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(54) A method of hardening the edges of a plurality of sheets.

(57) A method of hardening serrated intended cutting edges (11) in a plurality of cardboard carton blanks (10) is provided. The method comprises arranging the blanks (10) contiguously in a stack (16) with the intended cutting edges (11) on one side of the stack (16). That side of the stack (16) is then sprayed with a hardening agent which is allowed to set on the stack (16). The hardening agent is a solution of a sugar-based adhesive and is absorbed by the intended cutting edge (11) of the blanks (10) and after setting of the adhesive the blanks (10) can be physically separated without damage to the edges (11).

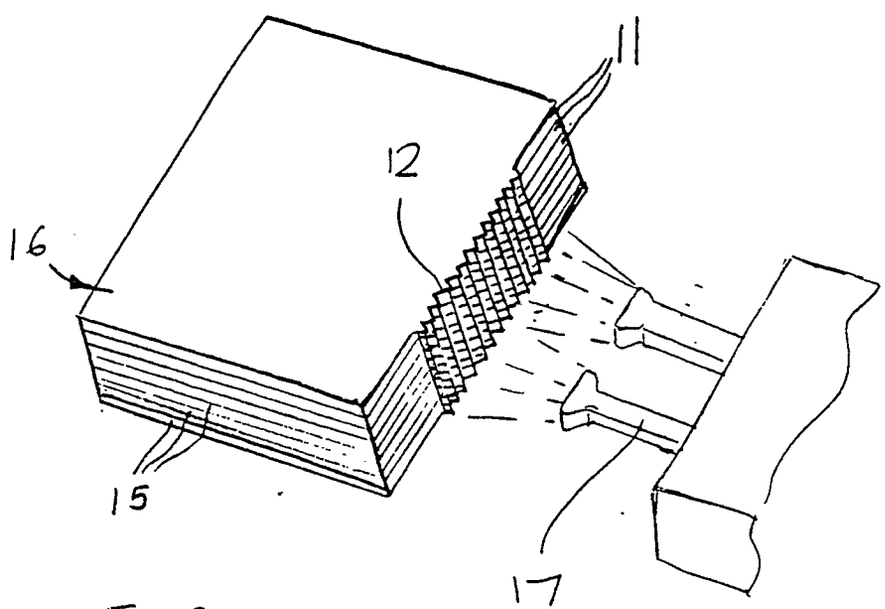

Fig 2

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A METHOD OF HARDENING THE EDGES OF A PLURALITY OF SHEETS

The invention relates to a method of hardening the edges of a plurality of sheets, for example, to form a cutting edge for cutting cling film, foil, grease-proof paper or the like.

GB 2128590A discloses a carton for a roll of cling film which is folded from a flat carton blank. In manufacture of the carton, a zig-zag cut is made along a fold line of the blank so that on folding of the blank to form the carton, a serrated edge is exposed. Prior to folding of the carton, the serrated edge is hardened by depositing a synthetic resin varnish thereon. The resin may be, for example, thermosetting resin of a polyester or polyurethane dissolved in a suitable solvent.

Each such carton blank is sprayed individually with resin and cured individually which may slow the rate of production of the cartons and may require an undesirably large amount of space. The process may be undesirably expensive.

US 4399935 discloses a carton for containing aluminium foil, waxed paper, plastic and other film materials. The carton is formed from a blank in which an intermittent cut score line is provided between the bottom and front panels to provide a cutting edge in the erected carton.

In manufacture of the carton, the carton blank is formed into an open ended tube by securing a glue flap of the blank to the front panel. The tube so formed is then flattened to expose the cutting edge and is arranged with other such flattened tubes upstanding in a row with the cutting edge of each tube uppermost. A roller coater is then moved over the cutting edges to deposit a stiffening coating of a plastic material. It is not disclosed that the tubes are contiguous in the position to be coated.

The rate of production of the cartons again may not be as rapid as desired and an undesirably large amount of space may be needed for the tubes while the coating hardens.

According to one aspect of the invention there is provided a method of hardening edges of a plurality of sheets comprising arranging the sheets contiguously in a stack with the edges to be hardened on one side of the stack, applying a hardening agent to that side of the stack, and causing the hardening agent to set on the stack the hardening agent being such that it is absorbed by the edges of the sheets and after setting of the hardening agent the sheets can be physically separated without damage to the edges.

