UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA
MIAMI DIVISION

CASE NO. 02-10052-CIV-KING/O'SULLIVAN

AIRSPRAY INTERNATIONAL B.V. and
AIRSPRAY INTERNATIONAL, INC.,

Plaintiffs,

v.

RIEKE CORPORATION,
RIEKE PACKAGING SYSTEMS and,
RIEKE DISPENSING,

Defendants.
_____/

FIRST AMENDED COMPLAINT

Plaintiffs, AIRSPRAY INTERNATIONAL B.V. and AIRSPRAY INTERNATIONAL, INC., by way of Complaint against Defendants, RIEKE CORPORATION, RIEKE PACKAGING SYSTEMS and RIEKE DISPENSING allege and state:

THE PARTIES

1. Plaintiff, AIRSPRAY INTERNATIONAL B.V. (hereinafter "AIRSPRAY (EUROPE)") is a Dutch company registered under the laws of the Netherlands and having a principal place of business at Ivoorstraat 9, 1812 RE, Alkmaar, The Netherlands and Plaintiff, AIRSPRAY INTERNATIONAL, INC. (hereinafter "AIRSPRAY (U.S.)") is a wholly owned subsidiary of AIRSPRAY (EUROPE), a corporation organized and existing under the laws of the State of Florida, having a principal place of business at 3768 Park Central Boulevard North, Pompano Beach, Florida 33064 (hereinafter collectively "AIRSPRAY").

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2. Upon information and belief, Defendant RIEKE CORPORATION is a corporation organized and existing under the laws of the State of Indiana, having a principal place of business at 500 West Seventh Street, Auburn, Indiana 46706; Defendant RIEKE PACKAGING SYSTEMS is a corporation organized and existing under the laws of the State of Indiana, having a principal place of business at 500 West Seventh Street, Auburn, Indiana 46706; and, Defendant RIEKE DISPENSING is a corporation organized and existing under the laws of the State of Indiana, having a principal place of business at 500 West Seventh Street, Auburn, Indiana 46706 (hereinafter collectively "RIEKE").

JURISDICTION AND VENUE

3. This is an action for patent infringement arising under the patent laws of the United States, Title 35 of the United States Code. Jurisdiction is conferred pursuant to 28 U.S.C. §§ 1331 and 1338 (a).

4. Venue is conferred in this judicial district pursuant to 28 U.S.C. § 1391©) and 28 U.S.C. 1400(b).

COUNT

PATENT INFRINGEMENT

5. DAIWA CAN COMPANY ("DAIWA"), a Japanese Corporation, having a place of business at 2-1-10, Nihonbashi, Chuo, Tokyo, Japan is the owner by assignment of all right, title and interest in and to United States Letters Patent No. 5,271,530 entitled "Foam Dispensing Pump Container" (hereinafter "the '530 patent"). A copy of the '530 patent is attached hereto as Exhibit A.

6. In January 1996, DAIWA and AIRSPRAY (EUROPE) entered into a cross-licensing agreement (hereinafter "Cross Licensing Contract") whereby DAIWA exclusively licensed to AIRSPRAY (EUROPE) certain patents, including the '530 patent, relating to pump foamers and/or squeeze foam dispensers. To confirm AIRSPRAY's independent right to bring this action, DAIWA submits in this action as Exhibit B hereto a declaration regarding the parties respective rights under the Cross Licensing Contract. A copy of the Cross Licensing Contract is attached as Exhibit 1 to the Declaration of Daiwa Can Company.

7. At the time of execution of the Cross Licensing Contract, it was Daiwa's understanding and intent that all substantial rights in each of the Daiwa licensed patents, including the '530 patent, were exclusively licensed to Airspray. The rights included, but are not limited to the right to make, use, sell, import and offer for sale products covered by the '530 patent. (Exhibit B, ¶ 6).

8. Daiwa did not retain any right to use the Daiwa licensed patents in the Cross Licensing Contract. (Exhibit B, ¶ 7).

9. Pursuant to the Cross Licensing Contract, paragraph 5, Daiwa specifically granted Airspray the independent right to bring and prosecute legal action for infringement by a third party of the Daiwa licensed patents, including the '530 patent. (Exhibit B, ¶ 8).

10. Based on Daiwa's understanding and intent at the time of execution of the Cross Licensing Contract, and since Airspray has instituted the above-captioned litigation, Daiwa does not have any right to sue Rieke Corporation, Rieke Packaging Systems, or Rieke Dispensing (collectively "Rieke") for any existing cause of action arising under the '530 patent, including but

not limited to, patent infringement. Accordingly, Daiwa cannot and will not bring any legal action against Rieke with respect to the '530 patent. (Exhibit B, ¶ 9).

11. In view of the grant in the Cross-Licensing Contract providing Airspray the right to bring this suit, Daiwa acknowledges and understands that it will be bound by the outcome of the above-captioned suit and accordingly agrees to be so bound. (Exhibit B, ¶ 10).

12. Pursuant to the Cross Licensing Contract with DAIWA, AIRSPRAY manufactures, distributes, markets and sells a foam dispensing, pump-actuated container covered by the claims of the '530 patent under the product code designations F2, F3, G3, M3, T1 and WR-F3. The foam dispensers are used in a wide variety of applications such as personal care products (e.g., soaps) and household products (e.g., cleaning products). Attached as Exhibit C are literature sheets illustrating the AIRSPRAY products covered by the '530 patent. Attached as Exhibit D is an article entitled "Foaming Hand Soaps Appeal to Everyone" discussing the significance of the AIRSPRAY innovative foam dispensing containers currently used by the world's leading consumer products companies.

13. AIRSPRAY (U.S.) is the sole distributor of AIRSPRAY products in the United States. AIRSPRAY (U.S.) also uses sub-distributors to market certain products; however, all sales of AIRSPRAY products in the United States pass through AIRSPRAY (U.S.).

14. On information and belief, Defendant, RIEKE made, used, imported, offered for sale and/or sells a pump-actuated foam dispenser containers (hereinafter "the accused products" covered by the claims in the '530 patent. On information and belief, two of the accused products are identified by RIEKE as an RF-08 Finger Tip Foamer dispenser and RF-17 Palm Foamer dispenser. RIEKE offers for sale and sells its products in this Judicial District and throughout the

United States. A copy of marketing materials illustrating the RIEKE accused products is attached hereto as Exhibit E.

15. AIRSPRAY has given RIEKE actual written notice of the '530 patent.

16. The manufacture, offer for sale and/or sale of the accused products by RIEKE in this Judicial District and elsewhere in the United States constitutes direct and contributory infringement of, and active inducement to infringe the '530 patent.

17. RIEKE's infringement of the '530 patent has been in violation of AIRSPRAY's rights under the '530 patent, and it is believed that RIEKE will continue to infringe AIRSPRAY's patent rights unless enjoined by this Court.

18. On information and belief, RIEKE's acts of infringement have been willful and deliberate, with full knowledge of AIRSPRAY's patent rights in the '530 patent.

19. As a result of RIEKE's infringement of the '530 patent, AIRSPRAY has been damaged and will continue to be damaged in an amount to be determined at trial. AIRSPRAY has suffered and will continue to suffer irreparable injury unless the infringing activities of RIEKE are enjoined.

20. By virtue of RIEKE's willful and deliberate infringement, this in an "exceptional case" within the meaning of 35 U.S.C. § 285.

WHEREFORE, Plaintiffs AIRSPRAY pray for the following relief:

A. Judgment for AIRSPRAY on its cause of action for patent infringement.

B. Preliminary and permanent injunction enjoining RIEKE, its officers, directors, agents and employees and all those in active concert or participation with them who receive actual notice of the judgment by personal service or otherwise, from making, using, importing,

offering for sale, and selling infringing pump-actuated foam dispenser containers and from otherwise infringing, contributing to infringement and actively inducing infringement of the '530 patent.

C. An award of compensatory and punitive damages to AIRSPRAY by reason of the wrongs committed by RIEKE, including an award of increased damages pursuant to 35 U.S.C. § 284, for Defendants' willful and deliberate patent infringement.

D. An award of costs of this action together with AIRSPRAY's attorney's fees pursuant to 35 U.S.C. § 285.

E. Such other and further relief as this Court deems just and proper.

JURY DEMAND

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, Plaintiffs demand a trial by jury on all issues triable by a jury.

AIRSPRAY INTERNATIONAL B.V. and
AIRSPRAY INTERNATIONAL, INC.
By its Attorneys,

Dated: April 2, 2003

By: _____

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and accurate copy of the FIRST AMENDED COMPLAINT has been served by Federal Express Next Day Air Service this 2nd day of April, 2003, to:

Gayle E. Miller, Esquire
Jeffrey B. Shapiro, Esquire
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Miami, Florida 33131

and

John S. Cipolla, Esquire
MCDONALD, HOPKINS CO., L.P.A.
2100 Bank One Center
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Elizabeth P. Johnson

ELIZABETH P. JOHNSON

Additional Attachments Not Scanned :

- ☐ Legal Size Document
- ☐ Large Exhibit
- ☐ Double Sided
- ☐ Extradition Papers
- ☒ Other Unscannable Exhibit(s) with bar codes

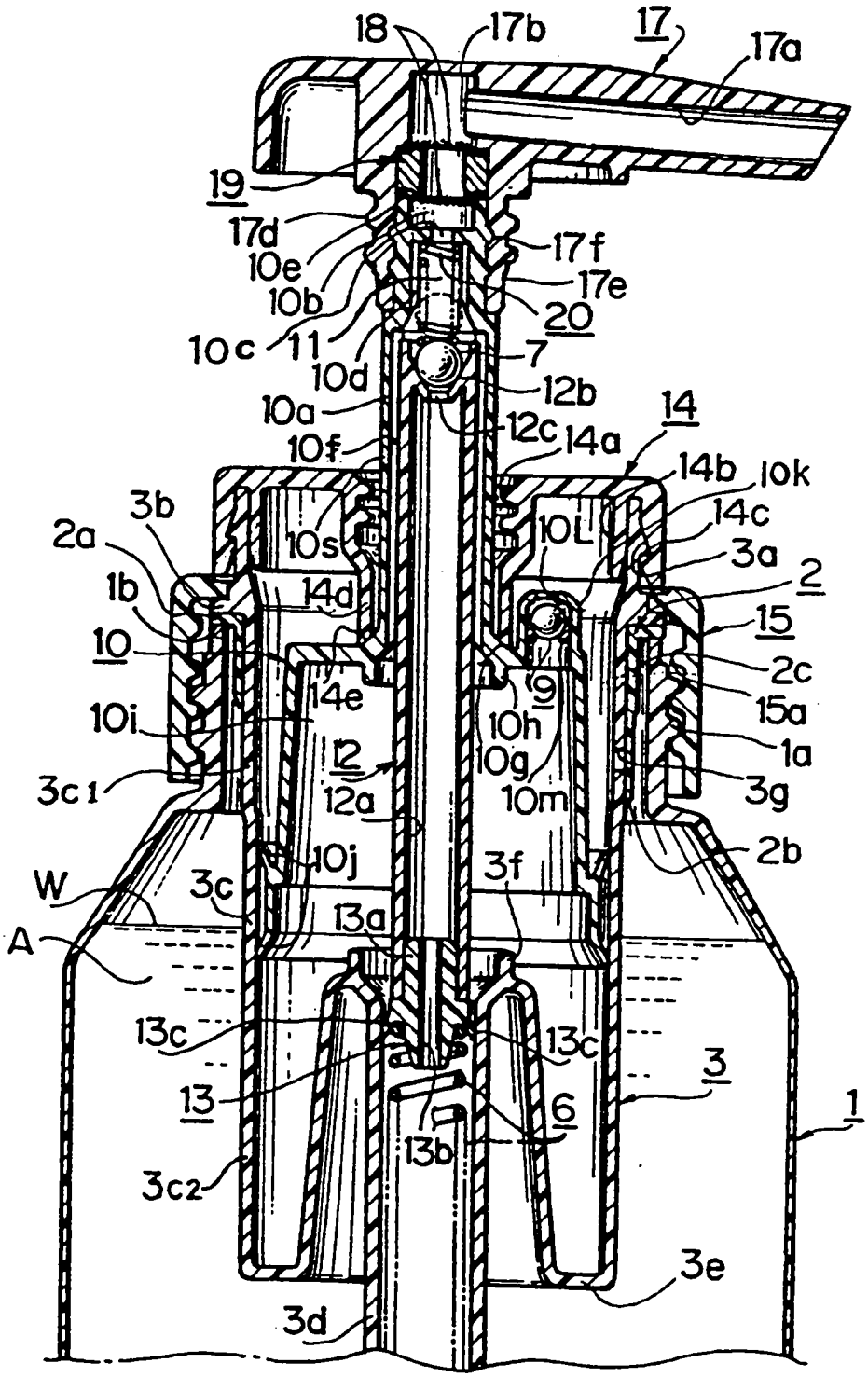
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FIG. 1

