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(54) Protection element for articles, and corresponding method of production

(57) Protection element for an article, obtained from a single sheet (11; 111) of cardboard or similar or comparable material, comprising at least two lateral walls (12; 112) defining between them a housing seating (39) into which at least a part of said article to be protected is inserted. An associable elastic element (34; 134) is also comprised.

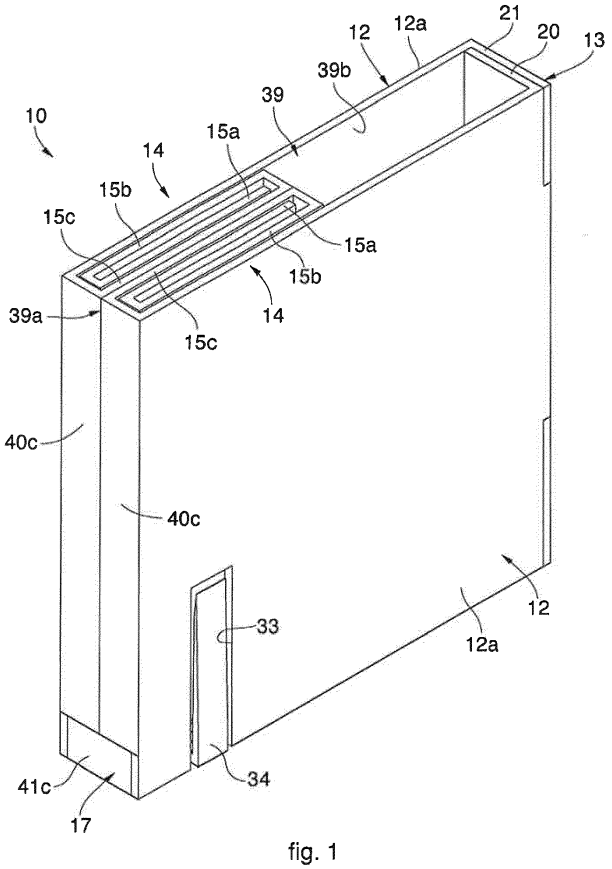

fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a protection element and the corresponding method for making said element, which is used to protect at least a part, for example an edge, of an article such as, for example, a sheet of glass, of polycarbonate or objects of any other type. In particular, the protection element is obtained from a sheet of cardboard, either single or from a strip, which is suitably cut and bent.

BACKGROUND OF THE INVENTION

[0002] Protection elements are known, able to protect at least a part of an article such as a sheet of glass, or any other fragile material, which are associated to the article to be protected so as to guarantee its integrity at least during packing, transport and/or storage.

[0003] Protection elements are known, formed from a single sheet or a plurality of overlapping sheets of cardboard. One example of a protection element of this type is described in US 2.896.833 A.

[0004] The sheets of cardboard are suitably cut and bent to define housing seatings through which the parts of the article to be protected are inserted: these include for example the edges of glass or polycarbonate sheets, or other objects.

[0005] In particular, during the bending of the cardboard two edges of cardboard are defined which, during use, are put into direct contact with the article to be protected. The thickness of each edge when bent in turn defines the protection capability that it has on the article.

[0006] Given their configuration, very often these protection elements do not give an adequate protection against possible impacts during movement.

[0007] Furthermore, during the movements to which the article is subjected, the protection elements, if not properly made solid with the article by means of suitable connections, such as for example adhesive strips, come free from the latter, leaving the part to be protected uncovered.

[0008] Furthermore, it is particularly complex and costly to make these protection elements, and also entails discarding a considerable quantity of material.

[0009] Other known protection elements are made of polystyrene. Although they have good resistance to impacts, such protection elements are rather costly, especially due to the complex production steps.

[0010] All these known protection elements have the disadvantage that they are not very resistant and do not guarantee adequate protection against many impacts, for example when the sheet contained inside them is transported.

[0011] Another disadvantage of known protection elements is that they are not adaptable to variable thicknesses of the element to be protected within a certain range of sizes. Indeed, if the sheet or other analogous element to be protected is thinner than the nominal measurement of the protection element, play is created which makes it difficult to hold the element to be protected and makes it easy for the protection element to become detached from the corners of the sheet. On the contrary, if the sheet is only a little thicker than the nominal measurement of the protection element, the force required to insert it can cause the protection element to break, and reduces its capacity to protect the corners of the sheet. In any case, after a few uses the protection element tends to loosen and can no longer be firmly attached to the corners of the sheet to perform its function of protecting the edges.

[0012] One purpose of the present invention is to obtain a protection element for articles that is resistant and that guarantees adequate protection.

[0013] Another purpose is to obtain a protection element that can be used for a variable range of thicknesses of the article to be protected, and that guarantees a firm hold both for all the variable thicknesses within said range, and after repeated uses over time.

[0014] Another purpose of the present invention is to obtain a protection element that is simple and economical, not entailing the discard of a considerable quantity of material in order to make it.

[0015] Another purpose of the present invention is to perfect a method for making a protection element for articles which is simple and economical.

[0016] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0017] The present invention is set forth and characterized in the independent claims, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0018] In accordance with the above purposes, a protection element according to the present invention, which overcomes the limits of the state of the art and eliminates the defects therein, is used to protect at least a part, for example an edge, of a sheet of glass, of polycarbonate or objects of any other type.

[0019] The protection element is obtained from a single sheet of cardboard, or similar or comparable material, which is suitably cut and possibly pre-creased, to define the plan development of the protection element.

[0020] The protection element comprises at least two lateral walls defining between them a housing seating into which at least a part of the article to be protected is inserted.

[0021] According to one feature of the present invention, the lateral walls are interconnected with each other by a front wall and each comprise a gripping part defined by the bending and overlapping of a plurality of first edg-

es. Furthermore, the protection element comprises a bottom wall interposed between the lateral walls and defined by the bending and overlapping of a plurality of second edges. The lateral walls, the front wall and the bottom wall together define the housing seating. In this way it is possible to obtain a protection element for articles that is simple and quick to make, with a limited waste of material and obtained from a single sheet.

[0022] The gripping parts, during use, are disposed in direct contact with the article to be protected and the bending of the first edges determines a protective thickness against possible external actions. In the same way, the second bent edges also define between them the bottom wall with adequate resistance to possible knocks to which the article may he subjected.

[0023] The front wall, being connected in turn to the lateral walls, obtains with the bottom wall an L-shaped housing seating for the article, which limits the risks of damage to the article that is put inside it.

[0024] According to one feature of the present invention, the protection element comprises an elastic element associable with the gripping parts and suitable to keep the gripping parts adjacent to each other; furthermore, at least one bottom wall has a seating inside which the elastic element is insertable so as to be invisible.

According to another feature of the present invention, the protection element comprises an elastic element associable to the gripping parts and able to keep the gripping parts adjacent with respect to each other.

