Aug. 11, 1964 S. J. SARNOFF 3,144,178

CARTRIDGE HOLDER

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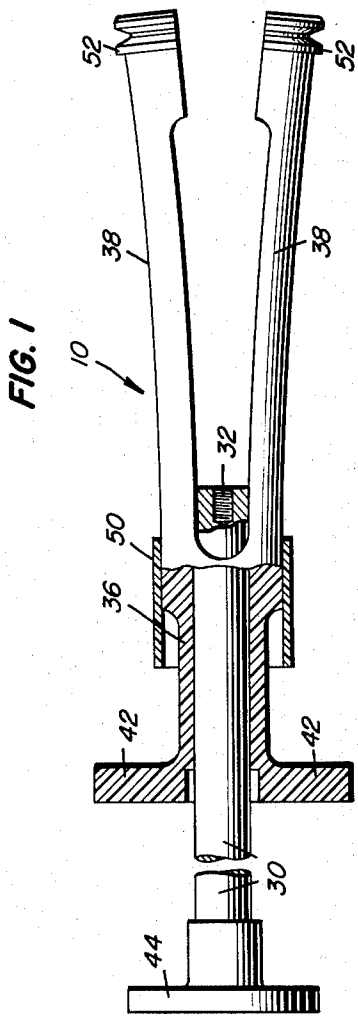

