

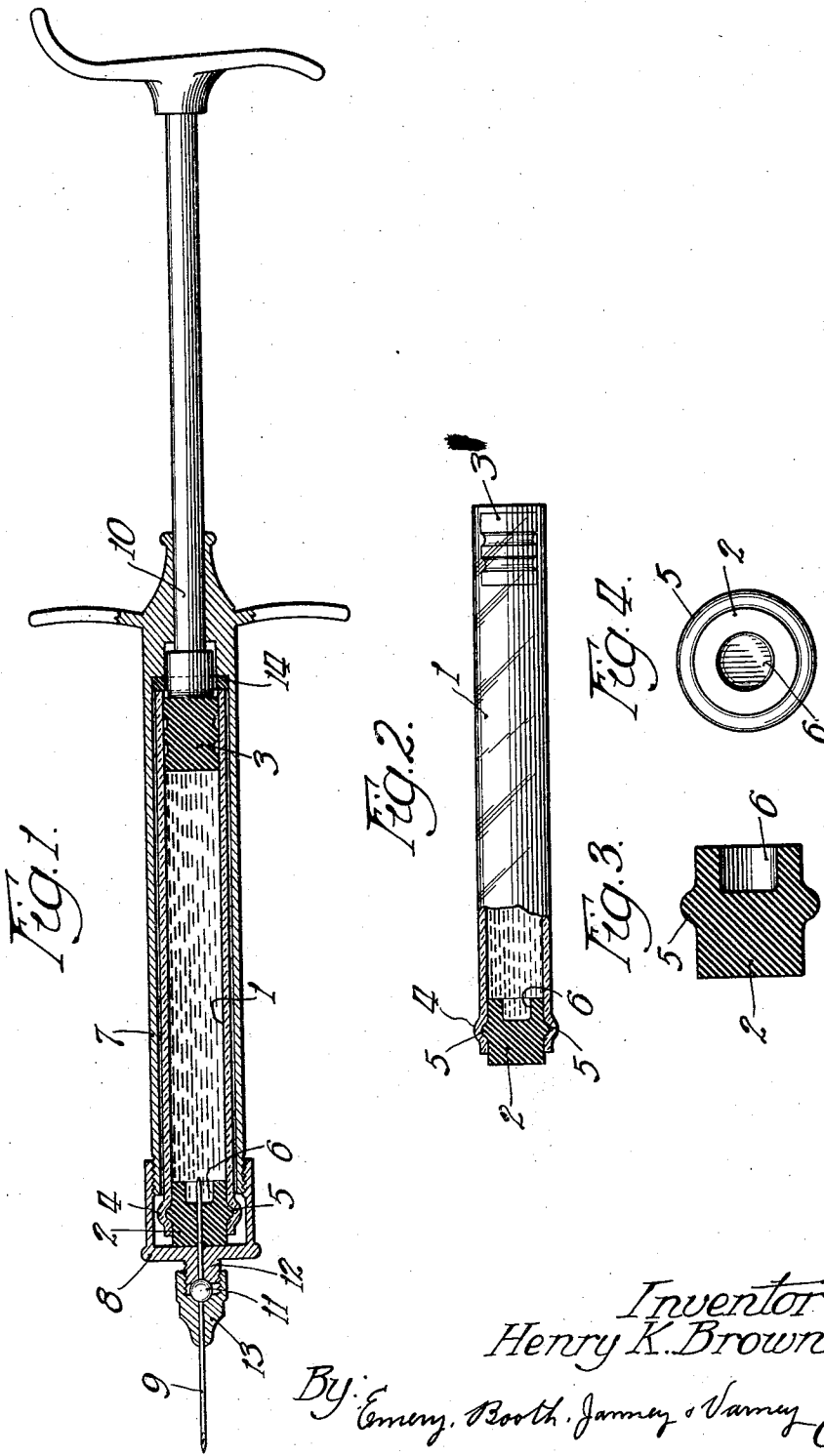
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H. K. BROWN

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HYPODERMIC SYRINGE

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UNITED STATES PATENT OFFICE

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HYPODERMIC SYRINGE

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

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

In said drawings:

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

Fig. 2 is a side elevation of the cartridge embodied in said syringe, the front portion of the cartridge being shown in section;

Fig. 3 is an enlarged sectional view of a pierceable stopper in the fore end of said cartridge; and

