Oct. 28, 1952 P. B. LINGENFELTER 2,615,446

HYPODERMIC SYRINGE

Filed May 15, 1951

Fig. 1.

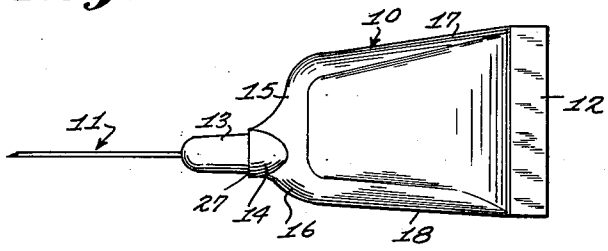
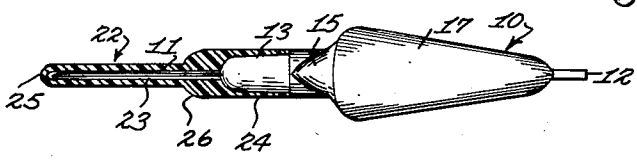


Fig. 4.



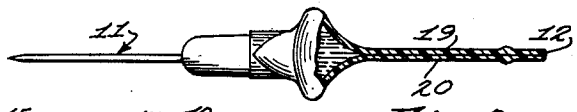


Fig. 3.

Fig. 2.

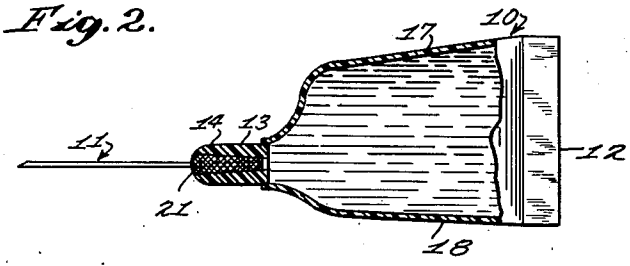


Fig. 5.

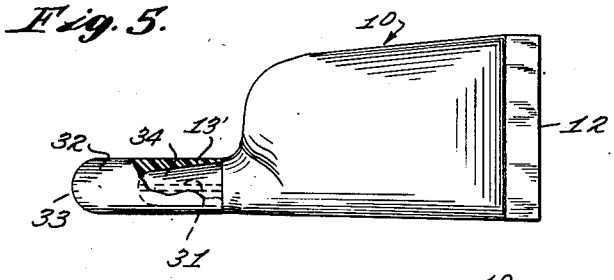
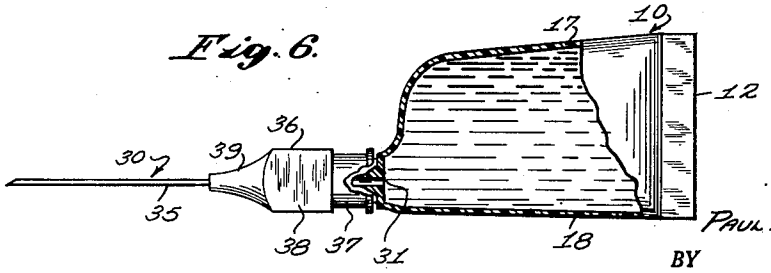


Fig. 6.



INVENTOR.
PAUL B. LINGENFELTER
BY

McMorrow, Berman + Davidson
ATTORNEYS

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HYPODERMIC SYRINGE

Paul B. Lingenfelter, Clinton, Okla.

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5 Claims. (Cl. 128—216)

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This invention relates to hypodermic syringes and more particularly to a reusable syringe of predetermined capacity especially adapted for use in clinics and in the field, although it may also be used in hospitals, physician's offices, and similar places to facilitate the work of medical personnel.

It is among the objects of the invention to provide an improved hypodermic syringe of small size and light weight for its capacity, which is operated by manually compressing and releasing a bulb of resilient sheet material constituting the container portion of the syringe; in which the needle may be either permanently attached to the container portion or detachably connected thereto and, in the case of a permanently attached needle, a needle cover may be detachably secured to the container in enclosing relationship to the needle; which includes a container of flattened shape so that substantially all of the contents can be forced from the container through the needle by finger pressure on the container and which container has an edge substantially in longitudinal alignment with the needle to facilitate inserting the needle into the skin of a patient; which can be thoroughly sterilized a large number of times without damage or deterioration; and which is simple and durable in construction, economical to manufacture, positive and effective in use and neat and attractive in appearance.

