

(No Model.)

D. C. PERKINS & B. F. SUTTON.

SYRINGE.

No. 342,131.

Patented May 18, 1886.

Fig. 1.

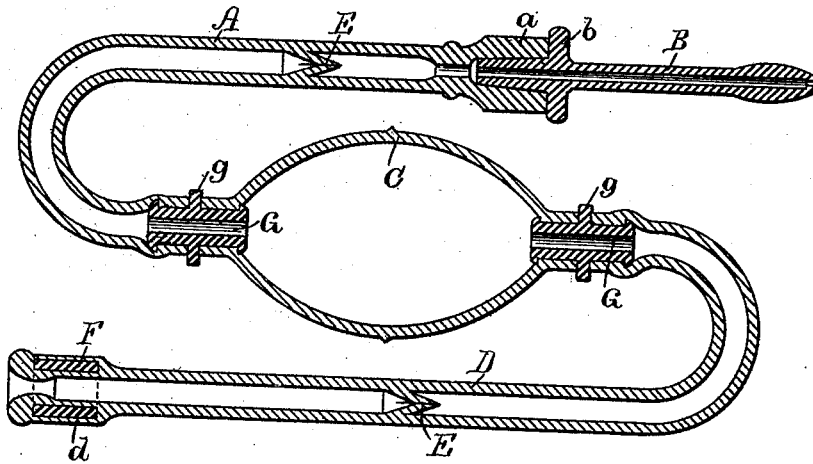


Fig. 2.

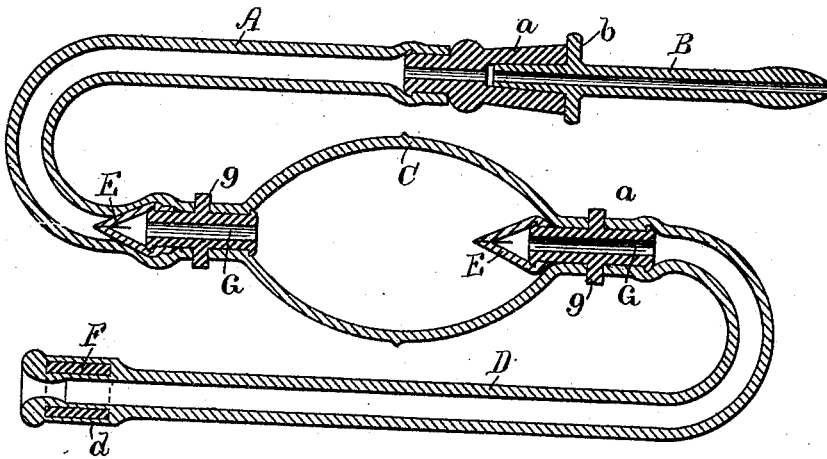
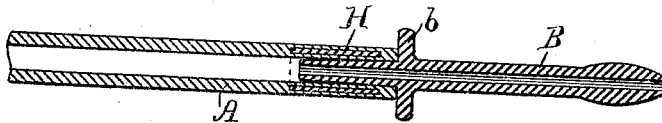


Fig. 3.



WITNESSES:

*C. H. Luther Jr.*  
*Geo. L. Condon.*

INVENTOR:

*Daniel C. Perkins & Benjamin F. Sutton*  
*By Joseph A. Miller & Co.*  
*Attys*

# UNITED STATES PATENT OFFICE.

DANIEL C. PERKINS AND BENJAMIN F. SUTTON, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS, BY MESNE ASSIGNMENTS, TO RUSSELL PARKER, JAMES H. STEARNS, AND THE SAID BENJAMIN F. SUTTON, ALL OF BROOKLYN, NEW YORK.

## SYRINGE.

SPECIFICATION forming part of Letters Patent No. 342,131, dated May 18, 1886.

Application filed May 10, 1884. Serial No. 130,967. (No model.)

*To all whom it may concern:*

Be it known that we, DANIEL C. PERKINS and BENJAMIN F. SUTTON, of the city and county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Syringes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to the class of ordinary soft-rubber syringes, and is in the nature of certain peculiar fixings, as applied to these syringes, whereby said syringes are rendered efficient and certain in operation, and, moreover, are simple, durable, and not easily deranged.

