United States Patent [19]

Watkins

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[54] **DISPENSING PACKAGE, CARTRIDGE AND CONTAINER**

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[73] Assignee: **Permtek, Incorporated,** Naples, Fla.

[22] Filed: **Oct. 23, 1973**

[21] Appl. No.: **408,479**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 169,439, Aug. 5, 1971, Pat. No. 3,785,556, which is a continuation-in-part of Ser. No. 854,979, Sept. 3, 1969, Pat. No. 3,661,506.

[52] **U.S. Cl.** **239/34;** 239/55; 239/57

[51] **Int. Cl.** **A47g 21/18;** A61j 15/80

[58] **Field of Search** 239/48, 55, 56, 57, 52, 239/34; 206/516, 412, 389

[56] **References Cited**

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Attorney, Agent, or Firm—Michael, Best & Friedrich

[57] **ABSTRACT**

Disclosed herein is a cartridge for controllably dispensing a liquid substance, which cartridge includes a sealed envelope or package comprising first and second plies of a plastic material which is permeable to the liquid substance, each of the plies formed to include a plurality of parallel corrugations with the corrugations of one of the plies being substantially identical to the corrugations of the other of the plies. The first and second plies are also peripherally sealed to each other in opposed relation to form the sealed package or envelope with the corrugations of one of the opposed plies in nested relation to the corrugations of the other of the opposed plies. In addition, the sealed package or envelope includes a quantity of the liquid substance and has portions overlaid with respect to each other and separated from each other by intervening spacer means.

17 Claims, 7 Drawing Figures

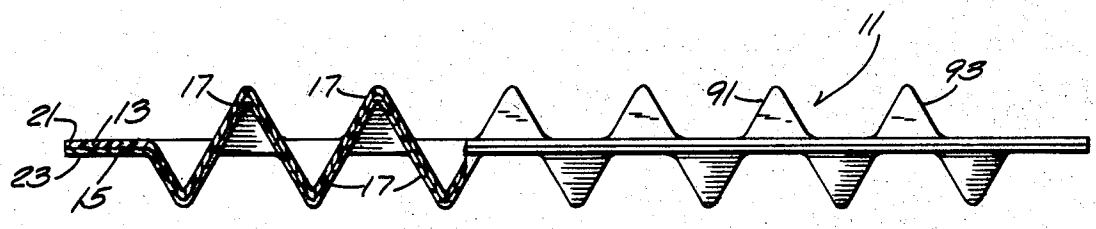
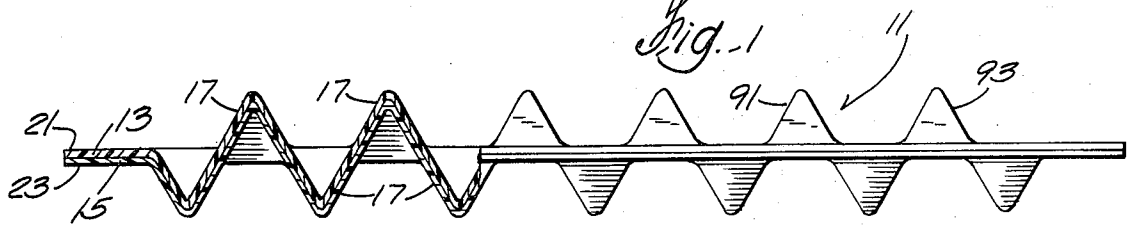


