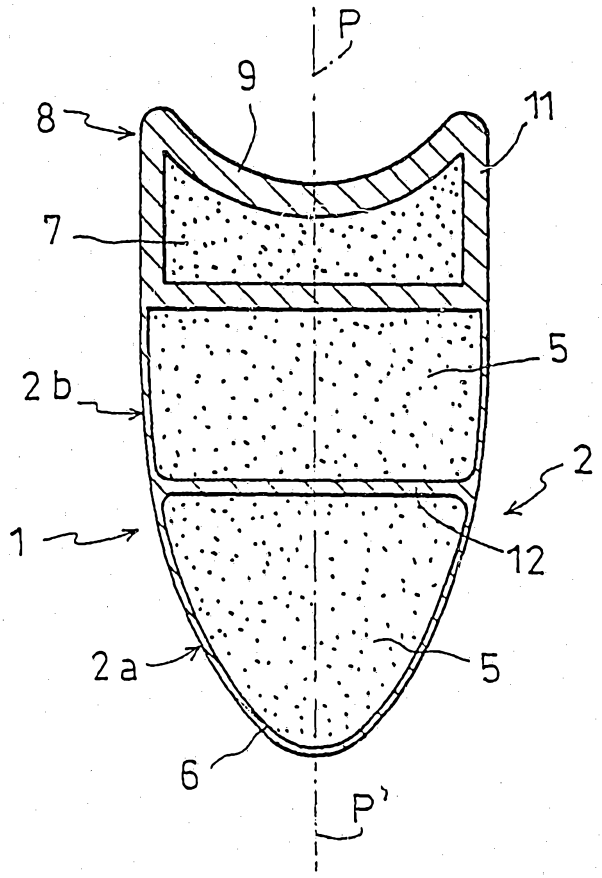


fig_2

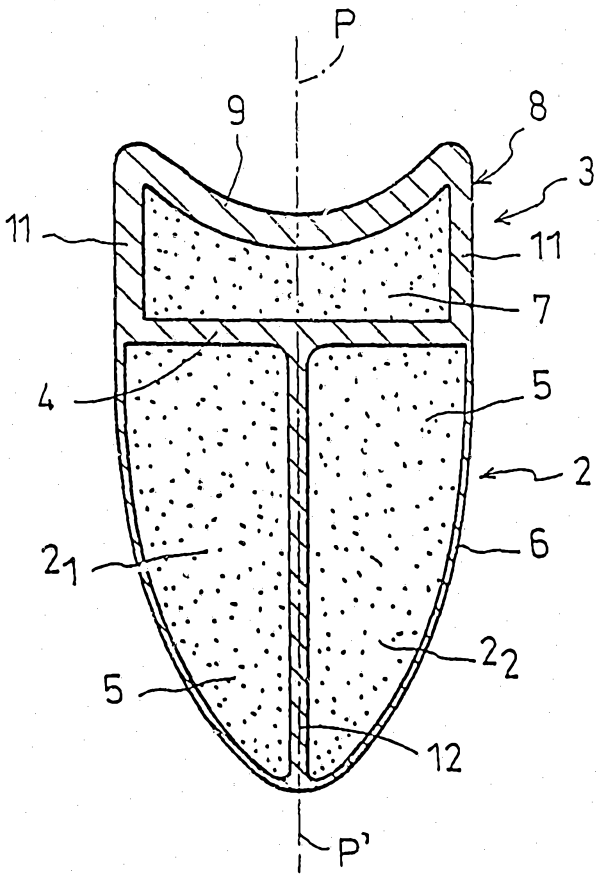


fig_3

fig_4

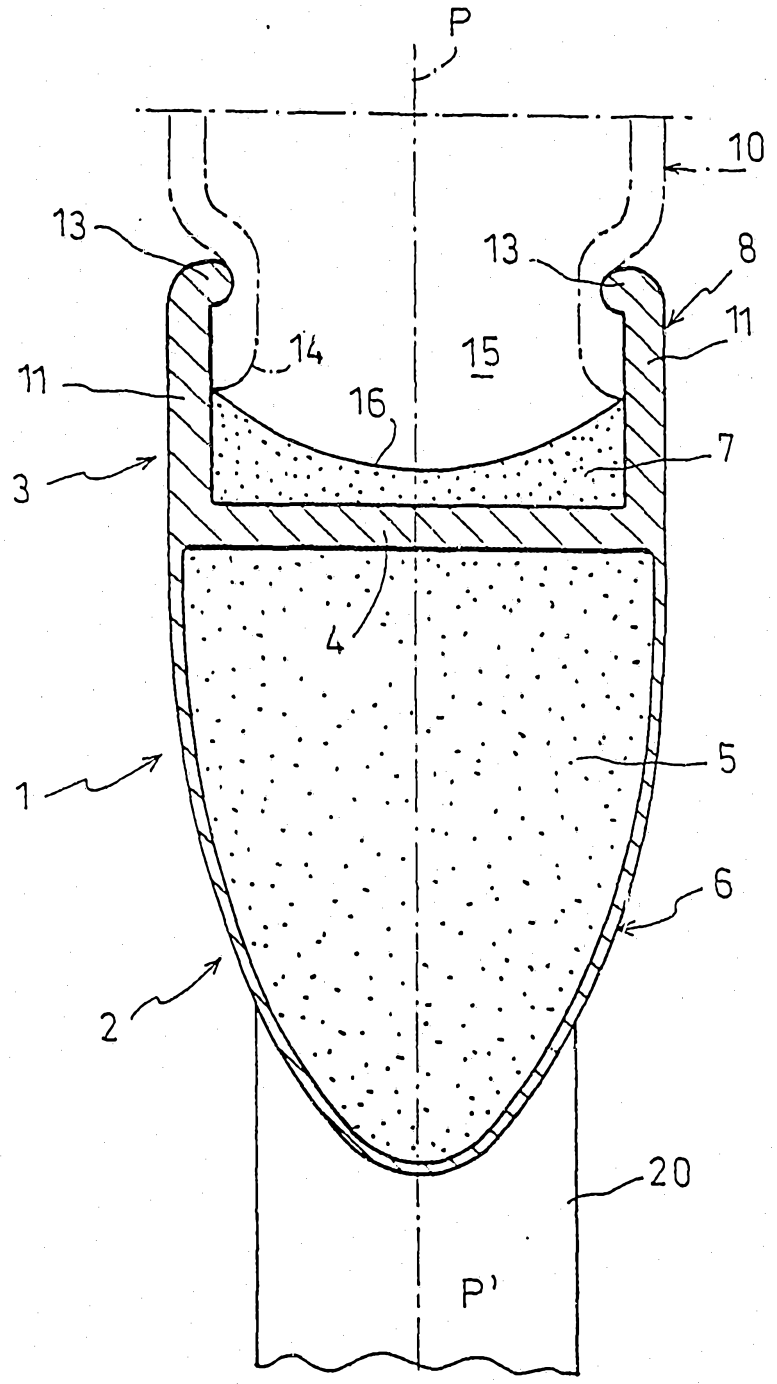


fig_5