W. R. HOWARD.

SYRINGE FOR INJECTING CEMENT IN TEETH.

APPLICATION FILED JULY 14, 1917.

1,306,816. Patented June 17, 1919.

Fig. 2.

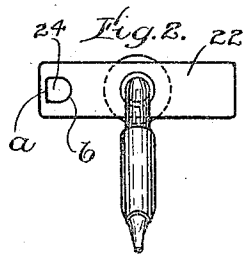


Fig. 1.

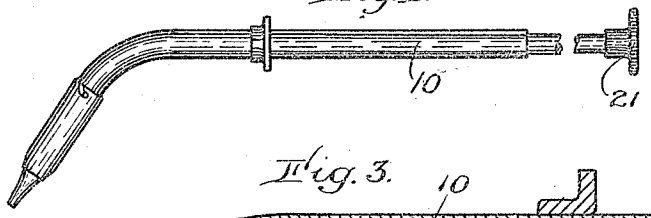


Fig. 3.

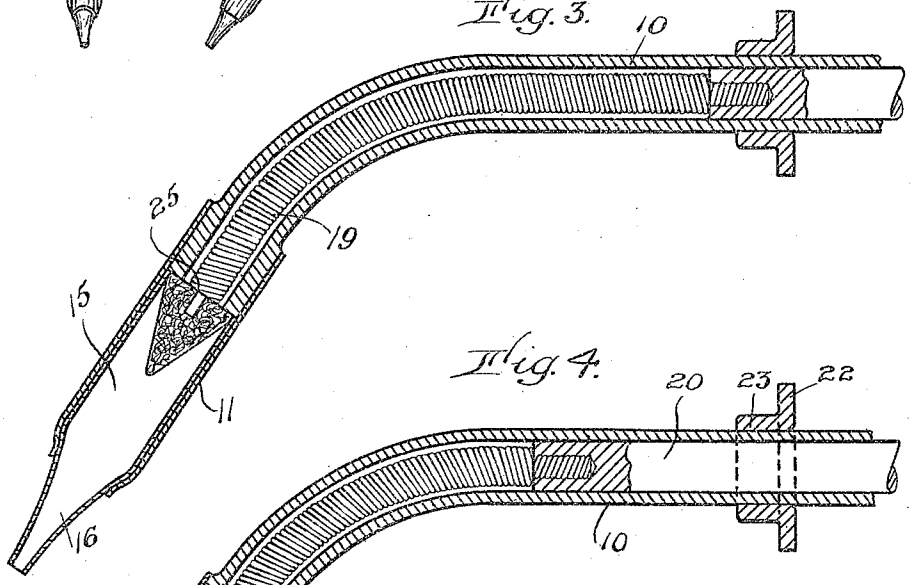


Fig. 4.

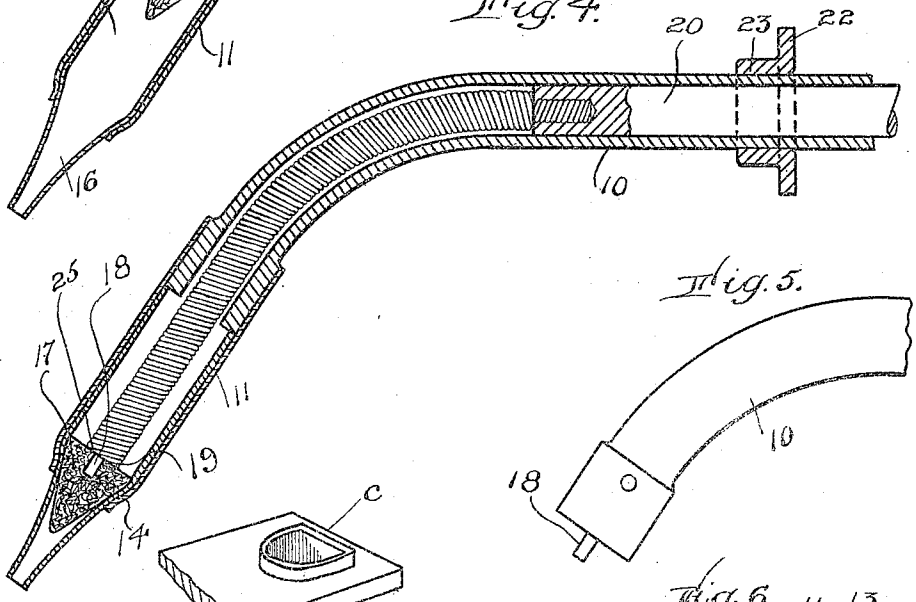


Fig. 5.

Fig. 6.

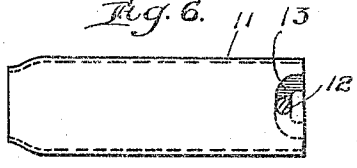


Fig. 7.

