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(54) **Cable carrier**

(57) Perfected cable carrier made of cardboard or corrugated cardboard, comprising two flanges (11) and a support element (12) conformed as a drum, disposed between the two flanges (11), obtained by folding at least a sheet of cardboard, and on which a cable (14) is suitable to be wound. The support element (12) is provided, in proximity to its peripheral development ends, with first protruding extensions (15) suitable to reciprocally connect the flanges (11) with the support element (12). The

support element (12) is also provided, in proximity to its peripheral development ends, with second protruding extensions (16; 116), at intervals to the first protruding extensions (15), and the flanges (11) are provided with seatings (25; 125) made in their thickness in a coordinated position and with a shape mating with that of the second protruding extensions (16; 116), the second protruding extensions (16; 116), in use, being inserted in said seatings (25; 125).

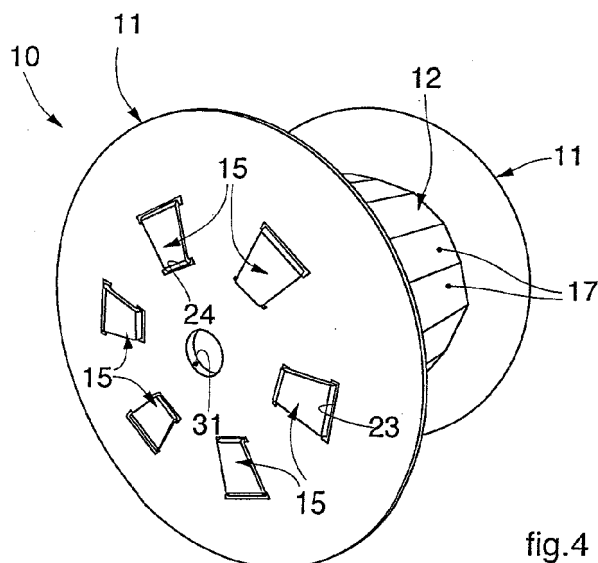


fig.4

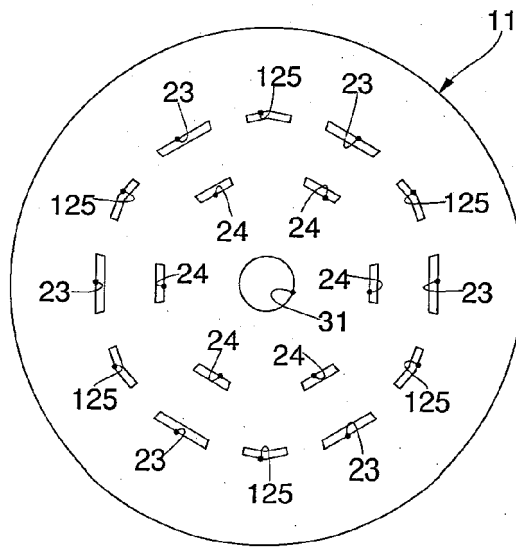


fig.6

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a perfected cable carrier, more precisely a cable carrier of the assemblable type which allows to reduce storage and transport bulk.

[0002] In particular, the cable carrier to which the present invention refers is made of cardboard, advantageously corrugated cardboard, and serves to wind cables, tubes, wires, ropes, according to need.

[0003] Here and hereafter in the description and the claims, the term cable shall also be understood to comprise tubes, wires, ropes or similar elements which can be wound on any support element.

BACKGROUND OF THE INVENTION

[0004] It is known that winding a cable on a support element, as the number of coils which are wound increases, this causes a necking effect which acts on the support element itself, exerting a compression action on its winding surface.

[0005] Cable carriers made of cardboard and provided with a support element of a substantially cylindrical or more often polygonal shape are known, at the base ends of which two flanges for containing the cable which will be wound are associated.

[0006] In particular the support element is provided, at its ends, with protruding lateral extensions which, in the assembly step of the cable carriers, are introduced through seatings made in the flanges in order to achieve the integral connection with the support element.

