

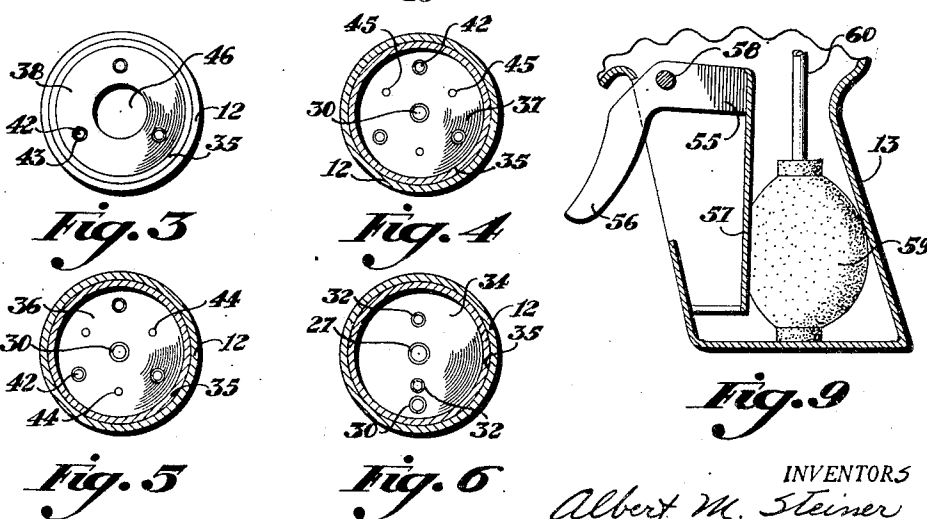
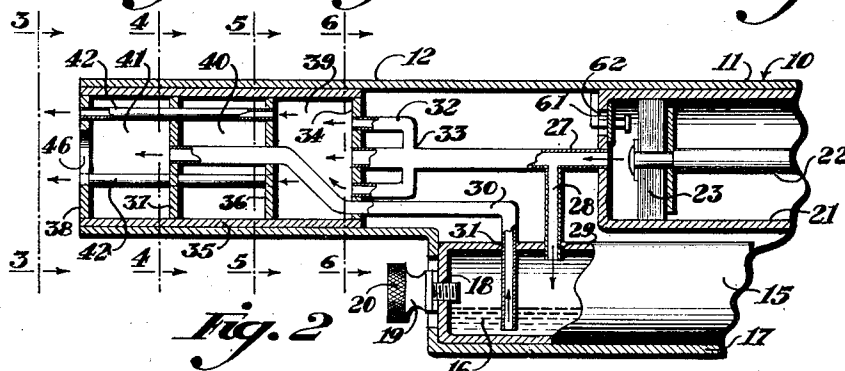
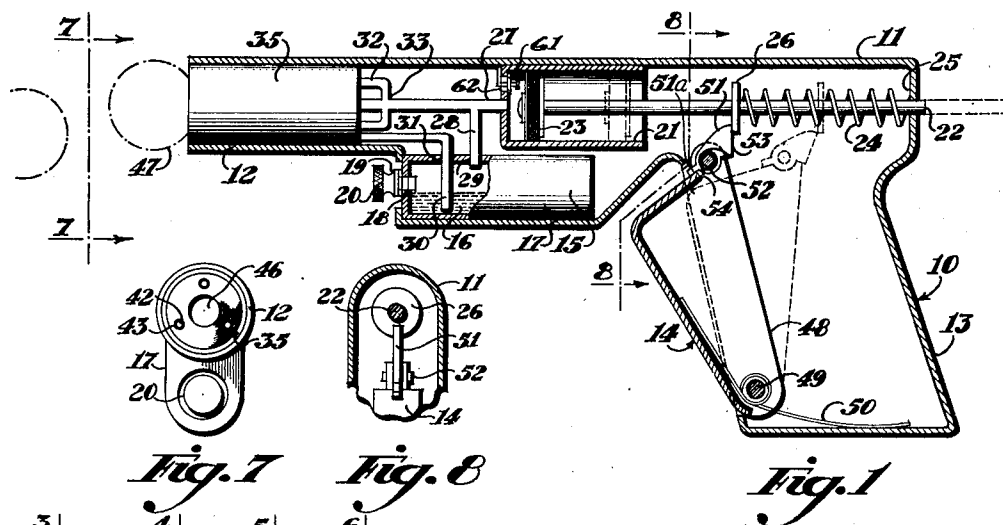
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BUBBLE FORMING AND PROPELLING DEVICE

