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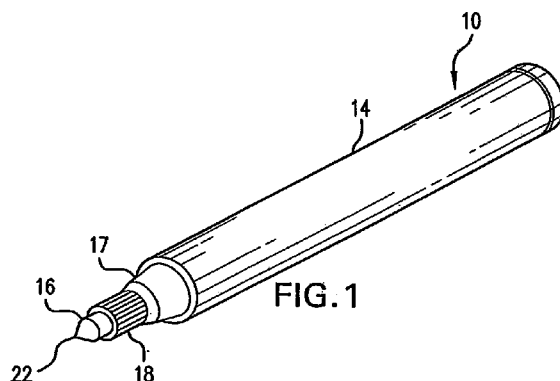
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(54) Title: FOOD GRADE MARKER



(57) Abstract: A food-grade marking composition useful for marking and labeling surfaces of food processing equipment includes a food grade base polymer, a coloring agent, and a volatile organic solvent. A marker pen is also provided which includes the food grade marking composition in combination with a delivery instrument. The food grade base polymer meets the regulatory requirements of 21 C.F.R. § 175.300 for incidental food contact applications.



FOOD GRADE MARKER

RELATED APPLICATIONS

This patent application claims priority under 35 U.S.C. § 119(e)(1) based on U.S. Provisional Application Serial No. 61/208,776, filed on 27 February 2009, and U.S. Provisional Application Serial No. 61/220,021, filed on 24 June 2009, the disclosures of which are incorporated by reference.

FIELD OF THE INVENTION

This invention relates to a food grade marking composition which is safe for incidental food contact, and to a marker pen for applying the food grade marking composition.

BACKGROUND OF THE INVENTION

Various techniques have been used for marking and labeling process equipment used to process meat, poultry, fish, dairy products, produce, juices, and other food products. In designing such labels, two significant challenges must be met. First, the label must be designed so that the marking is permanent and does not wear off during processing of the food items. Second, conventional labeling inks are not designed or approved for contact with foods. Therefore, the equipment and labeling should be designed so that the food products are generally protected from exposure to conventional labeling inks.

Isolation of food products from labeling inks is especially challenging when the food product is wet, flexible and moving, such as during the processing of meat and poultry. Accordingly, there is a need or desire for a marking composition which is durable, safe and approved for indirect and incidental contact with food products. There is also a need or desire for a marker pen or instrument that is capable of applying the marking composition to a wide variety of food processing equipment made of plastic, metal, glass, and the like.

SUMMARY OF THE INVENTION

The present invention is directed to a food grade marking composition which is safe for incidental food contact, and whose dry ingredients suitably meet the certification requirements of the NSF International/Nonfood Compounds Registration Program. The NSF International/Nonfood Compounds Registration Program is a continuation of the U.S.D.A. product approval and listing program, which is based on meeting the Food and Drug Administration regulatory requirements described in 21 C.F.R. § 175.300. The marking composition of the invention includes a food grade based polymer, which can be a terpolymer of vinyl chloride, vinyl acetate and dicarboxylic acid; a volatile organic solvent; and a coloring agent.

The present invention is also directed to a marker pen which includes the food grade marking composition combined with a delivery instrument, and a method for making a food grade label. The marker pen can apply the food grade marking composition to a variety of surfaces made of plastic, metal, glass, and the like. The marking composition provides durable marking labels for food processing equipment used to process meat, poultry, fish, dairy products, produce, juices and other food products. The marking labels are not spontaneously removed when exposed to wet, flexible and/or moving food products.

The present invention overcomes disadvantages associated with conventional marking compositions that are not food grade and are not NSF-approved. By applying a food grade marking composition, any concerns associated with incidental contact between the marking labels and food products can be alleviated.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of one embodiment of a marker pen useful for applying the food grade marking composition of the invention.

Fig. 2 is an enlarged side sectional view of the marker pen of Fig. 1.

Fig. 3 is a front view of the marker pen taken along line 3-3 in Fig. 2.

Fig. 4 is a perspective view of another embodiment of a marker pen useful for applying the food grade marking composition of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The food grade marking composition of the invention includes, in combination, a base polymer, a coloring agent, and one or more volatile solvents. The marking composition is formulated so that the dry ingredients which remain after evaporation of the solvent satisfy the regulatory requirements of 21 C.F.R. § 175.300.

