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(71) Applicant: **I.S. Imballaggi Speciali SRL**
20883 Mezzago (IT)

(72) Inventor: **ERRANTE, Giacomo Salvatore**
20851 LISSONE MB (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

(54) CONTAINER FOR THE PACKAGING OF DISC-SHAPED ELEMENTS, PARTICULARLY BRAKE DISCS FOR CAR BRAKING SYSTEMS

(57) A container (1) for the packaging of disc-shaped elements (d), particularly brake discs for car braking systems, comprising a box-like body (20) made of cardboard and a closure element (80) adapted to be fixed to the box-like body (20); the box-like body (20) comprising a rectangular horizontal base (21) and four vertical side walls (22, 23, 24, 25), which form between them an accommodation cavity (27) which is open upward and has substantially the shape of a parallelepiped. The particularity of the invention resides in that the accommodation cavity (27) accommodates multiple dividers (3, 3', 3", 4, 32A, 32B, 32C) and supporting elements (5, 7) made of cardboard, interlocked in the accommodation cavity (27) and interlocked with each other detachably, forming between them a plurality of seats (11, 29), each of which is configured to accommodate, protect and keep in position a single disc (d).

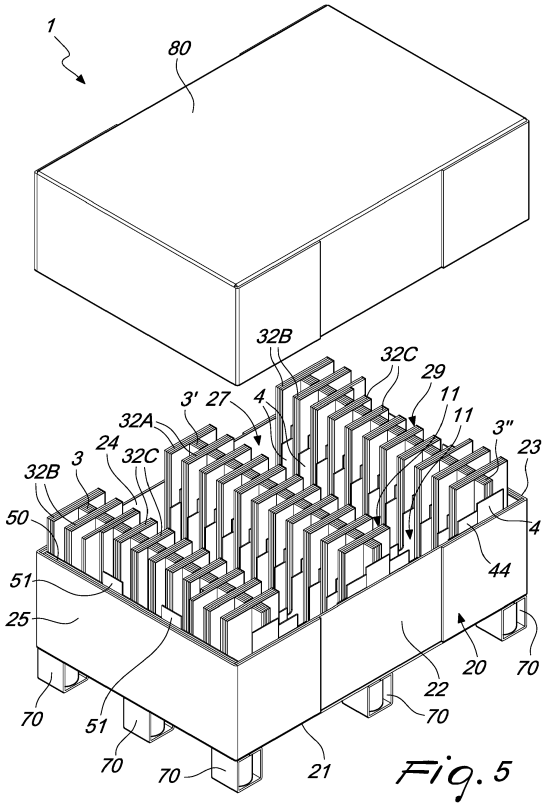

Fig. 5

EP 3 604 153 A1

Description

[0001] The present invention relates to a container for the packaging of disc-shaped elements and in particular for the packaging of brake discs for car braking systems.

[0002] In greater detail, the container according to the present invention is useful and practical for the handling and shipping of brake discs.

[0003] Currently, wood crates, inside which the freshly manufactured brake discs are inserted, are used for handling operations within the production facility.

[0004] Subsequently, as regards shipping, each disc is extracted manually from the wood crate and is inserted individually in an adapted container made of polystyrene and/or plastic, which is closed by means of an adhesive tape made of PVC.

[0005] The individual containers thus sealed are then inserted in a packaging box.

[0006] The packaging box is then normally arranged and secured with straps on a transport pallet.

[0007] Although the known method for packaging brake discs described above is useful and practical, it has some drawbacks.

[0008] First of all, various types of containers, such as the wood crate, the polystyrene and/or plastic containers, the packaging box and the pallet, are necessary, with consequent costs linked to the production and provisioning thereof.

[0009] Secondly, the times and costs of the processes for handling, packaging and shipping are considerable, since multiple steps which must be performed manually by an operator are necessary, such as the placement of the discs in the wood crate and their subsequent extraction, the packaging of the discs in individual polystyrene and/or plastic containers, the packaging of said containers within the packaging box.

[0010] Furthermore, each of the polystyrene and/or plastic containers must have a shape and dimensions suitable for the individual disc to be packaged and therefore, since the dimensions of the brake discs are variable depending on the order, it is expensive and complicated to have containers of various shapes and dimensions available.

[0011] Another disadvantage of brake disc packaging systems of the known type is the need to differentiate and dispose of the various materials that are present in the packaging, such as wood, plastic, polystyrene and cardboard, and the consequent use of time and of human and financial resources.

[0012] Another aspect that can be improved of brake disc packaging systems of the known type is the environmental impact caused by the various materials used.

[0013] The aim of the present invention is to provide a container for the packaging of disc-shaped elements that solves the technical problem described above, obviates the drawbacks and overcomes the limitations of the background art, allowing to simplify, speed up and reduce the cost of the processes for handling, packaging and shipping disc-shaped elements and in particular of brake discs.

[0014] Within this aim, an object of the present invention is to provide a container for the packaging of disc-shaped elements that is more versatile than that of the background art.

[0015] Another object of the invention is to provide a container for the packaging of disc-shaped elements that is easier and cheaper to dispose of than the background art.

[0016] A further object of the invention is to provide a container for the packaging of disc-shaped elements that produces a lower environmental impact than the background art.

[0017] Another object of the invention is to provide a container for the packaging of disc-shaped elements that allows a significant reduction of the volumes and costs of shipping with respect to the known packaging method.

[0018] Another object of the invention is to provide a container for packaging disc-shaped elements that is easy to provide and economically competitive if compared with the background art.

[0019] This aim, as well as these and other objects which will become better apparent hereinafter, are achieved by a container for the packaging of disc-shaped elements, particularly brake discs for car braking systems, comprising a box-like body made of cardboard and a closure element adapted to be fixed to said box-like body,

said box-like body comprising a rectangular horizontal base and four vertical side walls, which comprise two mutually parallel longitudinal side walls and two mutually parallel transverse side walls, which form between them an accommodation cavity which is open upward and has substantially the shape of a parallelepiped,

characterized in that said accommodation cavity accommodates multiple dividers and supporting elements made of cardboard, interlocked in said accommodation cavity and interlocked with each other detachably, forming between them a plurality of seats, each of which is configured to accommodate, protect and keep in position a single disc.

[0020] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of a container for the packaging of disc-shaped elements, illustrated by way of nonlimiting example with the aid of the accompanying drawings, wherein:

Figure 1 is an exploded view of a possible embodiment of a container for the packaging of disc-shaped elements, according to the invention;

Figure 2 is a perspective view, limited to the dividers and supporting elements, which are mutually assembled, of the container of Figure 1;

Figure 3 is a perspective view of the dividers and supporting elements, assembled together with the lateral panels;

Figure 4 is a perspective view of the elements assembled together with the lateral panels inside the box-like body;
Figure 5 is a perspective view of the container of Figure 1, fully assembled;
Figures 6A, 6B, 6C are perspective views of the abutment elements of the container of Figure 1;
Figure 7 is a perspective view of an internal transverse wall of the container of Figure 1;
Figure 8 is a perspective view of the lateral panels of the container of Figure 1;
Figure 9 is a perspective view of a concave supporting element of the container of Figure 1;
Figure 10 is a perspective view of an internal longitudinal wall of the container of Figure 1;
Figure 11 is a perspective view of a resting foot of the container of Figure 1;
Figure 12 is a perspective view of a tubular supporting element of the container of Figure 1;
Figure 13 is a sectional view, taken along a vertical plane, of the container of Figure 1, showing schematically two discs accommodated inside said container.

[0021] With reference to the figures, the container for the packaging of disc-shaped elements d (hereinafter simply "discs"), designated generally by the reference numeral 1, comprises a box-like body 20 made of cardboard and a closure element 80, such as for example a lid, which is adapted to be fixed to the box-like body 20 in order to close it.

[0022] The closure element is also made of cardboard.

[0023] The term "cardboard" is intended to indicate, in a fully general manner, any paper-like material and preferably the cardboard known as corrugated cardboard and comprising a central sheet comprised between two flat lateral sheets. In the preferred embodiment, the cardboard to which reference is made is of the recyclable type.

[0024] The box-like body 20 is substantially shaped like a parallelepiped and preferably has a rectangular base 21 with dimensions of 80 x 120 cm, so that it can be transported in a conforming manner both on trucks and in containers.

[0025] In some embodiments, the dimensions are different and the base can also be square.

[0026] In greater detail, the box-like body 20 comprises a rectangular horizontal base 21 and four vertical side walls 22, 23, 24, 25, arranged like the lateral faces of a parallelepiped, the base of which is the rectangular base 21.

[0027] The base 21 is the side that is adapted to be glued to the feet 70 or rested on a pallet and, as is obvious, in practice can assume any orientation depending on the handling operations to which it is subjected, and therefore it is referenced as horizontal merely to make the description clearer; therefore, all the elements that are referenced as "horizontal" are to be understood as being arranged along a plane that is parallel to the base 21, while the term "vertical" is understood to mean arranged along a plane that is perpendicular to the base 21.

