April 19, 1966 G. J. PAWELKA ETAL 3,246,419

AIR PROPELLED AQUATIC TOY

Filed Feb. 21, 1964

Fig. 1.

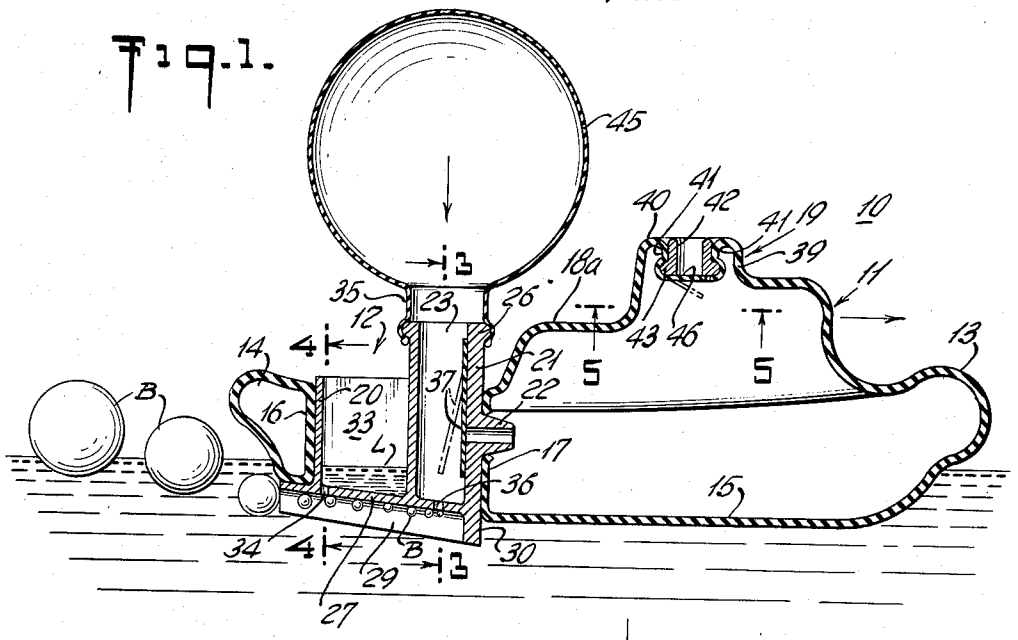


Fig. 2.

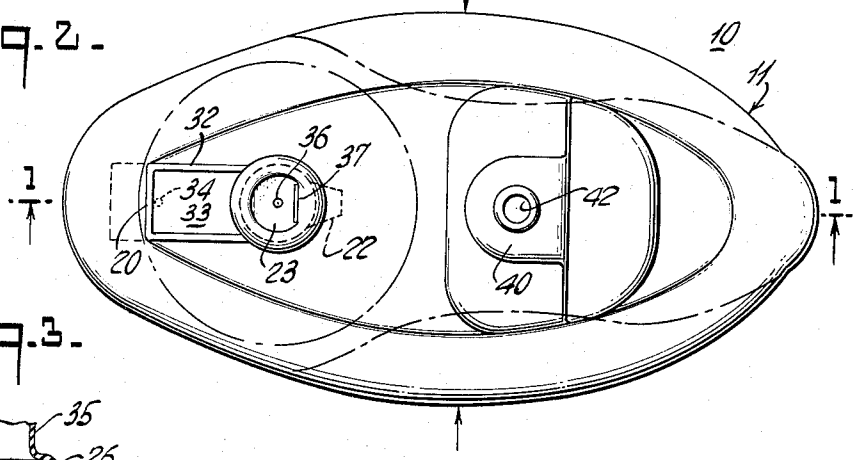


Fig. 3.

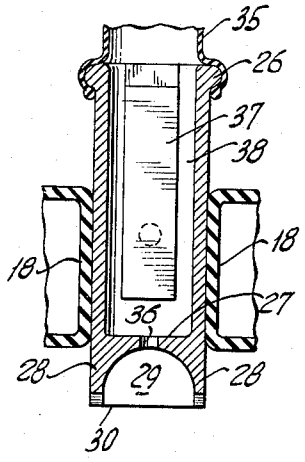


Fig. 4.

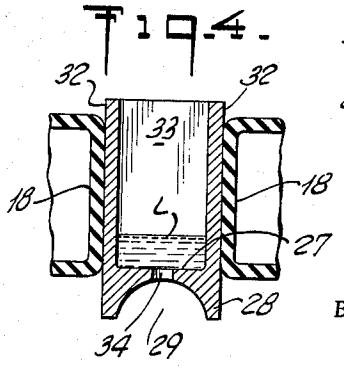
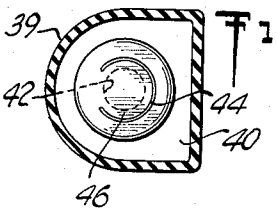


Fig. 5.



