June 21, 1955 W. G. DUNNICAN 2,711,171

HYPODERMIC SYRINGE

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Fig. 1

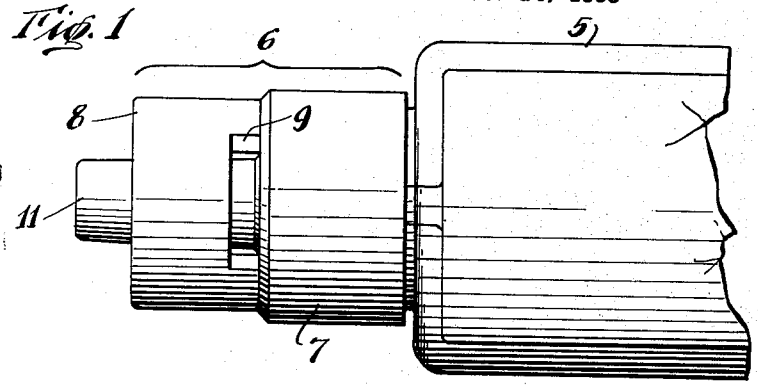


Fig. 2

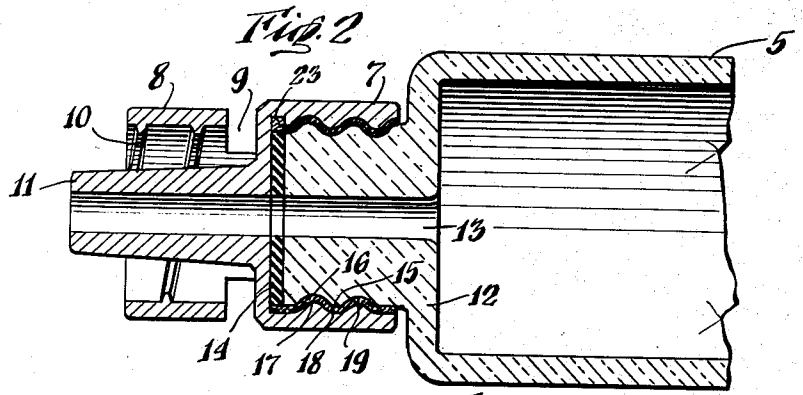


Fig. 3

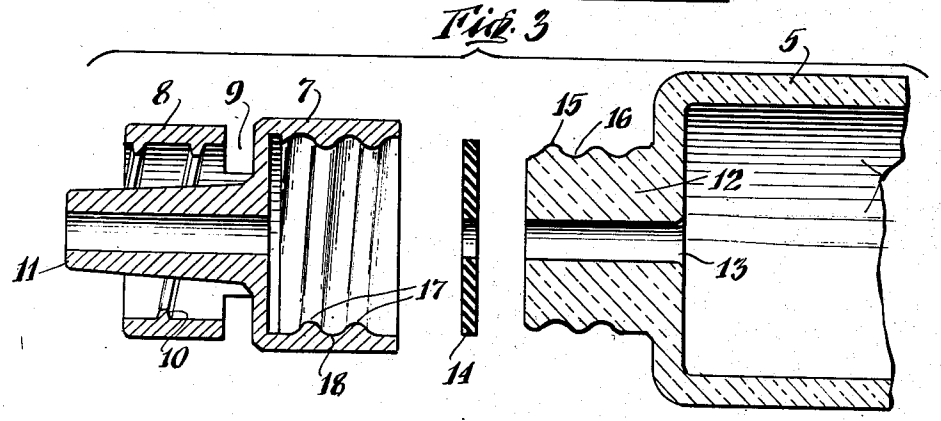
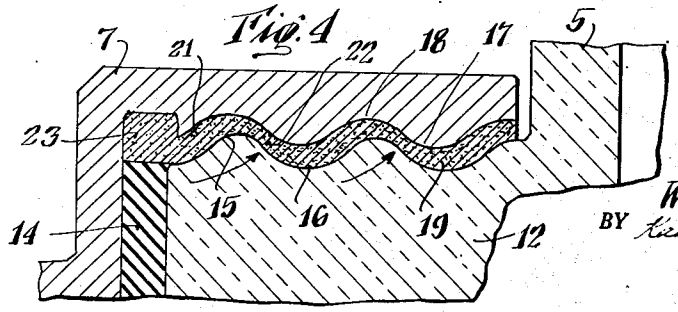


Fig. 4



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HYPODERMIC SYRINGE

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9 Claims. (Cl. 128—218)

This invention relates to hypodermic syringes and aims to provide a functionally and structurally improved mounting which will remain in permanent association with the syringe and by means of which a tissue-piercing needle may be supported in operative relationship with respect to the barrel thereof.

