(No Model.)

S. H. TACY.

SOAP BUBBLE FOUNTAIN.

No. 548,477. Patented Oct. 22, 1895.

Fig. 1

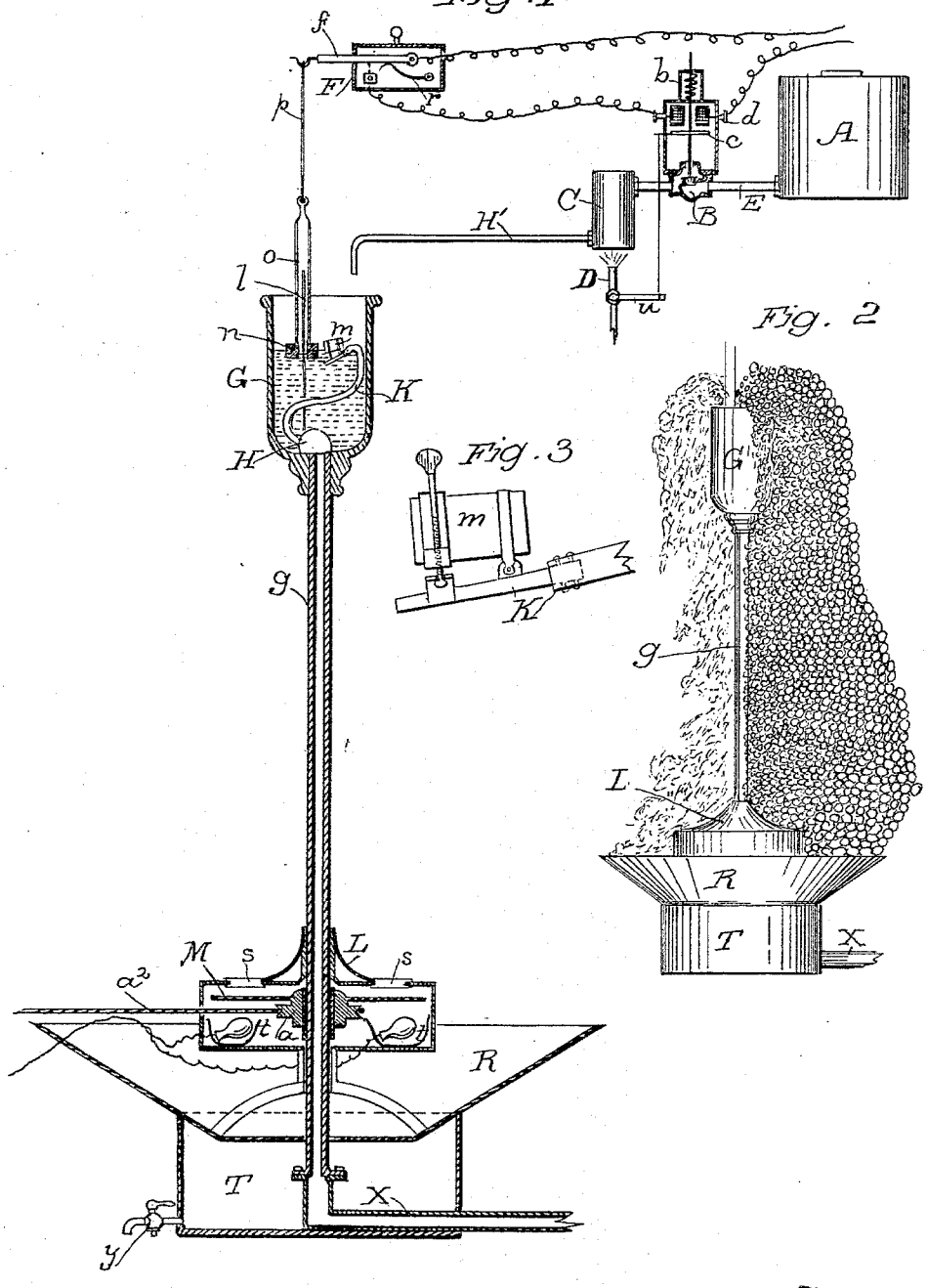

Fig. 2

Fig. 3

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SOAP-BUBBLE FOUNTAIN.