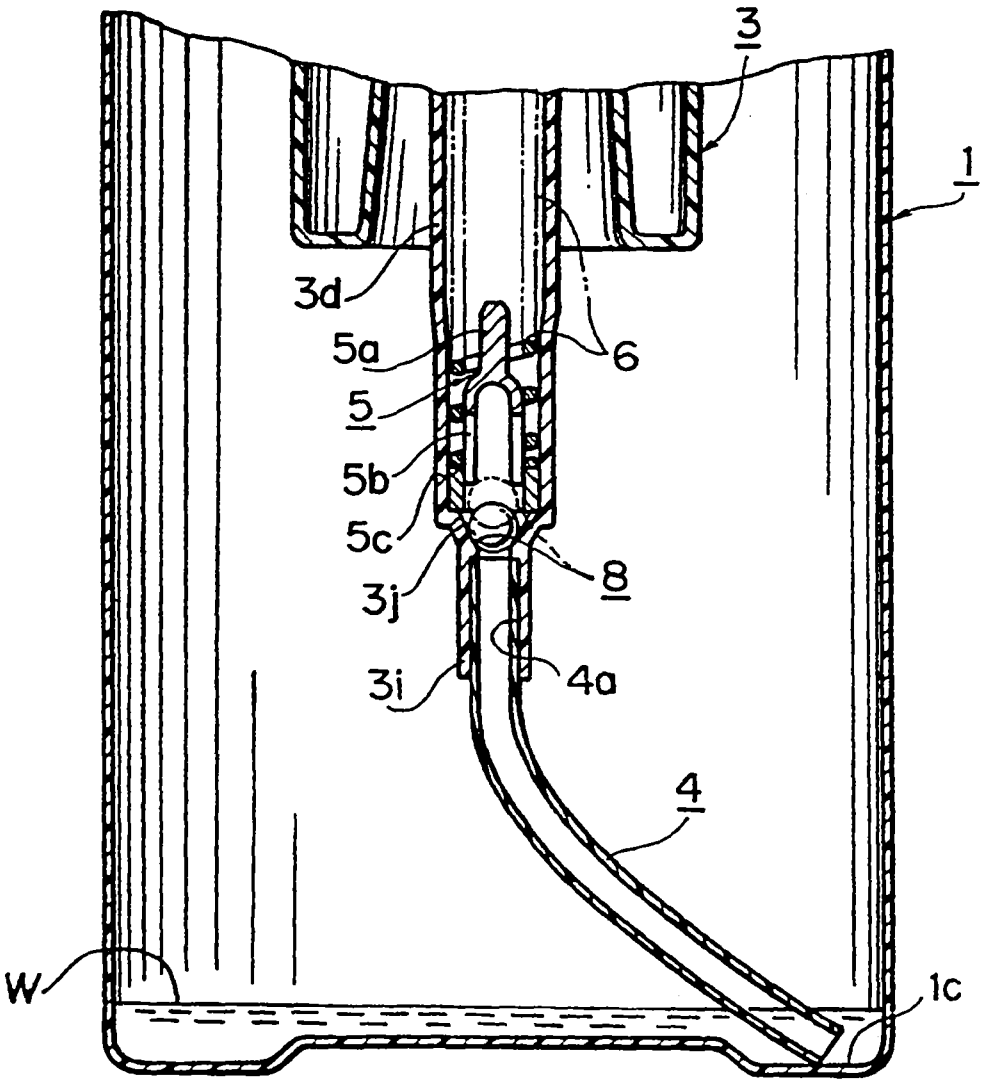


FIG. 2

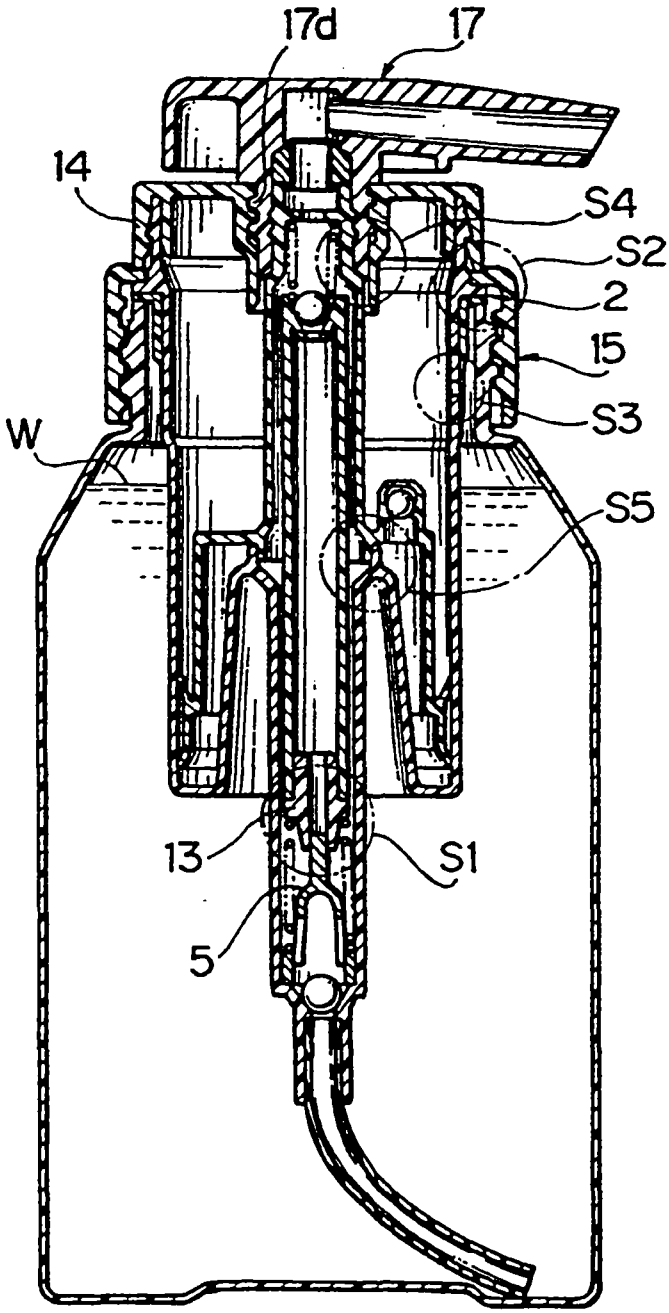


FIG. 3

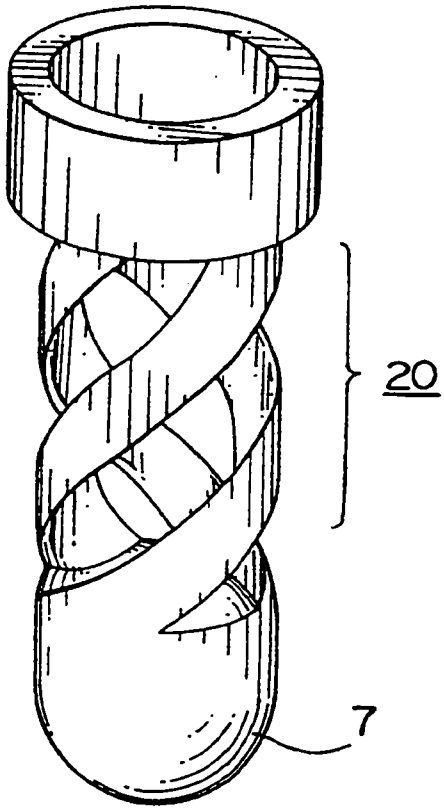


FIG. 4

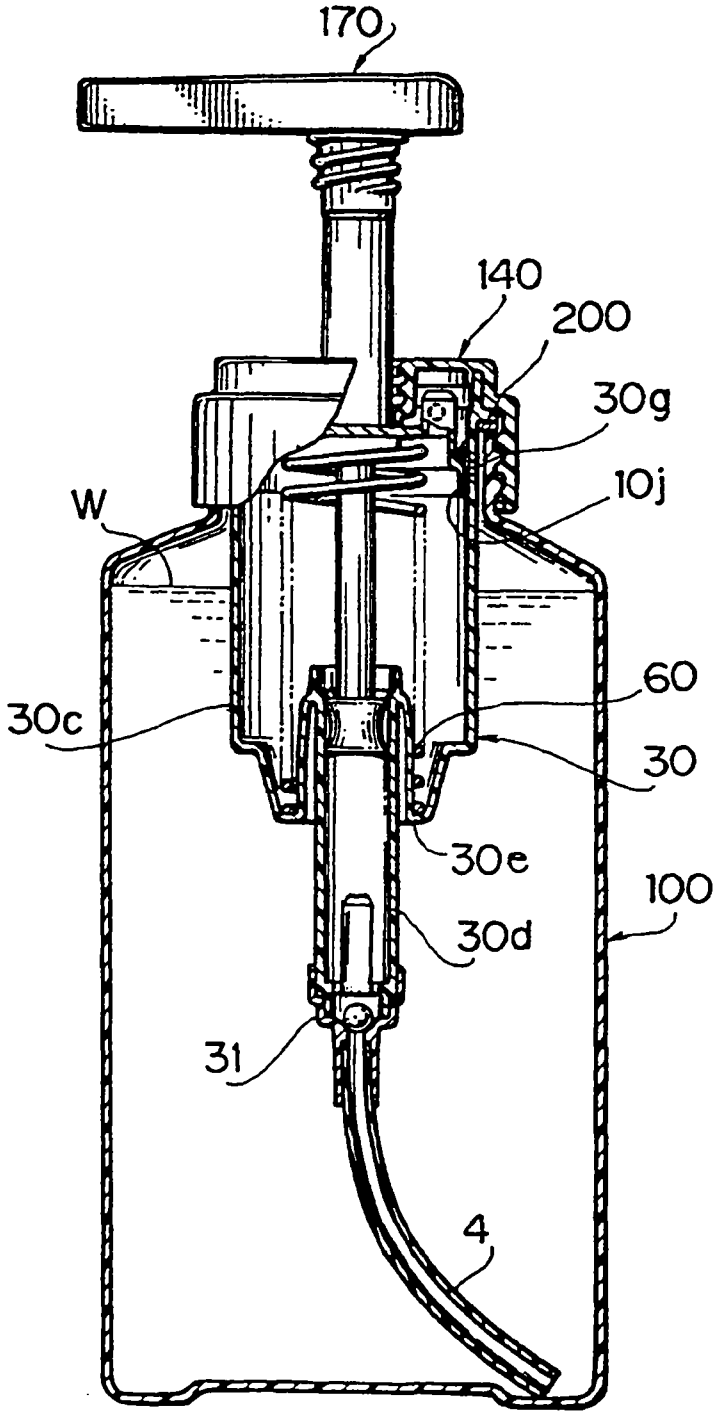


FIG. 5

FOAM DISPENSING PUMP CONTAINER

TECHNICAL FIELD

The present invention relates to a foam dispensing pump container for foaming a foamable liquid, e.g., a detergent, hand soap, or shampoo, by mixing it with air, and thereafter homogenizing the foam and dispensing it small amount at a time.