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AIR PROPELLED AQUATIC TOY

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10 Claims. (Cl. 46—8)

The present invention relates generally to improvements in toys and the like. It relates in particular to an improved self-propelled aquatic toy which produces and emits bubbles attendant the motivation thereof.

Inflatable rubber balloons have long been employed as sources of compressed air for the air-jet propulsion of toy vehicles, both along a solid surface and in water. However and particularly when used as the motive power for driving aquatic toys, the arrangements heretofore proposed and available possessed numerous disadvantages. For one thing, the compressed air was employed merely to propel the toy and served no other purpose or function. Also, they were generally expensive devices or were devices awkward and difficult to operate. They otherwise left much to be desired.

It is, therefore, a principal object of the present invention to provide an improved air-jet propelled toy.

Still another object of the present invention is to provide an improved air-jet propelled aquatic toy motivated by an inflated elastomeric balloon.

A further object of the present invention is to provide an improved aquatic toy self-propelled by compressed air wherein the compressed air serves additional functions.

Still a further object of the present invention is to produce an improved bubble-producing aquatic toy.

Another object of the present invention is to provide a toy of the above nature characterized by its simplicity of construction, ruggedness, ease of operation, low cost, attractive appearance and unique performance.

The above and further objects of the present invention will become apparent from a reading of the following description, taken in conjunction with the accompanying drawing, wherein

FIGURE 1 is a longitudinal sectional view, taken along line 1—1 in FIGURE 2, of an aquatic toy embodying the present invention;

FIGURE 2 is a top plan view thereof;

FIGURE 3 is an enlarged sectional view taken along lines 3—3 in FIGURE 1;

FIGURE 4 is an enlarged sectional view taken along lines 4—4 in FIGURE 1; and

FIGURE 5 is an enlarged sectional view taken along lines 5—5 in FIGURE 1.

In a sense, the present invention contemplates the provision, in a toy comprising a body member, of a pair of longitudinally spaced front and rear openings formed therein adjacent to the bottom thereof, means defining a channel extending between said front and rear openings, a compressed air reservoir communicating with said front opening and a reservoir adapted to contain a liquid communicating with said rear opening.

According to a preferred form of the improved aquatic toy, the body member includes a main section and an auxiliary section. The main section is a buoyant, hollow, water-tight member formed of collapsible material normally urged to its expanded condition, and has a well extending therethrough adjacent its rear portion. The auxiliary section nests snugly in the main section well and has a pair of longitudinally-spaced openings formed in the bottom thereof, the channel connecting the openings being upwardly, rearwardly inclined and terminating in a rearwardly directed opening. An upwardly extending tube communicates with the front opening and engages

the throat of an inflatable elastomeric balloon constituting an air storage tank. The reservoir communicating with the rear opening is in the shape of a cup formed in the auxiliary body member section. A pair of communicating ports are formed in the main body member section and the balloon carrying the tube and a check valve is associated therewith which permits the flow of air through these ports only into the tube. A second port is formed in the upper part of the main body member section and has a check valve associated therewith which permits the flow of air therethrough only into the main body member section.

Referring now to the drawing which illustrates a preferred embodiment of the present invention, reference numeral **10** generally designates the improved aquatic toy which includes a main body member **11** and an auxiliary body member **12**. The main body member **11** may be in the shape of a ship, as illustrated, or may assume any other desirable shape, and is hollow, water-tight and buoyant. Furthermore, the main body member **11** is defined by easily compressible walls of a resilient material which are normally urged to their expanded condition and may be formed of rubber or a synthetic elastomeric material, a synthetic thermoplastic resin such as polyethylene, polypropylene, polyvinyl chloride, saran, or the like.

Body member **11** is preferably integrally formed in any suitable manner and includes an enlarged peripheral section **13** which extends around the body member **11** and communicates with a rear transverse tubular section **14**. Extending through body member **11**, just forward of tubular section **14**, is a rear, medially-disposed vertical well of rectangular transverse cross-section delineated by a rear wall **16** which also defines the front wall **16** of tubular section **14**, a front wall **17** and side walls **18**. Forming part of body member **11** is a raised superstructure **18***a* and a bottom section **15** of any desirable shape, the raised superstructure including an upwardly directed centrally located valving section **19**.

