United States Patent [19]

Smith

[11] **3,711,023**

[45] **Jan. 16, 1973**

[54] DEVICE FOR CONTROLLING THE EVAPORATION OF VOLATILE SUBSTANCES PARTICULARLY FOR USE IN AIR CONDITIONING SYSTEMS

[76] Inventor: **Dean E. Smith,** 4649 North Dover Street, Chicago, Ill. 60640

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[21] Appl. No.: **128,277**

[52] **U.S. Cl.**.....**239/54,** 239/55
[51] **Int. Cl.**.....**A24f 25/00**
[58] **Field of Search**.....239/54, 55, 57

[56] **References Cited**

UNITED STATES PATENTS

3,410,488	11/1968	Sugimura	239/55
2,988,284	6/1961	Smith	239/54
2,103,609	12/1937	Bradburn	239/54

Primary Examiner—M. Henson Wood, Jr.
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Attorney—Hill, Sherman, Meroni, Gross & Simpson

[57] **ABSTRACT**

A method of creating odors in which the individual components from which the odor is to be formed, in volatile form, are stored in their own individual receptacles, controlled amounts of said components being released, by evaporation, from their individual storage receptacles, with the various evaporation products being subsequently intermixed to produce the desired odor by first intermixing individual evaporation products into respective streams of air and thereafter intermixing the respective streams of air to effect an intermixing of the various evaporation products therein contained, and a device for practicing such method employing means for producing a plurality of individual air streams, novel individual storage means for respective components to be employed in the creation of such odor, each individual storage means having means associated therewith for effecting a controlled release by evaporation of the associated stored component, such storage means being so arranged with respect to the air stream that the release of the evaporation products of each of the various stored components is effected into a different air stream, means being provided for effecting an intermixture of such air streams subsequent to the introduction therein of the various components.

26 Claims, 13 Drawing Figures

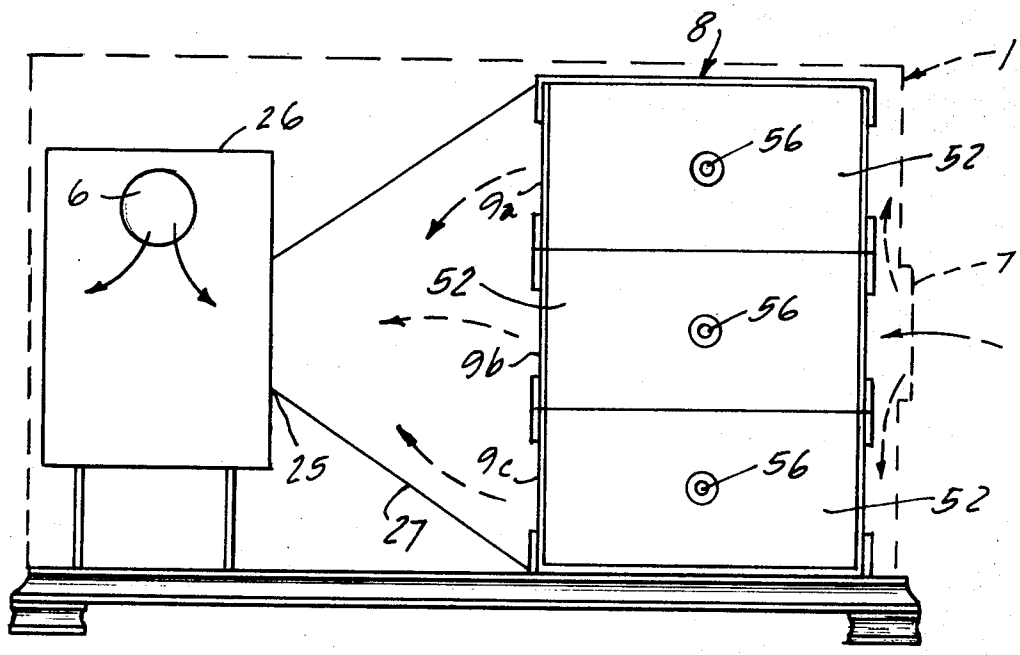

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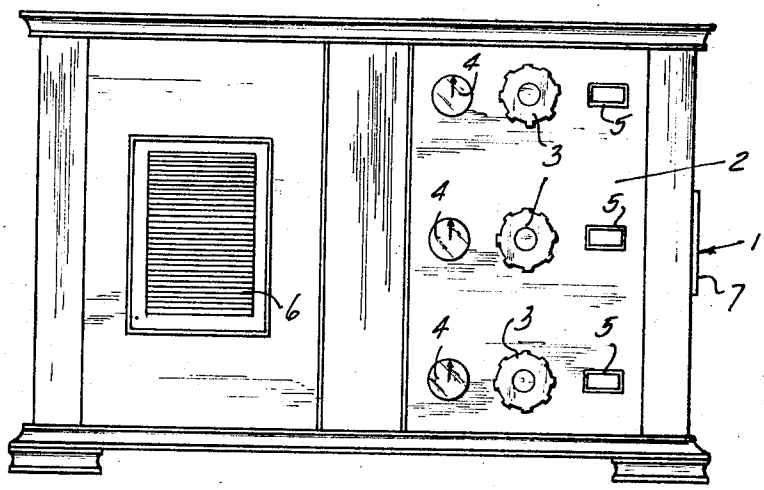
Fig. 1



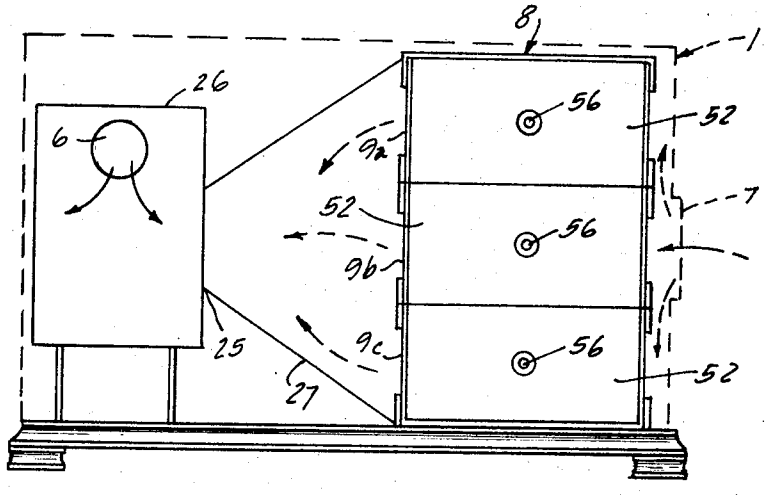
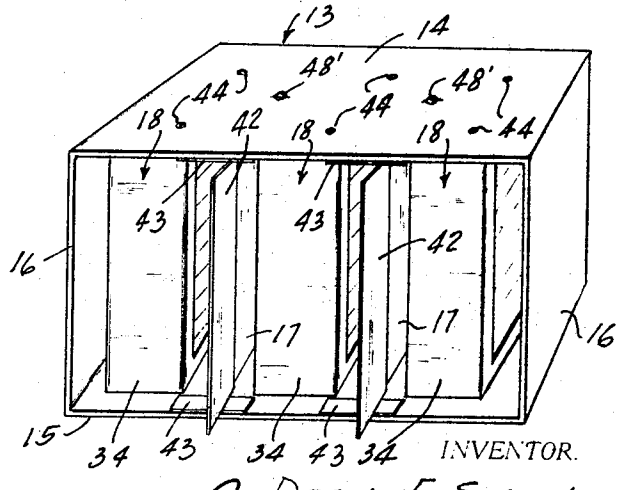