As the sheets are arranged contiguously in a stack and are not folded aunlike in the method disclosed in US 4399935, a large number of sheets can be treated at once, thus speeding up treatment and saving on space. As the sheet edges are hardened while the sheets are in the stack, again less space is required and the sheets can be subsequently separated when convenient. The method permits considerable cost savings in production.

Preferably, the hardening agent is such that once set it bonds more strongly to the sheets than to itself so that on physical separation of the sheets fracture occurs in the hardening agent.

The hardening agent may be any suitable substance and may be a sugar-based adhesive.

The hardening agent may be applied in any suitable manner but preferably is applied as a spray.

The sheets may be made from cardboard, paper or the like and preferably are made from low grade cardboard. Low grade cardboard may be less rigid than higher grades but is generally more absorbent and so provides a harder edge following treatment.

According to a further aspect of the invention there is provided a sheet having an edge hardened by means of a method according to the previous aspect of the invention.

Preferably the sheet comprises a carton blank.

According to another aspect of the invention there is provided an article formed from or including a sheet according to the immediately preceding aspect of the invention.

According to a further aspect of the invention, there is provided a method of strengthening an intended cutting edge formed in a piece of cardboard or paper characterised by applying a solution of a sugar-based adhesive to the intended cutting edge such that it is absorbed by the intended cutting edge and allowing the absorbed adhesive to dry.

Preferably, the sugar-based adhesive is dextrine which may be in dilute solution.

According to yet another aspect of the invention there is provided a piece of cardboard or paper including an intended cutting edge formed therein and characterised in that the cutting edge is strengthened by a method according to the preceding aspect of the invention.

Preferably the piece of cardboard or paper is a carton blank.

According to still another aspect of the invention there is provided an article characterised in that the article includes or is formed from a piece of cardboard or paper including an intended cutting edge formed therein according to the previous aspect of the invention.

An embodiment of the invention will now be described by way of example and with reference to

the accompanying drawings, in which:-

Fig. 1 is a perspective view of the embodiment, and

Fig. 2 is a perspective view of the embodiment in preparation.

Fig. 1 shows a carton blank 10 including an edge 11 formed with serrations 12 to provide a cutting edge. The blank 10 is formed with lines of weakness 13 and flaps 14 so that it can be folded into a carton, for example, for holding a roll of cling film.

The carton blank 10 is formed from a sheet of cardboard 15 which is cut along one edge 11 to provide the serrations 12. The sheet 15 together with a plurality of similarly cut sheets is then arranged in a stack 16 so that the serrations 12 of each sheet are aligned and provided on one side of the stack 16. The stack 16 is then sprayed using a spraying device 17 with a dextrine solution. The dextrine solution may be a solution comprising three parts of water to one of dextrine in the form sold under the name Stadex dextrine grade DM207. The cardboard serrations 12 absorb the dextrine solution, and the stack 16 is left for the dextrine to dry and harden before the sheets are separated to be cut and to have lines of weakness to be introduced to provide the carton blank 10 shown in Fig. 1. As the dextrine is in dilute solution it is absorbed well into the sheets. Once set the dextrine provides a hard edge to the sheets but as it is in weak solution it bonds the sheets together sufficiently weakly that the sheets can be separated without damage to them as fracture will occur in any dextrine situated between the sheets rather than at the serrations 12.

Claims

1. A method of hardening edges (11) of a plurality of sheets (10) comprising arranging the sheets (10) contiguously in a stack (16) with the edges (11) to be hardened on one side of the stack (16), applying a hardening agent to that side of the stack, and causing the hardening agent to set on the stack (16) the hardening agent being such that it is absorbed by the edges (11) of the sheets (10) and after setting of the hardening agent the sheets (10) can be physically separated without damage to the edges (11).

2. A method as claimed in claim 1, wherein the hardening agent once set bonds more strongly to the sheets (10) than to itself so that on physical separation of the sheets (10) fracture occurs in the hardening agent.

3. A method as claimed in claim 2, wherein the hardening agent is a sugar-based adhesive.

4. A method as claimed in claim 3, wherein the hardening agent is a solution of dextrine.

5. A method as claimed in any preceding claim, wherein the hardening agent is applied as a spray.

6. A method as claimed in any preceding claim, wherein the edges (11) of the sheets (10) to be hardened are shaped for use as a cutting edge (12).

