

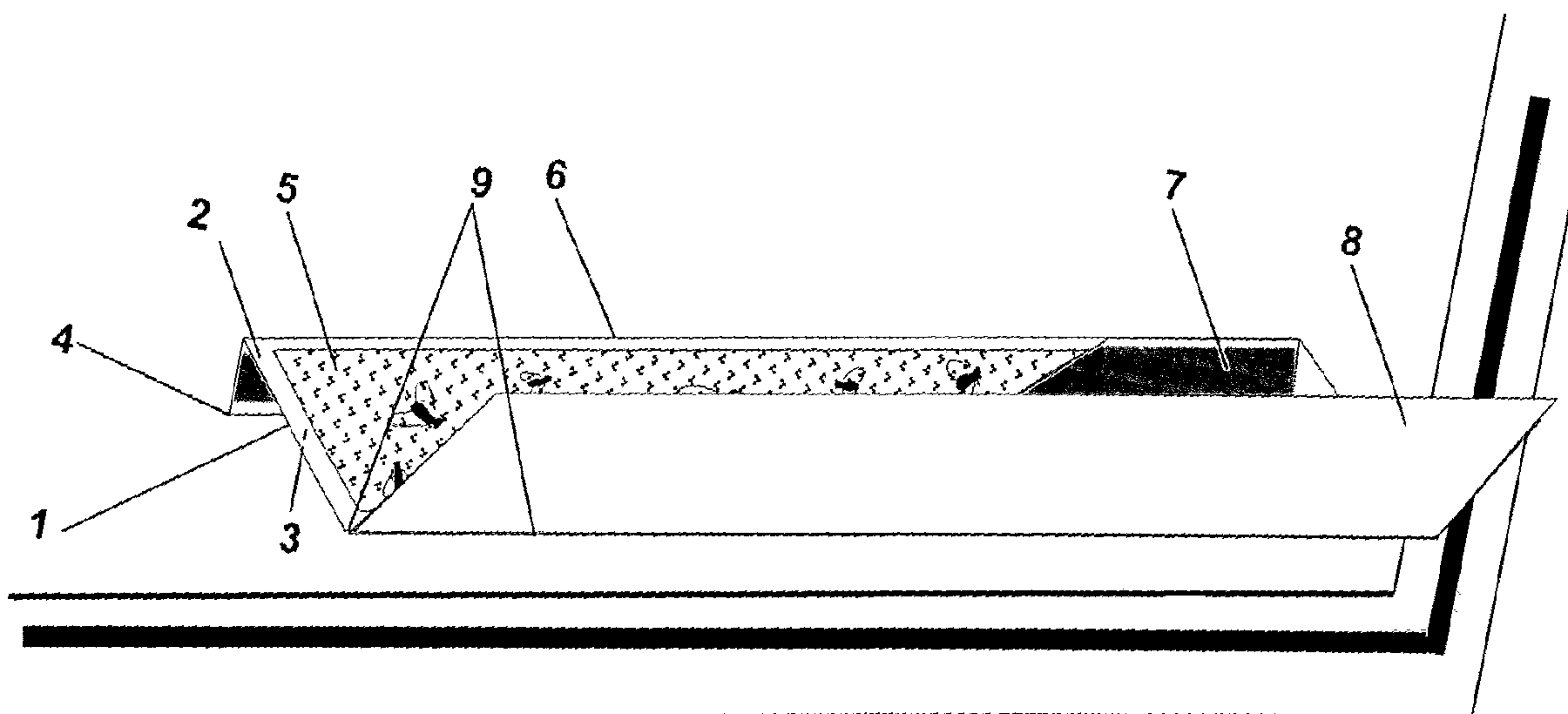


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(54) Titre : PIEGE ADHESIF POUR INSECTES VOLANTS PRESENTANT DES PROPRIETES D'INTERCEPTION AMELIOREES

(54) Title: ADHESIVE TRAP FOR FLYING INSECTS WITH IMPROVED TRAPPING PROPERTIES



(57) Abrégé/Abstract:

A device for trapping flying insects is disclosed, comprising a planar support (1) with an upper side (2) and a lower side (3), a fixing device (4) and a trapping wall (8). A layer (5), comprising an insect attractant and/or an insect sticking substance is applied to the upper side (2) and optionally also to the fixing device and the trapping wall (8). The device is mounted in the application region (for example at a window) such that the upper side (2) of the planar support (1) which is coated with the layer (5) is essentially horizontal and the trapping wall (8) is essentially vertical.

