CONTAINER FOR COLLECTING AND TRANSPORTING SPECIAL WASTE

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Appl. No.: 11/586,442
Filed: Oct. 25, 2006

Publication Classification
B65D 77/00 (2006.01)
B65D 25/14 (2006.01)

ABSTRACT
A container for collecting and transporting special waste, such as hospital waste and diagnostic samples, is provided with an outer box of cardboard, an inner box of cardboard, which can be placed in the outer box, and a plastic bag positioned between the outer box and the inner box. The outer box and the inner box each have a closed bottom and an open upper side. A cover can be pressed onto the container in a closure position for closing the container. The plastic bag is folded outwards or inwards over the upper edge of the outer box or the inner box and lies against the upper part of the wall of the outer box or the inner box. The cover has a peripheral edge, which encloses the upper part of the outer wall of the outer box in the closure position. An adhesive strip is provided on the inner side of said peripheral edge, in which the upper edges of the outer box and the inner box are accommodated when the cover is pressed on the container in the closure position.
CONTAINER FOR COLLECTING AND TRANSPORTING SPECIAL WASTE

BACKGROUND

[0001] The invention relates to a container for collecting and transporting special waste, such as hospital waste and diagnostic samples, which container comprises an outer box of cardboard, an inner box of cardboard, which can be placed in the outer box, a plastic bag positioned between the outer box and the inner box, which outer box and inner box each have a closed bottom and an open upper side, and a cover that can be pressed onto the container in a closure position for closing the outer box.

[0002] Such a container is known from EP-A-1 472 987, for example. It has been found from experiments with this known container that improvement is possible as regards the closure of the container. Furthermore, the closing edge of said known container is relatively complicated to manufacture.

SUMMARY

[0003] According to one aspect of the invention, the plastic bag is folded outwards or inwards over the upper edge of the outer box or the inner box and lies against the upper part of the wall of the outer box or the inner box, with the cover having a peripheral edge, which encloses the upper part of the outer wall of the outer box in the closure position and which is provided with an adhesive strip on the inner side, in which the upper edges of the outer box and the inner box are accommodated when the cover is pressed on the container in the closure position.

[0004] In this way a container is obtained in which a very strong bond between the upper edges of the inner box and the outer box and the adhesive strip in the cover is realised. In this way a hermetic seal of the container is obtained in the situation in which the cover is pressed onto the container. In addition, the upper edge of the outer box or the inner box that is covered by the plastic bag is easy to manufacture.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Aspects of the invention will now be explained in more detail with reference to the drawings, which shows in a very schematic way some embodiments of the container.

[0006] FIG. 1 schematically shows an embodiment of a container, in which the inner box with the plastic bag is still positioned outside the outer box and the cover is not shown.

[0007] FIG. 2 is a perspective view of the cover of the container of FIG. 1.

[0008] FIG. 3 shows the container of FIG. 1, in which the inner box and the plastic bag are entirely contained within the outer box and the cover is pressed onto the container.

[0009] FIG. 4 is a sectional view along the line IV-IV in FIG. 3.

[0010] FIG. 5 is a sectional view corresponding to FIG. 4, in which a different embodiment of the cover is used.

[0011] FIG. 6 shows a second embodiment of the container according to the invention, in which a second inner box is used and the two inner boxes are still positioned outside the outer box.

[0012] FIG. 7 shows a box that forms part of an alternative embodiment of a container.

[0013] FIG. 8 is a cross-sectional view of a variant of the cover of an embodiment of the container.

[0014] FIG. 9 is a perspective view of an embodiment of the cover of a third embodiment of the container.

[0015] FIG. 10 is a larger-scale view of a part of the cover of FIG. 9.

[0016] FIG. 11 is a perspective view from the bottom side of the cover of FIG. 9, with the peripheral edge of the cover in a temporary supported position.

[0017] FIG. 12 is a view along the line XII-XII of FIG. 11.

[0018] FIG. 13 is a sectional view corresponding to FIG. 4 of the third embodiment of the container according to the invention, in which the cover of FIG. 11 is placed on the outer box in the temporary supported position.

