July 26, 1966 J. W. MACEY 3,262,608

SYRINGE WITH BARREL AND CHARGE RECEIVING PLUNGER

Filed July 8, 1964

Fig. 1

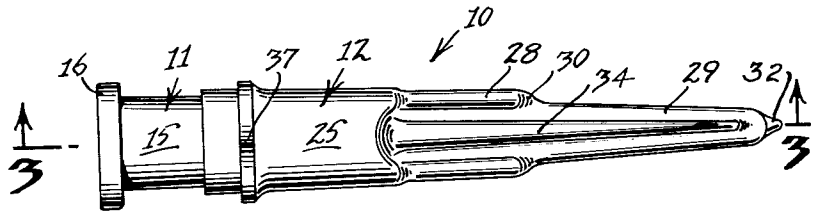


Fig. 2

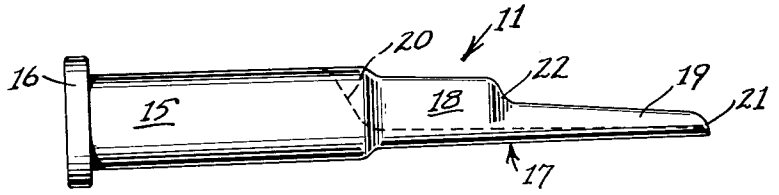
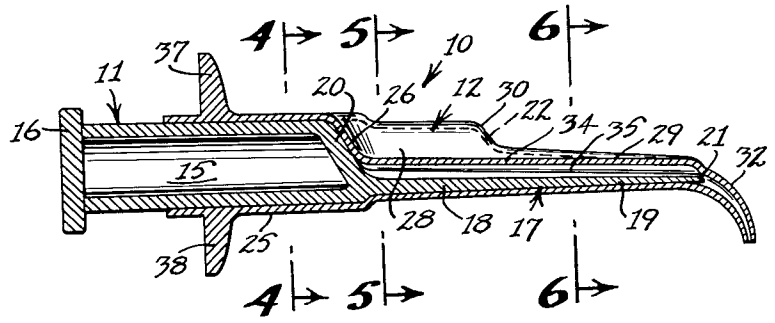


Fig. 3



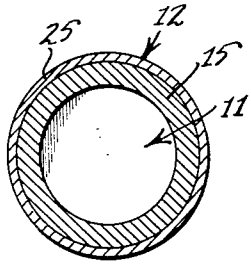


Fig. 4

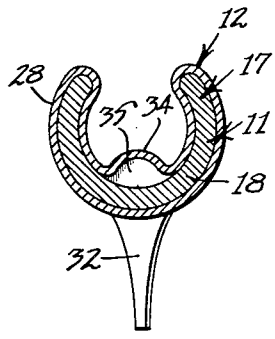


Fig. 5

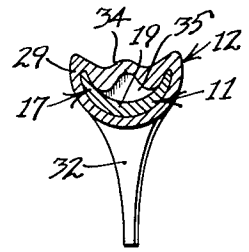


Fig. 6

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SYRINGE WITH BARREL AND CHARGE RECEIVING PLUNGER

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This invention relates to a syringe, and more particularly to a syringe especially adapted for loading and dispensing a charge of plastic or paste material.

One object of this invention is to provide a syringe particularly adapted for use by dentists in filling cavities and treating the periodontia.

Another object of this invention is to provide a syringe in which the plunger includes a scoop-like member for receiving and carrying a fluid, semi-solid material.

A further object of this invention is to provide a syringe including a plunger having a scoop-like member for receiving a pasty material and a barrel having a substantially complementary shape for receiving the plunger.

Another object of this invention is to provide a syringe in which the plunger and barrel are structurally designed to facilitate loading and extruding a fluid, semi-solid material.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings, wherein:

FIG. 1 is a top plan view of the invention with the plunger fully inserted into the barrel;

FIG. 2 is a side elevation of the plunger;

FIG. 3 is a section taken along the line 3—3 of FIG. 1;

FIG. 4 is a section taken along the line 4—4 of FIG. 3;

FIG. 5 is a section taken along the line 5—5 of FIG. 3; and

FIG. 6 is a section taken along the line 6—6 of FIG. 3.

Referring now to the drawings in more detail, the syringe 10 made in accordance with this invention includes a plunger 11 and a barrel 12 having substantially complementary structural parts so that the plunger 11 may be telescopingly received in the barrel 12.

The plunger 11 includes a cylindrical ram member or piston 15, preferably hollow, having a disc-like cap or head 16, against which the thumb of the operator is pressed to force the plunger 11 into the barrel 12. Extending longitudinally from the end of the ram member 15 is a scoop-like member 17 including a channel portion 18 and an extended portion 19. The channel portion has an arcuate or U-shaped cross-section with a circumference greater than 180° and tapers from the face 20 of the ram member 15, toward the free end or tip 21 of the plunger 11. However, the gradual taper of the scoop-like member 17 is interrupted by an abrupt shoulder 22 which separates the channel portion 18 from the extended portion 19. As best disclosed in FIGS. 2 and 6, the extended portion 19 still gradually tapers toward the tip 21 and also has an arcuate or U-shaped cross-section, but with a circumference of substantially less than 180°.

The barrel 12 has an enlarged cylindrical chamber 25 with an open rear end adapted to snugly but slidably receive the ram member 15 in its fully discharged position. The forward end of the chamber 25 comprises a sloping wall 26 against which the ram face 20 is adapted to abut in its fully discharged position. The forward end of the cylindrical chamber 25 is also provided with an arcuate opening communicating with the channel portion 28 of the barrel 12 having an arcuate cross-section adapted to receive the plunger channel portion 18 in its fully discharged position as best disclosed in FIG. 5. The forward end of the channel portion 28 communicates with the rear end of an extended barrel portion 29 having a modified arcuate cross-section for receiving the extended portion

19 of the plunger 11. The channel portion 28 merges with the extended portion 29 by means of an abrupt shoulder portion 30, which receives the shoulder 22 of the plunger 11 in its fully discharged position.

