



US00D735316S

(12) **United States Design Patent**  
**Steelman et al.**

(10) **Patent No.:** **US D735,316 S**  
(45) **Date of Patent:** **\*\* Jul. 28, 2015**

(54) **INHALATION SPACER**

FOREIGN PATENT DOCUMENTS

(71) Applicant: **FSC Laboratories, Inc.**, Charlotte, NC (US)

GB 2 275 615 A 9/1994  
WO WO 02/092146 A2 11/2002

(Continued)

(72) Inventors: **Peter Wayne Steelman**, Charlotte, NC (US); **James Edward Flynn**, New York, NY (US); **John Zeis**, San Marcos, CA (US); **Karla Worley-Ham**, Matthews, NC (US)

OTHER PUBLICATIONS

“AeroChamber Plus Flow-Vu Anti-Static Valved Holding Chamber, Mouthpiece, Large Mask” Forest Pharmaceuticals, Inc., RMC 16416  
Revision: Jan. 2010 (1 page).

(Continued)

(73) Assignee: **FSC Laboratories, Inc.**, Charlotte, NC (US)

*Primary Examiner* — Deanna L Pratt  
*Assistant Examiner* — Lilyana Bekic

(\*\*) Term: **14 Years**

(74) *Attorney, Agent, or Firm* — Myers Bigel Sibley & Sajovec, PA

(21) Appl. No.: **29/448,260**

(22) Filed: **Mar. 11, 2013**

(57) **CLAIM**

The ornamental design for an inhalation spacer, as shown and described.

(51) **LOC (10) Cl.** ..... **29-02**

(52) **U.S. Cl.**  
USPC ..... **D24/110**

**DESCRIPTION**

(58) **Field of Classification Search**  
USPC ..... D24/110; 128/203.12, 200.18, 200.14, 128/200.23, 200.17, 203.15  
CPC ..... A61M 15/0086; A61M 15/009; A61M 15/0018; A61M 15/0021; A61M 11/00; A61M 16/20; A61M 15/0088  
See application file for complete search history.

FIG. 1 is a front, top perspective view of a collapsible inhalation spacer showing our design in an open position;  
FIG. 2 is a rear, bottom perspective view thereof;  
FIG. 3 is a front view thereof, the rear view being a mirror image of the front view;  
FIG. 4 is a left side view thereof, the right side view being a mirror image of the left side view;  
FIG. 5 is a top view thereof;  
FIG. 6 is a bottom view thereof;  
FIG. 7 is a front, top perspective view of the collapsible inhalation spacer of FIG. 1 in a partially collapsed position; and,  
FIG. 8 is a front, top perspective view of the collapsible inhalation spacer of FIG. 1 in a fully collapsed, closed position.  
The broken lines in the drawings illustrate portions of the inhalation spacer which form no part of the claimed design.

