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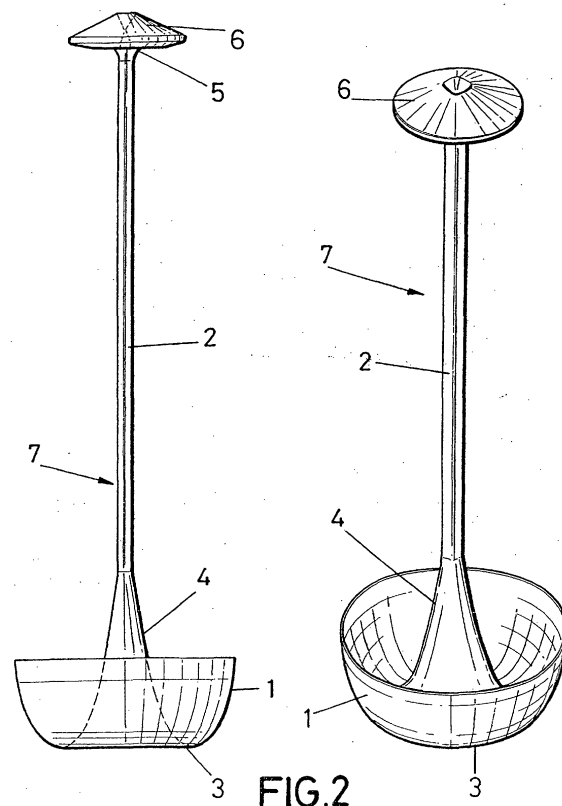
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(54) **METHOD FOR PRESERVING PERISHABLE PRODUCTS, ESPECIALLY FLOWERS, FRUITS AND VEGETABLES, AND CORRESPONDING DEVICE**

(57) The process and corresponding device are designed to preserve perishable products, especially flowers, plants, fruits and vegetables, and it consists of the continual generation of a flow of treated air, free of exogenous ethylene, with the desired uniform levels of temperature and humidity, and its channelling through a diffuser/container device in which the final product will be clustered in the form in which it will be displayed and sold/bought, such that there is a continual renewal of the air surrounding the product, and the endogenous ethylene is removed avoiding its accumulation and fixation, so that the product is subjected to the desired environmental conditions. This functions are performed permitting simultaneously the continuous display of the product, without any barrier standing between product and public/potential client. As an additional function, the process permits the treatment of products with pulverised or gaseous chemical compounds, with no additional handling required.



Description**OBJECT OF THE INVENTION**

[0001] The invention relates to a process for the preservation of flowers, plants, fruits and vegetables, among other perishable products, hereinafter generally denominated "product", being such process based upon the subjection of said product to a flow of treated air, free of exogenous ethylene, with the desired temperature and humidity and with no need for chambers.

[0002] It is the object of the invention to provide a process that permits a more lasting preservation of the products and the simultaneous display of such products with no barriers between them and potential customer.

[0003] It is also an object of the invention to provide the device for carrying out the process for preservation of the products, by which a steady flow of treated air is distributed and channelled to each one of the products and diffused throughout them.

BACKGROUND OF THE INVENTION

[0004] The main causes for deterioration of perishable products in general, flowers, plants, fruits, vegetables, meat and fish in particular are:

- The colonisation and/or growth of undesirable bacteria and fungi in the product.
- The excessive loss of water of the product.
- The ripening or senescence and/or rotting thereof, accelerated by both endogenous and exogenous ethylene.

[0005] In the current state of the art, the processes for preservation of perishable products, aimed at keeping them in their natural state and with their physicochemical characteristics unaltered, have been based mainly on:

a) The cooling of products, to slow down (with the cooling) or to stop (by freezing) metabolic processes, of both the products themselves and the fungi and bacteria which might infect them, and which as a whole are responsible for the ripening or senescence and rotting of perishable products.

The current state of the art manages to perform this function by means of placing the products in cold chambers or containers, with or without forced air circulation, with or without windows to permit public display.

b) In the case of flowers, plants, fruits, vegetables, etc, by keeping high levels of humidity in the products in order to avoid water loss, since water loss causes decay and subsequent senescence.

The current state of the art achieves this function by treatment of the air in the aforementioned chambers, using evaporators or any other similar

means to increase the relative humidity of air to the desired levels.

c) The filtration of air of the chambers to reduce contamination by spores, bacteria and other contaminating elements.

The current state of the art has used sets of filters to carry out said functions, among others those based upon the ozonization of air and those using UV rays for elimination of fungi and bacteria.

d) The control of ethylene: Ethylene is a gas that is generated during the senescence/ripening and rotting processes, combustion processes in general, soldering activities, etc., which once in contact with flowers, plants, fruits, vegetables, among other perishable products, starts a set of physiological reactions which in turn generates more ethylene that itself causes senescence/ripening of the flowers/fruits, and their subsequent rotting.

[0006] Thus, being at the same time cause and effect of senescence, ripening and rotting, its presence rapidly sets off a chain reaction. For this reason, control of ethylene is essential for the preservation of flowers, plants, fruits and vegetables among other perishable products.

[0007] In order to control the accumulation of ethylene, and its generation and/or fixation in plants, the current state of the art has focussed on two approaches:

- The creation of air filtering systems that separate and fix the ethylene in scrubbers, thus avoiding the accumulation of this gas in warehouses, chambers, etc.
- The creation of substances that inhibit the production and/or prevent assimilation of ethylene.

[0008] These compounds can be divided into two types:

1) Those that inhibit endogenous production of ethylene, such as aminoethoxyvinylglycine (AVG) and 2-aminoxyacetic acid (AOA). These are the compounds preferably used for the conservation of fruits.

