United States Patent [19]

Lin

[11] **3,898,039**

[45] **Aug. 5, 1975**

[54] **ARTICLE HAVING FUMIGANT CONTAINING SUBSTRATE FOR DIFFUSION PROMOTING CANDLE**

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[22] Filed: **Jan. 2, 1974**

[21] Appl. No.: **430,281**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 263,060, June 15, 1972, abandoned.

[52] **U.S. Cl.** **21/108;** 21/53; 21/110; 21/111; 44/7.5; 117/121; 252/425.5; 252/449; 424/18; 431/288; A01n/17/08

[51] **Int. Cl.** **A61l 9/02;** C11c 5/00

[58] **Field of Search** 21/55, 108–111, 21/116–120; 424/18, 15, 16, 17, 19–24; 117/121.2, 137; 44/7.5; 431/126, 288; 252/425.5, 449, 451, 315, 316; 161/168–170

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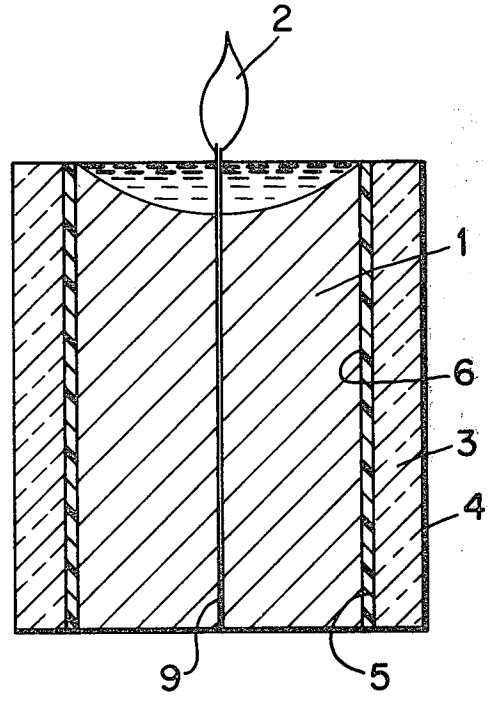
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Primary Examiner—Morris O. Wolk
Assistant Examiner—Dale Lovercheck

[57] **ABSTRACT**

An article of manufacture comprising a substrate, a particulate carrier and a binder at least part of at least one surface of said substrate bearing a fumigant, said fumigant diffusible from said article upon exposure to the thermal energy of a candle. The fumigant-bearing substrate in combination with a candle is particularly useful as a fragrance candle.

