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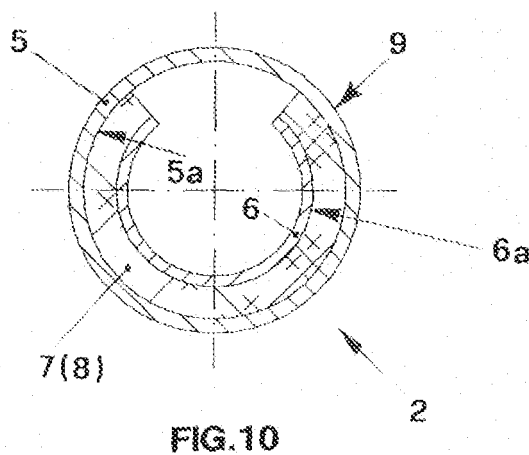
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(54) **Pole for sporting activities like skiing, trekking and the like**

(57) The invention is a pole (1) for sporting activities of the type comprising a tubular body (2) provided at one end (2a) with a tip (3) and at the opposite end (2b) with a handgrip (4), wherein the tubular body (2) comprises a tubular element (5) developing mainly in longitudinal direction and having a closed profile in cross section, and

at least one shaped element (6; 10) developing mainly in longitudinal direction fitted inside the tubular element (5) and having an open profile in cross section. Between the outer surface (6a; 10a) of the shaped element (6; 10) and the inner surface (5a) of the tubular element (5) opposing each other there is a filling structure (7; 13).



Description

[0001] The invention concerns a pole for sporting activities, particularly suited to be used for activities like skiing, trekking and the like.

[0002] It is known that the poles that are used in the sporting activities mentioned above substantially comprise a tubular body that develops longitudinally and is provided at one end with a tip that is pushed against the ground and at the opposite end with a handgrip that is held by the user.

[0003] The tubular body of the pole is generally made of aluminium or an aluminium alloy, but the most modern versions use also highly technological materials, like for example carbon.

[0004] However, it is indispensable for the tubular body of the pole to be light and above all resistant, due to the fact that during use it is subjected to particularly heavy stress.

[0005] For this reason poles have been designed, whose tubular body is made of a composite material, like for example the pole described in patent DE 20220186U.

[0006] According to the above mentioned patent, the tubular body of the pole comprises an outer tubular element and an inner tubular element that are coaxial with each other, between which there is a reinforcing tubular element made of plastic material.

[0007] This embodiment on one hand makes it possible to obtain a pole having a tubular body that with a limited increase in weight becomes more resistant to stress, but on the other hand also has some acknowledged drawbacks.

[0008] A first drawback is constituted by the fact that said pole is difficult to construct, since it is necessary to process with great precision at least two of the tubular elements that are coaxially coupled to each other in order to obtain the desired mutual connection.

[0009] Another drawback lies in that the tubular body of the pole offers uniform resistance on its entire cross section and therefore it is not possible to reinforce it only in some areas that are more subjected to stress, thus limiting also any excess weight.

[0010] Another drawback is represented by the fact that in order to make the tubular body of the pole it is necessary to prepare a production line capable of carrying out special additional processings compared to those included in the standard production cycle.

[0011] The present invention aims to overcome the drawbacks listed above.

[0012] In particular, it is a first aim of the invention to propose a pole for sporting activities, like for example skiing, trekking and the like, having a tubular body with composite structure that doesn't pose the construction difficulty posed by equivalent poles carried out according to the known art.

[0013] It is another aim of the invention to propose a pole comprising a tubular body whose structure has resistance characteristics that vary in the different areas of

its cross section.

[0014] It is another, yet not the last aim of the invention to propose a pole comprising a tubular body that weighs less than composite poles of known type having the same dimensions.

[0015] The aims mentioned above have been achieved through the construction of a pole for sporting activities of the type comprising a tubular body provided at one end with a tip and at the other end with a handgrip, characterized in that the above mentioned tubular body comprises:

- a tubular element that develops mainly in longitudinal direction and whose cross section has a closed profile;
- at least one shaped element that develops mainly in longitudinal direction and is fitted inside said tubular element, the cross section of said shaped element having an open profile.

[0016] According to an embodiment of the invention, the shaped element fitted inside the tubular element has a C-shaped profile in cross section.

