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Attorneys for Plaintiffs Funrise, Inc., and Honor Metro Limited

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF CALIFORNIA

Funrise, Inc.; Honor Metro Limited,

Plaintiffs,

v.

Big Lots Stores, Inc.,

Defendant.

Civil Case No.: **'19CV1228 GPC WVG**

COMPLAINT FOR PATENT INFRINGEMENT

DEMAND FOR JURY TRIAL

For its complaint against Defendant Big Lots Stores, Inc. ("Big Lots" or "Defendant"), Plaintiffs Funrise, Inc. and Honor Metro Limited (collectively, "Funrise" or "Plaintiffs") allege on personal knowledge as to its own activities and on information and belief as to the activities of others as follows:

THE PARTIES

1. Plaintiff Funrise, Inc. is California Corporation with its principal place of business located at 7811 Lemona Avenue, Van Nuys, California 91405.

2. Plaintiff Honor Metro Limited is a Marshall Islands Corporation with its principal place of business located at Ste. 223-231, Tsimshatsui Ctr., 66 Moody Road, Tsim Sha Tsui, Kowloon, Hong Kong.

3. Funrise, Inc. and Honor Metro Limited are both wholly-owned subsidiaries of Matrix Holdings Limited.

4. On information and belief, Defendant Big Lots is an Ohio Corporation with its principal place of business located at 4900 East Dublin Granville Road, Columbus, OH 43081.

5. On information and belief, Big Lots is registered to do business in the State of California, has designated an agent for service of process in the State of California, and has multiple physical retail stores located in the State of California and specifically in this district.

NATURE OF ACTION

6. This is an action alleging patent infringement by Defendant Big Lots Corporation of United States Patent No. 9,757,661 (the "'661 Patent" or the "Asserted Patent"), entitled "Apparatus and Method for Generating Bubbles," and issued on September 12, 2017. A true and correct copy of the '661 Patent is attached hereto as Exhibit A.

7. Plaintiff Honor Metro Limited is the assignee and owner of record of the '661 Patent, and all rights, title and interest in and to the '661 Patent.

8. Plaintiff Funrise, Inc. is the exclusive licensee in the United States of the '661 Patent, including the right to sue for patent infringement and recover for patent infringement.

JURISDICATION AND VENUE

9. This is an action for patent infringement arising under the patent laws of the United States, Title 35 of the United States Code, including without limitation 35 U.S.C. §§ 271 *et seq*. This Court has subject matter jurisdiction over this case pursuant to 28 U.S.C. §§ 1331 and 1338(a), because this action arises under the patent laws of the United States, Title 35 of the United States Code, including but not limited to 35 U.S.C. §§ 271, 281, 284 and 285.

10. On information and belief, this Court has personal jurisdiction over Big Lots based upon at least the following: Big Lots is a large nationwide retailor that sells and offers for sale goods in its physical retail stores in this state and district and online to residents and citizens of this state and district via its website; Big Lots is registered to do business in the State of California, has designated an agent for service of process in the State of California, and has multiple physical retail stores located in the State of California and specifically in this district. *See, e.g.* https://local.biglots.com/search/ca/san+diego?q=92130 .

11. Venue is proper in the United States District Court for the Southern District of California under 28 U.S.C. §§ 1391(b)-(d) and/or 1400(b) because, *inter alia*, a substantial part of the events giving rise to the claims of this action occurred in this district, because the acts and transactions complained of include the offer to sell and the sale of the identified infringing goods in the State of California and specifically in this district, because Big Lots is subject to personal jurisdiction in this district, and because Big Lots has committed acts of infringement in this district and has a regular and established place of business in this district. *See, e.g. id.*

FUNRISE'S BUSINESS

12. Funrise is a global innovator and industry leader in the design, manufacturing, marketing and distribution of toys and games worldwide. Delivering fun for kids of all ages, Funrise creates toys and games for high-profile brands including Tonka®, Gazillion®, Herodrive™, Sunny Bunnies™ and Wonder Park™. Funrise is also the creator, producer and brand owner of Rainbow Butterfly Unicorn Kitty™.

13. Specifically, through its Gazillion Bubbles products, Funrise has led the charge in creating premium bubble products for over a decade. These products include an extensive array of bubble toys and machines as well as a trade secret bubble solution that blows bigger, brighter, and more colorful bubbles than any other solution on the market.

14. Funrise's products in the Gazillion Bubbles product line are known for their vibrant names, which reflect various natural phenomena such as hurricanes, whirlwinds, monsoons, and tornadoes.

15. Funrise has earned a reputation in the marketplace as an innovator and trusted supplier through its Gazillion Bubbles products which has earned a reputation over the years as a provider of premium bubble products. Funrise has spent millions of dollars marketing its bubble generating products over the last few years.

16. Part of Funrise's Gazillion Bubbles product line is the patented Gazillion Bubbles Tornado (the "Tornado"). Producing 4500 bubbles per minute, the Tornado requires no pump, runs on batteries, and has no wait time for bubbles.

17. As shown in the chart in Exhibit B, the Tornado practices the '661 patent.

DEFENDANT'S INFRINGING ACTIVITIES

18. On information and belief, Big Lots, either directly or through other entities under its control, imports, uses, offers for sale, and/or sells infringing products, including without limitation the Turbo Bubble Machine (the "Accused Products").

19. On information and belief, Big Lots infringes the Asserted Patent by engaging in acts constituting infringement under 35 U.S.C. § 271, including without limitation by making, using, selling and/or offering for sale in and/or importing into the United States without authority one or more Accused Products that infringe one or more claims of the Asserted Patent.

20. On information and belief, Big Lots displays, promotes, sells and/or offers to sell its products throughout the United States, including without limitation by offering for sale and selling the Accused Products in its physical retail stores located in the State of California and specifically in this district.

21. As shown in the chart attached hereto as Exhibit C, the Turbo Bubble Machine infringes one or more claims of the '661 patent.

HARM TO PLAINTIFFS

22. Upon information and belief, Big Lots is concurrently directing its infringing activities toward consumers and causing harm within this district and elsewhere throughout the United States. As a result, Big Lots is harming Funrise and the consuming public for Big Lots' own benefit.

23. Funrise is suffering irreparable and indivisible injury and has suffered substantial damages as a result of Big Lots' unauthorized and wrongful use of Plaintiffs' intellectual property.

24. On information and belief, through use of the patented design and without the costs of research and development incurred by Funrise, the Accused

Products are offered at significantly lower prices and compete directly against Funrise's products, thus causing price erosion.

25. Funrise also lost sales through lost business opportunities as a result of Defendant's infringement.

26. Funrise has suffered and will continue to suffer irreparable injury as a result of Defendant's continued sale of infringing products, and monetary damages are inadequate to compensate Funrise for Defendant's continued sale of infringing products. Defendant sells competing products at a significantly lower price that infringe upon Plaintiffs' patent. Defendant's sale of infringing products has caused Funrise loss of market share, reputational harm, price erosion and/or jeopardy to Plaintiffs' competitive position. Therefore, Funrise has no adequate remedy at law.

27. Upon information and belief, Defendant would suffer no cognizable harm from ceasing infringing conduct. Plaintiffs, however, will suffer great harm to its competitive position and business if Defendant continues to sell products that infringe Plaintiffs' rights.

28. The public interest will be served by protecting Plaintiffs from Defendant's infringement of Plaintiffs' patent rights, and because substitute products from Funrise are available at major nationwide retail outlets including Walmart (https://www.walmart.com/ip/Funrise-Toys-Gazillion-Tornado-Bubble-Machine/136487643) and Amazon (https://www.amazon.com/gp/aw/d/B072J8SXB4?qid=1561588786&sr=8-9).

29. If Defendant's infringing activities are not preliminarily and permanently enjoined by this Court, Plaintiffs and the consuming public will continue to be harmed.

FIRST CAUSE OF ACTION

(Infringement of the '661 Patent)

30. Funrise incorporates by reference as if fully set forth herein the allegations in Paragraphs 1-29 of this Complaint.

31. On information and belief, Big Lots infringes, literally and/or under the doctrine of equivalents, one or more claims of the '661 Patent, by making, using, selling, offering for sale, and/or importing into the United States without authority products, including without limitation the Accused Products, that infringe one or more claims of the '661 Patent.

32. Defendant has directly infringed at least, for example, claim 1 of the '661 patent by making, using, selling, offering for sale, and/or importing into the United States without authority products, including without limitation the Accused Products.

33. The claim chart attached hereto as Exhibit C identifies on a limitation-by-limitation basis where each limitation of claim 1 of the '661 Patent is found within an exemplary Accused Product. Each limitation of claim 1 is literally present in the exemplary Accused Product. To the extent any limitation is found to be not present literally, such limitation is present in the exemplary Accused Product under the doctrine of equivalents because the exemplary Accused Product performs substantially the same function, in substantially the same way, to achieve substantially the same result as Claim 1 of the '661 Patent.

34. Big Lots does not have a license to any of Plaintiffs' patents or technology, including without limitation the Asserted Patent.

35. Big Lots has knowledge and notice of the Asserted Patent and its infringement since at least, and through, the filing of this Complaint.

36. As a direct and proximate result of Big Lots' infringement, Funrise has suffered, and will continue to suffer, damage in an amount to be proved at

trial.

37. As a result of the harm suffered as alleged herein, Funrise is entitled to relief under the Patent Act, including damages adequate to compensate it for such infringement, but in no event less than a reasonable royalty.

38. Funrise is informed and believes, and on the basis of such information and belief, alleges that Big Lots' infringement of the '661 Patent is willful and deliberate, at least at all times after the filing of the Complaint. Accordingly, Funrise is entitled to enhanced damages pursuant to 35 U.S.C. § 284 and to an award of attorney's fees and costs incurred in prosecuting this action pursuant to 35 U.S.C. § 285.

39. On information and believe, unless enjoined by this Court, Big Lots will continue to do the acts complained herein, and unless restrained and enjoined will continue to do so, all to Funrise's irreparable damage. It would be difficult to ascertain the amount of compensation which would afford Funrise adequate relief for such future and continuing acts. Funrise does not have an adequate remedy at law to compensate it for injuries threatened.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs respectfully pray that the Court grant the following relief:

A. For judgment that Big Lots has infringed and continues to infringe the '661 Patent;

B. For judgment that the '661 Patent is valid and enforceable;

C. For judgment that Big Lots has willfully infringed the '661 Patent;

D. For a preliminary and permanent injunction prohibiting Big Lots, and all persons or entities acting in concert with Big Lots, from infringing the '661 Patent;

E. An award of damages adequate to compensate Plaintiffs for the

infringement, as well as prejudgment and post-judgment interest from the date the infringement began, but in no event less than a reasonable royalty as permitted by 35 U.S.C. § 284;

F. An award of treble damages and/or exemplary damages due to Big Lots' willful misconduct under 35 U.S.C. § 284;

G. A finding that this case is exceptional and an award of interest, costs, expenses, and attorneys' fees incurred by Plaintiffs in prosecuting this action as provided by 35 U.S.C. § 285;

H. For any other orders necessary to accomplish complete justice between the parties; and

I. For such other and further relief as this Court or a jury may deem 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 so triable.

DATED: July 1, 2019

Respectfully submitted,

By: */s/ Jo Dale Carothers*
Jo Dale Carothers
Eric Caligiuri
Weintraub Tobin Chediak Coleman Grodin Law Corporation

Attorneys for Plaintiffs

EXHIBIT A

US009757661B2

(12) **United States Patent**
Chan

(10) **Patent No.: US 9,757,661 B2**
(45) **Date of Patent: Sep. 12, 2017**

(54) **APPARATUS AND METHOD FOR GENERATING BUBBLES**

(71) Applicant: **Honor Metro Limited**, Tortola (VG)

(72) Inventor: **Adam Hing Ping Chan**, Hong Kong (CN)

(73) Assignee: **HONOR METRO LIMITED** (VG)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/156,650**

(22) Filed: **May 17, 2016**

(65) **Prior Publication Data**

US 2016/0256793 A1 Sep. 8, 2016

Related U.S. Application Data

(63) Continuation of application No. 14/245,767, filed on Apr. 4, 2014, now Pat. No. 9,339,737.

(30) **Foreign Application Priority Data**

Mar. 20, 2014 (CN) 2014 1 01054649

(51) **Int. Cl.**
A63H 33/00 (2006.01)
A63H 33/28 (2006.01)

(52) **U.S. Cl.**
CPC ***A63H 33/28*** (2013.01)

(58) **Field of Classification Search**
CPC A63H 33/28
USPC 446/15, 16, 17, 18, 19, 20
See application file for complete search history.

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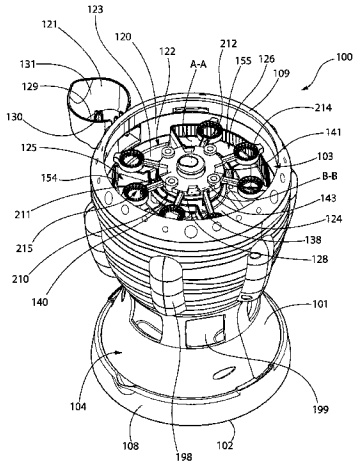
Primary Examiner — Melba Bumgarner
Assistant Examiner — Joseph B Baldori
(74) *Attorney, Agent, or Firm* — Belles Katz LLC

(57) **ABSTRACT**

A bubble generating device and a method for producing bubbles. In one aspect, the invention can be an apparatus for generating bubbles comprising: a housing; a motor; an air flow generator operably coupled to the motor; a trough containing a bubble solution; a cam surface; a follower member comprising a bubble generating device, the follower member in operable cooperation with the cam surface; and the motor operably coupled to the follower member to drive the follower member along the cam surface.

18 Claims, 16 Drawing Sheets



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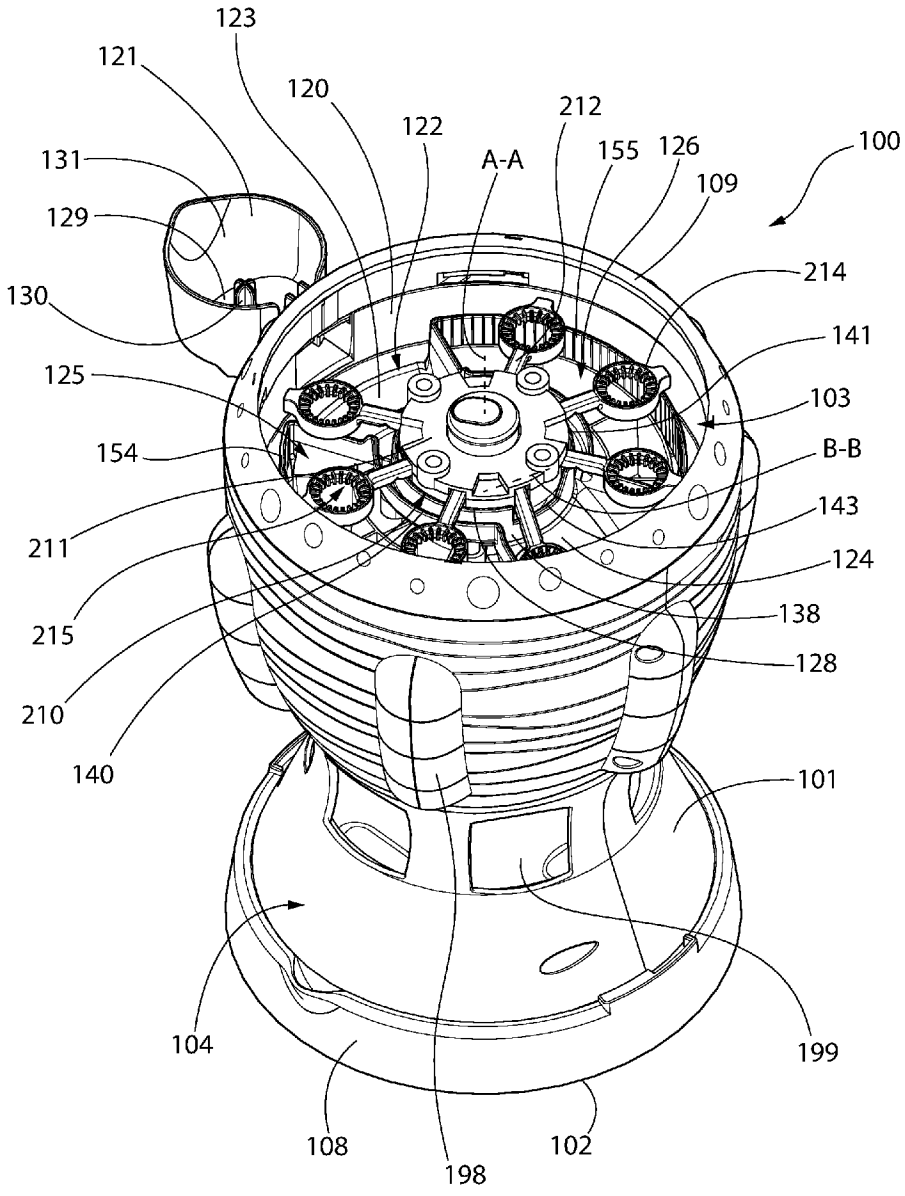
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FIG. 1