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BUBBLE FORMING AND PROPELLING
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This invention relates to toys or novelties and is particularly concerned with a device for forming and propelling bubbles. In its preferred form the device comprises a propelling structure formed in simulation of an automatic or other type of pistol but it will be apparent from the disclosure that the invention may be adapted to other propelling or expelling instrumentalities such as toy airplanes or toy boats.

The bubbles which the device is adapted to form and propel are those commonly termed soap bubbles although it is not essential that the material used to form the bubbles be saponaceous within a strict definition of this term. As is commonly known there are many materials available at the present time including, by way of example, sulphonated alcohol preparations, alkyl, aryl sulphonates, or similar components in which the surface tension is sufficiently low to permit the ready formation of bubbles which are superior to those formed from saponaceous materials in that they are substantially easier to form and disrupt less readily.

Briefly stated, the principal concept of the invention is to provide a toy or novelty primarily for the use of children in which bubbles may be formed by mechanical action from bubble forming material disposed within or closely associated with the device and after formation may be propelled outwardly from the device for a reasonably substantial distance and in simulation of projectiles.

Another object, as illustrated in the preferred embodiment disclosed and hereinafter described, is to provide a toy or novelty device configured to resemble an automatic or other type of pistol which is adapted to propel outwardly from the end of the barrel bubbles formed from bubble forming material stored within or closely associated with the device.

Another and important object is to provide a device of the character described in which a single column of air is utilized to form the bubble and to project it outwardly from the device after forming.

Another object is to provide a structure of the type under consideration in which a container for storing the bubble forming fluid is disposed within the interior of the ejecting device but so positioned as to permit ready refilling of the container after the material has been exhausted. Alternatively, the material container may be secured to the ejecting device without being disposed within the interior thereof thereby permit-

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ting a replacement of containers after exhaustion of the material.

Other and further objects and advantages will be apparent from a consideration of the further and more detailed description of the invention when considered in conjunction with the drawings in which:

Figure 1 is a sectional view of a complete embodiment of the invention disclosed in relation to the use of a toy automatic pistol as the bubble forming and propelling element.

Figure 2 is a greatly enlarged sectional view of a portion of Figure 1 with additional portions of the assembly broken away further to illustrate the details of construction and operation.

Figure 3 is an end view in the direction indicated by the line 3—3, Figure 2.

Figure 4 is a sectional view along the line 4—4, Figure 2.

Figure 5 is a sectional view along the line 5—5, Figure 2.

Figure 6 is a sectional view along the line 6—6, Figure 2.

Figure 7 is an end view in the direction indicated by the line 7—7, Figure 1.

Figure 8 is a sectional view along the line 8—8, Figure 1.

Figure 9 is a sectional view of the handle of the device showing a modified form of the invention in which a bulb is used to provide the source of air instead of the plunger illustrated in Figure 1.

Referring again to the drawings for a further and more detailed description of the invention, the automatic pistol device in question is designated generally as 10, Figure 1, and comprises the principal elements of an outer casing 11 configured to form a barrel portion 12 and a handle portion 13. A trigger of relatively conventional form is designated generally as 14.

The container in which the bubble forming material is stored is designated as 15 and the material itself is 16. This container may be positioned as shown on the interior of a portion of the casing 17 which depends from the underside of the barrel. An end aperture 18 in the container is adapted to be closed by the stopper 19 which is integrally connected to the knurled screw head 20 which extends on the exterior of the casing thereby permitting ready removal of the stopper for refilling the container with the bubble forming material. Although this modification is not illustrated it will be apparent that the container may be disposed on the exterior of the barrel and detachably secured thereto by clips or the like

without in any way affecting the operation of the structure.

