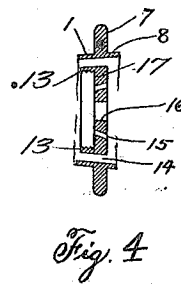
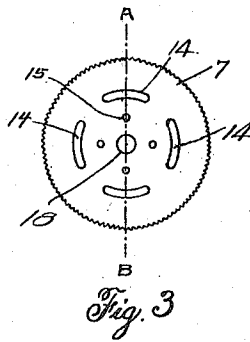
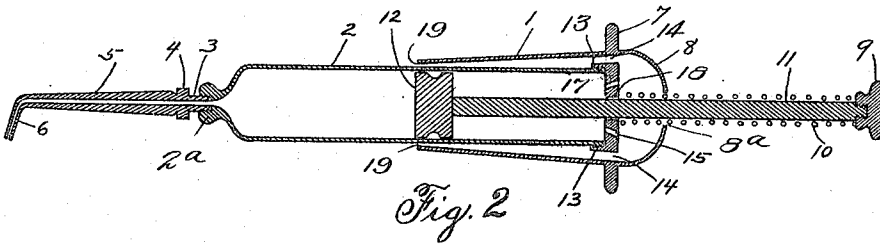
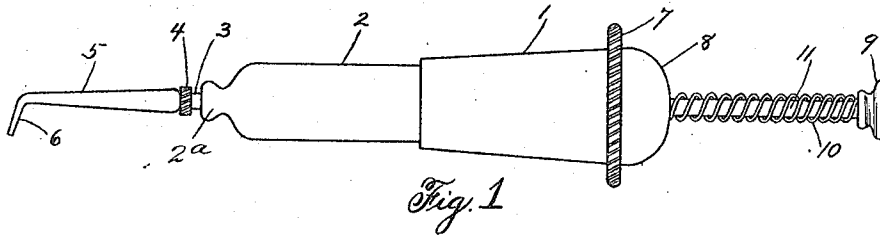


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SYRINGE.

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WITNESSES

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SYRINGE.

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To all whom it may concern:

Be it known that I, ROBERT B. THURMAN, a citizen of the United States, and a resident of Sparta, in the county of White and State of Tennessee, have invented a new and useful Improvement in Syringes, of which the following is a specification.

My invention is an improvement in syringes, and the invention has for its object to provide a device of the character specified, especially adapted for dentists' use, for flushing the oral cavity and for dislodging foreign matter in cavities of the teeth during the process of dental work, wherein the syringe is provided with automatic mechanism for draining the syringe.

In the drawings:—Figure 1 is a view of the improved syringe, Fig. 2 is a sectional longitudinal section, Fig. 3 is a front view of the diaphragm or disk, and Fig. 4 is a section on the line A—B of Fig. 3.

The present embodiment of the invention comprises a body or barrel 2 of cylindrical form, having one end reduced to form a nipple 2^a, and the other end of the barrel is closed by a hood or cover to be later described. A nozzle is connected with the nipple 2^a, the said nozzle comprising a tapering body 5, having at one end a reduced nipple 3 for engaging within the nipple 2^a, and having at the other end an angular discharge 6. The nozzle is provided with an annular rib 4 between the nipple 3 and the body, and the said rib is externally roughened or corrugated as shown to permit the nozzle to be manipulated in removing or replacing the same. The nipple 3 has a threaded engagement with the nipple 2^a, and it will be evident that when the nozzle is turned in the proper direction the nipple 3 may be engaged with or disengaged from the nipple 2^a.

