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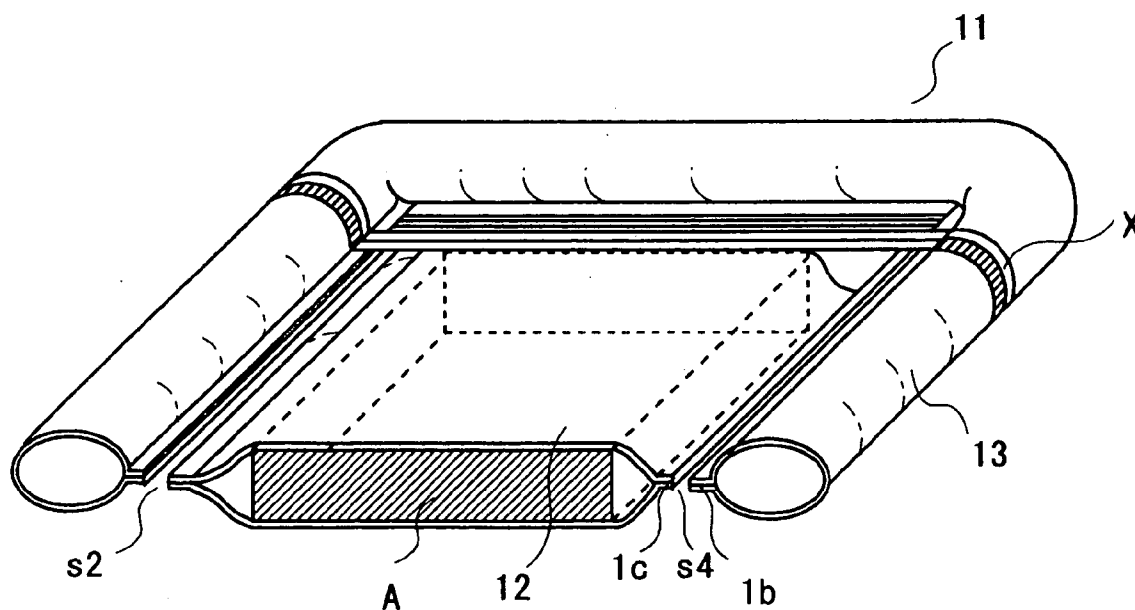


