

United States Patent [19]  
Cloyd

[11] 3,845,762  
[45] Nov. 5, 1974

[54] SYRINGE

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[73] Assignee: Nesco Plastics Incorporated, Erie, Pa.

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[21] Appl. No.: 75,121

[52] U.S. Cl. 128/218 P

[51] Int. Cl. A61m 5/22

[58] Field of Search 128/218 P, 218 PA, 218 R, 128/220, 221, 276, 215, 216, 224, 235, 237, 261, 218 N

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Primary Examiner—Richard A. Gaudet

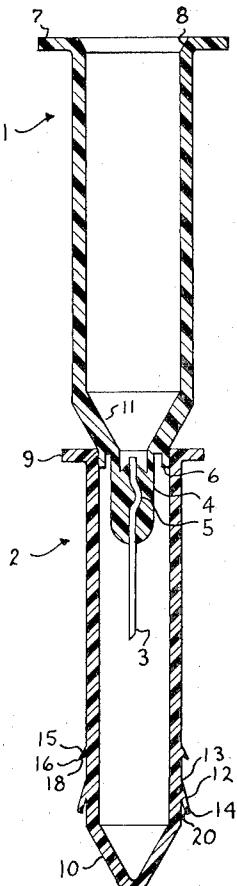
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[57] ABSTRACT

A syringe consisting of two units, one unit being a combined needle protector, piston, and piston rod, and the other unit being a barrel and needle assembly.

6 Claims, 3 Drawing Figures



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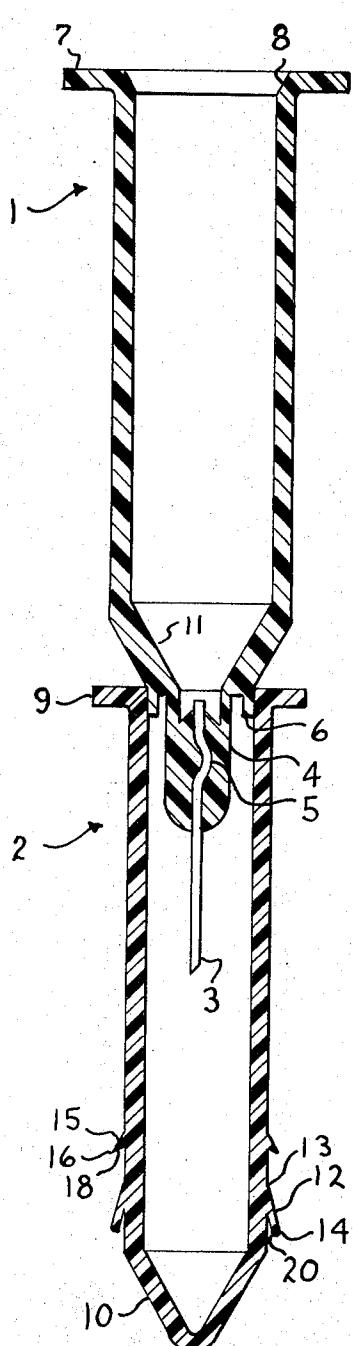


FIG. 1

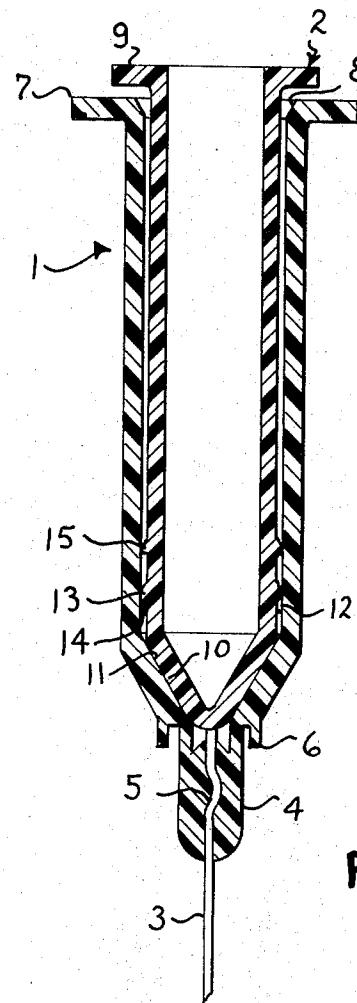


FIG. 2

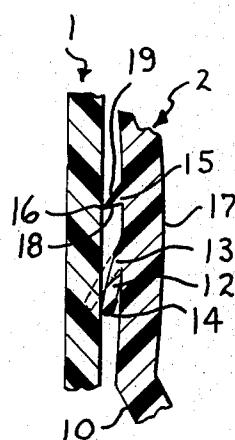


FIG. 3

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SYRINGE

This invention is a syringe which in a preferred form consists of two units, one unit being a combined needle protector, piston, and piston rod, and the other unit being a barrel and needle assembly.

In the drawing,

FIG. 1 is a longitudinal section through the syringe with the parts assembled for shipment,

FIG. 2 is a similar section with the parts assembled for use, and

FIG. 3 is an enlarged fragmentary section through the piston and the adjacent portion of the barrel.

The syringe comprises a needle - barrel assembly 1 and a combined needle protector, piston rod, and piston 2. Each of these parts is adapted to manufacture as a separate unit from molded plastics.

