

AN ENVIRONMENTALLY FRIENDLY AND SPACE EFFICIENT BATTERY PACKAGE

The present invention relates to a container and, more particularly, to a box, useful as a retainer for batteries, constructed from a single, uninterrupted paperboard production die blank.

Many of the packages in use today have been designed with an eye to both marketing and retention of the intended goods. The packages generally used for the retention and display of batteries are made from either a combination of plastic and paper or pure plastic, in an attempt to create a package which is both informative and attractive. One of the plastics commonly used in the packaging of batteries prior to sale is thermally formed polyvinyl chloride. This, and other plastics materials, are often used in combination with a paper coupon or label to advertise the product. Unfortunately, the mixture of paper and plastic is difficult to separate and, therefore, recycling of the package is not economically feasible. An additional disadvantage of such combination packages is that the customer is forced to remove all of the batteries once the package is opened. Once all of the batteries have been removed, the package must be discarded - even though the customer may have needed only one of the batteries at the time of opening the package, and would have liked to have stored the remaining new batteries in the package.

An additional disadvantage of presently available battery packages is that very few of these are designed to store the "dead" batteries once these have been used by the consumer. This is clearly a desirable feature, as the ability of the consumer to use the package to reliably and conveniently separate old, used, cells from new ones still to be used must help the confusion that typically results when the batteries in an article are changed.

Yet a further problem with the prior art packages is the fact that they have never been designed so as to enable the consumer to

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return used batteries to the manufacturer or to a third party, for example a re-cycling plant. Most, if not all, of the packages currently available are intended solely to retain the product during transfer from the manufacturer or supplier to the customer. That is to say that the package is "one-way" and is destroyed or discarded when the customer opens the package, regardless of whether or not he then uses the product.

Both environmental concerns and the ease and cost of components and assembly play an important role in the production of packages such as those typically used for retaining batteries. Features which are applicable to containers for other objects are, generally, equally applicable to boxes for batteries. Thus, for example, it is known that construction of such boxes from one-piece blanks is an advantage in the storage of the blanks, and therefore also an advantage to the manufacturer of the boxes. However, such blanks must be so designed as to result in a secure box. An advantage to the consumer is that such boxes may enable repeated access to the interior of the box, for example via a replaceable lid. Many such packages are described in the prior art. U.S. Patent Specification No. 2,097,941, for example, describes a carton for carrying bottles. This carton, which is made from a one-piece blank, includes a partition extending part way through the interior of the box and enabling a plurality of bottles to be carried by the carton. A further carton formed from a one-piece blank is described in U.S. Patent Specification No. 2,684,178. This carton, designed to allow the transport of a plurality of articles, rather than a single article, has central flaps on the top surface, which may be folded up after transport, so as to enable the carton to be carried. Further boxes are described in, for example, U.S. Patent Specifications No. 3,199,762; 1,737,950; 3,033,356; 5,065,937; 5,088,641; 3,404,806; 1,898,231; 2,881,946; 4,651,918 and UK Patent Application No. 2,086,850.

However, none of the cartons or boxes described in the prior art solves the particular problems associated with the retention and display of batteries, and nor do they address the environmental requirements so important today, or the specific requirements of the

consumer.

In view of the above, we have deduced that it would be desirable to produce a package which requires a minimum amount of packaging material, which is made from a one-piece blank and which can be readily recycled. The box must also be suited for carrying a plurality of cylindrical products. Such a package should minimise the required amount of packaging material whilst, at the same time, maximise the number of cylinders that can be stored and displayed within a fixed volume. Further considerations which the package must address are that, after the box has been opened, it must allow storage of the products until they are needed and it must allow used products to be inserted and retained after the new ones have been removed. The issue of re-cycling must also be addressed, and the material of the box, such as re-cycled paper printed with a water-based ink, must be chosen with this in mind. A further consideration is the fact that the box should be of such rigid construction as to retain the product when it is returned by the customer or end user to the manufacturer or other party re-cycling the product or its contents, that is the container must be "two-way".

The present invention overcomes the particular problems set out above, and provides a package which addresses each of the issues discussed hereinbefore.

The present invention provides, in a first aspect, a box formed from a one-piece blank and having a lid and a divider, the divider dividing the interior of the box into compartments and extending to form a carrying handle.

In a second aspect, the present invention provides a foldable blank defining a box, the blank being divided into three sections, a handle section, a body section and a divider section for dividing the interior of the box into at least two compartments, the sections being positioned in the blank relative to one another so as to allow folding of the blank to provide a box comprising said at least two compartments and closure means for allowing repeatable access to

said compartments.

