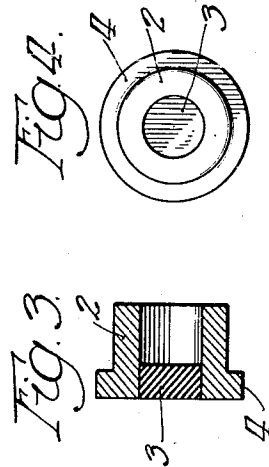
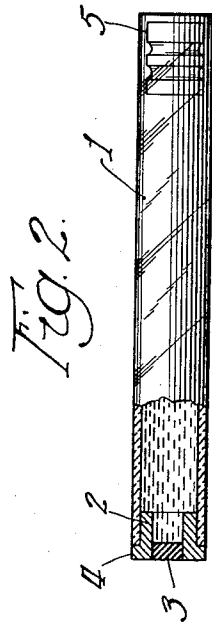
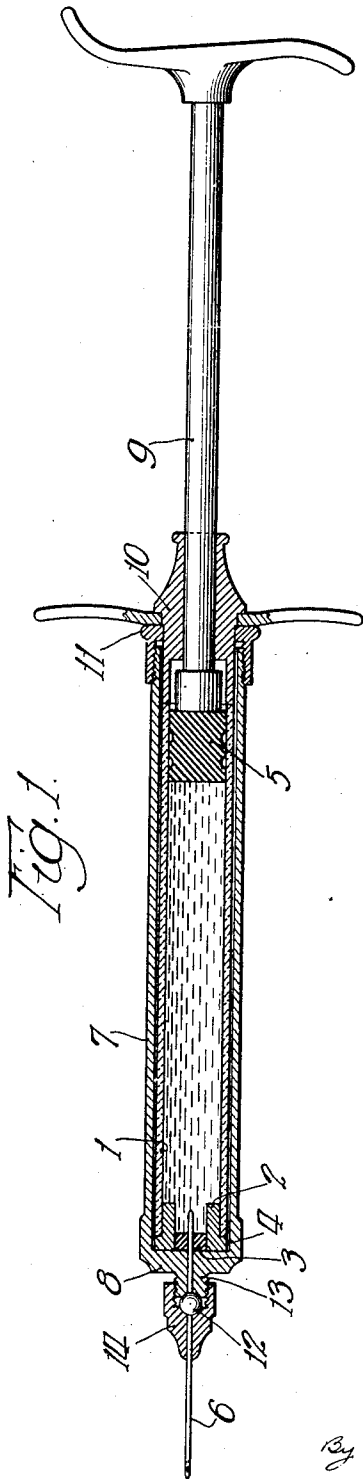


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H. K. BROWN
HYPODERMIC SYRINGE

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Inventor
Henry K. Brown

By Emery, Booth, Janney & Varney
Attys.

UNITED STATES PATENT OFFICE

HENRY K. BROWN, OF CHICAGO, ILLINOIS, ASSIGNOR TO COOK LABORATORIES, INC.,
OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

HYPODERMIC SYRINGE

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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;

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 bushing 2 may be of material such for instance as cork or a composition of cork or the like, or wood, and tightly fitted in the tube to seal the same; or the bushing
30 may be secured in the tube by an appropriate cement or adhesive. The bushing may be of flanged form as shown, the flange 4 thereof overlapping and protecting the edge of the glass tube. The stopper 3 may be of
35 suitable material such for instance as resilient soft rubber or a suitable rubber-like composition which can be pierced by a fine canula or hollow needle and will close or seal around the same and be self-sealing upon
40 withdrawal of the needle. Said stopper 2 may be suitably secured in the bushing 2 to provide a sealing closure therefor and to resist displacement of the stopper relative to the bushing. In this instance, the stopper
45 3 is simply a small plane or cylindric rubber plug, tightly fitted in the bore of the bushing. By employing such a stopper originally of larger diameter than the bore of the bushing and forcibly inserting it in the
50 bushing with resultant compression of the

rubber stopper, there is obtained a tenacious hold of the stopper in the bushing; the frictional engagement of such rubber stopper in the bore of the cork or wood bushing being
55 more resistant to displacement tendencies than in the case of a rubber stopper fitted directly in a smooth bored glass tube. This same advantage would be obtained if the bushing were of glass with a ground or roughened bore; or the stopper could be
60 fixedly secured in a bushing of glass, cork or other material by an appropriate cement or adhesive. A glass bushing could be adhesively secured in the tube by a cement or by fusion with the tube. Where a stopper
65 of the character shown is employed, its outer face is preferably flush with the outer face of the bushing 2. The tubular body of the bushing extends inwardly substantially beyond the inner end of the stopper. Thus
70 the bushing 2 with its stopper 3 provides a cartridge closure substantially in the form of a recessed plug, the closed outer end wall of which embodies an axial or central portion of pierceable material of a different substance from that of the body of the closure
75 plug.