2) Those that prevent the fixation of ethylene, either endogenous or exogenous, thus preventing/inhibiting the activation of negative responses of flowers, plants, fruits and vegetables to this gas.

[0009] The chemical compounds that achieve these results are divided into two families:

- STS (silver thiosulphite): Highly toxic chemical compound that dissolved in water is used in the treatment of flowers and plants. It is mainly used in the cut flower industry.
- 1-MCP (1-methylcyclopropene), gaseous chemical

compound, recently introduced in the US market for the treatment of plants and flowers in warehouses, cold chambers, etc. Based on the negligible toxicity of this gas (as stated in the E.P.A. report -CAS Registry Number 3100-04-7; OPP Chemical Code 224459; Registration Eligibility Document: Environment Protection Agency, April 1999; USA) on April 1999 the US administration has authorised the marketing of a product in the form of a powder, which in suitable combination with water gradually releases the aforementioned gas for the treatment of flowers and plants.

DESCRIPTION OF THE INVENTION

[0010] The process that is put forward has been conceived to solve the problem posed in the previous section, being its purpose to preserve flowers, plants and vegetables, among other perishable products, in their best conditions, and to make possible their simultaneous display with no barriers between said products and the potential customer.

[0011] The process has been conceived to perform the following functions:

- The subjection of product to a controlled atmosphere, with adjusted relative humidity and temperature, and free of exogenous ethylene. The relative humidities comprised between 90% and 95% and temperatures comprised between 0°C and 12°C, depending on the type of product.
- The displacement of endogenous ethylene from the product (flowers, plants, fruits and vegetables, etc) to avoid contact or to reduce the time in which said gas is in contact with the products.
- The performance of previous functions such that products can be displayed with no barriers between them and potential customers, and so that the products are visible to potential customers at any time. And to serve such purpose, products shall not be enclosed in any chamber or container.

[0012] As a secondary function, the products can be optionally treated with either pulverised or gaseous chemical compounds, thus reducing the number of handlings to which products are subjected or avoiding additional handlings at all.

[0013] The principle upon which the process is based is that of placing the product within a steady flow of air in order to subject that product to a controlled atmosphere in constant renewal.

[0014] Such principle differs from the usual practice of placing the product in a closed chamber or container with a controlled atmosphere inside.

[0015] Said principle is developed by means of a device that permits the product(s) to be placed in a flow of air of the required characteristics. Consequently, the air in contact with the product is constantly renewed and

replaced by clean, humid, cool air free of ethylene. Thus, besides the cooling and the preservation of humidity of the product, the endogenous ethylene that may be generated is immediately displaced and any possible concentration of ethylene in the air surrounding the flowers, plants, fruits or vegetables is removed.

[0016] Therefore, as product is not enclosed in a chamber or container, it can be shown and displayed without any type of physical barrier between the product itself and the potential customer.

[0017] Furthermore, this principle changes the sequential order in which the treatment and cooling of said type of products are carried out for their conservation.

[0018] The usual practice is to cool the entire chamber or container and the air within so that the products inside are submitted to a controlled atmosphere, whereas on the grounds of the process of the invention, the air itself is cooled and processed and then it is channelled directly to the products. Finally, when its main task is completed, it is the user who depending on his needs and preferences, decides whether to reuse the air for the cooling of the chamber or room or to dispose of it.

[0019] Therefore, it may be said that the process of the invention comprises three fundamental phases, which are as follows:

1. The generation of a volume of treated air that complies with the established specifications and its setting in motion to create a flow.
2. The distribution of this volume of treated air among the number of products to be treated, preserved and displayed.
3. The channelling and the diffusion of this flow of air throughout the entire product, by means of a device in order to provide a constant renewal of all the air surrounding the product.

[0020] Thus, by means of the process of the invention, the preservation functions are developed unlike the usual practice does, so that extra functions are as well developed with the consequent added value.

[0021] The three fundamental phases stated above are carried out using appropriate means, some of which are known to the current state of the art.

[0022] In the first described phase, for example, a steady flow of treated air can be generated by means of a fan, compressor, exchanger, evaporator, etc. Thus, any means, complement and/or mechanism will be suitable if they are able to generate a flow of air of an adjustable volume and rate and to maintain the desired range of temperature and relative humidity, depending on the type of product. Air filters such as ozone filters, filters with UV rays, etc., may be used to eliminate dust, bacteria and spores. Besides, ethylene scrubbers may be used to eliminate ethylene.

[0023] The second phase (the distribution of the flow of air among the products), is carried out by means of an expansion vessel. Thus, the processed flow of treat-

ed air is conveyed to an expansion vessel with the appropriate shape and dimensions, which will distribute said flow of air among the units of product to be preserved and displayed.

[0024] For this purpose, said expansion vessel will be completely airtight except for the intake of treated air and a number of outlets given by the number of products to be preserved and displayed; through said outlets treated air will flow outwards from the inside of the expansion vessel. The volume of treated air produced in the previous phase should be proportional to the number of outlets and their diameter in order to sustain, inside the expansion vessel, the pressure necessary to maintain the desired output of treated air flowing at the desired rate. Devices fitting outlets will be fixed on the outside of expansion vessel to secure the products and permit their display.

[0025] In a practical example of preservation and display of flower bouquets, it is foreseen the inside of the bouquet stand itself to be the expansion vessel giving the outlets for treated air on the outside of the stand, a conical shape in high relief on the surface of said stand. Thus, apart from channelling the treated air, that cone-shaped outlet works as a male support for the diffuser/container, a device that will be described later.