Fig. 1

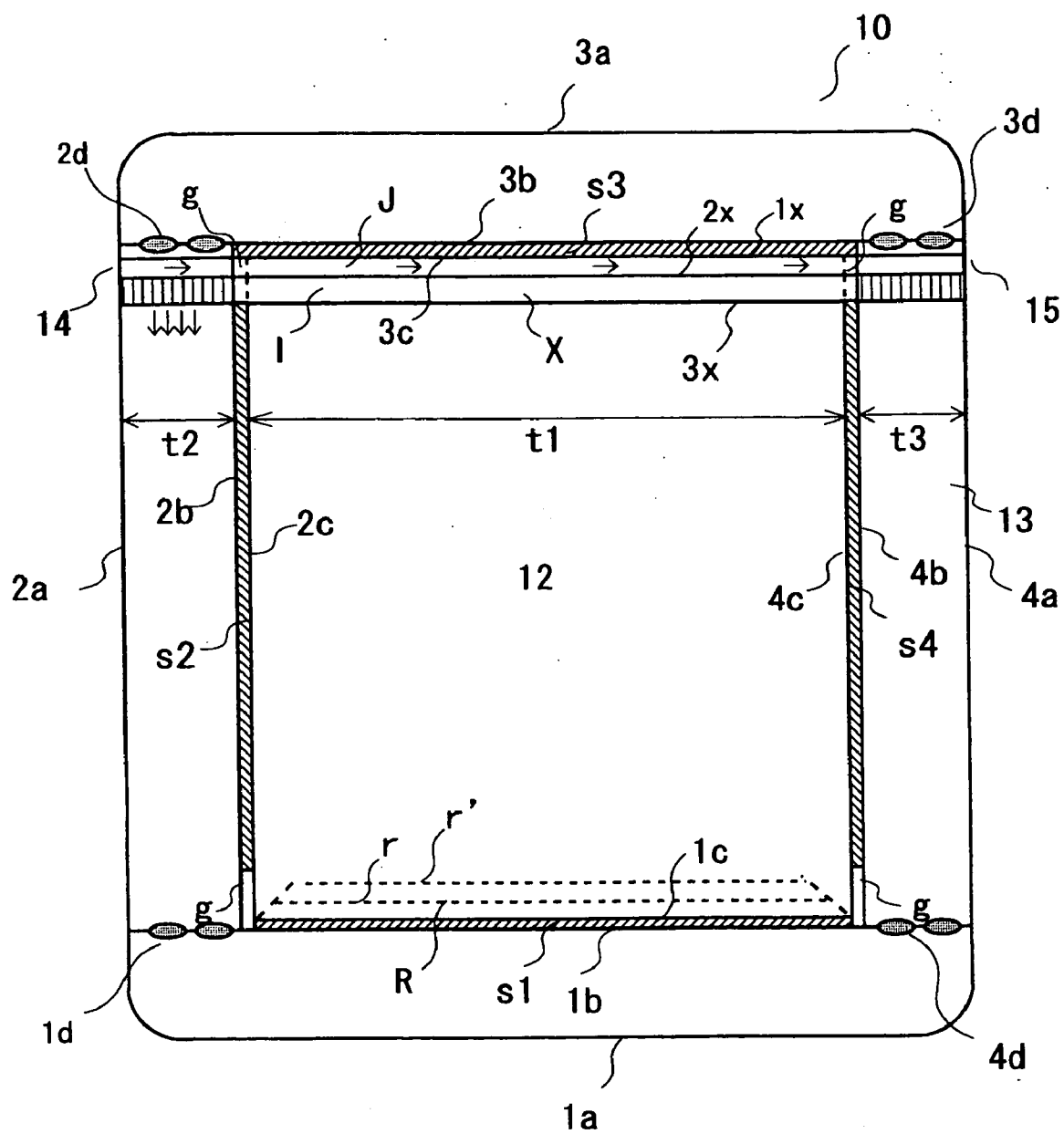


Fig. 2

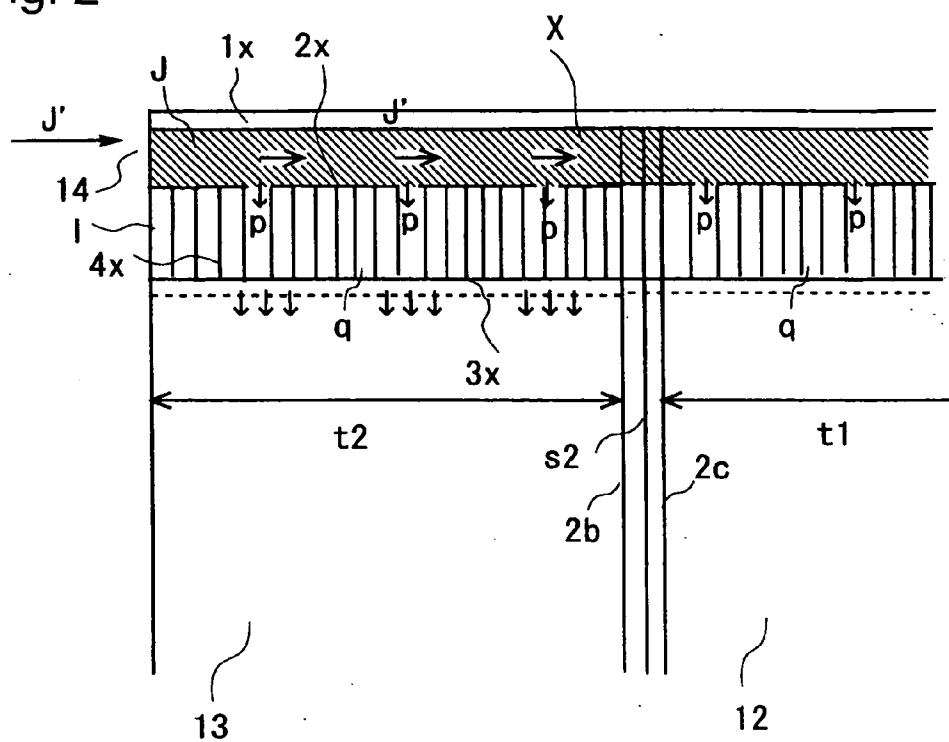


Fig. 3

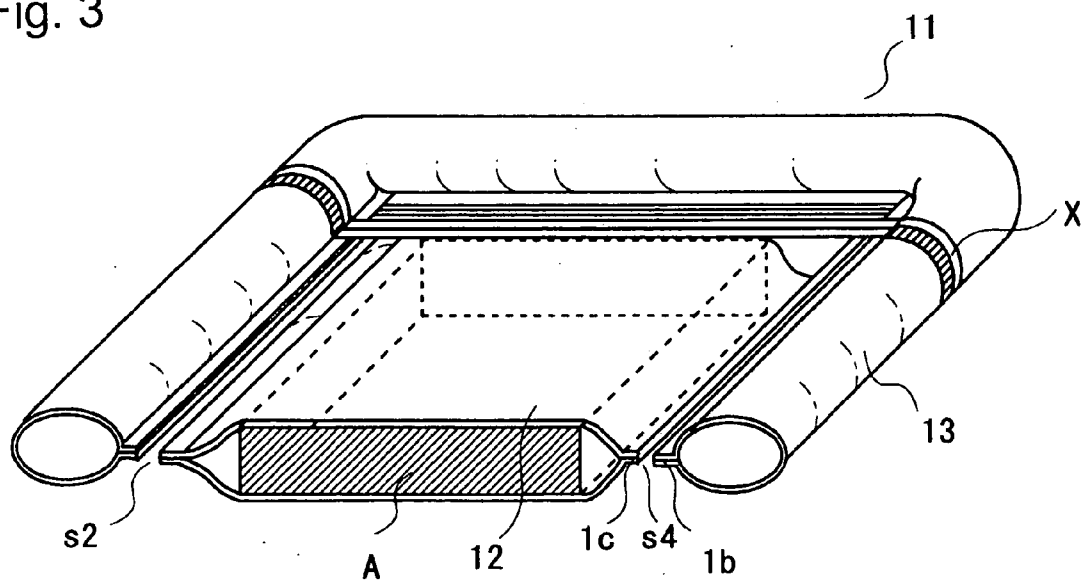
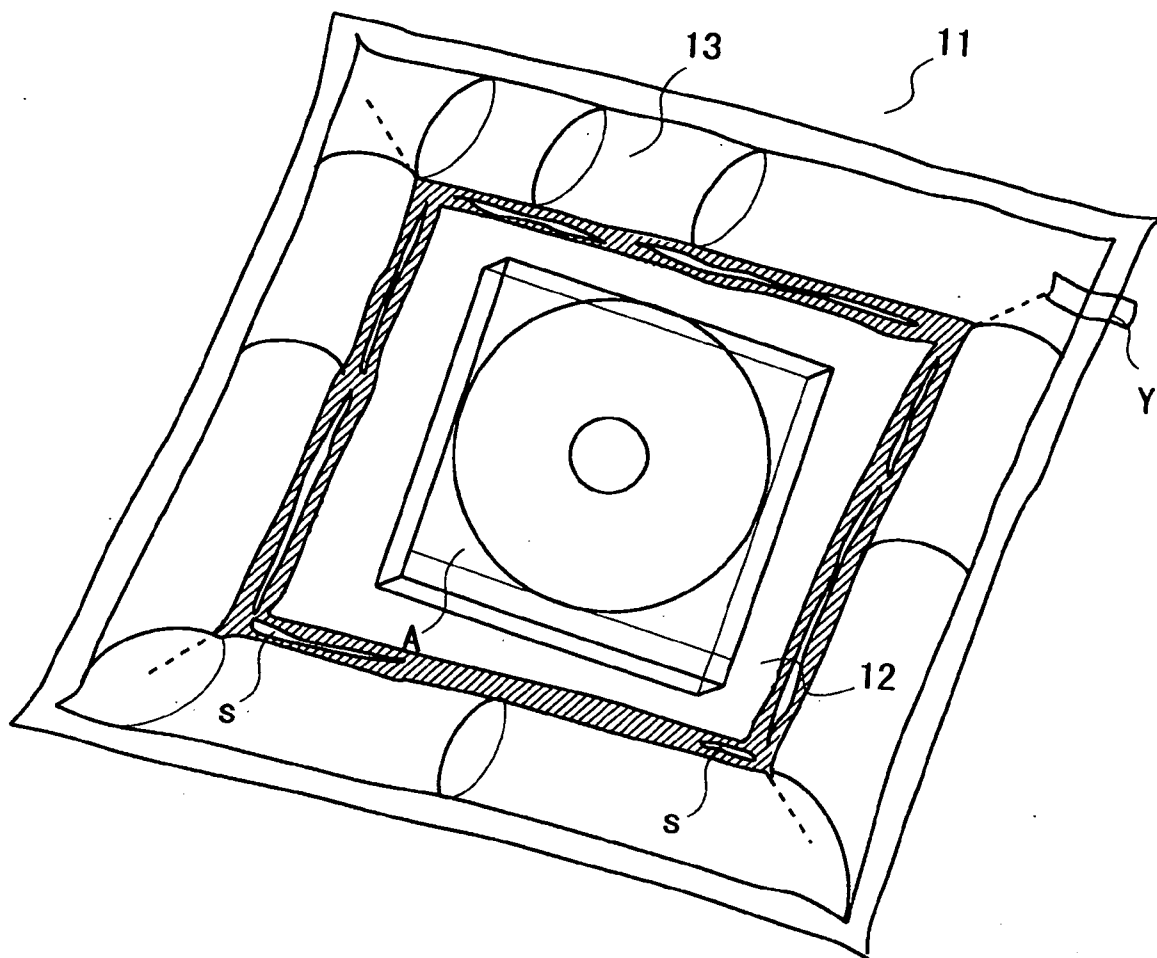