## Abstract

A device for trapping flying insects is disclosed, comprising a planar support (1) with an upper side (2) and a lower side (3), a fixing device (4) and a trapping wall (8). A layer (5), comprising an insect attractant and/or an insect sticking substance is applied to the upper side (2) and optionally also to the fixing device and the trapping wall (8). The device is mounted in the application region (for example at a window) such that the upper side (2) of the planar support (1) which is coated with the layer (5) is essentially horizontal and the trapping wall (8) is essentially vertical.

WO 03/075651

PCT/EP03/00706

**Adhesive trap for flying insects with improved catching properties**

5 The present invention is directed at a device which is suitable for catching flies and other flying insects (gnats, wasps, moths, beetles etc.).

10 Devices for catching flying insects have long been known, for example insect glue rings and window fly traps as provided by EP 281 562. There are, however, also electrically operated devices of various designs, which attract and kill insects by using UV fluorescent tubes in combination with high-voltage gratings, suction propellers or adhesive sheets, adhesive traps  
15 with separate attractant capsules and adhesive traps which emit optical lures of different wavelengths. In recent times, adhesive window traps which offer the flying insects a horizontal catching surface are also known. Such traps are described in DE 100 55 135.

20

The object of the present invention is to improve the flying insect trap as provided by DE 100 55 135, which is of a simple construction, costs little to produce and at the same time is easy for the user to operate.  
25 The required technical expenditure is to be kept as low as possible here. In particular, an increase in its efficiency in catching insects is to be achieved.

The object is achieved by a device which comprises a  
30 planar support (1) with an upper side (2) and a lower side (3). On the upper side (2), a layer (5) of a substance which attracts insects and/or to which insects stick is applied. Furthermore, the support (1) has a fastening device (4), by way of which it can be  
35 attached to the application site during use. This application site may be a wall, a mirror, the inside of a wardrobe, a kitchen cupboard or store cupboard or preferably the glass pane of a window in the interior

WO 03/075651

PCT/EP03/00706

- 2 -

of a room in a home or office or a vehicle (passenger car, bus, railroad car).

During use of this device, for example on a window pane, the flying insects are presented with a substantially horizontal surface coated with a substance which attracts insects and/or to which insects stick. The planar support (1) is preferably rectangular.

10

"Substantially horizontal" is to be understood as meaning that the upper side (2) of the support (1) coated with the layer (5) is arranged preferably parallel with respect to the ground during use of the device. However, it is also intended to cover arrangements in which this surface may be relatively inclined with respect to the ground. The limits for "permissible" inclination during use could be an angle amounting to approximately  $60^\circ$  (measured between the planar ground at the application site and the upper side (2) of the device coated with a substance which attracts insects and/or to which insects stick). This approximate limit value is determined by the fact that the risk of the layer (5) applied on the upper side (2) sticking to the application site (for example a window pane arranged vertically in relation to the ground) increases as the angle increases.

Therefore, angles below  $60^\circ$  are preferred; angles below  $30^\circ$  are particularly preferred. An angle of  $0^\circ$  corresponds to the case of an ideal parallel arrangement of the planar support (1) and the ground. In practice, however, the value lies between  $45^\circ$  and  $-45^\circ$ . Consequently, this angular range corresponds to a "substantially horizontal" arrangement of the upper side (2) coated with the layer (5) with respect to the ground.

35

WO 03/075651

PCT/EP03/00706

- 3 -

Finally, the device has a catching wall (8). This is a planar strip of material which is attached at the side to the planar support (1) and during use is arranged substantially perpendicularly in relation to the latter. The catching wall (8) is located on the side of the planar support (1) that is opposite from the fastening device (4).

The material of which the planar support (1) consists may be, for example, board, cardboard, paperboard, a plastic such as polyethylene, polypropylene, polystyrene, polyester, ethylene-vinyl acetate copolymer or a composite material of these materials, for example a laminate of cardboard and polyester.

This material may be opaque or, preferably, translucent. "Translucent" also covers the case in which light is not completely absorbed or transmitted, but instead, if appropriate, only certain wavelength ranges are absorbed, so that the support (1) appears colored and, under some circumstances, even then also largely transparent. The use of a colored planar support (1) may be advantageous if certain flying insects react to such optical signals, as is the case for example with house flies, food moths, wasps and certain types of beetle, such as the bread beetle.