DETAILED DESCRIPTION

[0019] FIGS. 1-3 show an embodiment of a container for collecting and transporting special waste. The container comprises an outer box 1 and an inner box 2, which is still positioned outside the outer box in the view that is shown in FIG. 1. Present between the outer box 1 and the inner box 2 is a plastic bag 3, which is made of so-called shrink film, for example biaxially shrinkable LDPE having a thickness of 60-70 μ. The outer box 1 and the inner box 2 have a bottom with a so-called American closure, with this understanding that the bottom flaps formed on the side walls 4 partially overlap each other, so that no openings are present in the bottom in the assembled state of the box. The plastic bag 3 likewise has a closed bottom. When the inner box 2 is placed in the plastic bag 3, the plastic bag 3 projects about 4 cm above the inner box.

[0020] The outer box 1 and the inner box 2 of the container as described includes a water resistant, solid cardboard, in particular a solid, water resistant glued cardboard with a plastic coating of polyethylene, for example. In one embodiment, at least 600 g/m² cardboard can be used. The thickness of the material of the solid cardboard of the outer box 1 and of the inner box 2 preferably meets the standards as regards resistance to puncture by sharp objects of, for example, British Standard BS7320 (1990).

[0021] Upon manufacture of the container, the inner box 2 is placed into the plastic bag 3 and the inner box 2 with the plastic bag is inserted into the outer box 1. The dimensions of the outer box 1 and the inner box 2 have been selected so that when the inner box 2 rests on the bottom of the outer box 1, the upper edges 5 and 6 of the outer box 1 and the inner box 2 lie at least substantially in the same plane. Then the projecting part of about 4 cm of the plastic bag 3 is folded down outwards and the container is subjected to a heat treatment. As a result, the part of the plastic bag 3 that abuts against the upper part of the outer wall of the outer box 1 contracts tightly around the outer wall of the outer box 1. In practice the material of the plastic bag 3 will also bond firmly to the plastic coating of the outer box 1, as a result of which a smoothly finished surface is obtained in particular at the upper edge 5 so as to provide a water-tight and airtight seal of the container by means of a cover 7 as shown in FIG. 2.

[0022] In the illustrated embodiment, the cover 7 comprises an outer cover 8 with a peripheral edge 9. Said peripheral edge 9 is in one piece with the upper surface 10 of the outer cover 8 and has been formed together with the upper surface 10 of a blank without any cuts. An inner cover 11 is fitted in the outer cover 8, so that a channel 13 is formed between the peripheral edge 9 and an inner edge 12 of the inner cover 11. An adhesive strip 14 is provided in said
channel 13, which adhesive strip preferably can be of a flexible hot melt adhesive, for example a hot melt with a base of a synthetic polymer. Said hot melt adhesive may or may not be foamed. The cover 7 is made of the same material as the outer box 1 and the inner box 2.

[0023] In FIG. 3 the cover 7 is pressed onto the outer box 1 with the inner box 2 and the plastic bag 3 present therein. In this closure position of the cover 7, the peripheral edge 9 encloses the upper part of the outer box 1 and the upper edges 5 and 6 of the outer box 1 and the inner box 2 respectively are pressed into the adhesive strip 14, as is shown in the sectional view of FIG. 4. Tests have shown that in this way a fully hermetic seal of the container is obtained. The sealed container meets all the standards that are made of containers for hospital waste.

[0024] As is shown in FIG. 1, each side wall 4 of the outer box 1 can be provided with a handle opening 15, and top flaps 16 are provided on the side walls 4, which flaps are folded against the inner side of the side walls 4. In this way the handle openings 15 are covered, so that the contents of the container are protected by a double layer of cardboard also at the location of the handle openings 15. In the illustrated embodiment, the handle openings 15 are not only intended for lifting the container, but they also function as connecting means in order to ensure that the cover 7 is pressed onto the container in the correct closure position. The peripheral edge 9 of the cover 7 is provided with connecting lips 17, which can be folded into the handle openings 15 when the cover 7 is fully pressed onto the container. The connecting lips 17 are retained between the side walls 4 and the top flaps 16 in that case.

[0025] According to an alternative embodiment, the outer box 1 may not be provided with the top flaps 16 or with top flaps that do not cover the handle openings. The connecting lips 17 are retained between the side walls of the outer box 1 and the side walls of the inner box 2 in that case. The advantage of retaining the connecting lips between two box parts, i.e. the top flaps and the side walls of the outer box and the side walls of the outer box and the inner box, respectively, in the variants described herein is that in case of an excess pressure in the container relative to the environment an the connecting lips will be wedged against the side walls of the outer box 1, with the wedging force increasing as the excess pressure increases. It is also possible, of course, not to configure the openings 15 as handle openings, in which case the openings only function as locking openings for receiving the connecting lips 17. It is noted that the locking engagement of the cover 7 on the container as described can also be used with containers of a type different from that of the containers that are described herein. The container may comprise an inner box, an outer box and a cover made of different materials.

