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W. E. STEWART

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SYRINGE SHIELD

Filed June 22, 1926

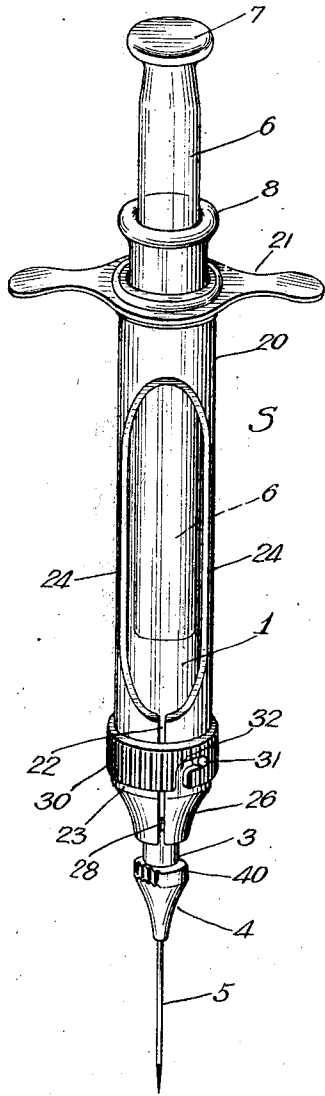


Fig. 1,

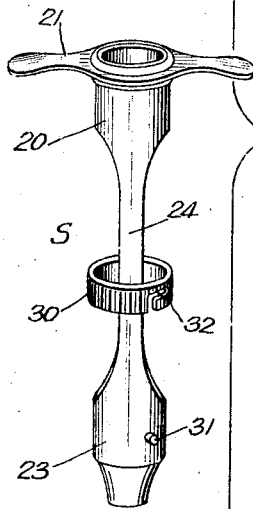
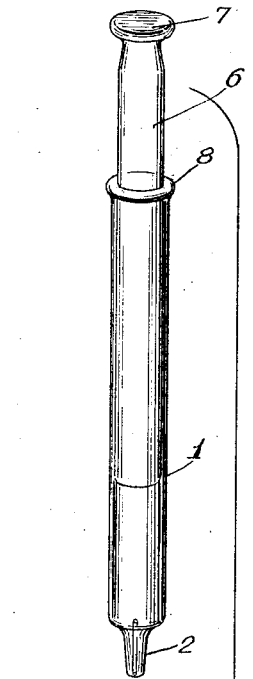


Fig. 2,



Fig. 4,

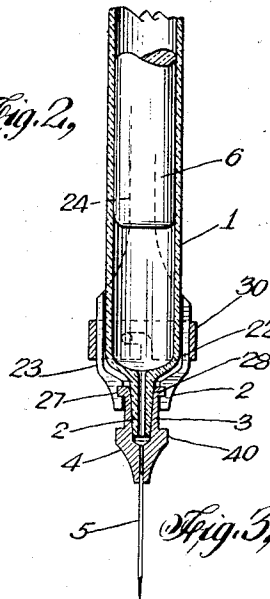


Fig. 3,

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SYRINGE SHIELD.

Application filed June 22, 1926. Serial No. 117,693.

My invention relates to shields for glass or other hypodermic syringes.

The principal objects of the invention are:

To provide a shield dimensioned or adjustable to co-operate with glass or other syringes of known types and of one or various sizes; to construct and arrange the shield for cooperation with the hubs or bases of known types of needles and especially the type known as Luer needles; to so construct and arrange the shield that when desired the needle may be placed in it prior to insertion of the syringe, so that the shield with the needle, and the syringe, may be separately sterilized, and the syringe thereafter inserted in the shield and operatively connected with the needle; to provide a shield which protects the syringe tip or part which enters the needle base and prevents breakage of the tip, this being especially important in the case of a glass syringe; to apply the reactive force occasioned by pressure on the syringe plunger, through the shield to the needle base, which insures retention of the needle upon the syringe tip, prevents displacement of the needle from the tip by hydraulic pressure, and especially in the case of a glass syringe tube, avoids application of strain to the bead at the upper end of the tube; to provide a shield of flexible or adjustable construction so that it is readily and practically automatically adaptable to syringes of varying diameters, and to provide a simple, secure and easily operated locking device for clamping the needle base in the shield and securing the shield to the syringe.

The characteristics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawing, which shows a representative embodiment of the invention. After considering this example, skilled persons will understand that many variations may be made, and I contemplate the employment of any structures that are properly within the scope of the appended claims.

