



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
01.08.2007 Bulletin 2007/31

(51) Int Cl.:
B65D 25/28 (2006.01) **B65D 77/04** (2006.01)
B65D 81/02 (2006.01)

(21) Application number: **07250398.0**

(22) Date of filing: **30.01.2007**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**
Designated Extension States:
AL BA HR MK YU

(72) Inventor: **Imai, Fumihito**
Odawara-shi
Kanagawa (JP)

(30) Priority: **30.01.2006 JP 2006021175**
31.01.2006 JP 2006022859

(74) Representative: **Stevens, Jason Paul**
Frank B. Dehn & Co.
St Bride's House
10 Salisbury Square
London EC4Y 8JD (GB)

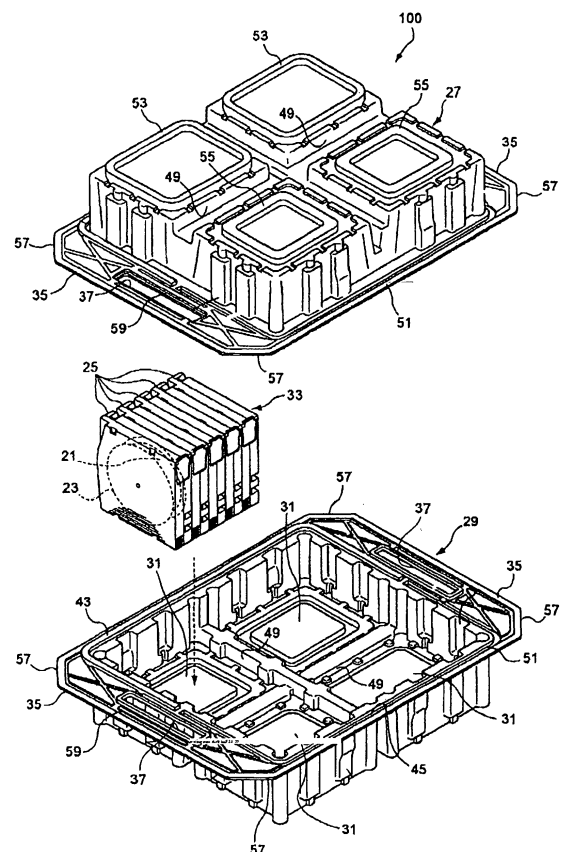
(71) Applicant: **Fujifilm Corporation**
Minato-ku
Tokyo (JP)

(54) **Cartridge container**

(57) A cartridge container (100) for storing a plurality of flat tape cartridges (25), having tape reels (23) therein on which electromagnetic tapes are wound, comprises a cartridge case shell made up two mating case shell halves (27, 29) identical in shape and structure. The case shell halves (27, 29) are coupled to each other to provide at least one compartment for receiving a set of a plurality of the tape cartridges arranged closely side by side in an interior of the cartridge container.

The cartridge container (100) is provided with crushable flanges (35) formed at its opposite sides, and openings (37) are formed in the crushable flanges to act as handgrips.

Fig. 1



Description

[0001] The present invention relates to a cartridge container for storing flat tape cartridges with electromagnetic tapes wound on reels therein and, more particularly, to an electromagnetic tape cartridge container which prevents the tape cartridges put therein from being affected by impact against thereto and which encourages tape cartridge packing efficiency.

[0002] Typically, it is usual in an ordinary distribution process to provide impact protection for a package of one-reel type electromagnetic tape cartridges by filling a cardboard packing box 5 with a substantial number of the tape cartridges 1 individually packed in cartridge cases 3, respectively, as shown in Figure 5. An inconvenience encountered by the collective package is that the cardboard packing box 5 has to be opened in order to check its contents and/or the type of the tape cartridges 1 packaged therein. Further, if the cardboard packing box 5 is wetted with water and leaks, the tape cartridges 1 and electromagnetic tapes in the tape cartridges become wet and damaged depending upon circumstances, in addition to damage of the cardboard packing box 5.

[0003] Such being the case, there has been marketed a transparent plastic box 7 having a peripheral flange 17 for collective packing of tape cartridges 1 such as shown in Figure 6. This packing box 7 has a structural strength unaffected by exposure to water, and allows its contents to be seen. Such a transparent plastic box 7 is known in the name of UTO-Ultrium L-pack (trademark of TDK Co., Ltd.) and described in, for example, Japanese Unexamined Patent Publication No. 2003-285424.

[0004] However, the transparent plastic box 7 is put in a cardboard packing box in such a manner that the peripheral flange 17 is in contact with an inner wall of the cardboard packing box by reason of space saving and impact absorption. When opening the cardboard packing box and pulling out the transparent plastic box 7 from the cardboard packing box, it is hard to take a grip on the transparent plastic box 7 because there is no space between the flange 17 and the inner wall of the cardboard packing box. Further, if a user forces a hand between them, the fingers of the hand can be injured by a peripheral edge of the flange 17. In this instance, the transparent plastic box 7 with 20 units of LTO type tape cartridges packed therein reaches a weight of approximately 4.0 kg, which is relatively heavy. Even though the transparent plastic box 7 is provided with a handgrip in the form of an opening formed in the flange 17, there are some situations where an edge of the handgrip bites into a hand when gripping the handgrip and pulling out the transparent plastic box 7. In particular, when carrying the transparent plastic box 7, it is essential to hold it with both hands. Accordingly, the prior art plastic box for packing tape cartridges is quite inconvenient in handling.

