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THUMB RING FOR HYPODERMIC SYRINGE

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Fig. 1

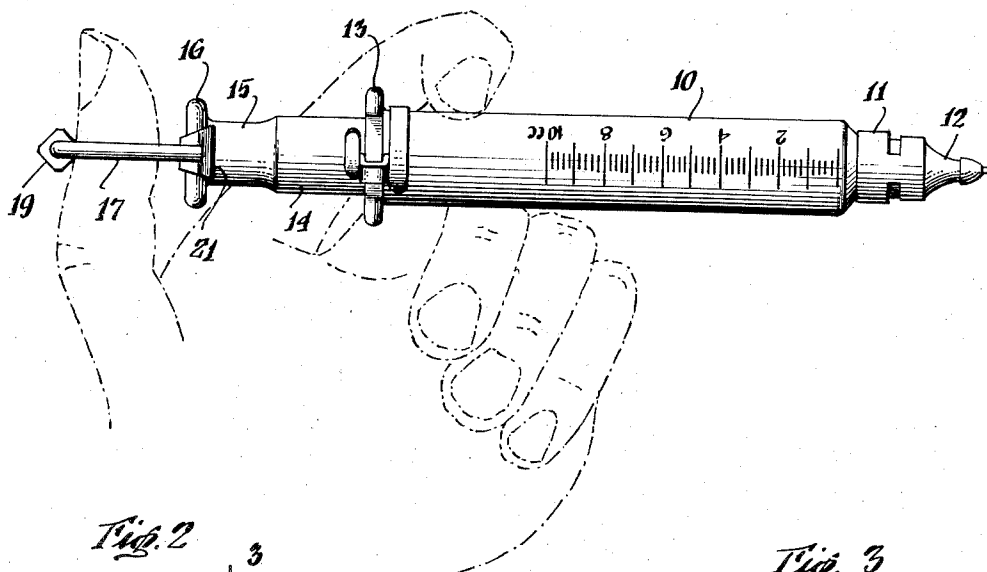


Fig. 2

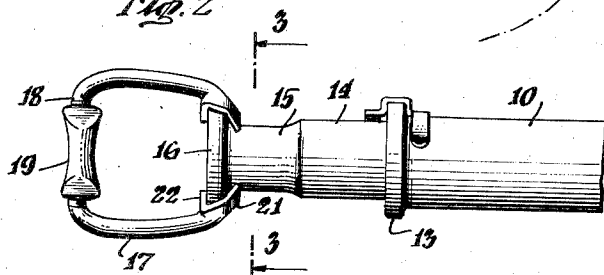


Fig. 3

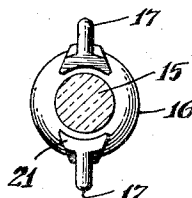


Fig. 4

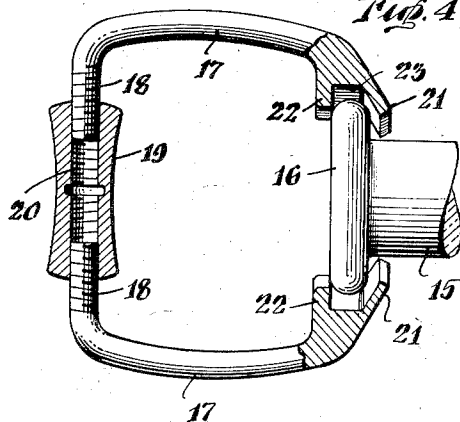
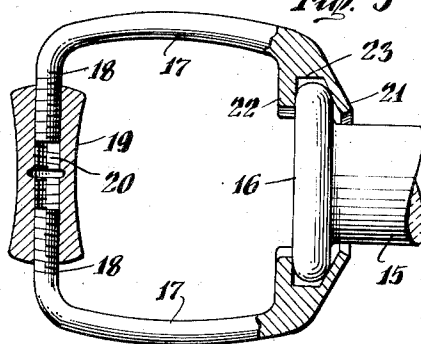


Fig. 5



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THUMB RING FOR HYPODERMIC SYRINGE

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This invention relates to a functionally and structurally improved syringe assembly and especially one involving a hypodermic syringe of the so-called "control" type.

With respect to such a syringe, it is well understood by the profession that at least the plunger is provided with a ring or similar element such that the thumb may be used, not alone to project the plunger, but also to retract the same. To secure this result it has been customary to connect to the plunger a ring through which the end of the thumb is introduced. Ordinarily, also finger rings are suitably connected to the barrel. Therefore, a physician or other technician, by simply passing the index and middle finger, one through each of the latter rings, and the thumb through the ring affixed to the plunger, has been able to move the parts, not alone to effect expulsion of medicament, but also to perform an aspirating action.

