United States Patent [19]

Starr

[11] **3,861,076**

[45] **Jan. 21, 1975**

[54] **BUBBLE MAKER**

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[21] Appl. No.: **437,372**

[52] **U.S. Cl.** **46/6**

[51] **Int. Cl.** **A63h 33/28**

[58] **Field of Search** 46/6, 7

[56] **References Cited**

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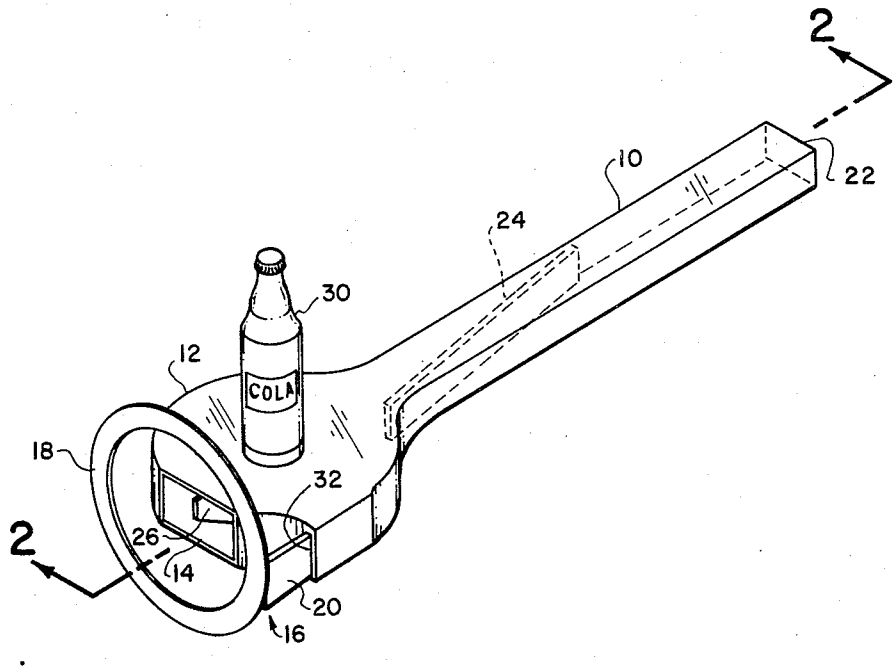
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Primary Examiner—Louis G. Mancene
Assistant Examiner—Robert F. Cutting
Attorney, Agent, or Firm—Faye & Sharpe

[57] **ABSTRACT**

A duct having an inlet end and an outlet end and attached thereto in register with the outlet end is a loop adapted to hold the bubble making solution in a thin film, whereby air expelled through the duct will be propelled through the loop and cause the formation of bubbles from the bubble making solution. A support arm connects the duct and loop to hold the two in relative operating position. The support arm is connected to the loop by a flexible bridge or hinge which allows the arm to pivot from a plane parallel with the loop to a position perpendicular to the plane of the loop. A pop bead type of connection on the arm and loop serve to lock the arm in position perpendicular to the plane of the loop.

13 Claims, 10 Drawing Figures



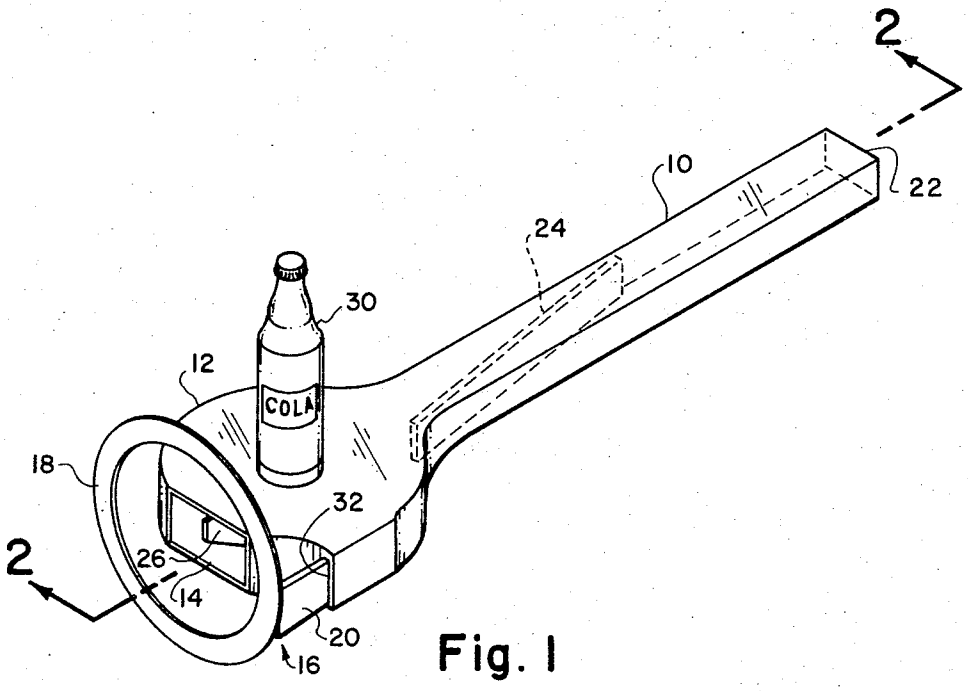

2
10
22
24
30
12
COLA
18
32
26
14
2
20
16

Fig. 1

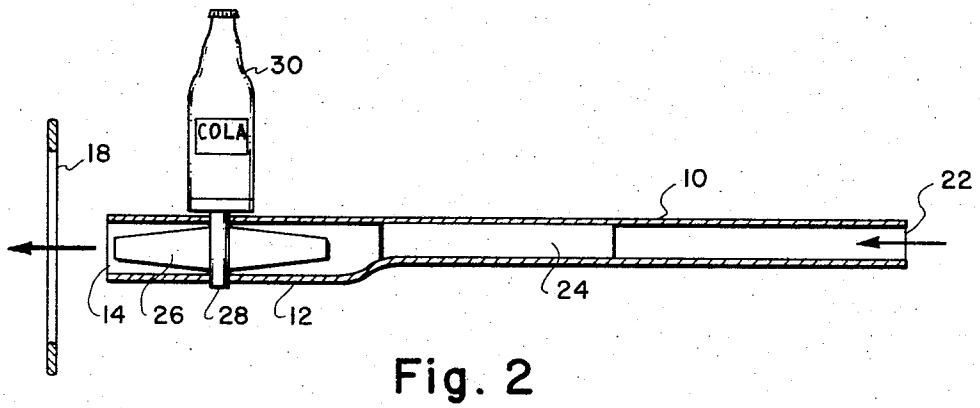

30
COLA
18
10
22
14
26
28
12
24

Fig. 2

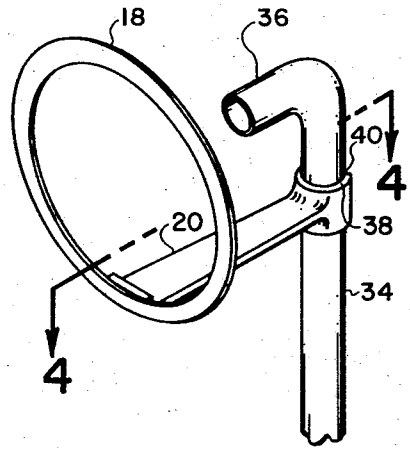


Fig. 3

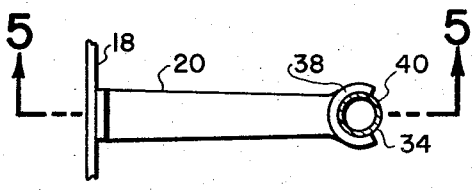


Fig. 4

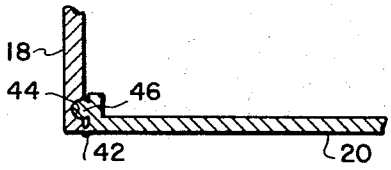


Fig. 5

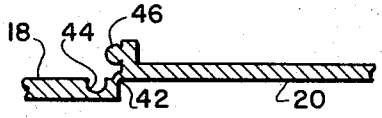


Fig. 6

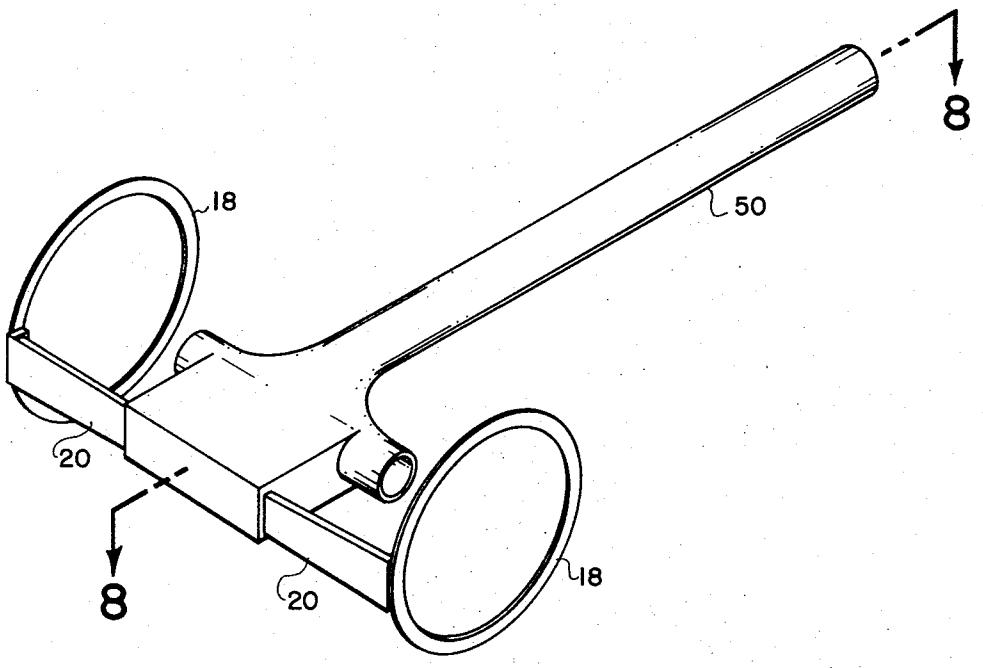


Fig. 7

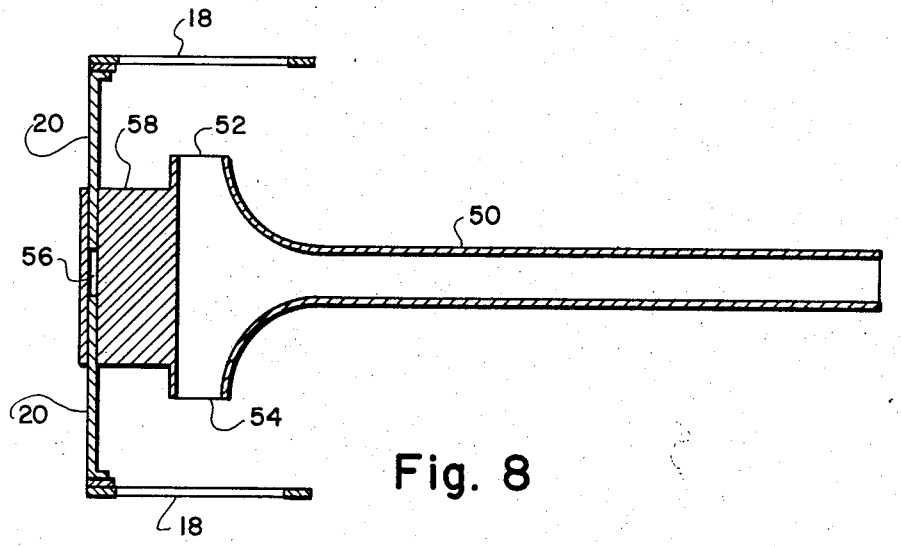


Fig. 8

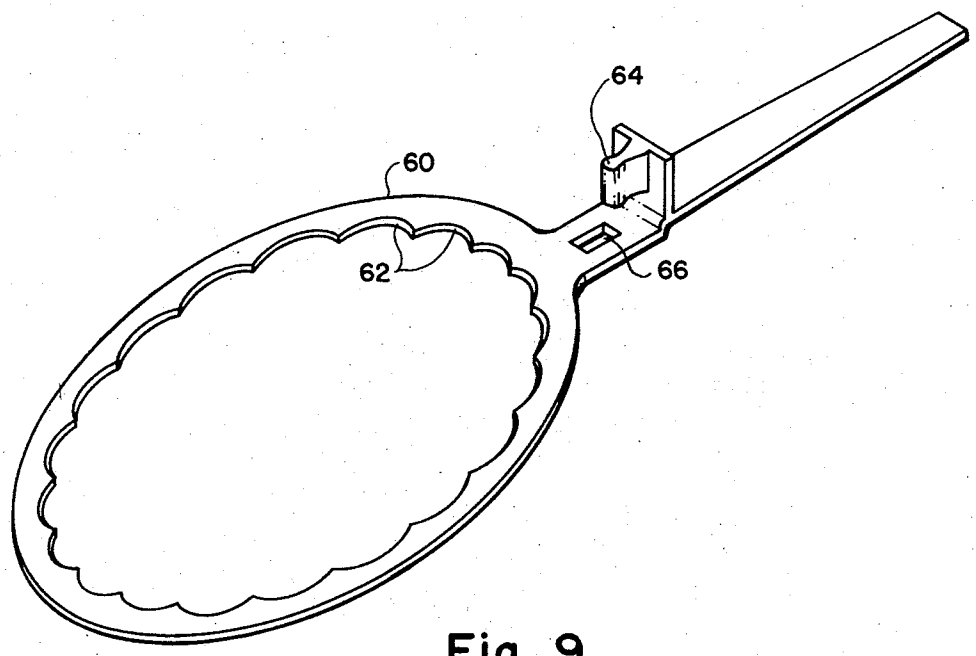


Fig. 9

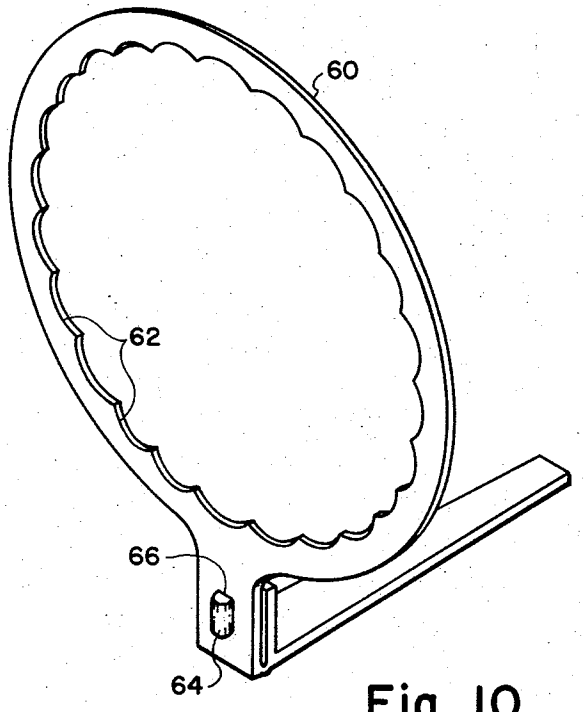


Fig. 10

BUBBLE MAKER

BACKGROUND OF THE INVENTION

Bubble makers of various designs have been marketed for years and where the combination includes a bubble wand in combination with a blow tube or a tube having a bellows on one end which is compressed to expel air from the outlet end of the duct, the problem has always been that the wand is L-shaped in design and is not readily adaptable to a flat package of the whole combination.

As is obvious to toy packagers and manufacturers, where the product can be marketed in flat, thin, blister package type containers, a greater quantity can be shipped and stored in warehouses and on retain shelves in a smaller space.

Additionally, the trend in more recent times with improved bubble making solution has been to have larger and larger wands to have larger and larger bubbles. Apparently, large bubbles are attractive to the age group who purchase bubble making apparatus.

Thus, the need in the industry is for a bubble wand which can be packaged flat and will operate in the combination in ways similar to existing devices; this invention provides for this need.

BRIEF DESCRIPTION OF THE INVENTION

The bubble wand which is designed to be used with existing apparatus as well as some of the other unique designs of the particular duct work and accessory attachment illustrated in this invention as will be explained subsequently, includes a loop and a support arm. At one edge of both the support arm and the loop, the two are joined by a bridge or hinge of flexible material of either polypropylene or polyethylene. As a practical matter, the arm and loop are probably also formed of the same material, although it is not necessary for an operable device.

The flexible hinge or bridge allows the support arm to pivot from a position perpendicular to the plane defined by the loop to a position parallel with the plane defined by the loop. In this manner, the wand which is generally L-shaped in operative position can be flattened for packaging with the other elements of the bubble maker and thereby, provide the thin, flat package which is most desirable for toy manufacturers to reduce the cost of shipping as well as the cost of storage space within a merchandising establishment. Additionally, manufacturing costs are much less where a flat plastic product is being formed rather than one having right angles.

The way the loop and support arm are locked in rigid L-shaped position when they are connected operatively together with the duct is with a pair of pop bead type connections which lock in place as the arm is pivoted to the perpendicular position.

In one embodiment a rotor with radially extending vanes is mounted within the duct and air is directed to impinge tangentially on the vanes to rotate the rotor which in turn rotates some decorative device for its visual affect on the operator.

In another embodiment, either in combination with a rotor and other attachments or without the same is a bubble making apparatus having plural outlet passages and bubble wands to provide more than one source of bubbles.

Connection of the bubble wand to the ducting may be by way of several conventional ways and some which are not so conventional as in two embodiments illustrated in this case. One includes a semi-circular resilient element on one end of the support arm which is of the same general interior shape as the exterior shape of the ducting and includes a side opening which is smaller than the ducting. In this manner, the ducting can be forced through the side opening and the resilient loop will snap back into place to clamp and hold the ducting and support the bubble loop in operative position.

Another embodiment suitable for mounting the bubble wand on the ducting is a tapering slot in a part of the ducting and a cooperatively tapered probe at one end of the support arm. The wedge-shaped probe will slide into the slot and as the surfaces converge the arm would be held in rigid operative position for supporting the bubble loop.

The objects of the invention not heretofore specifically enumerated will be obvious from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of one embodiment of the bubble making invention which includes a duct, a rotor with radially extending vanes, a decorative device mounted on the top of the ducting and a mounting for the bubble wand which supports the same in a vertical plane;

FIG. **2** is a sectional view taken along line **2—2** of FIG. **1**;

FIG. **3** shows an alternative ducting with a modified mounting bracket for the bubble wand;

FIG. **4** is a fragmentary sectional view taken along line **4—4** of FIG. **3**;

FIG. **5** is a fragmentary sectional view taken along line **5—5** of FIG. **4** and particularly illustrating the pop bead connection between the support arm and the loop means;

FIG. **6** shows the joint between the loop and the support arm where the pop bead connection has been disengaged and the support arm is deflected approximately into the plane of the loop;

FIG. **7** illustrates a modification of the bubble maker of FIG. **1** where two bubble wands are supported on the end of the ducting apparatus in register over two outlet passages;

FIG. **8** is a sectional view taken along line **8—8** of FIG. **7**;

FIG. **9** is a perspective view of a modification of the loop and the locking means between the loop and the support arm; and

FIG. **10** is a perspective view of the bubble wand of FIG. **9** deflected into locked operative position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Observing particularly, FIGS. **1** and **2** there is illustrated a duct work **10** which includes an enlargement **12** near the outlet end **14.** Supported adjacent the outlet end **14** of the duct work is a bubble wand **16** which includes a bubble loop **18** and a support arm **20.** The support arm and loop are pivotally connected together by particular joint structure illustrated in FIGS. **5** and **6** and which will be explained in more detail subsequently.

In operation, air is injected through the inlet end **22** from the lungs of the operator, an attached bellows device (not illustrated) or any number of other conventional air injection means. The air will progress through the ducting from the inlet **22** toward the outlet **14** but will be channeled to one side by the baffle **24** such that it will impinge tangentially on a rotor, the rotor including an axle **28** having radially extending vanes or blades **26.** Projecting upward from axle **28** is a decorative device **30** which will rotate when the axle **28** rotates.

The visual affect of the rotating decorative device **30** in addition to the bubble making function of the bubble maker as a whole is a new and unusual feature not heretofore provided in any similar combination. As would be obvious to those having ordinary skill in the art, the decorative device **30** could be a merry-go-round, flower pot, ballerina or any other type of device desirable by a particular manufacturer or that captures the child's imagination. The duct work **10** or perhaps only the enlarged portion **12** could be transparent on the top portion and the decorative device mounted on the inside and outside or either alone to give the desired visual affect. Such would not depart from the spirit of this invention.

The mounting mechanism for connecting the support arm **20** to the ducting means **10** comprises a slot **32** on one side of the enlarged portion **12** of the ducting and a chisel-shaped wedge portion on the distal end of the support arm **20.** When the support arm is wedged into the slot **32,** it will support the loop **18** in proper operative position in register over the outlet end **14** of the ducting means.

Observing FIG. **3,** a different shape of ducting means **34** is illustrated having a side opening or chimney **36.** A similar loop **18** and support arm **20** is provided. However, the connection means is somewhat different between the duct and the support arm. In this instance, the connection comprises a semi-circular or open loop **38** which has a side opening **40** smaller than the size of the ducting **34.** Thus, when the ducting **34** is forced into the side opening **40,** the loop **38** will expand and then spring back to clamp tightly around the ducting **34** and hold the loop **18** in operative position in register over the opening of chimney **36.**

FIGS. **5** and **6** illustrate the particular mechanism so important in the manufacture and packaging of this invention where economics is so critical. In the preferred embodiment the loop **18** and support arm **20** will be formed integral and will include a very thin flexible hinge or bridge **42** permanently connecting the two together. To lock the two in operative position (generally L-shaped as illustrated in FIG. **5**), a pop bead connection is employed which includes a concavity **44** in one of the members and a projecting bead or nipple **46** on the other member.

"Pop bead" types of connections are well known in other types of apparatus and they generally involve a nipple or ball having a large front end and a tapering rear end while the other element includes a concavity or socket having a large interior with a small opening and when the nipple **46** is pushed into the concavity **44,** the mouth of the concavity tends to contract around the recessed diameter portion of the nipple and hold the elements in operative position.

FIG. **6** particularly illustrates the flat arrangement of the bubble wand **16** which is suitable for manufacturing, blister packaging, shipping and handling so desirable in the manufacture of bubble sets.

Turning now to FIGS. **7** and **8,** another modification of the invention is illustrated. It will be obvious to those having ordinary skill in the art that the decorative device **30** such as is illustrated in FIGS. **1** and **2,** could be employed with the embodiment in FIGS. **7** and **8** without departing from the scope of the invention. Such has not been illustrated to save time and space.

This embodiment involves a particular design of ducting **50** which is generally T-shaped or Y-shaped in configuration as best seen in FIG. **8.** It includes two outlet passages **52** and **54** which serve to expel air in two separate streams suitable for forming bubbles in two separate directions. On observing the drawing the operation is obvious and will not be described here.

One slot **56** or two slots (not illustrated) are provided in a solid projection **58** on the front end of the ducting **50** to accommodate the chisel-shaped ends of support arms **20** in a manner similar to that illustrated in FIG. **1.** No further explanation appears necessary.

Obvious modifications could be made to the structure illustrated herein without departing from the spirit or scope of the invention. It is the intention of the inventor that this invention be limited only by the scope of the appended claims. An example of such modification is illustrated in FIGS. **9** and **10.**

The loop **60** is shown with its interior surface scollaped **62.** The configuration at **62** could take many shapes and all provide the same result, namely, an increased length of line contact for the bubble liquid and storage for bubble liquid. Bubble liquid is held across the opening in the loop by its surface tension. Irregularities in the bubble loop will not increase the surface tension at the middle of the loop but near the irregularity the result will be a thickening of the film. When a bubble is blown the liquid tends to repair the rupture and maintain the spread across the loop; the additional liquid to repair the rupture flows from the thicker area near the irregularity. Thus, elaborate shapes for the "irregularities" have been proposed to maximize storage. The obvious result is to allow the child to blow a long string of bubbles without dipping the wand into a dish of the bubble liquid. Proposed designs for the irregularity include radially inwardly projecting prongs which include smaller, transversely extending prongs; such designs are within the spirit of this invention.

FIGS. **9** and **10** also show an elongated nipple **64** designed to project through a similarly shaped aperture or concavity **66.** In view of the previous explanation of FIGS. **1–8,** it is believed that no further explanation of the operation of FIGS. **9** and **10** is necesssary.

In the claims:

1. In the combination to form a bubble making apparatus, means forming a duct adapted to convey air from an inlet end to an outlet end and means forming a loop for holding a film of bubble making solution,

means for attaching said loop means and said duct means together for holding them in operative position,

in operative position said loop means being located whereby air expelled from the outlet end of said duct means passes through the aperture bounded by said loop means,

the improvement comprising:

a relatively rigid support arm flexibly attached to said loop means, the flexible attachment between the

arm and loop allowing said support arm to pivot from a position approximately perpendicular to the plane defined by said loop means to a position approximately parallel with said plane, and

means for locking the support arm and loop means in position with the arm approximately perpendicular to the plane defined by said loop means.

2. The combination of claim **1** wherein the locking means comprises a nipple on one of the arm and loop means and a concavity on the other, the concavity being at least partially smaller than the largest part of the nipple and formed of resilient material, whereby the nipple is gripped and held by the deformed surface of the concavity when the nipple is inserted therein.

3. The combination of claim **2** wherein the end of the support arm remote from the loop means is shaped to be joined with a cooperatively shaped structure of said duct means.

4. The combination of claim **3** wherein the duct means includes two outlet passages at its outlet end and a loop means in register over each outlet passage.

5. The combination of claim **2** wherein the duct means includes two outlet passages at its outlet end and a loop means in register over each outlet passage.

6. The combination of claim **1** wherein the duct means includes two outlet passages at its outlet end and a loop means in register over each outlet passage.

7. The combination of claim **6** wherein the end of the support arm remote from the loop means is shaped to be joined with a cooperatively shaped structure of said duct means.

8. The combination of claim **1** wherein the end of the support arm remote from the loop means is shaped to be joined with a cooperatively shaped structure of said duct means.

9. The combination of claim **3** wherein the means for attaching the loop means and the duct means comprises a resilient open loop on the end of the arm remote from the loop means, said resilient open loop having a side opening smaller than the duct means whereby, the duct may be forced through said side opening and gripped by the inside surface of the resilient open loop.

10. The combination of claim **3** wherein the means for attaching the loop means and the duct means comprises a slot in one of the duct means and arm means and a cooperatively shaped probe on the other whereby the probe inserted into the slot serves to lock the loop means and duct means together.

11. The combination of claim **1** wherein the duct means incorporates therein a rotor with an axle and radially extending vanes,

a decorative element being mounted on said axle and being visible from the exterior of said duct,

means for directing a stream of fluid passing through said duct to impinge tangentially on said vanes to thereby rotate said rotor and said decorative device.

12. The combination of claim **1** wherein the interior surface of the loop means includes means forming surface irregularities for storing larger amounts of bubble solution than are stored with a correspondingly smooth interior surface.

13. The combination of claim **1** wherein the locking means comprises an elongated aperture in one of the loop means and the support arm and an elongated nipple on the other, the nipple having a portion larger in cross-section than the smallest cross-section of the aperture.

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