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

The cartridge embodied in the illustrative syringe comprises a glass tube 1 sealed at its ends by stoppers 2 and 3 and containing anæsthetic solution or other medicament to be dispensed. The stoppers are preferably of resilient material such as soft rubber or other suitable material or composition. The stopper 2 is to be pierced by a fine canula or hollow needle and to seal around the same, and the stopper 3 is to be pushed inward to expel the fluid through the needle. To secure the stopper 2 in the tube so as to resist relative displacement in the cartridge-piercing or fluid-ejecting operations, said stopper is mechanically interlocked with the tube by an annular rib on one of them engaging an annular groove in the other. In this instance the tube is shown beaded at 4 to provide a groove engaging the annular projection 5 on the stopper 2, whereby the desired interlocking is obtained. As shown, the stopper protrudes substantially beyond the fore end of the glass tube to provide a cushion. By forming the stopper with the inwardly facing axial cavity 6, the advantage is obtained that the inner tubular end of the stopper is readily compressed and facilitates the compression of the immediately adjacent portion of the stopper when forcibly insert-

ing it into the tube so as to seal the rib 5 in the groove provided by the bead 4. On the other hand, in the fluid-ejecting action the hydrostatic pressure acting on the annular wall surrounding said recess presses said wall more forcibly against the interior of the tube, tending to tighten the hold of the stopper and resisting displacement.

The syringe or injection-administering organization shown in Fig. 1 comprises said cartridge with means embodied in this instance in a syringe-like instrument. Referring to said Fig. 1, the cartridge is mounted in the holder or tubular-like instrument body 7 with the fore end of the cartridge seated against the inner side of the head 8, and with the rubber stopper 2 impaled upon and forming a resilient seal around the inwardly-protruding end of the double-pointed needle 9. In operation, the plunger rod 10 is forced into the cartridge-tube, drawing the piston plug 3 inwardly and forcibly expelling the medicament solution through the needle. In this action, the mechanical interlock between the stopper 2 and the tube resists tendency to relative displacement while the protrusion of the stopper beyond the end of the glass tube cushions it against end thrust. The resiliency of the compressed stopper and the hydrostatic pressure action on the interior of the tubular part of the stopper contribute with the mechanical interlock in the maintenance of a good seal.

In the particular instrument selected for illustration, the head 8 is detachable, being screwed upon the front end of the instrument body 7. When the head 8 is removed, the cartridge may be inserted endwise into said body, after which the head 8 carrying the needle 9 may be attached, so as to cause the inner end of the needle to pierce the stopper or rubber plug 2. The needle 9, which is removably affixed to the head 8, is shown having an intermediate enlargement 11 seated on the end of the screw-threaded nipple 12 and secured by the screw-cap 13. A gasket 14 is shown fitted in the breech end of the cartridge holder or instrument barrel, the cartridge being clamped between said gasket and the

inner face of the head 5 when the latter is screwed on the instrument body.

I claim as my invention:—

1. A syringe cartridge comprising a sealed medicament container having a closure to be pierced by and seal around a needle and constructed to have the interior volume of the cartridge reduced for ejecting the fluid contents through the needle, said cartridge embodying a substantially straight glass tube beaded near its fore end to provide an internal annular groove and said closure comprising a stopper of resilient material formed with an annular rib engaging in said groove and thereby mechanically interlocked with the tube, the stopper protruding substantially beyond the end of said tube to provide a cushioning means.

2. A syringe cartridge comprising a straight glass tube beaded near its fore end, having a sealing stopper of resilient material fitted in the said beaded fore end and adapted to be pierced by a needle, and having a piston plug in its opposite end adapted to be pushed into or through the tube to eject the liquid contents through the needle, said pierceable stopper shaped to fit the bead of the tube, being otherwise cylindrical and of substantially uniform diameter and having cylindrical portions fitted in the tube both behind and in front of the bead of the tube, and the cylindrical portion of said stopper in front of the bead projecting substantially beyond the fore end of the tube to provide a cushioning means.

3. A syringe cartridge comprising a sealed medicament container having a closure to be pierced by and seal around a needle and constructed to have the interior volume of the cartridge reduced for ejecting the fluid contents through the needle, said cartridge embodying a substantially straight glass tube formed near its fore end with an annular bead providing an interior annular groove and said sealing closure comprising a cylindrical stopper of resilient material formed intermediate its ends with an annular rib engaging said groove, whereby the stopper is interlocked with the tube to resist relative displacement in either direction between the tube and stopper during the fluid-ejecting operation.

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

HENRY K. BROWN.