[0026] In this example, the external part of this expansion vessel has been furnished with the above mentioned conical supports on which, by means of the diffuser/container device, products rest on by gravity. Anyhow, said external supports can be different in size and shape and with a different securing/fastening mechanism according to the final product to be preserved and according to the way and the leaning angle it will be displayed.

[0027] As for the means for carrying out the third fundamental phase of the process, the corresponding device consists of a diffuser/container. In the first place, such device collects the flow of treated air described in the previous phase and distributes it throughout the entire product to be preserved and displayed, in such a way that all air surrounding the product is constantly displaced and renewed by the flow of treated air. And in the second place, the device supports the product in the stand so as to make it easily and completely perceptible (or partially if desired), attractive and ready to be bought.

DESCRIPTION OF THE DRAWINGS

[0028] For a further description and a better understanding of the features of the invention, and according to an example of a preferred embodiment thereof, this specification is completed with a set of drawings in which, for illustrative purposes and in no way limiting, the following has been represented:

Figure 1: Shows a representation according to a perspective view of an expansion vessel/stand with the three practical examples of embodiment of the

diffuser/container along with an example of an embodiment for boxes of fruit, vegetables or greens.

Figure 2:- Shows a representation according to a side elevation view and a perspective view of a diffuser/container, the device that diffuses the flow of treated air throughout the product while displaying it. In this example, the product is a ready-made bouquet of cut flowers for sale.

Figure 3:- Shows another side elevation view as well as another perspective view of an alternative embodiment of the diffuser/container represented in Figure 2, in this case buckets for conditioning and preservation of cut flowers.

Figure 4:- Shows another alternative embodiment of the diffuser/container, in this case adapted for a flower pot.

Figure 5:- Shows a representation according to a perspective view, a lower plan view and a main side view of the example of the embodiment for boxes of fruit, vegetables and greens.

PREFERRED EMBODIMENT OF THE INVENTION

[0029] In accordance with the process of the invention, the preservation (and simultaneous display if desired) of flowers, plants, fruits and vegetables, among other perishable products, is achieved on the grounds of three fundamental phases of the process.

[0030] The first phase corresponds to the generation of a volume of treated air that complies with the established specifications, and its setting in motion to create a flow.

[0031] The second phase corresponds to the distribution of that volume of treated air among the number of products to be preserved and displayed by means of an expansion vessel/stand.

[0032] And the third phase, corresponds to the channelling of that flow of air and its diffusion throughout the product by means of a diffuser/container, so that all the air in contact with the product is constantly displaced and renewed.

[0033] More specifically, the process of the invention is fundamentally focussed on the second and third aforementioned phases: the distribution of a volume of treated air among the number of products to be preserved by means of an expansion vessel/stand, the channelling of the resulting flow and its diffusion throughout the product by means of a diffuser/container.

[0034] The diffuser/container shown in the aforementioned figures performs distinctive functions at the same time. On the one hand the diffuser/container collects the flow of treated air from the expansion vessel/stand, and channels and diffuses it throughout the product to be preserved and displayed so that all the air surrounding the product is constantly displaced and renewed by the steady flow of fresh treated air. On the other hand the diffuser/container holds the product on the expansion vessel/stand so as to make it easily and completely per-

ceptible (or partially perceptible if so desired), attractive and ready to be bought/consumed.

[0035] Thus, as shown in the drawings, said diffuser/container [(7) or (7') or (7'')] consists of a receptacle [(1) or (1') or (1'')] of variable size and shape, ready to contain the product. Such receptacle [(1) or (1') or (1'')] is the origin of a hollow shank/duct [(2) or (2') or (2'')] of variable size and shape.

[0036] The shank/duct [(2) or (2') or (2'')] conveys treated air and, by means of a set of outlets arranged along same shank/duct [(2) or (2') or (2'')], it diffuses said treated air throughout the product. The outside of the shank/duct [(2) or (2') or (2'')] may have borders, hooks, profiles and/or any other suitable means to secure the product.

[0037] The bottom part of the shank/duct [(2) or (2') or (2'')] is connected to the outer part of the base forming a cavity of variable shape and size. Such cavity permits to secure the diffuser/container [(7) or (7') or (7'')] to the expansion vessel/stand (8) and creates a stable channel to convey the treated air from said expansion vessel/stand (8) to the shank/duct (2) and then to the product itself.

[0038] Specifically, as shown in figure 2, the diffuser/container (7) designed for bunches of flowers shows on its outer part a receptacle (1) of hemispherical shape with a flattened base (3), where the stems of the flowers are to be placed.

[0039] Erected upon the centre of such a base (3) there is a cone (4) connecting the hollow shank/duct (2) which, among other functions, supports the flowers. The shank/duct (2) widens in its upper part and beyond that enlargement it ends in a top (6), where outlet (s) for diffusion of treated air may be placed.

[0040] In its internal part, the device has a truncated cone-shaped cavity, with an open top and bottom. The widest part of that cavity -the open bottom- points towards the lower part of the device and is open to the outside, while the narrowest part of such cavity -the open top- points towards the upper part of the device, and connects with the hollow shank/duct (2). This cavity will perform the functions of the female, so securing the product to the above described conical appendix of the expansion vessel/stand through which it receives the flow of treated air. Thus, the treated air is conveyed by the shank/duct(2) and it is then diffused throughout the product (bunch of flowers, greens, etc.) for a constant renewal of the air surrounding that product.

[0041] Said shank/duct (2) can end in one or more diffusers, according to the diameter and/or desired characteristics of the bunch.

[0042] Along the shank/duct (2) a suitable number of outlets can be located, depending such number on the desired rate of renewal of the treated air to which the stems of the flowers shall be subjected.