Fig. 4



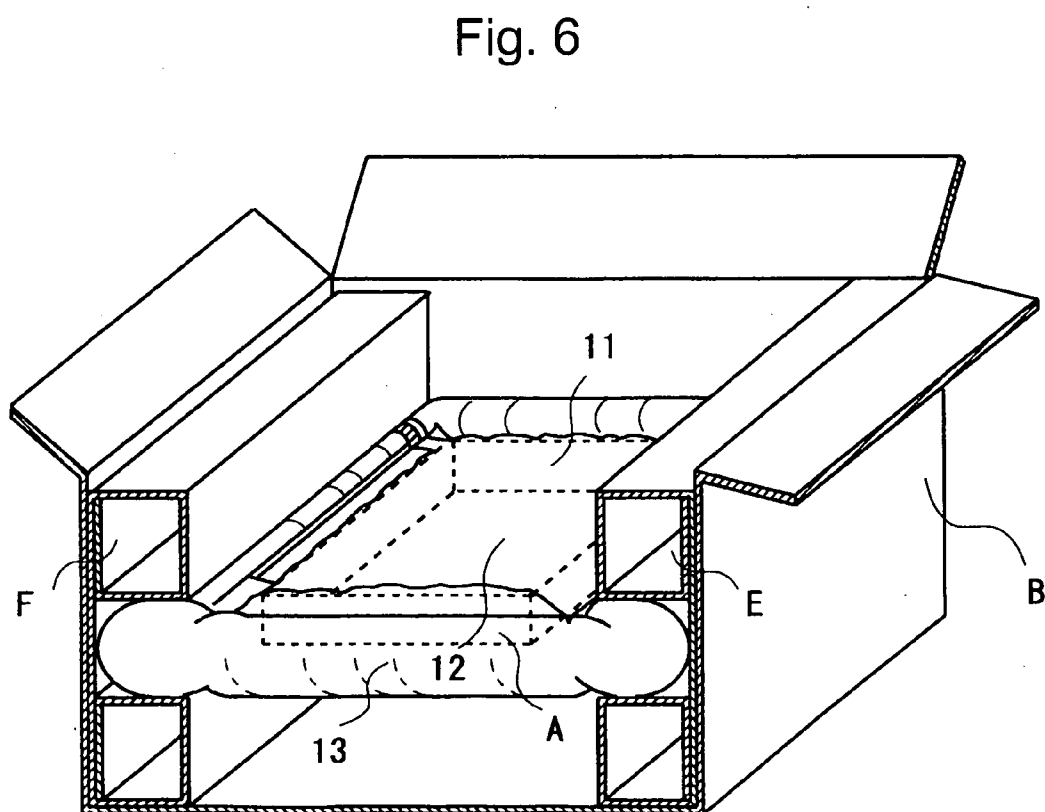
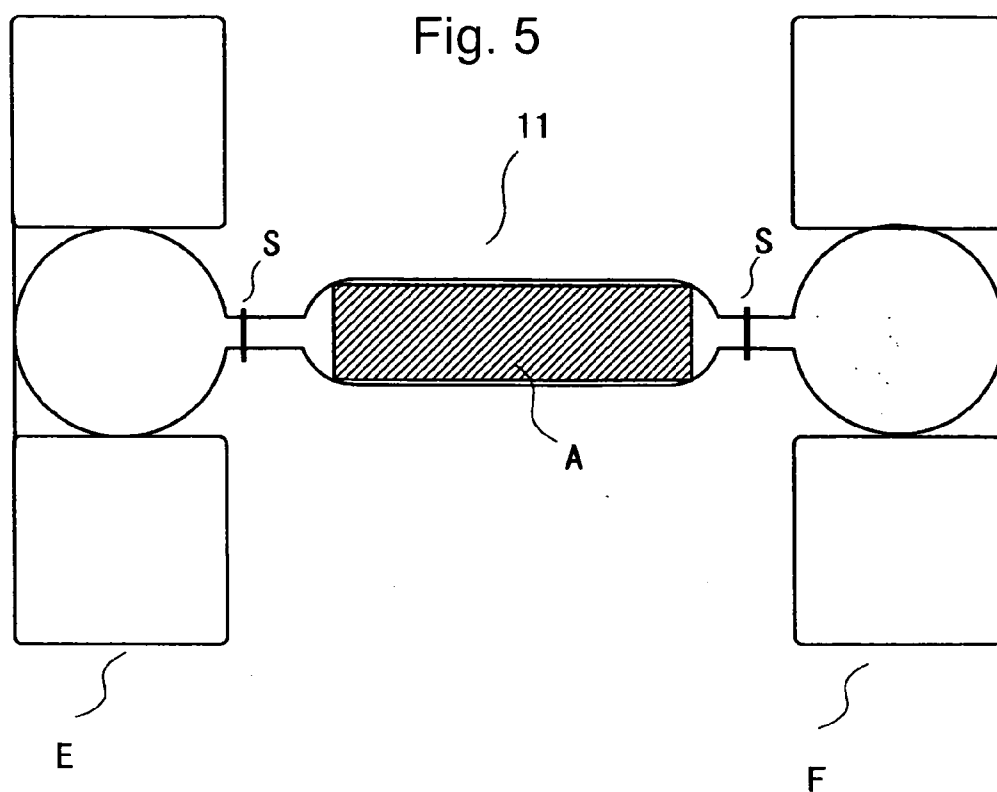


