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A. STRAZDINS ETAL

3,101,712

FOUNTAIN SYRINGE

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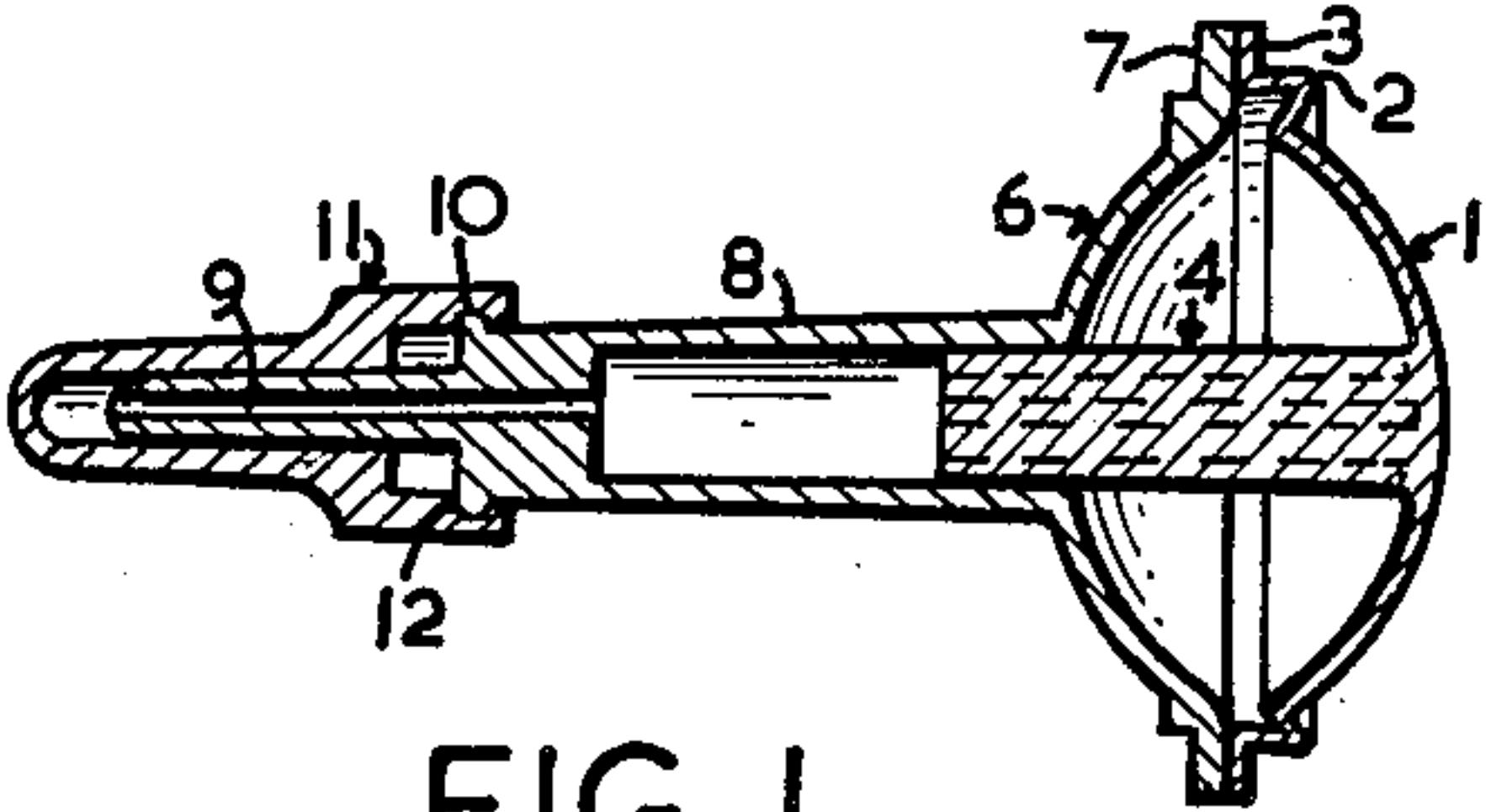