The hood or cover has its inner end open, and the outer end is closed by an integral rounded portion or cap 8, having a central opening 8^a at the axis of the hood, and the said hood or cap is of smallest diameter at its inner end, gradually increasing in diameter toward the rounded portion or closed end 8. At the junction of this rounded portion 8 with the body of the hood the hood is provided with an annular rib 7, the said rib being externally roughened or corrugated as shown for the convenient manipulation of the same. The hood or cover is also provided with a transverse diaphragm at the

rib 7, and the said diaphragm is practically continuous with the rib, being in the same plane. This diaphragm 17 has an annular lateral extending threaded rib 13, which engages the end of the barrel 2 remote from the nipple 2^a, and the said diaphragm closes that end of the barrel. The barrel is externally threaded at the end remote from the nipple for engaging within the rib 13, and it will be obvious that by turning the hood or cover by means of the rib 7, the rib 13 may be disengaged from the barrel. Between the rib 13 and the internal surface of the hood or cover the diaphragm is provided with arc-shaped slots 14, the said slots being four in number in the present instance, and being concentric with the barrel and the hood or cover. These slots 14 provide a communication between that portion of the hood or cover on the outer side of the diaphragm 17 and the space between the body of the hood or cover and the exterior of the barrel. The inner end of the hood or cover it will be noted does not fit tightly against the periphery of the barrel, there being left a space between the periphery of the barrel and the inner end of the hood or cover. The diaphragm is also provided with openings 15, on the inner side of the rib 13, and the said openings in the present instance are four in number, being spaced to correspond with the spacing of the slots 14. The openings 15 provide a communication between that portion of the hood or cover on the outer side of the diaphragm 17 and the interior of the barrel and at its center the diaphragm is provided with a central opening 18.

A plunger 12 is arranged within the barrel and a rod or stem 11 is connected with the plunger. The stem extends through the openings 18 of the diaphragm and 8^a of the rounded portion of the hood or cover, and at its outer end the stem is provided with a detachable head or button 9, forming a handle for the convenient manipulation of the plunger. This head or button is provided with an internally threaded recess, which is engaged by a reduced threaded stem on the outer end of the rod 11. A coil spring 10 is arranged between the head 9 and the diaphragm 17, the opening 8^a of the hood or cover being of sufficient diameter to permit the passage of the spring. This spring normally acts to force the plunger toward the diaphragm and to return

the plunger after the contents of the syringe has been ejected.

In operation, the syringe is filled by pressing the head 9 toward the nozzle 5 until the plunger 12 is adjacent to the nipple 3^a. When now the head is released the plunger will be forced toward the diaphragm by the spring and the liquid will be drawn through the nozzle 5—6 into the barrel. In order to eject the liquid the hood or cover 1 is grasped between the two first fingers of the hand, and the thumb engages the head 9. When this head is pressed inwardly the contents of the syringe will be forced out through the port of the nozzle into the oral cavity or into the tooth cavity. In use, the liquid gains access to that portion of the barrel between the plunger and the diaphragm 17, and this liquid in the ordinary syringe will either be forced through the opening around the plunger rod or will cause trouble in the syringe. With the present construction any liquid that may gain access to the space above the plunger will be driven out through the openings 15, when the plunger moves upward into that chamber formed between the diaphragm 17 and the portion 8 of the hood or cover. From here the liquid may pass out through the annular passage between the hood or cover and the periphery of the barrel, finally discharging at 19 and away from the fingers of the operator, which are at the rib 7.

In filling the syringe the nozzle 5 may be dipped into the liquid before or after the plunger has been moved inwardly, and as soon as the plunger is released the spring will force the plunger outward drawing the liquid into the syringe. Any liquid that passes above the plunger will pass through the openings 15 into the chamber at the outer end of the hood or cover and from there will pass through the openings or slots 14 into the space between the hood and the barrel, finally discharging at the opposite end of the barrel from that grasped by the user.

It will be noted that the openings 15 are not parallel with the axis of the barrel, but inclined inwardly toward their inner ends. The purpose of this inclination of the openings is to prevent a sudden jet of water from being forced through the opening 8^a of the cap 8. The annular opening 19 is sufficiently large to allow free discharge of the water, being in practice about $\frac{1}{16}$ of an inch.