Fig. 7

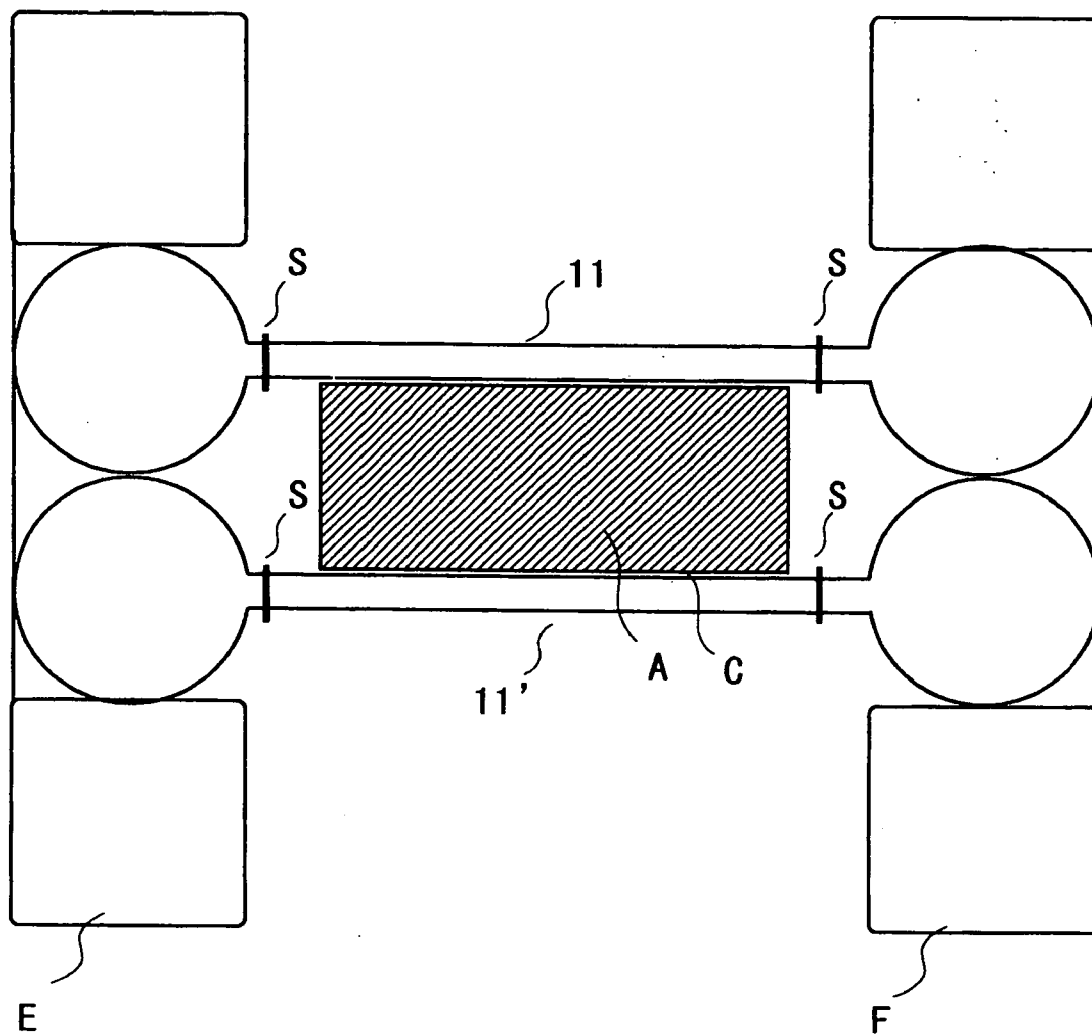


Fig. 8

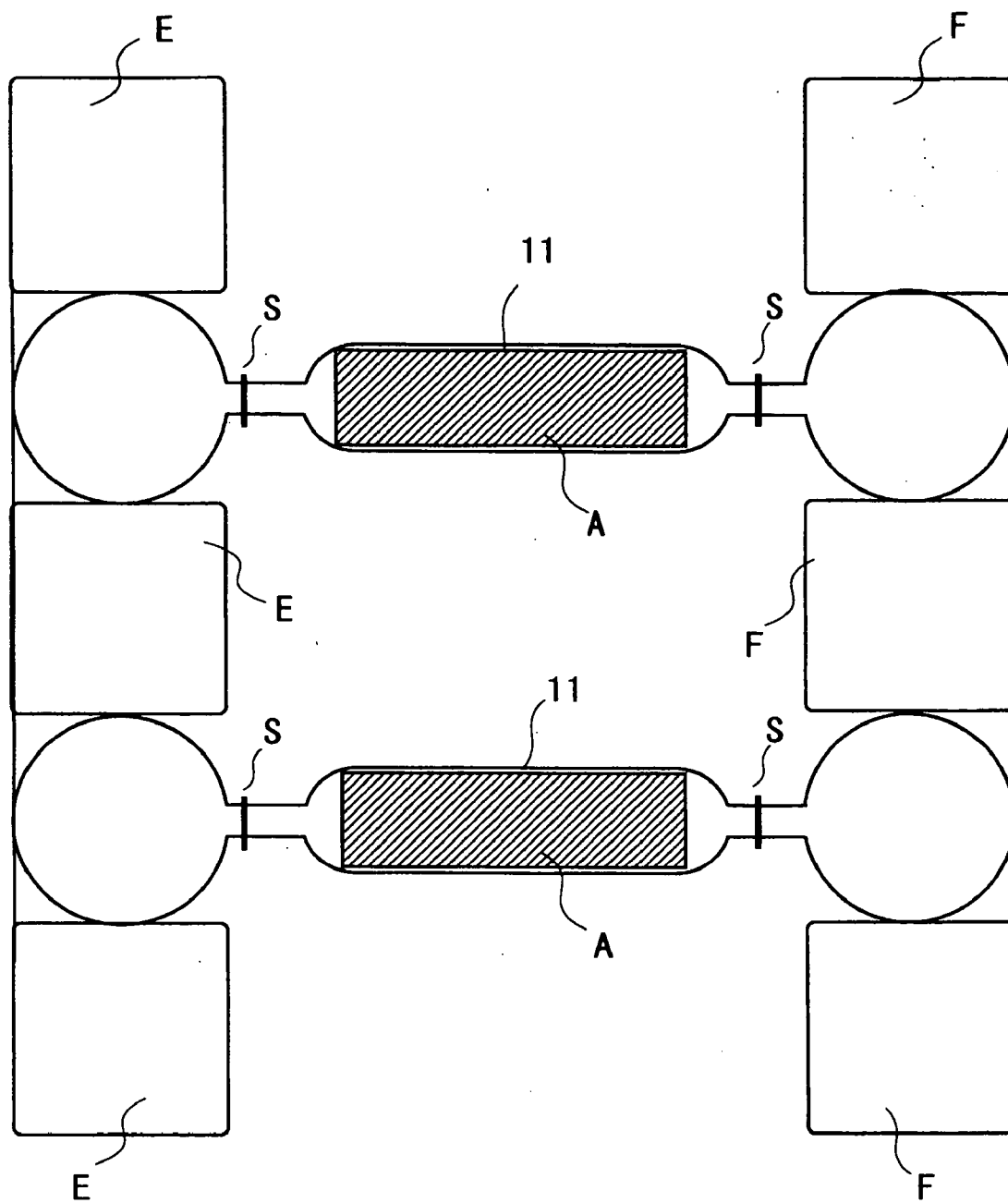


Fig. 9

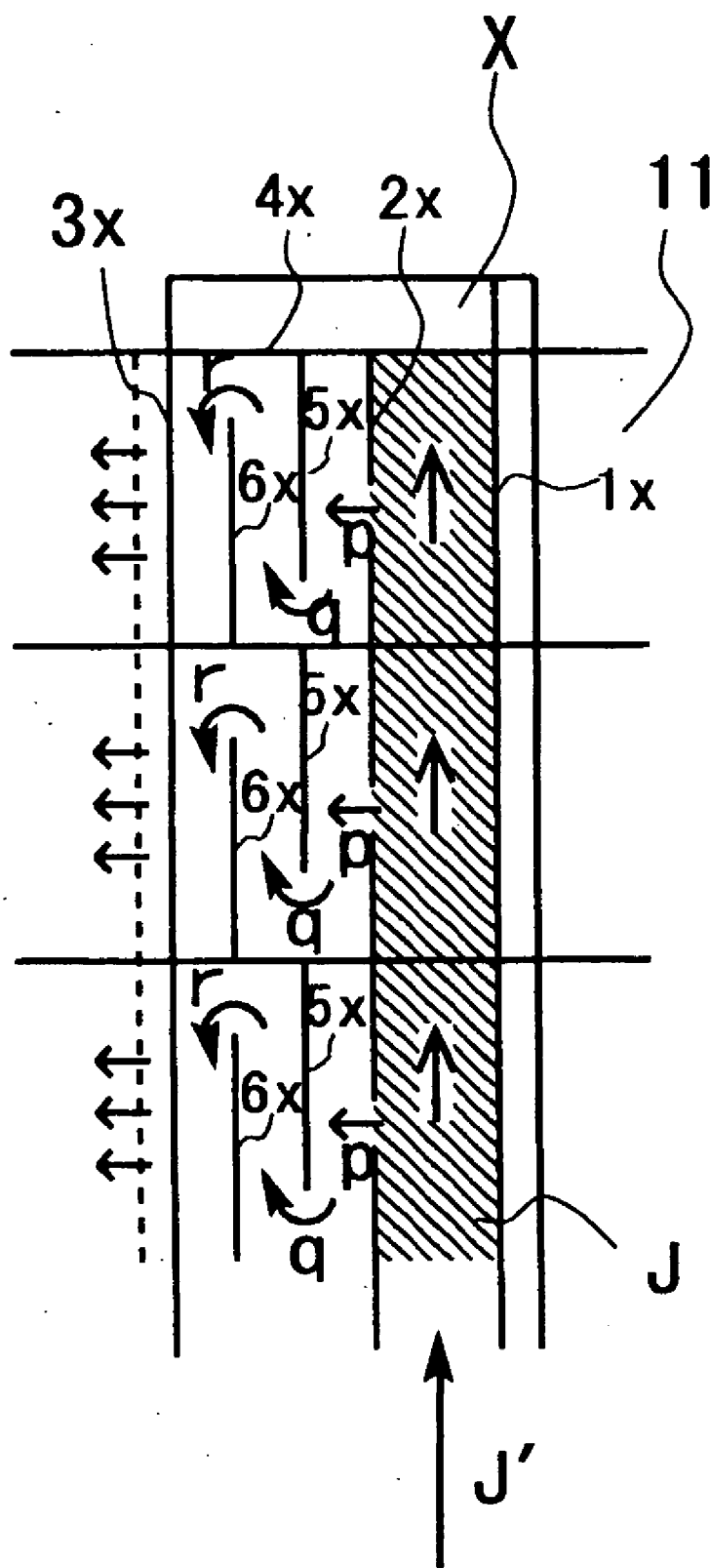
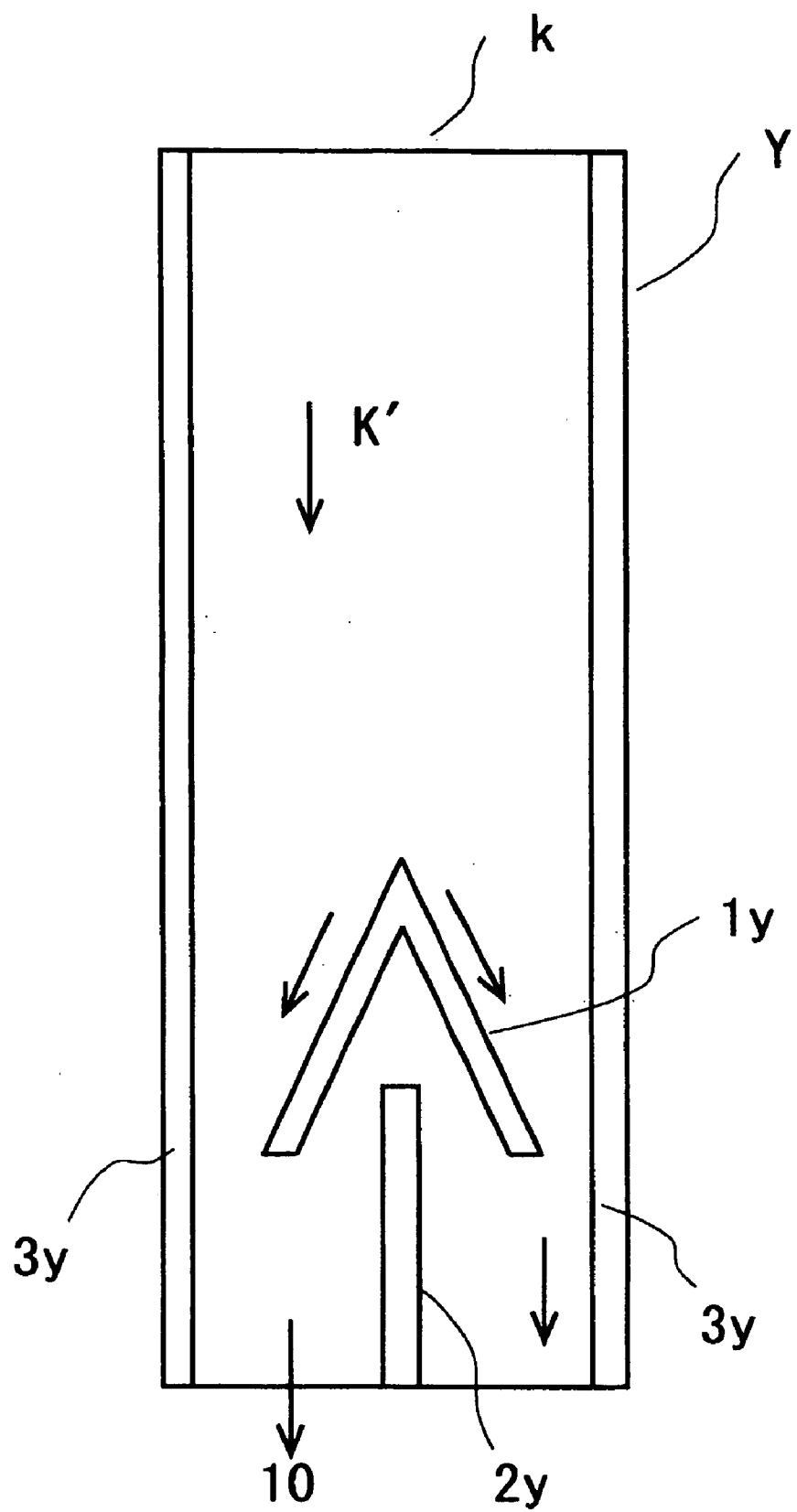