The cartridge tube, which is shown substantially straight and may be a section of commercial glass tubing, has in its opposite
80 end a plug 5, preferably an externally corrugated rubber plug tightly fitted in the tube and which functions as a sealing closure and also as a piston adapted to be pushed inward to expel the fluid contents of the cartridge
85 through the needle piercing the closure in the fore end of the tube. This typifies one form of cartridge pierceable by a needle and constructed to be reduced in interior volume for expelling the contents through the needle.
90

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
95 cartridge is held in the tubular-like instrument body 7, the fore end of the cartridge abutting against the head 8 of said body. A cartridge-piercing canula is provided by a double-pointed hypodermic needle 6, remov-
100

ably secured to said head 8, the needle being axially arranged with its inner end protruding inwardly to pierce the rubber stopper 3 in the center of the fore cartridge closure. A
 5 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.

The particular instrument selected for
 10 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 engaging the
 15 threaded rear end of the cartridge holder or instrument body 7 is unitary with or rigidly secured on the breech-head. Said breech-head has an inwardly protruding portion to bear on the rear end of the cartridge and push it into place with the
 20 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 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
 25 the screw-threaded nipple 13 and secured by the screw-cap 14.

It will be observed that the composite closure consisting of the tubular plug or bushing 2 and the stopper 3 therein is of such
 35 character 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 tight engagement with the bore of the bushing or by fixed connection therewith as for instance by a cement, is not liable to be displaced in the piercing operation. The bushing, by virtue of its tight
 45 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
 50 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. By employing a bushing of cork or other yieldable material, the flange 4 affords
 55 a protective cushion and gasket during the fluid-ejecting operation, and there is not liable to be leakage around the bushing, because even if there is no adhesion between the cork bushing and the glass tube the hydrostatic pressure will act radially outward

on the interior of the tubular bushing and thus tend to tighten its hold in the glass tube. The tight fit of the compressed rubber stopper 3 in the bore of the bushing should ordinarily be sufficient to resist relative displacement between the bushing and stopper by the fluid-ejecting operation, though as before indicated, the stopper may be immovably held in the bushing by other means as for instance an adhesive connection therewith.

I claim as my invention:

1. A hypodermic syringe comprising an assembled injection-administering organization embodying a cartridge and cartridge-piercing needle and constructed and organized to operate by reducing the interior volume of the cartridge to expel the fluid contents through the needle; said cartridge embodying a tube having in its fore end a composite sealing closure comprising a bushing and stopper therein adapted to be pierced by the needle and to seal around the same so as to prevent leakage or flow of fluid except through the needle.

2. A hypodermic syringe comprising an assembled injection-administering organization embodying a cartridge and cartridge-piercing needle and constructed and organized to operate by reducing the interior volume of the cartridge to expel the fluid contents through the needle; said cartridge embodying a tube having in its fore end a flanged bushing of yieldable material, the flange of which overlies the end of the tube to provide a protective and cushioning gasket, and a stopper secured in said bushing of material adapted to be pierced by the needle and to seal around the same; the organization including an abutment against which the bushing bears in the fluid-ejecting operation.

3. A hypodermic syringe comprising an assembled injection-administering organization embodying a cartridge and cartridge-piercing needle and constructed and organized to operate by reducing the interior volume of the cartridge to expel the fluid contents through the needle; said cartridge comprising a tube having in its fore end a bushing and stopper therein to be pierced by and to seal around the needle, and having in its opposite end a piston plug to be forced inwardly to expel its fluid contents through the needle piercing said stopper, said bushing extending rearwardly beyond the inner end of the needle and affording a stop to limit the forward movement of said piston plug.

4. A hypodermic syringe comprising an assembled injection-administering organization embodying a cartridge and cartridge-piercing needle and constructed and organized to operate by reducing the interior volume of the cartridge to expel the fluid contents through the needle; said cartridge em-

bodying a tube having in its fore end a bushing and stopper therein to be pierced by and seal around the needle, said bushing being of yieldable material and affording a tubular wall around the needle adapted to be pressed outward against the bore of the tube by the hydrostatic pressure in the fluid-ejecting operation.

5 5. A syringe cartridge comprising a sealed medicament container embodying a tube with a bushing in its fore end and a stopper secured therein adapted to be pierced by a needle and to seal around the same, the cartridge constructed to have its interior volume reduced for expelling the fluid contents through the needle.

6. A syringe cartridge comprising a sealed medicament container embodying a tube having in its fore end a composite closure consisting of a flanged bushing of yieldable material and a stopper therein of material to be pierced by a needle and to seal around the same, the flange of said bushing overlying the end of the glass tube to protect the same and to provide a cushion therefor, the cartridge constructed to have its interior volume reduced for expelling the fluid contents through the needle.

7. A syringe cartridge embodying a tube having in its fore end a composite closure comprising a flanged bushing of yieldable material and a stopper therein to be pierced by a needle, the flange of said bushing overlying the end of the tube and the tubular body of the bushing extending rearward substantially beyond the stopper; said cartridge constructed to have its interior volume reduced for expelling the fluid contents through the needle.

8. A syringe cartridge comprising a sealed tube having in its fore end a bushing and pierceable stopper therein and having in its opposite end a piston-plug, the bushing extending rearward substantially beyond the stopper to limit the forward motion of the piston-plug and to protect the needle therefrom.

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

HENRY K. BROWN.