A plunger casing designated as 21 may be disposed adjacent the upper surface of the barrel portion of the casing and secured thereto. A plunger rod 22 having a plunger head 23 formed on the end thereof is adapted to be inserted in the plunger casing and to be disposed substantially centrally in the barrel portion 12 of the pistol. The movement of this rod 22 forward in the casing 21 provides the supply of air utilized in the operation of the device in the manner which will be hereinafter described. The plunger rod 22 extends rearwardly and through an opening in the rear end of the casing. A compression spring 24 is positioned on the rear portion of the plunger rod with its ends abutting the inner surface of the casing as at 25 and the plate 26 which is secured to the rod and made integral therewith. Accordingly, as the plunger rod is forced rearwardly by the trigger action a portion of the rod protrudes from the rear end of the casing as the spring compresses to provide the impetus required for the forward stroke. A valve head element 61 may be loosely mounted in a port 62 in the front wall of the plunger casing 21. As the plunger head moves rearwardly the valve head 61 is moved rearwardly also because of the vacuum created in the plunger head. This opens the port 62 and permits the drawing of air into the plunger chamber from the barrel and from the outside through crevices in the casing which is not intended to be air tight. The forward movement of the plunger head compresses the air in the cylinder thereby seating the valve head 61.

Extending forwardly from the front end of the plunger casing 21 is a tube 27 through which passes the major portion of the air started in motion by the plunger action. Directly forwardly of the front end of the plunger a branch tube 28 extends downwardly from the main tube 27 and through the aperture 29 into the interior of the material container 15, terminating at a point above the ordinary level of the material 16. A second tube 30 also enters the material container 15 through the aperture 31 and has its extended end normally below the surface of the material 16. As shown in Figure 2, this tube 30 then extends forwardly into a cylinder element 35 and terminates at the plate 37.

Lateral air diffusing passageways 32 branch from the tube 27 at the point 33. These lateral passageways are preferably two in number and preferably are spaced approximately regularly around the periphery of the barrel terminating at the forward edge 34 of the cylinder element 35 which is securely positioned within the interior of the barrel 12 extending rearwardly from the front edge thereof.

Disposed within the interior of the cylinder element 35 are circular plates numbered 36, 37 and 38, respectively, the latter forming the front face of the barrel. These plates are best shown in Figures 5, 4 and 3, respectively, and define chambers 39, 40 and 41 within the interior of the barrel. The chambers are preferably of approximately the same size and contour.

A plurality of tubes 42 extend forwardly from the plate 36 to the plate 38 and have apertures 43 on the exterior of the latter plate as shown in Figure 3. A plurality of additional apertures 44 are formed in the plate 36 and additional apertures 45 are formed in the plate 37. The principal outlet aperture in the forward plate 38 has been designated 46 and the bubble which is formed at

this point, as best illustrated in Figure 1, has been designated 47.

Referring again to the construction of the trigger element 14, this element comprises the trigger plate 48 which is pivotally secured to the handle portion 13 of the pistol by the pin 49. A spring 50 encircles the pin 49 and has its ends disposed closely adjacent to the interior surface of the trigger and the base of the handle as clearly illustrated in Figure 1. At the upper edge of the trigger plate a pawl 51 is pivotally secured to the plate by the pin 52 and has a surface 53 thereof for engaging the plate 26 pinned to the plunger shaft 22. The pawl 51 has a finger 51a which is normally maintained in contact with the top of the trigger member 14 by means of a spring 54 which tends to rotate said pawl in a counterclockwise direction (as seen in Figure 1). The plunger spring 24 forces the plate 26 against the plate-engaging surface 53 while the piston is in the rearward movement and while the trigger is in the inoperative position. As the trigger is squeezed, the pawl 53 forces the shaft rearwardly until the pawl and trigger assembly reach the position shown by the dotted line in Figure 1. At this point the pawl slips the engagement with the collar 26 and the spring 24 drives the piston forward, the collar 26 passing over the top surface of the pawl. When the trigger is released, the trigger spring 50 drives the trigger forward thereby returning it to the cocked position. The front surface of the pawl strikes the collar 26 as the trigger moves forward. The pawl then pivots clockwise, compressing the spring 54, and slips past the collar 26. When the pawl has passed the collar, the compressed spring rotates the pawl 51 in a counterclockwise manner until the rotation of the pawl is stopped by the contact of the pawl finger 51a with the trigger element 14.

