

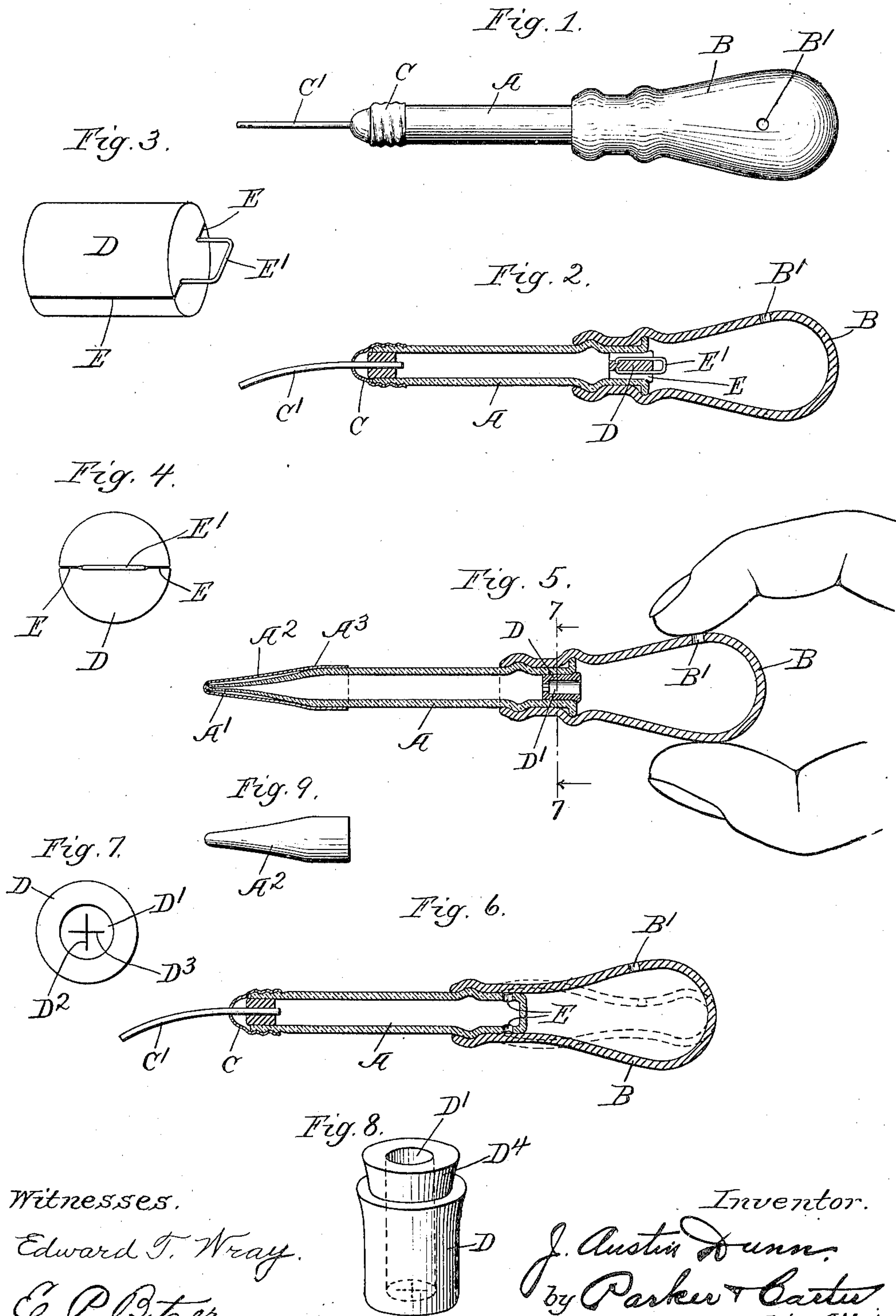
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Patented Apr. 16, 1901.

J. A. DUNN.
SYRINGE.

(Application filed Feb. 14, 1900.)

(No Model.)



Witnesses.

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SYRINGE.

SPECIFICATION forming part of Letters Patent No. 672,207, dated April 16, 1901.

Application filed February 14, 1900. Serial No. 5,124. (No model.)

To all whom it may concern:

Be it known that I, JESSE AUSTIN DUNN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Syringes, of which the following is a specification.

My invention relates to syringes, and has for its object to provide a new and improved syringe of which the following is a description, reference being had to the accompanying drawings, wherein—

Figure 1 is a view of a syringe embodying my invention. Fig. 2 is a longitudinal section through Fig. 1. Fig. 3 is an enlarged sectional view of the plug in the end of the syringe-tube. Fig. 4 is an end view of this plug. Fig. 5 shows a modified construction. Fig. 6 shows a further modification. Fig. 7 is a section on line 7 7, Fig. 5. Fig. 8 shows a modified form of valve or plug. Fig. 9 is a view of the shield for the end of the syringe-tube.

Like letters refer to like parts throughout the several figures.

