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(54) Container.

(57) The invention provides a package for contents which are to be added to a liquid medium wherein the package comprises a first part which is readily soluble and/or dispersible in the liquid medium and a further part which is not readily soluble and/or dispersible in the liquid medium.

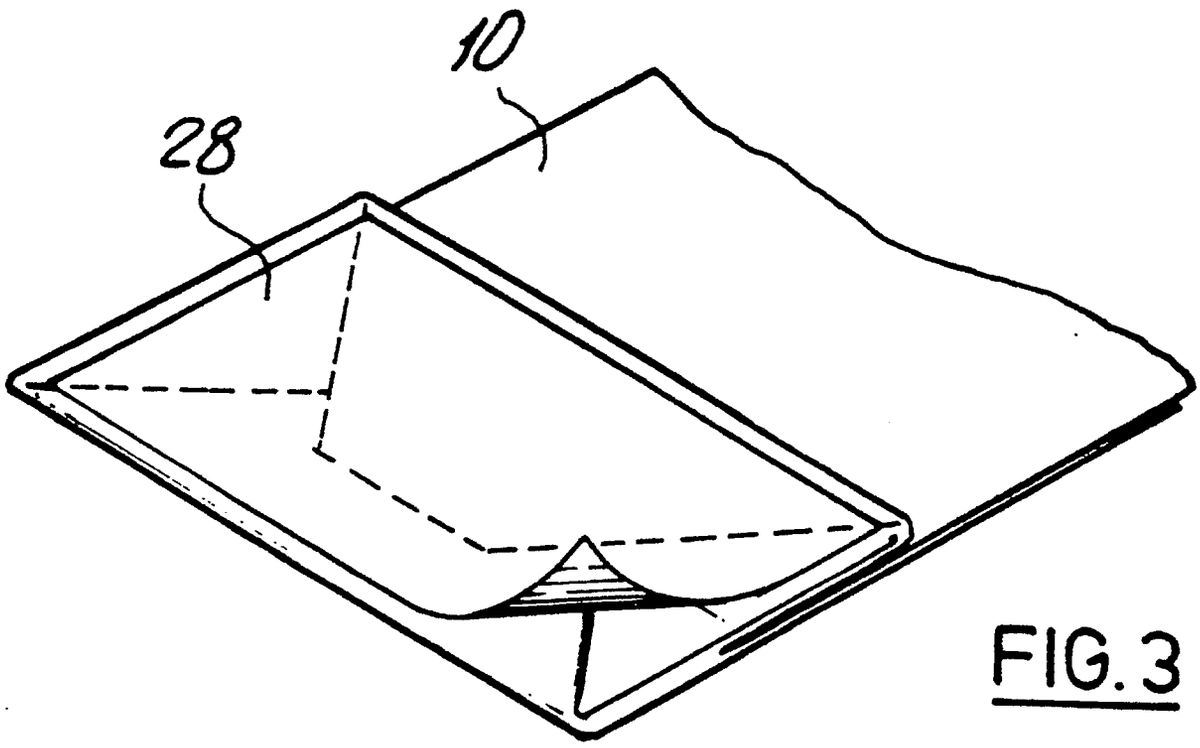

FIG.3

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CONTAINER

The present invention relates to a package of material to be dispersed in a liquid and to the sue of such packages. In particular, the present ivnention relates to packages for substances e.g. concentrated forms of agrochemicals which are to be added to water to create a dilute solution or suspension.

There is always a need to control and limit the contact of hazardous and potentially hazardous substances with operators and the environment. For example many pesticides are formulated as granules or powders which are dissolved or dispersed in water prior to use e.g. by spraying. When packed in conventional open top drums, cartons or bags there is a risk of contamination to the crop spray operator when tipping the pesticide into the crop spray mixing tank through an open top manhole, especially in open, often windy conditions. Therefore, there is a need for packages which allow their contents to be discharged into a liquid without exposing either the environment or an operator to the contents.

The present invention provides a package for contents which are to be added to a liquid medium, wherein the package comprises a first part which is readily soluble and/or dispersible in the liquid medium and a further part which is not readily soluble or non-dispersible in the liquid medium. The package may include the contents which will generally be in the form of granules or powder. Typically the package is a container for granules or powders, having an operable base which is closed and sealed by a strip of water soluble or dispersible paper.