SPECIFICATION forming part of Letters Patent No. 548,477, dated October 22, 1895.

Application filed November 7, 1894. Serial No. 528,156. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL H. TACY, a citizen of the United States, residing in the city and county of New York, State of New York, have invented an Improvement in Soap-Bubble Fountains; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus for the continuous formation of soap-bubbles and a mechanism connected therewith.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of an apparatus designed for the purpose. Fig. 2 is an illustration showing its action. Fig. 3 is an enlarged view of the nozzle-float and adjustment.

The object of my invention is to provide an automatically-regulated apparatus for the continuous production of soap-bubbles, means for keeping up the supply of material as fast as exhausted, means for regulating the position of the nozzle with reference to the quantity of liquid in the bowl or fountain, and also to regulate the size of bubbles produced, and means for illuminating the same.

In the construction of my fountain I employ a bowl or receiver G, which may be made of any suitable material, preferably of glass. It is supported by a tubular column *g*, also preferably of glass, and this is connected at the lower end with a tube X, through which air is admitted and passes up through the tube *g* into the receiver G.

Around the tube X is fixed a waste-tank T, and above this waste-tank is fixed a catch-basin R, which may rest upon the tank T and by means of braces or supports therein assist in supporting and steadying the tube *g*. Above the catch-basin R is a hood L, surrounding the tube *g* and having within it a rotary disk M, provided with differently-colored glass plates at intervals around its circumference for the passage of light from the electric or other lights *t*, which are situated beneath the disk M. The disk M is caused to rotate by means of a pulley *a* turning freely around the vertical tube *g* and carrying the disk with it. A belt a^2 passes from any source of power around the pulley *a* and thus rotates the disk at any desired rate of speed.

Any suitable well-known mechanism may be substituted to produce the rotation of the disk.

The hood L may be transparent, or if made of metal or other opaque substance it may have glass disks *s* in line above the electric lights through which the differently-colored lights from the disk M will be thrown upwardly.

Connected with the upper end of the tube *g* is a flexible or movable tube K, having a check-valve H, through which the air passes into the tube. The upper end of the tube is supported by a float *m* and has a nozzle dipping below the surface of the liquid, which is contained within the reservoir C. The float *m* rises and falls upon the surface of the liquid, so as to retain the nozzle at a constant depth below the surface, and the nozzle is also adjustable with relation to the float, so that it will dip into the liquid to a distance which will produce the best results when in operation.

In order to supply the receiver G with the soap solution from which bubbles are to be made, I employ a reservoir A, situated above the level of the receiver G and adapted to contain a supply sufficent for any desired length of time. From this reservoir a pipe E leads into a smaller intermediate reservoir C, and from this a second pipe H′, of less capacity than the pipe E, discharges into the receiver G.

B is a valve in the pipe E. The stem of the valve is connected with an armature *c*, which is moved by an electromagnet *d* when the latter is energized.

F is a circuit-breaker of any of the usual or ordinary forms of construction, and through this a current of electricity is passed to the electromagnet *d*, so that when the electromagnet is energized the armature *c* will be drawn up and will open the valve at B, thus allowing the solution to flow from the reservoir A into the receiver G. A spring *b*, acting upon the stem of the valve, will close the latter whenever the current of electricity is cut off.

In order to open or close the circuit at F, I have shown a cord *p*, connecting with a lever-arm *f*, which forms one part of the circuit-

breaker, and this has suspended from its lower end a tube or slide *o*, connected with a float *m*, resting upon the surface of the liquid in the receiver G.

l is a vertical rod or guide extending up into the tube *o* through the float *n* and serving to keep these in their proper position as they rise and fall.

