

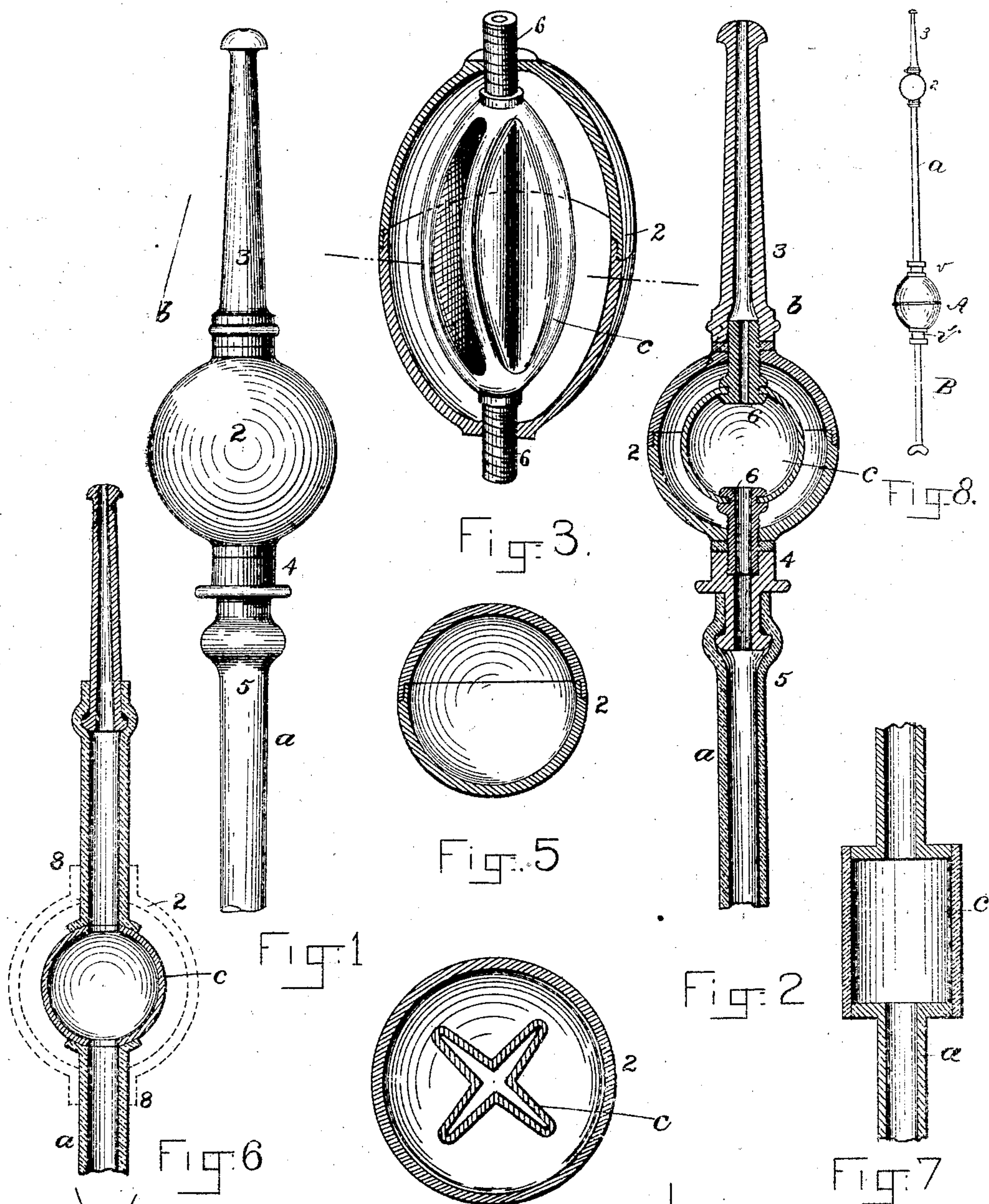
(No Model.)

T. F. MATTHEWS.

SYRINGE.

No. 367,648.

Patented Aug. 2, 1887.



WITNESSES.

C. S. Gooding,
A. D. Harrison.

Fig. 4

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THOMAS F. MATTHEWS, OF NEW YORK, N. Y.

SYRINGE.

SPECIFICATION forming part of Letters Patent No. 367,643, dated August 2, 1887.

Application filed October 18, 1886. Serial No. 216,485. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. MATTHEWS, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Syringes, of which the following is a specification.

This invention relates to syringes in which the liquid to be injected is expelled through a discharge-tube by the compression of a flexible rubber bulb communicating with the discharge-tube and with the receptacle from which the liquid is drawn.

It is the object of the invention to provide the discharge-tube of a syringe of this class with a section or reservoir forming a part of the conduit through said tube, but of greater elasticity than the tube, said section or reservoir being capable of being expanded by the pressure of the liquid which is forced through said tube by the compression of the bulb, and of contracting when such pressure ceases, and by its contraction expelling a part of the liquid accumulated in it, thus maintaining a discharge through the nozzle while the bulb is being refilled, so that the discharge may be made practically continuous, the bulb and elastic reservoir acting alternately.

The invention consists in the combination, with the discharge-tube of a syringe of the class above described, of an elastic reservoir forming a part of the conduit or passage through the discharge-tube, but of greater elasticity than said tube, so that the reservoir will be expanded by the liquid being impelled through the tube by the compression of the bulb, and will contract and expel the liquid accumulated in it while the bulb is being refilled.