The needle 3 has its upper end molded into a needle hub 4 at the lower end of the barrel. The needle is preferably secured in the hub by a bend 5 which mechanically anchors the needle in the hub. Other expedients are known for securing the needle in the hub. Surrounding the hub is an integral downwardly extending cylindrical flange 6 over which the upper end of the needle protector 2 is telescoped. The fit between the flange 6 and the needle protector is adequate to hold the needle protector in place during shipment. If the hub 4 were of larger diameter, the flange 6 would not be needed. At the upper end of the barrel are integral finger grip projections 7 for holding the barrel during use. At the extreme upper end of the barrel is an enlarged taper 8 for leading the piston into the bore of the barrel.

The needle protector piston assembly 2 is of generally tubular shape with an outwardly extending flange 9 at its upper end and closed at its lower end by conical walls 10 complementary to the frusto-conical surfaces 11 at the lower end of the barrel. The outer surface of the needle protector has an outside diameter sufficiently smaller than the inside diameter of the barrel to provide a loose, sliding fit when assembled into the barrel as shown in FIG. 2. At the lower end of the needle protector are two outwardly projecting sealing members which either separately or together provide a fluid-tight seal with the bore of the barrel. The lowermost seal comprises an annular flange 12 having its upper end integral with the needle protector at 13 and inclined downwardly and outwardly at an acute angle to the axis of the needle protector. The flange 12 terminates in a thick, non feathered edge 14 having an outside diameter sufficiently larger than the bore of the barrel so as to provide a fluid-tight seal. The flange 12 is in effect cantilevered at 13 and the free end 14 is deflected inward from the dotted line position to the full line position as shown in FIG. 3 to provide the required sealing pressure. At point 13, the part 2 is relatively rigid due to the reinforcing action obtained from the conical walls 10.

An additional seal is provided by an annular rib 15 having a peripheral edge 16 of a slightly larger outside diameter than the bore of the barrel 1. When inserted in the barrel of the bore, the side wall of the part 2 may deflect inwardly as indicated at 17 to limit the sealing pressure. At this point the side wall is yieldable and provides a spring action similar to the cantilevered flange 12. The rib 15 is of generally sawtooth configuration with an abrupt shoulder 18 facing the lower end

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of the part 2 and an inclined face 19 facing the open end of the part 2.

The parts 1 and 2 are shipped assembled in a first mode of assembly as shown in FIG. 1 with the part 2 serving as a protector for the needle 3. The assembly would be over packed in a sterile package.

Upon arriving at the point of use, the assembly of FIG. 1 would be removed from its package and the needle protector 2 inserted in the barrel 1 in a second mode of assembly until the conical wall 10 bottoms on the surfaces 11 as shown in FIG. 2. In this position, sealing contact with the bore of the barrel is established between the edge 14 of the flange 12 and the surface 16 of the rib 15. The sealing contact of the flange of the edge 14 is adequate so the rib 15 is usually not necessary. By retracting the part 2 from the barrel 1, a suction is developed for filling the syringe through the needle 3 in the usual manner. Then, by pushing the part 2 inward, the fluid is expelled or ejected. During the pressure or ejection stroke, the flange 12 is subject to hydraulic action due to the fluid pressure on the surface 20 which increases the sealing pressure.

The parts 1 and 2 are adapted to plastic molding from the usual plastics such as polyethylene, polypropylene, etc. The manufacturing cost is low enough so that the syringe may be used once and then thrown away.

What is claimed is:

1. A syringe consisting essentially of first and second units which may be assembled end to end in either of two modes, namely, a first mode to protect the needle or a second mode as an operative syringe,

the first unit comprising a barrel and needle assembly in which the barrel is open at one end and closed at the other end by a needle hub fixed to the barrel and in which the needle has one end fixed to the hub and communicating with the bore of the barrel and has the other end projecting from the hub for presentation to an injection site,

the second unit comprising a combined needle protector, piston and piston rod having a body which is closed at one end and has a needle receiving recess entering the other end of the body, the closed end of the body having structure acting as a piston making sealing engagement with the bore of the barrel when the closed end of the body is inserted in the barrel, the other end of the body having means for releasably coupling it to the closed end of the barrel with the needle received in said recess, and

in said first mode of assembly the body serving as a needle protector when coupled to the closed end of the barrel,

in said second mode of assembly the closed end of the body being a piston making sealing engagement with the bore of the barrel when the closed end of the body is inserted in the barrel with the other end of the body remote from the closed end of the barrel and the body then being a piston rod for reciprocating the piston.

2. The syringe of claim 1 in which the first unit is a one piece barrel and hub.

3. The syringe of claim 1 in which the second unit is in one piece of flexible plastic.

4. The syringe of claim 3 in which the body has tubular walls between its ends with a loose sliding fit in the bore of the barrel.

5. The syringe of claim 4 in which the piston has an integral flange extending outward from said tubular walls at an acute angle toward the closed end of the body and has a non feathered edge contacting the bore of the barrel.

6. The syringe of claim 4 in which the piston has an external rib integral with the tubular walls and engaging the bore of the barrel.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,845,762 Dated November 5, 1974

Inventor(s) Harold S. Cloyd

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The Assignee should read:  
-- Nosco Plastics Incorporated --.

Signed and Sealed this  
Thirty-first Day of May 1977

[SEAL]

Attest:

**RUTH C. MASON**  
*Attesting Officer*

**C. MARSHALL DANN**  
*Commissioner of Patents and Trademarks*