FIG. 1

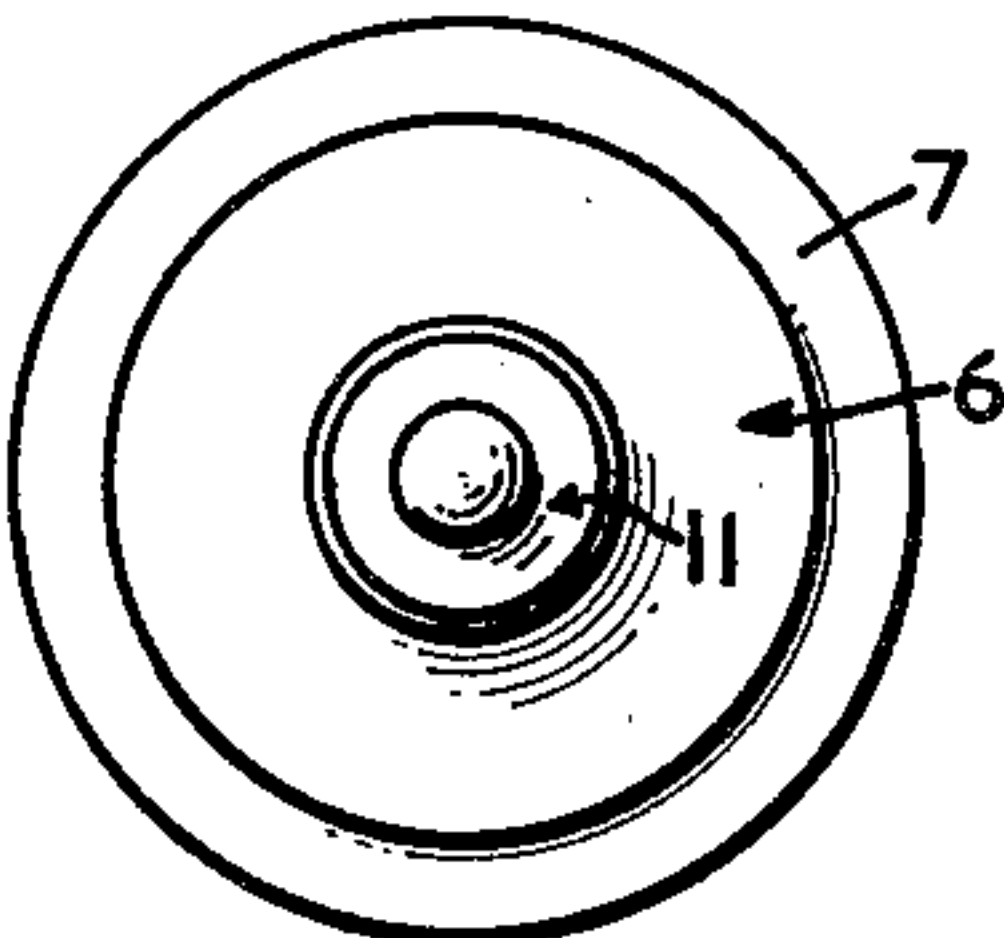


FIG. 2

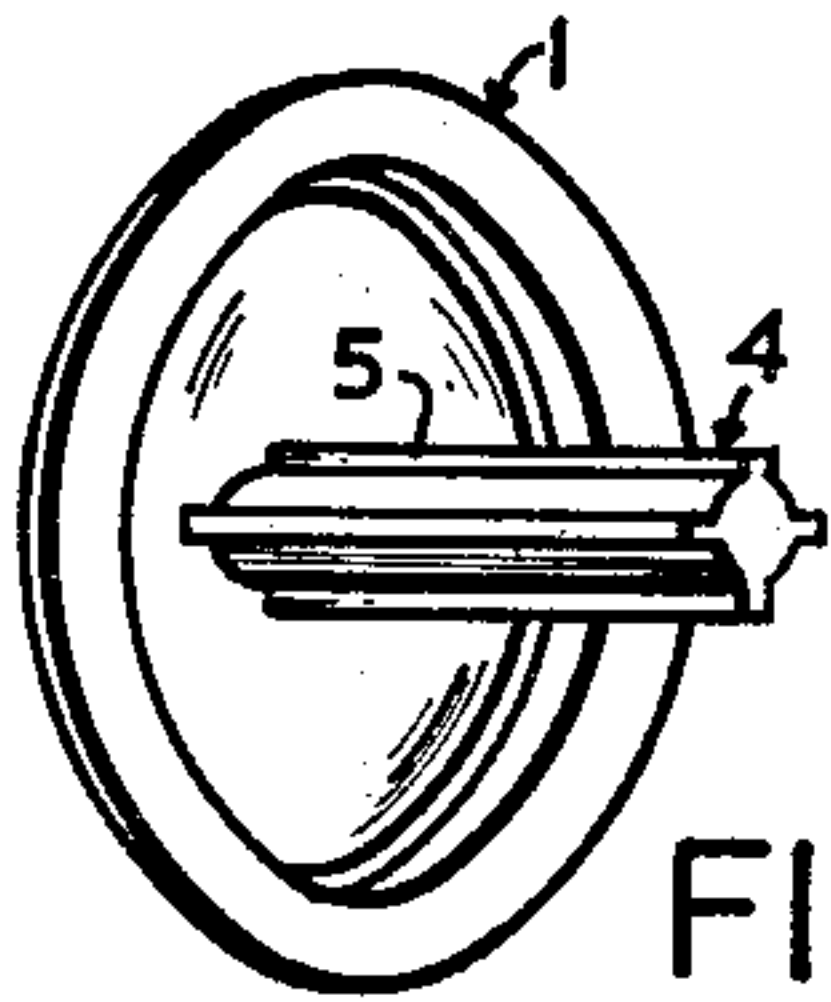


FIG. 3

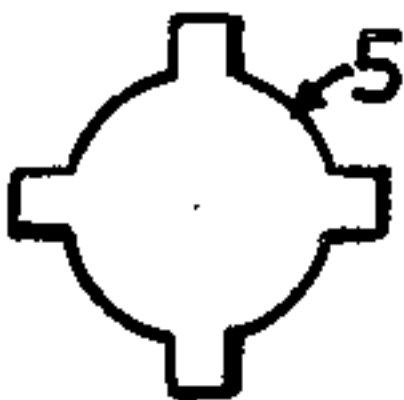


FIG. 4

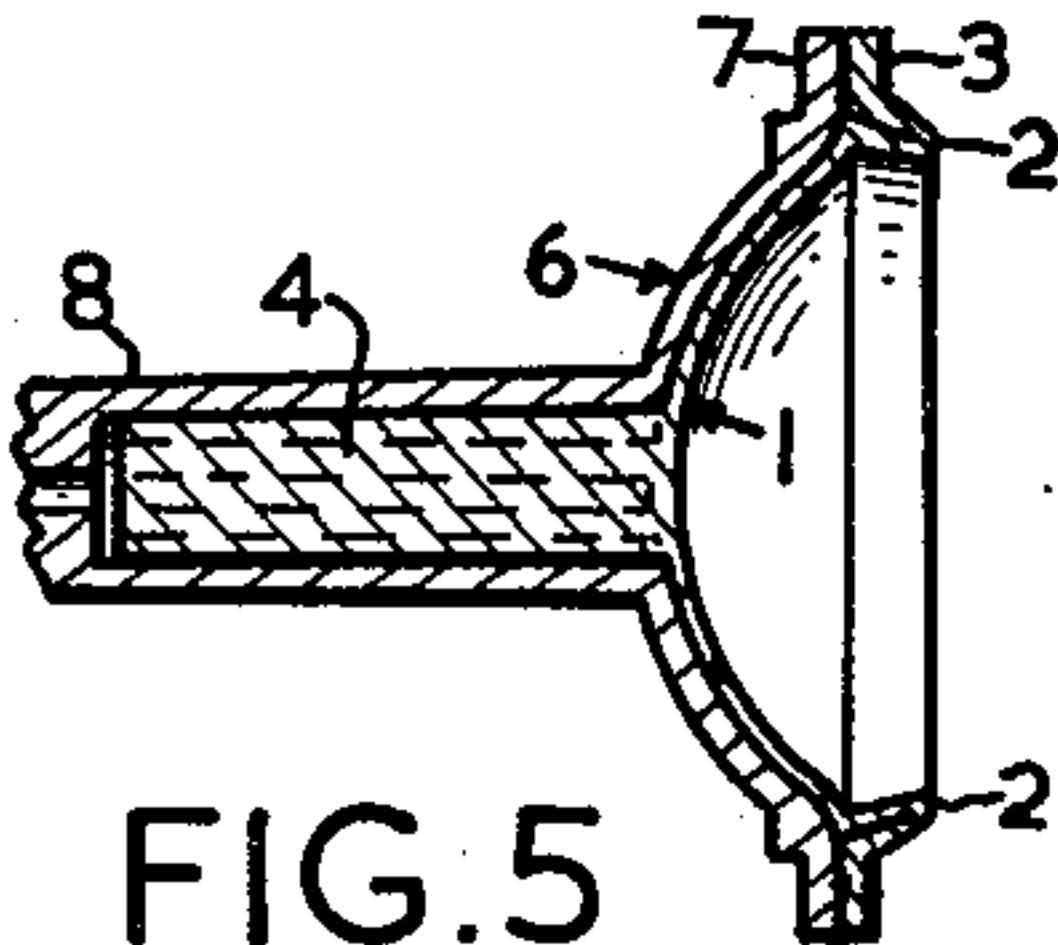