To lend such a translucent material a specific coloration, pigments which absorb visible light in a specific wavelength range are added to it. These matters are known to a person skilled in the art.

However, colorless and transparent materials are particularly preferred. These include glass and plastics such as polypropylene, polystyrene, polyester, polyacrylonitrile, ethylene-vinyl acetate copolymers, polyisobutylene, polyvinyl chloride, silicones, polyethylene terephthalate, polyacrylate etc.

WO 03/075651

PCT/EP03/00706

- 4 -

Polyester-containing materials in sheet form come into consideration with particular preference as plastics, since even in low material thicknesses they still have  
5 adequate product rigidity and dimensional stability along with advantageous plasticity (flexibility).

The fastening device (4) may be a material strip which consists of the same material as the planar support (1)  
10 and which is provided with a strip of adhesive (7). The fastening device (4) may be attached separately to the support (1), but can advantageously be produced by folding over along a first longitudinal side of the support (1). This produces on the support (1) a first  
15 separating line, which represents a delimiting line between the support (1) and the fastening device (4). The fastening device (4) may be folded downward or upward along the dividing line (6) before use. If it is folded upward, i.e. in the direction of the upper  
20 side (2) of the support (1) that is coated with the layer (5), it is provided with the strip of adhesive (7) on its underside. In this case, the fastening device (4) may likewise be coated on the side facing the side (2) of the support (1) that is to be coated  
25 with a layer (5) of a substance which attracts insects and/or to which insects stick (see Figure 2). If the fastening device (4) is folded downward, i.e. in the direction of the lower side (3) of the support (1), it is provided with the strip of adhesive (7) on its upper  
30 side (see Figure 1).

The catching wall (8) may be a material strip which consists of the same material as the planar support (1). The catching wall may be attached separately to  
35 the support (1), but can advantageously be produced by folding over along a second longitudinal side of the support (1). This produces on the support (1) a second separating line (9), which represents a delimiting line

WO 03/075651

PCT/EP03/00706

- 5 -

between the support (1) and the catching wall (8). The catching wall (8) is folded upward, that is in the direction of the upper side (2) of the support (1) that is coated with the layer (5). The catching wall (8) then approximately forms a right angle with the upper side (2). However, relatively great deviations are also possible here, so that angles between the upper side (2) and the catching wall (8) in the range from approximately 30° to 135° are also to be considered as "at right angles". While the upper side (2) of the support (1) that is coated with the layer (5) is arranged to be "substantially horizontal" during use of the device, the catching wall (8) is consequently correspondingly "substantially vertical". The catching wall (8) may also be coated on the side facing the side (2) of the support (1) that is to be coated with a layer (5) of a substance which attracts insects and/or to which insects stick (see Figure 2).

The separating lines (6) and (9) are lines which are already present as a folded edge or at least permit easy folding over of the fastening device (4) and catching wall (8) with respect to the planar support (1) ("predetermined folding lines"). These separating lines may in the latter case also be lines of reduced material, such as scores, notches, perforations, a strip with holes etc. The separating lines may, however, also be produced by machine-folding, after which they are present as a folded edge in a pre-folded state, which makes folding over to be carried out later, directly before use of the device, superfluous or considerably easier.

In certain embodiments, geometrical patterns (regularly or irregularly applied stripes, checks, lines and the like) may be located on the fastening device (4), the upper side (2) or the catching wall (8), irrespective of whether or not these structural elements are

WO 03/075651

PCT/EP03/00706

- 6 -

provided with a layer (5) with a substance which attracts insects and/or to which insects stick. Such patterns, which have an attracting effect on certain flying insects, are known to a person skilled in the art and described for example in EP 475 665, EP 446 464, WO 97/01272 and WO 98/42186. These patterns may be, for example, black-and-white rectangles, imitations of blossoms or illustrations of the target insects.

10 In one particular embodiment, the side of the catching wall (8) which is not facing the upper side (2) of the support (1) that is coated with the layer (5) during use of the device may be provided with an opaque imprint, for example a decorative image, a trade name,  
15 a target insect or the like, in order to prevent the flying insects which have already been caught from being seen.

