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(71) Applicant: **Figaroli, Romina**
24060 Riva di Solto, Bergamo (IT)

(72) Inventor: **Figaroli, Romina**
24060 Riva di Solto, Bergamo (IT)

(74) Representative: **Eterno, Enrico**
Jacobacci & Partners S.p.A.
Piazza della Vittoria, 11
25122 Brescia (IT)

(54) **METHOD OF MANUFACTURING DECORATIVE ARTICLES AND DECORATIVE ARTICLE**

(57) Method of manufacturing of a decorative article (1, 1', 1", 50, 50') comprising steps of providing a tyre (2) for car or motorcycle, subdividing the tyre (2) to obtain tyre fractions (4), optionally covering at least partly one or more tyre fractions (4) with a protective layer, configured to prevent or limit a transit of substances through the thickness of such layer, and connect the product of step iii) to a supporting structure (10, 10', 10"), in a visible position, to obtain such decorative article (1, 1', 1", 50, 50').

The invention further relates to a decorative article not necessarily obtained through this method.

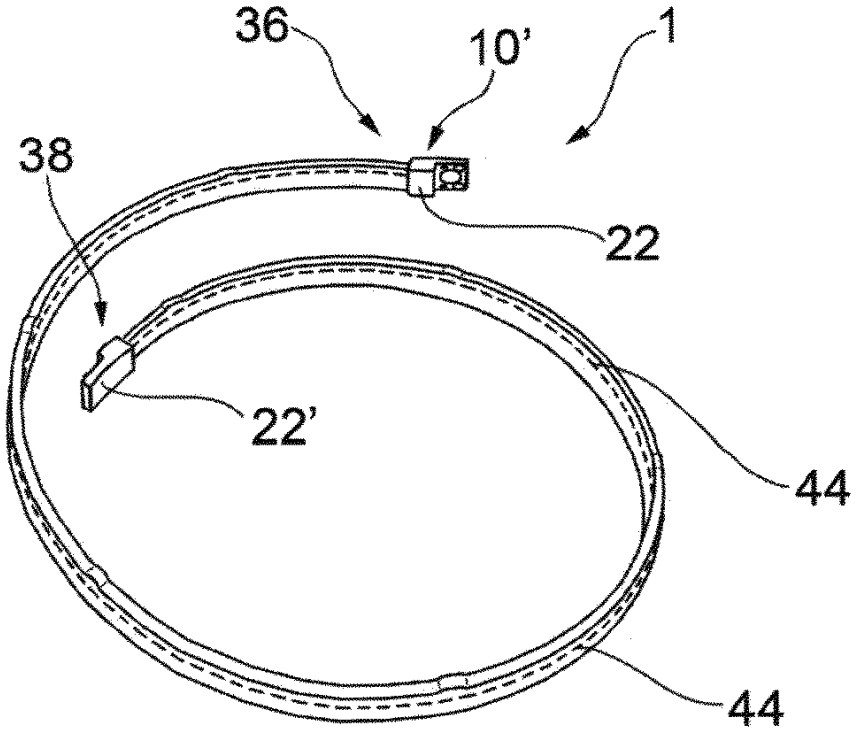

FIG.1

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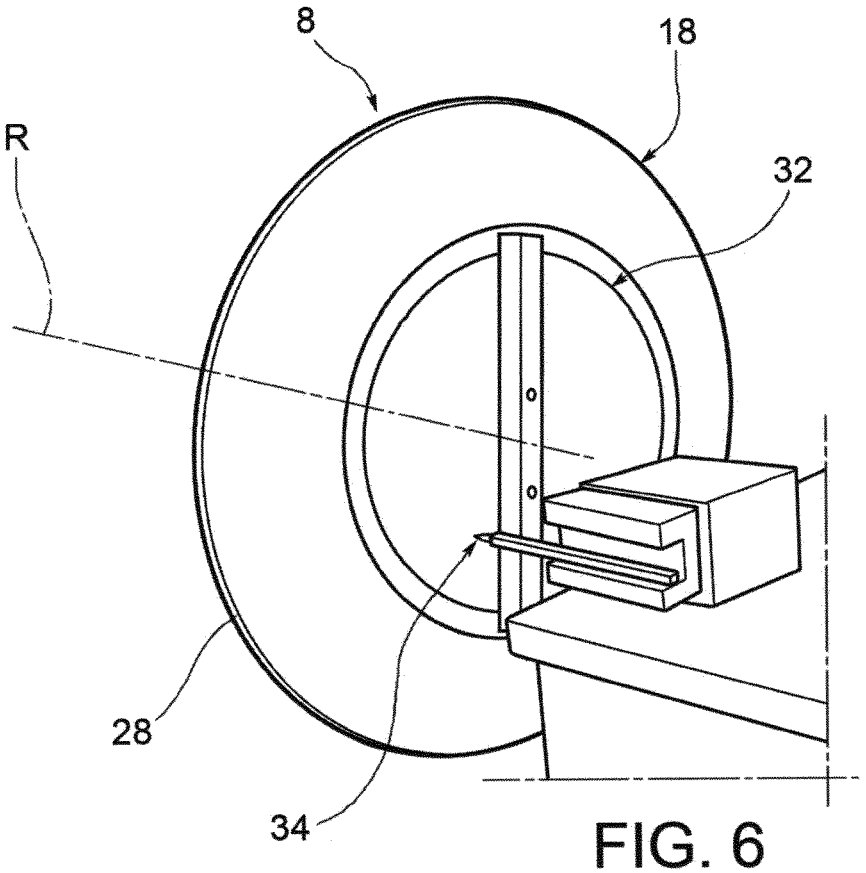


FIG. 6

Description

[0001] This invention relates to a method of manufacturing decorative articles and a decorative article not exclusively producible by means of the above method.

[0002] Worn car tyres have always been a significant environmental problem, mainly by virtue of the operations necessary for recycling the materials of which they are composed, without causing further damage to the environment, when they have reached the end of their useful life.

