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(19) **United States**(12) **Patent Application Publication**
Tsukii(10) **Pub. No.: US 2012/0241351 A1**(43) **Pub. Date: Sep. 27, 2012**(54) **CUSHIONING MEMBER AND PACKAGING
DEVICE**(52) **U.S. Cl. 206/521**(57) **ABSTRACT**(75) **Inventor: Katsumi Tsukii, Tokyo (JP)**(73) **Assignee: NEC Coprpration**(21) **Appl. No.: 13/514,224**(22) **PCT Filed: Dec. 6, 2010**(86) **PCT No.: PCT/JP2010/072302**§ 371 (c)(1),
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[Problem] Provided is a cushioning member and a packaging device which have enough capability of protecting an object to be packaged and improving a packaging efficiency.

[Solution] The disclosed cushioning member is arranged in a packaging box and is the cushioning member for protecting the object to be packaged, and includes a plurality of cushion elements in which a holding part which holds said object to be packaged is formed in a surface side and at least one projection part is formed in the other surface side respectively, and a fixing member in which through holes through which said projection part of each said cushion element can pierce are formed at predetermined positions and movements of each said cushion element are restricted by inserting each said projection part in said corresponding through hole, wherein said projection parts pierce said through holes and a tip end part of each said projection part contacts with an inner wall side of said packaging box in the case of arranging each said cushion element which is fixed by said fixing member in said packaging box.