A substance which attracts insects is understood for the purposes of the present description as meaning insect attractants or sexual or aggregation pheromones and their combinations. They are known to a person skilled in the art, such as for example the sexual pheromone of the house fly (Z)-9-tricosene or that of  
25 the food moth Z,E-9,12-tetradecandienyl acetate (TDA), which are obtainable for example from Bedoukian Research of Danbury, USA or Shin-Etsu of Tokyo, Japan. However, molasses, syrup, honey and malt, substance mixtures containing sugar and also odor-active  
30 substances and feedants can be considered as a substance which attracts insects for the purposes of this invention.

A substance to which insects stick is to be understood  
35 for the purposes of the present description as meaning adhesive substances which have the effect of making the insects stick on the side of the device coated with it in such a way that the flying insects are prevented

WO 03/075651

PCT/EP03/00706

- 7 -

from flying away. These substances are known to a person skilled in the art. They include, for example, from the substance group of adhesive polymers, polyisobutylenes, polybutenes and polyacrylates, such as for example copolymers of acrylic acid and acrylates, in particular alkyl acrylate such as 2-ethylhexyl acrylate or n-butyl acrylate. In the case of non-adhesive copolymers, such as for example polystyrene-isoprene-styrene, polystyrene-butadiene-styrene, polyethylene-vinyl acetate and polyethylene acrylate, suitable auxiliaries, known as tackifiers, must be added to achieve the desired properties. Serving in particular for this purpose are resinous substances such as colophony and its derivatives, polyterpene and hydrocarbon resins.

The substance which attracts insects and/or to which insects stick is applied to the upper side (2) of the planar support (1), where it forms the layer (5). This may be performed by this substance/these substances being applied to the side concerned of the planar support directly (for example by extrusion) or, if appropriate, dissolved or suspended in a suitable auxiliary substance, thereby obtaining a full surface coating. If appropriate, the auxiliary substance (for example a solvent) is subsequently removed (for example by evaporation of the solvent). In a corresponding way, such a layer (5) may also be applied to the catching wall (8) and/or the fastening device (4).

The layer (5) may also take a form in which it does not cover the full surface area. For example, this layer may comprise a multiplicity of individual dots, small surface areas and/or numerous lines, possibly joined to one another. Such a form of the layer (5) in which it does not cover the full surface area may be produced by application processes, such as for example rotary printing.

WO 03/075651

PCT/EP03/00706

- 8 -

The substance which attracts insects and/or to which insects stick may, however, also be applied to the upper side (2) of the planar support (1), to the catching wall (8) and/or the fastening device (4) in the form of a previously prepared two- or multi-layer laminate.

The production of a device according to the invention for catching flying insects which comprises a planar support with an upper side and a lower side, a fastening device and a catching wall can take place using a suitable planar material sheet. In this case, a surface of this planar material sheet is coated with a layer (5) of a substance which attracts insects and/or to which insects stick. A strip of adhesive (7) is applied to the edge region of the planar material sheet. This strip of adhesive (7) may be applied laterally alongside the layer (5) of substance which attracts insects and to which insects stick or on the previously uncoated second surface of the planar material sheet. The layer (5) and strip of adhesive (7) are covered with protective films which can be detached again.

The separating lines (6) and (9) are then introduced into the planar material sheet parallel to the layer (5), possibly also through this layer. This may be performed by punching, embossing, scoring, folding or corresponding methods familiar to a person skilled in the art.

If the separating lines (6) and/or (9) are introduced into the planar material sheet by folding, this takes place with a force which ensures permanent presence of a folded line in the planar material sheet. This produces an angle between the planar support (1) and the fastening device (4) or the catching wall (8).

WO 03/075651

PCT/EP03/00706

- 9 -

Individual devices can be obtained for example by cross-cutting such a material sheet into individual portions. These are in turn packed in sealed-edge  
5 bags, lay-flat film bags or blister packs.

The folding over may, however, preferably take place only directly before the device is attached at the application site. In this case, the entire device is  
10 planar (see Figure 3) until the user folds over the fastening device (4) and/or the catching wall (8) along the separating lines (6) and (9) and consequently transforms it into the form in which it is represented in Figure 1 and Figure 2.