[0028] Even more in detail, the four side walls 22, 23, 24, 25 comprise two mutually parallel longitudinal side walls 22, 24 and two mutually parallel transverse side walls 25, 23.

[0029] Again for the sake of clarity, it is useful to specify that the term "longitudinal side walls" 22, 24 refers to any two mutually parallel side walls and the term "transverse side walls" 25, 23 refers to the two remaining side walls that are perpendicular to the longitudinal side walls 22, 24. Therefore, hereinafter the term "longitudinal" will be understood to mean arranged along a plane that is parallel to the longitudinal side walls 22, 24, while the term "transverse" will be understood to mean arranged along a plane that is parallel to the transverse side walls 25, 23.

[0030] With reference to the description of the figures and with particular reference to Figure 1, the side walls 22, 23, 24 and 25 and the base 21 form between them an accommodation cavity 27 which is open upward and is substantially shaped like a parallelepiped and constitutes, in other words, the compartment inside which the discs d are accommodated and inside which the dividers 3, 3', 3", 4, 32A, 32B, 32C and the supporting elements 5, 7 described hereinafter are arranged.

[0031] According to the invention, multiple dividers 3, 3', 3", 4, 32A, 32B, 32C made of cardboard and supporting elements 5 and 7, also made of cardboard, are accommodated inside the accommodation cavity and 27, are interlocked in the accommodation cavity 27 and are mutually interlocked detachably and therefore so that they can be replaced.

[0032] These dividers 3, 3', 3", 4, 32A, 32B, 32C and supporting elements 5 and 7 form between them a plurality of seats 11, 29, each of which is configured to accommodate, protect and keep in position a single disc d.

[0033] Figure 2 shows the dividers 3, 3', 3", 4, 32A, 32B, 32C and the supporting elements 5, 7 that are present in the preferred embodiment in a mutually assembled condition; it should be noted that in the figure the dividers 3, 3', 3", 4, 32A, 32B, 32C and the supporting elements 5 and 7 thus interlocked form between them twenty-two seats 11 in the central portion of the accommodation cavity 27 (of which the reference numeral 11 designates only two for the sake of clearity), plus two additional seats 29 proximate to the transverse side walls 23, 25.

[0034] In practice, the dividers 3, 3', 3", 4, 32A, 32B, 32C and the supporting elements 5, 7 are shaped so as to mutually interlock detachably, for example by means of adapted notches 31, 41, slits 321 and recesses 43 which will be described hereinafter. More precisely, the dividers 3, 3', 3", 4, 32A, 32B, 32C and the supporting elements 5, 7 are shaped so as to mutually interlock, thus forming seats 11, 29 whose shape and dimension are suitable to contain a disk d, so as to minimize its movement, at the same time protecting it against impacts and frictions with the other discs d contained in the box-like

body 20.

[0035] In this manner, by replacing or changing the number or the shape or the position of the dividers 3, 3', 3", 4, 32A, 32B, 32C and of the supporting elements 5, 7, it is possible to modify number, shape and dimensions of the seats 11, 29, adapting them to the discs d to be packaged in a simple, quick and economical manner.

[0036] Furthermore, at least part of the dividers 3, 3', 3", 4, 32A, 32B, 32C is preferably formed by sheets arranged side by side, and even more preferably by cardboard sheets, so that by modifying the quantity, shape or dimension of the sheets it is possible to change the shape and dimensions of these elements and accordingly the dimensions of the seats 11 and 29.

[0037] The dividers 3, 3', 3", 4, 32A, 32B, 32C preferably comprise: a plurality of vertical internal transverse walls 3, 3', 3", a plurality of vertical internal longitudinal walls 4 which are interlocked at right angles to the vertical internal transverse walls 3, 3', 3", and a plurality of abutment elements 32A, 32B, 32C, which are also interlocked with the internal transverse walls 3, 3', 3" and are arranged longitudinally.

[0038] In greater detail, each one of the internal transverse walls 3, 3', 3" extends from one longitudinal side wall 22 to the other one 24.

[0039] Each one of the internal transverse walls 3, 3', 3" is provided, on an upper edge, with a plurality of vertical upper notches 31 (shown in detail in Figure 7), which are aligned with the vertical upper notches 31 of the other internal transverse walls 3, 3', 3" in longitudinal rows, i.e., aligned so as to form longitudinal rows of vertical upper notches 31.

[0040] Each one of the internal longitudinal walls 4 extends from one transverse side wall 25 to the other 23, as shown in Figure 4.

[0041] Each one of the internal longitudinal walls 4 is provided, on a lower edge, with a plurality of vertical lower notches 41, each of which is interlocked in one of the vertical upper notches 31 of the internal transverse walls 3, 3', 3"; the longitudinal walls 4 are decisive in order to maintain the integrity of the structure formed by the abutment elements 32A, 32B, 32C and by the internal transverse walls 3, 3', 3", which are correctly mutually spaced by virtue of the notches 41 and 31.

[0042] More precisely, as evident from Figures 2, 3, 4 and 5, each one of the internal longitudinal walls 4 engages one of the longitudinal rows of upper notches 31.

[0043] Each one of the abutment elements 32A, 32B, 32C is provided, on a lower edge, with a vertical slit 321 and is interlocked in one of the vertical notches 31 of the internal transverse wars 3, 3', 3", together with an internal longitudinal wall 4, which is arranged adjacent to said internal longitudinal wall 4.

[0044] In greater detail, while the abutment element 32A, 32B, 32C engages a vertical notch 31 of an internal transverse wall 3, 3', 3", said wall engages the vertical slit 321 of said abutment element.

[0045] The abutment elements 32A, 32B, 32C in practice form vertical shoulders on which the lateral faces of the discs d rest.

[0046] The abutment elements 32A, 32B, 32C have a substantially rectangular shape in the preferred embodiment.

[0047] As can be seen in particular in Figure 5, the internal transverse walls 3, 3', 3", the internal longitudinal walls 4 and the abutment elements 32A, 32B, 32C are configured so that a disk d accommodated in one of the seats 11 is contained in a downward region by the tubular supporting elements 5 arranged on the base 21, frontally between two abutment elements 32A, 32B, 32C and one of the internal longitudinal walls 4, and laterally between two internal transverse walls 3, 3', 3".

[0048] In other words, each seat 11 is formed between the supporting elements 5, the abutment elements 32A, 32B, 32C, one of the internal longitudinal walls 4 and two internal transverse walls 3, 3', 3".

[0049] As obvious, the discs d are contained in an upper region by the closure element 80.

[0050] Advantageously, as already mentioned, the internal transverse walls 3, 3', 3" and/or the abutment elements 32A, 32B, 32C comprise a plurality of cardboard sheets arranged side by side.

[0051] In the preferred embodiments, the internal transverse walls 3, 3', 3" and the abutment elements 32A, 32B, 32C are all constituted by a plurality of cardboard sheets arranged side by side, while the internal longitudinal walls 4 are constituted by a single cardboard sheet.

[0052] Advantageously, the internal longitudinal walls 4 and/or the internal transverse walls 3, 3', 3" and/or the abutment elements 32A, 32B, 32C, or the individual cardboard sheets that optionally constitute these elements, are obtained by die-cutting.

[0053] The internal longitudinal walls 4, the internal transverse walls 3, 3', 3" and the abutment elements 32A, 32B, 32C are preferably made of corrugated cardboard with a vertical rib direction. In this manner it is possible to obtain optimum strength.

[0054] Advantageously, the internal longitudinal walls 4 comprise, on an upper edge which is opposite to the lower edge, arranged at the abutment elements 32A, 32B, 32C, a plurality of protrusions 44 which are vertically extended, such as for example rectangular tabs. These protrusions 44 can be folded and are adapted to be folded toward the inside of the seats 11, so as to push the discs d accommodated in said seats 11 against the abutment elements 32A, 32B, 32C, so as to contribute to keep them in position.

[0055] Conveniently, the internal longitudinal walls 4 comprise, on the upper edge, a plurality of vertical recesses 45, which are arranged at the seats 11 and are adapted to be engaged by a protruding central portion of the discs d.

[0056] Advantageously, each internal longitudinal wall 4 comprises, on the upper edge, two vertical recesses 45, which have the function of creating the space required to facilitate the manual insertion and extraction of the

discs d.

[0057] In the preferred and illustrated embodiment, the vertical recesses have a substantially rectangular shape.

[0058] In greater detail, the abutment elements 32A, 32B, 32C, in the preferred and illustrated embodiment comprise:

- symmetrical abutment elements 32A, in which the vertical slit 321 is arranged at the center of said abutment element 32A;
- asymmetric narrow abutment elements 32C, in which the vertical slit 321 is off-center,
- asymmetric wide abutment element 32B, which have a greater longitudinal extension (i.e., are wider) than the asymmetric narrow abutment elements 32C and in which the vertical slit 321 is off-center.

[0059] In the preferred and illustrated embodiment, the internal transverse walls 3, 3', 3" comprise a first internal transverse wall 3 which is arranged adjacent to a first transverse side wall 25, a second internal transverse wall 3' arranged in an intermediate longitudinal region of the accommodation cavity 27, and a third internal transverse wall 3", which is arranged adjacent to a second transverse side wall 23.

