Oct. 10, 1967 J. L. HIGGINS ETAL 3,346,147

DENTAL COMPOUND SYRINGE

Filed Aug. 18, 1966

FIG.1

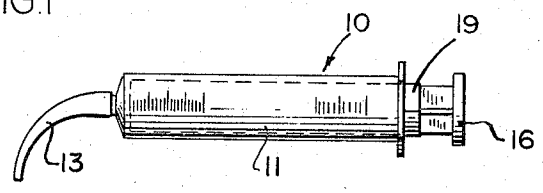


FIG.2

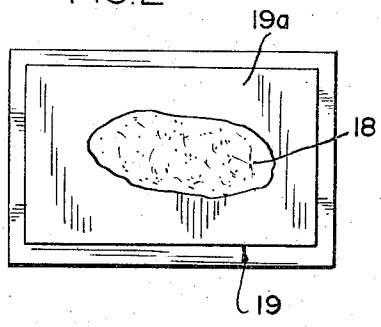


FIG.3

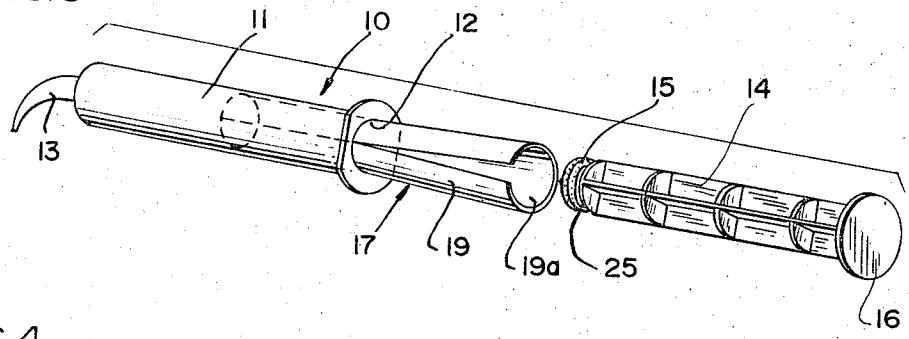


FIG.4

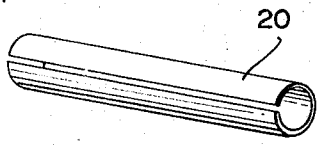


FIG.5

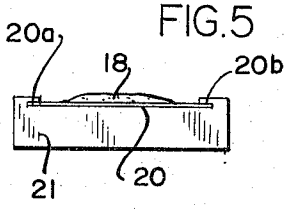


FIG.6

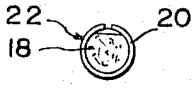
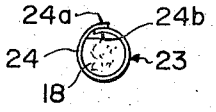


FIG.7



INVENTORS
JOHN L. HIGGINS
RICHARD W. GILSON

BY Hofgren, Wegner, Allen, Stellman & McCord

ATTORNEYS

United States Patent Office 3,346,147
Patented Oct. 10, 1967

3,346,147

DENTAL COMPOUND SYRINGE

John L. Higgins, Daytona Beach, Fla., and Richard W. Gilson, St. Louis, Mo., assignors to Brunswick Corporation, a corporation of Delaware

Filed Aug. 18, 1966, Ser. No. 573,317
7 Claims. (Cl. 222—326)

This invention relates to syringes and in particular to a charge for use with syringes.

One use of a syringe is in the preparation of dental plates, and the like, wherein the material to be delivered by the syringe has a relatively heavy consistency. It has been conventional to provide the charge of such material in the form of a loose mass thereof delivered into the open end of the syringe tubular barrel by a spatula, or the like. The charge material conventionally comprises a mixture of ingredients which are conventionally mixed on a suitable mixing plate requiring the subsequent transfer of the mixed charge from the plate into the syringe barrel. Thus, with such loose mixed charges, a portion of the composition may be left on the mixing plate. Not only is this undesirable from the point of view of being wasteful of the charge material, but also undesirably requires a subsequent cleaning of the plate. Still further, the transfer of such loose charge material may well entail spillage and possible waste thereof in attempting to place the material in the barrel.

The present invention comprehends a new and improved charge of such a mixture composition for use in a syringe eliminating the above discussed disadvantages of the conventional charges in a novel and simple manner.

