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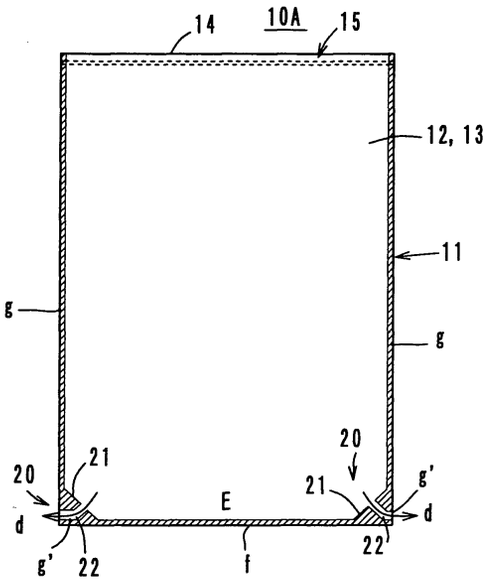
(54) COMPRESSIVE ACCOMMODATION BAG HAVING NON-RETURN VALVE FUNCT ION

(57) A compactor bag which has a substantially rectangular bag body 11 made of synthetic resin films 12 and 13, the bag body having an openable side 14 provided with a zipper 15 through which an item can be put into and taken out of the bag body 11. Check valve portions 20 are provided in right-triangular areas at both corners of a side opposite the openable side 14. Each of the check valve portions 20 has a flat and closable air release path 22 which is formed by fused portions f, g and 21 of the films 12 and 13, and air inside the bag body 11 is guided into the air release path 22 by the hypotenuse of the right-triangular area and is exhausted from the bag body 11 as indicated by arrow "d". The check valve portions 20 communicate with a packing space of the bag body 11 at the respective hypotenuses of the right-triangular areas. The check valve portions may be made of thin and soft films inserted between the films 12 and 13.

F I G. 2



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Description

Technical Field

[0001] The present invention relates to a compactor bag, and more particularly to a bag which extracts air from the inside of the bag body for compacting of clothing, bedding, etc.

Background of the Invention

[0002] There have been conventionally provided various kinds of bags with check valves which are used for compacting of clothing. For example, a compactor bag as shown by Fig. 17(A) is known. The bag has a zipper 3 on one side of a bag body 1 made of a resin film, and this side serves as an opening 2 for put-in and take-out of clothing. The bag further has a check valve 4 made of a pair of films and an air release path 5 on the opposite side of the bag body 1.

[0003] When this bag is used, clothing is put in the bag body 1, and the zipper 3 is closed. Thereafter, as Fig. 17(B) shows, as the user is rolling the bag body 1, the internal pressure of the bag body 1 rises, and air is exhausted from the bag body 1 through the check valve 4 and the air release path 5 as indicated by arrow "a". After the air exhaustion, the pressure inside the bag body 1 decreases, and the films of the check valve 4 stick together tight. Thereby, the inside of the bag body 1 can be kept airtight.

[0004] In this bag, the check valve 4 and the air release path 5 are provided on one side of the bag body in a portion with a width b, and this portion with the width b cannot be used as a space for packing. Therefore, the packing efficiency is bad.

[0005] An object of the present invention is, therefore, to provide a compactor bag with a good packing efficiency and with a good compacting efficiency.

[0006] Another object of the present invention is to provide a compactor bag which has a check valve of a simple structure and which can be produced easily.

Disclosure of the Invention

[0007] In order to attain the objects above, a compactor bag according to the present invention comprises a substantially rectangular bag body made of a synthetic resin film, the bag body having an openable side provided with a zipper through which an item can be put into and taken out of the bag body, said compactor bag comprising a check valve portion which is located in a right-triangular area on at least one corner of a side opposite the openable side of the bag body. In the compactor bag, the check valve portion comprises a flat and closable air release path which is formed by fused sides crossing at a right angle and a partly fused portion of films located in the right-triangular area, air inside the bag body being guided into the air release path by a hypotenuse of the right-triangular area and being exhausted, and the check valve portion communicates with a packing space of the bag body at the hypotenuse of the right-triangular area.

[0008] After an item such as clothing is put in the compactor bag of the above structure, the bag is rolled with the openable side inside. In the meantime, the internal pressure of the bag body rises, and air inside the bag body is guided into the air release path by the hypotenuse of the right-triangular area and is exhausted. After the air exhaustion, the internal pressure of the bag body reduces, and the films exposed to the air release path adhere together, whereby the inside of the bag body can be kept airtight. The right-triangular check valve portion which is flat and small is influenced irregularly by the packing space which contains an item and which has gain a thickness, and thereby, the check valve portion curls or bends indispensably. Because of the curl or bend, the films of the air release path certainly adhere to each other, whereby the airtightness of the bag body can be guaranteed.

[0009] Because air inside the bag body can be exhausted through a check valve portion which is provided on at least one corner of the bag body, it is not necessary to form an air release path outside the check valve portion. Therefore, the inside of the bag body can be used effectively as a packing space for clothing or other items.

[0010] When rolling the bag body with the openable side inside, air is apt to be left at the corners of the side opposite the openable side. In the compactor bag according to the present invention, however, because the check valve used for air exhaustion is provided at a corner of the side opposite the openable side, almost all of the air can be ejected out from the bag body. Thus, the compactor bag is good in air exhaustion/compacting efficiency.

[0011] The compactor bag according to the present invention preferably has two check valve portions at two corners of the side opposite the openable side of the bag body. By providing two check valve portions, the air exhaustion/compacting efficiency is improved.

[0012] The check valve portion(s) may be formed of the mutually facing surfaces of the synthetic resin film forming the bag body. In this case, since the check valve portion(s) is/are structured of the synthetic resin film of the bag body, the structure of the check valve portion(s) is easy, and manufacture of such bags is easy. It is preferred to use a soft material as the synthetic resin film for the bag body and the check valve portion(s).

[0013] Alternatively, the check valve portion(s) may be formed of a thin synthetic resin film which is inserted in the synthetic resin film of the bag body. By using a thin film as the material of the check valve(s), the sealing performance of the check valve(s) after air exhaustion is improved.

[0014] The compactor bag according to the present invention can be used to pack not only clothing and bedding but also other voluminous items such as vegeta-

bles, etc.

Brief Description of the Drawings

[0015]

Fig. 1 show a compactor bag which is a first embodiment of the first invention, (A) being a perspective view thereof and (B) showing air exhaustion from the bag.
Fig. 2 is a plan view of the compactor bag of the first embodiment;
Fig. 3 is an enlarged sectional view of an openable side of the compactor bag of the first embodiment.
Fig. 4 is an illustration showing a process of manufacturing compactor bags of the first embodiment.
Fig. 5 show modified check valve portions for the compactor bag of the first embodiment.
Fig. 6 is a plan view of a compactor bag which is a second embodiment of the present invention.
Fig. 7 is an enlarged plan view of a check valve of the compactor bag of the second embodiment.
Fig. 8 is an enlarged sectional view taken along the line X-X in Fig. 7.
Fig. 9 is a plan view of a check valve of the compactor bag of the second embodiment.
Fig. 10 is an illustration showing manufacturing processes of compactor bags of the second embodiment.
Fig. 11 is a front view of check valves which are used in the manufacturing processes of the compactor bags of the second embodiment.
Fig. 12 shows a compactor bag which is a third embodiment of the present invention, (A) being a plan view and (B) being a sectional view taken along the line P-P in (A).
Fig. 13 is an illustration showing manufacturing processes of compactor bags of the third embodiment.
Fig. 14 is a sectional view of the compactor bag taken along the line Y-Y in Fig. 13.
Fig. 15 is a sectional view of the compactor bag taken along the line Z-Z in Fig. 13.
Fig. 16 is an enlarged view of a portion Q in Fig. 13.
Fig. 17 show a conventional compactor bag.