[0060] It can be noted from the figures that the asymmetric narrow abutment elements 32C are arranged in a central portion of the first internal transverse wall 3 and of the third internal transverse wall 3", so that two interspaces are formed between the asymmetric narrow abutment elements 32C and the first and third transverse side walls 25 and 23 and constitute two additional seats 29, each for the accommodation of a disk d.

[0061] One or more concave supporting elements 7 are accommodated inside each one of said additional seats 29, are rested against the base 21, and have an arc-like upper concavity 71 that is adapted to support a disk d, as evident in Figure 2.

[0062] The concave supporting elements 7 also are preferably made of cardboard and comprise a plurality of sheets of cardboard arranged side by side.

[0063] Advantageously, the concave supporting elements 7, or the individual cardboard sheets which optionally constitute the concave supporting elements 7, are obtained by die-cutting. Even more preferably, the concave supporting elements 7 are constituted by corrugated cardboard sheets with a vertical rib direction.

[0064] In the illustrated example, the supporting elements 5, 7 comprise a plurality of horizontal transverse tubular supporting elements 5 which are adjacent to the base 21 and are preferably rested against it.

[0065] Also in this embodiment, the internal longitudinal walls 4 are provided, on the lower edge, with a plurality of recesses which are complementary to the tubular supporting elements 5 and are aligned in transverse rows.

[0066] Each one of the tubular supporting elements 5 engages one of the transverse rows of recesses 43 and is thus rigidly fixed inside the accommodation cavity 27.

[0067] The tubular supporting elements 5 have the function of preventing the rolling of the discs d and of creating a resting base for them on the bottom 21 of the container 1 as shown in Figure 13.

[0068] Conveniently, the container 1 comprises lateral panels 50, 52 which are arranged adjacent to the transverse side walls 23, 25, between each one of them and a row of abutment elements 32A, 32B, 32C.

[0069] More precisely, there are at least two external lateral panels 50, each arranged adjacent to a transverse side wall 23, 25, and two internal lateral panels 52, which are each arranged adjacent to one of the external lateral panels 50, between said lateral panel and a row of abutment elements 32A, 32B, 32C.

[0070] In even greater detail, there is a first external lateral panel 50 and a first internal lateral panel 52, which are mutually adjacent and are interlocked between the abutment elements 32B arranged on the first internal transverse wall 3 and the first transverse side wall 25; there is also a second external lateral panel 50 and a second internal lateral panel 52, which are mutually adjacent and interlocked between the abutment elements 32B arranged on the third internal transverse wall 3" and the second transverse side wall 23.

[0071] In the illustrated example, said lateral panels 50, 52 have a substantially rectangular shape.

[0072] Preferably, as shown in Figure 8, the external lateral panels 50 also comprise a plurality of cardboard sheets arranged side by side and even more preferably corrugated cardboard sheets with a vertical rib direction, while the internal lateral panels 52 are constituted by a single cardboard sheet.

[0073] The internal lateral panels 52 furthermore comprise a plurality of vertically extended foldable protrusions 51, which are adapted to be folded toward the inside of the accommodation cavity 27 so as to contrast the movement of the discs d so as to contribute to keep them in position.

[0074] In the illustrated example, said protrusions 51 are rectangular tabs which are substantially similar to the protrusions 44 of the internal longitudinal walls 4.

[0075] Advantageously, the lateral panels 50, 52 or the individual cardboard sheets which optionally constitute the lateral panels 50, 52 are obtained by die-cutting.

[0076] According to an optional and advantageous characteristic, the container 1 comprises a plurality of resting feet 70 which are fixed on a lower face of the base 21, at one or more of the internal transverse walls 3, 3', 3".

[0077] Advantageously, the resting feet 70, with particular reference to Figure 11, comprise a cardboard tube 701 which is wrapped in a band 702 of "corrugated" cardboard and are arranged and glued externally on a lower face of the base 21 so as to facilitate the movement and stacking of multiple containers 1.

[0078] The operation of the disc packaging container is clear and evident from what has been described.

[0079] It is noted here that all the elements described are preferably made of cardboard and, in the preferred

and illustrated embodiment, the entire container 1 is made exclusively of cardboard. Therefore, the container 1 is easy and cheap to be disposed of and also has a limited environmental impact, since it is constituted by a single material that can be easily disposed and recycled.

[0080] Furthermore, all the vertical elements are advantageously constituted by corrugated cardboard with a vertical rib direction, thus allowing to obtain a high structural strength.

[0081] Another important functionality is represented by the fact that the container 1 is provided with a completely modular internal structure, i.e., a structure constituted by interchangeable elements which can be replaced so as to form seats 11, 29 adapted for any type of disk d, such as the internal transverse walls 3, 3', 3", the internal longitudinal walls 4, the abutment elements 32A, 32B, 32C, the tubular supporting elements 5, the concave supporting elements 7, and the lateral panels 50, 52.

[0082] Moreover, in the preferred embodiment, each one of the interchangeable and replaceable elements is in turn modular, since it is constituted by cardboard sheets arranged side by side: by changing the number of cardboard sheets arranged side by side and/or changing the dimensions of the elements 32A, 32B, 32C, 3, 3', 3", and the notches 31 and the slits 321 it is possible to change the thickness and/or shape of said elements and consequently the shape and dimension of the seats 11 and 29.

[0083] It should be noted that the discs d, once arranged in the seats 11, are mutually separated in particular by the internal longitudinal walls 4, which avoid their mutual friction, as well as by the internal transverse walls 3, 3', 3".

[0084] Furthermore, oscillation of the thinner discs is avoided by the protrusions 44, which can be folded internally so as to block this oscillation.

[0085] The container 1 according to the invention is therefore suitable both for the movement of the discs inside the production facility and for their shipping and transport.

[0086] In practice, the discs d can be arranged inside the box-like body 20 of the container 1, within the seats 11, 29, already at the end of the production process.

[0087] Once the container 1 is filled with a preset number of discs d, the box-like body 20 can be closed with the closure element 80 and can be shipped directly, without requiring further operations.

[0088] Finally, it is specified that although the container 1 is conceived primarily for the packaging of brake discs, it can be used equivalently for the packaging of any item, element or mechanical part that is substantially disc-shaped. In this sense, the terms "disc-shaped element" and "disc" used in the present description and in the accompanying claims are to be understood, in a fully general manner, as any product that has a substantially disk-like shape or the like.

[0089] In practice it has been found that the container for the packaging of disc-shaped elements, according to the present invention, achieves the intended aim and objects, since it allows to simplify and speed up and reduce the cost of the processes for the handling, packaging and shipping of brake discs.

[0090] Another advantage of the container according to the invention resides in that it is more versatile than that of the background art.

[0091] A further advantage of the container according to the invention resides in that it is easier and cheaper to be disposed of than that of the background art.

[0092] Another advantage of the container according to the invention resides in that it produces a lower environmental impact than that of the background art.

[0093] A further advantage of the container according to the invention resides in the significant reduction of shipping volumes and costs with respect to the known packaging method: in the preferred embodiment, for an equal shipped quantity, a reduction of the shipping volumes and costs of over 30% is achieved with respect to the known packaging method.

[0094] Another advantage of the container according to the invention resides in that it is easy to provide and economically competitive if compared with the background art.

[0095] The container for the packaging of disc-shaped elements thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the accompanying claims.

[0096] All the details may furthermore be replaced with other technically equivalent elements.

[0097] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to the requirements and the state of the art.

[0098] The disclosures in Italian Patent Application No. 102018000007716 from which this application claims priority are incorporated herein by reference.

[0099] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A container (1) for the packaging of disc-shaped elements (d), particularly brake discs for car braking systems, comprising a box-like body (20) made of cardboard and a closure element (80) adapted to be fixed to said box-like body (20),
said box-like body (20) comprising a rectangular horizontal base (21) and four vertical side walls (22, 23, 24, 25), which comprise two mutually parallel longitudinal side walls (22, 24) and two mutually parallel transverse side walls (23, 25), which form between

them an accommodation cavity (27) which is open upward and has substantially the shape of a parallelepiped, **characterized in that** said accommodation cavity (27) accommodates multiple dividers (3, 3', 3", 4, 32A, 32B, 32C) and supporting elements (5, 7) made of cardboard, interlocked in said accommodation cavity (27) and interlocked with each other detachably, forming between them a plurality of seats (11, 29), each of which is configured to accommodate, protect and keep in position a single disc (d).

2. The container (1) according to claim 1, **characterized in that** said dividers (3, 3', 3", 4, 32A, 32B, 32C) comprise:

- a plurality of vertical internal transverse walls (3, 3', 3"), each of which is provided, on an upper edge, with a plurality of vertical upper notches (31) which are aligned with the vertical upper notches (31) of the other internal transverse walls (3, 3', 3") in longitudinal rows,
- a plurality of vertical internal longitudinal walls (4), each of which is provided, on a lower edge, with a plurality of vertical lower notches (41), each of which is interlocked in one of said vertical upper notches (31), each one of said internal longitudinal walls (4) engaging one of said longitudinal rows of upper notches (31),
- a plurality of abutment elements (32A, 32B, 32C), each of which is provided, on a lower edge, with a vertical slit (321) and is interlocked in one of said vertical notches (31) which is adjacent to one of said internal longitudinal walls (4).