[0025] The present invention also concerns a method to make a protection element for an article, which provides cutting operations to obtain a single sheet of cardboard, or similar or comparable material, defining the plan development of the protection element, and steps of bending the sheet to define at least two lateral walls defining between them a housing seating into which at least a part of the article to be protected is inserted.

[0026] According to one feature of the present invention, the bending step provides to make the lateral walls, interconnected with each other by a front wall, by means of the reciprocal bending of a plurality of first edges in order to dispose them overlapping with respect to each other to define respective gripping parts. It also provides to make a bottom wall, interposed between the lateral walls, by bending and overlapping a plurality of second edges. The housing seating is defined by the lateral walls, the front wall and the bottom wall.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] These and other characteristics of the present invention will become apparent from the following description of some forms of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a perspective view of a protection element according to the present invention;
- fig. 2 is a perspective view of the development of the protection element in fig. 1;
- fig. 3 is a perspective view of a first step in the assembly of the element in fig. 1;
- fig. 4 is a perspective view of a second step in the assembly of the element in fig. 1;
- fig. 5 is a perspective view of a third step in the assembly of the element in fig. 1;
- fig. 6 is a perspective view of a fourth step in the assembly of the element in fig. 1;
- fig. 7 is a plan view of the development of a protection element according to a variant form of embodiment;
- fig. 8 is a perspective view of an assembly step of the protection element in fig. 7;
- fig. 9 is a perspective view of the protection element in fig. 7 in its assembled condition;
- fig. 10 is a perspective view from below and the rear of the protection element in fig. 7;
- fig. 11 is an enlarged detail of the protection element in fig. 9.

DETAILED DESCRIPTION OF SOME FORMS OF EMBODIMENT

[0028] With reference to the attached drawings, a protection element 10, 110 according to the present invention, in this case made of cardboard, is used in the field of packing, transport and/or storage of articles such as, for example, sheets of glass, or any other fragile material, or in general objects, not shown in the drawings.

[0029] The protection element 10 (fig. 1) is obtained by bending a single sheet 11 (fig. 2) suitably cut to define the plan development of the whole protection element 10.

[0030] The protection element 10 comprises at least two lateral walls 12 (fig. 1), defining between them a housing seating 39 through which at least a part of the article to be protected is inserted.

[0031] The lateral walls 12 are interconnected with each other by a front wall 13 and each comprise a gripping part 14 defined by the bending of a plurality of first edges 15a, 15b and 15c (figs. 1 and 2).

[0032] The protection element 10 also comprises a bottom wall 17 (fig. 1), partly interposed between the lateral walls 12 and defined by the bending and overlapping of a plurality of second edges 18a, 18b and 18c (fig. 2).

[0033] The gripping parts 14 of the two lateral walls 12 are disposed adjacent to each other, to define the housing seating 39. In this case, the housing seating 39 is defined by the lateral walls 12, the front wall 13 and the bottom wall 17, and comprises a slit 39a and a containing compartment 39b.

[0034] More specifically, the lateral walls 12 comprise a peripheral portion 12a, substantially rectangular in shape, and the first edges 15a, 15b and 15c disposed adjacent to the peripheral portion 12a.

[0035] The two peripheral portions 12a define, in the assembled condition of the protection element 10, two outermost perimeter surfaces thereof.

[0036] The first edges 15a, 15b and 15c are interconnected with each other by first intermediate edges 40a and 40b having a width coordinated to the thickness of the edge or edges that are bent.

[0037] Another first intermediate edge 40c reciprocally connects the first edge 15c and the peripheral portion 12a.

[0038] The first intermediate edges 40a, 40b and 40c are suitable to define, in the assembled condition of the protection element 10, the thickness of the gripping parts 14.

[0039] The first edges 15a, 15b and 15c, the peripheral portion 12a and the first intermediate edges 40a, 40b and 40c are substantially rectangular in shape and are delimited on the perimeter by respective lines of intended bending 24 which allow to bend one part with respect to the other.

[0040] Each of the gripping parts 14 is defined by bending the first edges 15a, 15b and 15c. In particular, from the completely extended condition of the sheet 11 (fig. 2), the first edge 15a is bent around the first intermediate edge 40a so as to overlap and be adjacent to the first edge 15b (fig. 3). Subsequently, the first edges 15a and 15b are bent around the first intermediate edge 40b so as to dispose the first edge 15a in contact with and adjacent to the first edge 15c (fig. 4).

[0041] Finally, the first edges 15a, 15b and 15c are bent around the first intermediate edge 40c so as to dispose the first edge 15b in contact with and adjacent to the peripheral portion 12a and thus define the gripping part 14 (fig. 5).

[0042] The first edges 15a, 15b and 15c overlap each other substantially compact, that is, without leaving intermediate spaces.

[0043] The gripping part 14 extends for a shorter length than that of the peripheral portion 12a, so as to define, in the assembled condition, the containing compartment 39b.

[0044] The bottom wall 17 is defined not only by the second edges 18a, 18b and 18c but also by a bottom portion 16 (fig. 2), disposed in an intermediate position between the two peripheral portions 12a of the lateral walls 12 and which, in the assembled condition of the protection element 10, defines one of its outermost surfaces. The bottom portion 16 is interconnected with the peripheral portions 12a by respective lines of intended bending 30.

[0045] The second edges 18a, 18b and 18c are reciprocally interconnected with each other and with the bottom portion 16 by respective second intermediate edges 41 a, 4 1 b and 41 c, which define the thickness of the bottom wall 17.

[0046] The second edges 18a, 18b and 18c, the second intermediate edges 41a, 41b and 41 c and the bottom portion 16 are substantially rectangular in shape and are defined by respective lines of intended bending 26.

[0047] The second edges 18a, 18b and 18c and the second intermediate edges 41a, 41b and 41c have the same width, which is less than that of the bottom portion 16.

[0048] In other words, the sheet 11 has two rectangular notches 25, made between and extending for the whole length affected by the first edges 15a, 15b and 15c, by the second edges 18a, 18b and 18c, by the first intermediate edges 40a, 40b and 40c and by the second intermediate edges 41 a, 4 1 b and 41 c.

[0049] The notches 25 have a width substantially the same as the thickness defined by the gripping parts 14, so that, in the assembled condition, the first edges 15a, 15b and 15c are disposed with their thickness resting on the bottom portion 16.

[0050] The bottom wall 17 is obtained by bending the second edges 18a, 18b and 18c around the second intermediate edges 41 a, 41b and 41 c. In particular, from the completely extended condition of the sheet 11 (fig. 2), the second edge 18a is bent around the second intermediate edge 41 a so as to be disposed overlapping and adjacent to the second edge 18b (fig. 3). Subsequently, the second edges 18a and 18b are bent around the second intermediate edge 41b so as to dispose the second edge 18a in contact with and adjacent to the second edge 18c (fig. 4).