Fig. 1



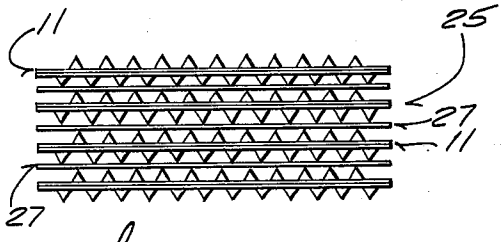


Fig. 2

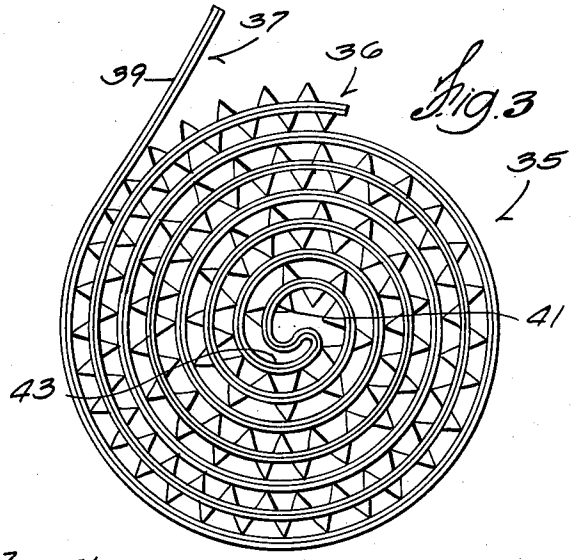


Fig. 3

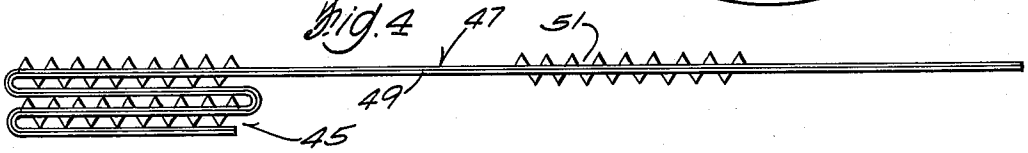


Fig. 4

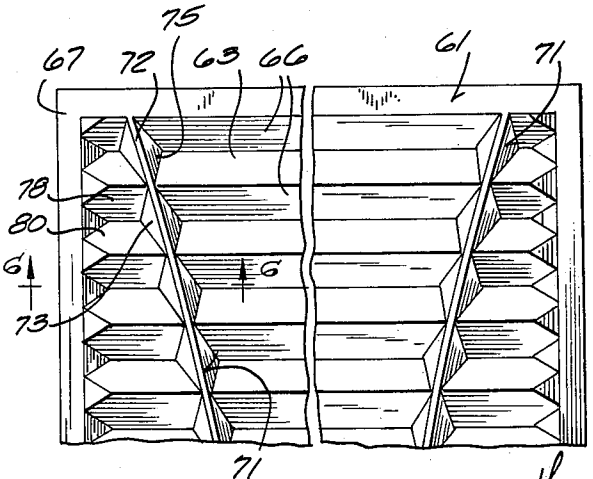


Fig. 5

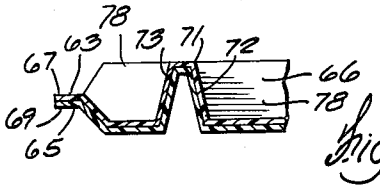


Fig. 6

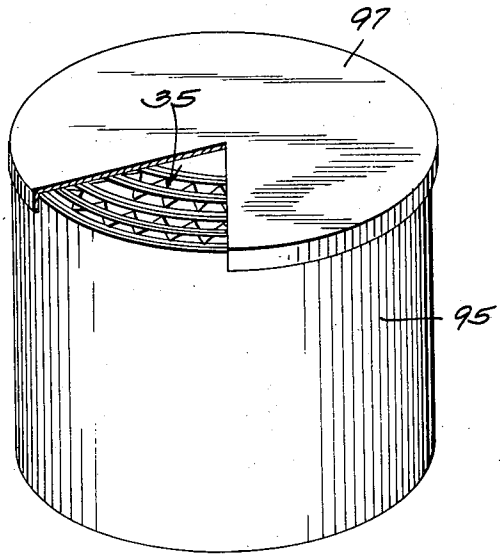


Fig. 7

DISPENSING PACKAGE, CARTRIDGE AND CONTAINER

RELATED APPLICATION

This application is a continuation in part of my copending application Ser. No. 169,439 filed Aug. 5, 1971, now U.S. Pat. No. 3,785,556, issued Jan. 15, 1974, which application, in turn, was copending with my still earlier application Ser. No. 854,979 filed Sept. 3, 1969 and issued on May 9, 1972 as U.S. Pat. No. 3,661,506.

BACKGROUND OF THE INVENTION

The invention relates generally to dispensing of liquids through flexible thermo-plastic material which is permeant to the liquid substance to be dispersed. Attention is directed to the U.S. Poitras Pat. No. 3,343,664 issued Sept. 26, 1967.