3. The container (1) according to claim 2, **characterized in that** said internal transverse walls (3, 3', 3"), said internal longitudinal walls (4) and said abutment elements (32A, 32B, 32C) are configured so as to form between them said seats (11), so that a disc (d) accommodated in one of said seats (11) is contained in a lower region by one or more of said supporting elements (5, 7), frontally between two of said abutment elements (32A, 32B, 32C) and one of said internal longitudinal walls (4), and laterally between two of said internal transverse walls (3, 3', 3").

4. The container (1) according to claim 2 or 3, **characterized in that** said internal transverse walls (3, 3', 3") and/or said abutment elements (32A, 32B, 32C) comprise a plurality of sheets of cardboard arranged side by side.

5. The container (1) according to one or more of claims 2 to 4, **characterized in that** said internal longitudinal walls (4), said internal transverse walls (3, 3', 3"), and said abutment elements (32A, 32B, 32C) are made of corrugated cardboard with a vertical rib direction.

6. The container (1) according to one or more of the preceding claims, **characterized in that** said supporting elements (5, 7) comprise a plurality of horizontal transverse tubular supporting elements (5) arranged adjacent to said base (21)
and **in that** said internal longitudinal walls (4) are provided, on said lower edge, with a plurality of recesses (43) which are complementary to said tubular supporting elements (5) and are aligned in transverse rows, each one of said tubular supporting elements (5) engaging one of said transverse rows of recesses (43), said tubular supporting elements (5) being adapted to prevent rolling and to support said discs (d) in a lower region.

7. The container (1) according to one or more of claims 2 to 6, **characterized in that** said internal longitudinal walls (4) comprise a plurality of vertically extended protrusions (44) on an upper edge which is opposite to said lower edge, said protrusions being arranged at said abutment elements (32A, 32B, 32C) and being foldable and adapted to be folded toward the inside of said seats (11) so as to push the discs (d) accommodated in said seats (11) against said abutment elements (32A, 32B, 32C) so as to contribute to keep them in position.

8. The container (1) according to one or more of claims 2 to 7, **characterized in that** said abutment elements (32A, 32B, 32C) comprise:

- symmetrical abutment elements (32A), wherein said vertical slit (321) is arranged at the center of said abutment element (32A),
- asymmetric narrow abutment elements (32C), in which said vertical slit (321) is arranged off-center,
- asymmetric wide abutment elements (32B), which have a greater longitudinal extension than said asymmetric narrow abutment elements (32C) and in which said vertical slit (321) is arranged off-center;

and **in that** said internal transverse walls (3, 3', 3") comprise a first internal transverse wall (3), which is arranged adjacent to a first transverse side wall (25), a second internal transverse wall (3'), which is arranged in an intermediate longitudinal region of said accommodation cavity (27), and a third internal transverse wall (3"), which is arranged adjacent to a second transverse side wall (23),
said asymmetric narrow abutment elements (32C) being arranged in a central portion of said first internal transverse wall (3) and of said third internal transverse wall (3"), so that between said asymmetric narrow abutment elements (32C) and said first and second transverse side walls (25, 23) there are two interspaces which constitute two additional seats (29),

each for accommodating a disc (d); each one of said two additional seats (29) accommodating internally, rested against said base (21), one or more concave supporting elements (7) which have an upper concavity (71) shaped like an arc which is adapted to support a disc (d) in a downward region.

9. The container (1) according to one or more of claims 2 to 8, **characterized in that** it comprises at least two external lateral panels (50), each arranged adjacent to a transverse side wall (23, 25), and two internal lateral panels (52), each arranged adjacent to one of said external lateral panels (50), between the latter and a row of said abutment elements (32A, 32B, 32C),
said internal lateral panels (52) comprising a plurality of vertically extended protrusions (51), which can be folded and are adapted to be folded toward the inside of said accommodation cavity (27) so as to contrast the movement of said discs (d) in such a manner as to contribute to keep them in position.

10. The container (1) according to one or more of claims 2 to 9, **characterized in that** said internal longitudinal walls (4) comprise, on the upper edge, a plurality of vertical recesses (45), which are arranged at said seats (11) and are adapted to be engaged by a protruding central portion of the discs (d).

11. The container (1) according to one or more of claims 2 to 10, **characterized in that** it comprises a plurality of resting feet (70), which comprise a cardboard tube (701) wrapped in a band (702) of corrugated cardboard and are fixed on the lower face of said base (21), at one or more of said internal transverse walls (3, 3', 3").

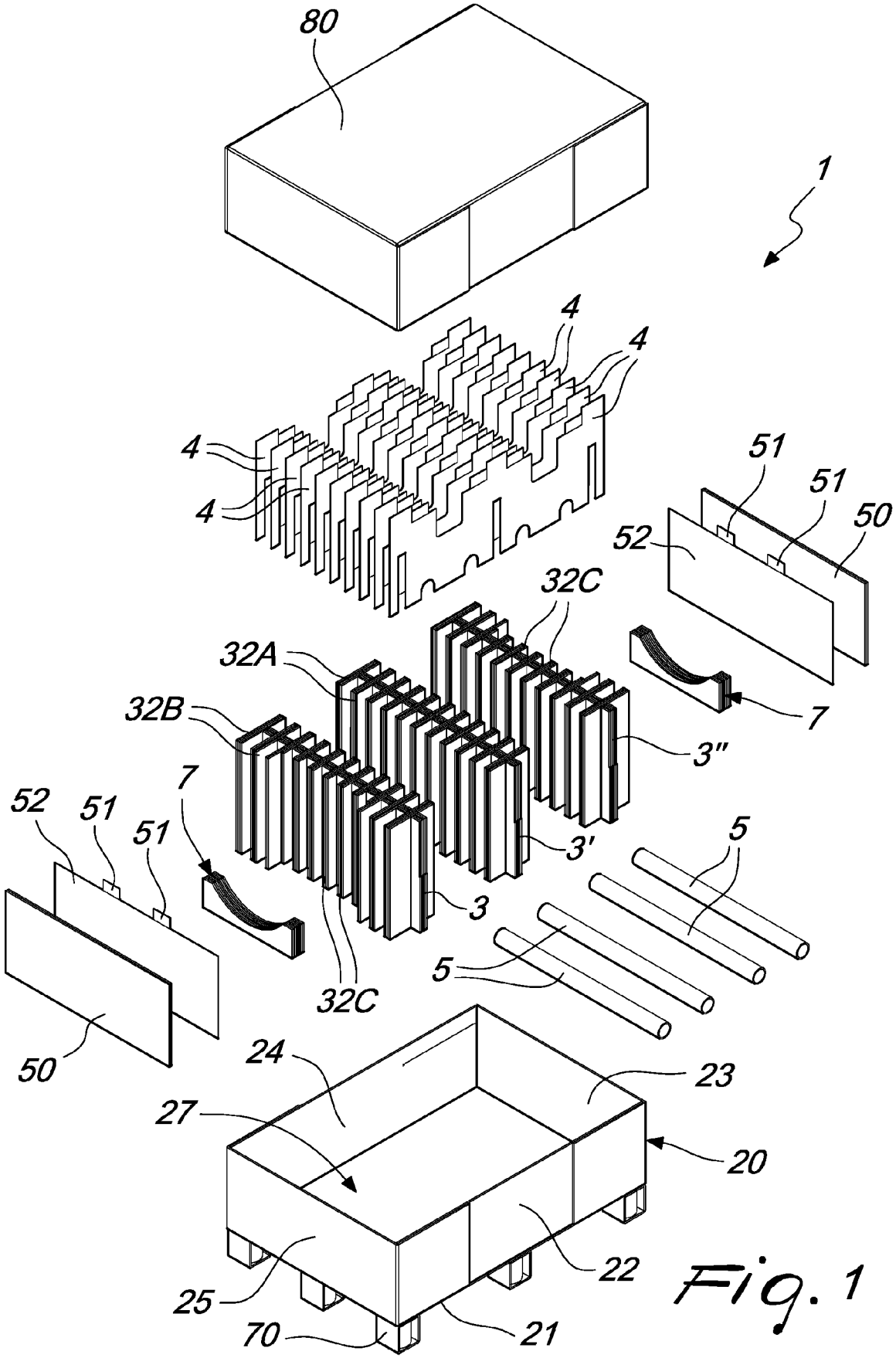
80
1
4
4
4
4
51
51
50
52
32C
32A
32B
7
3"
3'
3
5
5
7
52
51
51
50
32C
24
23
27
20
22
25
70
21