Fig. 10



CUSHION MATERIAL FOR PACKAGING PRODUCT THEREIN AND SUSPENSION AIR-PACKING METHOD USING SAME

FIELD OF THE INVENTION

[0001] The present invention relates to a cushion material for packing a product by using air as a buffer against shocks or other impacts and a suspension air-packing method that uses the cushion material for the product to be protected.

BACKGROUND OF THE INVENTION

[0002] Traditionally, cushion materials based on form plastic such as foaming polystyrene have been used as a shock absorber during the physical distribution of consumer products such as electronic devices, personal computers, precision instruments, ceramic ware and the like. Recently, however, there has been an increase in the usage of paper-based cushion material since the foam plastic increases the environmental load.

[0003] For example, Japanese Laid-Open Publication No. 7-315366 discloses such a paper-based cushion material. In this patent publication, a main body of the cushion material and a reinforced wall that will be established therein are formed in a developed shape (flat plate manner) from one piece of corrugated board. The main body of the cushion material is to create a base structure shaped like a rectangular case, and a part for fitting the product therein is formed by reverse folding a front wall and a top wall of the base structure.

[0004] Further, in order to strengthen the base structure, support members that are split into two and pushed up in a rhombus cone shape in the direction of the part for fitting the product therein are established by reverse folding against a folded angle between the bottom wall and the back wall. A V-shaped apex formed by another inverse folding at the top end of the two support members is formed, and the reinforced wall is established with an L-shaped folded column held between the column of the part for fitting the product therein and the V-shaped apex.

[0005] In other words, in the invention disclosed by this patent publication, the packing structure can be assembled from one developed shape of the cushion material, thus, the cushion materials can be piled on one another in the developed state for shipping. Further, different materials are not required during the assembly process since the cushion material can be assembled from one piece of corrugated board.

[0006] However, in the cushion material disclosed by the patent publication, since the holders and the support members are respectively formed by one piece of the corrugated board, the durability of the protruding piece for supporting the product to be packaged and the durability of the two sides of the holders for supporting the support members are low. Thus, once these portions are suffered from an impact, deformation or damage will occur on the cushion material, which significantly lowers the resistance to another impact. Further, there is another problem where other products cannot be accommodated since there is a limit to the size and shape of the product that can be packaged.

[0007] Another example is disclosed by Japanese Laid-Open Publication No. 2002-087472. In this patent publica-

tion, the cushion material is established with a holder formed to contact the periphery of the product to be protected and a support member joined to the holder in a cross-like manner and formed to hold the product to be packaged. Further, a reinforcing means for resisting any external forces is established at least in one of the holder or the support member.

[0008] Because of this structure having the reinforcing means, the durability of the cushion material is increased, thus even if there are repeated impacts, deformation and damage to the cushion material will be prevented and thus, the resistance to impacts is improved.

[0009] In the invention disclosed by the above noted patent publications, the cushion material is made of paper, hence there is an advantage of easily being burned or scrapped. However, there are disadvantages in that the manufacturing process is complicated, a relatively large space is required for storing the cushion materials, and disposal of the cushion material is not easy.

[0010] Therefore, there is a need of a new cushion material and method for packing a product by taking the above problems involved in the conventional technology into consideration.

SUMMARY OF THE INVENTION

[0011] It is, therefore, an object of the present invention to provide a cushion material for packing a product therein which is capable of being used repeatedly while absorbing large shocks and impacts.

[0012] It is another object of the present invention to provide a cushion material for packing various products of different shapes and sizes where the cushion material is easy to manufacture and use.

[0013] It is a further object of the present invention to provide a suspension air-packing method in which a product to be protected is packed by the cushion material in a mid-hanging manner.

[0014] To achieve the above objectives, the cushion material of the present invention has features as follows:

[0015] The cushion material of the present invention holds the object to be packaged in the mid-air by at least two flexible films that face one another, where the flexible films overlap with one another and the edges are heat-sealed to create a bag portion for holding the object to be packaged as well as a cushion portion which will be filled with compressed air that is established around the edges of the bag portion, where a slit is formed on a sealed portion between the bag portion and the cushion portion.

[0016] Further, the above noted cushion material of the present invention is comprised of an opening for inserting the object to be packed therethrough at least one side of the bag portion. Further, in the above noted cushion material of the present invention, the bag portion is provided with a notch on one of the films near the opening for inserting the object to be packaged. Further, the above noted cushion material of the present invention further includes at least one air opening for injecting the air therethrough.

[0017] Further, in the above noted cushion material of the present invention, the opening for injecting the air therethrough prevents the injected air from reverse flowing by

having a check valve comprising a labyrinth construction or a narrow pathway. Further, in the above noted cushion material of the present invention, the opening for injecting the air therethrough prevents the injected air from reverse flowing by having a check valve.

