

P. S. PITTENGER.
 PACKAGE AND HYPODERMIC SYRINGE.
 APPLICATION FILED JUNE 28, 1918.

1,288,174.

Patented Dec. 17, 1918.

Fig. 1.

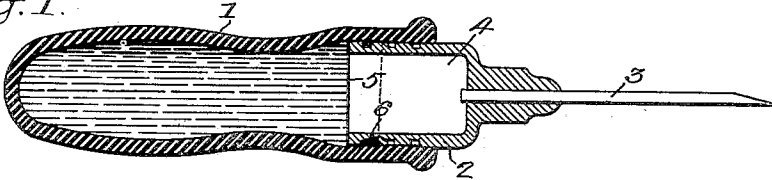


Fig. 2.

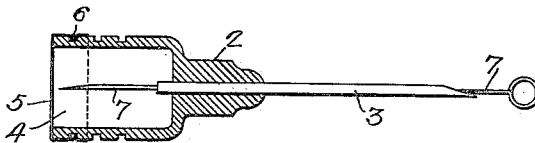


Fig. 3.

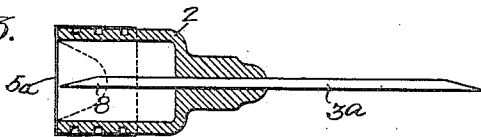


Fig. 4.

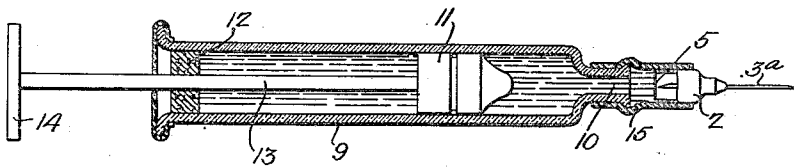


Fig. 5.

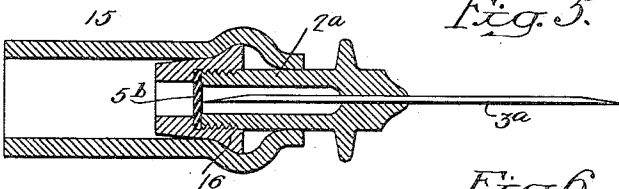
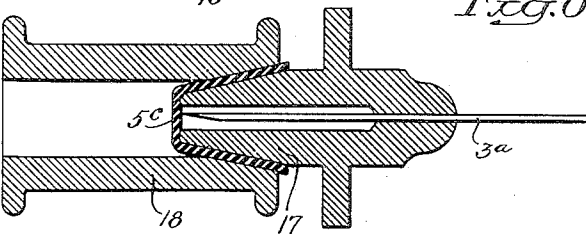


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PACKAGE AND HYPODERMIC SYRINGE.

1,288,174.

Specification of Letters Patent.

Patented Dec. 17, 1918.

Application filed June 28, 1918. Serial No. 242,438.

To all whom it may concern:

Be it known that I, PAUL S. PITTENGER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a Package and Hypodermic Syringe, of which the following is a specification.

One object of my invention is to provide a relatively simple, conveniently operative and inexpensive form of hypodermic syringe, which in addition to its ordinary functions, shall be particularly adapted for use as a shipping package and container for medicinal liquids, vaccines, serums and the like;—the invention particularly contemplating a novel arrangement of parts whereby the liquid within the container shall be effectually prevented from coming in contact with the needle or other metallic parts of the device until the time at which the syringe is put into use.

I further desire to provide a hypodermic syringe with novel means for hermetically sealing its liquid-containing compartment under normal conditions, which means however, shall be capable of being unsealed with the utmost ease and in some cases automatically, when it is desired to expel the liquid through the needle.

Another object of the invention is to provide a hypodermic syringe having the above characteristics, whose construction and arrangement of parts shall be such as to permit of its proper use by an unskilled operator;—the construction being such that it may be conveniently carried for long periods of time without danger of deterioration or contamination of the contained liquid.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figure 1 is a longitudinal section of a hypodermic syringe constructed in accordance with my invention and illustrating it as equipped with one of the simplest forms of sealing structures;

Figs. 2 and 3 are longitudinal sections of the metallic portions of the syringe shown in Fig. 1, showing them as equipped with modified forms of my invention;

Fig. 4 is a longitudinal section illustrating my invention as applied to another form of hypodermic syringe; and

