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Description

TECHNICAL FIELD

[0001] The present invention relates to a cushioning device, and particularly relates to a cushioning device having a fitting recess fitted with an end portion or corner portion of an indoor unit of an air conditioner.

BACKGROUND ART

[0002] Indoor units of air conditioners to be shipped from a factory are typically arranged so that its end portion or corner portion is fitted with a cushioning device made of expanded polystyrene or the like, in order to prevent the indoor units from receiving impact of vibrations during the transportation or the like (see Patent Document 1 and Patent Document 2, for example).

[0003] Patent Document 1 above teaches that a pair of cushioning devices, which have fitting recesses fitted respectively with one end portion and the other end portion of an indoor unit, are arranged so that the cushioning device fitted with one end portion near the barycentric position of the indoor unit is arranged to be thicker than the cushioning device fitted with the other end portion. In this way, the impact load on the indoor unit fitted with a pair of cushioning devices is lessened when the indoor unit is dropped. Patent Document 2 above also recites a cushioning device which is arranged so that a fitting recess fitted with an end portion of an indoor unit has a recess toward the depth of the device.

[Patent Document 1] Japanese Unexamined Patent Publication No. 137464/2007 (Tokukai 2007-137464)

[Patent Document 2] Japanese Unexamined Utility Model Publication No. 115885/1985 (Jitsukaisho 60-115885)

DISCLOSURE OF THE INVENTION

[0004] Indoor units mounted in the cushioning devices recited in Patent Documents 1 and 2 above are typically packed in cardboard boxes 903 and piled up in plural layers, as shown in Fig. 13. In this state, the indoor units 902b of the lower layer receive the load of the indoor units 902a of the upper layer. This arrangement is disadvantageous in that the indoor units 902b of the lower layer are pushed onto the bottom portions 915 of the cushioning devices 901 on account of the load of the indoor units 902a of the upper layer, and cover members 922 constituting the exterior of the indoor unit 902b are deformed as they are pushed onto the bottom portion 915 of the cushioning device 901. In particular, a lower cover member 922a which extends along the length of the indoor unit 902b and is provided on the lower side the indoor unit 902b when wall mounted and an upper cover member 922b which extends along the length of

the indoor unit 902b and is provided on the upper side the indoor unit 902b when wall mounted are thin and easily deformable, and hence these members are significantly deformed. In the meanwhile, side cover members (not illustrated) extending in the directions perpendicular to the length of the indoor unit and disposed on the respective sides of the indoor unit when wall mounted are arranged not to be easily deformed because they contact the cushioning device 901. In conventional arrangements, the lower cover member 922a and the upper cover member 922b may be fixed by using tapes or the like (not illustrated) to prevent the lower cover member 922a and the upper cover member 922b from deforming even if they are pushed onto the bottom portion 915. This arrangement, however, is disadvantageous in that the task of attaching the tapes is required and tape residue may remain on the product (indoor unit) after the removal of the tapes.

[0005] The present invention was done to solve the problems above, and an objective of the present invention is to provide a cushioning device capable of preventing cover members of stacked indoor units from deforming.

[0006] A cushioning device of the first aspect of the invention has a fitting recess fitted with a longitudinal end portion of an indoor unit of an air conditioner, wherein, when the end portion of the indoor unit is fitted with the fitting recess, a gap is formed at one of or both of (i) a border between a first edge portion of a lower cover member which portion extends along the length of the indoor unit and is on the lower side of the indoor unit when wall mounted and a first part of a bottom surface in the fitting recess which part opposes the first edge portion and (ii) a border between a second edge portion of an upper cover member which portion extends along the length of the indoor unit and is on the upper side of the indoor unit and a second part of the bottom surface in the fitting recess which part opposes the second edge portion.

[0007] According to this cushioning device, since a gap is formed at one of or both of the border between the first edge portion of the lower cover member and the bottom surface in the fitting recess and the border between the second edge portion of the upper cover member and the bottom surface of the fitting recess, at least one of the first edge portion of the lower cover member and the second edge portion of the upper cover member does not contact the bottom surface in the fitting recess, even indoor units are stacked and the lower indoor unit receives the load from the indoor unit on the upper layer. In this way, since at least one of the first edge portion of the lower cover member and the second edge portion of the upper cover member is not pushed onto the bottom surface in the fitting recess, it is possible to restrain the warping of at least one of the lower cover member and the upper cover member. It is therefore possible to restrain the deformation of at least one of the lower cover member and the upper cover member of the indoor unit when the indoor units are stacked.

[0008] In addition to the above, the cushioning device is advantageous in that, even if the lower cover member or the upper cover member of the indoor unit is thin and easily warped, at least one of the first edge portion of the lower cover member and the second edge portion of the upper cover member do not deform because the contact with the bottom surface in the fitting recess is avoided. For this reason, it is unnecessary to increase the strength of the lower cover member or the upper cover member by means of the selection of the material, thickness or the like. It is also unnecessary to increase the strength of the cushioning device by means of the selection of the material, thickness, or the like.

[0009] Furthermore, the cushioning device makes it possible to restrain the deformation of at least one of the lower cover member and the upper cover member only by forming a gap at least at the border between the first edge portion of the lower cover member and the bottom surface of the fitting recess and at the border between the second edge portion of the upper cover member and the bottom surface of the fitting recess. It is therefore unnecessary to put tapes to fix the lower cover member and the upper cover member, and hence the problem of tape residue remaining on the product (indoor unit) after the removal of the tapes does not occur.

[0010] In the second aspect of the invention, the cushioning device according to the first aspect is further arranged so that the bottom surface in the fitting recess includes a part which is arranged to be higher than at least one of the first part and the second part.

[0011] When receiving the load from the indoor unit of the upper layer, the cushioning device can support the load at the part which is higher than at least one of the first part and the second part. This easily makes it possible to prevent at least one of the first edge portion of the upper cover member and the second edge portion of the lower cover member from contacting the bottom surface in the fitting recess.

[0012] In the third aspect of the invention, the cushioning device of the first or second aspect is further arranged so that a recess is formed on at least one of the first part and the second part.

[0013] This cushioning device realizes the arrangement in which a part higher than at least one of the first part and the second part is provided on the bottom surface in the fitting recess, by simply forming a recess in at least one of the first part and the second part.

[0014] In the fourth aspect of the invention, a cushioning device has a fitting recess fitted with a lower corner portion of an indoor unit of an air conditioner which portion is on the lower side when wall mounted, wherein, when the lower corner portion of the indoor unit is fitted with the fitting recess, a gap is formed between a first edge portion of a lower cover member which portion extends along the length of the indoor unit and is on the lower side of the indoor unit when wall mounted and a first part of a bottom surface in the fitting recess which part opposes the first edge portion.

[0015] This cushioning device is advantageous in that, since a gap is formed between the first edge portion of the lower cover member and the bottom surface of the fitting recess, even if the indoor unit of the lower layer receives the load from that of the upper layer, the first edge portion of the lower cover member does not contact the bottom surface in the fitting recess. Since the first edge portion of the lower cover member is not pushed onto the bottom surface in the fitting recess, it is possible to restrain the warping of the lower cover member, and hence the deformation of the lower cover member when indoor units are stacked is restrained. Furthermore, as in the case of the cushioning device of the first aspect of the invention, it is unnecessary to increase the strength of the lower cover member and the cushioning device by the selection of the material and thickness, and the problem of tape residue on the product (indoor unit) does not occur because the operation to put tapes is unnecessary.

[0016] In the fifth aspect of the invention, the cushioning device of the fourth aspect is further arranged so that the bottom surface in the fitting recess includes a part arranged to be higher than the first part.

[0017] When receiving the load from the indoor unit of the upper layer, the cushioning device can support the load at the part higher than the first part. This easily makes it possible to prevent the first edge portion of the lower cover member from contacting the bottom surface in the fitting recess.

[0018] In the sixth aspect of the invention, the cushioning device according to the fourth or fifth aspect is further arranged so that a recess is formed on the first part.

[0019] This cushioning device realizes the arrangement in which a part higher than the first part is provided on the bottom surface in the fitting recess, by simply forming a recess in the first part.

[0020] In the seventh aspect of the invention, a cushioning device has a fitting recess fitted with an upper corner portion of an indoor unit of an air conditioner which portion is on the upper side when wall mounted, wherein, when the upper corner portion of the indoor unit is fitted with the fitting recess, a gap is formed between a second edge portion of an upper cover member which portion extends along the length of the indoor unit and is on the upper side of the indoor unit when wall mounted and a second part of a bottom surface in the fitting recess which part opposes the second edge portion.

[0021] This cushioning device is advantageous in that, since a gap is formed between the second edge portion of the upper cover member and the bottom surface of the fitting recess, even if the indoor unit of the lower layer receives the load from that of the upper layer, the second edge portion of the upper cover member does not contact the bottom surface in the fitting recess. Since the second edge portion of the upper cover member is not pushed onto the bottom surface in the fitting recess, it is possible to restrain the warping of the upper cover member, and hence the deformation of the upper cover member when

indoor units are stacked is restrained. Furthermore, as in the case of the cushioning device of the first aspect of the invention, it is unnecessary to increase the strength of the upper cover member and the cushioning device by the selection of the material and thickness, and the problem of tape residue on the product (indoor unit) does not occur because the operation to put tapes is unnecessary.