[0005] It is therefore an object of at least the preferred embodiments of the present invention to provide a cartridge container which is easily taken out from a packing

box.

[0006] It is another object of at least the preferred embodiments of the present invention to provide a cartridge container which is improved in tape cartridge handling and packing efficiency.

[0007] According to a first aspect of the present invention, there is provided a cartridge container for storing a plurality of flat tape cartridges having tape reels, respectively, therein, on which electromagnetic tapes are wound, respectively. The cartridge container comprises a case shell comprising two mating case shell halves identical in shape and structure which are coupled to each other to provide the cartridge container; a crushable flange formed as an integral part of each of the mating case shell half at each of opposite sides of the mating case shell half and a handgrip formed by an opening formed in the crushable flange of each the mating case shell half, wherein the two mating case shell halves are coupled to form at least one compartment for receiving a set of a predetermined number of the flat tape cartridges arranged closely side by side in a direction of axis of the tape reel in an interior of the cartridge container.

[0008] Since the cartridge container has the handgrip at a position of a mating face between the two mating case shell halves, it is easy to have a firm grip on the handgrip when pulling out the cartridge container from a cardboard packing box and when carrying the cartridge container by hand. Furthermore, when gripping the handgrip by a hand for carrying the cartridge container, no fingers are bitten and injured by an edge of the handgrip.

[0009] The handgrip may be formed by an opening with a generally L-shaped inner wall. The L-shaped wall increases the stiffness of the handgrip and its vicinity and, in consequence, prevents damage to the flange. Accordingly, the cartridge container is guaranteed in terms of quality.

[0010] The cartridge container may be made up of two mating case shell halves, each comprising a top fitting rail and a top groove forming a male and female coupling structure in which the top fitting rail of one of the two mating case shell halves is fitted in the top groove of the other of the two mating case shell halves by insertion, thereby coupling the two mating case shell halves for completing the cartridge container. In the case where the top fitting rail and the top groove are arranged symmetrically with respect to a centre line of the mating case shell half, the cartridge container is made up of completely identical two mating case shell halves. This brings about an advantage that it is only needed to provide a single mould for production of both mating case shell halves.

[0011] The cartridge container may have a plurality of compartments defined and separated from one another by partition walls. The cartridge container having the partition walls prevents sets of tape cartridges from having an effect of inertial impact on one another even when the respective sets of tape cartridges are individually affected by impact caused upon falling of the cartridge container.

[0012] The mating case shell half may comprise an integral moulded product made of a plastic resin preferably such as polyethylene terephthalate, polypropylene and polystyrene, and more preferably a translucent plastic resin. Furthermore, the mating case shell half may comprise a product formed by stretching press of a plastic resin sheet having a thickness in a range of from 0.5 to 2.0 mm. This plastic resin cartridge container is produced with a high degree of accuracy and at a low cost. The plastic resin such as mentioned above are easily available at a low cost and well-suited for vacuum moulding. The mating case half can be formed by stretching press of a plastic resin sheet having a thickness of 0.5 to 2.0 mm in order to economically acquire required minimum structural strength of the respective compartments of the cartridge container, and minimizing the cartridge container in weight while satisfying required minimum structural strength of the cartridge container. In addition, the usage of such a thin plastic resin sheet results in allowing the cartridge container to undergo proper deformation due to external impact, so as thereby to secure most appropriate impact absorbability for the tape cartridges. If the plastic resin sheet has a thickness less than 0.5 mm, the cartridge container deforms too easily, so that it is incapable of bringing about an appropriate impact absorption effect. On the other hand, if the plastic resin sheet has a thickness greater than 2.0 mm, the cartridge container encounters a difficulty in deformation which allows external impact to be directly transmitted to the tape cartridges put therein. The cartridge container whose thinnest part is confined in thickness to that limit range can be provided with an optimized crushable or appropriate impact absorbable zone. The cartridge container made of a translucent plastic resin makes it quite easy to check its contents and/or a type of the contents without being opened.

[0013] The foregoing and other objects and features of the present invention will be clearly understood from the following detailed description when reading with reference to the accompanying drawings wherein same or similar parts or mechanisms are denoted by the same reference numerals throughout the drawings and in which:

Figure 1 is an exploded perspective view of a cartridge container according to a preferred embodiment of the present invention in which with upper and lower mating halves are separated;

Figure 2A is a plane view of a lower case half of the cartridge container;

Figure 2B is a side view of the lower case half of the cartridge container;

Figure 3 is a perspective view of the cartridge container with the upper and lower mating halves mated;

Figure 4 is a cross-sectional view taken along a line IV-IV of Figure 3;

Figure 5 is an explanatory view showing a conventional cardboard packing box for packing tape cartridges therein; and

Figure 6 is a perspective view of a conventional container.

[0014] Referring to the accompanying drawings in detail, and in particular, to Figures 1, 2A and 2B, there is shown a cartridge container 100 for suitably containing a number of flat cartridges such as electromagnetic tape cartridges (which are hereinafter referred to as tape cartridges for simplicity) 25 therein. The tape cartridge 25, which has a tape reel 23 with an electromagnetic tape 21 wound around a reel core, is shaped in the form of, for example, a thin square box, or otherwise in the form of a thin rectangular box. The tape reel 23 has an axis of rotation extending in a direction of the thickness of the tape cartridge 25.

