Feb. 1, 1955 C. ARLISS 2,700,845

TOY BUBBLE GUN

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FIG. 1

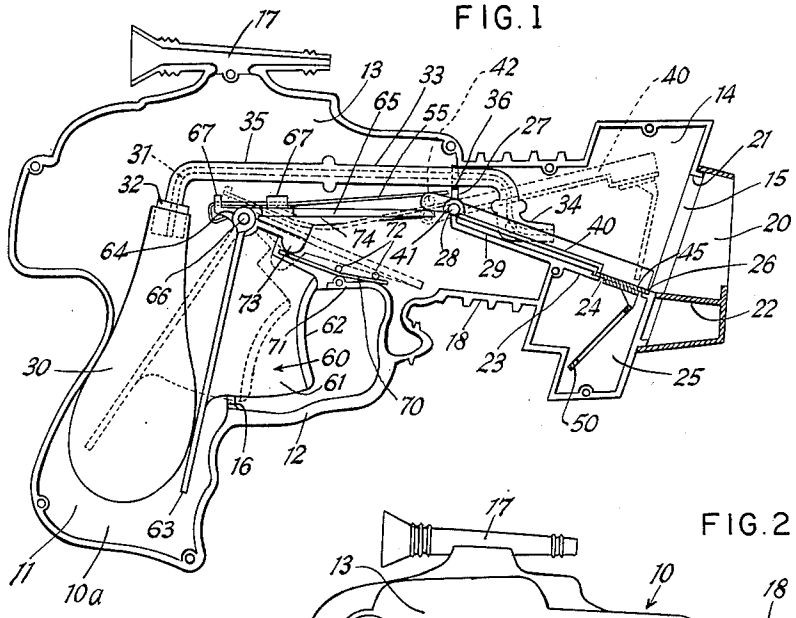
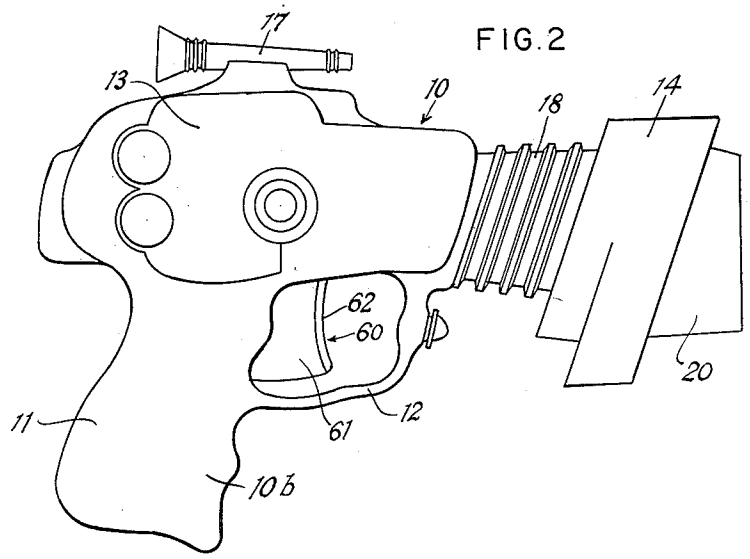