[0007] In this way, the lateral extensions, during use, that is, when the cable is wound on the support element, stretch the support element and keep it taut in order to overcome the necking effect. Despite the use of this type of coupling, Applicant has noted for some time that on many occasions the necking effect is such as to overcome the resistance of the support element causing it, wholly or partly, to collapse toward its central axis.

[0008] To overcome this defect different strategies have been tried, such as providing elements inside the support element, reinforcing the anchorage of the extensions to the flanges, but all without success, indeed creating problems of storage, assembly, dismantling and maintenance, because of the resulting increased bulk.

[0009] Document DE 295 02 721 U1, on which the preamble of the main claim is based, describes a solution in which, in an intermediate position on the through seatings, other intermediate through seatings are provided in order to house intermediate mating protuberances provided between the protruding lateral extensions. Providing other through seatings, as well as those provided for housing the lateral extensions, on the one hand produces a reduction in the resistance and solidity of the flanges, and on the other generates a worse esthetic effect be-

cause of the presence of parts protruding from the external surface of the flange. Moreover, this solution can compromise the plan stability and the stacking of the cable carrier.

[0010] US-A-2.799.458 does not provide intermediate through seatings nor corresponding intermediate protuberances.

[0011] One purpose of the present invention is to obtain a perfected cable carrier which has greater resistance to the stresses due to necking effects, and in this way allows to increase the winding capacity thereof.

[0012] Another purpose of the present invention is to obtain a cable bearer of the type which can be assembled with limited bulk sizes of the various parts also in its non-assembled condition, in order to increase the storing and transport capacity thereof.

[0013] Another purpose of the present invention is to obtain a perfected cable carrier which prevents damage to the cable which is wound onto it.

[0014] The Applicant has devised and tested the present invention to overcome the above disadvantages and to maintain the peculiarities typical of cardboard cable carriers, advantageously corrugated cardboard, at the same time keeping the number of components low and maintaining the same connection system.

SUMMARY OF THE INVENTION

[0015] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0016] In accordance with the above purposes, a perfected cable carrier made of cardboard or corrugated cardboard comprises two lateral flanges and a support element conformed as a drum and disposed between said two flanges. The flanges act as a containing element for a cable which is wound in coils around the support element.

[0017] The support element is obtained by folding at least a sheet of cardboard and is provided, in proximity to its ends, with first protruding extensions which allow the reciprocal connection of the flanges and the support element.

[0018] According to one feature of the present invention, the support element is also provided, in proximity to its peripheral development ends, with second protruding extensions, at intervals to the first protruding extensions. The flanges are provided with seatings made in their thickness in a coordinated position and with a shape mating with that of the second protruding extensions. The second protruding extensions are inserted in said seatings made in the flanges and, when the cable is wound around the support element, they allow the latter to support the necking stresses of the cable and therefore to prevent the support element collapsing toward its central part.

[0019] In this way, both the first protruding ends and

the second protruding ends, although in different ways, allow to support the peripheral edge of the support element and therefore to support the necking effect which is generated.

[0020] The seatings are made blind in the thickness of the flanges and similarly, the second protruding extensions protrude from the peripheral edge by an extension substantially equal to the depth of the blind seatings. The second protruding extensions therefore provide to support the necking effect solely by disposing themselves resting inside the blind seatings and do not carry out any function of containing the flanges.

[0021] According to one form of embodiment, the flanges are defined by a plurality of sheets reciprocally coupled to each other, and the blind seatings are made through in some of the sheets and in the face of the flanges which, during use, faces toward the inside of the support element. It is therefore possible to make through seatings through one or more sheets of cardboard, and subsequently to couple to these sheets, by gluing for example, other cardboard sheets in which the seatings are not made.