FIG. 5

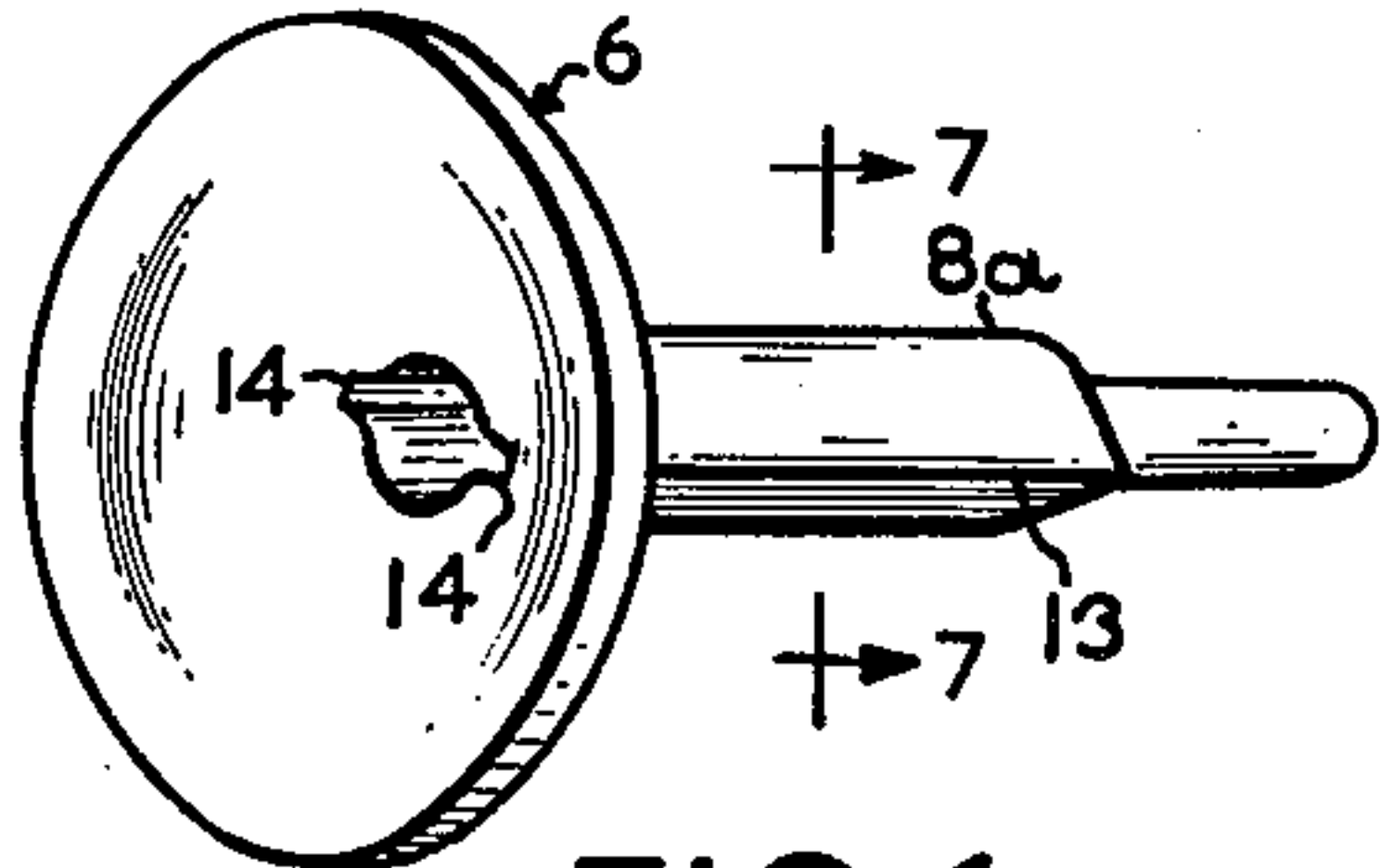


FIG. 6

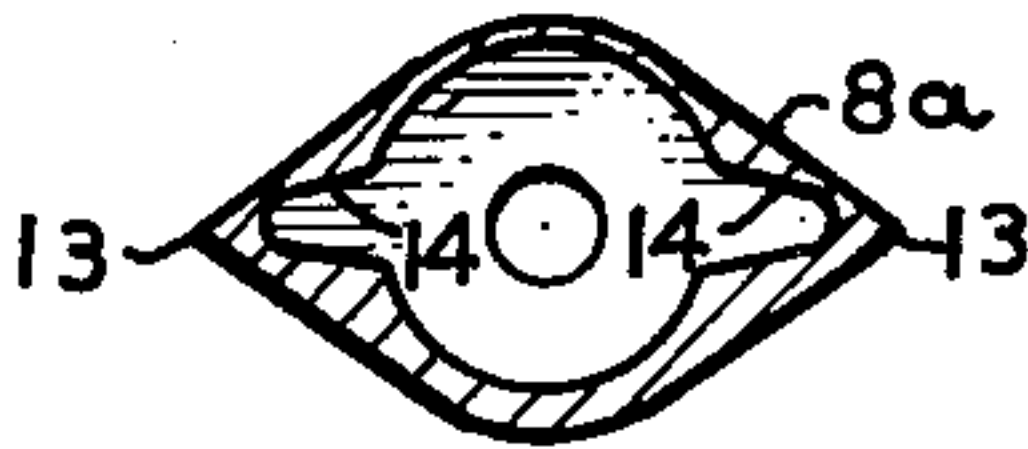


FIG. 7

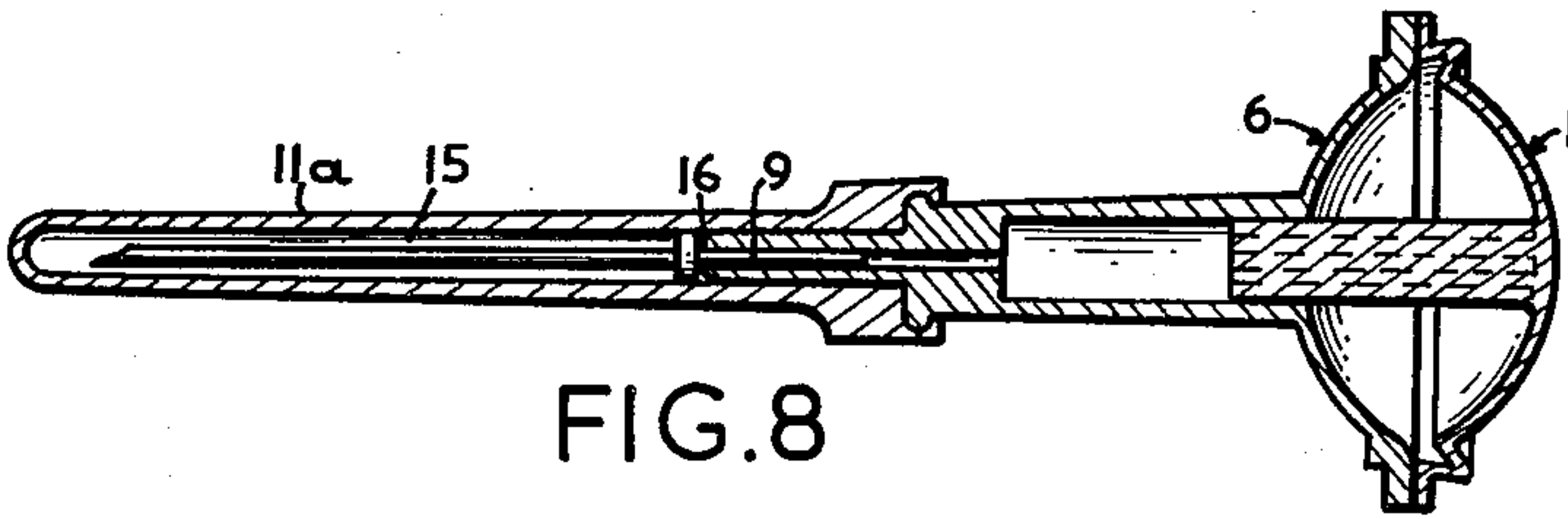


FIG. 8



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## FOUNTAIN SYRINGE

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7 Claims. (Cl. 128—218)

This invention has been devised to provide a fountain syringe which will hold a determined quantity of liquid or semi-liquid such as a medicament ready for use (hereinafter referred to as medicament) for human beings, animals and birds.