[0051] Finally, the second edges 18a, 18b and 18c are bent around the second intermediate edge 41c so as to dispose the second edge 18b in contact with and adjacent to the bottom portion 16 and thus define the bottom wall 17 (fig. 5).

[0052] The front wall 13 (fig. 1) comprises a first front edge 20 and a second front edge 21, each associated with one of the two peripheral portions 12a and on the opposite side with respect to which the first edges 15c are associated.

[0053] The first front edge 20 (fig. 2) and the second front edge 21 can be bent around a line of intended bending 31 and respectively 32.

[0054] The first front edge 20 is provided, along the line of intended bending 31, with a lateral opening 23. The second front edge 21 is provided on the perimeter with a closing edge 22 configured to be inserted, during use, into the lateral opening 23.

[0055] Once the gripping parts 14 and the bottom wall 17 have been obtained as described above (fig. 5), the gripping parts 14 and the peripheral portions 12a are bent around the lines of intended bending 30 so as to dispose the gripping parts 14 substantially orthogonal to the bottom portion 16 and resting with their thickness against the latter (fig. 6).

[0056] Subsequently, the first 20 and the second front edge 21 are bent to allow the insertion of the closing edge 22 into the lateral opening 23 and thus define the front wall 13.

[0057] A rectangular opening 19 is made in the sheet 11 (fig. 2), between the bottom portion 16 and the peripheral portions 12a.

[0058] In the assembled condition of the protection element 10, shown in fig. 6, the rectangular opening 19

defines a seating 33, substantially U-shaped and suitable to house an elastic holding element 34, with the function of keeping the two gripping parts 14 adjacent to each other.

[0059] In particular, the elastic element 34 is conformed as a fork, that is, it comprises a short segment 35 connecting to two long segments 36 connected to the ends of the short segment 35 and converging toward their concavity. The long segments 36, by means of an elastic deformation thereof, act on the first edges 15b of the gripping parts 14.

[0060] Advantageously, the elastic element 34 has the double function of keeping the protection element 10 assembled and, at the same time, of loosening and/or tightening the gripping parts 14, that is, distancing them and/or bringing them closer, to house the article to be protected inside the housing seating 39.

[0061] Once assembled, the protection element 10 defines a bulk shaped substantially like a parallelepiped, of which about half is occupied by the gripping parts 14, while the remaining volume defines the containing compartment 39b.

[0062] Given their thickness, the gripping parts 14 also define a protection for the portion of sheet of glass or article disposed between them, since they are able to cushion any impacts.

[0063] The portion of article is thus protected by the gripping parts 14 and by the containing compartment 39b in the zone near their edge.

[0064] According to another form of embodiment, a protection element 110 (fig. 9) according to the present invention is defined by assembling a sheet 111 (fig. 7).

[0065] Sheet 111 is different from sheet 11 in the following ways.

[0066] There are four first edges, respectively 115a, 115b, 115c and 115d, while there are two second edges, respectively 118a and 118b.

[0067] In this case too, the first edges 115a, 115b, 115c and 115d and the peripheral portion 12a are interconnected by respective first intermediate edges 140a, 140b, 140c and 140d and the gripping parts 114 are defined by their reciprocal bending, exactly as described above. In this case, the gripping parts 114 define in the assembled condition (figs. 8 and 11) an internal compartment 141 with a length substantially equal to that of the gripping parts 114 themselves.

[0068] In the same way, the second edges 118a and 118b, and also the bottom portion 16, are interconnected by respective second intermediate edges 141a and 141b (fig. 7). In this case too, the reciprocal bending of the second edges 118a and 118b on the second intermediate edges 141a and 141b, done in exactly the same way as described above, allows to obtain the bottom wall 117 (fig. 8).

[0069] In correspondence to an internal edge 116a and 116b defining part of the notch 125, the first edges 115b and 115d (fig. 7) comprise a lateral edge 138 with a smaller width than that of the first edges 115b and 115d. In this case, the lateral edges 138 of each lateral wall 112 can be made overlapping each other and insertable during assembly into two rectangular openings 119a and 119b made respectively on the bottom portion 16 and the second edge 118b.

[0070] More specifically, the rectangular openings 119a and 119b have the same sizes and a width smaller than that of the bottom portion 16 and of the second edge 118b, and a height equal to that of the lateral edges 13 8.

[0071] When the second edges 118a and 118b are bent around lines of intended bending 126 to define the bottom wall 117, the rectangular openings 119a and 119b overlap each other to define a seating 133 suitable for the insertion of an elastic element 134.

[0072] The seating 133 defines an opening toward the internal compartment 141, so that the long segments 36 of the elastic element 134 are disposed in cooperation with the first edges 115b of each gripping part 114.

[0073] In particular, once the protection element 10 has been assembled as in fig. 10, the lateral edges 138 are inserted into the seating 133 and through this the elastic element 134 is inserted. The lateral edges 138 keep each of the gripping parts 114 in position, preventing them from advancing toward the outside.

[0074] The protection elements 10, 110, once assembled, are very resistant to impacts that can occur during, for example, the transport, packing and/or storage of the articles they protect.

[0075] Furthermore, the methods described above are simple and economical, and entail only small quantities of discarded cardboard.

[0076] It is clear that modifications and/or additions of parts may be made to the protection element and corresponding method of production as described heretofore, without departing from the field and scope of the present invention.

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 protection element and corresponding method of production, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Protection element for an article, obtained from a single sheet (11; 111) of cardboard or similar or comparable material, comprising at least two lateral walls (12; 112) defining between them a housing seating (39) into which at least a part of said article to be protected is inserted, wherein said lateral walls (12; 112) are interconnected with each other by a front wall (13) and each comprise a gripping part (14; 114) defined by the bending and overlapping of a plurality of first edges (15a, 15b, 15c; 115a, 115b, 115c, 115d), said protection element also comprising a bot-

tom wall (17; 117) interposed between said lateral walls (12; 112) and defined by a bottom portion (16) and by a plurality of second edges (18a, 18b, 18c; 118a, 118b) bent and overlapping, said housing seating (39) being defined by said lateral walls (12; 112), said front wall (13) and said bottom wall (17; 117), **characterized in that** it comprises an elastic element (34; 134) associable with said gripping parts (14; 114) and suitable to keep said gripping parts (14; 114) adjacent to each other, **and in that** at least said bottom wall (17, 117) has a seating (33; 133) inside which said elastic element (34;134) is able to be inserted so as to be invisible.

2. Protection element as in claim 1, **characterized in that** said lateral walls (12; 112) comprise a peripheral portion (12a), facing toward the outside during use, to which said first edges (15a, 15b, 15c; 115a, 115b, 115c, 115d) are associated, suitable to be bent reciprocally with respect to each other and on said peripheral portion (12a).

3. Protection element as in claim 2, **characterized in that** a rectangular opening (19; 119a, 119b) is made in said sheet (11; 111), between said bottom portion (16) and said peripheral portions (12a), which, in the assembled condition of the protection element (10), defines said housing seating (33; 133) of said elastic element (34; 134).