[0022] In the eighth aspect of the invention, the cushioning device according to the seventh aspect is further arranged so that the bottom surface in the fitting recess includes a part which is arranged to be higher than the second part.

[0023] Receiving the load from the indoor unit of the upper layer, the cushioning device can support the load of the indoor unit at a part higher than the second part. This easily makes it possible to prevent the second edge portion of the upper cover member from contacting the bottom surface of the fitting recess.

[0024] In the ninth aspect of the invention, the cushioning device according to seventh or eighth aspect is further arranged so that a recess is formed on the second part.

[0025] This cushioning device realizes the arrangement in which a part higher than the second part is provided on the bottom surface in the fitting recess, by simply forming a recess in the second part.

[0026] In the tenth aspect of the invention, the cushioning device of any one of first to ninth aspects is further arranged so that a protrusion is formed at a third part on the bottom surface in the fitting recess to oppose a third edge portion of a side cover member which portion extends along a direction orthogonal to the length of the indoor unit and is provided on the longitudinal end portion of the indoor unit when wall mounted.

[0027] When a protrusion is formed at the third part in the fitting recess to oppose the third edge portion of the bottom surface of the side cover member, the cushioning device can support the side cover member at this protrusion. It is therefore possible to form gaps between the first part and the bottom surface and between the second part and the bottom surface.

[0028] In the eleventh aspect of the invention, the cushioning device according to any one of the first to ninth aspects is further arranged so that a recess is formed between a third edge portion of a side cover member provided at an end portion of the indoor unit and a third part provided on the bottom surface in the fitting recess to oppose the third edge portion edge portion.

[0029] In this cushioning device, the third edge portion of the side cover member is not pushed onto the bottom surface in the fitting recess, and hence the warping of not only the aforesaid lower cover member and upper cover member but also the side cover member is restrained, and hence the lower cover member, the deformation of the upper cover member, and the side cover member of the indoor unit is restrained when indoor units are stacked.

[0030] In the twelfth aspect of the invention, the cushioning device according to the eleventh aspect is further arranged so that the cushioning device is divided into a first member fitted with a corner portion on the back side of the end portion of the indoor unit and a second member fitted with a corner portion on the front side of the end portion of the indoor unit, and the recess provided between the third edge portion and the third part is provided on the first member.

[0031] This cushioning device is advantageous in that, when the recess in the third part opposing the third edge portion is formed by using a die, the recess is easily formed because the removal of the die is easy as the cushioning device is divided into first and second members.

[0032] As described above, the present invention exerts the following effects.

[0033] In the first aspect of the invention, since at least one of the first edge portion of the lower cover member and the second edge portion of the upper cover member is not pushed onto the bottom surface of the fitting recess, it is possible to restrain the warping of at least one of the lower cover member and upper cover member. It is therefore possible to restrain the deformation of at least one of the lower cover member and the upper cover member of the indoor unit, when indoor units are stacked. In the first aspect of the invention, furthermore, at least one of the first edge portion of the lower cover member and the second edge portion of the upper cover member does not deform because it does not contact the bottom surface in the fitting recess, even if the lower cover member and the upper cover member of the indoor unit are thin and easily warped. It is therefore unnecessary to increase the strength of the lower cover member or the upper cover member by the selection of the material, thickness of the like, in order to restrain the deformation of the lower cover member or the upper cover member. It is also unnecessary to increase the strength of the cushioning device by the selection of the material, thickness or the like. In the first aspect of the invention, furthermore, it is unnecessary to put tapes to fix the lower cover member and the upper cover member. This resolves the problem of tape residue on the product (indoor unit) after the removal of the tapes.

[0034] In the second aspect of the invention, when receiving the load from the indoor unit of the upper layer, the load is supported at the part higher than at least one of the first part and the second part. This easily makes it possible to prevent at least one of the first edge portion of the upper cover member and the second edge portion of the lower cover member from contacting the bottom surface of the fitting recess.

[0035] The third aspect of the invention realizes a cushioning device in which a part higher than at least one of the first part and the second part is provided on the bottom surface in the fitting recess by simply forming a recess in at least one of the first part and the second part.

[0036] In the fourth aspect of the invention, there is a

gap between the first edge portion of the lower cover member and the bottom surface in the fitting recess, and hence the first edge portion of the lower cover member does not contact the bottom surface in the fitting recess, even if the indoor unit of the lower layer receives the load from the indoor unit of the upper layer. Since the first edge portion of the lower cover member is not pushed onto the bottom surface in the fitting recess, it is possible to restrain the warping of the lower cover member, and hence the deformation of the lower cover member of the indoor unit is restrained when indoor units are stacked. Furthermore, as in the case of the cushioning device of the first aspect of the invention, it is unnecessary to increase the strength of the lower cover member and the cushioning device by the selection of the material and thickness, and the problem of tape residue on the product (indoor unit) does not occur because the operation to put tapes is unnecessary.

[0037] In the fifth aspect of the invention, when receiving the load from the indoor unit of the upper layer, the load is supported at the part higher than the first part. This easily makes it possible to prevent the first edge portion of the lower cover member from contacting the bottom surface of the fitting recess.

[0038] The sixth aspect of the invention realizes a cushioning device in which a part higher than the first part is provided on the bottom surface in the fitting recess by simply forming a recess in the first part.

[0039] In the fourth aspect of the invention, there is a gap between the second edge portion of the upper cover member and the bottom surface in the fitting recess, and hence the second edge portion of the upper cover member does not contact the bottom surface in the fitting recess, even if the indoor unit of the lower layer receives the load from the indoor unit of the upper layer. Since the second edge portion of the upper cover member is not pushed onto the bottom surface in the fitting recess, it is possible to restrain the warping of the upper cover member, and hence the deformation of the upper cover member of the indoor unit is restrained when indoor units are stacked. Furthermore, as in the case of the cushioning device of the first aspect of the invention, it is unnecessary to increase the strength of the upper cover member and the cushioning device by the selection of the material and thickness, and the problem of tape residue on the product (indoor unit) does not occur because the operation to put tapes is unnecessary.

[0040] In the eighth aspect of the invention, when receiving the load from the indoor unit of the upper layer, the load is supported at the part higher than the second part. This easily makes it possible to prevent the second edge portion of the upper cover member from contacting the bottom surface of the fitting recess.

[0041] The ninth aspect of the invention realizes a cushioning device in which a part higher than the second part is provided on the bottom surface in the fitting recess by simply forming a recess in the second part.

[0042] In the tenth aspect of the invention, when a pro-

trusion is formed at the third part in the fitting recess to oppose the third edge portion of the bottom surface of the side cover member, the side cover member is supported at this protrusion. It is therefore possible to form gaps between the first part and the bottom surface and between the second part and the bottom surface.

[0043] In the eleventh aspect of the invention, the third edge portion of the side cover member is not pushed onto the bottom surface in the fitting recess, and hence the warping of not only the aforesaid lower cover member and upper cover member but also the side cover member is restrained, and hence the lower cover member, the deformation of the upper cover member, and the side cover member of the indoor unit is restrained when indoor units are stacked.

[0044] In the twelfth aspect of the invention, when the recess in the third part opposing the third edge portion is formed by using a die, the recess is easily formed because the removal of the die is easy as the cushioning device is divided into first and second members.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045]

Fig. 1 is a cross section showing how indoor units mounted in cushioning devices of First Embodiment of the present invention are stacked.

Fig. 2 is a perspective view showing an indoor unit before being mounted in cushioning devices.

Fig. 3 is a perspective view showing an indoor unit mounted in cushioning devices.

Fig. 4 is a front elevation of the cushioning device.

Fig. 5 is a cross section taken at D-D of Fig. 4.

Fig. 6 is a perspective view showing an indoor unit mounted in cushioning devices of Second Embodiment of the present invention.

Fig. 7 is a perspective view of a cushioning device of First Variation.

Fig. 8 is a perspective view of a cushioning device of Second Variation.

Fig. 9 is a perspective view of a cushioning device of Third Variation.

Fig. 10 is a perspective view of cushioning devices of Fourth Variation.

Fig. 11 is a cross section of a cushioning device of Fifth Variation.

Fig. 12 is a cross section showing that an indoor unit is mounted in a cushioning device of Sixth Variation.

Fig. 13 is a cross section showing how indoor units mounted in conventional cushioning devices are stacked.

REFERENCE NUMERALS

[0046]

1a, 1b, 101a-101d, 201a, 301a, 401a, 501a, 601a,

701a: CUSHIONING DEVICE
 2, 102, 702: INDOOR UNIT
 10a, 110a: FITTING RECESS
 15a, 15b, 115a, 315a, 315b, 415a, 415b, 515a, 515b,
 615a, 615b, 615c, 715a: RECESS
 215a: PROTRUSION
 22a, 122a, 722a: LOWER COVER MEMBER
 221a, 1221a, 7221a: EDGE PORTION (FIRST
 EDGE PORTION)
 22b, 722b: UPPER COVER MEMBER
 221b, 7221b: EDGE PORTION (SECOND EDGE
 PORTION)
 22d: SIDE COVER MEMBER
 501a: FIRST MEMBER
 501b: SECOND MEMBER

BEST MODE FOR CARRYING OUT THE INVENTION

[0047] The following will describe a cushioning device of an embodiment according to the present invention with reference to figures.