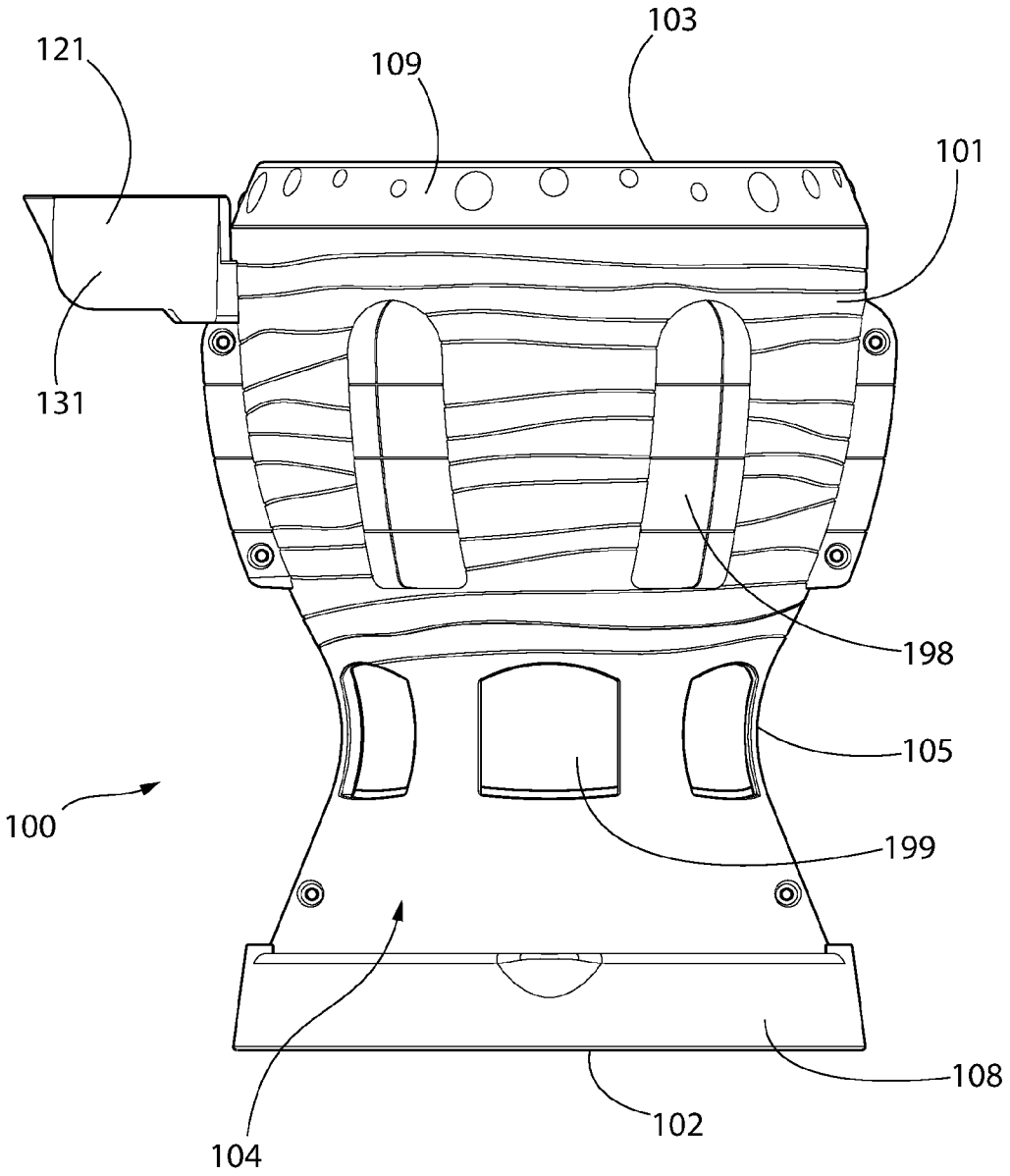

FIG. 2

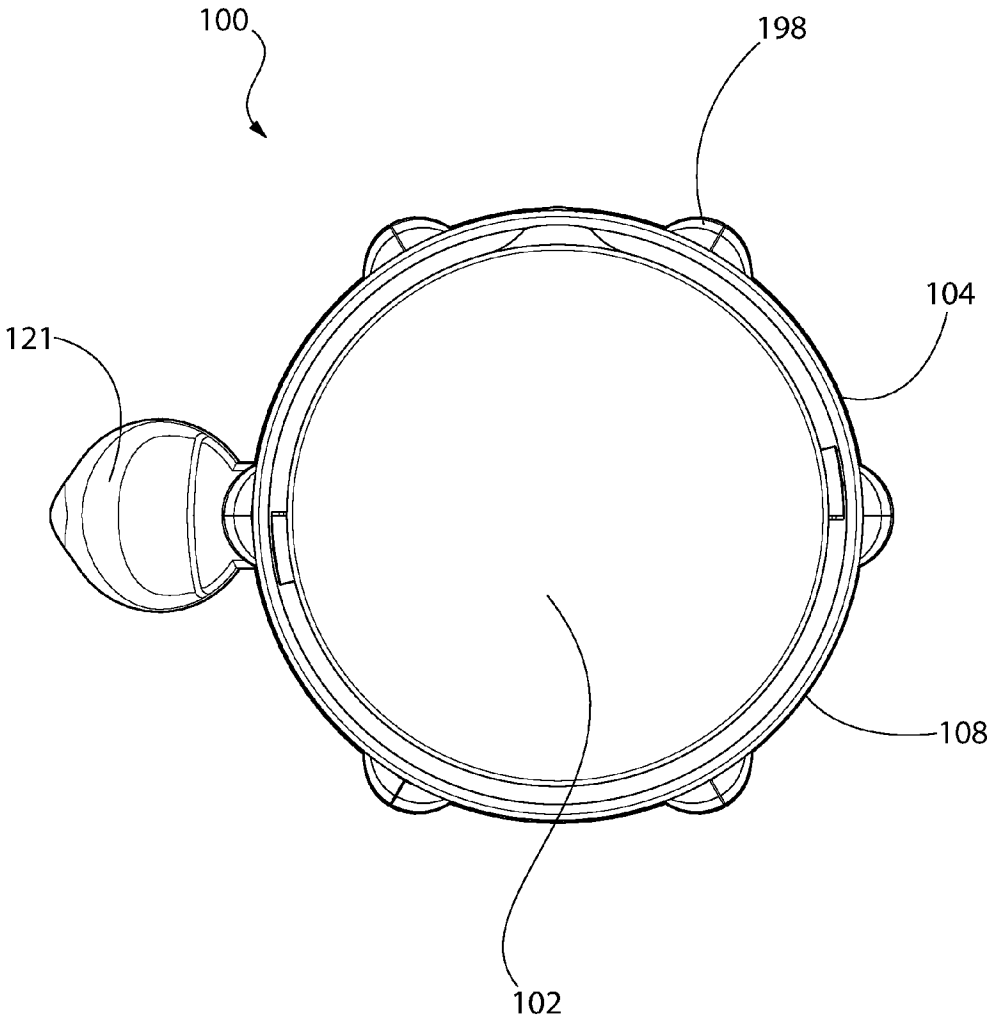

FIG. 3

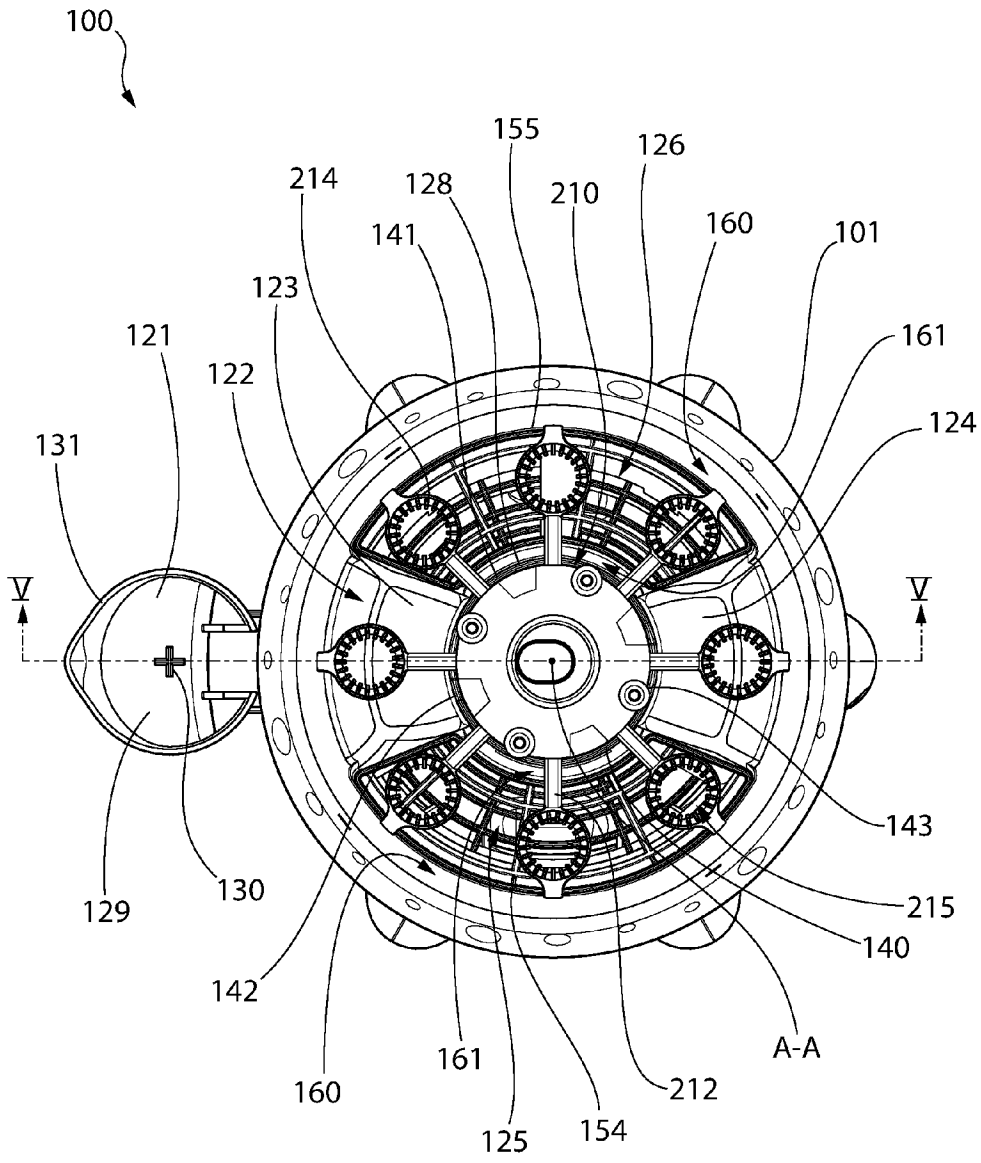
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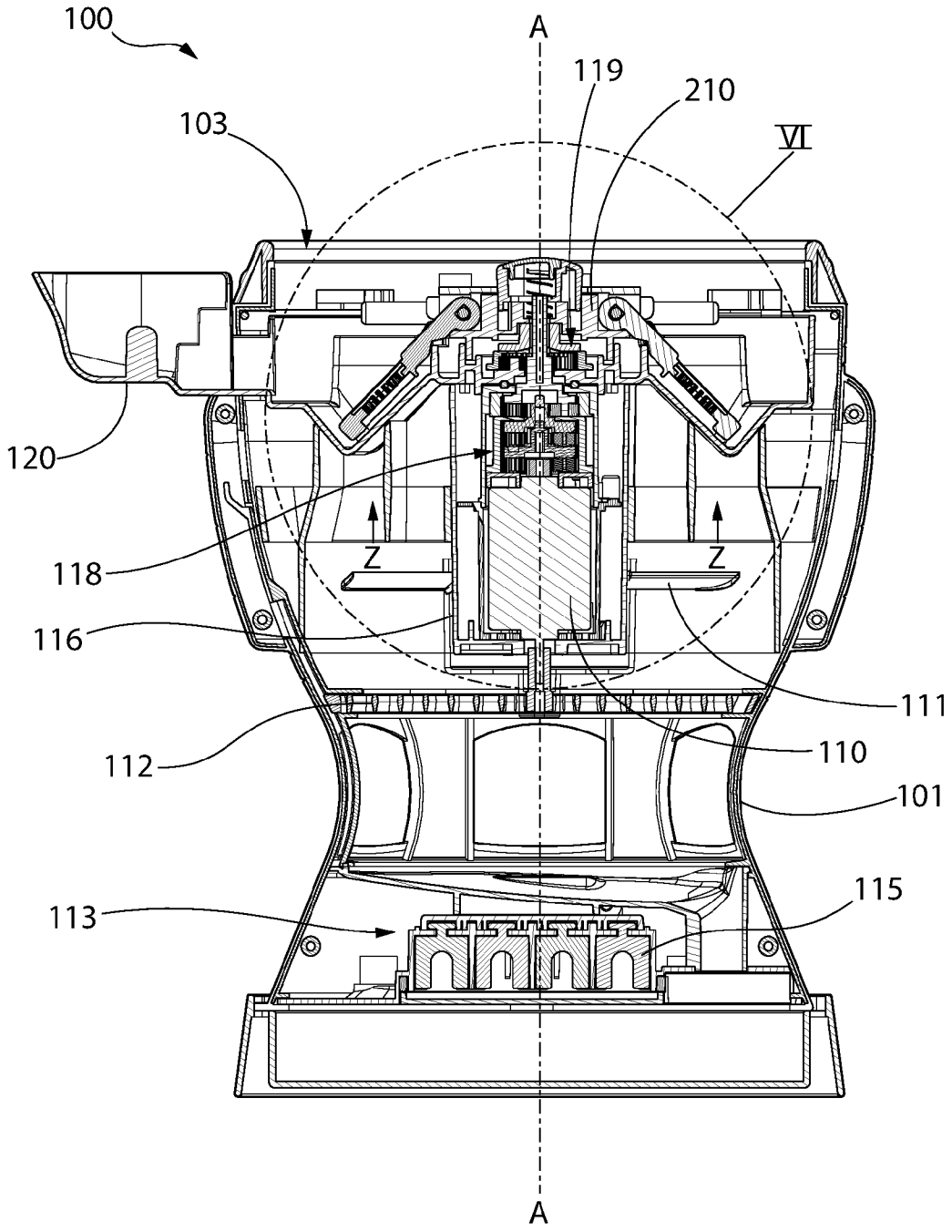
FIG. 4



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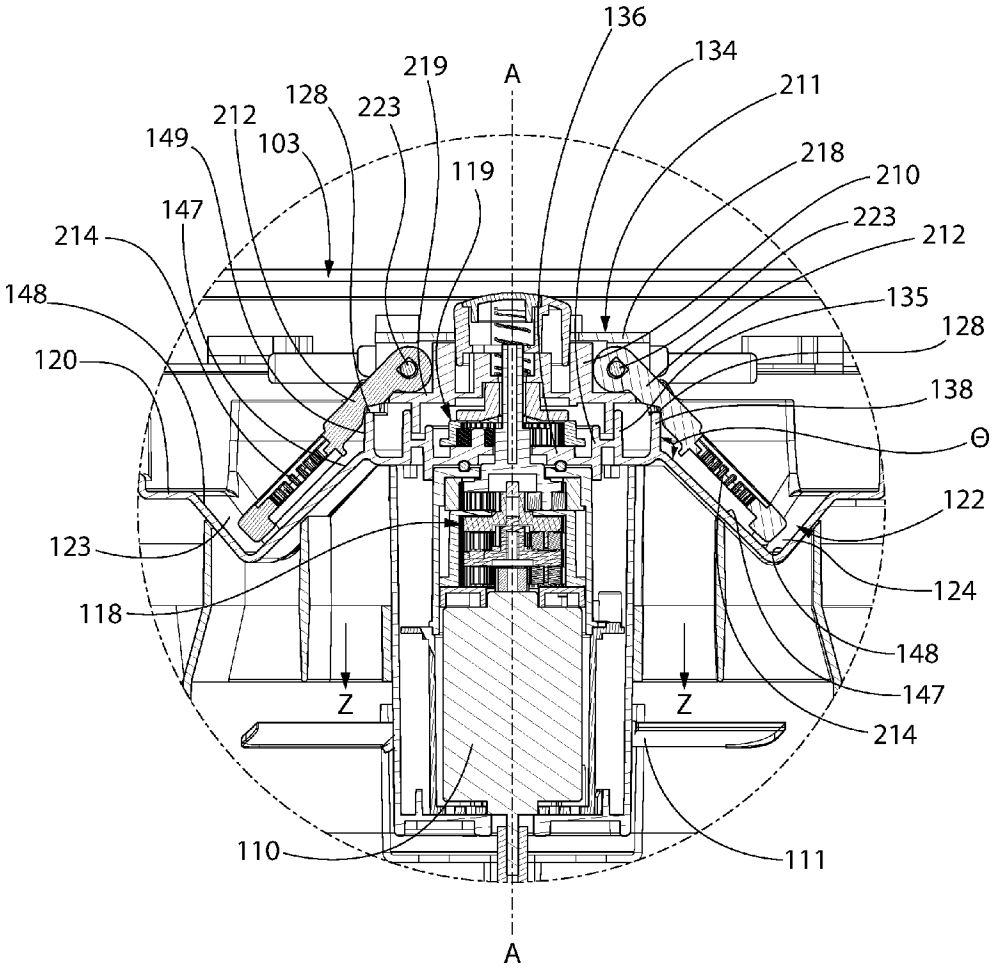
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FIG. 6

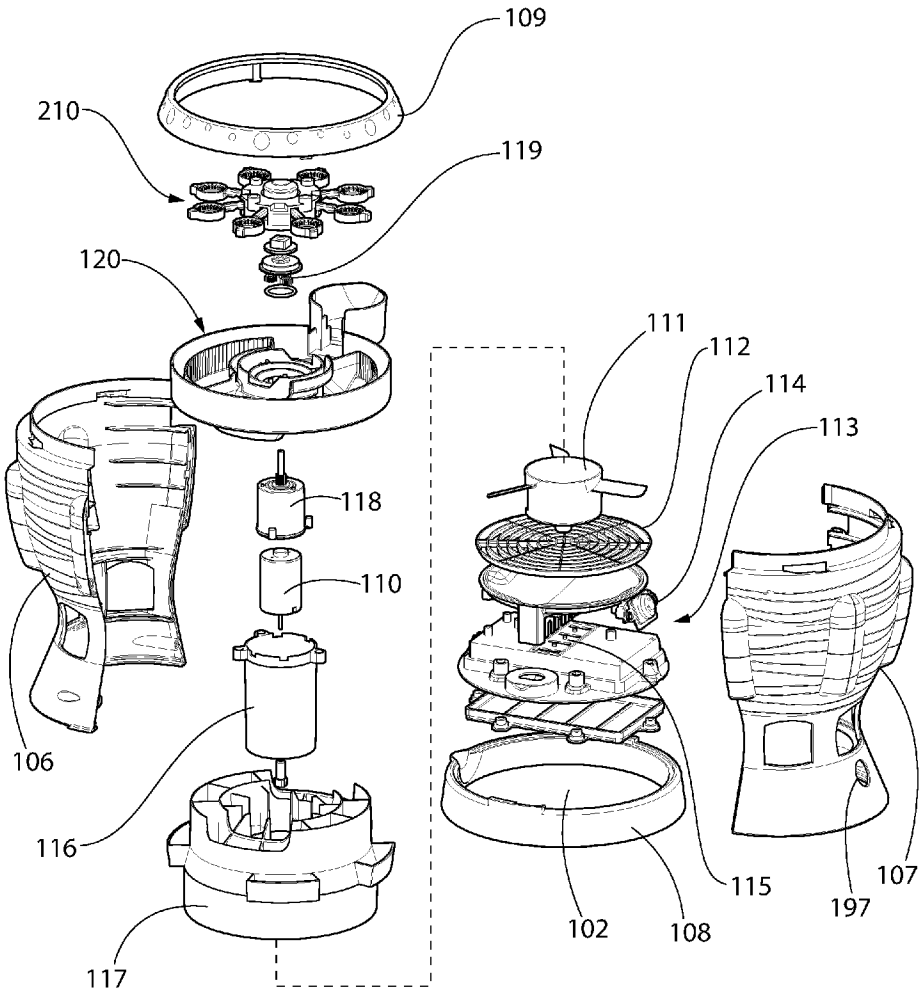
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FIG. 7

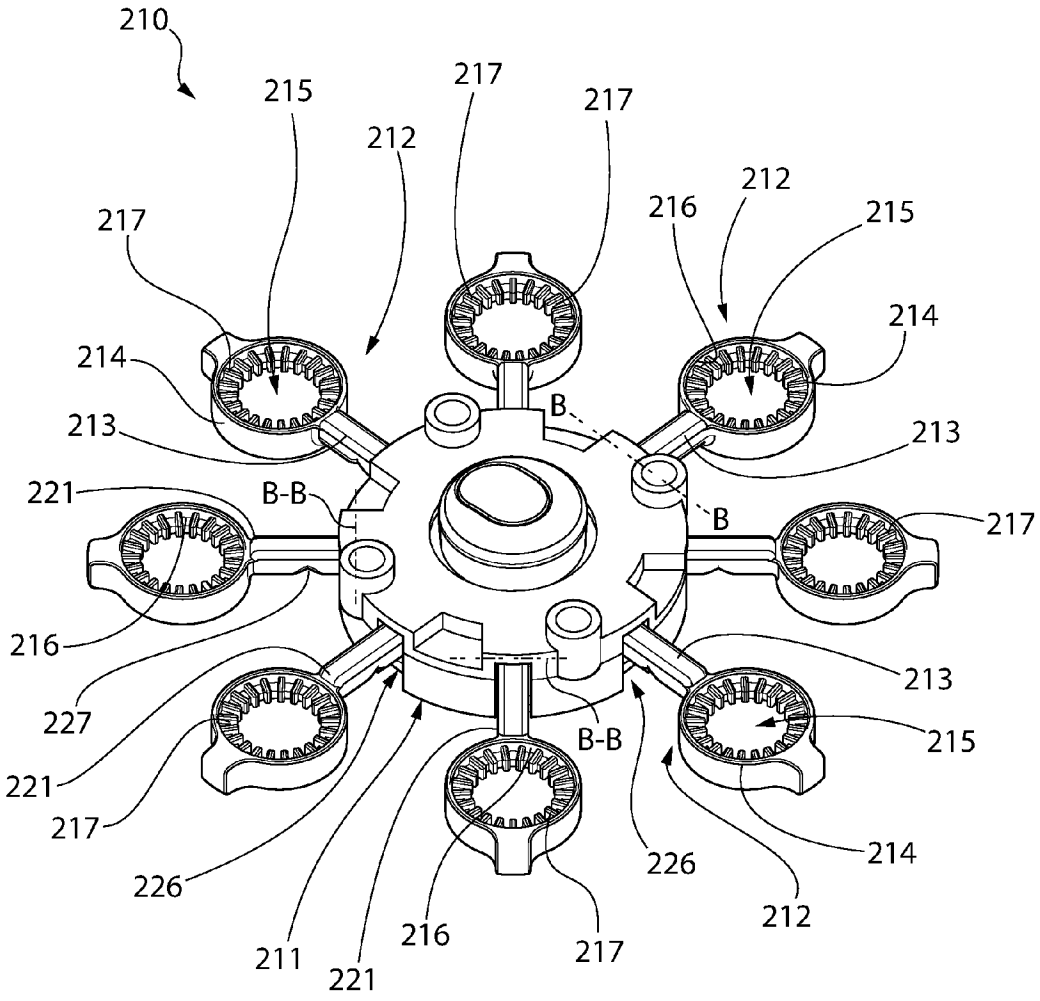
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FIG. 8

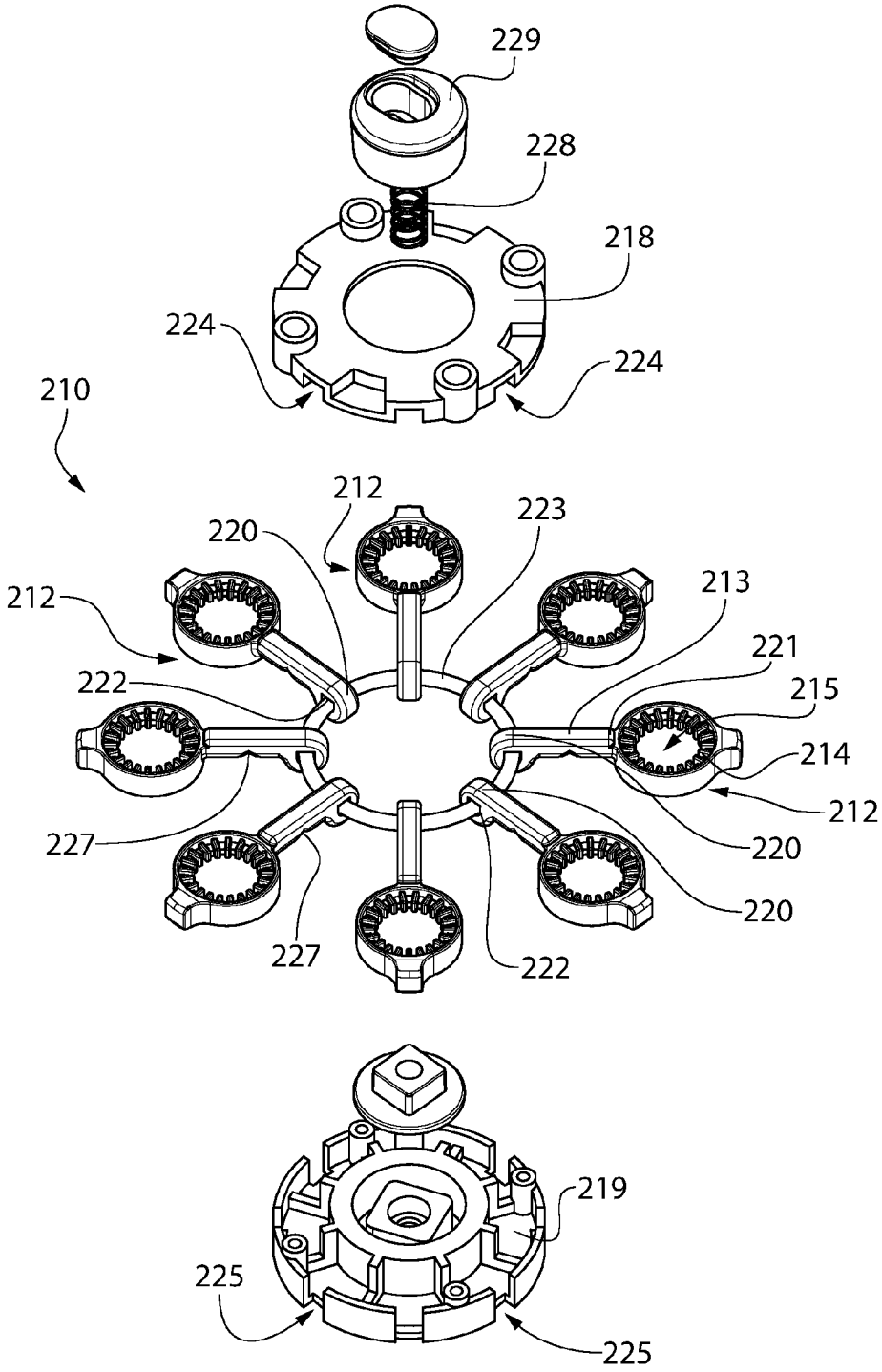
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FIG. 9

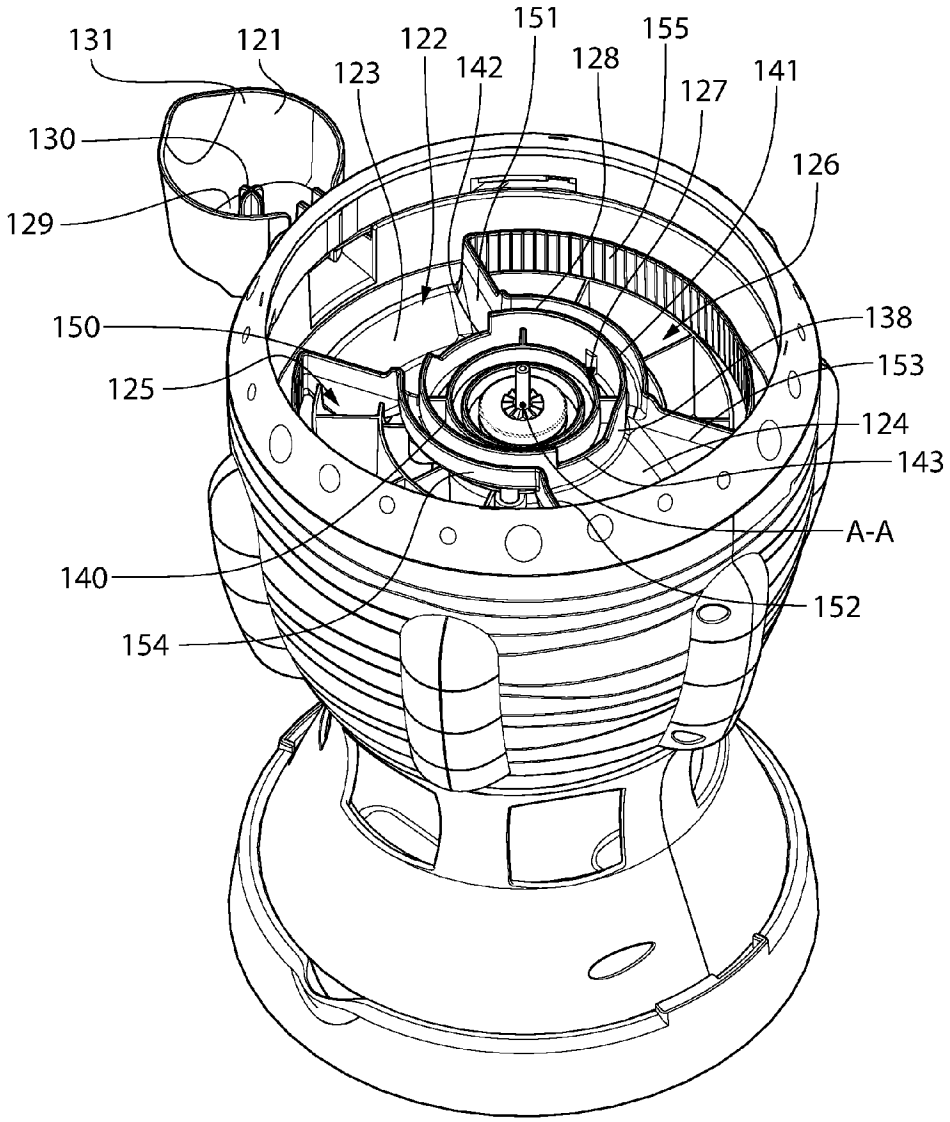
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FIG. 10