15 By the folding over to be performed by the user it is possible, if appropriate, to take into account that the application site itself is a window pane which is not vertical but is oriented at a certain angle with  
20 respect to the ground. Examples of intended application sites which come into consideration here are inclined windows in the roof area of homes or display cabinets in sales areas. Correspondingly adapted folding over, for example more extreme folding  
25 over, makes it possible to compensate for the inclination of the intended application site in such a way that, during use of the device, the surface coated with the substance which attracts insects or to which insects stick is arranged to be substantially  
30 horizontal to the ground.

On account of the material properties of the support (product rigidity, dimensional stability, plasticity), the machine-folding-over once carried out can be made  
35 reversible to the extent that the devices are substantially planar. This has advantages when packing the devices. The final angle between the support (1), the fastening device (4) and the catching wall (8) is

WO 03/075651

PCT/EP03/00706

- 10 -

in this case only set just before the device is used, by renewed manual folding over by the user. This is then much more easily possible on account of the folding over that has already taken place once by  
5 machine.

Comparative tests between the device according to the invention for catching flying insects and a window fly trap from the prior art, as described in the EP 281 562  
10 or DE 100 55 135, showed that, under otherwise comparable conditions (attachment of the two traps close to each other on the same window pane in the same room, catching area of the same order of magnitude, the same period of use), it was possible to catch a greater  
15 number of flying insects with the device according to the invention.

This is presumably partly attributable to the fact that the presence of the catching wall has the effect that a  
20 flying insect hitting the window pane bounces back from it and, with this uncontrolled backward movement, hits the catching wall (8) possibly provided with a layer (5). Consequently, not only the substantially horizontal surface coated with substance which attracts  
25 insects and/or to which insects stick that is on the upper side (2) of the support is available for catching the flying insects; rather, the space enclosed by the planar support (1) and the catching wall (8) can be regarded as a "catching volume". This shows that the  
30 object is achieved with surprisingly simple and at the same time unexpectedly effective catching efficiency.

The figures serve for illustrating the invention.

35 Figure 1 shows in a perspective representation a device for catching flying insects which is attached on the inside of a vertical window pane. The planar support (1) has in this embodiment a rectangular form.

WO 03/075651

PCT/EP03/00706

- 11 -

Figure 2 shows from the side a device for catching flying insects, which is attached to a vertical wall.

- 5 Figure 3 shows in plan view a device for catching flying insects, in which the folding over along the separating lines (6) and (9), to be performed directly before attachment of the device at the application site, has not yet taken place.

10

In the figures, the reference numerals have the following meaning:

- (1) planar support
- (2) upper side of the support (1)
- 15 (3) lower side of the support (1)
- (4) fastening device
- (5) layer with substance which attracts insects and/or to which insects stick
- (6) first separating line
- 20 (7) strip of adhesive
- (8) catching wall
- (9) second separating line

2002/103 WO

## Patent claims

1. A device for catching flying insects, comprising a planar support (1) with an upper side (2), which  
5 has a layer (5) with a substance which attracts insects and/or to which insects stick and is arranged to be substantially horizontal during use of the device, a fastening device (4), which is delimited from the planar support (1) by a first  
10 separating line (6), and a catching wall (8), which consists of the same material as the planar support (1), is delimited from the planar support (1) by a second separating line (9) and is arranged to be substantially vertical during use of the device,  
15 characterized in that the planar support (1) is translucent.
2. The device as claimed in claim 1, characterized in that the separating lines (6) and/or (9) take the  
20 form of a folded edge or a line which can easily be folded.
3. The device as claimed in claim 1 or 2, characterized in that the planar support (1)  
25 consists of glass, plastic or a composite material.
4. The device as claimed in one or more of claims 1 to 3, characterized in that the planar support (1) is colored.  
30
5. The device as claimed in one or more of claims 1 to 4, characterized in that the catching wall (8) and/or the fastening device (4) is coated with a layer (5) of a substance which attracts insects  
35 and/or to which insects stick.

