(Model.)

C. B. DICKINSON.

SYRINGE.

No. 455,939. Patented July 14, 1891.

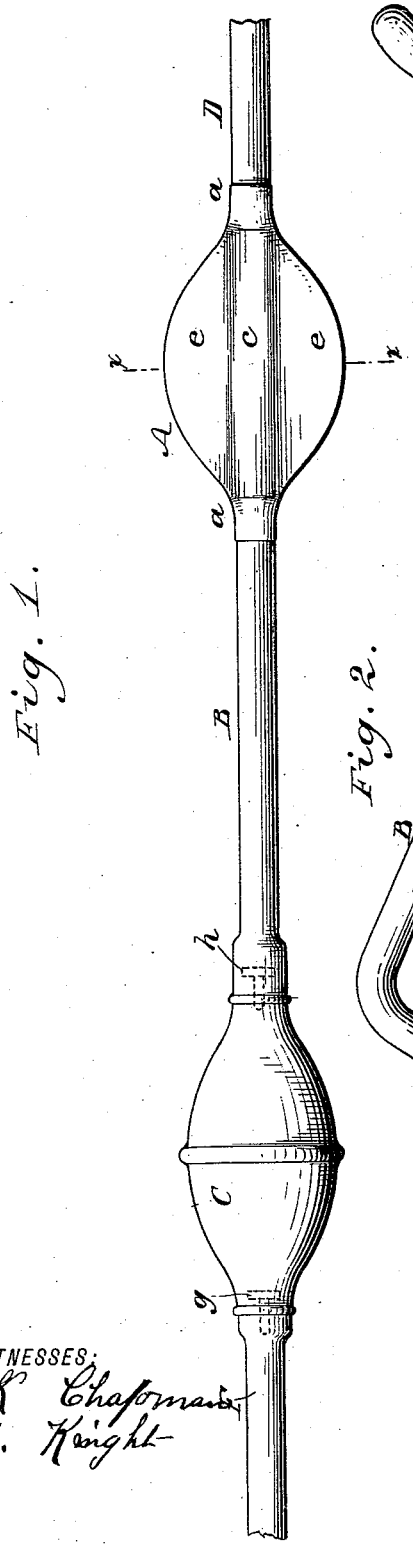

Fig. 1.

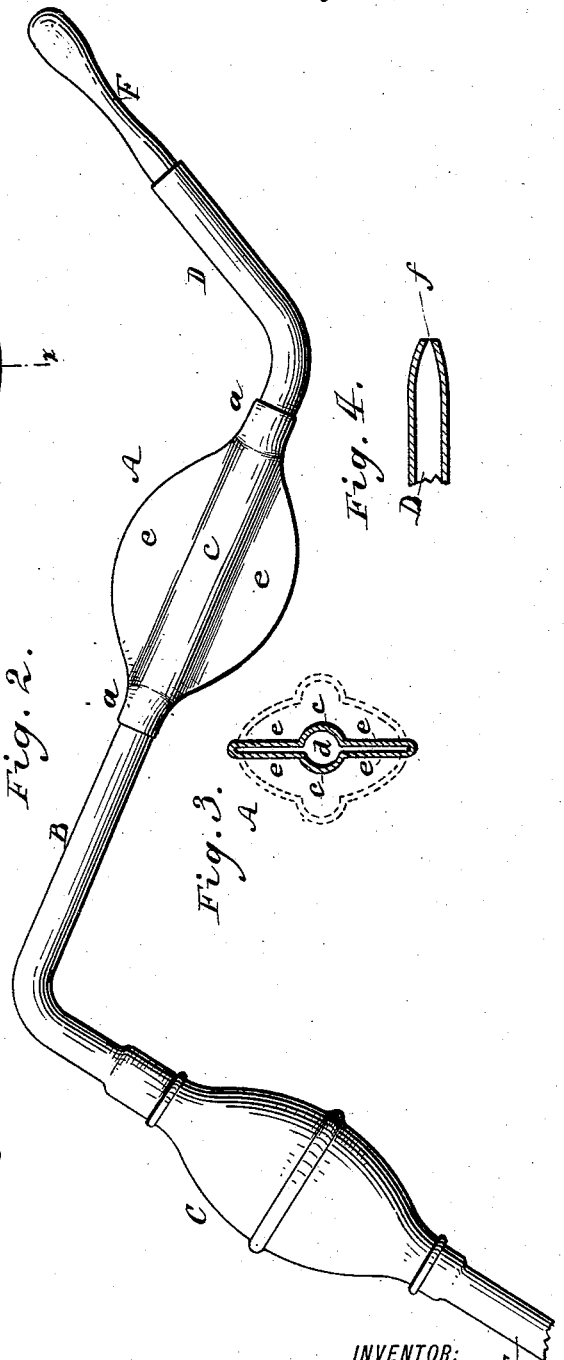

Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES:
L. K. Chapman
A. M. Knight

INVENTOR:
C. B. Dickinson
BY
H. A. Wells
ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES B. DICKINSON, OF BROOKLYN, NEW YORK.