Fig. 1

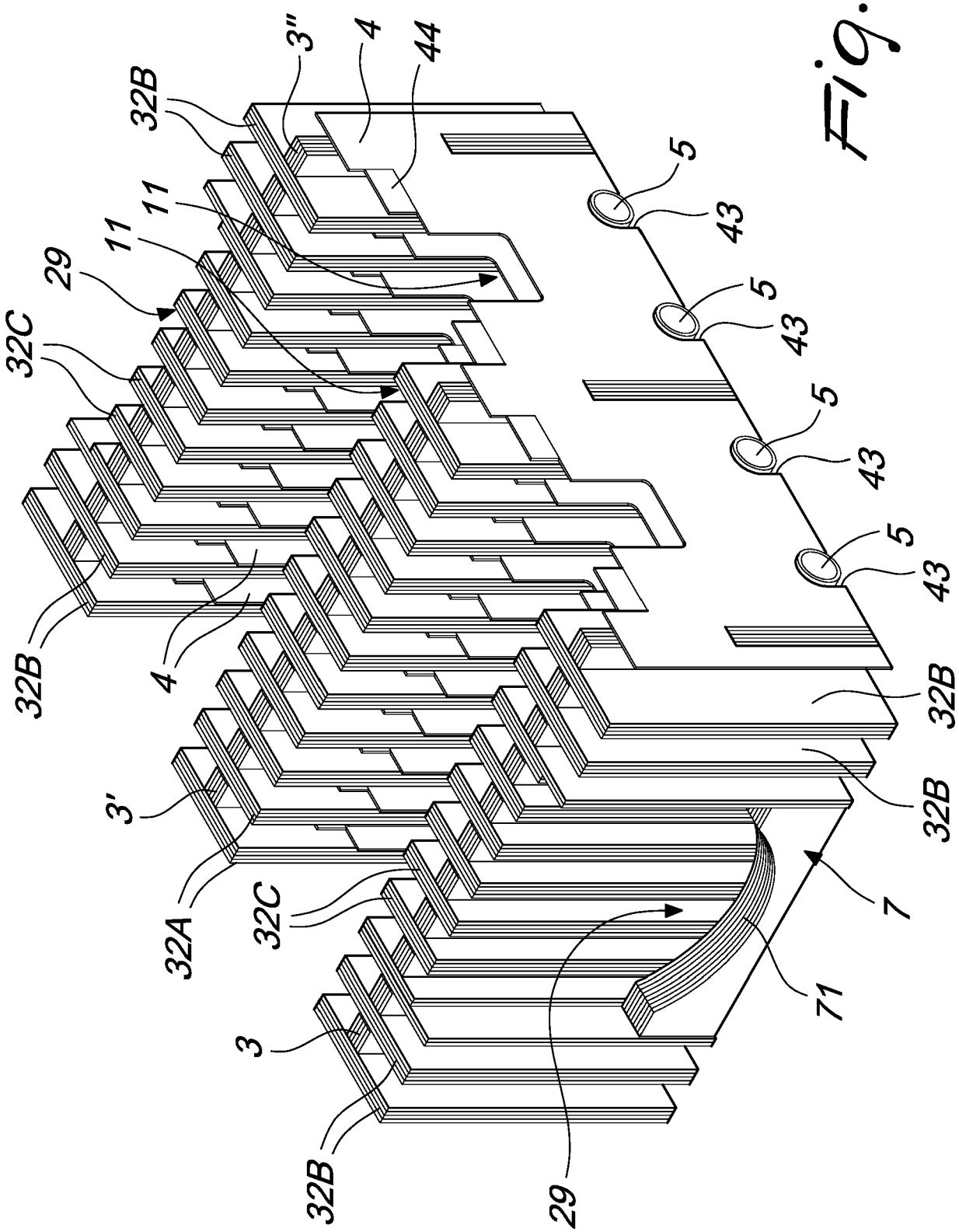
32B
3"
4
44
5
43
11
11
29
32C
32B
4
3'
32A
32C
3
32B
29
71
7
32B
32B
5
43
5
43
5
43
5
43

