

AUSTRALIA
Patents Act

631645

APPLICATION FOR A STANDARD PATENT

MOBAY CORPORATION of Mobay Road, Pittsburgh, PA 15205, United States of America
hereby applies for the grant of a standard patent for an invention entitled

An improved device

which is described in the accompanying complete specification.

Details of basic application:

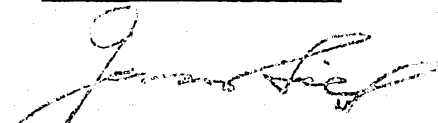
<u>Country</u>	<u>Number</u>	<u>Date</u>
United States of America	360,660	2 June 1989

The address for service is:

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DATED this 30th day of May, 1990

MOBAY CORPORATION
By Its Patent Attorneys
ARTHUR S. CAVE & CO.


J.G. SIELY, FIPAA

TO:
The Commissioner of Patents
COMMONWEALTH OF AUSTRALIA

FEE: \$206.00

5015183 31/05/90

(Form 8)

PATENT DECLARATION FORM (CONVENTION)
COMMONWEALTH OF AUSTRALIA

Patents Act 1952

Regulation
12 (2)

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION
FOR A PATENT

To be signed by the applicant(s) or in the case of a body corporate to be signed by a person authorised by the body corporate.

In support of the Convention application made for a patent for an invention entitled

(a) Insert title of invention.

(a) INSECT CONTROL DEVICE FOR LIVESTOCK CONTAINING FENTHION

(b) Insert full name(s) of declarant(s).

I/We (b) Joseph C. Gil

(c) Insert address(es) of declarant(s).

of (c) MOBAY CORPORATION
Mobay Road, Pittsburgh PA 15205, U.S.A.

do solemnly and sincerely declare as follows:-

1. I am/We are the applicant(s) for the patent

(OR, IN THE CASE OF AN APPLICATION BY A BODY CORPORATE.)

1. I am/We are authorised by Mobay Corporation

..... the applicant for the patent to make this declaration on its behalf.

2. The basic application(s) as defined by Section 141 of the Act was/were made in the following country or countries on the following date(s) namely:-

(d) Insert country in which basic application(s) was/were filed.

in (d) United States of America on (e) June 2, 1989

(e) Insert date of basic application(s).

by (f) Robert G. Arther 2) Wayne B. Rose

(f) Insert full names of basic applicant(s).

in (d) on (e)

by (f)

in (d) on (e)

by (f)

3. I am/We are the actual inventor(s) of the invention referred to in the basic application.

(OR, WHERE A PERSON OTHER THAN THE INVENTOR IS THE APPLICANT)

(g) Insert full name(s) of actual inventor(s)

3. (g) 1) Robert G. Arther 2) Wayne B. Rose

(h) Insert address(es) of actual inventor(s).

of (h) 1) 4414 Tomahawk Road, Prairie Village, KS 66208, USA
2) 6340 Robinhood Lane, Merriam, KS 66203, USA

is/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to make the application are as follows:

(i) Set out how applicant(s) derive(s) title from actual inventor(s) (i.e., assignee of the invention from the actual inventor(s). Assignment or legalization not required.

(i) The Company is the Assignee of the said invention from the said inventors

4. The basic application(s) referred to in paragraph 2 of this Declaration was/were the first application(s) made in a Convention country in respect of the invention the subject of the application.

Declared at Pittsburgh, PA this 5th day of April

1989

To:

MO 3214-A11

(12) PATENT ABRIDGMENT (11) Document No. AU-B-56162/90
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 631645

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INSECT CONTROL DEVICES FOR LIVESTOCK
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- (56) Prior Art Documents
GB 2170211
- (57) Claim

1. An insect control device for attachment to livestock which effectively releases insect controlling agent for a period of up to four months comprising a molded article formed from a mixture of fenthion and polyvinyl chloride, the fenthion being present in an amount of from 5 to 30 wt% of the total weight of the device.