FIG. 1

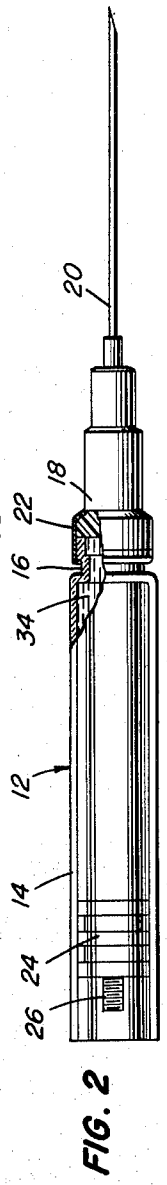

FIG. 2

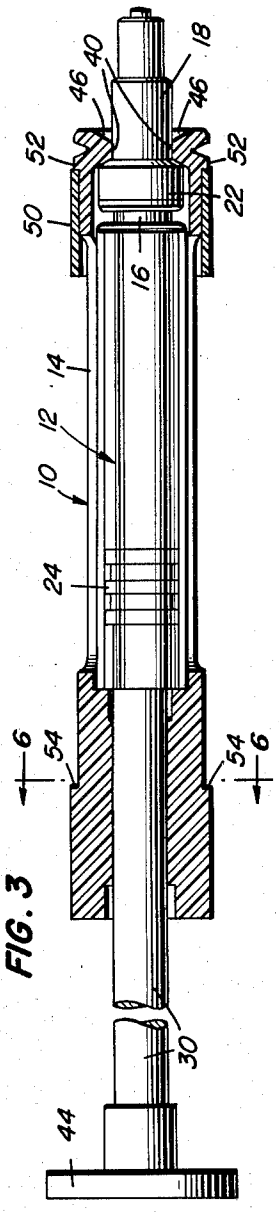

FIG. 3

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FIG. 5

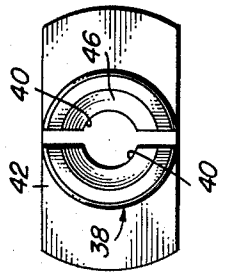


FIG. 6

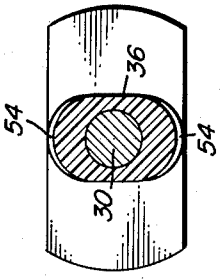


FIG. 4

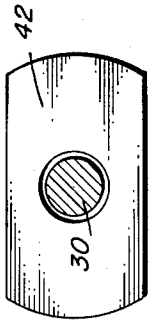


FIG. 7

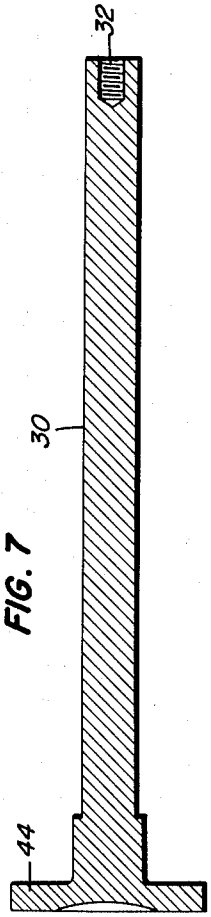
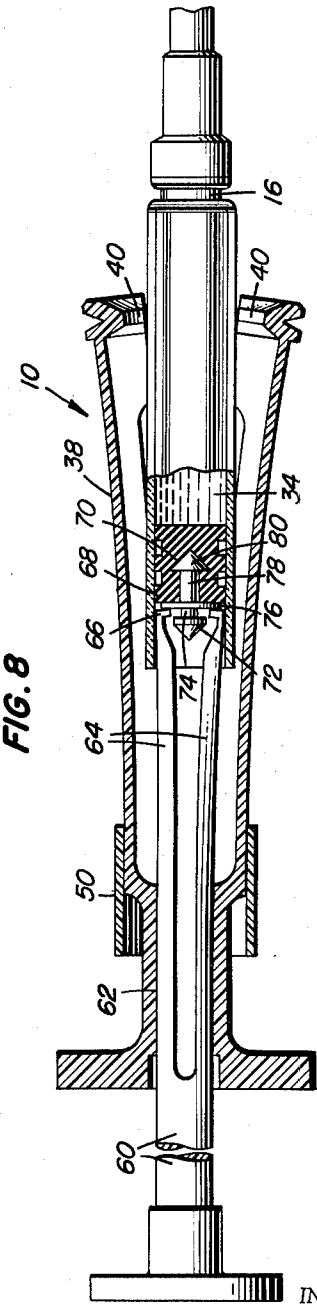


FIG. 8



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3,144,178

CARTRIDGE HOLDER

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2 Claims. (Cl. 222—327)

This invention relates to medical holders or syringes for use with cartridges containing medication, wherein a plunger of the holder couples up with a medicament-expelling piston of the cartridge. In particular, the invention relates to a holder for use with a cartridge of the type which may be used once and then thrown away.

An object of the invention is to provide a holder for such a cartridge to enable quick assembly of the cartridge therewith by endwise movement of the cartridge into the holder between open jaws thereof.

Another object of the invention is to provide for such assembly and automatic coupling with the plunger of the holder upon passage of the cartridge between the open jaws of the holder.

Other objects will become apparent upon consideration of the following specification, when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a side elevation, partly in section, of a holder forming the subject matter of the invention;

FIG. 2 is a view of a type of cartridge for use with the holder;

FIG. 3 is a view of the holder similar to FIG. 1, the holder being turned 90° from the position shown in FIG. 1 but with its jaws closed and secured in position to hold firmly the cartridge inserted into the holder;

FIG. 4 is a rear end view of the holder with the plunger shown in section;

FIG. 5 is a front or cartridge-receiving end view of the holder;

FIG. 6 is a sectional view of the plunger on the line 6—6 of FIG. 3;

FIG. 7 is a sectional view of the plunger utilized in FIG. 1; and

FIG. 8 illustrates a modified form of plunger and piston and shows the position of parts just before coupling of the plunger and piston takes place.

Now referring to the drawings with greater particularity, at 10, FIGS. 1 and 3, is indicated generally a holder adapted to receive and firmly hold therein a cartridge 12. The cartridge 12, shown by itself in FIG. 2, comprises a transparent tube 14 of glass or the like provided with a necked down portion 16 and a shouldered hub 18 of cylindrical configuration abutting the end of the glass tube. The hub is held to the end of the glass tube by spinning the rearward end of a collar 22 into the necked down portion 16 of the glass tube. The hub is traversed by a hollow needle 20 rigidly secured therein. The left-hand end of the cartridge, as viewed in FIG. 2, is provided with a piston 24, formed, for example, of resilient material, such as of rubber, which piston is provided with a coupling element in the form of a threaded stud 26 for coupling to a plunger 30 of the holder, the plunger for this purpose being provided with a threaded socket 32. The space in the cartridge between the piston and the hub 18 is filled with medication 34.