4. Protection element as in claim 2, **characterized in that** a plurality of intermediate edges (40a, 40b, 40c; 140a, 140b, 140c, 140d) are interposed with said first edges (15a, 15b, 15c; 115a, 115b, 115c, 115d) and with said peripheral portion (12a) and are suitable to define the thickness of said gripping parts (14; 114).

5. Protection element as in claim from 2 to 4, **characterized in that** said bottom portion (16) is interposed between said peripheral portions (12a).

6. Protection element as in any claim hereinbefore, **characterized in that** a plurality of second intermediate edges (41 a, 41b, 41 c; 141 a, 141b) are interposed with said second edges (18a, 18b, 18c; 118a, 118b) and with said bottom portion (16) and are suitable to define the thickness of said bottom wall (17; 117).

7. Protection element as in any claim hereinbefore, **characterized in that** said front wall (13) comprises a first front edge (20) and a second front edge (21), each associated to one of said lateral walls (12; 112), and able to be reciprocally coupled with each other.

8. Protection element as in claim from 2 to 5, and 7, **characterized in that** said first front edge (20) and said second front edge (21) are each associated to one of said peripheral portions (12a).

9. Protection element as in any claim hereinbefore, **characterized in that** said gripping parts (114) define an internal compartment (141).

10. Protection element as in any claim hereinbefore, **characterized in that** said elastic element (34) is conformed as a fork with a short segment (35) connecting to two long segments (36) connected to the ends of the short segment (35) and converging toward their concavity, wherein said long segments (36), by means of an elastic deformation thereof, are able to act on the first edges (15b) of the gripping parts (14).

11. Method to make a protection element (10; 110) for an article as in any claim hereinbefore, which provides cutting operations to obtain a single sheet (11; 111) of cardboard, or similar or comparable material defining the plan development of said protection element (10; 110), and bending steps of said sheet to define at least two lateral walls (12; 112) defining between them a housing seating (39) into which at least a part of said article to be protected is inserted, **characterized in that** said bending step provides to make said lateral walls (12; 112) interconnected with each other by a front wall (13) by means of the reciprocal bending of a plurality of first edges (15a, 15b, 15c; 115a, 115b, 115c, 115d) in order to dispose them overlapping with respect to each other to define respective gripping parts (14; 114), **in that** it provides to make a bottom wall (17; 117), interposed between said lateral walls (12; 112), bending and overlapping a plurality of second edges (18a, 18b, 18c; 118a, 118b), said housing seating (39) being defined by said lateral walls (12; 112), said front wall (13) and said bottom wall (17; 117), which provides to associate to said gripping parts (14; 114) an elastic element (34; 134) suitable to keep said gripping parts (14; 114) adjacent to each other, and which provides to make on said bottom wall (17; 117) a seating (33; 133) inside which said elastic element (34; 14) is able to be inserted so as to be invisible.