[0026] It is noted that it will suffice, if desired, to provide two opposite side walls 4 and parts of the peripheral edge 9 of the cover 7 with handle openings 15 and connecting lips 17 respectively. Furthermore it is possible to use two or more handle openings and connecting lips on one side.

[0027] FIG. 5 is a view corresponding to FIG. 4 of a container, in which an alternative embodiment of the cover 7 is used. In this case the inner cover 11 is provided with a sloping inner edge 12, which slope enables the inner edge 12 to function as a guide edge for the upper edge 6 of the inner box 2. In this way it is ensured that the upper edge 6 of the inner box 2 is pressed into the adhesive strip 14 over the entire circumference thereof.

[0028] As is shown schematically in FIG. 1, the side walls of the inner box 2 can be provided with top flaps 18 as well, which top flaps are folded against the inner side of the side walls, so that a smooth, strong upper edge 6 of the inner box 2 is obtained. Although the upper edge 6 of the inner box 2 is not covered by a plastic bag 3, the plastic coating of the material of the inner box provides a smoothly finished upper edge 6, which helps to obtain a good hermetic seal by means of the cover 7.

[0029] Alternatively, the projecting part of the plastic bag 3 can also be folded down inwards, so that the plastic material will come to lie against the inner side of the wall of the inner box 2. After the heat treatment a smoothly finished surface of the upper edge 6 of the inner box is obtained. In this variant of the inner box 2, the heat treatment can be carried out before the top flaps 18 are folded inwards. As a result, the plastic bag is pulled tightly over the top flaps 18 and the plastic material will adhere to the coating of the top flaps 18. After the heat treatment, the upper flaps 18 are folded inwards together with the plastic material of the plastic bag 3 adhering thereto, as a result of which the plastic material is pulled tightly over the upper edge 6 of the inner box 2.

[0030] The part of the plastic bag 3 present between the two boxes 1 and 2 is more or less freely positioned between the two boxes. As a result, air is retained within the plastic bag 3 when the container is closed with the cover 7, which air has a damping effect when the container is subjected to shock loads. The airtight closure of the plastic bag 3 is ensured in that the plastic bag encloses the upper edge 5 of the outer box 1 or the upper edge 6 of the inner box 2 and is pressed into the adhesive strip 14 when the cover 7 is placed on the container.

[0031] It is noted that the plastic bag 3 may also comprise of a plastic material other than a shrink foil. In that case the upper end of the plastic bag 3 can be folded over the top flaps 18 of the inner box 2, for example, and be folded inwards together with the top flaps 18, as a result of which the plastic material is pulled tightly around the upper edge 6 of the inner box.

[0032] An amount of absorption material may be present in the container, if desired, which material is capable of absorbing any moisture that may be present in the waste. The dimensions (L×W×H) of the outer box are 40×30×50 cm, for example.

[0033] An advantage of the container as described herein is that a hermetic seal of the outer box 1 and the inner box 2 by the cover 7 can be effected by using relatively simple means. The container meets the usual standards as regards puncture resistance and falling resistance for containers of hospital waste. Another advantage of the container as described herein is that when more stringent requirements are to be met, this can be done by using a heavier type of cardboard. The cardboard container as described herein furthermore has this advantage that the dimensions can readily be changed, without any costly investments in new molds being required, as is the case with containers of plastic material.

[0034] The container can readily be extended in a modular fashion in those cases in which very stringent requirements are to be met, for example when UN packing instruction
P620 applies. A possible variant is shown in FIG. 6, in which a second inner box 19 is used. Said inner box 19 is placed into a plastic bag 20 and is inserted into the inner box 2 together with said plastic bag 20, after which the plastic bag is folded over the side walls of the inner box 2 and pulled tightly around the upper side of the inner box 2 as a result of being subjected to a heat treatment. Then the inner boxes 2 and 19 are placed into the outer box 1 together with the plastic bag 3 and the plastic bag 3 is pulled tightly around the upper side of the outer box 1 in the above-described manner. One or more additional inner boxes 19 may be used, depending on the requirements that the container is to meet.