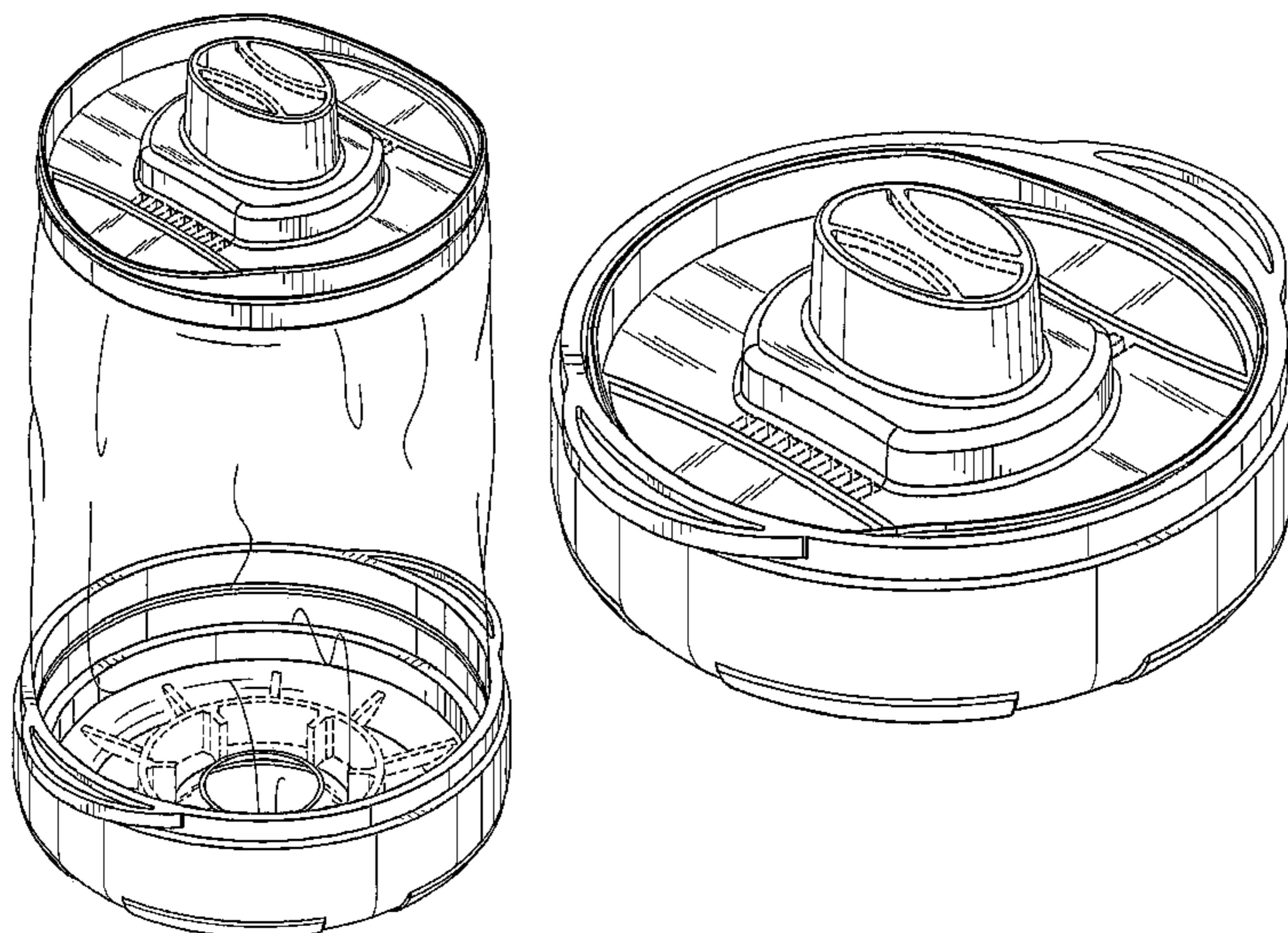
(56) **References Cited**

U.S. PATENT DOCUMENTS

4,291,688 A	9/1981	Kistler
4,470,412 A	9/1984	Nowacki et al.
4,484,577 A	11/1984	Sackner et al.
4,706,663 A	11/1987	Makiej
4,796,614 A	1/1989	Nowacki et al.
4,809,692 A	3/1989	Nowacki et al.
5,012,803 A	5/1991	Foley et al.
5,012,804 A	5/1991	Foley et al.

(Continued)

**1 Claim, 8 Drawing Sheets**



(56)

## References Cited

## U.S. PATENT DOCUMENTS

5,040,527	A	8/1991	Larson et al.	
5,042,467	A	8/1991	Foley et al.	
5,074,294	A	12/1991	Chiesi	
5,109,840	A	5/1992	Daleiden	
5,150,815	A *	9/1992	Saklad .....	220/708
5,203,323	A	4/1993	Tritle	
5,318,016	A	6/1994	Mecikalski	
5,385,140	A	1/1995	Smith	
5,427,089	A	6/1995	Kraemer	
5,477,849	A	12/1995	Fry	
5,497,765	A	3/1996	Praud et al.	
5,501,214	A	3/1996	Sabo	
5,513,626	A	5/1996	Hamilton	
D373,630	S *	9/1996	Berg et al. ....	D24/110
5,571,246	A	11/1996	Alldredge	
5,645,049	A	7/1997	Foley et al.	
5,724,962	A	3/1998	Vidgren et al.	
5,809,996	A	9/1998	Alldredge	
5,816,240	A	10/1998	Komesaroff	
5,848,588	A	12/1998	Foley et al.	
D412,979	S *	8/1999	Weinstein et al. ....	D24/110
5,988,160	A	11/1999	Foley et al.	
6,026,807	A	2/2000	Puderbaugh et al.	
6,039,042	A	3/2000	Sladek	
6,240,917	B1	6/2001	Andrade	
6,293,279	B1	9/2001	Schmidt et al.	
6,345,617	B1	2/2002	Engelbreth et al.	
6,435,177	B1	8/2002	Schmidt et al.	
6,463,929	B1	10/2002	Scheuch et al.	
6,550,473	B1	4/2003	Sladek	
6,557,549	B2	5/2003	Schmidt et al.	
6,595,204	B2	7/2003	Genova et al.	
6,595,206	B2	7/2003	Vito	
6,604,522	B2	8/2003	Arvidsson et al.	
7,107,987	B2	9/2006	Sundaram et al.	
7,360,537	B2	4/2008	Snyder et al.	
7,404,400	B2 *	7/2008	Lulla et al. ....	128/200.14
7,431,175	B2 *	10/2008	Heilos .....	220/717
D585,542	S	1/2009	Watson et al.	
7,562,656	B2 *	7/2009	Gallem et al. ....	128/200.14
D597,656	S *	8/2009	Bird et al. ....	D24/110
7,748,385	B2	7/2010	Lieberman	
8,074,641	B2 *	12/2011	Gallem et al. ....	128/200.14
8,074,642	B2	12/2011	Bruce et al.	
RE43,174	E	2/2012	Schmidt et al.	
D717,424	S *	11/2014	Steelman et al. ....	D24/110
2002/0069870	A1	6/2002	Farmer	
2003/0205226	A1	11/2003	Gallem et al.	
2004/0094148	A1 *	5/2004	Lulla et al. ....	128/200.23
2007/0113841	A1 *	5/2007	Fuchs .....	128/200.14
2007/0289590	A1	12/2007	Kreutzmann et al.	
2008/0210225	A1	9/2008	Geiger	
2009/0007909	A1 *	1/2009	Carrico .....	128/203.15
2009/0013993	A1 *	1/2009	Bird et al. ....	128/200.15
2011/0209700	A1	9/2011	Kreutzmann et al.	
2011/0226242	A1 *	9/2011	Von Hollen et al. ....	128/203.12
2011/0232636	A1	9/2011	Von Hollen et al.	
2011/0247624	A1 *	10/2011	Von Hollen .....	128/205.23
2012/0042874	A1	2/2012	Gallem et al.	
2012/0247460	A1 *	10/2012	Stenzler et al. ....	128/203.12
2013/0075393	A1 *	3/2013	Haynie .....	220/6
2013/0276781	A1 *	10/2013	Steelman et al. ....	128/203.12
2013/0291862	A1 *	11/2013	Eagle .....	128/203.12

## FOREIGN PATENT DOCUMENTS

WO	WO 2010/070496	A1	6/2010
WO	WO 2012/038861	A1	3/2012

## OTHER PUBLICATIONS

“AeroChamber Plus Flow-Vu Anti-Static Valved Holding Chamber, Small Mask, Medium Mask” Forest Pharmaceuticals, Inc., RMC 16417 Revision: Jan. 2010 (1 page).