When the ordinary bulb-syringe is used by dentists, physicians, and surgeons in the practice of their profession, a number of different medicaments are alternately used in the same syringe, as it is impracticable to have a different syringe for each medicament. It is substantially impossible or at least impracticable to prevent these different medicaments from coming into contact with the bulb of the syringe, as the air by which the syringe is operated must come through the same opening as the medicament. It will thus be seen that the syringe cannot be thoroughly cleaned and sterilized when the medicament is changed. This feature, as will be readily understood, is of the greatest importance in the administration of medicaments and has been the great drawback connected with the use of the ordinary bulb-syringe in this field. Another objection to the ordinary bulb-syringe is that the air must be drawn through the same opening as the medicaments, thus mixing air with the liquid when the syringe is being used.

The object of my invention is to provide a syringe for medical and other uses which

will be satisfactory and efficient and which will obviate the evils heretofore met with.

Referring now to the drawings, I have shown the syringe as made up of the tube or barrel A and the bulb B. The tube A is preferably of glass, so that it may be easily cleaned, and the outer end may be formed in any desired manner or provided with any desired attachment. As herein shown, I have illustrated the tube as provided with the cap C and the needle C'. Ordinarily the air by means of which the medicament is forced out of the syringe is drawn in through the tube A. In the present instance I arrange the parts so that only the medicament is drawn in through the tube A, the air which operates the device being admitted to the bulb through an independent opening back of the tube. There is a suitable opening connecting the tube A and the bulb, so that the air may be forced from the bulb into the tube in order to force the material out of the syringe during its operation. This opening may be formed in any desired manner and is normally substantially closed or inoperative when no pressure is applied to the bulb. In other words, this communicating opening or passage-way is so arranged that the medicament cannot pass back through it into the bulb, and yet when the bulb is compressed the air may be forced therethrough, so as to force the medicament out at the end of the tube. As illustrated in Figs. 1 to 4, inclusive, the tube A is open at the rear end and an elastic plug D is provided. This plug may be of any suitable material, preferably rubber, and is provided with a normally closed or inoperative opening. This opening may be formed in any desired manner. As shown in Figs. 1 to 4, this opening is provided by mutilating the rubber plug, so that the passage-way is normally closed, the mutilated parts of the rubber permitting an open passage-way for the air when the bulb is compressed. As shown in these figures, the rubber is cut or mutilated at any desired point or points, so as to form the normally closed or inoperative passage-way or passage-ways E. A piece E' is thrust into these cuts or mutilations of the rubber, and the plug is then forced into the end of the tube. The rubber then fits snugly

around the piece E', so that no liquid can run back of the plug. The rubber, however, gives when pressure is applied to the bulb B, so that air may be forced through the cuts or mutilations in the rubber in order to force the material out at the end of the tube. As illustrated in Figs. 2, 3, and 4, I have shown the piece E' as made in the form of a loop, so as to aid in removing the plug. The bulb B is provided with a suitable air-inlet B' independent of the tube, so that air may enter the bulb back of said tube. This inlet may simply consist of an unobstructed opening, as shown in the drawings, the opening being controlled by means of the thumb or finger. In this construction the finger is placed over the opening when the bulb is compressed. When it is desired to draw the medicament into the tube, the finger is held on the opening until a sufficient amount of the medicament is drawn into the tube and may then be removed, so as to prevent the tube from becoming completely filled. This precaution prevents any of the medicament from being drawn up into the bulb. After the medicament is in the tube it may be forced out in any desired manner by holding the finger on the opening and compressing the bulb to the desired extent.

The plug D may be termed a "valve," for it acts to control the connection between the tube and the bulb. Instead of forming the valve as shown in Figs. 2 to 4 I may provide some other suitable construction. In Fig. 5 I have shown a preferred valve construction wherein the valve consists of the plug provided with a suitable cavity or hole D', which extends part way therethrough, leaving the end of the plug normally closed. Two slits D² and D³ are then made through this closed end, the two slits being at an angle to each other, as shown, for example, in Fig. 7, forming what may be termed a "cruciate incision." This incision provides a normally closed, obstructed, or inoperative passage-way, which prevents the material from running back into the bulb, but which opens under the pressure of the air when the bulb is manipulated. By providing the plug D with the opening D', I am enabled to shorten the portion of the plug through which the normally closed passage-way is formed and still retain the thick plug, which can be easily handled and which will retain its position in the tube. By this means the passage-way is not so long and the danger of its becoming obstructed is much lessened. Of course if the passage-way is obstructed it will be opened by pushing a suitable needle or the like therethrough. It is of course evident that instead of making the hole D', I might make the plug itself thin and omit the hole; but such a construction is not as efficient and desirable as the one shown. I may form the valve with a projecting part D⁴ at the top, as shown, for example, in Fig. 8. This projection will extend from the top, so as to be engaged by the thumb