FIG. 7 shows an embodiment of a box 21 capable of accommodating the outer box 1 and the inner box 2. It is furthermore possible to place assemblies of two or more assembled outer and inner boxes 1.2 into said box 21. The box 21 is provided with two top flaps 22 and 23, which are arranged one on top of the other so as to close the box 21. Then a top flap 24 comprising a closure flap 24a is laid over the top flaps 22,23, with the closure flap 24a being inserted between the side wall of the box 21 and the top flaps 22,23. Finally, a top flap 25 provided with a closure lip 25a is laid over the top flap 24 and the closure lip is inserted into the opening 26. A slot 25b is formed in the closure lip 25a, into which slot a closure lip 27 is inserted.

FIG. 8 shows an alternative embodiment of the cover 7, which is made up of the outer cover 8 and a plate 28 of a plastic material, for example polyethylene, provided therein. Between the plate 28 and the peripheral edge 9 the channel 13 is formed, in which the adhesive strip 14 is provided. The plate 28 may comprise a sloping locating edge for the upper edge 6 of the inner box 2. If desired, a cover 7 not provided with an inner cover 11 or a plate 28 can be used.

FIGS. 9-12 show an advantageous embodiment of a cover 29 for a container, in which the outer box 1 and the inner box 2 of FIG. 1 can be used. The cover 29 is configured with a peripheral edge 30 similarly to the cover 7 of FIG. 2, which edge in this case includes two parts 31 and 32, of which the peripheral edge part 31 joins the upper panel 33 and is completely closed in the corners, as is shown schematically in FIG. 10. The peripheral edge part 32 is open in the corners, as indicated at 34, so that the peripheral edge part 32 can be folded inwards about the fold lines indicated by a dashed line 35 to the position that is shown in FIGS. 11 and 12. The peripheral edge part 32 is maintained in this temporary position of use by the connecting lips 17 on the inner cover 11 or, if an inner cover is not used, temporarily affixing it to the inner side of the upper panel 33, for example by means of a suitable adhesive. In this way the adhesive strip 14 in the channel 13 is covered by the peripheral edge portion 32, so that the adhesive strip 14 is fully protected. The peripheral edge part 32 functions as a covering edge for the channel 13 and the adhesive strip 14, as it were.

In addition, the cover 29 can easily be placed in a temporary supported position on the outer box 1 and the inner box 2, as is shown in sectional view in FIG. 13. In this position, the cover 29 engages the upper edge 5 of the outer box 1 with the peripheral edge part 32, as a result of which a more or less airtight temporary closure of the container is obtained. Once the inner box 2 has been filled, the connecting lips 17 are pulled off the inner side of the upper panel 33 or the inner cover 11, and the cover 29 is placed permanently on the outer box 1 and the inner box 2, with the upper edges 5,6 of the boxes 1,2 being pressed into the adhesive strip 14 and the connecting lips 17 being folded into the handle openings 15.

For the sake of completeness it is noted that in those cases in which the cover 7 or 29 is not provided with an inner cover, this single cover may be made of a heavier type of cardboard so as to obtain the required puncture resistance.

According to another variant of the container, it is also possible to place a container of a plastic material provided with a cover of its own into the container that is shown in FIG. 1, which may be extended with one or more inner boxes 19. Furthermore, one or more so-called needle boxes may be placed in the container according to the invention. The needle boxes may be formed in a relatively simple manner of a puncture resistant cardboard (for example according to British Standard BS7320).

Although the invention has been described herein by means of embodiments of containers for collecting and transporting special waste, the containers described may also be used for collecting and transporting other materials. Another application is the packing and shipping of diagnostic samples.

The invention is not restricted to the embodiments described above, which can be varied in several ways, for example in the shape of the boxes and corresponding covers, without departing from the scope of the claims. In addition, aspects of the container(s) as described in European Patent Application 06110144.0, published Aug. 23, 2006 as EP1693020A1, which is hereby incorporated by reference in its entirety, can be adopted, if desired.

1. A container for collecting and transporting special waste, such as hospital waste and diagnostic samples, which container comprises an outer box of cardboard, an inner box of cardboard, which can be placed in the outer box, a plastic bag positioned between the outer box and the inner box, which outer box and inner box each have a closed bottom and an open upper side, and a cover that can be pressed onto the container in a closure position for closing the container, wherein the plastic bag is folded outwards or inwards over the upper edge of the outer box or the inner box and lies against the upper part of the wall of the outer box or the inner box, with the cover having a peripheral edge, which encloses the upper part of the outer wall of the outer box in the closure position and which is provided with an adhesive strip on the inner side, in which the upper edges of the outer box and the inner box are accommodated when the cover is pressed on the container in the closure position.