BACKGROUND ART

Conventionally, foam dispensing pump containers based on the method of storing a high-pressure gas, e.g., a carbon dioxide gas and a Freon gas, in a container together with a foamable liquid creating foam upon dispensing and are in wide practical use. With the growing public consciousness for the global environment in these years, however, there have been apparent moves for totally banning use of such kinds of high-pressure gases in an attempt to protect the global atmosphere. Accordingly, demands have arisen for a foam dispensing pump container not using the high-pressure gas.

Japanese Utility Model Registration No. 1529456 (Japanese Utility Model Publication No. 58-23415) discloses a typical example of a foam dispensing pump container not using a high-pressure gas. The proposed arrangement according to this disclosure may be briefed as follows. That is, this foam dispensing pump container comprises a double cylinder which is provided at an opening portion of a container containing a liquid and which is constituted by air and liquid cylinders that are concentrically provided, a dip tube for allowing a bottom portion of the liquid cylinder and a bottom portion of the container to communicate with each other, a piston assembly constituted by air and liquid pistons integrally provided and movable up and down in the air and liquid cylinders, respectively, a nozzle member provided at an upper end of the piston assembly and having a foam dispensing hole portion, an air flow path for allowing the hole portion and the air cylinder to communicate with each other, a liquid flow path for allowing the liquid cylinder and the hole portion to communicate with each other, a first check valve disposed midway along the liquid flow path, a second check valve disposed in the liquid cylinder, a compression spring for urging the piston assembly to a top dead point with respect to the double cylinder, a lid member for fixing the double cylinder to the container and defining the air cylinder to guide insertion of the piston assembly therethrough, and an interposed permeable object or a porous member, e.g., a sponge, having a function of introducing outer air and generating and discharging foam at a juncture of the air flow path and the liquid flow path in the hole portion.

With the above arrangement, when the piston assembly moves up and down, the liquid supplied from the liquid cylinder and air supplied from the air cylinder are mixed in the interposed permeable object to generate foam and dispense it through the hole portion of the nozzle member.

However, the aforementioned interposed permeable object of this proposal has the first problem in that, since it has has two functions, i.e., a function of introducing the outer air into the air cylinder and a function of generating and discharging the foam, the fluid resistance upon introduction of the outer air essentially becomes large enough to disturb smooth reciprocal movement of the piston assembly. The interposed permeable object also has a second problem. That is, the liquid component of the foam remaining in the interposed permeable object gets dry and solidified in it, causing clogging.

Japanese Utility Model Registration No. 1467526 (Japanese Utility Model Publication No. 57-20285), which is filed by the same applicant as Japanese Utility Model Registration No. 1529456 described above, proposes another foam dispensing pump container not using a high-pressure gas. According to this second proposal, the double cylinder in the arrangement of above Japanese Utility Model Registration No. 1529456 is provided with the liquid cylinder which stands at the central portion of the bottom portion of the air cylinder, an outer air inlet hole having an operational valve is formed in the air cylinder to allow the liquid in the container to communicate with outer air outside the container in order to prevent the interior of the container from being set at a negative pressure, and the skirt portion of the air piston which slides on the inner surface of the air cylinder is formed thin.

However, the second proposal does not clearly describe a means for introducing outer air into the air cylinder and if the same arrangement as the first proposal is in use, it still has the same problems. Also, if the skirt portion of the air piston which slides on the inner surface of the air cylinder is to be formed thin so that the skirt portion is deformed inward when the interior of the air cylinder is set at the negative pressure, thereby introducing outer air into the air cylinder, high precise slidable contact between the air cylinder and the air piston must be maintained.

Even if such precise sliding contact is obtainable, sufficient air supply cannot be attained when the piston is slightly inclined while it is moved downward, and as a result, the quantity of air supplied to the interposed permeable object essentially varies and a constant mixing ratio of the air and liquid cannot be maintained.

DISCLOSURE OF INVENTION

The present invention has been made in view of the problems described above, and has an object to provide a foam dispensing pump container for dispensing foam by a manual pumping operation, wherein the introduction of outer air to generate foam takes place with a minimum of resistance so as to ensure smooth reciprocal movement of the piston assembly, a porous member employed for generating the foam may not be clogged by dry and solidified liquid component of the residued foam and the quantity of air introduced into the air cylinder is kept constant at all times to maintain a given mixing ratio of air and the liquid.

It is another object of the present invention to provide a foam dispensing pump container capable of threadably engaging a nozzle member with a lid member to close the container hermetically while the container is in transit or storage.

In order to achieve the above objects, a foam dispensing pump container according to the present invention comprises a double cylinder which is provided inside an opening portion of a container containing a liquid and which is constituted by an air cylinder for air pumping and a liquid cylinder for pumping liquid, both arranged concentrically, a dip tube for allowing a bottom portion of the liquid cylinder and a bottom portion of the container to communicate with each other, a piston assembly constituted by air and liquid pistons, both arranged

concentrically and integrally to move up and down in the air and liquid cylinders respectively, a nozzle member provided at an upper end of the piston assembly and having a foam dispensing hole portion, an air flow path for allowing the hole portion and an interior of the air cylinder to communicate with each other, a liquid flow path for allowing an interior of the liquid cylinder and the hole portion to communicate with each other, a first check valve disposed midway along the liquid flow path, a second check valve disposed in the liquid cylinder, a porous member disposed in the hole portion, a compression spring for urging the piston assembly to a top dead point with respect to the double cylinder, an outer air inlet hole formed in the air cylinder to allow the liquid in the container and an outer air outside the container to communicate with each other and prevent the interior of the container from being set at a negative pressure and having an operational valve, and a lid member for fixing the double cylinder to the container and guiding insertion of the piston therethrough. Wherein the porous member is constituted by a porous sheet-like member, a juncture where the liquid flow path and the air flow path join with each other is provided in the upstream of the porous sheet-like member and serves as a mixing chamber for mixing the liquid and air, the liquid cylinder extends downwardly from a bottom surface of the air cylinder so that a slidable portion of the air piston and a slidable portion of the liquid piston of the piston assembly move up and down at different elevations and a third check valve is provided in the air piston so that outer air is introduced into an air chamber, defined by the air cylinder and the air piston, through an insertion gap between an outer circumferential surface of the air piston and an insertion hole of the lid member.

In order to achieve the above objects, a foam dispensing pump container accordingly to the present invention comprises a double cylinder which is provided inside an opening portion of a container containing a liquid and which is constituted by an air cylinder for pumping air and a liquid cylinder for pumping liquid, both arranged concentrically, a dip tube for allowing a bottom portion of the liquid cylinder and a bottom portion of the container to communicate with each other, a piston assembly constituted by air and liquid pistons, both arranged concentrically and integrally to move up and down in the air and liquid cylinders respectively, a nozzle member provided at an upper end of the piston assembly and having a foam dispensing hole portion, an air flow path for allowing the hole portion and an interior of the air cylinder to communicate with each other, a liquid flow path for allowing an interior of the liquid cylinder and the hole portion to communicate with each other, a first check valve disposed midway along the liquid flow path, a second check valve disposed in the liquid cylinder, a porous member disposed in the hole portion, a compression spring for urging the piston assembly to a top dead point with respect to the double cylinder, an outer air inlet hole formed in the air cylinder to allow the liquid in the container and outer air outside the container to communicate with each other and prevent the interior of the container from being set at a negative pressure and having an operational valve, and a lid member for fixing the double cylinder to the container and guiding insertion of the piston assembly therethrough. Wherein the porous member is constituted by a porous sheet-like member, a juncture where the liquid flow path and the air flow path join with each other is provided in the upstream of the porous sheet-like member and serves as a mixing chamber for mixing the liquid and air, the liquid cylinder extends downwardly from a bottom surface of the air cylinder so that a slidable portion of the air piston and a slidable portion of the liquid piston of the piston assembly move up and down at different elevations, a third check valve is provided in the air piston so that outer air is introduced into an air chamber, defined by the air cylinder and the air piston, through an insertion gap between an outer circumferential surface of the air piston and an insertion hole of the lid member.

An externally threaded portion is formed on the outer circumferential surface of the air piston in the vicinity of the nozzle member and an internally threaded portion is formed on the lid member to threadably engage with the external thread portion, such that a threadable engagement of the air piston and the lid member is maintained against repelling force of the compression spring.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a longitudinal sectional view showing an upper portion of a foam dispensing pump container according to the first embodiment;

FIG. 2 is a longitudinal sectional view showing a lower portion of the foam dispensing pump container according to the first embodiment;

FIG. 3 is a longitudinal sectional view showing the aforesaid foam dispensing pump container which is set in a state for long-term storage or transportation;

FIG. 4 is an external view of an integrally molded first ball and coil spring; and

FIG. 5 is a longitudinal sectional view showing a foam dispensing pump container according to the second embodiment.

MOST PREFERRED EMBODIMENTS OF THE INVENTION

The first embodiment of a foam dispensing pump container according to the present invention will be described in two areas, an upper half and a lower half. FIG. 1 is a longitudinal sectional view showing the upper portion of the foam dispensing pump container, and FIG. 2 is a longitudinal sectional view showing the lower portion of the foam dispensing pump container.

Referring to FIG. 1, a cylindrical container 1, formed by, e.g., blow molding a resin or the like, carries, up to its maximum fill level W, a formable liquid A to which a surfactant or the like is added to impart foaming properties when mixed with air. An opening thread portion 1*a* having an externally threaded portion is integrally formed on the outer circumferential end portion of the upper opening portion of the container 1. When an inner thread portion 15*a*, which is an internally threaded portion of a large lid member 15, is held engaged with the opening thread portion 1*a*, the hermetic state of the container is maintained, and also, a complete pump assembly to be described later is fastened to the container 1.

The construction of the pump assembly will be described. The cylinder portion of the pump assembly is injection-molded from, e.g., a polypropylene resin and is constituted as a double cylinder 3 in which two cylinders, a large air cylinder 3*c* and a small liquid cylinder 3*d*, respectively, are concentrically formed, as shown in FIG. 1. The double cylinder 3 is open upward, and an

annular fitting portion 3*a* having a locking portion inserted under pressure in and locked with a small lid member **14** and a flange portion 3*b* serving as a portion to be fastened to the container **1** are annularly formed on the open end portion of the double cylinder **3**. Accordingly, the assembly as shown in FIG. **1** is obtained by assembling the respective components, to be described later, in the double cylinder **3**, then fitting the aforesaid large lid member **15** to the flange portion 3*b* of the double cylinder **3**, and finally pressing the annular fitting portion 3*a* until it is locked in a space between an outer wall locking portion **14***c* and an inner wall portion **14***b* of the small lid member **14**, injection-molded from, e.g., a colored polypropylene resin, to form an integral assembly, so that the large lid member **15** may not come off from the pump assembly.

