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G. N. HEIN

GUARD FOR HYPODERMIC SYRINGES

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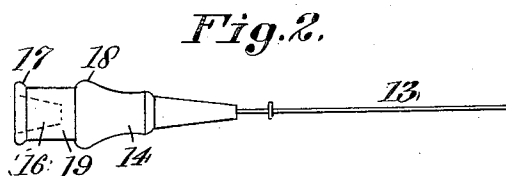
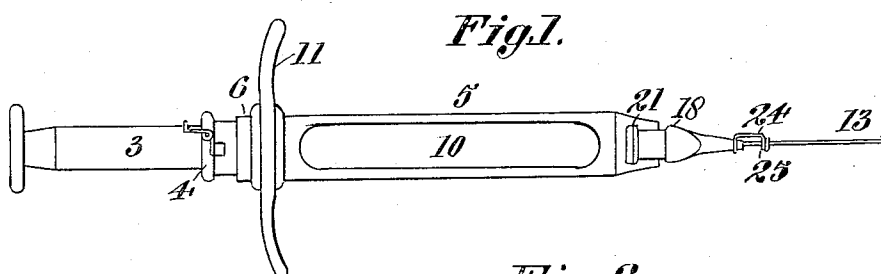


Fig. 3.

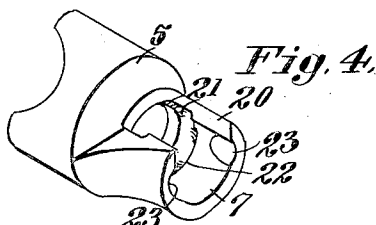
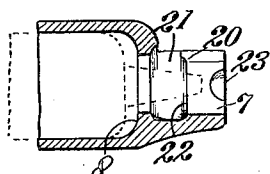
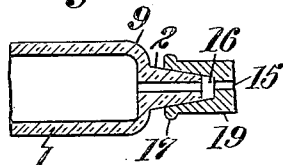


Fig. 5.



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UNITED STATES PATENT OFFICE.

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GUARD FOR HYPODERMIC SYRINGES.

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To all whom it may concern:

Be it known that I, GEORGE N. HEIN, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Guards for Hypodermic Syringes, of which the following is a specification.

There is in use in the medical and dental profession at the present time a hypodermic syringe commonly known as the Luer. This syringe consists of a glass barrel in which operates a piston of similar material and which barrel is provided with a tubular integral extension at one end of the same material as the barrel and with which engages a conventional needle base. This construction due to its simplicity, ease of handling, and ease of sterilization is extensively used but the loss due to breakage is considerable. There is a disadvantage to the construction in that the needle base is retained in position on the tubular extension solely through frictional contact and is often blown therefrom when pressure is applied to the expelling piston without the needle being inserted into the body of the person.

The present invention relates to a guard or protector for the conventional type of Luer syringe, for protecting the same against breakage when in use and by the use of which cooperating engagement between the barrel and the needle base is maintained by other than sole frictional contact when pressure is applied to the fluid expelling plunger.

The invention consists primarily in a guard for receiving the Luer barrel, there being provided a tubular extension for receiving the barrel discharge tip, and there also being provided in connection with the guard a receiver for a needle base whereby the needle base is retained in the guard during such time as the discharge tip is received in the needle base. The invention consists further in the provision of a coupling between the discharge tip of the barrel and the needle base whereby on the engagement or disengagement of the two parts a relative rotary motion can be transmitted between the same.

With the above-mentioned and other objects in view, the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the ac-

companying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Fig. 1 is a view in elevation of one embodiment of my invention with a Luer type syringe therein and a needle mounted thereon.

Fig. 2 is a view in elevation of a needle base and needle illustrating particularly the needle support.

Fig. 3 is an enlarged vertical sectional view of the guard illustrating the interior construction of the tubular extension.

Fig. 4 is a view in perspective looking into the tubular extension at the discharge end of the guard.

Fig. 5 is a view in elevation of the tip end portion of the conventional type of Luer barrel.