SUMMARY OF THE INVENTION

The invention provides a dispensing package and/or cartridge which maximizes dispensing in relation to a flowthrough cross sectional area. In accordance with the invention, there is provided a package for controllably dispensing a liquid substance, which package includes first and second plies of a plastic material which is permeable to the liquid substance and with each of the plies formed to include a plurality of corrugations which preferably extend in parallel relation with the corrugations of one ply being substantially identical to the corrugations of the other ply. The first and second plies are also peripherally sealed to each other in opposed relation to provide a sealed envelope or package with the corrugations of one ply in nested relation to the corrugations of the other ply, and with a quantity of the liquid substance in the sealed envelope or package.

The invention also provides a cartridge for controllably dispensing a liquid substance comprising a sealed envelope or package including first and second plies of a plastic material which is permeable to the liquid substance, with each of the plies being formed to include a plurality of parallel corrugations anad with the corrugations of one ply being substantially identical to the corrugations of the other ply. The first and second plies are also peripherally sealed to each other in opposed relation to form the sealed envelope or package with the corrugations of one ply in nested relation to the corrugations of the other ply. The container contains a quantity of the liquid substance and further includes portions overlaid with respect to each other, together with spacer means for preventing partial nesting or meshing of the overlaid portions.

One of the features of the invention is the provision of a package which is suitable for dispensing a liquid substance through the walls of the package and which is formed to maximize the wall area through which the liquid substance can be dispersed.

Another of the features of the invention is the provision of a cartridge which is suitable for dispensing a liquid substance through the wall surface of a package which includes the substance and which is arranged with overlying portions which maximize dispersion of the substance while permitting maximum air flow through the cartridge.

Still another of the features of the invention is the provision of a cartridge which is suitable for dispensing a liquid substance in the manner indicated in the preceding paragraph and which is designed for removable use in a dispensing device.

Other features, objects and advantages of the invention will become known by reference to the following drawings, general description, and claims.

DRAWINGS

FIG. **1** is an enlarged fragmentary view of one envelope or package in accordance with the invention.

FIG. **2** is a fragmentary view of a cartridge in accordance with the invention.

FIG. **3** is a fragmentary view of a cartridge in accordance with the invention.

FIG. **4** is a fragmentary view of a partially formed cartridge in accordance with the invention.

FIG. **5** is a fragmentary view of another embodiment of a package or envelope in accordance with the invention.

FIG. **6** is a fragmentary sectional view taken along line **6—6** of FIG. **5.**

FIG. **7** is a prospective view, partially broken away, of a cartridge in accordance with the invention.

Before explaining the invention in detail, it is to be understood that the invention is not limited in its application to the details of the construction and arrangement of parts set forth in the following general description or illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

GENERAL DESCRIPTION

Shown in the drawings is an envelope or container or package **11** for controllably disseminating a liquid substance through a plastic material which is permeable to the liquid substance. Such liquid substances can be, for instance, odorants, deodorants, insecticides, attractants, and repellents. The package or envelope **11** includes two plies **13** and **15** of plastic material which is permeable to the liquid substance to be dispensed. Each of the plies is formed with a plurality of undulations or corrugations **17** with the undulations or corrugations in one ply being substantially similar in form to the undulations or corrugations in the other ply. In the preferred construction, the corrugations extend in parallel relation to each other. However, in some circumstances where air flow parallel to the corrugations is not desired, corrugations other than in parallel relation can be employed.

In further accordance with the invention, the plies **13** and **15** include respective margins **21** and **23** which are peripherally hermetically sealed to each other in opposed relation to provide the envelope or package **11** with the corrugations or undulations **17** of one ply being nested with respect to the corrugations or undulations of the other ply. In addition, the sealed envelope or package **11** is interiorly provided with a quantity of the liquid to be dispensed.

In further accordance with the invention, there is provided a cartridge including a plurality of package layers, each layer including two nested plies with the undulations or corrugations of the package layers being

arranged in generally parallel relation to one another, together with means for preventing nesting or meshing of one package layer in relation to the adjacent package layer.

More specifically, in FIG. **2**, there is disclosed a flat dispensing cartridge **25** including a stack or series of separate or individual packages or envelopes **11**, each package or envelope constituting a layer. Adjacent layers are separated, i.e., prevented from nesting or meshing relative to each other, by interleaving a spacer **27** therebetween. The spacers **27** can constitute a single ply of any material having sufficient rigidity to prevent nesting. Alternatively, the spacers **27** can also constitute a flat package, i.e., a package as disclosed in my earlier copending application Ser. No. 169,439 and formed of material permeable to the substance being dispensed and without corrugations or undulations, but having sufficient rigidity to prevent nesting or meshing between the layers. Other spacing arrangements can also be employed.