(First Embodiment)

[0048] Fig. 1 is a cross section showing how indoor units mounted in cushioning devices of First Embodiment of the present invention are stacked. Fig. 2 is a perspective view of the indoor unit before being mounted in the cushioning devices. Fig. 3 shows the indoor unit mounted in the cushioning devices. Fig. 4 is a front elevation of the cushioning device. Fig. 5 is a cross section taken at D-D line of Fig. 4.

[Structure of Indoor Unit]

[0049] First, referring to Fig. 1 and Fig. 2, the structure of an indoor unit 2 mounted in cushioning devices 1a and 1b will be discussed. As shown in Fig. 1, the indoor unit 2 of the air conditioner includes pieces of equipment 21 such as a heat exchanger, a fan motor, and a fan, cover members 22 which are able to house the pieces of equipment 21 therein, and a mounting board 23 by which the indoor unit 2 is mounted on a wall. As shown in Fig. 1 and Fig. 2, the cover members 22 include a lower cover member 22a on the lower side of the indoor unit 2, an upper cover member 22b on the upper side of the indoor unit 2, a front cover member 22c on the front side, and side cover members 22d on the respective lateral sides. The cover members 22 have an opening 22e on the back side, and the aforesaid mounting board 23 is provided at this opening 22e. It is noted that the positions such as "upper side", "lower side", "front side", "lateral sides", and "back side" are those when the indoor unit 2 is wall mounted.

[0050] The lower cover member 22a, the upper cover member 22b, and the side cover members 22d are arranged so that the gap between the wall and the cover members 22 when wall mounted is narrow in order to

prevent the pieces of equipment 21 of the indoor unit 2 from being exposed through the gap and marring the appearance.

5 [Structure of Cushioning Device]

[0051] Now, referring to Fig. 1-Fig. 5, the cushioning devices 1a and 1b will be described. It is noted that a cushioning device 1a fitted with one end portion 2a of the indoor unit 2 is identical with a cushioning device 1b fitted with the other end portion 2b in terms of shape and materials, and hence the cushioning device 1b fitted with the other end portion 2b will not be detailed below.

10 **[0052]** The cushioning device 1a of the present embodiment is made of expanded polystyrene, and is fitted with one end portion 2a in the longitudinal direction (L direction) of the substantially rectangular parallelepiped indoor unit 2, as shown in Fig. 2 and Fig. 3. The indoor unit 2 is packed, as shown in Fig. 1, in such a way that a side of the indoor unit 2 which is the back side when wall mounted faces down, the cushioning devices 1a and 1b are fitted with the one end portion 2a and the other end portion 2b of the indoor unit 2, respectively, and the indoor unit 2 mounted in the cushioning devices 1a and 1b is sheathed in a cardboard box 3 or the like. Packed indoor units 2 are stacked in plural layers when transported or stored.

25 **[0053]** The cushioning device 1a is box-shaped and has a fitting recess 10a fitted with one end portion 2a of the indoor unit 2. As the one end portion 2a of the indoor unit 2 is inserted into the fitting recess 10a, the cushioning device 1a is attached (see Fig. 3). This cushioning device 1a includes, as shown in Fig. 4, lateral side portions 11 and 12 opposing the lower cover member 22a and the upper cover member 22b, respectively, a top plate portion 13 opposing the front cover member 22c, an end face portion 14 opposing the side cover member 22d, and a bottom portion 15 opposing the mounting board 23. The top plate portion 13 is orthogonally connected to the lateral side portions 11 and 12 and the end face portion 14, and the bottom portion 15 is orthogonally connected to the and the lateral side portions 11 and 12 and the end face portion 14, with the result that the cushioning device 1a is formed to have a box-shape as described above. It is noted that the aforesaid terms "lateral side", "top", "edge surface", and "bottom" refer to the positions when the indoor unit 2 is stored.

30 **[0054]** According to the present embodiment, the bottom portion 15 is arranged so that, as shown in Fig. 5, a part A1 (indicated by thick slanting lines) which opposes the edge portion 221a (see Fig. 1 and Fig. 3) of the lower cover member 22a and a part A2 (indicated by thick slanting lines) which opposes the edge portion 221b (see Fig. 1) of the upper cover member 22b, which parts oppose the wall when wall mounted, are different from the remaining part B (indicated by thin slanting lines) in terms of height. In other words, the part B is arranged to be higher than the parts A1 and A2. More specifically, as

shown in Fig. 2 and Fig. 4, the part B is arranged to be higher than the parts A1 and A2 in such a way that recesses 15a and 15b are formed in the respective parts A1 and A2 of the bottom portion 15 along the length of the indoor unit 2 (i.e. in the L direction). Therefore, when the one end portion 2a of the indoor unit 2 is fitted with the fitting recess 10a, there is a gap between the edge portion 221a of the lower cover member 22a and the bottom portion 15 and there is also a gap between the edge portion 221b of the upper cover member 22b and the bottom portion 15. Thanks to this arrangement, as shown in Fig. 1, even if the indoor unit 2 of the lower layer receives the load from the indoor unit 2 of the upper layer when they are stacked, the indoor unit 2 (lower cover member 22a and the upper cover member 22b) is not supported at the parts A1 (recess 15a) and A2 (recess 15b). In this state, the indoor unit 2 (mounting board 23) is supported at the part B which is different from the parts A1 and A2. Furthermore, since the side cover member 22d is entirely in contact with the inner surface of the end face portion 14 of the cushioning device 1a, the deformation of this member 22d is restrained.

[Characteristics of Cushioning Devices of the Present Embodiment]

[0055] The cushioning devices 1a and 1b of the present embodiment have the following characteristics.

[0056] These cushioning devices 1a and 1b are arranged so that, when the indoor units 2 are stacked, the edge portion 221a of the lower cover member 22a and the edge portion 221b of the upper cover member 22b do not contact the bottom portion 15 despite the load from the indoor unit 2 stacked above. Since the edge portion 221a of the lower cover member 22a and the edge portion 221b of the upper cover member 22b are not pushed onto the bottom portion 15, it is possible to prevent the lower cover member 22a and the upper cover member 22b from warping. As a result, it is possible to prevent the lower cover member 22a and the upper cover member 22b of the indoor unit 2 from deforming, when plural indoor units 2 are stacked.

[0057] The cushioning devices 1a and 1b are also advantageous in that, even if the lower cover member 22a and the upper cover member 22b of the indoor unit 2 are thin and easily warped, the edge portion 221a of the lower cover member 22a and the edge portion 221b of the upper cover member 22b do not deform because they do not contact the bottom portion 15. For this reason, it is unnecessary to increase the strength of the cover members 22 by means of the selection of suitable material and thickness to restrain the deformation of the lower cover member 22a and the upper cover member 22b. Furthermore, it is unnecessary to increase the strength of the cushioning devices 1a and 1b by means of the selection of suitable material and thickness.

(Second Embodiment)

[0058] Fig. 6 is a perspective view showing an arrangement in which an indoor unit is mounted in cushioning devices of Second Embodiment according to the present invention. Described in Second Embodiment are cushioning devices 101a-101d fitted with the corner portions of an indoor unit 102. These devices 101a-101d are different from the above-described cushioning devices 1a and 1b of First Embodiment, which are fitted with the one end portion and other end portion of the indoor unit.

[0059] As shown in Fig. 6, the cushioning devices 101a and 101b of the present embodiment are fitted with lower corner portions which are on the lower side when the indoor unit 102 is wall mounted, whereas the cushioning devices 101c and 101d are fitted with upper corner portions which are on the upper side when the indoor unit 102 is wall mounted. Since the cushioning devices 101a and 101c fitted with the corner portions on the one end portion 102a side of the indoor unit 102 are identical with the cushioning devices 101b and 101d fitted with the corner portions on the other end portion 102b side of the indoor unit 102 in terms of the shapes and materials, the cushioning devices 101b and 101d on the other end portion 102b side are not detailed below.

[0060] In the present embodiment, the bottom portion 115 of the cushioning device 101a has a recess 115a at a part opposing an edge portion 1221a of a lower cover member 122a. Therefore, when the lower corner portion of the indoor unit 102 is fitted with the fitting recess 110a, there is a gap between the edge portion 1221a of the lower cover member 122a and the bottom portion 115. In a similar manner, the bottom portion of the cushioning device 101c has a recess (not illustrated) at a part opposing the edge portion of the upper cover member. Therefore, when the upper corner portion of the indoor unit 102 is fitted with the fitting recess, there is a gap between the edge portion of the upper cover member and the bottom portion.

[0061] While the present invention has been described in conjunction with the specific embodiment outlined above, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, the preferred embodiment of the invention as set forth above is intended to be illustrative, not limiting. Various changes may be made without departing from the spirit and scope of the invention as defined in the following claims.