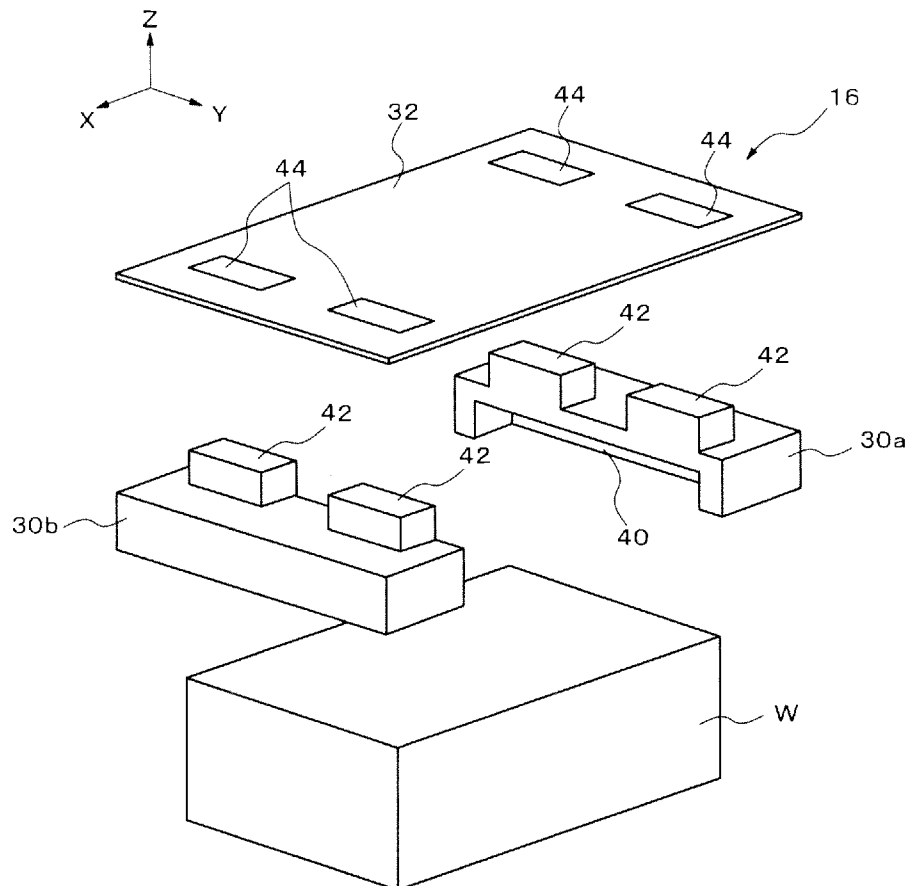


Fig. 2

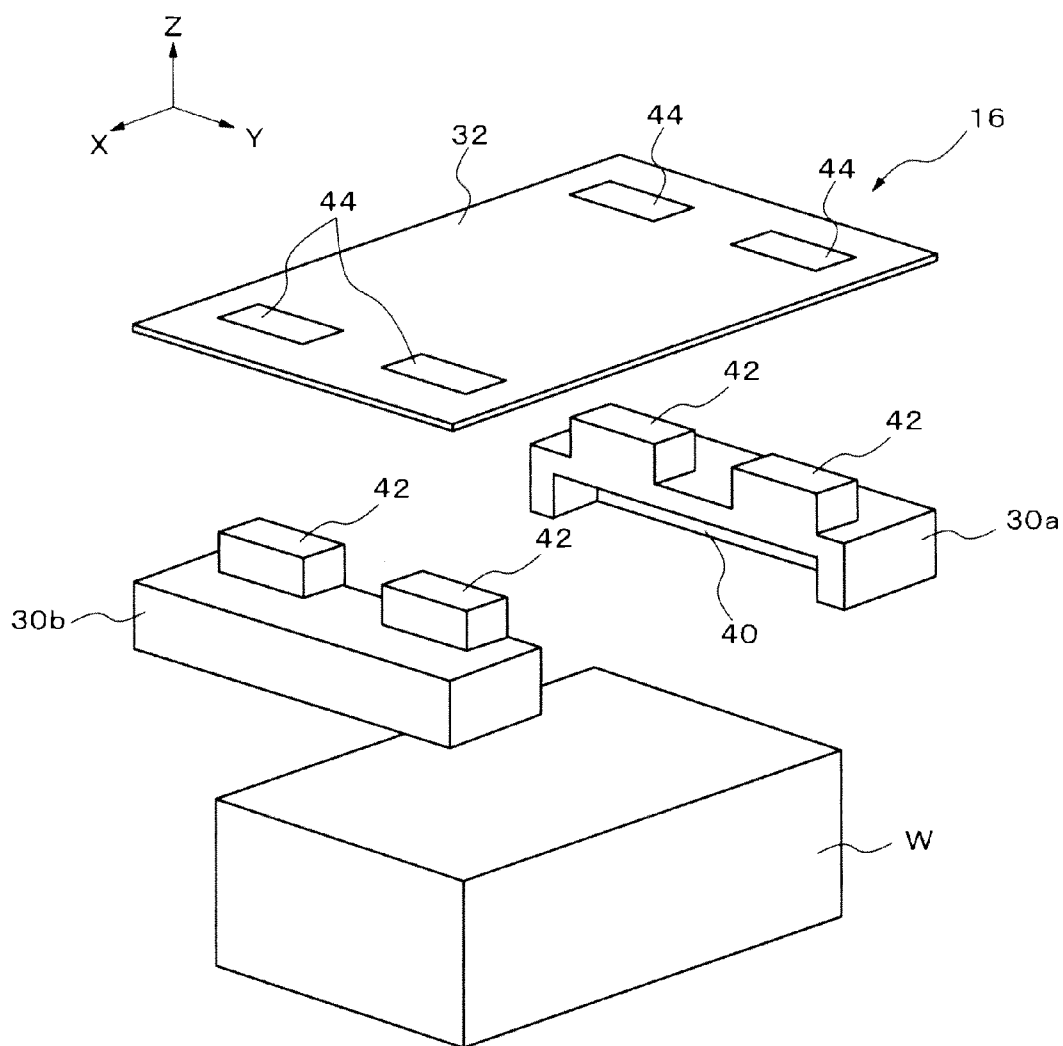


Fig. 3

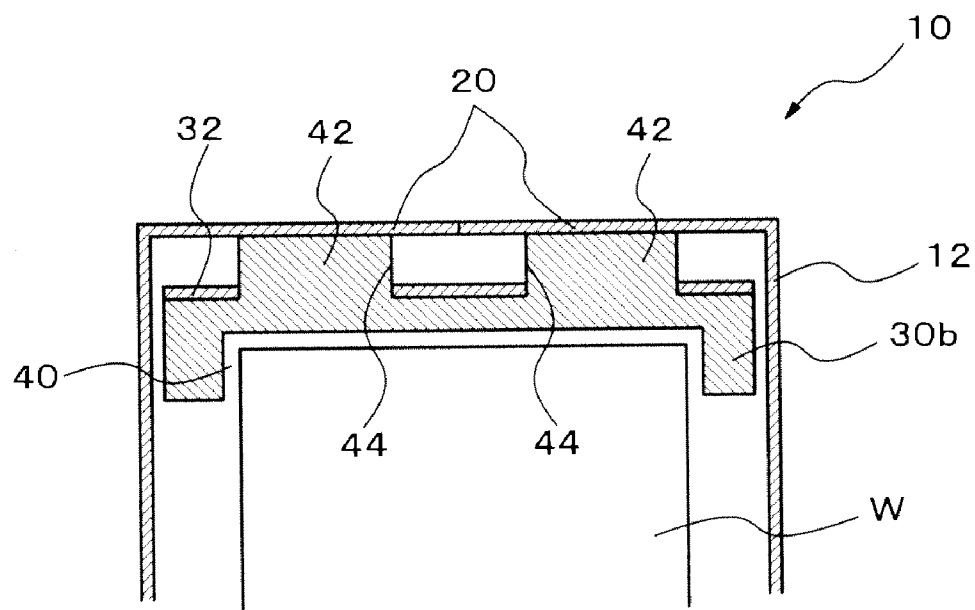