The double cylinder **3** has the annular fitting portion 3*a*, the flange portion 3*b*, the air cylinder portion 3*c*, and the liquid cylinder portion 3*d*, as shown in FIG. **1**, wherein the air cylinder 3*c* is continuous from the flange portion 3*b*, and has an outer diameter slightly smaller than the inner diameter of the opening thread portion **1***a* of the container **1** and a substantially cylindrical shape. The liquid cylinder portion 3*d* is connected with the air cylinder portion 3*c* at the cylinder portion 3*c*, and has a substantially cylindrical shape concentric with the air cylinder portion 3*c* and a diameter smaller than that of the air cylinder portion 3*c*.

The double cylinder **3** will be described in more detail. The air cylinder portion 3*c* consists of a cylindrical portion constituted by a cylindrical guide portion $3c_1$ having an inner diameter smaller than that of the annular fitting portion 3*a* and a cylinder portion $3c_2$ connected with the cylindrical guide portion $3c_1$ through a taper portion and having an inner diameter smaller than that of the cylindrical guide portion $3c_1$, and a bottom portion 3*e* extending inwardly in the radial direction from the lower end of the cylinder portion $3c_2$ and having an upwardly inverted central portion. The liquid cylinder portion 3*d* is connected with the upper end of the inverted portion of the bottom portion 3*e* of the air cylinder portion 3*c* where a projecting seal portion 3*f* to be described later is formed, then extends downwardly from this connecting portion and terminates at its lower end with a reduced diameter.

Regarding the dimensional relationship among the inner diameters of the annular fitting portion 3*a*, the cylindrical guide portion $3c_1$, and the cylinder portion $3c_2$, and the outer diameter of a slidable seal portion 10*j* of an air piston **10** to be described later, the inner diameter of the annular fitting portion 3*a* is larger than the outer diameter of the slidable seal portion 10*j*, the inner diameter of the cylindrical guide portion $3c_1$ is substantially equal to the outer diameter of the slidable seal portion 10*j*, and the inner diameter of the cylinder portion $3c_2$ is slightly smaller than the outer diameter of the slidable seal portion 10*j*. The inner surface portions having different inner diameters are connected by taper portions. In the aforesaid arrangement, when an assembly of the air piston **10** and the liquid piston **12** is inserted in the corresponding cylinders, the liquid cylinder portion 3*d* and the liquid piston **12** are automatically aligned with each other simply by bringing down the slidable seal portion 10*j* of the air piston **10** through the annular fitting portion 3*a*, the flange portion 3*b*, the cylindrical guide portion $3c_1$, and the cylinder portion $3c_2$ so that the insertion is readily done and in addition, damage to slidable portions of the respective pistons that may be caused during such insertion can be eliminated.

The mixing ratio of the liquid to air is governed basically by the volumetic ratio of the air cylinder portion 3*c* to the liquid cylinder portion 3*d*, and to generate desired foam, the quantity of air must be sufficiently larger than that of the liquid. On the other hand, if an overall length of the double cylinder **3** is made excessively large, the container **1** must also be made tall enough to match such length. Therefore, the double cylinder is designed such that the central portion of the bottom portion 3*e* of the air cylinder portion 3*c* is inverted upward, and the liquid cylinder portion 3*d* is connected to the upper end portion of such inverted portion.

While the liquid cylinder portion 3*d* extends downwardly from the bottom portion 3*e* of the air cylinder portion 3*c*, the slidable seal portion 10*j* of the air piston **10** and a slidable seal portion 13*c* (to be described later) of the liquid piston **12** are set at different elevations. Hence, these freely slidable pistons are supported at least at two points, i.e., upper and lower, to enhance prevention of their tilting and waddling.

The annular projecting seal portion 3*f* is formed on the reverse side of the connecting portion connecting the liquid cylinder portion 3*d* with the air cylinder portions 3*c* so as to project upwardly in the air cylinder portion 3*c*. For transportation or storage, an air piston to be described later is sealingly fitted to the projecting seal portion 3*f* to maintain the hermetic state. Furthermore, the inner circumferential surface of the projecting seal portion 3*f* is formed to have a conical shape portion which continues to the inner circumferential surface of the liquid cylinder portion 3*d*, as shown in FIG. **1**. Hence, a slidable seal member **13** to be described later can be smoothly inserted and assembled in the liquid cylinder portion 3*d* without interruption.

An outer air inlet hole portion 3*g* for introducing outer air into the container **1** through the aforesaid inner thread portion **14***a* of the small lid member **14** is formed in the cylindrical guide portion $3c_1$ of the air cylinder portion 3*c*. As the foamable liquid A is consumed, outer air of a volume equivalent to a volume of consumption of the liquid A is introduced into the container **1** through the outer air inlet hole portion 3*g* (see the right hand side portion of FIG. **1**), so that the interior of the container **1** is prevented from being set at a negative pressure. An annular seal member **2** made of a soft resin is interposed between the flange portion 3*b* of the double cylinder **3** and an opening end portion **1***b* of the container **1** to maintain the hermetic state. The seal member **2** consists of a seal portion **2***a*, a thin tongue portion **2***b*, and an annular portion **2***c*. The seal portion **2***a* serves as a gasket to maintain the hermetic state when the large lid member **15** is threadably engaged with the container **1**. The tongue portion **2***b* serving as a valve member to close the outer air inlet hole portion 3*g* is formed on part of the seal member **2** in such a manner that it is urged against the air cylinder **3**. The annular portion **2***c* is fitted to the outer circumferential surface of the upper portion of the cylindrical guide portion $3c_1$ of the air cylinder portion 3*c*. The tongue portion **2***b* is elastically deformed to open only when outer air is introduced as described above, other than that, it always closes the outer air inlet hole portion 3*g* so that the liquid A may not leak into the air cylinder 3*c* through the outer air inlet hole portion 3*g* while the container is in transit or kept in stock.

Referring now to FIG. 2, part of a bottom portion 1*c* of the container 1 is formed deeper to enhance both ability to stand upright stably and rigidity of the container 1 as is conventionally known, and also to ensure that the liquid A can be completely drawn through a hollow dip tube 4 even when the foamable liquid A is consumed until the liquid level W goes down as shown in FIG. 2.

The liquid cylinder 3*d* of the double cylinder 3 is formed to extend downwardly and terminate with a lower hole portion 3*i* having a small diameter. An upper end 4*a* of the dip tube 4 is pressure-fitted into the lower hole portion 3*i*. A ball seat 3*j* is formed on the inner surface of a stepped portion between the lower hole portion 3*i* and the liquid cylinder 3*d*, and a second ball 8 made of a stainless steel or the like and having high corrosion resistance is seated on the ball seat 3*j* in such manner that the ball is freely movable between a position shown by the solid line and the position shown by the broken line. Furthermore, a plug member 5 is provided in the liquid cylinder 3*d* and placed over the ball seat 3*j*, as shown in FIG. 2. The plug member 5 restricts movements of the second ball 8 beyond the position shown by the broken line, and has an annular seat portion 5*c* to receive a coil spring 6 which gives repelling force to a dispenser nozzle member (to be described later) when the dispenser nozzle member is pressed down. A plug portion 5*a* is formed on the head portion of the plug member 5. During transportation or storage, the plug portion 5*a* is fitted in a liquid guide hole portion 13*b* of the slidable seal member 13 of the piston, so that leakage of the liquid A is eliminated. An opening portion 5*b* is formed between the plug portion 5*a* and the seat portion 5*c*, and when the second ball 8 is moved to the position indicated by the broken line, the liquid A is allowed into the liquid cylinder portion 3*d* through the opening portion 5*b*.

Referring again to FIG. 1, a portion of the pump assembly serving as the piston are moved up and down integrally in the air and liquid cylinder portions 3*c* and 3*d* of aforesaid double cylinder 3. For this purpose, the air piston 10 is of a hat-like construction constituted by a pair of upper and lower slidable seal portions 10*j* and an air chamber portion 10*i*. The slidable seal portion 10*j* ensures adequate sealing contacts when the air piston 10 slides vertically along the inner wall surface of the air cylinder portion 3*c* (or more specifically, the inner wall surface of the cylinder portion $3c_2$). In addition, a hollow rod portion 10*a* is formed integrally with the air piston 10 to extend upwardly from the central portion of the air chamber portion 10*i*. Also, as is apparent from FIG. 1, the slidable seal portions 10*j* of the air piston 10 contact the inner wall surface of the air cylinder portion 3*c* at two points, upper and lower, so that the desired hermetic state can be maintained even if a user depresses the air piston 10 obliquely, and as a result, a predetermined mixing ratio of the air to liquid can be maintained.

The liquid piston 12 is pressure fitted in and integrally fixed to the air piston 10 so that they are movable integrally. The liquid piston 12 is constituted by a cylindrical member (as shown in FIG. 1) to guide the liquid to its interior. The liquid piston 12 has a ball seat 12*b* at its upper portion for holding a first ball 7, and an opening portion 12*c* communicating with a liquid guide portion 12*a*.

The first ball 7 is held at the position indicated by the solid line by means of a small coil spring 20. When operated as will be described later, the first ball is urged by the pressure of the liquid A in the liquid guide portion 12*a* and the small coil spring 20 is compressed so that the first ball 7 moves to a position indicated by a broken line to cause the opening portion 12*c* and a mixing chamber 11 to communicate with each other. As a result, the liquid is fed into the mixing chamber 11. The first ball 7 may be seated on the ball seat 12*b* by its own gravity but by providing the small coil spring 20 leakage of the liquid is prevented when the container 1 is tipped over. The first ball 7 may be formed integrally with the small coil spring 20 to a configulation as shown in FIG. 4 showing an integrally molded first ball and the coil spring.

A pressure fitted portion 13*a* of the slidable member 13 having the slidable seal member 13*c* which moves up and down sealingly in the liquid cylinder 3*d* is inserted in the lower end of the liquid piston 12, as shown in FIG. 1. The slidable member 13 has the liquid guide hole portion 13*b* which fits to the aforesaid plug portion 5*a* of the plug member 5 to maintain the hermetic state and also serves as a flow path through which the liquid is introduced. The upper end of the aforesaid coil spring 6 is abutted against the lower side of the slidable seal portion 13*c* to urge the integral assembly of the air and liquid pistons 10 and 12 to the position shown in FIG. 1.

A dispenser nozzle member 17 is pressure fitted in and fixed integrally to an end portion 10*e* of the rod portion 10*a* of the air piston 10. For this purpose, an urging insertion hole portion 17*f* having a recess is formed on the dispenser nozzle member 17, so that the projection of the rod portion 10*a* can be fitted fixedly in the urging insertion hole portion 17*f*. The mixing chamber 11 for generating a foam by mixing the liquid and air is formed at the upper end of the rod portion 10*a* and it serves also as a chamber to accommodate the said small coil spring 20. An opening hole portion 10*c* for allowing the foam, generated by mixing air and liquid, into a net member (to be described later) is formed at the upper center portion of the mixing chamber 11. Ribs 10*d* for locating the small coil spring 20 to the centered portion are radially formed around the opening hole portion 10*c*. A plurality of air passage portions 10*f* for guiding air in the air chamber 10*i* of the air piston 10 are radially formed below the ribs 10*d*. A seal portion 10*h* to fit to the aforesaid projecting seal portion 3*f* of the double cylinder member 3 is formed in the vicinity of the lower opening portions of the air passage portions 10*f*, so that the seal portion 10*h* can be fitted sealingly in the projecting seal portion 3*f*.