11. The device of Claim 1 in which coumaphos is also present in the mixture to be molded.

15. A process for treating livestock to control insects comprising attaching the device of Claim 11 to the ear of the animal to be treated.

Our Ref: 323199

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AUSTRALIA
Patents Act

FORM 10

COMPLETE SPECIFICATION

(ORIGINAL)

Application Number:
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority:
Related Art:

Applicant(s): MOBAY CORPORATION
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PA 15205,
United States of America

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Complete specification for the invention entitled
"An improved device".

The following statement is a full description of this invention, including the best method of performing it known to me:-

BACKGROUND OF THE INVENTION

The present invention relates to insect control devices for livestock and to a process for protecting livestock against insects.

Livestock are frequently troubled by various types of insects such as flies and lice which transmit infection of the skin, eyes and ears as well as cause irritation leading to loss of production. Several approaches have been taken to alleviate this insect problem. One approach requires application of an insecticide spray on the animal. This approach is undesirable because it requires a substantial amount of time and labor to gather the animals to be treated and then to treat the animals. Further, application by this method is effective for only a short period of time so that frequent applications are necessary to effectively treat the livestock. A more economical and less labor intensive approach is therefore generally preferred.

One approach which is used is application of insecticide by having the animal to be treated come into contact with a device from which the selected insecticide is dispensed. Dispensers such as dust bags or oilers are placed in areas where it is anticipated that the livestock will come into contact with them. This approach does reduce the amount of labor involved in treating livestock, but it does not ensure that each animal will receive the necessary treatment at regular intervals.

Another approach employs slow release pesticide technology. In this approach, a pesticide is mixed with a resinous substance which will release the insecticide over an extended period of time. These pesticide containing resins have been used in a variety of forms ranging from collars to tags which should be attached to various body parts of the animal. The use of pesticide containing ear tags is of particular interest for treating livestock as is evident from the large number of publications and patents directed to such ear tags.

For example, U.S. Patents 4,366,777 and 4,562,794 each disclose ear tags in which a liquid insecticide dispenser is used. In U.S. 4,366,777 the insecticidal liquid which is enclosed in a fibrous or foam reservoir is wicked onto the surface of the tag to provide insecticidal activity. In U.S. 4,562,794, the dispenser or reservoir containing the insecticide is attached to an animal identification tag. Release of the insecticide is dependent upon migration or diffusion of the insecticide through a semipermeable membrane.

10 U.S. 4,428,327 discloses an insecticide impregnated tape which is attached to a conventional ear tag. Each of these tags has been found to be disadvantageous because the insecticide containing reservoir or tape may be detached from the tag on fences or brush. It would therefore be advantageous to have a tag in which the insecticide is directly incorporated.

Such an approach is disclosed in U.S. Patents 4,721,064, 4,195,075 and 4,265,876 as well as in Miller et al, "Release of Pyrethroids from Insecticidal Ear Tags", J. Econ. Entomol. 76:1335-1340 (1983) and Miller et al, "Release Rates From Cattle Insecticidal Ear Tags In Various Regions Of The United States", The Southwestern Entomologist, Vol. 11 No.1, pages 45-50 (March 1986). The Miller et al disclosures and U.S. 4,195,075 are, however, limited to use of liquid pyrethroid insecticides which will evaporate at ambient temperatures. Use of liquid pyrethroids may be undesirable because these compounds are sensitive to degradation by sunlight and flies have developed resistance to these insecticides.

U.S. 4,721,064 teaches that any of the well known migratory and/or vaporizable insecticides may be incorporated in the disclosed tags. No particular advantage is attributed to a specific insecticide.

U.S. 4,265,876 and U.S. 4,195,075 are limited to tags containing pyrethroid insecticides whereas fenthion is not a pyrethroid.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an insect control device for livestock which is effective against insects such as Horn and Face flies for up to four months.

5 It is also an object of the present invention to provide a process for protecting livestock against insects such as Horn and Face flies for up to four months.

