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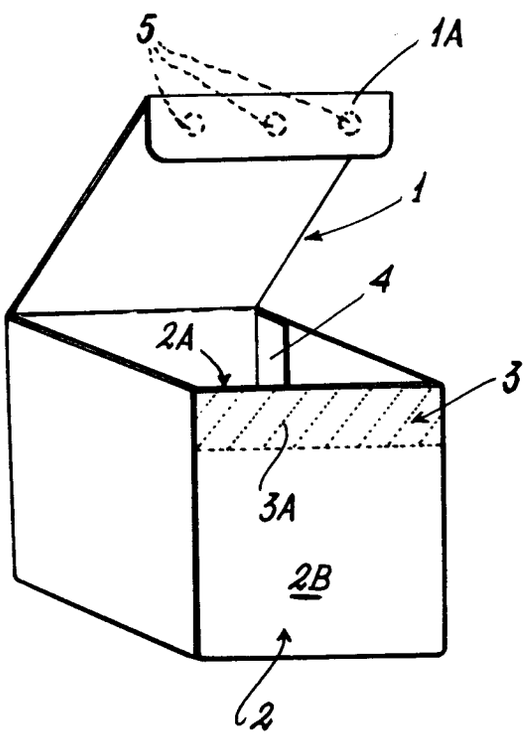
(54) Method for preparing a container with its opening sealable by a heat-meltable glue and provided externally with an anti-tamper layer of thermosensitive recording material.

(57) The invention relates to a method for preparing boxes or the like the openings of which are closed by a heat-meltable glue, on the outer surface of the boxes there being applied, in correspondence with the region in which said glue is applied, a layer of thermosensitive recording material or ink the colour or tone of which changes irreversibly if the closed finished box is heated in order to fraudulently open it.

According to the method, the layer of thermosensitive recording material is applied to the box directly by the box manufacturer and in any event before the products to be contained therein are inserted into the box.



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This invention relates to a method for preparing containers with their opening sealable by means of a heat-meltable or heat-softenable glue, on the outer surface of said containers there being provided, in correspondence with the region in which the glue is positioned, a layer of thermosensitive recording material or ink which changes colour at a temperature equal to or less than the softening point of the glue.

Such containers, consisting generally of cardboard boxes, are intended to contain high-value products, generally pharmaceutical, cosmetics or other products, for which it is desired to prevent tampering which could be achieved by heating the containers locally in correspondence with the regions in which the glue is applied, this thus softening or melting to enable the containers to be opened and their contents tampered with, after which the containers could be again closed after again heating the glue.

To prevent fraudulent opening of the containers in the aforesaid manner, the patent US-A-4,480,749 describes a container, on the outer surface of which in correspondence with its openings there is provided a layer of a temperature-sensitive indicator, such that its colour or colour tone changes irreversibly at a temperature equal to or less than the melting or softening point of the glue. Hence if an attempt is made to fraudulently open the container and then reclose it after tampering with the contents, the colour change of the said indicator immediately and clearly indicates that tampering has taken place.

As described and claimed in the said US-A-4,480,749 the temperature-sensitive indicator is applied to the container after the product to be protected has been placed in it and after the container has been closed by the the said glue. More specifically, as specified on lines 52-56 of column 2 of the said patent, the temperature-sensitive indicator is a liquid (ink or recording material) which is sprayed onto the container when its packaging is complete.

Such a procedure results in serious problems (which have prevented the working of that described in the USA patent), both because the thermosensitive ink or recording material or their solvents can contaminate the product (especially in the case of a pharmaceutical or food product) contained in the container (box), and because the container packaging lines or machines have to be flanked by costly and bulky systems for applying the thermosensitive ink or recording material, and finally because the application of such ink when the container packaging is complete seriously slows down the packaging rate. All this explains why the patent US-A-4,480,749 has not been successful. It has not been used by any packaging company and was quickly abandoned (by lack of payment of renewal fees) by the patentee.

The present invention relates to a method for preparing packages or boxes of the aforedescribed type by which all the aforesaid drawbacks are overcome, and in particular by which no modification of any type is required to a line for packaging normal boxes not comprising the layer of thermosensitive recording material.

The invention also relates to the boxes obtained in this manner and to boxes ready to be made up by conventional machines.

According to this method, the layer of thermosensitive recording material is applied to the flat sheet which is to form the box directly before, after, or during the printing of the box, or to the semifinished box, ie partially folded and glued; whereas on the packaging line there is merely applied the heat-meltable or heat-softenable glue in a quantity sufficiently small to prevent its temperature propagating through the thickness of the material (usually cardboard) with which the box is constructed, to the extent of causing the colour of the recording material to change.

To clarify the characteristics of the present invention, reference will be made by way of non-limiting example to the accompanying drawing, in which the single figure represents a perspective view of a box with its lid or upper flap in the open position.

The flap or lid 1 of the box comprises a folded edge 1A to be glued to the onto the inner face 2A of the wall 2 of the box.

On the part 3 of the exposed face 2B of the box wall 2 there is applied a layer 3A (shown by dashed lines) of a thermosensitive recording material or ink. In the box when packaged and closed, the folded edge 1A of the lid 1 is positioned below and in correspondence with the part 3 of the wall 2.

The box will have been assembled in the conventional manner, by folding the punched blank from which it has been obtained, and gluing the edge 4 to the side wall on which the edge 4 is superposed.