“AeroChamber Plus Valved Holding Chamber” Forest Pharmaceuticals, Inc., Retrieved Date: May 6, 2010, From URL: <http://www.aerochambervhc.com> (3 pages).

“E-Z Spacer® Collapsible holding chamber for metered-dose inhalers” FSC Laboratories, Inc., FSC 393-11, Rev A, Nov. 2008 (1 page).

“Optichamber® Advantage Valved Holding Chamber” Philips Respironics, Retrieved Date: Oct. 14, 2010, From URL: <http://optichamberholdingchamber.respironics.com/default.asp> (5 pages).

“PARI Granted US Patent for Vortex Holding Chamber” PARI Respiratory Equipment, Inc., News Release, Midlothian, Virginia, Jul. 21, 2009 (1 page).

“PARI In the Americas—The Lower Airways—Home” PARI Respiratory Equipment, Inc., Retrieved Date: May 6, 2010, From URL: <http://www.pari.com/pdd.htm> (1 page).

“PARI Vortex® Non Electrostatic Valved Holding Chamber” PARI Respiratory Equipment, Inc., Retrieved Date: May 6, 2010, From URL: <http://www.pari.com/pdd/vortex.htm> (2 pages).

“Pocket Flow Spacer” Health Enterprise East Ltd., Retrieved Date: Jun. 21, 2010, From URL: <http://www.hee.org.uk/Licensing-Opportunities/pocket-flow-spacer.html> (1 page).

“Spacers and holding chambers” Koninklijke Philips Electronics N.V., Retrieved Date: May 6, 2010, From URL: [http://www.healthcare.philips.com/main/homehealth/respiratory\\_drug\\_delivery/spacers\\_and\\_holding\\_chambers/index.wpd](http://www.healthcare.philips.com/main/homehealth/respiratory_drug_delivery/spacers_and_holding_chambers/index.wpd) (1 page).

Haidl et al., “Inhaled isotonic alkaline versus saline solution and radioaerosol clearance in chronic cough” *European Respiratory Journal* 2000; 16: 1102-1108.

Hsu et al. “Breath-by-breath Delivered Dose Comparison from Three Anti-Static Valved Holding Chambers With Facemasks Under Simulated Use Conditions”, Philips Respironics, (Date Unknown).

Hsu et al. “Evaluation of Delivery Efficiency from Valved Holding Chambers with Facemasks Under Simulated Use Conditions”, Retrieved from the internet at URL [http://www.healthcare.philips.com/pwc\\_hc/us\\_en/homehealth/respiratory\\_drug\\_delivery/optichamberdiamond/pdf/RDD\\_2011\\_Hsu\\_et\\_al\\_LiteTouch\\_Facemask\\_seal.pdf](http://www.healthcare.philips.com/pwc_hc/us_en/homehealth/respiratory_drug_delivery/optichamberdiamond/pdf/RDD_2011_Hsu_et_al_LiteTouch_Facemask_seal.pdf) (Date Unknown).

Nikander et al. In Vitro Comparison of Aerosol Characteristics of HFA Ipratropium Bromide Pressurized Metered Dose Inhaler (pMDI) Formulation from Three Valved Holding Chambers (VHCs), Philips Respironics, Presented at the European Respiratory Society Conference, Sep. 24-28, 2011, Amsterdam, The Netherlands (1 page).

OptiChamber Advantage Valved Holding Chamber Koninklijke Philips Electronics N.V., Retrieved Date: May 6, 2010, From URL: [http://www.healthcare.philips.com/main/homehealth/respiratory\\_drug\\_delivery/optichamberholdingchamber/default.wpd](http://www.healthcare.philips.com/main/homehealth/respiratory_drug_delivery/optichamberholdingchamber/default.wpd) (1 page).

Philips Respironics, “OptiChamber Diamond anti-static valved holding chamber”, 2011 Koninklijke Philips Electronics N.V., Retrieved from the internet at URL [http://www.healthcare.philips.com/pwc\\_hc/main/homehealth/respiratory\\_drug\\_delivery/litetouch/pdf/PR\\_OCD\\_AerosolCharacterization\\_Charts\\_HI.pdf](http://www.healthcare.philips.com/pwc_hc/main/homehealth/respiratory_drug_delivery/litetouch/pdf/PR_OCD_AerosolCharacterization_Charts_HI.pdf) (3 pages).