Fig. 2

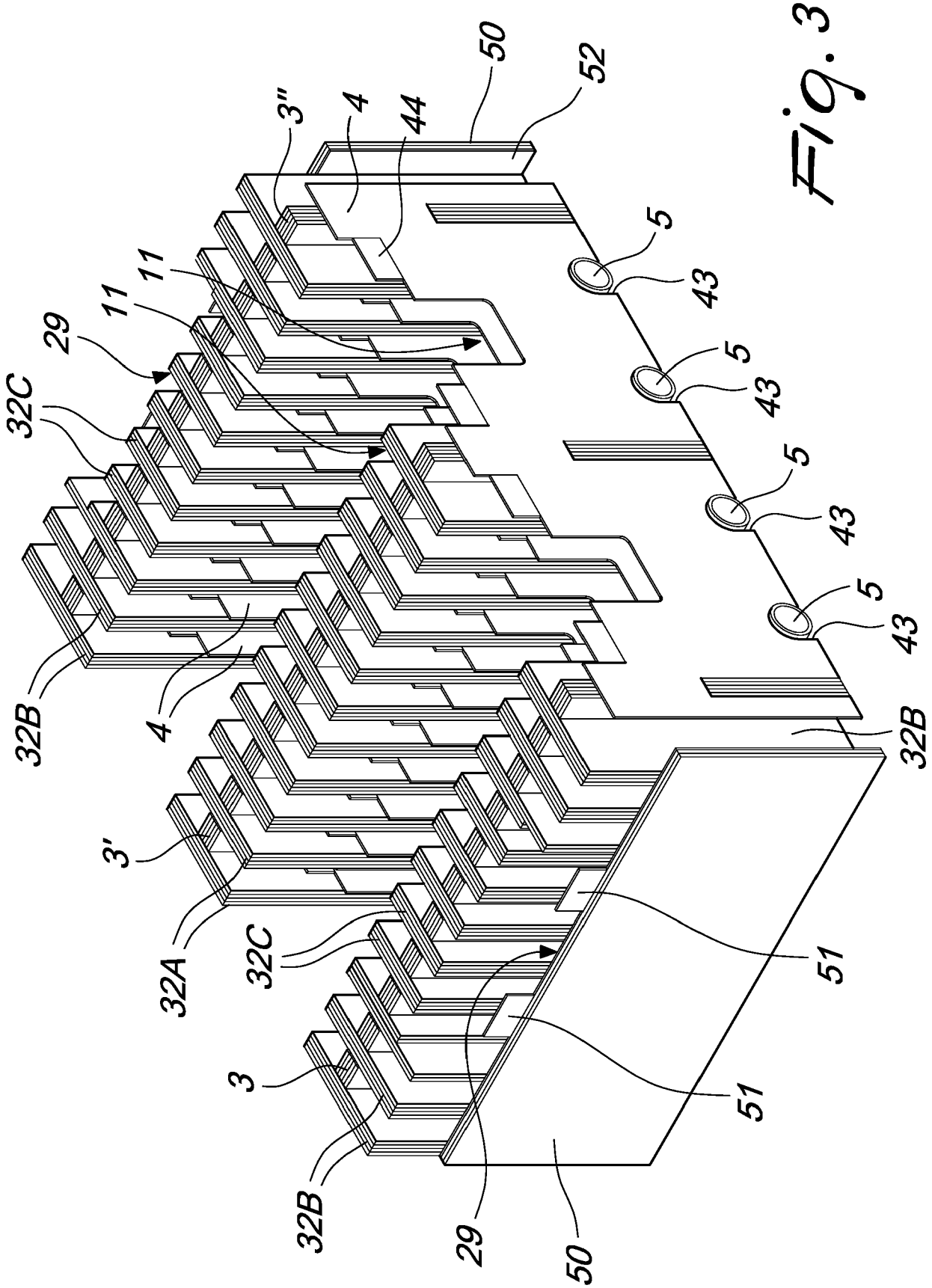

Fig. 3

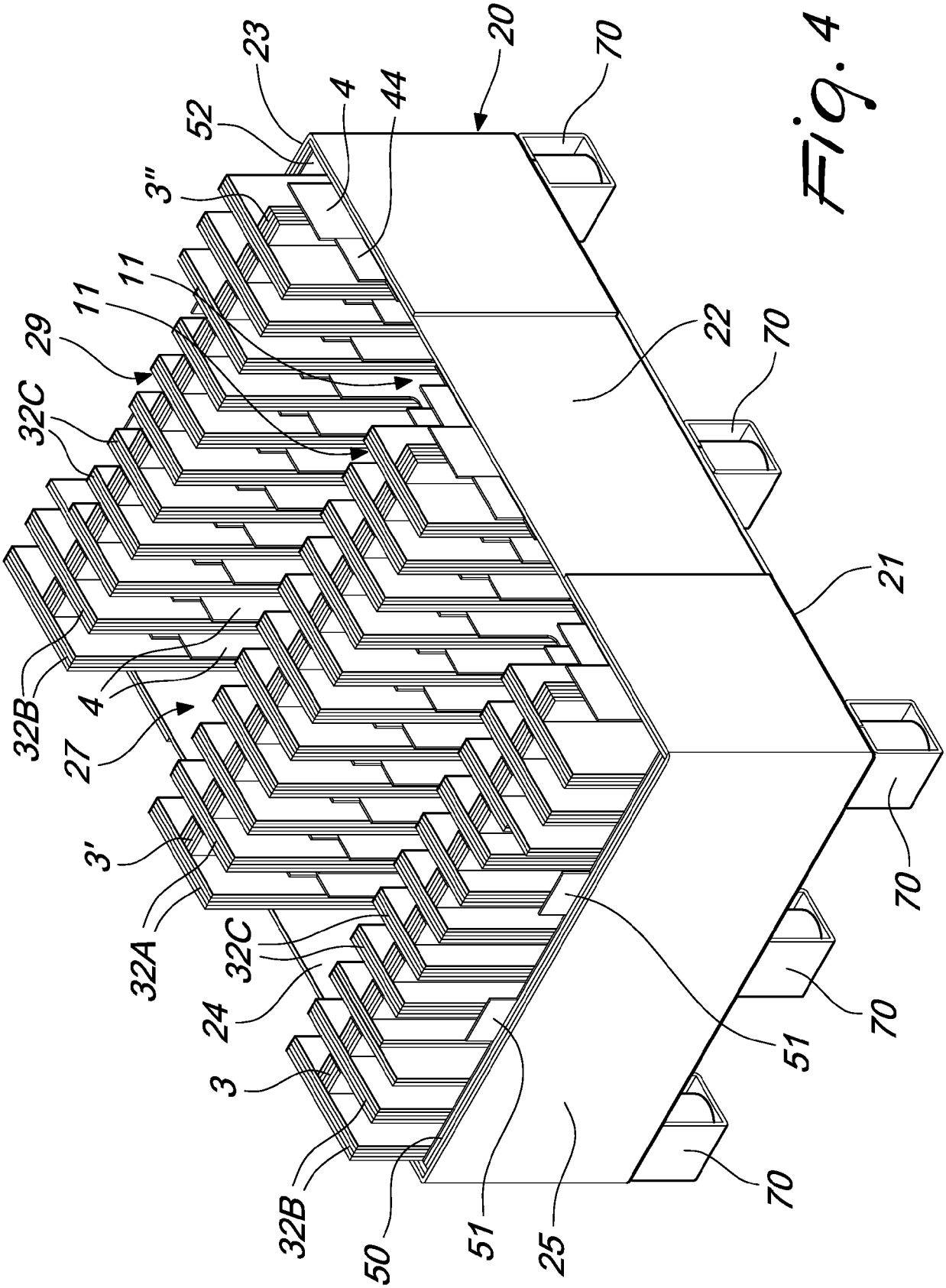
20
23
4
44
52
3"
11
11
29
32C
32B
4
27
3'
32A
32C
24
3
32B
50
51
25
51
22
21
70
70
70
70
70
70

Fig. 4

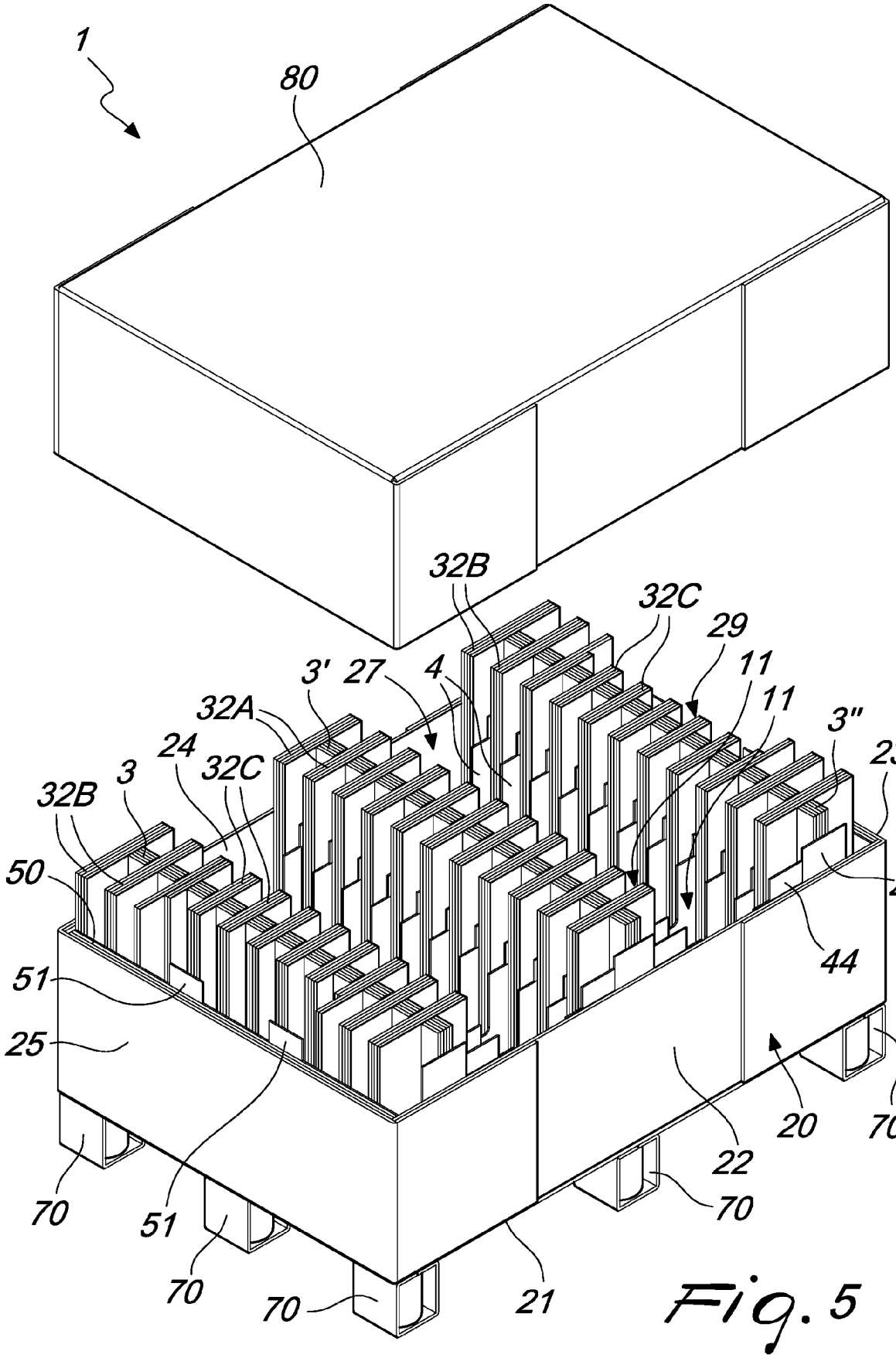
1
80
32B
32C
29
11
11
3'
27
4
32A
3"
23
24
32C
3
32B
50
4
44
51
25
70
20
70
22
70
51
70
70
21