The extended portion 29 has a constricted opening forming a nozzle 32 which extends beyond the tip 21 of the plunger 11 in its fully discharged position. As disclosed in the drawings, the nozzle 32 extends downwardly in a curved, tapering configuration, a design structure which is desirable for introducing dental material into a tooth cavity. However, it will be understood that the nozzle 32 may extend straight beyond the tip 21, if desired, or have any other shape which is convenient for the operation of the syringe 10.

The rib 34 in the top of the barrel 12 from the chamber wall 26 to the nozzle 32 provides a continuous conduit 35 for the pasty material to be dispensed from the ram face 20 to the nozzle 32 for any operative position of the plunger 11 within the barrel 12.

A pair of conventional finger grips or flanges, 37 and 38, are also formed on the barrel 12, if desired, to facilitate the manipulation of the syringe 10 with one hand. Thus, the forefinger and middle finger of the operator engage the forward surfaces of the flanges 37 and 38, while the operator's thumb presses the head 16 to force the plunger 11 into the barrel 12.

Assuming that the syringe 10 is to be used by a dentist for filling the cavity of a tooth, the plunger 11 is removed from the barrel 12, and the scoop member 17 is filled or loaded with the plastic semi-solid or pasty dental material for filling cavities. The dentist then inserts the tip 21 into chamber 25 and forces the plunger 11 into the barrel 12 until the material completely fills the spaces between the various portions of the plunger 11 and the barrel 12. If it is desired to extrude the material through the nozzle 32, pressure on the head 16 is continued, squeezing the material between the ram face 20 and the end wall 26 and between the shoulders 22 and 30. Because of the general tapering structure of both the barrel 12 and the plunger 11 from the ram face 20 and end wall 26 forward, the compressed material is gradually forced toward the nozzle 32.

In the event that some of the material becomes caked in certain portions of the syringe between the complementary arcuate walls of the barrel 12 and the plunger 11, the rib 34 provides a continuous outlet 35 for the material for any position of the plunger 11 in the barrel 12. It will be observed that when the plunger 11 is fully inserted so that its ram face 20 abuts end wall 26, and the shoulders 22 and 30 abut each other, there is still a continuous opening 35 beneath the rib 34 and the opposing portions of the scoop member 17. This open space 35 beneath the rib 34 is clearly disclosed in FIGS. 3, 5 and 6.

After the plunger 11 has attained its fully discharged position in the barrel 12, the plunger 11 may be removed and refilled for a subsequent operation, or the syringe 10 may be thoroughly cleaned for storage. The syringe 10 may also be made of inexpensive material, such as plastic, so that it may be completely disposable, if desired.

Another reason that barrel portion 29 and extended plunger portion 19 are substantially reduced in cross-section from the barrel channel portion 28 and plunger channel portion 18, is to facilitate the introduction of the extended portions 29 and 28 into the patient's mouth for operation upon any desired tooth or any desired region of the mouth.

It will thus be seen from the above description that a syringe has been provided which not only extrudes a plastic semi-solid material for the same uses as many other syringes, but also incorporates structure for receiving the material and facilitating the loading of the syringe.

It will be apparent to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof, and therefore the invention is not limited by that which is shown in the drawings and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A syringe comprising:

(a) an elongated plunger comprising a ram member and a scoop member extending longitudinally from said ram member,

(b) said scoop member having an arcuate cross-section shaped symmetrically about the longitudinal axis of said plunger,

(c) said scoop member comprising a channel portion adjacent said ram member and an extended member on the opposite end of said channel portion from said ram member and terminating in a tip,

(d) a barrel having a enlarged opening at one end for receiving said plunger,

(e) a nozzle forming the other end of said barrel,

(f) an enlarged chamber in said barrel adjacent said enlarged opening for snugly and slidably receiving said ram member,

(g) an intermediate channel barrel portion communicating with said chamber for snugly receiving the channel portion of said scoop member,

(h) an extended barrel portion communicating with said channel barrel portion for snugly receiving said extended member,

(i) said tip being adapted to abut said nozzle when said plunger is fully inserted into said barrel.

2. The invention according to claim **1** in which the channel portion of said scoop member tapers gradually from said ram member toward said extended member, and said extended member tapers gradually toward said tip.

3. The invention according to claim **2** in which the channel portion of said scoop member is separated from said extended member by a shoulder portion.

4. The invention according to claim **1** in which said ram member is cylindrical and said chamber is cylindrical.

5. The invention according to claim **4** in which said channel portion of said scoop member is an elongated wall having a circular cross-section extending concentrically about the longitudinal axis of said plunger greater than 180° but less than 360°, and said channel barrel portion has a complementary shape to receive said wall.

6. A syringe comprising:

(a) an elongated plunger comprising a ram member and a scoop member extending longitudinally from said ram member,

(b) said scoop member having a U-shaped cross-section symmetrical about the longitudinal axis of said plunger,

(c) a barrel having a enlarged opening at one end for receiving said plunger,

(d) a nozzle forming the other end of said barrel,

(e) an enlorged chamber in said barrel adjacent said enlarged opening for snugly and slidably receiving said ram member, and

(f) a hollow U-shaped portion in said barrel communicating with said chamber for snugly receiving said U-shaped scoop member.

7. The invention according to claim **6** in which said scoop member converges away from said ram member to form a tip adapted to be received in said nozzle when said plunger is fully inserted into said barrel.

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