[0043] The enlargement of the upper top (6) should be located below the calyxes of the flowers in order to make it less perceptible. This location will provide a bet-

ter circulation of the treated air around the calyxes which are at the most distant point from the source of the air flow. That is important inasmuch as calyxes are the most sensitive to ethylene concentrations and they can be affected by adverse conditions much more easily than any other part of the flower. Besides, calyxes are the closest to the buyers and so the ones that can rouse greatest purchasing desire in the potential client.

[0044] Flowers will be clustered together with the diffuser/container (7) around the shank/duct (2), and the resulting bunch or bouquet will be kept in place by any suitable means, such as a string, rubber band, plastic film, etc. Thus, the diffuser/container (7) will be an integral part of the bunch or bouquet, and the bunch or bouquet will keep the usual appearance of an standard bunch or bouquet.

[0045] The diffuser/container (7) manages to diffuse the flow of air in a single direction when complemented with a wrapping of waterproof film or paper, which in its lower part will be fixed to the internal part of the receptacle by any thermal, chemical or mechanical means, wrapping up the flowers longitudinally and completely except for the upper top of the bunch, which will be left open.

[0046] This, apart from giving the appearance of a normal wrapping for a bunch or bouquet, permits the flow of air to be directed from the base of the bunch to the upper part and to be dislodged through the top, thus making possible the constant renewal of treated air to be efficient and ensuring that no part of the bunch is exposed to the external environment. And thus a better regulation of the desired temperature and humidity will be accomplished and exposure of flowers to exogenous ethylene will be avoided.

[0047] In the embodiment represented in figure 2, one of any possible shape of each one of the parts of the diffuser/container (7) is shown as a guide. However, each one of the parts of said diffuser/container (7) can be given its own shape according to any desired particular appearance or for any other reasons.

[0048] Thus, in figure 3, the diffuser/container (7') is shown for the preservation of cut flowers in wet buckets.

[0049] In this case, said diffuser/container (7') presents a receptacle (1') of larger size for housing the desired quantity of flowers, and although it maintains basically the same configuration as that illustrated in figure 2, its edges are extended up to the height of the top (6') of the shank/duct (2'), thus leaving a cavity which, in addition to the product, may contain water or solutions for the nutrition and preservation of the flowers and/or foliage or plants.

[0050] In addition, the air outlets should be located in the upper part of the shank/duct (2') and should ensure that the level of water does not surpass them. In this case, the diffuser/container (7') may be provided with a valve, tap, key or cap on its base (3') to displace by gravity the water or solution it might contain.

[0051] The conical part (4') erected upon the afore-

mentioned base (3') couples on the expansion vessel/stand (8), and the shank/duct (2') has been extended up to the height of the receptacle itself (1').

[0052] If necessary, the use of this diffuser/container (7') permits the re-conditioning of the flowers and/or foliage by using water, at a temperature (approximately 20°C) that will be different to the temperature of the air treating flowers, and thus helping the stems to absorb the re-conditioning solution more easily while the rest of the flower/foilage keeps the desired temperature.

[0053] This version of the diffuser/container (7') is applicable both to products being displayed and to products in transit by means of the creation of an expansion vessel and support adapted to the vehicle that transports the products, in which case the means used for generating the flow of treated air will be electrically or mechanically propelled by the engine or engines of the vehicle, a combination which makes possible the display of products in the same container they are being transported.

[0054] In figure 4, another variation of the diffuser/container (7'') is shown, in this case adapted to plant or flower pots that for any reason need to be submitted to a controlled atmosphere: sensitivity to ethylene, maintenance requirements or specific atmospheric parameters necessary to attain flowering stage, among others.

[0055] As in above described embodiments, the diffuser/container (7'') consists of a receptacle (1'') with a conical part (4'') erected upon its base (3'') from which the shank/duct (2'') is originated. The receptacle (1'') is lower than the shank/duct (2'') itself. Depending on the characteristics of each plant or the quantity of earth, humus, etc. to be used, this receptacle (1'') will be lower or higher, and the shank/duct (2'') will be increased or reduced to adjust it to the desired height.

[0056] This particular embodiment may be complemented too with a wrapping of waterproof film or paper which in its lower part will be fixed to the internal part of the receptacle by any suitable means.

[0057] Finally, in figure 5, an example is shown of the embodiment of the diffuser/container (7) adapted to boxes of fruits, vegetables and greens (9), as these products are ever more frequently selected to comply with specific parameters of size, shape and calibre, and so the diffuser/container (7) can be also adapted to fruit and vegetables.

[0058] The receptacle will have the form of a box (9), with the necessary number of shanks/ducts (2) uniformly distributed throughout it; shanks/ducts will be similar to those described in the previous examples and figures (figures 2, 3 and 4), so that each fruit is contained in the clear space between two shanks/ducts, with the particular feature that the shanks/ducts (2) are in this case slightly lower than the receptacle or box (9) and they are provided with the air diffusion outlets preferably along them and not in the top; those shanks/ducts (2) are connected at the bottom to an expansion vessel (10) that collects and distributes the treated air; and such expansion

vessel (10) is furnished with the corresponding conical parts (11), low at their bases, for connection with the expansion vessel/stand itself (8).

[0059] These boxes (9) may be also duly adapted for preservation of fish with the corresponding distribution of diffusers/containers (7).

[0060] The boxes (9) have a flange so that they can be stacked up. Thus, preservation will be possible, both by the traditional method (cold chamber) and by the method or process proposed for the display thereof.

