

"PESTICIDAL SHEETS OR CONTAINERS"

This invention relates to pesticidal sheets, containers or the like, and to methods of manufacturing same.

There are two main methods for applying pesticidal protection to a surface or area. The first method is to apply the pesticide to the surface by mixing it with a liquid carrier, spraying the mixture onto the surface, and allowing the liquid carrier to evaporate, leaving the pesticide as a residue. The pests come into contact with the pesticide, and die. These pesticides have an effective life of approximately 3 months. However, their effectiveness can be markedly reduced if the surface is washed or becomes damp, removing the pesticide. Because of the nature of spraying the pesticide onto the surface, a uniform distribution of pesticide cannot be assured, and so a relatively high toxicity level must be used to ensure effectiveness. Even then, areas of the surface may be missed, allowing the pests to pass through a target zone without coming into contact with the pesticide.

The second method is to employ pest strips which contain a vapourizing pesticide which must diffuse throughout the area to be protected. Again, as the pesticide must be effective throughout the whole area, fairly high toxicity levels must be used. As the pesticide must be able to vapourize, it is generally unstable, and means must be provided to control the breakdown of the pesticide or the effective life of the strip would only be from a few hours to e.g. 7 to 10 days.

For example, Australian Patent Specification No. 491,714 (Herculite Protective Fabrics Corporation)

discloses a pesticidal strip where a pesticidal impregnated sheet is enclosed in a non-porous container which allows a controlled migration of the pesticide to the surface of the container. The Specification states
5 it is essential to use this form of encapsulation as the pesticides are subject to rapid breakdown (or decomposition) at 100°F (about 38°C), and gives examples of pesticides which have effective lives in open
10 atmosphere of approximately 7 to 10 days but which may be effective for up to 90 days using the encapsulation method. Should the container be damaged, the pesticides would rapidly lose their effectiveness, and the user would be exposed to very high toxicity levels with detrimental health effects. The pesticides employed
15 rely on their vapourising characteristics, and leave little, if any, residue.

It is an object of the present invention to provide a sheet, container or the like, hereinafter referred to as an item, which is provided with the pesticide to
20 protect the item from pest attack and/or to protect at or adjacent a target zone to kill pests which come in contact with the item.

It is a preferred object to provide a pesticidal, item where the protection against pests is available at
25 much lower toxicity levels than for conventional methods.

It is a further preferred object to provide a pesticidal item which has a long effective life.

It is a still further preferred object to provide a
30 pesticidal item which can be easily and economically manufactured.

Other preferred objects of the present invention will become apparent from the following description.

In one aspect the present invention provides a method of proofing an item against crawling insects, the method including the steps of:

- 5 (a) formulating a pesticide in a solvent, said solvent comprising a water- or alcohol-based printer's ink/solvent mixture (or milled ink) and said pesticide comprising a wettable-powder dispersible in or a liquid soluble in the solvent;
- 10 (b) applying the pesticide formulation to the item by a printing method; and
- (c) drying the applied formulation to remove the volatile solvent constituent and to leave the pesticide on the item to be contacted by the crawling insects.

15 In one preferred embodiment, the pesticide is applied to the surface of the item by printing the pesticide formulation onto the item using a flexopress, offset press or letterpress technique. Alternatively, the pesticide may be applied by silk screening methods.

20 The pesticide is preferably a residual contact pesticide, retained on the material of the item as a residue of fine crystals, uniform in size and distributed uniformly over the material of the item. It may actually be soluble in a suitable common solvent for the pesticide and the ink. A preferred pesticide for
25 use with the flexopress, offset or letterpress methods of printing is that sold under the Trade Mark "WP80" by Bayer AG. Another preferred pesticide is "Propoxur" (2-isopropoxy-phenyl-N-methyl-carbamate) developed by Bayer AG and the subject of U.S. Patent No. 3,111,539 assigned
30 to Bayer. Other commercially available residual contact pesticides may be used for all the embodiments, and these include carbamates (such as bendicarb), chlorinated hydrocarbons, organic phosphates (such as

idophenphos, fenitrochion or DURSBAN (RTM), and pyrethroids (including synthetic pyrethroids).

The pesticide formulation is printed directly onto the item to proof the item against crawling insect attack. However, in addition the formulation may first be applied to items - in the form of sheets, laminae or the like - which are then placed in a target zone to protect the target zone from the crawling insects. The formulation may, for example, be applied directly to legal or archival documents, or to the containers for same, to prevent the insects from destroying the valuable documents.

Suitable sheets or laminae include paper or paper-like materials, papiermaché, thin felt, cloth, plastics materials or other similar liquid-absorbent materials. One particularly suitable as the sheets or laminae is newsprint, which is highly absorbent.

Preferably, the sheets or laminae can be readily cut to size and shape to enable them to be fitted to a surface, and the sheets or laminae may be provided with an adhesive backing to enable them to be fixed to the surface. The sheets or laminae may also be provided with a waterproof membrane to enable them to break down in soil to leave a pesticidal barrier in the soil.

