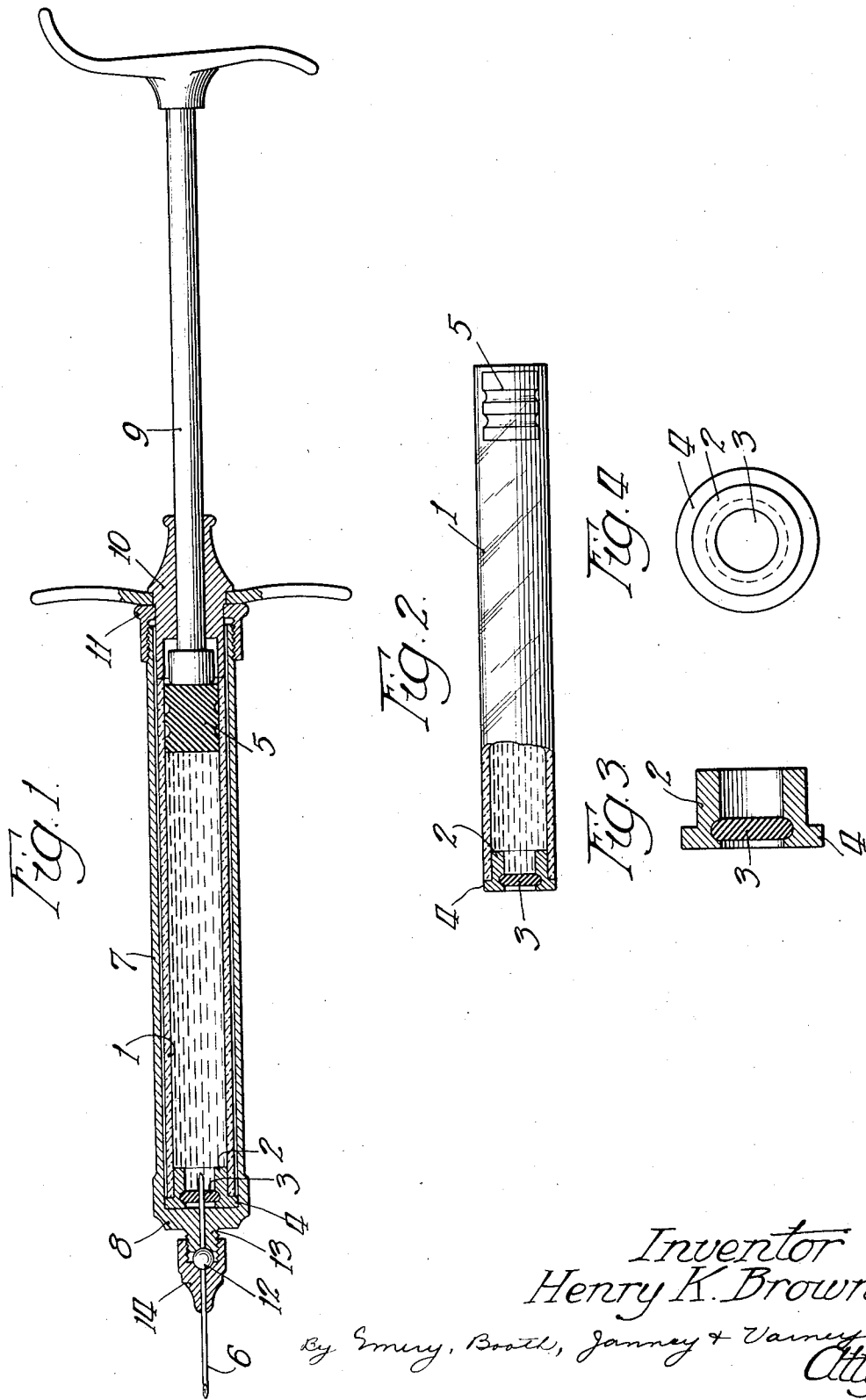


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H. K. BROWN
HYPODERMIC SYRINGE
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UNITED STATES PATENT OFFICE.

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HYPODERMIC SYRINGE.

Application filed December 12, 1927. Serial No. 239,314.

This invention relates to hypodermic syringes of the kind comprising a cartridge and cartridge-piercing canula in an assembled injection-administering organization.

5 The invention will be explained by reference to an illustrative embodiment shown in the accompanying drawings, and will be more particularly pointed out in the claims following the description.

10 In said drawings:

Fig. 1 is a longitudinal sectional view of a syringe or injection-administering organization comprising or containing the illustrative embodiment of the invention;

15 Fig. 2 is a side elevation of the cartridge embodied in said organization, with the front end portion of the cartridge in section;

Fig. 3 is an enlarged longitudinal sectional view of the closure for the fore end of the

20 cartridge; and

Fig. 4 is a rear end view of said closure.