In the drawings, wherein like characters of reference designate corresponding parts throughout the several views, 1 indicates a tubular barrel of the conventional type of Luer syringe provided at its discharge end with a tubular tapered tip 2. A piston 3 snugly fitting the interior of the barrel 1 and of a configuration corresponding to the inner configuration of the barrel 1 is mounted to reciprocate therein through the open end 4 of the barrel. This piston may be of any well known type or if desirable may be of particular construction.

For receiving and protecting the barrel 1 which is usually constructed of glass, I provide a tubular guard 5 open at one end as at 6 to receive the barrel 1 and through which opening the same is inserted and the guard is provided at its opposite end with a tubular bore 7, there being provided at the inner end of the tubular bore a flange 8 on which rests the shoulder 9 of the barrel 1 on the barrel being fully inserted into the guard. For convenience, a sight opening 10 is provided in the guard 5 to enable the operator to ascertain the charge within the barrel 1. Finger gripping means 11 extend laterally from opposite sides of the open end 6 of the guard as in the drawing. A hypodermic needle 13 of the conventional type projects from the outer end of a needle

base 14 formed with a tubular bore 15 therein communicating at one end with the inner end of the needle and at its opposite end connecting with a conical recess 16 in the end of the needle base 14. The extreme end of the base 14 is provided with an annular bead 17 and the needle base substantially midway of its length, for example, at the point 18, is substantially oval in cross section, the intervening portion between points 17 and 18 and which is indicated by numeral 19 being substantially cylindrical in cross section.

The wall of the tubular extension is cut away in advance of the shoulder 8 as at 20, affording a passage through which the needle base 14 is adapted to pass when positioned into or removed from bore 7. This cut away portion 20 is of a length to receive the cylindrical portion 19 of the needle base. At its inner end the cut away portion 20 is enlarged by peripherally grooving the interior thereof as at 21 to receive the bead 17 on the base 14. That portion of the bore 7 immediately in advance of the groove 21 is annularly chambered as at 22 to receive the bead 17 and to permit of a longitudinal movement of the cylindrical portion 19 of the needle base 14 within the bore 7. The surface of the bore 7 at its outer end is recessed as at 23 at opposite points to receive the opposite portions of the oval structure of the base 14 when the needle base is moved longitudinally outwardly in the bore 7. It will be observed that when the guard 5 is held in a substantially horizontal position with the cut out portion 20 upwardly disposed, that a needle base is adapted for insertion into or removal from the bore 7 through the opening 20. When positioned within the bore 7 through the opening 20 and moved longitudinally forward in the bore 7 it will be observed that the bead 17 being received in the portion 22 will preclude the withdrawal of the needle base from the bore until such time as the base is moved rearwardly in said bore.

In use, the barrel 1 is inserted into the guard 5 through its open end 6 until the tip 2 is about to project beyond the flange 8. Either at this time or previously a needle base 14 is or has been positioned within the bore 7 through the cut out portion 20 with the bead 17 in line with the annular groove 21. The needle base 14 is then moved forwardly with the bead 17 received in chamber 22 and the barrel 1 is then fully seated within the guard. This operation causes the reception of the tip 2 within the conical opening 16 and to afford a tight joint a slight axial rotation is imparted to the barrel 1. The slight axial rotation with the endwise pressure applied to the barrel causes the bead 17 to frictionally contact with the forward wall of seat 22 and cause