[0003] This invention is placed in the preceding context, proposing to provide an innovative method capable of reusing car and motorcycle tyres for the manufacture of high added-value articles, such as jewellery, advantageously allowing a marked reduction of waste materials.

[0004] This purpose is achieved by means of a method according to claim 1 and by means of a decorative article according to claims 13 and 14. The claims dependent on these show preferred embodiments.

[0005] The object of this invention will now be described in detail, with the help of the accompanying drawings, in which:

- Figures 1 and 2 show views of decorative articles, the object of this invention, according to possible embodiments;
- Figures 4, 5, 6, 7, 8 and 9 diagram the processing steps of a tyre in this method.

[0006] The above objective is achieved through a method of manufacturing a decorative article 1, 1', 1", 50, 50' comprising steps of:

i) providing a tyre 2 for cars or motorcycles, which extends in an annular manner around a tyre axis X;
ii) subdividing the tyre 2 to obtain tyre fractions 4;
iii) optionally covering at least part of (for example, completely) one or more tyre fractions 4 with a protective layer configured to prevent or limit a transit of substances through the thickness of said layer;
iv) connecting the product of step ii) to a supporting structure 10, 10', 10" in a visible position, to obtain said decorative article 1, 1', 1", 50, 50'.

[0007] It should be clarified that, in this description, the terms "radial", "axial", "circumferential" or "tangential" will always refer to the tyre axis X, unless otherwise specified. This axis X is usually substantially parallel to a rotation axis of the tyre, during its use.

[0008] With regard to the protective layer, this layer is preferably hypoallergenic.

[0009] According to further embodiments, the protective layer of step iii) is at least partially transparent and/or coloured.

[0010] Optionally, the protective layer could be fixed permanently to the tyre fractions 4.

[0011] In essence, the protective layer acts as a barrier between the compound of which the tyre fractions are constituted and the surfaces with which such fractions could come into contact. In this way, the fractions can be subject to reduced deterioration due to any substances with which they could come into contact (for example greasy or oily substances, or sweat). Likewise, the tyre fractions are at least partially prevented from yielding components of its compound (such as carbon black) through the protective layer, and thus into the surrounding environment.

[0012] According to still further embodiments, the protective layer of step iii) could be absent.

[0013] According to a particularly preferred embodiment, the tyre 2 of step i) is a competition and/or collectors' tyre used - in a certified manner - in a given car/motorcycle race.

[0014] The method according to this variant is thus intended for the recovery of a special type of tyre, which is a relic of a piece of automotive/motorcycle history.

[0015] According to a further preferred embodiment, the decorative articles 1, 1', 1", 50, 50' made from such tyre 2 are unique, numbered and/or traceable pieces.

[0016] Preferably, the decorative article 1, 1', 50, 50' is a piece of jewellery, in particular a bracelet 1, a necklace 1', a pendant 50 or an earring 50'.

[0017] According to different embodiments, the supporting structure 10, 10', 10" comprises a base or support portion 26, fastening semi-elements 22, 22' of a bracelet or necklace, a clip 42, an eyelet 40 for pendant, a brooch structure or the like.

[0018] Preferably, the supporting structure 10, 10', 10" could be at least partially constituted by at least one precious metal, in particular silver, platinum, gold, or combinations thereof.

[0019] According to a further variant, the decorative article 1" is or comprises a furnishing accessory, in particular an ornament, a clock (for example, see Figure 2), a frame or similar.

[0020] The protective layer is preferably applied to at least one surface 6 of the tyre fraction 4 (preferably to all the surfaces that delimit said fraction), through a solution of a protection agent (for example, comprising PTFE, silicone or an elastomer), and subsequent evaporation of this solution. For example, the solution could be of aqueous type.

[0021] According to another variant, the protective layer could be a layer in the form of film or tape, applied or coupled to one or more surfaces 6 of the tyre fraction 4. Merely by way of example, such a layer could be at least partially constituted by a strip of fabric, nonwoven fabric, leather and/or a polymeric material.

[0022] According to an embodiment, the tyre fraction 4 delimits at least one surface 6 disposed in a visible position on the decorative article 1, 1', 1", 50, 50'.

[0023] Preferably, the surface 6 is obtained during step ii) as a subdivision surface of the polymeric mass of at least one side 8, and/or a casing or a tread 12, of such a tyre 2. With regard to the definitions of "side", "casing"

and "tread", please refer to the following description.

[0024] In other words, during step ii) a bulk section is performed (i.e., through the polymeric mass of the tire 2), so as to create a pair of subdivision surfaces on two different tyre fractions 4. According to the variant just illustrated, the subdivision surfaces remain visible on the final article.

[0025] According to an advantageous variant, sections of reinforcing wire 44 embedded in the polymeric mass could be identifiable on the surface 6. In this regard, refer, for example, to the variant of Figure 1.

[0026] According to possible variants, step ii) could comprise sub-steps of wire drawing, laser cutting (with a low-intensity source to avoid damaging the compound) and cutting with water and/or an abrasive material (for example, silica).

[0027] According to an advantageous variant, step ii) comprises sub-steps of:

a) separating at least part of one or both sides 8 of the tyre 2 from a respective casing or from a respective tread 12; and

b) making said tyres fractions 4 from at least one side 8 and/or from said casing or said tread 12.

[0028] In this description, the term "side" means the part of the tyre that extends substantially in a plane orthogonal to the tyre axis X. The "casing" or "tread" instead means the portions that develop in a substantially cylindrical manner about the axis X.

[0029] According to a variant, during the sub-step b), the side of the tyre 8 is cut into tyre fractions 4, in the shape of a ribbon 14 or cord 16, in a circumferential direction C (figure 5) with respect to said axis X.

[0030] According to a further variant, following the sub-step b) the tyre fractions 4 comprise at least one ribbon 14 or cord 16 having a width in the range of 1-25 millimetres, preferably 2-15 millimetres, for example 2-6 millimetres.

