ABSTRACT
A cardboard box for protectively storing perishable paper products that includes protective materials that protect the box and its contents from any of a number of threats including water damage, fire damage, insects, mold and fungi. The box comprises a bottom wall, side walls and a lid that surround and define an interior cavity in which the paper products are stored. Each of the bottom wall, side walls and lid are made from cardboard. Protective materials are applied to one or more of the bottom wall, side walls and lids by either impregnating the cardboard with a suitable chemical, applying a film over the cardboard or spraying a coating thereover. Suitable chemicals that produce the desired properties include, but are not limited to wax, oil, plastic, polybrominated diphenyl ether, polybrominated biphenyl, brominated cyclohydrocarbons, boric acid and hydrogen peroxide.
STORAGE BOX HAVING PROTECTIVE MATERIALS INCORPORATED THEREIN

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] This invention generally relates to storage materials. More particularly, the invention relates to storage boxes made from corrugated cardboard. Specifically, the invention relates to corrugated cardboard storage boxes that have protective materials incorporated therein.

[0003] 2. Background Information

[0004] Offices and individuals frequently need to store materials such as files and papers for long periods of time. Typically, these materials are placed in some sort of storage box for safekeeping. These boxes may take a variety of forms including plastic tubs or corrugated cardboard boxes with lids. Plastic tubs are convenient and protect the materials stored therein from dangers such as liquid exposure, but can be relatively expensive if large volumes of materials need to be stored. Cardboard boxes on the other hand are inexpensive and convenient, but they are vulnerable to dangers such as water damage, fire, insects and mold.

[0005] There is therefore a need in the art for an improved corrugated cardboard box that is less vulnerable to threats that may damage the contents of the box.

SUMMARY OF THE INVENTION

[0006] The device of the present invention comprises a cardboard box for protectively storing perishable paper products that includes protective materials that protect the box and its contents from any of a number of threats including water damage, fire damage, insects, mold and fungi. The box comprises a bottom wall, side walls and a lid that surround and define an interior cavity in which the paper products are stored. Each of the bottom wall, side walls and lid are made from cardboard. Protective materials are applied to one or more of the bottom wall, side walls and lids by either impregnating the cardboard with a suitable chemical, applying a film over the cardboard or spraying a coating thereover. Suitable chemicals that produce the desired properties include, but are not limited to wax, oil, plastic, polybrominated diphenyl ether, polybrominated biphenyl, brominated cyclohydrocarbons, boric acid and hydrogen peroxide.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The preferred embodiments of the invention, illustrative of the best mode in which applicant has contemplated applying the principles, are set forth in the following description and are shown in the drawings and are particularly and distinctly pointed out and set forth in the appended claims.

[0008] FIG. 1 is a perspective view of a corrugated cardboard box known in the prior art;

[0009] FIG. 2 is a cross-sectional top view through line 2-2 of FIG. 1;

[0010] FIG. 3 is a perspective view of a corrugated cardboard box in accordance with the present invention;

[0011] FIG. 4 is a cross-sectional top view of a first embodiment of a side wall taken through line 4-4 of FIG. 3;

[0012] FIG. 4A is a cross-sectional top view of a second embodiment of the side wall of the storage box of FIG. 3;

[0013] FIG. 4B is a cross-sectional top view of a third embodiment of the side wall of the storage box of FIG. 3;

[0014] FIG. 4C is a cross-sectional top view of a fourth embodiment of the side wall of the storage box of FIG. 3; and

[0015] FIG. 5 is a cross-sectional top view of a fifth embodiment of the side wall of the storage box of FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

[0016] FIGS. 1 and 2 show a corrugated cardboard box 10 known in the prior art. Box 10 has a bottom wall (not shown) and four side walls 12 that define an interior cavity 14 for holding a plurality of files or papers 16. A lid 18 is provided for closing off access to cavity 14. Lid 18 may take any one of a number of different forms, such as four panels as shown in FIG. 1, or a single panel (not shown) or a completely separate lid unit (not shown). The bottom wall, side walls 12 and lid 18 are all made from corrugated cardboard. As shown in FIG. 2, the side wall 12 comprises two planar sheets 20, 22 which sandwich a corrugated cardboard sheet 24 therebetween. The cardboard used in box 10 is vulnerable to water damage, fire damage, may permit mold to grow therein if it is subjected to high moisture environments and is susceptible to paper-eating insects such as silverfish and the like.

