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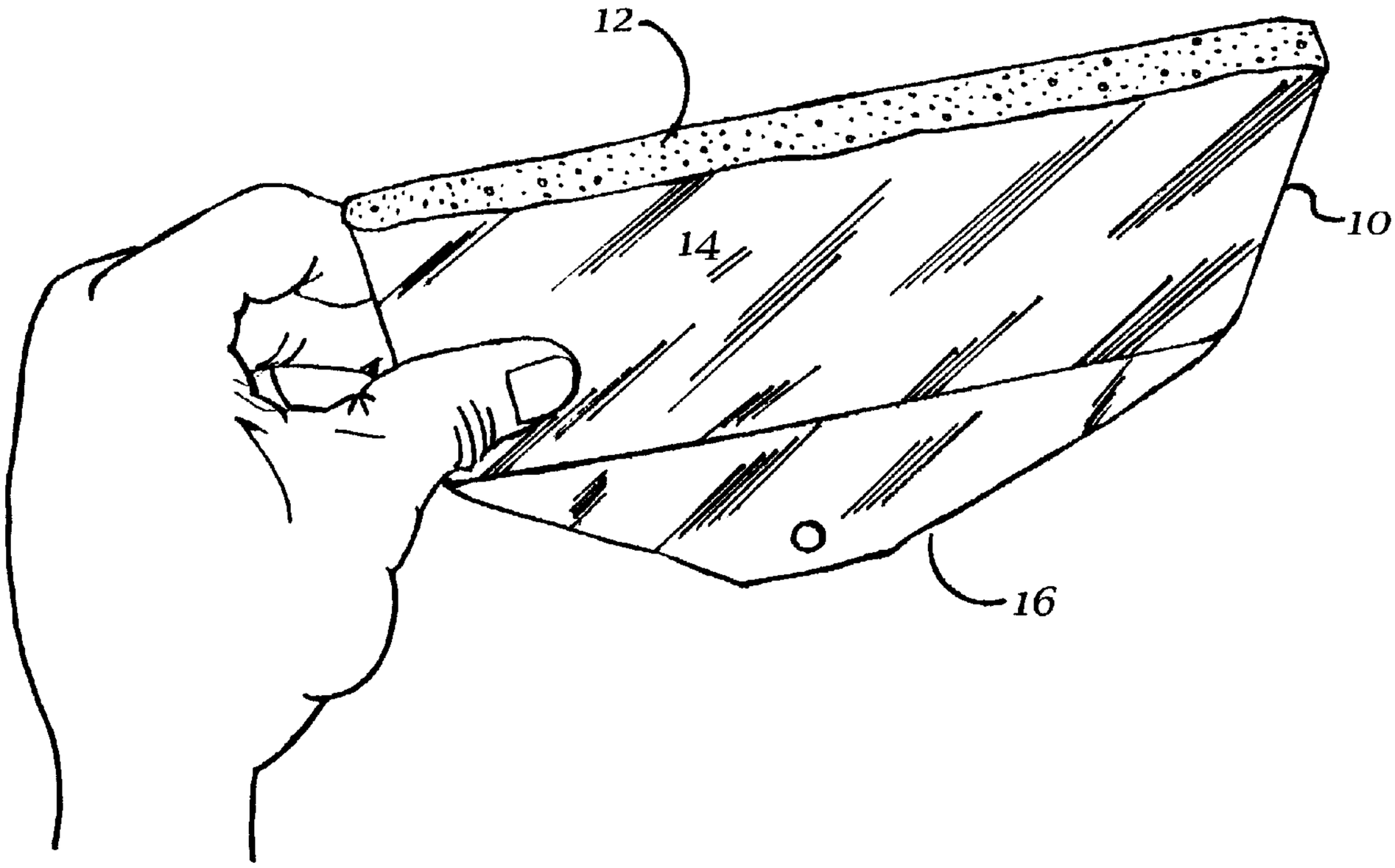
(54) Titre : DISTRIBUTEUR D'ACIDE FORMIQUE POUR LE CONTROLE DES MITES
(54) Title: FORMIC ACID DISPENSER FOR CONTROL OF MITES



(57) Abrégé/Abstract:
A formic acid dispenser includes a phenolic foam core encased in a fluid impervious skin or sheath. The fluid impervious skin or sheath is sealed about the phenolic foam core. In one embodiment this is done once the phenolic foam core has been saturated with formic acid fluid, whereby, when it is desired to dispense formic acid from the phenolic foam core by means of evaporation, said fluid impervious skin and phenolic foam core is sliced so as to separate the dispenser into two sections or halves. Each half is vertically hung in a bee space so as to downwardly dispose an exposed surface of the phenolic foam core to thereby evaporate acid at a uniform rate.