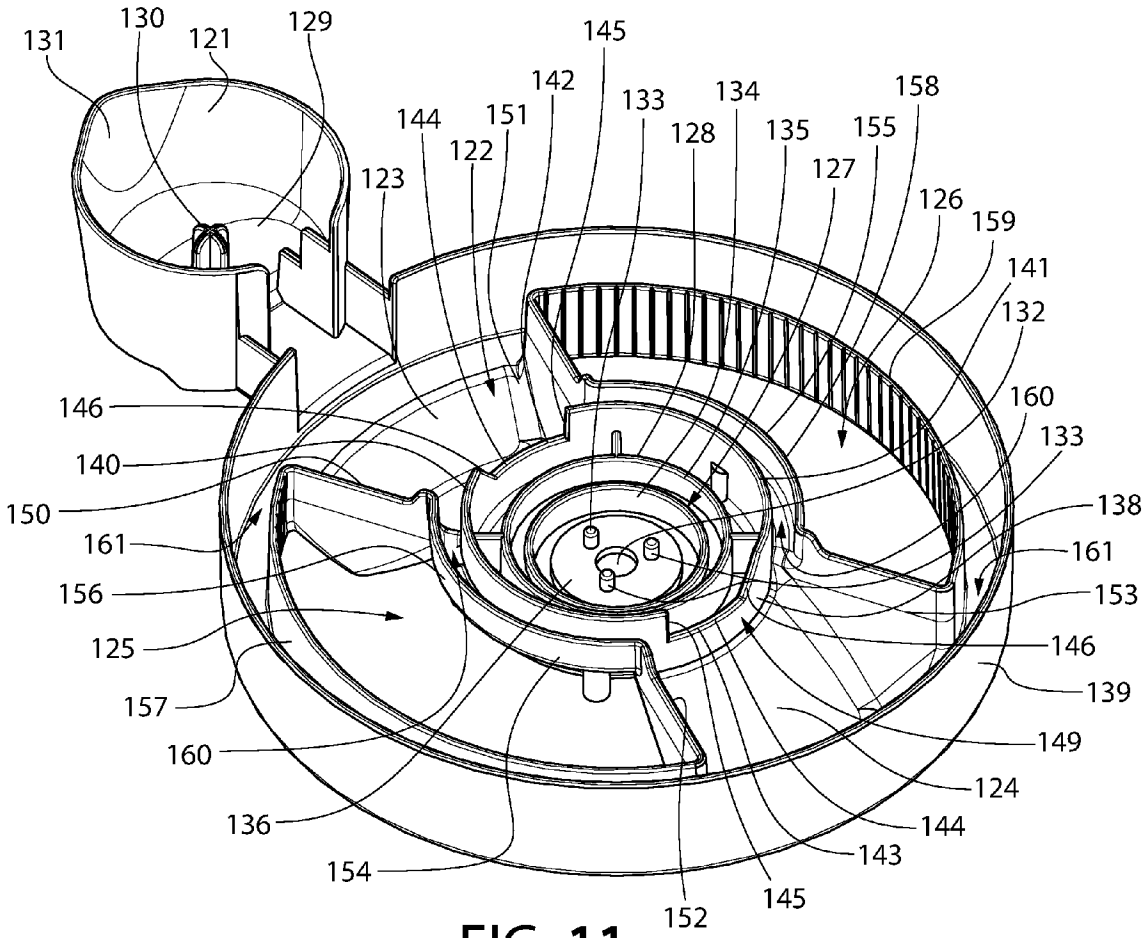
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FIG. 11

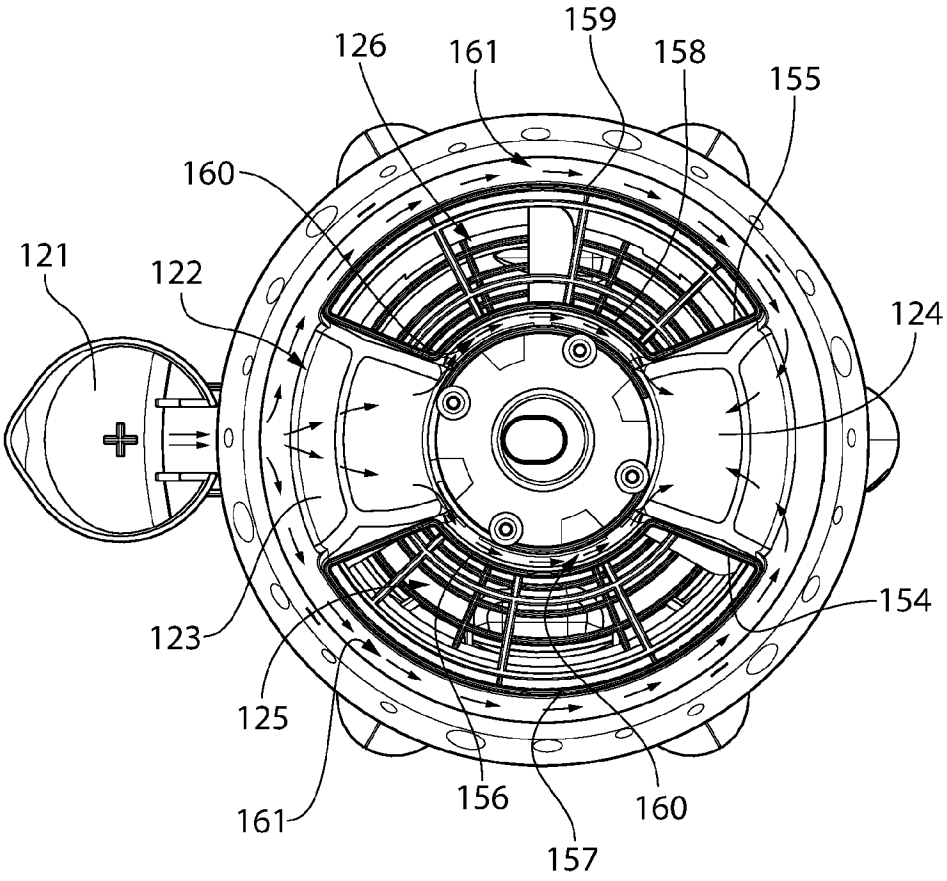

FIG. 12

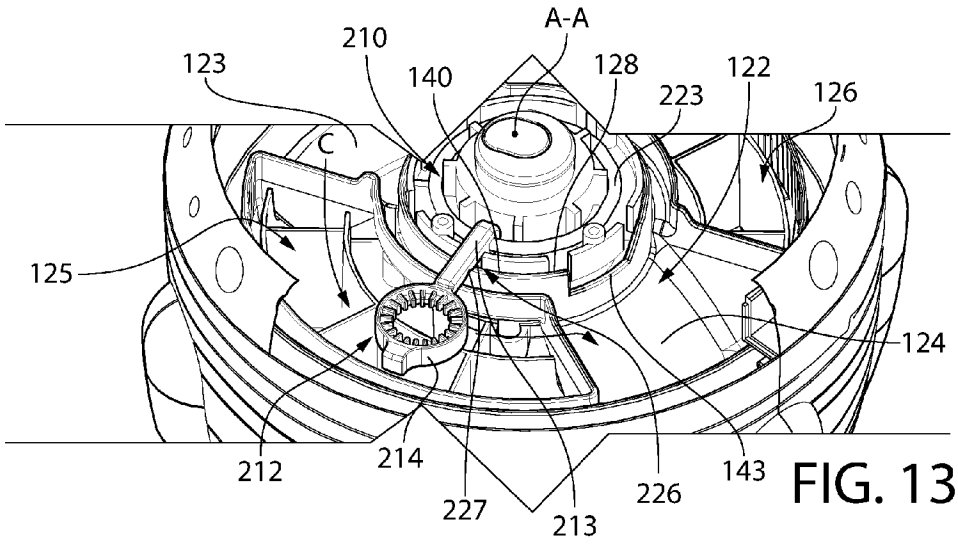

FIG. 13A

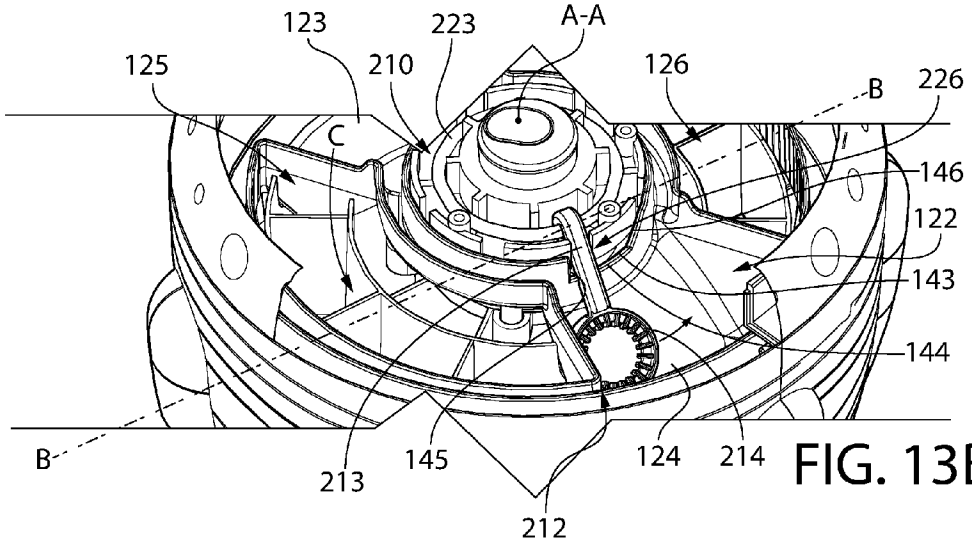

FIG. 13B

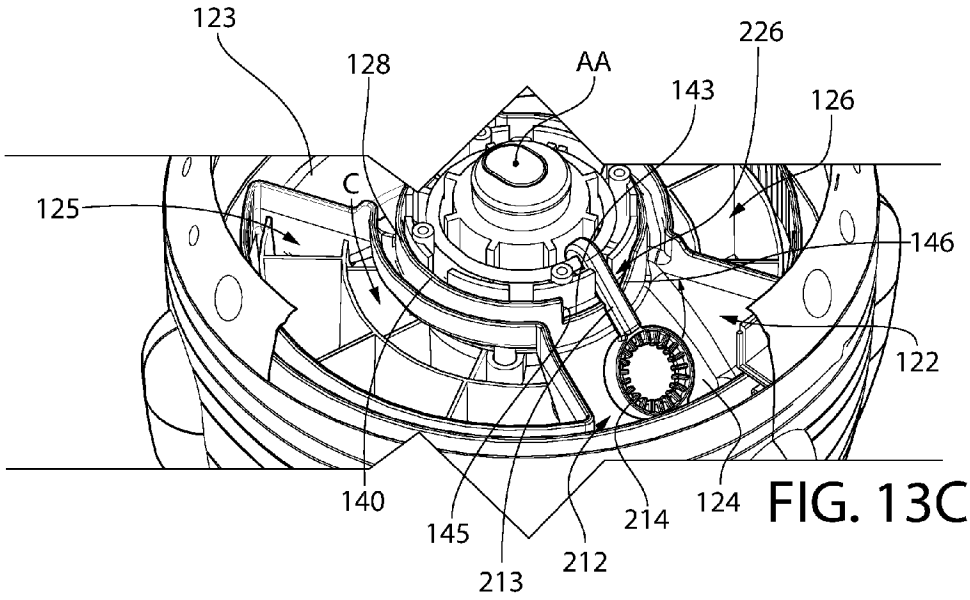

FIG. 13C

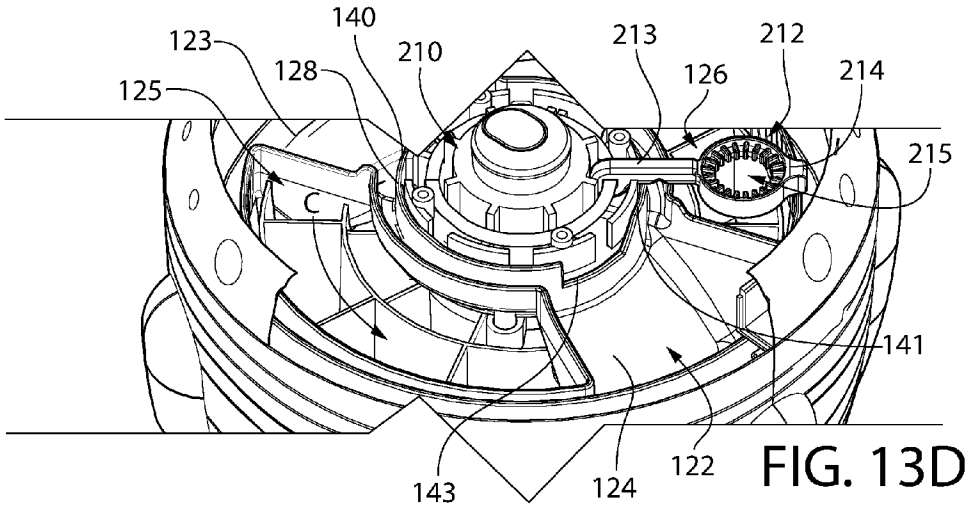

FIG. 13D

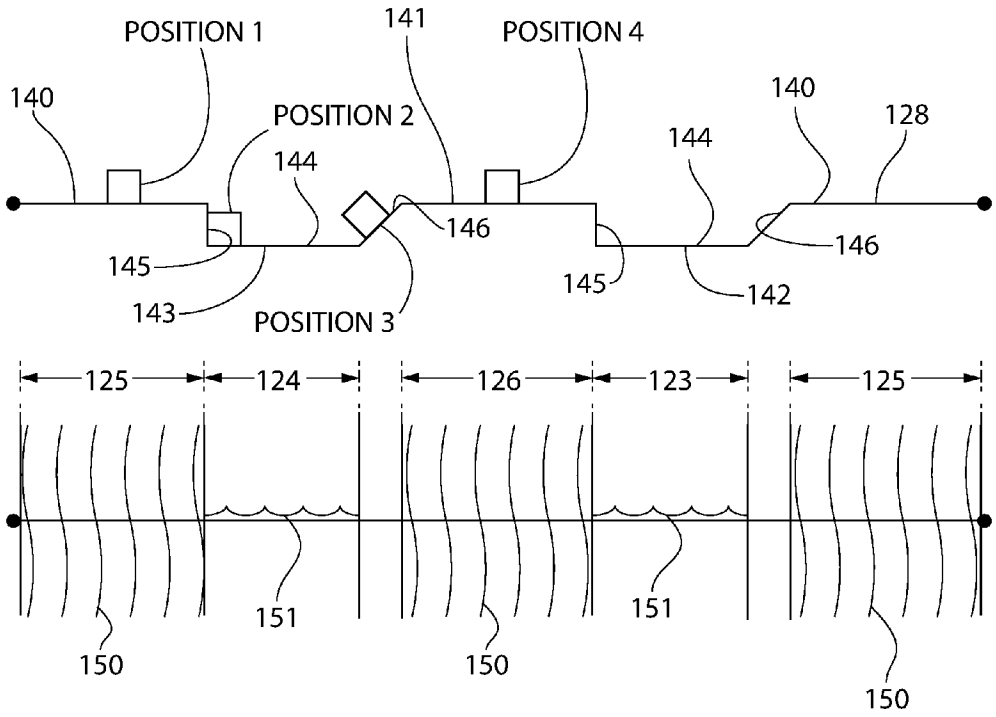
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FIG. 14

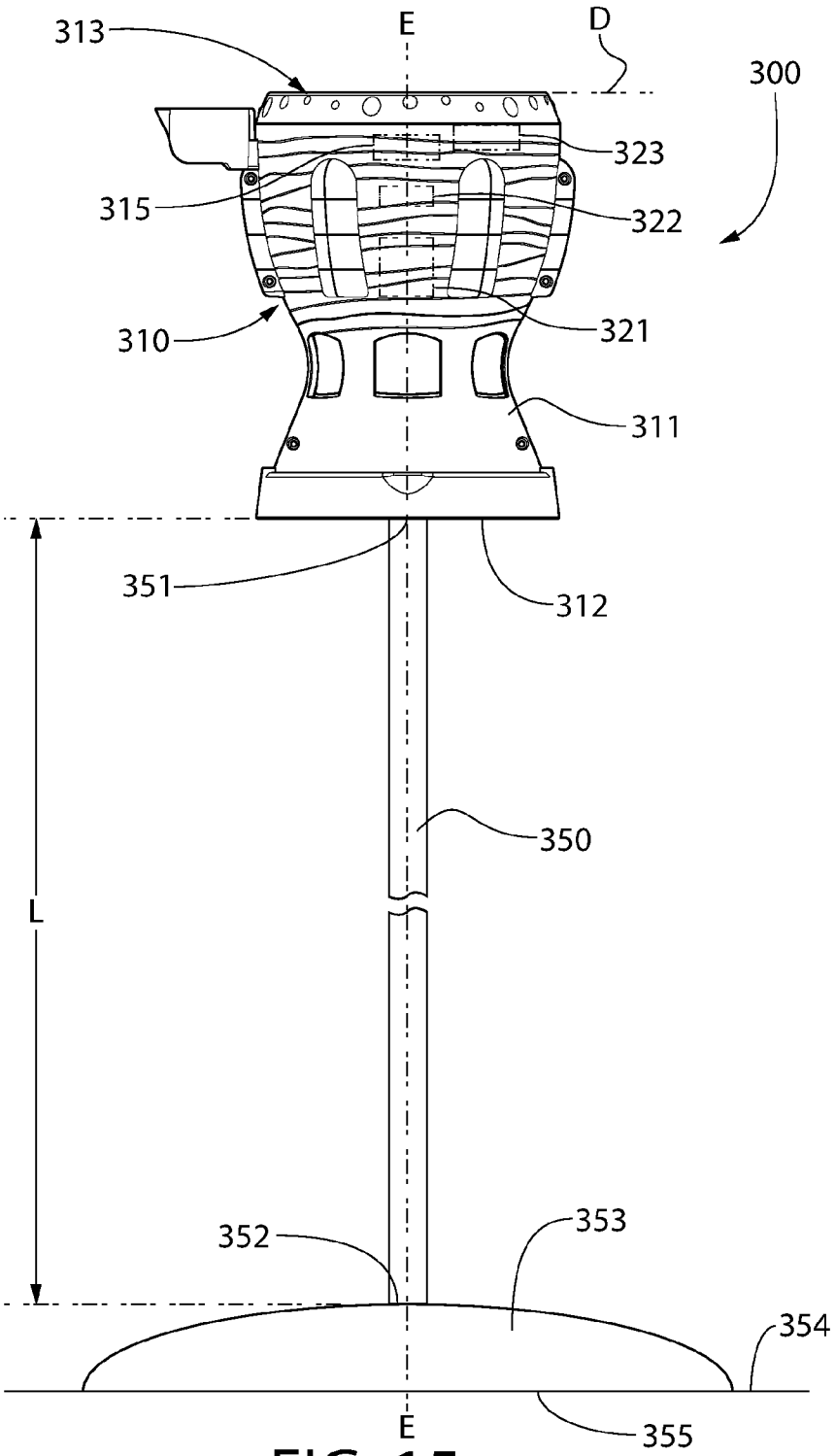


FIG. 15

APPARATUS AND METHOD FOR GENERATING BUBBLES

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a continuation of U.S. patent application Ser. No. 14/245,767, filed Apr. 4, 2014, which in turn claims priority to Chinese Patent Application No. 2014101054649, filed on Mar. 20, 2014, the entirety of which is incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to apparatuses for generating bubbles and methods of generating bubbles.

BACKGROUND OF THE INVENTION

Children love bubbles and the bubble makers that are used to create them. At least as far as children are concerned, there is a general understanding that the more bubbles that are made and the quicker they are made, the better the bubble maker. Simple wands that produce bubbles by loading the wands with a bubble solution and blowing through the wands with air from a person's mouth are well known. Furthermore, certain types of automated bubble producing devices, such as bubble producing guns, are also known. However, these types of devices can make a terrible mess in the hands of a child (the same goes for some adults, too). For purposes of generating more bubbles, and making less of a mess, stand-alone bubble generating toys have been designed. Such a toy generates bubbles by forming a film of bubble solution using an applicator as the solution streams through bubble-forming openings. This type of bubble generating toy requires bubble solution to be pumped from a reservoir at the base of the assembly and streamed over the bubble-forming openings. Furthermore, excess bubble solution must be collected so that it can be directed back into the reservoir. Toys of this type also blow air through small air tubes, which direct the air to the bubble-forming openings to help form the bubbles.

Existing automated bubble making devices must run for a period of time before any bubbles are created, thus leading users to become bored while waiting for the production of bubbles. Furthermore, existing automated bubble making devices are messy, difficult and expensive to manufacture, and difficult to use. Thus, a need exists for an apparatus for generating bubbles which overcomes the above-noted deficiencies.

BRIEF SUMMARY OF THE INVENTION

Exemplary embodiments according to the present disclosure are directed to an apparatus for generating bubbles and to a method of generating bubbles. The apparatus may include a housing, a motor and an air generating device operably coupled to the motor. The apparatus may further include a bubble generating assembly. The bubble generating assembly may ride along a cam surface to transition between a lowered position in which bubble solution is loaded onto the bubble generating assembly and a raised position in which air generated by the air generating device flows through the loaded bubble generating assembly to produce bubbles.

In one aspect, the invention can be an apparatus for generating bubbles comprising: a housing; a motor; a fan device operably coupled to the motor to generate an air stream; a bubble generating assembly comprising a body and a follower member having a bubble generating device, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first rotational axis, the follower member pivotably coupled to the body so as to be pivotable about a second rotational axis; an annular cam surface comprising a raised portion and a valley portion, the annular cam surface circumscribing the first rotational axis, the follower member in operable cooperation with the annular cam surface; wherein upon the bubble generating assembly being rotated about the first rotational axis by the motor, the follower member rides along the annular cam surface to repetitively transition between: (1) a lowered position in which the follower member is located along the valley portion of the annular cam surface and the bubble generating device becomes loaded with bubble solution; and (2) a raised position in which the follower member is located along the raised portion of the annular cam surface and the bubble generating device is aligned with the air stream generated by the fan; and wherein the follower member transitions between the raised position and the lowered position by rotating about the second rotational axis.

In another aspect, the invention can be an apparatus for generating bubbles comprising: a housing; at least one motor; an air flow generator operably coupled to the at least one motor; a trough for containing a bubble solution; a cam surface comprising a raised portion and a valley portion; a follower member comprising a bubble generating device, the follower member in operable cooperation with the cam surface; the at least one motor operably coupled to the follower member to drive the follower member along the cam surface in a repetitive cycle such that: (1) upon the follower member being located along the valley portion of the cam surface, the bubble generating device of the follower member is in the trough for loading with the bubble solution; and (2) upon the follower member being located along the raised portion of the cam surface, the bubble generating device of the follower member is aligned with an air flow generated by the air flow generator for producing bubbles from the bubble solution loaded on the bubble generating device.

In yet another aspect, the invention can be a method of generating bubbles comprising: filling a trough with a bubble solution; generating an air stream with an air stream generator that is operably coupled to a motor; moving a follower member having a bubble generating device along a cam surface, the cam surface comprising a raised portion and a valley portion; loading the bubble solution onto the bubble generating device when the follower member is located along the valley portion of the cam surface; and flowing the air stream through the bubble generating device when the follower member is located along the raised portion of the cam surface to produce bubbles from the bubble solution loaded on the bubble generating device.

In a further aspect, the invention can be a bubble producing flameless torch apparatus comprising: a housing; a rod coupled to the housing; at least one motor; an air flow generator operably coupled to the at least one motor; a trough for containing a bubble solution; a cam surface comprising a raised portion and a valley portion; a follower member comprising a bubble generating device, the follower member in operable cooperation with the cam surface; the at least one motor operably coupled to the follower member to drive the follower member along the cam surface in a repetitive cycle such that: (1) upon the follower member

being located along the valley portion of the cam surface, the bubble generating device of the follower member is in the trough for loading with the bubble solution; and (2) upon the follower member located along the raised portion of the cam surface, the bubble generating device of the follower member is aligned with an air flow generated by the air flow generator for producing bubbles from the bubble solution loaded on the bubble generating device.

In a still further aspect, the invention can be a bubble producing flameless torch apparatus comprising: a housing; a source of bubble solution; an elongated rod coupled to the housing; an illumination source coupled to the housing; at least one motor; an air flow generator operably coupled to the at least one motor to generate an air stream; and a bubble generating device configured to: (1) be loaded with the bubble solution from the source of bubble solution to form a loaded bubble generating device; and (2) produce bubbles from the bubble solution by flowing the air stream generated by the air flow generator through the loaded bubble generating device.

In another aspect, the invention can be a bubble producing apparatus comprising: a housing having a closed bottom end and an open top end; a source of bubble solution; an elongated rod coupled to the closed bottom end of the housing; and a bubble generating device configured to produce bubbles from the bubble solution, the bubbles flowing upwardly from the open top end of the housing.

In an even further aspect, the invention can be an apparatus for generating bubbles, the apparatus comprising: a housing extending from a bottom end to a top end; a motor positioned in the housing; a fan device positioned in the housing, the fan device operably coupled to the motor to generate an upward air stream; a bubble generating assembly positioned in the housing, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis, the bubble generating assembly comprising; a body comprising: an upper shell; a lower shell, the upper shell coupled to the lower shell to form a plurality of slots in the body; and a ring structure positioned between the upper and lower shells; a plurality of follower members extending from the slots of the body, each of the follower members comprising: an arm having a first end pivotably coupled to the ring structure so as to be pivotable about a second axis, the first end of the arm comprising an aperture through which the ring structure extends; and a bubble generating device coupled to a second end of the arm; a basin member comprising: a trough for containing bubble solution, the trough positioned within the housing, the trough comprising a floor that is inclined downwardly with distance from the first axis; a feed reservoir protruding from the housing, the feed reservoir configured such that bubble solution fed into the feed reservoir flows into the trough; and a cam wall having a raised portion and a recess that forms a valley portion; and wherein upon the bubble generating assembly being rotated about the first rotational axis by the motor, each of the follower members ride along the upstanding cam wall and repetitively transition between: (1) a lowered position in which the follower member is located in the valley portion and the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough; and (2) a raised position in which the follower member is located along the raised portion and the bubble generating device is aligned with the air stream generated by the fan; and wherein each of the follower members transition between the raised position and the lowered position by rotating about the second axis.