Fig. 2

Fig. 4



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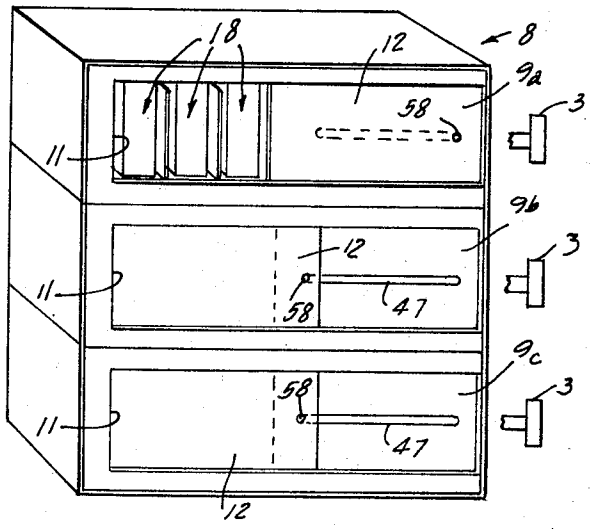

Fig. 3

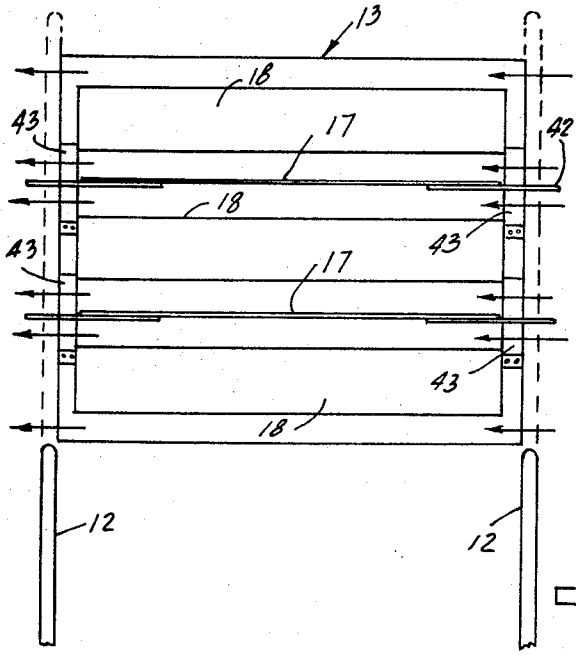

Fig. 8

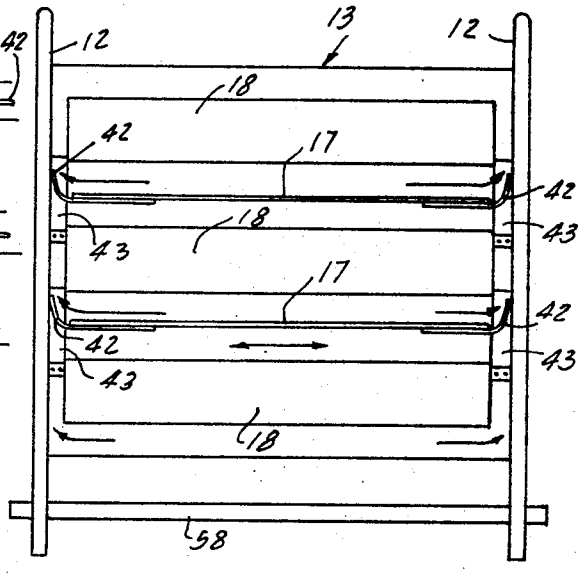

Fig. 9

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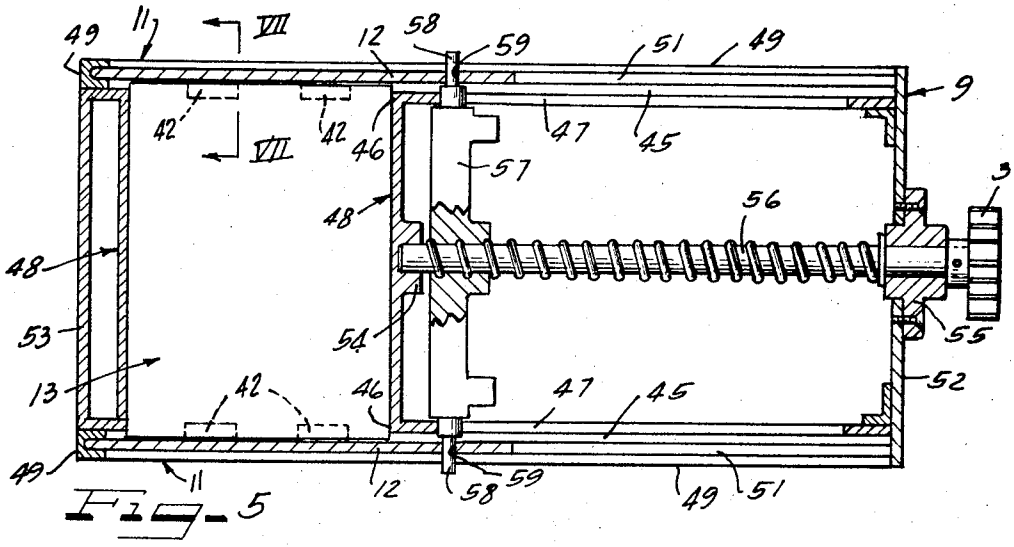