37 Claims, 5 Drawing Figures



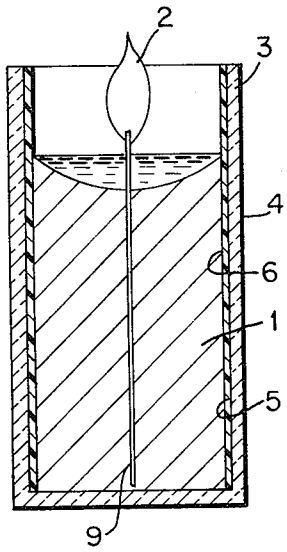


FIG. 1

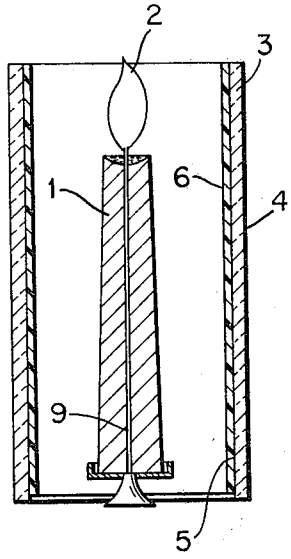


FIG. 2

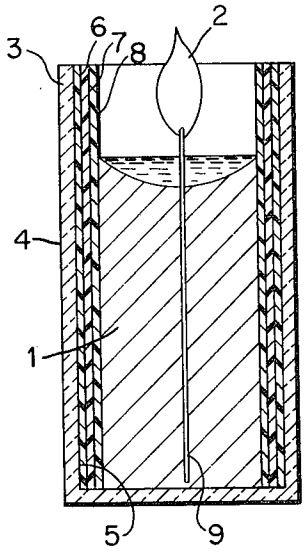


FIG. 3

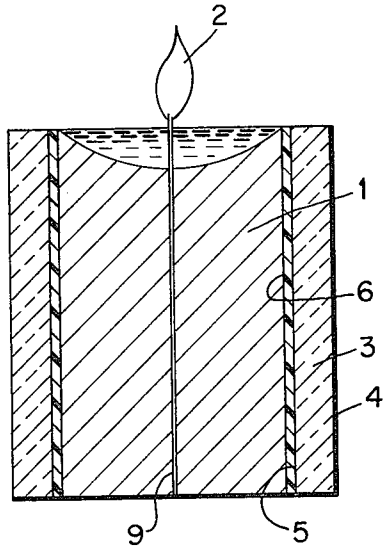


FIG. 4

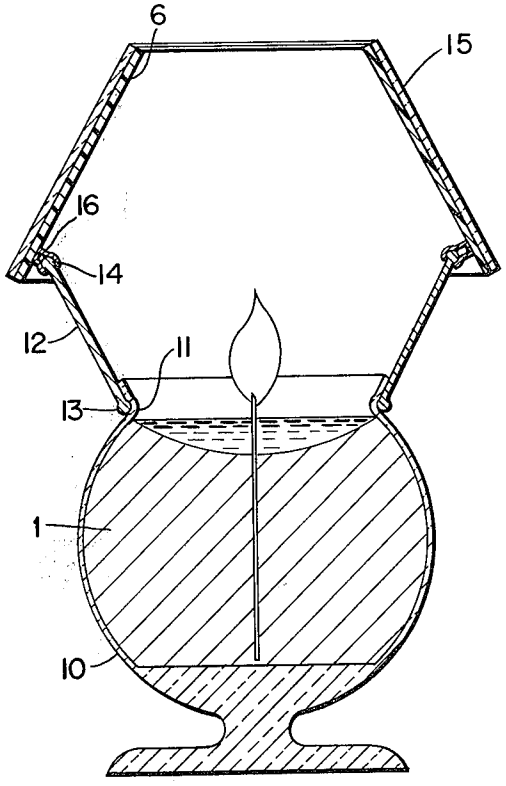


FIG. 5

ARTICLE HAVING FUMIGANT CONTAINING SUBSTRATE FOR DIFFUSION PROMOTING CANDLE

This application is a continuation-in-part of application Ser. No. 263,060, filed June 15, now abandoned.

This invention relates to a fumigant containing substrate. More particularly, this invention relates to a fumigantcontaining substrate for use with a candle to promote diffusion of fragrances, insect repellents, medicaments, etc. into the atmosphere.

Decorative and fragrance candles are widely sold and used in the United States and European countries. The conventional fragrance candles are generally made by dissolving a perfume oil into a melted wax, sometimes with the aid of a solubilizer. The resulting wax mixture is then poured into a mold or a glass container, and provided with a wick to form a candle.

Most of the so-called fragrance candles sold today do not liberate much fragrance when the candles are lighted. The reason is that the perfume oil dissolved in the wax is readily absorbed by the candle wick before the oil is diffused into the atmosphere. Also, amounts of the perfume oil are burned and converted into odorless gases and other compounds. Although some of the perfume in the pool of melted wax will diffuse into the air, the amount is not great since the temperature of the melted wax surrounding a lighted candle is only about 60°C. Moreover, the wax reduces the vapor pressure of the perfume oil and suppresses the diffusion of the fragrance.