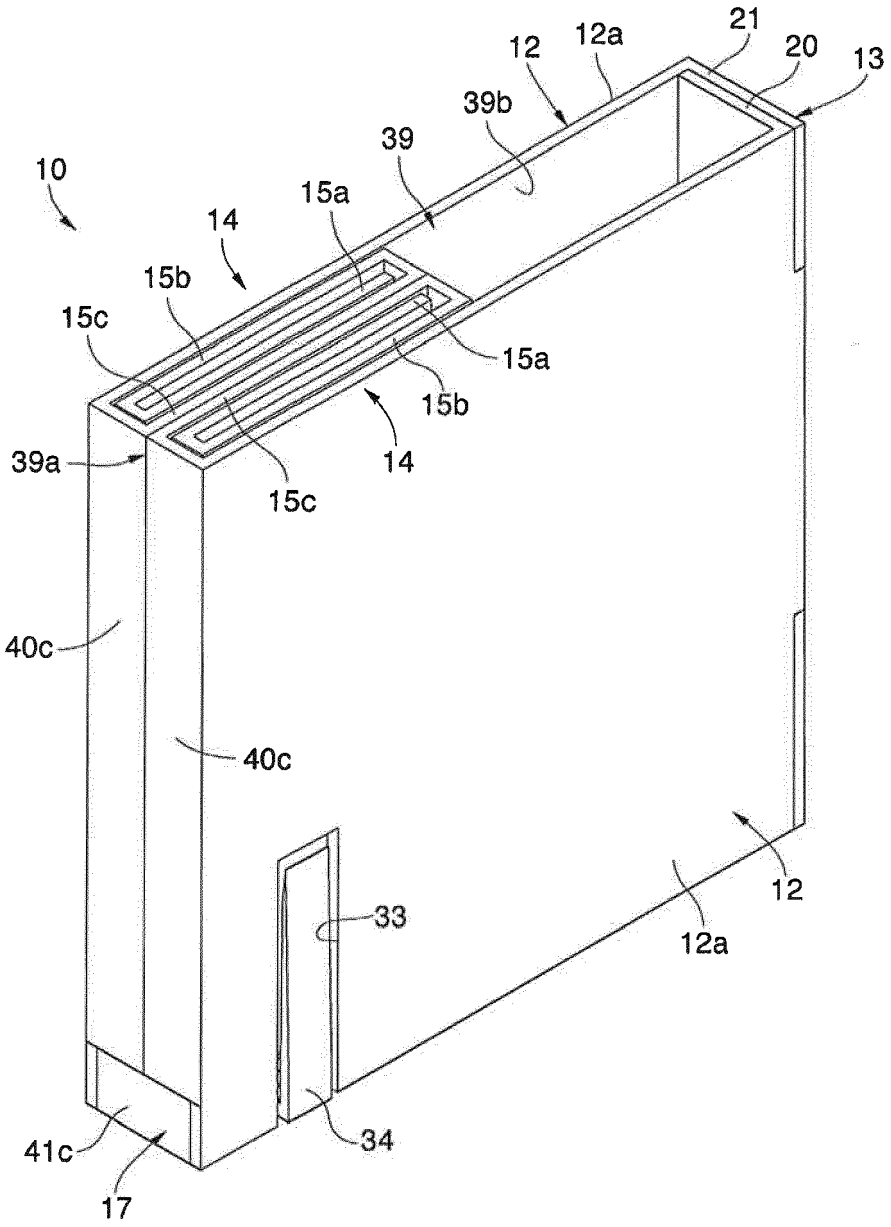

fig. 1

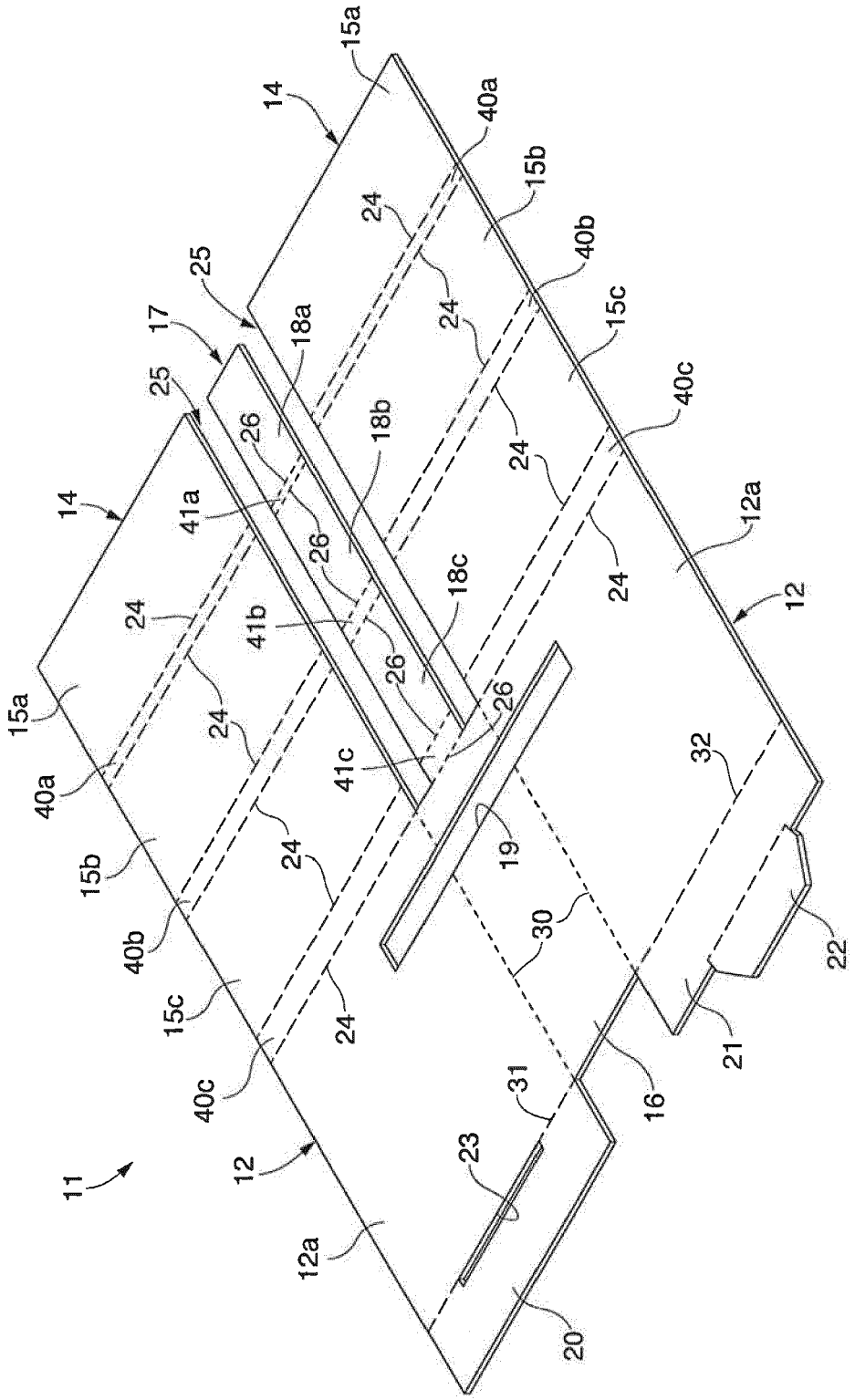
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fig. 2