Philips Respironics, “Philips Respironics OptiChamber Diamond anti-static valved holding chamber”, 2011 Koninklijke Philips Electronics N.V., Retrieved from the internet at URL [http://www.healthcare.philips.com/pwc\\_hc/main/homehealth/respiratory\\_drug\\_delivery/optichamberdiamond/pdf/Intl-PN1091731.pdf](http://www.healthcare.philips.com/pwc_hc/main/homehealth/respiratory_drug_delivery/optichamberdiamond/pdf/Intl-PN1091731.pdf) (2 pages).

von Hollen et al. “Determining the Influence of Washing on the Aerosol Performance of an Anti-Static Valved Holding Chamber” Philips Respironics, Presented at the Association of Asthma Educators Annual Conference, Jul. 22-24, 2011, Denver, Colorado, USA (1 page).

von Hollen et al. “Effect of Simulated Facial Movement on the Seal Integrity of a Valved Holding Chamber Mask”, Philips Respironics, Presented at the American Thoracic Society International Conference, May 14-19, 2010, New Orleans, LA, USA, (1 page).

von Hollen et al. “In Vitro Comparison of Aerosol Characteristics of Two Pressurized Metered Dose Inhaler Formulations Commonly Used in COPD”, Philips Respironics, Presented at the American Association of Pharmaceutical Scientists Conference, Oct. 23-27, 2011, Washington, DC, USA, (1 page).

von Hollen et al. “In Vitro Comparison of Aerosol Characteristics of HFA Albuterol Pressurized Metered Dose Inhaler Formulation from

(56)

**References Cited**

## OTHER PUBLICATIONS

Anti-Static Valved Holding Chambers”, Philips Respironics, Presented at the American Thoracic Society International Conference, May 13-18, 2011, Denver, CO, USA, (1 page).

von Hollen et al. In Vitro Comparison of Aerosol Characteristics of HFA Albuterol (Salbutamol) Pressurized Metered Dose Inhaler (pMDI) Formulation from Three Valved Holding Chambers (VHCs), Philips Respironics, Presented at the European Respiratory Society Conference, Sep. 24-28, 2011, Amsterdam, The Netherlands, (1 page).

von Hollen et al. “Quantifying Facemask Sealing Efficiency when used on a Valved Holding Chamber During Simulated Breathing”, Philips Respironics, Presented at the Association of Asthma Educators annual conference, Jul. 31-Aug. 2, 2009, New Orleans, LA, (1 page).

von Hollen et al., “Comparison of Aerosol Characteristics from Two HFA Pressurized Metered Dose Inhaler Formulations using Anti-

Static Valved Holding Chambers”, Philips Respironics, Presented at Respiratory Drug Delivery Europe, Berlin, Germany, May 3-6, 2011, (1 page).

von Hollen et al., “Evaluation of the Aerosol Characteristics of an HFA Fluticasone Propionate Pressurized Metered Dose Inhaler Formulation with Conventional and Anti-Static plastic Valved Holding Chambers”, Philips Respironics, Presented at the 18<sup>th</sup> Congress of International Society for Aerosols in Medicine, Jun. 18-22, 2011, Rotterdam, The Netherlands, (1 page).

von Hollen et al., “Impact of Flow Rate Change on the Aerosol Characteristics of HFA Albuterol (Salbutamol) Pressurized Metered Dose Inhaler Formulation with an Anti-Static Valved Holding Chamber”, Philips Respironics, Presented at the 18<sup>th</sup> Congress of International Society for Aerosols in Medicine, Jun. 18-22, 2011, Rotterdam, The Netherlands, (1 page).

Invitation to Pay Additional Fees Corresponding to International Application No. PCT/US2013/036936; Date of Mailing: Jun. 27, 2013; 8 Pages.