The food grade base polymer is defined as one which meets the regulatory requirements of 21 C.F.R. § 175.300. One suitable food grade base polymer is a terpolymer of predominantly vinyl chloride with vinyl acetate and dicarboxylic acid, available from Wacker Polymers of Adrian, Michigan under the trade name VINNOL® H15/45M. Based on information from the supplier, this terpolymer has excellent resistance to water, oil, grease, aliphatic hydrocarbons, alcohols, dilute aqueous acids, alkalis, and saline solutions. The terpolymer may be present in the marking composition in an amount of about 1-20% by weight, suitably about 1.5-10% by weight, or about 2-5% by weight.

The coloring agent may also contain food grade ingredients that meet the regulatory requirements of 21 C.F.R. § 175.300. The type of coloring agent depends on the desired color of the marking composition. When a black marking composition is desired, the coloring agent may be a combination of a black pigment, such as carbon black, and a food grade carrier resin. One food grade carrier resin is UCAR Solution Vinyl Resin VAGD available from Dow Chemical Co. of Midland, Michigan. Another food grade carrier resin is VINNOL® H15/45M vinyl chloride terpolymer available from Wacker Polymers. For instance, the black coloring agent may contain about 25-35% by weight carbon black and about 65-75% by weight of the foregoing vinyl polymer. Other coloring agents and colors can also be used,

provided the ingredients meet the requirements of 21 C.F.R. 175.300. The coloring agent may be present in the marking composition at about 2-20% by weight, suitably about 5-15% by weight, or about 8-12% by weight.

The volatile organic solvent should be composed of one or more ingredients that evaporate quickly following application of the marking composition to a substrate. Because the solvent is not approved for food contact, it should evaporate completely from the substrate. Ketone solvents having high volatility are especially suitable. One suitable solvent is a combination of about 50-85% by weight acetone and about 15-50% by weight cyclohexanone, particularly about 70-80% by weight acetone and about 20-30% by weight cyclohexanone. Another suitable solvent is a combination of about 50-85% by weight methyl isobutyl ketone and about 15-50% by weight cyclohexanone, particularly about 70-80% by weight methyl isobutyl ketone and about 20-30% by weight cyclohexanone. The second combination is more suitable because it does not evaporate quite as fast as the first combination. It is advantageous for the solvent to dry quickly, but not too quickly after the marking composition is applied to a substrate. The solvent may be present in the marking composition at about 60-97% by weight, suitably about 75-95% by weight, or about 83-90% by weight.

The present invention is also directed to a marker pen which includes the food grade marking composition in combination with a delivery instrument. Suitable marker pens include valve action marker pens. Exemplary valve action marker pens include those in which pressure applied to the pen dispensing tip during writing activates a spring-loaded valve inside the pen chamber, causing the release of marking composition from the chamber into the dispensing tip. Exemplary valve action marker pens are disclosed in U.S. Patent 6,641,320, issued to Ballot et al.; U.S. Patent 4,848,947, issued to Kremer et al.; U.S. Patent 4,792,252, issued to Kremer et al.; and U.S. Patent 4,685,820, issued to Kremer et al.

A particularly suitable valve action marker pen is illustrated in Figs. 1-3 with an alternative valve action marker pen being shown in Fig. 4. Referring to

Figs. 1-3, a marker pen 10 contains a liquid marking composition 12 in a chamber 14, which has a narrower open end 18 and a wider closed end 19. A marker tip 16 is mounted to a narrow end 18 of marker pen 10, and is used for dispensing marking composition 12 onto a surface, typically by writing or brushing. The marker tip 16 may be formed of any suitable absorbent sponge, fibrous, felt or brush-type material. The chamber 14 may be provided with a metal ball or slug 20, used to agitate the marking composition 12 inside the chamber 14. A valve assembly 11 dispenses marking composition 12 from chamber 14 to marker tip 16.