[0015] The cartridge container 100 comprises a case shell made up of two mating case shell halves, namely upper and lower mating case shell halves 27 and 29. These upper and lower mating case shell halves 27 and 29 are identical in structure and shape with each other. The upper and lower mating case shell halves 27 and 29 are detachably fitted together by engagement so as to be opened and closed. For this detachable fitting of the upper and lower mating case halves 27 and 29, there are formed a plurality of compartments 31 (four in this embodiment), for receiving four tape cartridge sets 33. The tape cartridge set 33 to be received in the compartment 31 comprises a predetermined number of tape cartridges 25 (five in this embodiment), arranged closely side by side in a direction of thickness in a block. As shown in Figure 1, in order to protect tape egress/ingress slots of the tape cartridges 25 which are generally weak in mechanical structure against impact from the outside of the cartridge container 100, it is preferred to put the tape cartridge set 33 so as to position the tape egress/ingress slots on the side of a boundary between adjacent compartments 31 and faced upward. It is more preferred to put the cartridge sets 33 in the compartments 31 so that the tape egress/ingress slots of the cartridge sets 33 in adjacent compartments 31 are opposed to one another. In this instance, the compartment 31 has a storage volumetric capacity which is approximately the same as the cubic measure of the five tape cartridges 25. Accordingly, the tape cartridges 25 are neatly arranged in the compartment 31 even if put in the compartment 31 in a careless way. This is because there is no parting strip separating the tape cartridges 25 in the compartment 31. Since it is possible to hold two or three tape cartridges 25 together by hand and put them into the compartment 31, the cartridge container 100 brings a marked improvement in tape cartridge packing operation as compared with the conventional cartridge container or box which needs to put tape cartridges 25 one by one.

[0016] As described above, according to the structure of the cartridge container 100, since the tape cartridges 25 are contained in lots of multiple units, the cartridge container 100 can acquire an extra area uninvolved in storage in the case of the same storage area (which is

normalized by a standard) as the prior art cartridge container 7 including a flange adapted to receive the tape cartridges 25 individually. The extra area of the cartridge container 100 is utilized for what is called a crushable or impact absorption zone. In this embodiment, the crushable zone is provided in the form of wide transverse flanges 35 formed at and along opposite short sides of the mating case half 27, 29. The transverse flanges 35 of the mating case halves 27 and 29 at the respective short sides have rectangular openings 37 respectively so as to be used as carrying handgrips of the cartridge container 100. Therefore, the cartridge container 100 can not only be carried in a horizontal position by grasping both handgrips 37 but also be carried in a vertical position by gripping either one of the opposite handgrips 37. If a carrier accidentally drops the cartridge container 100 while carrying it in a vertical position by one hand, the cartridge container 100 has a first hit against a floor at the far side flange 35. At this time, the far side flange 35, that performs as an impact absorption member, is deformed or crushed by the weight of the cartridge container 100 and its contents so as to absorb impact strength, thereby absorbing a direct shock against the tape cartridges 25. In general, the tape cartridge 25 has a weakness for impact in a direction of thickness or axis of the tape reel, because a roll of electromagnetic tape 21 does not always have even side surfaces but has irregularities at opposite sides thereof. The electromagnetic tape 21 is not always wound on the tape reel 23 with side edges of convolutions of the tape neatly flush with one another, so that a roll of the electromagnetic tape 21 wound in the tape reel has irregularities at opposite sides. The irregularities can cause the electromagnetic tape 21 to hit against the flanges of the tape reel 23 at the side edges due to external force while winding the electromagnetic tape 21 in the tape reel 23, with the result that the electromagnetic tape 21 is crushed and/or broken back in a transverse direction at its side edges as being wound in the tape reel 23. The electromagnetic tape 21 having crushed and broken irregularities brings down an adverse effect on smooth winding and unwinding, and can at worst cause defective recording. In contrast, the container 100 having the crushable flanges 35 arranged at the short sides thereof which is identical with the axis of the tape reel 23 has enhanced impact resistance in the lengthwise direction in which the tape cartridge 25 is mechanically weak.

[0017] The mating case half 27, 29 has a case coupling structure comprising a generally U-shaped top fitting rail 43 extending half around an opening thereof and a generally U-shaped top groove 45 extending separately half around the opening as male and female coupling components, respectively. These male and female coupling components are formed on opposite sides of a longitudinal centre line 47 of the mating case shell half 27, 29 and are completely equal in overall length to each other. The top fitting rail 43 of one of mating case shell halves 27 and 29 is fitted in the top groove 45 of the other by

insertion. The mating case shell half 27, 29 is provided with a cruciform partition wall 49 for defining the respective compartments 31. Further, the mating case shell half 27, 29 is provided with a lateral rim 51 extending entirely along either one of the rim projection 43 and the groove 45 and bent toward the counterpart so as to cover the periphery of the mating case shell half 27, 29 of the other of the top fitting rail 43 and the top groove 45 of the counterpart to improve dustproofing and waterproofing.

[0018] The mating case half 27, 29 further has a container coupling structure comprising two bottom fitting frames 53 and two bottom fitting frames 55 formed as male and female coupling components, respectively, on an external bottom surface thereof. The bottom fitting frame 53 defines an aperture into which the bottom fitting frame 55 fits well. These bottom fitting frames 53 and 55 are located correspondingly to the respective compartments 31 and on opposite sides of the longitudinal centre line of the mating case half 27, 29. The bottom fitting frames 53 and 55 are dimensioned so that the bottom fitting frames 55 of the mating case shell half 27, 29 are fitted together in the bottom fitting frames 53 of the mating case shell half, 27, 29 of another cartridge container 100 by insertion. By means of the container coupling structure, a plurality of the cartridge containers 100 piled on top of another are prevented from sliding relative to each other and, in consequence, from tumbling down.