[0022] This solution considerably facilitates the production steps of the flanges, allowing to predispose in the warehouse sheets provided with through seatings and sheets without through seatings, which are then glued to each other to form the flange. With this solution an extremely solid and resistant flange is obtained, esthetically pleasing because it does not have hollows visible from the outside, easily positioned horizontally because it does not have protruding parts, as well as being easily stackable on other similar cable carriers.

[0023] According to one form of embodiment of the present invention, the sheet of cardboard of the support element has a plurality of creasings to define a plurality of sectors which can be folded with respect to each other to define said support element with polygonal section.

[0024] In accordance with another form of embodiment, the first and the second protruding extensions, made on the peripheral edges of the cardboard sheet of the support element, are each disposed in correspondence with one of said sectors.

[0025] According to a variant, the second protruding extensions are made on the peripheral edges of the cardboard sheet of the support element, in correspondence with at least two of the sectors and between at least one of the creasings. In this way each creasing confers on the respective second protruding extension a greater resistance to necking stresses. Moreover, this particular configuration allows to increase the number of sectors which make up the support element, given that intermediate sectors are provided between the first ends and are supported precisely by the second ends.

[0026] The increase in the number of sectors allows to obtain a nearly circular cross section of the support element. This is advantageous because the angularity of the polygonal section is reduced and the wound cable is not subjected to very big folds which could damage the

sheathing which protect it. Likewise, the increase in the number of sectors and the presence of the second protruding extensions thus disposed, allow to confer greater resistance to the necking stresses which are imparted to the cable which is wound on the support element, preventing the latter from collapsing.

[0027] In accordance with another form of embodiment, the first and the second protruding extensions made on the peripheral development edges of the support element are disposed angularly offset with respect to the corresponding first and second protruding extensions made on the opposite peripheral edge of the support element, with a consequent advantage to the overall resistance of the support element.

[0028] With the present invention it is also possible to reduce the workings and the working times required to make the individual components compared with solutions known in the state of the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a perspective view of a perfected cable carrier according to the present invention;
- fig. 2 is a front view of a first detail of fig. 1;
- fig. 3 is a partial view of the development of a second detail of fig. 1;
- fig. 4 is a perspective view of the cable carrier in fig. 1, according to a variant;
- fig. 5 is a front view of a first detail of fig. 4;
- fig. 6 is a view of the development of a second detail of fig. 4;
- fig. 7 is a partial exploded view of the first and the second detail of fig. 4 and respectively of fig. 5;
- fig. 8 is a partial view in section of a detail of fig. 1.

[0030] To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings. It is understood that elements and characteristics of one form of embodiment can conveniently be incorporated into other forms of embodiment without further clarifications.

DESCRIPTION OF SOME PREFERENTIAL FORMS OF EMBODIMENT

[0031] With reference to fig. 1, a cable carrier according to the present invention is indicated in its entirety by the reference number 10, it is of the type that can be assembled/dismantled, and comprises two lateral flanges 11 and a support element, or drum 12, disposed between the two flanges 11 and on which, during use, a cable 14 is wound (fig. 7).

[0032] The drum 12 (fig. 1) has a polygonal section, even if, in other forms of embodiment, it can also have a circular shape, and is obtained from a single sheet of cardboard, advantageously corrugated cardboard, which is suitably cut and creased to define its development.

[0033] In particular, the cutting operations allow to define a winding surface 13 on which to wind the cable 14, first protruding extensions 15 (fig. 2) suitable to allow the connection between the flanges 11 and the drum 12, and second protruding extensions 16 at intervals with the first protruding extensions 15 and whose functions will be clarified hereafter in the description.

[0034] More in particular, both the first 15 and the second 16 protruding extensions are made along the lateral development edges of the drum 12.

[0035] The creasing operations allow to make lines of folding 18 both in the winding surface 13 and also in the first protruding extensions 15. The winding surface 13 is therefore divided into a plurality of sectors 17 of a substantially rectangular shape, which are folded with respect to each other to define the drum 12.