Best Mode for Carrying out the Invention

[0016] Some embodiments of a compactor bag according to the present invention will be described with reference to the accompanying drawings.

First Embodiment; See Figs. 1 through 4

[0017] As Figs. 1(A), 1(B) and 2 show, a compactor bag 10A which is a first embodiment of the present invention has a substantially rectangular bag body 11 which is formed by stacking two synthetic resin films 12 and 13. The bag body 11 has three fused sides (hatched portions f and g in the drawings) and an open side 14 for put-in and take-out of clothing or the like.

[0018] At the open side 14, as Fig. 3 shows, a zipper 15 with a groove 17 and a ridge 18 is fused with the inner surfaces of the resin films 12 and 13. The zipper 15 is of a conventional type which is formed by extrusion-molding the groove 17 and the ridge 18 on respective bases 16 integrally. However, the zipper 15 may be of any structure and of any shape, and the zipper 15 may be formed by extrusion-molding together with the films 12 and 13. Also, in order to improve the airtightness of the bag body 11, two zippers may be provided. In order to facilitate open/close motion of the zipper 15, a slider may be provided.

[0019] The films 12 and 13 of the bag body 11 are preferably laminate films. As Fig. 3 shows, a fusible material such as polyethylene, polypropylene or the like is used as an inner sheets 12a and 13a of the films 12 and 13, and polyamide, polyethylene terephthalate or the like is used as an outer sheets 12b and 13b of the films 12 and 13.

[0020] A feature of this compactor bag 10A is to have check valve portions 20 in right-triangular areas at the corners which are opposite the open side 14 of the bag body 11. As Fig. 2 shows, each of the check valves 20 comprises the fused portions f and g which are the sides forming the right angle and an air release path 22 made in a triangular fused portion 21. Air inside the bag body 11 is guided by the triangular fused portion and is exhausted through an non-fused portion g' as shown by arrow "d".

[0021] The entire inside of the bag body 11 except the check valve portions 20 can be used as a packing space for clothing or the like, and the check valve portions 20 directly communicate with the packing space at the triangular fused portions.

[0022] When the compactor bag 10A of the above structure is used, the zipper 15 is opened, and clothing is put inside through the open side 14. Thereafter, the zipper 15 is closed, and the bag body 11 is rolled up in such a way the openable side 14 will be rolled inside (see Fig. 1(B)). In the meantime, the internal pressure of the bag body 11 rises, and air inside the bag body 11 is exhausted through the air release paths 22 of the check valve portions 20 (see arrow "d"). The air exhaustion is completed when the clothing in the bag body 11 is compressed. Once air exhaustion has been carried out, the internal pressure of the bag body 11 decreases, and the respective inner surfaces of the films 12 and 13 in the air release paths 22 stick together. Thereby, air is prevented from flowing back into the bag body 11, and the inside of the bag body 11 is kept airtight.

[0023] The air exhausting performance and the sealing performance of the check valve portions 20 depend on the width and the length of the air release paths 22 and the adherence of the films 12 and 13 to each other. More specifically, if the air release paths 22 are wide,

short and straight, the air exhausting performance of the check valve portions 20 is good. On the other hand, if the air release paths 22 are narrow, long and curved, the sealing performance (effect of preventing air from flowing backward) of the check valve portions 20 is good. The effect of preventing air from flowing backward is brought by adherence of the films 12 and 13 to each other. If the films bend or curl, the films adhere to each other at the bending or curling portion, whereby an air flow is cut at the portion. Providing narrow and/or long air release paths 22 heightens the certainty of adherence of the films 12 and 13 to each other but lowers the air exhausting performance.

[0024] Therefore, the best check valve portions 20 are to have air release paths 22 which are straight while exhausting air and which curl after air exhaustion. In the bag body 11, each of the check valve portions 20 is formed at a corner of the bag body 11 to have the shape of a right triangle. The right-triangular check valve portions 20 take in air with the hypotenuses guiding air, and the hypotenuses communicate with the packing space of the bag body 11. In this structure, during air exhaustion, the air release paths 22 keep straight in parallel to the planes of the films 12 and 13 because of an increase in internal pressure, and after air exhaustion, the air release paths 22 curl or bend around the hypotenuses or the flat portions. Thus, the check valve portions 20 are good both in air exhausting performance and in sealing performance. A right triangle is an ideal shape to provide an air release path 22 therein, and the hypotenuse is an ideal spot to locate the inlet of the air release path 22 thereat.

[0025] Also, in the bag body 11, clothing or the like can be also put in the space E shown in Fig. 2, and the packing efficiency is better than that of a conventional bag.

[0026] When the bag body 11 is rolled with the openable side 14 inside, because of the fused portions f and g, air is collected at the corners F (see Fig. 1(B)) on the opposite side of the openable side 14. In the bag body 11, since the check valve portions 20 are provided at the corners F where the collected air heightens the internal pressure, almost all of the air collected at the corners F can be ejected. Thus, the air exhaustion/compacting efficiency is good.

[0027] Next, manufacturing processes of such compactor bags 10A are described with reference to Fig. 4.

[0028] In the first process, while the films 12 and 13 are unrolled and stacked one upon the other, the zipper 15 is provided between the films 12 and 13 by fusion, and the films 12 and 13 are fused by a horizontal heater at a bottom side (fused portion f). Next, in the second process, the films 12 and 13 are fused together by a vertical heating bar to make a fused vertical side (fused portion g). The vertical heating bar comprises a heating section for forming the check valve portions 20, and simultaneously with the fusion at the side, the fused portions 21 of the check valve portions 20 are made. Thereby, the air release paths 22 are formed.

[0029] Thereafter, in the third process, the films 12 and 13 are cut at the center of the fused side g. Thus, the compactor bag 10A is produced. One bag body 11 may have one check valve portion 20 at one corner; however, even in a case of forming two check valve portions 20 at both corners, the number of fusing processes at the vertical side g is only one.

Modifications of the Check Valve Portions; See Figs. 5

[0030] In the compactor bag 10A of the first embodiment, the check valve portions 20 may be of any of various other shapes. Fig. 5 shows some exemplary shapes. The shape and the size of the air release paths 22 are designed arbitrarily according to the volume of air exhaustion.

[0031] The check valve portion 20 shown by Fig. 5(A) has fused portions 21 at a corner of the bag body 11, and thereby, a straight air release path 22 is formed between the fused portions 21. Further, a fused portion 23 which serves as a weir is made on the hypotenuse of the right triangle. The route of air exhausted through this check valve portion 20 is indicated by arrow "d". The vertex of the corner of the bag body 11 where this check valve portion 20 is located is cut off.

[0032] The check valve portion 20 shown by Fig. 5(B) has an air release path 22 which extend among islands of fused portions 24. The route of air exhausted through this check valve portion 20 is indicated by arrow "d". In the case of Fig. 5(B), the air release path 22 has two outlets (non-fused portions) f and g'.

[0033] The check valve portion 20 shown by Fig. 5(C) has islands of fused portions 25 and slits 26 made in the films 12 and 13, and an air release path 22 is formed between the slits 26. The route of air exhausted through this check valve portion 20 is indicated by arrow "d". Further, a fused portion 25' is formed to prevent clothing or other items put in the bag body 11 from closing the air release path 22 and to keep adherence of the films 12 and 13 to each other.