For these reasons, the portion of the perfume in an ordinary fragrance candle diffusing into the surrounding atmosphere is generally very small in comparison to the portion which is simply burned away or converted to other compounds. For example, even when the fragrance candle contains as much as 6% by weight of perfume oil, the fragrance diffused while burning the candle may not be very great. Moreover, the quality and fidelity of the fragrance can be quite poor due to a partial conversion of the fragrance into other compounds having an undesirable odor.

Another disadvantage of an ordinary fragrance candle is the perfume loss during the manufacturing process. Since the perfume is generally incorporated into a batch of hot melted wax, a considerable amount of fragrance can be lost in mixing, pouring and cooling the perfurmed wax mixture.

An additional problem encountered with the conventional fragrance candles is the compatibility between the wax and the perfume oil. For example, it is known in the art that stearic acid adds firmness and improves the appearance of a candle. However, the use of stearic acid in a fragrance candle is known to suppress the diffusion of the perfume oil. It is also known that some perfume oils discolor the candle or weaken its structure.

Accordingly, this invention provides an article of manufacture comprising a substrate bearing a fumigant. The fumigant is contained on at least part of at least one surface of the substrate, and is diffusible from the article into the surrounding atmosphere upon exposure of the substrate to the thermal energy of a lighted candle.

According to this invention there is also provided, in combination, the fumigant bearing substrate with a candle. The surface of the substrate bearing the fumigant is preferably substantially parallel to a longitudinal axis of the candle. Other configurations are illustrated hereinafter.

This invention aids in overcoming the previously mentioned problems encountered in the prior art. When the fumigant-bearing substrate of this invention is used in combination with a lighted candle, larger amounts of the fumigant diffuse into the surrounding atmosphere, while small amounts, if any, are consumed by the candle flame. Also, the fumigant does not weaken or generally discolor the candle material. Furthermore, fumigant loss during the substrate manufacturing process is minimized because the process can be conducted at relatively low temperatures, for example, room temperature. The fragrance quality and fidelity are generally good since the fragrance is not masked by compounds having undesirable odors generated as substances burn in the lighted candle.

This invention will be more clearly understood by reference to the drawings in which FIGS. 1, 2, 3, 4 and 5 are elevation views in cross-section of various embodiments of the fumigant-bearing substrate of this invention in combination with a lighted candle.

According to a preferred embodiment shown in FIG. 1, a candle 1 having a flame 2 is surrounded by a container 3 which comprises the substrate. Container 3 has an outer surface 4 and an inner surface 5. Either the outer surface 4 or inner surface 5 or both bear a fumigant or fumigant-containing composition 6. As shown in FIG. 1, inner surface 5 has a fumigant containing coating 6.

The combination shown in FIG. 1 can readily be prepared. For example, a perfume oil can be mixed with an absorbing solid or carrier, such as talc or silica gel. This mixture can then be combined with a binder, such as an aqueous solution of polyvinyl alcohol. The resulting mixture can then be applied to the inner surface 5 of container 3. When the resulting coating 6 is dry, a molten wax normally used in making candles can be poured into container 3, and an ordinary candle wick 9 inserted.

FIG. 2 depicts a slightly different preferred embodiment of this invention. In FIG. 2, an ordinary freestanding candle 1 having a flame 2 is used. However, a hollow cylinder 3 comprising the substrate is placed around candle 1. The perfume oil or other fumigant can be painted on the inner wall 5 of the cylindrical container 3 to form a coating 6. It will of course be understood that a coating 6 can also be provided on outer surface 4 of cylinder 3; however, this is not shown in FIG. 2.

FIG. 3 depicts another preferred embodiment of this invention. The combination shown in FIG. 3 is similar to that of FIG. 1 except that container 3 is provided with multiple fumigant-containing layers 6, 7 and 8. By using multiple layers, a novel candle is obtained which will release the fragrance or other fumigants in two or more stages into the atmosphere. Here again it is possible to coat not only the inner surface 5, but also the outer surface 4 or both surfaces 4 and 5.