Fig. 1 is a perspective view of a shield embodying the invention in one form, properly applied and secured to a glass syringe and a needle of the Luer type, as representative of known or standard syringes and needles with which the shield is designed to co-operate.

Fig. 2 shows the shield, syringe and needle separated.

Fig. 3 is a longitudinal section of the lower part of the shield applied and secured to the syringe and needle.

Fig. 4 is a perspective view of a known type of glass syringe and needle, the syringe being provided with the usual finger grip, for use without a shield.

While, as indicated above, the present shield is adapted or adaptable for use with various types of syringes and needles including metal or other syringes, and needles of other than the Luer type, the characteristics and advantages of the invention will be understood by explanation of its co-operation with a glass barrel syringe of known type and with Luer needles adapted for such glass syringes. The invention structure is therefore shown in the drawings as especially adapted to and used in connection with a syringe and needle of the stated types.

This glass syringe consists of a tube or barrel 1 having an integral tip 2 tapered and ground to have a tight friction fit within the tapered socket 3 of the base 4 of a hypodermic needle 5, which, in this instance, is of the Luer type. A glass plunger or piston 6 slides in the tube and the tube and piston are ground to provide a tight and practically leak-proof fit. At the upper end of the piston is a flattened thumb knob 7. These glass tubes 1 usually have at the upper end a reinforcing bead 8, and in customary practice a finger grip 10 having projecting finger pieces 11 is slipped over the tube and rests against the under face of the bead, so that when the fingers of the operator are placed beneath the finger pieces 11, and the thumb is applied to knob 7 to force the piston into the tube, the pressure reaction is taken by the finger grip and applied to the bead 8. Since the tube 1 is usually of thin section, this pressure is apt to cause breakage. The needle base also, while it is applied to the tip 2 with a tight friction fit, is not positively secured, and hydraulic pressure in many cases causes the needle to be displaced from the tip during an injection. The tube, being of glass, is relatively fragile and in absence of a protecting shield is apt to be broken by dropping it or by contact with hard objects.

To avoid these difficulties or disadvantages of the ordinary glass type syringe, and also to realize the objects or advantages above and hereafter pointed out in connection with syringes and needles of these and other types, I provide the shield structure generally designated as S, the drawing showing a single representative embodiment which is preferred in many cases, but which may evidently be varied as to details of structure or arrangement within the principles of the invention and within the limits defined by the claims appended.

This shield comprises a tubular body 20 at the upper end of which a finger grip 21 is secured. The lower part of the tube is rendered adjustable or flexible by severing it along one, or preferably two, opposite longitudinal lines, as at 22, Fig. 1, producing the separate movable or adjustable lower portions 23 of generally semi-cylindrical contour. Above the longitudinal slots or divisions 22 the tube is preferably cut away or apertured at one or preferably two opposite sides, as shown, this tube formation producing long, narrow part-cylindrical members 24 connecting the upper tubular portion 20 and the lower adjustable members 23. The relatively narrow connecting members 24 are flexible or resilient and therefore support the lower gripping members 23 for substantial movability toward and from each other. The lower gripping members 23 terminate in nose or chuck portions 26 of reduced diameter, and the inner face of each of the chuck members is grooved, as at 27, to receive the upper flange or bead 28 of a Luer or other type of needle base 4. Any suitable clamping or locking device may be provided, represented in this embodiment by a ring 30 placed about the tube and prevented from downward displacement by a pin 31 inserted in one of the clamping members 23. This pin also co-operates with a bayonet slot 32 in the ring, as explained hereafter.

The inner diameter of the upper portion of the tube 20 is dimensioned to fit syringe tubes within a desired range of sizes and it will be evident from the following operative description, that the external diameter of the syringe used with any particular shield may vary within considerable limits.

The base of a Luer or other type of needle may be inserted between the chuck jaws 26 while they are separated (with the locking ring 30 in an upward position, as in Fig. 2) and temporarily held in the shield by the natural resilient pressure of the connecting strips 24 or by moving the ring 30 downward toward the pin 31. The shield with the needle may then be sterilized and a separately sterilized syringe may be inserted through the upper end of the shield until the tip 2 enters the needle socket 3

and is firmly secured by a twisting movement, and if necessary the lower flange 40 of the needle base may be grasped and turned to insure tight connection with the tip. The shield is then firmly locked in position by moving the locking ring down until pin 31 enters the axial portion of the bayonet slot and then turning the ring to cause the pin to enter the diagonal or circumferential part of the slot to move the ring to final locking position, whereupon the inner faces of the clamping members 23 grip the lower portion of the syringe tube and the chuck members 26 grip the needle base. The locking or gripping action of the members 23 and 26 in co-operation with the ring may be insured by so shaping the exterior faces of the members 23 that they flare slightly downwardly, this flare or taper being in most cases too slight for accurate representation in the drawing.