[0034] The check valve portion 20 shown by Fig. 5(D) has a fused portion 27 and an air release path 22 extending along the fused portion f. The route of air exhausted through this check valve portion 20 is indicated by arrow "d". Further, a fused portion 25' is formed to prevent clothing or other items put in the bag body 11 from closing the air release path 22 and to keep adherence of the films 12 and 13 to each other.

[0035] In the above-described modifications, the fused portions 23, 24, 25, 25' and 27 are made by fusing the films 12 and 13 with each other.

Second Embodiment; See Figs. 6 through 11

[0036] Fig. 6 shows a compactor bag 10B which is a second embodiment of the present invention. In the compactor bag 10B, check valves 30, each of which is

composed of two synthetic resin films, are provided instead of the check valve portions 20 in the first embodiment. The check valves 30 are located at both corners on the side opposite the openable side 14 of the bag body 11. The other parts are the same as those of the first embodiment. These parts are provided with the same reference symbols, and a repetition of a description thereof is omitted.

[0037] Each of the check valves 30, as shown by Figs. 7, 8 and 9, are made by fusing two fusible thin and soft films 31 and 32 (for example, polyethylene films) with each other at a portion h. Also, each of the check valves 30 has fused branch portions 34 and a hole 35 which pierces also through the front and back sides of the bag body 11, and thereby, an air release path 33 is formed. The route of air exhausted through this air release path 33 is indicated by arrow "d".

[0038] Further, the check valves 30 are fixed to the bag body 11 by fused portions f and g. The hatched portion i in Fig. 7 indicates a portion where the inner surfaces of the films 12 and 13 of the bag body 11 are fused respectively with the films 31 and 32 of the check valve 30. This fused portion i is to prevent air leakage. The mutually facing surfaces of the films 31 and 32 had been subjected to a fusion preventing treatment, for example, had been coated with ink 36 so that the mutually facing surfaces of the films 31 and 32 would not be fused together when the fused portion i was formed.

[0039] The compactor bag 10B of the above structure can be used in the same way as the compactor bag of the first embodiment, and the bag 10B has the same effect as the bag of the first embodiment. In the second embodiment, especially because thin and soft films 31 and 32 are used for the check valves 30, the check valves 30 have a strong effect of preventing air from flowing backward (effect of maintaining airtightness) after air exhaustion.

[0040] Next, manufacturing processes of such compactor bags 10B are described with reference to Figs. 10 and 11.

[0041] First, referring to Fig. 10, while films 12 and 13 are unrolled, the films 12 and 13 are stacked one upon the other with the zipper 15 and the check valves 30 inserted in-between. The check valves 30 are fused between the films 12 and 13 at the fused portions i in this first process.

[0042] The check valves 30 used in this first process are cut sequentially from a series of check valves 30'. As Fig. 11 shows, the series of check valves 30' is a serial connection of pairs of check valves 30. In each pair, two check valves 30 are joined back to back, and these check valves 30 are to be cut from each other later. The series of check valves 30' is made by fusing the films 31 and 32 at portions h and 34 so as to form the air release paths 33 in the respective check valves 30 and further by coating fusion preventing ink 36 on the mutually facing surfaces of the films 31 and 32. The check valves are cut from the series of check valves 30' at lines j pair by pair, and in the first process, these pairs of check valves 30 are inserted and fused between the films 12 and 13 sequentially.

[0043] Next, in the second process, the zipper 15 is fused with the films 12 and 13 by use of a heating bar 51, and further, the films 12 and 13 of the bag body 11 are fused together at a side f by use of a heating bar 52. The fusion at the side f is also to fuse the films 31 and 32 of the check valves 30 with the films 12 and 13 of the bag body 11.

[0044] Thereafter, in the third process, the films 11 and 12 are fused together at a vertical side g by use of a vertically positioned heating bar (not shown). Simultaneously, through holes 35 for air exhaustion are made. Then, in the fourth process, the films 12 and 13 are cut at the center of the fused vertical side g, and thereby, a compactor bag 10B is cut off. Thus, compactor bags 10B of the above structure can be manufactured.

[0045] In the second embodiment, instead of the fused branch portions 34, fused islands as shown in Fig. 5 may be formed. Also, the holes 35 may be replaced with slits.

Third Embodiment; See Figs. 12 through 16

[0046] As Fig. 12(A) shows, a compactor bag 10C which is a third embodiment of the present invention has check valves 40 instead of the check valves 30 of the second embodiment. The check valves 40 are formed by inserting two synthetic resin films 41 and 42 between the films 12 and 13 along the side opposite the openable side 14 entirely from an end to the other end.

[0047] The four films 12, 13, 41 and 42 are fused together at portions f and g. At a portion k, as Fig. 12(B) shows, the film 12 is fused with the film 41, and the film 13 is fused with the film 42. At this portion k, the films 41 and 42 are not fused together.

[0048] In the check valves 40, as in the first embodiment, air release paths 43 are formed between fused branch portions 44 (which may be islands). The formation of the fused portions 44 is carried out simultaneously with the fusion of the films 12, 13, 41 and 42 at the sides g. The portions g' of the sides g are non-fused portions serving as outlets of the air release paths 43. To the air release paths 43 indicated by arrow "d", only the thin and soft films 41 and 42 (for example, polyethylene films) are exposed. The outlets of the air release paths 43 may be positioned at portions of the side f.

[0049] The followings are the purposes of forming the fused portion k. Because the films 41 and 42 are fused respectively with the inner surfaces of the films 12 and 13, when clothing or any other item is put in the bag 10C through the open side 14, the films 41 and 42 will never obstruct the item to be packed. Also, air is prevented from coming into the bag 10C from the outlets (non-fused portions g') through the space between the films 12 and 41 and the space between the films 13 and 42.

[0050] The compactor bag 10C of the above structure

can be used in the same way and has the same effect as those of the first and second embodiments. In the third embodiment, because long films 41 and 42 are used for the check valves 40, it is not necessary to prepare a series of check valves 30' as in the second embodiment.

[0051] Next, referring to Figs. 13 through 16, manufacturing processes of such compactor bags 10C are described.

[0052] Referring to Fig. 13, in the first process, while films 12 and 13 are unrolled, the films 12 and 13 are stacked one upon the other with the zipper 15 and the films 41 and 42 inserted in-between (see Fig. 14).

[0053] Next, in the second process, the zipper 15 is fused with the films 12 and 13 by use of a heating bar 51, and the films 41 and 42 are fused respectively with the films 12 and 13 at the portion k by use of a heating bar 53. In carrying out the fusion at the portion k, a fusion preventing plate 54 is inserted between the films 41 and 42 (see Fig. 15) so that the films 41 and 42 will not fuse with each other. It is possible to coat fusion preventing ink 36 on the mutually facing surfaces of the films 41 and 42 as is carried out in the second embodiment, instead of inserting the plate 54.

[0054] In the third process, the films 12 and 13 are fused together at a side f, whereby the fused bottom side f of the bag body 11 is made. This fusing process at the side f is also to fuse the films 41 and 42 of the check valves 40 with the films 12 and 13.

[0055] Thereafter, in the fourth process, the films are fused together at a vertical side g by use of a vertically positioned heating bar (not shown). Simultaneously, the fused branch portions 44 of the check valves 40 are formed, and the air release paths 43 and their outlets (non-fused portions g') are made (see Fig. 16). Then, in the fifth process, the films 12 and 13 are cut at the center of the vertical fused portion g, and thereby, a compactor bag 10C is cut off. Thus, compactor bags 10C of the above structure can be manufactured.