[0062] For example, the embodiment above describes a case where a bottom portion has recesses at parts opposing the edge portion of the lower cover member and the edge portion of the upper cover member so that gaps are formed between the bottom portion and the cover members. The present invention, however, may be alternatively arranged so that a gap between the bottom portion and the cover member is formed by providing, in the bottom portion, a protrusion at a part corresponding to the mounting board (i.e. at a part different from the

parts opposing the edge portions of the lower cover member and the upper cover member).

[0063] In addition to the above, the embodiment above describes a case where recesses are formed in the bottom portion in order to form gaps between the edge portion of the lower cover member and the bottom portion and between the edge portion of the upper cover member and the bottom portion. The present invention, however, may be alternatively arranged so that, as in the case of a cushioning device 201a of First Variation of Fig. 7, a protrusion 215a may be formed at a part of the bottom portion 215 which part opposes the edge portion of the side cover member which is along the direction (S direction) orthogonal to the length of the indoor unit (i.e. L direction) and at the end portion of the indoor unit in the longitudinal direction when wall mounted. It is possible also in this case to form gaps between the edge portion of the lower cover member and the bottom portion and between the edge portion of the upper cover member and the bottom portion.

[0064] In addition to the above, the embodiment above describes a case where recesses are formed at parts opposing the edge portion of the lower cover member and the edge portion of the upper cover member. The present invention, however, is not limited to this arrangement, and hence the recesses may be variously shaped as long as gaps are formed between the edge portion of the lower cover member and the bottom portion and between the edge portion of the upper cover member and the bottom portion. For example, as in the case of a cushioning device 301a of Second Variation shown in Fig. 8, recesses 315a and 315b may be formed which have widths W1 and W2 longer than those of the recesses 15a and 15b of the cushioning device 1a of First Embodiment. Furthermore, as in the case of a cushioning device 401a of Third Variation of Fig. 9, a recess 415c may be formed at a part supporting the mounting board, in addition to recesses 415a and 415b which are identical with the recesses 315a and 315b of the cushioning device 301a of Third Variation. In this case, the material of the cushioning device is reduced because of the enlargement of the widths of the recesses 315a, 315b, 415a, and 415b and required for providing the recess 415c.

[0065] In addition to the above, the embodiment above describes the cushioning devices 1a and 1b attached to cover the one end portion 2a and the other end portion 2b of the indoor unit 2. The present invention, however, may be alternatively arranged so that a cushioning device is fitted to corner portions on the back side of the end portion of the indoor unit, as in the case of a cushioning device (first member) 501a of Fourth Variation shown in Fig. 10. This cushioning device 501a has: a recess 515a at a part opposing the edge portion of the lower cover member; a recess 515b at a part opposing the edge portion of the upper cover member; and a recess 515c at a part opposing the edge portion of the side cover member. The recesses 515a, 515b, and 515c are provided to form substantially a U-shape. This cushioning device 501a is

paired with a cushioning device 501b (second member) fitted with the corner portions on the front side of the end portion of the indoor unit.

[0066] The arrangement above is advantageous in that, when the recess 515c is formed by using a die, the recess 515c is easily formed because the removal of the die is easy as two cushioning devices 501a and 501b are used.

[0067] In addition to the above, the embodiment above describes an example where recesses are formed to oppose the edge portion of the lower cover member and the edge portion of the upper cover member. The present invention, however, may be alternatively arranged so that, as in the case of a cushioning device 601a of Fifth Variation shown in Fig. 11, a recess 615c is formed at a part opposing the edge portion of the side cover member provided at the end portion of the indoor unit, in addition to the recess 615a opposing the edge portion of the lower cover member and the recess 615b opposing the edge portion of the upper cover member.

[0068] The above-described arrangement is advantageous in that, since the edge portion of the side cover member is not pushed onto the bottom surface 615 of the fitting recess, it is possible to prevent not only the lower cover member and the upper cover member but also the side cover member from warping. This prevents the lower cover member, the upper cover member, and the side cover member of the indoor unit from deforming when stacked.

[0069] In addition to the above, the embodiment above describes an example where, since the upper cover member is formed so that a gap with the wall is narrow when wall mounted, the bottom portion is provided with a recess at a part opposing the edge portion of the upper cover member. The present invention, however, is not limited to this arrangement. As a cushioning device 701a of Sixth Variation of Fig. 12 shows, when a recess 715a is formed at a part opposing the edge portion 7221a of the lower cover member 722a of the indoor unit 702 whereas the edge portion 7221b of the upper cover member 722b is formed to secure a large gap between the unit 702 and the wall when wall mounted, it is not necessary in the bottom portion 715 to form a recess opposing the edge portion 7221b of the upper cover member 722b. This is because the large gap between the edge portion 7221b of the upper cover member 722b and the wall is formed in order to allow the indoor unit 702 to be easily fitted with the mounting board 723 attached to the wall.

[0070] The present invention makes it possible to restrain the deformation of cover members of an indoor unit, which plural indoor units are stacked.

Claims

1. A cushioning device having a fitting recess fitted with a longitudinal end portion of an indoor unit of an air

conditioner, wherein,

when the end portion of the indoor unit is fitted with the fitting recess, a gap is formed at one of or both of (i) a border between a first edge portion of a lower cover member which portion extends along the length of the indoor unit and is on the lower side of the indoor unit when wall mounted and a first part of a bottom surface in the fitting recess which part opposes the first edge portion and (ii) a border between a second edge portion of an upper cover member which portion extends along the length of the indoor unit and is on the upper side of the indoor unit and a second part of the bottom surface in the fitting recess which part opposes the second edge portion.

2. The cushioning device according to claim 1, wherein, the bottom surface in the fitting recess includes a part which is arranged to be higher than at least one of the first part and the second part.
3. The cushioning device according to claim 1 or 2, wherein, a recess is formed on at least one of the first part and the second part.
4. A cushioning device having a fitting recess fitted with a lower corner portion of an indoor unit of an air conditioner which portion is on the lower side when wall mounted, wherein,
when the lower corner portion of the indoor unit is fitted with the fitting recess, a gap is formed between a first edge portion of a lower cover member which portion extends along the length of the indoor unit and is on the lower side of the indoor unit when wall mounted and a first part of a bottom surface in the fitting recess which part opposes the first edge portion.
5. The cushioning device according to claim 4, wherein, the bottom surface in the fitting recess includes a part arranged to be higher than the first part.
6. The cushioning device according to claim 4 or 5, wherein, a recess is formed on the first part.
7. A cushioning device having a fitting recess fitted with an upper corner portion of an indoor unit of an air conditioner which portion is on the upper side when wall mounted, wherein,
when the upper corner portion of the indoor unit is fitted with the fitting recess, a gap is formed between a second edge portion of an upper cover member which portion extends along the length of the indoor unit and is on the upper side of the indoor unit when wall mounted and a second part of a bottom surface in the fitting recess which part opposes the second edge portion.
8. The cushioning device according to claim 7, wherein,

the bottom surface in the fitting recess includes a part which is arranged to be higher than the second part.

9. The cushioning device according to claim 7 or 8, wherein, a recess is formed on the second part.
10. The cushioning device according to any one of claims 1 to 9, wherein, a protrusion is formed at a third part on the bottom surface in the fitting recess to oppose a third edge portion of a side cover member which portion extends along a direction orthogonal to the length of the indoor unit and is provided on the longitudinal end portion of the indoor unit when wall mounted.
11. The cushioning device according to any one of claims 1 to 9, wherein, a recess is formed between a third edge portion of a side cover member provided at an end portion of the indoor unit and a third part provided on the bottom surface in the fitting recess to oppose the third edge portion edge portion.
12. The cushioning device according to claim 11, wherein, the cushioning device is divided into a first member fitted with a corner portion on the back side of the end portion of the indoor unit and a second member fitted with a corner portion on the front side of the end portion of the indoor unit, and the recess provided at the third part opposing the third edge portion is provided on the first member.