These and other objects which will be apparent to those skilled in the art are accomplished by combining fenthion and
10 polyvinyl chloride and then molding this mixture to form an insect control device such as an ear tag. This device or ear tag is attached to the animal to be treated.

DETAILED DESCRIPTION OF THE INVENTION

The insect control devices of the present invention are
15 formed from a mixture of fenthion and polyvinyl chloride.

Fenthion is a liquid organophosphorous insecticide which is effective against insects such as Horn flies, grubs and lice. In the devices of the present invention, fenthion is generally present in an amount of from 5 to 30 wt% of the total weight of
20 the device and preferably in an amount of from about 10 to about 25 wt%, most preferably in an amount of from 15 to 20 wt%. It is, of course, possible to include other known insecticides in the mixture from which the fenthion containing insect control devices of the present invention are formed. In fact, it is
25 preferred that fenthion be used in combination with coumaphos. Where coumaphos is also used, coumaphos is generally used in a quantity of from about 5 to about 30 wt% of the total weight of the insect control device, preferably from about 10 to about 25 wt%, most preferably from about 10 to about 15 wt%. When a
30 combination of fenthion and coumaphos is used, those insecticides are generally used in quantities such that the ratio of fenthion to coumaphos is from about 2:1 to about 1:2 based on weight, and most preferably from about 1.5:1 to about 1:1.5. It is advisable that the total quantity of insecticide present in the insect
35 control device not exceed 35 wt% of the device and preferred that

from about 20 to about 30 wt% of the device be insecticide. The most preferred amount of total insecticide present in the devices of the present invention is from about 20 to about 25%.

Polyvinyl chloride is generally present in the devices of the present invention in an amount of from 50 to 80 wt% of the total weight of the device, preferably in an amount of from about 55 to about 80 wt%, and most preferably from 55 to 65 wt%.

A plasticizer need not be used to make the insect control devices of the present invention where more than 25% of the total weight of the device is fenthion. If a plasticizer is used, it may be any one of the known plasticizers. Specific examples of suitable plasticizers include: phthalates such as dioctyl phthalate, diethyl hexyl phthalate, diphenyl phthalate, dicyclohexyl phthalate, dimethyl phthalate and dihexyl phthalate; sebacates such as dipentyl sebacate, n-butyl benzyl sebacate and dibenzyl sebacate; adipates such as dioctyl adipate, dicapryl adipate, di-isobutyl adipate and dinonyl adipate; hydrogenated polyphenols; alkylated aromatic hydrocarbons; and polyester plasticizers such as polyesters of polyols and polycarboxylic acids having a molecular weight of at least 2000. The plasticizer is present in an amount of from 0 to 30 wt% of the total weight of the insect control device, preferably from about 5 to about 25 wt%, most preferably from 10 to 20 wt%.

Other materials such as dyes, pigments, lubricants, fillers, anti-oxidants and ultraviolet stabilizers may optionally be included in the mixture from which the insect control devices of the present invention are formed. If these materials are included, they are generally present in an amount of from 1 to 10 wt%, preferably in an amount of from 2 to 4 wt%.

The mixture containing fenthion and polyvinyl chloride and optional ingredients is a mixture which is molded, preferably by injection molding, to the desired form. The preferred form is an ear tag which may be attached directly to the ear of livestock. Techniques for molding such mixtures are known to those skilled in the art. One such molding method is disclosed

in U.S. Patent 4,195,075. Techniques for attaching the molded insect control device to an animal are also well known in the art.

As used herein, the expression "livestock" is intended to include cattle, sheep, pigs, horses and other animals.

Having thus described our invention, the following examples are given as being illustrative thereof. All percentages given in these examples are percents by weight, unless otherwise indicated.