FIG. 4 depicts a further preferred embodiment of this invention. The diffusion-promoting candle of FIG. 4 can be prepared by pouring a wax into a mold to form an outer shell 3. The perfume oil or other fumigant mixed with a binder and carrier can be applied to the inner wall 5 or outer wall 4 of the wax shell. The inner core or candle 1 can be made by simply inserting a

ready-made candle in the hollow opening in shell **3**. Also, candle **1** can be prepared by pouring melted wax into the opening in shell **3** and inserting a wick **9**. The melting point of the wax used for shell **3** can be slightly higher than the wax used for candle **1**. In the alternative, the same wax can be used for both candle **1** and shell **3**.

It is apparent from FIGS. **1, 2, 3** and **4** that the surface of the fumigant bearing substrate be substantially parallel to the longitudinal axis of the candle. In fact, when the substrate is a hollow cylinder, the longitudinal axis of the cylinder is preferably practically coincident with the longitudinal axis of the candle. Nevertheless, the art skilled will recognize that other arrangements are feasible. For example, in FIG. **5** a decorative vase **10** is provided with a candle **1**. The vase is contoured at its mouth to form a recess **11** which will accept a ring **13** of lamp shade support **12**. The lamp shade support **12** is also provided with a ring **14** at its upper end. Ring **14** will accept a spring clip **16** secured to fumigant bearing substrate **15** in the shape of a removable shade. A coating **6** containing the fumigant is applied to the inner surface of substrate **15** to form a diffusion promoting candle of this invention. It is apparent from FIG. **5** that the longitudinal axis of the substrate, rather than the substrate surface, is substantially parallel to the longitudinal axis of the candle. This combination has the advantage of allowing easy change or replacement of the fragrance merely by replacing the removable shade **15**.

It will be apparent to one skilled in the art that numerous other variations of this invention are possible. FIGS. **1** through **5** merely depict several preferred embodiments.

In describing this invention, the term "diffusible" is used. By this term it is meant that a fumigant passes from a substrate into the surrounding atmosphere after exposure to the thermal energy from a lighted candle. In practicing this invention, at least one of three possible mechanisms is employed. First, the fumigant can be a material which diffuses into the surrounding atmosphere by buring or combustion. Also, the fumigant can be a material which passes into the surrounding atmosphere by vaporization. Finally, the fumigant can be a material which sublimates upon exposure to the thermal energy from a lighted candle.

Based on this discussion it will be clear to one skilled in the art that the term "fumigant" is to be given a broad interpretation. As used herein the term "fumigant" means any material which will pass from the substrate to the surrounding atmosphere upon exposure to the thermal energy of a lighted candle to produce an odor perceptible by the human sense. As used herein the term "fumigant" includes fragrances such as perfumes and incense. The term also includes vermin destroying or repelling agents, such as insecticides and insect repellents. Typical insect repellents are citronella, dimethyl phthalate, 2-ethyl-hexane-diol-1,3; α,α-dimethyl-α-carbobutoxy-γ-dihydropyrene, diethyltoluamide, etc. As used herein, the term "fumigant" also includes medicaments, disinfectants and cleansing agents. Medicaments are particularly useful for relieving the symptoms of a cold. The term includes not only odor-producing agents, but also odor-masking agents the diffusion of which is increased by the application of heat from a lighted candle. It will be understood that mixtures of fumigants can be used.

As used herein the term "substrate" is any material which is solid at room temperature and has a vapor pressure less than the vapor pressure of the fumigant at the diffusion temperature. The diffusion temperature is the temperature under conditions of actual usage at which the fumigant diffuses into the surrounding atmosphere upon exposure to heat from a lighted candle. The substrate is preferably a hollow cylindrical shape as shown in FIG. **2**, or a hollow container having a bottom and substantially parallel walls as shown in FIG. **1**. The substrate can also be planar, triangular, eliptical, conical (e.g. truncated) or rectangular cross-section. It will be apparent to those skilled in the art that the substrate can be almost any other geometrical or decorative shape. A particularly preferred shape is a hollow cylinder, with or without a bottom, and having an inside diameter of about 3–10 cm, preferably about 5–7 cm. A 6 cm internal diameter cylinder is particularly preferred. The exact dimensions and configuration of the substrate will of course depend on the fumigant and its diffusion temperature. Typically, the interior walls of a cylindrical container having a diameter of about 6 cm attain a temperature of about 70°–200°C.

