

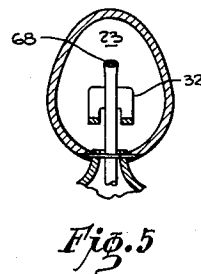
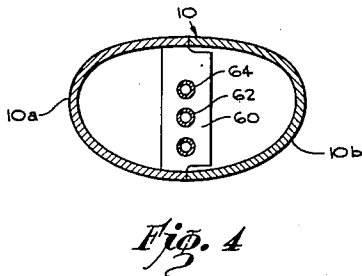
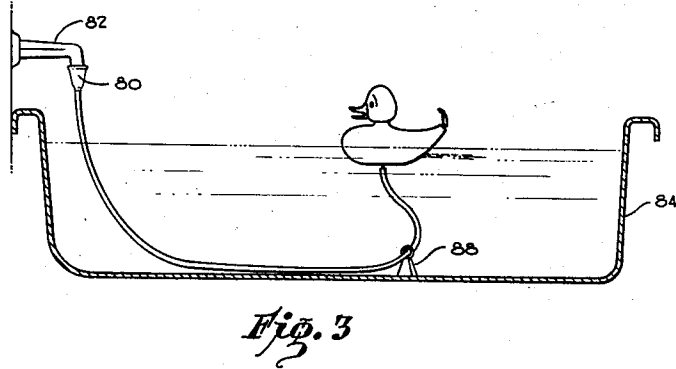
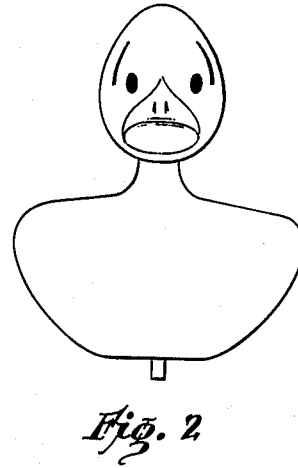
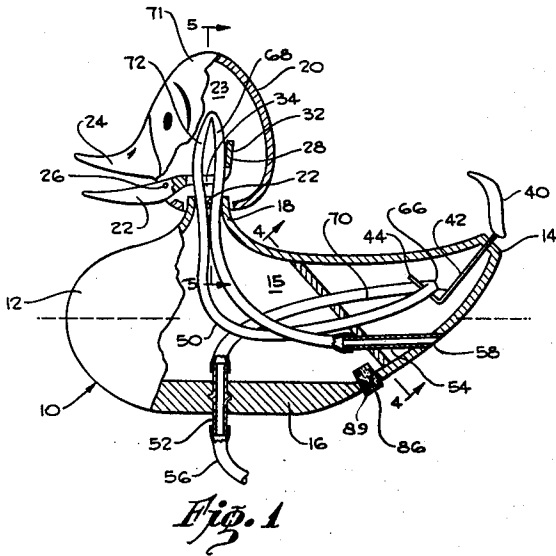
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2,674,065

HYDRAULICALLY-OPERATED TOY

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## UNITED STATES PATENT OFFICE

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## HYDRAULICALLY-OPERATED TOY

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11 Claims. (Cl. 46—92)

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My invention relates to improvements in toys, especially aquatic toys that are adapted to float upon a body of water and relates more particularly to an improved hydraulically-operated motor for propelling and operating such a mechanical aquatic toy.

An object of my invention is to provide an aquatic mechanical toy that is automatically animated and propelled by hydraulic forces.

Another object of my invention is to provide a mechanical toy having movable members with means for operating those members hydraulically.

Another object of my invention is to provide an aquatic toy with an hydraulically-actuated motor for applying pulsating propulsion forces thereto.

Another object of my invention is to provide a simple and inexpensive hydraulically-actuated motor for use in operating or propelling a toy.

The foregoing and other objects of my invention will become apparent from the following specification taken in connection with the accompanying drawing where:

Figure 1 is a side view partly broken away of an animated duck to which my invention is applied;

Fig. 2 is a front view of the duck;

Fig. 3 is a schematic diagram illustrating the operation of the duck;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1; and

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1.

Referring to the drawing, there is illustrated an animated duck employing my invention. This duck includes a hollow body member 10 having a rounded breast portion 12 and a tapered tail portion 14. The seat 16 of the body member 10 is thickened to provide a stabilizing weight and the remaining walls of the body member are of more or less uniform thickness, the entire body member enclosing a cavity 15. Intermediate the front and rear ends of the body member there is provided an upwardly extending tubular neck portion 18.