[0018] Further, in the above noted cushion material of the present invention, the opening for injecting the air therethrough passes through a main body of the cushion material. Further, in the above noted cushion material of the present invention, a sealing portion is formed on each of the corners of the cushion portion through a heat-sealing treatment.

[0019] The suspension air-packing method of the present invention for the object to be protected holds the object in the mid-air by using the cushion material formed of at least two flexible films facing one another, where the flexible films overlap with one another and the edges are heat-sealed to create a bag portion for holding the object to be packaged as well as a cushion portion which will be filled with compressed air that is established around the edges of the bag portion, where a slit is formed on a sealed portion between the bag portion and the cushion portion.

[0020] Further, the suspension air-packing method for holding the object in the mid-air uses the cushion material having the features defined in the foregoing. Further, in the suspension air-packing method for holding the object in the mid-air, the cushion material is installed in a container box. Further, in the suspension air-packing method for holding the object in the mid-air, the inner walls of the container box is provided with one or more support members, where the cushion portion of the cushion material is inserted therethrough.

[0021] According to the cushion material and the suspension air packing method using the cushion material of the present invention, the product to be protected such as a precision instrument, a recording medium, a laptop compute, etc. is packed in the mid-air in a stable manner. The cushion material and suspension air packing method of the present invention can effectively absorb the shocks and vibrations applied to the product during the product distribution process by flexibly hanging the bag portion in the mid-air and inflating the cushion material by the compressed air. A large number of the cushion materials of the present invention can be piled on one another without being inflated by the air and easily stored in a relatively small storage space and easily transported at low cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] FIG. 1 is a plan view showing a structure of a base of the cushion material related to the embodiment of the present invention.

[0023] FIG. 2 is a plan view showing an enlarged view of the structure of the cushion material in the area of the sheet material X in accordance with the present invention.

[0024] FIG. 3 is a cross sectional perspective view showing the condition after the air has been injected into the cushion material of the present invention where the product is packed in the bag portion.

[0025] FIG. 4 is a perspective view showing the condition after the air has been injected into the cushion material of the present invention where the product is packed in the bag portion.

[0026] FIG. 5 is a cross-sectional view showing the basic structure of the cushion material of the present invention when packing the product where the cushion material is fitted between support members.

[0027] FIG. 6 is a perspective view showing the overall structure of the cushion material of the present invention when packing the product where the cushion material is fitted between the support members and installed in a container box.

[0028] FIG. 7 is a cross-sectional view showing another example of basic structure of the two cushion materials of the present invention when packing the product between the two cushion materials where the cushion materials are fitted between the support members.

[0029] FIG. 8 is a cross-sectional view showing a further example of basic structure of the two cushion materials of the present invention each packing a product in the bag portion thereof where the cushion materials are fitted between support members.

[0030] FIG. 9 is a schematic diagram showing an example of structure of the check valve and the air flows therein in another embodiment of the present invention.

[0031] FIG. 10 is a schematic diagram showing an example of structure of the check valve in a further embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0032] The embodiments of the cushion material related to the present invention will be explained below with reference to the accompanying drawings. FIG. 1 is a plan view showing a structure of the cushion material 10 of the present invention.

[0033] The cushion material 10 is comprised of a cushion material main body 11 which is formed with two flexible thermoplastic films (sheets) of the same shape and size that overlap with one another where the required parts are heat-sealed, and a sheet material X which is provided between the two thermoplastic films of the cushion material main body 11 to function as a check valve. The sheet material X also functions as an opening for injecting the air.

[0034] The cushion material main body 11 of the present embodiment is configured by a bag portion 12 for holding an object to be packaged therein, and a cushion portion 13 that will be inflated when it is injected with compressed air and established around the edges of the bag portion 12 (also shown in FIGS. 3 and 4). The bag portion is formed at an inner area of the two thermoplastic films for holding the object to be packaged therein, and the cushion portion is established around the bag portion at an outer area of the two thermoplastic films. The two thermoplastic films of the cushion material main body 11 are heat-sealed at the border area between the bag portion 12 and the cushion portion 13 as indicated by hatches in FIG. 4.

[0035] Further, slits s1-s4 are established between the bag portion 12 and the cushion portion 13 on the border areas where the two thermoplastic films are heat-sealed. The slits s1-s4 are provided for achieving increased flexibility when hanging the bag portion 12 having a product therein in the mid-air when the air is injected inside to inflate the cushion portion 13.

[0036] The sheet material X achieves the effect of a check valve, and is structured by overlapping two thermoplastic films that are thin and flexible and made of, for example, polyethylene. Although two thermoplastic films are typically used, it is also possible to use a single sheet of sheet material X as a check valve.

[0037] FIG. 2 is an enlarged view showing the structure of the cushion material in the area around the sheet material X, where the sheet material X is attached to the two thermoplastic films of the cushion material main body 11 at the heat-sealed portions 1x and 2x. FIG. 2 also shows partitions 4x for forming air paths q for allowing the air to flow therethrough. Further, on an air supply path J shown with hatch lines in FIG. 2, a separation process (ex. using high resistant paint) is applied on the entire inner surfaces of the sheet material X so that the thermoplastic films will not be heat-sealed, thereby creating an air passage. The partitions 4x form the air flow paths q in the sheet material X as noted above so that the sheet material X can function as a check valve.

[0038] With reference to FIGS. 1 and 2, the cushion material main body 11 of the present embodiment is formed by heat-sealing the edges 1a-4a and sealing portions 1b-4b and 1c-4c provided on either sides of the slits s1-s4 of the two thermoplastic films of the same size and shape overlapped with one another.

[0039] In the present embodiment, the sealing portions 1x-3x and the partitions 4x of the sheet material X are bonded to one of the thermoplastic films of the cushion material main body 11 in advance, then the above mentioned edges 1a-4a and the sealing portions 1b-4b and 1c-4c are heat-sealed to form the cushion material main body 11. Further, the sealing portion 3x is heat-sealed only at an area shown by a label t1 in FIG. 1 which crosses the bag portion 12.

[0040] As explained above, by establishing the sheet material X on one of the thermoplastic films in advance and then overlapping and heat-sealing the two thermoplastic films together, the sealing process can be done easily, thereby forming the cushion material main body 11 easily and efficiently.

[0041] In the example of FIG. 1, the sheet material X is established by extending through the cushion portion 13 and the bag portion 12, however, the cushion material of the present invention is not limited to this structure. For example, the sheet material X can be provided only on the cushion portion 13. Further, for example, the sheet material X can be provided so that it extends to the cushion portion 13, the bag portion 12, and the slit s3.

[0042] On the cushion material 10 of the present invention, corner sealing portions 1d-4d can be preferably formed on the respective corners of the cushion portion 13. The corner sealing portions 1d-4d, as shown in FIG. 1, can be created at locations determined by extending the line of either the sealing portions 1b-4b and crossing the direction perpendicular to the longitudinal direction of the cushion portion 13, or locations determined by each line that connects the apices of cushion portion 13 and the apices of the cushion material main body 11.

[0043] As shown in FIG. 2, the two thermoplastic films at the corner sealing portions 1d-4d are heat-sealed so that a

partially sealed part and a partially unsealed part p are alternately established thereon, allowing the air to flow therethrough. Similarly, the sealing portions 2x of the sheet material X are also established with appropriate partially unsealed parts p on the cushion portion 13 of the cushion material main body 11 so that the air can flow therethrough.

[0044] In this embodiment, each of the flexible films constructing the cushion material 10 is formed by laminating two thermoplastic films made of, for example, polyethylene or polypropylene with a reinforcing film which is made of, for example, nylon, fluorocarbon resin or silicon between the two thermoplastic films. By doing so, both outer surfaces of the base of the cushion material 10 can be sealed by heat, allowing the cushion material main body 11 to become more easily a three-dimensional shape. It is also possible to configure each of the thermoplastic films of the cushion material 10 by laminating a single thermoplastic film with a reinforcing film such as a one made of nylon. Further, the reinforcing film can be a metallic film such as a one made of aluminum.