[0017] According to another embodiment of the invention, the shaped element has an Ω -shaped profile in cross section.

[0018] According to both embodiments, between the outer surface of the shaped element and the inner surface of the tubular element that houses it there is a filling structure, preferably made of a non-rigid plastic material.

[0019] In the case in which the shaped element has an Ω -shaped profile in cross section, in the air space defined between the lateral outside surface of the shaped element and the lateral inside surface of the tubular element that houses it there are longitudinal reinforcing elements buried in the plastic filling material.

[0020] In all the different embodiments described above, the tubular body of the pole has a structure that is not homogeneous in cross section, where it is possible to identify a more resistant part corresponding to the area where the cross section includes several structures in mutual contact with one another.

[0021] Said more resistant area may, for example, be facing towards the front of the pole, that must be capable of resisting any impacts during use.

[0022] Advantageously, the pole that is the subject of the invention makes it possible to simplify the construction technique of poles with composite structure and furthermore, still advantageously, to produce composite poles that though ensuring the same resistance weigh less than composite poles of known type.

[0023] Still advantageously, it is also possible to carry out composite poles with increased resistance only in some predefined areas.

[0024] Finally, to advantage, to construct the pole that is the subject of the invention it isn't necessary to modify the standard production line considerably.

[0025] The aims and advantages described above will

be highlighted in greater detail in the description of preferred embodiments of the pole of the invention, which are described with reference to the attached drawings, wherein:

- Figure 1 is a view of the pole that is the subject of the invention;
- Figures from 2 to 5 show in cross section the different construction steps of an embodiment of the pole of the invention;
- Figures from 6 to 10 show the different construction steps of another embodiment of the pole of the invention;
- Figures from 11 to 16 show the different construction steps of a further embodiment of the pole of the invention;
- Figure 17 shows the cross section of the pole illustrated in Figure 1 according to any of the embodiments described, plastically deformed once construction has been completed;
- Figure 18 shows the pole illustrated in Figure 1 according to any of the embodiments described, plastically deformed in longitudinal direction once construction has been completed.

[0026] The pole for sporting activities that is the subject of the invention is shown in Figure 1, where it is indicated as a whole by **1** and where it can be observed that it comprises a tubular body **2** provided at one end **2a** with a tip **3** and at the opposite end **2b** with a handgrip **4**.

[0027] According to the invention and with reference to the cross section shown in Figure 5, the tubular body **2** comprises:

- a tubular element **5** that develops mainly longitudinally and whose cross section has a closed profile;
- at least one shaped element **6** fitted inside the tubular element **5** and whose cross section has an open profile.

[0028] It can be observed that the tubular element **5** has a circular profile in cross section, while the shaped element **6** has a C-shaped profile.

[0029] In other embodiments of the invention the tubular element and the shaped element may have cross section profiles different from the circular profile and the C-shaped profile.

[0030] The construction method of the tubular body **2** comprises a series of operations that are described with reference to Figures from 2 to 5, each one of which shows the cross section of one or more of the elements that make up the tubular body **2** during the construction stage.

[0031] In Figure 2 it is thus possible to observe the arrangement of the tubular element **5** that develops mainly longitudinally and whose cross section has a closed and preferably, but not necessarily circular profile.

[0032] Figure 3 shows a shaped element **6** that develops mainly in longitudinal direction, with cross section

with open and preferably, but not necessarily C-shaped profile.

[0033] Preferably, but not necessarily, the shaped element **6** isn't longer than the tubular element **5**.

[0034] Preferably, but not necessarily, the tubular element **5** is an electrically welded tube in aluminium or an aluminium alloy, while the shaped element **6** is preferably, but not necessarily a semi-finished element shaped before electric welding and thus used to make an electrically welded tube similar to the tubular element **5** but with smaller diameter.

[0035] Applying opposing forces **F** to the outside of the shaped element **6**, as shown in Figure 4, the ends **6b** of its open profile are brought near each other, so that the cross section of the shaped element **6** takes on a shape suited to be housed inside the cross section of the tubular element **5**.

[0036] The shaped element **6** is thus inserted with a sliding movement in the tubular element **5**.

[0037] Once the insertion has been completed, the shaped element **6** is released, so that when the action of the opposing forces **F** ends, it expands due to elastic recovery and causes the permanent coupling of its outer surface **6a** with the inner surface **5a** of the element **5** that can be observed in Figure 5.