Other Embodiments

[0056] Compactor bags according to the present invention are not limited to the above embodiments, and various changes and modifications are possible within the scope of the invention.

[0057] Various kinds of resin can be used for the films 12, 13, 31, 32, 41 and 42. The detailed structures and shapes of the check valve portions 20, and the check valves 30 and 40 can be designed arbitrarily.

[0058] In the third embodiment, the check valves 40 are made of two films which are stacked one upon the other; however, the check valves 40 may be made by inserting a single film between the films 12 and 13 of the bag body 11.

[0059] The manufacturing processes of the first, second and third embodiments include a process of fusing the zipper 15 with the films 12 and 13. It is, however, possible to use a film with the zipper fitted thereto beforehand and to manufacture compactor bags by meltdown. In this case, the portion f is not a fused portion but a fold portion. Also, the bag body 11 may be structured into a gazette bag, and the check valve portion 20, or the check valves 30 or 40 may be provided thereto.

[0060] Further, the check valve portions 20, and the check valves 39 and 40 can be provided for vacuum compactor bags from which air is extracted by a vacuum cleaner or the like.

Industrial Applicability

[0061] As has been described, compactor bags according to the present invention are good in air exhaustion efficiency and in compacting efficiency. These bags are suited for compacting of clothing which permits easy carriage of the clothing.

Claims

1. A compactor bag which comprises a substantially rectangular bag body made of a synthetic resin film, the bag body having an openable side provided with a zipper through which an item can be put into and taken out of the bag body, said compactor bag comprising:

   a check valve portion which is located in a right-triangular area on at least one corner of a side opposite the openable side of the bag body,

   wherein:

   the check valve portion comprises a flat and closable air release path which is formed by fused sides crossing at a right angle and a partly fused portion of films located in the right-triangular area, air inside the bag body being guided into the air release path by a hypotenuse of the right-triangular area and being exhausted; and
   the check valve communicates with a packing space of the bag body at the hypotenuse of the right-triangular area.

2. A compactor bag according to claim 1, wherein check valve portions are provided at two corners of the side opposite the openable of the bag body.

3. A compactor bag according to claim 1, wherein the check valve portion is formed of mutually facing surfaces of the synthetic resin film which forms the bag body.

4. A compactor bag according to claim 1, wherein the check valve portion is made of a thin synthetic resin

film which is inserted in the synthetic resin film of the bag body.

FIG. 1 (A)

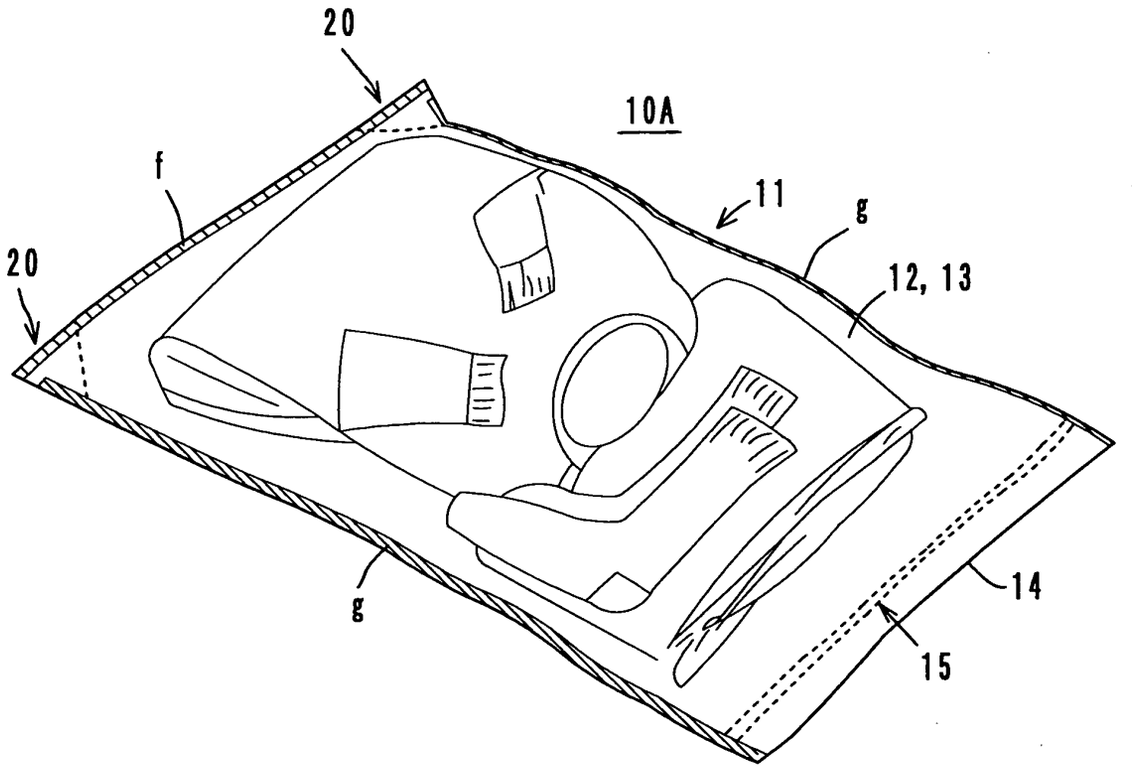


FIG. 1 (B)