In the operation of the device, as the plunger head 23 moves forwardly through the action of the spring 24 a quantity of air is forced into the tube 27 through the opening in the front face of the plunger chamber. A portion of this air is directed downwardly through the tube 28 into the interior of the material container 15. This air forces bubble forming material upwardly through the tube 30 until it eventually enters the ejector chamber 41. In the course of this operation the material foams and bubbles to a certain extent so that by the time it reaches the ejector chamber 41 it is not strictly in liquid condition.

The main portion of the air directed forwardly through the tube 27 enters the branch tubes 32 and thence to the chamber 39. In this chamber the air is further dispersed between the tubes 42 and the apertures 44. The air passing into the chamber 40 through the apertures 44 eventually enters the chamber 41 through the apertures 45 while the air which enters the tubes 42 passes directly out of the forward end of the barrel through the apertures 43 and is utilized to propel the bubbles after they have been formed.

The bubbles are formed in the ejector chamber 41 through action of the air entering this chamber through the apertures 45 on the bubble forming material which has previously entered the chamber through the tube 30. As previously stated, this material has already become foamy and bubbly in its passage through the tube 30 so that a great quantity of air is not required to form the completed bubbles.

As the air engages the bubble mass a bubble is formed at the principal opening 46 in the end of the barrel. As soon as this bubble becomes of

sufficient size its outer edges are engaged by the streams of air passing outwardly through the apertures 42 and these streams of air detach the bubble from the end of the barrel and project it forwardly for an appreciable distance. As compression of the trigger is continuously repeated more air will be supplied forwardly through the tube 27 and a continuous stream of bubbles will be expelled from the end of the barrel.

In the modified form of the invention shown in Figure 9 the trigger plate 55 has a conventional trigger element 56 depending therefrom. The trigger plate 55 may be pivotally secured to the handle casing as at 53. The rearward surface 57 of the trigger plate when pressed rearwardly engages a bulb 59 disposed in the base of the handle and compresses the bulb to supply air outwardly through the tube 60. This tube 60 may form an extension of or be continuous with the tube 27 as shown in the principal form of the invention and the operation of the device is otherwise identical.

It will be apparent that a very unique and attractive operation is accomplished through the continued manipulation of the trigger element in either form of the invention in that a continuous and steady stream of bubbles are formed and propelled outwardly through the single and simple mechanical action of the elements as herein described.

Obviously, many changes and departures may be made from the exact construction of the preferred embodiment and modification without departing from the scope and intent of the invention as set out in the ensuing claims.

Having described our invention, we claim:

1. A novelty device for forming and propelling bubbles, comprising a reservoir for holding bubble forming material, an ejector chamber having an aperture therein, said reservoir and chamber being interconnected, means for directing a column of air into the reservoir to expel the material therefrom into the ejector chamber, means for directing another portion of the same column of air against the material in the ejector chamber for forming bubbles at the aperture therein, and means including a plurality of tubes constituting air passageways and extending through said ejector chamber for directing a third portion of the column of air at a plurality of points adjacent said aperture against the bubbles so formed for propelling them away from the chamber.

2. A device for forming and propelling bubbles, comprising a reservoir for holding bubble forming material, an ejector chamber having a plurality of outlet apertures, said reservoir and chamber being interconnected, means for directing a column of air against the bubble forming material in the ejector chamber for forming bubbles at one of said outlet apertures, and means for splitting said column of air to direct a portion thereof against the material in the reservoir to force it into the ejector chamber and another portion thereof to the outlet apertures other than the one at which the bubbles are formed, said last named air column functioning to propel the bubbles away from the aperture at which they are formed.

3. A device for forming and propelling bubbles, comprising a reservoir for holding bubble forming material, an ejector chamber having a plurality of outlet apertures, said reservoir and chamber being interconnected, means for directing a first column of air into the reservoir and simultaneously a second column of air into the ejector chamber for forcing bubble forming material from the reservoir into the chamber and for forming bubbles at one of said outlet apertures and a plate interposed in front of said second air column, said plate having apertures therein, tubes leading from certain of said apertures to the outlet apertures in the ejector chamber other than the one at which the bubbles are formed, whereby air passing through said tubes functions to propel the bubbles away from the aperture at which they are formed.

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