Additionally, the present invention provides a box, comprising:
a front panel and a back panel hingedly attached to side panels along parallel fold lines and having a top and a bottom opening;

bottom closure flaps dependent from a lower edge of said front, back and side panels, adapted to close the bottom opening thereof;

a divider panel dependent from one of said panels to an interior of said box and fixed to an opposite one of said panels, dividing the interior of said box into a first and a second interior volume and having a portion of said divider panel extending from said top opening; and

top closure flaps dependent from an upper edge of said front, back and side panels, adapted to close the top of said first and second interior volume defined by said divider panel.

In yet a further aspect, the present invention provides a blank for a box having an integral divider, comprising:

a plurality of interconnected panels including a front panel, a rear panel, and a first and second side panel each having a top and a bottom edge;

upper and lower fold-in flaps defined along and integrally dependent from the top and bottom edge of said first and second side panel;

upper tuck-in flaps defined along and integrally dependent from the top edge of said front and back panel; and

a divider panel integrally extending from one end of said plurality of panels, said divider panel having a bottom edge coterminous with the bottom edge of said panels, and an upper edge extending beyond the upper edge of said panels.

In its final aspect, the present invention provides a box, comprising:

a body having four sidewalls, a bottom sealed by a first set of flaps and a top sealed by a second set of flaps;

a panel centrally located within said body, interconnecting

opposing ones of said sidewalls and extending from the top of said body between said second set of flaps.

The terms used in the definition of the box and blank of the present invention have the meanings commonly assigned to them. However, in the case that interpretation of such terms is necessary, the following interpretation is determining:

"Package" refers to a box or container having closed end faces and completely enclosing the contents.

"Flap" refers to a closing member of a box.

"Panel" refers to a face or a side of a box.

"Score" refers to an impression or crease in a material to locate and facilitate folding.

"Slit" refers to a cut made in a sheet of material which does not result in removal of material.

"Slit-score" refers to a cut made in a sheet of material which extends through a portion of the thickness of the material only.

"Slot" refers to a cut made in a sheet of material to permit folding.

As discussed above, the present invention includes a blank defining a package, as well as the package itself, the blank and the package having novel features which result in the production of a handy and reusable container for storing products, and particularly for storing batteries. The blank, and hence the box, is made from a single sheet of material and has integrally interconnected panels which, when assembled by, for example, folding and/or glueing, minimise the amount of packaging material required, whilst at the same time maximising the number of products that can be stored and displayed within the fixed volume.

The size of the box is not essential to the present invention. Typically, the size of the box will be determined, at least in part, by the objects which it is designed to carry. Thus, if the box is intended to carry, for example, bottles, then it must be of sufficient size to allow retention of the full height of the bottle within its volume. The box of the present invention is particularly intended for use in the retention and display of batteries. In this case, the dimensions of the box should be so chosen as to enable retention of the desired number of batteries in an economical fashion. The exact size and number of batteries to be stored and displayed will play a part in determining the final size of the box.

The final shape of the box is also not essential to the present invention, so long as the final shape of the box can result from a one-piece blank. Thus, the box may be cuboid or rectangular or, in the alternative, it may be polygonal in cross-section. We particularly prefer that the box of the present invention is substantially square or rectangular in cross-section.

The box of the present invention may be constructed from any suitable material, and preferably from a material that can be readily re-cycled. We particularly prefer that the material chosen will result in a box which has at least a degree of rigidity. A further factor which may influence the choice of material is the ease with which advertising details may be applied to that material. Suitable materials from which the box may be made include paperboard, that is a material which has cellulose fibres as its major component, or woven or non-woven materials treated, for example, so as to impart rigidity. Particularly preferred materials for the box of the present invention include materials made from cellulose fibres on board machines, such as fibreboard, liner board, corrugated medium, for example corrugated cardboard, and the plies of solid fibreboard most commonly made from wood pulp or paper stock. Such materials may be virgin materials, or they may themselves be derived from re-cycled stock. The material used in forming the box may, if desired, be coated or impregnated with a substance. Coatings, such as a clay coating, may be applied to, for example, the outside surface of the box and generally act to facilitate the

receipt of printed material. The inside surface of the box may also, if desired, be coated or impregnated with a substance. Typically, such coatings, or impregnation, are used to enhance the water-resistance properties of the material of the box or to enhance the strength characteristics of the box. Materials used for coating or impregnation should, preferably, be re-cyclable.