In FIG. **3**, there is shown a coiled dispensing cartridge **35** including an elongated package **36** which has undulations extending transversely to the length of the package **36.** The coiled cartridge **35** is formed by rolling up the envelope or package **36** with a spacer **37** between the coils.

The spacer **37** can be a single thickness or ply of a material having sufficient rigidity to prevent nesting or can be a flat package containing the substance to be dispensed. In the construction illustrated in FIG. **3**, the package **36** includes a corrugated portion **41** and a flat portion **43** which extends from the corrugated portion **41**, and, together with the corrugated portion, forms a single sealed package or envelope and which is sufficiently rigid to prevent nesting. In this regard, the coiled cartridge **35** is formed by overlying the flat portion **43** over the corrugated portion **41** and by rolling the package **36** from the juncture of the flat portion **43** with the corrugated portion **41.** Thus, in the coiled cartridge **35**, the innermost coil extends from the junction of the flat and corrugated portions.

Shown in FIG. **4** is a partially formed cartridge **45** formed from a single package **47** having alternate flat and corrugated portions **49** and **51**, respectively. Rather than being continuously coiled, as explained in connection with FIG. **3**, the cartridge **45** shown in FIG. **4** is formed by reversely overlying the flat and corrugated package portions **49** and **51.**

Any form of corrugation or undulation can be employed. In the preferred construction illustrated in FIG. **1**, each corrugation **17** includes two generally flat surfaces **91** and **93** arranged in angular relation at an included angle of about 60°. Other included angles could also be used and a continuously curving or serpentine corrugation could also be employed to provide the desired corrugations. Although it is preferred that all of the corrugations be generally identically constructed, adjacent corrugations in each ply need not be identically constructed although the corrugations of the opposed plies are preferably of substantially identical construction to one another to permit nesting of one ply with respect to the other ply when forming a package. In addition, the corrugations preferably extend in parallel relation to each other to permit maximum air flow through the resultant cartridge and the inside surface of the plies is preferably uneven or roughened to provide capillary action as explained in application Ser. No. 169,439.

Other spacer means can also be provided for preventing nesting between layers. Such nesting prevention means can also be desirably integrated into a corrugated package. In this regard, there is shown, in FIG. **5**, an elongated package **61** formed from two plies **63** and **65** which include a plurality of parallel nested corrugations **66** and which are sealed along their respective margins **67** and **69** to provide the envelope or package **61** which is adapted to be rolled or otherwise overlayed upon itself to form a cartridge. The nesting preventing means or spacer means comprises formation in the transversely corrugated plies **63** and **65** of one or more longitudinal ridges **71** which extend lengthwise of the package **61**, and so that, with respect to a longitudinal line, the ridge segments between each corrugation are offset from the longitudinal line at differring spacings. Thus, when the package **61** is overlaid upon iteself to form a cartridge, in the manner shown in FIGS. **3** and **4**, or when individual packages are overlaid with respect to each other in the manner shown in FIG. **2**, the lengthwise ridge or ridges **71** will not nest and will prevent nesting of the transverse corrugations **66.** Preferably, the longitudinal ridges can be vacuum formed or die formed in the thermo-plastic plies **63** and **65** at the same time of the formation of the corrugations **66.**

Each ridge **71** is constructed in a manner similar to the formation of the plies **63** and **65** adjacent to their margins **67** and **69**, and includes a plurality of segments **72** located between adjacent corrugations **66.** In particular, each ridge segment is formed between the juncture of one side of each of two triangular sections **73** and **75**, the other two sides of each triangular section joining the angularly related surfaces **78** and **80** forming the corrugations **66.**

It is particularly to be noted that while the longitudinal ridges **71** prevent nesting, they do not prevent transverse air flow through the cartridge, as the ridges **71** contact the apeces of the corrugations **66** in the adjacent layers, thereby affording ample free area for transverse air flow.