and finger when it is desired to remove the plug. This construction facilitates manipulation in the way of handling, cleaning, &c., and as the valve is all in one part the liability of said valve to get out of order or the parts to become lost is greatly reduced. It is of course evident that the incision in the plug may be different from that shown and that other constructions may be used to obtain this automatic valve. It is also evident that this automatic valve may be used in other constructions than those herein shown. The automatic valve arrangement, for example, may be obtained even when the plug D is not used. I have shown one construction for this purpose in Fig. 6. In this figure the end of the tube A is closed and the passage-way E is formed by making a simple opening in the side of the tube, the opening being arranged so that it is normally closed by a portion of the bulb. Of course there may be more than one of these passage-ways, and the parts are so arranged that when no pressure is applied to the bulb it will fit snugly over these passage-ways and prevent the material from passing out into the bulb. When pressure is applied to the bulb, however, and the inlet B' is closed, the bulb will give, so as to permit air to pass into the tube.

For purposes of illustration I have shown some simple constructions embodying my invention; but it is of course evident that the various parts may be changed and some of the parts may be omitted and others used with parts not herein shown without in any manner departing from the spirit of my invention, and I therefore do not limit myself to the constructions shown.

By changing the needle on the end of the tube I may transform this syringe into any of the various syringes used by dentists, physicians, and surgeons—such as a drop syringe, a hypodermic syringe, and the like.

This syringe may also be used in various arts and for various purposes. For example, it may be used to apply oil to delicate machinery where it is desired to have perfect control of the oil or apply a small amount of oil at a given point without the danger of having the oil spread or having too much oil applied. In Fig. 5, for example, I have shown a construction particularly adapted for use in applying oil to machinery. In this construction the inlet B' may be omitted and the tube A is drawn down to a point A', thus providing the opening at the end of the desired size. This construction enables me to make the device cheaply and is desirable for this and other uses. When the point is used, as shown in Fig. 5, I prefer to provide a shield A², which slips over the point and which is of sufficient length to pass over the enlarged part A³ of the tube A. This shield may be made of any suitable material and is so constructed that it stops the end of the hole in the point A' and prevents the material from passing out of the tube. The shield also protects the end

of the tube and prevents it from being broken by the falling of the device or by other rough handling. When this device is used as an oil-can, the amount of oil can always be known and shows through the transparent or glass tube A.

The use and operation of my invention are as follows: When it is desired to use the syringe, the bulb is compressed, the inlet B' being closed by the finger or by other means, and the end or needle is dipped into the medicament to be used. The bulb is then allowed to expand until the proper amount of material is in the tube, and before the tube is completely filled, in the event a larger quantity of material is desired, the obstruction to the inlet B' is removed, so as to insure against the material being drawn up into the bulb. This same result can be obtained by having the capacity of the bulb smaller than the capacity of the tube, so that even when the bulb is completely compressed and then released it will be unable to completely fill the tube with material. I have found that the syringe may now be inverted or held in any desired position, and yet none of the material will pass into the bulb. It will thus be seen that after the syringe is charged it may be handled in any desired manner and held in any desired position and that its use is therefore in no manner restricted. When it is desired to force the material out of the syringe, the inlet B' is obstructed by means of the finger or otherwise and the bulb compressed. The normally closed passage-way E is then opened by the pressure of the air and air is forced into the tube, thus forcing out the material. If it is desired to force all of the material out of the tube at one time, the bulb may be completely compressed, while if it is desired to force only a part out the bulb may be again released, the inlet B' being preferably open while the bulb is expanding. It will be seen that while the inlet B' is open or unobstructed the passage-way between the bulb and the tube A will be closed and that even though the material in the tube passes down to the inner end thereof it cannot pass into the bulb,

as its weight alone is not sufficient to open the passage-way. This result can be obtained and the parts so arranged that the passage-way may be easily opened when the bulb is compressed.

I claim—

1. A syringe, comprising a tube, a bulb provided with an air-admission opening and connected with said tube, a valve in said tube consisting of an elastic plug provided with an enlarged opening extending part way there-through, one or more incisions through the remaining portion of the plug, which form an obstructed or normally closed passage-way between the tube and the bulb.

2. A syringe, comprising a tube, a bulb provided with an air-admission opening and connected with the end of said tube, an elastic portion interposed between the opening in the tube and the opening in the bulb, said elastic portion provided with a normally closed opening therethrough, said opening adapted however to open and permit the passage of air under pressure in either direction.

3. A syringe, comprising a tube, a bulb provided with an air-admission opening and connected with the end of said tube, a separate plug-like elastic portion inserted in the end of the tube between the opening in the tube and the opening in the bulb, said plug provided with a normally closed opening therethrough, said opening adapted however to open and permit the passage of air under pressure in either direction.

4. A syringe, comprising a tube, a bulb provided with an air-admission opening, a passage-way from the chamber of the tube to the chamber of the bulb, a double-acting normally closed valve in said passage-way, said valve being adapted to open and permit the passage of fluid from either chamber when pressure is applied within such chamber, to the other chamber.

Chicago, Illinois, January 29, 1900.

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Witnesses:

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