The box of the present invention has a lid and a divider, which divider divides the box into compartments. The box suitably has at least one lid. In a preferred embodiment of the present invention, the number of lids is dependent on the number of compartments in the box. Typically, the number of lids will be the same as the number of compartments, thus enabling individual access to each compartment. Although it is possible that, when there is more than one lid, each lid is on a different panel of the box, we prefer that, when there is more than one lid, they together form a single panel. We most prefer that there are two lids, each lid allowing access to a single compartment of the box, the two lids together forming the top surface of the box and being positioned one on either side of the divider panel as it extends through the box to form the carrying handle.

The divider in the assembly of the present invention divides the interior of the box into compartments. The number of compartments into which the interior of the box is divided is not essential to the present invention but may be influenced by, for example, the number and type of objects to be carried. We particularly prefer that the interior of the box is divided into two compartments, preferably two compartments of substantially equal size and volume. Similarly, the number of dividers in the box of the present invention is, generally, determined by the desired number of compartments, but may also be influenced by the requirement of the blank from which the box of the present invention is formed, to be one-piece. We particularly prefer that the box of the present invention includes a single divider.

The divider of the box of the present invention extends to form a carrying handle. When there is more than one divider these

may be combined to form a single carrying handle or, in the alternative, there may be more than one handle by which the box may be carried. The divider may be considered to consist of two parts, a first part within the interior of the box and acting to divide the interior of the box into compartments, and a second part extending outside the interior of the box to form a carrying handle. The first part of the divider preferably extends into the interior of the box so as to divide the box into distinct compartments, that is the divider extends from one panel to another panel so as to divide the box into unconnected compartments. It is further preferred that the divider extends from one panel to a diametrically opposing panel, so as to divide the interior of the box into compartments of substantially equal volume.

The handle of the box of the present invention is preferably so arranged as to allow the box to be both transported with other, similar, boxes, in an economical and space-saving fashion, as well as to allow the box to be displayed, for example, by hanging. Suitably, therefore, the handle may be laid flat for transport of the box, for example by folding the handle along a hinge line, such that it lies substantially parallel to, and preferably flat against, that panel of the box through which it extends. For display of the box, the handle should then be folded in the opposite direction, that is such that it is then substantially perpendicular to the panel of the box through which it extends. The handle may also include, if desired, a punched-out section, enabling the box to be displayed on a hanger.

The box of the present invention may be assembled from the blank using well known techniques. Typically, the blank will be provided with fold or score lines, and the box may thus be assembled by folding along the marked lines. The box may be secured in its finished form by any suitable technique. Thus, the box may be secured merely by folding and tucking in flaps, interconnected so as to prevent the box from opening once in its finished form. Alternatively, adhesive materials may be used in the production of the box, with the result that the panels and flaps of the box may be, for example, glued, so as to prevent them from separating in the finished product. In the alternative, the box may

be assembled using any other suitable fixing or joining technique or material.

In one embodiment of the present invention, the box includes an upstanding divider panel which is preferably located centrally along one of the top centrelines of the box and which extends upwardly to form the carrying handle. In this embodiment, a plurality of flaps are used to seal the top and bottom of the box. The side panels of the box, of which there are preferably four, the centrally located divider and the flaps are made as a single piece, thereby satisfying the requirement that the blank for the box is one-piece.

In another embodiment of the present invention, the box is typically substantially cuboid and suitably includes an upstanding divider panel located centrally along one of the top centrelines of the box, and extending upwardly to form the carrying handle. In this embodiment the top of the box, that is that part through which the divider extends into the carrying handle, is suitably formed from four fold-in flaps and two fold-over tuck-in flaps. The bottom of the box, that is the panel diametrically opposing that through which the divider extends into the carrying handle, is then suitably sealed by two fold-in flaps and two fold-over/tuck-in flaps that overlap each other. The blank for the box of this embodiment is also one-piece.

In a further embodiment, the box of the present invention typically has an upstanding panel forming the divider and the carrying handle and dividing the volume of the box. The box then generally includes a front panel and a back panel hinged to side panels. One of the openings, for example the bottom opening, formed by these front, back and side panels is then suitably closed by a plurality of flaps, one of which, for example, is dependent from the lower edge of each of the front, back and side panels. Such flaps are suitably adapted to be folded into the box and secured to each other, for example by gluing or otherwise sealing. In this embodiment, the panel forming the divider and extending to form the carrying handle is, for example, dependent from one of the front, back and side panels and extends into the interior of the box.