Fig. 5

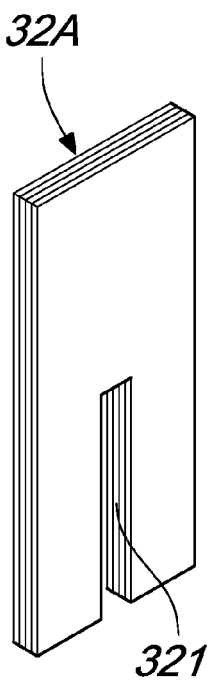

Fig. 6A

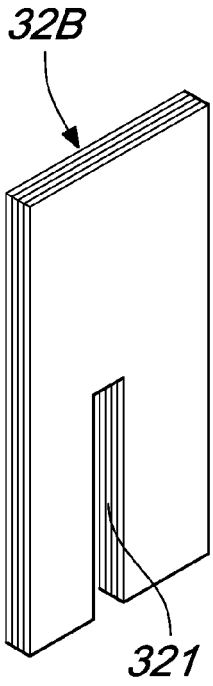

Fig. 6B

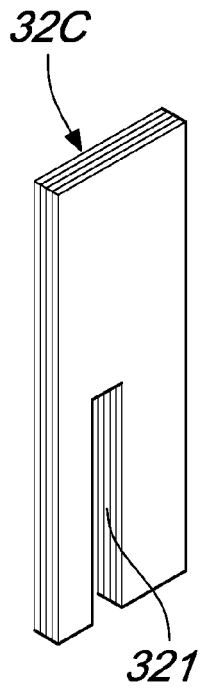

Fig. 6C

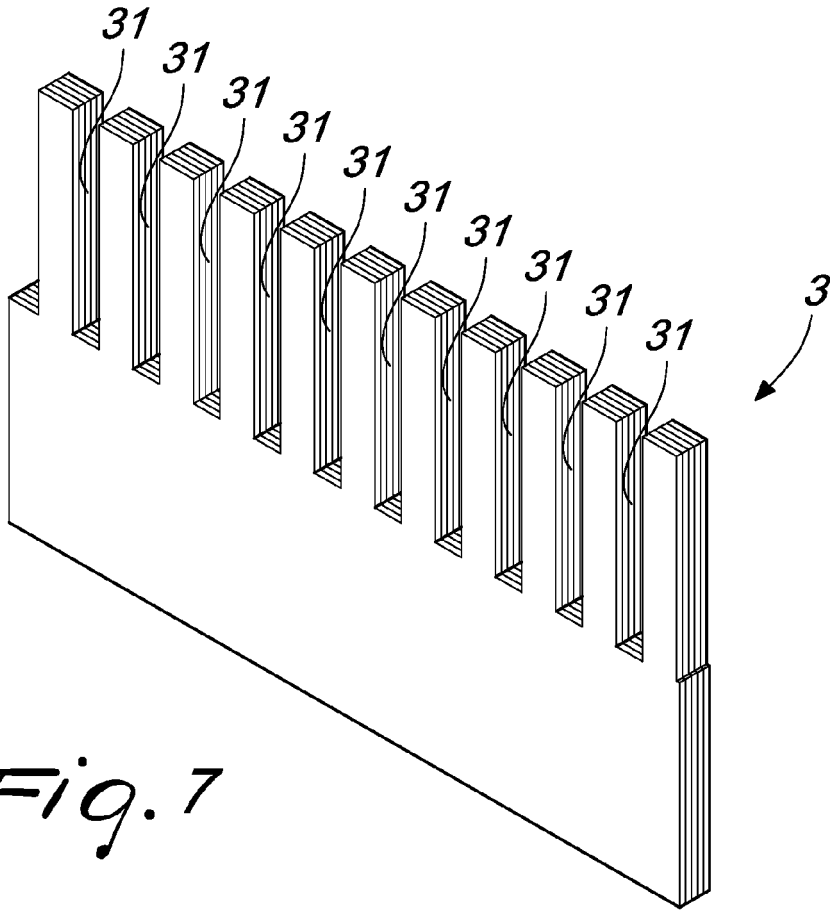

Fig. 7

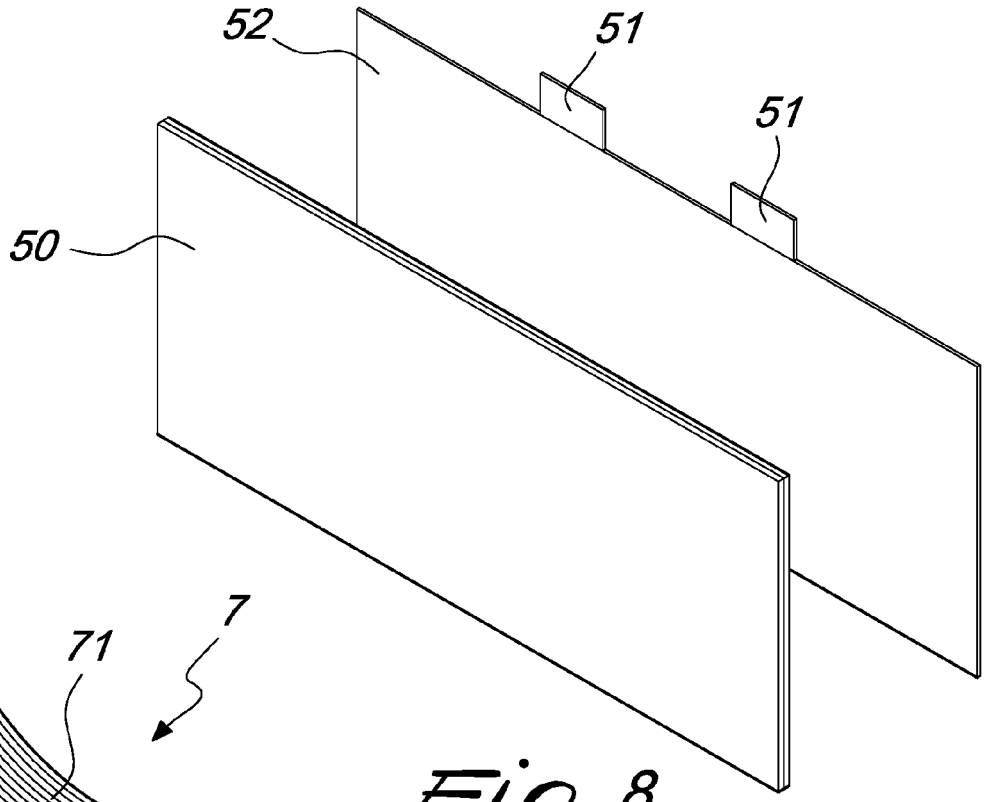

Fig. 8

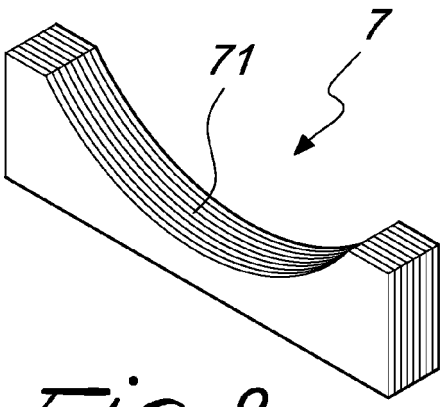

Fig. 9

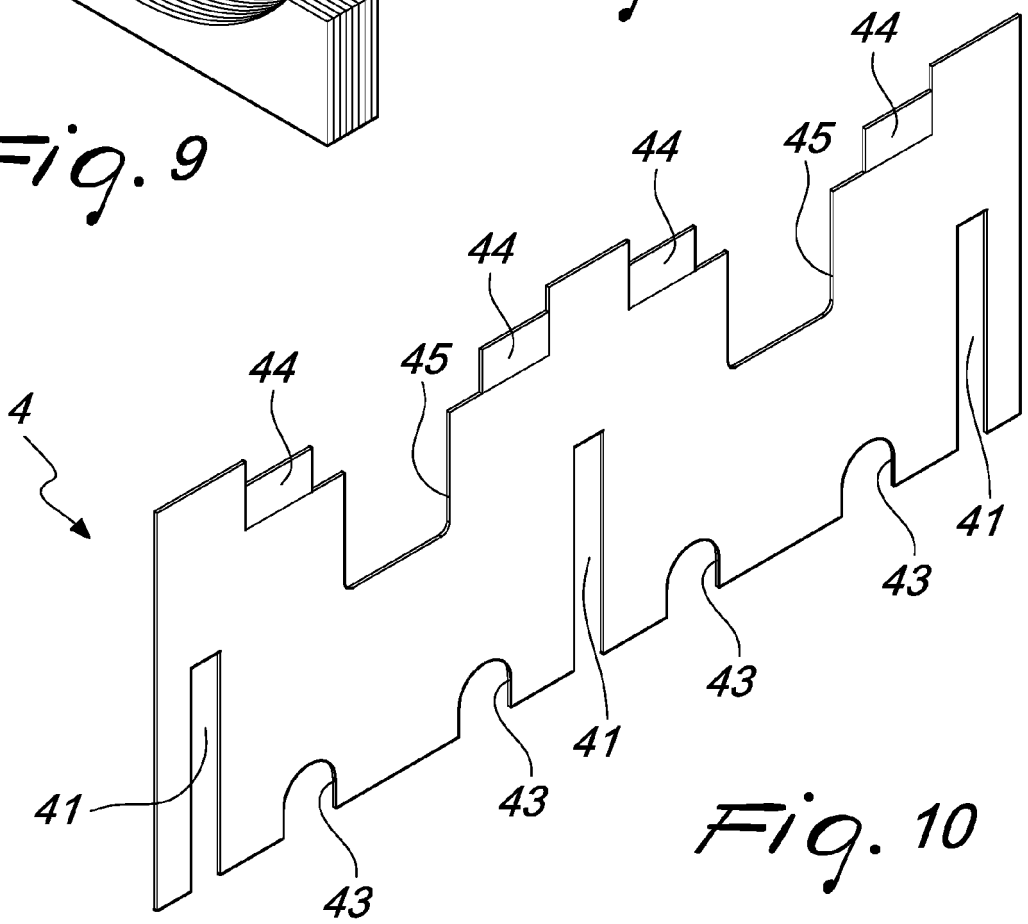

Fig. 10

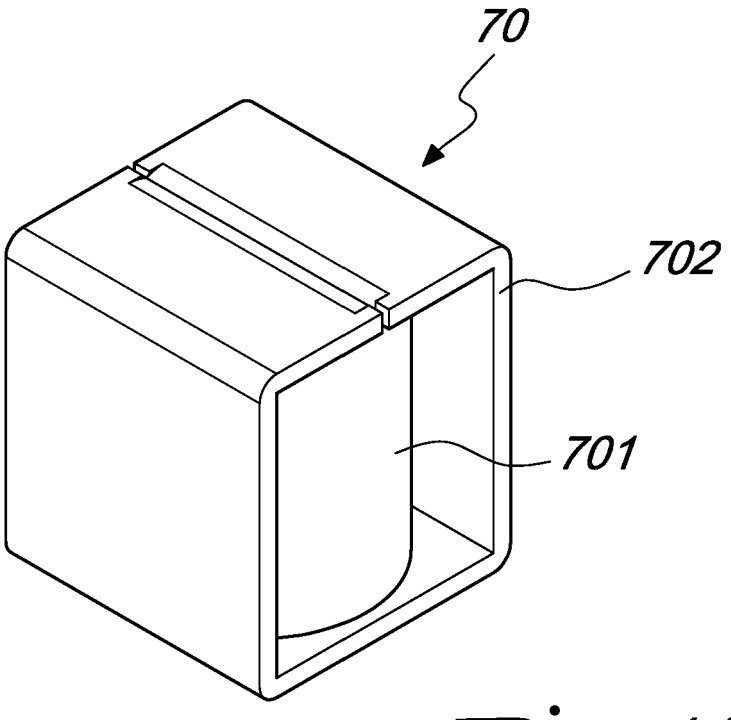

Fig. 11

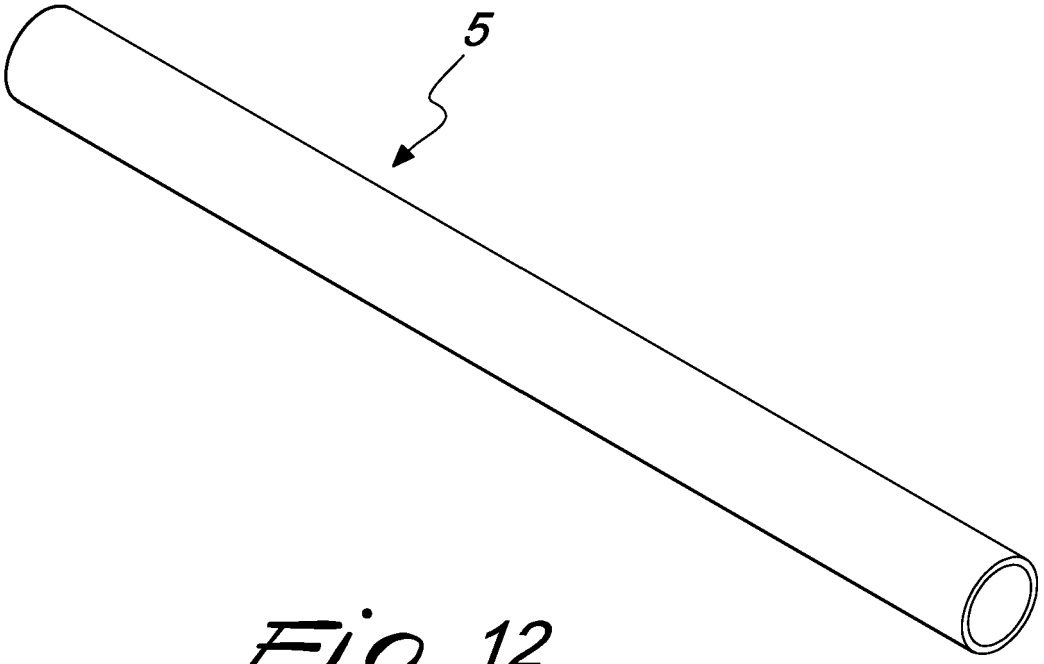

Fig. 12

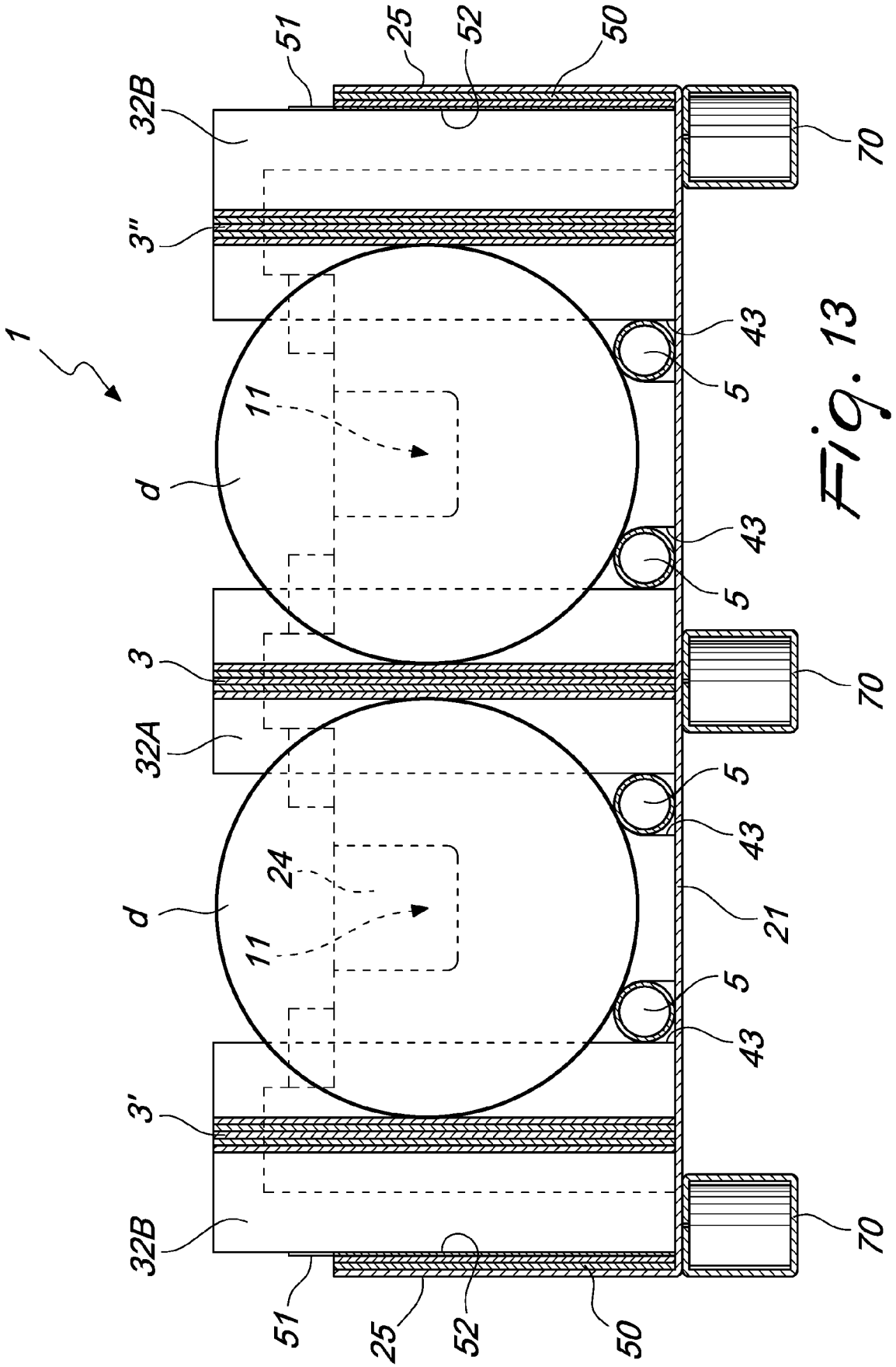

Fig. 13

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EUROPEAN SEARCH REPORT

Application Number
EP 19 18 7759

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	JP 2005 350116 A (ROHM CO LTD) 22 December 2005 (2005-12-22) * the whole document *	1	INV. B65D5/49 B65D5/50 B65D5/54
X	GB 2 428 037 A (MONDI PACKAGING UK LTD [GB]) 17 January 2007 (2007-01-17) * page 4, paragraph 2 * * page 5, paragraph 2 - page 6, paragraph 3; figures *	1	
X	US 2008/149519 A1 (TING CHUNG-KUAN [TW] ET AL) 26 June 2008 (2008-06-26) * paragraph [0024]; figures *	1	