\* cited by examiner

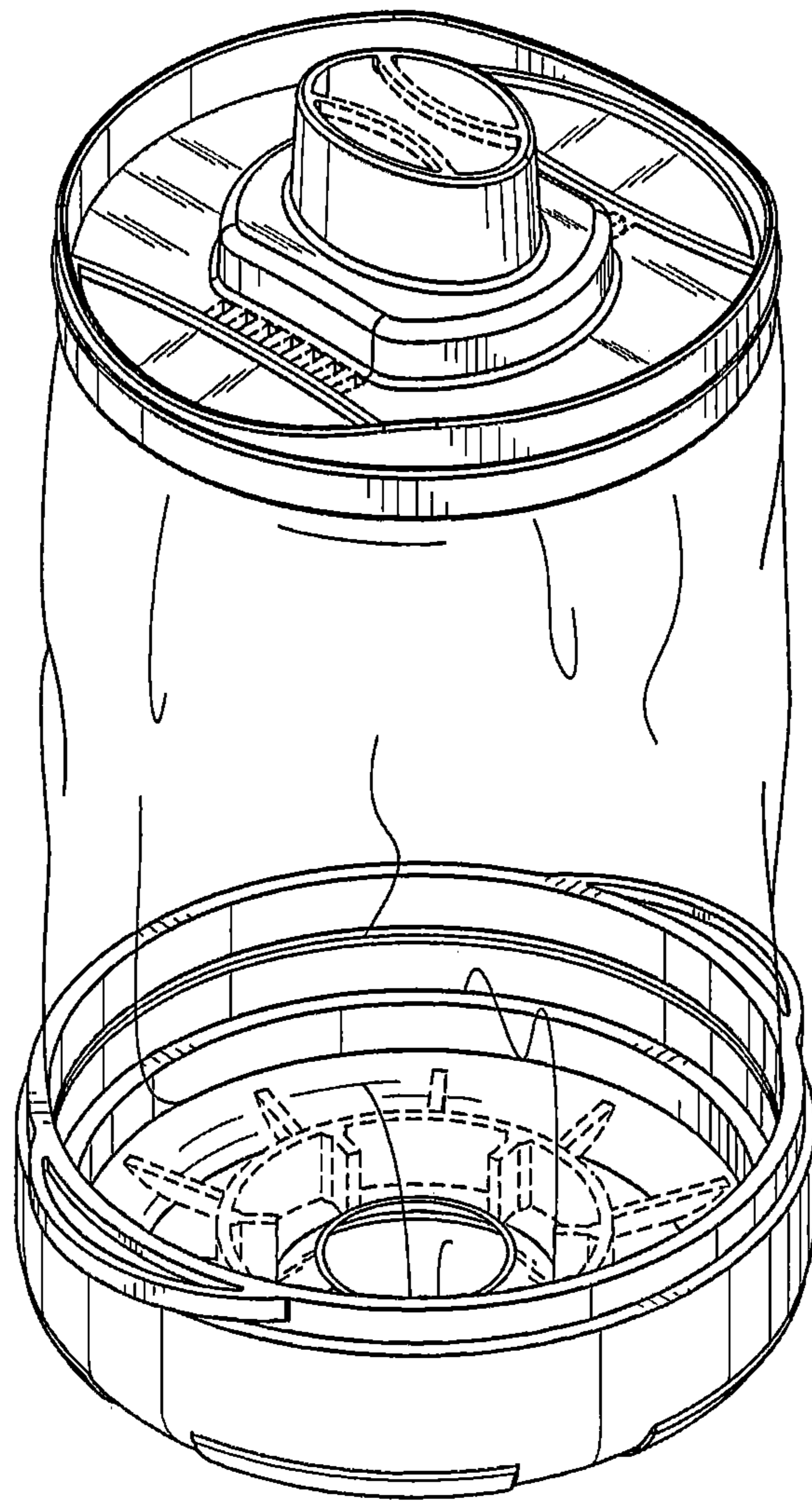


Fig. 1