Fig. 4

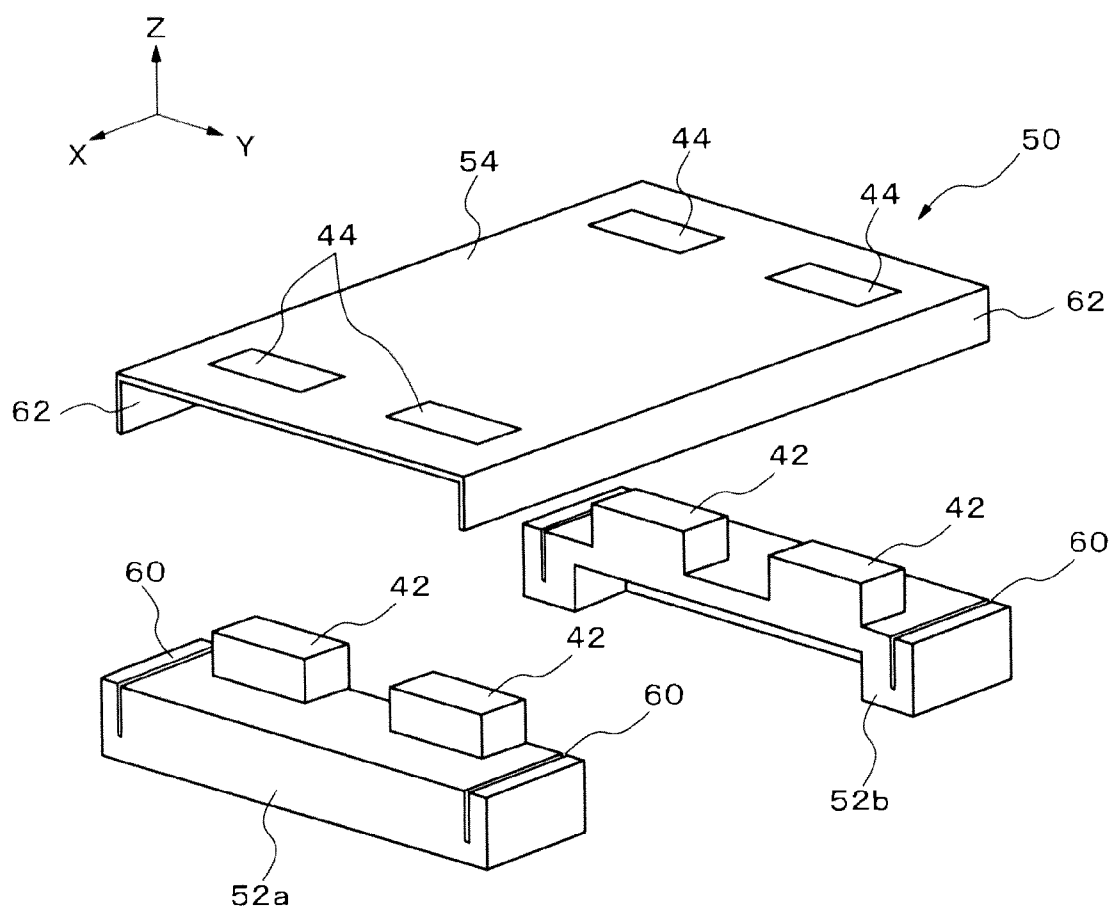


Fig. 5

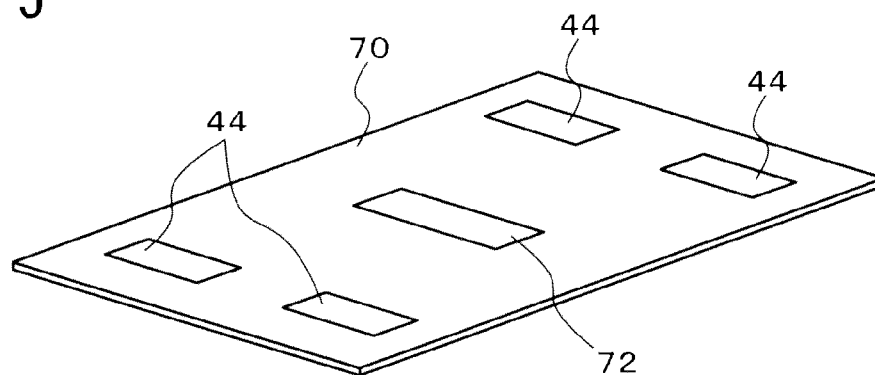
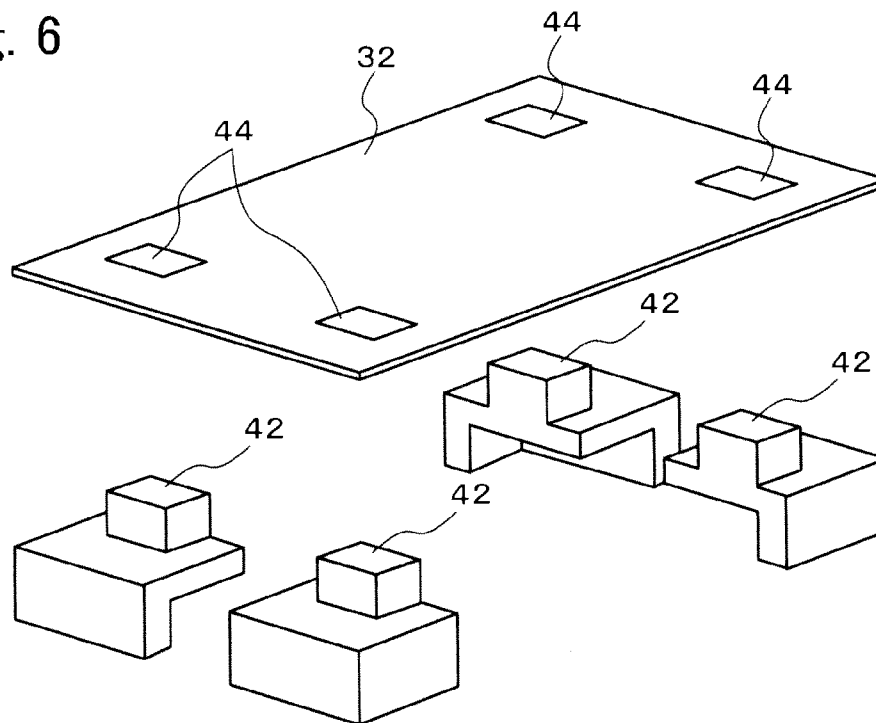