Typical of substrate materials are wax, glass, asbestos, ceramics, earthenware, metals and plastics, such as polyethylene, polypropylene, polyvinylchloride, polycarbonates and acrylics. Other materials will be apparent to those skilled in the art. The substrate can be clear, opaque, translucent colored or otherwise decorated. A particularly preferred substrate is frosted glass i.e. a glass, having a roughened surface texture. It will be apparent that at least part of at least one surface of the substrate must bear the fumigant material.

In describing this invention, it has been stated that the substrate "bears" the fumigant material. It will be apparent from this term that the substrate and fumigant can be combined in numerous ways. The fumigant can be dispersed in a carrier and binder which is then coated on at least part of at least one surface of the substrate. The fumigant can be a microencapsulated solid, liquid or gas adhered to the surface of the substrate. As described in FIG. **3**, multiple layers or coatings of fumigant containing material can be used.

When the fumigant is applied to the substrate as a coating, the fumigant can be combined with an adsorbent or absorbent particulate carrier. Typical carriers are talc, silica gel, titanium dioxide, kaolin, dicalciumphosphate, powdered glass, iron oxide, bentonite, calcium sulfate or polymers. Mixtures of different carriers can also be used. In general, the carrier can be any particulate material which will absorb or adsorb the fumigant and which has a vapor pressure less than the vapor pressure of the fumigant at the diffusion temperature.

The carrier and fumigant are generally combined with a binder which exhibits adhesive properties with respect to the carrier and substrate. The binder can be any material which is not soluble in the wax for the candle. Preferably, the binder is water soluble for ease of application and clean-up. The binder should form a film which is at least partially permeable in order to permit the escape of the fumigant. Thus, the binder should have a vapor pressure less than the vapor pressure of the fumigant at the diffusion temperature. The binder can be a low melting, e.g. about 100°–300°C., material. Preferred binders are carboxy methyl cellulose, hydroxypropyl cellulose, polyvinyl alcohol, polyvinyl acetate and carboxy vinyl polymers. Preferred

carboxy vinyl polymers are polymers of acrylic acid, methacrylic acid, maleic acid, fumaric acid, itaconic acid and crotonic acid, and copolymers thereof. It has been found that the binder need not melt under the conditions of actual usage in the diffusion promoting candle of this invention. It is only necessary that the binder be at least partially permeable to the fumigant under conditions of actual usage.

When the fumigant is combined with a carrier and binder, the resulting mixture is conveniently applied to the substrate as a coating by brushing, spraying, dipping or roller coating. The amount of the carrier employed should be sufficient to completely absorb the fumigant. An insufficient amount of carrier results in excessive loss of fumigant, while too great an amount of carrier retards diffusion. Typical amounts of carriers employed for given applications are shown in the following examples. Other amounts can be determined with a minimum of experimentation.

The thickness of the coating supplied to the substrate will of course vary with the fumigant and intended application. Generally, when a large amount of fumigant is desired, a relatively thick coating is applied. Also, the thicker coatings tend to reduce heat loss from the candle flame. Typically, the thickness of the coating is about 1–5 mm; however, other thicknesses can be employed.

When diffusion is accomplished by means of vaporization of the fumigant, the substrate can bear an encapsulated liquid. Methods for encapsulating liquids are well-known to those skilled in the art, and means for preparing these fumigant-containing substrates will be readily apparent. A typical method involves microencapsulation in a gelatin.