The container may be a bag or carton made of paper or cardboard and which may be lined with a thin plastics sheet e.g. of polyethylene. The base may be formed by simply folding over the bottom and then securing it by means of a strip of water soluble or dispersible paper which is fixed in place by an adhesive.

The paper is preferably such that when wetted with water and the container is held away from any base support, the paper is weakened sufficiently for the weight of the contents of the container to force open the base within about 10 seconds, preferably with 7 seconds.

Thus the container may be lowered into a tank of water through a manhole to wet the base for 4-5 seconds. The container is then lifted clear of the water surface and after e.g. 2-3 seconds the base is forced open by the weight of the contents which are emptied into the tank without generating any dust.

For ease of use the top of the container is preferably heat sealed and fitted with a handle. In order to prevent premature wetting e.g. by exposure to rain, the container is preferably inside a moisture resistant outer container from which it is removed for use. The outer container can also be used to hold the dripping inside container after use, for disposal.

Alternatively the soluble/dispersable part of the package may be protected by a peelable covering of insoluble and non-dispersable material. In this way the covering can be peeled off to expose the soluble/dispersable part just prior to use of the package.

The water soluble or dispersible paper may be composed mainly of carboxymethyl cellulose or any other material which produces a paper having sufficient dry strength to hold the bottom of the container closed when full or product, but which rapdily becomes very week when wetted with water.

The thickness of the water soluble or dispersible paper can vary depending on the size of the container and the weight of product therein. The thickness may conveniently range from 30 microns to 200 microns preferably from 60 to 200 microns for instance.

The contents of the container may comprise one or more fertilisers and/or pesticides, such as insecticides and fungicides, in powder or granular form. In addition, one or more water soluble packets of a different pesticide may be included so as to give a final solution or dispersion containing pesticides in a predetermined ratio. The package may also be used for other substances such as dyes or pigments.

In a preferred type of embodiment the invention provides a package (generally a bag or carton) having side walls and a base formed by folded over portion(s) of one or more side walls, which portion(s) are not adhered to each other or to side walls but are retained so as to provide the base by a water soluble/dispersable patch adhered to the portion(s) and/or side walls. Thus, dissolution or dispersion of the patch may convert the bag to a bottomless tube, out of which the contents can drop unimpeded.

The packages may be substantially rigid or substantially flexible or have both flexible and rigid portions. The packages may be in the form of bags, sacks, cartons, cups, drums, or trays. They may be lined or unlined. The soluble/dispersable part of the package may comprise stitching used to seal for example a bag or a sack, an ahesive used to seal a lid to a carton cup or drum, or papers or films comprising part of the package e.g. a side of a carton, top of a cup, drum or tray, or the base of

a bag. Suitable material for soluble/dispersable films include in addition to carboxymethyl cellulose, polyvinyl alcohol (PVOH) and polyethylene oxide (PEO). These further materials are thermoplastic and heat sealable. It is convenient to use cast films and/or coated papers.

The present invention also provides a method of adding a substance to a liquid medium which comprises providing the substance in a package of the above type, and immersing at least that part of the package which is soluble and/or dispersible, in the medium, thus dissolving or dispersing a part of the package to release the contents therefrom.

In order that the invention may be more easily understood, some embodiments will be described with reference to the accompanying drawings in which:

Fig. 1 is a bottom perspective view of a package before closure;

Fig. 2 shows the bottom of the package of Fig. 1 folded over;

Fig. 3 shows a piece of water soluble or dipsersible paper in position; and

Fig. 4 shows an unopened folded bag in plan view.

Referring to the drawings, Figs. 1-3 show a package 10 with walls 2, 4, 6, 8 having crease marks indicated by dash-dot lines. The ends of walls 2, 4 are folded along crease lines 12, 14, 16, 18, 20, 22, and then the ends of walls 6, 8 are folded along crease lines 24, 26 to give the position shown in Fig. 2. The folded ends are then held in place by fixing a piece of water soluble or water dispersible paper 28, as shown in Fig. 3.