[0045] In the manufacturing process of the cushion material 10 of the present invention, the sheet material X is inserted between the two thermoplastic films constituting the cushion material main body 11, where a heat-seal inhibitor such as heat resistant ink or peeling agent is either painted or printed in advance on inner surfaces of the thermoplastic films so as not to be heat-sealed. After applying the heat-seal process, since the cushion material main body 11 having partially unsealed portions p can be formed easily while the edge portions 1a-4a, the sealing portions 1b-4b and 1c-4c, the corner sealing portions 1d-4d, the sealing portions 1x-2x, and partitions 4x are created at the same time.

[0046] The cushion material in the present invention is provided with an opening R for an object (product) to be inserted therethrough by cutting one end of the bag portion 12 of the cushion material main body 11 as shown in FIG. 1 (cutting portion r shown in FIG. 1), and also formed with the slits s1-s4 by cutting the heat-sealed thermoplastic films at the locations represented by labels s1-s4 in FIG. 1, to achieve a structure shown in FIG. 3.

[0047] As a result, the cushion material of the present invention can be manufactured by only cutting and heat-sealing the predetermined locations of the thermoplastic films, thereby allowing an automatic production of a large volume of cushion materials. Thus, the cushioning materials for holding products such as DVDs, computers, precision instruments, recording mediums, etc., in a stable manner can be provided at extremely low cost.

[0048] In the cushion material 10 shown in FIG. 1, each of the slits s1-s4 is constituted by a single continuous cut, however, the slits are not limited to this structure, and can be a plurality of shorter slits.

[0049] Further, the cutting portion r for forming the opening R of the bag portion 12 for the object to be inserted therethrough is preferably established without extending to the sealing portions 2c and 4c. Further, on the opening R of the bag portion 12, an end of one of the thermoplastic films at the opening R is further cut off as shown by a label r" in FIG. 1 so that there is a difference in position between the two ends of the top and bottom thermoplastic films, thereby allowing easy insertion of the product A (FIGS. 2 and 3) to be packaged.

[0050] Next, the way of using the cushion material and the effects thereof will be explained. The check valve configured by the sheet material X functions as an air opening for injecting the compressed air. An air injecting tube (ex. connected to an air compressor) is inserted into the air injecting point 14 or 15 on the air supply path J in the direction shown as J' in FIG. 2. As noted above, the air supply path J is created by applying a heat resistant paint or other peeling agent on the entire opening area of the sheet material X so that the thermoplastic films are not heat-sealed at the opening area. When the compressed air is injected from the injecting tube, the air passes from the air supply path J through the partially unsealed portions p as well as the flow paths q, and lastly passes through the cushion portion 13 of the cushion material main body 11 from the end 3x of the sheet material X which crosses the cushion portion 13.

[0051] In other words, in FIG. 1, the compressed air supplied from the air injecting point 14 flows into the cushion portion 13 from the location represented by a label t2 of the end 3x of the sheet material X. The air further passes through each unsealed portion of the corner sealing portions 1d, 4d, 3d, and 2d to inflate the entire cushion portion 13. After sufficiently inflating the cushion portion 13, the air flow paths in the sheet material X will be closed due to the internal pressure produced by the compressed air, hence preventing the reverse flow of the air.

[0052] FIG. 3 is a cross sectional perspective view showing the condition after the compressed air has been injected into the cushion material of the present invention where the product A is packed in the bag portion 12. In the sheet material X, the end 3x (sealing portion) that crosses the bag portion 12 (represented by label t1 in FIG. 1) is heat-sealed, thus the air passing through the air supply path J will not flow therethrough, and will only flow into the portions that cross the cushion portion 13, thereby inflating the cushion portion 13.

[0053] When injecting the compressed air into the cushion portion 13, the air can be injected through both the air injecting points 14 and 15, where the air will flow from the end 3x of the sheet material X into the cushion portion 13 in the areas represented by a label t3 in FIG. 1 and a label t2 in FIG. 2.

[0054] As shown in FIG. 3, when the air is supplied into the cushion material main body 11 of the present invention, the cushion portion 13 will inflate and at the same time, the slits s1-s4 will be expanded because of the cuts provided in the heat-sealed portions g (FIG. 1) between the bag portion 12 and the cushion portion 13. Therefore, the bag portion 12 will be pulled towards the cushion portion 13 through the heat-sealed portions g so that the bag portion 12 will be suspended in the air with high flexibility.

[0055] The product A is inserted through the opening R formed by cutting the one end of the bag portion 12, and held therein between the two thermoplastic films. As noted above, by supplying the air to the cushion portion 13, the bag portion 12 will be pulled towards the cushion portion 13, thereby closing the bag portion 12 as well as the opening R thereof to prevent the product A in the bag portion 12 from falling out. Further, since the bag portion 12 is partially separated from the cushion portion 13 due to the slits s1-s4, any shocks or impacts that come from the outside will be absorbed or dumped down before reaching the bag portion 12 and the product A.

[0056] As explained above, by forming the difference in the length between the ends r and r' of the opening R where one end of the thermoplastic film at the opening R is further cut so that it is uneven with the other end, the thermoplastic films will not stick to one another, which enabling to easily insert the product A in the bag portion 12 through the opening R.

[0057] In FIG. 2, the partitions 4x are established at small intervals over the entire air supply path J which is the path where the air initially flows through and prevents the air from flowing in the reverse direction. However, the structure for the prevention of the reverse flow of the air is not limited to this particular structure. For example, as shown in FIG. 9, a labyrinth (air flow maze) structure forming the small air flow paths q and r formed by partially heat-sealed portions 5x and 6x established in a direction parallel with the air flow direction J' can also prevent the air from the reverse flow.

[0058] Further, a check valve Y functioning as an opening for injecting the air can be established instead of the sheet material X as a means to prevent the injected air from reverse flowing. FIG. 10 is a schematic diagram of the check valve Y in another embodiment. The check valve Y is composed of two rectangular thermoplastic films such as polyethylene films that overlap with one another where a seal inhibiting layer is formed therebetween. The air flows in the K' direction of the cushion material main body 11 from the opening and into the cushion material main body 11. The check valve Y has a structure for preventing the air from flowing in the reverse direction. This type of thermoplastic film check valve is publicly known and is disclosed, for example, by Japanese patent laid-open publication No. 07-10159, thus the explanation of which is omitted.

[0059] Even in the case where the sealing portions are formed across the corners of the cushion portion 13, since the partially sealed portions and the partially unsealed portions p are alternately established on the corner sealing portions 1d-4d, the air supplied to the inside of the cushion material main body 11 through the partially unsealed portions of the corner sealing portions 1d-4d securely inflates the entire cushion portion 13.

[0060] FIG. 4 is a perspective view showing the condition where the air is supplied to the inside of the cushion portion 13 of the cushion material main body 11 in the present invention. In this condition, as shown in FIG. 1, by forming the corner sealing portions 1d-4d on the cushion portion 13, the corners of the cushion portion 13 can be prevented from rising higher than the sides thereof when the cushion portion 13 is inflated by the air supplied from the air injecting point 14 or 15. As a consequence, the bottom surface of the cushion portion 13 will contact with a flat surface of the support member with a relatively large contact area, thereby allowing the product A to be packaged is set within the bag portion 12 in a stable manner.

[0061] In the case where the corner sealing portions 1d-4d are established at locations on the transversal direction of the cushion portion 13 which is the same direction of the sealing portions 1b-4b, the cushion portion 13 can be bent along the sealing portions 1b-4b, thereby achieving a high degree of freedom on the cushion portion 13, which makes the use of the cushion material 10 much easier.