This panel is then suitably fixed to one of the other remaining panels using any well known technique, thereby defining a first and second volume within the box. A portion of the divider panel then typically extends upwards, and protrudes through the top opening of the box. The top opening in this embodiment is then sealed in a manner suitable to form the lid of the box, for example by at least one flap dependent from one of the front, back and side panels and, preferably, in a box having two side panels, a front and a back panel, dependent from each of the two side panels.

In yet a further embodiment, the box of the present invention typically has a front panel, a back panel and two side panels, the boundaries of these panels being marked in the one-piece blank by fold lines, which fold lines run in a vertical direction after folding of the blank. This box then has two openings, that is a top and a bottom opening. The front, back and side panels together form a rectangular or cubical volume. A divider panel, which extends to form the carrying handle, is dependent from one of the front, back and side panels, suitably from a side panel, and, in the finished box, extends through the interior of the box and is suitably fixed to the opposite panel, for example, the other side panel. The interior of the box is thereby divided into first and second chambers. That part of the divider which forms the carrying handle then suitably extends above the top of the box. The bottom of the box in this embodiment is then suitably sealed by closure flaps which are dependent from the lower edge of the front, back and side panels, each of the flaps being adapted to fold in towards the interior of the box until they contact each other and thereby close the bottom of the box. The top of the box, through which the divider extends to form the carrying handle, is, in this embodiment, typically sealed by top closure flaps which are dependent from the upper edge of the front, back and side panels. Each of these flaps is adapted to fold inwards towards the interior of the box, thereby closing the top of the first and second chambers defined by the divider panel.

In its second aspect, the present invention provides a blank which, when folded, forms a box, the blank being one-piece. The blank consists of three sections, a body section, a divider section

and a handle section. The body section of the blank includes flaps and panels sufficient to define the front, back, sides, top and bottom of the box. In a preferred aspect, that part of the body section which forms a side wall is linked to the handle portion via the divider portion. It is more preferred that a locator tab is disposed between that part of the body portion forming a side wall and the divider portion. In a further preferred embodiment, the divider portion has a locator tab disposed on two of its sides, one of the locator tabs forming a link between the divider portion and the body portion. In this embodiment, the second locator tab suitably extends from the opposite side of the divider portion to that from which the first locator tab extends. The handle portion, which extends from the divider portion may, if desired, comprise two parts, the two parts being distinguished by a fold or score line running longitudinally between the two parts. Folding of the handle along this longitudinal fold or score line will result in the production of a double thickness handle having advantageous strength characteristics.

In a further embodiment, the blank of this aspect of the invention may be defined as a single sheet of material having a plurality of panels defined thereon, including a front panel, a rear panel and a first and second side panel, these panels typically being hingedly attached to each other by a plurality of transverse score lines and each panel typically having a top and a bottom edge defined by longitudinal score lines. An upper and a lower fold-in flap are, in this embodiment of the invention, suitably defined along, and integrally dependent from, the top and bottom edge of the first and second side panels. An upper and a lower tuck-in flap are suitably defined along, and integrally dependent from, the top and bottom edge of the front and back panels. A divider panel, which extends to form a handle portion, typically extends from and is integral with one end of the front, rear and side panels, along a line parallel to the transverse score lines, and having a bottom edge coterminous with the bottom edge of the panels. The handle portion in this embodiment of the invention extends beyond the upper edge of the back, front and side panels.

In a further embodiment of the blank of this aspect of the present invention, the front, back and side panels are arranged linearly, such that the side panels alternate with the front and back panels. In this embodiment, the divider panel suitably includes an integral locator tab, which tab connects the divider panel to one of the plurality of panels, as well as a tab, for example a glue tab, which extends from the edge of the divider opposite that from which the locator tab depends, which second tab allows securing of the opposite edge of the divider panel upon assembly. The divider panel extends into the handle portion and is hingedly separated therefrom by a slit-score line, which typically runs parallel to the longitudinal lines. The presence of a further score line, for example running parallel to the top of the box, allows the handle to be folded flat in the assembled box, for easy shipping and stacking.

The container of the present invention has many advantages, including the fact that it is re-usable and particularly suited for storing batteries. Furthermore, the blank, and the box made therefrom, require a minimum amount of packaging material. The blank and box are made from a single sheet of material and, in the blank, the panels are integrally interconnected with one another. With this arrangement, there is no need to produce any additional components for the box - all of the components required to produce the box are found in the single blank. During assembly of the box from the blank, the integral divider/header is securely attached to the side panels of the box which, together with the other features of the box, substantially eliminates distortion, breakage or tearing of the box when the package is suspended from a rod which extends through an opening in the header/divider.