After the package is filled, e.g. with herbicide, the top is sealed and it is then ready for use. In use the bottom of the package is inserted into a tank of water in which the herbicide is to be dissolved or dispersed for spraying. The package is then raised so that the wet base is clear from the water. The paper rapidly loses its strength and the weight of the contents of the package forces the bottom open and allows the contents to fall into the water.

The bag 100 shown in Figure 4 is self-opening satchel-shaped bag, shown folded flat. In use, it may be unfolded to form a cuboidal bag with an open top 112. The rectangular base 114 of the bag 100 is conventionally formed from flaps 116, 118, 120 and 122 folded as in the form of an envelope. However, in contrast to a conventional bag, the flaps 116, 118, 120 and 122 are not sealed to each other. Instead a rectangular piece of material 124 is laid over the flap arrangement and sealed thereto to effect closure of the base 114 of the bag 110. The rectangular piece of material 124 is made from either a water soluble film or a water dispersable paper. The material 124 is applied to the base 114 of the bag 110 using a water based paste.

Bags such as these are filled and closed at the top according to conventional practices. After closure the filled bags may be placed on a tray, placed in a carton and stored and distributed in the conventional manner.

To use the bag 100 operator (or possibly a machine) will grasp the bag 100 near the end 112 which has been closed. The base 114 will then be dipped into the aqueous liquid and then withdrawn from the liquid and suspended with the bag's base 114 a few centimetres above the liquid's surface. The water soluble/water dispersable material 124 then dissolves or disperses so that the contents of the bag are released into the liquid. As the contents of the bag 110 pass through the aqueous liquid they are dispersed, particularly if the aqueous liquid is agitated by stirring paddles or continuous flow. The empty bag may then be disposed of as appropriate.

Claims

1. A package for contents which are to be added to a liquid medium wherein the package comprises a first part which is readily soluble and/or dispersible in the liquid medium and a further part which is not readily soluble and/or dispersible in the liquid medium.

2. A package as claimed in claim 1 in which the soluble/dispersible part comprises stitching, anhesive, paper or other film.

3. A package as claimed in claim 2 in which the paper or other film comprises carboxymethyl cellulose, polyvinyl alcohol or polyethylene oxide.

4. A package as claimed in claim 1 which is a container for granules or powders, having an openable base which is closed and sealed by a strip of water soluble or dispersible paper.

5. A package as claimed in claim 4 in which the paper is such that when wetted with water and held away from any base support the paper is weakened sufficiently for the weight of the contents of the container to force open the base within about 10 seconds.

6. A package as claimed in claim 5 in which the paper is weakened sufficiently for the weight of the contents of the container to force open the base within about 7 seconds.

7. A package as claimed in any of claims 4 to 6 in which the water soluble or water dispersible paper is composed mainly of carboxy methyl cellulose.

8. A package as claimed in any of claims 6 to 7 in which the water soluble or water dispersible paper has a thickness of from 30 microns to 200 microns.

9. A package as claimed in any preceding claim which contains one or more fertilisers and/or pes-

ticides.