Claims

1. A process for preservation of perishable products, especially flowers, plants, fruits and vegetables, **characterised in that** it consists of subjecting the product (flowers, plants, fruits and vegetables) to a controlled and constantly renewed atmosphere, free of exogenous ethylene, simultaneously removing the endogenous ethylene to prevent contact or to reduce the time said gas is in contact with the product; all this to be carried out by the distribution, as a flow, of a volume of treated air (controlled atmosphere) among the number of products to be preserved, and by the channelling of that flow of treated air directly to the product by means of a diffuser/container [(7) or (7') or (7'')]; thus, the preservation of the product is achieved together with its free display and with no barriers between the product itself and the potential client.
2. A process designed for preservation of perishable products, especially flowers, plants, fruits, vegetables, etc. according to claim 1, **characterised in that**, after its distribution and channelling to each product, the flow of treated air is diffused throughout the product, whether it be flowers, plants, fruits, vegetables, etc., to achieve a constant renewal of the air in contact with the product.
3. A process designed for preservation and display of perishable products, especially flowers, plants, fruits and vegetables, according to claim 1, **characterised in that** it, optionally, can make possible the subjection of products to treatment using pulverised or gaseous chemical compounds avoiding additional handlings.
4. A device for preservation of perishable products, especially flowers, plants, fruits and vegetables, according to the previous claims, **characterised in that** it consists of a diffuser/container [(7) or (7') or (7'')] in which the product will be displayed and sold, that collects the flow of treated air coming from the expansion vessel/stand (8); diffuser/container [(7) or (7') or (7'')] that consists of a receptacle [(1) or (1') or (1'')], and a vertical hollow shank/duct (2) or

(2') or (2'') originated in the base [(3) or (3') or (3'')] of that receptacle [(1) or (1') or (1'')], designed to receive the product (flowers, plants, fruits, vegetables, etc), and whose central part] consists of a conical cavity [(4) or (4') or (4'')] acting as a joint between the shank/duct [(2) or (2') or (2'')] and the receptacle [(1) or (1') or (1'')], to collect the flow of treated air coming through the base [(3) or (3') or (3'')] of the receptacle [(1) or (1') or (1'')] from the expansion vessel/stand (8), and to convey that treated air to the shank/duct [(2) or (2') or (2'')] and to secure the entire diffuser/container [(7) or (7') or (7'')] together with the product to the expansion vessel/stand (8); the shank/duct [(2) or (2') or (2'')], that in its bottom is coupled to the receptacle [(1) or (1') or (1'')] by the above described conical part [(4) or (4') or (4'')] and that has an enlargement [(6) or (6') or (6'')] in its top, conveys the flow of treated air and, together with the entire receptacle, secures the product to the expansion vessel/stand (8) so as to make it easily and completely (or partially if desired) perceptible and ready to be sold, having been the device also designed to be used for only one purpose at a time, either for preservation or for display.

5. A device for preservation of perishable products, especially flowers, plants, fruits and vegetables, according to claim 4, **characterised in that** the shank/duct [(2) or (2') or (2'')] is hollow, that it is designed to convey treated air towards the product and throughout it, by means of outlets and that it can be complemented with other elements for supporting product, with the particular feature that the shank/duct has outlets for treated air and the enlargement [(6) or (6') or (6'')] in the upper top may have outlets and diffuser(s).
6. A device for preservation of perishable products, especially flowers, plants, fruits and vegetables, according to claim 4, **characterised in that** in the embodiment adapted to boxes of fruit, vegetables and fish (9), it has the form of a box in the strict sense (9), with the number of necessary shanks/ducts (2) uniformly distributed throughout it, similar to those of the case of figure 2 for bouquets and bunches of cut flowers, so that each fruit or vegetable is supported/held/contained in the clear space between two shanks/ducts [(2) or (2') or (2'')], in this case slightly lower than the height of the box (9), provided with outlets for air diffusion all along except for the top, and connected at the bottom to an expansion vessel (10) provided with the corresponding conical parts (11) of little height at its base to connect with the expansion vessel/stand (8) itself that collects and distributes the treated air.