[0031] According to a still further variant, the thickness of one or more tyre fractions 4 could be in the range 1-5 millimetres, for example 2-3 millimetres.

[0032] Optionally, the method could comprise a step of adjusting the length of the aforesaid ribbon 14 or cord 16, for example performed by a cutting operation.

[0033] According to a still further variant, sub-step b) comprises one or more steps of cutting (or lathing) the side 8 from a radially outermost portion 18 to a radially innermost portion 20 with respect to the tyre axis X, along a single, substantially spiral path or along a plurality of substantially circular and concentric paths.

[0034] Preferably, the at least one cutting step is performed from a radially outer edge 28 to a radially inner edge 30 of the side 8.

[0035] With reference, for example, to the embodiments of Figures 6 to 7, the side 8 could be mounted on a rotating support 32, so that the latter puts the side in rotation around a rotation axis R. During the rotation of the side, the rotating support 32 and a cutting tool 34 (for example a blade) are placed in mutual approach until contact of the tool 34 with the surface of the side 8, and further for the penetration of a sufficient depth in the side thickness so that the tool separates the tyre fractions 4.

[0036] Optionally, the cutting tool 34 could be mounted on a structure translatable radially or tangentially with respect to the rotation axis R, in order to achieve a substantially spiral cutting path through the combined rotation-translation motion, or a circular and concentric cutting path as discussed above.

[0037] According to a still further variant, sub-step b) comprises one or more steps of cutting (or lathing) the side 8 from a radially innermost portion 20 to a radially outermost portion 18 with respect to said tyre axis X, along a single, substantially spiral path or along a plurality of substantially circular and concentric paths.

[0038] Specifically, the at least one cutting step could be performed from a radially inner edge 30 to a radially outer edge 28 of the side 8.

[0039] According to an embodiment not illustrated, sub-step b) could comprise at least one step of die cutting.

[0040] According to a further embodiment, sub-step b) could comprise steps of making the tyre fractions 4 through sections in the radial direction of the side 8 with respect to the tyre axis X.

[0041] According to a preferred embodiment, during the sub-step b), the casing 12 is cut into tyre fractions 4 along an axial direction, substantially parallel to the tyre axis X, or along a substantially circumferential direction (for example for lathing).

[0042] Since the tyres also have a necessary metal reinforcement, an embodiment could provide that, following the step ii), any metal components of the divided tyre 2 are subjected to at least one granulation step and that the granules obtained are then separated gravimetrically.

[0043] The granules of polymeric material may then be destined to other uses.

[0044] According to a possible variant, following step ii), and preferably before step iii), the tyre fractions could be subjected to one or more of the following steps:

- detailed sorting in order to eliminate at least part of any foreign bodies (wood, stones, etc.);
- washing in a detergent solution, preferably non-acidic, in order to remove at least part of any surface deposits (such as oils, tars, grease or similar);
- drying at a temperature equal to or smaller than 50°C, for example at ambient temperature, advantageously at a constant temperature.

[0045] According to a further variant, following the step ii), and advantageously upstream of step iii), the tyre fragments 4 could be subjected to steps of removal of any burrs, finishing and/or surface smoothing.

[0046] The performance of one or more of such steps thus allows obtaining visually and qualitatively accepta-

ble homogeneous fragments ready to respond better to the possible phase iii), if conducted downstream of these steps of the method.

[0047] Optionally, downstream of one or more of the preceding removal, finishing and/or smoothing steps, the products could be subjected to washing with a detergent-softener (preferably not acidic), and drying at a temperature smaller than or equal to 50 °C, for example at ambient temperature, advantageously at a constant temperature.

[0048] Advantageously, the removal, finishing and/or smoothing steps precede step iv).

[0049] These objectives are also achieved through a decorative article 1, 1', 1", 50, 50' as specified below.

[0050] Since a preferred embodiment provides that such article be obtained through the method just illustrated, this article may include all the features deducible - even only implicitly - from the foregoing description. The reverse consideration is also valid, in which the aforesaid method may include any processing step deducible in structural terms from the following description.

[0051] The decorative article 1,1',50,50' is thus preferably a piece of jewellery.

[0052] This article is obtained partly from a tyre 2 for cars or motorcycles that extends in an annular manner around a tyre axis X.

[0053] The decorative article 1, 1', 1", 50, 50' comprises at least one tyre fraction 4, preferably a protective layer (for example hypoallergenic), which covers at least part of the tyre fraction 4 and which is configured to prevent or limit a transit of substances through the thickness of said layer, and a supporting structure 10, 10', 10" to which the tyre fraction 4 is attached in a visible position.

[0054] According to a possible embodiment, the article 1', 50' comprises a plurality of tyre fractions 4 mutually side by side.

[0055] According to a preferred variant, in an intermediate position of the tyre fractions (that is to say between the end portions 36, 38 of the fractions), the article comprises at least one transverse element 24 joining the tyre 4 fractions.

[0056] In other words, this element 24 realises a union of the tyre fractions in a transverse direction, so as to keep them adjacent in this direction.

[0057] Preferably, the transverse element 24 is shaped so as to bind two or more tyre fractions 4.

[0058] Optionally, the transverse element 24 could be constituted by at least one precious metal, in particular silver, platinum, gold, or combinations thereof. Advantageously, the metal of the transverse element 24 is the same as the supporting structure, for those variants that provide for such a metal structure.

[0059] Innovatively, the method of this invention allows brilliantly achieving the purposes mentioned in the opening, in particular to create a noble product from materials traditionally destined to incineration or gasification.

[0060] Advantageously, the method of this invention allows to manufacturing memorabilia related to the history of motoring and motorcycling, for enthusiasts, but not only, of these disciplines.

[0061] Advantageously, the method of this invention allows obtaining an article as faithful as possible to the original product from an aesthetic profile, but compatible with contact with the skin and other surrounding surfaces.

[0062] Advantageously, the article described is designed to last and to withstand any deteriorating factors.