An outer air inlet check valve which operates when outer air is to be introduced is integrally provided on the upper wall of the air piston 10. This check valve is constituted by a check valve portion 10*k* incorporating a third ball 9 which is freely movable between the position indicated by the solid line and the position indicated by the broken line, an opening portion 10L which is open at the upper portion of the check valve portion 10*k* and is closed when the third ball 9 is moved upward, and a stopper portion 10*m* for holding the third ball 9 at the position indicated by the solid line to introduce the outer air through the opening portion 10L.

The rod portion 10*a* of the air piston 10 is guided to maintain a gap between its outer circumferential surface and the inner circumferential surface of an opening portion 14*d* of the small lid member 14, and through this gap outer air is introduced to the check valve accommodating the third ball 9.

Two net members **18** of about 200 meshes/inch each made of polyester fiber and having a thickness of 0.06 mm are pressure fitted one above the other with a spacer **19** therebetween in the aforesaid urging insertion hole portion **17***f* of the dispenser nozzle member **17**. The diameter size of bubbles of the foam is governed by the mesh size of the net member **18** and when the bubbles having a random diameter in the mixing chamber portion **10***b* pass through the net member **18**, they are changed to be fine uniform bubbles and dispensed through a hole portion **17***b* and a nozzle hole portion **17***a* of the dispenser nozzle member **17**. The net members **18** may be of one-piece construction and may also be made of a nylon, polyethylene, polypropylene, or carbon fiber, or a stainless steel wire. Nets each having 20 to 400 meshes/inch and a thickness of 0.01 to 2 mm may be used and nets each having 50 to 300 meshes/inch and a thickness of 0.03 to 0.5 mm are more preferable.

In place of the net members **18**, disk-like sheet members made of a thermoplastic resin, e.g., polyethylene or polypropylene, by injection-molding, each having a multiple of 0.03 to 0.5 mm pores and a thickness of 0.01 to 2 mm, or sintered bodies or etched metal plates each having the pores and thickness similar to those as aforesaid may be used.

An outer thread portion **17***d* having the externally threaded portion is formed on the outer surface of the urging insertion hole portion **17***f* of the dispenser nozzle member **17**. The outer thread portion **17***d* can be sealingly threadably engaged with the internally threaded inner thread portion **14***a* of the small lid member **14**, so that the hermetic state of container **1** can be maintained during long-term storage or transportation. For this purpose, the outer diameter of an outer circumferential portion **17***e* formed below the outer thread portion **17***d* is set slightly larger than the inner diameter of the opening portion **14***d* formed below the inner thread portion **14***a*. When the aforesaid outer thread portion **17***d* is engaged with the internally threaded inner thread portion **14***a* of the small lid member **14**, the outer circumferential portion **17***e* is fitted in the opening portion **14***d*, thereby maintaining the hermetic state of the upper space of the air cylinder.

The operation of the aforesaid arrangement will be sequentially described. FIG. **3** is a longitudinal sectional view of the aforesaid foam dispensing pump container set in a state for long-term storage or transportation.

Referring to FIG. **3**, the container has the liquid up to the liquid level W, and the contacting portions of the respective components are in contact under pressure with each other sealingly so that the liquid may not leak when the container is not in use during transportation or display at a shop. To obtain this state, the nozzle member **17** is urged down to the small lid member **14** against the repelling force of the coil spring **6** and rotated to engage its outer thread portion **17***d* with the inner thread portion **14***a*.

As a result, a first seal portion S1 where the plug portion **5***a* of the plug member **5** is fitted in the liquid guide hole portion **13***b* of the slidable member **13** fixed to the liquid piston **12**, a fifth seal portion S5 where the projecting seal portion **3***f* of the double cylinder **3** is fitted on the seal portion **10***h* of the air piston **10**, and a fourth seal portion S4 where the outer circumferential portion **17***e* of the dispenser nozzle member **17** is fitted in the opening portion **14***d* of the small lid member **14** are respectively formed.

The large lid member **15** is threadably engaged with the container **1** through the seal member **2** to form second seal portion S2. The thin tongue portion **2***b* is integrally formed with the seal member **2** to close the outer air inlet hole portion **3***g* and form a third seal portion S3. Since the container, the air cylinder and the liquid cylinder are sealed at the first to fifth seal portions, the liquid in the container may not leak during transportation or storage.

The steps of dispensing the foam from the foam dispensing pump container having the aforesaid arrangement will be described with reference to FIGS. **1** and **2**. Firstly, the container is released from the long-term storage state in FIG. **3** and the dispenser nozzle member **17** is depressed downward while the liquid A is not present in the liquid guide portion **12***a* of the liquid piston **12**, so that the internal pressures of the air and liquid cylinders go up and urge the first and third balls **7** and **9** upward to the positions indicated by the broken lines respectively, while only the second ball **8** stays at the position indicated by the solid line.

Subsequently, when the dispenser nozzle member **17** is released, the integral assembly of the air and liquid pistons **10** and **12** is urged upward by the repelling force of the coil spring **6**. At this time, a negative pressure is created in the interior of the liquid cylinder **3***d* to close the first check valve accommodating the first ball **7** and as the pressure in the interior of the liquid cylinder **3***d* goes further down the second check valve accommodating the second ball **8** is opened and the liquid A is drawn into the liquid cylinder. Simultaneously, a negative pressure is also created in the interior of the air chamber portion **10***i* to open the third check valve accommodating the third ball **9**. As a result, outer air is smoothly supplied into the air chamber portion **10***i* through the gap between the rod portion **10***a* and the opening portion **14***d* of the small lid member **14** to prepare for foam dispensing.

When the integral piston assembly is moved downward again, the outer air introduced in the air chamber portion **10***i* of the air cylinder is pressurized to close the third check valve. As a result, the air having no other escape in the air chamber portion **10***i* is further pressurized and led upward into the mixing chamber **11** through the air passage portions **10***f*. Simultaneously, the liquid A in the liquid cylinder **3***d* is also pressurized and led upward through the liquid guide portion **12***a* to open first check valve comprising the first ball, suppressing repelling force of the coil spring **20**, and flows into the mixing chamber **11**.

As a result, the liquid A and air are mixed in the mixing chamber **11** to generate a foam having bubbles of random diameters, which are subsequently let through the net members **18** to become foam of uniform bubbles and dispensed through the dispenser nozzle **17**.

At this time, the interior of the container is set at a negative pressure due to consumption and decrease of the liquid A, so that the tongue portion **2***b* is elastically deformed outwardly to open the outer air inlet hole **3***g*, and the outer air is drawn into the upper space in the container to release it from the negative pressure. When the container is released from the negative pressure, the tongue portion **2***b* closes the outer air inlet hole **3***g*. By further reciprocal movements of the piston assembly, stable foam of a constant mixing ratio of the air to liquid is dispensed at all times in need.

FIG. **5** is a longitudinal sectional view showing the second embodiment of a foam dispensing pump con-

tainer. Since the basic arrangement of the second embodiment is substantially the same as that of the first embodiment, only different portions will be described. Referring to FIG. 5, a lid member **140** has functions to serve as a guide hole for guiding a dispenser nozzle member **170** and same time threadably engage the dispenser nozzle member **170** with a container **100**. A coil spring **60** is provided not in a liquid cylinder **30***d* but in an air cylinder **30***c*. The aforesaid outer air inlet hole portion now identified as **30***g* is sealed by a slidable seal portion **10***j* of an air piston. Provided at the bottom portion of the liquid cylinder **30***d* is an urging insertion component **31** for accommodating and holding a second ball **8** and holding a pressure fitted dip tube **4**. In the second embodiment having the aforesaid arrangement, stable foam with a constant mixing ratio of air to liquid can be dispensed by reciprocal movement of the piston assembly.

As has been described above, according to the present invention, there is provided a foam dispensing pump container in which the resistance in introducing outer air is kept to a minimum to ensure smooth reciprocal movement of the piston assembly, the net member or the porous member may not be clogged with a dried and solidified liquid component of the foam remaining therein, and the quantity of air introduced into the air cylinder always remains constant to maintain a given mixing ratio of liquid and air.

There is also provided a foam dispensing pump container in which the nozzle member can be threadably engaged with the lid member to maintain the hermetic state of the container when the container is not in use.

Since air is introduced into the air cylinder from the outside of the container, no extra space is needed in the upper portion of the container, and the container can carry the liquid up to a level close to the outer air inlet hole in the upper portion of the cylinder.

As has been described above, foam is generated in the mixing chamber **11** and then homogenized by the sheet-like net members **18**. Therefore, even if clogging is caused in the net members **18** by an unpredictable cause after dispensing the foam, the clogging is readily cleared as the sheet-like net members **18** are thin and the clogging substance is dissolved in the subsequent foam dispensing operation by the liquid constituting the foam. In addition, since introduction of outer air is performed through the gap, it does not adversely affect the reciprocal movement of the piston assembly at all.

The inventor's experiment by removal of the sheet-like net members **18** has shown that bubbles of the foam generated in the mixing chamber **11** have random diameter sizes.

The preferred embodiments of the present invention have been described in detail with reference to the accompanying drawings but it is to be understood that the practical arrangement is not limited to these specific embodiments, and that various design changes may be made without departing from the spirit and scope of the present invention.

We claim:

1. A foam dispensing pump container comprising a double cylinder which is provided inside an opening portion of a container containing a liquid and which is constituted by an air cylinder for pumping air and a liquid cylinder for pumping a liquid, both arranged concentrically, a dip tube for allowing a bottom portion of said liquid cylinder and a bottom portion of said container to communicate with each other, a piston assembly constituted by an air and a liquid piston concentrically and integrally provided to move reciprocally in said air and liquid cylinders respectively, a nozzle member provided at an upper end of said piston assembly and having a foam dispensing hole portion, an air flow path for allowing said hole portion and an interior of said air cylinder to communicate with each other, a liquid flow path for allowing an interior of said liquid cylinder and said hole portion to communicate with each other, a first check valve disposed midway along said liquid flow path, a second check valve disposed in said liquid cylinder, a porous member disposed in said hole portion, a compression spring for urging said piston assembly to a top dead point with respect to said double cylinder, an outer air inlet hole formed in said air cylinder to allow the liquid in said container and outer air outside said container to communicate with each other to prevent the interior of said container from being set at a negative pressure and having an operational valve, and a lid member for fixing said double cylinder to said container and guiding insertion of said piston assembly therethrough, characterized in that

said porous member is constituted by a porous sheet-like member, a juncture where said liquid flow path and said air flow path join with each other is provided upstream of said porous sheet-like member to serve as a mixing chamber for mixing the liquid and air, said liquid cylinder extends downwardly from a bottom surface of said air cylinder so that a slidable portion of said air piston and a slidable portion of said liquid piston of said piston assembly are set for said reciprocal movement at different elevations, and a third check valve is provided in said air piston so that outer air is introduced into an air chamber, defined by said air cylinder and said air piston, through an insertion gap between an outer circumferential surface of said air piston and an insertion hole of said lid member.