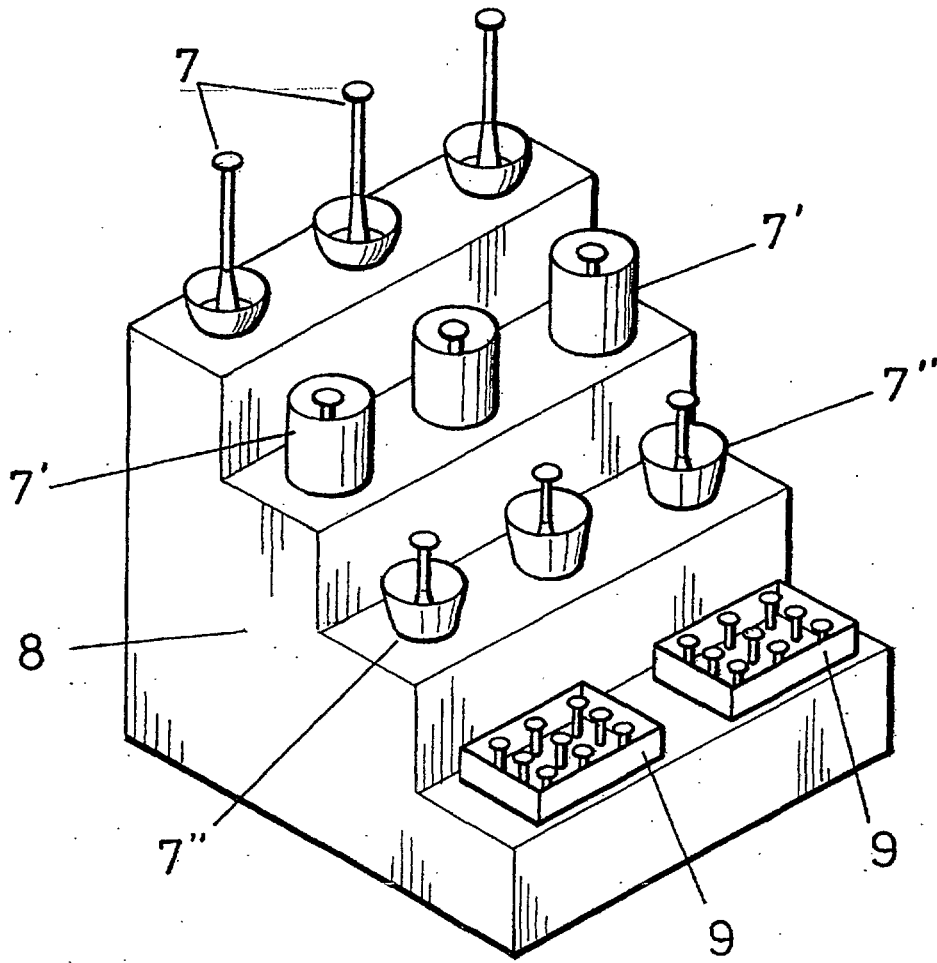


FIG. 1

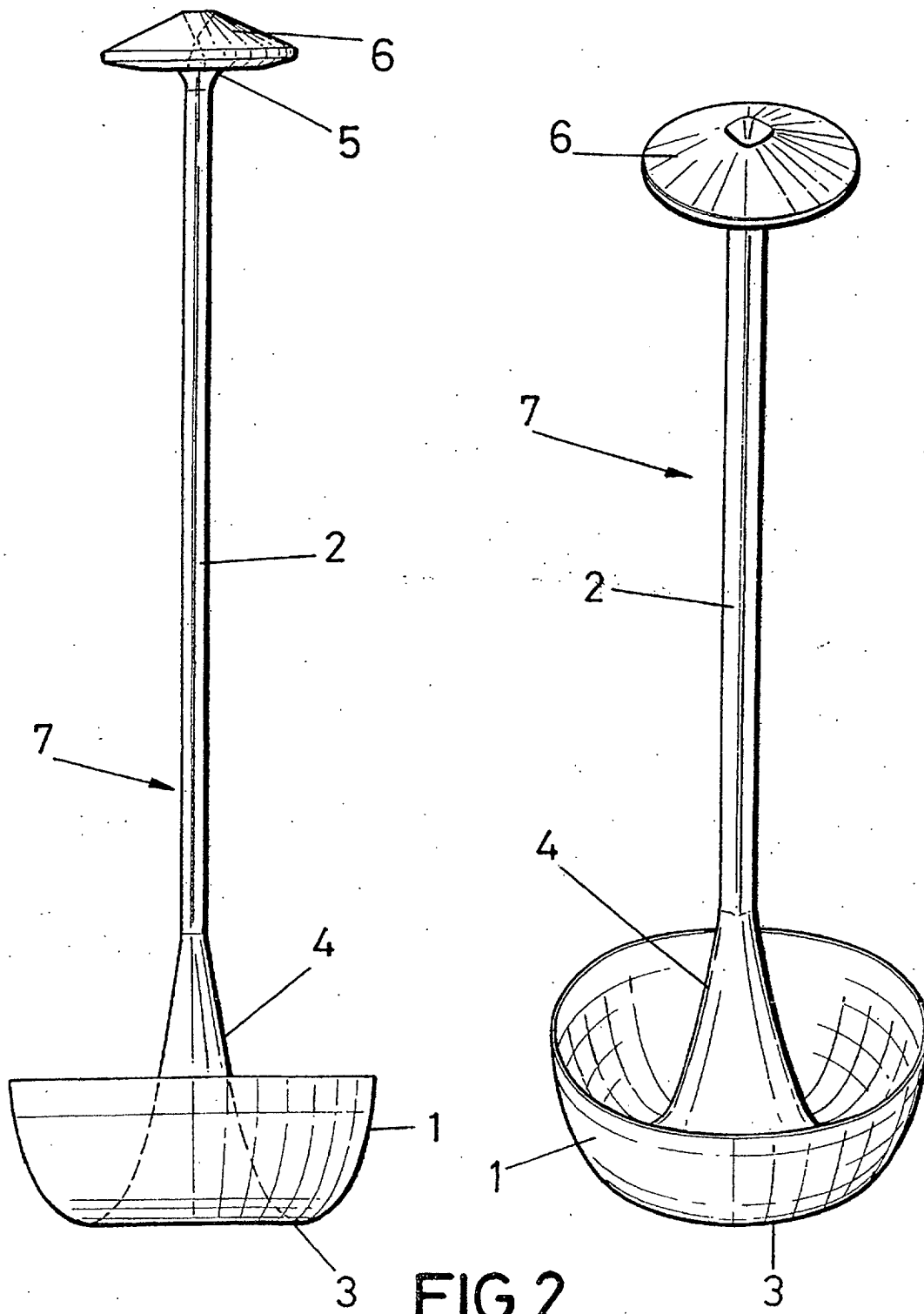