[0063] Advantageously, the method of this invention allows optimising the recovery of the more noble parts of the tyre, and maximising the number of fragments obtainable.

[0064] Advantageously, the method of this invention allows excellent production economies, not only by virtue of the possible automation of some of the operations described.

[0065] Advantageously, the article of this invention retains a particularly artisanal character that is particularly appreciable from an aesthetic profile.

[0066] Advantageously, the uniqueness of the article of this invention resides also and above all in the different conformations, in the different positions and types of "cutting" of the tyre used.

[0067] Advantageously, the original reinforcement of the "raw material" tyre constitutes a unique decorative and characterising element, and further, for the tyre fractions that exhibit this detail.

[0068] To the embodiments of the aforesaid method and decorative article, one skilled in the art, in order to meet specific needs, may make variants or substitutions of elements with others functionally equivalent.

[0069] Even these variants are contained within the scope of protection, as defined by the following claims.

[0070] Moreover, each of the variants described as belonging to a possible embodiment can be realised independently of the other variants described.

Claims

1. Method for manufacturing a decorative article (1, 1', 1", 50, 50') comprising the steps of:

   i) providing a tyre (2) for cars or motorcycles, which extends in an annular manner around a tyre axis (X);
   ii) subdividing the tyre (2) to obtain tyre fractions (4);
   iii) covering at least part of one or more tyre fractions (4) with a protective layer, such as a hypoallergenic layer, configured to prevent or limit a transit of substances through the thickness of said layer;
   iv) connecting the product of step iii) to a supporting structure (10, 10, 10) in a visible position, to obtain said decorative article (1, 1', 1", 50, 50').

2. Method according to the previous claim, wherein the tyre (2) of step i) is a competition and/or a collection tyre, used - in a certified manner - in a given car/motorcycle race, and wherein the decorative articles (1, 1', 1", 50, 50') generated from said tyre (2) are unique, numbered and traceable pieces.

3. Method according to claim 1 or 2, wherein the protective layer of step iii) is at least partially transparent, and wherein said layer is applied to at least one surface (6) of said fraction of tyre (4) by means of a solution of a protective agent, for example comprising PTFE, silicone or an elastomer, and subsequent evaporation of said solution, for example of the aqueous type.

4. Method according to any of the previous claims, wherein the step ii) comprises sub-steps of:

a) separating at least part of one or both sides (8) of said tyre (2) from a respective casing or from a respective tread (12); and
b) making said tyres fractions (4) from at least one side (8) and/or from said casing or said tread (12).

5. Method according to the previous claim, wherein, during the sub-step b), the side of the tyre (8) is cut into tyre fractions (4), in the shape of a ribbon (14) or cord (16), in a circumferential direction (C) with respect to said axis (X).

6. Method according to claim 4 or 5, wherein, following the sub-step b) the tyre fractions (4) comprise at least one ribbon (14) or cord (16) having a width in the range of 1-25 millimetres, preferably 2-15 millimetres.

7. Method according to any of the claims 4-6, wherein the sub-step b) comprises one or more steps of lathing the side (8) from a radially outermost portion (18) to a radially innermost portion (20) with respect to said axis (X), along a single, substantially spiral path or along a plurality of substantially circular and concentric paths.

8. Method according to claim 4, wherein, during the sub-step b), the casing (12) is cut into tyre fractions (4) in a direction parallel to the tyre axis (X).

9. Method according to any of the previous claims, wherein, following the step ii), any metal components of the divided tyre (2) are subjected to at least one granulation step, wherein the granules obtained are then separated gravimetrically.

10. Method according to any of the preceding claims, wherein said decorative article (1, 1', 50, 50') is a piece of jewellery, in particular a bracelet (1), a necklace (1'), a pendant (50) or an earring (50').

11. Method according to any of the preceding claims, wherein the supporting structure (10, 10', 10") comprises fastening semi-elements (22, 22') of a bracelet or necklace, a clip (42), an eyelet (40) for pendant, a brooch structure or the like, preferably at least partially composed of a precious metal.

12. Method according to any of the preceding claims, wherein the tyre fraction (4) delimits at least one surface (6) disposed in a visible position on the decorative article (1, 1', 1", 50, 50'), said surface (6) being obtained during step ii) as a subdivision surface of the polymeric mass of at least one side (8) of said tyre (2), on said surface being identifiable sections of reinforcing wires (44) embedded in said mass.

13. Decorative article (1, 1', 1", 50, 50') directly obtained by means of the method according to claim 1.

14. Decorative article (1, 1', 1", 50, 50'), preferably a piece of jewellery, obtained in part from a tyre (2) for a car or motorcycle which extends in an annular manner around a tyre axis (X), comprising at least one fraction of tyre (4), a protective layer for example hypoallergenic, which covers at least part of the tyre fraction (4) and which is configured to prevent or limit a transit of substances through the thickness of said layer, and a supporting structure (10, 10', 10") to which the tyre fraction (4) is attached in a visible position.

15. Article according to the previous claim, comprising a plurality of tyre fractions (4) flanked to each other wherein, in an intermediate position of said fractions, said article comprises at least one transverse element (24), in at least one precious metal, joining the tyre fractions (4).

