

No. 642,892.

Patented Feb. 6, 1900.

S. B. BLISS.
SOAP BUBBLE BLOWER.

(Application filed Aug. 17, 1899.)

(No Model.)

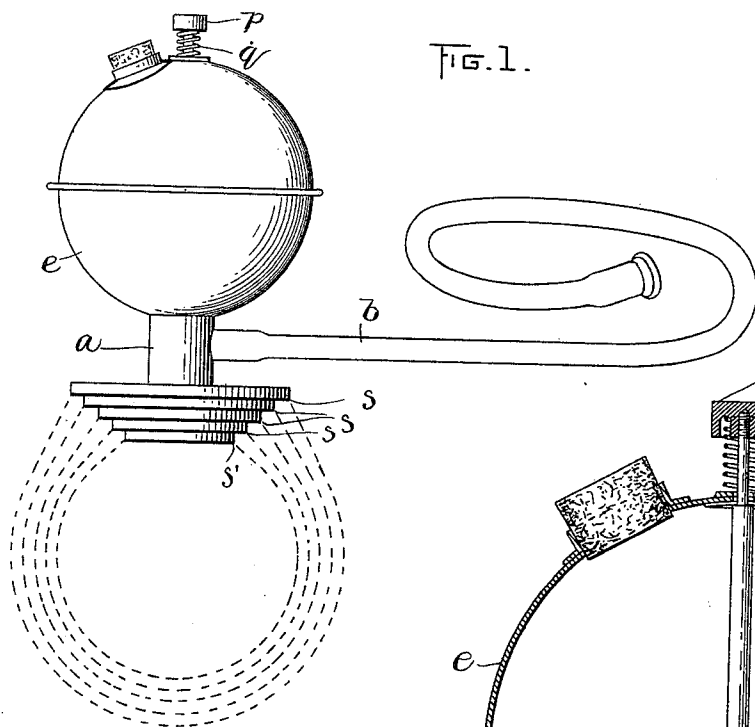


FIG. 1.

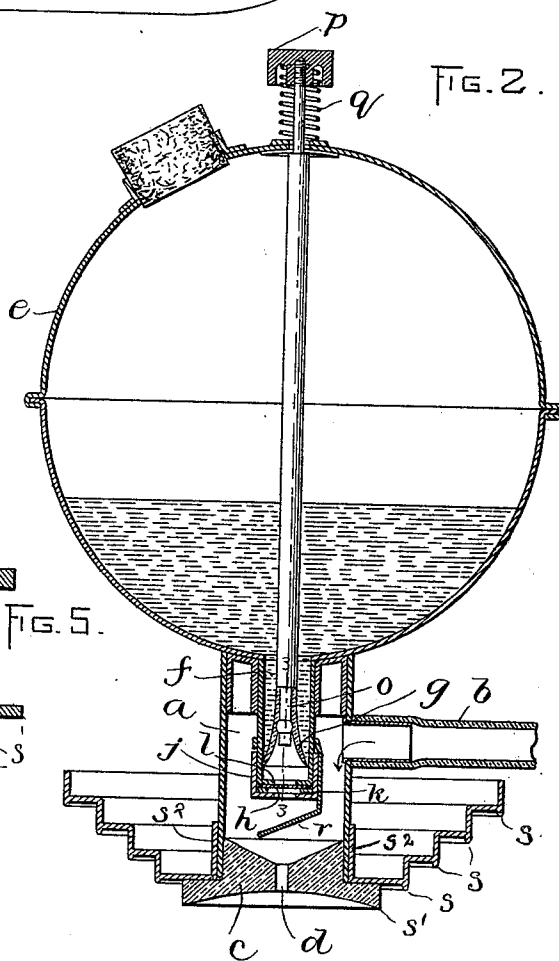


FIG. 2.

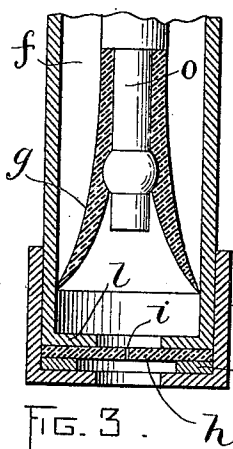


FIG. 3.

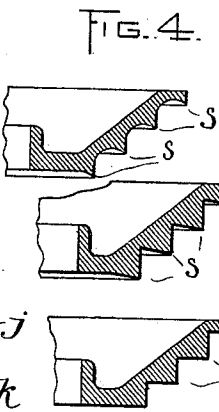


FIG. 4.

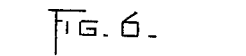


FIG. 5.

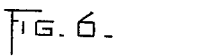


FIG. 6.

WITNESSES:

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UNITED STATES PATENT OFFICE.