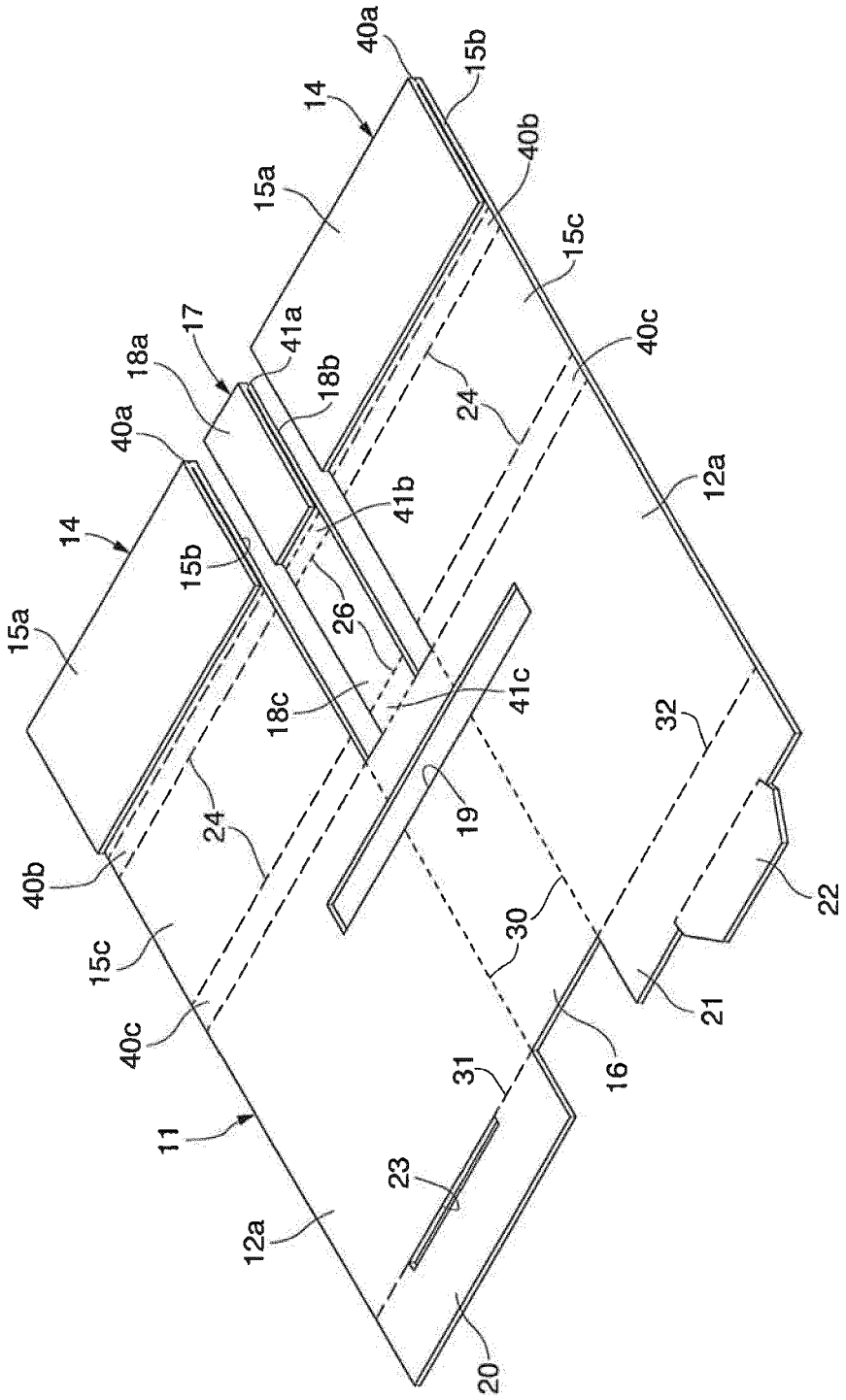
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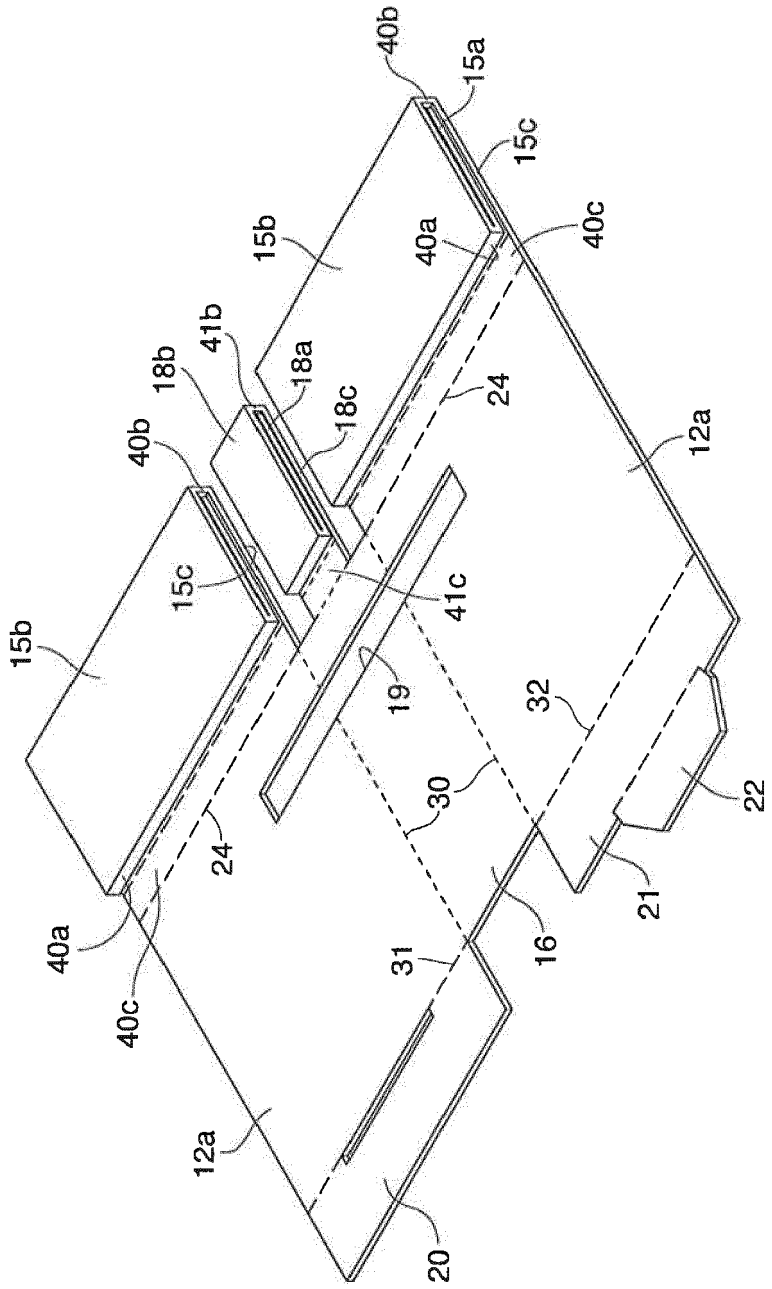
fig. 3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40c
12a
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fig. 4

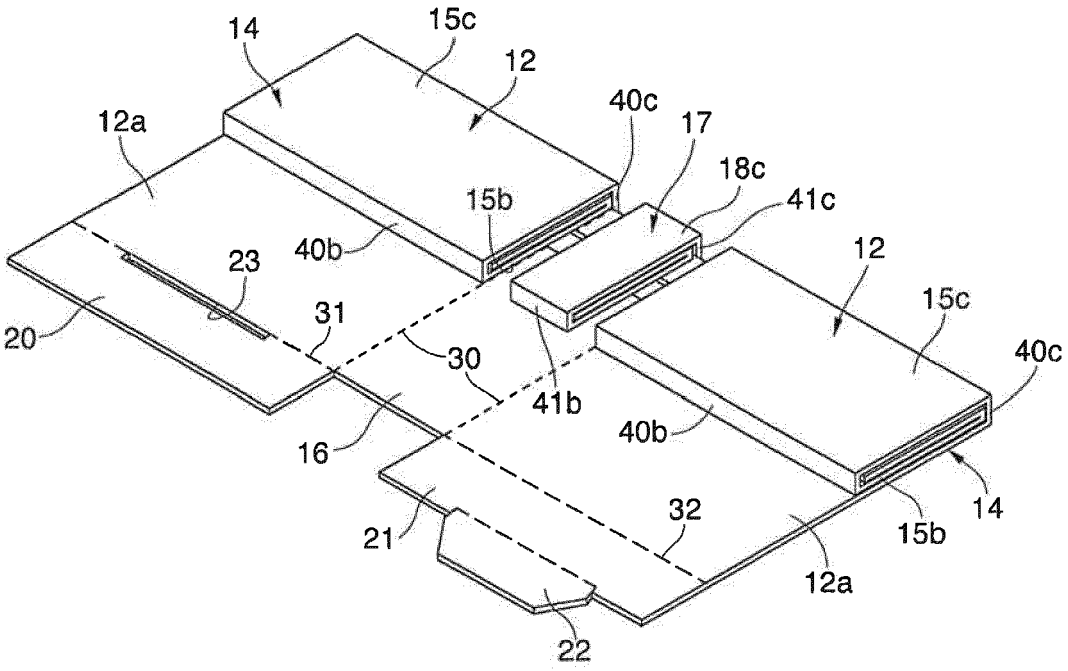
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fig. 5