[0017] FIGS. 3A-5 show a storage box in accordance with the present invention and generally indicated at 50. Box 50 is similarly formed to box 10 in that it has a bottom wall (not shown), side walls 52 that surround and define an interior cavity 54 for holding a plurality of files or papers 56 therein. A lid 58 is provided for closing off access to cavity 54. Lid 58 shown in FIG. 3 comprises four panels that are secured together with an adhesive tape of the like. It will be understood by those skilled in the art that the shape, size and configuration of box 50, as shown in the attached drawings, is by way of illustration only. Any shape, size and configuration of the box and lid may be used without departing from the spirit of the present invention.

[0018] In accordance with a specific feature of the present invention, each of the bottom wall, side walls 52 and lid 58 of box 50 is manufactured from a corrugated cardboard that has been specially treated with one or more of several protective materials as will be hereinafter described.

[0019] Referring to FIG. 4, there is shown a portion of side wall 52 comprising a first and a second planar sheet 60, 62 of cardboard which sandwich a corrugated sheet 64 of cardboard therebetween. It will be understood by those skilled in the art, that the bottom wall, side walls 52 and lid 58 of box 50 may be made up from any number of a plurality of planar and corrugated sheets that are layered and bonded together to form a unitary member of the required strength, without departing from the spirit of the present invention. The following illustrations show a box wall 52 made from two planar sheets and one corrugated sheet for the sake of clarity only. FIG. 4A illustrates a first embodiment of the side wall 52 in which one or more of sheets 60, 62 and 64 are impregnated with a protective material as will be hereinafter described.

[0020] FIG. 4A shows a second embodiment of side wall 152 that includes a layer of protective material 166 therein. In this instance, layer 166 is applied over second sheet 162 and, because second sheet 162 forms the exterior surface of side wall 152, protective layer 166 forms the exterior surface of the storage box.

[0021] Referring to FIG. 4B, there is shown a third embodiment of a side wall of the box, being generally indicated at 252. Side wall 252 comprises first and second planar sheets 260, 262 of cardboard which sandwich a corrugated layer 264 therebetween. Protective layer 266 is applied over first
sheet 260 and thus forms the interior surface of the box in accordance with the present invention.

[0022] Referring to FIG. 4C, there is shown a fourth embodiment of a side wall for the box, being generally indicated at 352. Side wall 352 comprises first and second planar sheets 360, 362 of cardboard which sandwich a corrugated layer 364 thereinbetween. A first protective layer 366 is applied over sheet 362 and a second protective layer 368 is applied over sheet 360. The protective layers 366, 368 therefore form both the exterior and interior surfaces of the box.

[0023] Referring to FIG. 5, there is shown a fifth embodiment of a side wall for the box, being generally indicated at 452. Side wall 452 comprises first and second planar sheets 460, 462 of cardboard which sandwich a corrugated layer 464 thereinbetween. A protective layer 466 is applied over sheet 462 and another planar sheet of cardboard 470 is applied over protective layer 466. Thus, protective layer 466 is sandwiched between two layers of untreated cardboard.

[0024] In accordance with one of the specific features of the present invention, one or more layers of the bottom wall, side walls 52 and lid 58 of box 50 include protective materials that impart improved protective properties to the storage box 50. In a first instance, shown in FIG. 4, any or all of sheets 50, 60, 62 and 64 may be impregnated with a protective material. Thus, any and all of sheets 60, 62 and 64 constitute a protective layer of box 50.

[0025] With reference to FIGS. 4A-5, the protective layer will be referred to in the following description as layer 66 for the sake of clarity, but it will be understood that any and all of the protective layers 66, 68 throughout FIG. 466 includes one or more protective materials that impart improved protective properties to the storage box. Protective layer 66 may be one of a planar or corrugated sheet of cardboard that is impregnated with the protective material. Alternatively, protective layer 66 may comprise a film that is bonded onto a planar sheet of cardboard. Furthermore, protective layer 66 may constitute a separate thin film. Finally, protective layer 66 may constitute a powder or liquid coating that is sprayed or otherwise deposited onto one of the sheets in the box.