[0038] Once construction has been completed, the external cross section **9** of the tubular body **2** is circular, as shown in Figure 5.

[0039] A construction variant of the tubular body **2** is shown in Figure 10 and differs from the embodiment previously described due to the fact that it features a filling structure **7** included between the outer surface **6a** of the shaped element **6** and the inner surface **5a** of the tubular element **5** opposing each other.

[0040] In particular, the filling structure **7** is preferably, but not necessarily made of plastic material or in any case a material featuring a certain degree of elasticity.

[0041] The construction method of the tubular body **2** of the pole **1** in the embodiment just described is illustrated in Figures from 6 to 10, each one of which shows the cross section of one or more of the elements that make up the tubular body **2** during its construction stage.

[0042] It can thus be observed that after arranging the tubular element **5** and the shaped element **6** shown in Figures 6 and 7, respectively, a covering layer **8** with predefined thickness is applied to the lateral outside surface **6a** of the shaped element **6**, said layer being preferably, but not necessarily constituted by sprayed liquid paint or by a pigment powder applied, for example, through an electrostatic application process.

[0043] The covering layer **8** with predefined thickness may also be applied using other systems, for example by means of bonding agents or other equivalent methods.

[0044] Once the shaped element **6** with the covering layer **8** shown in Figure 8 has been completed as described above, the ends **6b** of its open profile are brought near each other by applying opposing forces **F** to the outside of the shaped element, as shown in Figure 9.

[0045] The cross section of the shaped element **6** thus takes on a shape suitable for being housed inside the cross section of the tubular element **5**.

[0046] The shaped element **6** deformed in this way is thus inserted with a sliding movement in the tubular element **5**.

[0047] Once the insertion has been completed, the shaped element **6** is released, so that its elastic recovery causes the permanent coupling of the covering layer **8** with the inner surface **5a** of the element **5**, as can be observed in Figure 10.

[0048] In this situation the covering layer **8** with predefined thickness previously applied to the shaped element **6** forms the filling structure **7** of the tubular body **2**.

[0049] It is important to point out that in this method the covering layer **8** can be applied to the lateral outside surface **6a** of the shaped element **6** using the normal painting lines that carry out the external painting of the tubular element **5**.

[0050] Therefore it isn't necessary to include in the production lines also precision coupling operations and tolerance compensation operations, as it happens, on the other hand, in the construction of the pole that is the subject of the mentioned patent.

[0051] According to a variant of the method described above, which is not illustrated herein with reference to any drawings, the covering layer **8** applied to the outer surface **6a** of the shaped element **6** is made of expanding material.

[0052] In this case the thickness of the covering layer **8** may be such as to allow the shaped element **6** to be fitted inside the tubular sliding element **5** with no need to provide in advance for tightening the profile of the shaped element itself.

[0053] The expansion of the covering layer **8**, after the fitting operation, causes the permanent coupling of the former with the inner surface **5a** of the tubular element **5**.

[0054] In this regard, depending on the type of material used for the covering layer, expansion may be spontaneous or induced by heating inside a furnace.

[0055] Another embodiment of the tubular body **2** of the pole **1** is visible in Figure 16, where it can be observed that it differs from the embodiment previously described due to the fact that the shaped element **10** has an open profile with Ω -shaped cross section and between its outer surface **10a** and the inner surface **5a** of the tubular element **5** there are reinforcing elements **11**.

[0056] The method for carrying out this embodiment is described with reference to Figures from 11 to 16 and differs from the method previously described due to the fact that the shaped element **10** with Ω -shaped cross section shown in Figure 12 is positioned after the arrangement of the tubular element **5** shown in Figure 11.

[0057] The shaped element **10** is subjected to opposing forces **F** to bring the ends **10b** of its open profile near each other, as shown in Figure 13.

[0058] The shaped element **10** is then inserted coaxially inside the tubular element **5** and when it is released

and the action of the opposing forces **F** ends, it expands due to elastic recovery making the ends **10b** adhere to the inner surface **5a** of the tubular element **5** that is shown in Figure 14.