Considerable difficulty has been experienced in this type of syringe in the event damage has occurred to the all-glass plunger. When the latter has required replacement, the procedure has involved detachment of the ring therefrom in the event the ring was to be reused. In any event a new plunger has had to be matched with the still-usable barrel. Most important has been the mounting of the thumb ring on that new plunger. Such mounting has been, at best, time consuming and expensive.

By means of the present teachings, a coupling is furnished such that the ring or its equivalent may readily be connected with or removed from the plunger. Therefore, costs will be minimized when plunger replacement is necessary in this type of syringe.

Moreover, by means of the present teachings, a structure is provided which may be economically produced and which will be simple in design and capable of operating with entire satisfaction for indefinite periods of time.

With this and other objects in mind, reference is had to the attached sheet of drawing, illustrating one practical embodiment of the invention, in which:

Fig. 1 is a side elevation of a syringe assembly;

Fig. 2 is a fragmentary plan view of the rear portion of that assembly;

Fig. 3 is a transverse sectional view taken along the line 3—3 in the direction of the arrows as indicated in Fig. 2;

Fig. 4 is a partly sectional side elevation of the coupling and ring member in process of application to the plunger; and

Fig. 5 is a similar view, showing the ring member fully mounted on the plunger.

Primarily referring to Fig. 1, the numeral 10 indicates the barrel of a preferably all-glass syringe assembly which, in the usual manner, may be provided adjacent its forward end with a fitting 11, by means of which the hub 12 of a hypodermic needle is detachably mounted on that end. In accordance with conventional construction, the face of the barrel may present indicia indicative of the cubical content or volume of the syringe when the plunger is in predetermined positions therein. Also, in

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accordance with common practice, the barrel may have adjacent its open rear end a flange portion 13 serving as a rest or support. In the present illustration, there has not been shown in association with this flange portion a supporting member including a pair of finger rings. However, such a member may ordinarily be employed. Extending into the bore of the barrel is a glass plunger 14 having the usual reduced neck portion 15 adjacent its rear end, terminating in an actuating head 16.

Applied to this head and neck portion is a coupling member embracing the present teachings. That member will ordinarily be in the form of a ring having an internal diameter such that the thumb may readily be inserted through it, as shown in Fig. 1. It is to be understood, of course, that outlines other than a ring (whether elliptical, substantially rectangular or otherwise) could be employed. In this connection, it will be appreciated that the sole functional requirement is that by swinging the thumb, the plunger of the syringe assembly should be susceptible to retraction, or projection without it being necessary to employ other than the one hand which is also thrusting against the barrel so that relative movements may be effected.

The coupling and ring member in the present exemplification comprise a single assembly. As shown especially in Figs. 4 and 5, a pair of similar yoke members may be furnished, each including axially-extending arm parts 17 which, adjacent their outer ends, are turned inwardly as at 18 and preferably threaded. That threading should be in opposite directions on the opposed ends of the two arms. These ends are coupled by a sleeve 19 which has its bore 20 threaded in opposite directions toward its two ends so as to engage with the threads of portions 18. Thus, in effect, a turnbuckle structure is provided which, with the arms 17 held against swinging movement and the sleeve 19 being turned, will cause those arms to be moved in opposite directions.

Adjacent their forward or inner ends, these arms are provided with elongated contact portions which extend transversely with respect to such arms and preferably embody an arcuate configuration as in Fig. 3. Such portions conveniently include forwardly-extending lips 21 which overlap the annular peripheral surface providing head 16. They also include lips 22, which preferably extend perpendicular to the axis of the assembly. These two lips provide between them a groove 23 in the inner face of each contact portion. The width of this groove is preferably proportioned to the width of the bead providing head 16, so that certain surfaces of the latter may be accommodated therein.

As will be apparent, when it is desired to apply the thumb-actuating member to the plunger, sleeve 19 is simply rotated to separate arms 17 for a proper distance. Thereupon, the head 16 of the plunger, by lateral movement, is introduced into the grooves between lips 21 and 22 of the two arms, as in Fig. 4.