2. A foam dispensing pump container comprising a double cylinder which is provided inside an opening portion of a container containing a liquid and which is constituted by an air cylinder for pumping air and a liquid cylinder for pumping a liquid, both arranged concentrically, a dip tube for allowing a bottom portion of said liquid cylinder and a bottom portion of said container to communicate with each other, a piston assembly constituted by an air piston and a liquid piston concentrically and integrally provided to move reciprocally in said air and liquid cylinders respectively, a nozzle member provided at an upper end of said piston assembly and having a foam dispensing hole portion, an air flow path for allowing said hole portion and an interior of said air cylinder to communicate with each other, a liquid flow path for allowing an interior of said liquid cylinder and said hole portion to communicate with each other, a first check valve disposed midway along said liquid flow path, a second check valve disposed in said liquid cylinder, a porous member disposed in said hole portion, a compression spring for urging said piston assembly to a top dead point with respect to said double cylinder, an outer air inlet hole formed in said air cylinder to allow the liquid in said container and outer air outside said container to communicate with each other to prevent the interior of said container from being set at a negative pressure and having an operational valve, and a lid member for fixing said double cylinder to said container and guiding insertion of said piston assembly therethrough, characterized in that

said porous member is constituted by a porous sheet-like member, a juncture where said liquid flow path and said air flow path join with each other is provided upstream of said porous sheet-like member to serve as a mixing chamber for mixing the liquid and air, said liquid cylinder extends downwardly from a bottom surface of said air cylinder so that a slidable portion of said air piston and a slidable portion of said liquid piston of said piston assembly are set for said reciprocal movement at different elevations, a third check valve is provided in said air piston so that outer air is introduced into an air chamber, defined by said air cylinder and said air piston, through an insertion gap between an outer circumferential surface of said air piston and an insertion hole of said lid member, and

an externally threaded portion is formed on said outer circumferential surface of said air piston in the vicinity of said nozzle member and an internally threaded portion is formed on said lid member to threadably engage with said externally threaded portion, such that a threadable engagement of said air piston and said lid member is maintained against repelling force of said compression spring.

3. A foam dispensing pump container according to claim 2, including first means for sealing between said double cylinder and said container, second means for sealing a hole portion in said double cylinder, and third means for sealing said liquid piston, said first, second, and third sealing means to cut off communication between the liquid in said container and outer air while in said threadable engagement.

4. A foam dispensing pump container according to claim 1, wherein said compression spring is disposed in said liquid cylinder.

5. A foam dispensing pump container according to claim 1, wherein said sheet-like member is a net member having predetermined meshes and a predetermined thickness, and at least one sheet-like member is disposed to homogenize bubbles of foam to have a uniform diameter.

6. A foam dispensing pump container according to claim 1, wherein a taper portion is formed on an inner circumferential surface of said double cylinder in order to easily fit and insert said piston assembly in said double cylinder during assembly.

7. A foam dispensing pump container according to claim 1, wherein said operational valve is formed as a thin tongue portion of a seal member interposed to maintain a hermetic seal between said lid member and said container.

8. A foam dispensing pump container according to claim 1, wherein said first to third check valves comprise ball members.

9. A foam dispensing pump container according to claim 1, wherein a ball member of said first check valve is urged by a compression spring to close said first check valve.

10. A foam dispensing pump container according to claim 2, wherein a taper portion is formed on an inner circumferential surface of said double cylinder in order to easily fit and insert said piston assembly in said double cylinder during assembly.

11. A foam dispensing pump container according to claim 2, wherein said compression spring is disposed in said liquid cylinder.

12. A foam dispensing pump container according to claim 2, wherein said sheet-like member is a net member having predetermined meshes and a predetermined thickness, and at least one sheet-like member is disposed to homogenize bubbles of foam to have a uniform diameter.

13. A foam dispensing pump container according to claim 2, wherein a ball member of said first check valve is urged by a compression spring to close said first check valve.

14. A foam dispensing pump container according to claim 2, wherein said operational valve is formed as a thin tongue portion of a seal member interposed to maintain a hermetic seal between said lid member and said container.

15. A foam dispensing pump container according to claim 2, wherein said first to third check valves comprise ball members.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,271,530

DATED : December 21, 1993

INVENTOR(S) : Uehira et al

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

Column 1, line 8, after "it" insert --a--

Column 5, line 25, after "the" (second instance) insert --central portion of a bottom portion 3e of the air--

Column 10, line 44, replace "led" with --let--

Column 10, line 47, replace "led" with --let--

Signed and Sealed this

Twenty-second Day of November, 1994

Attest:

BRUCE LEHMAN

Attesting Officer

Commissioner of Patents and Trademarks

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA
MIAMI DIVISION

Case No.: 02-10052-CIV-KING/O'SULLIVAN

AIRSPRAY INTERNATIONAL B.V. and
AIRSPRAY INTERNATIONAL, INC.,

Plaintiffs,

v.

RIEKE CORPORATION,
RIEKE PACKAGING SYSTEMS and
RIEKE DISPENSING,

Defendants.
_____/

DECLARATION OF DAIWA CAN COMPANY

I, MICHIHITO IZUKA, declare and state as follows:

1. I am a JAPANESE citizen who resides at : 55-1-302, MIYAGAYA, NISHI-KU, YOKOHAMA, KANAGAWA, JAPAN (POSTAL CODE : 220-0006)

2. I am an officer of Daiwa Can Company (hereinafter "Daiwa") and have the authority to execute this document on behalf of Daiwa.

3. Daiwa is a Japanese corporation, having a place of business at 2-1-10, Nihonbashi, Chuo, Tokyo, Japan.

EXHIBIT
tabbies "B"

4. Daiwa is the owner by assignment of all right, title and interest in and to United States Patent No. 5,271,530 entitled "Foam Dispensing Pump Container," (hereinafter '530 patent).

5. In January 1996, Daiwa and Airspray International B.V. (hereinafter "Airspray") entered into a cross-licensing agreement (hereinafter "Cross Licensing Contract") whereby Daiwa exclusively licensed to Airspray certain patents, including the '530 patent, relating to pump foamers and/or squeeze foam dispensers in the United States, Canada, Europe and Australia and future applications in North America, South America, the European continent and Australia, (hereinafter "Daiwa licensed patents"). Likewise, Airspray exclusively licensed to Daiwa certain patents relating to pump foamers and/or squeeze foam dispensers in Japan and future patent applications in Japan, China, Taiwan, Vietnam, Thailand, Indonesia, Philippines and Korea. A copy of the Cross Licensing Contract is attached hereto as Exhibit 1.

6. At the time of execution of the Cross Licensing Contract, it was Daiwa's understanding and intent that all substantial rights in each of the Daiwa licensed patents, including the '530 patent, were exclusively licensed to Airspray. The rights included, but are not limited to the right to make, use, sell, import and offer for sale products covered by the '530 patent.

7. Daiwa did not retain any right to use the Daiwa licensed patents in the Cross Licensing Contract.

8. Pursuant to the Cross Licensing Contract, paragraph 5, Daiwa specifically granted Airspray the independent right to bring and prosecute legal action for infringement by a third party of the Daiwa licensed patents, including the '530 patent.

9. Based on Daiwa's understanding and intent at the time of execution of the Cross Licensing Contract, and since Airspray has instituted the above-captioned litigation, Daiwa does not have any right to sue Rieke Corporation, Rieke Packaging Systems, or Rieke Dispensing (collectively "Rieke") for any existing cause of action arising under the '530 patent, including but not limited to, patent infringement. Accordingly, Daiwa cannot and will not bring any legal action against Rieke with respect to the '530 patent.

10. In view of the grant in the Cross-Licensing Contract providing Airspray the right to bring this suit, Daiwa acknowledges and understands that it will be bound by the outcome of the above-captioned suit and accordingly agrees to be so bound.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct on the basis of my personal knowledge.

Executed on March 31, 2003 at DAIWA CAN COMPANY , TOKYO , JAPAN

DAIWA CAN COMPANY

NAME: Michihito Izuka
TITLE: A Director of the Board

CROSS LICENSING CONTRACT

The parties:

1. Daiwa Can Company,
a Japanese corporation, having its principal office at 2-1-10, Nihonbashi, Chuo, Tokyo, Japan (hereinafter referred to as 'Daiwa'); and

2. Airspray International B.V.,
a Dutch company registered under the laws of the Netherlands and having its principal office at Zuiderkade 31-33, 1948 NG Beverwijk, The Netherlands (hereinafter referred to as 'ASI').

Preamble:

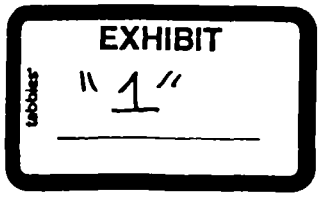
- whereas Daiwa and ASI respectively have developed inventions in the field of spray and foam dispensing technology, which inventions have been patented or applied for patents in various countries;
- whereas each of Daiwa and ASI wishes to enter a cross licensing arrangement and acquire a license under such patents and patent applications of the other in certain countries.

Now, therefore, the parties hereto, intending to be legally bound hereby, agree as follows.

1. License granted to ASI

Daiwa hereby grants ASI an exclusive and royalty-free license under Daiwa's patents and patent applications as listed below for manufacturing and selling pump foamers (the listed patents and patent applications are hereinafter collectively called 'the licensed patents of Daiwa' and the countries wherein filing of the licensed patents of Daiwa are made are hereinafter collectively called 'ASI's Territory');

- US patent no 5,271,530
- EPC patent no 565713 B1



- Canadian patent application no 2073256-3
- US patent no 5,443,569
- EPC patent application no 0613728 A2
- Australian patent no 56442/94
- Canadian patent application no 2117054
- All future patents and patent applications covering improvements by Daiwa of the inventions disclosed in any of the above mentioned patents and patent applications, if filed in any of the following countries.
  a) the countries in the European Continent including Central and East Europe, the Baltic Republics, Russia, Belo-Russia and Ukraine,
  b) Australia, and
  c) the countries in American Continents including South, Central and North America.

Daiwa will take all necessary steps to keep the above mentioned patents in force.

ASI may not, without a prior written consent of Daiwa, sub-license the license granted hereunder to any party other than wholly owned subsidiaries of ASI.

2. License granted to Daiwa

ASI hereby grants Daiwa an exclusive and royalty-free license under ASI's patents and patent applications as listed below for manufacturing and selling pump foamers and/or squeeze foam dispensers (the listed patents and patent applications are hereinafter collectively called 'the licensed patents of ASI' and the countries wherein filing of the licensed patents of ASI are made are hereinafter collectively called 'Daiwa's Territory');

- Japanese patent application no HEI4-505906.
- Japanese patent application no HEI6-510727.
- A Japanese patent application corresponding to Dutch application no 1001366.
- All future patents and patent applications covering improvements by ASI of the inventions disclosed in any of the above mentioned patents and patent applications, if filed in any of the following countries.
  a) Japan,
  b) The Peoples Republic of China,

c) Taiwan,
d) Vietnam,
e) Thailand,
f) Indonesia,
g) Philippines, and
h) Korea.

ASI will take all necessary steps to keep the above mentioned patents in force.

Daiwa may not, without a prior written consent of ~~Daiwa~~ ASI, sub-license the license granted hereunder to any party other than fully owned subsidiaries of Daiwa.

3. Term of Contract

This Contract will come into effect and become enforceable when the last of all necessary governmental approvals, if any, is obtained. Each party shall notify the other forthwith, if such approvals are necessary. Failure to so notify will give the other party the ability to seek compensation for any damages that could result from the inability to enforce the Contract.

This Contract will remain in effect for an initial period of five(5) years from the effective date hereof, provided, however, that, unless both parties agree to its termination, the term hereof will be extended automatically and repeatedly for subsequent periods of five (5) years.

Notwithstanding any provision contrarily setting forth, this Contract will always expire when all the patents, or patent applications referred to herein expire and/or become invalid.

4. Improvements and developments

Each party shall promptly disclose to the other in confidence, and may file patent applications in its Territory for, any substantial modification or improvement made to the inventions covered by the licensed patents of the other party.

If either party files a patent application pursuant hereto, such party(the inventing party) shall forward an English translation of the specifications of such application to the other party promptly and at least within one(1) month from the date of the application, and such other party will have an option to demand

the inventing party to file corresponding patent applications in such other party's Territory, provided, however, that the ownership of such corresponding patent applications shall forthwith be transferred to such other party and such other party shall reimburse the inventing party for all costs incurred in the filing of such corresponding patent applications.