10 EXAMPLES

EXAMPLE 1

2468.0 grams of polyvinyl chloride, 424.0 grams of fenthion, 982.0 grams of dioctyl adipate (DOA), 120.0 grams of organo barium zinc and 6 grams of titanium dioxide were added in the sequence listed to a mixer where they were mixed for two hours. The resultant white powder mixture was then used to mold (by injection molding) 20 ear tags in which the concentration of fenthion was 10%.

EXAMPLE 2

20 4140.0 grams of polyvinyl chloride, 2000.0 grams of fenthion, 800.0 grams of piperonyl butoxide (PBO), 800.00 grams of dioctyl adipate (DOA), 240 grams of organo barium zinc, 12 grams of titanium dioxide and 12 grams of red lake were added in the sequence listed to a mixer where they were mixed for two hours. The resultant pink colored powder mixture was then molded (by injection molding) into approximately 500 ear tags in which the fenthion concentration was 25%.

EXAMPLE 3

1.00 kg of fenthion, 1.24 kg of coumaphos, 4.3 kg of polyvinyl chloride, 0.24 kg of organo barium zinc, 1.20 kg of dioctyl adipate (DOA), 0.12 kg of titanium dioxide, 0.006 kg blue lake and 0.006 kg yellow dye were mixed in a ribbon blender which was heated to 90°F. This mixture was then extruded at 340°F and the extrudate was injection molded to form ear tags. The coumaphos was present in these ear tags at 12.5% concentration and 15.5% fenthion was present.

EXAMPLE 4

1.0 kg fenthion, 0.424 kg cyfluthrin, 4.87 kg of polyvinyl chloride, 0.80 kg piperonyl butoxide (PBO), 0.80 kg dioctyl adipate (DOA), 0.24 kg organo barium zinc, 0.012 kg titanium dioxide and 0.012 kg orange lake were mixed in a ribbon blender heated to 170°F. This mixture was then extruded and molded in the same manner as the mixture of Example 3. Fenthion was present in these tags at 12.5% concentration and cyfluthrin was present in an amount of 5.20%.

10 EXAMPLE 5

Ear tags in which fenthion was present at a concentration of 20%, 20% piperonyl butoxide (PBO) and 56.75% polyvinyl chloride, 3% organo barium zinc, 0.15% titanium dioxide, 0.15% blue lake were present were produced by the same procedure as was used in Example 1. These tags were attached to the ears of cattle in herds located in South Texas (80 cattle) and in Georgia (34 cattle). The number of Horn flies on each cow before attachment of the ear tag and at regular intervals subsequent to attachment were counted and the percent reduction of Horn flies was calculated as follows:

$$\begin{aligned} \text{per cent} &= \frac{\bar{X} \text{ no. flies on untreated animals} -}{\bar{X} \text{ no. flies on the ear tag animals}} \times 100 \\ \text{efficacy} &= \frac{\bar{X} \text{ no. flies on untreated animals}}{\bar{X} \text{ no. flies on untreated animals}} \times 100 \end{aligned}$$

The results of these studies are reported in the Table below.

		South Texas	Georgia
	#flies pretreatment	300	150
	#flies (% reduction) week #1	44 (89.6)	0.6 (99.8)
5	2	20 (92.7)	0.1 (97.9)
	3	10 (96.0)	-
	4	8 (97.2)	0.0 (100)
	5	12 (96.0)	0.0 (100)
	6	16 (95.1)	-
	7	10 (97.5)	0.0 (100)
10	8	7 (98.1)	-
	9	5 (97.3)	-
	10	7 (98.5)	0.0 (100)
	11	18 (96.4)	-
	12	25 (96.3)	1.3 (99.2)
15	13	75 (88.0)	1.0 (99.6)
	14	100 (80.0)	-
	15	35 (95.0)	1.7 (99.6)
	16	55 (91.8)	14.1 (96.3)

EXAMPLE 6

20 The study described in Example 5 was repeated using ear tags which contained 20% fenthion, 10% piperonyl butoxide (PBO), 10% dioctyl adipate (DOA), 56.7% polyvinyl chloride, 3% organo barium zinc, 0.15% titanium dioxide and 0.15% yellow lake. The results achieved were as follows:

		South Texas	Georgia
25	#flies pretreatment	350	60
	#flies after 1 week (% reduction)	3 (99.3)	0.5 (99.8)
	2 weeks	5 (98.2)	-
	3	5 (98.0)	0.0 (100)
30	4	4 (98.6)	0.0 (100)
	5	0 (100)	-
	6	8 (97.5)	0.0 (100)
	7	40 (90.0)	-
	8	3 (99.2)	-
35	9	10 (96.7)	-
	10	12 (97.5)	0.0 (100)
	11	5 (99.0)	-
	12	20 (97.0)	0.2 (99.9)
	13	100 (84.0)	-
40	14	150 (70.0)	3.7 (97.7)
	15	35 (95.0)	-
	16	55 (91.8)	0.9 (99.7)

EXAMPLE 7

The study described in Example 5 was repeated using one herd in South Texas with 103 animals with ear tags which contained 10% fenthion, 15% coumaphos, 15% dioctyl adipate (DOA) and 56.7% polyvinyl chloride, 3% organo barium zinc, 0.15% titanium dioxide, 0.075% blue lake and 0.075% yellow lake. The results were as follows:

	#flies pretreatment	
	#flies after week #	1 (400)
10	2	8 (97.1)
	3	8 (96.8)
	4	6 (97.9)
	5	10 (96.7)
	6	4 (98.8)
15	7	7 (98.2)
	8	10 (97.3)
	9	5 (98.3)
	10	5 (98.9)
	11	7 (98.6)
20	12	5 (99.3)
	13	5 (99.2)
	14	10 (98.0)
	15	45 (93.5)
	16	55 (91.8)

Although the invention has been described in detail in the foregoing for the purpose of illustration, it is to be understood that such detail is solely for that purpose and that variations can be made therein by those skilled in the art without departing from the spirit and scope of the invention except as it may be limited by the claims.

The claims defining the invention are as follows:

1. An insect control device for attachment to livestock which effectively releases insect controlling agent for a period of up to four months comprising a molded article formed from a mixture of fenthion and polyvinyl chloride, the fenthion being present in an amount of from 5 to 30 wt% of the total weight of the device.
2. The device of Claim 1 in which the fenthion is present in an amount of from 10 to 25 wt% of the total weight of the device.
3. The device of Claim 2 which is in the form of an ear tag.
4. The device of Claim 2 in which polyvinyl chloride is present in an amount of from 55 to 65 wt%.
5. The device of Claim 4 in which the mixture to be molded also includes up to 20 wt% plasticizer.
6. The device of Claim 5 in which the mixture to be molded also includes up to 0.15 wt% pigment or dye.
7. The device of Claim 1 in which polyvinyl chloride is present in an amount of from 55 to 65 wt%.
8. The device of Claim 1 which is in the form of an ear tag.
9. The device of Claim 1 in which the mixture to be molded also includes up to 5 wt% stabilizer.
10. The device of Claim 1 in which the mixture to be molded also includes up to 0.15 wt% pigment or dye.
11. The device of Claim 1 in which coumaphos is also present in the mixture to be molded.
12. The device of Claim 1 in which from 5 to 30% fenthion and 5 to 30% coumaphos are present in the mixture to be molded.
13. A process for treating livestock to control insects comprising attaching the device of Claim 1 to the animal to be treated.
14. A process for treating livestock to control insects comprising attaching the device of Claim 6 to the ear of the animal to be treated.



15. A process for treating livestock to control insects comprising attaching the device of Claim 11 to the ear of the animal to be treated.

16. A process for treating livestock to control insects comprising attaching the device of Claim 12 to the ear of the animal to be treated.

DATED this 7th day of September, 1992.

MOBAY CORPORATION
By Its Patent Attorneys
DAVIES COLLISON CAVE