One object of the invention is to provide a fountain syringe for vending as a sealed unit containing a determined quantity of medicament for one application.

Another object of the invention is to provide such a fountain syringe having an ejector nozzle and/or means to fit a hypodermic needle thereto.

A still further object of the invention is to provide such a fountain syringe having a part formed to function as an aspirator which can be manipulated while the syringe is charged with medicament.

A still further object of the invention is to provide such a fountain syringe which can be easily held and manipulated by one hand.

A still further object of the invention is to provide such a fountain syringe which is made so cheaply that it can be disposed of after one application.

This fountain syringe is made of an elasto-plastic material (such as polyethylene) compatible to the medicament it is required to hold. For hypodermic injection it has means for attaching thereto a "needle" made of some other material. An ejector nozzle may be made as an integral component or as a separate attachment.

Basically this fountain syringe comprises a vessel formed by two half shells jointed together along their mating edges. One half shell (called herein the first half shell) is deformable by the application of pressure into the other half shell (called herein the second half shell) and in the deformed position to be in close contact with the inner surface of the second half shell. The second half shell has a tubular member projecting therefrom at a point of even distance from its edge. The bore of the tubular member is in communication with the vessel. Its outer end is formed as an ejector nozzle or is formed to have an ejector nozzle fitted thereto. In either form provision can be made to fit a hypodermic needle thereto. Means are provided to close the outlet of the tubular member.

The first half shell may have a plunger fixed thereto in axial alignment with the bore of the tubular member and adapted to enter said bore on deformation of the first half shell.

Preferably the vessel is of spheroidal shape formed by two half shells joined together along the major circumference of the vessel and it will be so described herein but without limitation thereto.

A feature of the invention is that when the first half shell is deformed into the second half shell it will remain in the deformed position thus precluding any tendency to draw back the discharged medicament.

The invention is described in further detail with reference to the annexed drawings wherein:

FIGURE 1 is a longitudinal central sectional view of the fountain syringe incorporating a nozzle on the tubular member and a sealing cap.

FIGURE 2 is a plan view of the vessel shown in FIGURE 1.

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FIGURE 3 is a perspective view of the first half shell showing how a plunger is fixed thereto.

FIGURE 4 is an enlarged plan of the plunger shown in FIGURE 3.

FIGURE 5 is a view similar to FIGURE 1 with part of the tubular member omitted and showing how the first half shell deforms into the second half shell.

FIGURE 6 is a perspective view of a second half shell showing a modification of the tubular member.

FIGURE 7 is a section (enlarged) on line 7—7 of FIGURE 6.

FIGURE 8 is a longitudinal central sectional view of the fountain syringe showing one manner of fitting a hypodermic needle thereto and a sealing cap.

The first half shell consists of a half spheroidal body 1 having a V-like surrounding corrugation 2 (inverted in relation to the second half shell) and the outer limb of the V extends into a flange like lip 3. A plunger 4 is fixed to the inner face of the half spheroidal body 1 at the centre thereof and it projects axially therefrom. As shown in FIGURE 4 the plunger has a number of longitudinal grooves 5 therein.

The second half shell consists of a half spheroidal body 6 having a flange like lip 7. A tubular member 8 is fixed to the outer face of the half spheroidal body 6 at the centre thereof and it projects axially therefrom in alignment with the plunger 4.

For one form of use the tubular member 8 has a nozzle 9 projecting from the end thereof and for another form of use it has conventional means for attaching a hypodermic needle thereto. The "needle" may be connected to the nozzle 9 or the nozzle may be omitted. In either form means are incorporated to seal the outlet of the tubular member until it is to be used. As illustrated in FIGURE 1 by way of example the tubular member has a flange like bead 10 projecting from the end and a cap 11 is provided with a complementary groove 12. The cap is held in sealing position by the bead 10 engaging the groove 12. It is to be understood that the invention is not limited to any particular form of sealing means. It may be sealed by a membrane capable of being fractured or pierced.