[0059] Figure 15 shows that reinforcing elements **11** are then preferably, but not necessarily inserted in the air space **12** defined between the inner surface **5a** of the tubular element **5** and the outer surface **10a** of the shaped element **10**, which have H-shaped cross section.

[0060] It is clear, however, that the cross section of the reinforcing elements **11** may have any shape.

[0061] The tubular body **2** is thus completed and can be used to make the pole **1**.

[0062] According to the construction method, also in this case the filling structure indicated by **13** preferably made of injected expanded material is preferably inserted in the structure formed as described above that can be seen in Figure 15, and in particular in the air space **12**.

[0063] Once the assembly has been completed, the external cross section **14** of the tubular body **2** is circular, as shown in Figures 15 and 16.

[0064] Independently of the method used to make the tubular body **2**, this may then be plastically deformed so that the outer circular shape of its cross section **9**, **14** that can be seen respectively in Figures 5, 10 and 15, 16 is modified and transformed in the elliptical shape **15** that can be seen in Figure 17 or in an oval, triangular or other shape, not represented herein.

[0065] Furthermore, the tubular body **2** of the pole can also be longitudinally deformed and take on the arched shape **16** that can be seen in Figure 18 or other shapes that are not represented.

[0066] All the methods described above achieve the aims listed.

[0067] In particular, all the variants and the corresponding construction methods described above make it possible to obtain a composite pole having a structure with differentiated resistance in its various parts, which compared to equivalent poles of known type is lighter and easier to carry out.

[0068] Furthermore, it can be constructed by making a few and simple changes to the standard production cycle.

[0069] In the construction stage the tubular body of the pole of the invention may be subjected to modifications that are neither described nor illustrated herein, or may be carried out using other methods different from those described and represented.

[0070] It is clear, however, that any further embodiments and/or different construction methods must all be considered protected by the present patent, provided that they fall within the scope of the following claims.

[0071] In the cases where the technical characteristics illustrated in the claims are followed by references, these have been added only with the aim to facilitate the comprehension of the claims themselves and therefore said references do not have any limiting effect on the degree of protection to be granted to each element they identify

only by way of example.

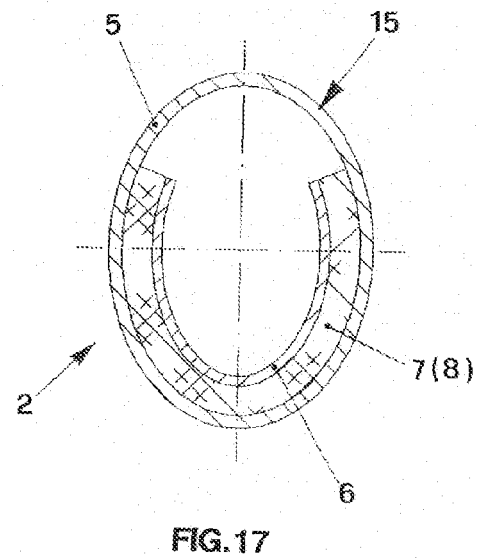
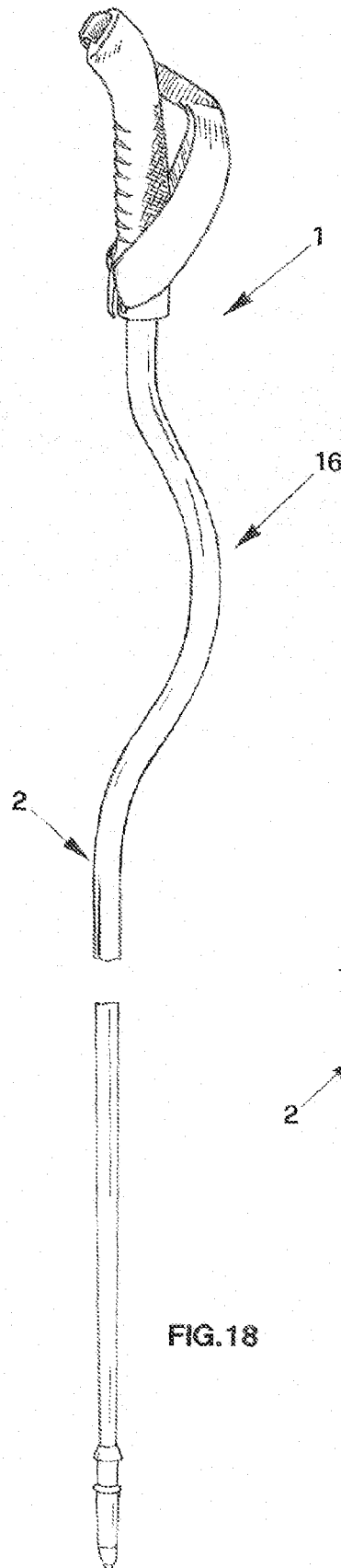
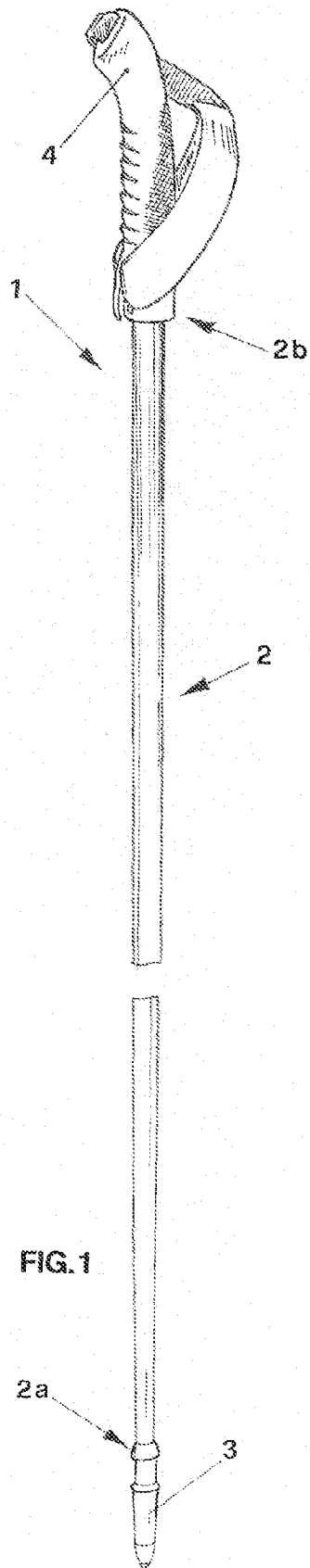
Claims