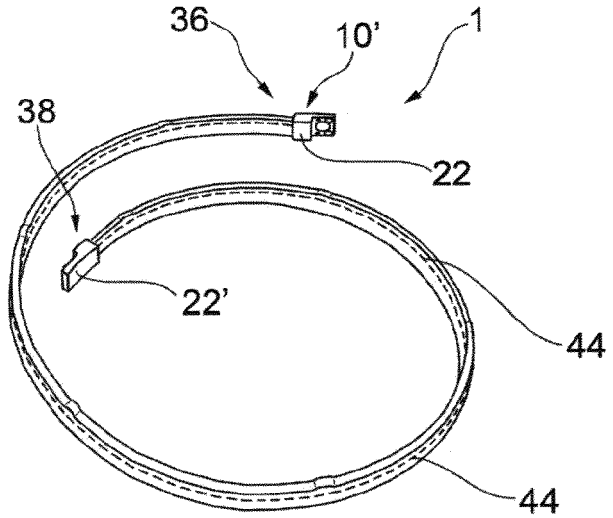


FIG.1

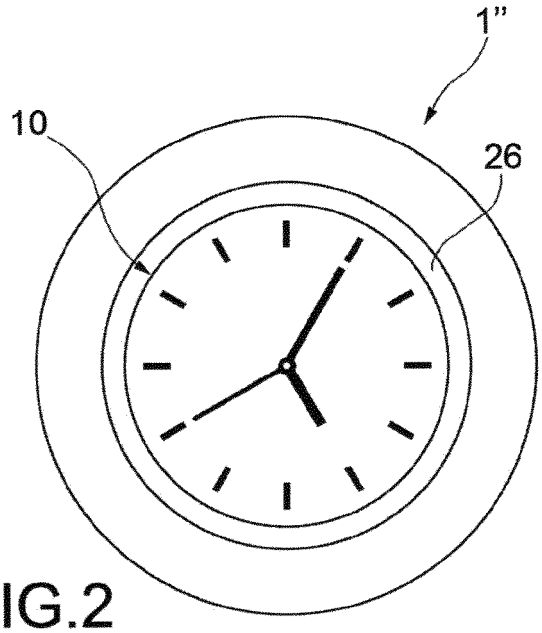


FIG.2

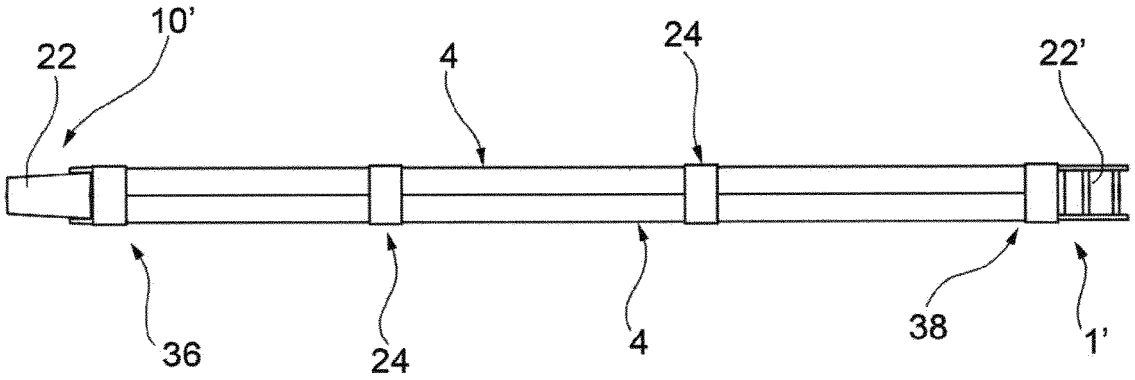


FIG.3