[0036] The first protruding extensions 15 and the second protruding extensions 16 are disposed in correspondence with the lateral development edges of the drum 12 and each in correspondence with one of the sectors 17. The first protruding extensions 15 are therefore disposed offset with respect to the second protruding extensions 16.

[0037] Each of the first protruding extensions 15 comprises respectively a first portion 19, connected directly to the lateral edge of the drum 12, a second portion 20, and a third end portion 21. The third portion 21 is provided, in its turn, with holding elements, in this case holding teeth 22, whose functions will be described hereafter.

[0038] The second protruding extensions 16 protrude from the respective sector 17 with a segment of a length equal to or less than the thickness of the flanges 11, and extend only for a portion of the width of the sector 17 in which they are made.

[0039] Once the cutting and creasing operations have been carried out, the sheet of cardboard is suitably folded and closed in proximity to one of its opening sides of the peripheral development, for example using the aid of suitable closing edges, made in a known manner in order to define said drum 12.

[0040] The flanges 11 (fig. 1) act as containing walls and define, in cooperation with the drum 12, a winding seating for the cable 14.

[0041] Each of the flanges 11 (fig. 3) has a substantially discoid shape and a greater diameter than the diameter of the drum 12. It is advantageous to provide that the flanges 11 are obtained by overlapping and reciprocally gluing a plurality of sheets of corrugated cardboard so as to give them greater resistance.

[0042] The flanges 11 are provided with first through slots 23, with second through slots 24, made internally with respect to the first through slots 23, and with blind

seatings 25 made angularly offset with respect to the first through slots 23.

[0043] In particular, both the first through slots 23 and the blind seatings 25 are made on the sides of a polygon similar to that according to which the drum 12 is conformed.

[0044] The position of the first through slots 23 is coordinated to that according to which the first protruding extensions 15 of the drum 12 are made, while the position of the second through slots 24 is coordinated and internal with respect to the first through slots 23.

[0045] During the assembly step of the cable carrier 10, the first protruding extensions 15 are inserted through the first through slots 23 of the flanges 11, and then are folded along the lines of folding 18 in order to insert their third portions 21 through the second through slots 24.

[0046] The holding teeth 22 are inserted through the second through slots 24 of the flanges 11 and abut against its internal surface in order to thus define the reciprocal connection between the flanges 11 and the drum 12.

[0047] During this operation, the second protruding extensions 16 are inserted in the blind seatings 25. In this way, a support of the winding surface 13 is achieved also in proximity to the sectors 17 to which the second protruding extensions 16 are associated.

[0048] The first 15 and the second 16 protruding extensions therefore provide to define a support of the body of the drum 12 to support the necking effects to which the winding surface 13 is subjected when the cable 14 is wound.

[0049] In accordance with a further form of embodiment (figs. 4-7), the sheet of cardboard which defines the drum 12 is cut and creased so as to define a plurality of said sectors 17.

[0050] In this case, the second protruding extensions, indicated by the reference number 116, are made between two of the sectors 17 defined by the creasing 18, so that the first protruding extensions 15 are disposed at intervals of every two sectors 17.

[0051] The second protruding extensions 116 therefore provide to support two adjacent sectors 17 which otherwise would not be supported by the first extensions 15. This solution therefore allows to increase the number of sectors 17 which make up the drum 12, in order to give it a cross section shape which is close to a circular shape.

[0052] Moreover, the first 15 and the second 116 protruding extensions which are made on one of the peripheral development edges of the drum 12 are offset by one sector 17 with respect to the first 15 and the second 116 protruding extensions made on the opposite peripheral development edge.

[0053] This particular disposition allows to give the drum 12 greater resistance to the necking effects to which it is subjected.

[0054] The flanges 11 are also provided with first 23 and second 24 through slots, similar to those described above. Moreover, the flanges 11 are provided with blind

seatings 125 suitably shaped to allow the insertion into them of the second protruding extensions 116.