-13 -

6. The device as claimed in one or more of claims 1 to 5, characterized in that the layer (5) takes a form in which it covers the full surface area or a form in which it does not cover the full surface area.
- 5
7. The device as claimed in one or more of claims 1 to 6, characterized in that the separating line (6) and/or (9) takes the form of a line which can easily be folded in the form of a score, notch, perforation, or strip with holes.
- 10
8. The device as claimed in one or more of claims 1 to 7, characterized in that the upper side (2), the fastening device (4) and/or the catching wall (8) has a geometrical pattern.
- 15
9. The device as claimed in one or more of claims 1 to 8, characterized in that the planar support (1) is rectangular.
- 20
10. The device as claimed in one or more of claims 1 to 9, characterized in that the fastening device (4) carries a strip of adhesive (7) on the side averted from the upper side (2) of the planar support (1).
- 25
11. The device as claimed in one or more of claims 1 to 10, characterized in that the substance attracting insects is a substance or a combination of substances from the group comprising sexual pheromones, aggregation pheromones, feedants and pheromone attractants.
- 30
12. The device as claimed in one of claims 1 to 11, characterized in that the substance which attracts insects is a substance or combination of substances from the group of adhesive substances which
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AMENDED SHEET

- 14 -

effectively prevents a flying insect sticking to it  
from flying away again.