Thus, a principal object of the present invention is the provision of a new and improved charge for use with syringes and the like.

A further object of the invention is the provision of such a charge of a mixture composition wherein the composition is provided in a tubular sheet for facilitated insertion thereof into the open end of the tubular barrel of the syringe.

Another object of the invention is the provision of such a charge wherein the tubular sheet is arranged to define also the mixing surface on which the ingredient materials of the composition are mixed to form the composition.

Still another object of the invention is the provision of such a charge wherein the sheet is biased to the tubular configuration.

Still another object of the invention is the provision of such a charge wherein the tubular sheet is arranged to extend outwardly of the barrel when inserted thereinto, for facilitated insertion of the syringe plunger into the tubular sheet.

Yet a further object of the invention is the provision of such a charge wherein the sheet is formed of resilient material biased outwardly against the inner surface of the syringe barrel to provide an accurate fit of the sheet to the barrel.

A further object of the invention is the provision of such a charge wherein the width if the sheet is slightly greater than the internal circumference of the syringe barrel whereby the sheet edges are overlapped in the tubular configuration.

Still another object of the invention is the provision of such a charge wherein the sheet is formed of a material providing a low friction inner surface in the tubular configuration, for facilitated movement of the plunger therethrough.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing, wherein:

FIGURE 1 is a side elevation of a syringe having a charge embodying the invention provided therein;

FIGURE 2 is a top plan view of the charge as during the mixing of the ingredient materials of the charge composition on the flexible sheet prior to the disposition of the sheet in the tubular configuration and insertion into the syringe barrel;

FIGURE 3 is an exploded view illustrating the insertion of the charge into the open end of the tubular syringe barrel;

FIGURE 4 is a perspective view of a modified form of tubular sheet preformed in a tubular configuration;

FIGURE 5 is a side elevation of the preformed tubular sheet in a flat arrangement in a suitable fixture for mixing of the ingredient materials of the composition thereon;

FIGURE 6 is an end view of the charge utilizing the tubular preformed sheet; and

FIGURE 7 is an end view of a charge wherein the width of the sheet is slightly greater than the inner circumference of the tubular barrel whereby the edges of the sheet overlap each other in the tubular configuration.

In the exemplary embodiment of the invention as disclosed in the drawing, a syringe generally designated **10** is shown to comprise a tubular barrel **11** having an open end **12** and an outlet **13** at the opposite end. The syringe further includes a plunger **14** having a forward piston portion **15** and a rearward thumb piece **16**. The plunger is adapted to be moved axially into the open end **12** of the syringe barrel **11** whereby the piston **15** may urge material in the tubular barrel **11** forwardly and outwardly through the outlet **13**.

As indicated briefly above, the invention comprehends a provision of the charge to be delivered from the syringe by the plunger **14** as a preformed charge **17** wherein the composition **18** is provided in a tubular sheet **19** for facilitated installation of the charge in the tubular syringe barrel. The invention further comprehends the provision of such a charge wherein the ingredient materials may be mixed on the sheet **19** to define the composition **18** while the sheet is arranged in a horizontal flat configuration with the sheet **19** being subsequently formed into the tubular configuration for facilitated insertion into the tubular syringe barrel. Thus, as shown in FIGURE 2, the composition **18** may be mixed on the upper surface **19*a*** of the sheet **19**. Upon completion of the mixing of the materials to form the composition, the entire quantity of composition may be then maintained enclosed in the tubular configuration of the sheet **19** and placed into the tubular syringe barrel **11**, thereby obviating the need for any clean-up of the mixing surface and assuring a delivery of the entire quantity of composition to the syringe barrel.

The sheet **19** may comprise a flat sheet so that upon the forming thereof into the tubular configuration, the natural resiliency of the sheet will tend to urge the sheet outwardly against the inner wall surface of the tubular syringe barrel **11** thereby assuring an accurate fit in the barrel. Alternatively, the sheet may be provided in the form of a preformed tubular sheet **20**, as shown in FIGURE 4, for facilitated arrangement of the sheet in the tubular configuration upon completion of the mixing of the composition thereon. As illustrated in FIGURE 5, where the sheet **20** is preformed in the tubular configuration, a fixture **21** may be provided for holding the edges **20*a*** and **20*b*** of the sheet to arrange the sheet in a generally flat configuration upon which the composition **18** may be mixed. Upon completion of the mixing of the composition, the sheet **20** is removed from the fixture **21** whereupon the sheet assumes its natural tubular configuration for facilitated insertion into the tubular barrel of the thusly formed charge **22**.