Fig. 5

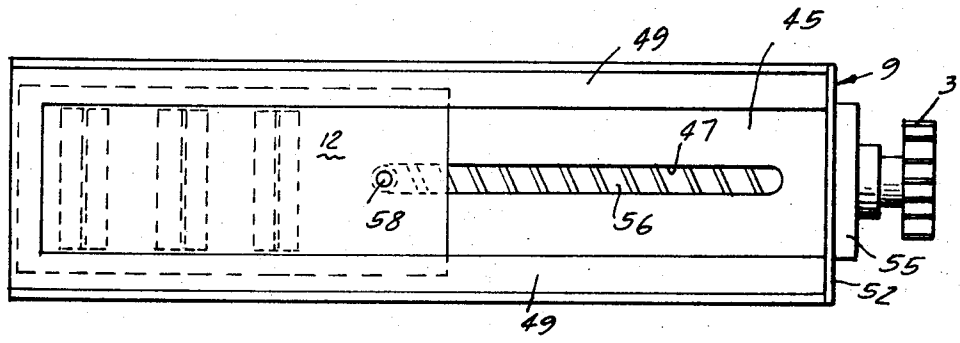

Fig. 6

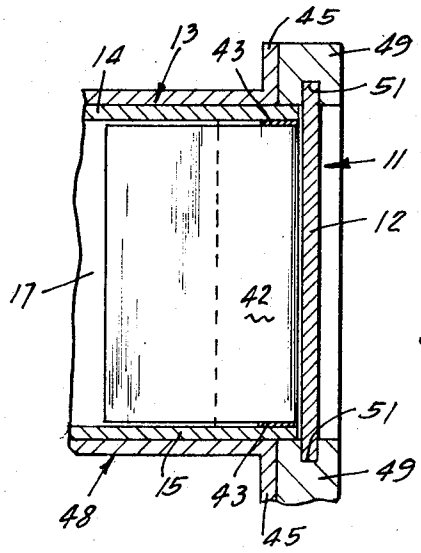

Fig. 7

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FIG. 10

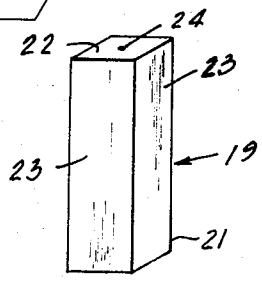


FIG. 11

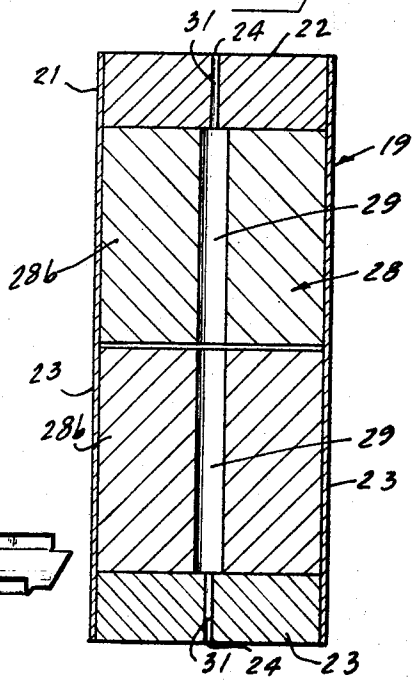
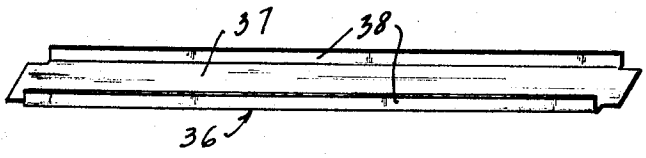


FIG. 13



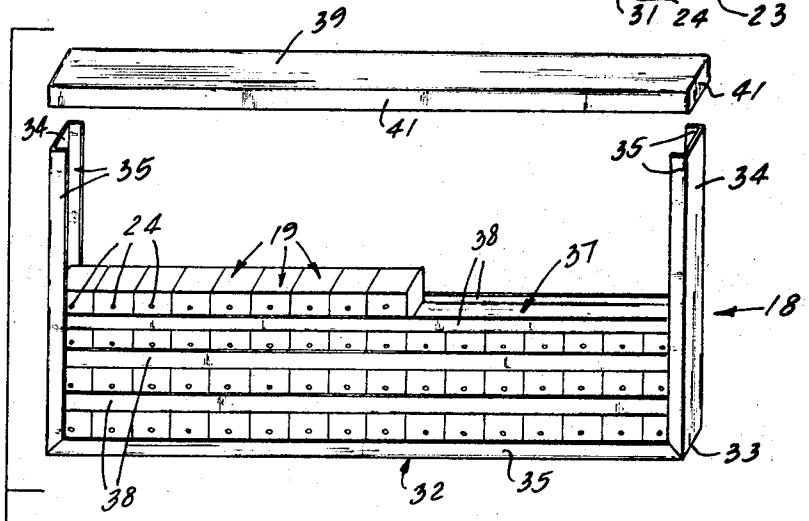


FIG. 12

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DEVICE FOR CONTROLLING THE EVAPORATION OF VOLATILE SUBSTANCES PARTICULARLY FOR USE IN AIR CONDITIONING SYSTEMS

BACKGROUND OF THE INVENTION

The invention is generally directed to the storage and dissemination of odor producing components, and more particularly to a method and apparatus for producing or reconstructing a natural odor or scent from a plurality of individual components to effect, if not an identical reproduction, a very close reproduction of the natural odor or scent, which heretofore could not be produced by currently employed techniques.

In the past, it has been common practice to produce various odors or scents in liquid or solid form, for example, a liquid perfume or the like. As is well known in the art, the production of a perfume may involve the blending of many individual components, the number of which may run as high as 100 or more. However, it will be particularly noted that in the production thereof the components are all intermixed. It has long been recognized that natural flower scents and the like involve various odor strains, entering into combination in the living bloom, which are often incompatible with one another when they come into contact with each other in liquid form. The same strains, however, in their volatile form will unite in the harmony which is recognized as the characteristic actual flower scent thus created and brought to completion in the process of its influorescence.

Consequently, mixtures of odor strains in liquid form must be limited to those which, when in such intermixed form, are compatible with one another, thereby imposing a severe limitation on the materials that can be used and in particular in attempting to employ the same materials in combination as may be involved in the natural flower. Furthermore, such limitation thus results in the manufacture of a liquid perfume or the like, in the substitution of other compatible components for the natural one whereby it is necessary to endeavor to arrive at a final "artificial" odor or scent which, so far as possible, will approach the natural. Thus, while it has been recognized that a combining of various odor strains entering, for example, into combination in a living bloom involve a combining of such strains in their volatile form, as distinguished from a liquid or solid form, no practical way of achieving the desired results has heretofore been available.

In my prior U.S. Pat. No. 2,988,284, issued on June 13, 1961, there is illustrated a device or structure by means of which the storage and controlled evaporation can be achieved of volatile substances such as those used in perfumes and the like to simulate or produce a desired scent or odor. More specifically, such patent disclosed the use of a porous relatively non-volatile structure containing a supply of a volatile aromatic substance therein, with such structure, in the form of a block, having a passageway or chamber therein, which might be deemed a "mixing passageway" for the contained volatile aromatic substance. Such passageway extended to at least one face of the block and communicated with the exterior thereof through a small opening. Emission from the block of the volatile aromatic substance was restricted to such opening by a shell enclosing the block and formed from a substantially impervious material, illustrated in the patent as comprising a coating on the block, the patent suggesting various materials which might be utilized in the formation of such a coating. As brought out in the patent, the construction is such that a controlled volatilization is provided over relatively very long periods of time. Likewise, it was also suggested in such patent that it might be possible to utilize normally incompatible substances in arriving at a desired odor which heretofore could not be suitably accomplished, by containing the incompatible substances in respective separate blocks and utilizing a group of blocks, as for example in a sachet, in an effort to achieve the desired results. However, subsequent experience has disclosed that interaction still takes place when blocks containing different components are intermixed in a close group.

The present invention is therefore directed to an apparatus, including an improved storage structure, by means of which the previous problems are overcome and the creation of scents from physically incompatible components may be precisely achieved to substantially duplicate a natural fragrance.