It is also preferred to form each ply with a planar periphery (such as the margins **21** and **23**) which generally bisects the corrugations, i.e., one part or half of the corrugated form extending to one side of the plane of the periphery and one part or half extending to the other side of the plane of the periphery. However, it is within the scope of the invention for the corrugations to extend wholly to one side of the plane of the periphery. Use of a package having a planar periphery (at least before being coiled) has the advantages of facilitating sealing and providing a linear belt for maintaining the corrugations in proper dimension during filling of the package with the substance to be dispensed. In other words, the linear belt is not subject to distortion due to the corrugations or due to the loading of liquid into the sealed envelope or container between the corrugated plies.

In further accordance with the invention, in order to prevent loss of the encapsulated substance, the cartridge **35** (or any other cartridge) can be packaged, as shown in FIG. **7**, in a sealable, airtight outer container **95** which is provided with at least one removable end cap **97** and which is fabricated of material which is not permeant to the liquid substance to be dispensed. Pref-

erably, the cartridge is adapted, after removal of the end cap **97**, to be readily assembled or employed in a device (not shown) for dispensing the liquid substance contained in the cartridge.

Various of the features of the invention are set forth in the appended claims.

What is claimed is:

1. A package for controllably dispensing a liquid substance and including first and second plies of a plastic material which is permeable to the liquid substance, each of said plies being formed to include a plurality of corrugations with said corrugations of one of said plies being substantially identical to the corrugations of the other of said plies, said first and second plies being peripherally sealed to each other and in opposed relation to form a sealed package with said corrugations of one of said opposed plies in nested relation to said corrugations of the other of said opposed plies, and a quantity of said liquid substance in said sealed package.

2. A package in accordance with claim **1** wherein said liquid substance is selected from a group comprising odorants, deodorants, insecticides, attractants, repellants and the like.

3. A package in accordance with claim **1** wherein each of said plies includes a planar peripheral margin which is united to the peripheral margin of the other of said plies.

4. A package in accordance with claim **3** wherein said margins lie in a plane located intermediate the extremities of said corrugations.

5. A package in accordance with claim **1** wherein said corrugations are provided by two angularly related surfaces.

6. A cartridge for controllably dispensing a liquid substance and including a sealed envelope formed of plastic material which is permeable to the liquid substance and including first and second plies formed to include a plurality of parallel corrugations with said corrugations of one of said plies being substantially identical to the corrugations of the other of said plies, said first and second plies being peripherally sealed to each other and in opposed relation to form said sealed envelope with said corrugations of one of said opposed plies in nested relation to said corrugations of the other of said opposed plies, and a quantity of said liquid substance in said sealed envelope, said envelope including portions overlaid with respect to each other, and spacer means preventing nesting of said overlaid portions.

7. A cartridge in accordance with claim **6** wherein said overlaid portions of said envelope lie in adjacent planes.

8. A cartridge in accordance with claim **7** wherein said envelope includes a first part including said corrugations, a second part which is flat and extends from said first part, and a third part which includes said corrugations and extends from said second part, and wherein said second part is located between and in general parallel relation to said first and third parts.

9. A cartridge in accordance with claim **6** wherein said spacer means is provided by a rigid member interleaved between said overlaid portions.

10. A cartridge in accordance with claim **6** wherein said spacer means comprises a planar package formed of said plastic and containing said substance.

11. A cartridge in accordance with claim **10** wherein said planar package constitutes a part of said envelope.

12. A cartridge in accordance with claim **6** wherein said corrugations includes apeces and wherein said spacer means comprises ridges extending transversely between said corrugations in non-alignment with each other longitudinally of said envelope and located in engagement with said corrugation apeces in the adjacent overlaid portion.

13. A cartridge in accordance with claim **6** wherein said envelope includes a first part which includes said corrugations and a second part which is flat and extends from said first part and is located in intervening relation between said overlaid portions.

14. A cartridge in accordance with claim **6** wherein said container is formed into a spiral to provide said overlaid portions.

15. A cartridge in accordance with claim **14** wherein said spacer means is provided by a rigid member.

16. A cartridge in accordance with claim **14** wherein said corrugations include apeces and wherein said spacer means comprises ridges extending transversely between said corrugations in non-alignment with each other longitudinally of said envelope and located in engagement with said corrugation apeces in the adjacent overlaid portion.

17. A package in accordance with claim **1** wherein said corrugations extend in parallel relation.

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