[0019] The mating case half 27, 29, that is preferably made in the form of an integral plastic resin product such as those relatively easy in handling, is provided with sufficient toughness for reliable protection of the tape cartridges 25 stored in the cartridge container 100 and appropriate impact absorbability and is suitable for commercial and inexpensive production of the cartridge container 100. It is preferred to use any one of polyethylene terephthalate, polypropylene and polystyrene for the mating case halves 27 and 29 by reason of easy availability of the material, easy and inexpensive vacuum moulding of the mating case halves 27 and 29, and collection and reclamation of waste cartridge containers 100.

[0020] It is further preferred to use translucent plastic resins by reason of visibility of the tape cartridges 25 put in the cartridge container 100 and easiness of keeping track of a contained state of the tape cartridges 25 in the cartridge container 100.

[0021] In order to economically acquire required minimum structural strength of the respective compartments 31 of the cartridge container 100, and besides minimizing the cartridge container 100 in weight while satisfying required minimum structural strength of the cartridge container 100, it is possible to form the mating case halves 27 and 29 by stretching press of a plastic resin sheet having a thickness of 0.5 to 2.0 mm. In addition, the usage of such a thin plastic resin sheet results in allowing the cartridge container 100 to undergo proper deformation due to external impact, so as thereby to secure most appropriate impact absorbability for the tape cartridges

25. In this instance, if the plastic resin sheet has a thickness less than 0.5 mm, the cartridge container 100 deforms too easily, so that it is incapable of bringing about an appropriate impact absorption effect. On the other hand, if the plastic resin sheet has a thickness greater than 2.0 mm, the cartridge container 100 encounters a difficulty in deformation which allows external impact to be directly transmitted to the tape cartridges 25 put therein. The cartridge container 100 whose thinnest part is confined in thickness to that range in the limits is provided with an optimized crushable or appropriate impact absorbable zone.

[0022] Referring to Figures 3 and 4, the cartridge container 100 is completed by coupling the upper mating case shell half 27 to the lower mating case shell half 27 with four cartridge sets 33 put therein through insertion of the top fitting rail 43 into the top groove 45. The cartridge container 100 thus packed is boxed in a cardboard packing box 80 that is made similarly in size to the cartridge container 100 and carried about. When opening the cardboard packing box 80 and taking the cartridge container 100 out from the cardboard packing box 80, it is possible to pull out the cartridge container 100 from the cardboard packing box 80 with ease by grasping the handgrip 37 formed in the flange 35 and pulling it. In order to make it more easy to take the cartridge container 100 out from the cardboard packing box 80, the flange 35 is shaped with opposite corners 57 cut off at approximately 45 degrees so as to form triangular spaces between the cartridge container 100 and the cardboard packing box 80 for easy access to the cartridge container 100 for fingers.

[0023] As shown in detail in Figure 4, the handgrip 37 of the mating case shell half 27, 29 has inner walls 59 which are generally L-shaped in cross section at its long sides (in the transverse direction of the cartridge container 100). The L-shaped inner wall 59 has a breadth L of 1 to 2 mm in the longitudinal direction of the cartridge container 100 in order to enhance structural rigidity of the handgrip 37. The handgrips 37 having the L-shaped inner walls 59 provide for an easy and firm grip by a hand for an easy lift of the cartridge container 100. In this instance, when producing the mating case shell half 27, 29 by injection moulding, the handgrip 37 is formed by forming a bottomed opening in the flange 35 first and thereafter cutting out the bottom so as to leave an arm portion 61 of the L-shaped wall 59. It is preferred to chamfer edges of the arm portion 61, and more preferably to round them off them. The handgrip 37 thus provides a safety grip and easy withdrawal of the cartridge container 100 from the cardboard packing box 80, and also prevents a hand from being injured during carrying the cartridge container 100.

Claims

1. A cartridge container (100) for storing a plurality of

flat tape cartridges (25) having tape reels (23), respectively, therein, on which electromagnetic tapes are wound, respectively, **characterized by:**

- 5 a case shell comprising two mating case shell halves (27, 29) identical in shape and structure which are coupled to each other to form said cartridge container (100);
- 10 a flange (35) formed as an integral part of each said mating case shell half (27, 29) at each of opposite sides of said mating case shell half (27, 29) and
- 15 a handgrip (37) formed by an opening (37) formed in said crushable flange (35) of each said mating case shell half (27, 29);

wherein said two mating case shell halves (27, 29) are coupled to form at least one compartment for receiving a set of a predetermined number of said flat tape cartridges (25) arranged closely side by side in a direction of axis of said tape reel (23) in an interior of said cartridge container (100).

- 25 2. A cartridge container as defined in claim 1, **characterized in that** said opening (27) has a generally L-shaped inner wall (59).
- 30 3. A cartridge container as defined in claim 1 or 2, **characterized in that** each said mating case shell half (27, 29) comprises a top fitting rail (43) and a top groove (45), said top fitting rail (43) of one of said two mating case shell halves (27, 29) being fitted in said top groove (45) of the other of said two mating case shell halves (27, 29) by insertion so as thereby to couple said two mating case shell halves (27, 29) for completing said cartridge container (100).
- 35 4. A cartridge container as defined in any one of the preceding claims 1 to 3, **characterized in that** each said mating case shell half (27, 29) has a plurality of partition walls (49) for defining a plurality of said compartments separately.
- 40 5. A cartridge container as defined in any one of the preceding claims 1 to 4, **characterized in that** each said mating case shell half (27, 29) is formed as an integral moulded product made of a plastic resin.
- 45 6. A cartridge container as defined in claim 5, **characterized in that** said plastic resin comprises one selected from a group of polyethylene terephthalate, polypropylene and polystyrene
- 50 7. A cartridge container as defined in claim 5 or 6, **characterized in that** said plastic resin comprises a translucent plastic resin.
- 55 8. A cartridge container as defined in any one of the

preceding claims 5 to 7, **characterized in that** each said mating case shell half (27, 29) comprises a product formed by stretching press of a plastic resin sheet having a thickness in a range of from 0.5 to 2.0 mm.