BRIEF SUMMARY OF THE INVENTION

It is an acknowledged attribute of aromatic compounds that they are almost universally composed of light, medium and heavier fractions which correspondingly evaporate quickly, moderately and more or less slowly from their original state in liquid form. The above referred to patent discloses a structure by means of which the disadvantages attendant to the utilization of evaporation may be overcome or minimized, the patented structure providing for a continual mixing of the evaporating fractions of an aromatic compound through a process of evaporation and recondensation in a mixing tunnel of a cellulose cube impregnated with the aromatic substance. The present invention is directed to a structure which makes use of these principles. Thus, by disposing a plurality of suitably constructed storage cells or units in a closed space of moderate dimensions and controlling the air flow through such space, a desired scenting of air can be controlled as desired. Likewise, by employing a series of closed spaces, each with its own supply of impregnated storage cells, with cells containing different volatile materials being disposed in different spaces, by control of the air flow through such respective spaces and in particular the intermixing of air discharged from such spaces a whole new field of odor creation is opened, enabling a substantially unlimited selection of components, compatible or incompatible, to be used in the creation of the desired odor.

Surprisingly, it has been found that, at the present stage of development, relatively small impregnated cells are preferable and that a relatively small quantity of cells will provide, in a structure embodying the present invention, adequate emission of the volatile substances to enable the scenting of a relatively large room or enclosure, at the same time distributing such emission over a surprisingly extended period before complete dissipation of the components. At the same time, an apparatus for the desired purposes may be readily constructed with relatively very small external dimensions, enabling the utilization of air moving

means, such as a centrifugal blower of very moderate capacity.

More particularly, the invention is also directed to the fabrication of storage structures or cells embodying the general principles set forth in the previously referred to patent, but which are so constructed that in addition to a relatively simple structure enabling the use of efficient production techniques, the resulting cell structure is vastly superior to the construction illustrated in said patent, in particular, in enabling accurate and uniform dimensioning of the cells and thus, in turn, the assembly of a plurality of cells into an accurately dimensional integrated structure. At the same time, storage cells constructed in accordance with the present invention are considerably more durable than those illustrated in the patent as in the present invention a metallic shell is utilized to encase the individual impregnated blocks as distinguished from applied coatings such as described in my prior patent.

The cells of the present invention, may then be assembled in respective groups or stacks and disposed in means forming a plurality of chambers, each chamber of which contains its own supply of impregnated blocks, means being provided for supplying an air flow through the respective chambers whereby the flowing air will pick up volatile fractions passing out of the individual cells and for suitably intermixing the air streams from different chambers to effect a mixing or combining of the respective volatile components while the latter are in a state of evaporation or volatilization. Means is also provided for effectively controlling the absence or presence of an air flow through the respective chambers.

In the particular embodiment illustrated, the apparatus is provided with three independently controllable sections or divisions, each of which is provided with three component-containing compartments through which air may flow, following which the respective air streams may be combined to produce a desired scent. More particularly, suitable closure means in each division are operable to permit the admission of the requisite air to activate evaporation or to close off the sections when not in operation. The various vapor strains preceding from the evaporation cells or capsules are brought into combination by the action of an electrically operated centrifugal blower, or the like, which is arranged to draw air through the respective sections and bring the same into combination, whereby they are exhausting from the apparatus in their combined form. Thus in the construction illustrated it is possible to provide for as many as nine separate sources of different strains which can then be suitably combined and discharged from the device.

It will thus be apparent that the present invention enables the achievement, heretofore considered impossible, of accurately, in effect, recreating an actual fragrance of a living flower, utilizing components at least some of which may be incompatible with one another.

The invention also has among its objects the production of such an apparatus which may be efficiently "turned off," i.e., the operation of the device discontinued and further discharge of volatile substances effectively prevented to insure the retention of the supply of such volatile materials over long periods of non-use, without material dissipation of such materials.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings wherein like reference characters indicate like or corresponding parts;

FIG. **1** is a front elevational view of a scent disseminating device constructed in accordance with the invention;

FIG. **2** is a semi-diagrammatic elevational view similar to FIG. **1** but with the outer cabinet removed;

FIG. **3** is a perspective view of the storage assembly;

FIG. **4** is a perspective view of one of the storage shell and associated storage stacks;

FIG. **5** is a horizontal section of a housing structure for a shell, illustrated in FIG. **4**, taken approximately on the line V—V of FIG. **2**;

FIG. **6** is a side elevational view of the housing structure illustrated in FIG. **5**;

FIG. **7** is a transverse sectional view taken approximately on the line VII—VII of FIG. **5**;

FIG. **8** is a semi-diagrammatic section illustrating the details of the shell sealing mechanism with the latter shown in open position;

FIG. **9** is a view similar to FIG. **8**, with the mechanism in closed position;

FIG. **10** is a perspective view of one of the storage cells or capsules of the present invention;

FIG. **11** is an enlarged longitudinal section of a cell, such as illustrated in FIG. **10**, showing the details of construction;

FIG. **12** is a perspective view of a storage stack, composed of a plurality of cells such as illustrated in FIG. **8**; and

FIG. **13** is a perspective view of one of the tray structures utilized in the assembly of a stack illustrated in FIG. **12**.

DETAILED DESCRIPTION OF THE INVENTION

General Construction

Referring to FIGS. **1** and **2**, the reference numeral **1** indicates generally a cabinet structure illustrated as being of generally rectangular configuration having respective top, bottom, front, back and side walls, the front wall **2** having a plurality of manually adjustable control members **3**, illustrated in the present embodiment as totalling three such members, and indicating means **4** by means of which the effective adjustment of the device may be readily visually ascertained, as set by the individual knobs **3**. If more than one scent is involved, for example if each knob **3** controls a particular scent, respective identification means **5** may be provided to identify the scent controlled by each respective knob. The front of the device is also provided with an air outlet **6** through which the scented air is discharged, and in the embodiment illustrated an air inlet **7** is provided at one side whereby air enters the inlet **7**, picks up the desired scent as determined by the respective knobs **3**, and the scented air discharged through the outlet **6**.

As illustrated in FIG. **2**, there is disposed in the cabinet **1** (indicated in broken lines) adjacent the side wall having the air inlet **7**, a component storage assembly, indicated generally by the numeral **8**, comprising three sections or divisions **9***a*, **9***b* and **9***c* vertically stacked one upon the other and suitably secured in assembled relation and mounted in the cabinet **1**. If desired like walls of the sections may be formed as sin-

gle wall members. The storage assembly **8** is illustrated in greater detail in FIG. **3**. Each section or division is provided with an air discharge opening **11** adapted to be closed, when desired by a movable closure member **12**, the closure member associated with the upper division **9***a* being represented in open position while both members of the other two sections are illustrated in their respective closed positions, such opening and closing movements of the members being controlled by manual adjustment of the corresponding knob **3**, the actuating mechanism of which will be subsequently described.

As will be apparent from a reference to FIG. **5**, the longitudinal side wall, not visible in FIG. **3** is constructed in the same manner as the longitudinal side wall visible in FIG. **3** and thus each division or section is provided with a similar opening **11** and cooperable closure member **12**, the latter likewise being movable in response to actuation of a knob **3** simultaneously with the closure member **12** illustrated in FIG. **3**.