Other objects and advantages will become apparent from a consideration of the following description and the appended claims in conjunction with the accompanying drawing wherein:

Figure 1 is a side elevational view of a hypodermic syringe illustrative of the invention;

Figure 2 is a view similar to Figure 1 with a portion of the syringe broken away and shown in cross section to better illustrate the construction thereof;

Figure 3 is a top plan view of the syringe illustrated in Figure 1 with a portion broken away and shown in cross section to better illustrate the construction of the syringe, the syringe being shown in a compressed condition in this figure;

Figure 4 is a top plan view of the syringe illustrated in Figure 1 with a needle cover mounted on the syringe, the needle cover being shown in longitudinal cross section;

Figure 5 is a side elevational view of a somewhat modified form of syringe showing the syringe with the needle removed and a protective covering on the needle receiving boss of the syringe; and

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Figure 6 is a side elevational view of the modified form of syringe with the protective covering removed and a needle attached, a portion of the syringe being broken away and shown in cross section to better illustrate the construction thereof.

With continued reference to the drawing, the syringe illustrated in Figures 1, 2 and 3 comprises, in general, a container 10 and a hypodermic needle 11 permanently secured at one end to one end of the container.

The container 10 is formed of a sheet material having characteristics of resiliency and resistance to sterilizing temperatures, such material being either a synthetic resin, such as vinyl-vinylidene chloride resins, polyethylene, polyamide resins, commonly known as "nylon," vinyl chloride resins, or vinyl chloride-acetate resins, or a synthetic rubber, such as polychloroprene, butadiene-styrene copolymers, butadiene-acrylonitrile copolymers, or isobutylene-diolefin copolymer.

The container is elongated and flattened and has at one end a substantially straight edge 12 provided by pressing the side walls of the container together and securing them together by suitable means, such as cementing or fusing the material. At its other end the container is provided with a needle receiving boss 13 of cylindrical shape having a substantially hemispherically rounded outer end and having a bore 14 extending longitudinally therethrough and communicating with the interior of the container, the bore tapering from the outer end of the boss toward the container, as is particularly illustrated in Figure 2.

The boss 13 is connected at its other end to the container by a neck portion 14 of the container. Rounded shoulders 15 and 16 extend from the neck portion 14 to the side edges 17 and 18 respectively of the container. The shoulder 15 is longer than the shoulder 16 so that the side edge 17 is spaced further from the neck portion 14 than is the side edge 18, the shoulder 16 preferably being so slight that the side edge 18 extends from one end of the straight edge 12 at the end of the container remote from the boss 13 to the neck portion 14 substantially in alignment with the boss 13 and the needle 11.

Having the needle adjacent one edge of the container and substantially in longitudinal alignment therewith greatly facilitates inserting the needle into the skin of a patient. The material of the container and the boss has sufficient stiffness and rigidity that the needle can be inserted by pressure transmitted through the con-

tainer and the boss without compressing the container sufficiently to eject fluid contents therefrom, the fluid contents of the container being ejected through the needle by additional finger pressure on the container after the needle has been inserted.

The longitudinal edges 17 and 18 of the container are transversely rounded and the container is thicker at its end connected to the boss 13 than at its end remote from the boss and tapers in thickness from its boss adjacent end to its other end. This provides a construction in which substantially the entire contents of the container can be ejected from the container through the needle 11 by pressing the side walls 19 and 20 of the container together, as illustrated in Figure 3. The container is accurately formed so that it has a definite, predetermined volumetric capacity corresponding to the dosage of the material to be injected by the syringe. For example, a syringe container may have a capacity of one cubic centimeter or of one and a half, two or three cubic centimeters, as may be desired.

In the arrangement illustrated in Figures 1, 2 and 3, the needle 11 has a pointed end and has at its other end an elongated collar or sleeve 21 received in the bore 14 of the boss 13 and secured in the boss by being cemented, fused or vulcanized therein. This sleeve or collar 21 is tapered to the same taper as the bore of the boss and is preferably roughened or knurled on its surface to provide a secure connection between the needle collar and the boss of the container.

The material of the container has a sufficient stiffness and resiliency that the syringe can be refilled by pressing the side walls of the container together and, with the pointed end of the needle inserted in liquid in a suitable receptacle, by releasing the pressure on the side walls of the container the container will resume its normal shape and draw liquid through the needle into the container to completely fill the container. It is possible to quickly and easily fill the syringe container with the exclusion of air pockets and bubbles completely from the container contents.

Where the needle is permanently secured in the container, as described above, a needle cover is provided to protect the needle and keep it in a sanitary condition, such cover being particularly illustrated in Figure 4 and generally indicated at 22. This needle cover 22 comprises an elongated tubular body formed of a suitable material, such as a synthetic resin plastic or synthetic rubber and has a bore 23 therein of a size to loosely receive the needle 11 and a counterbore 24 at one end of the bore 23 of a size to tightly receive the boss 13, the end of the cover remote from the counterbore being closed, as indicated at 25.