A hollow head member 20 in the shape of a duck's head is movably connected to the neck portion 18 by means of a transverse pin 22, the head being pivoted for rotation about a transverse axis to provide a nodding action. The head member 20 comprises a main head portion 21 comprising a cavity 23 and including an upper bill part 24. A lower movable bill part 22 is pivotally secured to the main head portion 21 by means of a trans-

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verse pin 26 arranged on the main head portion 21 at the jaw position, the two bill portions thus being arranged for relative movement, simulating a quacking action. The lower bill part 22 is secured to a rigid member 28 that extends into the head cavity into a position above and opposite the neck 18. This rigid operating element is provided with an upwardly extending operating or arm element 32 directly opposite the rear portion of the neck 18. An opening 34 is formed in the operating element 32 in alignment with the central opening in the neck portion 18.

A tail member 40 is attached to the outer end of a shaft 42 journaled in the tail portion 14 and extending into the body cavity 15. The shaft 42 is inclined downwardly at an angle of about 45° and is provided at the inner end with a transverse operating element or arm 44 extending upwardly at an angle of about 45° so that movement of the arm 44 causes the tail member 40 to rotate, thus simulating a wagging movement.

A discharge, or exhaust, fitting or pipe 54 extends horizontally and is secured within an outlet 58 arranged in the tail portion of the body member, being supported in fixed position by an inclined transverse partition 60. The duck is so designed and its weight so distributed that it normally floats up to a waterline indicated by dashed lines in Fig. 1. With the tail member 40 and the head member 20 well above the waterline and the outlet 58 below the waterline.

The propulsion and animation of the duck are produced by means of a very simple hydraulically-operated motor. This motor comprises a flexible tube 50, such as a thin-walled rubber tube, one end of which is connected to a supply fitting 52 and the other end of which is connected to the exhaust fitting 54. The supply fitting 52 is rigidly mounted along a vertical line in the lower wall portion 16, the outer end of this fitting being connected to a hose 56 through which water is supplied continuously under pressure during operation.

The flexible tube 50 is looped about the shaft arm 44 and also about the neck pivot pin 22, being threaded through vertically spaced holes 62 and 64 in the partition 60 mounted within the body portion as well as being threaded through the neck portion 18.

The portions of the tubing extending through the holes 62 and 64 are substantially parallel, being supported in fixed positions and resiliently constricting the rear portion 66 of the tubular member adjacent the shaft arm 44. Likewise, the portions of the tubing extending through the

neck 18 are substantially parallel, thus resiliently constricting the upper portion 68 of the tubular member within the head cavity 23. The two constricted portions 66 and 68 are thus pinched together substantially closing the passage through the tubing. The rear loop 70 so formed encircles the arm 44 and is adapted to rotate that arm about the shaft 42 as the loop vibrates horizontally about the fixed parallel parts thereof which thus act as a pivot for the loop 70. The upper loop 72 so formed extends through the aperture 34 and is arranged to strike the operating arm 32 as this loop vibrates back and forth about a horizontal axis near the fixed parts thereof which thus act as a pivot for the loop 72.

In effect, the two constricted portions 66 and 68 of the tubing 50 operate as hydraulically-operated valves. The opening of each of these valves decreases when the pressure on the upstream side thereof is reduced and enlarges when that pressure is increased, thereby causing the flow of water through the tubing to pulsate. As each of the constrictions decreases, hydraulic pressure increases on the upstream side of the constriction, thus swelling the tubing slightly. Finally, when this pressure becomes great enough the constriction is enlarged permitting water to pass rapidly through or past the constriction, thereby relieving the pressure on the upstream side thereof. When this pressure is relieved, the constriction is again reduced causing the pressure to be increased again on the upstream side thereof. The repeated rise and fall of pressure and the repeated corresponding fall and rise of flow rate cause the corresponding loop to vibrate about the fixed parallel parts referred to above.

With the arrangement described, when water under pressure is supplied through the hose 56 the rear loop 70 vibrates in a horizontal direction about a vertical axis and the upper loop 72 vibrates forward and backward about a horizontal axis. The vibrating action of the loops 70 and 72 causes the tail 40 to wag and both the main head portion and the lower bill part 22 to oscillate, simulating a very natural animated effect.