[0055] The flanges 11 (fig. 7) in this case comprise three sheets of cardboard 130 one on top of the other and reciprocally glued to each other. In other forms of embodiment it may be provided that the number of sheets of cardboard can either be two or more than three. The blind seatings 125 are made through only in one of the sheets of cardboard 130 and, in particular, on the one which, during use, faces toward the internal part of the drum 12.

[0056] In this case therefore, the second protruding extensions 116 extend from the peripheral edge of development by an extension equal to the thickness of this last sheet of cardboard 130, each being able to be inserted in a corresponding blind seating 125.

[0057] In both the above forms of embodiment, the flanges 11 are provided, in a known manner, with an axial through hole 31 disposed in correspondence with the axis of the drum 12 in order to allow the insertion of a mandrel for the winding/unwinding operations.

[0058] It is clear that modifications and/or additions of parts may be made to the cable carrier 10 as described heretofore, without departing from the field and scope of the present invention.

[0059] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of cable carrier, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Perfected cable carrier made of cardboard or corrugated cardboard, comprising two flanges (11) and a support element (12) conformed as a drum, disposed between said two flanges (11), obtained by folding at least a sheet of cardboard, and on which a cable (14) is suitable to be wound, said support element (12) being provided, in proximity to its peripheral development ends, with first protruding extensions (15) suitable to reciprocally connect said flanges (11) with said support element (12), wherein said support element (12) is also provided, in proximity to its peripheral development ends, with second protruding extensions (16; 116), at intervals to said first protruding extensions (15), and wherein said flanges (11) are provided with seatings (25; 125) made in their thickness in a coordinated position and with a shape mating with that of said second protruding extensions (16; 116), said second protruding extensions (16; 116), in use, being inserted in said seatings (25; 125), **characterized in that** said seatings (25) are made blind in the thickness of said flanges (11).

2. Cable carrier as in claim 1, **characterized in that** said flanges (11) are defined by a plurality of sheets (130) coupled with respect to each other, **and in that** said seatings (125) are made through in at least some of said sheets (130) and in the face of said flanges (11) which, during use, faces toward the inside of said support element (12).
3. Cable carrier as in any claim hereinbefore, **characterized in that** said cardboard sheet of the support element (12) has a plurality of creasings (18) to define a plurality of sectors (17) which can be folded with respect to each other to define said support element (12) with polygonal section.
4. Cable carrier as in claim 3, **characterized in that** said first (15) and second (16) protruding extensions are made on the peripheral edges of said cardboard sheet of the support element (12), each in correspondence with one of said sectors (17).
5. Cable carrier as in claim 3, **characterized in that** said second protruding extensions (16) are made on the peripheral edges of said cardboard sheet of the support element (12) in correspondence with at least two of said sectors (17) and between at least one of said creasings (18).
6. Cable carrier as in any claim hereinbefore, **characterized in that** said first (15) and second (16; 116) protruding extensions made on one of the peripheral development edges of said support element (12) are disposed angularly offset with respect to the first (15) and second (16; 116) protruding extensions made on the opposite peripheral edge of said support element (12).