In another aspect, the invention can be an apparatus for generating bubbles, the apparatus comprising: a housing extending from a bottom end to a top end; a motor positioned in the housing; a fan device positioned in the housing, the fan device operably coupled to the motor to generate an upward air stream; a bubble generating assembly positioned in the housing above the motor and above the fan device, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis, the bubble generating assembly comprising a plurality of follower members, each of the follower member comprising an arm and a bubble generating device; a trough for containing bubble solution; a cam surface configured to repetitively transition, during rotation of the bubble generating assembly, each of the follower members from: (1) a lowered position in which the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough; and (2) a raised position in which the bubble generating device of the follower member is aligned with the air stream generated by the fan; a plurality of air inlet openings extending though the housing, the air inlet openings arranged about a circumference of the housing in a spaced-apart manner and configured to permit air to flow into the housing that is used by the fan device to generate the upward air stream; and a grate positioned in the housing, the grate located above the air inlet openings and below the fan device and the motor.

In another aspect, the invention can be an apparatus for generating bubbles, the apparatus comprising: a housing extending from a bottom end to a top end; a motor positioned in the housing; a fan device positioned in the housing, the fan device operably coupled to the motor to generate an upward air stream; a bubble generating assembly, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis, the bubble generating assembly comprising: a body; a plurality of follower members extending radially from the body, each of the follower members comprising: an arm having a first end pivotably coupled to the body so as to be pivotable about a second axis; and a bubble generating device coupled to a second end of the arm; a trough for containing bubble solution; a cam surface configured to repetitively transition, during rotation of the bubble generating assembly, each of the follower members from: (1) a lowered position in which the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough; and (2) a raised position in which the bubble generating device of the follower member is aligned with the air stream generated by the fan; wherein each of the follower members transition between the raised position and the lowered position by rotating about the second axis; and wherein, for each of the follower members, the arm extends along a linear arm axis in both the lowered and raised positions.

Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood that the detailed description and specific examples, while indicating the preferred embodiment of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

FIG. **1** is a perspective view of an apparatus for generating bubbles in accordance with one embodiment of the present invention;

FIG. **2** is a front view of the apparatus for generating bubbles of FIG. **1**;

FIG. **3** is a bottom view of the apparatus for generating bubbles of FIG. **1**;

FIG. **4** is a top view of the apparatus for generating bubbles of FIG. **1**;

FIG. **5** is a cross-sectional view taken along line V-V of FIG. **4**;

FIG. **6** is an enlarged view of area VI of FIG. **5**;

FIG. **7** is an exploded view of the apparatus for generating bubbles of FIG. **1**;

FIG. **8** is a perspective view of a bubble generating assembly of the apparatus for generating bubbles of FIG. **1**;

FIG. **9** is an exploded view of the bubble generating assembly of FIG. **8**;

FIG. **10** is a perspective view of the apparatus for generating bubbles with the bubble generating assembly removed;

FIG. **11** is a perspective view of a basin member of the apparatus for generating bubbles of FIG. **1**;

FIG. **12** is a top view of the apparatus for generating bubbles of FIG. **1** with directional arrows to indicate the direction of flow of bubble solution;

FIG. **13**A is a perspective view of a portion of the apparatus for generating bubbles of FIG. **1** with a bubble generating device in a first position;

FIG. **13**B is a perspective view of the portion of the apparatus for generating bubbles of FIG. **13**A with the bubble generating device in a second position;

FIG. **13**C is a perspective view of the portion of the apparatus for generating bubbles of FIG. **13**A with the bubble generating device in a third position;

FIG. **13**D is a perspective view of the portion of the apparatus for generating bubbles of FIG. **13**A with the bubble generating device in a fourth position;

FIG. **14** is a schematic diagram illustrating the operation of the apparatus for generating bubbles based on the positioning of the bubble generating device; and

FIG. **15** is a front view of an apparatus for generating bubbles coupled to an elongated rod in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The following description of the preferred embodiment(s) is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses.

The description of illustrative embodiments according to principles of the present invention is intended to be read in connection with the accompanying drawings, which are to be considered part of the entire written description. In the description of embodiments of the invention disclosed herein, any reference to direction or orientation is merely intended for convenience of description and is not intended in any way to limit the scope of the present invention. Relative terms such as "lower," "upper," "horizontal," "vertical," "above," "below," "up," "down," "top" and "bottom" as well as derivatives thereof (e.g., "horizontally," "downwardly," "upwardly," etc.) should be construed to refer to the orientation as then described or as shown in the drawing under discussion. These relative terms are for convenience of description only and do not require that the apparatus be constructed or operated in a particular orientation unless explicitly indicated as such. Terms such as "attached," "affixed," "connected," "coupled," "interconnected," and similar refer to a relationship wherein structures are secured or attached to one another either directly or indirectly through intervening structures, as well as both movable or rigid attachments or relationships, unless expressly described otherwise. Moreover, the features and benefits of the invention are illustrated by reference to the exemplified embodiments. Accordingly, the invention expressly should not be limited to such exemplary embodiments illustrating some possible non-limiting combination of features that may exist alone or in other combinations of features; the scope of the invention being defined by the claims appended hereto.

Referring first to FIGS. **1-4** and **7** concurrently, an apparatus for generating bubbles **100** (hereinafter "the apparatus **100**") will be described in accordance with an embodiment of the present invention. The apparatus **100** comprises a housing **101** having a closed bottom end **102**, an open top end **103** and an outer surface **104**. Of course, in certain embodiments the bottom end **102** may be partially or entirely open. The housing **101** has various openings **199** and protrusions **198** along its outer surface **104** for aesthetic purposes. The openings **199** may also assist in air generation by permitting the inflow of air into the housing **101** that is used to generate an air stream by an air generating device, as discussed in more detail below. However, the outer surface **104** can have any ornamental design desirable. In the exemplified embodiment, the housing **101** has an hourglass-like shape with a waist portion **105** that is narrowed relative to the remainder of the housing **101**. Of course, the invention is not to be so limited in all embodiments and the outer surface **104** may have a constantly shaped profile, such as being square-shaped, rectangular shaped or the like in other embodiments. The housing **101** can take on virtually any shape.

Furthermore, in the exemplified embodiment the housing **101** comprises a first shell **106** and a second shell **107** that are separable from one another to facilitate manufacture of the apparatus **100**. The housing **101** also includes a base plate **108** that forms the closed bottom end **102** and an upper ring **109** that surrounds the open top end **103**. The housing **101** is preferably formed of a rigid material, such as a hard plastic including for example without limitation thermoset or thermoplastic polymers such as polyolefins which include polyethylene, polyester, polyurethane and the like. Of course, other materials can be used to form the housing **101** as would be readily selectable by persons of ordinary skill in the art.

In the exemplified embodiment, the housing **101** houses and/or contains all of the components of the apparatus **100**. Thus, the first and second shells **106**, **107** are coupled together (with screws, fasteners, tight-fit, interference fit, adhesion, or the like) and the remaining components of the apparatus **100** are positioned within the housing **101**. However, the invention is not to be so limited in all embodiments and in certain other embodiments some of the components of the apparatus **100** may be positioned external to the housing **101** while still being in operable communication with the other components to enable the apparatus **100** to produce bubbles as will be described in more detail below.

Referring briefly to FIGS. **5-7**, the various components of the apparatus **100** will be briefly described, it being understood that a more detailed description of each of these components will be provided below. In addition to the housing **101**, the apparatus **100** generally comprises a motor **110**, an air flow generator **111** for generating an air stream or air flow, a grate **112** to prevent a user from contacting the

blades of the air flow generator **111** by preventing a user's fingers from being able to contact the air flow generator **111** if the user's fingers are inserted into the openings **199**, a power sub-system **113** that includes a power button **114**, battery contacts **115** and all other components necessary to power on the apparatus **100** for use thereof. In the assembled apparatus **100**, the power button **114** may be exposed through an opening **197** formed through the housing **101**. The apparatus **100** also includes a shroud **116** for protecting the motor **110** against water or liquid damage and a gear housing **117** for housing the various gears (including the gears **118** and **119**) that facilitate transferring movement from the motor to the various components of the apparatus **100** at a desired speed. The apparatus **100** also includes a basin member **120** and a bubble generating assembly **210**.

The motor **110** is operably coupled to a power source (such as batteries) to enable the motor **110** to rotate about a rotational axis. In the exemplified embodiment, the air flow generator **111** is a fan device having blades thereon so that during rotation of the air flow generator **111**, the blades generate an air stream which flows upwardly through the housing **101** in the direction of the arrows Z towards the open top end **103** of the housing **101**. Of course, the air flow generator **111** need not be a fan device in all embodiments and the air flow generator **111** can be any other device capable of generating an air stream for bubble production as discussed herein. In the exemplified embodiment, the air flow generator **111** is operably coupled to the motor **110** so that during rotation of the motor, the air flow generator **111** also rotates. In the exemplified embodiment the air flow generator **111** is directly coupled to the motor **110** so that the air flow generator **111** rotates at the same rotational speed as the motor **110**. However, the invention is not to be so limited in all embodiments and the air flow generator **1110** may be coupled to the motor **110** indirectly via a gear train so that the air flow generator **111** may rotate faster (via step up gears) or slower (via step down gears) than the motor **110**.

In the exemplified embodiment, the bubble generating assembly **210** is also operably coupled to the motor **110** so that the bubble generating assembly **210** is made to rotate during operation. More specifically, the bubble generating assembly **210** rotates about a first rotational axis A-A during operation of the apparatus **100**. Of course, the invention is not to be so limited in all embodiments and in certain other embodiments the bubble generating assembly **210** may translate in a linear direction rather than moving in a rotational direction. Thus, movement directions other than that illustrated in the exemplified embodiment are possible and are within the scope of the present invention. In the exemplified embodiment, the bubble generating assembly **210** is indirectly coupled to the motor **110** via various ones of the gears **118**, **119**. It may be desired to rotate the bubble generating assembly **210** at a slower speed than the rotation of the motor **110**, and thus the gears **118**, **119** may be step down gears that facilitate slower movement of the bubble generating assembly **210** than the motor **110**. The bubble generating assembly **210** comprises bubble generating devices that can be loaded with bubble solution so that as the air stream generated by the air stream generator **111** flows through the bubble generating devices that are pre-loaded with a bubble solution, bubbles are formed. This will be described in more detail below.

Referring to FIGS. **1**, **4**, **10** and **11** concurrently, the apparatus **100** will be described in more detail. As noted above, the apparatus **100** includes a basin member **120**, which is depicted in FIG. **11** in isolation. The outer boundaries of the basin member **120** are formed by a perimetric wall **139**. Although in the exemplified embodiment all of the various parts of the basin member **120** are illustrated as being formed into a single unitary structure, the invention is not to be so limited in all embodiments and in certain other embodiments the various parts of the basin member **120** may be individual components that are positioned within the apparatus **100** in such a manner to enable them to cooperate as needed to achieve the desired bubble generation.

In the exemplified embodiment, the basin member **120** includes a gravity-feed reservoir **121**, a trough **122** comprising a first reservoir **123** and a second reservoir **124**, a first air flow opening **125**, a second air flow opening **126**, a connection section **127** for coupling the bubble generating assembly **210** to the basin member **120** and a cam surface **128**.

The gravity-feed reservoir **121** includes a floor **129**, a protrusion **130** extending upwardly from the floor **129** at a center point of the floor **129** and a cylindrical wall **131** forming a periphery of the gravity-feed reservoir **121**. During use, a bottle containing a bubble solution may be placed upside-down within the gravity-feed reservoir **121** so that the open end of the bottle is adjacent the floor **129** of the gravity-feed reservoir **121**. In this position, the protrusion **130** will enter into an opening in the top of the bottle and the cylindrical wall **131** will surround a portion of an outer surface of the bottle. The combination of the cylindrical wall **131** surrounding a portion of the outer surface of the bottle and the protrusion **130** extending into the opening of the bottle will facilitate maintaining the bottle in this upside-down position without requiring the user to hold the bottle in place. In certain embodiments, the opening of the bottle may be closed by a film of plastic or by a piece of rubber material. The protrusion **130** will extend into the opening in the bottle, and may serve to pierce such a film of plastic or piece of rubber material that is covering the opening in the bottle to enable the bubble solution to flow out from the bottle and into the gravity-feed reservoir **121**. After filling the gravity-feed reservoir **121**, the bubble solution will flow into the trough **122**. The flow of the bubble solution from the bottle to the gravity-feed reservoir **121** and from the gravity-feed reservoir **121** to the trough **122** will be described in more detail below with particular reference to FIG. **12**.

Referring to FIGS. **1**, **4**, **6**, **10** and **11**, the connection section **127**, the cam surface **128** and the trough **122** will be described in more detail. The connection section **127** comprises a platform **136** having an aperture **132** therein for receiving a connection mechanism such as a bolt, a screw, a fastener or the like to couple the bubble generating assembly **210** to the basin member **120**. The platform **136** also includes protuberances **133** that facilitate the coupling of the bubble generating assembly **210** to the basin member **120**. Furthermore, the connection section **127** comprises two concentric upstanding walls **134**, **135** to further facilitate the coupling of the bubble generating assembly **210** to the basin member **120**.

The cam surface **128** is a top surface of a cam wall **138** that extends upwardly from the basin member **120**. In the exemplified embodiment, the cam wall **138**, and thereby also the cam surface **128**, is an annular structure. Thus, in the exemplified embodiment the cam wall **138** concentrically surrounds each of the two concentric upstanding walls **134**, **135** and the platform **136**. Similarly, the cam wall **138** and the cam surface **128** circumscribe the first rotational axis A-A. However, the invention is not to be so limited in all embodiments such that the cam wall **138** and the cam surface **128** need not be annular in shape in all embodiments. Rather, the cam wall **138** and the cam surface **128** can take

on other shapes such as being linear or having any closed polygonal shape. As discussed in more detail below, during operation the cam surface **128** is stationary or non-movable. A follower member of the bubble generating assembly **210** moves relative to and along the cam surface **128** while the cam surface **128** remains stationary to achieve the functionality of the apparatus **100**.

In the exemplified embodiment, the cam surface **128** comprises a first raised portion **140**, a second raised portion **141**, a first valley portion **142** and a second valley portion **143**. However, the invention is not to be so limited in all embodiments and in certain other embodiments the cam surface **128** may only include one raised portion and one valley portion, or the cam surface **128** may include three or more raised portions and three or more valley portions. Thus, the invention is not to be particularly limited by the number of raised and valley portions that form the cam surface **128** in all embodiments.

In the exemplified embodiment, each of the first and second raised portions **140**, **141** is a flat portion of the top surface of the cam wall **138** that extends to a height greater than the height of each of the valley portions **142**, **143**. Thus, the valley portions **142**, **143** of the cam surface **128** are lowered or recessed relative to the raised portions **140**, **141** of the cam surface **128**. Each of the valley portions **142**, **143** of the cam surface **128** comprise a floor **144**, a first wall **145** extending upwardly from the floor **144** to one of the raised portions **140**, **141** and a second wall **146** extending upwardly from the floor **144** to the other one of the raised portions **140**, **141**. Specifically, referring to the valley portion **143**, the valley portion **143** has the first wall **145** which extends from the floor **144** to the first raised portion **140** and the second wall **146** which extends from the floor **144** to the second raised portion **141**. The valley portion **142** has a first wall **145** which extends from the floor **144** to the second raised portion **141** and a second wall **146** that extends from the floor **144** to the first raised portion **140**.

The floor **144** of the valley portions **142**, **143** is a substantially planar flat surface. The first wall **145** extends upwardly from the floor **144** at an approximately 90° angle such that the first wall **145** is substantially perpendicular to the floor **144**. Substantially perpendicular can include the first wall **145** forming an angle with the floor **144** of between 88-92° in one embodiment, between 85-95° in another embodiment, between 80-100° in a further embodiment or between 70-110° in a still further embodiment. The second wall **146** extends upwardly from the floor **144** so as to form an obtuse angle between the floor **144** and the second wall **146**. Specifically, the obtuse angle may be between 100-170° in one embodiment, more specifically between 110-210° in another embodiment, more specifically between 120-150° in yet another embodiment, and still more specifically between 130°-140° in a further embodiment. Thus, the second wall **146** forms a ramp on the cam surface **128**, the purpose of which will be discussed in more detail below.

As noted above, the trough **122**, in the exemplified embodiment, comprises a first reservoir **123** and a second reservoir **124**. Of course, the invention is not to be limited by the number of reservoirs included in the trough **122** in all embodiments. In certain other embodiments the trough **122** may only include one reservoir, or the trough **122** may include three, four or more reservoirs in other embodiments. The trough **122** is intended to receive and contain a bubble solution therein for application onto the bubble generating assembly **210**, which will be described in more detail below.

Each of the first and second reservoirs **123**, **124** of the trough **122** comprises a floor **147** and a sidewall **148** extending upwardly from the floor **147** at an approximately 90° angle. Of course, the sidewall **148** can extend upwardly from the floor at angles that are greater than or less than 90°, such as an angle between 88-92°, between 85-95°, between 80-100° or the like. The floor **147** of each of the first and second reservoirs **123**, **124** of the trough **122** extends downwardly from an outer surface **149** of the annular cam wall **138** thereby forming an obtuse angle θ between the floor **147** of the trough **122** (or the floor **147** of each of the first and second reservoirs **123**, **124** of the trough **122**) and the annular cam wall **138**. The obtuse angle θ may be any angle that is greater than 90° and less than 180°, but more preferably is between approximately 110° and 160°, or even more preferably between approximately 120° and 150°, and still more preferably between approximately 130° and 140°. When in use, the bubble solution fills up each of the first and second reservoirs **123**, **124** of the trough **122** as will be discussed in more detail below with reference to FIG. **12**.

In the exemplified embodiment, the first reservoir **123** is spaced apart from the second reservoir **124** about the first rotational axis A-A. More specifically, in the exemplified embodiment, a center of the first reservoir **123** is circumferentially spaced approximately 180° from a center of the second reservoir **124**. The first reservoir **123** comprises a first side **150** and an opposing second side **151** and the second reservoir **124** comprises a first side **152** and an opposing second side **153**. In the exemplified embodiment, adjacent sides of the first and second reservoirs **123**, **124** (i.e., the first side **150** of the first reservoir **123** is adjacent to the first side **152** of the second reservoir **124** and the second side **151** of the first reservoir **123** is adjacent to the second side **153** of the second reservoir **124**) are spaced apart less than 180° about the first rotational axis A-A because each one of the reservoirs **123**, **124** spans a distance about the first rotational axis A-A. Of course, the invention is not to be so limited and the center-to-center spacing between the first and second reservoirs **123**, **124** can be less than 180° in other embodiments, such as the first and second reservoirs **123**, **124** being spaced apart by approximately 30°, 45°, 60°, 90°, 120°, 150° or the like.

The basin member **120** also includes the first air flow opening **125** and the second air flow opening **126**. In the exemplified embodiment, each of the first and second air flow openings **125**, **126** are arcuate in shape, although other shapes are certainly possible in other embodiments. Specifically, the first and/or second air flow openings **125**, **126** may be circular, ovular, rectangular or the like. Although two air flow openings are depicted in the drawings, the invention is not to be so limited in all embodiments and in certain other embodiments the apparatus **100** may include more than two air flow openings or just a single air flow opening.

In the exemplified embodiment each of the first and second air flow openings **125**, **126** spans between 90° and 150° about the cam wall **138**, more specifically between 100° and 140° about the cam wall **138**, and still more specifically between 110° and 130° about the cam wall **138**. Thus, the two air flow openings **125**, **126** collectively span approximately 220° to 260° about the cam wall **138**, and the two reservoirs **123**, **124** collectively span approximately 100° to 160° about the cam wall **138**. Without desiring to be particularly limited in this regard in all embodiments, in the exemplified embodiment each of the first and second air flow openings **125**, **126** has a greater area (i.e., takes up more space) than each of the first and second reservoirs **123**, **124**. The first and second air flow openings **125**, **126** are formed by holes or apertures that extend through the basin member **120**. Due to the holes or apertures, the air stream or air flow

that is generated by the air flow generator **111** flows upwardly towards the basin member **120** in the direction of the arrows Z (FIG. **6**), and then flows through the first and second air flow openings **125**, **126**.

The first air flow opening **125** is defined by or surrounded by a first upstanding wall **154** and the second air flow opening **126** is defined by or surrounded by a second upstanding wall **155**. In the exemplified embodiment, the first upstanding wall **154** forms an uninterrupted closed perimeter that surrounds the first air flow opening **125** and the second upstanding wall **155** forms an uninterrupted closed perimeter that surrounds the second air flow opening **126**. Of course, the invention is not to be so limited and in certain other embodiments each of the first and second upstanding walls **154**, **155** may be formed by wall segments that are spaced apart from one another. In still other embodiments the first and second upstanding walls **154**, **155** may partially, but not entirely, surround the first and second air flow openings **125**, **126**. In still other embodiments, the first and second upstanding walls **154**, **155** may be altogether omitted. As will be discussed in more detail below, the first and second upstanding walls **154**, **155** assist in the formation of channels between the first and second reservoirs **123**, **124** to enable the bubble solution to flow between the first and second reservoirs **123**, **124**.

In the exemplified embodiment, the first air flow opening **125** is located between the first side **150** of the first reservoir **123** and the first side **152** of the second reservoir **124**. Furthermore, the second air flow opening **126** is located between the second side **151** of the first reservoir **123** and the second side **153** of the second reservoir **124**. Thus, the reservoirs **123**, **124** and the air flow openings **125**, **126** alternate in position when moving in a rotational direction about the cam wall **138**. Furthermore, the first raised portion **140** of the cam surface **128** is aligned with the first air flow opening **125**, the second raised portion **141** of the cam surface **128** is aligned with the second air flow opening **126**, the first valley portion **142** of the cam surface **128** is aligned with the first reservoir **123** and the second valley portion **143** of the cam surface **128** is aligned with the second reservoir **124**. The term aligned, as used in this paragraph, simply indicates whether a reservoir or an air flow opening is adjacent to the raised portions and valley portions of the cam surface **128**.

To visualize, the basin member **120**, which in the exemplified embodiment is round or circular in shape, can be divided into four pie shaped segments such that a first pie shaped segment encompasses the first valley portion **142** of the cam surface **128** and the first reservoir **123**, a second pie shaped segment encompasses the first raised portion **140** of the cam surface **128** and the first air flow opening, a third pie shaped segment encompasses the second valley portion **143** of the cam surface **128** and the second reservoir **124**, and a fourth pie shaped segment encompasses the second raised portion **141** of the cam surface **128** and the second air flow opening **126**. This relative positioning of the raised and valley portions **140**, **141**, **142**, **143** of the cam surface **128** relative to the air flow openings **125**, **126** and to the reservoirs **123**, **124** enables bubble solution to be loaded onto a bubble generating device when the bubble generating device is positioned within the trough **122** (or within one of the reservoirs **123**, **124** of the trough **122**) and then enables the air stream generated by the air flow generator **111** to flow through the loaded bubble generating device to produce bubbles when the bubble generating device is positioned over and aligned with one of the air flow openings **125**, **126**, as will be discussed in more detail below with reference to FIGS. **13**A-D and **14**.

The first upstanding wall **154** has an inner portion **156** and an outer portion **157**. Similarly, the second upstanding wall **155** has an inner portion **158** and an outer portion **159**. A first channel **160** is formed between the cam wall **138** and the inner portions **156**, **158** of each of the first and second upstanding walls **154**, **155**. A second channel **161** is formed between the outer portions **157**, **159** of each of the first and second upstanding walls **154**, **155** and the perimetric wall **139** of the basin member **120**. In the exemplified each of the first and second channels **160**, **161** is an annular channel. In that regard, in the exemplified embodiment, the first channel **160** has a first diameter and the second channel **161** has a second diameter, the second diameter being greater than the first diameter. Each of the first and second channels **160**, **161** extends between the first reservoir **123** and the second reservoir **124**. Thus each of the first and second channels **160**, **161** fluidly couples the first reservoir **123** to the second reservoir **124**.