Fig. 6



CUSHIONING MEMBER AND PACKAGING DEVICE

TECHNICAL FIELD

[0001] The present invention relates to a cushioning member and a packaging device which protect an object to be packaged from impacts.

BACKGROUND ART

[0002] Styrene foam is becoming popular as a cushioning member which is interposed between a packaging box and objects to be packaged and protects the object to be packaged from falling or impacts by collision with other objects, in the case that the electronic apparatuses including personal computers, displays and the communication devices or the like are packed.

[0003] As a first example of using the styrene foam for the cushioning member, it includes a case that all the cushioning members are formed by the styrene foam. However, in this case, it needs to mold a complicated shape of the object to be packaged as a mold. Further, in order to form as a whole using relatively expensive styrene foam, there is a problem that a cost may increase.

[0004] Alternatively, as a second example, a method is well known where the styrene foam is partially used (e.g. four corners) for it instead of forming everything using it. Because it can reduce amount of consumptions of the styrene foam, it can suppress increase of the cost. However, it may cause the following two problems because the styrene foams are separately formed.

[0005] The first problem is on a point that an efficiency of a packaging work is low. Here, for example, a packaging method where it covers an upper part of the object to be packaged with a plurality of styrene foams in the packaging box is assumed. Since, in this kind of the packaging method, it is necessary to arrange a plurality of styrene foams at each four corners, it is hard to say that it can keep a high working efficiency.

[0006] The second problem is on a point that damages may be added to the object to be packaged at a time of transportation. Specifically, because the styrene foams are separated and are not fixed each other, those are shaken due to vibrations at a time of transportation and the object to be packaged will be chafed and damaged because of the shakes.

[0007] Patent document 1 discloses that whole the cushioning members are composed of a plurality of styrene foam members instead of single styrene foam member in order to overcome the above-mentioned problem. Further, the Patent Document 1 discloses that it fixes positions of a plurality of styrene foam members by joining a plurality of styrene foam members to a fixing member which is formed by a relatively cheap corrugated fiberboard. By composing the cushioning member as is described above, cost can be reduced since amount of consumption of the styrene foam members can be reduced. In addition, the Patent Document 1 discloses that it adopts a packaging method where the cushioning member, which is designed as described above, covers an upper part of the object to be packaged in the packaging box which is made of corrugated fiberboard. Here, a plurality of styrene foam members are fixed by the fixing member. Accordingly, in the case of covering the styrene foam on the object to be packaged, because it can arrange a plurality of styrene foam mem-

bers at four corners in one lump instead of arranging separately, packaging efficiency can be improved.

PRIOR ART DOCUMENT

Patent Document

[0008] [Patent Document 1] The Japanese Utility Model Application Laid-Open No. H6-6265.

SUMMARY OF INVENTION

Technical Problem

[0009] Incidentally, following to the Patent Document 1, the joining of the styrene foam member and the fixing member is done by inserting a ligula piece formed in the fixing member to an insertion groove formed in the styrene foam member. Then, in the Patent Document 1, as it is mentioned above, the cushioning member which is designed following to the descriptions covers the upper part of the object to be packaged in the packaging box. That is, in the case of the Patent Document 1, the fixing member made of corrugated fiberboard contacts with the inner wall side of a lid of the packaging box made of corrugated fiberboard. Basically, the corrugated fiberboard has a plastic body and has a characteristic that elastic deformation is difficult in thickness direction. That is, according to the Patent Document 1, because of a fact that a part of the fixing member is plastically contacted, it cannot elastically absorb vibrations in a vertical direction, for example, at a time of transportation and gaps are formed among the lid, the cushioning member and the object to be packaged, and therefore the object to be packaged is shaken and there is further apprehension that the object to be packaged will be hurt. Moreover, according to the Patent Document 1, due to the above-mentioned characteristics of the joining, because the structure is such that the lid and the cushioning member are contacted at whole of the surface, there is also an apprehension that gaps are created by slightly tilting the surface of the cushioning member to a surface of the lid.

