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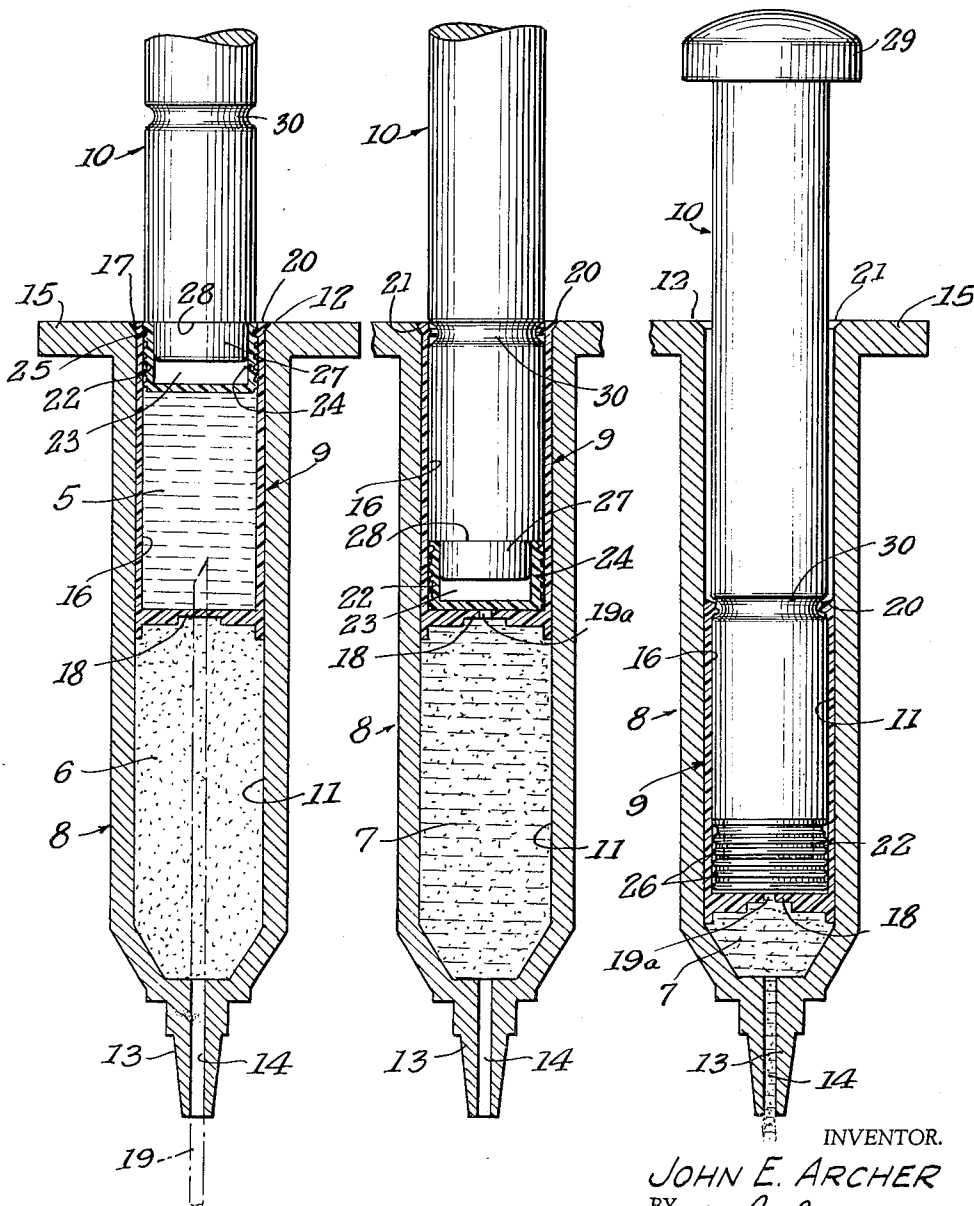
MOLD-FILLING DEVICE

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Fig. 1.

Fig. 2.

Fig. 3.



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MOLD-FILLING DEVICE

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This invention relates to a device for filling a mold, and deals more particularly with a syringe that extrudes cold-curing liquid material that enables molding operations in proximity to or even in contact with portions of the skin surfaces of people. An object of the present invention is to provide such a safe and effective device.