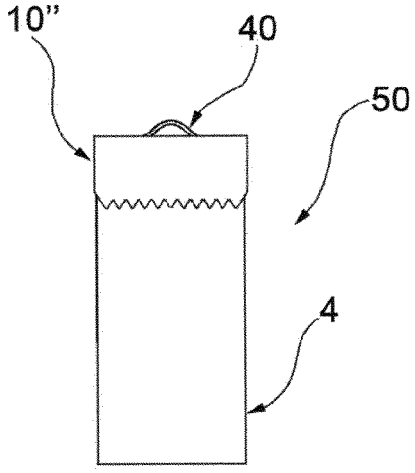


FIG10

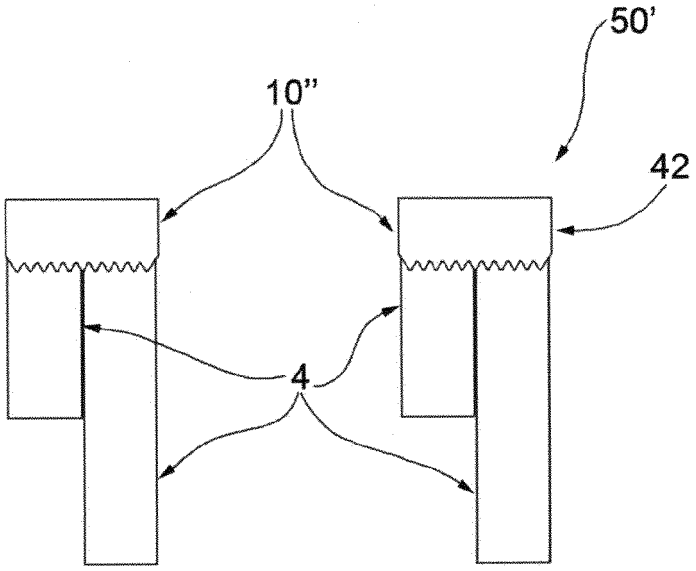


FIG.11

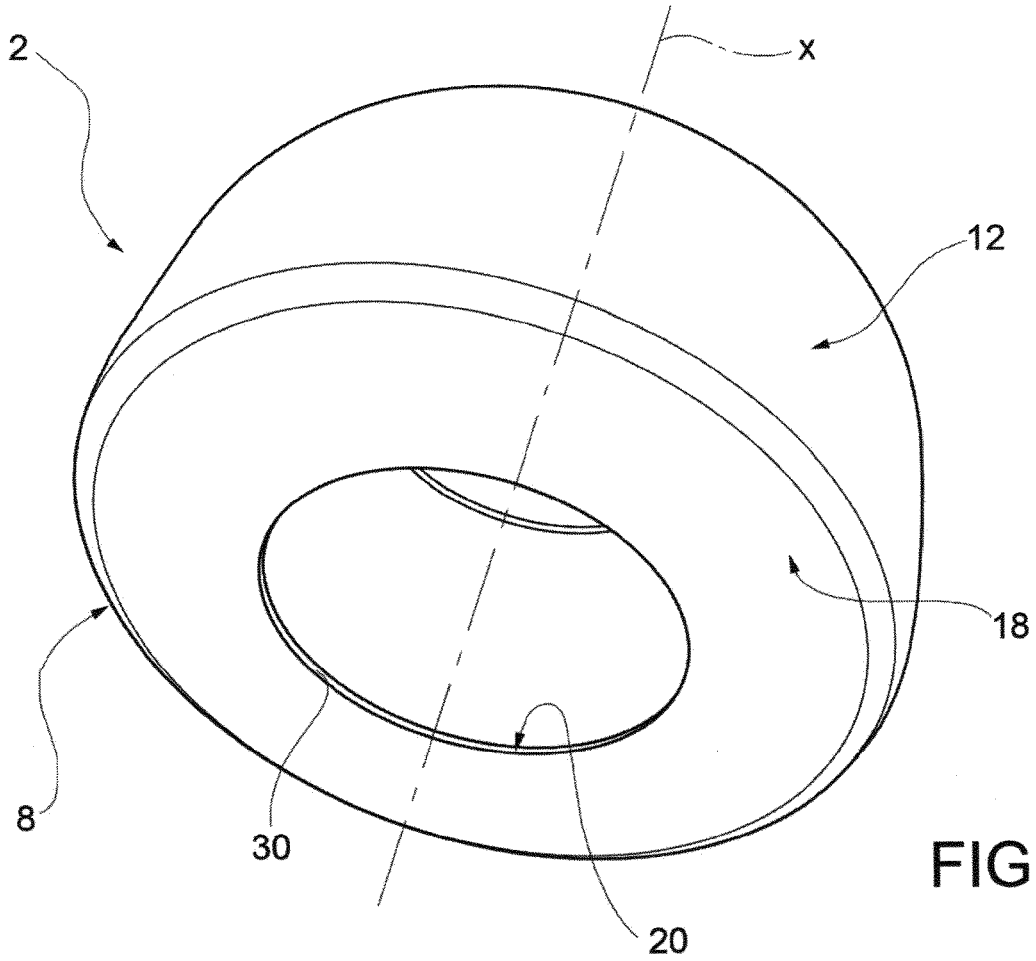
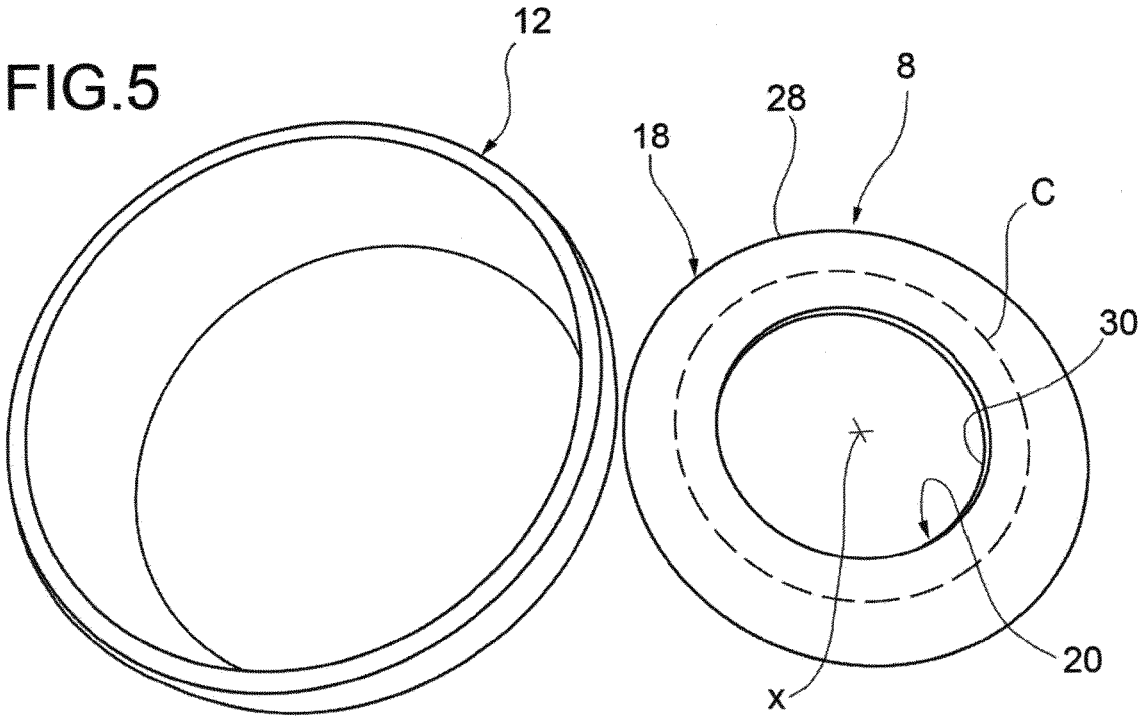