Abstract of the Disclosure

A formic acid dispenser includes a phenolic foam core encased in a fluid impervious skin or sheath. The fluid impervious skin or sheath is sealed about the phenolic foam core. In one embodiment this is done once the phenolic foam core has been saturated with formic acid fluid, whereby, when it is desired to dispense formic acid from the phenolic foam core by means of evaporation, said fluid impervious skin and phenolic foam core is sliced so as to separate the dispenser into two sections or halves. Each half is vertically hung in a bee space so as to downwardly dispose an exposed surface of the phenolic foam core to thereby evaporate acid at a uniform rate.

FORMIC ACID DISPENSER FOR CONTROL OF MITES

Field of the Invention

This invention relates to the field of methods for controlling mites and in particular trachea and varroa mites in bees.

Background of the Invention

It is well known to control trachea and varroa mites in a beehive by release of formic acid by evaporation at a controlled rate. In the prior art applicant is aware of German Patent No. 3427330 to Kramer. Kramer discloses a device for combating varroa mites in beehives where the device consists of soft fibre plates impregnated with formic acid and enclosed in a perforated plastic bag. In particular, the Kramer device consists of a 250-650 square centimeter soft fibre plate having 10 millimeters thickness which may be impregnated with 200-300 millilitres of concentrated formic acid. The soft fibre plate may be enclosed in a plastic film bag having 5-15 perforations on each side of the plate for a total exit area of 15-55 square centimeters.

Kramer teaches that, when placed horizontally in the hive over the brood area and above the brood chambers of the bee population, that the soft fibre plate formic acid dispenser controls varroa mites without harming the bees. The size of the fibre of plate and extent of the perforation of the plastic bag result in controlled release of 85% formic acid concentration over a period of 7 days in August and 14 days in October.

As reported in the American Bee Journal (March, 1996, at pages 190-192), the Kramer soft fibre plates are made of Pavatex (tm) and the plastic bags are of 0.15 millimeter thickness. For storage the plates are kept frozen and the plastic container kept air tight. Before application, the necessary evaporation holes are made in the plastic casing with a round punching

tool of 1.5 centimeters diameter. The number of holes varies according to the hive system and climate including the microclimate of the apiary. For a treatment, the plates are hung into the empty honey chamber by means of a honeycomb frame for seven days. For medium sized one story hives, Kramer teaches that a distance of 5 centimeters should be kept between the brood combs and the board.

The treatment efficiency of this method depends on the formic acid concentration in the hive air and on the duration of the treatment. It can be controlled on the basis of the amount of evaporated formic acid. Thus, the board has to be weighed before and after the treatment. If there is an evaporation of more than 7 grams of formic acid (85% concentration) per day, a treatment efficiency of more than 95% may be expected. If less than 7 grams evaporate, the treatment efficiency will be insufficient. To be reused, the Kramer plates must be reimpregnated with formic acid up to their gross weight of 250 grams of formic acid.

Summary of the Invention

The formic acid dispenser of the present invention includes a phenolic foam core snugly encased in a fluid impervious skin or sheath. The core is advantageously is a planar member, for example, rectangular in shape. The fluid impervious skin or sheath is sealed about the phenolic foam core. In one embodiment this is done once the phenolic foam core has been saturated with formic acid fluid, whereby, when it is desired to dispense formic acid from the phenolic foam core by means of evaporation, said fluid impervious skin and phenolic foam core is sliced, for example so as to separate the dispenser into two sections or halves, and each section or half hung vertically so as to downwardly dispose an exposed surface of the phenolic foam core, to thereby evaporate acid at a uniform rate. The length of the slice is varied by angling the slice relative to the core to adjust the evaporation rate of the formic acid.

Brief Description of the Drawings

Figure 1 is, in perspective view, the formic acid dispenser of the present invention.

Detailed Description of Preferred Embodiments

A drawback of the Kramer device is introduced by the reduced absorbency of the soft fibre Pavatex plates as compared to the phenolic foam core of the present invention. A further drawback is the use of a high (85%) acid concentration causes loss of queen bees. The reduced absorbency means that a Kramer device is more bulky, in that it requires 650cc (up to 1100cc for a two story hive) of Pavatex material, which cannot be placed in any existing space in the hive, and additional box space is required. That is, 2 1/2 times as much material (5 times as much material in the case of a two story hive) is required as compared to the formic acid dispenser of the present invention which is placed in existing bee space in any standard LangstromJ hive.