Another important advantage which results from the construct of the present invention is the fact that the inclusion of a divider/header panel, as well as the manner in which it is connected to the side panels, virtually ensures that the box will be the desired shape, for example square, when it is manufactured and that it will retain that shape as well as its rigidity when it is used by the consumer. Furthermore, when the divider/header panel is so arranged as to divide the interior of the box into two chambers of

substantially equal volume, the box may be hung without tipping either forward or backward, or leaning to either side.

Yet a further advantageous feature of the box is the incorporation of hinge means where the header/divider panel protrudes through the top of the box. The ability to fold the carrying handle portion of the header/divider panel flat against the top of the box provides for maximum density when the boxes are packed for shipment, or when the boxes are arranged for display on, for example, a store shelf. Provision of such hinge means then allows the carrying handle portion to be extended away from the top of the box, thereby allowing the box to be hung in a conventional display rack whilst at the same time maximising the surface area of the box that is available for advertising.

These and other features, objects and advantages of the present invention are further described with reference to the accompanying drawings in which:

Fig. 1 is an oblique view of a rectangular box;

Fig. 2 is a front view of a rectangular box;

Fig. 3 is a side view of a rectangular box;

Fig. 4 is a top plan view of a rectangular box with the top open;

Fig. 5 is a side sectional view taken along line V-V of Fig. 2;

Fig. 6 is a bottom plan view of a rectangular box with the bottom open;

Fig. 7 is a plan view of a production blank die used to form a rectangular box in accordance with this invention; and

Figs. 8-10 are plan views of a production blank at different stages of folding.

Referring now to the figures in general, and in particular to Figures 1-6, there is shown package 10. Package 10, which is constructed from a single paperboard production die blank, comprises a generally one-piece body 12 with an integral divider 14.

Body 12 includes a front panel 16 and a back panel 18 interconnected by side panels 20 and 22 along vertical fold or score lines 24-28. Bottom 30 of body 12 is closed by fold-in flaps 32 and 34, dependent from side panels 20 and 22, respectively, along horizontal score lines 36. Bottom tuck-in flap 38, having a tab 40, folds over fold-in flaps 32 and 34 along score line 36, and is integrally dependent from back panel 18. Tab 40 is folded along tab score line 42 so as to lie parallel to side panel 22 when in the closed position. A second tuck-in flap 44 is folded along score line 36 at the bottom of side panel 22 to close bottom 30. Tab 46, dependent from flap 44, and formed along tab score line 48, is received in slot 50 perforating horizontal score line 36 between back panel 18 and tuck-in flap 38.

Although it is preferred that bottom 30 is closed by fold-in and tuck-in flaps 32, 34 and 38, 44 described above, bottom 30 may, in the alternative, be closed by an adhesive 30 between flap 38 and flap 44. If an adhesive is used to join flaps 38 and 44 together, tabs 40 and 46 used to lock flap 38 and 44 together need not be used.

Top 52 of body 12 is closed by two sets of fold-in flaps 54 which fold into the container along horizontal score line 56. Fold-in flaps 54 depend from an upper edge of each side panel 20 and 22 and include a cutout 58 along a centreline so as to accommodate integral divider/header 14. Tuck-in flaps 60 at the top of front and back panels 16 and 18, respectively, fold inwardly along score line 56 to cover fold-in flaps 54. Tabs 62, formed by score lines 64 at the ends of each tuck-in flap 60, lie adjacent the integral divider/header 14 and retain flaps 60 in the closed position.

In Figures 4 and 5, vertical edge 66 of panel 18, immediately

adjacent to panel 22, includes an integral locator tab or panel 68 coupled at score line 70. Locator tab 68 is interior of and immediately adjacent to side panel 22 fixed thereto by an adhesive commonly used in paperboard box construction. Locator tab 68 extends from score line 70 with back panel 18 to approximately the midpoint or centreline of side panel 22, where it is joined at score line 72 to divider/header 14.

Divider/header 14 includes a divider panel 74 which extends substantially from the bottom 30 of body 12 to 25 slit-score line 76. Divider panel 74 is folded back upon itself at slit-score line 76 to form header panel 78 terminating just below upper score line 56. Below slit-score line 76, and extending through panels 74 and 78, is a punch-out 80 of predetermined shape for the purposes of suspending package 10 from a hanger.