The holder is comprised of a resilient material, such as plastic, having a body 36 and spaced apart legs 38 of any number, but preferably two in number, said legs terminating in opposed jaws 40, as indicated in FIGS. 3 and 8. The body may have any desired cross section, as, generally elliptical, the end of the body being provided with a generally rectangular piece 42 crosswise of the body and adapted to be engaged on its under surface by the

index and middle fingers while the plunger top 44 is engaged by the thumb. The legs 38 of the holder are other, sufficient to allow for free insertion of a cartridge longitudinally of the holder and between the jaws 40. The exterior surfaces of the legs, when they lie in parallelism, lie in a cylindrical surface, for a reason which will soon become apparent. While it is desirable to have sufficient normal spread of the jaws to allow for free unimpeded insertion of a cartridge into the holder, a slight forcing of the fingers apart to allow for this insertion is possible since the jaws are bevelled on their outer faces as indicated at 46 to allow for spreading of the jaws as the piston end of the cartridge is inserted into the holder between the jaws. The bevelled outer faces 46 of the jaws also function to guide the cartridge into the holder when the cartridge is inserted thereinto. The jaws are preferably substantially semicircular in shape, as seen in FIG. 5, to snugly engage about the hub 18 of the cartridge.

In order to draw the jaws together, after the cartridge has been fully inserted into the holder, there is provided a sleeve 50 of hard plastic or of metal and of an internal diameter substantially equal to the external diameter of the legs 38 when the jaws 40 are engaged with the cylindrical hub portion of a cartridge. The sleeve is slidable along the legs from the left-hand end of the holder, FIG. 3, to the right-hand end thereof, camming the resilient legs toward each other and causing the jaws 40 to firmly engage the cartridge at the cylindrical hub portion. Preferably abutments, as a flange 52 on each of the jaws and projections 54 on the body of the holder, are formed to limit the longitudinal displacement of the sleeve along the body and legs. When the jaws engage the cartridge hub, the glass body of the cartridge is otherwise out of contact with the internal walls of the legs thus avoiding possibility of crushing of the glass. Furthermore, this freedom from contact allows some slight leeway in coupling alignment of the plunger and piston stud. Once the parts are coupled, the cartridge is aligned at one end by the plunger engaging the piston and at the other end by the jaws engaging the cylindrical portion 18 of the cartridge, thus establishing rigidity between the holder and the cartridge needle.

After the contents of the cartridge have been expelled by movement of the plunger to the right, FIG. 3, the plunger may be uncoupled from the piston and drawn back. The sleeve 50 is then pushed to the left, releasing the pressure on the jaws 40 allowing the jaws to spread apart, whereby the spent cartridge may be removed or dumped out.

In a modification of the invention, shown in FIG. 8, the plunger is bifurcated to form tines with jaws on the ends of the tines to engage under the head of a stud, the major portion of the stud being fixed in the piston with the head extending above the piston. The plunger 60, in this modification, slides snugly in the bore 62 of the body of the holder. The plunger is of resilient material and has arms 64 normally biased to spring apart. Each of the arms terminates in an inturned finger 66 directed toward the finger on the other arm. The resilient preformed to normally diverge at a slight angle from each piston 68 in the cartridge has a coupler, forming part of the piston indicated generaly as 70, firmly fixed in the resilient body of the piston 68. The coupler comprises a hard plastic element having a conical head 72 extending beyond the piston, a reduced portion or neck 74 extending beyond the piston, a flange 76 bearing against a face of the piston, a second neck 78 and an enlarged head 80 both the latter being embedded in the piston. The conical head 72 assists in the entering of the cartridge into coupling engagement with the plung-