Now, if sleeve 19 is rotated in a reverse direction, arms 17 will be drawn toward each other. This will result in similar movements on the part of the contact portions embracing the lips 21 and 22. Due to the inclination of the inner faces defining the lips 21 and the consequent diminishing of groove 23, the head 16 will be centered during this movement so that it assumes the position shown in Fig. 5. In other words, it will be in line with the base and as the parts continue their movements, the inner faces of lips 22 will bear against the flat head of the syringe plunger, while the lips 21 will cam against the forward peripheral zone of head 16. Finally, the head will be, in effect, ensleeved throughout diametrically opposite portions by the contact members or elements supported by arm 17. Under these circumstances, the

coupling and parts associated therewith will be completely rigid and immovable with respect to the plunger.

Therefore, it is obvious that the barrel may be gripped between the fingers, as in Fig. 1, or the middle and index fingers of the user may be passed through finger rings attached to that barrel and not shown in the present drawings. In any event, the thumb will not alone be capable of bearing against head 16 to project the plunger, but may also be swung to exert a retracting force such that the plunger will be moved in a direction withdrawing it from a position adjacent the tip end of the barrel. It is apparent that no difficulties will be experienced in coupling and uncoupling this thumb member with respect to the barrel.

As is well understood by those skilled in the art of syringe manufacture, the heads of all-glass syringe plungers cannot be held to an extremely close tolerance. In a certain size they may vary in diameter as much as one-tenth of an inch. In that same size the thickness of the bead portion 16 may vary around 0.020" in thickness. In order that objectionable play between the parts will not occur when the coupling member is mounted by the plunger, the contact portions should present a radius at the base of the groove between lips 21 and 22 slightly less than that which will correspond to the smallest diameter of plunger bead to be accommodated therein. Also the distance between lips 21 and 22 should be such that it is slightly less than the smallest bead thickness to be accommodated.

With the radius of the yoke groove base portion being less than the piston head radius, a stable three-point contact is assured between each yoke and the piston head. In other words one contact point will exist on lip 22 and two points on inclined lip 21. In this manner the edge of the bead 16 will never touch the base of the groove. Obviously such an arrangement of contact zones or points could also be incorporated in a skeletonized structure not necessarily involving an arcuate form. With the leverage occurring as a consequence of the length of arm portions 17 and the bearing engagement between the contact portions and the bead defining head 16 the inter-engaging threads will be "spring locked." Stated otherwise, they will be under a condition of tension and will not accidentally loosen. Sleeve 19 may, of course, be loosened one or two turns when the syringe plunger is placed in the sterilizer. This will occur by a deliberate manipulation of the parts.

Thus, among others, the several objects of the invention as specifically aforementioned are achieved. Obviously numerous changes in construction and rearrangements of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. In a syringe assembly, in combination, a hypodermic syringe plunger, a circular beaded portion defining an end thereof, a pair of connected contact elements to removably engage such portion, said elements each comprising a pair of spaced lips to receive between them a part of said portion, said lips defining between them a groove and the base of each groove presenting an arcuate

configuration corresponding substantially to the radius of said beaded portion.

2. For use in connection with a syringe assembly, a pair of head-contacting elements, said elements each including a pair of spaced lip sections to receive between them the head of a plunger head, means connected to the same, said sections defining between them a bead-accommodating groove and said groove having an arcuate base portion.

3. An attachment for use with a syringe assembly having a plunger including an actuating head at its outer end defined by a bead, said attachment including in combination a pair of arms having outer ends, means adjustably connecting such ends to move the arms toward and away from each other, elongated contact portions connected to the opposite ends of said arms and extending substantially transversely with respect thereto and said contact portions providing in their inner faces longitudinally extending grooves to receive the bead defining the actuating head of a syringe plunger.

4. In an attachment as defined in claim 3, said contact portions being arcuately curved around the axis of said attachment.

5. In an attachment as defined in claim 3, spaced lips defining such grooves and having their opposed faces converging toward each other in the direction of the bases of the grooves.

6. A syringe assembly including in combination a plunger, an actuating head at one end of the same, a substantially annular bead defining such head, a pair of arms having outer ends, means adjustably connecting such ends to move the arms toward and away from each other, elongated contact portions connected to the opposite ends of said arms and extending substantially transversely with respect thereto, said contact portions providing in their faces longitudinally extending grooves of decreasing width, said bead extending within said grooves and the base areas of said grooves having a width less than the thickness of said bead.

7. In a syringe assembly as defined in claim 6, lips spaced from each other to define said grooves, one of said lips overlying the actuating head of said plunger and having a head-engaging surface extending substantially perpendicular to the axis thereof, the other lip having a head-engaging surface and said latter surface extending away from such first-named surface and the actuating head.

8. In a syringe assembly as defined in claim 6, said grooves extending arcuately around the axis of said plunger and the radius of such grooves being less than the radius of said bead.

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