The amount of fumigant used with each binder will of course vary depending on the type of binder, type of fumigant, geometry of the candle and substrate, intensity of fragrance desired, etc. Optimum amounts can be determined with a minimum of experimentation. Typically, about 0.2–8 weight percent of the fumigant is used based on the weight of the binder. Preferably, about 2.5–3.5 weight percent fumigant is used with the preferred binders previously mentioned. About 3 weight percent fumigant is particularly preferred.

The candle can be comprised of any of the well-known candle making materials. Typical materials are tallow, paraffin wax, carnauba wax, stearic acid, and beeswax. The candle can contain the usual additives, colorants and decorations.

Similarly, when the fumigant is coated on the substrate as a mixture with a carrier and binder, the resulting coating can contain a plasticizer to improve its mechanical and structural properties. Typical plasticizers are epoxy tallate, epoxidized oils, medium molecular weight polyesters, di-2-ethylhexyl phthalate, di(isodecyl)phthalates, alkyl di(tridecyl)phthalate, di(linear alkyl)phthalates, alkyl di(phenyl) phosphate and di(2-ethylhexyl)adipate. The coating can also contain fillers or extenders which may or may not absorb the fumigant. Typical fillers are barium sulphate, fumed colloidal silica, calcium carbonate, calcium silicate, and clay. The coating can also contain a fibrous reinforcement, such as asbestos, ceramic fibers, fibrous glass or polyvinyl alcohol fibers. Further, the coating can contain flame retardants, heat stabilizers, preservatives, adhesion promoters, surfactants and other processing aids.

This invention will be more fully understood by reference to the following examples in which all parts, proportions and percentages are by weight unless otherwise indicated.

EXAMPLE 1

Fragrance Candle

Perfume oil	4 parts
Talc	10 parts
Polyvinyl alcohol, 10% aqueous solution	8 parts

The perfume oil is mixed with the talc until the oil is completely absorbed. The polyvinyl alcohol solution is then added and mixed thoroughly until a moderately thick paste is obtained. The mixture is then evenly applied on the inner wall of a cylindrical glass cup having a 6 cm diameter and 12 cm height. If the mixture is too thick to paint, a little water can be added. If the mixture is too thin, more talc can be added. After the surface is completely dry, a mixture of wax consisting of 10% stearic acid and 90% paraffin wax (M.P. 133° to 138°F.) is poured into the cup. A candle wick is placed at the center of the candle, and the candle is allowed to cool. The rate of the fragrance release can be adjusted by adjusting the ratio of the perfume oil to the solid substrate.

EXAMPLE 2

Fragrance Candle

Perfume oil	4 parts
Silica gel	5 parts
Polyvinyl alcohol, 10% aqueous solution	10 parts

The mixture is prepared as in the previous example and applied on a glass container. A mixture of wax consisting of 70% paraffin wax, 20% stearic acid and 10% beeswax is poured into the container to make a candle.

Pearlescent materials such as guanine, bismuth oxychloride, titanium dioxide coated mica, etc. can be added or used in place of the silica gel to obtain a pearlescent candle.

EXAMPLE 3

Fragrance Candle

Perfume oil	5 parts
Polyvinyl alcohol, 10% aqueous solution	6 parts

The perfume oil and polyvinyl alcohol solution are emulsified, and then a candle is prepared as before. If necessary, a small amount of emulsifier can be added to facilitate emulsification. When this compound is painted on a clear glass cup, it will dry to a nearly transparent film. Coloring materials can be added to enhance the appearance.

EXAMPLE 4

Insect Repellent Candle

Insect repellent	4 parts
Silica gel	5 parts
Polyvinyl alcohol, 10% aqueous solution	10 parts

The candle is prepared like before. For insect repellents one can use dimethyl phthalate; 2-ethyl-hexanediol-1,3; α,α-dimethyl-α-carbobutoxy-γ-dihydropyrene; diethyl-toluamide; etc.