Whenever by the operation of the apparatus the supply of the solution in the receiver G falls too low, the float *n*, descending with it, will eventually pull upon the cord *p* and draw the lever *f* down until it makes contact with the other member of the circuit-breaker, when a current of electricity passing through the electromagnet *d* will act to open the valve B, as previously described, and liquid will flow through the pipe, filling the smaller reservoir C, and thence flowing through the pipe H′ into the receiver G until the liquid therein is raised to near the proper point, when the float *n*, rising, will release the lever-arm *f*, and by means of a spring *r* the lever-arm *f* will be thrown up and the circuit will be broken. The valve at B will then close and the flow of liquid from the reservoir A will cease. The reservoir C will then discharge what remains in it through the smaller pipe H′, thus filling the reservoir C to the desired height.

D is a gas burner or heater of any description having a lever *u* connected with its controlling-cock, and this is connected by a cord with the armature *c*, so that when the armature is moved in one direction it turns on the light, and this acts to heat the liquid in the reservoir C and passing through it before it is delivered into the receiver G. This is done because I have found that the solution works better when slightly warm. The current of gas is cut off again when the liquid ceases to flow by the operation of the rod connecting it with the armature.

The operation will now be as follows: The receiver G being filled with a solution of soap dissolved in water to the proper strength, air is supplied through the pipe X by any suitable air-forcing mechanism. The air flowing up through this pipe, the tube *g*, and the nozzle of the pipe K is discharged just beneath the surface of the liquid sufficiently to form bubbles, which first fill the cylindrical receiver, rising up and flowing over the edge of the receiver, each bubble being followed by a succession of others as long as the air-current is continued. These bubbles flowing over the edge of the receiver cling to the side and also the side of the tube *g*, flowing thence downward upon the hood L, which, serving as a sort of stop, causes them to pile up in a pyramidal form, and as they accumulate they gradually flow over the edge into the catch-basin R and thence eventually descend into the tank T, where, becoming dissolved or returning to the watery condition again, the liquid may be drawn off through a cock *y* and again returned to the reservoir A. In the continuous flow of the bubbles the size can be regulated to some extent by the depth to which the nozzle of the air-tube is immersed in the solution. The deeper it is immersed the smaller the bubbles will be. In practice the bubbles are not of a uniform size and the larger ones will separate from the smaller, flowing over one side of the receiver G, while the smaller ones flow over the opposite side, there being a gradual decrease in size from the larger ones upon one side to the smaller ones, which become so small as to have an opaque and whitish appearance, while the larger ones are clear, and, crowding together, their meeting faces will be flattened, so that they take polygonal shapes, piling up in this form in varying fantastic shapes in the hood L and the catch-basin R. While this is going on the disk M is rotated and the variously-colored lights are alternately thrown upward through the mass of bubbles, producing any variety or combination of colors, which ingenious arrangements of the colored glasses will effect.

While I have here described an apparatus by which these results may be produced, it will be manifest that various modifications of the appliances may be made without departing from the main features of the invention.

If desired, several receivers G may be arranged around or with other desired relation to a central one and branch air-pipes leading to each with appropriate connections allow of varying and beautiful combinations.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A fountain having a nozzle dipping beneath the surface of the bubble solution and automatically maintained at any desired depth beneath the surface of the solution regardless of the depth of the solution, and a means for delivering a constant supply of air through the nozzle to produce a continuous flow of independent and connected bubbles.

2. A fountain comprising a container for the solution, a buoyant nozzle maintained beneath the surface of the solution regardless of the depth of the solution, and means for supplying a flow of air to the nozzle.

3. A soap bubble fountain consisting of a container for the solution, a nozzle maintained at any desired depth beneath the surface of the solution regardless of the depth of the solution, and a pipe connecting therewith adapted to supply a continuous flow of air thereto.

4. A fountain for the production of soap bubbles, consisting of a containing vase for the soap solution, a flexible pipe through which air is delivered, said pipe having a nozzle dipping below the surface of the solution and a float by which said nozzle is constantly sustained at a given depth in the solution.

5. A fountain for the production of soap bubbles, consisting of a containing vase or receiver for the soap solution, a flexible or adjustable pipe having a nozzle dipping into

the surface of the solution and receiving air under pressure, a float by which the nozzle is constantly supported in fixed relation to the surface of the liquid, said nozzle being adjustable with relation to the float to regulate the depth to which it enters the solution.