5. Defence of patents and patent infringements

Each party will, at its own primary descretion and responsibility, defend the rights under, and patentability of, the licensed patents of the other party.

If either party decides not to take any actions against infringement by a third party of the licensed patents of the other party, such other party may bring suit to enjoin-such infringement. The parties may agree to jointly take actions against such infringement, in which case any litigation expenses and damages collected shall be equally shared by the parties.

6. Compensation for damages due to breach of Contract

In the event that either party suffers any damage caused by non-performance or breach of this Contract by the other party, such other party shall be liable to compensate such damage.

7. Force Majeure

Neither party shall be responsible for failure or delay due to causes beyond its control in performing any of its obligatins hereunder. Such causes shall include but not be limited to fire, storm, flood, earthquake, explosion, accident, acts of a public enemy, war, rebellion, insurrection, epidemic quarantine restrictions, sabotage, lockouts, labor disputes, labor shortages, transportation embargoes, or failure or delay in transportation, acts of Gods, acts or regulations or priorities of any government or its branches or agency.

8. Termination of Contract for cause

In the event either of the parties for reasons of insolvency or bankruptcy becomes unable to continue performing the obligations in accordance with this Contract, then such party shall immediately notify the other party of the circumstances, thereby allowing such other party to take action in order to terminate this Contract for that cause. However, it is understood that in case the party in solvency problems falls

under receivership by Court procedures, the other party may not demand the immediate termination of this Contract but shall follow the orders of the Court, allowing the party in problems opportunity of restructuring its financial situation as permitted by the Court.

If this Contract is terminated in consequence of one of the parties becoming insolvent, then the other party may continue enjoying the benefits of the license granted to it hereunder, for then available Contract term.

In the event of major breach of this Contract by one party, the other party may give the breaching party a notice demanding due performance hereof and unless such breach is rectified within 60 days from the date of the notice, such other party may forthwith terminate this Contract. Upon such termination the breaching party shall be liable to compensate resulting damage of the other party.

9. Arbitration

Any dispute between the parties arrising out of or relating to interpretation or execution of this Contract or breach thereof shall be finally settled by arbitration by which each party hereto shall be bound. Where arbitration is requested by ASI, it shall be held in Tokyo in accordance with the rules of the Japan Commercial Arbitration Association. Where arbitration is requested by Daiwa, it shall be held in Rotterdam in accordance with the rules of arbitration of the Nederlands Arbitrage Instituut, Rotterdam, Netherlands. All arbitration proceedings hereunder shall be in English language.

10. Notices

Unless otherwise directed, all notices relating to this Contract shall be sent to the following addressees:

If to Daiwa: Mr. N. Sakai, Managing Director
Daiwa Can Company
2-1-10, Nihonbashi,
Chuo, Tokyo,
Japan.

If to ASI: Mr. A.S.M. Molenaar, Nanaging Director
Airspray International B.V.

PO Box 398
1940 AJ Beverwijk
The Netherlands.

A telefax message shall be accepted as a notice hereunder only when it is expressly acknowledged by the recipient.

IN WITNESS WHEREOF the parties have caused this contract to be executed in duplicate by their duly authorised representatives on the date set forth below.

AIRSPRAY INTERNATIONAL B.V.	DAIWA CAN COMPANY
Name: A.S.M. Molenaar	Name: Naoshi Sakai
Title: Managing Director	Title: Managing Director
Date: January 11, 1996	Date: December 28, 1995
Witness:	Witness:
Name: E.I.M. van der Heyden	Name: Kazuo Suzuki

Airspray®

Leading in the world of innovative dispensing technology

F2 FINGER PUMP FOAMER

Airspray Pump Foamers create foam without the use of gas propellants. Their unique, patented, technology allow for the precise mixing of liquid and air, resulting in a dose of high quality foam with each single stroke. The F2 Finger Pump Foamer was the first mousse finger pump on the market and has been used in an everwidening range of applications in the personal care industry.
Some typical uses are:

Personal Care
- hair styling mousses
- **hair conditioning mousses**
- **facial cleansers**
- **acne washes**
- baby washes
- self tanning products
- sun protection foams

Other applications
- household cleaning products
- pet care products
- spot removers
- anti-lice foam

[redacted]

Visit our website: www.airspray.net

Product code	Type	Output ml	Stroke mm	Thread diameter
F2	F2-L11	0.75	14.8	Ø 43
	F2-L7	1.50	18.8	Ø 43

General info
- Mechanical, non aerosol, foam dispenser
- Handheld
- Standard and customized colors
- Airspray and custom bottle designs
- Frosted and transparent overcap available
- Jet foamer execution available
- Diptube filters available

EXHIBIT
"C"
tabbies

Airspray

Leading in the world of innovative dispensing technology

ELEGANT FOAMER LINE

Airspray Pump Foamers create foam without the use of gas propellants. Their unique, patented, technology allow for the precise mixing of liquid and air, resulting in a dose of high quality foam with each single stroke. The small and elegant Mini Foamer is specifically suited for cosmetic and personal care products such as facial cleaners and make-up removers. The Mini Foamer also induced Airspray's customers to launch products that never before were available in foam such as foaming candy, feminine hygiene products and antiseptics. It is also used for sales promotions and for test markets.

The design of the new F3 and G3 Finger Pump Foamers is similar to the Mini Foamer, but offer the output of a large foamer. These products offer customers the opportunity of launching a line of products in different sizes while maintaining one design and brand image.

Airspray International B.V.
Tel: +31-72-541 46 66
E-mail: general@airspray.nl

Airspray International Inc.
Tel: +1-954-979-7750
E-mail: general@airspraylntl.com

Visit our website: www.airspray.net

Product code	Type	Output ml	Stroke mm	Thread diameter
M3	M3-S10	0.4	11.0	Ø 30
G3	G3-L11	0.75	14.8	Ø 40
	G3-L7	1.50	18.8	Ø 40
F3	F3 L11	0.75	14.8	Ø 43
	F3 L7	1.50	18.8	Ø 43

General info

- Mechanical, non aerosol, foam dispenser
- Handheld
- Standard and customized colors
- Diptube filter available
- Airspray and custom bottle designs
- Decoration options available
- Frosted and transparent overcap available

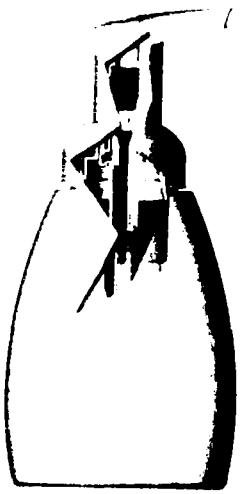
Airspray

Leading in the world of innovative dispensing technology

Airspray Pump Foamers create foam without the use of gas propellants. Their unique, patented, technology allow for the precise mixing of liquid and air, resulting in a dose of high quality foam with each single stroke.

The Airspray Table Top Foamer is specifically designed for counter top applications such as hand soaps and professional salon products.

Especially for the hand soap market, the Table Top Foamer is ideal. The foaming hand soap, which the Airspray Table Top Foamer creates, was hailed by one of the early users as 'the greatest innovation in the soap market since the advent of liquid soap'.



Product code	Type	Output ml	Stroke mm	Thread diameter
T1	T1 L11	0.75	14.8	Ø 40
	T1-L7	1.50	18.8	Ø 40

General info

- Mechanical, non aerosol, foam dispenser
- Table top
- Standard and customized colors
- Airspray and custom bottle designs
- Diptube filter available
- Nozzle lock feature

Airspray International B.V.
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E-mail: general@airspray.nl

Airspray International Inc.
Tel: +1-954-972-7750
E-mail: general@airsprayintl.com

Visit our website: www.airspray.net

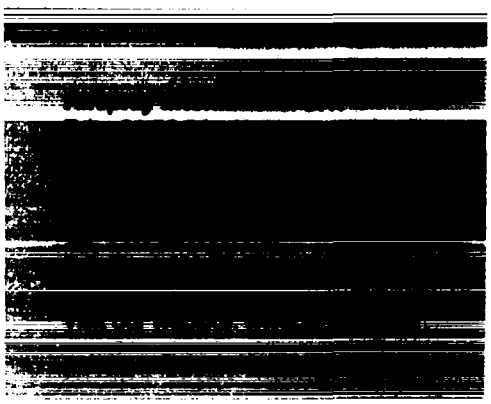
Airspray

Leading in the world of innovative dispensing technology

WATER RESISTANT FOAMER

Airspray Pump Foamers create foam without the use of gas propellants. Their unique, patented, technology allow for the precise mixing of liquid and air, resulting in a dose of high quality foam with each single stroke.

The Water Resistant Foamer is specifically developed for use in wet or humid environments. Its design limits the entry of water and humidity into the inside of the dispenser. This feature is important in order to avoid water entering the air chamber of the pump mechanism.
The main products to benefit from the water-resistant capabilities of this dispenser are bath and shower products. As for body washes and shampoos the dispenser is also ideal for 'fun products' for children to play with in the shower.



Product code	Type	Output ml	Stroke mm	Thread diameter
WR-F3	WR-F3 L11	0.75	14.8	Ø 40
	WR-F3 L7	1.50	18.8	Ø 40

General info

- Mechanical, non aerosol, foam dispenser
- Handheld
- Standard and customized colors
- Airspray and custom bottle designs
- Diptube filter available
- Nozzle lock feature

INGENIOUS IDEAS DEPT.

Foaming Hand Soaps Appeal to Everyone

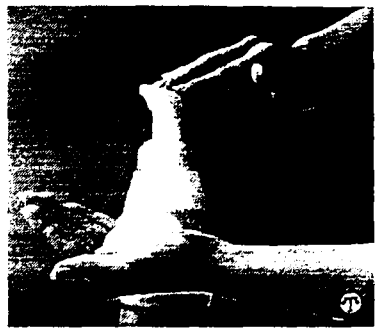
(NAPS)—There is a new generation of high-tech, instant-foam hand soap dispensers that have won over U.S. consumers. The new foaming hand soaps help you wash your hands even cleaner.

The foaming hand soaps appeal to parents by helping get children to wash their hands more often and with greater thoroughness. The soaps wash thoroughly, rinse quickly, and feel rich and creamy.

The new soaps came along at just the right time. According to a survey by the American Society for Microbiology (ASM), at least one-third of Americans forget the single best piece of infection control advice: washing your hands after you go to the bathroom.

According to the ASM, it is important to wash hands before and after handling food products, after handling pets, before eating, and when sick, or when around people who are sick. Despite the common belief that cold germs are spread through sneezing and coughing, most germ transmission comes from hand-to-hand contact and transfer of germs.

Airspray International was the first to develop the innovative foaming dispensers now used by the world's leading consumer product companies. These proven "engines" allow a precise mixture of liquid and air with a single stroke of a smooth-action button,



Foaming soap dispenser can make hand washing easier and more fun.

but without using chemical propellants.

Some of the biggest names in personal care products are committed to this new packaging technology. The first foaming hand soap was produced by Dial Corp., and marketed as "Dial Complete." Johnson & Johnson has introduced two hand soap products, "Johnson's Kids Foam Blaster Hand Soap" and "Harry Potter Foaming Red Cherry." More foaming hand soap products are on the way.

The pumps are also being used in products ranging from sunless tanners to baby shampoo.

For more information on foaming soaps or tips on handwashing, visit www.airspray.net, www.washup.org, or www.completehandwashing.com.