a tight engagement between the surface of the recess 16 and the tip 2. Assuming the barrel 1 to be now filled with fluid and endwise pressure being applied to the plunger or piston 23 by the action of the operator, he also grasping the finger grips 11, the pressure of the fluid within the barrel 1 will force the same toward the seat 8 and the needle base being held within the chamber 22, the danger of a separation between the base 14 and tip 2 is eliminated. At this time the aligning of the base 14 and tip 2 is assured and maintained by the bore 7 and chamber 22 as the bore is of a diameter greater than that of the cylindrical portion 19 to permit of radial movement of the portion 19 within the bore 7 as the base 14 is being centered on the tip 2. When it is desired to dismantle the apparatus, a rearward longitudinal movement of the barrel 1 will, through the frictional contact of the tip 2 with the wall of the conical recess 16, impart a rearward longitudinal movement to the cylindrical portion 19 of the base 14 within the bore 7. If rotation is imparted to the barrel 1 at this time the oval portion 18 of the needle base forwardly of the cylindrical portion 19 will be received in the recesses 23 and thus the base will be held from further rotation with the barrel 1. This action will permit of the separation of the friction joint connection between tip 2 and the walls of conical recess 16 and enable the barrel to be withdrawn from the guard 5. The needle base may now be separated from the guard 5 by aligning the bead 17 with the groove 21 and moving the base through the cutout portion 20.

Extending from the outer end of the base 14 is a spring member 24 preferably in the form of a wire disposed parallel with the needle 13 and said spring member at its outer end, approximately midway of the length of the needle 13, is loosely looped about the needle as at 25. This construction provides a yielding support for the needle approximately midway of its length and assists in precluding the breaking of the needle at the point of its projection from the end of the base 14. It has been discovered that unsupported needles, on pressure being applied thereto, often, due to crystallization and the process of attachment to the base, break at their point of projection from the base.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent of the United States is:—

1. A hypodermic construction including a tubular guard open at its opposite ends and formed at one end with a contracted tubular extension having a laterally opening recess, a barrel for longitudinal reception within the guard and provided with a conical tip for reception within said

tubular extension, a needle base provided with a conical recess at one end for the reception of the conical tip and adapted for reception within said tubular extension through said laterally opening recess, means for holding said needle base from rotation within said extension, said needle base adapted for longitudinal movement within the extension and precluded from removal from the extension when at its limit of movement in either direction.

2. A hypodermic construction including a tubular guard open at its opposite ends and formed at one end with a contracted extension, a barrel for linear reception within the guard for frictional connection with the needle base and provided with a conical tip for reception within said contracted extension, said contracted extension provided with a lateral recess, a needle base provided with a conical recess at one end for the reception of the conical tip and adapted for positioning within and removable from said extension through said lateral recess, said base adapted for a limited linear movement within said extension, and means for precluding the rotation of the base within said tubular extension.

3. A hypodermic construction including a tubular guard open at its opposite ends and formed at one end with a contracted extension, a barrel for removable reception within the guard and provided with a conical tip for reception within said contracted extension, said contracted extension provided with a lateral recess, a needle base provided with a conical recess at one end for the reception of the conical tip and adapted for positioning within and removable from said extension through said lateral recess, said base adapted for a limited linear movement within said extension, and means for retarding the rotation of the base within said tubular extension when the base is at

the end of its linear movement in either direction.

4. A hypodermic syringe construction including a tubular barrel provided at one end with a tubular conical tip, a tubular guard for receiving the barrel and provided with a bore through which said tip extends, said bore being formed with an annular seat and a lateral opening, a needle base provided with a bead adapted for reception within said bore through said lateral opening with the bead receivable within said seat on forward linear movement being imparted to the base, said base provided with a conical recess for the reception of said tip, a hypodermic needle extended from the base, finger gripping means associated with the guard, and a piston reciprocably mounted within the barrel.

5. A guard for receiving the barrel of a hypodermic syringe, the same including a tubular body provided at one end with a contracted bore communicating with the interior of the body, said bore provided with a lateral opening and an enlarged seat annularly of the inner end of the bore, said base being further provided with a recess extending inwardly from its outer end.

6. A protecting guard for receiving and protecting the barrels of hypodermic syringes, the same including a tubular body provided at one end with a contracted extension provided with a bore disposed axially of the tubular body, said bore being provided with a laterally cut away portion and further provided at the inner end of the bore with an annular seat, and further provided with a channel extending transversely through the body at the inner end of the cut away portion and in rear of the seat, and finger grip members associated with the body.

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

GEORGE N. HEIN.