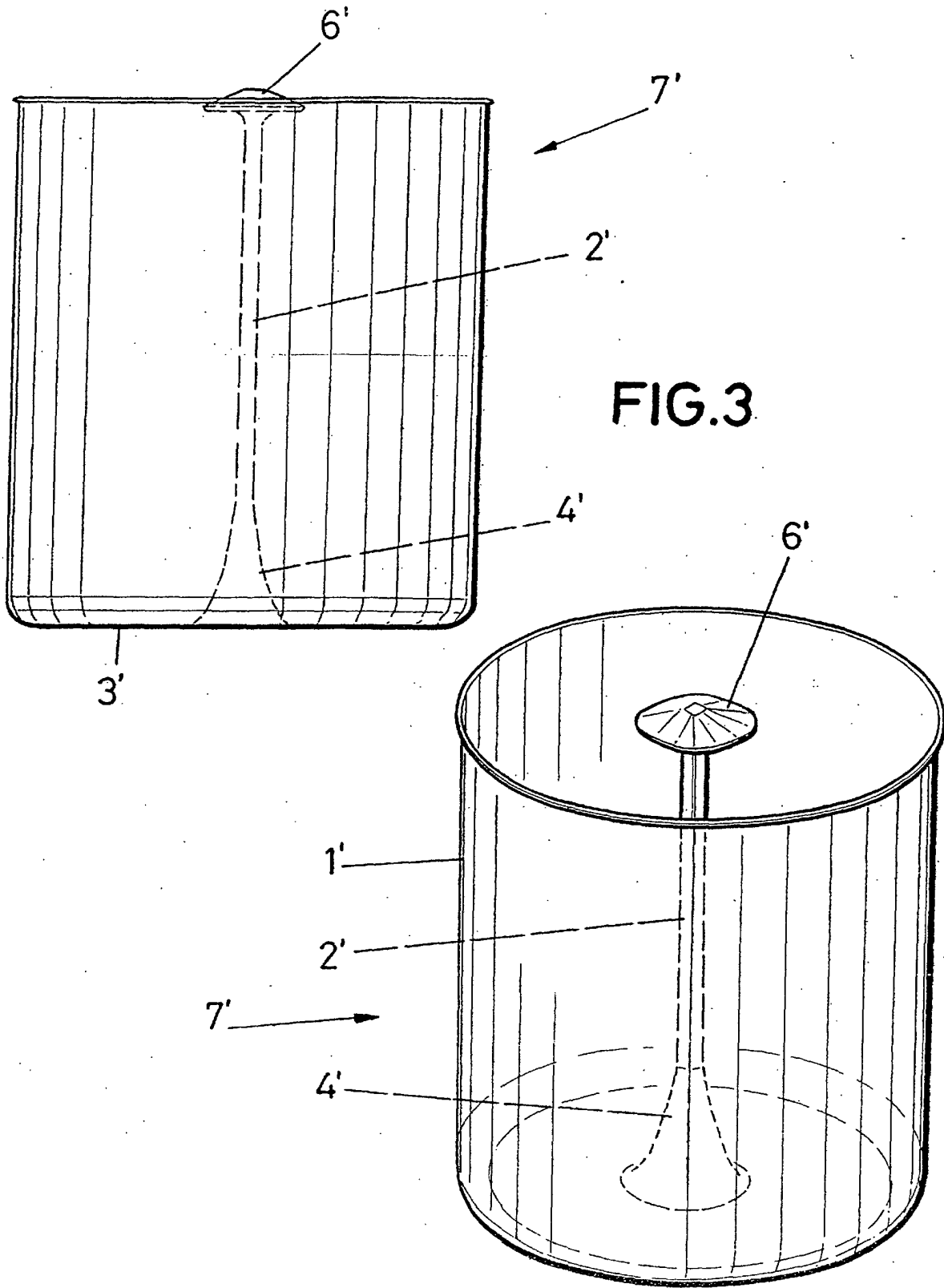
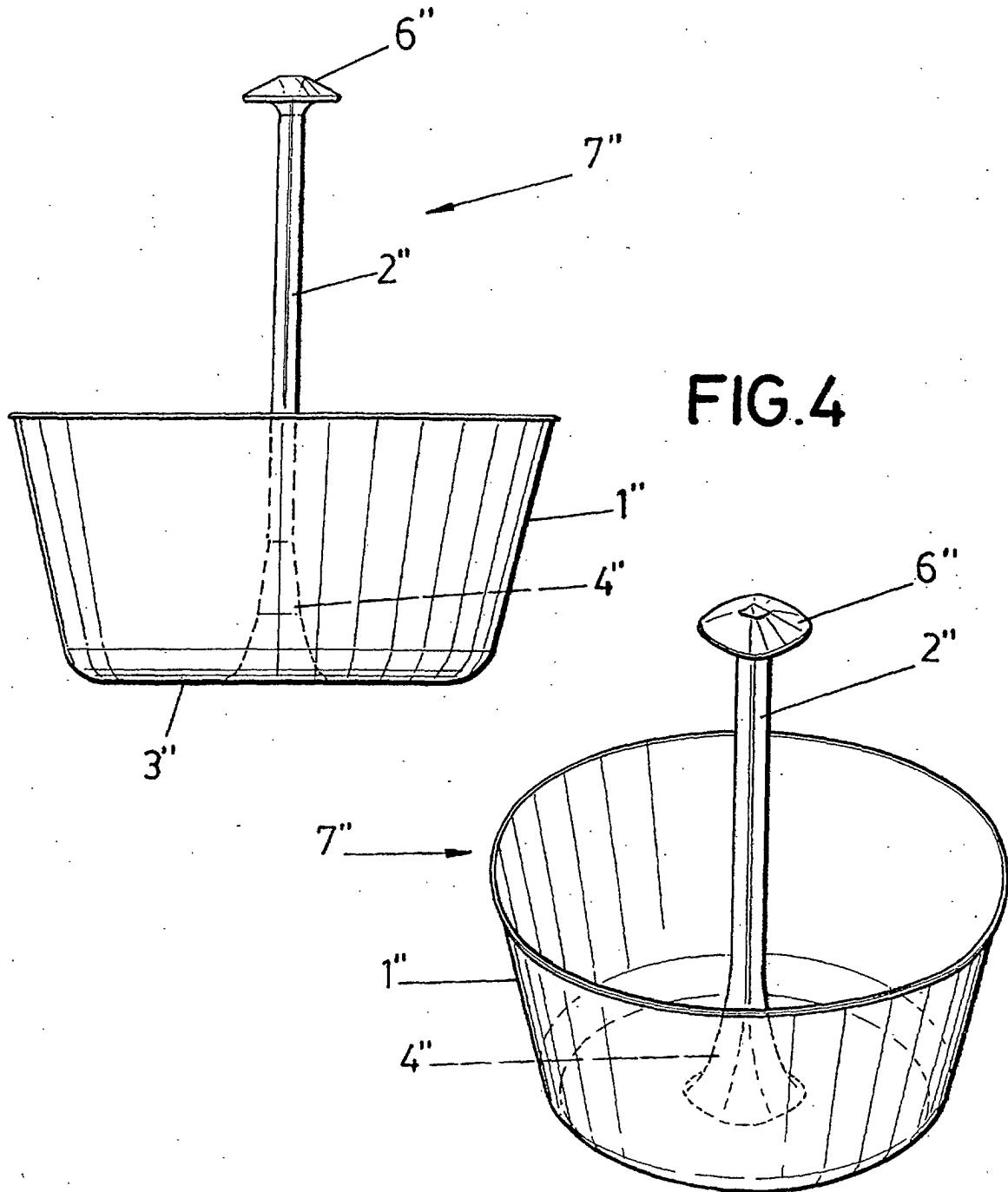