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**Fig. 1**

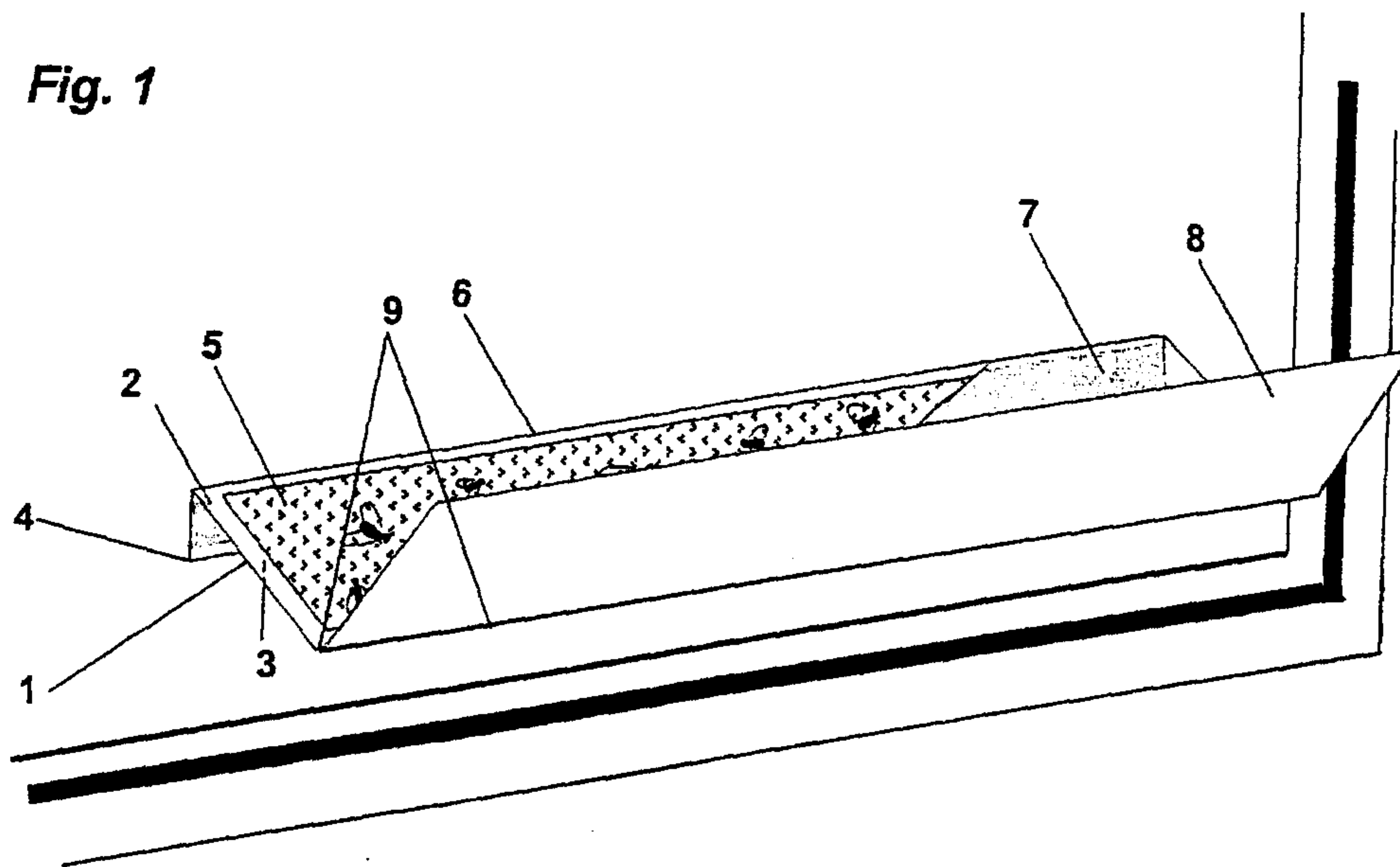


**Fig. 2**

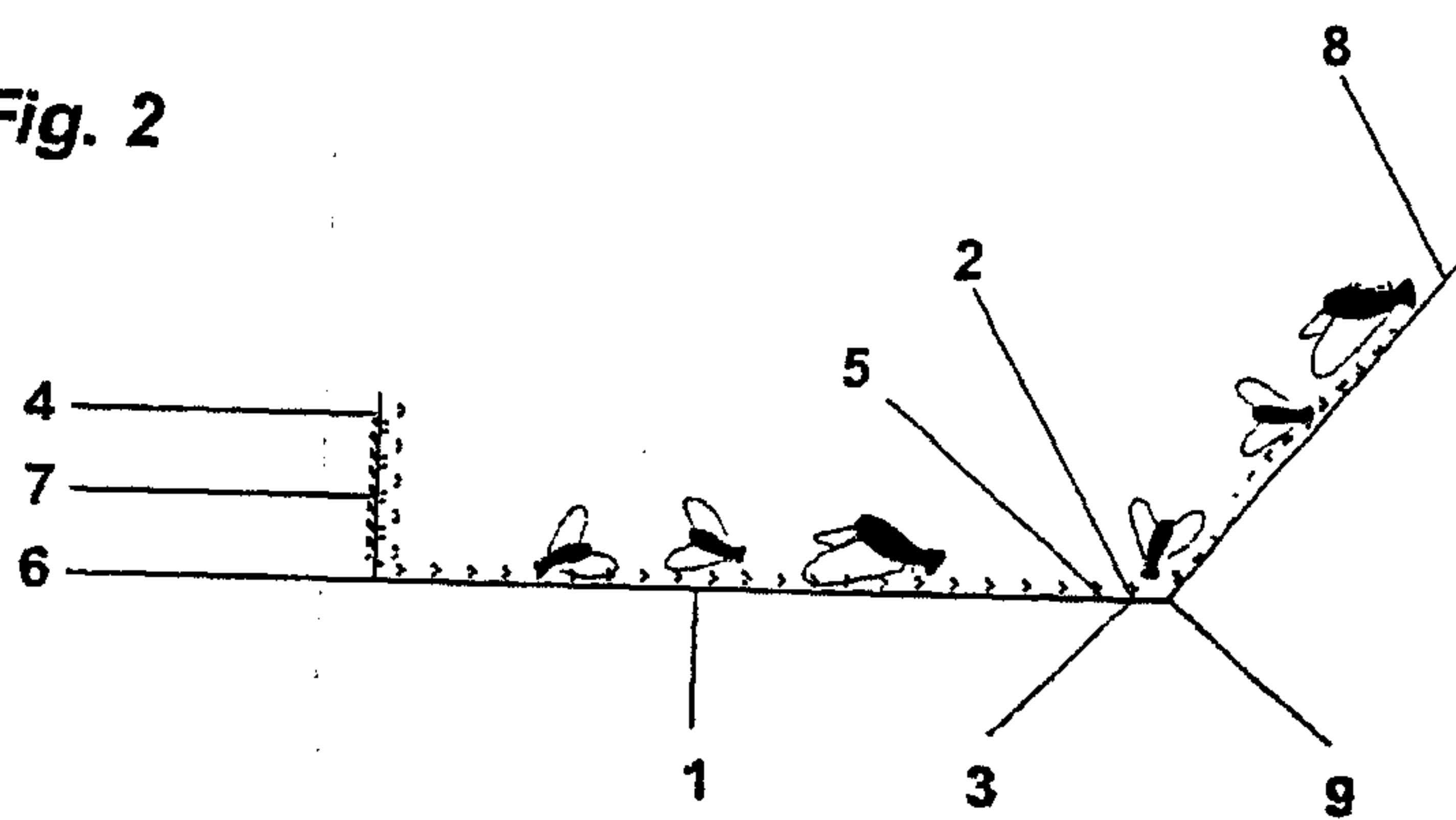


**Fig. 3**