The portion of the cover surrounding the counterbore 24 is enlarged, and is joined to the smaller, outer portion of the cover at the adjoining ends of the two portions by a beveled, annular shoulder 26.

The counterbore 24 of the needle cover snugly receives the boss 13 and the boss is preferably tapered in a direction away from the container so that the cover can be easily assembled with and removed from the boss. An annular shoulder 27 is preferably provided at the inner end of the boss and the adjacent end of the cover bears against this shoulder to provide a smooth outer surface from the neck 14 to the outer end of the enlarged portion of the cover when the cover is mounted on the syringe, as illustrated in Figure 4.

In the somewhat modified arrangement illustrated in Figures 5 and 6, the container 10 is the same as that illustrated in Figures 1 to 5 inclusive and described above, but in this case, the needle, generally indicated at 30, is detachably connected to the boss of the container.

As illustrated in Figure 5, the boss 13' of the modified form of container, is outwardly tapered, as indicated above, and is provided with a bore 31 extending longitudinally therethrough from its outer to its inner end and communicating with the interior of the container 10. When the syringe is not in use, a cap 32 is mounted on the boss to protect the boss against contamination and to prevent leakage of contents from the container. This cap is a cylindrical body of suitable synthetic resin or synthetic rubber material and has a rounded outer end 33 and a cavity 34 opening to its other end and shaped to closely receive the boss 13'. This cap may be placed on the boss and removed therefrom, as desired.

The needle 30 comprises a needle shank 35 received at one end in a thimble structure 36 which has a cavity opening to the end thereof remote from the needle shank and shaped to closely receive the boss 13' and a bore connecting the inner end of this cavity to the bore of the needle shank. Exteriorly the thimble structure 36 comprises a substantially cylindrical portion 37 at the end of the thimble structure remote from the needle shank, a portion 38 of square or polygonal cross sectional shape at the end of the portion 37 adjacent the needle shank and an outwardly tapered end portion 39 into which one end of the needle shank is inserted.

In the form of the invention shown in Figures 5 and 6 the bottom edge 18 of the container is substantially in longitudinal alignment with the needle shank to facilitate inserting the needle into the skin of a patient by pressure exerted on the container 10 only.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed is:

1. A hypodermic syringe comprising a container of resilient sheet material having a flattened shape with a substantially straight edge at one end and a needle receiving boss projecting from its other end and having a bore therethrough communicating with the interior of said container, said container having a substantially straight edge extending from one end of the first mentioned straight edge to said boss substantially in longitudinal alignment with the latter.

2. A hypodermic syringe comprising a container having a needle receiving boss at one end and a needle connected at one end to said boss and projecting outwardly from said container, said container comprising a closed hollow body of flattened shape and formed of resilient sheet material, said body having transversely rounded longitudinal edges and rounded shoulders extending from said boss to said longitudinal edges, one of said shoulders being shorter than the other to position said boss adjacent the corresponding longitudinal edge.

3. A hypodermic syringe comprising a con-

tainer having a needle receiving boss at one end and a needle connected at one end to said boss and projecting outwardly from said container, said container comprising a closed hollow body of flattened shape and formed of resilient sheet material, said body having transversely rounded longitudinal edges and rounded shoulders extending respectively from said boss to said longitudinal edges and being tapered in thickness from the end thereof adjacent said boss to its other end with a substantially straight edge at its other end, one of said shoulders being shorter than the other to dispose the corresponding longitudinal edge substantially in longitudinal alignment with said needle.

4. A hypodermic syringe comprising a container having a needle receiving boss at one end and a needle connected at one end to said boss and projecting outwardly from said container, said container comprising a closed hollow body of flattened shape and formed of resilient sheet material, said body having transversely rounded longitudinal edges and rounded shoulders extending from said boss to said longitudinal edges, one of said shoulders being shorter than the other to position the corresponding longitudinal edge substantially in longitudinal alignment with said needle, said boss having a bore extending longitudinally therethrough and tapering from the outer end of said boss to the end of the latter joined to said container and said needle having at said one end a tapered elongated collar fitting the bore of said boss and secured therein.

5. A hypodermic syringe comprising a container having a needle receiving boss at one end and a needle connected at one end to said boss and projecting outwardly from said container, said container comprising a closed hollow body of flattened shape and formed of resilient sheet material, said body having transversely rounded longitudinal edges and rounded shoulders extending from said boss to said longitudinal edges, one of said shoulders being shorter than the other to position said boss adjacent the corresponding longitudinal edge, said boss being outwardly tapered and said needle having at one end a thimble structure having a tapered cavity opening to one end thereof and closely receiving said boss.

PAUL B. LINGENFELTER.

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