Referring to FIGS. **11** and **12** concurrently, the flow of the bubble solution into the first and second reservoirs **123**, **124** and through the channels **160**, **161** will be described. As noted above, a bottle of bubble solution can be positioned upside-down within the gravity-feed reservoir **121** to enable the bubble solution to flow out of the bottle and into the basin member **120**. As the bubble solution flows out of the bottle, the bubble solution flows from the gravity-feed reservoir **121** and into the first reservoir **123**. As the first reservoir **123** fills up with the bubble solution, the bubble solution begins to flow within and along each of the first and second channels **160**, **161** in the direction of the second reservoir **124**. This flow of the bubble solution within the channels **160**, **161** is illustrated by the arrows in FIG. **12**. The bubble solution continues to flow until either the bottle is empty of bubble solution, or until both of the reservoirs **123**, **124** are filled with the bubble solution. Excess bubble solution may remain in the first and second channels **160**, **161** in addition to the bubble solution located within the first and second reservoirs **123**, **124**. The bubble solution located within the reservoirs **123**, **124** of the trough **122** can be loaded onto bubble generating devices during operation of the apparatus **100**, as will be discussed in more detail below with specific references to FIGS. **13**A-D and **14**.

Referring now to FIGS. **1**, **4**, **6**, **8** and **9** concurrently, the bubble generating assembly **210** will be described in detail. The bubble generating assembly **210** generally comprises a body **211**, a follower member **212** (only a few of the follower members **212** are labeled in the figures order to avoid clutter), a spring **228** and a cover **229**. The body **211** of the bubble generating device **210** comprises an upper shell **218** and a lower shell **219** that are operably coupled together. In the exemplified embodiment, the bubble generating assembly **210** comprises a plurality of the follower members **212**, and more specifically eight of the follower members **212**, although any number of follower members **212** can be used in other embodiments. Each of the follower members **212** comprises a follower arm **213** and at least one bubble generating device **214**. In the exemplified embodiment, each of the follower members **212** comprises exactly one bubble generating device **214**. However, the invention is not to be so limited and in certain other embodiments each of the follower members **212** may include more than one bubble generating device **214** if desired.

In the exemplified embodiment, the bubble generating devices **214** are annular-shaped structures having an inner

surface **216** that surrounds a central aperture **215**. Furthermore, the bubble generating devices **214** comprise a plurality of ribs or ridges **217** protruding from the inner surface **216** in a spaced-apart manner. The ridges **217** assist in loading bubble solution onto the bubble generating devices **214**. Specifically, when the bubble generating devices **214** are positioned within a reservoir that contains a bubble solution, the bubble solution will adhere to the bubble generating devices **214** along the ridges **217** on the inner surfaces **216** thereof. When bubble solution adheres to the bubble generating devices **214**, those bubble generating devices **214** are considered to be loaded with the bubble solution.

The follower arms **213** of the bubble generating assembly **210** have a first end **220** that is coupled to the body **211** and a second end **221** that is coupled to one or more of the bubble generating devices **214**. Furthermore, each of the follower arms **213** has a notch **227** formed into its underside or bottom surface, the purpose of which will be better understood from the description of FIGS. **13**A-**13**D below. The second end **221** of the follower arms **213** may be integrally formed with one or more of the bubble generating devices **214**. The first end **220** of each of the follower arms **213** has an aperture **222** formed therethrough to facilitate attachment of the follower arms **213** to a ring structure **223**. Specifically, in the exemplified embodiment the follower arms **213** are rotatably or pivotably coupled to the ring structure **223**. Although a ring structure **223** is depicted in the exemplified embodiment, each of the follower arms **213** may be rotatably or pivotably coupled to the body **211** in other manners, such as the upper and/or lower shells **218**, **219** having protrusions which extend into the apertures **222** in the follower arms **213**. Thus, the invention is not limited to the user of the ring structure **223** for coupling the follower arms **213** to the body **211** in all embodiments.

As noted above, the body **211** of the bubble generating device **210** comprises the upper shell **218** and the lower shell **219** that are operably coupled together. The upper shell **218** comprises a plurality of notches **224** positioned in a spaced apart manner along its perimetric outer surface and the lower shell **219** comprises a plurality of notches **225** formed in a spaced apart manner along its perimetric outer surface. When the upper shell **218** is operably coupled to the lower shell **219**, the ring structure **223** and the first ends **220** of the follower arms **213** are trapped/positioned between the upper shell **218** and the lower shell **219**. Furthermore, when the upper shell **218** is coupled to the lower shell **219**, the notches **224** of the upper shell **218** are aligned with the notches **225** of the lower shell **219**, thereby forming slots **226** in the body **211**. The second ends **222** of each of the follower arms **213** are located within one of the slots **226** of the body **211** so that the follower arms **213** can pivot/rotate within the slot **226**. More specifically, each one of the follower arms **213** is capable of rotating about a second rotational axis B-B within the slot **226** that it is positioned. The follower arms **213** are not capable of 360° rotation because the upper and lower shells **218**, **219** of the body **211** prevent such a full degree of movement. However, the follower arms **213** are capable of sufficient pivotable or rotational movement so as to be movable within the slot **226** between a raised position and a lowered position, which will be discussed in more detail below with reference to FIGS. **13**A-**13**D.

The bubble generating assembly **210** is operably coupled to the motor **110** so as to be rotatable about the first rotational axis A-A. The entirety of the bubble generating assembly **210** including the body **211** and the follower members **212** rotates together as a unit. In the exemplified embodiment, the bubble generating assembly **210** rotates about the first rotational axis A-A in a counter-clockwise direction. However, the invention is not to be so limited and the bubble generating assembly **210** may rotate about the first rotational axis A-A in a clockwise direction if desired. Furthermore, the bubble generating assembly **210** may move in a manner that is not rotational, such as linear movement or the like, in certain non-exemplified embodiments of the invention.

The bubble generating assembly **210** is operably coupled to the connection section **127** of the basin member **120** so that the bubble generating assembly **210** rotates about the first rotational axis A-A relative to the stationary basin member **120**. The bubble generating assembly **210** is positioned within the apparatus **100** so that the follower member **212**, and more specifically the follower arm **213**, rides along the cam surface **128** as the bubble generating assembly **120** rotates about the first rotational axis A-A. Because the follower arm **213** is rotatably/pivotably coupled to the body **211** within the slot **226**, as the follower arm **213** rides along the cam surface **128** the follower member **212** rotates/pivots between a raised position and a lowered position. Specifically, when the follower arm **213** is located along one of the raised portions **140**, **141** of the cam surface **128**, the follower member **212** is in a raised position. When the follower arm **213** is located along one of the valley portions **142**, **143** of the cam surface **128**, the follower member **212** is in the lowered position. The follower member **212** repetitively transitions between the raised and lowered positions as it continues to ride along the cam surface **128** during operation of the apparatus **100**.

Furthermore, as noted above the raised portions **140**, **141** of the cam surface **128** are aligned with the first and second air flow openings **125**, **126** and the valley portions **142**, **143** are aligned within the first and second reservoirs **123**, **124** of the trough **122**. Therefore, when the follower arm **213** is located along one of the raised portions **140**, **141** of the cam surface **128**, the bubble generating device **214** of that follower arm **213** is aligned with and positioned over one of the air flow openings **125**, **126**. When the follower arm **213** is located along one of the valley portions **142**, **143** of the cam surface **128**, the bubble generating device **214** of that follower arm **213** is positioned within one of the reservoirs **123**, **124** of the trough **122**. Thus, when the first and second reservoirs **123**, **124** are filled with a bubble solution, the apparatus **100** generates bubbles as described below.

Referring to FIGS. **13**A-**13**D and **14**, operation of the apparatus will be described. It is noted that in FIGS. **13**A-**13**D the bubble generating assembly **210** is illustrated having only one follower member **212** with a follower arm **213** and a bubble generating device **214**. This is for simplicity of explanation. It should be understood that multiple of the follower members **212**, such as eight as depicted in the embodiment of FIGS. **1** and **8**, can be used. FIG. **14** illustrates a schematic diagram of operation of the apparatus **100** regarding the action being applied to the bubble generating device **214**. Specifically, in FIG. **14** the top line is a schematic representation of the cam surface **128** and the bottom line is a schematic representation of whether an air stream **250** is being applied to the bubble generating device **214**, whether bubble solution **251** is being loaded onto the bubble generating device **214**, or neither of those two actions are occurring. FIG. **14** is intended to be viewed in conjunction with FIGS. **13**A-**13**D and the description below.

During operation, first the trough **122**, and more specifically the first and second reservoirs **123**, **124** of the trough **122**, are filled with the bubble solution in the manner described herein above with reference to FIG. **12** or in any

other desired manner. Specifically, rather than positioning the bubble bottle upside-down within the gravity-feed reservoir **121**, the bubble solution can simply be poured into the trough **122** in any desired manner. After the trough **122** is filled with the bubble solution, the apparatus **100** is ready to generate bubbles. Thus, after the trough **122** is filled with the bubble solution, a user presses **112** the power button **112** on the apparatus **100**.

Upon pressing the power button **112** on the apparatus **100**, the motor **110** begins to rotate. Due to its operable coupling with the motor **110**, as the motor **110** rotates the bubble generating assembly **210** rotates about the rotational axis A-A. As the bubble generating assembly **210** rotates about the rotational axis A-A, the follower arm **213** rides along the cam surface **128** in the direction of the arrow C. In the exemplified embodiment, the notch **227** of the follower arm **213** is positioned in direct surface contact with the cam surface **128** as the follower arm **213** rides along the cam surface **128**. However, in certain embodiments the notch **227** may only be in surface contact with the cam surface **128** when the follower arm **213** is riding along the valley portions **142**, **143** of the cam surface **128**. This will enable the follower member **212** to be even lower when on the valley portions **142**, **143** of the cam surface **128** and even more raised or higher when on the raised portions **140**, **141** of the cam surface **128**. Furthermore, upon pressing the power button **112**, the air generating device **111** rotates along with the motor **110** due to its operable coupling with the motor **110**. As the air generating device **111** rotates, the air generating device **111** generates an air stream that flows upwardly towards the open top end of the apparatus **100**.

Referring to FIGS. **13**A and **14** concurrently, the follower member **212** is illustrated in Position **1**. Specifically, the follower member **212**, and more specifically the follower arm **213**, is located on the first raised portion **140** of the cam surface **128**. When the follower member **212** is positioned on the first raised portion **140** of the cam surface **128**, the follower member **212** is in the raised position. Furthermore, when the follower member **212** is positioned on the first raised portion **140** of the cam surface **128**, the bubble generating device **214** is aligned with the first air opening **125**. As discussed above, the air stream generated by the air generating device **111** flows upwardly through the first air opening **125**. Thus, when the bubble generating device **114** is aligned with and positioned over the first air opening **125**, the air stream **150** (FIG. **14**) flows through the bubble generating device **114**. If the bubble generating device **114** has been pre-loaded with bubble solution, the air stream **150** flowing through the bubble generating device **114** will produce bubbles from the bubble solution that will flow upwardly away from the apparatus **100**.

As the bubble generating assembly **210** continues to move or, in the exemplified embodiment rotate about the rotational axis A-A in the direction of the arrow C, the bubble generating assembly **210** reaches Position **2**, illustrated in FIGS. **13**B and **14**. In Position **2**, the follower member **212** of the bubble generating assembly **210** is located on the second valley portion **143** of the cam surface **128** (it should be understood that the use of the terms "first" and "second" is not to be limiting of the present invention, but is merely intended to distinguish between two or more similar structures). Specifically, in the exemplified embodiment the follower member **212** rides along the first raised portion **140** of the cam surface **128** in the direction of the arrow C until it reaches the first wall **145** of the second valley portion **143** of the cam surface **128**. Upon reaching the first wall **145** of the second valley portion **143** of the cam surface **128**, the follower member **212** pivots about the second rotational axis B-B and falls downwardly along the first wall **145** and into contact with the floor **144** of the second valley portion **143**.

Thus, upon reaching the second valley portion **143** of the cam surface **128**, the follower member **212** pivots or rotates downwardly within the slot **226** of the body **211** of the bubble generating assembly **210** about the second rotational axis B-B. As the follower member **212** pivots or rotates downwardly about the second rotational axis B-B, the follower member **212** is in the lowered position and the bubble generating device **214** is positioned within the trough **122**, and more specifically within the second reservoir **124** of the trough **122**. When the bubble generating device **214** is positioned within the second reservoir **124** of the trough **122**, which is filled with the bubble solution, the bubble solution **151** (FIG. **14**) is loaded onto the bubble generating device **214**.

As the bubble generating assembly **210** continues to rotate about the rotational axis A-A, the follower member **212** of the bubble generating assembly **210** rides along the second valley portion **143** of the cam surface **128** and the bubble generating device **214** remains positioned within the second reservoir **124**. The follower arm **212** of the bubble generating assembly **210** is eventually located in Position **3**. In Position **3**, which is illustrated in FIG. **13**C, the follower arm **212** is located on the second wall **146** of the second valley portion **143** of the cam surface **128**. As the bubble generating assembly **210** continues to rotate, the follower arm **212** rides along the second wall **146** of the second valley portion **143** of the cam surface **128** and rotates upwardly about the second rotational axis B-B. The second wall **146**, due to its being oriented at an acute angle relative to the floor **144** of the second valley portion **143** of the cam surface **128**, forms a ramp which enables the follower arm **212** to ride its way upwardly along the cam surface **128** and out of the second reservoir **124**. Thus, as the follower arm **212** rides along the second wall **146** of the second valley portion **143** of the cam surface **128**, the follower arm **212** transitions from the lowered position to the raised position.

As depicted in FIG. **14**, when the follower member **212** is located along the second wall **146** of the second valley portion **143** of the cam surface **128**, there is neither bubble solution being loaded onto the bubble generating device **214** nor an air stream being blown through the bubble generating device **214**. However, the invention is not to be so limited in all embodiments and in certain other embodiments while the follower member **212** rides along the second wall **146** of the second valley portion **143** of the cam surface **128**, bubble solution continues to be loaded onto the bubble generating device **214**. Whether or not the bubble generating device **214** is loaded with the bubble solution while the follower member **212** is located on or rides along the second wall **146** of the second valley portion **143** of the cam surface **128** is dependent upon the liquid level of the bubble solution within the second reservoir **124** of the trough **122**. Specifically, if the liquid level is low, the bubble generating device **214** may not be positioned within the bubble solution while the follower member **212** rides along the second wall **146** of the second valley portion **143** of the cam surface **128**. However, if the liquid level is high, the bubble generating device **214** may remain positioned within the bubble solution while the follower member **212** rides along the second wall **146** of the second valley portion **143** of the cam surface **128**.

As the bubble generating assembly **210** continues to rotate in the direction of the arrow C, the follower arm **212** eventually reaches Position **4**, which is illustrated in FIG. **13**D. In Position **4**, the follower arm **212** is located on the

second raised portion **141** of the cam surface **128**. When the follower arm **212** is located on the second raised portion **141** of the cam surface **128**, the bubble generating device **214** is positioned over and aligned with the second air flow opening **126**. In this position, the air stream **150** generated by the air flow generator **111** flows through the central aperture **215** of the bubble generating device **214** that is loaded with the bubble solution. As the air stream **150** flows through the central aperture **215** of the loaded bubble generating device **214**, bubbles are produced from the bubble solution and flow upwardly away from the apparatus **100** in the direction of the flow of the air stream **150**.

Although not depicted in FIGS. **13**A-**13**D, the bubble generating assembly **210** continues to rotate about the first rotational axis A-A so that the follower member **212** rides along and is located on the first valley **142** of the cam surface **128**. When the follower member **212** is located on the first valley **142** of the cam surface **128**, the bubble solution **151** is loaded on the bubble generating device **214**, which is located within the first reservoir **123**. The follower member **212** then continues to ride along the cam surface **128**, up the second wall **146** of the first valley portion **142**, and back onto the first raised portion **140** of the cam surface **128** in which the bubble generating device **214** is again positioned over and aligned with the first air flow opening **125** where the air stream **150** flows through the bubble generating device **214** to produce bubbles.

The movement discussed above continues indefinitely as the apparatus **100** is powered on. Thus, the follower member **212** repetitively transitions between the lowered and raised positions as the follower member **212** continues to ride along the cam surface **228**. The follower member **212** transitions between the raised position and the lowered position and between the lowered position and the raised position by rotation about the second rotational axis B-B.

Furthermore, as noted above, in certain embodiments the bubble generating assembly **210** comprises a plurality of the follower members **212** that are riding along the cam surface **128** simultaneously. In such an embodiment, each of the follower members **212** is positioned so as to be spaced apart from an adjacent one of the follower members **212**. Furthermore, in one such embodiment that includes a plurality of the follower members **212**, at least one of the follower members **212** is located along one of the valley portions **142**, **143** of the cam surface **128** while at least one other of the follower members **212** is located along one of the raised portions **140**, **141** of the cam surface **128**. Thus, in such an embodiment one of the bubble generating devices **214** is being loaded within bubble solution while another one of the bubble generating devices **214**, which has been pre-loaded with the bubble solution, is positioned so that the air stream flows therethrough for the production of bubbles.

Although in the exemplified embodiment, the cam surface **128** is annular and the bubble generating assembly **210** rotates about the first rotational axis A-A, the invention is not to be so limited in all embodiments. In certain embodiments, the cam surface **128** may be linear, while still including the raised and lowered portions. In such an embodiment, the bubble generating assembly **210** will translate in a linear direction so that the follower member **212** rides along the linear cam surface **128**. The bubble generating device **214** can be made to alternate between being located in a reservoir filled with bubble solution and being positioned over an air flow opening as discussed above even with the cam surface **128** being linear and the movement being linear. Thus, the invention is not to be specifically limited by the arrangements depicted in the drawings in all embodiments.

Referring now to FIG. **15**, a bubble producing flameless torch apparatus **300** (hereinafter "the torch apparatus **300**) will be described in accordance with another embodiment of the present invention. The torch apparatus **300** generally comprises a bubble generating device **310** and an elongated rod **350** that supports the bubble generating device **310** above a horizontal surface. Specifically, the elongated rod **350** supports the bubble generating device **310** so that the bubble generating device **310** is elevated off of the ground. A plurality of the torch apparatuses **300** could be positioned around a yard to achieve a similar effect to that of a Tiki® torch.

The bubble generating device **310** may be the apparatus **100** described in detail herein above or any other apparatus that is capable of generating bubbles. Thus, the torch apparatus **300** may include affixing an elongated rod to any bubble generating devices now known or later developed. More specifically, in certain embodiments the bubble generating device **310** comprises a housing **311** having a closed bottom end **312** and an open top end **313**. In one embodiment, the bubble generating device **310** is configured to generate bubbles that flow upwardly through the open top end **313** of the housing **311**. However, the invention is not to be so limited in all embodiments and in certain other embodiments the bubble generating device **310** may be configured to generate bubbles that flow out through an opening in a side surface or in a bottom surface of the housing **311**. This can be achieved utilizing the apparatus **100** described above or any other bubble generating device. Thus, the invention is not limited to the specific mechanisms and structures that facilitate bubble generation in all embodiments. However, in certain embodiments the bubble generating device **310** will include a motor **321**, an air flow generator **322**, a bubble producing assembly **323** that may include bubble producing wands and a source of bubble solution. The source of bubble solution is loaded onto the bubble producing assembly **323** during operation, and then an air stream generated by the air flow generator **322** is blown through the bubble producing wand of the bubble producing assembly **323** to produce bubbles from the bubble solution.

In certain embodiments, the bubble generating device **310** is any device that is configured to be loaded with bubble solution from a source of bubble solution to form a loaded bubble generating device and is also configured to produce bubbles from the bubble solution by flowing an air stream through the loaded bubble generating device. In one embodiment, the bubble generating device **310** includes the bubble producing assembly **323** that is operably coupled to the motor **321** so that the bubble producing assembly moves **323** between a first position and a second position. In such an embodiment, in the first position bubble producing wands of the bubble producing assembly **323** are loaded with bubble solution and in the second position an air stream flows through the loaded bubble producing wands to produce bubbles that flow upwardly from the open top end **313** of the housing **311**.

In the exemplified embodiment, the elongated rod **350** is coupled to the closed bottom end **312** of the housing **311**. The elongated rod **350** can be formed out of any desired material, including any of the various hard plastics described herein above, metals, metal alloys, wood or the like. The elongated rod **350** extends along a longitudinal axis E-E from a first end **351** to a second end **352**. In one embodiment,

the elongated rod **350** has a length L measured along the longitudinal axis E-E of between 6 inches and 60 inches. In other embodiments, the length L may be between 6 inches and 12 inches, between 6 inches and 24 inches, between 12 inches and 24 inches, between 12 inches and 36 inches, between 24 inches and 36 inches, between 24 inches and 48 inches, between 36 inches and 48 inches or between 36 inches and 60 inches. In still other embodiments, the length L may be less than 6 inches or greater than 60 inches. Thus, the length L of the elongated rod **350** is not to be limiting of the present invention in all embodiments and can be made adjustable in certain other embodiments by using telescoping rod elements, separately connectable rod elements, or the like.

The first end **351** of the elongated rod **350** is coupled to the closed bottom end **312** of the housing **311**. In the exemplified embodiment, the second end **352** of the elongated rod **350** is coupled to or formed integrally with a base structure **353**. The base structure **353**, in the exemplified embodiment, is dome-shaped and has a flat bottom surface **355**. During use, the flat bottom surface **355** of the base structure **353** is positioned atop of a horizontal surface **354**, such as the ground. When so positioned, the base structure **353** supports the torch apparatus **300** in an upright orientation such that the elongated rod **350** extends upwardly from the horizontal surface **354** and the bubble generating device **310** is supported in an upright manner so that a plane D that extends along the open top end **313** of the bubble generating device **310** is substantially parallel or exactly parallel to the horizontal surface **354** (substantially parallel can include plus or minus 5° from exactly parallel). In this manner, if the bubble generating device **310** includes a trough for containing a bubble solution, the bubble solution will not spill out of the device **310**.

Although the exemplified embodiment illustrates the base structure **353** for supporting the torch apparatus **300**, the invention is not to be so limited in all embodiments. In certain other embodiments the elongated rod **350** may terminate in a pointed end to form a stake that can be inserted into the horizontal surface **354** when the horizontal surface **354** is the ground. In such embodiments, the elongated rod **350** can be inserted into the horizontal surface **354** to support the bubble generating device **310** in an elevated manner relative to the horizontal surface **354**. In still other embodiments, the elongated rod **350** may not include a base structure **353** or a base. In such an embodiment, the elongated rod **350** may merely be a rod intended to be used as a handle for holding the torch apparatus **300**. A user can walk around with the torch apparatus **300** by holding the elongated rod **350** while the bubble generating device **310** generates bubbles from the open top end **313** of the housing **311**.

In the exemplified embodiment, the bubble generating device **310** also includes an illumination source **315** operably coupled to the housing **311**. In the exemplified embodiment, the illumination source **315** is generically illustrated as a box. In that regard, in certain embodiments the exact structure, arrangement, size and positioning of the illumination source **315** is not to be particularly limiting of the present invention. Rather, the illumination source **315** can be any device capable of generating light and that light may be generated within the housing **311**, that light may be emitted from the housing **311** either through the open top end **313** of the housing **311** or otherwise, or any other desired manner of emitting light may occur. Furthermore, it should be appreciated that in certain other embodiments the illumination source **315** may be altogether omitted.

The illumination source **315** may be located within the interior of the housing **311**, on the exterior of the housing **311**, or elsewhere as desired. In the exemplified embodiment, the illumination source **315** is located within the interior of the housing **311**. The illumination source **315** may be any type of device that can generate light, such as one or more light emitting diodes (LEDs), one or more light bulbs including incandescent and fluorescent bulbs, or any other device capable of generating light. The illumination source **315** is operably coupled to a power source and to an illumination button (not shown) so that the illumination source **315** is generating light when the illumination button is pressed. The illumination source **315** may generate light having different colors in the visible spectrum, may flash or strobe at various speeds, or may be a constant generation of light.

In certain embodiments, the housing **311** may be transparent or translucent. In such embodiments, the illumination source **315** will light up the housing **311** and cause the housing **311** to glow. In other embodiments, the illumination source **315** may emit light from the open top end **313** of the housing **311**. This can create more of a torch-like feel from the torch apparatus **300**. In some embodiments, during bubble generation, the bubbles are generated and flow from the open top end **313** of the housing **311**. Furthermore, the illumination source **315** may light up the bubbles as they flow away from the open top end **313** of the housing **311** to create a light show effect. Thus, there are various uses of the illumination source **315** that are within the scope of the present invention.

As used throughout, ranges are used as shorthand for describing each and every value that is within the range. Any value within the range can be selected as the terminus of the range. In addition, all references cited herein are hereby incorporated by referenced in their entireties. In the event of a conflict in a definition in the present disclosure and that of a cited reference, the present disclosure controls.