X	US 2016/144998 A1 (KRETZ DAVID [US] ET AL) 26 May 2016 (2016-05-26) * paragraph [0021] - paragraph [0031]; figures *	1	
X	US 2006/180497 A1 (TING CHUNG-KUAN [TW]) 17 August 2006 (2006-08-17) * paragraphs [0013] - [0022]; figures *	1	TECHNICAL FIELDS SEARCHED (IPC) B65D
X	JP 2010 228799 A (GREEN PACKAGE KK; NIPRO CORP) 14 October 2010 (2010-10-14) * the whole document *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 December 2019	Fournier, Jacques

CATEGORY OF CITED DOCUMENTS

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13-12-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2005350116 A	22-12-2005	NONE	
GB 2428037 A	17-01-2007	NONE	
US 2008149519 A1	26-06-2008	TW 200827255 A	01-07-2008
		US 2008149519 A1	26-06-2008
US 2016144998 A1	26-05-2016	NONE	
US 2006180497 A1	17-08-2006	TW I284108 B	21-07-2007
		US 2006180497 A1	17-08-2006
		US 2008099369 A1	01-05-2008
JP 2010228799 A	14-10-2010	JP 4959743 B2	27-06-2012
		JP 2010228799 A	14-10-2010

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Patent documents cited in the description

- IT 102018000007716 **[0098]**