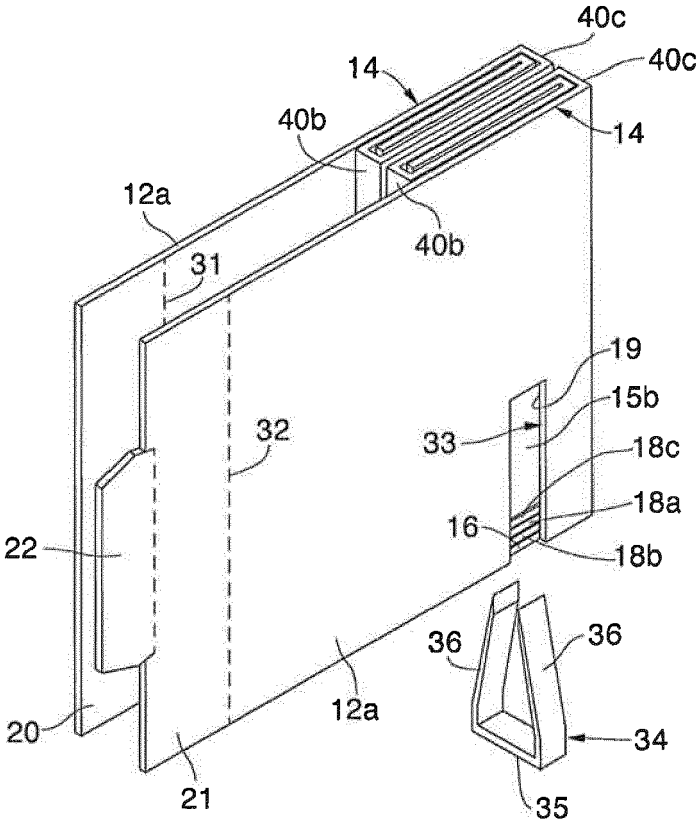
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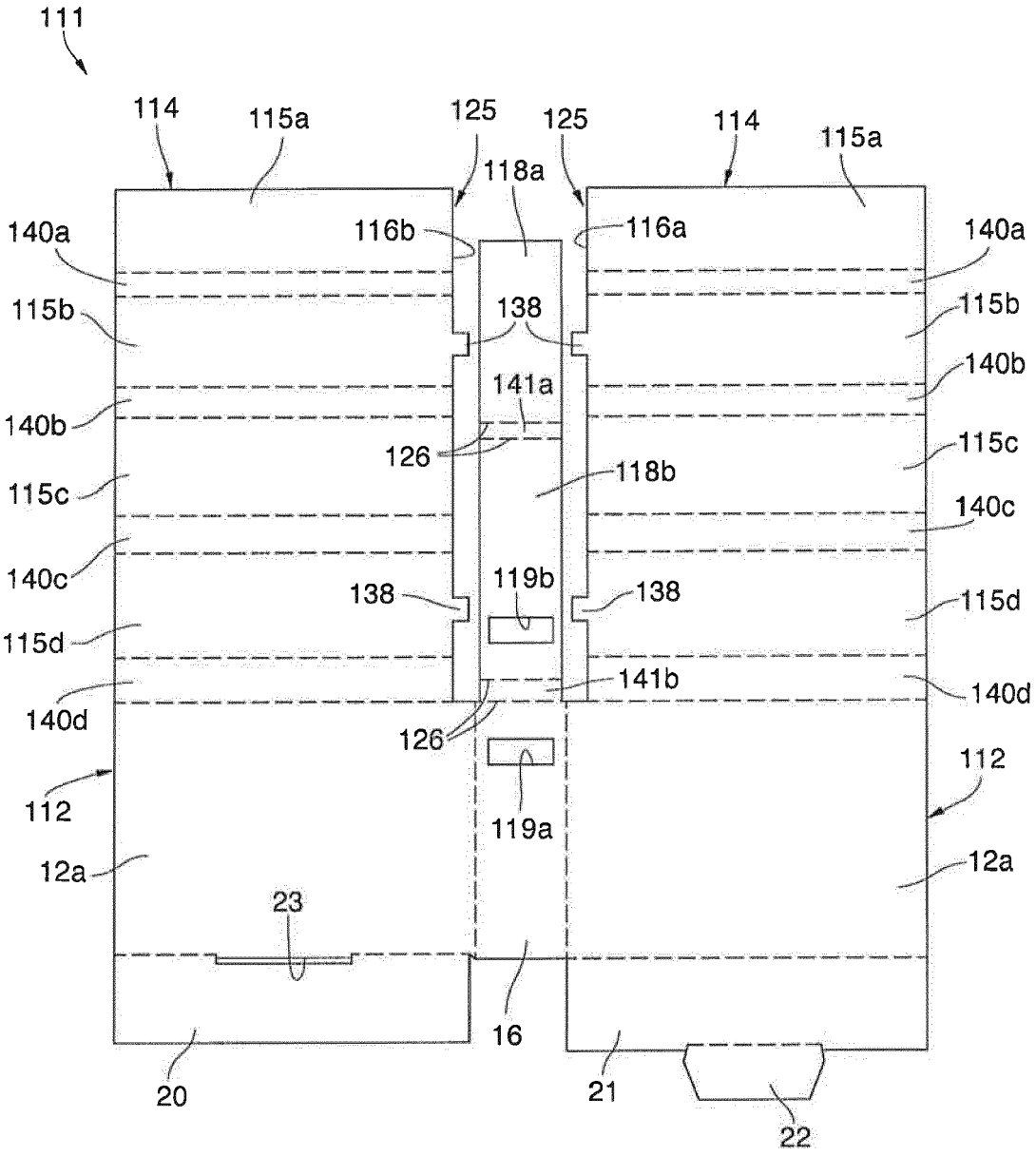
fig. 6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126
115c
118b
115c
140c
140c
138
119b
138
115d
115d
141b
140d
140d
126
112
112
119a
12a
12a
23
16
20
21
22

fig. 7

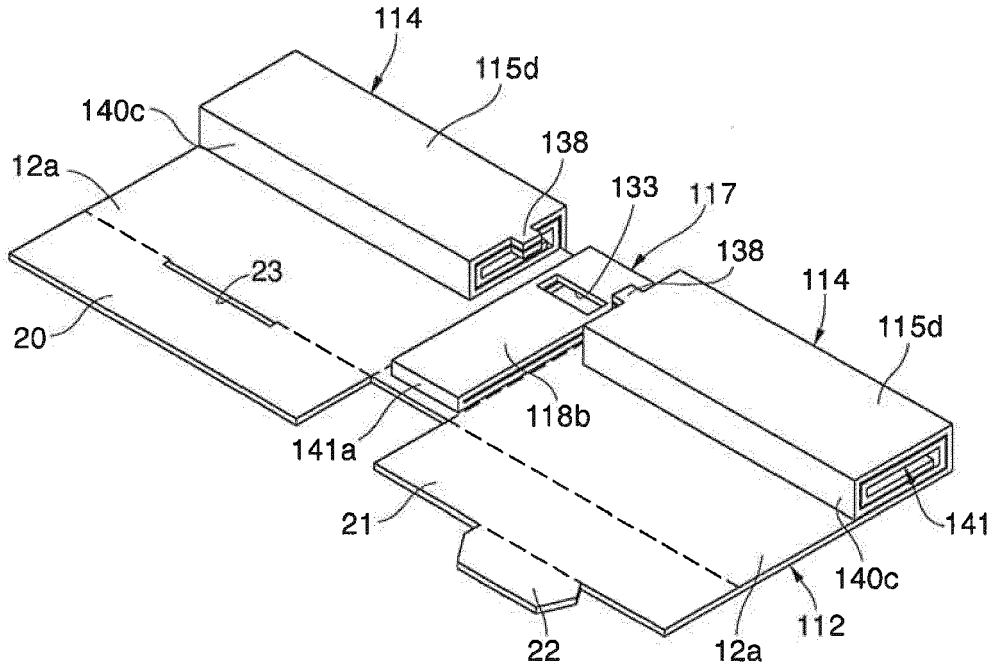
114
115d
140c
138
12a
133
117
138
23
114
115d
20
118b
141a
21
141
140c
112
22
12a