The valve assembly 11 includes a plug 26, a subchamber 15, and a spring 28 mounted between one or more support members 30 and plug 26, as herein explained. The marker tip 16 has an exposed outer end 22 and an inner end 24 that engages cylindrical plug 26. The marker pen 10 has an intermediate portion 17 that is wider than narrow end 18 and narrower than chamber 14. The intermediate portion 17 acts as a transition between narrow end 18 and the wider chamber 14. When marker pen 10 is at ease, and not in use, the plug 26 engages inner wall 19 of intermediate portion 17, and the plug 26 and marker tip 16 define a subchamber 15 with the inner wall 19 of intermediate portion 17.

The plug 26 engages a spring 28 located in the wider chamber 14 immediately adjacent to the intermediate portion 17. The spring 28 is supported in chamber 14 between an end rim 29 and a plurality of support members 30 projecting from an inner wall 13 of chamber 14. When the marking pen 10 is used, the marker tip 16 is pressed against a substrate surface with sufficient pressure to dislodge plug 26 from the intermediate portion 17, and urge the plug 26 into the wider chamber 14 against the biasing action of spring 28. This opens the plug 26 and enables the food grade marker composition 12 to flow around the plug 26 and spill into subchamber 15, where it is absorbed by marker tip 16 and transmitted to the substrate surface. When the marking pen 10 is lifted from the substrate surface, the pressure is released, and the biasing action of spring 28 urges the plug 26 back into its closed position in the intermediate portion 17.

Fig. 4 illustrates an alternative valve action marker pen 50 in the form of a felt-tipped dauber applicator. The valve action marker pen 50 has a relatively wider chamber 54, and relatively wider narrow end 58 and marker tip 56, compared to the embodiment of Figs. 1-3. The inner mechanics of the marker pen 50 may be the same or somewhat different than the inner mechanics of marker pen 10 of Figs. 1-3. In any case, it has been determined that the food grade marking composition is best applied using a marker pen that is a valve action marker pen. In either embodiment, the narrow portion 18 of marker pen 10, or the narrow portion 58 of marker pen 50, may be covered with a removable (not shown) which protects the marker tip 16 or 56 when the marker pen is not in use.

The present invention is also directed to a method of making a food grade label for food processing equipment. The method includes the step of providing a marker pen as described above, including a chamber, a food grade marking composition in the chamber, a marker tip, and a valve assembly for transferring the food grade marking composition from the chamber to the marker tip. The tip of the marker pen is applied to a surface of the food processing equipment with sufficient pressure to activate the valve assembly to transfer a quantity of the food grade marking composition from the chamber to the tip. The marker tip is then moved along the surface of the food processing equipment to form the label. Once formed, the label is dried to remove the volatile organic solvent from the food grade marking composition. The remaining ingredients, namely the base polymer and the coloring agent, suitably meet the regulatory requirements of 21 C.F.R. § 175.300 and are suitable for incidental food contact.

The embodiments of the invention described herein are exemplary, and various modifications and improvements can be made without departing from the spirit and scope of the invention. The scope of the invention is indicated by the appended claims, and all changes that fall within the meaning and range of equivalents are intended to be embraced therein.

WE CLAIM:

1. A food grade marking composition, comprising:
about 1-20% by weight of a food grade base polymer;
about 2-20% by weight of a coloring agent; and
about 60-97% by weight of a volatile organic solvent.
2. The food grade marking composition of Claim 1, wherein the food grade base polymer comprises a terpolymer of vinyl chloride, vinyl acetate and dicarboxylic acid.
3. The food grade marking composition of Claim 1, wherein the food grade base polymer is present at about 1.5-10% by weight.
4. The food grade marking composition of Claim 1, wherein the coloring agent comprises a pigment and a food grade carrier resin.
5. The food grade marking composition of Claim 1, wherein the coloring agent is present at about 5-15% by weight.
6. The food grade marking composition of Claim 1, wherein the volatile organic solvent comprises acetone and cyclohexanone.
7. The food grade marking composition of Claim 1, wherein the volatile organic solvent comprises methyl isobutyl ketone and cyclohexanone.
8. The food grade marking composition of Claim 1, wherein the volatile organic solvent is present at about 75-95% by weight.

9. A marker pen comprising the food grade marking composition of Claim 1 in combination with a delivery instrument.

10. A marker pen, comprising:
a chamber containing a food grade marking composition; and
a marker tip receiving the food grade marking composition from the chamber;

wherein the marking composition comprises a food grade base polymer, a coloring agent, and a volatile organic solvent.