While the invention has been described with respect to specific examples including presently preferred modes of carrying out the invention, those skilled in the art will appreciate that there are numerous variations and permutations of the above described systems and techniques. It is to be understood that other embodiments may be utilized and structural and functional modifications may be made without departing from the scope of the present invention. Thus, the spirit and scope of the invention should be construed broadly as set forth in the appended claims.

What is claimed is:

1. An apparatus for generating bubbles, the apparatus comprising:

a housing extending from a bottom end to a top end;

a motor positioned in the housing;

a fan device positioned in the housing, the fan device operably coupled to the motor to generate an upward air stream;

a bubble generating assembly positioned in the housing, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis, the bubble generating assembly comprising:

a body comprising:

an upper shell;

a lower shell, the upper shell coupled to the lower shell to form a cavity between the upper and lower shells;

a plurality of slots in the body that form passageways into the cavity from outside of the body; and

a ring structure positioned in the cavity;

a plurality of follower members extending through the passageways formed by the slots of the body, each of the follower members comprising:

an arm having a first end in the cavity and pivotably coupled to the ring structure so as to be pivotable about a second axis, the first end of the arm comprising an aperture through which the ring structure extends; and

a bubble generating device coupled to a second end of the arm located outside of the body;

a basin member comprising:

a trough for containing bubble solution, the trough positioned within the housing, the trough comprising a floor that is inclined downwardly with distance from the first axis;

a feed reservoir protruding from the housing, the feed reservoir configured such that bubble solution fed into the feed reservoir flows into the trough; and

a cam wall having a raised portion and a recess that forms a valley portion; and

wherein upon the bubble generating assembly being rotated about the first rotational axis by the motor, each of the follower members ride along the cam wall and repetitively transition between: (1) a lowered position in which the follower member is located in the valley portion and the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough; and (2) a raised position in which the follower member is located along the raised portion and the bubble generating device is aligned with the air stream generated by the fan device; and

wherein each of the follower members transition between the raised position and the lowered position by rotating about the second axis.

2. The apparatus of claim **1** wherein each of the follower members transition from the raised position to the lowered position by falling downwardly from the raised portion of the cam wall into the valley portion.

3. The apparatus of claim **2** wherein each of the follower members are transitioned from the raised position to the lowered position by gravity.

4. The apparatus of claim **1** wherein the basin member further comprises a connection section to which the bubble generating assembly is rotatably coupled.

5. The apparatus of claim **4** wherein the connection section comprises a platform and at least one annular upstanding wall that circumscribes the first axis; and wherein the annular upstanding wall facilitates coupling of the bubble generating assembly to the connection section of the basin member.

6. The apparatus of claim **5** wherein the cam wall is concentric with the annular upstanding wall; and wherein the raised portion at least partially circumscribes the annular upstanding wall.

7. The apparatus of claim **1** wherein the basin member is an integrally formed single component.

8. The apparatus of claim **1** wherein the feed reservoir comprises a floor and a wall, the floor of the feed reservoir located a first height from the bottom end of the housing, and the floor of the trough located a second height from the bottom end of the housing; and wherein the first height is greater than the second height.

9. The apparatus of claim **8** wherein the basin member comprises a channel extending from the feed reservoir to the trough, the channel extending through an opening in the housing.

10. The apparatus of claim **1** wherein the raised portion of the cam wall forms an annular structure concentric about the first axis and having a gap formed by the recess.

11. The apparatus of claim **10** wherein the raised portion terminates in an upper edge that lies in a reference plane that is substantially perpendicular to the first axis; wherein the cam wall further comprises a first edge extending downwardly from the upper edge and a ramp edge extending upwardly to the upper edge, the recess formed between the first edge and the ramp edge.

12. The apparatus of claim **11** wherein the first edge extends substantially parallel to the first axis and substantially perpendicular to the reference plane; and wherein the ramp edge is inclined relative to the reference plane.

13. An apparatus for generating bubbles, the apparatus comprising:

a housing;

a motor in the housing;

a fan device in the housing, the fan device operably coupled to the motor to generate an upward air stream;

a bubble generating assembly in the housing, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis, the bubble generating assembly comprising:

a body defining a cavity;

a plurality of slots in a sidewall of the body that form passageways into the cavity from outside of the body;

a ring structure positioned in the cavity; and

a plurality of follower members, each of the follower members comprising:

an arm extending through one of the passageways from a first end located within the cavity to a second end that is located outside of the body, the first end of the arm pivotably coupled to the ring structure; and

a bubble generating device coupled to the second end of the arm;

a trough for containing bubble solution, the trough positioned within the housing;

a cam structure; and

wherein upon the bubble generating assembly being rotated about the first rotational axis by the motor, the follower members are transitioned, by the cam structure, from: (1) a lowered position in which the bubble generating device is positioned within the trough; to (2) a raised position in which the bubble generating device is aligned with the air stream generated by the fan device.

14. The apparatus of claim **13** wherein each of the follower members transition from the raised position to the lowered position by falling downwardly from a raised portion of the cam structure into a gap of the cam structure.

15. The apparatus of claim **14** wherein each of the follower members are transitioned from the raised position to the lowered position by gravity.

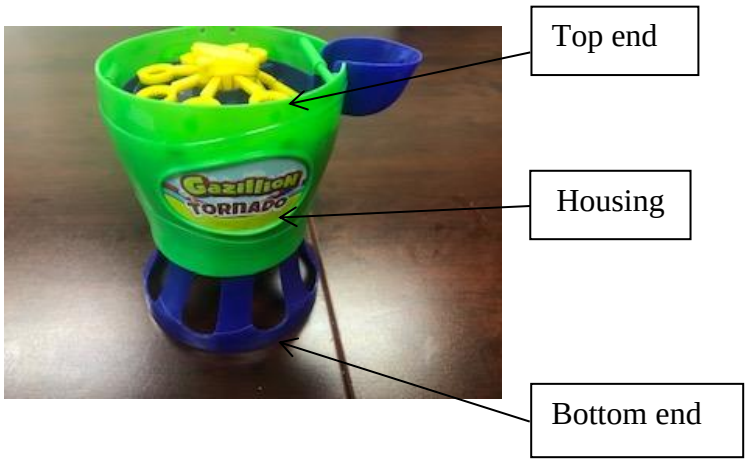
16. The apparatus of claim **13** wherein the cam structure comprises an upper edge that lies in a reference plane that is substantially perpendicular to the first axis; a first edge extending downwardly from the upper edge; a ramp edge extending upwardly to the upper edge and a gap formed between the first edge and the ramp edge.

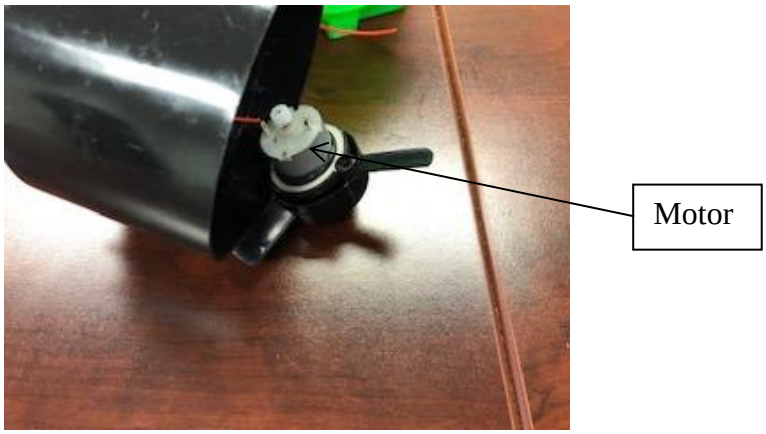
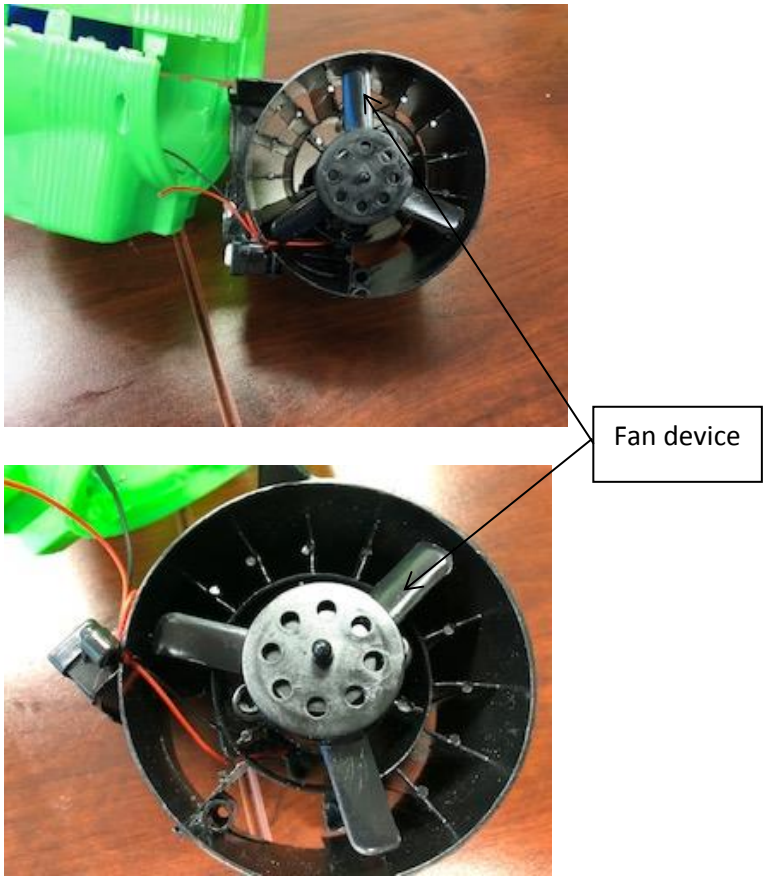
17. The apparatus of claim **16** wherein the gap is radially aligned with the trough.

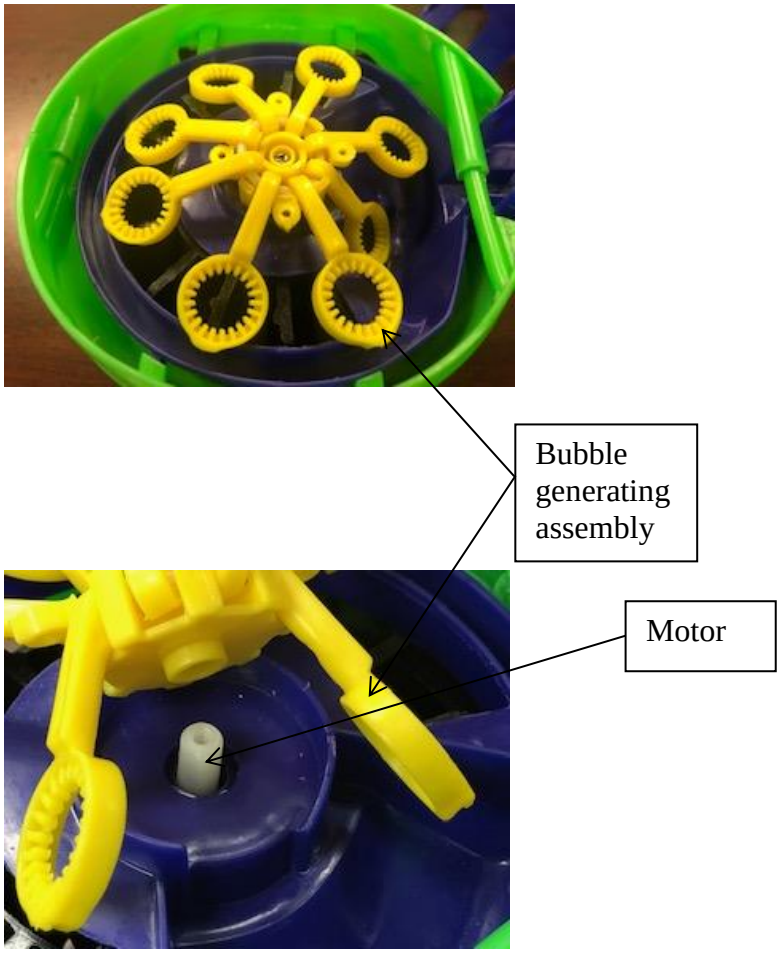
18. The apparatus of claim **13** wherein each of the follower members transition between the raised position and the lowered position by rotating about the second axis.

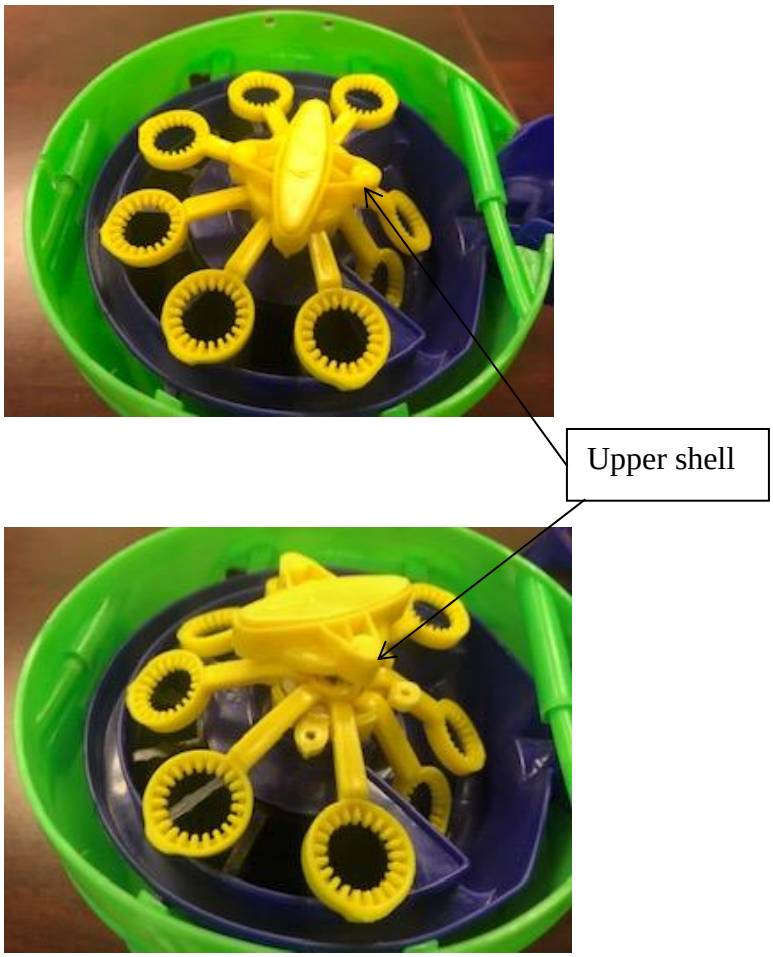
* * * * *

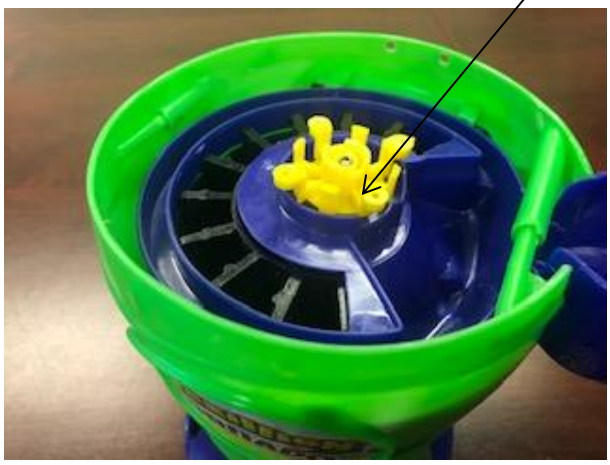
EXHIBIT B

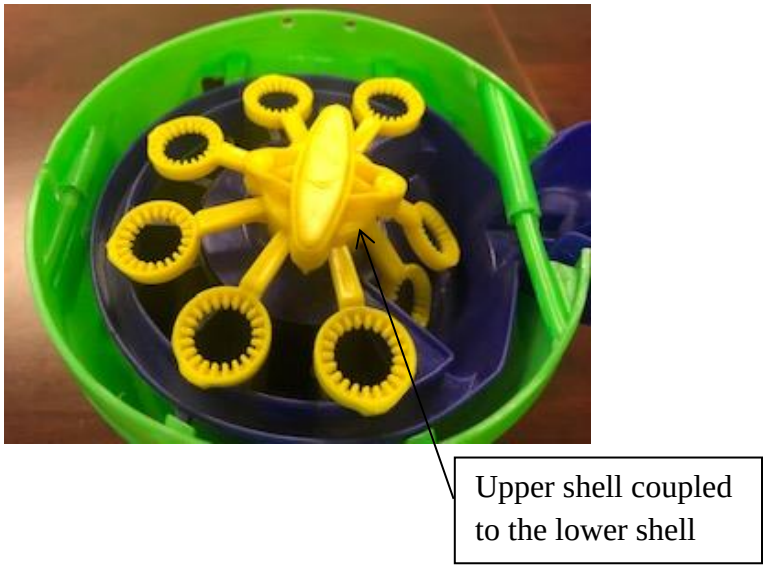
Claim 1 of U.S. Patent 9,757,661	Funrise's Gazillion Tornado Bubble Machine
1. An apparatus for generating bubbles, the apparatus comprising:	The Funrise Gazillion Tornado bubble machine ("Tornado") is an apparatus for generating bubbles. Specifically, the Tornado makes a "Gazillion premium bubbles." 
a housing extending from a bottom end to a top end;	The Tornado has a housing extending from a bottom end to a top end. 

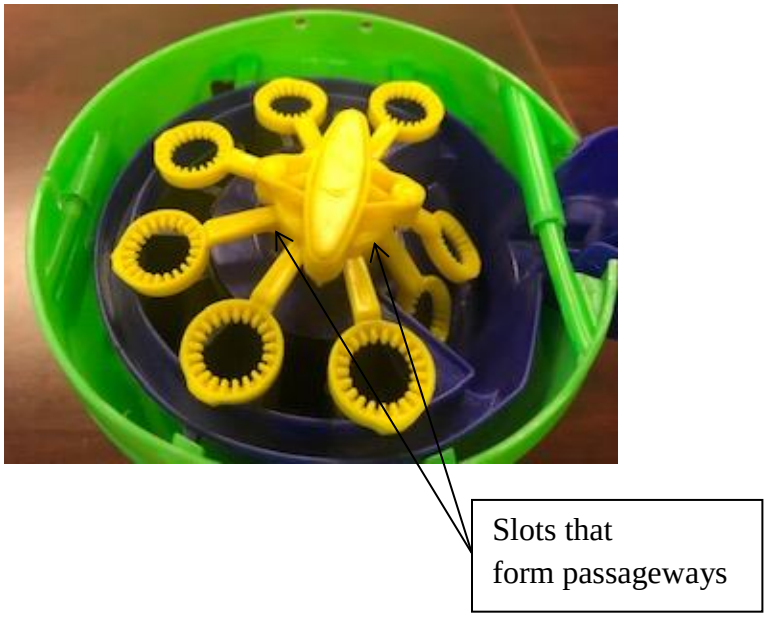
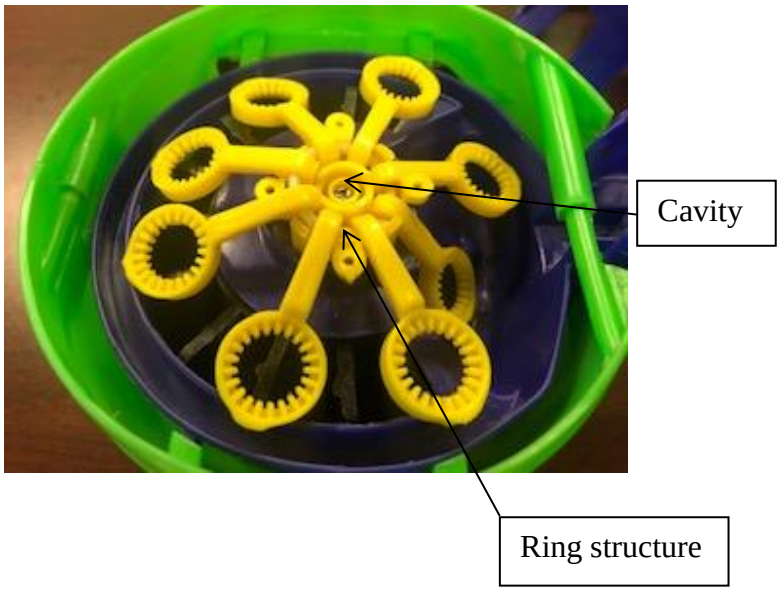
a motor positioned in the housing;	The Tornado has a motor positioned in the housing. 
a fan device positioned in the housing, the fan device operably coupled to the motor to generate an upward air stream;	The Tornado has a fan device positioned in the housing. The fan device is operably coupled to the motor to generate an upward air stream. 

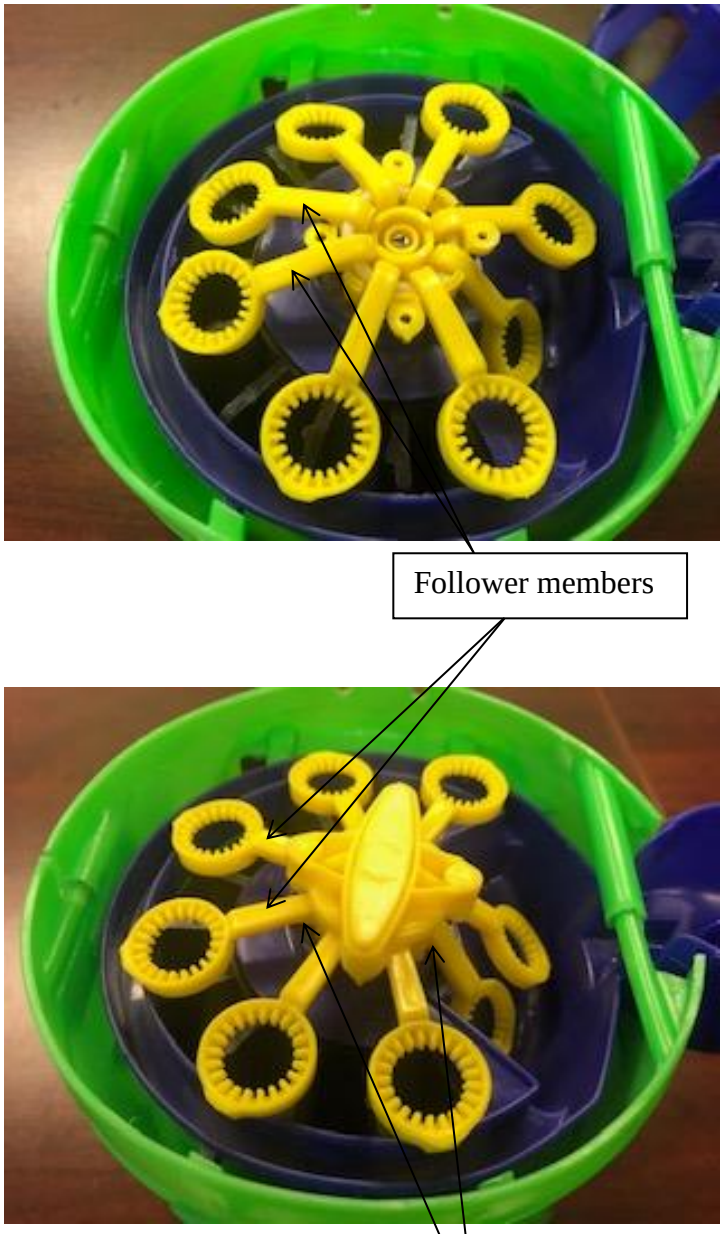
	
a bubble generating assembly positioned in the housing, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis,	The Tornado has a bubble generating assembly positioned in the housing. The motor is operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis. 