The formic acid dispenser of the present invention replaces the soft fiber plates taught by Kramer with a phenolic foam of the type used to retain water in the base of floral presentations. One type of phenolic foam which has been successfully employed, is Standard Oasis (tm) Floral Foam, manufactured by Smidher Oasis, of Pickering, Ontario. It has been found that phenolic foam is highly absorbent of, and not affected by, formic acid. The phenolic foam cell structure provides a relatively constant evaporation rate given constant temperature and humidity, whereas the soft fibre Pavatex plates of the Kramer device are made of material such as employed in ceiling tiles or peg boards, that is, out of textile waste, and, it has been found, the absorbency is inconsistent.

As seen in cross-section in Figure 1, the formic acid dispenser 10 of the present invention in one embodiment is an approximately 250 cubic centimeters phenolic foam core 12 which, it has been found, will absorb approximately 230 grams of formic acid (65%

concentration). The phenolic foam acts as a formic acid reservoir holding the formic acid within the porous cell structure of the foam. The foam is sufficiently rigid to allow a fluid impervious skin 14 to be snugly mounted on the foam, so as to enclose the foam. The skin may be a plastic film (seen in Figure 1), a wax layer, or the like. Mounting of the skin on the foam core may be by shrink-wrapping, dipping, or by like means known in the art. Once the foam has been saturated with formic acid, and the foam sealed in the skin, the formic acid dispensers of the present invention may be prepackaged and shipped for resale, or shipped empty for fill up by applicator, franchise dealer or final user beekeeper himself, as formic acid is readily available.

In use, the fluid impervious skin of the formic acid dispenser (which is formed as a plate) is cut in half to allow release of the formic acid by evaporation, or, if shipped dry, dipped in formic acid, then hung vertically for example by tab 16 so as to dispose the exposed cut surface downwardly in the bee space. Environmental conditions dictate the rate of evaporation. Where the plate is cut to expose the saturated core, the length of the cut is varied to vary the size of the exposed face. For example, the cut may be lateral, longitudinal or diagonal.

In use, the formic acid dispenser of the present invention releases 10 grams of 65% formic acid per day for 21-25 days (for a brood cycle treatment). A single half of one plate may be used for a single story hive. Both halves of a plate may be used for a two story hive. Each half plate is hung with its exposed phenolic foam surface disposed downwardly between the last frame in the hive and the wall of the hive. If not hung using tab 16, the half plate may be secured by means of stapling to the top of the frame or wall of the hive.

In cold climates, where four beehives may be grouped together to form a rectangle, the formic acid dispensers of the present invention are advantageously mounted toward the center of the rectangle where the temperature typically is warmer than the outside temperature, especially if the hives have been insulated. For example, it has been found that the bees will keep the

temperature in an insulated hive between 24-28 degrees Celsius when the temperature outside can be as low as 0 degrees Celsius, and the humidity as high as 60%.

In the formic acid dispenser of the present invention, a typical plate thickness is approximately 9.5 millimeters (that is, 3/8 of an inch). Because of the Kramer prior art evaporation method (holes on the side of the plate), Kramer requires typically 20 millimeter spacer bars under horizontally placed plates. In the Kramer method, the space requirement has been addressed by requiring extra boxes to mount the Kramer plates in. For a large farm having thousands of hives, this equates to installing corresponding thousands of extra boxes. Further, the procedure recommended by Kramer of freezing the plates, which it has been found is done to allow for easier cutting of holes into plastic covering of the soft fibre plates, requires in that instance freezer space for, perhaps, thousands of plates.

Further, or in the Kramer method, a template is used to place perforations in the correct locations. Where there are hundreds or thousands of plates to be perforated, having to make between 7 and 15 perforations through a template for each plate makes for an excessive amount of work, whereas in the formic acid dispenser of the present invention, the phenolic foam allows for ease of cutting without having to be frozen, and the plate may be merely cut in half and hung as described above, without the requirement for perforations. In mass production, the plastic cover may be pre-cut and provided with ripping tape, for example as used in cigarette packaging, so as to hold the two halves together until separated by the end user. This will allow for easier application.

In terms of ease of shipping, an empty phenolic foam formic acid dispenser weighs approximately 6 grams, when the equivalent dispenser by Kramer weighs approximately 30-40 grams empty.

As will be apparent to those skilled in the art in the light of the foregoing disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope thereof. Accordingly, the scope of the invention is to be construed in accordance with the substance defined by the following claims.