An edge of divider panel 74 opposite locator panel 56 has glue tab 82 extending therefrom, which is adhered to an inner surface of side panel 20 by an adhesive, such as that to be used to adhere locator tab 68 to the inner surface of side panel 22. Bonding of tabs 68 and 82 to side panels 20 and 22 not only locate divider 14, but also bond the sides of container 10 together to form a stronger package. The bonding surfaces of tabs 68 and 82 may contain shallow perforations in order to absorb some of the adhesive and improve the bond between the panels.

Locator tab 68, extending from score line 70 to score line 72, establishes the distance for one end of divider panel 74. The edge of divider panel 74, opposite locator tab 68, is preferably located directly opposite the attachment point on side panel 22. It is preferred that divider panel 74 is located along a centreline of side panels 20 and 22 with glue tab 82 attached to side panel 20 on a side of divider panel 74 opposite that of locator tab 68. However, glue tab 82 may be folded in an opposite direction so as to be fixed to side panel 20 on the same side of the divider panel as locator tab 68. The purpose of adhering glue tab 82 to side panel 22 on a side of divider panel 74 opposite locator tab 68 is for ease of construction.

Reference is made now to Figure 7 which shows a production blank, shown generally by the numeral 110, used to make package 10. Production blank 110 is preferably made from a single sheet of paperboard stock in a continuous process on a die press. The sheet material, preferably from a continuous roll, is fed into one end of a die press where one or more male die blades and rules cut out the production blank 110, score the fold lines and slit the material to form the various flaps and panels.

Production blank 110 includes a front panel 116 and back panel 118 which are hingedly attached to side panels 120 and 122 along score lines 124, 126 and 128. The upper and lower edges of each panel 116-122 are defined by parallel horizontal score lines 136 and 156 which also form the hinge lines for the lower and upper closure flaps. Bottom fold-in flaps 132 and 134 are hingedly attached along score line 136 to side panels 122 and 120, respectively. Similarly, bottom tuck-in flaps 138 and 144 are hingedly attached along score line 136 to back and front panels 118 and 116, respectively. Tuck-in tab 140 is hingedly attached to flap 138 along score line 142 and tab 146 is similarly hingedly attached along score line 148 to flap 144. A slit 150 is formed in score line 136 between back panel 118 and flap 138 to receive tab 146. If it is desired to close bottom 30 by glueing flaps 138 and 144, tabs 140 and 146 may be dispensed with, as well as slit 150. Moreover, the length of flaps 138 and 144 may be reduced to conserve material. A sufficient amount of material should remain so that the adhesive may be applied to bond the flaps together.

The top flaps of blank 110 include fold-in flaps 154 hinged along score line 156 to the upper edges of side panels 120 and 122. Two fold-in flaps 154 are formed along the upper edge of each side panel 120 and 122 by cutout 158. Similarly, the upper edges of front and back panels 116 and 118 have tuck-in flaps 160 attached thereto along score line 156. Tuck-in tabs 162 are, in turn, hinged to flaps 160 along score line 164 which is parallel to hinge line 156.

Integrally extending from vertical edge 166 of back panel 118 is locator tab 168 hinged along score line 170. Tab 168 tapers from hinge line 170 to another hinge line 172 attaching divider panel 174. At the top of panel 174 is header panel 178 attached by slit-score line 176. This enables header panel 178 to be folded back upon divider panel 174. Defined on an edge of divider panel 174 opposite that of locator tab 168 is a glue tab 182 attached by fold line 186.

Referring to Figures 7-10, package 10 is formed from blank 110 by folding header panel 178 along slit-score line 176 onto divider panel 174 shown by arrow A. An adhesive is used to bond header panel 178 against divider panel 174. Divider panel 174, locator tab 168 and glue tab 182 are folded over onto an interior surface of back and side panels 118 and 120, respectively (Figure 7). By folding along fold line 170 (arrow B in Figure 8), glue tab 182 is located on the inner surface of side panel 120 as indicated by area 190. Prior to folding, an adhesive is applied either to glue tab 182 or to area 190. In a second step (Figure 9), front panel 116 and side panel 122 are folded along fold line 126 (arrow C) onto the opposite side of divider panel 174, locator panel 168 and glue tab 182, which overlie rear and side panels 118 and 120, respectively. Prior to folding, an adhesive is applied to the exposed surface of locator tab 168 or to an inside surface of side panel 122, as indicated by dashed areas 192.