[0010] Further, according to the Patent Document 1, because the ligula piece is simply formed by cutting off a part of the corrugated fiberboard and bending the notch part, strength of the ligula piece is not so high. Accordingly, by the vibrations at a time of transportation, the ligula piece collapses or moves and the styrene foam member shifts its position or shakes accordingly, and this may injure the object to be packaged. Moreover, the ligula piece may tear from its root position, and there is an apprehension that the fixing member and the styrene foam member are to be separated.

[0011] On the other hand, it also has a problem that the packaging efficiency (in other words, the assembly efficiency of the cushioning member) is not so high. As it is mentioned above, because the ligula piece is simply formed by bending the corrugated fiberboard, it does not have enough strength. Accordingly, at a time of an assembly work of the cushioning member, there is also an apprehension that it becomes difficult to insert the ligula piece into a notch part in a situation that the ligula piece is being bent or the like

[0012] As a summary, according to the Patent Document 1, even though it can suppress increase of the cost of the cushioning member (and packaging device), a performance of protecting the object to be packaged and the packaging efficiency are not so high.

[0013] The present invention has been made in order to settle the above-mentioned problems, and its object is to provide a cushioning member and a packaging device capable of having high performance for protecting the object to be packaged and improving the packaging efficiency.

Solution to Problem

[0014] In order to settle the above-mentioned problems, a cushioning member of the present invention is arranged in a packaging box and is the cushioning member for protecting an object to be packaged, comprising: a plurality of cushion elements in which a holding part which holds said object to be packaged is formed in a surface side and at least one projection part is formed in the other surface side respectively, and a fixing member in which through holes which said projection part of each said cushion element can pierce are formed at predetermined positions and movements of each said cushion element are restricted by inserting each said projection part in said corresponding through hole, wherein said projection parts pierce said through holes and a tip end part of each said projection part contacts with an inner wall side of said packaging box in the case of arranging each said cushion element which is fixed by said fixing member in said packaging box.

Advantageous Effects of Invention

[0015] According to the present invention, a cushioning member and a packaging device capable of having high performance for protecting the object to be packaged and improving packaging efficiency are provided.

BRIEF DESCRIPTION OF DRAWINGS

[0016] FIG. 1 is an exploded perspective view showing an exemplary configuration of the packaging device according to a first exemplary embodiment of the present invention.

[0017] FIG. 2 is an exploded perspective view showing an exemplary configuration of a second cushioning member shown in FIG. 1.

[0018] FIG. 3 is an enlarged cross-sectional view at A-A line in FIG. 1.

[0019] FIG. 4 is an exploded perspective view showing an exemplary configuration of the second cushioning member according to a second exemplary embodiment of the present invention.

[0020] FIG. 5 is a perspective view showing an exemplary configuration of a fixing member according to a third exemplary embodiment of the present invention.

[0021] FIG. 6 is an exploded perspective view showing a variation example of a cushion element.

DESCRIPTION OF EMBODIMENTS

First Exemplary Embodiment

[0022] FIG. 1 is the exploded perspective view showing the exemplary configuration of a packaging device 10 according to the first exemplary embodiment of the present invention. The packaging device 10 includes a packaging box 12, a first cushioning member 14 which is accommodated in the packaging box 12 and protects a work W (i.e. object to be packaged) from impacts, and a second cushioning member 16 (i.e. cushioning member).

[0023] The first cushioning member 14 is formed by members having elasticity (e.g. corrugated fiberboard or styrene foam member). A holding part 22 which fits to a shape of a

bottom part of the work W is formed in a surface side which contacts with the work W of the first cushioning member 14. The second cushioning member 16 is set at an upper part of the work W and protects the work W.

[0024] When it packages, at first, the first cushioning member 14 is set in the bottom part of the packaging box 12 and the work W is mounted on the first cushioning member 14. Then, the second cushioning member 16 is arranged on the upper part of the work W. Finally, a ceiling lid 20 of the packaging box 12 is closed, and the packaging is completed.

[0025] FIG. 2 is the exploded perspective view showing the exemplary configuration of the second cushioning member 16. The second cushioning member 16 includes a plurality of cushion elements 30a and 30b and a fixing member 32.

[0026] Each of cushion elements 30a and 30b has elasticity and protects the work W from impacts. Hereinafter, a case is exemplified where the cushion elements 30a and 30b are formed using the styrene foam. It is needless to mention that the material of the cushion elements 30a and 30b are not limited to the styrene foam. A holding part 40 which holds the work W is formed at a surface side (i.e. surface side which contacts with the work W) of each of cushion elements 30a and 30b. At least one projection part 42 is formed in the other surface side (i.e. surface side which contacts with the ceiling lid 20 of the packaging box 12) of each of cushion elements 30a and 30b. In the following descriptions, a case where the projection part 42 is formed one by one at both of the end parts of each of cushion elements 30a and 30b is exemplified. Note that number of the projection parts 42 is not limited to the above descriptions, and it can be appropriately adjusted based on various characteristics (e.g. weight and shape of the work W).