11. The marker pen of Claim 10, further comprising a valve assembly for transferring the food grade marking composition from the chamber to the marker tip.

12. The marker pen of Claim 10, wherein the food grade marking composition comprises about 1-20% by weight of a food grade base polymer, about 2-20% by weight of a coloring agent, and about 60-97% by weight of a volatile organic solvent.

13. The marker pen of Claim 12, wherein the food grade base polymer comprises a terpolymer of vinyl chloride, vinyl acetate and dicarboxylic acid.

14. The marker pen of Claim 11, wherein the valve assembly comprises:
a plug engaging an inner end of the marker tip;
a subchamber defined by the plug, a portion of the marker tip, and an inner wall portion of the marker pen;

a spring engaging the plug on a side opposite the marker tip; and
one or more support members engaging the spring and sustaining the
spring between the plug and the one or more support members;

wherein pressure applied to the marker tip opens the plug and permits
the food grade marker composition to flow from the chamber to the subchamber and
into the marker tip.

15. The marker pen of Claim 10, wherein the marker pen is
configured as a dauber applicator.

16. The marker pen of Claim 10, wherein the marker tip comprises
a material selected from the group consisting of an absorbent sponge material, a
fibrous material, a felt material, a brush-type material, and combinations thereof.

17. The marker pen of Claim 12, wherein the food grade marking
composition comprises about 1.5-10% by weight of the food grade base polymer,
about 5-15% by weight of the coloring agent, and about 75-95% by weight of the
volatile organic solvent.

18. A method of making a food grade label for food processing
equipment, comprising the steps of:

providing a marker pen including a chamber, a food grade marking
composition in the chamber, a marker tip, and a valve assembly for transferring the
food grade marking composition from the chamber to the marker tip;

applying the marker tip to a surface of the food processing equipment
with sufficient pressure to activate the valve assembly to transfer the food grade
marking composition from the chamber to the marker tip; and

moving the marker tip along the surface of the food processing
equipment to form the label.

19. The method of Claim 18, wherein the food grade marking composition comprises a food grade base polymer, a coloring agent and a volatile organic solvent.

20. The method of Claim 19, further comprising the step of drying the label to remove the volatile organic solvent from the food grade marking composition.

21. The method of Claim 19, wherein the food grade base polymer comprises a terpolymer of vinyl chloride, vinyl acetate and dicarboxylic acid.

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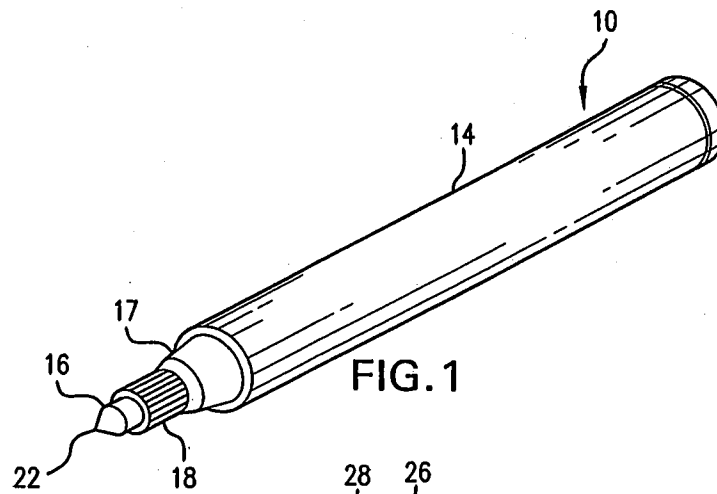