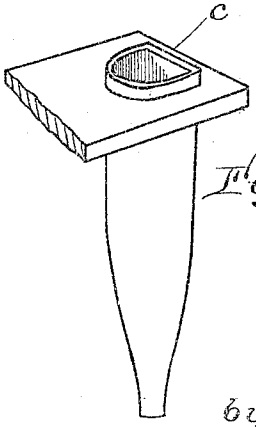
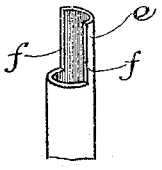


Fig. 8.



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UNITED STATES PATENT OFFICE.

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SYRINGE FOR INJECTING CEMENT IN TEETH.

1,306,816. Specification of Letters Patent. Patented June 17, 1919.

Continuation of applications Serial No. 66,893, filed December 15, 1915, and Serial No. 109,430, filed July 15, 1916. This application filed July 14, 1917. Serial No. 180,555.

To all whom it may concern:

Be it known that I, WILLIAM R. HOWARD, a citizen of the United States, residing at Newport, in the county of Newport and State of Rhode Island, have invented new and useful Improvements in Syringes for Injecting Cement in Teeth, of which the following is a specification.

This invention has relation to syringes and has for its primary object to provide an instrument of the class referred to which may be employed in dental work. In certain operations, such as crowning, root-filling and the like, it is necessary or desirable to insert plastic or fluid cement in a prepared cavity or socket in the tooth. Such an instrument should be capable of sterilization, should be simple and inexpensive, and those parts which engage the tooth and the cement should be made of such cheap and inexpensive material that they may be discarded after once being used. My invention has for its object, more specifically, to provide such an instrument.

On the drawings,—

Figure 1 represents a side elevation of the syringe.

Fig. 2 represents an end elevation of the same.

Figs. 3 and 4 represent longitudinal sections, on a large scale, through the syringe, and show the plunger in two different positions.

Fig. 5 shows the end of the shank, with the barrel-holder removed.

Fig. 6 shows the barrel holder.

Fig. 7 illustrates the barrel removed from the holder and located to receive a charge of cement.

Fig. 8 shows another form of barrel.

As shown upon the drawing, the syringe comprises three main elements, to wit, a barrel which may be discarded after a single use, a holder therefor, and a plunger. The holder consists of a shank or handle portion, and a barrel-holding portion, which are separable, to permit the removal of the barrel; and the plunger consists of a rod or stem, and a piston which, if desired, may be separated from the stem and discarded.

The shank or handle, as shown, consists of a metallic tube 10, which is curved for a portion of its length so that the axes of its extremities form an obtuse angle, and on the front end thereof is the barrel holder 11. Any suitable joint may be employed for temporarily or detachably connecting the holder and the shank. As shown, a bayonet joint may be used, the shank having pins 12 to extend into the open-end angular slots 13 in the holder 11. The outer end of the holder is inwardly tapered as at 14. The barrel holder and the shank being of metal may be easily sterilized. The barrel consists preferably of celluloid or other like compound which easily may be molded or formed in shape and which is of such inexpensive construction that it may be discarded after a single use. The barrel is indicated as a whole at 15. It is substantially cylindrical in form with a tapering nozzle 16 which may be projected through the reduced end of the holder 14 so that the converging portion or extremity of the holder will engage a reduced portion of the barrel as shown in Figs. 3 and 4. The barrel may be positioned by first removing the holder 11 from the handle or shank 10, and introducing the barrel into the holder through the large open end thereof until the nozzle occupies the position shown in Figs. 3 and 4. The plunger comprises a piston 17 of some inexpensive material such as cardboard impregnated with a harmless compound inert in respect of the cement or other materials to be used in the syringe, such for example, as paraffin. The piston is illustrated as being substantially conical to eject as much cement as possible. The stem comprises a flexible member so that it may be moved longitudinally through the curved portion of the shank. This flexible member may consist of a central wire 18 about which is a wire helix 19, and the end of the wire 18 may, if desired, extend far enough beyond the helix for insertion in the piston 17, as illustrated in Figs. 3 and 4. The end of the helix forms a shoulder 25 for engaging the piston and forcing it through the barrel. As illustrated, the opposite end of the flexible member is secured to a rod 20 which projects rearwardly beyond the shank 10 and is provided with a head 21 for its manipulation. By making the stem of metal, it may be sterilized coincidently with the sterilization of the shank and the holder. To assist in the manipulation of the syringe, a cross bar 22 is secured to the shank at a suitable point between the ends thereof so that the operator may use the syringe by placing the first two fingers of one hand against the cross bar and the thumb of his

hand against the head of the stem, and thus, by pressure of his thumb, force the stem through the shank and the piston through the barrel so as to eject from the barrel such material as may be contained therein. The cross bar may be secured to the shank in any suitable way, being shown as provided with a collar 23 which is brazed or otherwise secured upon the shank.

It is ordinarily quite difficult, because of the small size of the barrel, to fill it with cement, particularly since it is circular in cross section. I therefore provide means for so bending or reshaping the end of the barrel as to form a straight edge against which the knife or spatula may be scraped for filling the interior of the barrel. To this end, the cross bar 22 is provided with an aperture 24. This said aperture has a rectilinear or straight wall *a* and a curved wall *b*, these two walls approximating in shape the letter **D**. Being formed of celluloid, gelatin or other like material, and thereby being flexible, the barrel may be inserted in the aperture 24, as shown in Fig. 7, and its end portion will conform to the shape of the aperture so as to afford a rectilinear or straight edge *c* and thus facilitate the scraping of the cement from the knife or spatula into the interior of the barrel.