7. A method as claimed in any preceding claim, wherein the sheets (10) are made from cardboard, paper or the like.

8. A method as claimed in claim 7, wherein the sheets (10) are made low grade cardboard.

9. A sheet characterised by having an edge (11) hardened by a method as claimed in any preceding claim.

10. A sheet as claimed in claim 9, wherein the sheet (10) is a carton blank.

11. An article characterised in that the article is formed from or includes a sheet (10) as claimed in claim 9 or claim 10.

12. A method of strengthening an intended cutting edge (12) formed in a piece of cardboard or paper (10) characterised by applying a solution of a sugar-based adhesive to the intended cutting edge (12) such that it is absorbed by the intended cutting edge (12) and allowing the absorbed adhesive to dry.

13. A method as claimed in claim 12, wherein the sugar-based adhesive is dextrine.

14. A method as claimed in claim 12 or 13, wherein the sugar-based adhesive is in dilute solution.

15. A piece of cardboard or paper including an intended cutting edge (12) formed therein characterised in that the intended cutting edge (12) is strengthened by a method as claimed in claim 12, 13 or 14.

16. A piece of cardboard or paper as claimed in claim 15, wherein the piece of cardboard or paper is a carton blank (10).

17. An article characterised in that the article includes or is formed from a piece of cardboard or paper (10) including an intended cutting edge (12) formed therein as claimed in claim 15 or 16.

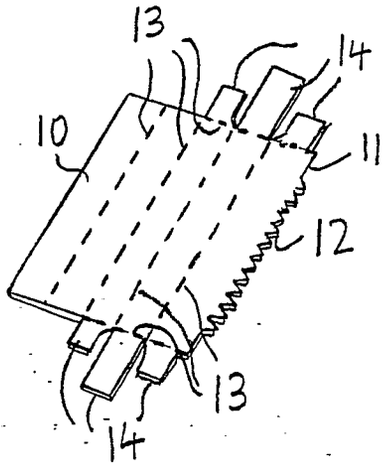

Fig.1.

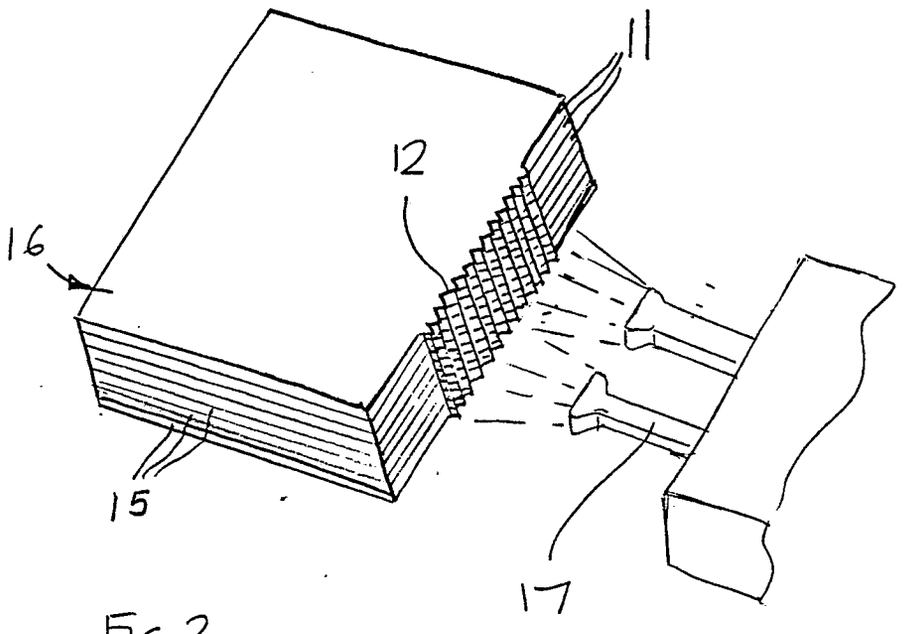

Fig2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 30 2228

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	CA-A-1 068 175 (SOMMERVILLE BELKIN INDUSTRIES LTD) * Page 1, lines 2-6; page 4, lines 4-21; claims 1,4; figures *	1,6-11	B 31 B 1/74 B 65 D 85/671
Y		2-5,12-17	
Y	US-A-4 437 850 (MASAYYUKI ONO) * Abstract; column 2, lines 52-66; column 5, lines 37-43; figures 2,3 *	2-5,12-17	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 31 B
D 21 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12-04-1990	ZANGHI A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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