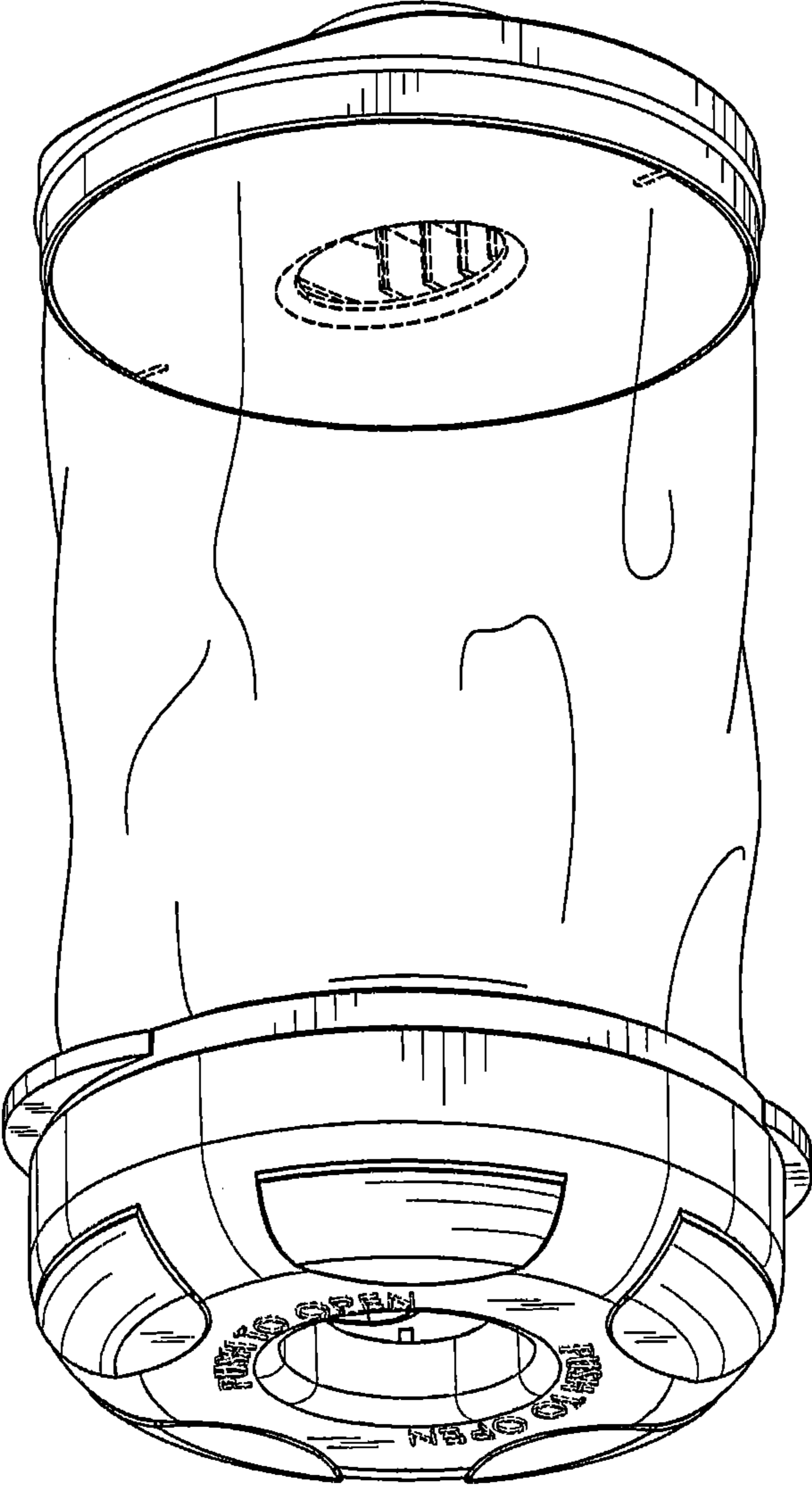


Fig. 2

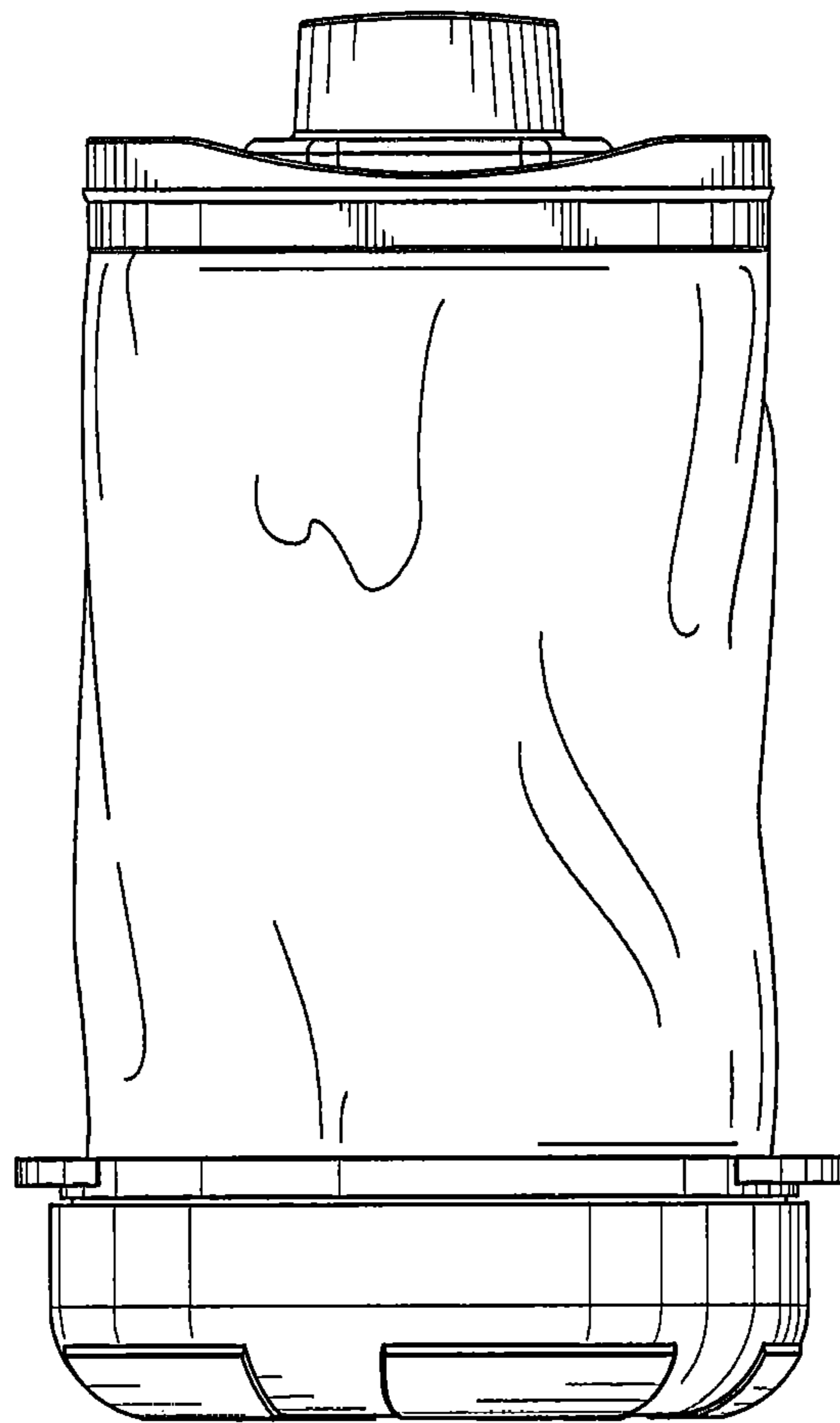


Fig. 3