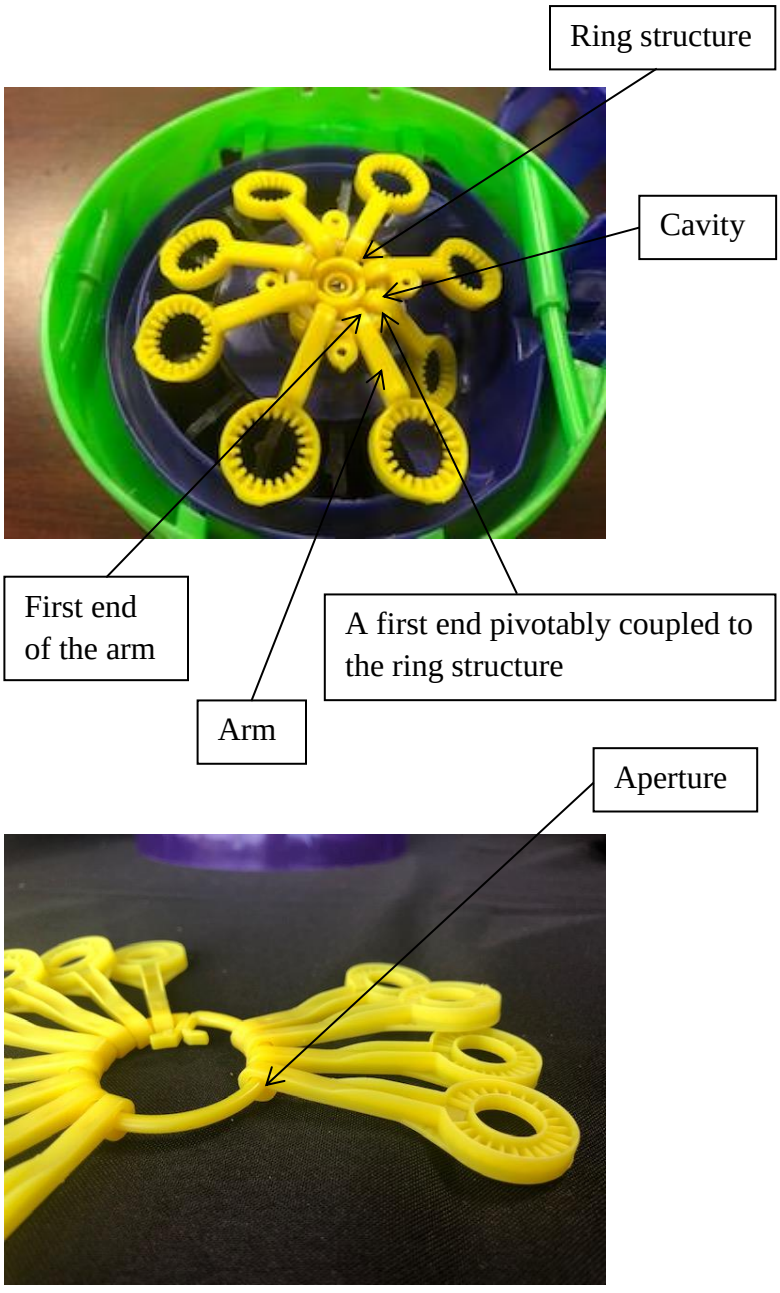
the bubble generating assembly comprising: a body comprising:	The bubble generating assembly in the Tornado has a body. 
an upper shell;	The body of the Tornado's bubble generating assembly has an upper shell. 

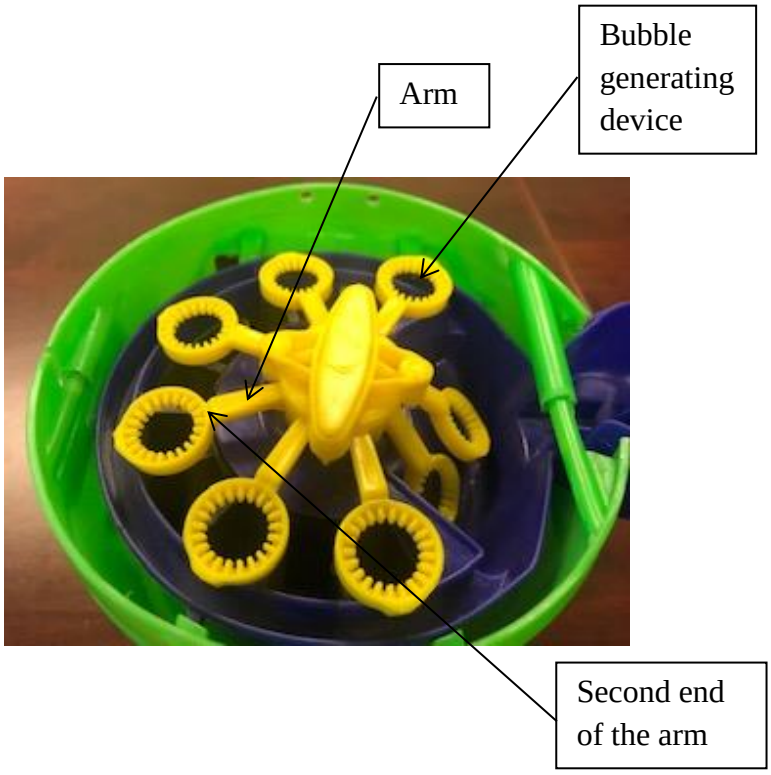
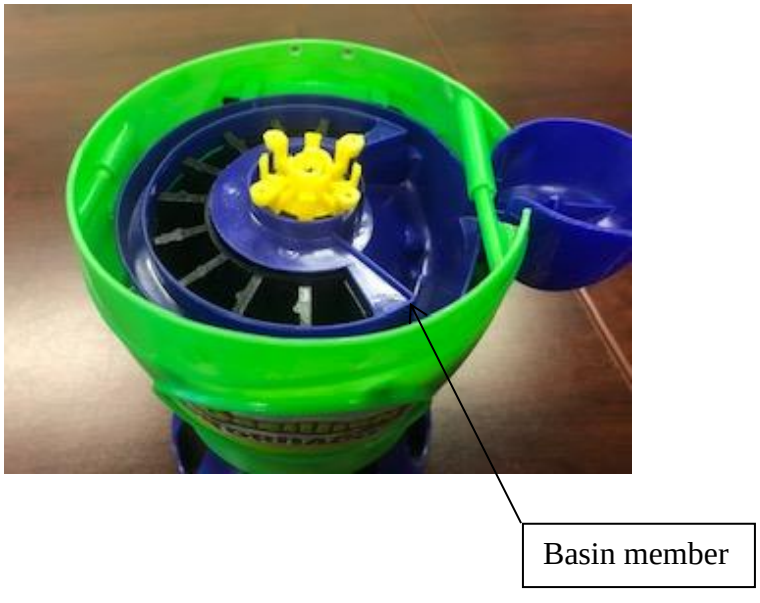
a lower shell,	The body of the Tornado's bubble generating assembly has a lower shell.  

the upper shell coupled to the lower shell to form a cavity between the upper and lower shells;	The Tornado's upper shell is coupled to the lower shell to form a cavity between the upper and lower shells.  

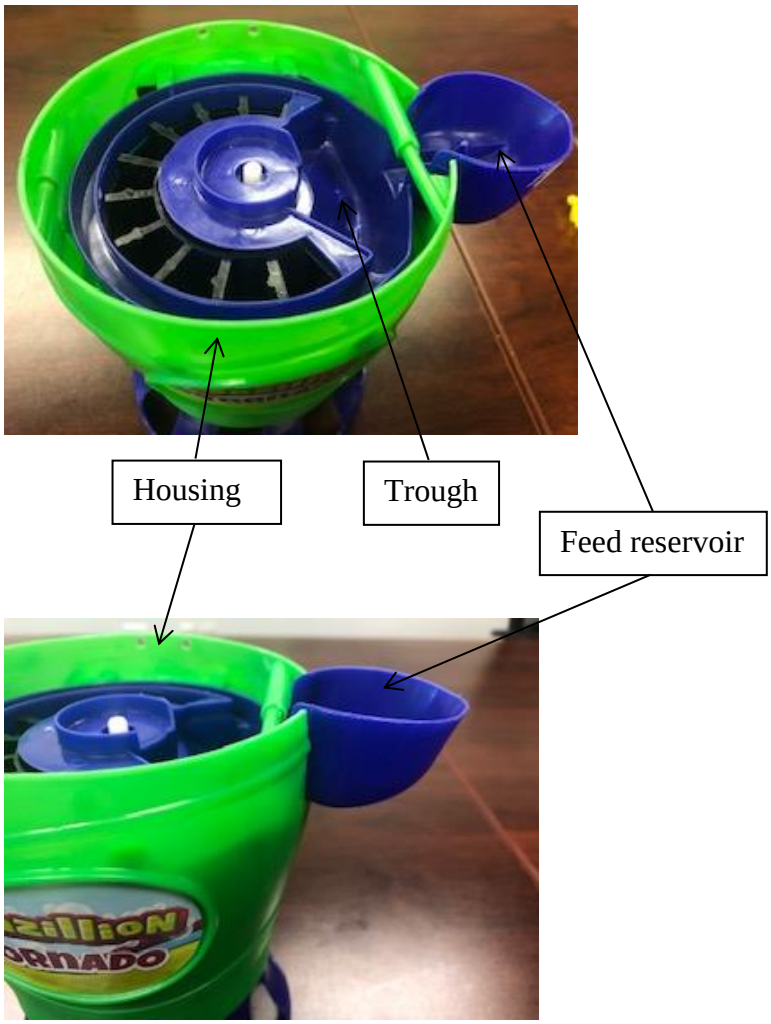
a plurality of slots in the body that form passageways into the cavity from outside of the body; and	There are a plurality of slots in the Tornado's body that form passageways into the cavity from outside of the body. 
a ring structure positioned in the cavity;	The Tornado has a ring structure positioned in the cavity. 

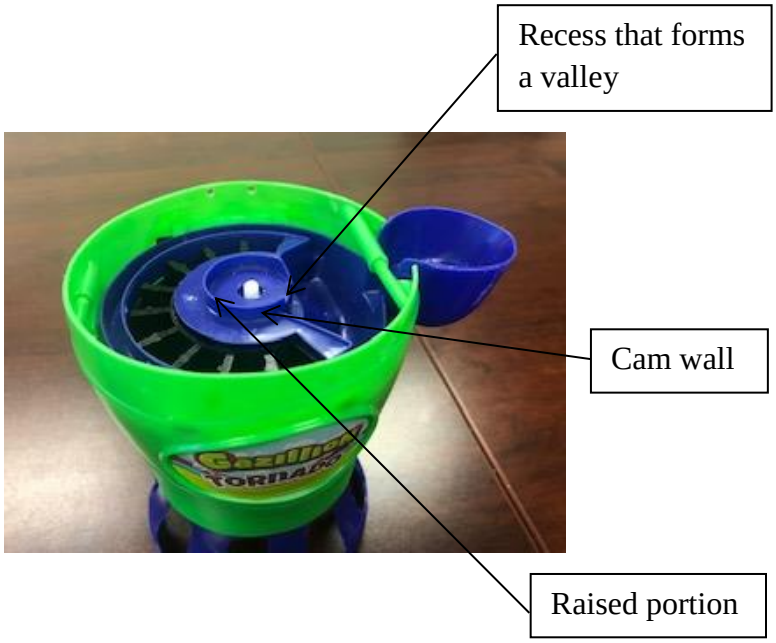
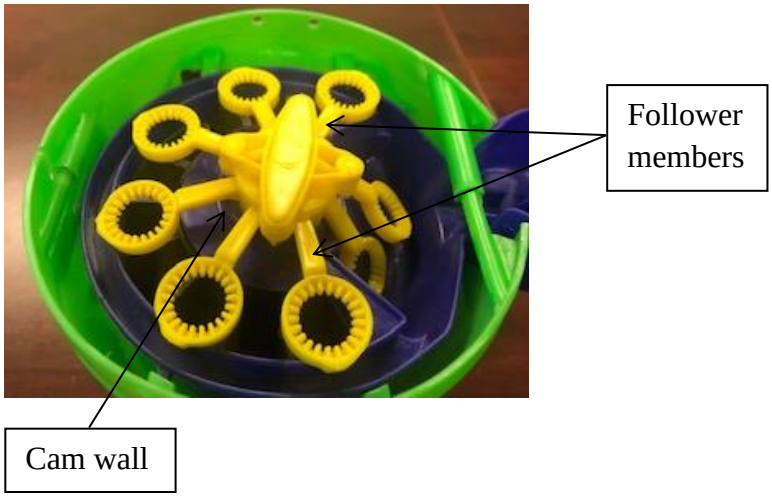
a plurality of follower members extending through the passageways formed by the slots of the body, each of the follower members comprising:	In the Tornado, a plurality of follower members extend through passageways formed by the slots of the body. 

an arm having a first end in the cavity and pivotably coupled to the ring structure so as to be pivotable about a second axis, the first end of the arm comprising an aperture through which the ring structure extends; and	The Tornado has an arm having a first end in the cavity and pivotably coupled to the ring structure so as to be pivotable about a second axis, the first end of the arm comprising an aperture through which the ring structure extends. 

a bubble generating device coupled to a second end of the arm located outside of the body;	The Tornado has a bubble generating device coupled to a second end of the arm located outside of the body. 
a basin member comprising:	The Tornado has a basin member. 

a trough for containing bubble solution, the trough positioned within the housing, the trough comprising a floor that is inclined downwardly with distance from the first axis;	The Tornado has a trough for containing bubble solution, the trough positioned within the housing, the trough comprising a floor that is inclined downwardly with distance from the first axis. 

a feed reservoir protruding from the housing, the feed reservoir configured such that bubble solution fed into the feed reservoir flows into the trough; and	The Tornado has a feed reservoir protruding from the housing, the feed reservoir configured such that the bubble solution fed into the feed reservoir flows into the trough. 

a cam wall having a raised portion and a recess that forms a valley portion; and	The Tornado has a cam wall having a raised portion and a recess that forms a valley portion. 
wherein upon the bubble generating assembly being rotated about the first rotational axis by the motor, each of the follower members ride along the cam wall and repetitively transition between: (1) a lowered position in which the follower member is located in the valley portion and the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough; and (2) a raised position in which the follower member is located along the raised portion and the bubble generating device is aligned with the air stream generated by the fan device; and	Upon the bubble generating assembly being rotated about the first rotational axis by the motor, each of the follower members of the Tornado ride along the cam wall and repetitively transition between (1) a lowered position in which the follower member is located in the valley portion and the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough and (2) a raised position in which the follower member is located along the raised portion and the bubble generating device is aligned with the air stream generated by the fan device. 

Follower member is located in the valley portion

Bubble generating device positioned within the trough

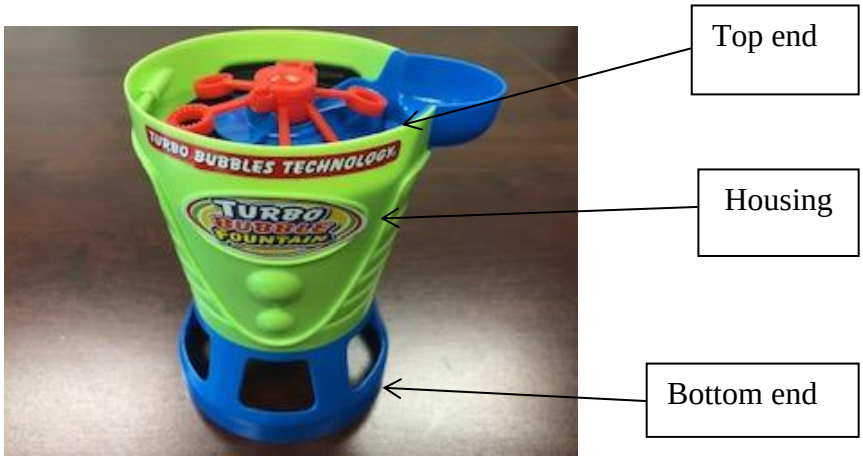
Bubble generating device aligned with the air stream

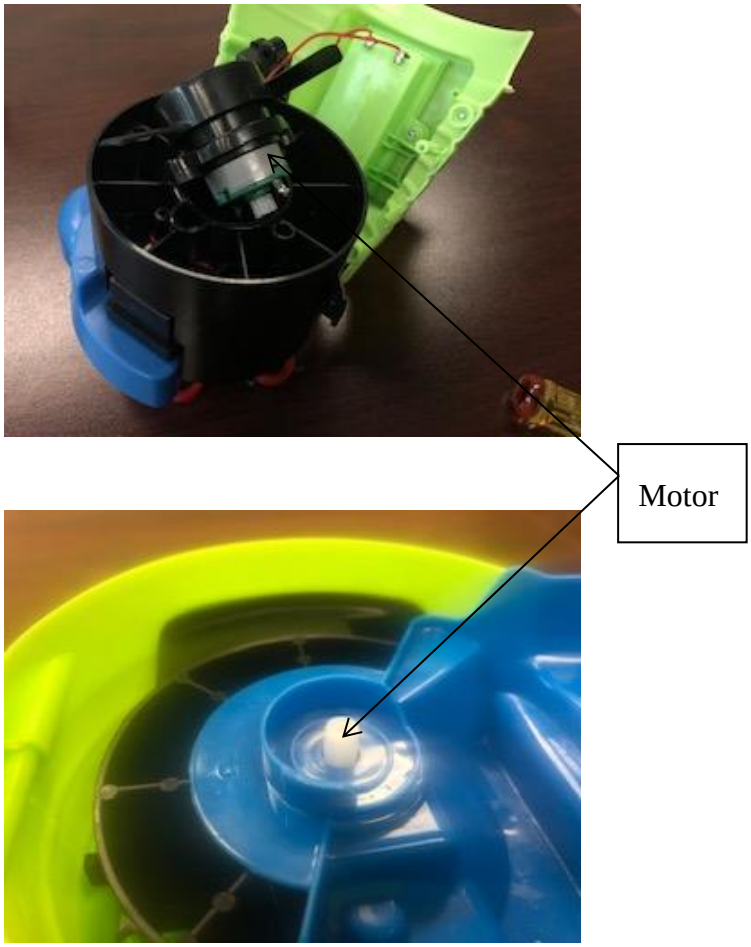
Follower member is located along the raised portion

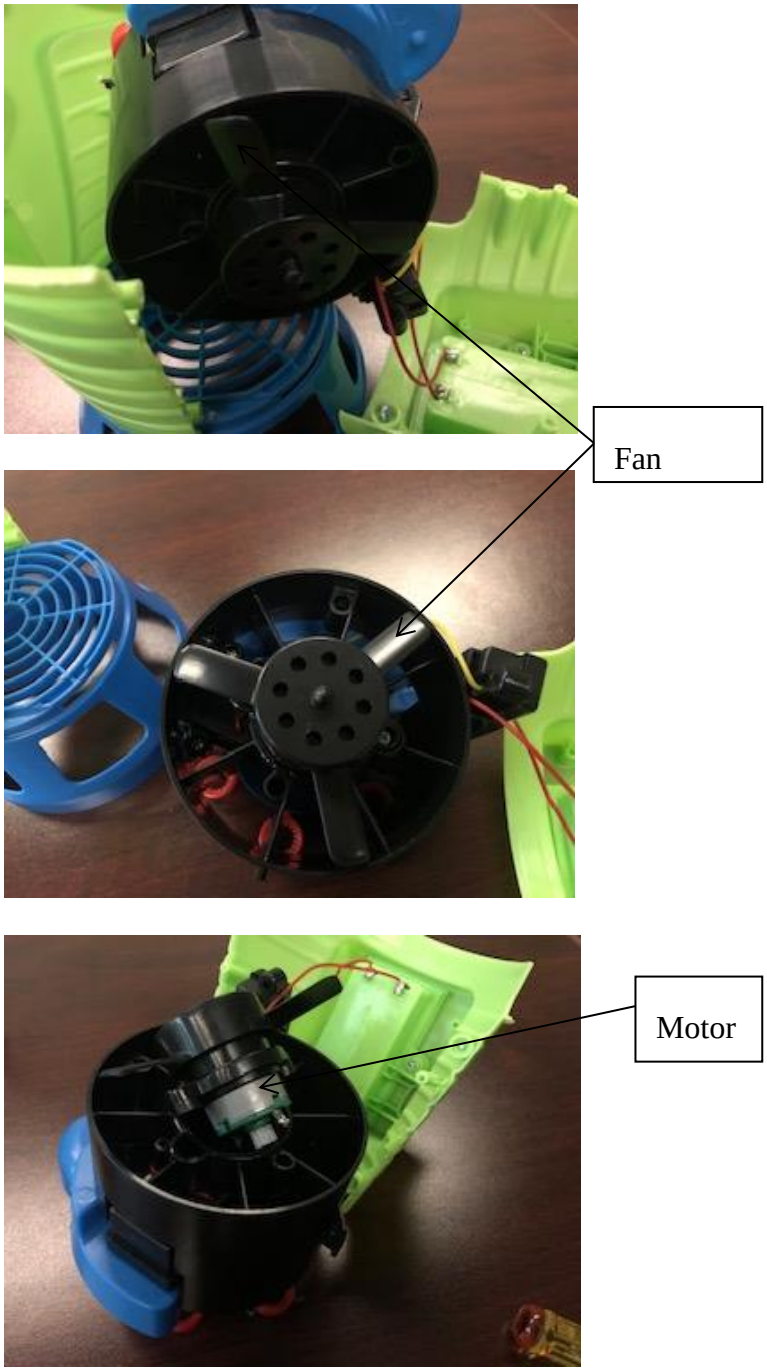
wherein each of the follower members transition between the raised position and the lowered position by rotating about the second axis.	In the Tornado, each of the follower members transition between the raised position and the lowered position by rotating about the second axis. 

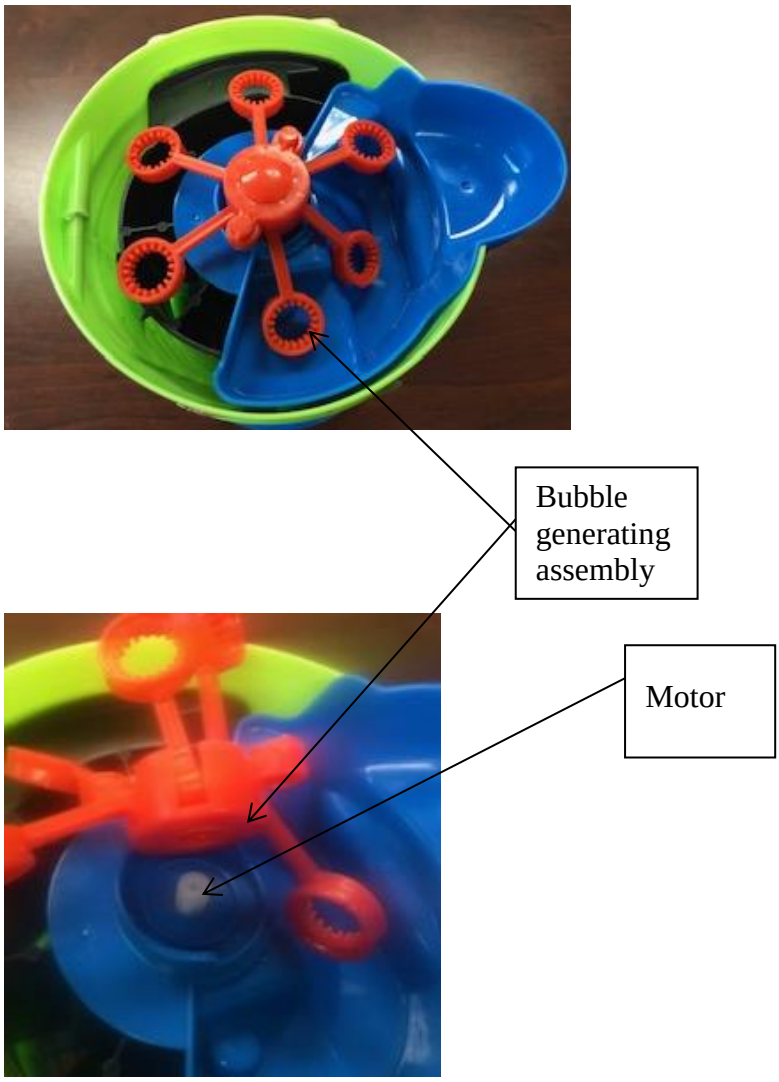
EXHIBIT C

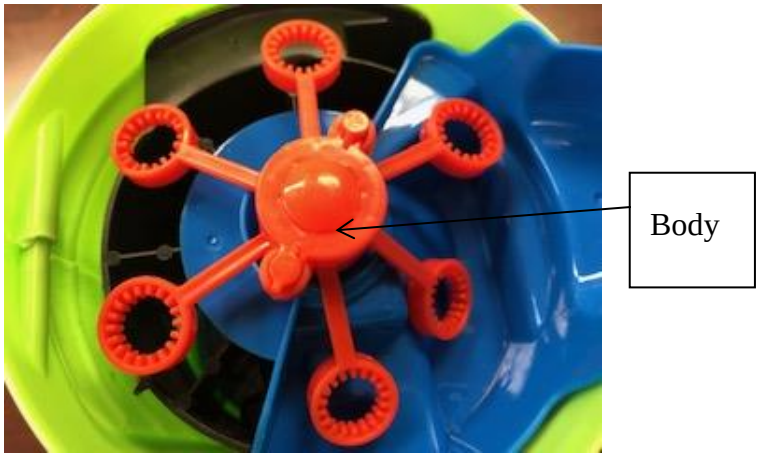
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
1. An apparatus for generating bubbles, the apparatus comprising:	The Turbo Bubble Fountain ("Turbo") is an apparatus for generating bubbles. Specifically, the Turbo makes "up to 10,000 bubbles in 5 minutes." 