FIG. 1

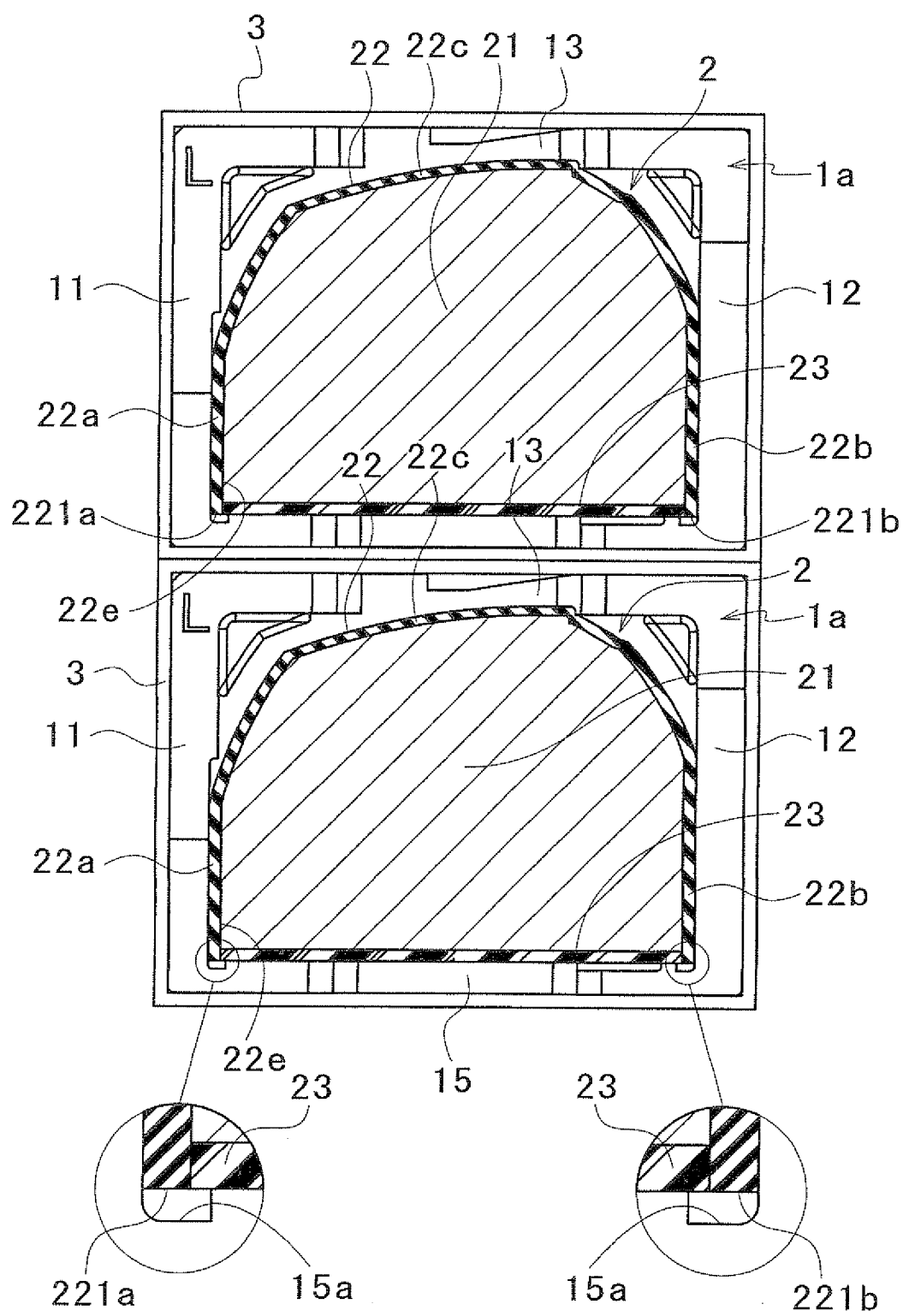


FIG. 2

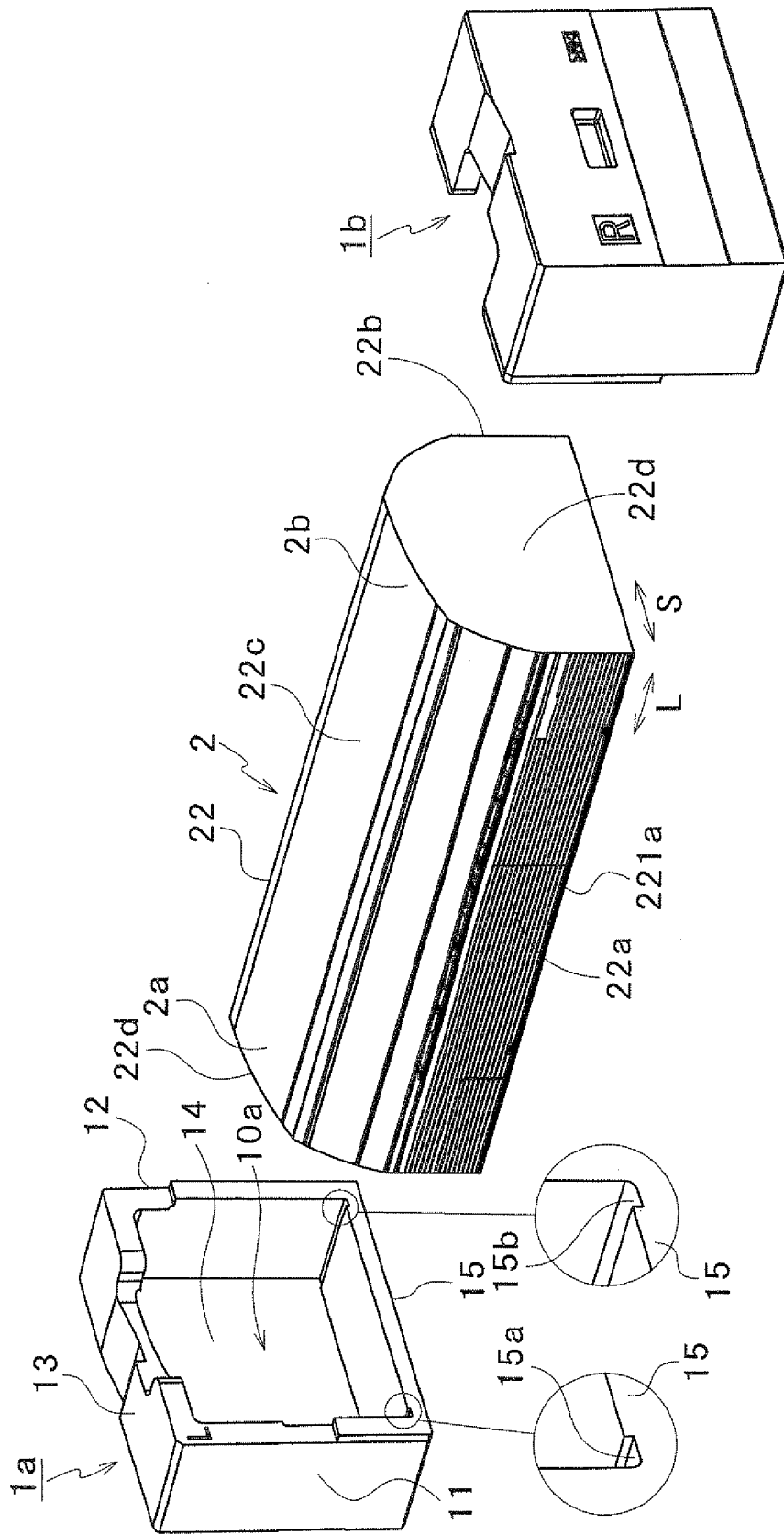


FIG. 3

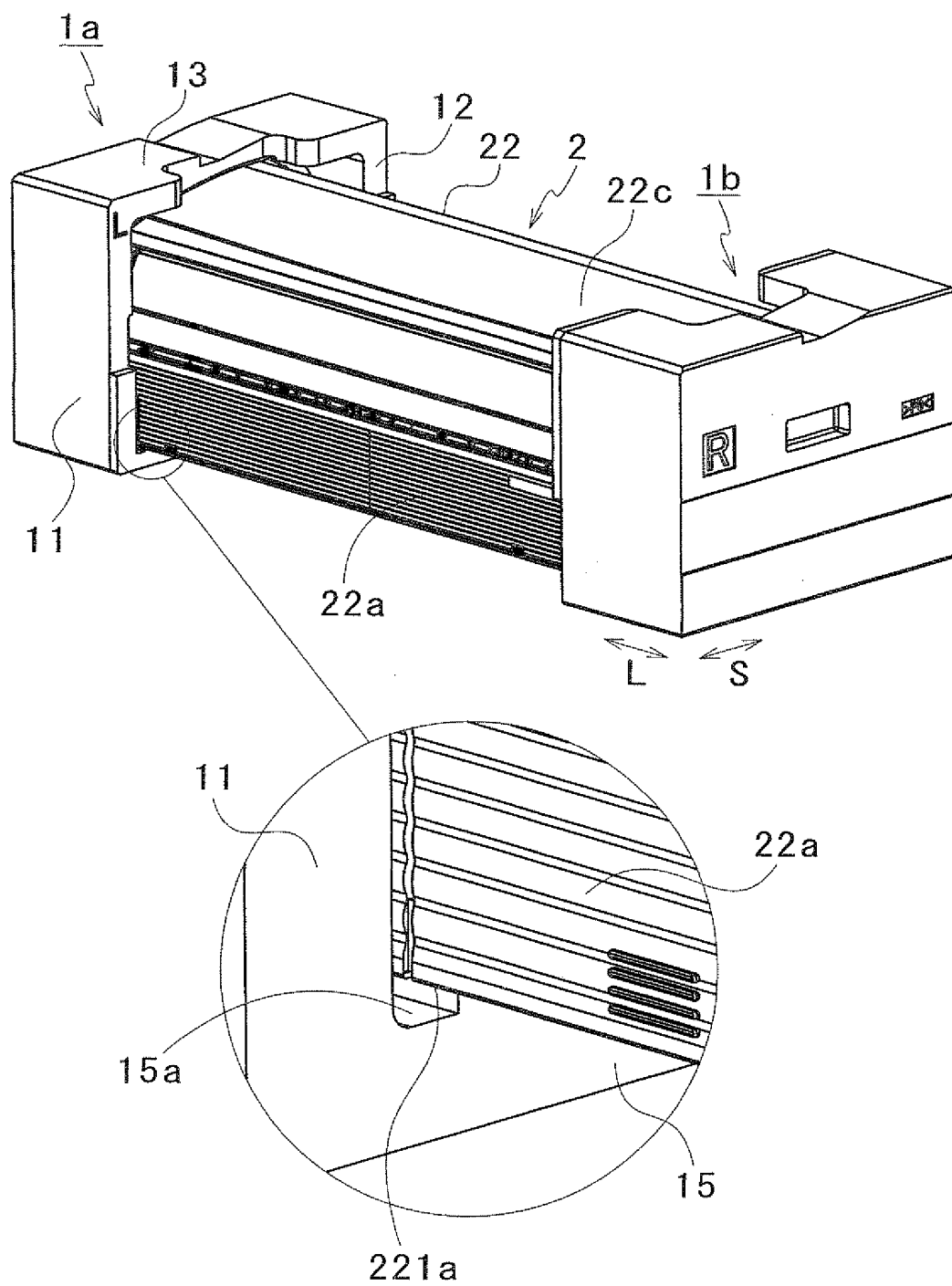


FIG.4

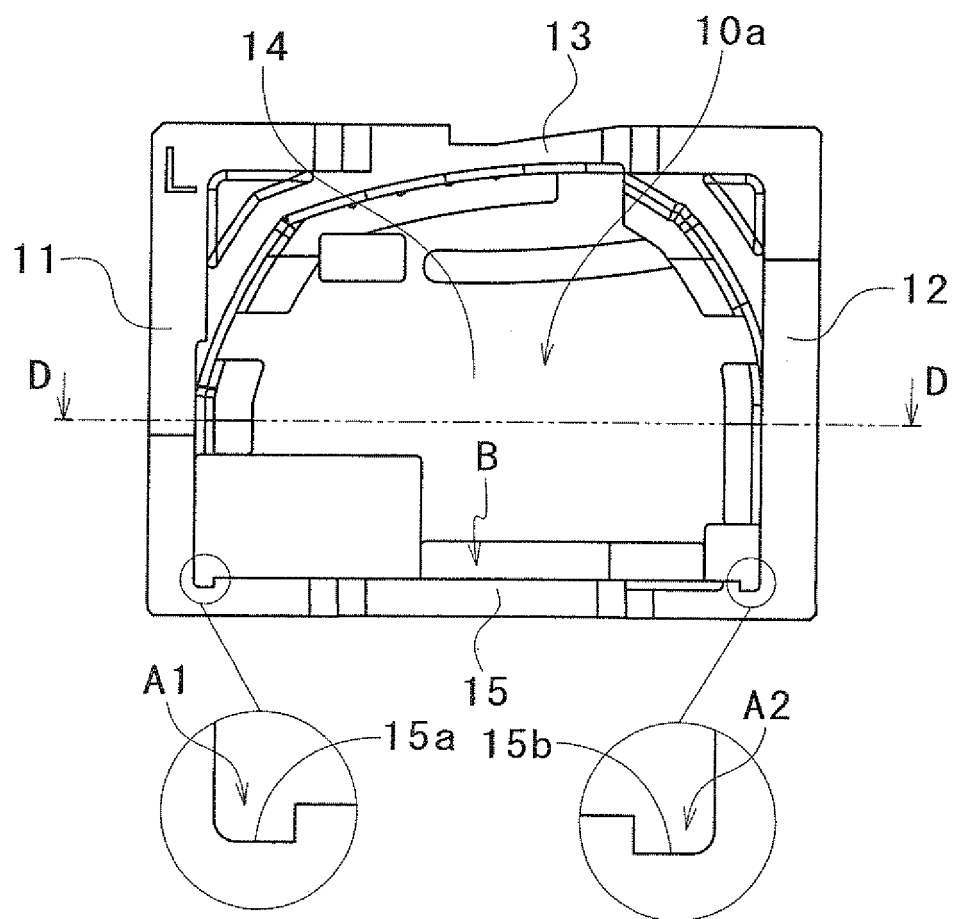


FIG.5

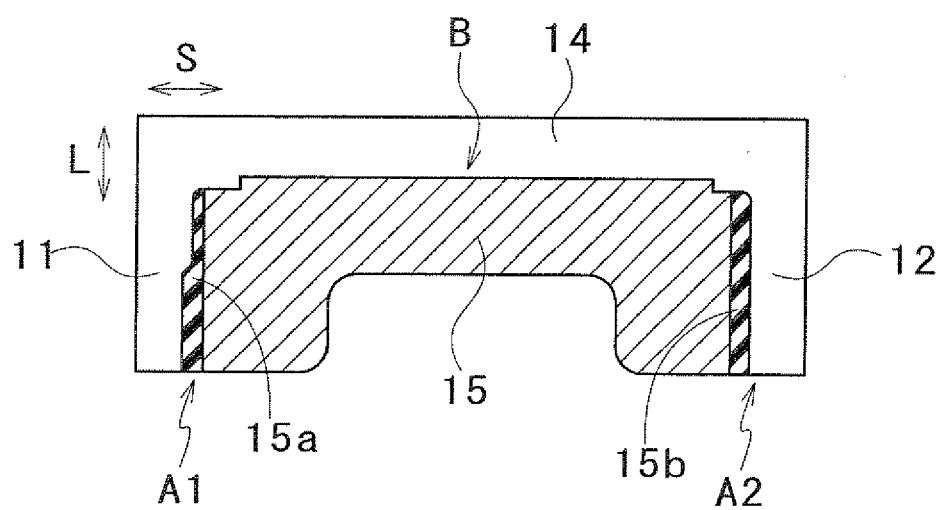


FIG.6

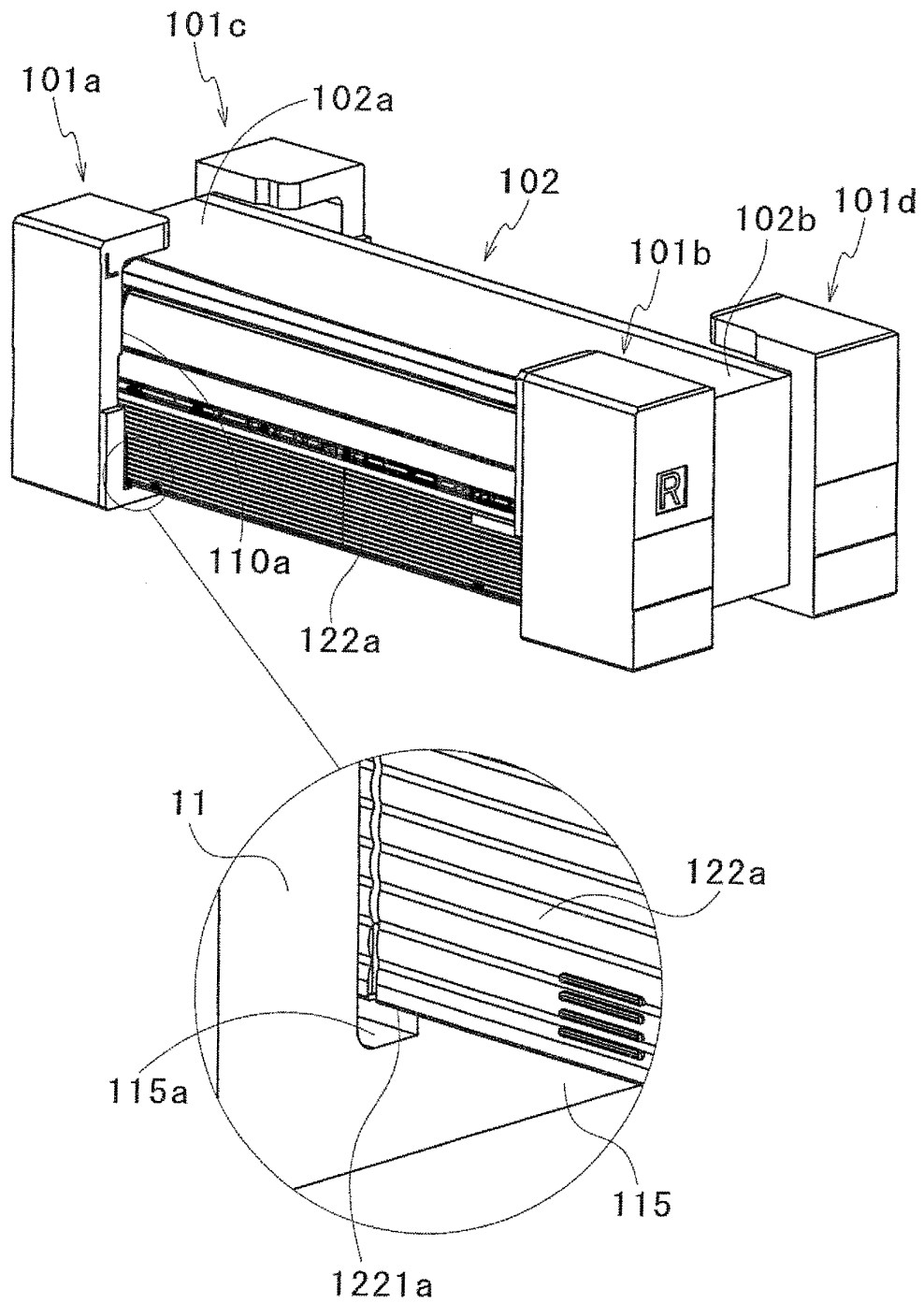


FIG.7

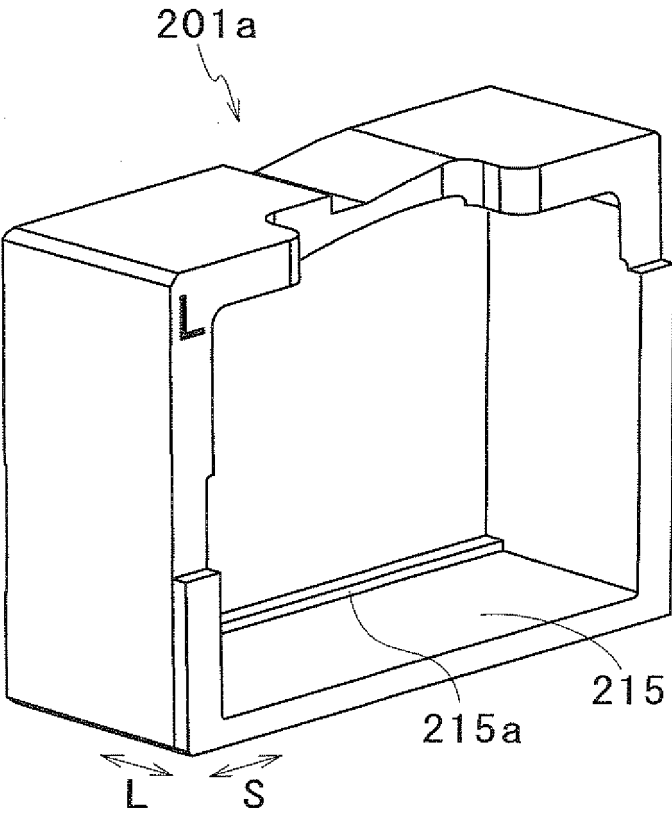


FIG.8

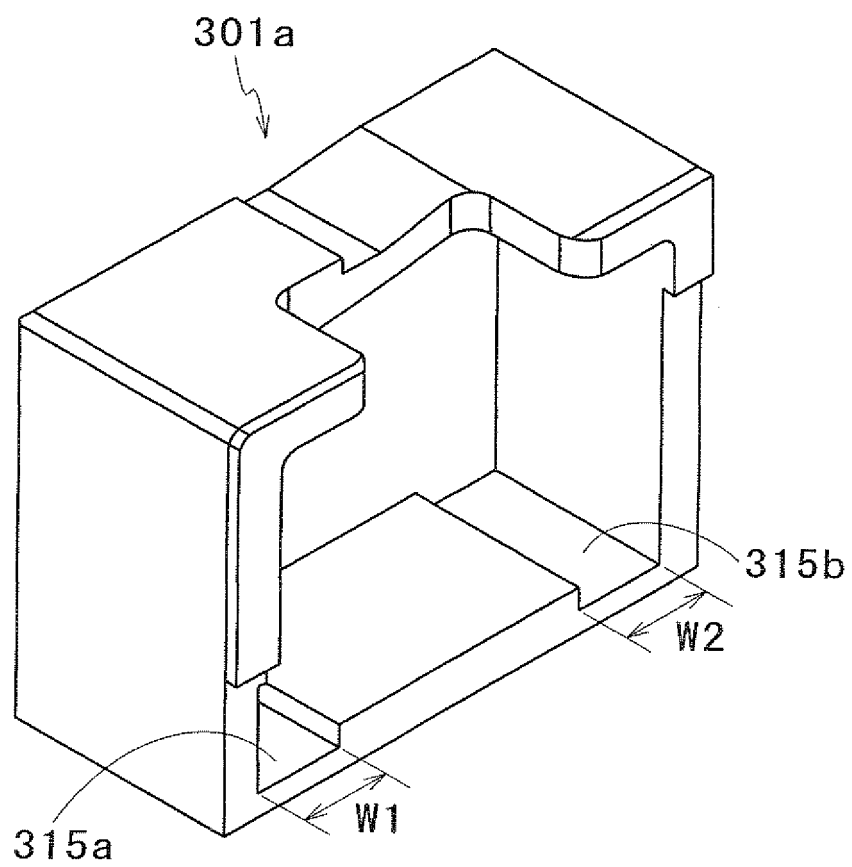


FIG.9

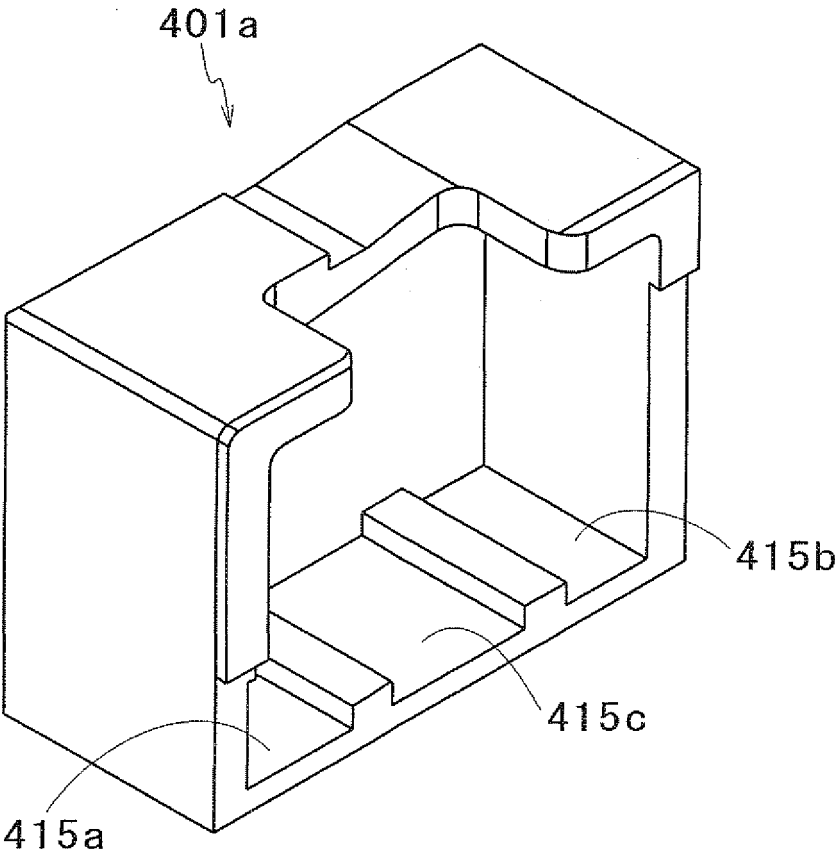


FIG.10

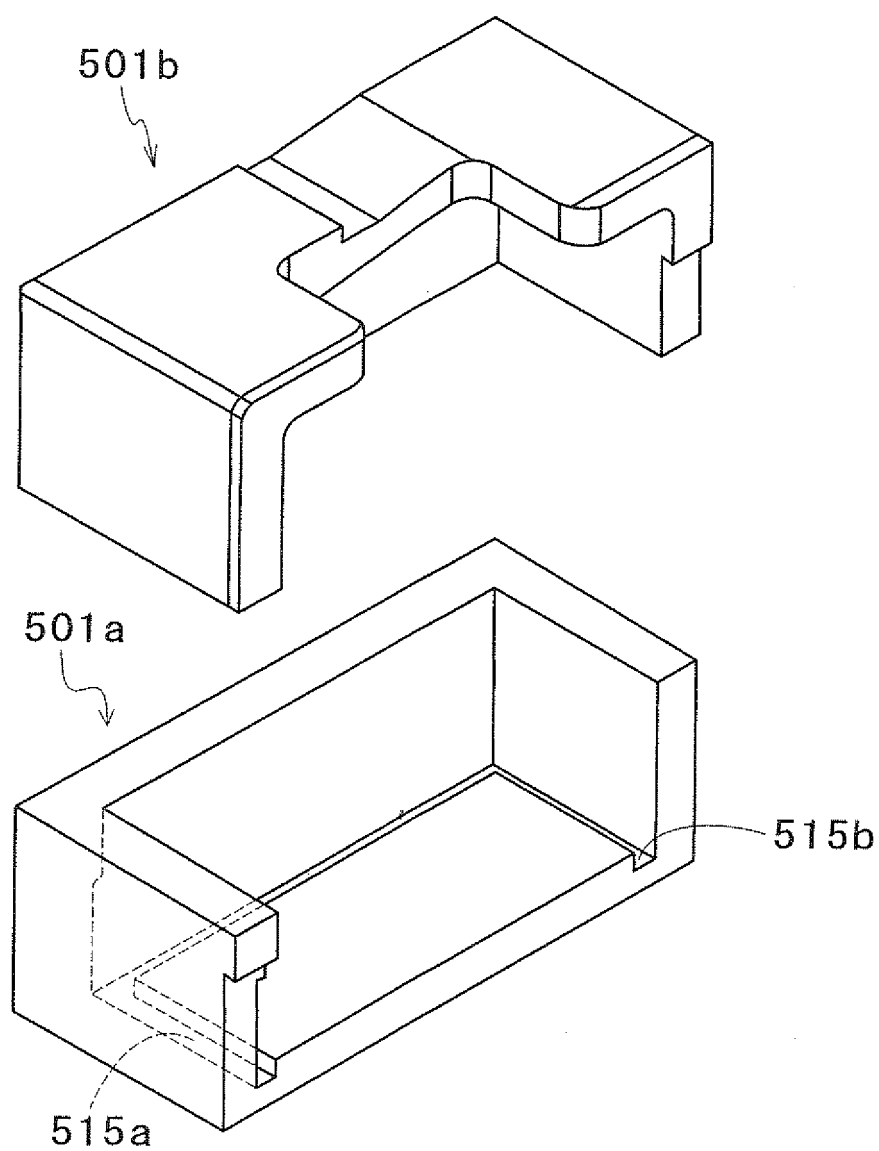


FIG.11

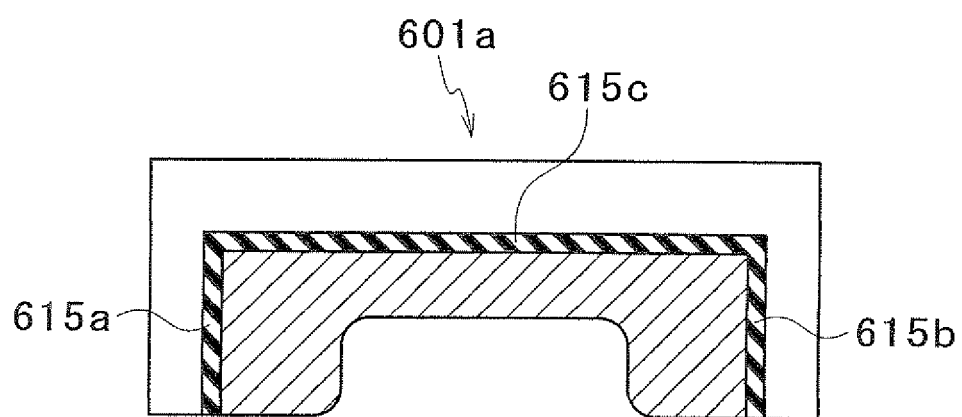


FIG.12