FIG.2





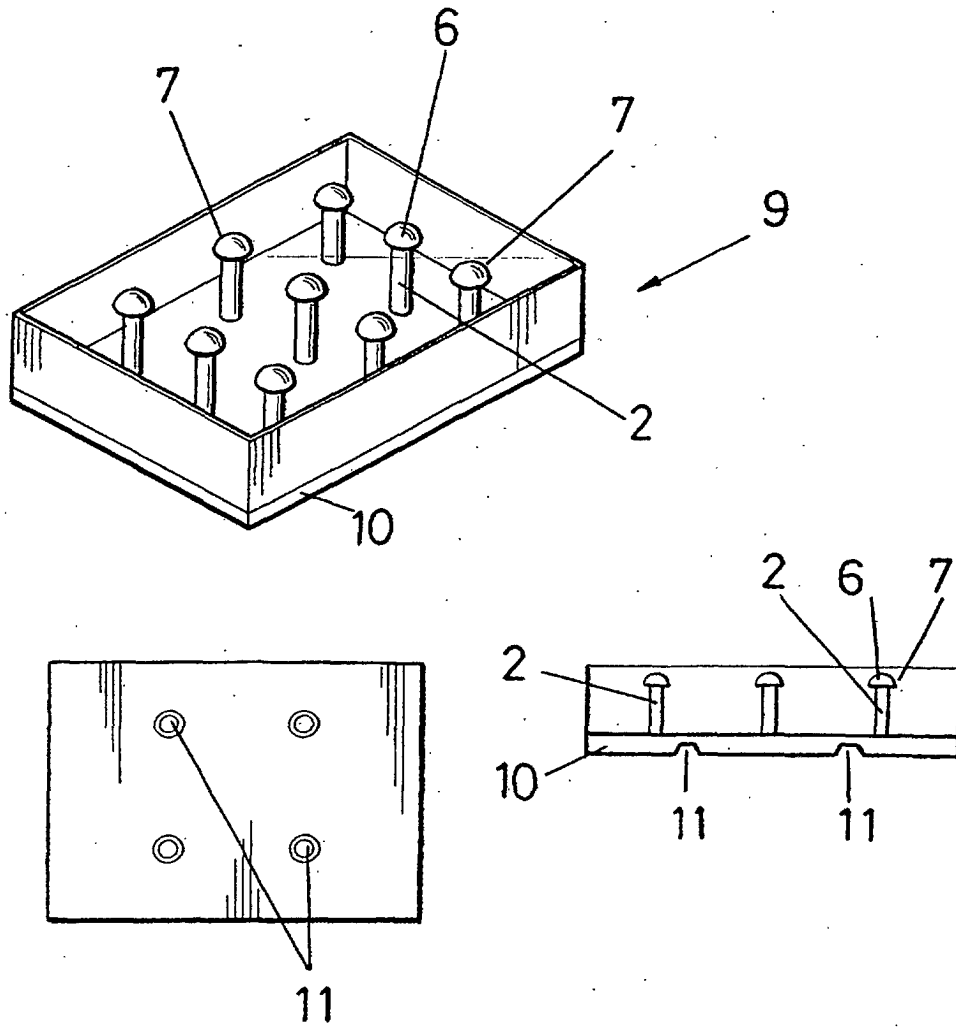


FIG.5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 00/00268

A. CLASSIFICATION OF SUBJECT MATTER		
IPC	A47F 3/04	
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC	A47F 3/04	
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
CIBEPAT, EPODOC		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5964512 A1 (BORGES). 12.10.1999. Figs	
A	US 5860289 A1 (WETZEL). 19.01.1999. Figs	
A	US 4953363 A1 (DRIMOZIC). 04.09.1990. Figs	
A	US 4608776 A1 (KOOY). 02.09.1986. Figs	
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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INTERNATIONAL SEARCH REPORT
 Information on patent family members

International Application No
 PCT/ES 00/00268

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