FIG. 2



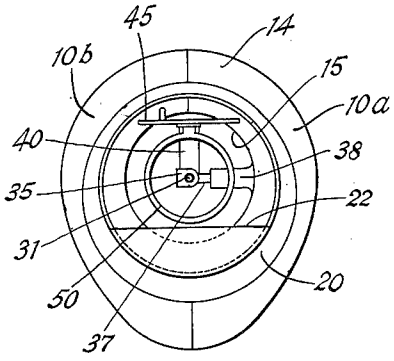


FIG. 3

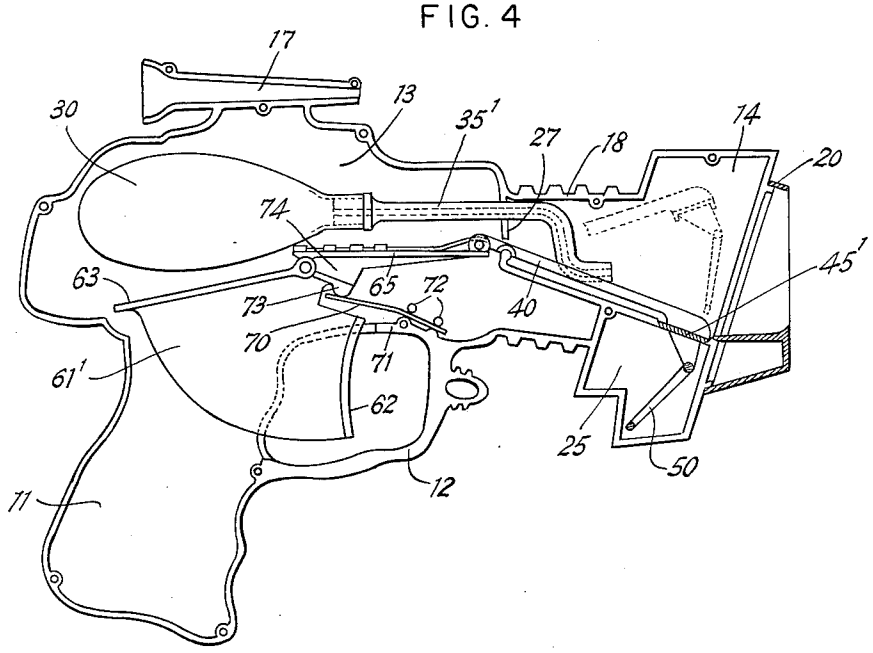
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FIG. 4



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TOY BUBBLE GUN

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Application February 10, 1954, Serial No. 409,297

10 Claims. (Cl. 46—8)

This invention relates to toy guns and, more particularly, to an improved and simplified toy gun for discharging bubbles responsive to actuation of a trigger.

Various arrangements and devices have been proposed for mechanically forming and discharging bubbles, formed from soap films, for example, and some of these devices have taken the form of toy guns. As essentials, such devices include means for forming a film of bubble forming solution across an aperture and means for directing an air stream against such film to form and dislodge the bubble. The film is usually formed by dipping a ring or other apertured member into a reservoir containing the film solution and then positioning the ring in the path of an air stream.

Such devices as hitherto proposed have been characterized by complex constructions and cumbersome operation. Generally, formation and discharge of the bubble has required conjoint manipulation of two or more controls. While a few devices have been operated by a single control, the mechanism has been relatively complicated and liable to derangement, particularly when operated by a child. The arrangements for holding the film solution have been inefficient and unsatisfactory, resulting in solution loss due to leakage, and the operating parts have been difficult to properly assemble. This latter factor increases the cost of the device.

In view of the foregoing, the present invention is directed to a novel, simplified, and rugged trigger-operated bubble gun, in which the film solution reservoir is sealed except when a bubble is actually being formed and discharged. A simplified trigger arrangement is provided for conjointly withdrawing an apertured member out of the reservoir and operating an air forcing means to discharge an air stream against the film on such member, the member preferably being so withdrawn slightly in advance of operation of the air forcing means.

A feature of the invention is the formation of the several operating parts as individual units arranged to be operatively associated upon assembly of the units in proper position in the gun casing. Thus, the air forcing means preferably comprises a resiliently collapsible bulb having a rigid conduit secured to its open end and serving as a positioning support for the bulb to position the same for operative association with the trigger.

The casing, which is formed of two mating halves, has a muzzle discharge opening beneath which is a reservoir for the film forming solution. This reservoir has an opening in its top wall arranged to be normally closed by a cover on the outer end of a lever pivoted intermediate its ends in the casing. The outer end of this lever also has rigidly secured thereto, or integral therewith, an apertured member or ring which is dipped in the reservoir when the cover is closed. The lever unit is constructed for easy mounting in the casing and serves to properly orient the cover with the reservoir and the apertured member with the reservoir and with the aforementioned conduit and the muzzle aperture.

The trigger, and its operating means for the bulb and the lever, also form a separate unit. When this unit is positioned in the casing, a pressure surface on the trigger is automatically positioned adjacent the bulb, and a forked arm means on the lever is automatically positioned in operative relation to the inner end of the lever. Preferably the three mentioned units are all assembled in one half of the casing, after which the second half of the casing is easily assembled to the first half, a "flash suppressor" being secured to the muzzle ends of the two halves.

For an understanding of the invention principles, reference is made to the following description of a typical embodiment thereof as illustrated in the accompanying drawings.

In the drawings:

Fig. 1 is an elevation view of the invention bubble gun, with one casing section removed;

Fig. 2 is an outside elevation view of the invention bubble gun;

Fig. 3 is an end elevation view looking at the muzzle end of the gun shown in Figs. 1 and 2; and

Fig. 4 is an elevation view, similar to Fig. 1, illustrating another embodiment of the invention gun.