Disposed in each section or division **9** is a generally rectangular shaped shell, indicated generally by the numeral **13**, that in the embodiment of the invention illustrated comprising a top wall **14**, bottom wall **15** and side walls **16** whereby the remaining opposite ends of the shell are open. The shell **13** is divided into a plurality of chambers or passages, numbering **3** in the present instance, by a pair of spaced parallel partition walls **17** secured in sealing relation to the top and bottom walls, and disposed in each of the passageways so formed is a storage structure or stack indicated generally by the numeral **18** in which is stored at least one aromatic component of the desired scent involved.

As illustrated in FIG. **12**, which illustrates a partially assembled storage structure **18**, such structure is composed of a plurality of relatively small storage cells or capsules indicated generally by the numeral **19**, the details of which are illustrated in FIGS. **10** and **11**.

Each cell **19** comprises an outer casing or housing **21**, of rectangular configuration which is square in transverse cross-section having square end walls **22** and four elongated rectangular side walls **23** extending therebetween. Each end wall of the unit is provided with a small port **24** therein through which the aromatic component contained within the cell is adapted to be discharged. As illustrated in FIG. **12**, a plurality of such individual cells **19** are disposed in stacked arrangement lying on one of their long sides **23** with the discharge port or ports **24** exposed along opposite longitudinal faces of the stack.

As illustrated in FIG. **3**, the shell **13** for each section **9** is so arranged therein that air may flow through the one opening **11** forming an air inlet passing through the passages in the shell **13** and discharged through the opposite opening **11** forming an air outlet. Likewise by moving the closure members **12** into closed positions the associated shell **13** and its contents are effectively sealed to prevent undesired discharge of the aromatic components contained therein when the device is not in use.

As illustrated in FIG. **2**, the storage assembly **8** is disposed in the cabinet structure **1** with the knobs **3** disposed at the exterior of the front panel **2** and the openings **11** of each section at opposite sides of the assembly as viewed in FIG. **2**. Thus the openings **11** at the right hand side of the assembly are disposed for operative communication with the air inlet **7** and the openings **11** at the opposite side of the assembly are adapted to be connected with the inlet side **25** of a centrifugal blower **26**, the discharge opening **6** of which forms the air discharge of the device, suitable duct means **27** extending between the storage assembly and the inlet **25** of the blower **26**.

It will thus be apparent that in operation the movement of air through the inlet **7**, shell **13** and duct **27** is not under pressure but rather is drawn therethrough and following mixing of the air streams, passing through the respective sections **9** in the duct **27** and the blower **26**, is discharged under pressure.

Consequently, air flow through the shells **13** is gentle and of relatively low volume, providing an ideal environment for the discharge of volatized aromatic components from the respective cells of the individual storage stacks into the air moving through the associated passageway of the shell, and it is only after such dissemination that the air streams from the respective shells are permitted to intermix in the duct **27**. Pressurizing of the air takes place only within the blower **26** after the individual components of the scent have been thoroughly mixed.

The nature of the aromatic components involved will depend entirely upon the characteristics of the scent or scents be employed. For example, conceivably the device of FIG. **1** could be employed for the selective creation and discharge of any one of three different scents, each of which would be stored in a respective shell **13** with normally incompatible components being stored in different storage stacks **18**. With such an arrangement the knobs **3** would be so actuated that only a selected one of the several sections would be operable, so that at any time only the components of the selected section are being disseminated.

It is also quite possible that a desired scent requires a sufficient number of incompatible components that more than one section would be required to provide adequate separated storage structures for each of such components, in which case more than one section would contain components of a single scent.

It will therefore be appreciated that the construction illustrated in the drawings is merely illustrative and that the number of sections, as well as the number of stacks in each section, and the number of individual storage units or receptacles in each stack may be readily varied to meet specified requirements.

While I have referred to the control of the closure members **12** as being manually performed, obviously the closure members could be motor operated and the manual control suitably performed through push buttons, etc. Likewise where only one scent is involved the closure members could be automatically controlled by means of the on-off switch for the blower motor.

While the above general description has been presented sequentially from the entire assembly through successively smaller sub-assemblies, the detailed description of each of such sub-assemblies, etc. will be considered in the reverse order, beginning with the basic individual storage cell **19**.

The Individual Storage Units

Referring to FIGS. **10** and **11**, the side walls **23** of each cell or capsule **19** is formed from a short section of aluminum tubing of square cross section, while the end walls **22** are formed from respective rectangular blocks of aluminum which are suitably secured to the side walls **23** adjacent corresponding edges thereof by any suitable means that will provide a firm connection and a good seal between the respective parts. In most cases it is believed that a press fit or a so-called pressure weld will be adequate, eliminating the necessity of providing additional sealing means. Disposed in the container thus formed is a component-retaining core structure indicated generally by the numeral **28**, illustrated in the present embodiment as comprising two substantially square blocks **28***a* and **28***b* of identical construction. The blocks **28** are provided with respective centrally disposed aligned bores **29** therein which extend longitudinally parallel to the planes of the side walls **23** and each of the end blocks **22** is provided with a respective bore **31**, illustrated, in the present instance, as being of a diameter less than that of the bores **29**; the outer end of each bore **31** forming the port **24**.

The respective blocks **28** may be of any suitable material which will adequately accept impregnation with the aromatic components to be used. It will be appreciated that the general construction of the individual cells **19** corresponds to that of the blocks illustrated in may prior patent, previously referred to, and the individual blocks may be constructed in accordance with the general teaching of said patent, it being noted however, that the construction illustrated herein represents an improvement over those illustrated in such patent, providing improved overall results as well as simplifying the manufacture and assembly of the respective components. I have found that for the present purposes it will normally be desirable to construct the individual cells **19** as relatively very small structures which may then be assembled to form a larger storage structure such as the respective stacks **18**. While the cells **19** of the present invention employ a metal prefabricated shell structure in lieu of an applied coating or the like, as illustrated in my prior patent, obviously the overall operation of the cell **19** corresponds, for example, to a construction such as illustrated in FIG. **6** of such patent wherein the relatively large bore in the respective block functions as a mixing chamber or tunnel therein from which the vapor is discharged through a smaller bore.

Consequently no need is seen to go into the general theory and operation of such type of structure, reference being made to my previous patent in connection therewith. Sufficient to say, the construction of the individual cells **19** is such that the aromatic components contained therein, will be discharged therefrom, during operation of the device, at a controlled rate over a relatively very long period of time, for example a period of months or even a year or more before requiring replacement.

It will be appreciated however that the present construction eliminates coating operations, the performing of drilling operations on a coated structure, etc., enabling the production of accurately and uniformly dimensioned cells requiring no drilling or other operations after the impregnated blocks have been encased in the aluminum shell, as well as providing a more efficient shell structure than can be achieved by applied coatings. Consequently, the cell **19** of the present invention represents a considerably improved storage unit over those illustrated in my previous patent.

Another advantage of the construction illustrated in FIGs. **10** and **11** involves the relatively small physical dimensions of the cells **19**, preferably employed in the practice of the present invention. I have found that a very advantageous size for use in devices such as that herein described is one in which the cubes **28** have uniform dimensions of approximately seven thirty-seconds inch. The length of the tube forming the side walls **23** may, for example, in such case be three-fourths inch in length and may be constructed with a side wall thickness of, for example, 0.01 inch which has been found wholly adequate for the purposes. With such dimensions, the end blocks **22** may each have a thickness of approximately five thirty-seconds inch whereby the overall dimensions of each cell **19** is three-fourths inch in length and slightly over seven thirty-seconds inch in transverse dimensions. In such a dimensioned construction, I have found that a very suitable diameter for the mixing tunnels **29** is about one-twentieth inch while the evaporating outlet apertures **31** preferably have a diameter of 0.02 to 0.01 inch depending at least in part on the volatility of the impregnated substance.