Candles prepared according to this invention have many distinct advantages over conventional fragrance or fumigant candles. First of all, perfume oil embedded in the substrate can be protected by a thick layer of wax from the candle, resulting in very little loss of oil before actual usage. When the candle is lighted, the substrate becomes hot and the fumigant gradually diffuses into the atmosphere. As the wax in the candle is consumed, fresh surface of the substrate is exposed to heat, and thereby results in continuous diffusion of the fumigant into the atmosphere.

The temperature of the melted wax in an ordinary lighted candle does not get much higher than the melting point of the wax. The temperature of the substrate used in combination with a candle according to this invention can, nevertheless, get much higher. This is because the wall receives heat not only by conduction and convection of hot air, but also by radiation from the hot candle flame. The high temperature of the substrate effectively promotes the gradual and complete duffision of the fumigant borne by the substrate. The rate of diffusion and substrate temperature can readily be controlled by properly selecting the size and shape of the substrate.

Additionally, this invention is advantageous since a perfume oil mixture can be prepared and applied to a substrate cold. Consequently, there is less loss of the perfume during the manufacturing operation. Furthermore, compatibility problems can be avoided since the wax need not be in direct contact with the perfume oil. Thus, the need for solubilizers is obviated, and fragrance suppression or discoloration problems are avoided.

Among other binders which can be used in practicing this invention are acrylic ester polymers. Preferred, especially in aqueous emulsion form are polymers of methyl acrylate, ethyl acrylate, n-butyl acrylate, methyl methacrylate; isobutyl acrylate, t-butyl acrylate, 2-ethyl hexyl acrylate, 2-ethoxy-ethyl acrylate, 2-hydroxy propyl acrylate, ethyl methacrylate and butyl methacrylate, or copolymers of corresponding monomers.

I claim:

1. An article of manufacture comprising a substrate, a coating on at least part of at least one surface of said substrate, said coating consisting essentially of a mixture of at least one fumigant and at least one carrier in particulate form, said mixture being dispersed in a binder having a melting point of about 100° to about 300° C, said coating being at least partially permeable to permit the escape of the fumigant to the surrounding atmosphere when said coating is exposed to the thermal energy of a lighted candle.

2. Article of claim **1** in which the substrate is of hollow cylindrical shape.

3. Article of claim **2** in which the substrate is about 6 cm internal diameter.

4. Article of claim **2** in which the substrate is wax, glass, ceramic, earthenware, plastic or metal.

5. Article of claim **3** in which the substrate is wax, glass, ceramic, earthenware, plastic or metal.

6. Article of claim **4** in which the fumigant is an incense, a perfume, a medicament, an insecticide or an insect repellent.

7. Article of claim **5** in which the fumigant is an incense, a perfume, a medicament, an insecticide or an insect repellent.

8. Article of claim **1** in which said carrier is calcium sulfate, talc, silica gel, titanium dioxide, iron oxide or bentonite.

9. Article of claim **1** in which said binder is carboxy methyl cellulose, polyvinyl alcohol, polyvinyl acetate or hydroxy propyl cellulose.

10. Article of claim **8** in which said binder is carboxy methyl cellulose, polyvinyl alcohol, polyvinyl acetate or hydroxypropyl cellulose.

11. Article of claim **10** in which the coating contains a colorant.

12. Article of claim **11** in which the coating contains a filler.

13. Article of claim **12** in which the coating contains a plasticizer.

14. In combination, the article of claim **4** and a candle, said surface bearing said fumigant being substantially parallel to a longitudinal axis of said candle and wherein said fumigant is diffusible from said article when said coating is exposed to thermal energy from said candle when lighted.

15. In combination, the article of claim **8** and a candle, said surface bearing said fumigant being substantially parallel to a longitudinal axis of said candle and wherein said fumigant is diffusible from said article when said coating is exposed to thermal energy from said candle when lighted.