Referring to Figs. 1, 2 and 3, the invention gun includes an outer casing **10** having the general form of a "ray gun" or "atomic pistol" such as popularized in "space" stories and pictures. The casing is preferably molded from a suitable composition material, and comprises mating halves **10***a* and **10***b* provided with the usual mating pins and holes for assembly. Only section **10***a* will be described in some detail.

The casing **10** includes a handle **11**, a trigger guard **12**, a chamber **13**, and a muzzle **14** having a discharge opening **15** therein. Handle **11** is formed with a trigger slot **16** in its inner surface, and a "sight" **17** may be formed on the upper edge of the casing. A barrel **18** joins chamber **13** to muzzle **14**. The aperture **15** is surrounded by a flange **21** and, after the two casing halves **10***a* and **10***b* are engaged in assembly, a "flash suppressor" **20**, in the form of an angularly truncated cone is slipped over this ring.

Cone **20** is formed with an inner wall **22** which is substantially a continuation of the top wall **23** of a reservoir **25** formed in the muzzle portion of the casing and disposed beneath aperture **15**. Reservoir top wall **23** has an opening **24** therein, which is preferably rectangular and formed with a recessed periphery as indicated at **26**.

Air for forming and discharging bubbles is provided by trigger-operated air forcing means including a resiliently collapsible bulb **30** having a relatively rigid conduit **35** secured to the open end of bulb **30**. Conduit **35** has a passage **31** formed therethrough and includes an enlargement **32** secured in the neck of bulb **30**, a main section **33**, and an offset discharge end **34** aligned centrally of aperture **15** and terminating inwardly of muzzle section **14**. Main conduit section **33** seats in a conforming recess **36** in a partition **27** in casing section **10A**, and the conduit may have projecting locating pins **37** fitting in sockets **38** in section **10A**. The rigidly positioned conduit **35**, which may be formed of a suitable plastic composition material, serves to locate and retain bulb **30** in operative relation to the trigger of the gun. In Figs. 1, 2 and 3, bulb **30** is located in handle **11**.

Partition **27** also serves to locate a lever **40** carrying a cover **45**, for the opening **24** in reservoir **25**, and a film forming apertured member or ring **50**. For this purpose, the end of partition **27** is somewhat spaced from a transversely extending pin **28** integral with a partition **29**, the major part of which is a coplanar extension of wall **23**. Near its inner end, lever **40** is formed with a transversely extending U-shaped pivot **41** which slips over pin **28** and is held from lateral displacement from the latter by partition **29**. The inner end of lever **40** has integral therewith a laterally projecting pin **42**, for a purpose to be described. Cover **45** is integral with the outer end of lever **40**, and ring **50** is integral with and projects downwardly from cover **45**. In the inoperative position of the parts, cover **45** closes opening **24** and member **50** is disposed in reservoir **25**, with lever **40** lying against partition **29**.

The lever **40** and bulb **30** are conjointly operated by a trigger **60**. This trigger includes a plate **61** projecting outwardly through slot **16** and having a rib **62** along its outer edge. The inner edge of plate **61** carries a pressure plate **63** arranged, when the trigger is operated, to compress bulb **30** against the rear surface of handle **11** to force air through conduit **35**. A bearing **64** at the upper inner corner of the trigger slips over a pivot pin **66** formed on casing section **10***a*.

An arm **65** is integral with plate **61** and extends from bearing or trunnion **64** toward barrel **18**. The forward

end of arm **65** underlies the pin **42** on the inner end of lever **40**. The upper surface of arm **65** is formed with guides **67** receiving and retaining a flat spring **55** whose free forward end overlies the pin **42**. Spring **55** is so bent that, in the position of the parts shown in Fig. 1, the spring end is spaced slightly from pin **42**. Spring **55** and arm **65** form a fork arm means interconnecting trigger **60** and lever **40**.

The trigger **60** is biased outwardly to the inoperative or "ready" position by a flat spring **70**. This spring is set edgewise between a partition **71**, forming part of the trigger guard **12**, and a pair of pins **72** adjacent this partition. The free end of spring **70** underlies an abutment **73** formed on a web **74** extending from arm **65**. The spring **70** biases trigger **60** counterclockwise, the limit to such movement being set by cover **45** seating in opening **24**.