Fig. 4

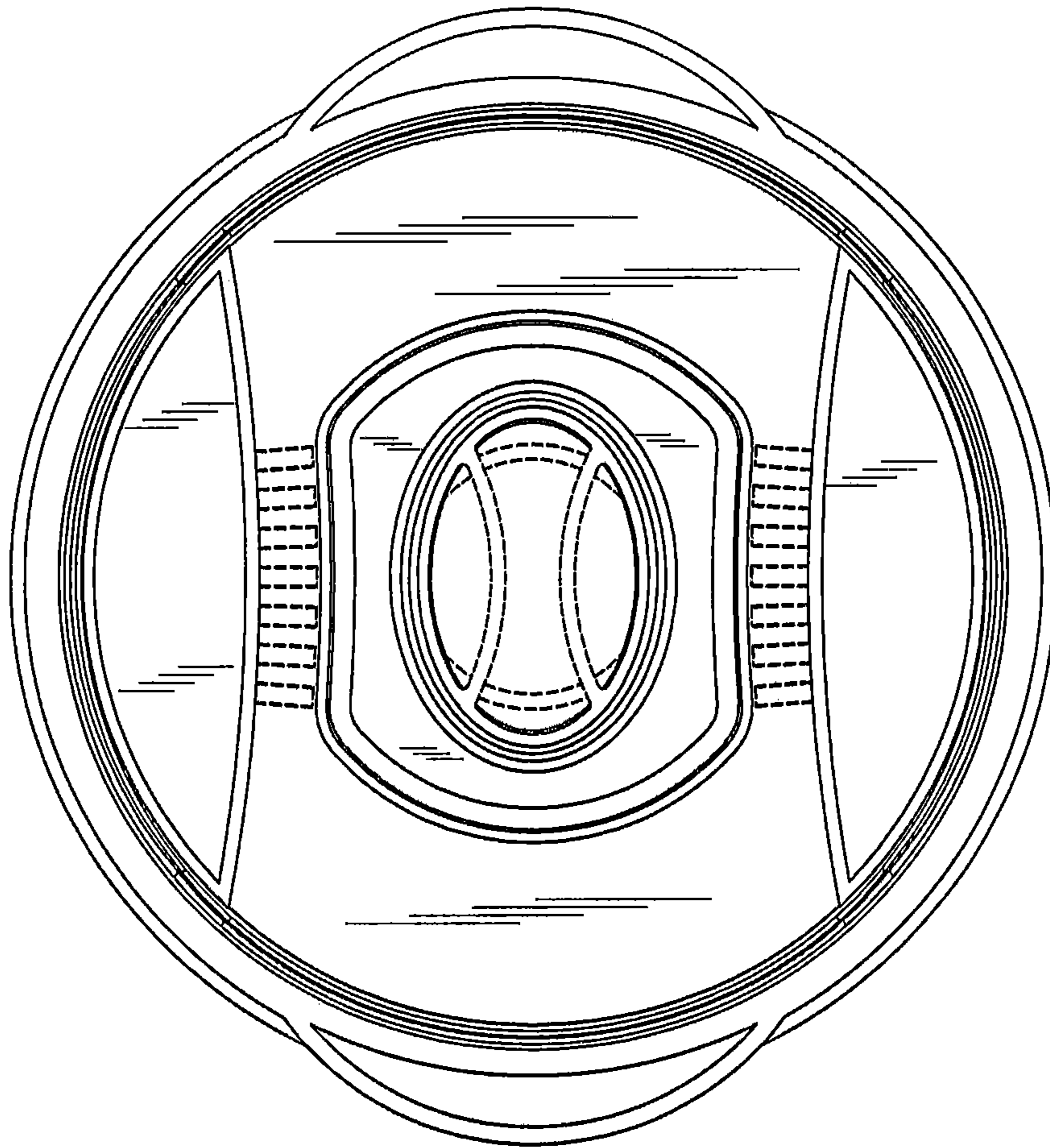


Fig. 5





Fig. 6

