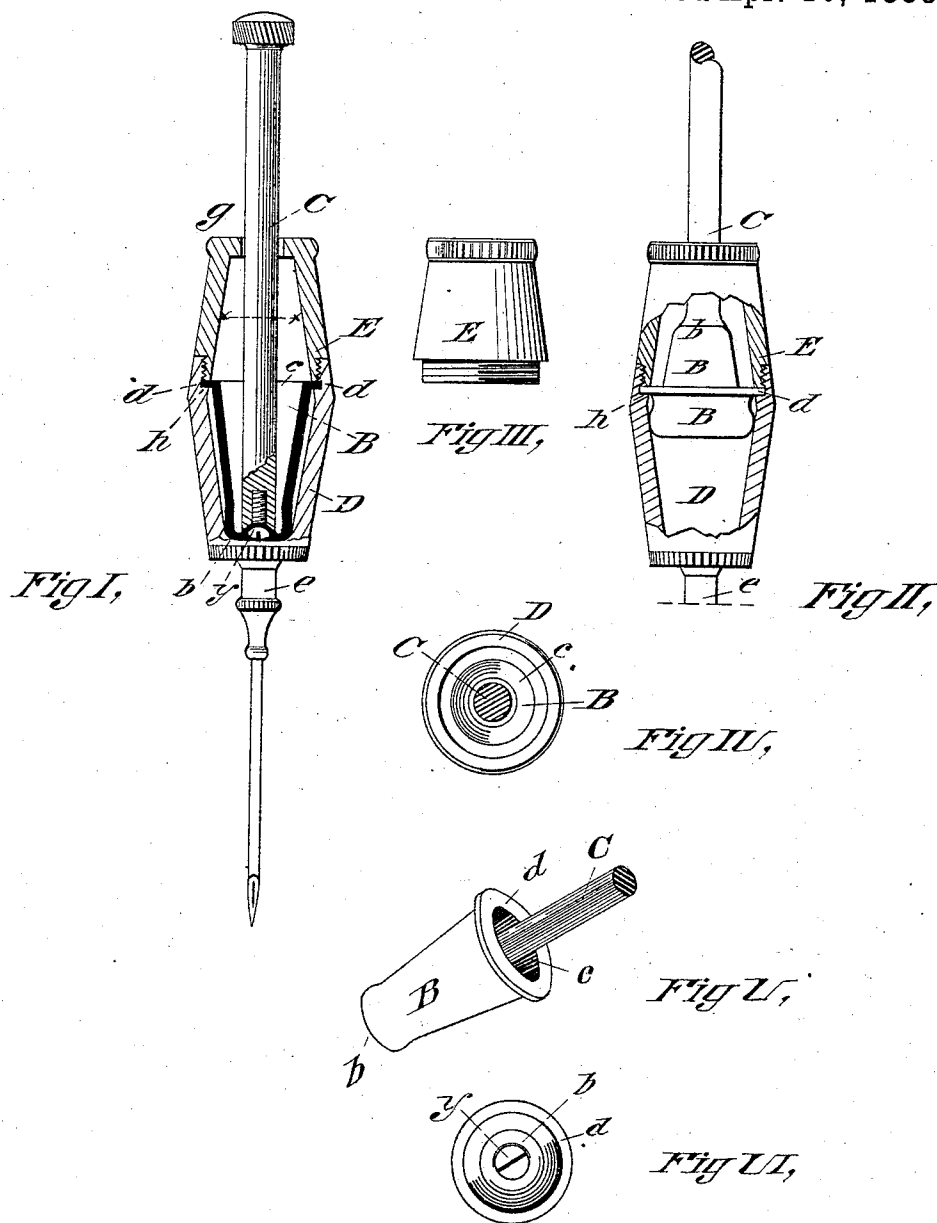


(No Model.)

C. M. BARTON.
SYRINGE.

No. 380,673.

Patented Apr. 10, 1888.



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UNITED STATES PATENT OFFICE.

CHESTER M. BARTON, OF HATFIELD, MASSACHUSETTS.

SYRINGE.

SPECIFICATION forming part of Letters Patent No. 380,673, dated April 10, 1888.

Application filed March 10, 1887. Serial No. 230,379. (No model.)