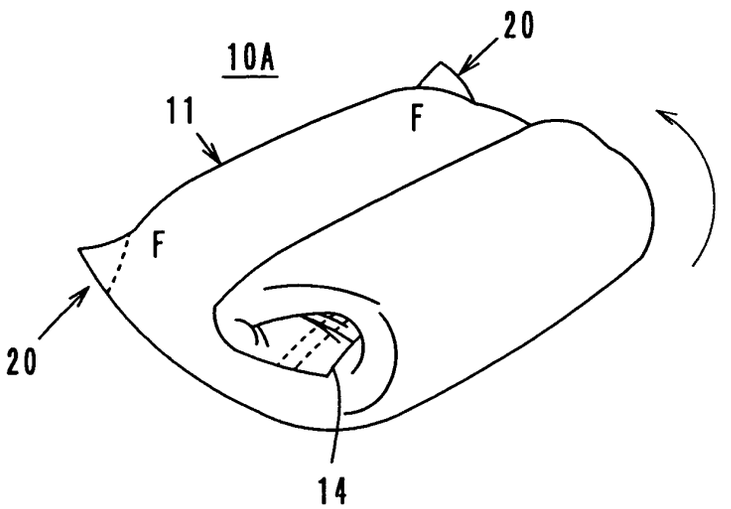


FIG. 2

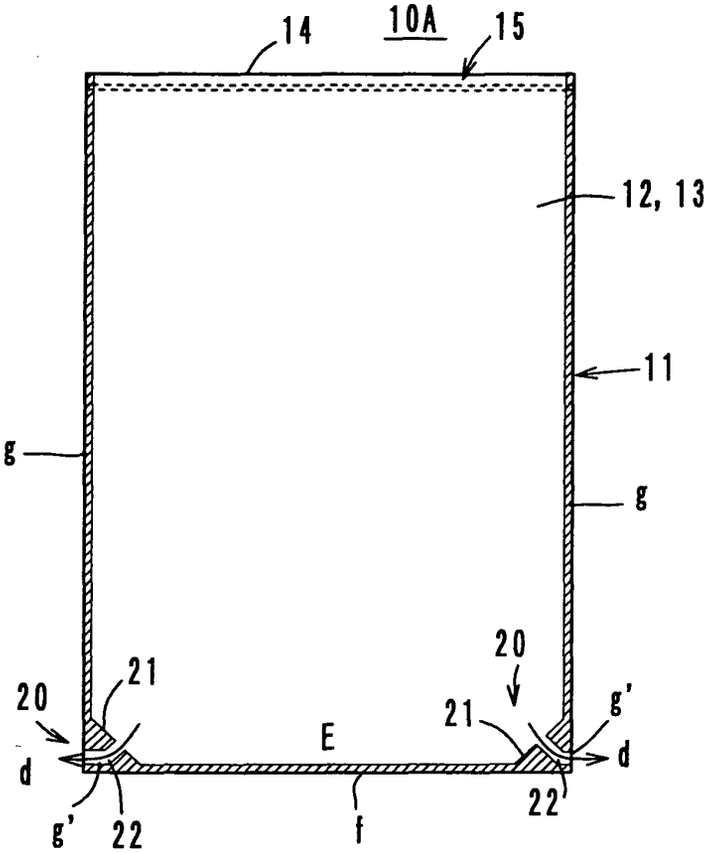

14
10A
15
12, 13
11
g
g
20
21
20
21
g'
E
d
d
g'
22
f
22

FIG. 3

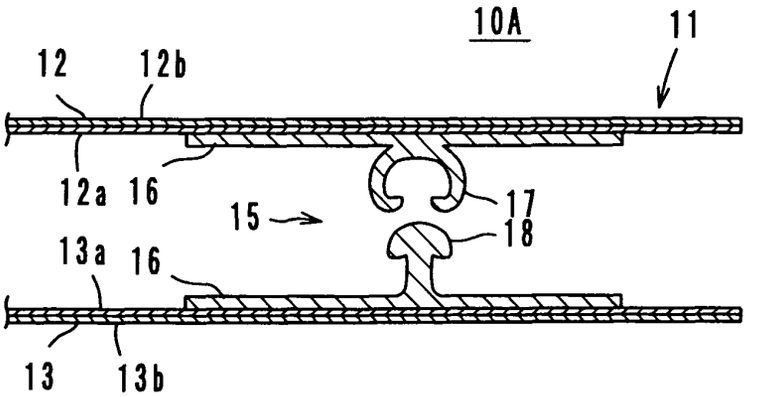

10A
11
12
12b
12a
16
15
17
18
13a
16
13
13b

FIG. 4

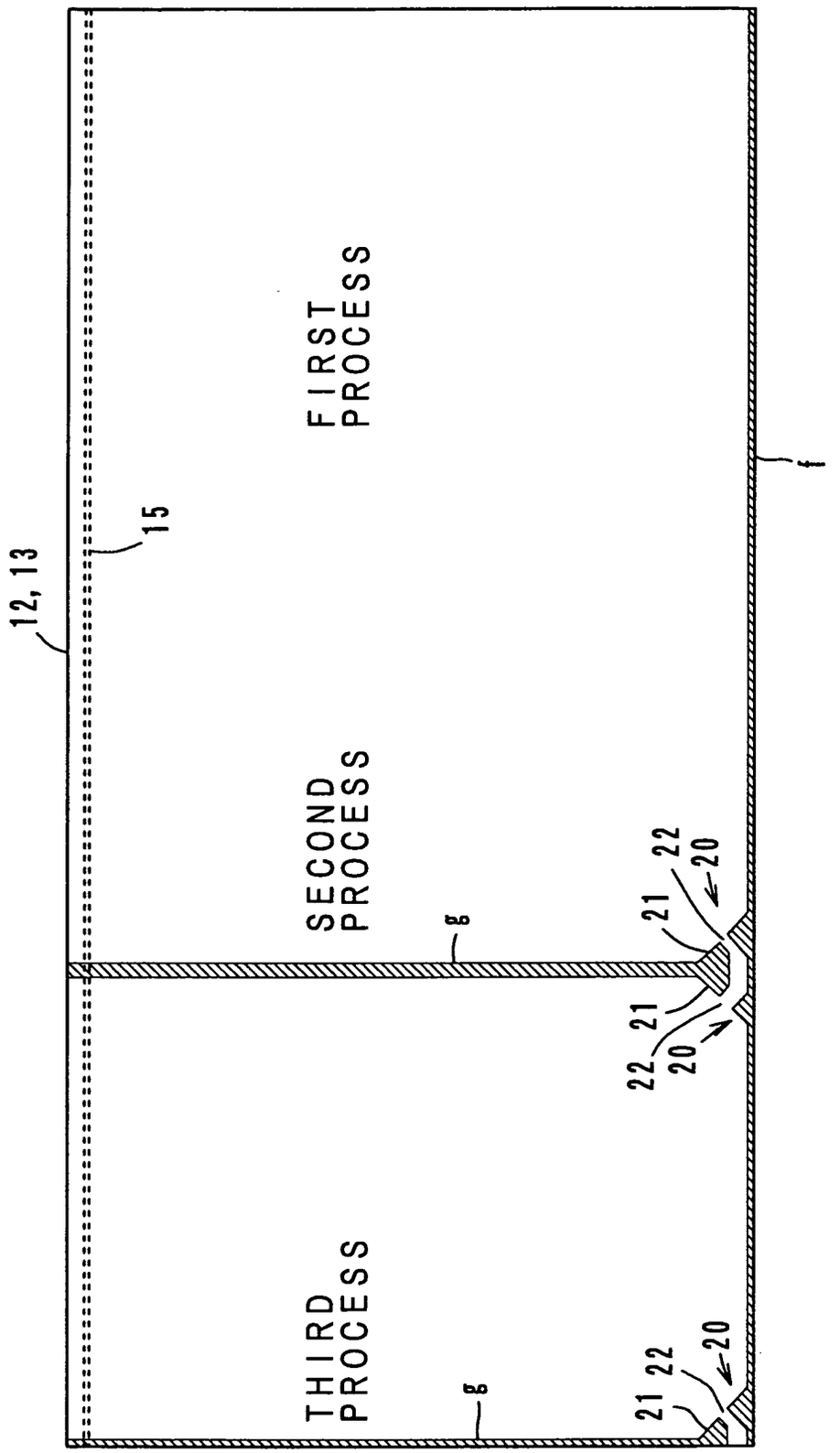

12, 13
15
FIRST PROCESS
SECOND PROCESS
THIRD PROCESS
g
g
f
21
22
20
21
22
20
21
22
20

FIG. 5 (A)

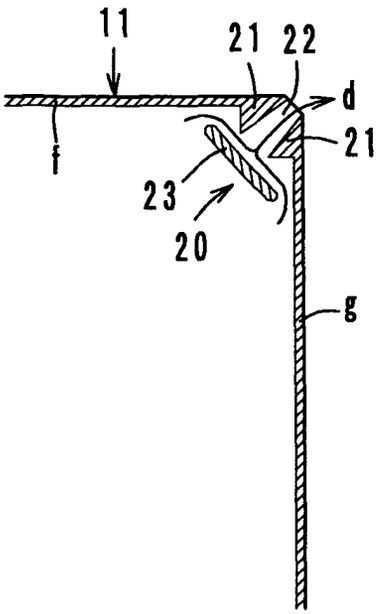


FIG. 5 (B)

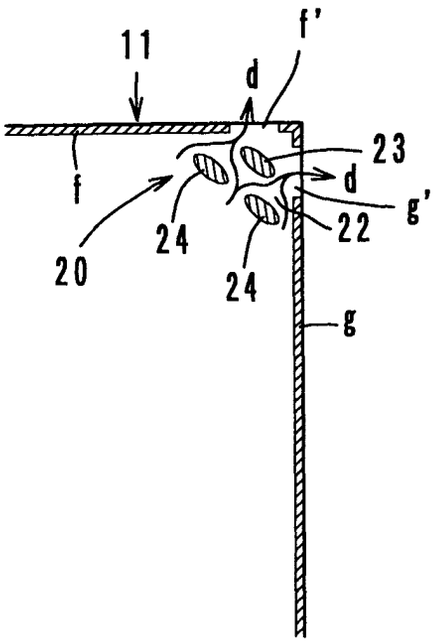


FIG. 5 (C)