SYRINGE.

SPECIFICATION forming part of Letters Patent No. 455,939, dated July 14, 1891.

Application filed May 18, 1889. Serial No. 311,296. (Model.)

To all whom it may concern:

Be it known that I, CHARLES B. DICKINSON, a citizen of the United States, and a resident of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Conduits for Syringes, &c., of which the following is a specification.

My invention relates to a conduit for syringes, atomizers, and similar devices; and its object is to furnish a conduit which shall comprise the advantages of the common straight tube used on intermittent-flow syringes and atomizers, and also the advantages of conduits, also in common use, which employ a flattened or self-collapsible section which constitute the so-called "continuous-flow" syringes.

To this end my invention consists of a conduit of soft india-rubber, consisting of a continuous tube from end to end and of the conduit expanded laterally at a point between its ends to form opposing diaphragms united at their outer edges, but opening in a slot into the tube, the adjacent inner surfaces of which are normally parallel and in close contact with each other, while the tube remains open throughout.

Referring to the accompanying drawings, in which similar letters indicate corresponding parts in all the figures, Figure 1 is a side elevation of the preferred form of my new conduit, shown connected to a rubber-pump bulb of ordinary construction. Fig. 2 is a similar view showing the end of the conduit provided with an ordinary syringe-tip. Fig. 3 is a sectional elevation taken in the line *x x* of Fig. 1, showing in full lines the walls of the self-collapsible section closed nearly in contact with each other, the normal condition being in close contact; and Fig. 4 is a view of the end of the conduit finished to form a contracted tip.

My new conduit is made of soft india-rubber and formed or provided with a self-collapsible section or chamber A of any suitable length and width. This self-collapsible section is formed with two connections or necks *a* and *b*, the former *a* of which is connected by a tube B to the valved eduction end of the pump-bulb C. The latter *b* is provided with a tube D of varying length to suit any purpose for which the conduit may be designed. This tube D may be finished to form a tip *f*, or it may be left open to receive any form of separate nozzle or tip, as the syringe-tip E. Along the center or sides of the self-collapsible section A are formed the ribs or strips *c*, which are outwardly curved, or the section may be otherwise constructed to form the passage *d* for furnishing a free flow for the fluid from the pump through the self-collapsible section to the end or tip of the conduit. At the sides of the passage *d* are formed extended opposite diaphragms *e e*, which are expanded by internal pressure when the pump C is compressed, as shown in dotted lines in Fig. 1, and which contract upon relaxation of the pump, thus serving to store up a part of the power exerted at the pump to maintain a continuous flow during the intervals of compression. The collapsible portion is preferably curved so that the inner surfaces of the diaphragms *e e* normally stand in close or nearly close contact, thus serving to automatically expel the entire contents of the section after operation of the pump ceases, except what remains in the passage *d*. The side strips *c* act like independent springs to close the self-collapsible section and prevent it from stretching beyond bounds, and they stiffen the section, so that it will not bend or "buckle" and stop the flow, and the passage *d* facilitates the ready action of the device and the cleaning (if used for a syringe) after use, and by using the common rubber tubes B D the conduit as a whole may be bent into any desired position, as indicated in Fig. 2, without in any manner cutting off or interrupting the flow, as in conduits formed of flattened or corrugated tubes now used in continuous-flow syringes.

When used for a syringe, the pump C will be provided with an inlet-tube F, as shown; but when used for forcing air this tube will be omitted.

The pump C is provided with the usual or any appropriate form of inlet and outlet valves *g h*. (Shown in dotted lines in Fig. 1.)

By constructing the conduit as herein described there is at all times a free passage through the conduit. In other words, the free open tube is always intact, furnishing a free passage, as with a common intermittent-

flow syringe, which is advantageous for light injections and also in cleaning the syringe, and where more than a single bulbful is to be injected the syringe also possesses the advantage of continuous flow. Furthermore, as a matter of construction, by this form I am enabled to make the chamber integral with the tubular portions.

I am aware that it is not new to make conduits of flattened and corrugated tubes, or to provide conduits with self-collapsible separable bulbs folded in at four points to form a star-shaped bellows-like collapsible chamber, as in the patent to T. F. Matthews, August 2, 1887, No. 367,648, and therefore lay no claim to such structures.

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

A conduit for syringes, atomizers, &c., comprising a continuous tube of soft india-rubber expanded laterally at a point between its ends to form opposing diaphragms united at the outer edges and opening into the tube, the adjacent surfaces of the diaphragms being parallel with each other and in a normal state in contact, while the continuity of the tube past the diaphragms remains intact, substantially as shown and described.

CHARLES B. DICKINSON.

Witnesses:
H. A. WEST,
WILLIAM R. SMITH.