The oscillation of pressure in the loops 70 and 72 and the resultant vibration of parts of the loops occurs continuously, while the flow of water into the supply tube 56 is maintained. At the same time, the repeated opening and closing of the valves 66 and 68 causes the flow of water through the tubing to pulsate, thereby causing the discharging water to apply pulsating forces to the duck. One of these forces acts along the axis of the exhaust fitting and the other along the axis of the supply fitting 52. The exact nature of the resultant action varies somewhat with the positions of the axes of the fittings relative to the center of percussion and the center of gravity of the duck. Generally speaking however, as a result, the duck is propelled forwardly and rocked by intermittently applied forwardly directed and upwardly directed forces.

In practice, the supply tube 56 may be connected by means of a fitting 80 to a faucet 82 and the duck placed in a partially-filled bathtub 84. To restrain the movement of the duck, a weight 88 is attached to the supply tubing 56, thus permitting the duck to make random excursions on the surface of the water within a limited range.

In practice, in the manufacture of the duck the body member 10 is formed of two parts 10a and 10b and the wall member 60 is formed uni-

tary with one of these sections, as indicated in Fig. 4.

A stopper 86 may be arranged in a port 88 near the bottom of the body member to facilitate emptying water from the cavity 15.

From the foregoing disclosure, it is apparent that I have provided a novel improved animated aquatic toy embodying many novel features which are adaptable as well to many kinds of toys other than the specific toy herein illustrated and described. Thus, the feature of animating the head and tail may be applied to the animation of other relatively movable body elements of a toy animal. Likewise, the hydraulically-operated motor may be applied either to actuate other moving parts or to propel other kinds of aquatic toys. It will, therefore, be understood that my invention is not limited to the specific embodiment thereof illustrated and described herein but that it may be applied to other kinds of devices. It will also be obvious that my invention is not limited to the specific embodiment illustrated and described herein but is capable of a variety of mechanical embodiments. Various changes which will now suggest themselves to those skilled in the art may be made in the material, form, details of construction, and arrangement of the elements without departing from the principles of my invention. Reference is therefore to be had to the appended claims to ascertain the scope of the invention.

I claim:

1. In an animated toy constructed to float upon water, a hollow body member having a body cavity therein and having a tail portion and a neck portion above the waterline thereof, said body cavity having an outlet at the rear portion thereof below the waterline thereof, a tail member secured to a first movable rigid member extending through the tail portion into said body cavity, a hollow head portion movably supported upon said neck portion and having a head cavity, a head member secured to a second movable rigid member extending into said head cavity, a flexible tubular member mounted within said body cavity, one end of said tubular member being connected to said outlet, movable portions of said tubular member being operatively engageable with said two rigid members, means for connecting a supply of water under pressure to the other end of said flexible tubular member, and means for causing the flow of water through said tubular member to pulsate whereby said movable portions of said tubular member vibrates, thereby oscillating said head portion, said head member, and said tail member.

2. In an animated toy constructed to float upon water, a hollow body member having a body cavity therein and having a tail portion and a neck portion above the waterline thereof, said body cavity having an outlet at the rear portion thereof below the waterline thereof, a tail member secured to a first movable rigid member extending through the tail portion into said body cavity, a hollow head portion movably supported upon said neck portion and having a head cavity, a head member secured to a second movable rigid member extending into said head cavity, a flexible tubular member mounted within said body cavity, one end of said tubular member being connected to said outlet, movable portions of said tubular member being operatively engageable with said two rigid members, means for connecting a supply of water under pressure

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to the other end of said flexible tubular member, and means for resiliently constricting said movable portions of said tubular member whereby the opening in the constrictions thereof decrease when the pressure on the upstream sides thereof is reduced and enlarge when such pressure is increased thereby producing a pulsating forward thrust on said body member and oscillating said head portion, said head member, and said tail member.

3. In an animated toy constructed to float upon water, a hollow body member having a body cavity therein and having a tail portion and a neck portion above the waterline thereof, said body cavity having an outlet at the rear portion thereof below the waterline thereof, a tail member secured to a first movable rigid member extending through the tail portion into said body cavity, a hollow head portion movably supported upon said neck portion and having a head cavity, a flexible tubular member mounted within said body cavity, one end of said tubular member being connected to said outlet, means for supporting two parts of said tubular member in a substantially parallel arrangement whereby a constricted loop is formed therein in a position where it is operatively engageable with said first rigid member, means for supporting two parts of said tubular member in a substantially parallel arrangement whereby a constricted loop is formed therein in a position where it is operatively engageable with said second rigid member, and means for connecting a supply of water under pressure to the other end of said flexible tubular member.