Referring to the cartridge shown in the drawings, the glass cartridge tube 1 has its fore end sealed by a closure which comprises 25 a tubular plug or bushing 2 with a stopper 3 therein. The pushing 2 may be of material such for instance as cork, wood or a suitable composition and tightly fitted in the tube to seal the same; or the bushing 30 may be of glass or other material and secured in the tube by an appropriate cement or adhesive. The bushing may have a flanged outer end as shown, the flange 4 thereof overlapping and protecting the edge of the glass 35 tube. The stopper 3 in the bushing may be of suitable material such for instance as resilient soft rubber or a rubber-like composition to be pierced by a fine canula or hollow needle and to close or seal around the 40 same so as to prevent leakage or flow of the fluid contents of the cartridge except through the needle. Said stopper 3 is secured in the bushing 2 in such manner as to provide an adequate sealing closure therefor and to effectually resist displacement of 45 the stopper relative to the bushing either by the piercing operation or the fluid-ejecting operation. In this instance the stopper is a rubber plug or disc of larger diameter than the bore of the bushing and secured in an annular groove in the bushing, whereby the stopper is held substantially immovably in the bushing by mechanical interlocking therewith.

55 The cartridge tube, which is shown sub-

stantially straight and may be a section of commercial glass tubing, has in its opposite end a plug 5, preferably an externally corrugated rubber plug tightly fitted in the tube and which functions as a sealing closure and 60 also as a piston adapted to be pushed inward to expel the fluid contents of the cartridge through the needle piercing the closure in the fore end of the tube. This typifies one form of cartridge pierceable by a needle and 65 constructed to be reduced in interior volume for expelling the contents through the needle.

The syringe or injection-administering organization represented in Fig. 1 comprises said cartridge in assembly with means embodied in this instance in a syringe-like instrument. Referring to said Fig. 1, the cartridge is held in the tubular-like instrument body 7, the fore end of the cartridge abutting 75 against the head 8 of said body. A cartridge-piercing canula is provided by a double-pointed hypodermic needle 6, removably secured to said head 8, the needle being axially arranged with its inner end protruding inwardly to pierce the rubber stopper 80 3 in the center of the fore cartridge closure. A plunger rod 9 mounted in the opposite end of the instrument is arranged to enter the cartridge tube to drive in the piston plug 5 for ejecting the fluid through the needle. 85

The particular instrument selected for illustration has a detachable breech-head 10, permitting endwise insertion of the cartridge into the instrument when said breech-head with the plunger rod carried thereby is removed. The screw-cap 11 screwed upon the threaded rear end of the cartridge holder or instrument body 7 is unitary with or rigidly secured on said breech-head. Said breech-head has an inwardly protruding portion to 95 bear on the rear end of the cartridge and push it into place with the flanged end of the bushing 2 abutting against the inner face of the head 8. The piercing of the stopper 3 may be accomplished by pushing the cartridge 100 into position after the needle is affixed, or by pushing in and affixing the needle after the cartridge is in place and held by the breech-head. As shown, the needle has an intermediate enlargement 12 seated on the end of the screw-threaded nipple 13 and secured by the screw-cap 14. 105

It will be observed that the closure comprising the tubular plug or bushing 2 and the stopper 3 therein is of such character 110

as to provide a substantially longer portion of the bushing in engagement with the glass tube than the stopper, or in other words a comparatively short rubber stopper may be used. This stopper, by virtue of its interlocking engagement with the cork bushing is not liable to be displaced in the piercing operation. The bushing, by virtue of its tight bearing in the glass tube, or its adhesive connection therewith in case an adhesive is employed, cannot be displaced, and where the bushing is of the flanged form shown the flange would prevent inward displacement in any event. The inner end of the needle protrudes through the rubber stopper 3, but not beyond the inner end of the tubular bushing, so that there is no liability of pushing the rubber piston plug 5 against the inner point of the needle, since the inner end of the tubular bushing provides a stop to limit the forward movement of the piston plug. In the fluid-ejecting operation, the flange 4 of the bushing 3, especially in case the bushing is of cork or other yieldable material, affords a protective cushion and gasket. There is not liable to be leakage around the bushing, because even if there is no adhesion between the bushing and the glass tube the hydrostatic pressure will act radially outward on the interior of the tubular bushing if of cork or the like and thus tend to tighten its hold in the glass tube.

Notice is given of my application Serial No. 239,315, filed December 12, 1927, in which I disclose a cartridge syringe and cartridge therefor having a composite seal-

ing closure comprising a bushing and stopper therein of resilient material adapted to be pierced by the needle, and in which application such cartridge and syringe are broadly claimed; this present application being for subject-matter which embodies the broader invention claimed in said application Serial No. 239,315.

I claim as my invention:

1. A hypodermic syringe embodying as a separable operative component a cartridge constructed to have its interior volume reduced and having in its fore end a composite closure comprising a bushing and a plug to be pierced by a needle sealing the bore of the bushing and mechanically interlocked therewith to prevent displacement of the plug by the piercing operation or the fluid-ejecting operation; the syringe comprising said cartridge and needle with means in assembly therewith to provide an injection-administering organization.

2. A syringe cartridge embodying a tube having a bushing and a plug to be pierced by a needle sealing the bore of the bushing and mechanically interlocked therewith against outward or inward displacement.

3. A syringe cartridge embodying a tube having a bushing and a plug to be pierced by a needle sealing the bore of the bushing, the bushing having an interior annular groove and the plug being fitted in said groove.

In testimony whereof, I have signed my name to this specification.

HENRY K. BROWN.