Of course it is not essential that the barrel should be made of celluloid or gelatin or like materials, as it may be made of paper or other inexpensive material.

The juncture of the nozzle with the cylindrical portion of the barrel forms a shoulder with which the inwardly tapered or reduced portion of the end of the holder may engage to limit the movement of the barrel in respect of the holder as herein before stated.

In operation, a barrel is inserted in the aperture 24 of the cross piece of the handle and is filled with cement, after which the barrel is located in the holder 11 and the holder inserted in place. Usually, the piston is thrust into the end of the barrel before the holder is positioned on the shank or handle. Thereafter the operator, grasping the instrument in the way previously described, places the nozzle in the patient's mouth so as to direct the cement into the socket or cavity which has been prepared therefor, and then drives the stem into the barrel, forcing the cement from the barrel into the cavity or socket.

Shanks or handles of varying curvature may be provided, if desired, so as to afford access to cavities in the differently located teeth. Dental cement hardens rapidly, and for this reason it is practically impossible to use the same barrel twice unless it is instantly cleaned after being used, and such cleaning is tedious and time-taking. According to my invention, I provide a barrel of such inexpensive material that it may be used but once and then discarded. The barrel is large enough to contain the required body of cement, and yet has the reduced nozzle to deliver the cement in a thin stream. It has a straight scraping edge (when inserted in the aperture 24) which facilitates the insertion of the cement. This edge may be permanent, as shown in Fig. 8, in which the barrel has at its rear end a longitudinal projection *e*, the sides *f f* of which form straight scraping edges. In this latter case, the barrel may be held in one hand when being filled, instead of being inserted in the aperture.

So far as the generic subject-matter is concerned, this application is a continuation of my previous applications Serial No. 66,893, filed December 15, 1915, and Serial No. 109,430, filed July 15, 1916.

Having thus explained the nature of my said invention and described a way of making and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, what I claim is:

1. A syringe comprising a holder of tubular form, a barrel projecting lengthwise through the holder and having a reduced end projecting therefrom to form a nozzle, and a plunger located in the holder and movable longitudinally thereof for coöperating with said barrel, said holder having a reduced end to engage the barrel and hold it against longitudinal movement.

2. A syringe comprising a tubular holder formed in detachable sections, a barrel formed of cheap material adapted to be discarded after use and adapted to be inserted in one section of the holder so as to protrude therefrom, the projecting end of the barrel being reduced to form a nozzle, and a plunger in said holder for coöperation with said barrel.

3. A syringe comprising a holder, a barrel adapted to be placed in the holder and to protrude therethrough, the protruding end of the barrel being reduced to form a nozzle, and a plunger for coöperation with said barrel consisting of a stem and a piston detachably secured on the end of said stem, said barrel and said piston being respectively formed of cheap material whereby they may be discarded after use.

4. A syringe comprising a tubular shank, a barrel holder detachably secured thereto, a barrel adapted for insertion into said holder and having a nozzle adapted to protrude through the end of said holder, a plunger located in said tubular shank, and a piston adapted for engagement with said plunger, said piston and said barrel being of inexpensive material, whereby they may be discarded after a single use.

5. A syringe comprising a barrel holder,

a curved tubular shank detachably connected with said holder, a removable barrel contained within said holder, and a plunger comprising a piston for coöperation with said barrel and a flexible stem passing through said tubular shank for operating said piston.

6. A dental syringe comprising a holder, a removable barrel formed of flexible material adapted for insertion in said holder, and a member attached to said holder and provided with an aperture of which one wall is straight or rectilinear, substantially for the purpose set forth.

7. A syringe comprising a holder, a barrel formed of cheap material adapted to be discarded after use and adapted to be inserted in the holder and to protrude therefrom, the projecting end of the barrel being reduced to form a nozzle, and a plunger for coöperation with said barrel.

8. A dental syringe comprising a body consisting of a longitudinally curved tubular shank and a barrel holder detachably secured thereto, a removable barrel in said barrel holder, and a plunger for ejecting the contents of the barrel, said plunger having a flexible stem and a separable piston.

9. A dental syringe comprising a holder, a plunger, and a barrel formed of flexible material and having a wall the edge of which is adapted to form a straight scraper.

10. A dental syringe comprising a tubular body, a barrel of flexible material for insertion therein and normally circular in cross section, and a member secured to and projecting laterally from said body and having a D-shaped aperture in which the barrel may be temporarily inserted for filling.

11. A dental syringe comprising a holder, a barrel formed of inexpensive material so as to be discarded after use, and adapted to be inserted in said holder, and a member formed to receive said barrel temporarily while said barrel is being filled.

In testimony whereof I have affixed my signature.

WILLIAM R. HOWARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."