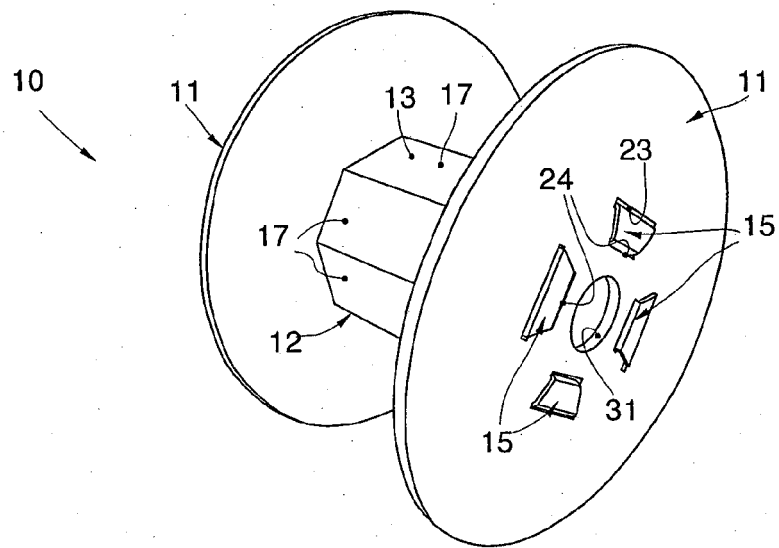


fig.1

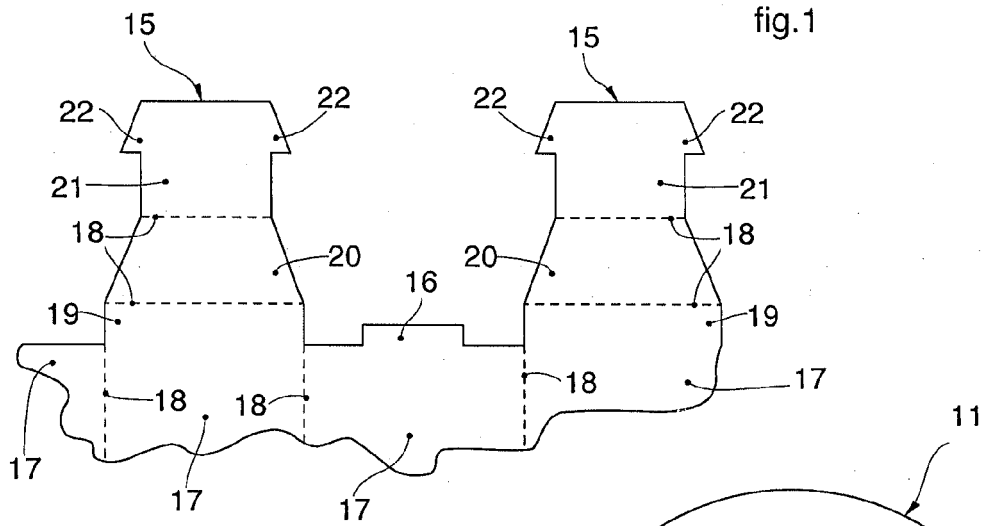


fig.2

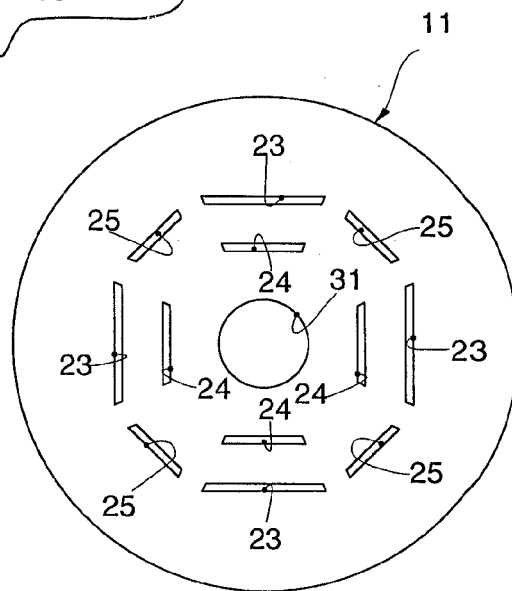


fig.3

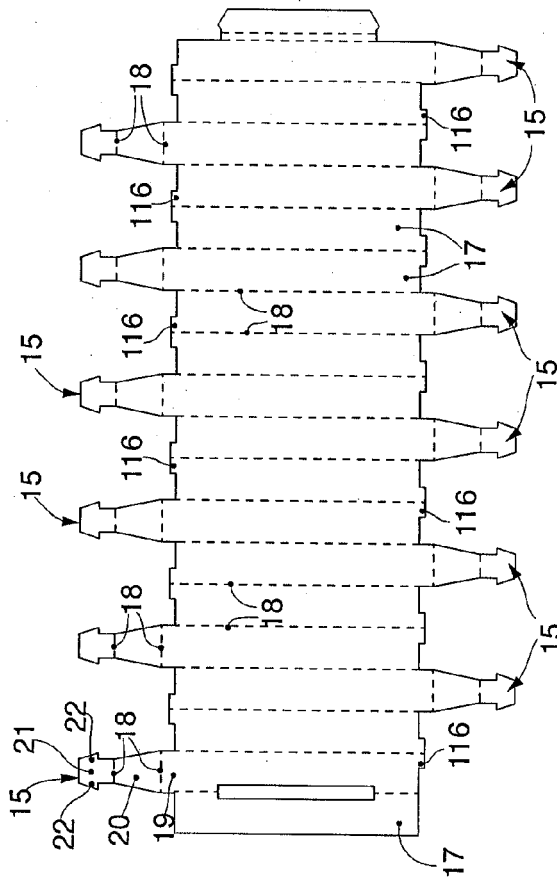


fig.5

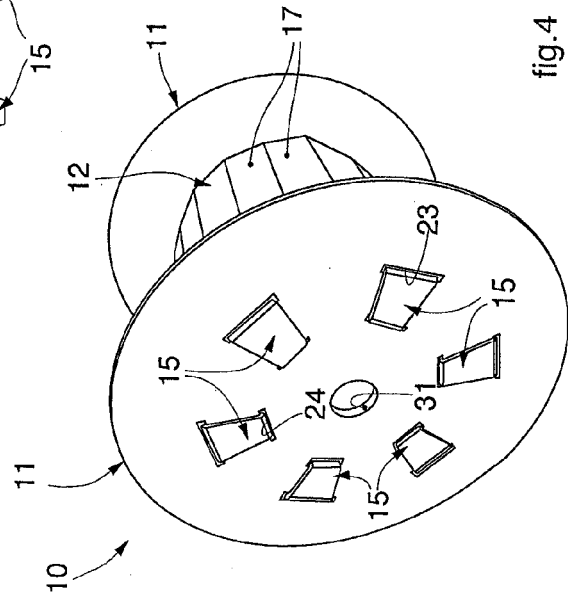


fig.4

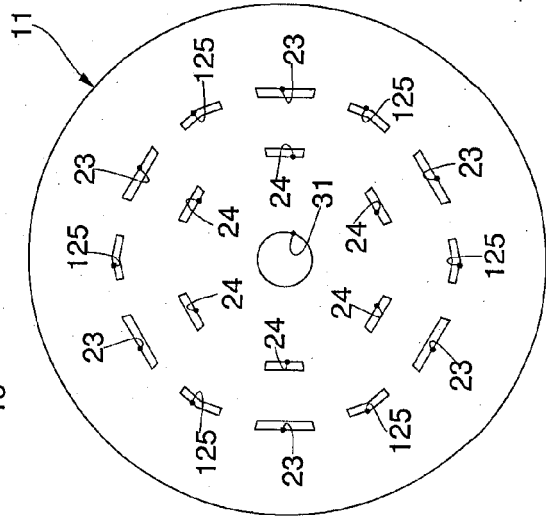


fig.6