The invention also consists in the combination, with said elastic reservoir and the discharge-tube to which it belongs, of a casing secured to said tube and inclosing the reservoir to protect the latter from injury, and to prevent it from being wrinkled or bent out of shape, all of which I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side view of the discharge-tube of a syringe embodying my invention. Fig. 2 represents a longitudinal section of the same. Fig. 3 represents a perspective view, partly in section,

of a modification. Fig. 4 represents a section on line *x x*, Fig. 3. Fig. 5 represents a sectional view of the casing, showing its parts held together by friction. Fig. 6 represents a longitudinal section of a discharge-tube, showing the reservoir applied to the flexible part of the tube. Fig. 7 represents a sectional view of another modification. Fig. 8 represents a side view of a complete syringe having my improvements.

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

In the drawings, A represents the bulb of a syringe having the usual valves at *v* and *v'*, and provided with the outlet-tube B, said bulb being adapted to be compressed by the hand of the operator, as usual.

a represents the discharge-tube of a syringe, said tube being usually of flexible rubber, and *c* represents the elastic reservoir.

In Figs. 1, 2, 3, 4, and 5 I have shown the reservoir applied to the rigid nozzle *b* at the discharge end of the tube *a*, while in Figs. 6 and 7 I have shown it applied to the flexible tube itself. The nozzle shown in Figs. 1 and 2 has an enlargement or casing, 2, of metal, hard rubber, or other suitable material, to one side of which the discharging-tip 3 of the nozzle is affixed, and to the other side the neck 4, to which the rubber portion 5 of the discharge-tube is attached. Within the casing 2 is the elastic reservoir *b*, which is a spherical or other shaped chamber of rubber sufficiently thin to enable it to yield and be distended by the pressure of the liquid within it, and connected by rigid couplings 6, 6 with the tip 3 and the neck 4, so that the channel or conduit of the discharge-tube is directly through the elastic reservoir. It will be seen, therefore, that when the bulb of the syringe is compressed the pressure of the liquid forced thereby through the discharge-tube will distend the reservoir *c*, and that when the bulb is released and ceases to force the liquid the elastic reservoir will contract by reason of its elasticity, and will expel the accumulation of liquid therein until it regains its normal diameter. It is evident, therefore, that if the reservoir *c* be made of sufficient capacity it will discharge liquid through the nozzle during the entire time that the bulb is being refilled, so that a continuous discharge may be maintained.

The casing 2 protects the elastic reservoir from external injury and prevents it from being distended to an injurious extent. The casing also prevents the reservoir from being creased or bent and flattened by bending, as it would be liable to be if unsupported.

I prefer to make the casing in two separable sections, which may be screwed together, as shown in Figs. 2 and 3, or fitted together like the parts of a box, as shown in Fig. 5.

In Figs. 3 and 4 I have shown the reservoir as corrugated lengthwise, to give it a greater capability for distension.

Figs. 6 and 7 show the elastic reservoir applied directly to the elastic portion of the discharge-tube. The reservoir shown in Fig. 6 is spherical in shape, and is made of rubber, which is thinner than that of which the tube is made. The reservoir is in this case suitably secured to lips or flanges formed on the ends of two sections of the rubber tube. The reservoir shown in Fig. 7 is cylindrical in shape, the body of the cylinder being a tube of comparatively thin rubber cemented to thicker end pieces or heads, which are cemented or otherwise secured to the sections of the rubber tube.

It is obvious that the reservoirs shown in Figs. 6 and 7 may be protected by casings 2, supported by the tube. In Fig. 6 I have shown a casing in dotted lines, the same being made in separable sections, each provided with a sleeve, 8, fitting closely upon the discharge-tube.

I am aware that it is not new to make the discharge-tube of a syringe capable of distension along its entire length. It will be observed, however, that my elastic reservoir is very limited in length compared with the entire tube, and is therefore put under greater pressure when distended than the tube last above described, and contracts more quickly and positively than such tube, so that the expulsion of liquid by the contraction of the reservoir is

more nearly like that caused by the compression of the bulb.

I am also aware that a water-bag syringe has had a compressible bulb in its discharge-tube to exhaust the air and start a siphonic flow into the bag; but such bulb has not been combined with a valved bulb adapted to be compressed to force the water through the discharge-tube, and has not been constructed to be distended by pressure of water within it.

The nozzle having the reservoir and casing may be put on sale as an article of manufacture, to be used with any of the syringes now in use.

I claim—

1. The combination, in a syringe, of the main bulb, the discharge tube or conduit, an additional elastic reservoir forming a part of the said conduit and located at a point between the main bulb and the discharging end of the conduit, and a rigid casing or protector inclosing the reservoir, as set forth.

2. As an improvement in syringes, a tube or conduit adapted to conduct liquid from the main bulb of the syringe, and provided with an additional elastic reservoir and with a rigid casing or protector inclosing said reservoir, as set forth.

3. A nozzle forming a part of a discharge tube or conduit and composed of a discharge-tip, a neck adapted to be connected to a flexible tube, a casing composed of two separable parts secured, respectively, to said tip and neck, and an elastic reservoir within said casing and coupled to said tip and neck, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 16th day of October, 1886.

THOMAS F. MATTHEWS.

Witnesses:

C. F. BROWN,

A. D. HARRISON.