The Storage Structures or Stacks

As illustrated in FIGS. **12** and **13**, each storage structure or stack **18** comprises a plurality of layers of storage cells **19** arranged side-by-side into horizontal rows and the individual rows vertically stacked one upon the other. Cooperable with the individual cells to form the respective stacks is a supporting frame member **32** having a bottom wall **33** and respective upwardly extending end walls **34**, each of which is provided with inwardly directed parallel flanges **35** adapted to form retaining walls for the peripherally disposed cells **19** extending therealong.

Cooperable with the frame **32** is a plurality of tray structures **36** each having a bottom wall **37** and upwardly directed longitudinally extending parallel flanges **38**, the latter having an overall length substantially equivalent to the distance between the vertical edges of corresponding flanges **35** on the respective vertical walls **34** of the frame structure while the overall length of the bottom wall **37** of each tray is approximately equal to the distance between the vertical walls **34** whereby the free end portions of the bottom wall **37** of each tray structure will be disposed between the adjacent flanges **35** carried by the vertical walls **34**. As will be apparent from a reference to FIG. **12** the lowermost row of storage cells **19** are disposed on the bottom of the tray structure and retained in position by the flanges **35** carried thereby. A tray structure **36** is then disposed on the top faces of such assembled row of storage cells and the second row of cells disposed on such tray. This assembly operation is repeated until the tray structure is completely filled, following which a cover member **39** may be engaged with the upper ends of the respective vertical walls **34**, the cover member having a peripheral flange **41** extending around both the longitudinal and end edges of the cover member

with the internal dimensions between opposed flanges being such that the ends of the walls **34** will be received in the cover member to interlock the structure in assembled relation, the cover being retained in position as a result of a press fit or by other suitable means as may be deemed necessary or desirable.

The Storage Shell

Details of the storage shell structure are illustrated in FIGS. **4** and **7**. It will be noted that, as previously described, the shell **13** is open at opposite ends and provided with partition walls **17**. As illustrated in greater detail in FIG. **7**, each partition wall **17** is provided adjacent its free outer edge with a flexible extension **42** suitably secured in sealing relation with the associated partition wall and thus forming an extension of the latter. It will be noted that each partition wall **17** ends approximately on a line with the adjacent end of the respective stacks **18** with the flexible strip **42** extending outwardly beyond the adjacent edges of the shell. Disposed at the top and bottom edges of the flexible extensions **42** preferably are cooperable leaf spring seals **43**, the latter being suitably secured at one end to the inner face of the top or bottom walls **14** and **15** of the shell as clearly illustrated in FIGS. **4** and **7**.

The stacks **18** may be suitably retained within the shell **13** by any suitable means as for example by spot welding as indicated at **44** or any other suitable securing or interlocking arrangement at both the top and bottom faces of the respective stacks.

The Component Sections or Divisions

Details of construction of the component storage divisions or sections **9***a*, **9***b*, and **9***c* are illustrated in FIGS. **3**, **5**, **6** and **7**.

Referring particularly to FIGS. **5–7**, each section **9** may comprise a pair of side walls **45** which are provided with respective aligned openings **46** of a size to receive a cooperable shell **13**, as well as aligned elongated slots **47**. As illustrated in FIG. **5** the two side walls **45** are connected by a tubular sleeve indicated generally by the numeral **48** which has the same dimensions as the openings and is welded to the side walls to form an integral structure, thereby forming a chamber for reception of a shell **13** and its contents. The shell **13** and the member **48** may be provided with suitable means for adequately securing the shell within the chamber, for example inwardly directed projections on the top and bottom wall of the member **48** adapted to seat in the dimples **48'** on the top and bottom walls of the shell **13**, or suitable set screws threaded in a side wall of the sleeve **48**.

Extending along the top and bottom edges of the side walls **45** and the end of each side wall adjacent the opening **46** is a generally C-shaped member **49** having grooves **51** in its inwardly disposed faces, in which a corresponding door member **12** is adapted to be slidably carried. The frame member **49** may be of any suitable construction fabricated in one or more pieces, and secured to the associated side wall **47** by any suitable means as for example a plurality of screws, welding etc. The respective ends of each enclosure are provided with a front wall **52** and a rear wall **53**, again suitably secured as for example by screws or the like to the remaining section structure. As previously mentioned, respective sections **9** may be individually constructed and assembled into a unitary structure in accordance with modular techniques, or all or selected side and end walls may be fabricated as respective unitary structures common to all three sections. Obviously, such details of construction may be widely varied to meet specific requirements of cost or to fit in with existing production techniques, etc. Where individual units are employed, they may be readily assembled and secured one to the other to form a unitary storage assembly.

Carried by the right-hand wall of the structure **48**, as viewed in FIG. **5** is a suitably mounted hub member **54** cooperable with a similar flanged member **55** mounted on the front wall **52** by any suitable means as for example screws, in which members **54** and **55** is journalled a threaded shaft **56**, the outer end **57** of which carries a knob **3**. Threadedly mounted on the shaft **56** is a carriage block **57** having oppositely directed pin or stem portions **58** extending through the slots **47** in the side walls and through apertures **59** in the respective closure members **12** thereby operatively connecting the carriage block **57** to the respective closure members whereby movement of the carriage **57** as the shaft **56** is rotated, for example, by manual actuation of the knob **3**, the closure members **12** may be moved from closed positions as illustrated in FIGS. **5** and **6** to an open position as illustrated in FIG. **3** with respect to the section **9***a*.

FIGS. **8** and **9** illustrate, in diagrammatic form, the operation of the door members **12** and the flexible strips **42** on the respective partition walls, as well as the spring seals **43**.

It will be noted that when the door members **12** are in their open positions as illustrated in FIG. **8** the respective passages in the shell **13** are open at opposite ends permitting air to flow through such passageways and along the ends of the cells **19** carried in the respective stacks **18** so that vapor products eminating from the cells of the stack will be picked up by the air and exhausted from the storage structure. However, when the door members are in closed positions as illustrated in FIG. **9** they will closely bear on the end edges of the shell structure of suitable gasket means interposed therebetween and the flexible portions **42** will flex to the position illustrated in FIG. **9** as a result of their engagement with the associated closure member **12** to provide an effective seal between such member and the partition wall, with the top and bottom sealing springs **43** serving to improve the seal at the top and bottom of the flexible portions **42**. Thus when the door members are in their closed position the associated shell **13** is effectively sealed at both of its open ends and no vapor will be discharged therefrom.