1. Pole (1) for sporting activities of the type comprising a tubular body (2) provided at one end (2a) with a tip (3) and at the opposite end (2b) with a handgrip (4), **characterized in that** said tubular body (2) comprises:
 - a tubular element (5) that develops mainly in longitudinal direction and whose cross section has a closed profile;
 - at least one shaped element (6; 10) that develops mainly in longitudinal direction and is fitted inside said tubular element (5), the cross section of said shaped element having an open profile.
2. Pole (1) for sporting activities according to claim 1), **characterized in that** said open profile of said shaped element (6) fitted inside said tubular element (5) is C-shaped.
3. Pole (1) for sporting activities according to claim 1), **characterized in that** said open profile of said shaped element (10) fitted inside said tubular element (5) is Ω -shaped.
4. Pole (1) for sporting activities according to any of the claims from 1) to 3), **characterized in that** it comprises a filling structure (7; 13) included between the outer surface (6a; 10a) of said shaped element (6; 10) and the inner surface (5a) of said tubular element (5) opposing each other.
5. Pole (1) for sporting activities according to claim 3), **characterized in that** it comprises longitudinal reinforcing elements (11) arranged in the air space (12) defined between said outer surface (10a) of said shaped element (10) and the inner surface (5a) of said tubular element (5).
6. Pole (1) for sporting activities according to claim 5), **characterized in that** one or more of said longitudinal reinforcing elements (11) has H-shaped cross section.
7. Pole (1) for sporting activities according to claim 1), **characterized in that** the outer cross section of said tubular body (2) is circular (9, 14) for at least part of its length.
8. Pole (1) for sporting activities according to claim 1), **characterized in that** the outer cross section of said tubular body (2) is elliptical (15) for at least part of its length.
9. Pole (1) for sporting activities according to claim 1), **characterized in that** the outer cross section of said tubular body (2) is oval for at least part of its length.
10. Pole (1) for sporting activities according to claim 1), **characterized in that** the outer cross section of said tubular body (2) is triangular for at least part of its length.
11. Pole (1) for sporting activities according to any of the claims 1) or from 7) to 10), **characterized in that** said tubular body (2) is rectilinear.
12. Pole (1) for sporting activities according to any of the claims 1) or from 7) to 10), **characterized in that** said tubular body (2) is arc-shaped (16) for at least part of its length.
13. Pole (1) for sporting activities according to claim 4), **characterized in that** said filling structure (7; 13) is made of non-metallic material.
14. Pole (1) for sporting activities according to claim 4), **characterized in that** said filling structure is an expanding structure.
15. Method for constructing a tubular body (2) of a pole (1) for sporting activities, provided at one end (2a) with a tip (3) and at the opposite end (2b) with a handgrip (4), **characterized in that** it comprises the following steps:
 - preparing a tubular element (5) that develops mainly in longitudinal direction and whose cross section has a closed profile;
 - preparing at least one shaped element (6; 10) that develops mainly in longitudinal direction and whose cross section has an open profile;
 - elastically tightening said shaped element (6; 10) bringing the ends (6b; 10b) of said open profile near each other so that the cross section of said shaped element (6; 10) takes on a shape suited to be contained inside the cross section of said tubular element (5);
 - inserting said at least one shaped element (6; 10) in said tubular element (5) with a sliding movement;
 - releasing said shaped element (6; 10) in order to place it in contact with the inner surface (5a) of said tubular element (5) due to the elastic recovery of said shaped element (6; 10).
16. Method according to claim 15), **characterized in that** said shaped element (6) has said open profile in the shape of a C and wherein a covering layer (8) of non-metallic material with predefined thickness is applied to the lateral outside surface (6a) of said shaped element (6) before said shaped element (6)