Figs 5 and 6 are longitudinal sections illustrating modifications of my invention. 5

In Fig. 1 of the above drawings, 1 represents an elongated container of collapsible material such as a bulb of rubber, permanently closed at one end and having inserted in its other end a tubular head or plug 2 in which is fixed a hypodermic needle 3. Said head and needle are customarily made of metal and the former is preferably provided with one or more annular ridges or grooves 4. 61

In order to normally prevent access of the liquid contents of the bulb or container 1 to the metal of the head or needle, I seal the inner open end of the former with a sheet 5 of easily puncturable material such as rubber dam, and in Fig. 1 show this as extending over the cylindrical surface of the head 2 to which it is held by a thread 6 tied around the same so as to force the sheet rubber into one of the annular grooves 4. 70
Obviously the rubber may be given the form of a cap and snapped or forced over the head 2 where it is held by its own resiliency as well as by the bulb 1. When the head 2 with its seal or closure 5 is inserted in the bulb 1, it serves as a cork or plug to absolutely cut off communication of said liquid with the atmosphere, at the same time also serving to absolutely prevent access of said liquid to the metal parts comprised by the head 2 and needle 3. 75 80 85

In order to permit of the delivery of the liquid from the interior of the bulb or container 1, I may utilize a peculiar property of rubber by virtue of which a small hole or cut made in the rubber sheet automatically closes when the hole-producing tool or implement is removed, such action occurring if the rubber sheet be punctured when in an unstretched condition, by a needle. 90 95

I have utilized this property of the rubber in one form of my invention by puncturing the closure 5 preferably at or adjacent its center, prior to the introduction of the head 2 into the bulb 1 and have found that the liquid contained in said bulb will not under normal conditions leak out through the cut or hole in the rubber sheet nor will it allow the entrance of micro-organisms, etc., from the cavity of the head 2 to the interior of the bulb 1. It is therefore possible to fill 100 105

the bulb with any desired liquid and to utilize the syringe as a shipping package or container without the danger of escape of the liquid in the bulb or of its deterioration and contamination.

When it is desired to use the instrument the needle 3 is inserted in the required manner into or through the skin of a patient, after which pressure upon the bulb 1 causes the liquid to press upon and stretch the rubber closure 5, forcing it into the hollow of the head 2 and causing the previously formed cut to open, thus allowing the liquid to pass from the bulb into the head and thence out through the needle.

In that form of my invention shown in Fig. 2, I provide the head 2 of the needle with a closure 5 but in this case do not puncture the latter. When it is desired to expel the liquid in the bulb or container to which the head 2 is attached, a stylet 7 is introduced through the needle and caused to puncture the rubber sheet 5, after which said stylet is withdrawn and the instrument operated in the well known manner.

In Fig. 3 I have illustrated another modification of the invention in which the needle 3^a carried by the head 2 is provided with an inner or second point 8 terminating immediately adjacent the normally imperforate rubber sheet closure 5. When pressure is exerted upon the collapsible or other liquid-containing portion of the syringe to which this form of the invention is attached, the seal or closure 5 is bulged outwardly into the hollow of the head 2, as shown in dotted lines, being thus forced against the adjacent needle point and being at once punctured thereby so that the liquid in the syringe body flows directly into the needle whose opening is now within the liquid holding space of the bulb 1.

While the above invention is particularly adapted to a hypodermic syringe of the form shown in Fig. 1, it will be understood that it may obviously be utilized in other forms of syringe and in similar apparatus such for example, as the piston syringe shown in Fig. 4. In this instrument there is provided a cylindrical barrel or body 9 having at one end a reduced neck 10 and containing a slidable piston 11. The opposite end of said barrel is closed by a cork or similar structure 12 serving to guide the piston rod 13, on whose outer end is mounted an operating handle 14. In this instance the reduced neck 10 of the barrel is connected by a short length of rubber tubing 15 to the needle head or plug 2 which as before, is sealed from the liquid in the barrel 9 and is caused to close the latter by means of the rubber sheet 5 which is held over its inner end. Obviously said sheet may be imperforate as shown in Fig. 2 so that it requires to be punctured by means of a stylet before

the apparatus can be used or on the other hand it may be provided at the time of its manufacture, with a hole or puncture of such a nature as not to interfere with the sealing function of said closure unless pressure is exerted upon it by the liquid in the barrel or container 9.