16. In combination, the article of claim **10** and a candle, said surface bearing said fumigant being substantially parallel to a longitudinal axis of said candle and wherein said fumigant is diffusible from said article when said coating is exposed to thermal energy from said candle when lighted.

17. In combination, the article of claim **11** and a candle, said surface bearing said fumigant being substantially parallel to a longitudinal axis of said candle and wherein said fumigant is diffusible from said article when said coating is exposed to thermal energy from said candle when lighted.

18. In combination, the article of claim **1** and a candle, a longitudinal axis of said surface bearing said fumigant being substantially parallel to a longitudinal axis of said candle, and wherein said fumigant is diffusible from said article when said coating is exposed to thermal energy from said candle when lighted.

19. Article according to claim **1** in which said fumigant is in an amount of about 0.2 – 8 weight percent based on the weight of the binder.

20. Article according to claim **19** in which the fumigant is about 2.5 – 3.5 weight percent.

21. Article according to claim **20** in which the fumigant is about 3 weight percent.

22. Article according to claim **2** in which said cylinder has a diameter of about 3 – 10 cm.

23. Article according to claim **22** in which said diameter is about 5 – 7 cm.

24. Article according to claim **1** in which said fumigant is an encapsulated liquid.

25. Article according to claim **24** in which said fumigant is microencapsulated in a gelatin.

26. Article according to claim 1 in which said fumigant diffuses into surrounding atmosphere by vaporization or sublimation after exposure of said article to the thermal energy from a lighted candle.

27. An article of manufacture comprising a substrate, a coating on at least part of at least one surface of said substrate, said coating consisting essentially of a mixture of:

a. at least one fumigant;

b. at least one carrier in particle form selected from the group consisting of calcium sulfate, talc, silica gel, dicalcium phosphate, kaolin, titanium dioxide, iron oxide and bentonite; and

c. a binder having a melting point of about 100° to about 300°C, wherein said binder is a polymer of methyl acrylate, ethyl acrylate, n-butyl acrylate, methyl methacrylate, isobutyl acrylate, t-butyl acrylate, 2-ethyl hexyl acrylate, 2-ethoxyethyl acrylate, 2-hydroxy propyl acrylate, ethyl methacrylate, butyl methacrylate or a copolymer comprised of said monomers, and further wherein said fumigant is diffusible from said article into surrounding atmosphere upon exposure of said article to the thermal energy of a lighted candle.

28. Article according to claim 27 in which said fumigant is an incense, perfume, medicament, insecticide or insect repellent.

29. Article according to claim 28 in which said coating has a thickness of about 1 – 5 mm.

30. An article according to claim 29 in which said substrate is of hollow cylindrical shape having an inside diameter of about 3 – 10 cm.

31. Article according to claim 30 in which said substrate is frosted glass.

32. Article according to claim 31 in which said coating contains a plasticizer for said binder.

33. Article according to claim 31 in which said fumigant is an encapsulated liquid.

34. Article according to claim 33 in which said fumigant is microencapsulated in a gelatin.

35. Article according to claim 28 in which said fumigant is present in an amount of about 0.2 – 8 weight percent based on the weight of the binder.

36. In combination, the article of claim 27 and a candle, a longitudinal axis of said surface bearing said fumigant being substantially parallel to a longitudinal axis of said candle, and wherein said fumigant is diffusible from said article when said coating is exposed to thermal energy from said candle when lighted.

37. In combination, the article of claim 31 and a candle, a longitudinal axis of said surface bearing said fumigant being substantially parallel to a longitudinal axis of said candle, and wherein said fumigant is diffusible from said article when said coating is exposed to thermal energy from said candle when lighted.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,898,039 Dated August 5, 1975

Inventor(s) Lin, Tong Joe

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The address of patentee is as follows:

628 Enchanted Way
Pacific Palisades
California 90272.

Signed and Sealed this

Thirteenth Day of July 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks