Nov. 6, 1951 F. G. LUDWIG 2,574,117

BUBBLE-BLOWING DEVICE

Filed July 1, 1947 2 SHEETS—SHEET 1

Fig. 4.

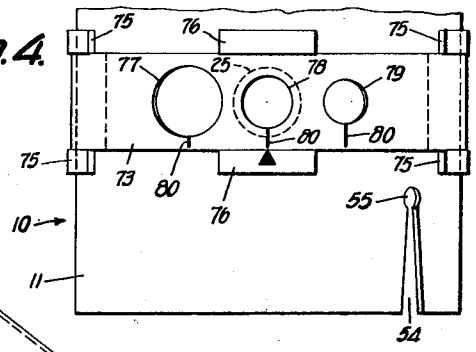


Fig. 1.

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Fig. 3.

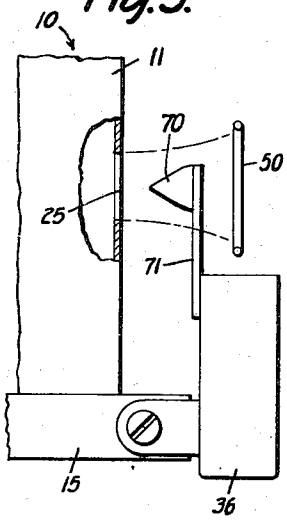


Fig. 2.

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BUBBLE-BLOWING DEVICE

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6 Claims. (Cl. 46—8)

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The present invention relates to a bubble blowing device of the type employing film forming liquids or solutions such as soap solutions. The device although primarily useful as a toy can be used as an advertising instrument or attention arrester.

Among the objects of the present invention are to provide a new and improved bubble blowing device which can be simply operated through manipulation of a single operating element such as a string, which requires no air blowing power operated means such as motor operated blowers, fans, or the like, which can be operated without creating any mess, which affords a great deal of delight and pleasure in its bubble blowing operations, which is inexpensive to manufacture and which is adjustable to permit the blowing of bubbles of different sizes.

Various other objects of the invention will be apparent from the following particular description and from an inspection of the accompanying drawings, in which

Fig. 1 is a side elevation of the bubble blowing device embodying the present invention, parts being shown broken away to reveal the interior structure of said device;

Fig. 2 is a front elevation of the bubble blowing device;

Fig. 3 is a detail of a modified form of orifice air blowing arrangement embodying the present invention; and

Fig. 4 is a front elevation of a portion of the bubble blowing device and shows in connection therewith means for adjusting the size of the bubbles produced.

Referring to Figs. 1 and 2 of the drawings, the bubble blowing device of the present invention comprises a tower 10 including an upstanding air cylinder 11 and a hood 12 on said cylinder. This hood 12 is shown in conical form and has an annular flange 13 retained in the upper end of the air cylinder with a friction fit. The air cylinder 11 is mounted on a base 15 which in turn is secured to a bracket 16 by any suitable means, as for example, the nails 17. This bracket 16 may be mounted on a wall or door 18 out of reach of a child by any suitable means, as for example screws 20.

The cylinder 11 has near its lower end an orifice or opening 25 through which an air blast is ejected for the formations of the bubble. This air blast is generated by means of a piston 26 slidable in the air cylinder 11 and tending to gravitate towards the bottom of said cylinder. This piston 26 is raised by means of a flexible

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slender element 27 shown in the form of a string which passes over a guide staple 28 secured to the bracket 16 through the opening 29 in the cylinder 11 and over a pulley 30 and is secured at its end to the central part of said piston, as for example, by a staple 31. This string 27 passes through an opening 32 in the base 15 and extends downwardly within easy reach of a child.

The pulley 30 comprises a cylindrical member, desirably made of wood, and having end gudgeons 33 desirably in the form of nails journalled in diametrically opposite wall sections of the air cylinder 11. The central part of this pulley 30 is formed with a V-groove 34 to receive the string 27.

Attached to the lower section of the air cylinder 11 is the film forming means comprising a tank 36 secured to the forward edge of the base 15 by a bracket 37 and shown of long narrow L-shape. This tank 36 is adapted to contain a film forming liquid A which may be the usual soap bubble forming solution. This tank 36 is maintained filled by a fountain or reservoir 38 comprising an inverted container having a neck 40 extending into the upper end of the tank and having an annular groove 41 into which extends with a snap fit the beaded upper edge 42 of the outer wall 43 of said tank. This beaded edge 42 may be formed by doubling over the marginal portion of the tank wall 43. In this manner, the fountain reservoir or container 38 is supported on the tank 36, can be removed therefrom by simple manipulation for the purpose of replenishment and can be just as simply snapped into mounted inverted position with respect to the tank.

The fountain arrangement just described is self-feeding. When the level of the liquid in the tank 36 falls below the bottom of the reservoir neck 40, the liquid in the reservoir 38 feeds into the tank until the level of the liquid in said tank is restored to the level of the bottom of the reservoir neck 40. Since the reservoir 40 is hermetically sealed, and the tank 36 is open at the top, the atmospheric pressure acting on the liquid in said tank will automatically maintain the hydraulic conditions between said tank and said reservoir shown in the drawings.

Mounted for operation in front of the orifice 25 is a film frame 50 shown formed from a wire circularly coiled or looped at one end to define said frame and bent to define a crank arm 51, a shaft 52, and an offset crank section 53 at its other end. The shaft 52 extends through the

bottom of the air cylinder 11 and is journalled in the walls of said cylinder. For that purpose, the air cylinder 11 is provided at its lower section with a pair of upwardly tapering notches 54 open at their lower ends and formed at their upper ends with circular eyes 55 through which the shaft 52 extends. A block 56, desirably of wood, fits into the lower end of the air cylinder 11 and supports the shaft 52 in the eyes 55. This block 56 is secured to the tower base 15, as for example, by means of the screw 57 and has a friction fit in the air cylinder 11. This arrangement permits easy assembly of the lower section of the device. This assembly is effected by slipping the shaft 52 through the notches 54 and into the eyes 55 and then slipping the block 56 into the lower end of the air cylinder 11. A nail 58 may then be employed to assure a fast connection between the air cylinder and the block 56.

In order to hold the shaft 52 against endwise movement in the eyes 55, there is secured to said shaft on the outside of the air cylinder 11 collars in the form of washers 60. The section of the shaft 52 on opposite sides of each collar 60 is desirably pinched to retain said collar against movement along said shaft.

The crank wire end 53 carries a counterweight 61 by which the film frame 50 is normally maintained in axial alignment with the opening 25 in the full line position shown in Fig. 2.

The film frame 50 is adapted to be dipped into the tank 36 to pick up a film from the solution A therein. For that purpose, the shaft 52 has a bend 65 in the interior of the air cylinder 11 serving as a crank arm normally extending obliquely upwardly under the influence of the counterweight 61. When the piston 26 is permitted to drop in the air cylinder 11 under its own weight, it engages the crank arm 65 and thereby rotates the shaft 52 counterclockwise (Fig. 2), so that the film frame 50 dips into the solution A in the tank 36, as shown in dot and dash lines in Fig. 2. As the piston 26 is lifted in the air cylinder 11 by a pull on the string 27, the shaft 52 under the influence of the counterweight 61 is rotated clockwise (Fig. 2), thereby raising the film frame 50 with a film thereon out of the tank 36 and into axial alignment with the orifice 25.

The piston 26 is raised in the air cylinder 11 approximately to the position shown in Fig. 1 and then permitted to drop suddenly. The air which has entered into the air cylinder 11 through the orifice 25 is then forcefully ejected from said cylinder through said orifice during the sudden down movement of the piston 26 and is projected against the film frame 50, thereby causing the film thereon to be inflated, to break away from said frame and to form a bubble.

If desired, a heater 66 may be provided to heat the air in the air cylinder 11 and thereby to impart to the bubbles greater buoyancy. This heater 66 may be of the electric resistance type connected to power lines 67 passing through an opening 69 in the base 15 and is mounted in a recess 68 which is formed in the block 56 and which opens into the lower end of the air cylinder 11.

After the piston 26 has dropped to the level of the upper edge of the orifice 25 and after the bubble has been blown, said piston engages the crank arm bend 65 in the shaft 52 and starts rotating said arm counterclockwise (Fig. 1) thereby dipping the film frame 50 into the solution A of the tank 36. During the upper movement of the piston 26 caused by a pull on the string 27, the film frame 50 is restored in position opposite the orifice 25 in preparation for the next bubble blowing operation.

By means of the operation described, every time the string 27 is released, a bubble is blown and the film frame 50 subsequently dipped into the tank 36 and every time the string is pulled, the film frame 50 with a film thereon is restored into position to receive a bubble blowing blast and the air cylinder 11 is filled with air.

In Fig. 3 is shown a modified construction which may be employed to make bubbles larger than are permissible with the structure of Figs. 1 and 2. In this form, there is disposed in the path of the air stream ejected from the orifice 25 a diffusing element 70 shown in the form of a member tapering in a direction opposite to the direction of air flow and more specifically in the form of a cone coaxial with said orifice. This air diffusing cone 70 is mounted at the upper end of a bracket arm 71 secured at its lower end to the inner wall of the tank 36.

As the air stream discharged from the orifice 25 passes over the diffusing cone 70, it is flared out by said cone. The resulting flaring air stream striking the film on the film frame 50 blows a bubble larger than that produced by the device of Figs. 1 and 2.