At this point, the originally flat production blank 110 has now been folded to form a flattened package 10. To expand flattened package 10 from its folded position as seen in Fig. 10, edge 66 and fold line 26 are compressed toward each other, causing front and rear panels 16 and 18 to extend from central divider 74 along fold lines 24, 28 with both panels remaining parallel to divider panel 74. With front and rear panels 16 and 18 and side panels 20 and 22 generally forming a rectangular volume 12 bottom fold-in flaps 32 and 34 may be folded into the interior of the rectangular volume 12 along hinge line 36. Fold-in flaps 32 and 34 are followed by tuck-in flap 38 with tab 40 folded along hinge line 42 so as to lie adjacent to front panel 16. In a similar fashion, tuck-in flap 44 is folded

along hinge line 36 over flap 40 with tab 46 inserted into perforation 50, locking tab 46 in the bottom of tuck-in flap 38. In the alternative, tabs 40 and 46 may not be cut in the blank and an adhesive may be applied either to flap 38 or 44 and folded accordingly, such that the adhesive bonds the two flaps together.

Top 52 of package 10 may be closed by folding fold-in flaps 54 into the container along hinge line 56. Cutout 58 of each fold-in flap 54 now accommodates divider panel 74 when folded into the container. Each chamber 15 on opposite sides of divider 74 may be closed by tuck-in flaps 60 overlying fold-in tabs 54. Tuck-in tabs 62 fold along hinge line 64 and lie adjacent to divider panel 74 in the closed position and retain flaps 60 in place when closed.

The Z shaped tabs 68 and 82 coupling divider panel 74 to side panels 20 and 22 are important in that divider 74 is integral with the four vertical surfaces 16-22 of package 10. Since divider panel 74 is securely attached to side panels 20 and 22, there is no problem with distortion, breaking or tearing of the panels when the box is suspended by a hanger which extends through punch-out 80 at the top of divider panel 62. Divider panel 74 also virtually ensures that package 10 will be generally square when it is expanded and will remain so when used by the consumer. Further, by centrally locating the divider, package 10 may be hung without tipping when on display.

Another key feature of package 10 is the incorporation of hinge 88 aligned with score line 56 at the top of the box. The ability to fold divider panel or header 74 flat against top 52 of package 10 provides for maximum density when packing the boxes for shipment or arranging them for display on a store shelf. Extension of header or upper portion of divider panel 74 in a vertical direction allows package 10 to be hung in a conventional display rack while maximising the surface area of the box that is available for advertising.

Although not specifically addressed in the above description, it should be understood that each of the score lines between a flap

or panel and a tab contain a slit along the outer margins. The purpose of each small slit is to lock the tab in the closed position by allowing the bases of the fold-in flaps to extend into each slit.

The package as described above is well suited for carrying a plurality of cylindrical batteries. The unitary package minimises the required amount of packaging material while maximising the number of batteries that can be stored and displayed within a fixed volume. After the box has been opened, new batteries can be stored until they are needed and used cells can be inserted into the box after the new cells have been removed. Preferably, the blank, and hence the box, is made from recycled paper that has been printed with water base ink on an exterior surface, so that the box can be recycled.

The invention has been described with respect to specific preferred embodiments thereof. However, many variations and modifications will become apparent to those skilled in the art. It is, therefore, the intention that the appended claims be interpreted as broadly as possible in view of the prior art to include all such variations and modifications.

CLAIMS:



1. A box (10) formed from a one-piece blank (110) and having a lid (60) and a divider (14), the divider (14) dividing the interior of the box (10) into compartments (15), and extending to form a carrying handle (74).
2. A box (10) as defined in claim 1, which is of sufficient size to retain at least one battery.
3. A box (10) as defined in claim 1 or claim 2, which has an interior volume substantially cuboid in shape.
4. A box (10) as defined in claim 3, which is constructed from a re-cyclable material.
5. A box (10) as defined in claim 4, which is constructed from paperboard, a woven or non-woven material.
6. A box (10) as defined in claim 5, which is constructed from paperboard or a woven or non-woven material treated so as to produce a surface suitable for printing and/or treated so as to reduce the passage of water or moisture therethrough.
7. A box (10) as defined in any one of claims 1 to 6, in which the divider (14) divides the interior of the box into two compartments (15).
8. A box (10) as defined in claim 7, in which the two compartments (15) are of substantially equal volume.
9. A box (10) as defined in any one of claims 1 to 8, in which the divider (14) extends through the interior of the box (10) such that the compartments (15) produced thereby are not interconnected.
10. A box (10) as defined in any one of claims 1 to 9, in which one lid (60) allows access to all of the compartments (15).