6. A soap bubble fountain provided with a floating self-adjusting air discharge tube, dipping beneath the surface of the solution to a constant depth independent of the depth of the solution, and means for supplying a constant current of air thereto.

7. A soap bubble fountain consisting of a receiver for the soap solution, and a floating air discharge nozzle dipping therein, a means for replenishing the waste in the receiver, consisting of a reservoir, a pipe leading therefrom to the receiver, a valve and an electro magnet by which it is opened, a circuit breaker by which the electric circuit of the magnet is made or broken, a float within the receiver adapted to rise and fall with the liquid therein, said float being connected with one member of the circuit breaker whereby a circuit will be completed through the electro magnet when the liquid in the receiver has been lowered to a certain point, and the circuit will be broken to allow the supply valve to close when the liquid has again risen to the proper point.

8. In a soap bubble fountain, the receiver in which the bubbles are formed, a main reservoir, an automatically actuated valve, a float carried upon the surface of the bubble blowing solution, an intermediate mechanism through which the movement of the float serves to operate the valve, a buoyant nozzle maintained beneath the surface of the solution and connected with a source of air supply, a reservoir into which the solution is delivered, a means for heating the same and a pipe or passage connecting the intermediate reservoir with the receiver.

9. In a soap bubble fountain, the receiver in which the bubbles are formed, having a self-adjusting floating air nozzle, a means for supplying said receiver with a solution, consisting of a main and supplemental reservoir and pipes or passages connecting them with each other, and with the receiver, an electrically actuated valve, a float carried upon the surface of the bubble blowing solution and connected through the intermediate mechanism to operate the valve, whereby the flow from the main reservoir is controlled, a pipe leading from the supplemental reservoir to the receiver, said pipe being of smaller diameter than that leading from the main to the supplemental reservoir, whereby the latter is kept full as long as the flow continues.

10. In a soap bubble fountain, the receiver within which the bubbles are formed, the supply consisting of a main and supplemental reservoir with a pipe connecting the two, a pipe of smaller diameter leading from the supplemental reservoir to the receiver, a controlling valve in the pipe from the main reservoir, an electro magnet by which it is actuated, a circuit breaker interposed in the line of wire through which the electric current passes to the electro magnet, a float within the receiver rising and falling as the solution therein increases or diminishes, said float being connected with the circuit breaker so as to complete the electrical circuit when the amount of solution in the receiver is reduced, and to break the connection when the receiver is again filled to the proper point.

11. A main and supplemental reservoir, a pipe connecting the two, a pipe of smaller diameter connecting the supplemental reservoir with the receiver of the soap bubble fountain, an electro magnet by which the valve is opened to allow the solution to flow from the main to the supplemental reservoir and the receiver, and a float carried upon the surface of the bubble blowing solution, a device connected therewith by which the magnet is energized or de-energized, a burner and heating attachment below the supplemental reservoir and a lever controlling the burner and connected with the armature of the electro magnet so that heat is turned on to heat the solution as it passes through the smaller reservoir and is turned off when the flow therethrough ceases.

12. In a soap bubble fountain, a receiver with an automatically adjustable air discharge nozzle dipping into the solution contained in the receiver, a pipe by which air is supplied thereto, a hood surrounding the pipe adapted to receive the bubbles as they flow down from the receiver, a catch basin into which the bubbles fall from the hood, and a receiving tank for the liquid condensed therefrom.

13. A soap bubble fountain consisting of a receiver adapted to contain a soap solution having an automatically adjustable nozzle floating upon and dipping into the surface of the liquid, a hollow pipe or standard upon which the receiver is supported and through which air is delivered to the nozzle, a hood surrounding the standard and pipe having transparent openings in its surface for the passage of light, a rotary disk situated within the hood having colored glasses fixed around its circumference, and lights fixed below the disk adapted to throw colored lights upward through the mass of bubbles which flow down from the receiver to the hood.

In witness whereof I have hereunto set my hand.

SAMUEL H. TACY.

Witnesses:
S. H. NOURSE,
GEO. H. STRONG.