[0026] The protective layer 66 may constitute cardboard that is impregnated with a chemical that renders that layer water impervious or water repellant. The chemical may render the layer fire resistant or fire retardant. The chemical may be a fungicide that prevents mold from growing, or a pesticide that kills insects such as silverfish or that repels such insects because of an odor or taste associated therewith. A wide variety of chemicals are known to produce these properties, but have not been previously applied to corrugated cardboard or have not been applied in combination with each other to cardboard. So, for instance, a wide variety of chemicals and chemical components may be used for these purposes. These include, but are not limited to, a wax, or an oil may be impregnated into the layer, or a plastic film may be used to create a water repellant or resistant layer. Chemicals such as aluminum hydroxide and diatomaceous phosphate, polybrominated diphenyl ether, polybrominated biphenyl or brominated cyclohexarbons can be sprayed or otherwise applied to a one of the layers 60, 62 or a separate cardboard sheet in order to create a fire retardant layer. Boric acid or hydrogen peroxide may be used in layer 66 to act as a pesticide or fungicide. So, for example, in FIG. 4, one or more of sheets 60, 62 and 64 may be impregnated with a suitable insecticide to repel insects such as silverfish from box 50. Or, in FIG. 4A, layer 166 of a suitable fire retardant chemical may be applied over the outer sheet 162 of the box. Or, in FIG. 4B, a fungicide may be applied as layer 268 over the interior sheet 260 of the box. Or, in FIG. 4C, layer 366 may be a suitable water repellent and layer 368 may be a fire retardant. Or, in FIG. 5, a fire retardant layer 466 may be sandwiched between two sheets 462, 470 of cardboard.

[0027] It will be understood by those skilled in the art that one or more or all of these and other chemical compounds may be applied to the cardboard in one or more layers in order to protect the box from one or more of water, fire, insects and mold. Furthermore, any other chemical or substance may be applied to the interior or exterior of box 50, or may be impregnated into the cardboard layers thereof in order to give the materials thereof the protective qualities that are desired.

[0028] In the foregoing description, certain terms have been used for brevity, clearness, and understanding. No unnecessary limitations are to be implied therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes and are intended to be broadly construed.

[0029] Moreover, the description and illustration of the invention are an example and the invention is not limited to the exact details shown or described.

1. A cardboard box for protectively storing perishable paper products, wherein said box comprises:
   a bottom wall;
   a plurality of side walls extending upwardly away from the bottom wall to surround and define an interior cavity; said cavity being adapted to retain the paper products therein;
   a lid receivable over an upper end of the side walls to cover said interior cavity;
   a protective material applied to one or more of said bottom wall, side walls and lid to protect the same from one or more threats selected from the group consisting of fire, water, insects, mold, fungi and bacteria.

2. The cardboard box as defined in claim 1, wherein the protective material is impregnated into the one or more of said bottom wall, side walls and lid.

3. The cardboard box as defined in claim 1, wherein the protective material is applied as a film over the one or more of said bottom wall, side walls and lid.

4. The cardboard box as defined in claim 1, in which the protective material is sprayed over the one or more of said bottom wall, side walls and lid.

5. The cardboard box as defined in claim 4, in which the protective material is one or more of a wax, an oil, a plastic, aluminum hydroxide, diatomaceous phosphate, polybrominated diphenyl ether, polybrominated biphenyl, brominated cyclohexarbons, boric acid and hydrogen peroxide.

6. The cardboard box as defined in claim 1, wherein each of the bottom wall, side walls and lid of the box includes at least:
   a first planar layer;
   a second corrugated layer; and
   a third planar layer, said first and third layers sandwiching the second layer thereinbetween; and wherein the protective material is applied to one or more of the first, second and third layers.

7. The cardboard box as defined in claim 6, wherein the protective material is impregnated into one or more of the first, second and third layers.

8. The cardboard box as defined in claim 6, wherein the protective material is applied as a film over one or both of the first and third layers.
9. The cardboard box as defined in claim 6, wherein the protective material is sprayed over one or both of the first and third layers.

10. The cardboard box as defined in claim 9, wherein the protective layer is sprayed in one of a powder form and a liquid form over the one or both of the first and third layers.

11. The cardboard box as defined in claim 6, wherein the protective material comprises:
   a first component that protects the box against a first threat.

12. The cardboard box as defined in claim 11, wherein the first threat is one of water damage, fire damage, mold and insects.

13. The cardboard box as defined in claim 12, wherein the protective material further comprises:
   a second component that protects the box against a second threat.

14. The cardboard box as defined in claim 13, wherein the second threat is a different one of water damage, fire damage, mold and insects.

15. The cardboard box as defined in claim 14, wherein the protective material further comprises:
   a third component that protects the box against a third threat.

16. The cardboard box as defined in claim 15, wherein the third threat is a further different one of water damage, fire damage, mold and insects.

17. The cardboard box as defined in claim 16, wherein the protective material further comprises:
   a fourth component that protects the box against a fourth threat.

18. The cardboard box as defined claim 17, wherein the fourth threat is the last different one of water damage, fire damage, mold and insects.

19. The cardboard box as defined in claim 18, wherein each of the first, second, third and fourth components are selected from the group consisting of a wax, an oil, a plastic, aluminum hydroxide, diammonium phosphate, polybrominated diphenyl ether, polybrominated biphenyl, brominated cyclohydrocarbons, boric acid and hydrogen peroxide.

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