SAMUEL BLAKE BLISS, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO CHARLES E. WOODRUFF, OF JOLIET, ILLINOIS.

SOAP-BUBBLE BLOWER.

SPECIFICATION forming part of Letters Patent No. 642,892, dated February 6, 1900.

Application filed August 17, 1899. Serial No. 727,515. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL BLAKE BLISS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Soap-Bubble Blowers, of which the following is a specification.

This invention has for its object to provide an improved soap-bubble blower adapted to be readily controlled by the operator, so that bubbles can be blown more satisfactorily than heretofore and with a greater range of ornamental effect.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a bubble-blower embodying my invention. Fig. 2 represents a sectional view of the same on a larger scale. Fig. 3 represents a section on line 3 3 of Fig. 2, further enlarged. Figs. 4, 5, and 6 represent views of modifications.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents an air-chamber, with which is connected an air-supply tube *b*, preferably flexible and adapted to conduct air to the chamber *a* from the mouth of the operator. The chamber *a* is or may be made of sheet metal and has a bottom piece *c*, having a contracted bubble-outlet *d* at its central portion, the bottom piece *c* and outlet *d* being of any suitable form which will cause the formation of a bubble below the outlet when a suitable liquid or solution and air are forced conjointly into the chamber *a*.

e represents a liquid-reservoir adapted to hold a solution of soap, said reservoir having an outlet which communicates with the air-chamber, so that liquid can be forced from the reservoir into the chamber.

My invention includes a pump or device for positively forcing liquid from the reservoir into the air-chamber in any quantity that may be desired by the operator, the pump enabling the supply of liquid furnished to be graduated or varied at will. As here shown, the pump comprises a barrel *f*, which is preferably cylindrical, and a piston or plunger *g*,

movable in said barrel. The upper end of the barrel opens into the reservoir *e*, and its lower end is provided with a valve adapted to be opened by pressure of the liquid in the barrel when the piston is descending and to close to prevent the entrance of air into the barrel through the liquid-outlet when the piston is rising. Said valve is preferably a flexible diaphragm *h*, extending across the lower end of the barrel and provided with a minute perforation *i*. The diaphragm may be secured to the barrel in any suitably way, such as by a cap *j* and a metal washer *k*, which hold the diaphragm against a seat or face, such as an inwardly-projecting lip or flange *l* on the lower end of the barrel. The diaphragm is distended by the pressure of the liquid against it when the piston is descending, the orifice *i* being thus enlarged sufficiently to permit a small stream of liquid to be forced from the barrel. When the piston rises, the diaphragm contracts and closes the orifice *i* sufficiently to prevent the passage of air therethrough, the piston being constructed so that in rising it will permit liquid to pass between it and the barrel, so that the space below the piston is filled with liquid and the outer side of the diaphragm is not subjected to sufficient atmospheric pressure to open the orifice *i*.

The piston is preferably conical in form and made of rubber, leather, or other flexible material, its larger end fitting the interior of the barrel and being thin and flexible, so that when the piston is rising said edge will readily yield sufficiently to permit liquid to fill the space below the piston, the conical form of the piston causing said edge to be held closely against the barrel when the piston is descending, so that the piston is operative to eject the liquid below it forcibly through the orifice *i*.

The piston is attached to a rod *o*, which extends through the liquid-reservoir *e* and projects from one side thereof, its projecting end having a push-piece *p*, by which the operator can depress the piston. A spring *q*, interposed between the push-piece and the reservoir *e*, normally raises the piston.

It will be seen that the operator by varying the extent of depression of the piston can

vary the quantity of liquid discharged into the air-chamber, and thus vary the performance of the device, by varying the supply of bubble-forming material. For example, by a very slight depression of the piston a minute quantity of liquid, which is less than a full drop, can be ejected into the air-chamber. I have found that by supplying the liquid in very minute charges, each a fractional part of a full drop, I am able to produce very striking and beautiful effects and form bubbles that have sufficient durability to enable them to be grouped into long strings or large clusters. Ordinarily too much liquid is used in blowing bubbles, the bubble being weighted at its bottom and caused to burst prematurely. There have been no means provided heretofore in bubble-blowers to permit the restriction of the supply of liquid to a quantity less than a full drop, and this capability of restricting the supply of liquid enables my device to produce certain desirable effects which cannot be produced when the liquid is supplied in full drops.

I prefer to interpose a deflector or distributor *r* between the liquid-outlet of the liquid-reservoir and the bubble-outlet *d* of the air-chamber for the purpose of distributing the liquid in the air-chamber and preventing it from being squirted through the outlet *d*. Said deflector is here shown as a thin sheet of metal attached to the pump-barrel, although it may be attached to the air-chamber or to any other suitable support and may be made of any other suitable material.