4. In a toy constructed to float upon water, a hollow member having a cavity therein, an external member secured to a movable rigid member extending through the wall of said hollow member into said cavity, a flexible tubular member mounted within said cavity, a movable portion of said tubular member being operatively engageable with said rigid member, means for connecting a supply of water under pressure to the other end of said flexible tubular member, and means for causing the flow of water through said tubular member to pulsate whereby said movable portion vibrates thereby oscillating said external member.

5. In a toy constructed to float upon water, a hollow member having a cavity therein, an external member secured to a movable rigid member extending through the wall of the hollow member into said cavity, a flexible tubular member mounted within said cavity, one end of said tubular member being connected to said outlet, a portion of said tubular member being operatively engageable with said rigid member, means for connecting a supply of water under pressure to the other end of said flexible tubular member and for flowing water through said tubular member, and means for resiliently constricting said portion of said tubular member whereby the opening in the constriction therein decreases when the pressure on the upstream side thereof is reduced and enlarges when such pressure is increased thereby oscillating said external member.

6. In a toy constructed to float upon water, a hollow member having a cavity therein, an external member secured to a movable rigid member extending through the wall of said hollow member into said cavity, a flexible tubular member mounted within said cavity, one end of said tubular member being connected to said outlet, 75

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means for supporting two parts of said tubular member in a substantially parallel arrangement whereby a constricted loop is formed therein in a position where it is operatively engageable with said rigid member, and means for connecting a supply of water under pressure to the other end of said flexible tubular member and for flowing water through said tubular member whereby said tubular member vibrates thereby oscillating said external member.

7. In a hydraulically-operated toy, the combination of: a hollow body member having an outlet, a flexible tubular member supported on said body member and having one end thereof leading to said outlet whereby water discharged from said tubular member through said outlet propels said toy in the opposite direction, means for connecting a supply of water under pressure to the other end of said tubular member, and a hydraulically-actuated valving means arranged between the ends of said tubular member, the opening in said valving means decreasing when pressure is reduced on the upstream side thereof and enlarging when such pressure is increased.

8. In a hydraulically-operated toy, the combination of: a hollow body member having an outlet, a flexible tubular member supported on said body member and having one end thereof leading to said outlet whereby water discharged from said tubular member through said outlet propels said toy in the opposite direction, means for resiliently constricting said tubular member between the ends thereof, and means for connecting a supply of water under pressure to the other end of said tubular member whereby the opening in the constriction decreases when the pressure on the upstream side thereof is reduced and enlarges when such pressure is increased, thereby producing a pulsating thrust on said body member.

9. In a hydraulically-operated toy, the combination of: a hollow body member having an outlet, a flexible tubular member supported on said body member and having one end thereof leading to said outlet whereby water discharged from said tubular member through said outlets propels said toy in the opposite direction, means for supporting two parts of said tubular member in a substantially parallel arrangement whereby a constricted loop is formed therein, and means for connecting a supply of water under pressure to the other end of said tubular member whereby the opening in the constriction decreases when the pressure on the upstream side thereof is reduced and enlarges when such pressure is increased, thereby producing a pulsating thrust on said body member.

10. In a hydraulically-operated toy, the combination of: a body member having an outlet, a flexible tubular member supported on said body member and having one end thereof leading to said outlet, means for connecting a supply of water under pressure to the other end of said tubular member, and means for resiliently constricting a portion of said tubular member whereby said constricted portion closes when the pressure on the upstream side thereof is reduced and opens when such pressure is increased thereby producing a pulsating flow of liquid through said member.

11. In a hydraulically-operated toy, the combination of: a body member having an outlet, a flexible tubular member supported on said body member, and having one end thereof leading to said outlet, means for connecting a supply of

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water under pressure to the other end of said tubular member, and means for supporting two parts of said tubular member in a substantially parallel arrangement whereby a constricted loop is formed therein, the constriction thereof decreasing when the pressure on the upstream side thereof is reduced and enlarging when such pressure is increased thereby causing a pulsating flow of liquid through said member.

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