A primary object of the invention is that of furnishing in a hypodermic syringe assembly, a mounting which may readily be provided by means of automatic machinery and methods, which mounting, in association with the syringe barrel will furnish a unit permanently associated with the barrel stem.

A further object is that of designing a structure, the parts of which may readily be cleaned and sterilized so as to be capable of repeated use.

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

Fig. 1 is a fragmentary elevational view of a syringe with the improved mounting in association therewith;

Fig. 2 is a sectional side view of the parts;

Fig. 3 is an exploded view of the assembly; and

Fig. 4 is a greatly enlarged fragmentary sectional view of the structure adjacent the barrel stem.

In these views the numeral **5** indicates the barrel of a hypodermic syringe preferably formed of glass. The numeral **6** generally indicates the fitting which furnishes the mounting for the hollow skin-piercing needle (not shown) and through which the contents of the barrel are, for example, injected into the tissues. This fitting embraces a cup-shaped base **7** preferably of metal and an outer collar portion **8** integral therewith. This collar portion is conveniently defined by slots **9** which intervene it and the cup **7**. The inner face of collar **8** is formed with a thread **10** suitable for engagement with extended hub portions of the needle. A stem **11** is also integral with the base or cup **7** and is preferably tapered so that it may frictionally engage the inner bore face of the needle hub and establish a leak-proof contact therewith.

Extending from the forward or outer end of barrel **5** is an integral stem portion **12**. The latter is formed with a bore **13** which aligns with the corresponding bore of stem **11** when the parts are properly disposed with respect to each other. Interposed between the adjacent outer face of tip **12** and the base of cup **7** is a disk-shaped layer of relatively soft material. This may comprise a suitable plastic composition and the disk is centrally apertured to a diameter corresponding to that of bore **13**. It is to be noted that the height of tip **12** is greater than the depth of cup **7** when the latter is in mounted position with the disk **14** interposed between the parts as shown in Fig. 2. Such dimensions are resorted to in order that the edge of cup **7** shall clear the outer face of barrel body **5**.

Both the inner face of the side wall of cup **7** and the outer side face of tip **12** are formed with cooperating screw threads. As shown especially in Fig. 4, the threads on tip **12** comprise peak portions **15** and valleys **16**, the apices of which are preferably rounded. The threads on

the inner face of the cup side walls include peaks **17** and valleys **18**, the apices of which are likewise rounded. The diameters of the peaks and valleys of cups **7** are substantially greater than the corresponding diameters of the valleys and peaks of tip **12**. Accordingly, while the surfaces of the threads engage with each other to prevent a separation of the parts, a loose fit between these parts exists. This clearance is filled in with a layer of cement incorporating moisture-proof qualities and is not susceptible to fracturing due to the difference in the expansive and contractive qualities of the fitting and tip throughout normal temperature ranges.

The parts are assembled by first providing or inserting disk **14** into the cup so that it rests against the base of the latter. Of course, if desired, the layer of adhesive **19** might be applied prior to such insertion. Regardless of this step, however, the adhesive or cement is caused to coat the threads **15—16** of the tip **12** and the threads **17—18** of the cup. This result may be achieved by applying the cement to the threads of the tip, the threads of the cup, or to both sets of threads. In any event, as the fitting is rotated with respect to the barrel, the tip will be telescoped into the cup until it finally bears against the layer **14**. Now, as the final tightening operation is resorted to, the cement will be squeezed between the adjacent surfaces of the different threads. Incident to the reaction forces which occur as a consequence of the edge of cup **7** preferably remaining clear of the outer end of barrel **5**, the layer **19** will present a relatively thickened zone **21** between outwardly facing adjacent thread portions and a relatively thin zone **22** between adjacent inwardly facing thread portions. Also, if space intervenes the outermost convolution of the cup threads and the edge of disk **14**, the cement will key into this space as indicated at **23** in Fig. 4. Summarized, due to the axial displacement which occurs between the cup and tip as the outer face of the latter forcibly bears against layer **14** and causes the edge zone of that disk to displace or bulge, a wiping effect occurs. Such effect results in the elimination of all voids within layer **19** so that a continuous uninterrupted body of water-proof cement will intervene the parts and secure them against detachment from each other. That layer will present no cavities within which dirt particles or excess medicament may lodge. Accordingly, any cleaning operation in accordance with conventional teachnique will result in the entire assembly being effectively cleansed; a sterilizing operation rendering the unit ready for subsequent use. Also, even the sterilizing and subsequent cooling operations will not result in the cement layer cracking.