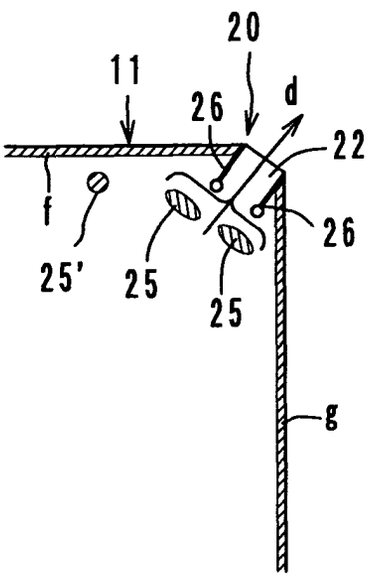


FIG. 5 (D)

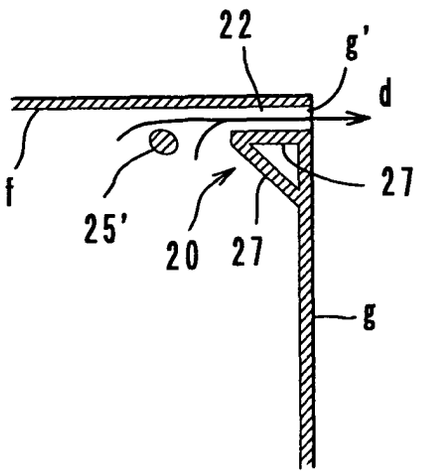


FIG. 6

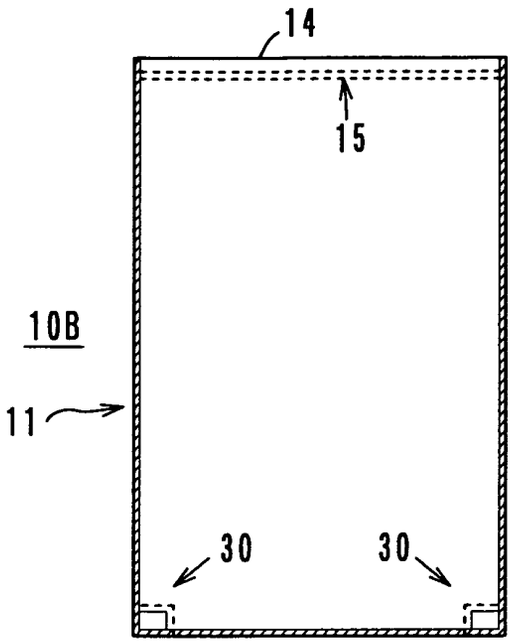


FIG. 7

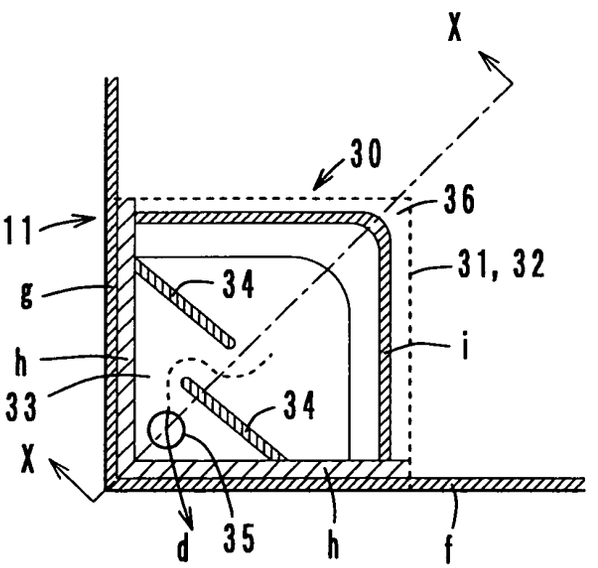


FIG. 8

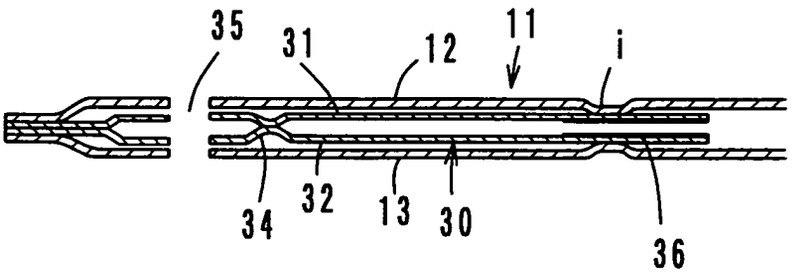


FIG. 9

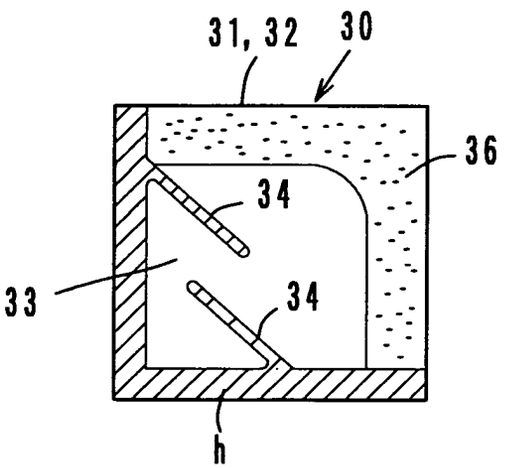
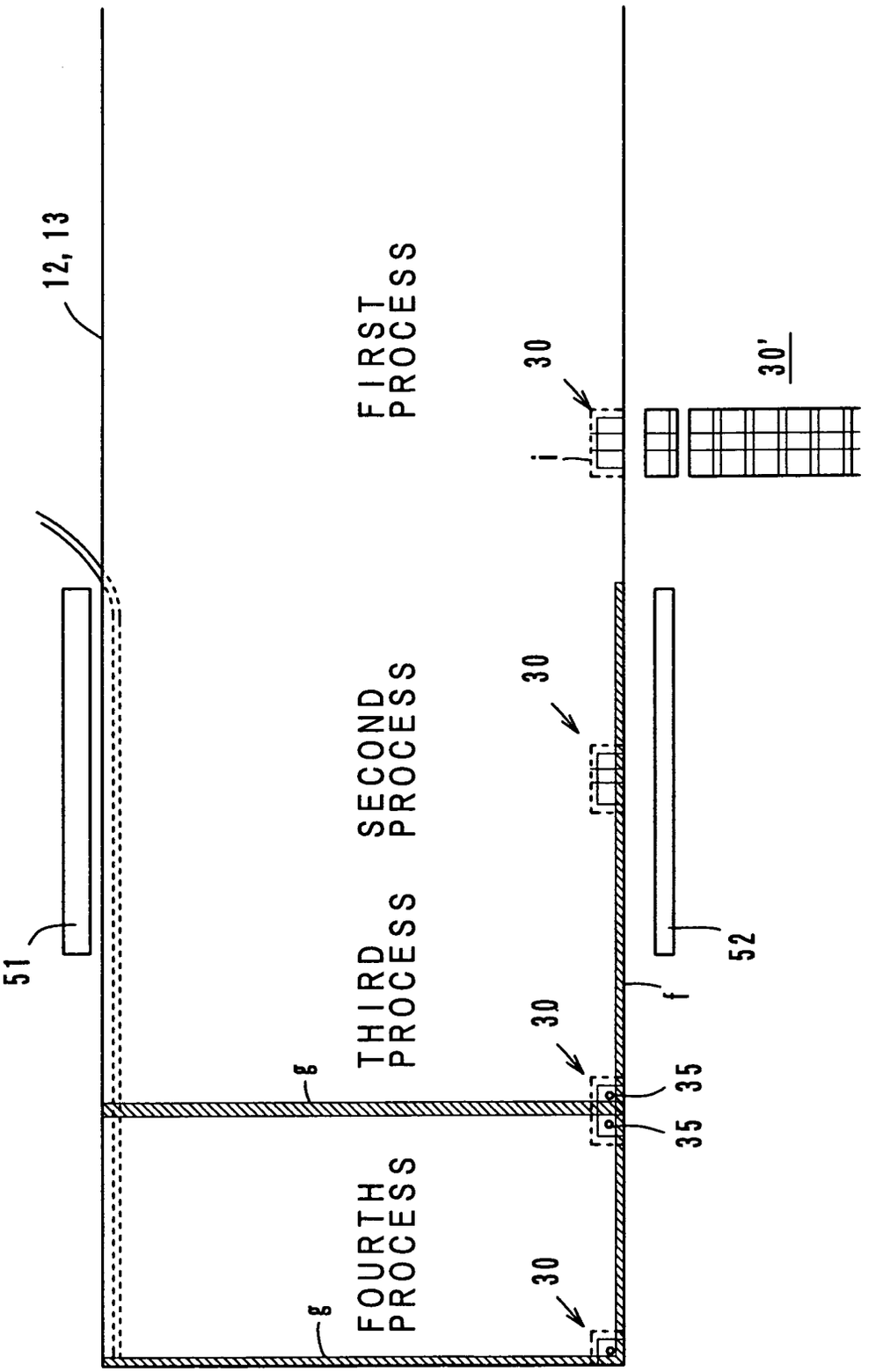