[0027] The fixing member 32 restricts movements of each of cushion elements 30a and 30b. Hereinafter, a case where the fixing member 32 is formed with the corrugated fiberboard is exemplified. It is needless to mention that the material of the fixing member 32 is not limited to the corrugated fiberboard. The fixing member 32 is formed by a single rectangular plate member such as a corrugated fiberboard sheet. Through holes 44 for inserting the projection parts 42 of each of cushion elements 30a and 30b are formed at predetermined positions of the fixing member 32. By inserting each projection part 42 in a corresponding through hole 44, movements to the front, to the back, to the left, to the right, and to the oblique direction (i.e. X-Y plane in FIG. 2), slipping down in the height direction (i.e. Z-direction in FIG. 2) and shakes (i.e. rotation around axis of Y-direction in FIG. 2) of each of cushion elements 30a and 30b can be restricted.

[0028] In the case of the present exemplary embodiment, a case is exemplified where the cushion elements 30a and 30b are fixed at each end part of a pair of opposing side which faces in a direction of fluted direction (i.e. X-direction in FIG. 2 and is first direction) of the corrugated fiberboard of the fixing member 32. In the above description, the fluted direction of the corrugated fiberboard indicates an extended direction of a core (i.e. inside of the corrugated fiberboard and the corrugated part) which composes the corrugated fiberboard. It is well known that this direction has a higher strength compared with a direction which is crossing at right angle with the direction (i.e. direction which the corrugated part lines up). Accordingly, by arranging the cushion elements 30a and 30b at each end part of a pair of opposing side which faces in this direction, it can enhance the strength against impacts added to the X-direction in FIG. 2 of the second

cushioning member 16. In this case, although the direction of crossing at right angle with fluted direction has low strength, because impacts added to this direction is absorbed by the cushion elements 30a and 30b, it may cause no problems.

[0029] FIG. 3 indicates the enlarged cross-sectional view at the A-A line in FIG. 1. As it is recognized by FIG. 3, almost all the portion of the projection part 42 pierces the through hole 44 and exposes to the back surface of the fixing member 32. That is, when each of cushion elements 30a and 30b which is fixed by the fixing member 32 are installed in the packaging box 12, the projection part 42, which is exposed to the back surface of the fixing member 32, contacts with the inner wall side of the ceiling lid 20. In this case, a thickness (i.e. cross-sectional area in the X-Y plane in FIG. 2) and a length (i.e. length in the Z-axial direction in FIG. 2) of the projection part 42 are appropriately adjusted based on various characteristics (e.g. weight and shape of the work W).

[0030] As described above, the present exemplary embodiment has a structure in which the projection part 42 which pierced the fixing member 32 contacts with the inner wall side of the ceiling lid 20. That is, the structure can achieve elastic contact (i.e. contact of corrugated fiberboard and styrene foam member) instead of plastic contact as is disclosed in the Patent Document 1 (i.e. contact of corrugated fiberboard and corrugated fiberboard), between the ceiling lid 20 and the second cushioning member 16. That is, according to the present exemplary embodiment, because it can elastically keep contacting the ceiling lid 20 and the work W via the second cushioning member 16, it can evade to generate gaps between the ceiling lid 20, the second cushioning member 16 and the work W unless huge hard vibrations are added. Accordingly, shakes of the work W are suppressed, and damages of the work due to shakes (i.e. it can improve performance of protecting the work W) can be prevented.

[0031] Further, according to the present exemplary embodiment, it employs a method where the ceiling lid 20 and the second cushioning member 16 are contacted at a plurality of projection parts 42 instead of contacting at whole of the surface as is disclosed in the Patent Document 1. It also brings an effect that impacts are mitigated and are less transmitted to the work W by the projection parts being transformed, because the projection parts are easier to transform than whole the surface. Further, in the case of a structure where the ceiling lid 20 and the second cushioning member 16 are contacted at a plurality of projection parts 42, even in the case that the second cushioning member 16 tilts against the surface of the ceiling lid 20, inclinations are absorbed by the transformations of the projection parts and the gaps are accordingly less caused. That is, it can further suppress shakes of the work W.

[0032] In addition, the projection part 42 in the exemplary embodiment has sufficient strength compared with the ligula piece (e.g. in Patent Document 1) which is simply formed by bending the corrugated fiberboard. Accordingly, for example, a possibility of collapses and looseness of the projection part 42 caused by vibrations at a time of transportation becomes very low. Therefore, a possibility of positional displacements and shakes of the cushion elements 30a and 30b becomes very low, and as a result, the work W will not be damaged.