5

10

15

20

25

30

35

40

45

50

55

Fig. 1

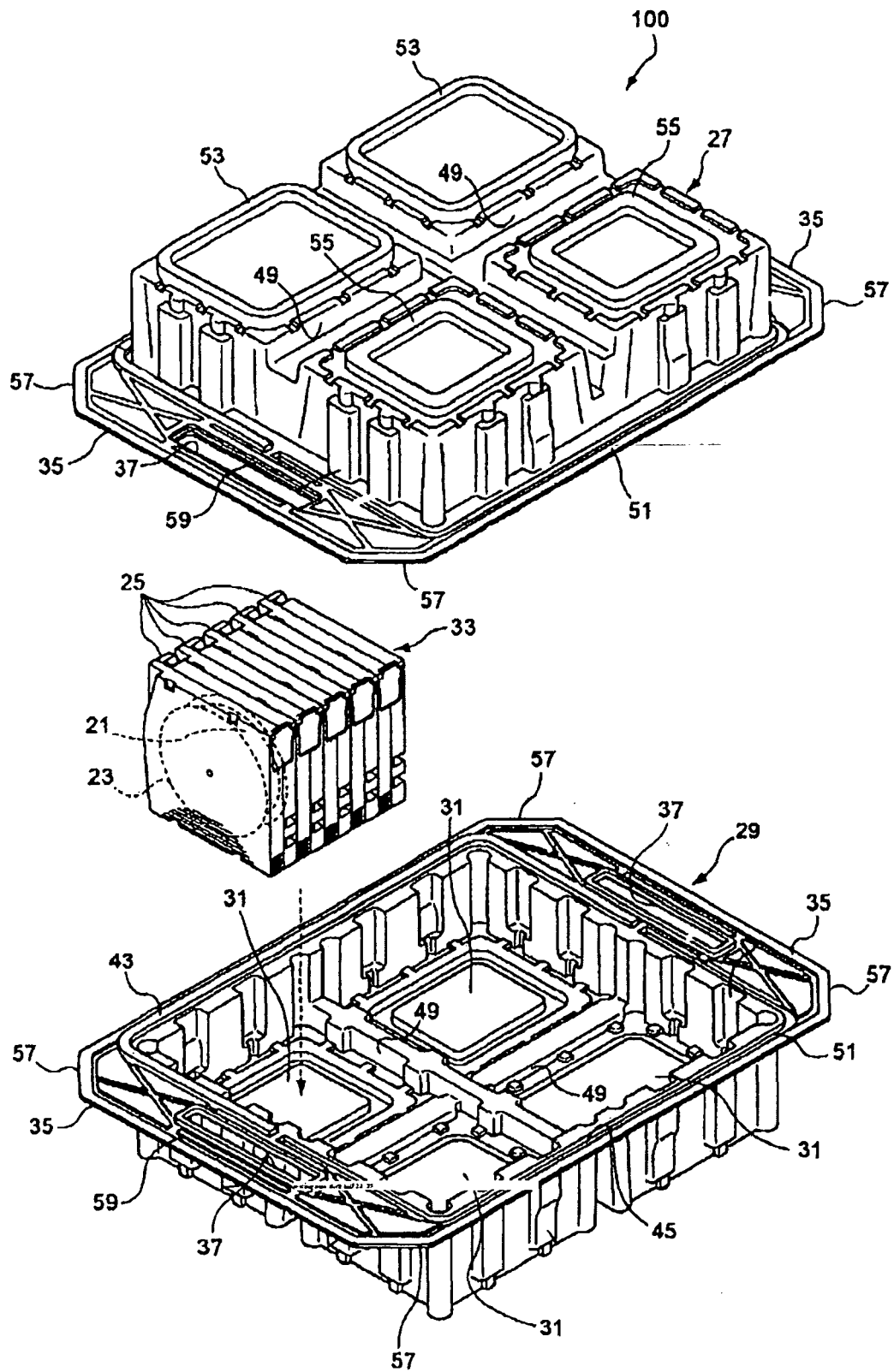


Fig. 2A

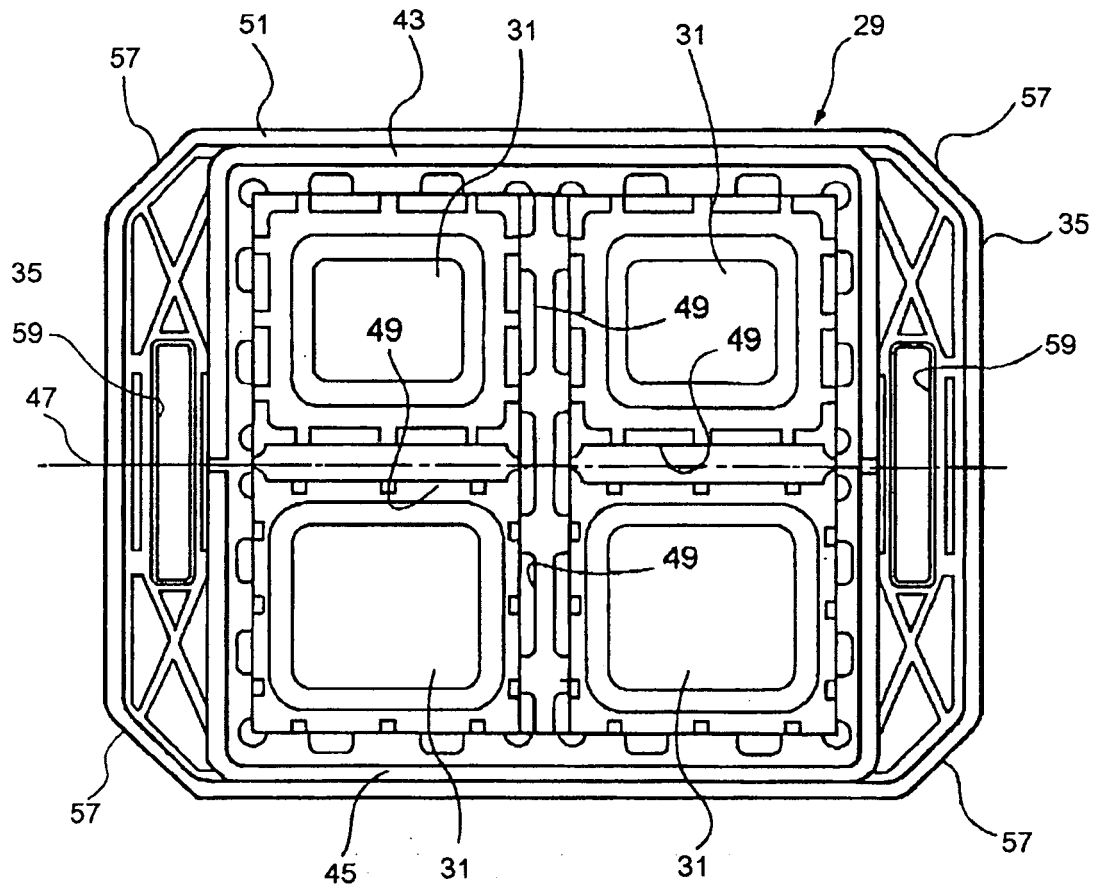


Fig. 2B

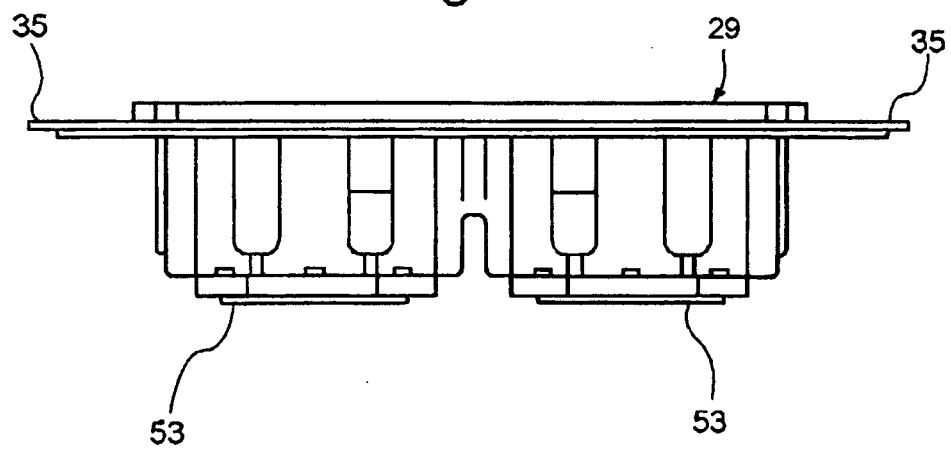


Fig. 3

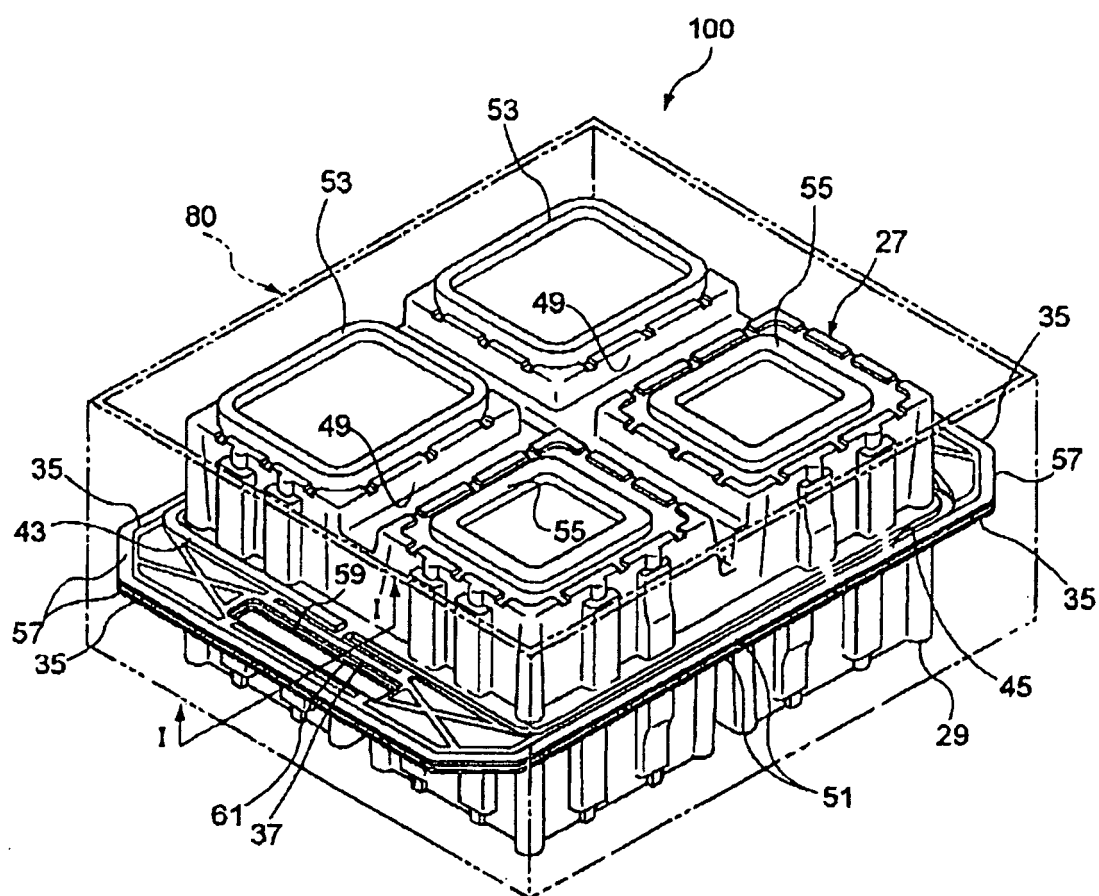


Fig. 4

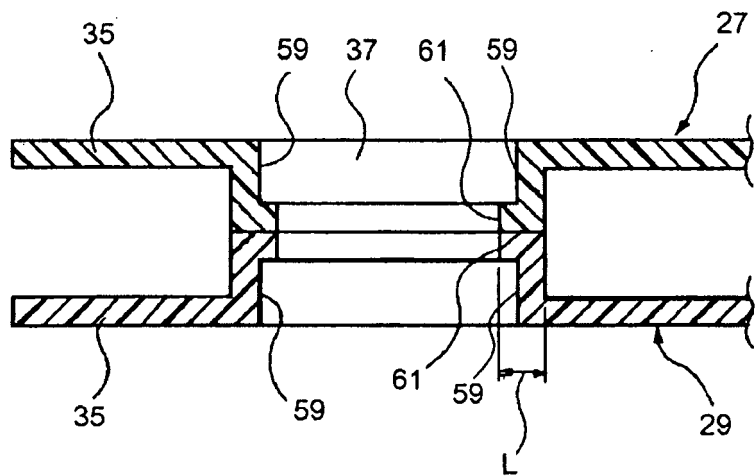


Fig. 5
Prior Art

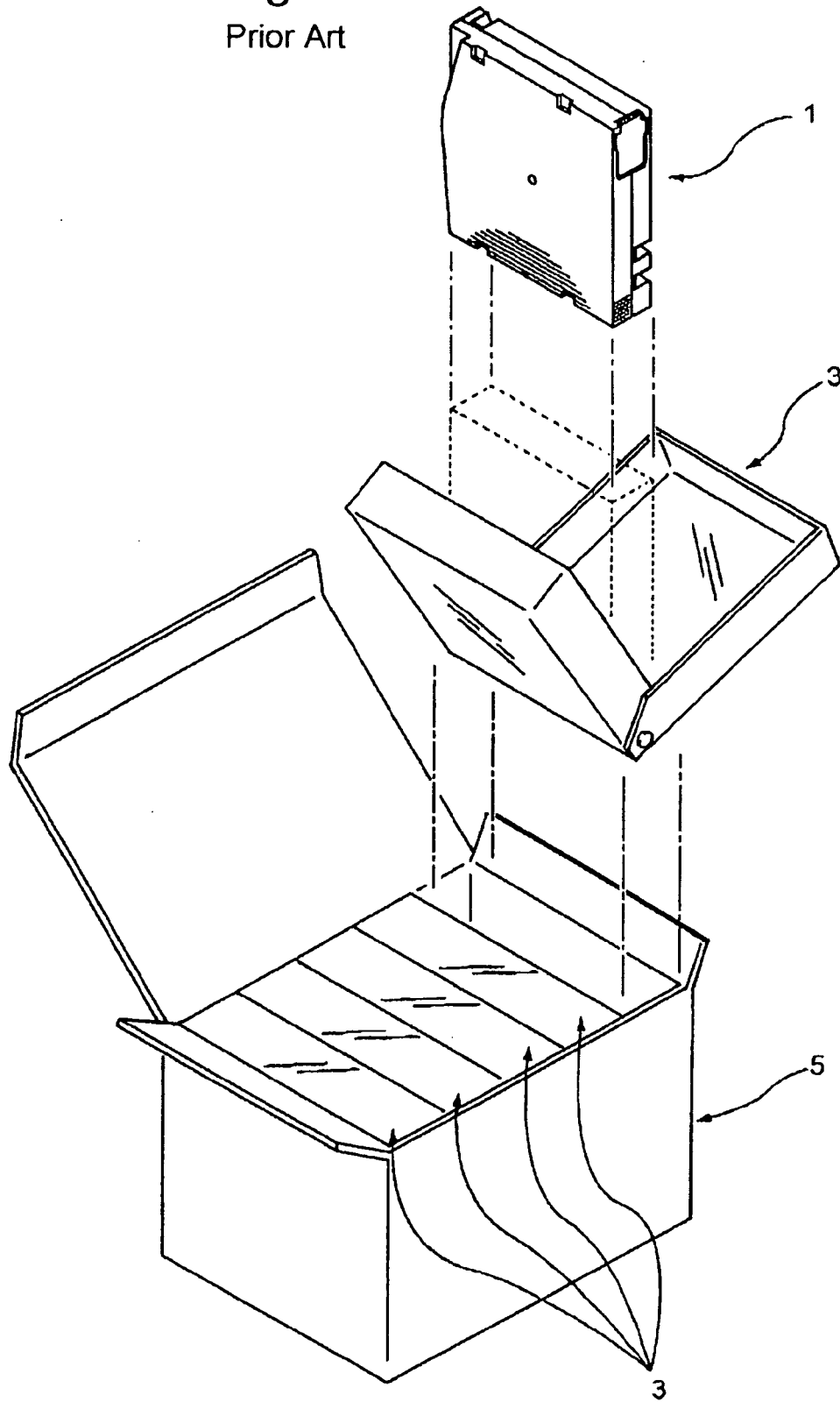
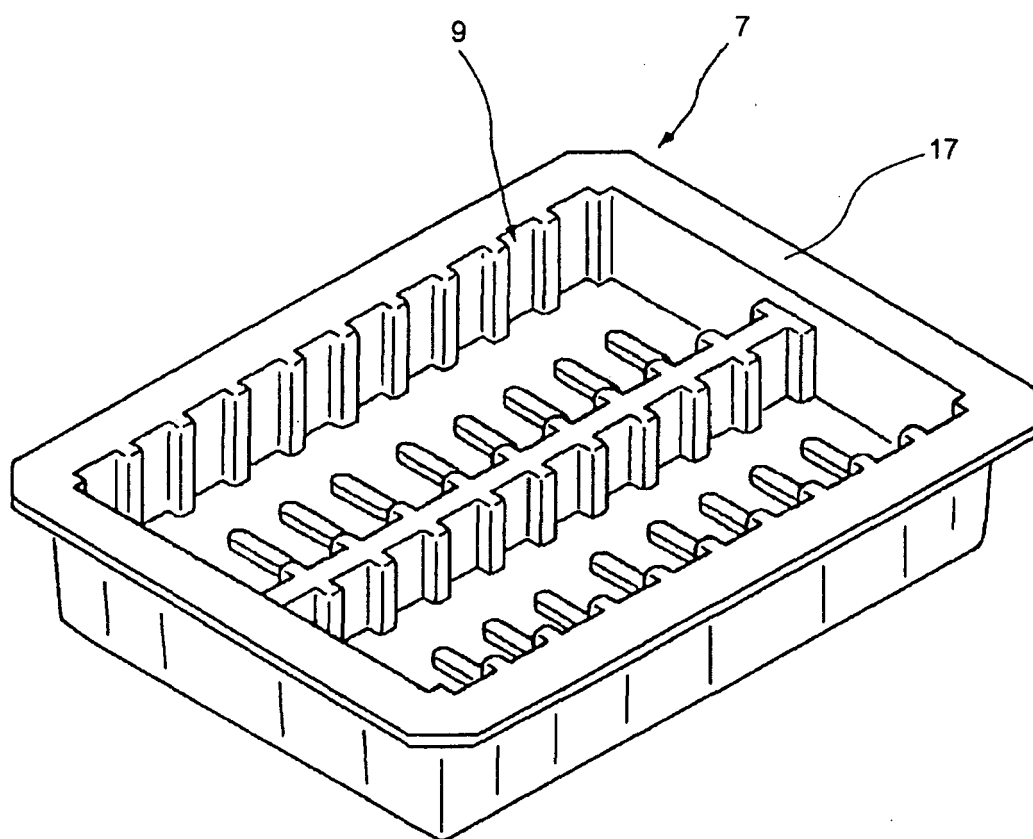


Fig. 6

Prior Art





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 25 0398