is elastically tightened and fitted in said tubular element (5) with a sliding movement.

17. Method according to claim 15), **characterized in that** said shaped element (10) has said open profile in the shape of an Ω and wherein non-metallic filling material (13) is injected in the air space (12) defined between the inner surface (5a) of said tubular element (5) and the outer surface (10a) of said shaped element (10), after said shaped element (10) has been elastically tightened and fitted in said tubular element (5) with a sliding movement. 5
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18. Method according to claim 17), **characterized in that** it includes an operation for inserting one or more longitudinal reinforcing elements (11) in said air space (12) before injecting said filling material (13). 15
19. Method according to claim 17) or 18), **characterized in that** said filling material (13) is of the type that expands at room temperature. 20
20. Method according to claim 17) or 18), **characterized in that** said filling material (13) is of the type that expands at temperatures above room temperature. 25
21. Method according to claim 16), **characterized in that** said covering layer (8) is applied by painting.
22. Method according to any of the previous claims, **characterized in that** it comprises at least a first deformation operation suited to give an elliptical shape (15) to the circular cross section (9, 14) of said tubular body (2). 30
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23. Method according to any of the previous claims, **characterized in that** it comprises at least a first deformation operation suited to give an oval shape to the circular cross section (9, 14) of said tubular body (2). 40
24. Method according to any of the previous claims, **characterized in that** it comprises at least a first deformation operation suited to give a triangular shape to the cross section of said tubular body (2). 45
25. Method according to any of the previous claims, **characterized in that** it comprises at least a second deformation operation suited to create at least one curved section (16) on said tubular body (2). 50

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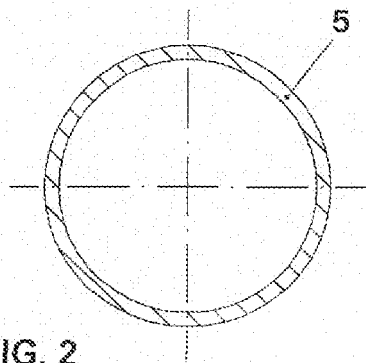