[0033] In addition, the projection part 42 has sufficient strength compared with the ligula piece (e.g. in Patent Document 1) which is simply formed by bending the corrugated fiberboard. Accordingly, during an assembly work of the second cushioning member 16, a situation where it becomes

difficult to insert the projection part 42 in the through hole 44 because of bending or the like can be avoided (i.e. a packaging efficiency can be improved).

[0034] Further, according to the exemplary embodiment, because relatively expensive cushion material (e.g. styrene foam) is partially used instead of entirely used for the second cushioning member 16, it can suppress increase of the cost. In addition, according to the exemplary embodiment, because joint of the fixing member with the cushion material is simply done by an insertion instead of using adhesive or the like, when disposing, it only needs to remove it and also has an advantage that a separation becomes easy.

[0035] Further, according to the above-described first exemplary embodiment, the projection part 42 is formed one by one at both of the end parts of each of the cushion elements 30a and 30b. That is, as a whole, it has a configuration that the work W is held at four corners. As the result, a holding stability of a work can be increased and the work W is firmly protected.

[0036] According to the above-described first exemplary embodiment, it is needless to mention that similar cushioning member as the second cushioning member 16 can be adopted as the cushioning member of the first cushioning member 14 arranged in the bottom part of the packaging box 12.

Second Exemplary Embodiment

[0037] FIG. 4 is the exploded perspective view showing the exemplary configuration of a second cushioning member 50 according to the second exemplary embodiment of the present invention. The second cushioning member 50 includes a plurality of cushion elements 52a and 52b and a fixing member 54. The difference between the cushion elements 52a and 52b according to the second exemplary embodiment and the cushion elements 30a and 30b according to the first exemplary embodiment is on a point that the cushion elements 52a and 52b further includes the projecting part which is projecting to both of the end part, and a groove part 60 is formed at each projecting part.

[0038] In addition, the difference between the fixing member 54 in the second exemplary embodiment and the fixing member 32 in the first exemplary embodiment is on a point that the fixing member 54 further forms a bending part 62 at each end part of a pair of opposing side which faces in the direction of crossing at right angle (i.e. Y-direction shown in FIG. 4, and is a second direction) to the direction of fluted direction (i.e. X-direction shown in FIG. 4, and is first direction) of the corrugated fiberboard of the fixing member 54.

[0039] In the case of assembling the second cushioning member 50, each projection part 42 of the cushion elements 52a and 52b is inserted in the corresponding through hole 44 of the fixing member 54, which is similar to the first exemplary embodiment. In addition, each bending part 62 of the fixing member 54 is inserted in the corresponding groove part 60 of the cushion elements 52a and 52b.

[0040] According to the above-described second exemplary embodiment, because the cushion elements 52a and 52b and the fixing member 54 can be joined more firmly, shakes of the cushion elements 52a and 52b can be surely suppressed. In addition, by installing the bending part 62 in the fixing member 54, it can further increase durability against impacts

added to the horizontal direction (i.e. Y-direction in FIG. 4). That is, it can further improve a protection performance of the work W.

Third Exemplary Embodiment

[0041] FIG. 5 is the perspective view showing the exemplary configuration of a fixing member 70 according to the third exemplary embodiment of the present invention. The difference between the fixing member 70 and the fixing member 32 of the first exemplary embodiment is on a point that the fixing member 70 includes a hole part 72 at a predetermined position which is capable of penetrating a convex part which is formed in the work W (e.g. a grasping part for carrying the work W or an attaching part for installing it). The convex part of the work W is accommodated in a space formed by the inner wall side of each projection part 42 of the cushion element (e.g. 30a and 30b in the case of the first exemplary embodiment), the fixing member 70 and the ceiling lid 20 of the packaging box 12.

[0042] According to the above-described third exemplary embodiment, it can utilize a space formed by the projection parts 42, and package the work W having projections without enlarging the packaging device.

Variation Example

[0043] In the above-described first to third exemplary embodiments, the following contrivance can be made for the insertion of the projection part 42 to the through hole 44. It is possible to set size of the through hole 44 smaller than size of the projection part 42, and also forms cuts at four corners of the through hole 44. By doing in this way, the cushion element can be more firmly fixed with the fixing member. Further, it can easily insert the projection part 42 into the through hole 44. In addition, the shape of the projection part 42 can be designed so that it gradually becomes large from a base. By forming the shape of the projection part 42 following to the above descriptions, a drop of the cushion element from the fixing member can be prevented.

[0044] In addition, number of the cushion elements is not limited to two. For example, as shown in FIG. 6, four cushion elements can be adopted to be arranged at each one of the four corners.

[0045] In addition, the cushion elements does not need to be arranged at a pair of opposing side which faces in the direction which fluted direction of the corrugated fiberboard extends (e.g. X-direction in FIG. 2), but can be arranged at a pair of opposing side which faces along the direction which fluted direction extends.

[0046] Further, in the above-described first to third exemplary embodiment, the shape and the number of the projection part 42 formed in the cushion elements 30a and 30b are not limited to those described above, but can be arbitrarily changed. For example, concerning the number, one projection part can be employed which covers the whole area of each of cushion elements 30a and 30b, or no smaller than three projection parts can be adopted.