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2004/144781 A1 (DEES JEROME G [US] ET AL DEES JEROME G [US] ET AL) 29 July 2004 (2004-07-29) * abstract; figures *	1,3,5-8	INV. B65D25/28 B65D77/04 B65D81/02
A	GB 1 471 033 A (AGOSTINI G) 21 April 1977 (1977-04-21) * page 1, line 9 - line 45; figures *	1,3,5	
A	FR 2 051 966 A (CHATELARD ETS) 9 April 1971 (1971-04-09) * claims; figures *	1,3-6	
A	FR 2 675 121 A1 (SAPLEST PRODUCTIONS [FR]) 16 October 1992 (1992-10-16) * the whole document *	1,3-6	
A	US 5 823 351 A (MATSUO SHINICHI [JP] ET AL) 20 October 1998 (1998-10-20)		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) B65D
Place of search The Hague		Date of completion of the search 24 April 2007	Examiner SERRANO GALARRAGA, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

 2
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 25 0398

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-04-2007

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2004144781	A1	29-07-2004	NONE		
GB 1471033	A	21-04-1977	FR	2224977 A7	31-10-1974
FR 2051966	A	09-04-1971	NONE		
FR 2675121	A1	16-10-1992	NONE		
US 5823351	A	20-10-1998	CN	1130439 A	04-09-1996
			EP	0723290 A1	24-07-1996
			WO	9602069 A1	25-01-1996
			JP	3269631 B2	25-03-2002
			KR	100241794 B1	01-02-2000

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2003285424 A [0003]