To the above purposes our invention consists in the certain new and useful constructions and arrangements of the several parts, as hereinafter fully described and claimed.

In order that our invention may be fully understood, we will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a syringe embodying our improvements. Fig. 2 is a similar view illustrating certain modifications of construction hereinafter described. Fig. 3 is a longitudinal section of the discharge-end of the flexible tube and the nozzle, embodying a modification of construction hereinafter described.

In the said drawings, A designates the outlet-tube of a syringe. As shown in Fig. 1, this tube contains the eduction-valve E, and D designates the suction-tube, which, in this figure, contains the induction-valve E. These valves are each hollow and conoidal in form and provided with a slit which extends from the tip, point, or apex of the valve backward to a suitable point, so as to form two lips which separate or open under inward pressure and close against outward pressure.

In Fig. 1 the valves E E are formed integrally with the flexible tubes, the eduction-valve being so placed as to point toward the nozzle B, while the induction-valve points toward the bulb C, the purpose of this ar-

range being obviously to prevent the expulsion of the liquid through the suction-tube when the bulb is compressed.

In Fig. 2 the valves E E are not formed integrally with the flexible tubes, but are molded separately therefrom and held firmly in place by being sprung over or attached to the connections G G by which the tubes are connected to the bulb. The connections G are stiffened coupling-pieces provided with collars g, and having their ends adapted to receive and hold thereon the ends of the tubes and bulb, respectively.

The outlet end of the tube A is formed integrally at its outer end with an enlarged cup, a, (see Fig. 1,) which is stiffer than the body of the tube and receives the plug end of the nozzle B.

In Fig. 2 the cup a is not formed integrally with the tube A, but is molded separately therefrom, and the discharge end of said tube embraces the plug of the cup, which is, as before, stiffer than the body of the tube.

The suction end d of the tube D is enlarged and thickened, and within this enlarged and thickened portion is embedded a material, F, (see Figs. 1 and 2,) of greater gravity, which acts as a sinker. This sinker F is preferably of annular form, but may be of other form, as desired.

The flexible tubes A D are formed by winding rubber of a suitable thickness around cores, then vulcanizing the rubber, and subsequently removing the cores. When the valves E E are formed integrally with the tubes, as shown in Fig. 1, two cores are used in the winding process, one of said cores having a conical projection on its inner end and the other core having a conical depression on its inner end, so that the valves are formed, internally and externally, coincidently with the winding process. After being vulcanized the cores are removed from the tubes and the valves are slitted by a suitable tool.

When the flexible tube is constructed of very elastic material, however, the discharge end is made of the required degree of thickness and stiffness by embedding an annular piece of

metal or other suitably rigid material, H, within its walls, as shown in Fig. 3.

The sinker F is preferably embedded in the tube D during the winding process.

5 It will be seen that the flexible valves constructed as above described materially cheapen the syringes and increase their durability, and also render the instrument more compact and reliable.

10 We are aware of the heretofore use of a conoidal valve, and do not broadly claim such, *per se*, but claim the combination of it as shown and described.

15 Having thus described our invention, we claim as new and desire to secure by Letters Patent—

20 1. The flexible inlet-tube D, having its suction end embedded with a sinker between its inner and outer peripheries, substantially as described.

2. The flexible tube A, having its discharge

end stiffened by a rigid annular substance, H, embedded between its inner and outer peripheries, substantially as described.

3. In combination, in a syringe, a tube, the 25 tubular coupling inserted partially into said tube, and the hollow conoidal valve sprung over said coupling, substantially as set forth.

4. The combination, with the syringe-bulb, of the induction and eduction tubes, each of 30 said tubes provided with the tubular coupling inserted in the end of said bulb, and the hollow conoidal valve sprung over said coupling, said valves lying in same direction and operating oppositely, substantially as de- 35 scribed.

DANIEL C. PERKINS.  
BENJAMIN F. SUTTON.

Witnesses:

J. A. MILLER, Jr.,  
M. F. BLIGH.