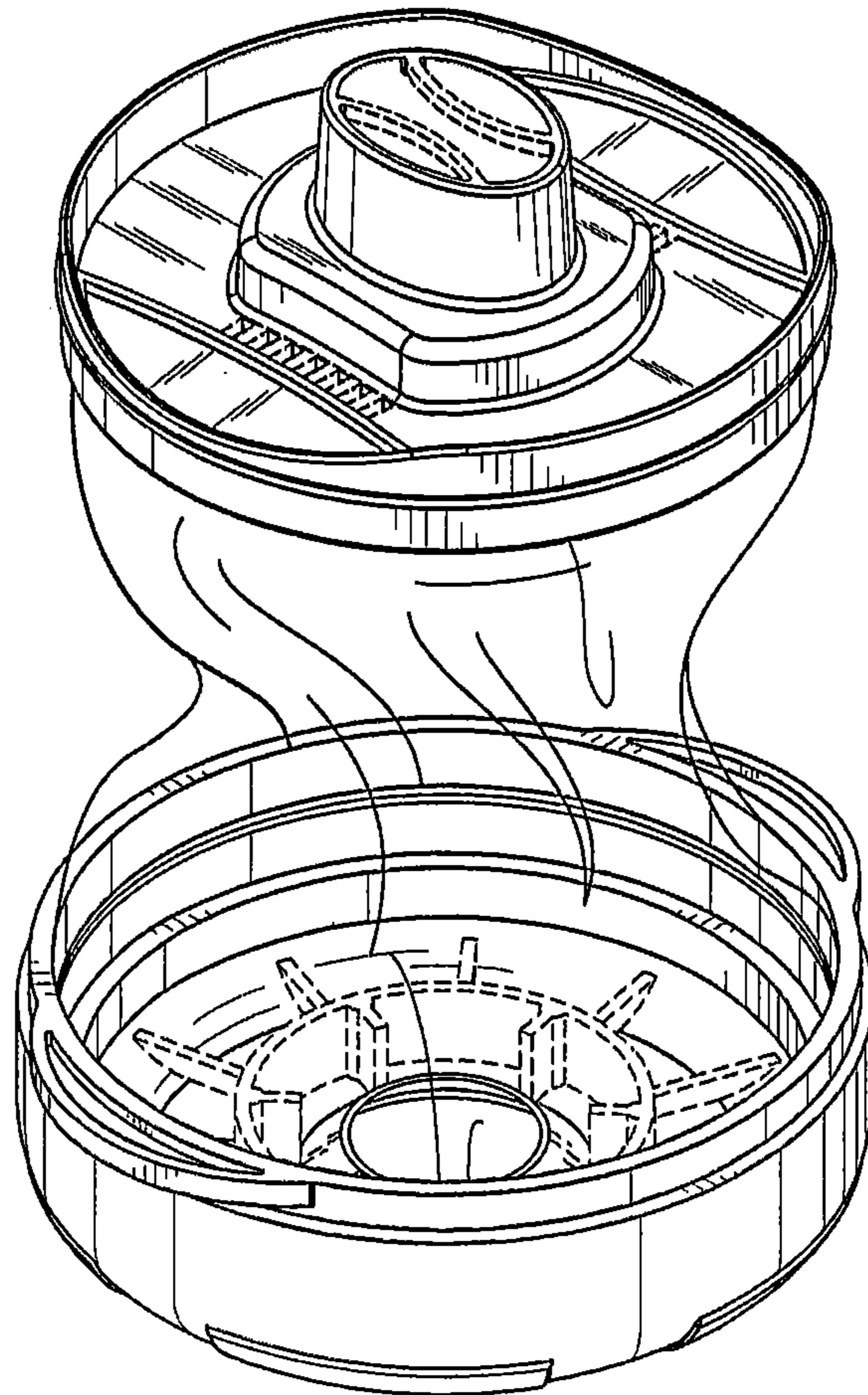


Fig. 7

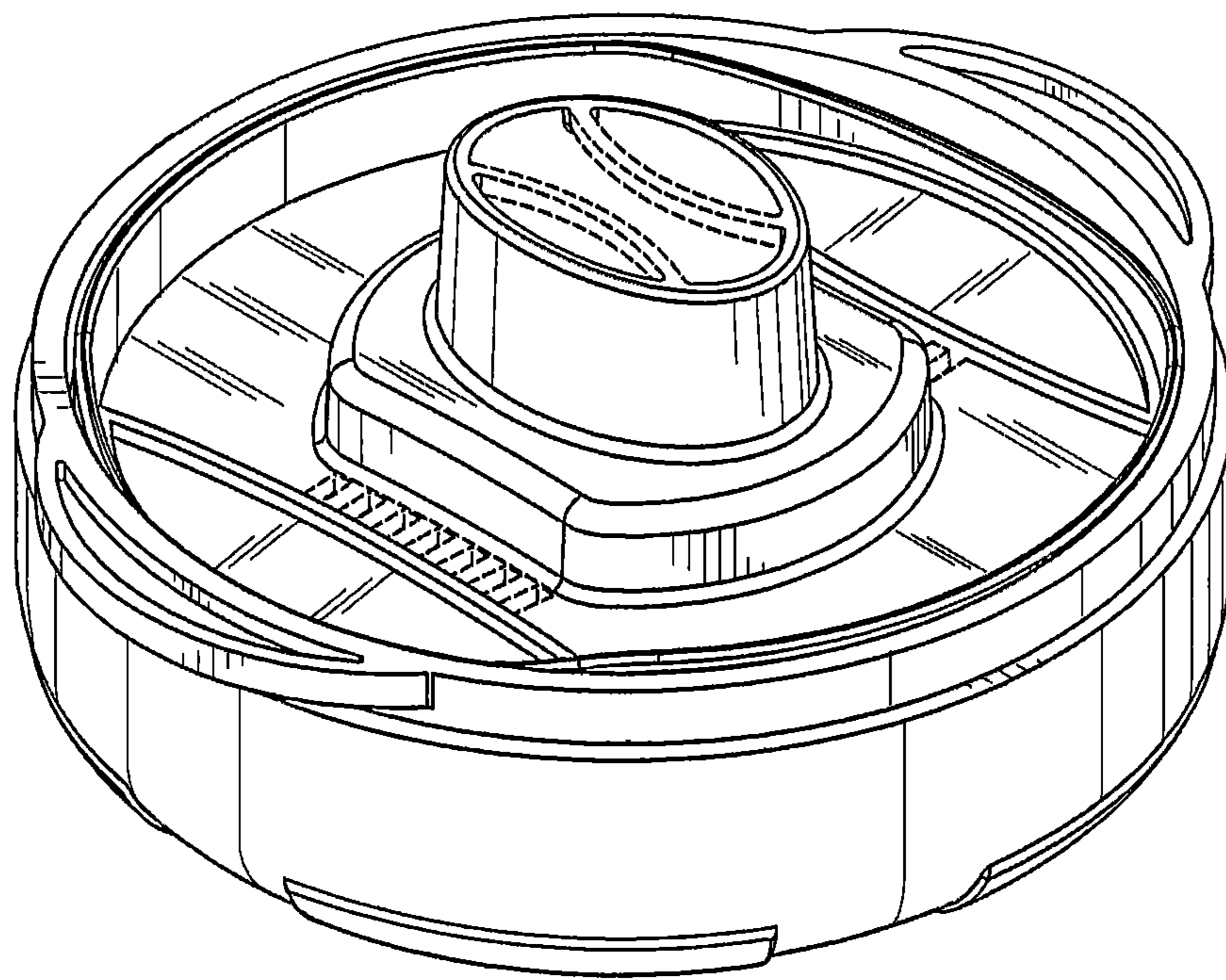


Fig. 8