If it is not desired to apply the needle to the shield before the syringe is inserted, the syringe may first be inserted in the shield while the gripping members 33 are laterally retracted; the needle is then applied and secured to the tip 2, and the ring 30 is moved to locking position, whereupon the chuck members firmly engage the needle base, as previously described.

When the finger grip 21 is grasped by the fingers and the thumb is applied to knob 7 to make an injection, the reactive force is applied through the shield to the needle base and through it to tip 2 and the lower portion of the syringe tube. In this way the needle is firmly held upon the tip without possibility of displacement by hydraulic pressure, and any strain upon the upper portion of the tube or bead 8 is avoided, and therefore there is no possibility of tube breakage caused by injection pressure. The side apertures in the shield permit ready inspection of the syringe and its contents. The shield covers the major portion of the tube and sufficiently prevents it from any reasonable possibility of breakage by contact with hard objects. Especially, the lower part of the shield or the chuck jaws 26 in co-operation with the needle base enclose the glass tip 2 and prevent breakage thereof. The range of movement or adjustability of the lower or clamping members 23 with the chuck members 26 is such that the shield may be secured to glass or other syringe tubes of different diameters within a substantial range. The locking device is easily manipulated even when the operator is using rubber gloves and the gloves are wet. Other features of structural and operative advantage will be sufficiently understood from the previous explanations.

I claim:—

1. A syringe shield comprising a tubular body having a bifurcated lower portion, the

furcations normally resiliently held in spaced relation, and means co-operating with the furcations for pressing them together to removably clamp a needle base and the lower portion of a syringe barrel or tube.

2. A syringe shield comprising a tubular body having a bifurcated lower portion, the furcations normally resiliently held in spaced relation, means co-operating with the furcations to press them together to removably clamp a needle base and the lower portion of a syringe barrel or tube, and a finger grip at the upper end of the tubular body.

3. A syringe shield comprising a tubular body having a bifurcated lower portion, the furcations normally resiliently held in spaced relation, and means co-operating with the furcations for pressing them together to removably clamp a needle base and the lower portion of a syringe barrel or tube, the body having in at least one side a slight opening of substantial length and width.

4. A syringe shield comprising a tubular metal body including opposite narrow portions terminating in part-cylindrical gripping members, said members being adapted to grip the lower portion of a syringe tube and being provided with chuck members conformed to receive and grip a needle base.

5. A syringe shield comprising a tubular metal body including opposite narrow portions terminating in part-cylindrical gripping members, said members being adapted to grip the lower portion of a syringe tube and being provided with chuck members conformed to receive and grip a needle base, and locking means for releasably clamping said gripping and chuck members upon a syringe tube and needle base.

6. A syringe shield comprising a tubular metal body including opposite narrow portions terminating in part-cylindrical gripping members, said members being adapted to grip the lower portion of a syringe tube

and being provided with chuck members conformed to receive and grip a needle base, and a finger grip secured substantially at the upper end of the tubular body.

7. A syringe shield comprising a tubular body provided with resiliently retractable gripping members, and locking means, said gripping members including chuck formations designed to grip and secure a needle base either before or after insertion of a syringe within the body, and said members also adapted to retractably grip the lower portion of the syringe.

8. A syringe shield comprising a tubular body provided with resiliently retractable gripping members, and locking means, said gripping members including chuck formations designed to grip and secure a needle base either before or after insertion of a syringe within the body, said members also adapted to retractably grip the lower portion of the syringe, and a finger grip at the upper end of the tubular body, the parts being constructed and arranged to apply the reaction of injection pressure through the shield to the lower portion of the syringe.

9. A syringe shield comprising a metal tube having opposite side portions cut away for a substantial distance producing sight openings and also providing opposite narrow resilient strips connecting upper and lower portions of the body, the lower end of the tube being longitudinally slotted producing convergently movable semi-cylindrical clamping members terminating in chuck jaws conformed to receive and grip a needle base, and clamping means co-operating with said clamping members to secure them in contact with the needle base and the lower portion of a syringe inserted in the shield.

Signed at Nashville in the county of Davidson and State of Tennessee this 19 day of June, A. D. 1926.

WILLIAM EVERETTE STEWART.