FIG. 2

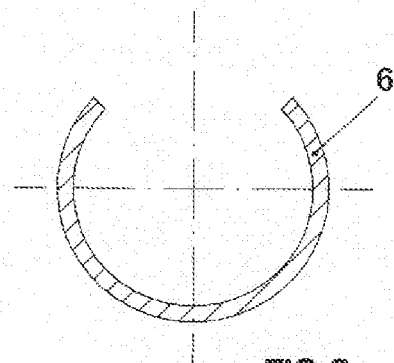


FIG. 3

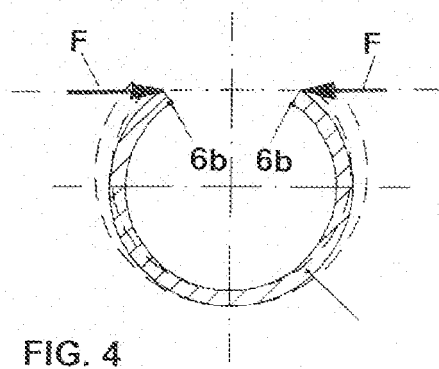


FIG. 4

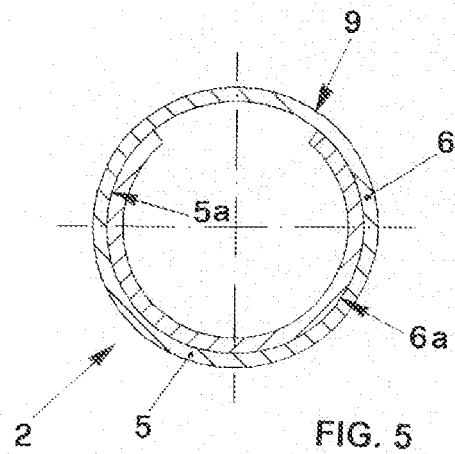
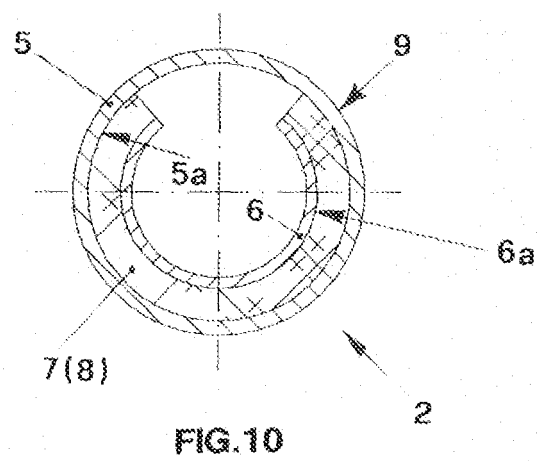
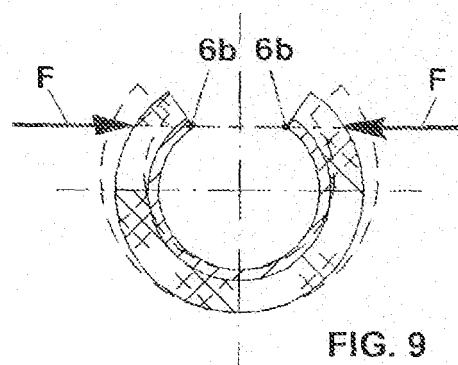
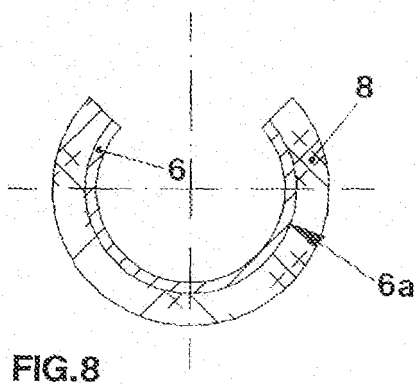
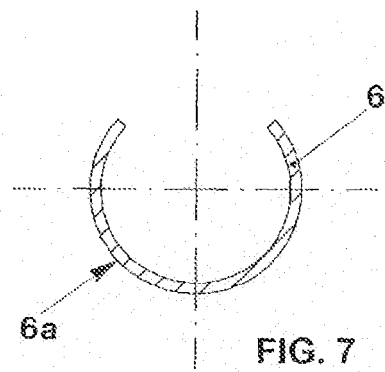
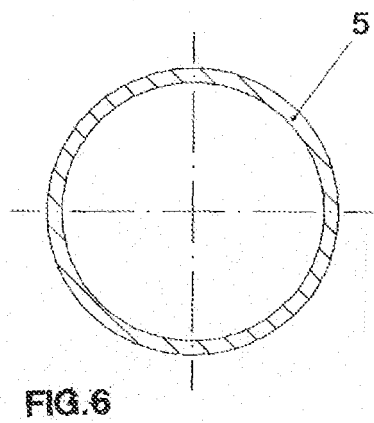


