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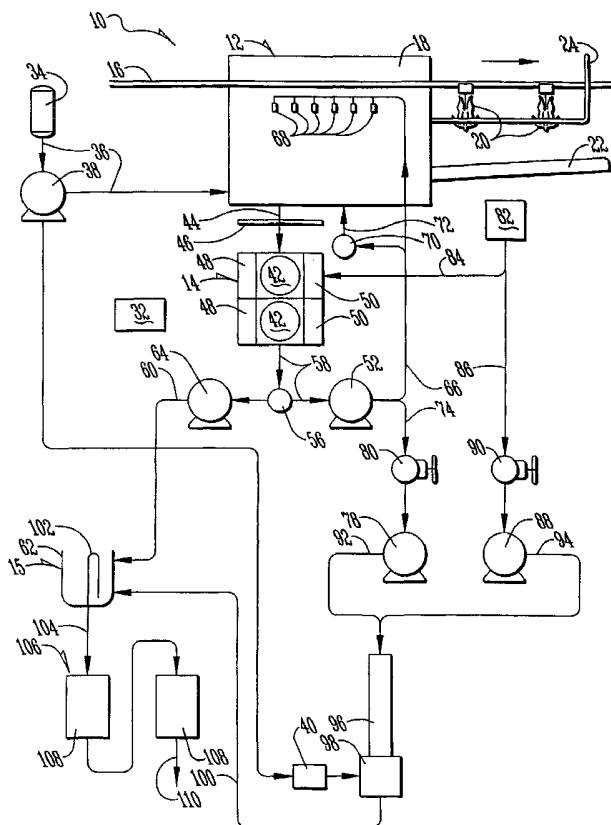
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[Continued on next page]

(54) Title: APPLICATION SYSTEM WITH RECYCLE AND RELATED USE OF ANTIMICROBIAL QUATERNARY AMMONIUM COMPOUND



(57) Abstract: An antimicrobial application system is disclosed, comprising an antimicrobial application unit and a recycle unit. An initial, dilute antimicrobial composition is prepared. The composition is provided to the antimicrobial application unit and applied to workpieces, such as raw poultry. After application to the workpieces, the composition is returned to the recycle tank. The concentration of the antimicrobial in the recycle tank is monitored, and additional antimicrobial is automatically added if the concentration of the antimicrobial in the composition falls below a desired amount. The composition is periodically diverted to a capture tank, and the antimicrobial is selectively removed from the composition. The removed antimicrobial and remaining composition are then disposed of in appropriate manners. The antimicrobial is preferably a quaternary ammonium compound, is more preferably an alkylpyridinium chloride, and is most preferably cetylpyridinium chloride.



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,
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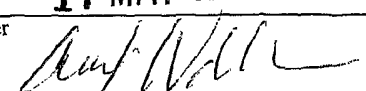
- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/35933

A. CLASSIFICATION OF SUBJECT MATTER																						
IPC(7) : A23B 4/14; A23B 4/20																						
US CL : 426/335, 615, 641, 643																						
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) U.S. : 426/335, 615, 641, 643																						
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 practicable, search terms used) Please See Continuation Sheet																						
C. DOCUMENTS CONSIDERED TO BE RELEVANT																						
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																				
Y, P	US 2003/0047087 A1 (PHEBUS et al.) 13 March 2003, abstract and page 3, paragraphs 0029, 0030-0037.	1-31																				
Y	US 4,996,070 A (NAFISI-MOVAGHAR) 26 February 1991, abstract and col. 10, lines 24-39, col. 12, lines 20-30.	5, 6																				
Y	US 5,421,883 A (BOWDEN) 06 June 1995, abstract and col. 7, lines 55-64, col. 8, 1-11 .	7-11																				
Y, P	US 2003/0198716 A1 (HANKINSON et al.) 23 October 2003, abstract and page 5, paragraph 0044, 0045, 0046.	16-17																				
Y, P	US 2003/0148727 A1 (HILGREN et al.) 07 August 03 2003, paragraphs 0014, 0048, 0064, 0132, 0134.	16, 19, 24																				
Y, E	US 2004/0009271 A1 (DAVIDSON et al.) 15 January 2004, abstract and paragraphs 0016, 0054, 0065.	24-31																				
Y	US 6,126,810 A (FRICKER et al.) 03 October 2000, abstract and col. 4, lines 33-55.	30, 31																				
Y	US 2002/0064585 A1 (CHRISTIANSON et al.) 30 May 2002, abstract and page 14, claim 20 and 21.	25, 26																				
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.																						
* Special categories of cited documents: <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>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</td> </tr> <tr> <td>"E"</td> <td>earlier application or patent published on or after the international filing date</td> <td>"X"</td> <td>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</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>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</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"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	"E"	earlier application or patent published on or after the international filing date	"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	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
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"P"	document published prior to the international filing date but later than the priority date claimed																					
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Helen F. Pratt  Telephone No. 571-272-1201																				

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International application No.

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

- The additional search fees were accompanied by the applicant's protest.
No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

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BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-7, drawn to a method of applying a composition to a workpiece.

Group II, claim(s) 8-15, drawn to an apparatus that contains various apparatus for applying a composition to a product.

Group III, claim(s) 16-20, drawn to a method of conveying a plurality of workpieces.

Group IV, claim(s) 21-23, drawn to an apparatus which requires a rigid member with a plurality of openings.

Group V, claim(s) 24-31, drawn to a method which requires particular antimicrobial compounds.

The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group I, claims 1-7 are to applying a composition to a workpiece, diverting a portion of the composition and diluting the diverted composition, determining a concentration of the first component and adding an additional amount of the first component.

Group II, claims 8-15 are to a combination that contains various apparatus for applying a composition to a product. The method of Group II does not require the same technical features because they are to particular apparatus such as a sprayers and conduits and spectrophotometers which are not required for the first method.

Group III, claims 16-20 is to a method of conveying which lacks the same or corresponding special technical feature of the method of group I which requires no conveying, or the particular apparatus of Group II which requires an apparatus.

Group IV, claims 21-23 is to an apparatus further requiring a rigid member with a plurality of openings which is not the same technical feature required for the previous groups.

Group V, claims 24-31 further requires particular antimicrobial compounds not required by the previous groups and therefore the previous groupings lack the same corresponding technical feature.

Continuation of B. FIELDS SEARCHED Item 3:

INTERNATIONAL SEARCH REPORT

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West and East search terms: antimicrobial, antibacterial, apply, remove, recycle, conveyor, filter, lenses, sensors, sprayer
concentration