It is accordingly apparent that the fitting is in effect caused to provide a mounting which is an integral part of the barrel. The parts are connected so that there will be no danger of accidental detachment occurring throughout the life of the assembly. Liquid will not enter between the adjacent base surfaces of the cup and tip, in that this will be prevented by the layer **14**. Moreover, any tendency towards seepage will be effectively blocked by the bulged or bead portion provided by layer **14** as it is subjected to a flattening or squeezing effect.

Thus, among others, the several objects of the invention as specifically aforenoted are achieved. Obviously numerous changes in construction and re-arrangements 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 hypodermic syringe in combination a barrel, a threaded tip integral with and extending from the end of said barrel, a cup-shaped fitting providing a mounting for a needle hub and formed with threads on its inner face, the peak and valley portions of the cup threads having diameters substantially greater than the corresponding

portions of said tip threads, said fitting being mounted on said tip and the effective depth of said cup when mounted being less than the length of said tip.

2. In a hypodermic syringe in combination a barrel, a threaded tip integral with and extending from the end of said barrel, a cup-shaped fitting providing a mounting for a needle hub and formed with threads on its inner face, the peak and valley portions of the cup threads having diameters substantially greater than the corresponding portions of said tip threads, said fitting being mounted on said tip and the effective depth of said cup when mounted being less than the length of said tip and a layer of substantially water-proof cement interposed between the surfaces of the opposed threads of said tip and cup.

3. In a hypodermic syringe in combination a barrel, a threaded tip integarl with and extending from the end of said barrel, a cup-shaped fitting providing a mounting for a needle hub and formed with threads on its inner face, the peak and valley portions of the cup threads having diameters substantially greater than the corresponding portions of said tip threads, said fitting being mounted on said tip and the effective depth of said cup when mounted being less than the length of said tip, a layer of substantially water-proof cement interposed between the surfaces of the opposed threads of said tip and cup and the thickness of said layer between adjacent outer slopes of the threads of said tip and cup being greater than between the adjacent inner slopes of the threads.

4. In a hypodermic syringe in combination a barrel, a threaded tip integral with and extending from the end of said barrel, a cup-shaped fitting providing a mounting for a needle hub and formed with threads on its inner face, the peak and valley portions of the cup threads having diameters substantially greater than the corresponding portions of said tip threads, said fitting being mounted on said tip and the effective depth of said cup when mounted being less than the length of said tip, a layer of substantially water-proof cement interposed between the surfaces of the opposed threads of said tip and cup and a body of cushioning material interposed between the outer face of said tip and the base face of said cup.

5. In a hypodermic syringe in combination a barrel, a threaded tip integral with and extending from the end of said barrel, a cup-shaped fitting providing a mounting for a needle hub and formed with threads on its inner face, the peak and valley portions of the cup threads having diameters substantially greater than the corresponding portions of said tip threads, said fitting being mounted on said

tip and the effective depth of said cup when mounted being less than the length of said tip, a layer of substantially water-proof cement interposed between the surfaces of the opposed threads of said tip and cup, a body of cushioning material interposed between the outer face of said tip and the base face of said cup and said body being subjected to compression between the tip and cup surfaces and forming a bead extending into the space occupied by said layer of cement.

6. In a hypodermic syringe in combination a glass barrel, a threaded tip integral and extending from the end of said barrel, a cup-shaped fitting formed of metal and providing a mounting for a needle hub, said cup being formed with threads on its inner face, the peak and valley portions of the cup threads having diameters substantially greater than the corresponding portions of said tip threads and a layer of substantially moisture-proof cement intervening the threads of said cup and tip.

7. In a hypodermic syringe in combination a glass barrle, a threaded tip integral and extending from the end of said barrel, a cup-shaped fitting formed of metal and providing a mounting for a needle hub, said cup being formed with threads on its inner face, the peak and valley portions of the cup threads having diameters substantially greater than the corresponding portions of said tip threads, a layer of substantially moisture-proof cement intervening the threads of said cup and tip and the peaks and valleys of both the threads of said cup and tip being rounded.

8. In a hypodermic syringe in combination a barrel, a tip formed with a bore and extending from one end of said barrel, a fitting, a cup forming a part of the same, said cup being mounted upon said tip, the inner face of said cup and the outer face of said tip being formed with cooperating threads and a layer of cement interposed between said threads to permanently retain said cup upon said tip.

9. A syringe as specified in claim 8 and a washer interposed between the base of said cup and the end of said tip to be subjected to compression between the same, said washer having its edge portion extending into said cement layer.

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