FIG. 10


12, 13
FIRST PROCESS
SECOND PROCESS
THIRD PROCESS
FOURTH PROCESS
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i
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52
f
g
g
35 35

FIG. 11

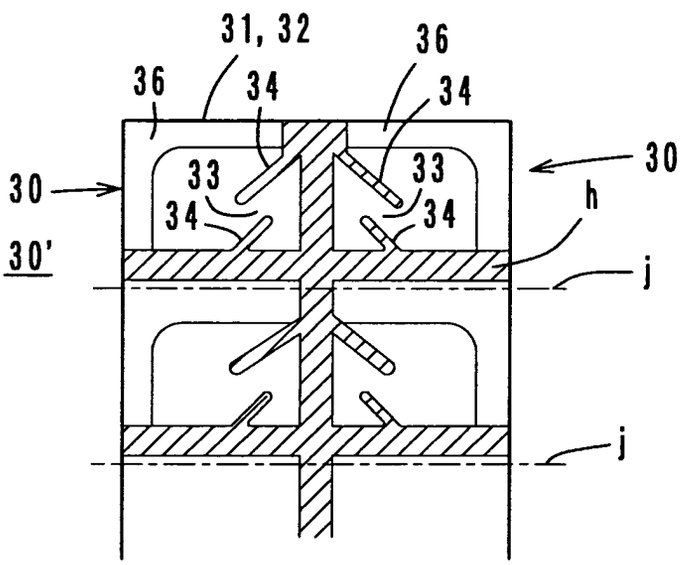


FIG. 12(A)

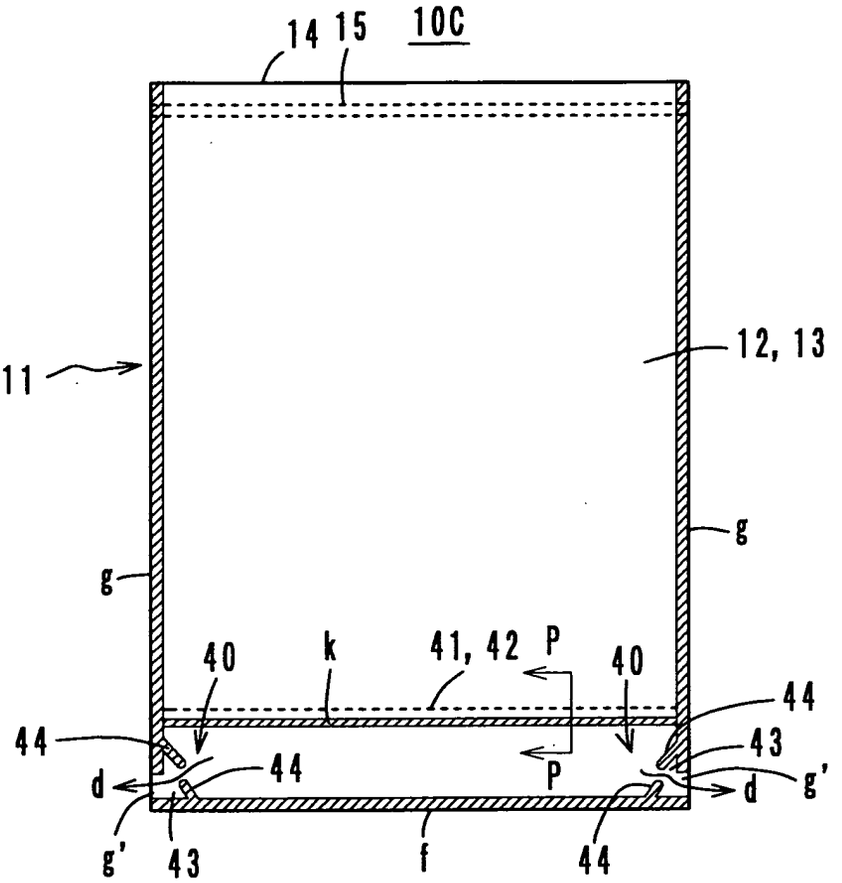


FIG. 12(B)