As shown in FIGURE 7, a further modified charge **23** embodying the invention comprises a charge wherein a

tubular sheet **24** is preselected to have a width slightly greater than the circumference of the interior of the syringe barrel **11**, so that the edges **24***a* and **24***b* of the sheet **24** overlap slightly. Thus, sheet **24** may readily accommodate itself to variations in the internal diameter of the syringe barrel while yet providing a continuous tubular wall about the composition **18** therein. The tubular sheet **24** may be preformed in the tubular configuration of FIGURE 7, or may be a flat sheet formed in a tubular configuration similar to sheet **19**.

As shown in FIGURE 1, the length of the tubular sheet **19** is preferably slightly greater than the length of the tubular barrel **11** so that the sheet will extend outwardly therefrom for facilitated insertion of the plunger **14** thereinto. The piston **15** preferably includes an annular sealing ring **25** which may have an expanded outer diameter equal to, or greater than, the inside diameter of the tubular barrel **11** whereby the sealing ring has forceful sealing arrangement with the inner surface **19***a* of the tubular sheet **19** during the movement of the plunger therethrough in expelling the composition **18** through the outlet **13** of the syringe. The sheets **19**, **20** and **24** are preferably formed of a flexible resilient material, such as a plastic, providing a low friction inner surface **19***a* for facilitated movement of the plunger seal **25** thereagainst.

While the charge structure of the present invention is extremely simple, it provides an improved, substantially maintenance free means for mixing the composition ingredients at the time of use and placing the mixed composition in the syringe barrel for facilitated ejection thereof by the syringe barrel. The syringe **10** may be a conventional disposable syringe and, thus, upon completion of the ejection of the composition, the entire unit may be discarded thereby obviating substantially all maintenance.

While we have shown and described certain embodiments of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. In a syringe having a tubular barrel provided with an open end and an opposite outlet, and a plunger movable through said open end to expel material from said barrel through said outlet, a charge of a mixture composition installed in the open end of the barrel of the

syringe to permit the plunger to be urged inwardly therethrough to expel said composition through said outlet, said charge being formed by the steps of: laying out a flexible sheet to present an upper mixing surface; placing on said surface ingredient materials of said composition;

mixing said materials on said surface to form said composition; and

forming said sheet into a generally tubular open-ended configuration with said composition retained therein.

2. The charge of claim **1** wherein the sheet is biased to a tubular configuration and flexed to a laid-out configuration for mixing said composition thereon.

3. The charge of claim **1** wherein said tubular sheet extends partially outwardly of said barrel for facilitated insertion of said plunger into said tubular sheet.

4. The charge of claim **1** wherein said plunger includes an annular resilient seal element at its inner end having an outside expanded diameter greater than the inside diameter of the syringe barrel for effectively sealingly engaging said tubular sheet to preclude leakage of said composition past said plunger during the movement thereof inwardly through the barrel.

5. The charge of claim **1** wherein the sheet is formed of a resilient material and is biased against the inner surface of the syringe barrel by its resiliency so as to provide an accurate fit of the sheet to the barrel when inserted thereinto.

6. The charge of claim **1** wherein the width of the sheet is slightly greater than the internal circumference of the syringe barrel whereby the opposite sheet side edges are overlapped in the tubular configuration within the barrel.

7. The charge of claim **1** wherein the sheet is formed of a material providing a low friction inner surface in the tubular configuration.

References Cited

UNITED STATES PATENTS

1,259,146	3/1918	Shields	222—326
1,269,438	6/1918	Heatzman	222—326
1,275,058	8/1918	Long	222—386 X
1,833,528	11/1931	Linton	222—326
2,175,747	10/1939	Dodd	222—386 X
2,844,287	7/1958	Brandt et al.	222—326
3,191,303	6/1965	Baum.	

RAPHAEL M. LUPO, *Primary Examiner.*