It is possible to compose the formulation such that the printed items are odourless and non-staining. It is also possible to choose a pesticide the toxicity level of which in or on the items is lower than for conventional methods for using contact pesticides - indeed, the toxicity level may be up to 60% lower, making the items safer to handle by humans.

The invention naturally extends to an item manufactured by the above method.

To enable the invention to be fully understood, a number of preferred embodiments will now be described.

Example 1

Wettable residual pesticide powder sold under the Trade Mark "WP80" (80% strength) by Bayer AG is mixed in
5 a water-based printer's ink in the ratio of approximately 30:70% by weight. The resultant dispersion is printed onto a sheet by conventional offset printing methods, and then dried to leave
10 pesticidal-bearing ink on the sheet, the pesticide being in the form of fine crystals substantially uniformly distributed through the ink.

For offset and letterpress printing, the dispersion may contain up to approximately 30% pesticide, high concentration being usable for flexopress printing.

15 Depending on the thickness and material of the sheet, it may be bound e.g. to a book, typed or printed on as a legal document, or formed into a container e.g. a cardboard box. Alternatively, the sheet may be cut to size and shape, and placed under a kitchen sink,
20 bathroom vanity unit and/or laundry tub unit.

Tests have shown that if a cockroach is exposed to the pesticide for 2 minutes, it is incapacitated in 45 minutes and dead in less than an hour. The effective life of the pesticide, particularly when used in the
25 printing of a book, may be many years. In this way, the invention may be used to provide protection for legal and archival material at very low cost. The documents may themselves be printed with the ink pesticidal dispersion or contained in boxes or cartons so printed

or in containers supplied with replaceable pesticidal sheets.

As cockroaches forage at night, the effectiveness of the sheets may be further increased by using paper
5 sheet having a "furry" surface which increases the effective surface area of the sheet with which the cockroaches can come into contact.

The sheet may be semi-rigid and supplied in the form of mats or pads, depending on the intended
10 application. The mats or pads may be applied to the floors of ships' holds, or may be provided as a lining for shipping containers, suitable adhesives being applied to one side of the mats or pads to hold them in place. The sheets may also be placed in pets' kennels
15 to kill fleas or ticks.

To protect young trees, when planting, against termites, the holes for the trees may be lined with papiermaché impregnated or printed with pesticide. The tree is planted and the hole is filled in. The
20 papiermaché breaks down, leaving the pesticide as a residual barrier around the roots of the tree.

To provide a termite barrier for concrete slab or pile house foundations, a waterproof membrane backing (similar to "Ferticon") is applied to the impregnated or
25 printed "paper" sheet. The sheet breaks down, leaving an evenly distributed pesticide residue under the concrete slab or around the concrete piles.

As the pesticidal sheets are odourless, non-staining and have a very low toxicity level, they can be
30 easily handled by humans, and for domestic applications the sheets can be cut from a roll or mat as required. The sheets are contact killers which are highly effective and can be easily removed, replaced and stored, with an estimated unlimited shelf and an
35 effective life of e.g. 12 to 18 months.

As can be readily seen, the sheets are safe to⁵⁶
humans and pets, yet deadly for pests, a claim which few
if any currently available pesticides or pest strips can
make.

- 5 It will be readily apparent to the skilled
addressee that the choice of sheets or laminae,
pesticidal materials and potential applications is
almost unlimited, and so various changes and
modifications may be made to the embodiments described
10 without departing from the scope of the present
invention defined in the appended Claims.

CLAIMS

1. A method of proofing an item against crawling insects, the method including the steps of:
 - (a) formulating a pesticide in a solvent, said solvent comprising a water- or alcohol-based printer's ink or ink/solvent mixture, and said
5 pesticide comprising a wettable powder dispersible in or a liquid soluble in the solvent;
 - (b) applying the pesticide formulation to the surface of the item by a printing method; and
 - 10 (c) drying the formulation to remove the volatile solvent constituents and to leave the pesticide on the item to be contacted by the crawling insects.
2. A method as claimed in Claim 1, in which the pesticide is a residual contact pesticide retained in or
15 on the material of the item as a residue of fine crystals.
3. A method as claimed in either of the preceding Claims, in which a flexopress, offset press or letterpress technique is used to apply the pesticide
20 formulation to the item.
4. A method as claimed in any of the preceding Claims, in which the pesticide is one or more carbamate, chlorinated hydrocarbon, organic phosphate, or natural or synthetic pyrethroid.
- 25 5. A method as claimed in Claim 4, in which the pesticide is one or more of bendicarb, idenophos and fenitrochion.
6. A method as claimed in any of the preceding Claims, in which the item is a sheet or lamina of paper,
30 newsprint, papiermaché, thin felt cloth or plastics material.
7. A method as claimed in any of the preceding Claims and substantially as hereinbefore described.



8. An item whenever insect-proofed by a method as claimed in any of the preceding Claims.

9. A method of proofing a surface or area against crawling insects, the method including the step of
5 placing on or near the surface, or in or near the area, an insect-proofed item as claimed in Claim 8.

10. A surface or area whenever proofed by a method as claimed in Claim 9.



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