In Fig. 4 is shown a modified form of device in which the size of the bubbles blown may be adjusted. For that purpose, there is provided an adjusting band 73 embracing the air cylinder 11 with a friction fit and extending for more than 180° around said cylinder. This band 73 is supported between guides 75 and 76 secured to the air cylinder and has a plurality of holes of different sizes, three of such holes 77, 78 and 79 being shown arranged in circumferential alignment. The hole 77 is coextensive in diameter with the orifice 25, the center hole 78 is of smaller diameter while the last hole 79 is of smallest diameter. A mark 80 on the band 73 on the bottom of each hole 77, 78 or 79 is adapted to register with a mark on the bottom band guide 76 to assure the coaxial alignment of any selective one of said holes with the orifice 25. By turning the band 73 about the air cylinder 11 to bring any selected hole on said band in axial registry with the orifice 25, the effective diameter of said orifice can be adjusted and the size of the bubbles blown correspondingly altered.

While the invention has been described with particular reference to a specific embodiment, it is to be understood that it is not to be limited thereto, but is to be construed broadly and restricted solely by the scope of the appended claims.

What is claimed is:

1. A bubble blowing device comprising an upstanding air cylinder having an orifice, a piston in said cylinder adapted to drop therein by its own weight, means including a control element for moving said piston upwardly in said cylinder, said piston being adapted to force air from said cylinder out through said orifice when said piston is moved in one direction in said cylinder and being adapted to permit air to be admitted into said cylinder when said piston is moved in the opposite direction, a film frame, a tank adapted to contain a film forming liquid, means supporting said film frame for movement into said tank and for movement out of said tank and into position opposite said orifice, in the path of the stream of air discharged from said cylinder through said orifice, and means correlating the

movement of said piston in said cylinder and the movement of said film frame in and out of said tank, to cause said film frame to dip into said tank and then move into position opposite said orifice in time to receive the stream of air from said orifice.

2. A bubble blowing device comprising an upstanding air cylinder having an orifice near its lower end, a piston in said cylinder adapted to drop therein by its own weight, means including a flexible slender element for moving said piston upwardly in said cylinder upon a downward pull on said element, said piston being adapted to force air from said cylinder out through said orifice when said piston is dropped and being adapted to permit air to be admitted through said orifice and into said cylinder when said piston is moved upwardly, a film frame, a tank adapted to contain a film forming liquid, means supporting said film frame for movement into said tank and for movement out of said tank and into position opposite said orifice in the path of the stream of air discharged from said cylinder through said orifice, and means correlating the movement of said piston in said cylinder and the movement of said film frame in and out of said tank, to cause said film frame to dip into said tank and then move into position opposite said orifice in time to receive the stream of air from said orifice.

3. A bubble blowing device comprising an upstanding air cylinder, a piston in said cylinder, a film frame outside said cylinder, a shaft extending into said cylinder and having a crank in the path of downward movement of said piston, said film frame being attached to a laterally extending arm of said shaft for rotation with said shaft about its axis, a tank outside said cylinder adapted to contain a film forming liquid and in position to receive said film frame as said shaft is rotated by the action of said piston on said crank during downward movement of said piston, said cylinder having an orifice near the lower section thereof through which air is discharged from said cylinder as said piston moves downwardly, and means for moving said film frame about the axis of said shaft and out of said tank into registry with said orifice as said piston is moved upwardly, and means for moving said piston upwardly.

4. In a bubble blowing device, the combination comprising an air cylinder having a discharge orifice, a piston operable in said air cylinder, a wire having a shaft section journalled in the walls of said air cylinder and extending through said cylinder, and a section at one end outside of said cylinder bent to define a crank arm and a film frame at the end of said crank arm, a portion of said shaft section being bent to form

a crank inside said cylinder, means for urging said shaft in a direction to bring said film frame in a position opposite said orifice and said crank in the path of movement of said piston, said film frame being moved away from said position as said piston engages said crank and thereby rotates said shaft, and a tank adapted to contain a film forming liquid and into which said film frame dips as said film frame is moved away from said position.

5. A bubble blowing device comprising an upstanding air cylinder having an orifice near the bottom thereof, a piston in said cylinder, a tank outside said cylinder adapted to contain a film forming liquid, a film frame outside said cylinder movable into dipping position with respect to said tank and out of said position into bubble blowing position opposite said orifice, means urging said film frame toward said bubble blowing position, and means operable by the downward movement of said piston after it reaches the position in which a bubble is blown for moving said film frame into dipping position.

6. In a bubble blowing device, the combination comprising an air cylinder having an air discharge orifice, a film frame opposite said orifice, means for discharging bubble blowing air through said orifice and against said frame, and means for adjusting the effective size of said orifice to adjust the size of the bubbles formed, and comprising a band embracing said air cylinder around said orifice and having a series of holes of different sizes, said band being slidable around said cylinder to bring any one of said holes in register with said orifice, and thereby alter the effective diameter of said orifice.

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