WHAT IS CLAIMED IS:

1. A formic acid dispenser comprising:

a phenolic foam core,

a fluid impervious skin mounted on said core so as to be completely wrapped around said core to seal said core,

wherein said skin and said core may be manually penetrated and sliced into segments by a knife so as to expose an interior surface of said core,

said dispenser adapted to be hung vertically with said interior surface downwardly disposed.

2. The dispenser of claim 1 wherein formic acid is contained, absorbed within said core and sealed within said skin in an unevaporated state until said skin sliced by said knife.

3. The dispense of claim 1 wherein said core and skin are sliced by said knife so as to expose said interior surface, and said dispenser is adapted to be manually gripped by a user for dipping of said interior surface into formic acid.

4. The dispenser of claim 1 wherein said skin is formic acid impervious plastic.

5. The dispenser of claim 1 further comprising means for hanging said dispenser vertically.

6. The dispenser of claim 1 wherein said core is a plate.

7. The dispenser of claim 1 wherein said core is planar.

8. The dispenser of claim 1 wherein said core is rectangular.

9. The dispenser of claims 1, 2, 3, 4, 5, 6, 7 or 8 wherein said skin extends from said core at one end of said core so as to form a flange for hanging said dispenser vertically.

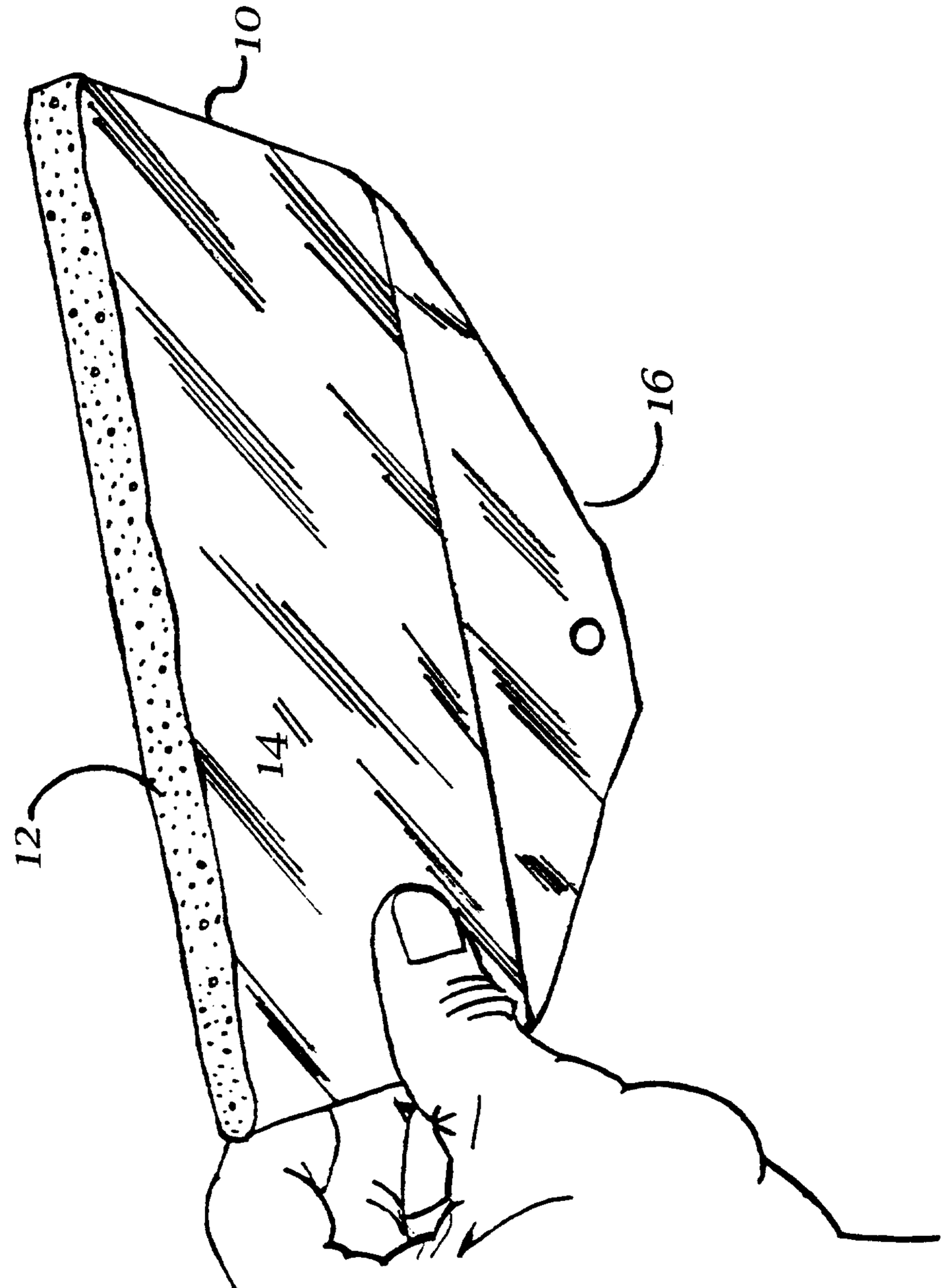
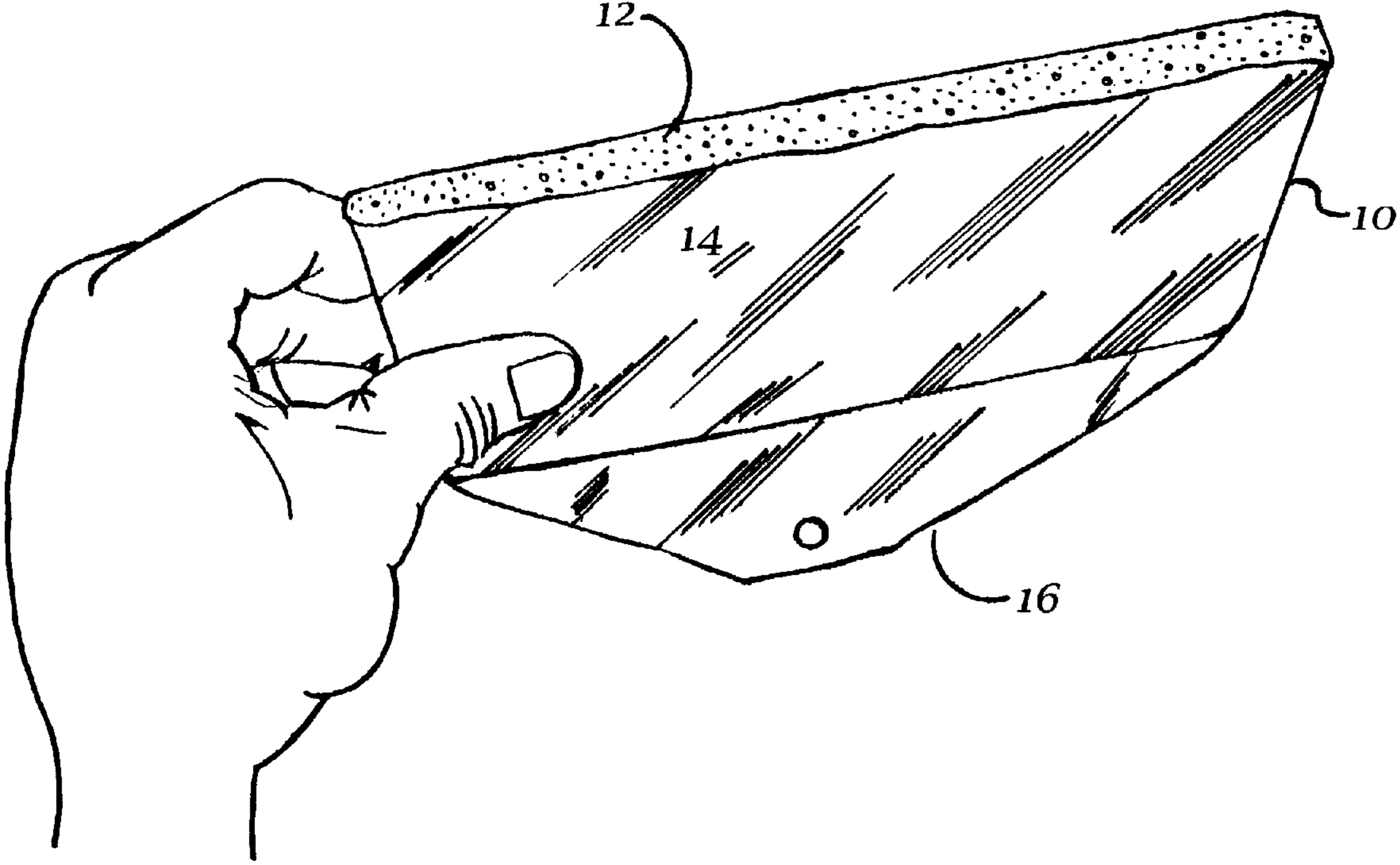


FIG. 1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