2. A container according to claim 1, wherein the outer box and the inner box and the cover are made of a water-resistant, solid cardboard, preferably with a coating of polyethylene.

3. A container according to claim 1, wherein the cover is provided with a channel on the inner side of the peripheral edge, the outer side of which channel is bounded by the peripheral edge and the inner side is bounded by an inner edge, in which channel the adhesive strip is present.

4. A container according to claim 3, wherein the inner edge of the channel is configured as a guide edge for the upper edge of the inner box.

5. A container according to claim 1, wherein the cover is provided with a cover edge joining the peripheral edge, which covers the adhesive strip, which cover edge is mov-
able between a supported position, in which the cover can be placed on the upper edge of the outer box in such a manner as to be removable therefrom, and an operative position, in which the cover can be pressed onto the container in the closure position.

6. A container according to claim 5, wherein the cover edge is in one piece with the peripheral edge, wherein the cover edge is aligned with the peripheral edge in the operative position and extends between the peripheral edge and the inner side of the cover in the supported position.

7. A container according to claim 1, wherein the outer box is provided with a handle opening in at least two opposite side walls and with a top flap that lies against the inner side of the outer wall, thereby covering the handle opening.

8. A container according to claim 7, wherein the cover and the outer box are provided with interacting connecting means which can be interconnected in the closure position of the cover.

9. A container according to claim 8, wherein the handle openings form the connecting means of the outer box and wherein the peripheral edge or the cover edge of the cover is provided with connecting lips which can be accommodated in the handle openings in the closure position.

10. A container according to claim 9, wherein all four side walls of the outer box are provided with a handle opening and a top flap, which top flaps are folded inwards, thereby covering the associated handle opening, wherein the peripheral edge or the cover edge of the cover is provided with a connecting lip for each handle opening, which connecting lip can be accommodated in the associated handle opening in the closure position.

11. A container according to claim 1, wherein the inner box is provided with top flaps that lie against the inner side of the outer wall.

12. A container according to claim 11, wherein the upper part of the plastic bag abuts tightly against the wall of the outer box or the inner box, whilst the remaining part of the plastic bag is contained between the outer box and the inner box with some play.

13. A container according to claim 1, wherein a second plastic bag is present between the outer box and the inner box, wherein the first plastic bag is folded inwards over the upper edge of the inner box and wherein the second plastic bag is folded down outwards over the upper edge of the outer box.

14. A container according to claim 1, comprising at least one second inner box and a second plastic bag which is folded over the upper edge of the first or the second inner box and which abuts tightly against the upper part of the wall of said inner box.

15. A container according to claim 1, comprising an inner container of plastic material provided with a cover of plastic material.

16. A container according to claim 1, wherein at least the folded part of the plastic bag tightly encloses the upper edge and the upper part of the wall of the outer box or the inner box.

17. A container for collecting and transporting special waste, such as hospital waste and diagnostic samples, wherein an inner box of a water resistant, solid cardboard having a closed bottom and upright side walls is placed into a plastic bag and the inner box with the plastic bag is placed into an outer box of a water resistant, solid cardboard having a closed bottom and upright side walls, wherein the plastic bag is folded down outwards or inwards over the upper edge of the outer box or the inner box and wherein at least the folded part of the plastic bag is pulled tightly around the upper part of the outer wall of the outer box.

18. A method for manufacturing a container for collecting and transporting special waste, such as hospital waste and diagnostic samples, wherein an inner box of a water resistant, solid cardboard having a closed bottom and upright side walls is placed into a plastic bag and the inner box with the plastic bag is placed into an outer box of a water resistant, solid cardboard having a closed bottom and upright side walls, wherein the plastic bag is folded down outwards or inwards over the upper edge of the outer box or the inner box and wherein at least the folded part of the plastic bag is pulled tightly around the upper part of the outer wall of the outer box.

19. A method according to claim 18, wherein the inner box is provided with top flaps and the plastic bag also encloses the upright top flaps, wherein the part of the plastic bag that encloses the top flaps is pulled around the top flaps of the inner box, after which the top flaps are folded inwards against the inner side of the wall of the inner box together with the abutting part of the plastic bag.

20. A method according to claim 18, wherein the plastic bag comprises a shrink foil and wherein the shrink foil is pulled tightly around the inner box and the outer box by using a heat treatment.

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