er. The neck 74 and ends of the fingers 66 snugly interlock when the cartridge and plunger both move to the left, FIG. 8, the arms 64 moving toward each other because of the arm-constricting or camming action of the bore 62 in the holder. As the plunger moves to the left, the spread out arms are forced together because the diameter of the bore is just slightly greater than the diameter of the non-bifurcated portion of the plunger. The flange 76 on the coupler affords a thrust surface for the fingers when the cartridge is thrust in between the jaws of the holder and moved back, thus enabling the plunger to be pushed back. The neck 78 and head 80 afford means to prevent the coupler from being pulled out of the resilient portion of the piston when the plunger is drawn to the left, and the piston and plunger are far enough to the left to be coupled together. With the modified arrangement, when the plunger is in a partially projected position with respect to the legs 38 and the holder is held vertically, the cartridge may be dropped into the holder, the movement of the cartridge into the holder being unrestricted by the jaws 40 of the holder because of their divergent condition. The flange 76 of the coupler will then come into engagement with the ends of fingers 66. Now, when the cartridge is thrust further into the holder, the plunger 60 will be forced to the left and the fingers will be cammed toward each other by the action of the bore 62 in the holder to bring the fingers in tight engagement with the neck 74 of the coupler to effect locking of the coupling means. When the cartridge has been fully inserted, the sleeve 50 is slipped to the right-hand end of the holder thus locking the jaws 40 against the cylindrical hub 18 of the cartridge and holding the cartridge in position in the holder. When the coupler and plunger end are in a position at the left-hand end of the holder, it is possible to make a limited withdrawal movement of the piston in the cartridge, as for testing for aspiration of blood into the cartridge from the body of a patient, without decoupling the plunger and piston. When the medication 34 in the cartridge has been expelled by piston action, the plunger fingers 66 are at the right-hand end of the holder, the arms are spread apart by the inherent resiliency of the arms, and the plunger and piston are automatically decoupled, the tube being sufficiently large in diameter to permit decoupling action of the fingers. The sleeve 50 is now drawn back, releasing the jaws 40 from the cylindrical hub 18 of the cartridge, and the spent cartridge is free to be removed from the holder which is then ready for immediate reuse.

While particular embodiments of this invention have been illustrated and described, modifications thereof will occur to those skilled in the art. It is to be understood, therefore, that this invention is not to be limited to the particular arrangements disclosed, and it is intended in the appended claims to cover all modifications within the spirit and scope of this invention.

Having thus described the invention, what is claimed is:

1. A medical holder comprising:
a body portion having a bore therethrough,
a plunger having normally divergent arms slidable in said bore, the bore being of a diameter to snugly embrace the arms when they are parallel to one another and functioning to draw the arms together when they are drawn into said bore,
said plunger having coupling means at the free ends of the arms for coupling with a piston located within one end of a cartridge and which cartridge at its other end has a hub portion,
said body portion having spaced apart resilient legs extending therefrom, each leg terminating in a jaw directed toward the jaw on the other leg, each jaw having a bevelled outer face,
said bevelled faces facilitating the positioning of the cartridge in the holder between the legs and engaging the hub portion of the cartridge when the resilient legs are brought together, and
a sleeve slidable along the legs adapted when moved toward the jaws to cause the jaws to firmly engage the hub portion of the cartridge, the plunger coupling means automatically coupling with the piston.

2. A medical holder comprising:
a body portion having a bore therethrough,
a plunger having normally divergent arms slidable in said bore, the bore being of a diameter to snugly embrace the arms when they are parallel to one another and functioning to draw the arms together when they are drawn into said bore,
said plunger having coupling means at the free ends of the arms for coupling with a piston located within one end of a cartridge and which cartridge at its other end has a hub portion,
said body portion having spaced apart resilient normally divergent legs extending therefrom, each leg terminating in a jaw directed toward the jaw on the other leg, each jaw having a bevelled outer face,
said bevelled faces facilitating the positioning of the cartridge in the holder between the legs and engaging the hub portion of the cartridge when the resiliend legs are brought together, and
a sleeve slidable along the legs adapted when moved toward the jaws to cause the legs to become substantially parallel to one another and the jaws to firmly engage the hub portion of the cartridge, the plunger coupling means automatically coupling with the piston.

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