For improving the skull-gripping form of eyeglass temples, for instance, the modeling of additional skull-conforming thickness onto the temples may be carried out by the present syringe device, the same forcing cold-curing liquid material into an elastic mold provided on the temples and said materials conforming to the skull formation and then cold-curing or -setting with little or no discomfort to the person to whose skull the mold is being applied for conforming purposes.

Another object of the invention is to provide a syringe device in which two materials are stored and kept separate one from the other and which, before and upon ejection from the syringe, combine to form a cold-curing liquid that hardens in a mold or other cavity.

A further object of the invention is to provide a syringe of the character above referred to that, together with the cold-curing materials, may be made up as a dispensable one-shot item.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawing merely shows and the following description merely describes, one embodiment of the present invention, which is given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

FIG. 1 is a longitudinal sectional view of a syringe according to the present invention in its normal state before use.

FIG. 2 is a similar view showing the syringe in the position thereof before ejection of the materials therein and during initial admixing of the materials.

FIG. 3 is also a similar view showing the syringe ejecting the combined materials.

The syringe of the present invention may serve for combining a liquid and a powder before the combined material is ejected. As an example, the liquid 5 may comprise a cold-cure auto-polymerizing polymer and the powder 6 a cold-cure auto-polymerizing monomer. In any case, without the application of heat and/or pressure, the two materials 5 and 6, when combined, polymerize. The action is one that produces first a liquid, shown at 7, and then a solid.

The present syringe device comprises, generally, an outer housing or container 8, an inner housing or container 9 telescopically fitted in the container 8, and a plunger 10 telescopically fitted in the container 8. Said container 8 is advantageously made of a rigid and preferably transparent plastic and the container 9 may be made of various materials, of which pliable plastics are preferred. The plunger may be made of a rigid material, although also of a plastic material.

The outer container 8 defines a cylindrical chamber 11 in which the powder 6 is stored. The same is open at

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its end 12 and its opposite end is formed as a nozzle 13 that is here shown with a discharge opening 14 of such small size that the powder 6 is retained in chamber 11. In any case, a slip cap may be used to close opening 14 until the syringe is ready for use. Said open end 12 may be provided with a flange 15 that may be engaged by the finger and facilitates handling of the syringe.

A chamfer 21 is provided at the open end 12 of the bore 11, as can be seen in FIG. 3.

The inner container 9 defines a cylindrical chamber 16 in which the liquid 5 is stored. Said chamber is open at its end 17 and its opposite end has a transverse wall 18. Said wall is adapted to be pierced by a sharp instrument 19 that may be introduced through the opening 14 in the barrel 8. The hole 19a thus formed in the wall 18 will normally contract but will allow the liquid 5 to be forced therethrough into the chamber 11.

The container 9 is held in a position closing the open end 12 of the container 8 by means such as the bead or flared portion 20 of container 9 seated in the chamfer or conical seat 21 in container 8. It will be clear that container 9 cannot be moved inwardly toward the nozzle 13 until a force is applied on container 9 that is great enough to cause the flared portion 20 to withdraw from seat 21 and slidingly fit within the chamber 11 of container 8 as the container 9 moves toward nozzle 13.

The inner container 9 includes a closure 22 that tightly seals in the liquid 5. Said closure has a hollow or recess 23 that is upwardly open and its cylindrical wall 24 has a bead and groove connection 25 with the inner face of the container 9. Thus, said closure has a normal position closing the open end 17 of the container 9. Sealing lands 26 may be provided on the outer face of wall 24 to insure against leakage of liquid 5 outward of the end 17.

The plunger 10 is provided with an end 27 that fits the closure recess 23, the same defining a shoulder 28 on the plunger that is designed to have end engagement with the rim or edge of the closure wall 24. The end 27 fits said recess 23 so snugly that, when the plunger is pushed by means of its end 29, in an inward direction, the flare 20 cannot withdraw from the seat or chamfer 21. As a consequence, the container 9 retains its position as in FIGS. 1 and 2, while the closure 22 is telescopically moved into said container by the plunger to cause displacement of the liquid 5, through the opening 19a, into permeation of the powder 6 in the container 8.