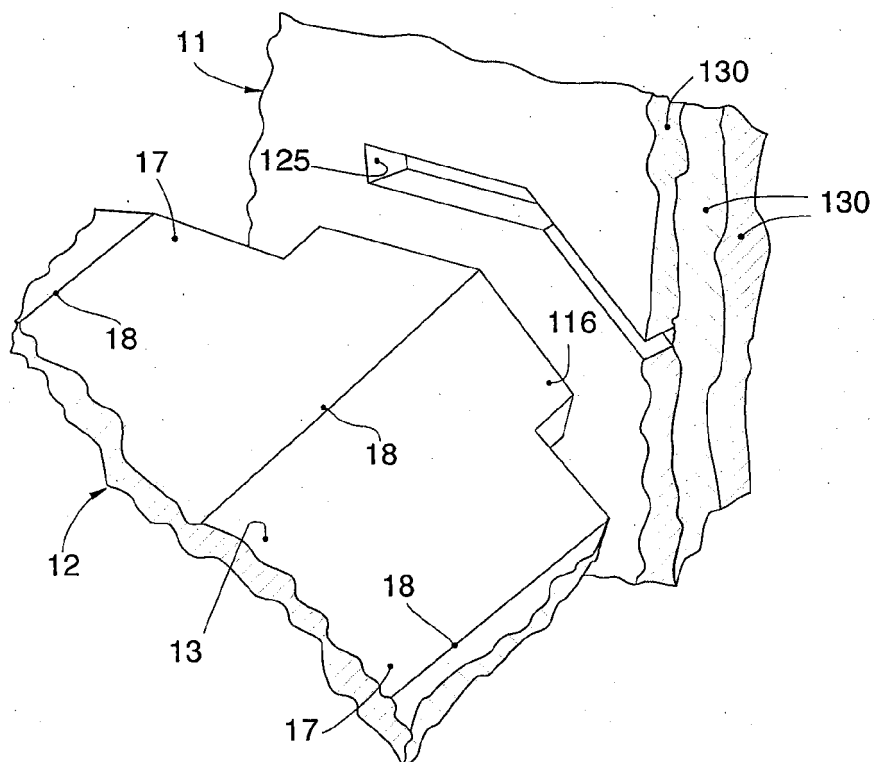


fig.7

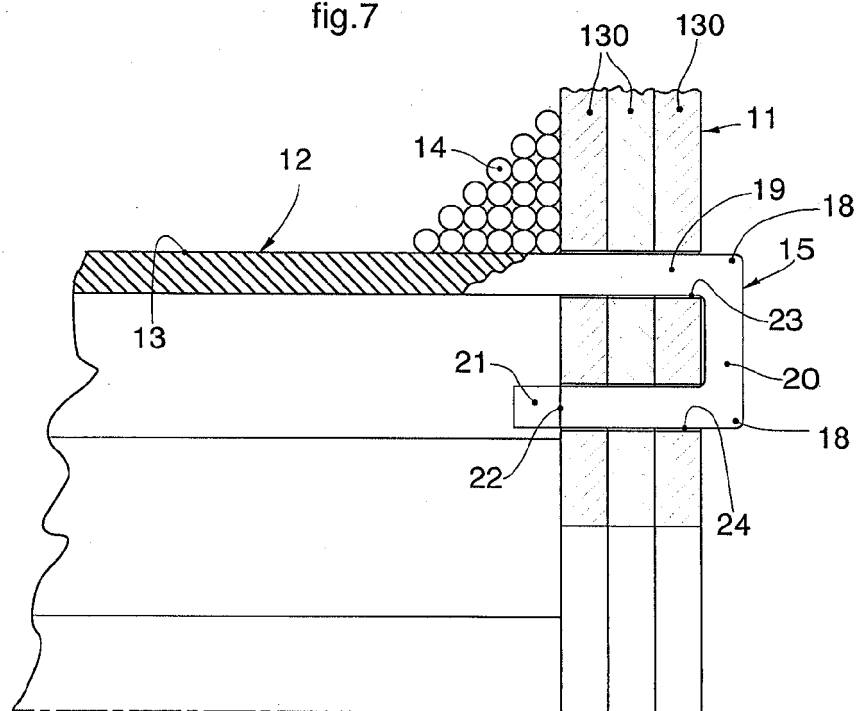


fig.8



EUROPEAN SEARCH REPORT

Application Number
EP 13 15 7101

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	US 2010/090049 A1 (WEISSBROD PAUL A [US]) 15 April 2010 (2010-04-15) * paragraph [0022]; figure 2 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 May 2013	Examiner Pussemier, Bart
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EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 15 7101

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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