[0047] Further, material of the cushion element is not limited to styrene foam, but foaming polypropylene or rubber or the like can be used. Material of the fixing member is not

limited to the corrugated fiberboard, but a plastic corrugated fiberboard, a plastic sheet, wood or metal or the like can be used.

Fourth Exemplary Embodiment

[0048] A cushioning member according to the fourth exemplary embodiment of the present invention is a cushioning member arranged at least in a bottom part or a ceiling part in a packaging box and protects a work, wherein it comprises a plurality of cushion elements in which a holding part which holds said work is formed in a surface side and at least one projection part is formed in the other surface side, and the fixing member which is formed by single rectangular plate member, has through holes for inserting said projection part of each said cushion element at predetermined positions and restricts movements of each said cushion element by inserting each said projection part in said corresponding through hole, wherein said projection parts pierce said through holes and a tip end part of each said projection part contacts with an inner wall side of said packaging box in the case of arranging each said cushion element which is fixed by said fixing member in said packaging box.

Fifth Exemplary Embodiment

[0049] The packaging device according to a fifth exemplary embodiment of the present invention includes a packaging box and a cushioning member which is arranged at least in a bottom part or a ceiling part and protects the work, wherein said cushioning member comprises a plurality of cushion elements in which a holding part which holds said work is formed in a surface side and at least one projection part is formed in the other surface side respectively, and a fixing member which is formed by single rectangular plate member, has through holes for inserting said projection parts of each said cushion element at predetermined positions and restricts movements of each said cushion element by inserting each said projection part in said corresponding through hole, wherein said projection parts pierce said through holes and a tip end part of each said projection part contacts with the inner wall side of said packaging box in the case of arranging each said cushion element which is fixed by said fixing member in said packaging box.

[0050] While the invention has been particularly shown and described with reference to exemplary embodiments thereof, the invention is not limited to these embodiments. It will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the claims.

[0051] This application is based upon and claims the benefit of priority from Japanese patent application No. 2009-279321, filed on Dec. 9, 2009, the disclosure of which is incorporated herein in its entirety by reference.

REFERENCE SIGNS LIST

- [0052]** 10 packaging device
- [0053]** 12 packaging box
- [0054]** 14 first cushioning member
- [0055]** 16 and 50 second cushioning member
- [0056]** 20 ceiling lid
- [0057]** 22 holding part
- [0058]** 30a (30b) and 52a (52b) cushion element
- [0059]** 32, 54 and 70 fixing member

[0060] 40 holding part
 [0061] 42 projection part
 [0062] 44 through hole
 [0063] 60 groove part
 [0064] 62 bending part
 [0065] 72 hole part

1. A cushioning member which is arranged in a packaging box and protects an object to be packaged, comprising:

a plurality of cushion elements in which a holding part which holds said object to be packaged is formed in a surface side and at least a projection part is formed in the other surface side; and

a fixing member in which a through hole which said projection part of each said cushion element can pierce is formed at a predetermined position and movements of each said cushion element are restricted by each said projection part being inserted in said corresponding through hole, wherein

said projection part pierces said through hole and a tip end part of said projection part contacts with an inner wall side of said packaging box in the case of arranging each said cushion element which is fixed by said fixing member in said packaging box.

2. The cushioning member according to claim 1, wherein said cushion element is fixed at each end part of a pair of opposing side which faces in a first direction of said fixing member.

3. The cushioning member according to claim 2, wherein a bending part is formed at each end part of a pair of opposing side which faces in a second direction which crosses at right angle with said first direction of said fixing member, and wherein

each bending part is inserted in each groove part formed at both of the end parts of each said cushion element.

4. The cushioning member according to claim 2, wherein said fixing member is formed by corrugated fiberboard sheets and said first direction is a direction which is the same as a fluted direction of the corrugated fiberboard sheets.

5. The cushioning member according to claim 1, wherein said projection part is formed one by one at both of each end part of each said cushion element.

6. The cushioning member according to claim 1, wherein a hole part through which a convex part formed in said object to be packaged can pierce is formed at a predetermined position of said fixing member, and a space formed by said projection part, said fixing member and the inner wall side of said packaging box accommodates said convex part.

7. The cushioning member according to claim 1, wherein size of said through hole is adjusted to smaller than size of said projection part and cuts are arranged around said through hole.

8. The cushioning member according to claim 1, wherein said projection part has a shape which gradually becomes large from a base.

9. A packaging device, comprising:

a packaging box; and

the cushioning member according to claim 1 which is arranged in the packaging box and protects the object to be packaged.

10. The packaging device according to claim 9, further comprising:

said cushioning member which is arranged at an upper part of said object to be packaged and protects the object to be packaged; and

another cushioning member which is arranged at a bottom part of said packaging box, possesses holding parts corresponding to shape of the bottom part of said object to be packaged and protects said object to be packaged.

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