As illustrated in FIG. **2**, the storage assembly **8** of FIG. **3** may be suitably disposed in the cabinet **1** with the inlet openings **11** of the assembly disposed adjacent the inlet opening **7** and the outlet openings communicating with the blower **26** through the duct **27**. With dimensions of approximately 7/32 × 7/32 × 3/4 inch for each storage cell **19**, 128 capsules may be disposed in a stack **18** and three such stacks placed in a shell **13** approximately 4 ½ inch long × 2 ¼ inch high and a depth from one open end to the other of 4 inches, whereby each shell with three stacks will deliver aroma from 384 storage units through 728 evaporation outlets. The

three sections **9** would, in such case, contain a total of 1,152 storage units with 2,304 apertures. Likewise, the blower **26** may be of small capacity, as for example 60 cubic feet per minute air displacement, with the outlet of the blower having for example, a diameter of 2 inches. A device embodying storage structures such as described could be readily fabricated with maximum dimensions of approximately 15 inches in width, 10 inches in depth and 8 inches in height, not allowing for leg structures, etc.

Under normal operating conditions the knobs **3** would be so adjusted that only one scent is being emitted from the storage structure and at the same time all closure members associated with the storage elements of such scent would be in fully opened positions as indicated by the corresponding indicator or indicators **4** which may be of any suitable construction and suitably geared or otherwise operatively connected to the shaft **56**, the details of which indicators form no part of the present invention. Various types of structures are available on the market, as for example so-called Vernier dials and the like.

To preserve the life of the aromatics employed in the device and to preserve their effectiveness, it is essential to keep the closure members completely closed when the mechanism is not in operation and likewise to keep it completely open when the valves are opened to insure full evaporation. Likewise, while aromatic vapors do not readily unite with other vapors at ordinary temperatures, such vapors when airborne may unite with a liquid surface, and the various flexible seals, etc. serve to effectively reduce the flow of any airborne vapors into undesired areas.

It will be apparent that the inlet and discharge openings in the cabinet **1** may be provided with suitable louvers or the like, particularly self closing louvers which are either electrically or otherwise actuated to open position when the device is placed in operation, thus limiting air movement through the structure as much as possible when the device is not in operation.

It will be noted from the above description that I have provided a novel structure having the ability to create, preserve and deliver the finer features of a scent over an extended period of time attaining this capacity through the effective control of the evaporation processes. Likewise, the construction is such that when the device is not in use the evaporation chambers are effectively closed whereby evaporation from the basic storage units is in a state of quiescence since energy derived from the air is completely shut off, and in such state the aromatic substances contained in the individual storage containers fall into equilibrium with their own vapors, in which condition they will remain until the evaporation chamber is again opened and operation resumed. It will be appreciated that the size of the storage structures may be varied to meet specific requirements. Thus if a considerably less quantity of one component is required, the proportions of the width of the passageways in the shell **13** may be varied to give a different proportion of air distribution and/or the outlets of the individual cells reduced in size to reduce the rate of discharge therefrom, as may be deemed desirable.

It will be particularly noted that the invention enables replacement of the volatile components in several different ways and to provide any one of several different modes of replacement.

Thus, individual cells **19** may be used as the replacement units, the new cells merely being substituted for spent cells.

Similarly one entire stack structure **18** may be replaced as a unit, or an entire shell **13** and its contents.

Consequently, replacement units may be sold separately from the remainder of the device, in any one of these forms or in several or all of such forms.

It will also be noted that the present invention enables the production of many scents and odors which heretofore could not be realistically achieved due to incompatibility of the various components.

It will also be appreciated from the above disclosures that I have provided a relatively simple yet highly effective device for the purposes intended and that various immaterial modifications may be made in the same without departing from the spirit of my invention. Hence I do not wish to be understood as limiting myself to the exact form, construction and arrangement of parts herein shown and described.

I claim as my invention:

1 A device for creating an odor, comprising a plurality of individual storage structures, the aromatic components to be employed in the creation of such an odor, each of said storage means being constructed to effect a controlled release by evaporation, of the associated stored component, means forming respective air passageways, one of said storage structures being disposed in each of said passageways with each storage structure containing compatible components and any respective non-compatible components being disposed in storage structures positioned in different passageways, air moving means arranged to create air flow through the respective passageways, whereby release of the evaporation products of any stored non-compatible aromatic components is effected into different air streams, and means for effecting intermixture of said air streams subsequent to the introduction therein of the various components, the storage structures for each separate passageway each comprising a plurality of storage cells each constructed to provide a controlled dissemination therefrom of the aromatic components stored therein, said storage cells being assembled into a storage stack, means for retaining the elements of such storage stack in assembled relation, said passageway-forming means comprising a generally rectangular shell open at opposite ends and having at least one partition wall extending from one open end to the other, dividing the same into a plurality of air passageways, each passageway having a storage stack therein, said air moving means operatively communicating with one end of such shell, operative to draw air therethrough, said air moving means providing a common discharge for air streams through said shell whereby such air streams are discharged from said common discharge in an intermixed state, and a movable closure member disposed adjacent the air discharge end of said shell, movable to a piston closing said end and thereby shutting off said air flow, or to an open position exposing such end.

2. A device for creating an odor from a plurality of aromatic components, some of which may be incompatible with one another, comprising a plurality of

storage structures, each having at least one porous block impregnated with a volatile aromatic component and enclosed in a sealing shell having at least one opening therein, which is small in comparison with the exterior surface of the porous block, each such block having a mixing passageway therein communicating with such opening in the shell thereof for controlled dissemination of the contained aromatic component, by evaporation, to the exterior, incompatible components, if any, being disposed in respective storage structures, and means forming respective air passageways, each having an air inlet and an air outlet, air moving means cooperably disposed relative to the air outlets of the respective air passageways, operative to draw air into the air inlets of, and through the respective passageways and discharge such air to the exterior, at least one of said storage structures being disposed in each air passageway, with the component disseminating opening of such storage structure being so disposed relative to air flowing through the passageway that such dissemination takes place into such air flow, and with any incompatible components contained in respective storage structures disposed in different air passageways, said air moving means and the air outlets of said air passageways being so arranged that intermixing of the respective air flows therethrough and thus intermixing of any incompatible components takes place only subsequent to discharge of air containing the same from the corresponding air passageways.

3. A device according to claim 2 comprising in further combination selectively actuatable means interposed between said air moving means and said storage structures for controlling the flow of air at said storage structures.

4. A device according to claim 3, comprising in further combination means actuatable with said air control means and cooperable therewith for effectively sealing said storage structures in their respective passageways, to prevent emission therefrom of the respective components contained therein when the device is not in use.

5. A device according to claim 2, wherein the storage structures for each separate passageway comprises a plurality of storage cells each constructed to provide a controlled dissemination therefrom of the aromatic components stored therein, said storage cells being assembled into a storage stack, means for retaining the elements of such storage stack in assembled relation, said passageway-forming means comprising a generally rectangular shell open at opposite ends and having at least one partition wall extending from one open end to the other, dividing the same into a plurality of air passageways, each passageway having a storage stack therein, said air moving means operatively communicating with one end of such shell, operative to draw air therethrough, said air moving means providing a common discharge for air streams through said shell whereby such air streams are discharged from said common discharge in an intermixed state.

6. A device according to claim 5, comprising in further combination a movable closure member disposed adjacent the air discharge end of said shell, movable to a position closing said end and thereby shutting off said air flow, or to an open position exposing such end.