11. A box (10) as defined in any one of claims 1 to 9, in which each compartment (15) is accessed via a separate lid (60).
12. A box (10) according to claim 11, in which a lid (60) is located on each side of the divider panel (14).
13. A box (10) as defined in any one of claims 1 to 12, in which, in use, the handle (74) extends upwardly from and substantially perpendicular to that surface of the box (10) through which it extends.
14. A box (10) as defined in any one of claims 1 to 12, in which the handle (74) is hinged at or near its point of contact with that surface of the box (10) through which it extends.
15. A box (10) as defined in claim 13 or 14, in which the handle (74) extends through the top surface (52) of the box (10).
16. A box (10) as defined in any one of claims 1 to 15, in which the handle (74) is formed from material of double thickness.
17. A box (10) as defined in claim 16, in which the handle (74) includes a section punched out (80) to enable display on a hanger.
18. A box (10), comprising:
 - a front panel (16) and a back panel (18) hingedly attached to side panels (20, 22) along parallel fold lines and having a top (52) and a bottom (30) opening;
 - bottom closure flaps (32, 34) dependent from a lower edge (36) of said front (16), back (18) and side (20, 22) panels, adapted to close the bottom (30) opening thereof;
 - a divider panel (14) dependent from one of said panels to an interior of said box (10) and fixed to an opposite one of said panels, dividing the interior of said box (10) into a first and a second interior volume (15) and having a portion of said divider panel (14) extending from said top opening (52); and
 - top closure flaps (54) dependent from an upper edge of said



front (16), back (18) and side panels (20,22), adapted to close the top (52) of said first and second interior volume (15) defined by said divider panel (14).

19. A box (10), comprising:

a body (12) having four sidewalls (16, 18, 20, 22), a bottom (30) sealed by a first set of flaps and a top (52) sealed by a second set of flaps;

a panel (14) centrally located within said body (12), interconnecting opposing ones of said sidewalls (16, 18, 20, 22) and extending from the top (52) of said body (12) between said second set of flaps.

20. A blank (110) for producing a box (10) as defined in any one of the preceding claims.

21. A blank (110) according to claim 20, which includes a body section (12), a divider section (174) and a handle section (178), the body section (12) being linked to the handle section (178) via the divider section (174).

22. A blank (110) as defined in claim 21, in which the body section (12) includes flaps and panels sufficient to define the front (16), back (18), sides (20, 22), top (52) and bottom (30) of the box (10).

23. A blank (110) as defined in claim 22, in which the body section (12) and divider section (174) are disposed linearly with respect to one another, and have the arrangement: side (122) - front (116) - side (120) - back (118) - divider (174).

24. A blank (110) as defined in claim 23, in which the bottom edge of the divider section (174) is co-terminous with the bottom edge of the front (116), side (120, 122) and back (118) panels.

25. A blank (110) as defined in claim 24, in which the top edge of the divider/handle section (174) extends beyond the top edge of the front (116), side (120,122) and back (118) panels.



26. A blank (110) as defined in claim 25, in which a locator tab (168) is disposed between the back panel (118) and the divider section (174).

27. A blank (110) as defined in claim 26, in which the divider section (174) has a tab (168, 182) disposed on two of its sides, one of the tabs (168) forming a link between the divider section (174) and the body section (12) and the other tab (182) extending from the opposite side of the divider section (174) to that from which the first tab (168) extends.

28. A blank (110) as defined in any one of claims 20 to 27, in which flaps defining the top (52) and bottom (30) of the box (10) are integrally dependent from the top and/or bottom edge of the side panels (120, 122) and/or front (116) and back (118) panels.

29. A blank (110) as defined in claim 28, in which flaps defining the top (52) and bottom (30) of the box (10) are integrally dependent from the top and bottom edge of the side panels (120, 122) and front (116) and back (118) panels.

30. A blank (110) as defined in any one of claims 20 to 29, in which the borders between the panels (116, 118, 120, 122) and flaps (132, 134, 138, 144, 154, 160) and tabs (140, 146, 162, 168, 182) are defined by hingeable fold or score lines.

31. A blank (110) for a box (10) having an integral divider (14), comprising:

- a plurality of interconnected panels including a front panel (116), a rear panel (118), and a first and second side panel (120, 122) and each having a top (156) and a bottom (136) edge;

- upper (154) and lower (132, 134) fold-in flaps defined along and integrally dependent from the top (156) and bottom (136) edge of said first and second side panel (120, 122);

- upper tuck-in flaps (160) defined along and integrally dependent from the top edge (156) of said front (116) and back (118) panel; and



a divider panel (174) integrally extending from one end of said plurality of panels, said divider panel (174) having a bottom edge coterminous with the bottom edge (136) of said panels, and an upper edge (188) extending beyond the upper edge (156) of said panels.