As shown in Fig. 5, the rubber or other seal may consist of a disk 5^b confined between the end of the needle head or plug 2^a and the shoulder of a nut 16 threaded thereon. This disk may be perforated in any of the ways previously described, though I have shown it as having the second point of a double pointed needle so placed as to puncture it when it is bulged by pressure.

Again as in Fig. 6, the rubber or other sealing sheet 5^c may be confined between a tapering tubular member 17 and the walls of a correspondingly tapered cavity formed in a second tubular member 18 so that it extends over and closes the passage from the latter to the former which is shown as having a needle mounted in it as in Figs. 3 and 5.

While I preferably employ rubber sheeting as the closure for the needle head or plug 2, it is obvious that other puncturable material, either flexible or relatively rigid, may be employed for this purpose, and likewise, while an elongated rubber bulb is particularly adapted for use with the sealed needle head above described, the latter may be employed with advantage with other forms of liquid containers regardless of whether these are made of collapsible material or are of other types.

It is obviously immaterial whether the needle structure or metallic needle-carrying member be employed in connection with a diaphragm 5 in direct engagement with the collapsible container 1, or whether as shown in Fig. 4, it be mounted in a flexible tube 15 forming a continuation of or connected to a container or reservoir such as the barrel 9;—the essential feature of this part of my invention residing in the provision of the tubular structure in combination with a diaphragm seal so mounted as to normally exclude the liquid from atmospheric contamination or from contact with the material of the conduit, while being adapted to automatically puncture or open to permit of the delivery of liquid when pressure is exerted thereon, or to be conveniently punctured prior to the application of such pressure.

I claim:

1. The combination in a hypodermic syringe of a container having an outlet; a delivery conduit mounted in said outlet; and a seal for the container consisting of a diaphragm of sheet material closing the passage of the conduit and confined between the walls of the outlet and those of said conduit.
2. The combination in a hypodermic syringe of a container having an outlet; a delivery conduit mounted in said outlet; and a seal for the container consisting of a diaphragm of sheet material closing the passage of the conduit and confined between the walls of the outlet and those of said conduit.

inge of a container; a needle structure connected to said container and permanently held from longitudinal movement; and a diaphragm of sheet material sealing the container and positioned to normally prevent access of material in the latter to the needle structure.

3. The combination in a hypodermic syringe of a container; a tubular structure mounted in the outlet of said container; a hypodermic needle mounted in said structure; and a seal of relatively thin material mounted over one end of the tubular structure in position to normally cut off the liquid in the container from the tubular structure and the needle.

4. A hypodermic syringe consisting of a collapsible container permanently closed at one end and having a needle head inserted in its opposite end; a needle for said head; and a diaphragm extending across the opening into the needle and confined between the latter and the walls of the container in position to seal the latter as well as cut off the liquid therein from the needle head.

5. The combination in a hypodermic syringe of an elongated rubber bulb; a needle structure including a tubular head mounted in one end of said bulb; and a diaphragm of relatively thin material mounted over the entrance to the needle head in position to normally exclude therefrom the liquid in the container.

6. The combination in a hypodermic syringe of a collapsible container; a needle structure mounted in one end of the same; and a diaphragm of sheet rubber extending over the inlet to the needle structure and

confined between the same and the walls of the container.

7. The combination in a hypodermic syringe of a container; a tubular delivery conduit therefor; and a diaphragm having a normally sealed opening therein mounted between the container and the conduit in position to prevent passage of liquid from the container to the conduit.

8. The combination in a hypodermic syringe of a container; a tubular delivery conduit therefor; and a diaphragm of relatively thin material mounted between the conduit and the container in position to normally seal the latter, said diaphragm having a cut adapted to open under pressure on the diaphragm but normally sealed to prevent passage of liquid.

9. The combination in a hypodermic syringe of a container; a needle structure therefor; with a diaphragm normally sealing the container from the needle structure; and a point extending adjacent the diaphragm in position to pierce the same when it is deflected from its normal position.

10. The combination in a hypodermic syringe of a collapsible container; a tubular head mounted in the outlet of the container; a diaphragm normally sealing the entrance to the tubular head; and a double pointed needle mounted in the head with one of its points extending adjacent the diaphragm in position to puncture the same when the collapse of the container causes pressure to be exerted upon said diaphragm.

In witness whereof I affix my signature.

PAUL S. PITTENGER.