FIG.4

FIG.5



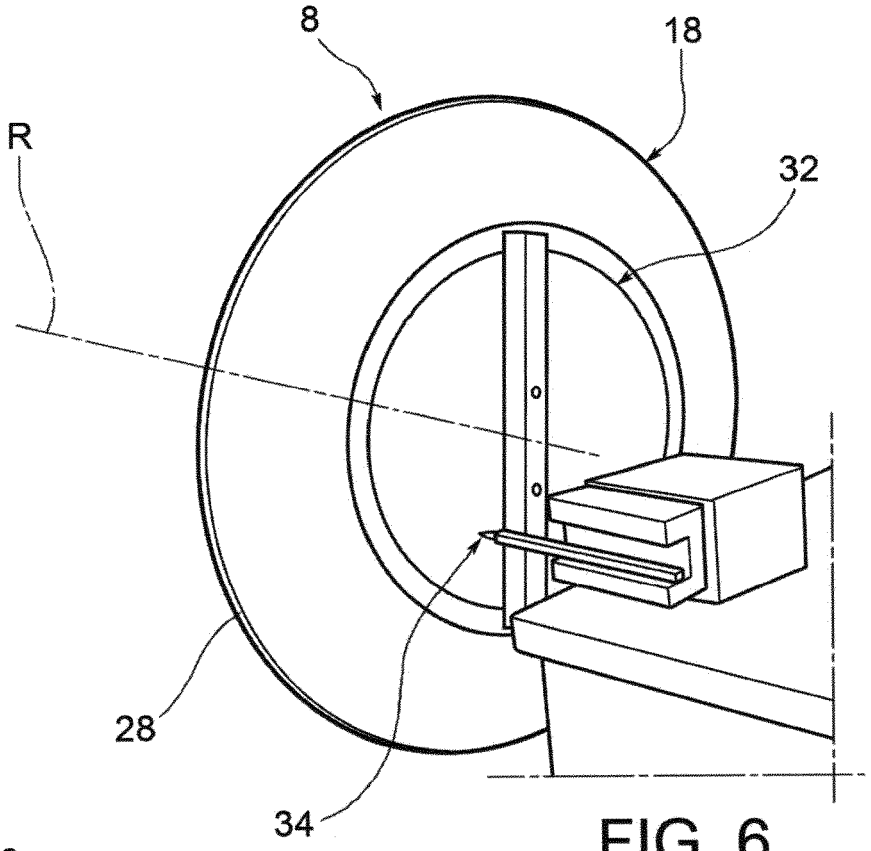


FIG. 6

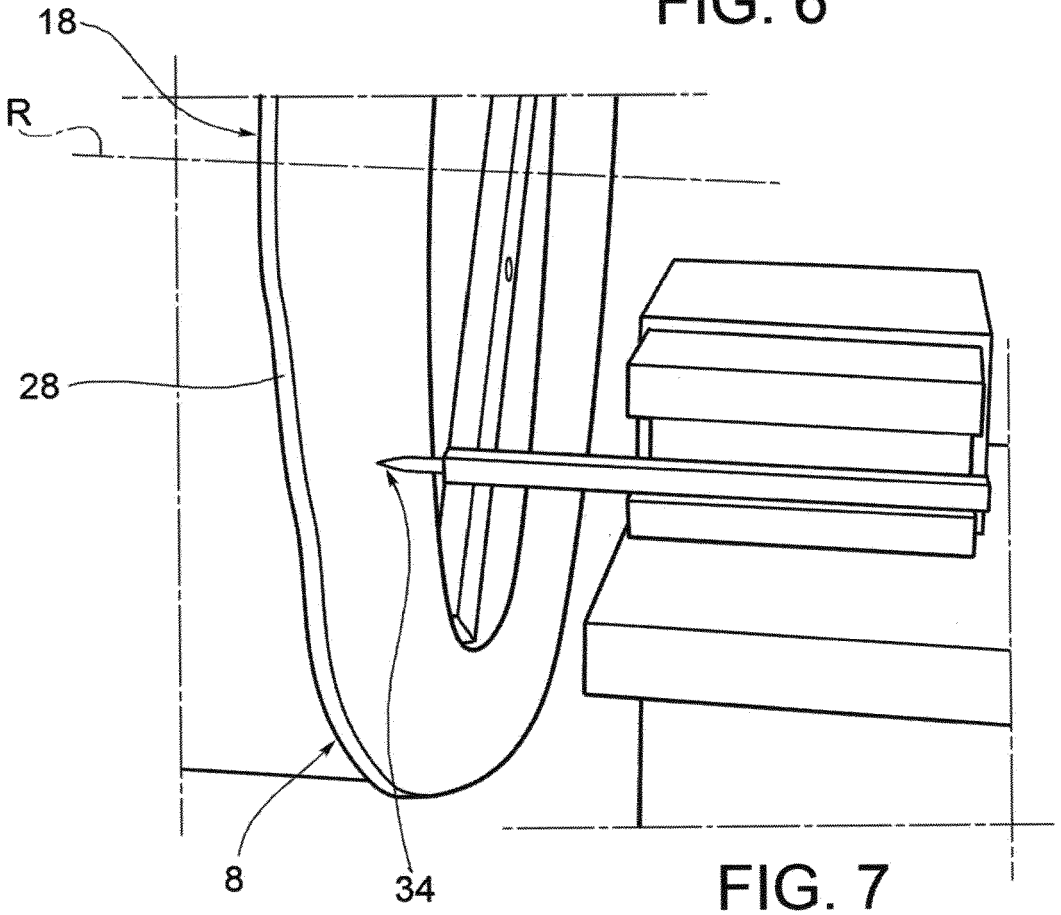


FIG. 7

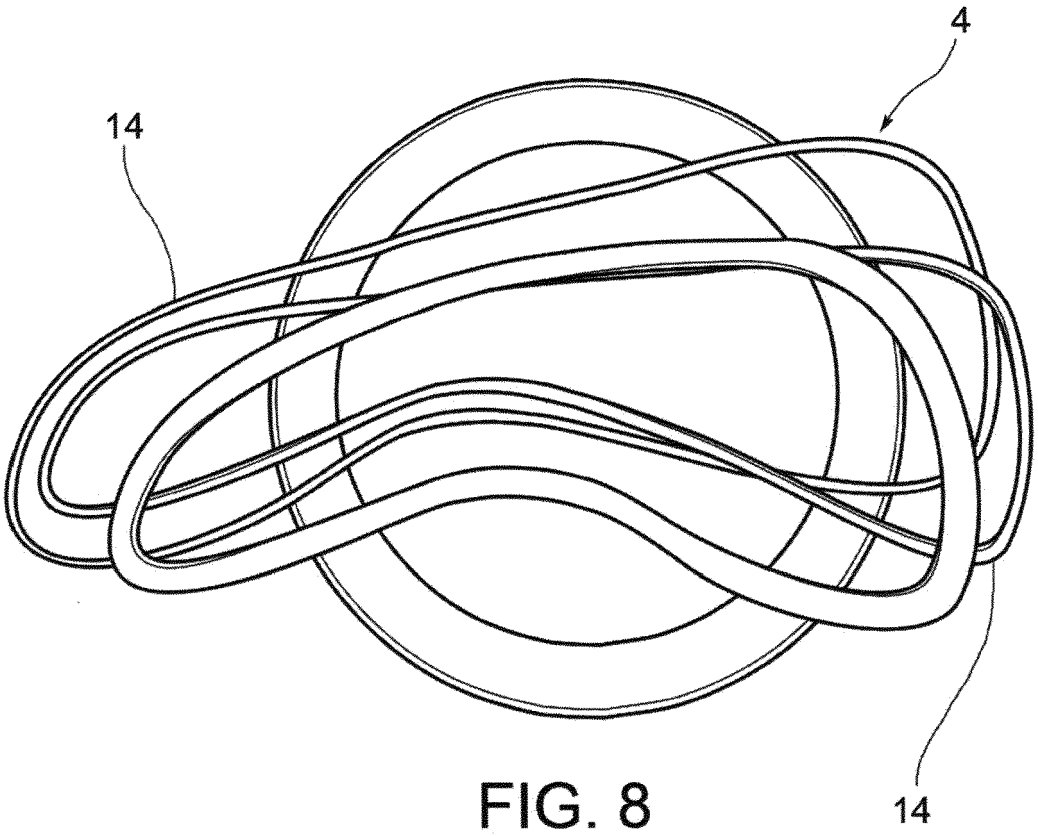


FIG. 8

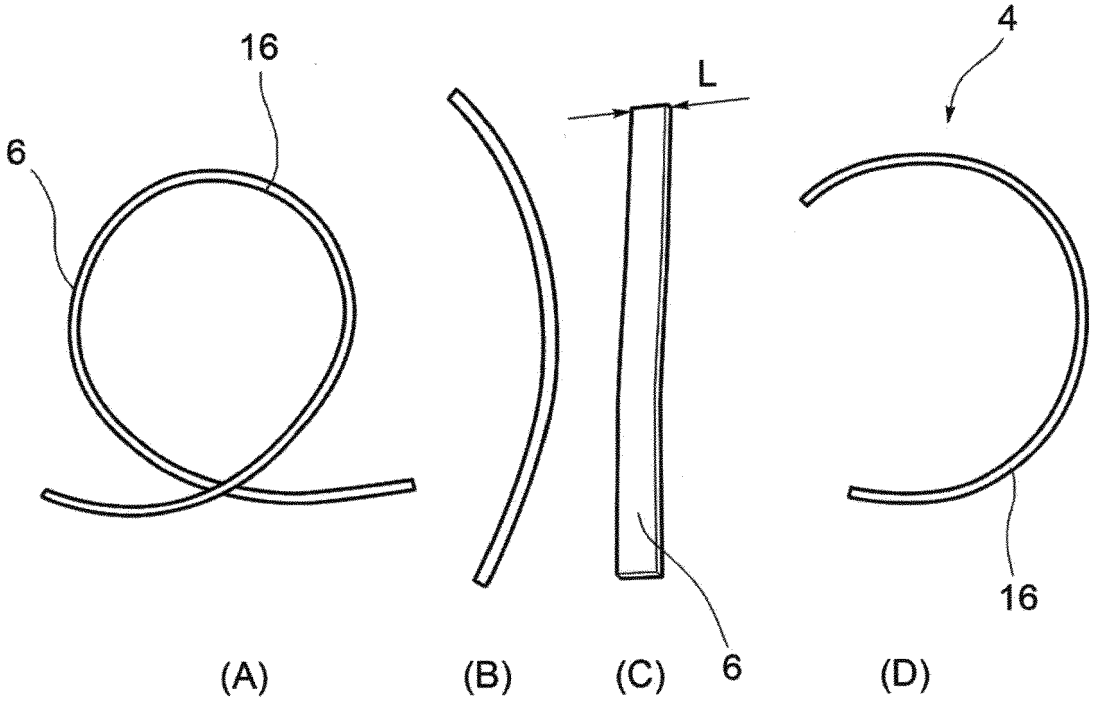


FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 2525

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DW (Deutsch): "Accessoires aus Fahrradschläuchen ¦ Euromaxx", YouTube, 20 June 2013 (2013-06-20), pages 1-1, XP054976628, Retrieved from the Internet: URL:https://www.youtube.com/watch?v=6JJrtunj6xw [retrieved on 2016-06-24]	1-9, 12-14	INV. A44C27/00
Y	* the whole document *	10,11,15	
X	Theo Scholl: "Altreifenentsorgung", YouTube, 4 June 2014 (2014-06-04), pages 1-1, XP054976627, Retrieved from the Internet: URL:https://www.youtube.com/watch?v=8V6SnFgSjkc [retrieved on 2016-06-24]	1-9, 12-14	
Y	* the whole document *	10,11,15	
Y	US 2010/285283 A1 (KINGSBURY NICHOLAS SCOT [US]) 11 November 2010 (2010-11-11) * abstract; figures 1, 3 *	10,11,15	TECHNICAL FIELDS SEARCHED (IPC) A44C
A	Beautiful DIY: "15 Wonderful Ideas to Upcycle and Reuse Old Tires", YouTube, 6 June 2014 (2014-06-06), pages 1-1, XP054976629, Retrieved from the Internet: URL:https://www.youtube.com/watch?v=3lzjyjp_JdA [retrieved on 2016-06-24] * the whole document *	1-14	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 March 2017	Krüger, Sophia

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 2525

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 861 658 A (GRIFFIN DONALD L [US] ET AL) 29 August 1989 (1989-08-29) * abstract *	1-14	
A	US 2007/292468 A1 (STUDIN JOEL [US] ET AL) 20 December 2007 (2007-12-20) * abstract *	1-14	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 March 2017	Krüger, Sophia

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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09-03-2017

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