To assemble the gun, conduit **35** may be set into position in section **10***a*, positioning bulb **30** in handle **11**. Then lever **40** may be positioned by sliding bearing or trunnion **41** over pin **28** and under the edge of partition or wall **27**. Bearing **64** of trigger **60** is then fitted onto pin **66**, with arm **65** and spring **55** disposed on either side of pin **42** on lever **40**. Section **10***b* is then assembled to section **10***a* and "flash suppressor" **20** is slipped over flange **21**, the two casing sections and member **20** being suitably sealed to each other.

To operate the gun, trigger **60** is pulled, swinging lever **40** counter-clockwise to draw member **50** out of reservoir **25**, the member **50** carrying a film of solution across its aperture. The operation of trigger **60** also compresses bulb **30** to force air through conduit **35**. The stream of air forces the film off member **50** to form a bubble which is ejected through aperture **15** and "flash suppressor" **20**.

Fig. 4 shows a modification of the gun in which bulb **30** is disposed in chamber **13**. Identical parts have identical reference characters, and corresponding parts have the same reference character primed. In this embodiment conduit **35'** is rectilinear except for its offset discharge end. To operate bulb **30**, trigger plate **61'** is extended substantially so that pressure plate **63** is adjacent the relocated bulb **30**. Cover **45'** has a bevelled edge, and the periphery of opening **24'** is correspondingly bevelled.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A toy gun comprising, in combination, a gun-shaped casing, formed of a pair of mating half sections having correspondingly located interengageable positioning means on their mating surfaces, said sections cooperatively forming a muzzle discharge aperture, and a reservoir below the aperture and inwardly thereof with a top wall having an opening therein, the reservoir being adapted to hold a bubble forming solution; one of said sections having formed therein element locating support means and a pair of longitudinally spaced pivot means; air forcing means mounted in said support means in said one section and having a discharge passage aligned by said support means with said aperture to direct a stream of air therethrough; a lever pivotally mounted intermediate its ends on the forward pivot means in said one section; an apertured member on the outer end of said lever movable by said lever through the reservoir opening between the reservoir and a position intermediate said aperture and the end of said discharge passage to carry a film of the solution across the air stream; a trigger pivotally mounted intermediate its ends on the other pivot means in said one section, and operatively engageable with said air forcing means to discharge air therefrom through said aperture upon operation of said trigger; said trigger including an arm rigid therewith extending from said other pivot means into overlapping relation with one surface of the inner end of said lever; resilient means on said arm overlapping the other surface of the inner end of said lever to bias said inner end into engagement with said arm to swing said apertured member, upon operation of said trigger, from said reservoir across the air stream in coordination with operation of said air forcing means by said trigger to form a bubble and discharge it through said aperture; and a cover for said opening secured to said lever; all of the operating elements of the gun being supported in said one section.

2. A toy gun as claimed in claim 1 in which the reservoir opening has a recessed periphery receiving said cover.

3. A toy gun as claimed in claim 1 in which said cover is integral with said lever and said member is integral with and extends from said cover.

4. A toy gun as claimed in claim 1 in which said air forcing means comprises a resiliently collapsible bulb in the path of movement of said trigger and a relatively rigid conduit extending from the bulb opening toward said aperture; said one casing section having a transverse partition recessed at its outer end to receive said conduit and having positioning means spaced from said partition engageable with positioning means on said conduit; said conduit forming the sole support for said bulb to maintain said bulb in predetermined relation to said trigger.

5. A toy gun as claimed in claim 4 in which the pivot of said lever comprises a U-shaped lateral extension of the lever, and the forward pivot means comprises a pin in said one casing section spaced from an end of said partition to engage in said U-shaped extension with the partition end overlying said extension.

6. A toy gun as claimed in claim 4 in which said bulb is disposed in the gun above the handle thereof.

7. A toy gun as claimed in claim 1 in which said resilient means comprises a leaf spring secured to said arm and having a free end extending along such other surface of the inner end of said lever.

8. A toy gun as claimed in claim 7 in which the inner end of said lever has a lateral extension, and said arm and the free end of said spring extend over opposite sides of said lateral extension.

9. A toy gun as claimed in claim 1 in which said air forcing means comprises a resiliently collapsible bulb in the path of movement of said trigger and a relatively rigid conduit extending from the bulb opening toward said aperture; said conduit being fixedly positioned in said one casing section and supporting said bulb in predetermined relation to said trigger; said trigger initiating compression of said bulb subsequent to movement of said member to such position.

10. A toy gun as claimed in claim 1 including a leaf spring mounted between support means in said one casing section and having a free end engaging the trigger arm to bias the trigger to the inoperative position.

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