To all whom it may concern:

Be it known that I, CHESTER M. BARTON, a citizen of the United States, residing at Hatfield, in the county of Hampshire and State of Massachusetts, have invented a new and useful Syringe, of which the following is a specification.

My improvements relate to the class of syringes depending upon a piston, and have for their object an increased facility and certainty of action in such; and my invention consists in the combination and construction, as hereinafter described, and more particularly pointed out in the claims.

The invention is fully illustrated in the accompanying drawings, in which—

Figure I is a partial longitudinal section of a syringe having my improvements. Fig. II is also a partial longitudinal section showing some of the parts in a changed position from that seen in Fig. I. Fig. III is a detail view. Fig. IV is a partial plan view in section on the dotted line *xx* of Fig. I. Fig. V is a detail view in perspective and in partial section, and Fig. VI is a detail in plan view.

In the drawings, showing enlarged views of the parts of a hypodermic syringe, B is a rubber diaphragm in the form approximately of a hollow truncated cone, closed at its apex *b*, open at its base *c*, and provided with an outward-extending flange, *d*.

C is a piston-rod entering centrally the hollow base *c* of the diaphragm B and secured to the apex *b*, as shown in Fig. I.

D is the barrel or fluid-chamber, internally a truncated cone, conforming generally to the exterior surface of nipple B, having its apex opposite the part extending to the pipe *e*, and having a shoulder, *h*, at its base left by a threaded countersink.

E is a threaded ring adapted to be screwed into the countersink at the base of cone D, to have a corresponding surface borne against the shoulder *h*.

The diaphragm B is adjusted relative to the barrel D, as shown in Fig. I, to have the apex of the diaphragm in close contact with that of the barrel when the flange *d* rests upon the shoulder *h*. The flange *d* so placed is bound by screwing the ring E down upon it, and no auxiliary packing is needed to make a tight joint.

The operation is as follows: The parts being in the position seen in Fig. I, the piston-rod C will, upon being drawn out, take with it the smaller end of the diaphragm B. Successive portions of this end are drawn into or invaginated in the larger part, and that part of the rubber cone which is bulged out by being bent or doubled upon itself constitutes a piston-head by hugging closely the inner wall of the barrel. The reverse stroke of the piston performs the act of expulsion, the bulge in the cone of rubber, as seen in Fig. II, following the inner wall of the barrel indifferently in either direction. The qualities of elasticity, as well as flexibility, possessed by rubber permit the cone to be doubled on itself to exert an outward pressure upon the barrel-wall. The conical form of the diaphragm prevents its sides from coming in frictional contact during movement of the plunger, and as successive portions of the diaphragm move over the wall of the barrel by a rolling motion there is none of the friction incident to the tight-fitting piston-head.

Many other advantages might be enumerated as peculiar to a syringe constructed on this principle were it deemed essential.

Although a mere ring, as described, for the purpose of binding the diaphragm B by its flange to the barrel D would be sufficient to enable my principle to be embodied in an effective device, I prefer to extend the ring E to form a guide, *g*, to the piston-rod C, as well as to form a stop to prevent the diaphragm B from having movement enough to be entirely inverted. The limit formed to its upward movement, as shown, by the guide *g* leaves a fold in the diaphragm, rendering it easier to start the piston-rod upon a return-stroke.

The rubber at the apex of the diaphragm is pressed into a concavity in the end of the piston-rod, thus forming an incipient fold, rendering it easier for the piston-rod to commence the inversion of the diaphragm, and a screw, *y*, binding the diaphragm to the piston-rod, leaves a flush face upon the apex corresponding closely to the end of the barrel, so that it may be completely emptied.

Now, having described my invention, what I claim is—

1. A syringe consisting, essentially, of a barrel provided with a nozzle, a flexible diaphragm

extending across the barrel and attached by its edges thereto, and a plunger attached to the central part of the diaphragm and having a handle at the end opposite the nozzle, substantially as described. 5

2. The syringe having barrel D, the ring E, connected to said barrel by a screw-thread, the elastic nipple secured between the ring and the

barrel, and a plunger secured to the central part of the nipple and guided at the other end by the ring E, the parts being combined and operating substantially as described. 10

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