The thermosensitive recording materials or inks are of known type (for example of the type in which the colour changes at a temperature of between about 90 °C and 100 °C), such as those described in the patents US-A-4742042, US-A-5043313 or DE 3836797 or those produced and marketed by the firms Pilot Ink (Japan), Big Three Industries Tempil Division (USA), Jin An Industrial (Taiwan), and Manoukian S.p.A. (Italy).

According to the invention, these recording materials or inks are applied by various means directly by the paper processing firms which print, punch and produce the boxes, for example by brush, by spraying or by printing machines. It has

however been found particularly advantageous to directly use those machines commonly used for applying liquids or fluids under pressure to paper supports or the like, employing spray guns or spreading heads of well known type such as those manufactured by Nordson Corporation (USA) or by Robatech (Italy) - commonly used for spreading glue over cardboard blanks or over packages of various types. Using these systems on a common machine of known type for folding and gluing boxes, it is possible to apply over limited regions of the boxes a layer of thermosensitive recording material or ink at a rate of about 100,000 boxes per hour (or more).

In all cases the layer of thermosensitive recording material 3A is applied before the box is fed onto the final packaging line or machine.

The heat-meltable glue used for closing the boxes on termination of their packaging is of the type commonly used for closing boxes, for example with a softening point of about 110-120 °C. This glue is deposited on the edge 1A in the form of droplets 5, using the common machines utilized for this purpose.

The quantity of glue applied to the edge 1A must be sufficiently small, ie its mass must be insufficient (depending on the type and thickness of the material with which the box is constructed) to transmit to the recording material 3A a quantity of heat sufficient to change the colour of the recording material.

In this respect it should be noted that the glue droplets 5 are applied to the edge 1A of the lid while it is open, after which the lid is quickly closed by positioning the edge 1A in contact with the inner surface 2A, in correspondence with the region 3. Conventionally, the quantity of glue must be so small that it solidifies immediately after being brought into contact with the wall 2 of the box.

It is apparent that with the described method, those firms using the boxes can process the boxes using common packaging machines.

If an attempt is made to fraudulently open the box after it has been closed, it is necessary to melt or soften the glue, resulting in the thermosensitive recording material changing colour.

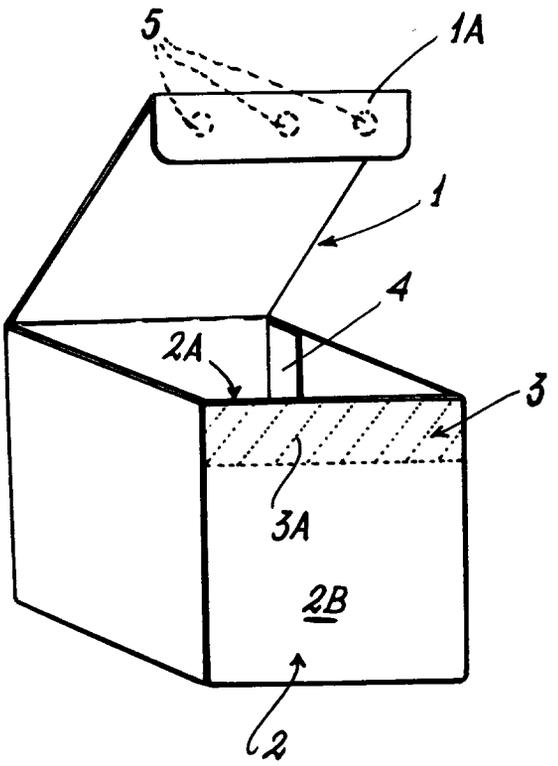
The invention also relates to the boxes obtained by the aforedescribed method and also the punched blanks and semifinished boxes to be used for processing by the method.

Claims

1. A method for preparing a container with its opening sealable by a heat-meltable glue and provided externally with an anti-tamper layer of thermosensitive recording material, characterised in that a layer of thermosensitive recording material is applied to the exposed face of the flat sheet which is to form the box, or of the semifinished box, the container being closed on the packaging line or machine after applying heat-meltable glue used for conventional closure, the temperature at which the colour of the recording material changes being less than or equal to the glue softening point, the quantity of glue used being sufficiently small to prevent the heat transmitted by it through the thickness of the constituent sheet of the box from heating the recording material to the temperature at which it changes colour.

2. A closed box provided with an anti-tamper layer of thermosensitive recording material, obtained by the method of claim 1.

3. A semifinished box or a punched flat sheet provided with a layer of thermosensitive recording material, and to be finished by the method of claim 1.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1A
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2A
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3A
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EUROPEAN SEARCH REPORT

Application Number EP 94104040.4

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)
D,A	US - A - 4 480 749 (PETER K. LAUCIS et al.) * Abstract; fig. 1B; claims 1-6 * --	1-3	A 61 J 1/03 A 61 J 1/00 B 65 D 55/02
A	US - A - 4 998 666 (FREDERICK R. EWAN) * Abstract; fig. 1-10; claims 1-9 * --	1-3	
A	GB - A - 2 235 187 (ROBERT PETER SUNMAN) * Abstract; fig. 1; claims 1-6 * ----	1-3	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A 61 J
B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	14-06-1994	HAUK

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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D : document cited in the application
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