The improved syringe may be easily taken apart for cleaning or the like. By turning the hood or cover in the proper direction with respect to the barrel the rib 13 may be disengaged from the barrel after which the hood and its cap together with the rib 7 and the diaphragm 17 and the plunger and its stem may be withdrawn from the barrel. The nozzle and connected parts may be also

detached from the other end. When the cover or hood is removed from the barrel the entire interior of the barrel is accessible. The plunger may be left in the barrel during the removal of the hood or cover by removing the head or thumb piece 9 from the stem 11. The hood or cover and its cap prevent the discharge of liquid near the upper end of the syringe insuring that all of the liquid will be discharged at the lower end of the barrel.

It will be understood that the improved syringe may be made of any desired material, as for instance, metal or hard rubber. When of metal, the diaphragm 17 and the rib 7 will preferably be a single integral construction as shown in Fig. 3, and the hood or cover 1 and the cap 8 will be soldered about this integral structure. This hood or cover and the cap will be of thin sheet metal when the syringe is of metal.

I claim:—

1. A syringe comprising a barrel having one end open and externally threaded and having at the other end a reduced internally threaded nipple, a discharge nozzle having an externally threaded nipple for engaging the internal threads of the nipple of the barrel, a hood or cover for the open end of the barrel, and comprising a frusto-conical portion fitting outside of the barrel and an integral cap portion at the large end of the frusto-conical portion and adapted to close the open end of the barrel, said hood or cover having a transverse diaphragm provided with a central opening and with an annular laterally extending internally threaded rib for engaging the threaded end of the barrel, said diaphragm having a central opening and having arc-shaped slots for placing the portions of the hood or cover on opposite sides of the diaphragm in communication and having openings for placing the barrel in communication with the interior of the cap, said openings inclining outwardly toward their outer ends, the cap having a central opening, a plunger in the barrel, a stem connected with the plunger and extending through the central openings of the diaphragm and cap, said stem having a detachable head at its outer end, a spring encircling the stem between the diaphragm and the head and passing through the opening of the hood, the inner end of the hood extending to near the center of the barrel and being spaced apart therefrom to permit drainage, said discharge nozzle and hood or cover having annular roughened ribs for convenience in turning the same.

2. A syringe comprising a barrel having a discharge nozzle detachably connected with one end and having the other end open, a plunger in the barrel and provided with a stem extending through the open end, said stem having a head at its outer

end, and a cap-shaped hood or cover for closing the open end of the barrel and of greater diameter than the barrel and fitting outside of the same, said hood or cover having a transverse diaphragm detachably connected with the open end of the barrel and having openings for placing the portions of the hood on opposite sides thereof in communication, and having openings at the end of the barrel, said diaphragm and cover having registering openings for the stem, and a spring encircling the stem between the diaphragm and the head and normally pressing the plunger away from the discharge nozzle, the openings of the diaphragm at the end of the barrel inclining outwardly toward their outer ends, and the inner end of the hood or cover being spaced apart from the periphery of the barrel.

3. A syringe, comprising a barrel having a discharge nozzle detachably connected with one end and having the other end open, a plunger in the barrel and provided with a stem extending through the open end, said stem having a head at its outer end, and a cap-shaped hood or cover for closing the open end of the barrel and of greater diameter than the barrel and fitting outside of the same, said hood or cover having a transverse diaphragm detachably connected with the open end of the barrel and having openings for placing the portions of the barrel

on opposite sides thereof in communication, and having openings at the end of the barrel, said diaphragm and cover having registering openings for the stem.

4. A syringe, comprising a barrel provided at one end with a discharge nozzle and having the other end open, a cap shaped hood or cover fitting over the open end of the barrel and having a diaphragm within the hood or cover and near the closed end thereof, and provided with means for detachably engaging the barrel, said diaphragm being supported by the hood or cover and having openings for placing the barrel in communication with the hood or cover, said cap or cover being spaced apart from the barrel to permit drainage.

5. A syringe comprising a barrel provided at one end with a discharge nozzle and having the other end open, a cap-shaped hood or cover fitting over the open end of the barrel and having means within the cap or cover and near the closed end thereof for detachably engaging and closing the said open end of the barrel, the said means having openings for placing the hood or cover and the barrel in communication with each other, and the hood or cover being spaced apart from the barrel at its open end to permit drainage.

ROBERT B. THURMAN.

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