The auxiliary body member **12** is preferably formed of a relatively rigid material, such as a synthetic organic design, for example, a high density polyethylene or polypropylene, polystyrene, or the like, and telescopes or nests snugly in the well formed in the main body member **11** and has a transverse cross-section approximateiy that of said well. Body member **12** is open topped and includes a rear wall **20** abutting wall **16** and it has a front wall **21** abutting wall **17**. A port-defining tapered tubular nozzle **22** is formed on front wall **21** of member **12** and projects through a registering port formed in wall **17** to define communication between the interiors of main and auxiliary body members **11** and **12**. Cooperating with the front wall **21** to form therewith an upwardly directed tube **23** is an intermediate wall, tube **23** projecting above the level of wall **17** and terminating in an outwardly directed peripheral bead **26**.

Extending along the bottom of auxiliary body member **12** is an upwardly, rearwardly-inclined, bottom wall **27** having downwardly directed side flanges **28** which delineate therewith an upwardly rearwardly inclined channel **29** of arcuate transverse cross-section. Wall **27**, flanges **28** and channel **29** extend rearwardly beyond wall **16** to terminate in a rearwardly-directed opening. The front end of the channel **29** is closed by the lower section **30** of wall **21** which depends below the bottom of the main body member **11**. The rear upper face of channel wall **27** abuts the underface of the main body tubular section **14**.

The side walls of the auxiliary body member and the rear and intermediate walls **20** and **24** delineate, with bottom wall **27**, a cup shaped liquid reservoir **33** for holding a soap solution or other bubble forming liquid L. Formed

medially on the trailing end of reservoir 33 is a small opening 34 which affords liquid communication between the trailing section of the channel 29 and reservoir 33. A second small opening 36 is formed in the front section of channel 29 concentrically with tube 23 and affords communication between the tube 23 and the leading section of channel 29.

An inflatable balloon 45 defines a compressed air reservoir and is of any desired shape and is formed of rubber or other suitable elastomeric material. Balloon 45 includes the conventional throat section 35 which snugly engages the beaded edge of tube 36 to releasably couple balloon 45 to tube 23 and effect communication between their interiors.

The main body member 11 functions as a hand pump to inflate the balloon 45. A pair of check valves are provided in order to restrict the flow of air from the exterior into body member 11 and from body member 11 into tube 23. The first check valve includes an elongated rectangular flap member 37 preferably formed of rubber or the like. Flap 37 cooperates with the flat front inner face 38 of tube 23 and is secured along its upper edge to face 38 at a point above the inner opening of the nozzle 22. In normal position, with air pressure in tube 23 greater than that in the main body member 11, flap 37 closes the nozzle opening thereby preventing backflow of air therethrough from tube 23. However, upon squeezing the walls of main body 11 to increase the pressure therein beyond that in tube 23, the increased pressure effects the opening of the valve flap 37 and the flow of air through nozzle 22 into tube 23.

The second check valve is located in valve section 19, which includes an upwardly directed peripheral wall 39 provided with an inwardly directed flange 40 from the inner edge of which depends an integrally formed cup shaped member 41. Nested in cup 41 is a relatively rigid bushing 42 having a bottom peripheral bead 43 which stretches the corresponding section of cup 41 to effect a tight coupling of the bushing. An arcuate slit 44 of less than 360° is formed in the bottom wall of cup 41 radially outside the periphery of the bore in bushing 42. Slit 44 delineates a flap 46 hinged along a line extending between the ends of slit 44, which flap cooperates with the underface of bushing 42 to define the second check valve. Flap 46 normally closes the bushing bore, particularly when the pressure within body 11 is greater than the exterior to prevent backflow of air through the bushing 42 attendant to the squeezing of the body member 11. However, during the expansion of body 11 following the squeezing thereof, the reduced pressure within said body 11 effects the opening of flap 46 and the flow of air from the exterior into the interior of body 11.

Considering now the operation of the improved aquatic toy 10 described above, a bubble forming liquid L is poured into reservoir 33 and the balloon 45 inflated the desired amount by repeatedly compressing and releasing body 11 which effects the flow of air from the interior of body 11 into the balloon 45 by way of tube 23 and from the exterior into the interior of body 11 through bushing 42, in the manner earlier described. During the inflation of the balloon 45, opening 36 may, if desired, be closed by pressing a finger against it. The aquatic toy is then floated in a pool of water with the channel 29 immersed therein. Successive bubbles B of compressed air will issue from opening 36 and will flow rearwardly along the upwardly and rearwardly inclined top of channel 29 past the reservoir opening 34. As the bubbles and water flow past the opening 34, they draw along therewith some of the bubble-forming liquid in the reservoir. The bubbles of compressed air increase in size in their rearward flow and with the decrease in surface tension effected by the mixture of the liquid L with the passing water, they expand to large bubbles as they leave the trailing end of the channel 29 and emerge to the surface of the water. The bubbles B traveling rearwardly along the channel 29 and emitted from the rear opening thereof effect the forward propulsion of the aquatic toy.