[0062] The cushion material main body 11 shown in FIG. 4 includes the check valve Y illustrated in FIG. 10 func-

tioning as an opening. However, the check valve that can be used in the cushion material main body **11** is not limited to this structure, and for example, the sheet material X shown in FIG. 1 can be used instead. Further, in the cushion material main body **11** shown in FIG. 4, the separate slits are provided between the bag portion **12** and cushion portion **13**. However, each of the slits can be formed by a single cut at each boundary between the bag portion **12** and cushion portion **13** as shown in FIG. 1.

[0063] Further, on the cushion material **10** shown in FIG. 1, the corners of the thermoplastic films are rounded, however, as shown FIG. 4, the rectangular thermoplastic films (sheets) with sharp corners can be used as well.

[0064] In the actual use, as shown in FIG. 6, the cushion material main body **11** of the present invention is installed in a container box B while holding the object A to be packaged inside the bag portion **12**. In this situation, a pair of two support members E and F shown in FIGS. 5 and 6 are provided in the container box B. Each pair of support members E and F contact with an inner side surface of the container box B, and the cushion portion **13** of the cushion material is fitted in the space between the support members E and F.

[0065] These support members, as shown in FIGS. 5 and 6, can be provided as two separate pair of the support members, or as one integral support member connected at the bottom of the container box B.

[0066] FIG. 6 is a cross sectional perspective view showing how the cushion material of the present invention is fitted between the support members E and F within the container box B. When the cushion portion **13** is fitted between the support members E and F, the bag portion **12** is suspended in the mid-air, thereby enabling to absorb the shocks or impacts when the cushion material main body **11** inside the container box B receives any impacts.

[0067] For this reason, the suspension air-packing method using the cushion material main body **11** of the present invention can securely protect the product such as precision instruments, computers, recording mediums, etc., packed inside the container box B from damages caused by shocks and impacts, and thus can be safely transferred and stored during the production distribution process.

[0068] By establishing the corner sealing portions **1d-4d** on the corners of the cushion portion **13** and preventing the corners from rising too high when the air is injected, the cushion portion **13** can be securely mounted between the support members E and F, thereby maintaining a stable packaging condition inside the container box B.

[0069] Further, as another embodiment for using the cushion material of the present invention, two or more cushioning material main bodies **11** can be used in a container box in combination with the support member E and F. The product A can be inserted and stored between the cushion material main bodies **11** as shown in FIG. 7. Namely, FIG. 7 is a schematic cross sectional view showing an example of way for using the two cushion material main bodies **11** in an overlapping manner which are fitted between the support members E and F within the container box. The product A is supported between the two bag portions of the cushion material main bodies **11**.

[0070] In this case, the two cushion material bodies **11** may preferably be bonded together by heat-sealing the respective sealing portions **1a-4a**, **1b-4b**, and **1c-4c** when overlapped with one another. Then, each cushion portion **13** is injected with the compressed air and fitted between corresponding spaces of the support members E and F. In this example, the product A to be packaged is not inserted in the bag portion **12**, and instead, it is inserted through the space C created between the two cushion material main bodies **11** and **11'**. Therefore, by holding the product A between the two cushion material main bodies **11** rather than holding the product in the bag portion **12**, a relatively heavy object can be held in a stable manner and transferred.

[0071] FIG. 8 is a schematic cross sectional view showing a further example of using a plurality of the support members E and F and a plurality of cushion material main bodies **11** within the container box B. Each cushion material main body **11** is fitted in the corresponding support members E and F. Therefore, two or more products A can be packaged in one container box B where each product A is inserted in the bag portion **12** of the cushion material main body **11**.

[0072] Further, in the case where the product A is light in weight, multiple cushion material bodies **11** stacked one another can be used in the container box B without using the support members where each product A is packed in the bag portion **12** of the cushion material main body **11**.

[0073] Further, the cushion material **10** of the present invention can be used by itself as a final form. In other words, the cushion material **10** can be transferred and stored in the condition where the object A is held inside the bag portion **12**, without storing the cushion material main body **11** in the container box B.

[0074] As has been described above, according to the cushion material and the suspension air packing method using the cushion material of the present invention, the product to be protected such as a precision instrument, a recording medium, a laptop compute, etc. is packed in the mid-air in a stable manner. The cushion material and suspension air packing method of the present invention can effectively absorb the shocks and vibrations applied to the product during the product distribution process by flexibly hanging the bag portion in the mid-air and inflating the cushion material by the compressed air. A large number of the cushion materials of the present invention can be piled on one another without being inflated by the air and easily stored in a relatively small storage space and easily transported at low cost.

[0075] Although the invention is described herein with reference to the preferred embodiment, one skilled in the art will readily appreciate that various modifications and variations may be made without departing from the spirit and scope of the present invention. Such modifications and variations are considered to be within the purview and scope of the appended claims and their equivalents.

What is claimed is:

1. A cushion material for holding an object to be packaged in a mid-air suspension manner, comprising:

two thermoplastic films overlapped with one another where edges thereof are heat-sealed;

- a bag portion formed at an inner area of said two thermoplastic films for holding the object to be packaged therein;
 - a cushion portion that is established around said bag portion at an outer area of the two thermoplastic films, said cushion portion will be filled with compressed air; and
 - a sealed portion established at a boundary area between the bag portion and the cushion portion where a slit is formed the sealed portion to increase flexibility of the bag portion.
2. A cushion material as defined in claim 1, further comprising an opening for inserting the object to be packed there through at least one side of said bag portion.
3. A cushion material as defined in claim 2, wherein said bag portion is provided with a cut off on one of the thermoplastic films near the opening for inserting the object to be packaged.
4. A cushion material as defined in claim 1, further comprising an air opening for injecting the air therethrough.
5. A cushion material as defined in claim 4, wherein said air opening for injecting the air therethrough prevents the injected air from reverse flowing by a labyrinth construction or a narrow pathway.
6. A cushion material as defined in claim 4, wherein said air opening for injecting the air therethrough prevents the injected air from reverse flowing by having a check valve.
7. A cushion material as defined in claim 4, wherein said air opening for injecting the air therethrough extends through a main body of the cushion material.
8. A cushion material as defined in claim 1, wherein a sealing portion is formed on each corner of the cushion portion through a heat-sealing treatment.
9. A suspension air-packing method for holding an object to be packaged in a mid-air suspension manner, comprising the steps of:
- providing a cushion material formed of two thermoplastic films overlapped with one another where the cushion material includes a bag portion formed at an inner area of the two thermoplastic films, a cushion portion formed at an outer area of the two thermoplastic films, and a sealed portion established at a boundary area between the bag portion and the cushion portion;

inserting an object to be packed through an opening of the bag portion;

inflating the cushion portion by supplying compressed air; and

installing the cushion material having the object therein in a container box.

10. A suspension air-packing method as defined in claim 9, said step of installing the cushion material includes a step of fitting the cushion portion with a space created by support members within the container box.

11. A suspension air-packing method as defined in claim 9, said step of installing the cushion material includes a step of installing two or more cushion materials each packing an object in the bag portion in an overlapping manner in the container box.

12. A suspension air-packing method as defined in claim 9, said step of installing the cushion material includes a step of installing two or more cushion materials where an object to be packed is inserted between two adjacent cushion materials in the container box.

13. A suspension air-packing method as defined in claim 9, wherein said cushion material includes a sealed portion established at a boundary area between the bag portion and the cushion portion where a slit is formed the sealed portion to increase flexibility of the bag portions.

14. A suspension air-packing method as defined in claim 9, wherein said cushion material includes an air opening for injecting the air therethrough, wherein the opening prevents the injected air from reverse flowing by having a labyrinth construction or a narrow pathway.

15. A suspension air-packing method as defined in claim 9, wherein said cushion material includes an air opening for injecting the air therethrough, wherein the opening prevents the injected air from reverse flowing by having a check valve made of thermoplastic film.

16. A suspension air-packing method as defined in claim 10, wherein said support members contact inner walls of the container box where the cushion portion of the cushion material is inserted in the space of each support member.

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