FIG. 1

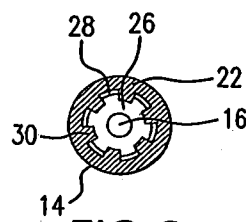


FIG. 3

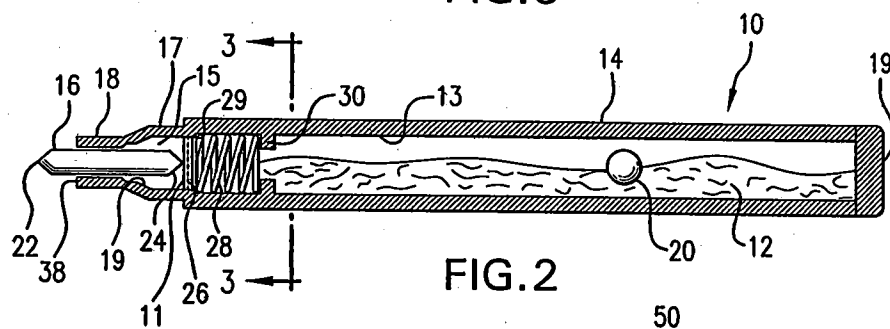


FIG. 2

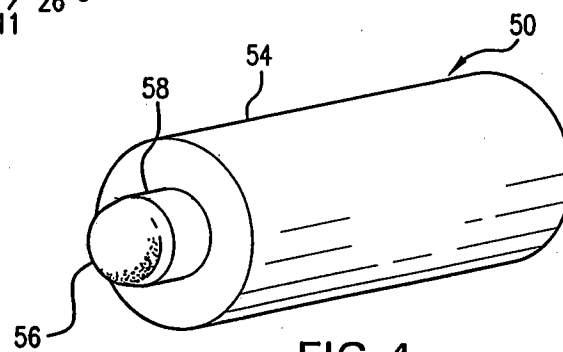


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/025002

A. CLASSIFICATION OF SUBJECT MATTER
INV. C09D11/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C09D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/120227 A1 (IMAGE SA [FR]; DE SAINT-ROMAIN PIERRE [FR]) 16 November 2006 (2006-11-16) claims 1-34; examples 1-6 -----	1-21
X	WO 2005/003242 A2 (PLAYTEX PRODUCTS INC [US] PLAYTEX PRODUCTS INC [US]; GORHAM PATRICK [U] 13 January 2005 (2005-01-13) claims 1-38; examples 1-20 -----	1-21
X	WO 2005/082611 A1 (BOISE WHITE PAPER L L C [US]; JUANG MIKE S D [US]) 9 September 2005 (2005-09-09) claims 1-38; examples 1-4 ----- -/--	1-21



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/025002

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/035673 A1 (SANFORD LP [US]; DAVIES-SMITH LEIGHTON [US]; KWAN VINCENT WING SUM [US] 21 April 2005 (2005-04-21) claims 1-41; examples 1,2 -----	1-21
X	US 2003/051634 A1 (TAKAHASHI NORIO [JP]) 20 March 2003 (2003-03-20) claims 1-14; examples 1-4 -----	1-21
X	US 6 025 022 A (MATZINGER MICHAEL D [US]) 15 February 2000 (2000-02-15) claims 1-32; examples 1-10 -----	1-21
X	EP 0 899 309 A1 (KUIVALA RISTO [FI]) 3 March 1999 (1999-03-03) claims 1-10; example 1 -----	1-21
X	US 5 397 387 A (DENG GODWIN [US] ET AL) 14 March 1995 (1995-03-14) claims 1-20; examples 1-3 -----	1-21

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/025002

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2006120227	A1	16-11-2006	CN 101171313 A EP 1879969 A1 FR 2885619 A1 US 2008193725 A1	30-04-2008 23-01-2008 17-11-2006 14-08-2008
WO 2005003242	A2	13-01-2005	AU 2004253945 A1 CA 2528855 A1 GB 2420501 A	13-01-2005 13-01-2005 31-05-2006
WO 2005082611	A1	09-09-2005	CA 2557548 A1	09-09-2005
WO 2005035673	A1	21-04-2005	AU 2004280599 A1 CA 2541499 A1 CN 1890333 A EP 1670869 A1 JP 2007509197 T KR 20060097026 A MX PA06003922 A US 7083665 B1 US 2005120919 A1	21-04-2005 21-04-2005 03-01-2007 21-06-2006 12-04-2007 13-09-2006 27-06-2006 01-08-2006 09-06-2005
US 2003051634	A1	20-03-2003	JP 2003089758 A	28-03-2003
US 6025022	A	15-02-2000	NONE	
EP 0899309	A1	03-03-1999	FI 973491 A	27-02-1999
US 5397387	A	14-03-1995	AU 691599 B2 AU 2111695 A CA 2187206 A1 EP 0754208 A1 WO 9527758 A1	21-05-1998 30-10-1995 19-10-1995 22-01-1997 19-10-1995