Said plunger 10, in suitable spaced relation to the end 27, is provided with a relief groove 30 that, as can be seen in FIG. 2, assumes a position aligned with the flare 20 when the closure 22 reaches the bottom 18 of the container 9. Thus, upon continued push on the plunger cap 29, the container 9, now acting as a plunger, displaces the intermixed liquid 7 outwardly from opening 14. This movement of container 9 is made possible because the flare 20 thereof is released from engagement with seat 21 and may be forced inwardly into the annulus formed by said groove 30, as can be seen from FIG. 3. Thus, the contents of the syringe may be emptied.

In practice, it is preferred to make up the syringe as a unitary device in which both materials 5 and 6 are surely kept separated until the wall 18 is punctured and the syringe operated to first admix the materials 6 and 5 and then eject the admixed liquid 7 that results from such admixture.

Regardless how made up, the present syringe provides for at least partial combining of the materials in both chambers 11 and 16 before the same is discharged from the nozzle end of the device.

This application is a continuation-in-part of my pending application, Serial No. 749,765, filed July 21, 1958 and bearing the same title, now abandoned.

While the foregoing specification illustrates and describes what I now contemplate to be the best mode of carrying out my invention, the construction is, of course, subject to modification without departing from the spirit and scope of my invention. Therefore, I do not desire to restrict the invention to the particular form of construction illustrated and described, but desire to cover all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A syringe comprising an elongated outer housing having a discharge nozzle, a shorter inner housing within the outer housing, each housing being adapted to hold a material, means separably connecting the housings to locate the inner housing in the end of the outer housing that is opposite to the nozzle of said outer housing, the inner housing, thereby, constituting a closure for the material in the outer housing, a closure for the inner housing telescopically fitted into said inner housing, and a plunger engaged with the latter closure to force the same in a direction to discharge the material of the inner housing into the material in the outer housing to intermix the same, when the inner housing is pierced, said plunger having portions to maintain the separable connection of the housing during telescopic movement of said closure of the inner housing.

2. A syringe comprising an elongated outer housing having a discharge nozzle, a shorter inner housing within the outer housing, each housing being adapted to hold a material, means separably connecting the housings to locate the inner housing in the end of the outer housing that is opposite to the nozzle of said outer housing, the inner housing, thereby, constituting a closure for the material in the outer housing, a closure for the inner housing telescopically fitted into said inner housing, and a plunger engaged with the latter closure to force the same in a direction to discharge the material of the inner housing into the material in the outer housing to intermix the same, when the inner housing is pierced, said plunger having portions to maintain the separable connection of the housing during telescopic movement of said closure of the inner housing, said plunger being provided with a relief annulus spaced from its inner end that, when in register with said separable connection, when the plunger has expelled the material in the inner housing therefrom, releases the same whereby the inner housing is adapted to move as a plunger within the outer housing to extrude the intermixed material from the mentioned discharge nozzle.

3. A syringe according to claim 2 in which the inner housing is formed of a flexible material whereby the

separable connection means thereof is forced by the outer housing into the relief annulus.

4. A syringe having an outer material-holding container having one open end and a discharge nozzle extending from the opposite end, an inner material-holding container tightly telescopically fitted in said open end of the outer container and provided with a puncturable wall on the end thereof directed toward the nozzle-provided end of the outer container, said wall being adapted to be punctured by a sharp implement inserted through, interengaging means on both containers to releasably hold the inner container in the mentioned position in the open end of the outer container, a plunger telescopically fitted in the open end of the inner container and positioned to retain said interengaging means engaged and to release said interengaging means upon movement in a direction toward the punctured end wall of the inner container, to thereby free the latter container for telescopic movement toward the nozzle end of the outer container, whereby movement of the plunger in the inner container forces material from said inner container into the outer container to first intermix said materials during movement of the inner container toward the nozzle and then discharge the mixture through the nozzle.

5. A syringe according to claim 4 in which the plunger is provided with an annular relief groove spaced from the end thereof engaged in the inner container a distance substantially equal to the distance of travel of the plunger toward the punctured end of the inner container, said relief groove reaching a position in register with the means interengaging the containers when the plunger reaches the punctured end of the inner container and, thereby, releasing said interengaging means when the material in the inner container has been displaced by the plunger into the outer container to intermix the materials as aforesaid.

6. A syringe according to claim 5 in which the plunger is formed as a closure cup for the open end of the inner container, and a longitudinal member longitudinally separable from fitted engagement in said cup.

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