FIG. 5



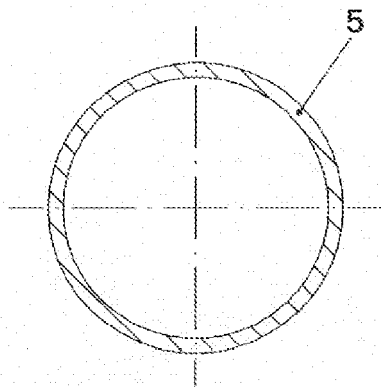


FIG. 11

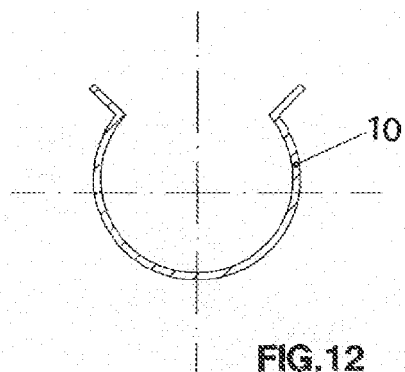


FIG. 12

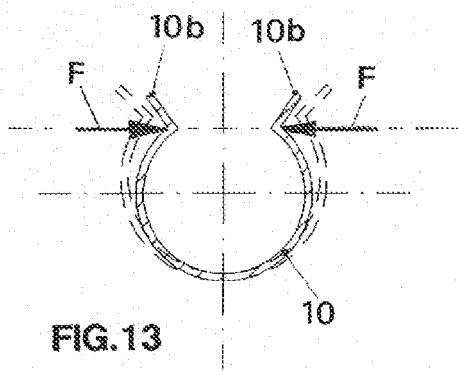


FIG. 13

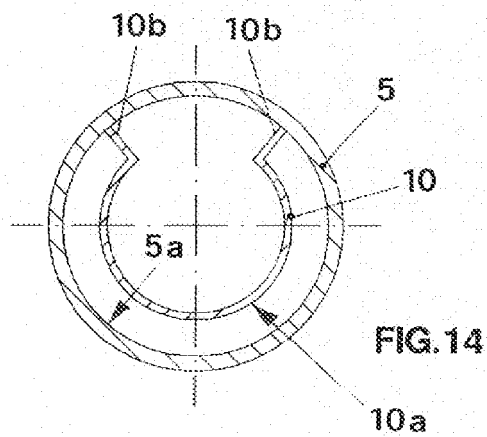


FIG. 14

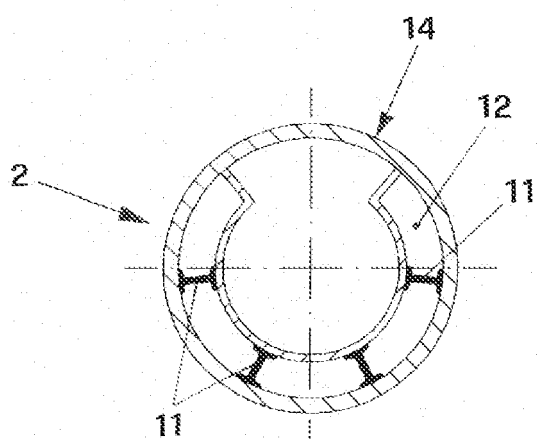


FIG. 15

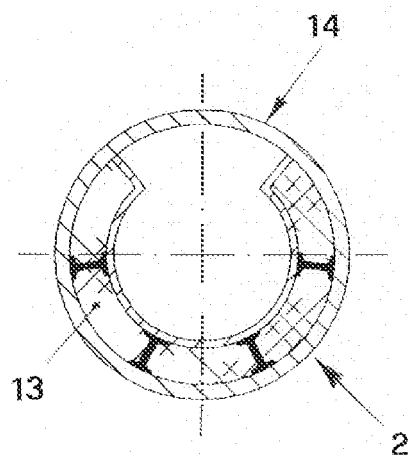


FIG. 16



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 12 5069

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y		8-10,12	
A	* figures 1-5 *	15	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 March 2007	Examiner Brunie, Franck
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EPO FORM 1503 03.82 (P04C01)

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