fig. 8

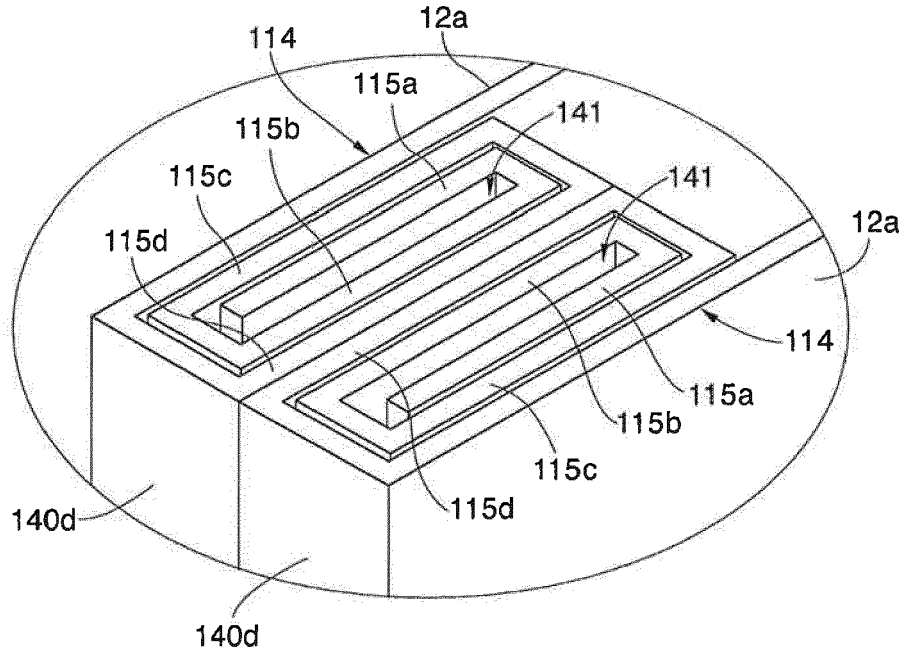
12a
114
115a
115b
141
115c
141
115d
12a
114
115a
115b
115c
115d
140d
140d

fig. 11

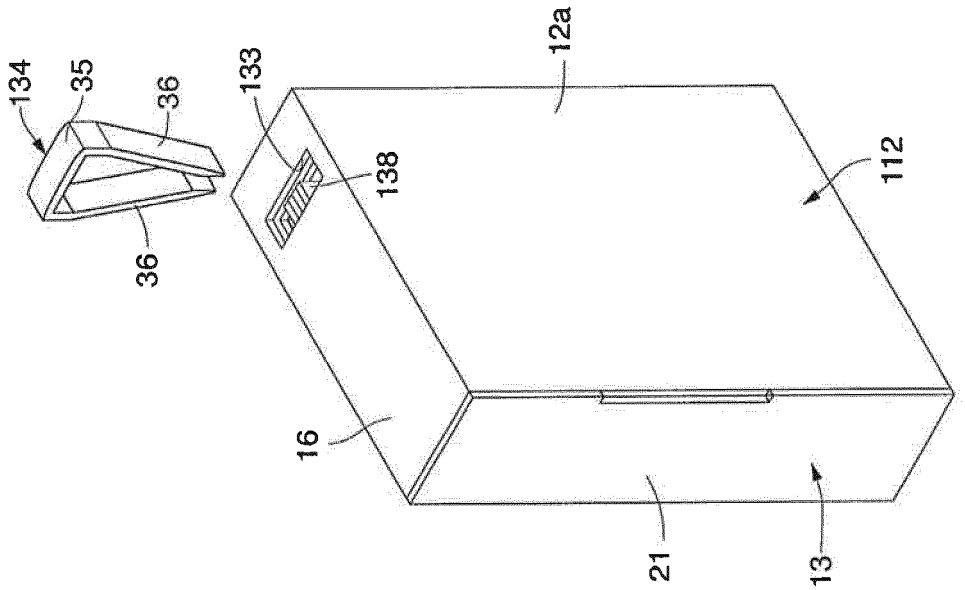
134
35
36
36
133
138
12a
112
16
21
13

fig. 10

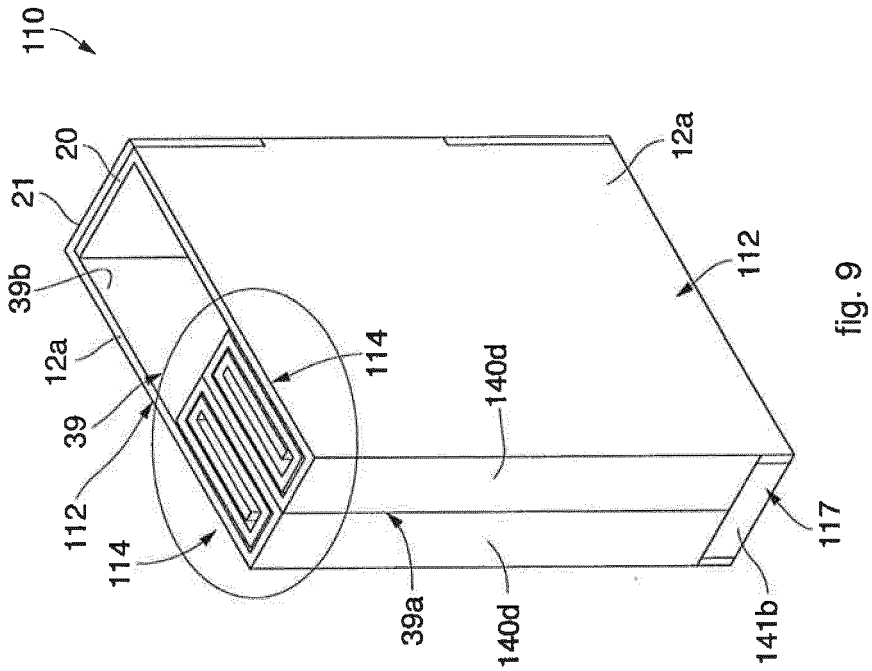
110
20
21
39b
12a
39
112
114
114
140d
12a
112
117
39a
140d
141b

fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 13 18 9199

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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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 February 2014	Segerer, Heiko

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