10. A package as claimed in claim 1 substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

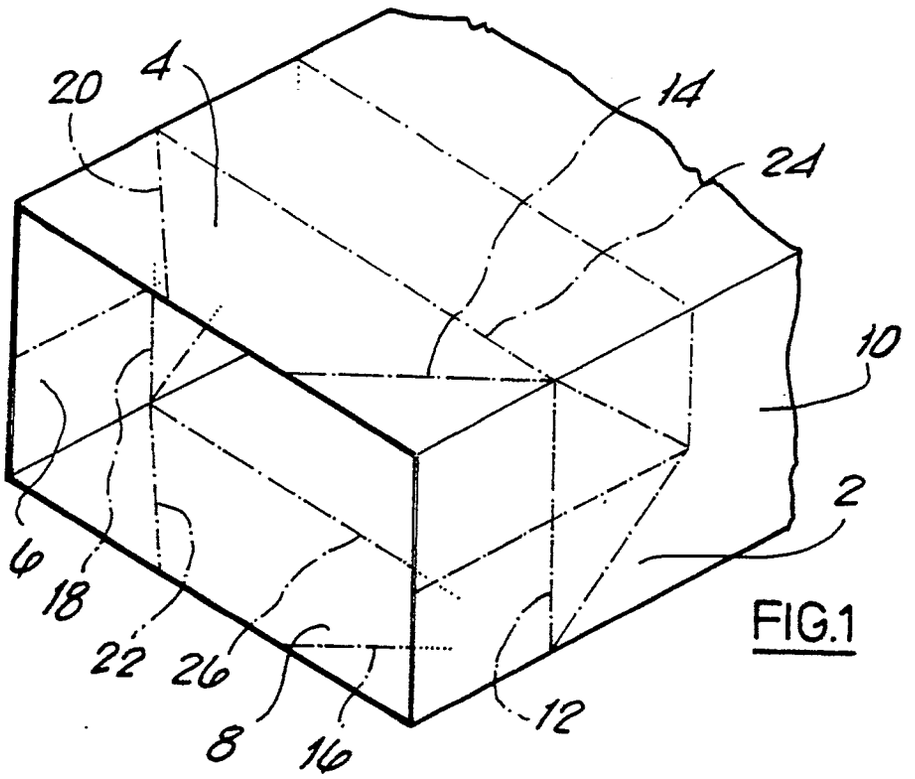

FIG.1

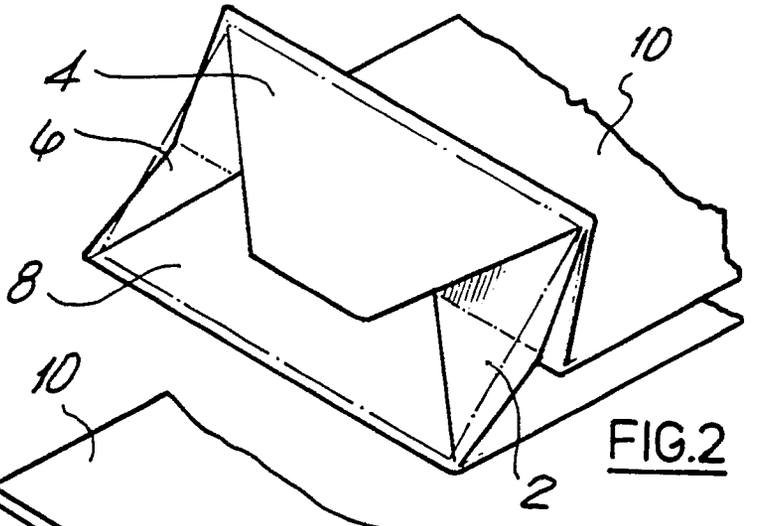

FIG.2

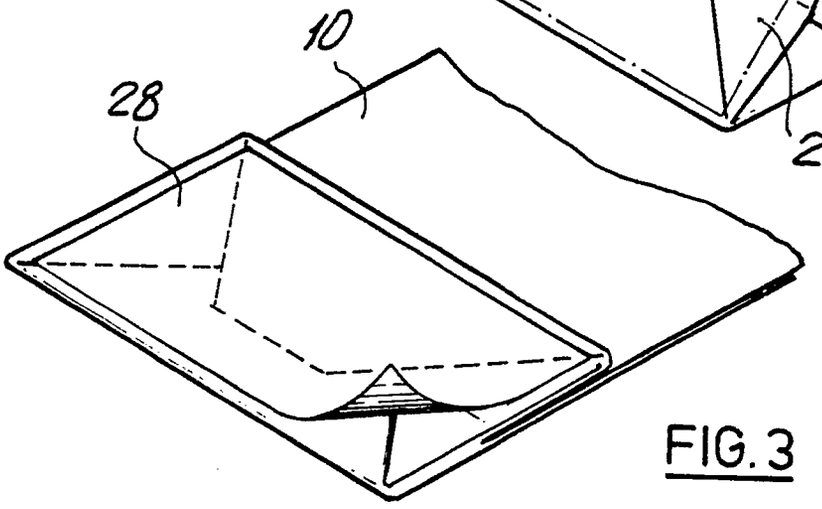

FIG.3

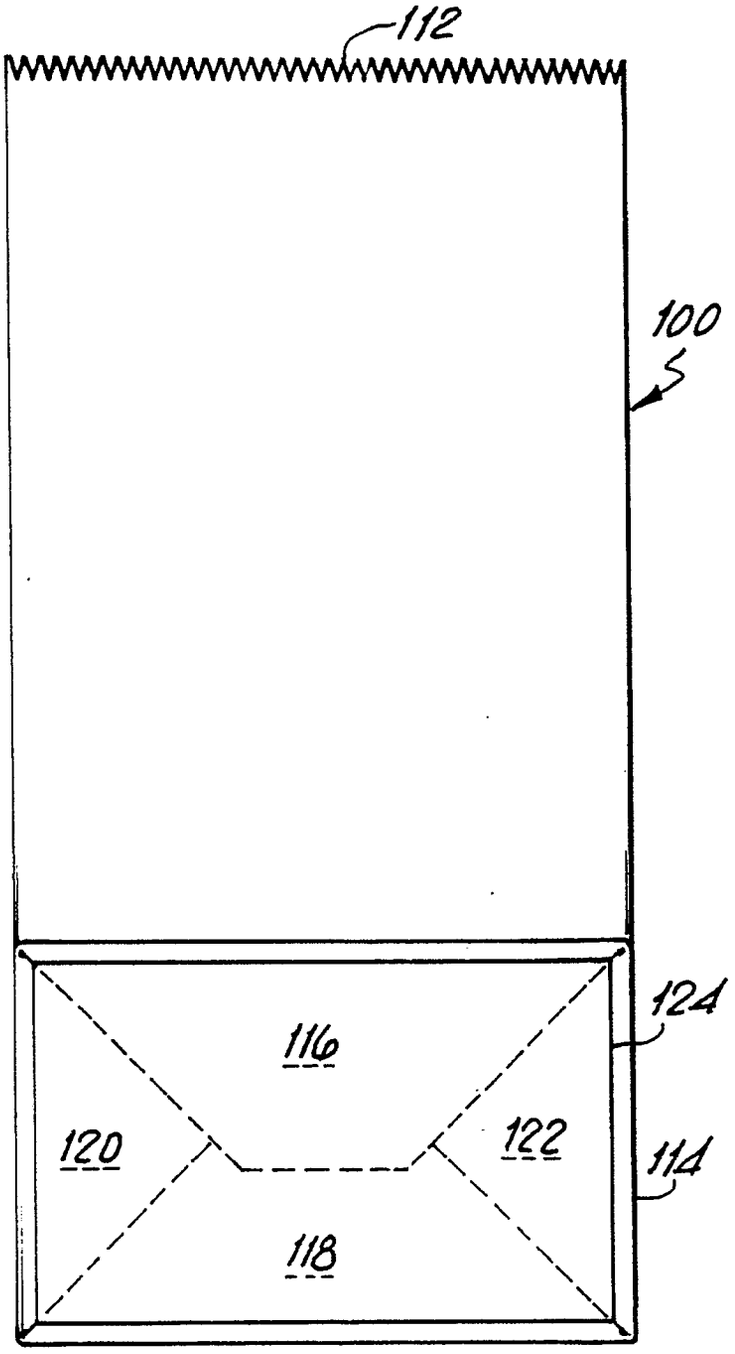

FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 90810464.9

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	GB - A - 2 073 702 (ENAK LIMITED) * Totality; esp. fig. 4, ref.no. 26; page 2, lines 1-6 *	1,2,3, 8	B 65 D 30/02 B 65 D 81/22 B 65 D 33/36 A 01 N 25/34
X	BE - A - 676 393 (UNILEVER N.V.) * Totality; esp. claim 1 *	1,2,3	
A	GB - A - 957 280 (ROHM & HAAS, GMBH.) * Totality *	1,2,4	
A	US - A - 4 806 261 (CIALLELLA et al.) * Totality; esp. column 4, lines 31-61 *	1,3,7	
A	US - A - 3 556 765 (HOUSTON) * Totality *	1,3,9	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A 01 M 7/00
A 01 N 25/00
B 65 D 30/00
B 65 D 33/00
B 65 D 81/00
D 06 F 39/00
C 11 D 17/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	10-10-1990	CZUBA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
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L : document cited for other reasons

& : member of the same patent family, corresponding document

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