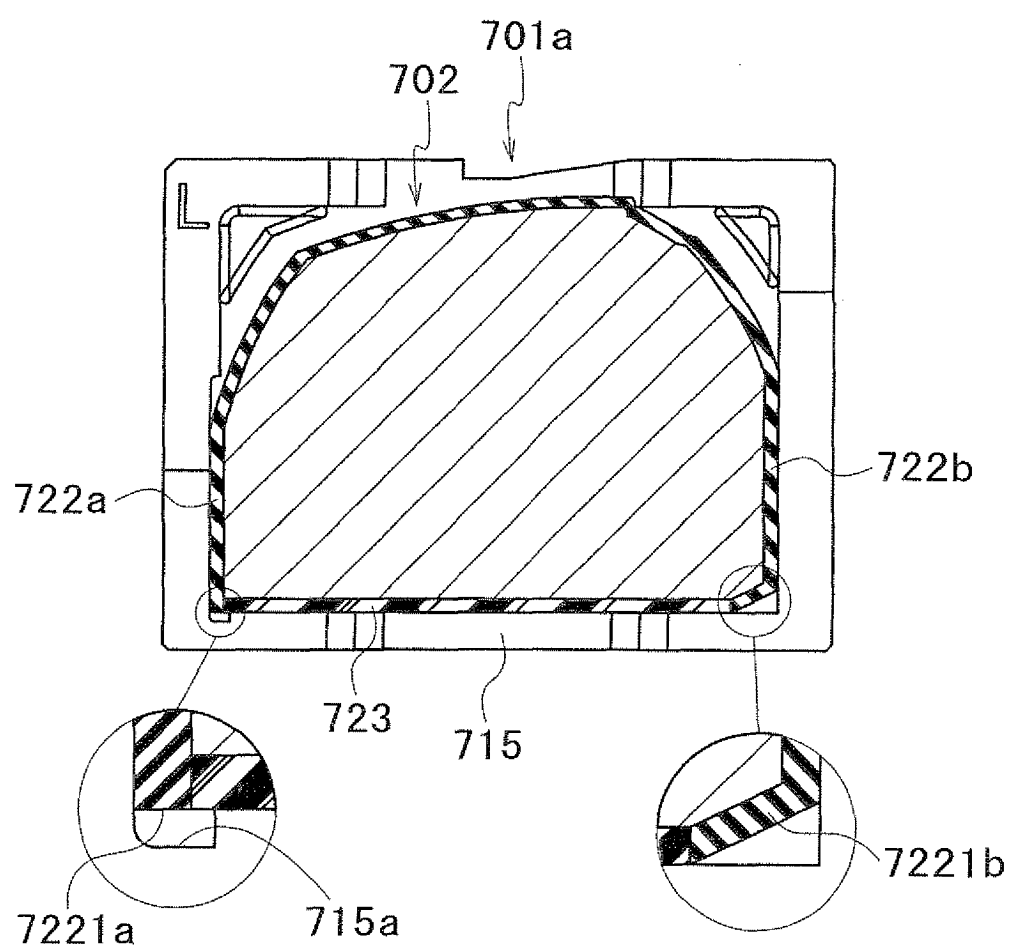
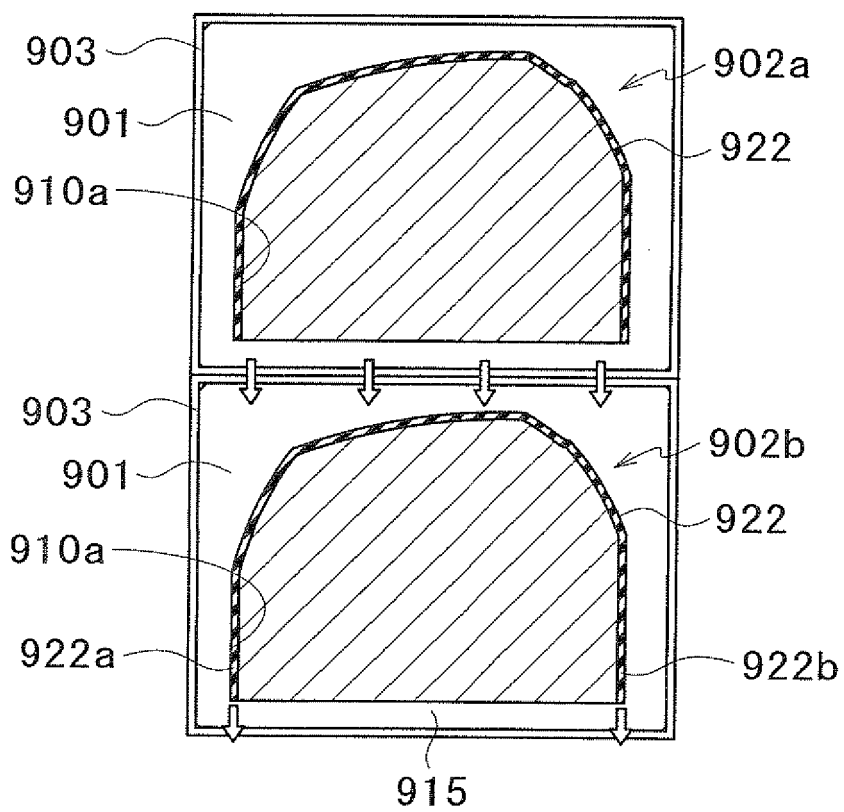


FIG.13



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/069911

A. CLASSIFICATION OF SUBJECT MATTER

B65D85/68 (2006.01) i, B65D81/113 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D85/68, B65D81/113

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2008
Kokai Jitsuyo Shinan Koho	1971-2008	Toroku Jitsuyo Shinan Koho	1994-2008

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 2880/1984 (Laid-open No. 115885/1985) (Kabushiki Kaisha Zeneraru), 05 August, 1985 (05.08.85), Claims; page 2, line 12 to page 3, line 12; Figs. 1 to 3 (Family: none)	1-9, 11-12 10
A	JP 2007-197014 A (Sharp Corp.), 09 August, 2007 (09.08.07), Figs. 1 to 4 (Family: none)	1-12

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search
28 November, 2008 (28.11.08)Date of mailing of the international search report
09 December, 2008 (09.12.08)Name and mailing address of the ISA/
Japanese Patent Office

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/069911

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 112330/1981 (Laid-open No. 19981/1983) (Tokyo Shibaura Electric Co., Ltd.), 07 February, 1983 (07.02.83), Claims; page 2, line 8 to page 4, line 14; Figs. 1 to 3 (Family: none)	1-12
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 43617/1987 (Laid-open No. 149872/1988) (Fujitsu General Ltd.), 03 October, 1988 (03.10.88), Claims; page 3, line 10 to page 5, line 2; Figs. 1 to 3 (Family: none)	1-12
A	JP 2007-137464 A (Mitsubishi Electric Corp.), 07 June, 2007 (07.06.07), Figs. 1 to 11 (Family: none)	1-12

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REFERENCES CITED IN THE DESCRIPTION

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