The two half shells 1 and 6 are joined and sealed together at the flange lips 3 and 7 preferably by fusing and when joined the plunger 4 is entered into or is in a position to enter into the tubular member 8. The vessel formed by the two half shells is filled with medicament in any convenient manner and with the outlet of the tubular member sealed it is in a vendable form.

The tubular member 8 is of such length and is made sufficiently flexible that when fitted with a "needle" for a hypodermic injection it can be first used as an aspirator by simply squeezing the tube, and then releasing the squeezing pressure whereupon the tubular member resumes its original shape and a partial vacuum is created therein whereby aspirating action is created. The medicament is displaced by applying such pressure to the first half shell 1 that it deforms into the second half shell 6. The corrugation 2 permits and facilitates complete inversion of the first half shell 1 commencing from the outer perimeter of the body and when deformation is complete the inner face of the body 1 is in close contact with the inner face of the body 6. The medicament is thus discharged from the vessel and as the first half shell remains in the deformed position there is no tendency to draw back the discharged medicament.

The plunger 4 is only required to displace medicament in the tubular member 8 in an ejecting operation.

For most purposes the nozzle 9 is made integral with the tubular member 8 and it can be made of an elasto-plastic material which is so pliable that it can be inserted



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into a small open passage in a "patient" without injuring the wall of the passage.

In the modification shown in FIGURES 6 and 7 the tubular member 8a has diametric extensions 13 throughout its length and these extensions have internal slots 14 in communication with the bore of the tubular member. The plunger 4 to be used in this tubular member does not require the longitudinal grooves 5.

As shown in FIGURE 8 the hypodermic needle 15 is mounted in the nozzle 9. It has a ring or flange on the inner end which abuts the shoulder 16 formed by the base of the nozzle 9 in the tubular member 8. The cap 11a can be secured in the same manner as the cap 11. Alternatively the needle can be secured in the nozzle 9 in a moulding or fitting operation.

We claim:

1. A fountain syringe comprising a vessel made of elastoplastic material, said vessel including first and second half shells joined together along their mating edges, a tubular member projecting from the second half shell at a point of even distance from its edge and having a central bore in communication with said vessel, means to close the outlet of the tubular member from the bore, the first half shell having a V-shaped circumferential groove adjacent the joined edges of said half shells and opening inwardly toward the second half shell, the outer wall of the groove extending into a flange-like lip, said groove permitting the first half shell to be deformed by the application of pressure thereon into the second half shell and into close contact with the inner surface of the second half shell in its deformed position.

2. A fountain syringe comprising a vessel of spheroidal shape, made of elastoplastic material, said vessel including first and second half shells each having a flange-like lip along its major circumference, said first half shell having a V-shaped groove adjacent said lip and opening inwardly toward the second half shell, the outer wall of the groove extending into and forming its flange-like lip, said two half shells being joined together at the position of said flange-like lips, said V-shaped groove permitting the first half shell to be deformed by the application of pressure into the second half shell and into close contact with the inner surface of the second half shell in the deformed position, a tubular member projecting from the second half shell at a point of even distance from its circumference, and having a central bore in communication with said vessel, and means to close the outlet from the bore.

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3. A fountain syringe according to claim 2 having an ejector nozzle on the outer end of said tubular member.

4. A fountain syringe according to claim 2 having means for fixing a hypodermic needle to said tubular member.

5. A fountain syringe according to claim 2 in which the first half shell has a plunger fixed thereto in axial alignment with the bore of said tubular member, said plunger being adapted to enter said bore on deformation of said first half shell.

6. A fountain syringe comprising a vessel of spheroidal shape, made of elastoplastic material, said vessel including first and second half shells, each having a flange-like lip along its major circumference, said first half shell having a V-shaped groove adjacent said lip and opening inwardly toward the second half shell, the outer wall of the groove extending into and forming its flange-like lip, said two half shells being joined together at the position of said flange-like lips, said V-shaped groove permitting the first half shell to be deformed by the application of pressure into the second half shell and into close contact with the inner surface of the second half shell in the deformed position, a tubular member projecting from the second half shell at a point of even distance from its edge and having a central bore in communication with said vessel, means to close the outlet from the bore and means for fixing a hypodermic needle to said tubular member, said tubular member having diametric extensions throughout its length, said extensions having internal slots in communication with its bore.

7. A fountain syringe according to claim 6 in which the first half shell has a plunger fixed thereto in axial alignment with the bore of said tubular member, said plunger being adapted to enter said bore on deformation of said first half shell.

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