The external surface of the bottom piece *c*, in which the bubble-outlet *d* is formed, is adapted to support a single bubble, and bubbles may be blown therefrom either singly or in a connected chain or in clusters.

To enable a nested series of bubbles to be formed, one or more being contained in another, I provide a series of shoulders *s*, surrounding the bubble-outlet, said shoulders being preferably concentric with each other and with the outlet and connected by intervening bubble-guiding surfaces so formed that the operator while blowing a bubble can by suitably manipulating the device cause the neck of the first bubble to expand and to move outwardly at its line of juncture with its support from one shoulder *s* to another, thus transferring the bubble from shoulder to shoulder, so that another bubble or as many bubbles as there are inclosed shoulders may be blown within it, each bubble depending from one of the shoulders, as indicated by the dotted lines in Fig. 1. In this way it is possible to produce a nest of bubbles containing as many bubbles as there are shoulders, the effect produced by this nest being very beautiful.

The form of the shoulders *s* and of the intervening surfaces may be variously modified. In Fig. 2 I show the shoulders as downwardly-projecting beads separated by intervening faces. In Figs. 5 and 6 modifications

are shown in which there are slight variations of form, but all adapted to produce the same result. A shoulder *s'*, similar to the shoulders *s*, is here shown as formed by the margin of the bottom piece *c*. When it is not desired to use the device for blowing nested bubbles, the series of shoulders *s* may be separated from the bottom piece *c* to prevent the transference of bubbles from said bottom piece to the shoulders *s*. To this end the shoulders *s* may be formed on a collar *s*², which is movable on the air-chamber *a*. When said collar is moved upwardly or away from the bottom piece *c*, no transfer of bubbles from the bottom piece to the shoulders *s* can take place; but this movable collar is not absolutely necessary.

I do not limit myself to the details of construction and arrangement of parts here shown, as the same may be variously modified without departing from the spirit of my invention.

I claim—

1. A bubble-blower comprising an air-chamber having a bubble-outlet and an air-supply tube, a liquid-reservoir having an outlet communicating with the air-chamber, and means for positively forcing liquid through said outlet into the air-chamber said means having provisions for forcing minute charges of liquid into the chamber, substantially as described.

2. A bubble-blower comprising an air-chamber having a bubble-outlet and an air-supply tube, a liquid-reservoir having a pump-barrel the outlet of which communicates with the air-chamber, and a liquid-forcing piston movable in said barrel and having a rod or operating device projecting outside of the reservoir, said piston and rod enabling minute charges of liquid to be supplied to the air-chamber, substantially as described.

3. A bubble-blower comprising an air-chamber having a bubble-outlet and an air-supply tube, and a liquid-reservoir having a force-pump discharging into the air-chamber, said pump having provisions for forcing minute charges of liquid into the chamber, substantially as described.

4. A bubble-blower comprising an air-chamber having a bubble-outlet and an air-supply tube, a liquid-reservoir having a pump-barrel extending from the reservoir to the chamber and having a flexible diaphragm which is perforated to form an outlet adapted to be opened by pressure within the barrel, to permit the escape of liquid, said outlet being automatically closed by the contraction of the diaphragm after the removal of such pressure to prevent the entrance of air into the barrel, and a piston movable in said barrel and adapted to force liquid through said outlet.

5. A bubble-blower comprising an air-chamber having a bubble-outlet and an air-supply tube, a liquid-reservoir having an outlet communicating with the air-chamber, means for

forcing liquid through said outlet into the air-chamber, and a liquid-deflector interposed between the liquid-outlet of the reservoir and the bubble-outlet of the air-chamber, whereby the liquid is distributed in the air-chamber.

5 6. A bubble-blower having a bubble-emitting outlet, an inner bubble-support surrounding said outlet, an outer bubble-support surrounding the inner support, and means for
10 guiding a bubble from the inner to the outer support, whereby a bubble may be formed on the inner support and then transferred to the outer support, leaving the inner support free for the formation of an inner bubble thereon.

15 7. A bubble-blower having a bubble-emitting outlet and a series of shoulders surrounding said outlet, said shoulders being connected by intermediate bubble-guiding surfaces, whereby a nested series of bubbles may be

formed by blowing each bubble through the 20 outlet and transferring all the bubbles excepting the one last formed.

8. A bubble-blower having a bubble-outlet, and a collar surrounding the bubble-outlet; and having provisions for supporting a 25 nested series of bubbles, one of said parts being adjustable relatively to the other, whereby the collar and outlet may be either placed in operative relation to each other to form a nest of bubbles, or separated to prevent the 30 transference of bubbles from the outlet to the collar.

In testimony whereof I have affixed my signature in presence of two witnesses.

SAMUEL BLAKE BLISS.

Witnesses:

C. F. BROWN,

E. BATCHELDER.