Many materials have been found suitable for the liquid L, such as liquid detergents, liquid bubble mixtures marketed for use with bubble blowing toys, aqueous solutions of powdered detergents and, preferably, the commercially available liquid shampoos. The air and liquid openings 36 and 34 are advantageously small, the air opening 36 advantageously having a diameter of about .032 inch and the opening 34 being smaller and advantageously having a diameter of about .023 inch.

While there has been described and illustrated a preferred embodiment of the present invention, it is apparent that numerous alterations, omissions and additions may be made without departing from the spirit thereof.

What is claimed is:

1. A toy comprising a body member having a pair of longitudinally spaced front and rear openings formed therein adjacent to the bottom thereof, means defining a channel extending adjacent to the bottom thereof, said means defining a channel extending between said front and rear openings, a compressed air reservoir communicating with said front opening, and a reservoir adapted to contain a liquid communication with said rear opening.

2. A toy comprising a body member having a pair of longitudinally spaced front and rear openings formed therein adjacent to the bottom thereof, means defining an upwardly rearwardly inclined channel extending between and rearwardly of said front and rear openings, a compressed air reservoir communicating with said front opening, and a reservoir adapted to contain a liquid communicating with said rear opening.

3. A toy comprising a body member having a pair of longitudinally spaced front and rear openings formed therein adjacent the bottom thereof, means defining a channel extending between said front and rear openings, a tube communicating with and extending upwardly from said front opening, an elastomeric balloon coupled to said tube, said tube having a port formed therein permitting the inflation of said balloon, and a reservoir adapted to contain a liquid communicating with said rear opening.

4. The toy of claim 3, including a movable flap registering with and normally closing the inner face of said port to define therewith a check valve permitting the flow of air therethrough only into said tube.

5. An aquatic toy comprising a hollow buoyant compressible main body member formed of a resilient material and normally urged to an expanded condition, an auxiliary body member connected to said main body member and having an opening formed adjacent to the bottom thereof, a tube communicating with and extending upwardly from said opening and terminating in an open end, an inflatable elastomeric balloon connected to the open end of said tube, said tube and said main body member having registering ports formed therein to afford communication therebetween and a check valve associated with said ports to permit the flow of air only from said main body member into said tube.

6. The toy of claim 5, wherein said main body member has a second port formed therein and including a second check valve associated with said second port and permitting the flow of air only into said body member through said second port.

7. An aquatic toy comprising a hollow buoyant compressible main body member formed of a resilient material and normally urged to an expanded condition, an auxiliary body member connected to said main body member and having a pair of longitudinally spaced front and rear openings formed therein adjacent to the bottom thereof, means defining a channel extending between said front and rear openings, a tube communicating with and extending upwardly from said front opening, an inflatable elastomeric balloon connected to and communicating with said tube, a reservoir adapted to contain a liquid communicating with said rear opening and disposed in said auxiliary

body member, said tube and said main body member having reigstering ports formed therein to afford communication therebetween, and a check valve associated with said ports to permit the flow of air only from said main body member into said tube.

8. The toy of claim **7**, wherein said main body member has a vertical well formed therein and said auxiliary body member tightly nests in said well.

9. A compressed air driven aquatic toy comprising a hollow body member of resilient material normally urged to expanded condition, a first opening thereinto and a first check valve associated with said opening, said valve closing on compression of the body and opening on release of compression and expansion of the body, a second opening in the body and a second check valve associated therewith, said second valve opening to permit air passage while the first valve is closed, and closed to permit air passage while the first valve is open, an air storage tank communicating with the body member by way of the second valve, an air outlet in said tank opening adjacent the bottom of the body, a bubble-forming liquid reservoir contained within the body and having an opening therein at the bottom thereof and rearwardly of the tank air outlet opening.

10. The toy of claim **9**, in which the bottom of the body member is provided with a downwardly opening chanuel member at the rear, and the tank air outlet opening and the opening in the liquid reservoir communicate with the channel in alignment lengthwise of the body.

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RICHARD C. PINKHAM, *Primary Examiner.*