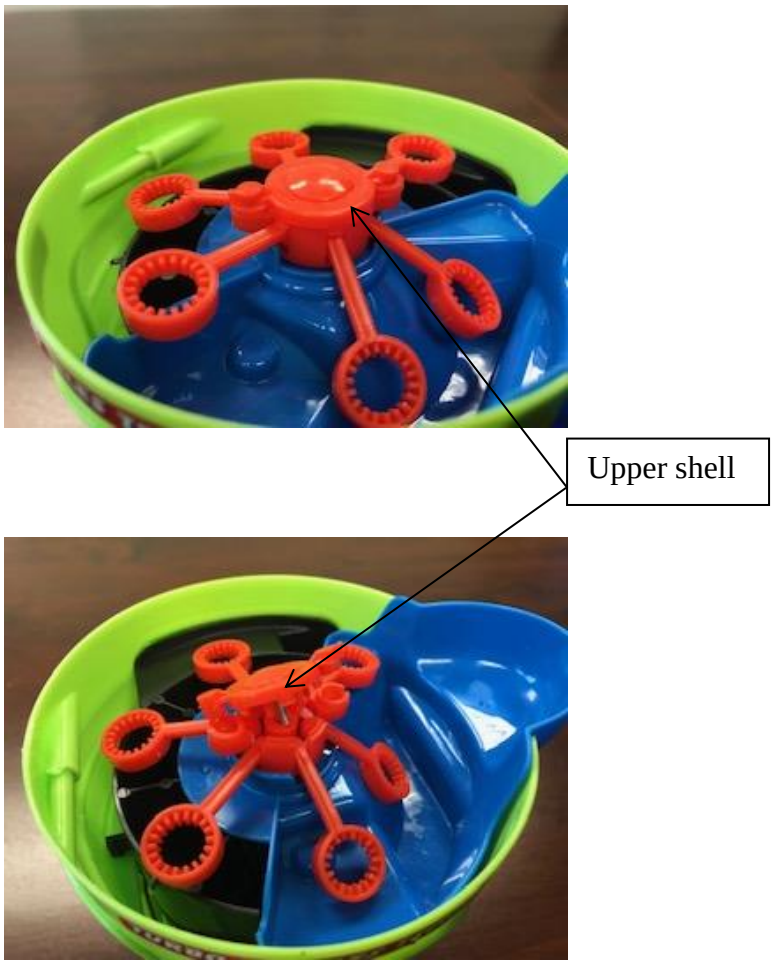
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a housing extending from a bottom end to a top end;	The Turbo has a housing extending from a bottom end to a top end. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a motor positioned in the housing;	The Turbo has a motor positioned in the housing. 

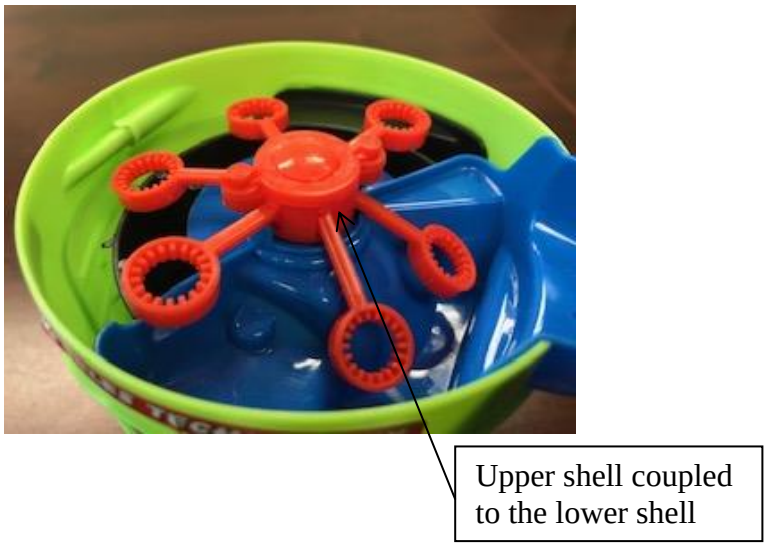
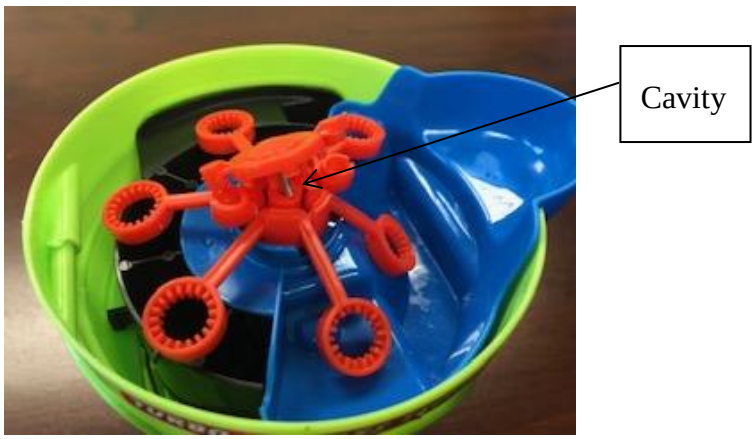
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a fan device positioned in the housing, the fan device operably coupled to the motor to generate an upward air stream;	The Turbo has a fan device positioned in the housing. The fan device is operably coupled to the motor to generate an upward air stream. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a bubble generating assembly positioned in the housing, the motor operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis,	The Turbo has a bubble generating assembly positioned in the housing. The motor is operably coupled to the bubble generating assembly to rotate the bubble generating assembly about a first axis. 

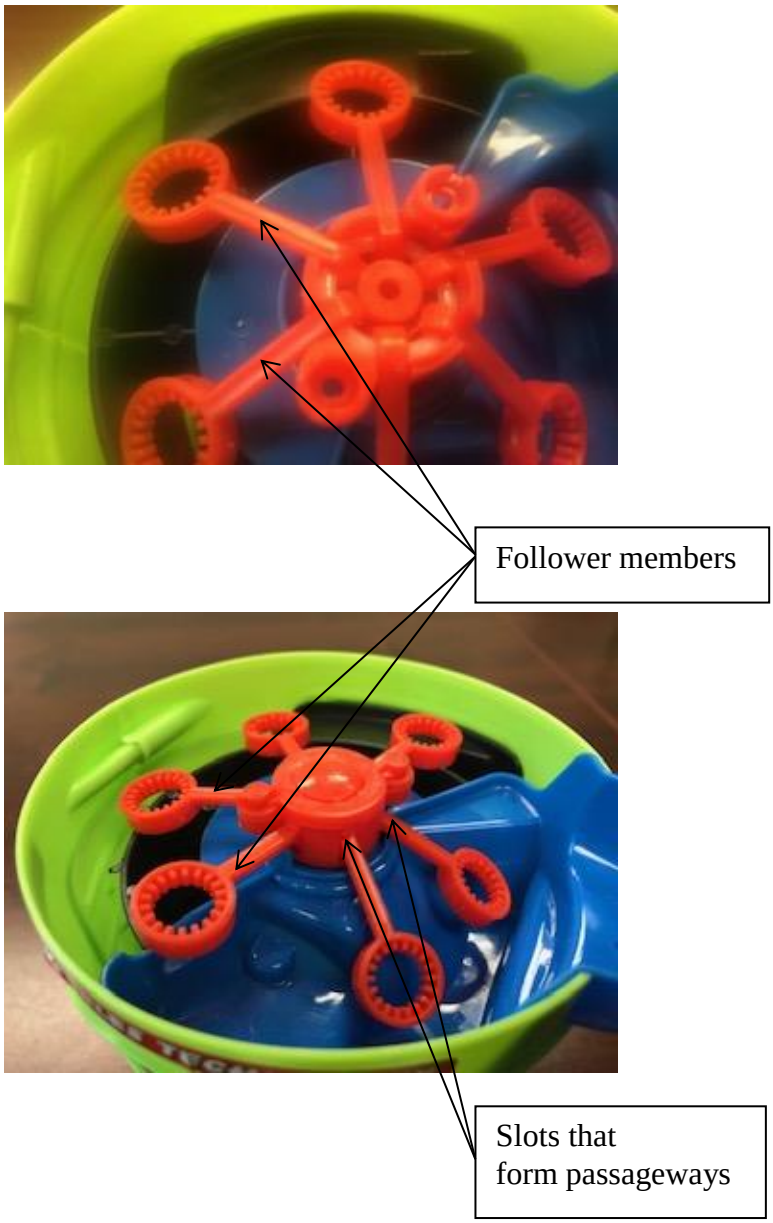
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
the bubble generating assembly comprising: a body comprising:	The bubble generating assembly in the Turbo has a body. 

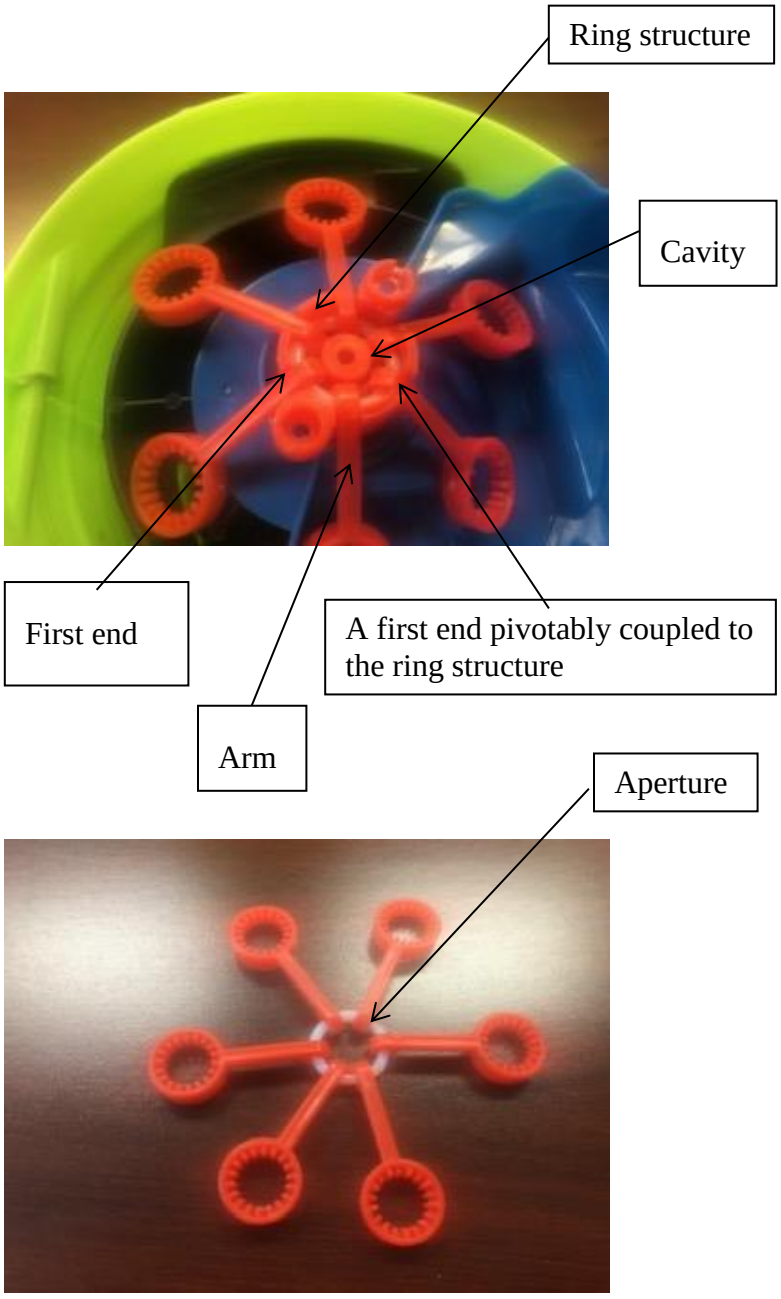
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
an upper shell;	The body of the Turbo's bubble generating assembly has an upper shell. 

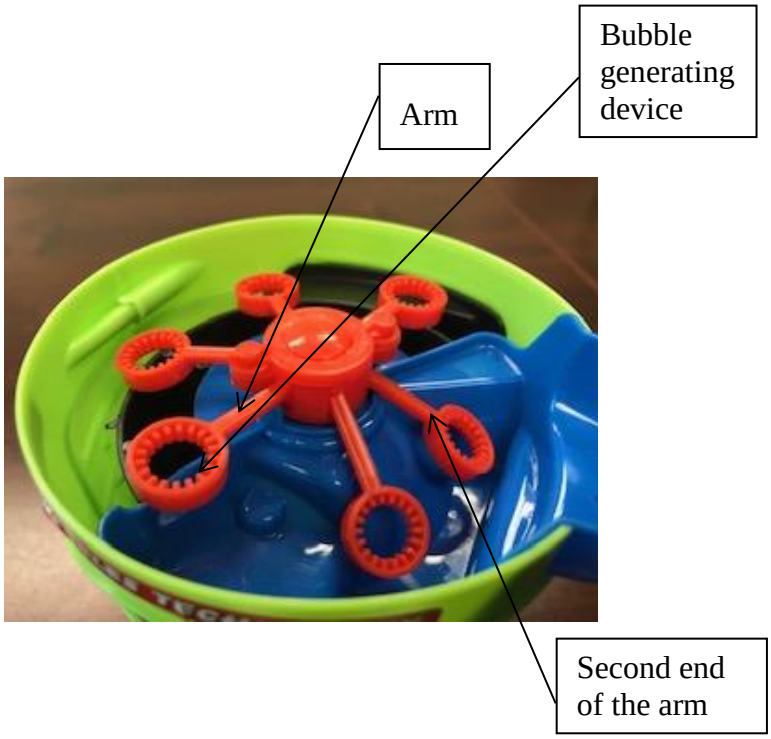
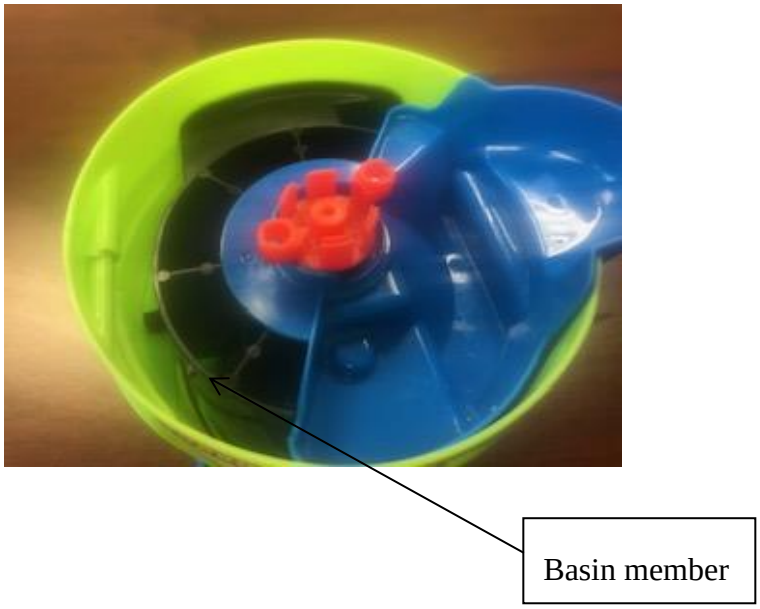
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a lower shell,	The body of the Turbo's bubble generating assembly has a lower shell.  

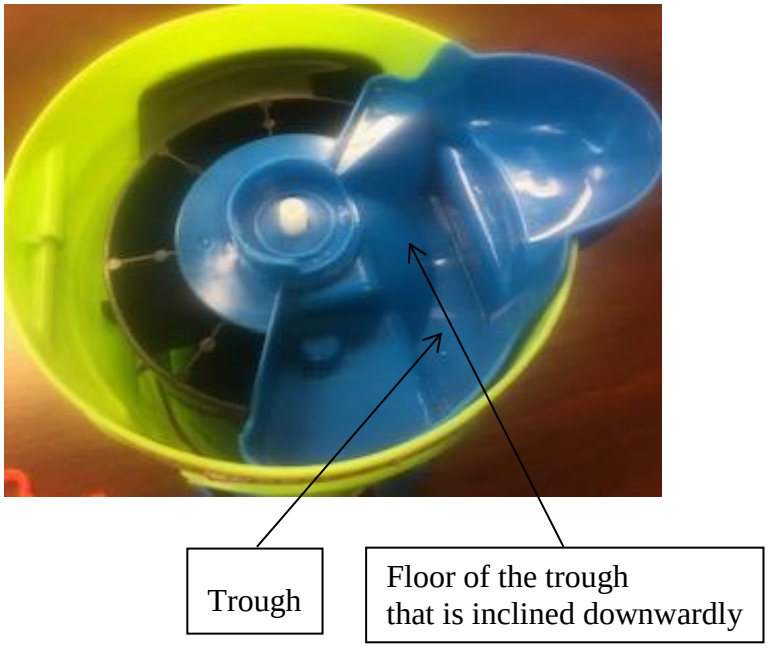
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
the upper shell coupled to the lower shell to form a cavity between the upper and lower shells;	The Turbo's upper shell is coupled to the lower shell to form a cavity between the upper and lower shells.  

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a plurality of slots in the body that form passageways into the cavity from outside of the body; and	There are a plurality of slots in the Turbo's body that form passageways into the cavity from outside of the body. 
a ring structure positioned in the cavity;	The Turbo has a ring structure positioned in the cavity. 

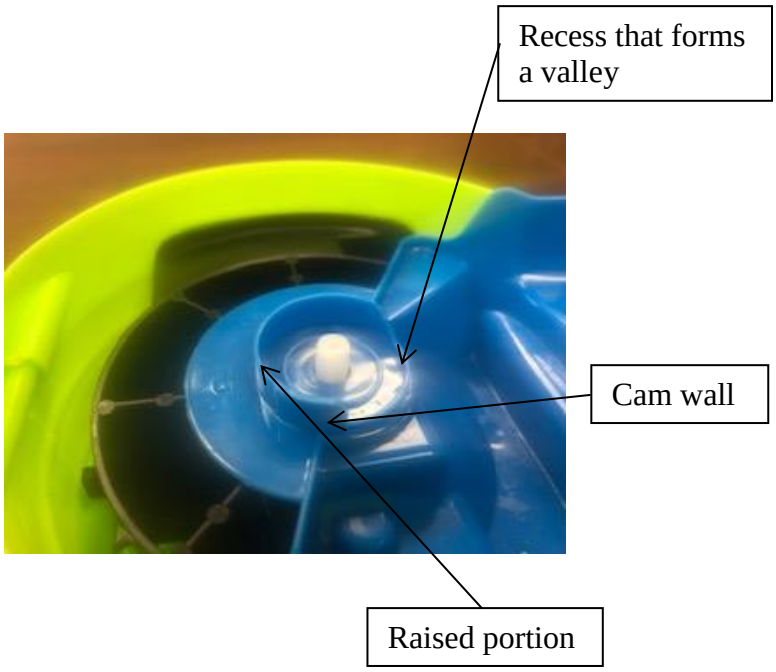
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a plurality of follower members extending through the passageways formed by the slots of the body, each of the follower members comprising:	In the Turbo, a plurality of follower members extend through passageways formed by the slots of the body. 

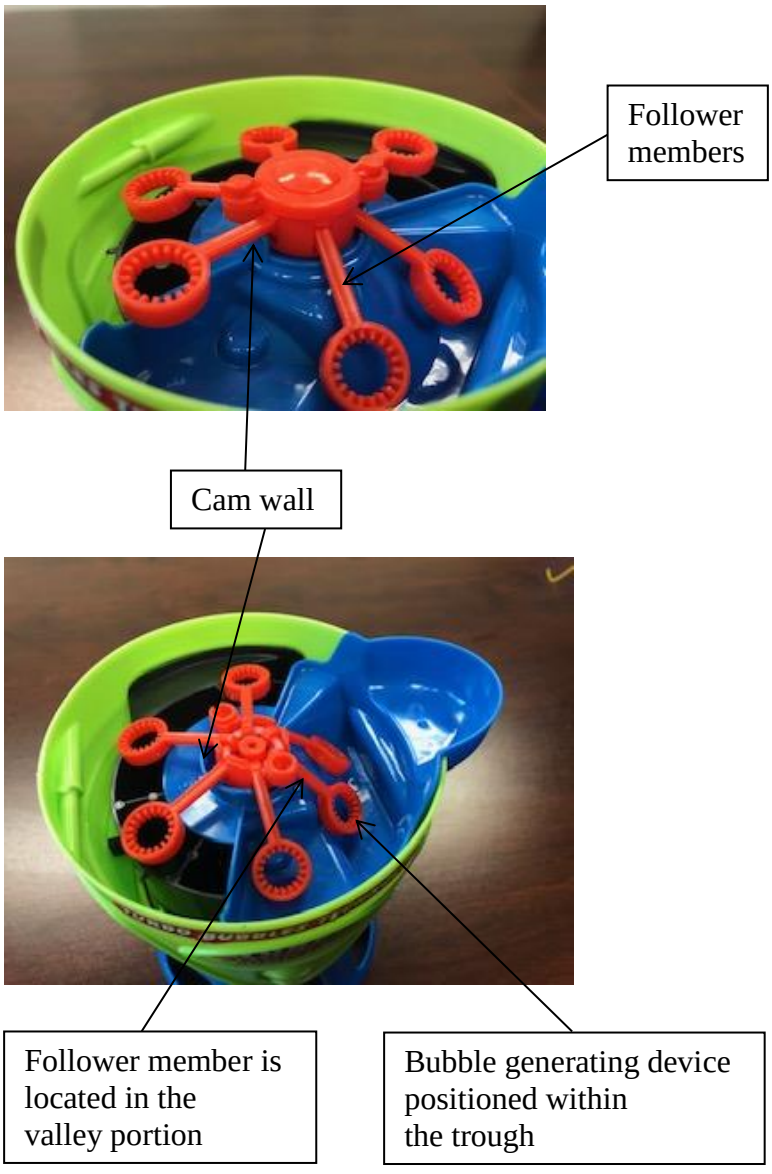
Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
an arm having a first end in the cavity and pivotably coupled to the ring structure so as to be pivotable about a second axis, the first end of the arm comprising an aperture through which the ring structure extends; and	The Turbo has an arm having a first end in the cavity and pivotably coupled to the ring structure so as to be pivotable about a second axis, the first end of the arm comprising an aperture through which the ring structure extends. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a bubble generating device coupled to a second end of the arm located outside of the body;	The Turbo has a bubble generating device coupled to a second end of the arm located outside of the body. 
a basin member comprising:	The Turbo has a basin member. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a trough for containing bubble solution, the trough positioned within the housing, the trough comprising a floor that is inclined downwardly with distance from the first axis;	The Turbo has a trough for containing bubble solution, the trough positioned within the housing, the trough comprising a floor that is inclined downwardly with distance from the first axis. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a feed reservoir protruding from the housing, the feed reservoir configured such that bubble solution fed into the feed reservoir flows into the trough; and	The Turbo has a feed reservoir protruding from the housing, the feed reservoir configured such that the bubble solution fed into the feed reservoir flows into the trough. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
a cam wall having a raised portion and a recess that forms a valley portion; and	The Turbo has a cam wall having a raised portion and a recess that forms a valley portion. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
wherein upon the bubble generating assembly being rotated about the first rotational axis by the motor, each of the follower members ride along the cam wall and repetitively transition between: (1) a lowered position in which the follower member is located in the valley portion and the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough; and (2) a raised position in which the follower member is located along the raised portion and the bubble generating device is aligned with the air stream generated by the fan device; and	Upon the bubble generating assembly being rotated about the first rotational axis by the motor, each of the follower members of the Turbo ride along the cam wall and repetitively transition between (1) a lowered position in which the follower member is located in the valley portion and the bubble generating device is positioned within the trough to become loaded with bubble solution in the trough and (2) a raised position in which the follower member is located along the raised portion and the bubble generating device is aligned with the air stream generated by the fan device. 

Claim 1 of U.S. Patent 9,757,661	Turbo Bubble Fountain
	 Bubble generating device aligned with the air stream Follower member is located along the raised portion
wherein each of the follower members transition between the raised position and the lowered position by rotating about the second axis.	In the Turbo, each of the follower members transition between the raised position and the lowered position by rotating about the second axis.