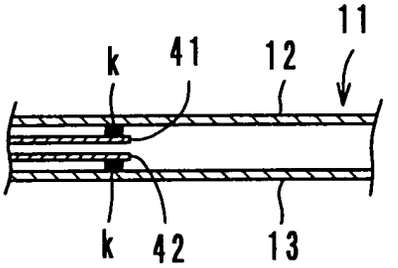
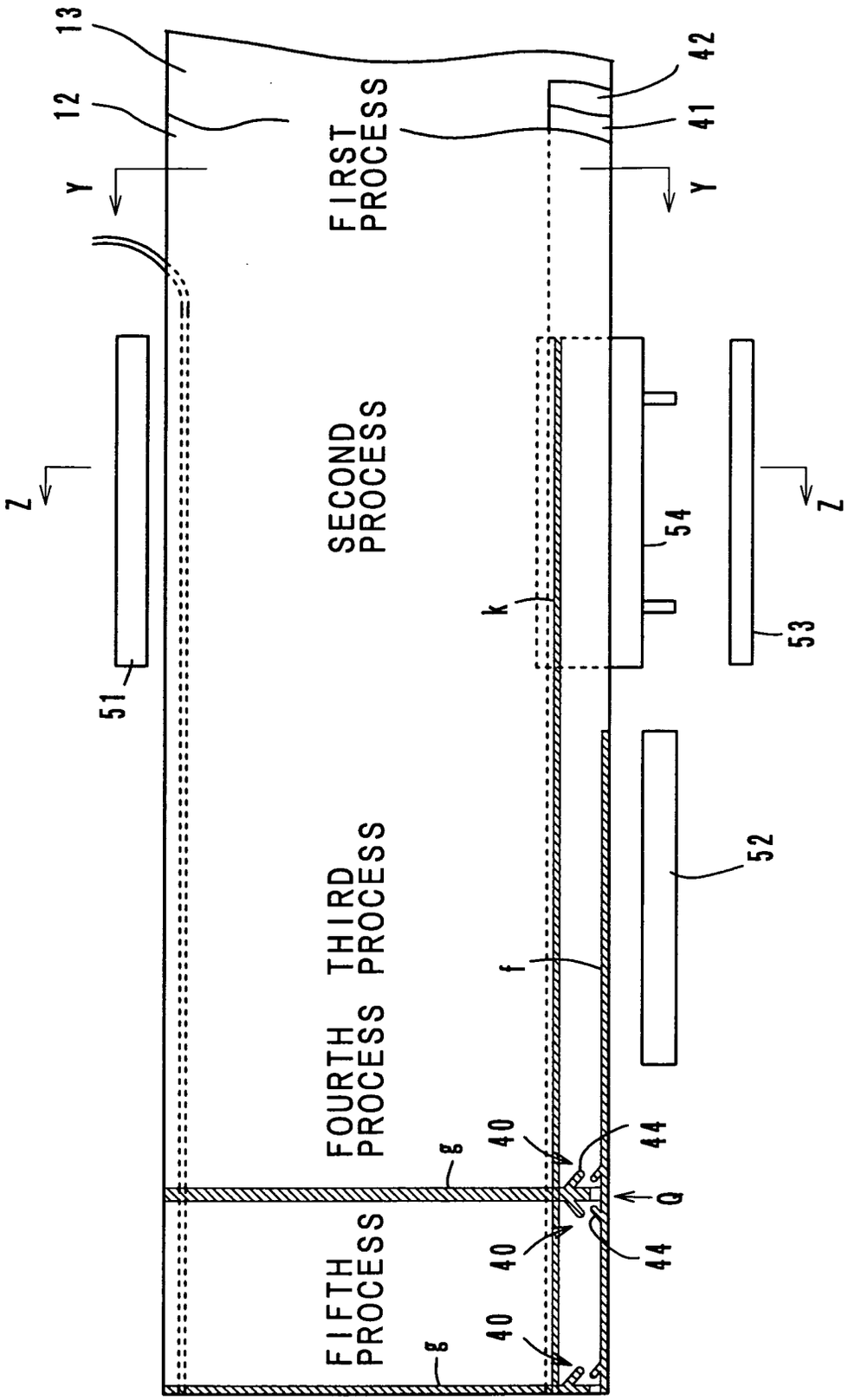


FIG. 13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THIRD PROCESS
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Q

FIG. 14

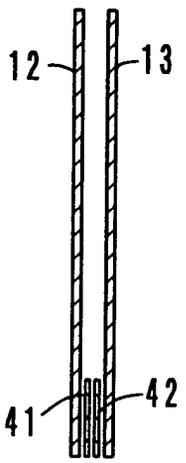


FIG. 15

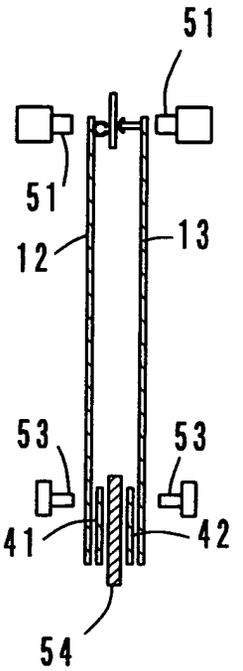


FIG. 16

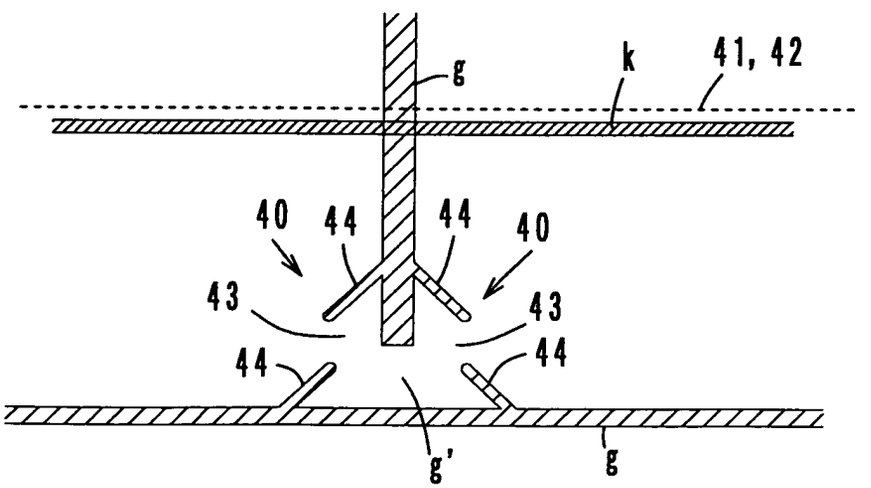


FIG. 17(A)

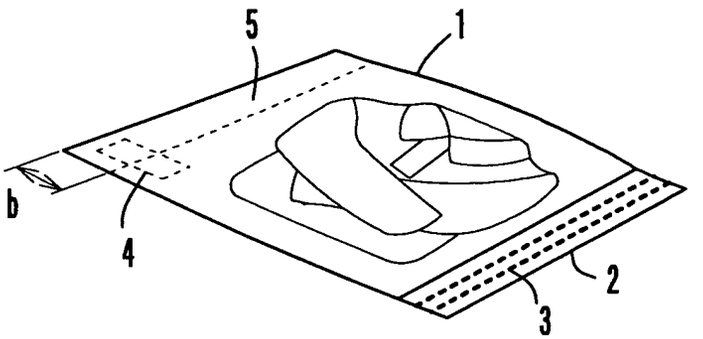
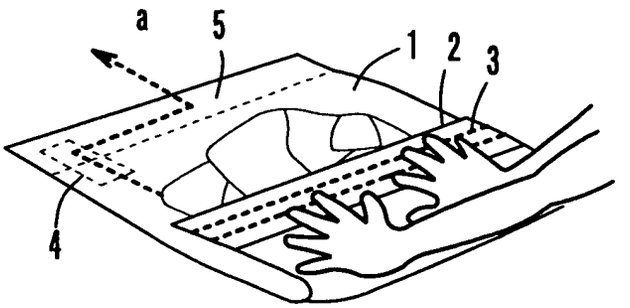


FIG. 17(B)



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP02/09003

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B65D30/24, 81/20, 85/18

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)
Int.Cl[7] B65D30/24-30/26, 81/20, 85/16-85/18

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

Jitsuyo Shinan Koho	1926-1996	Jitsuyo Shinan Toroku Koho	1996-2002
Kokai Jitsuyo Shinan Koho	1971-2002	Toroku Jitsuyo Shinan Koho	1994-2002

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.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 70194/1990(Laid-open No. 27749/1992) (Okusu Kabushiki Kaisha), 05 March, 1992 (05.03.92), Fig. 1 (Family: none)	1-4
Y	JP 3025235 U (Kabushiki Kaisha Aru), 21 March, 1996 (21.03.96), Fig. 5 (Family: none)	1-4

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

* Special categories of cited documents:
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"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 October, 2002 (10.10.02)	29 October, 2002 (29.10.02)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)