EXHIBIT
tabbies
"D"

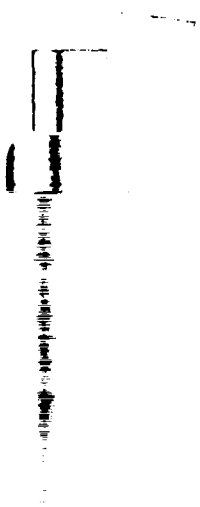
RF-17 Palm Foamer

Dispensers

New non-aerosol foam dispenser

A next generation non-aerosol foam dispenser with the pump fitting a standard 40mm neck, and a dose output of 1.7ml of liquid, the RF-17 Foamer can be used in a wide range of applications.

The RF-17 is part of a new foamer dispenser family that includes the RF-08 Finger Tip Foamer dispenser.



Features/Benefits:

- **No metal contact**
- **Two colour head options**
- **Superior aesthetics**
- **Soft touch nozzle option**
- **Up-shipper**

Applications:

- **Hand Soaps**
- **Household Products**
- **Pharmaceutical**
- **Personal Care**

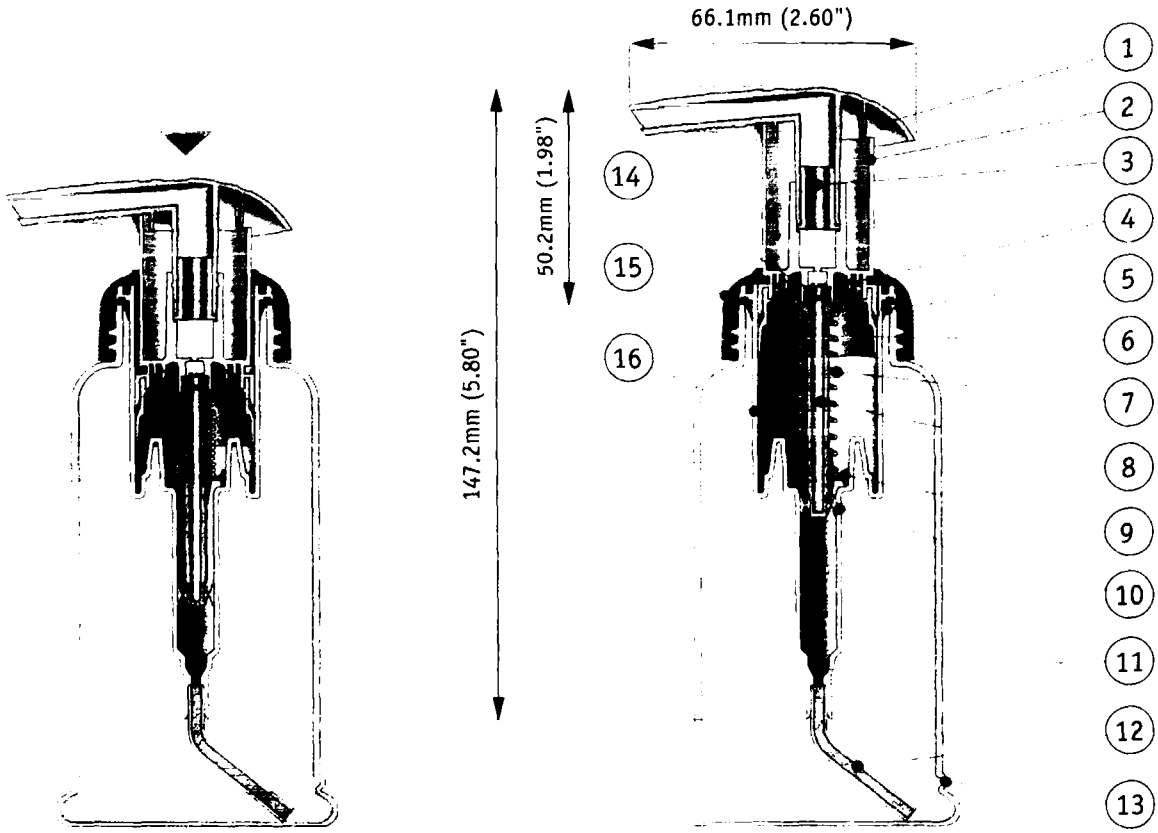
EXHIBIT "E"

Rieke Dispensing

Rieke Packaging Systems

Dispensers

RF-17 Palm Foamer



CONSTRUCTION MATERIAL

1. Spout - Polypropylene
2. Plunger Sleeve - Polypropylene
3. Mesh Assembly - HDPE
4. Air Outlet Valve - EVA
5. Vent Valve - EVA
6. Air Piston - EVA
7. Spring - Stainless Steel
8. Piston - Acetal
9. Piston Retainer - Polypropylene
10 Sliding Seal - EVA
11 4mm Ball - Glass
12 Suction Pipe - Polypropylene
13 Bottle - Optional
14 Piston Insert - Polypropylene
15 Collar - Polypropylene
16 Body - Polypropylene

Rieke Packaging Systems™

Rieke Dispensing

WEBSITE • www.riekepackaging.com

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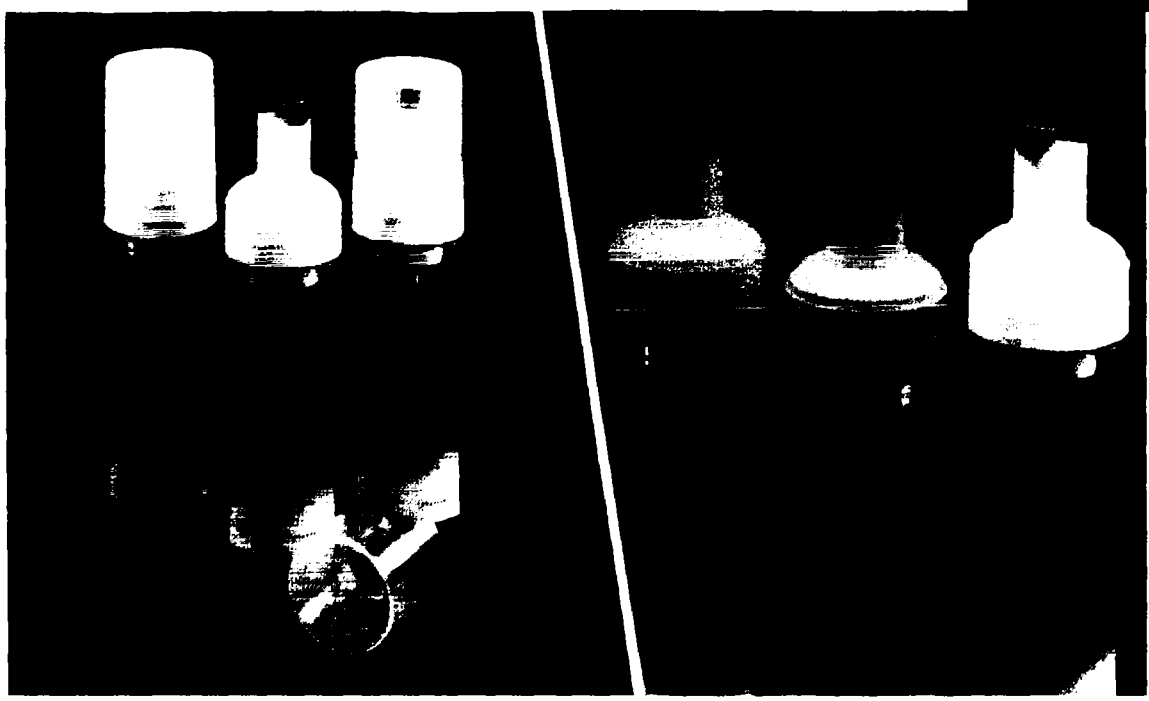
RIEKE DISPENSING • 500 West Seventh Street • Auburn, Indiana 46706 • USA • +1 260 925-3700 • Fax +1 260 925-2493 • email sales@riekecorp.com

RF-08 Finger Tip Foamer



New non-aerosol foam dispenser

A next generation non-aerosol foam dispenser with the pump fitting a standard 43mm neck. With a dose output of 0.8ml of liquid, the RF-08 Foamer can be used in a wide range of applications.

The RF-08 is part of a new foamer dispenser family that includes the new RF-17 Palm Actuated Foamer.

Features/Benefits:

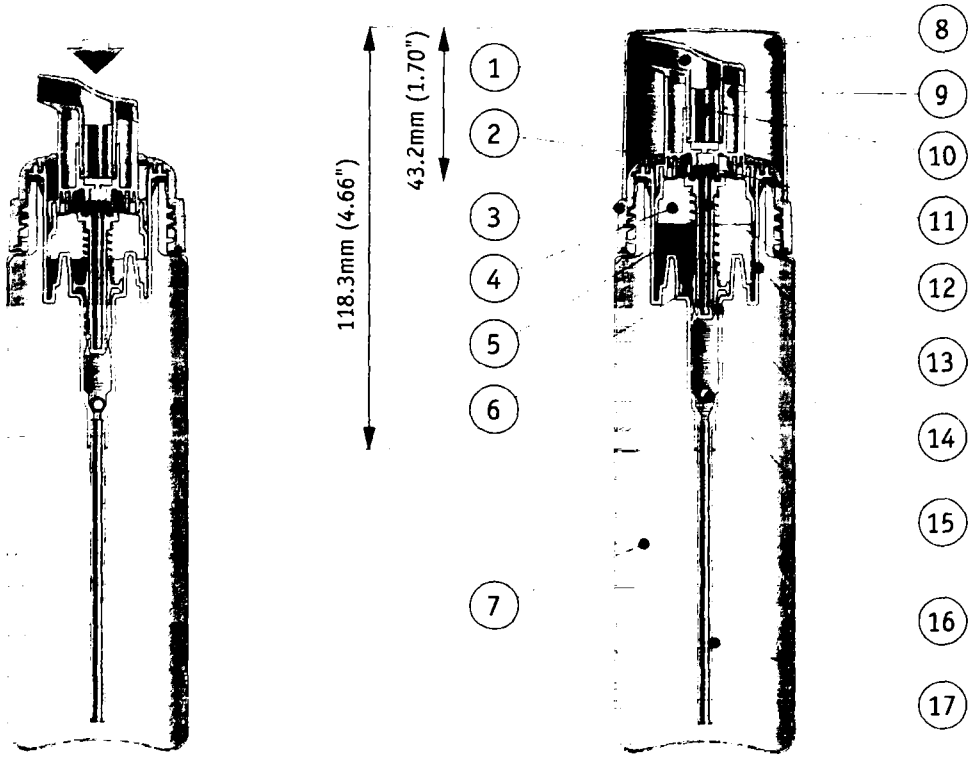
- **No metal contact**
- **Shower proof as standard**
- **Superior aesthetics**
- **Two colour head options**
- **Soft touch nozzle option**
- **Shippable**

Applications:

- **Personal Care Products**
- **Pharmaceutical**
- **Household**

Dispensers

RF-08 Finger Tip Foamer



CONSTRUCTION MATERIAL

1. Spout - Polypropylene
2. Air Outlet Valve- EVA
3. Collar - Polypropylene
4. Air Piston - EVA
5. Spring - Stainless Steel
6. Piston Retainer - Polypropylene
7. Bottle - Optional
8. Overcap - Polypropylene
9. Plunger Sleeve - Polypropylene
10. Mesh Assembly - HDPE/Polyester
11. Piston Insert - Polypropylene
12. Vent Valve - EVA
13. Piston - Acetal
14. Body - Polypropylene
15. Sliding Seal - EVA
16. 4mm Ball - Glass
17. Suction Pipe - Polypropylene

Rieke Packaging Systems™

Rieke Dispensing

WEBSITE • www.riekepackaging.com

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