7. A device according to claim 6, comprising in further combination a second movable closure member, disposed adjacent the opposite end of said shell, movable to a position closing such shell end, and means for simultaneously actuating both of said closure members, the latter being operable when in closed position to substantially seal the aromatic components of the storage stacks disposed in the shell with respect to the exterior thereof.

8. A device according to claim 7, comprising in further combination a storage assembly comprising generally rectangular shaped housing structure having top, bottom, side and end walls, said shell being removably supported in said casing adjacent one end thereof with the open ends of the shell extending parallel to the side walls of the casing, such housing side walls having openings therein exposing the open ends of said shell, said closure members each being of plate-like construction, said housing side walls having guide means thereon for said closure members whereby the latter are slidably movable along said sidewalls between their open and closed positions.

9. A device according to claim 8, wherein said actuating means for the closure members comprises a rotatable threaded shaft, the axis of which extends parallel to the planes of said closure members, with the adjacent end of said shaft extending through the wall of said housing at the opposite end thereof from said shell, a carriage block threaded on said shaft and movable therealong in response to rotation of said shaft, said carriage block having transversely disposed portions extending through slots in said housing side walls and engaged with respective closure members whereby movement of said carriage is transmitted thereto.

10. A device according to claim 9, comprising in further combination leaf spring means carried by a partition wall of said shell and adapted to flexibly bear on the inner face of the adjacent closure member when the latter is in closed position to effect a sealing relation between the partition wall and such closure member.

11. A device according to claim 10, comprising in further combination additional leaf springs and engageable with each disposed adjacent a respective transverse edge of said sealing springs at the top and bottom walls of said shell for providing an improved seal at such edges between adjacent passageways.

12. A device according to claim 8, wherein the storage assembly is constructed to receive a plurality of said shells, similarily oriented and arranged one after the other and each provided with its own pair of closure members and associated actuating means.

13. A device according to claim 12 wherein each shell, closure members therefor and associated actuating means are associated into a single housing forming a unitary section, a plurality of such housing structures being assembled into a unitary storage assembly.

14. A device according to claim 12, wherein said air moving means comprises a centrifugal blower, said means for intermixing said air streams comprising duct means operatively connecting the intake opening of such blower with the air discharge ends of the respective shells, forming a chamber common to all of said air streams.

15. A storage cell for controlling volatization of a volatile substance over a relatively long period of time,

comprising an elongated tubular shell, a closure block at each end of said shell, each block having a transverse configuration complemental to the transverse internal configuration of and transverse dimensions such that each closure block can be inserted into an end of said shell in engagement throughout the inner periphery thereof, said closure blocks being disposed in and operatively closing the respective ends of said shell, forming seals therefor, and a porous relatively non-volatile structure disposed in the closed shell and substantially filling the same, said structure being adapted to be impregnated with a volatile substance, said porous structure having passageway means therein opening on at least one closure block, such closure block having a bore therein operatively connecting such passageway means and the exterior, to provide an outlet at such cell and for such a volatile substance.

16. A storage cell according to claim 1, wherein the closure blocks are so disposed in the shell that the ends of the latter define the wall length of the cell.

17. A storage cell according to claim 15 wherein the passageway means of said porous structure opens on each closure block, each closure block being provided with a bore therein, connecting such passageway means with the exterior.

18. A storage cell according to claim 15, wherein said shell has a square transverse cross-section and said porous structure is in the form of two individual cubes, one being disposed adjacent each respective end of the shell, said passageway means comprising a bore in each cube, extending to the adjacent closure block, each of the latter having a bore therein connecting the bore of the adjacent cube with the exterior.

19. A storage cell according to claim 18 wherein the bores of the respective cubes and the bores in the closure members are axially aligned, with each bore in said cubes extending completely therethrough.

20. A storage cell according to claim 19, wherein said shell and closure blocks are formed from metal stock.

21. A storage structure according to claim 20, wherein said retaining means comprising a peripherally extending frame having inwardly directed flanges extending along the end edge portions of the outermost cells of the stack and a tray member disposed between adjacent layers of cells and having similar flanges extending along the end edge portions of the cells of the associated layer.

22. A storage structure for volatile substances, comprising a plurality of elongated rectangularly shaped individual storage cells, each constructed to contain a supply of such a volatile substance and having outlet means in the end walls thereof for the discharge of such a substance therefrom, said cells being arranged in a plurality of superimposed layers with the cells of each layer disposed in side-by-side relation with their corresponding ends disposed in respective cam parallel planes, whereby discharge of such volatile substance will take place from opposite faces of the stack of cells so formed and means for retaining said cells in assembled relation.

23. A storage structure according to claim 22, wherein each of said storage cells comprises a storage cell controlling volatization of a volatile substance, an elongated tubular shell, a closure block at each end of said shell, each block having a transverse configuration complemental to the transverse internal configuration of and transverse dimensions such that each closure block can be inserted into an end of said shell in engagement throughout the inner periphery thereof, said closure blocks being disposed in and operatively closing the respective ends of said shell, forming seals therefor, and a porous relatively non-volatile structure disposed in the closed shell and substantially filling the same, said structure being adapted to be impregnated with a volatile substance, said porous structure having passageway means therein opening on at least one closure block, such closure block having a bore therein operatively connecting such passageway means and the exterior, to provide an outlet at such cell end for such a volatile substance.

24. A storage structure according to claim 23, wherein said retaining means comprising a peripherally extending frame having inwardly directed flanges extending along the end edge portions of the outermost cells of the stack and a tray member disposed between adjacent layers of cells and having similar flanges extending along the end edge portions of the cells of the associated layer.

25. A storage structure for volatile substances, comprising a shell open at two opposite ends and having partition wall means extending from one open end to the other and dkviding the same into a plurality of passageways and a plurality of storage structures for volatile substances, each structure disposed in one of said passageways, each storage structure comprising a storage cell controlling volatization of a volatile substance, an elongated tubular shell, a closure block at each end of said shell, each block having a transverse configuration complemental to the transverse internal configuration of and transverse dimensions such that each closure block can be inserted into an end of said shell in engagement throughout the inner periphery thereof, said closure blocks being disposed in and operatively closing the respective ends of said shell, forming seals therefor, and a porous relatively non-volatile structure disposed in the closed shell and substantially filling the same, said structure being adapted to be impregnated with a volatile substance, said porous structure having passageway means therein opening on at least one closure block, such closure block having a bore therein operatively connecting such passageway means and the exterior, to provide an outlet at such cell end for such a volatile substance.

26. A storage structure according to claim 25, wherein each of said storage cells comprises a storage cell controlling volatization of a volatile substance, an elongated tubular shell, a closure block at each end of said shell, each block having a transverse configuration complemental to the transverse internal configuration of and transverse dimensions such that each closure block can be inserted into an end of said shell in engagement throughout the inner periphery thereof, said closure blocks being disposed in and operatively closing the respective ends of said shell, forming seals therefor, and a porous relatively non-volatile structure disposed in the closed shell and substantially filling the same, said structure being adapted to be impregnated with a volatile substance, said porous structure having passageway means therein opening on at least one clo-

sure block, such closure block having a bore therein operatively connecting such passageway means and the exterior, to provide an outlet at such cell end for such a volatile substance.

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