

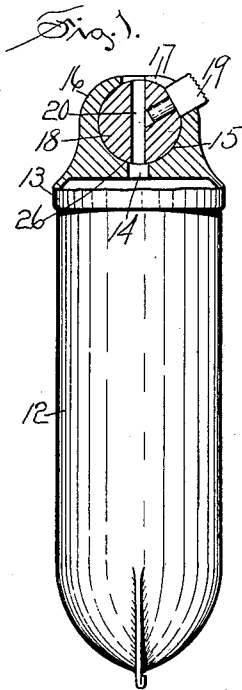
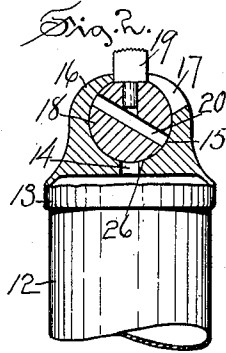
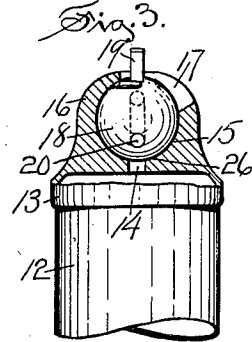
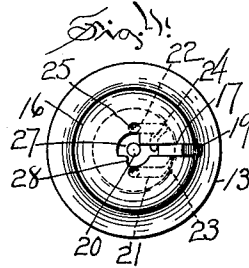
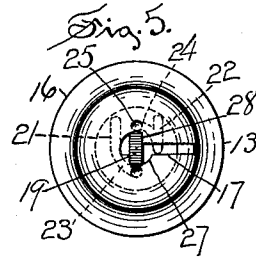
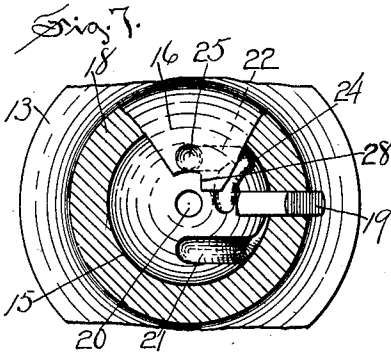
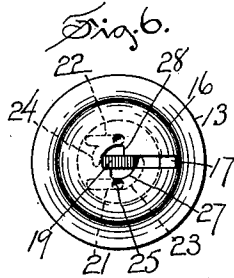
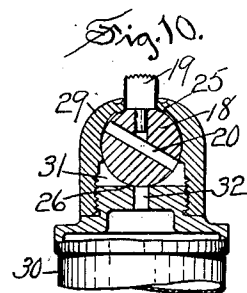
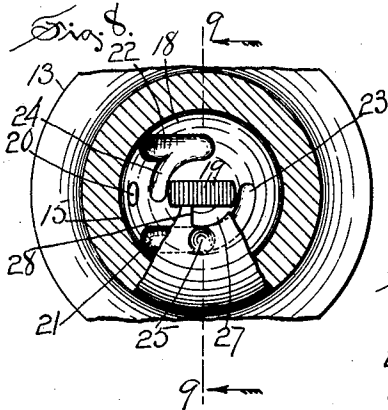
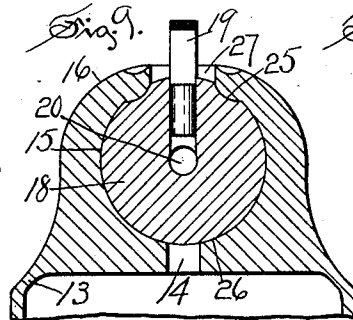
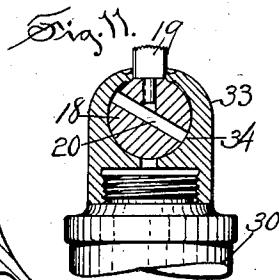
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2,014,066

COLLAPSIBLE TUBE

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UNITED STATES PATENT OFFICE

2,014,066

COLLAPSIBLE TUBE

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8 Claims. (Cl. 221-60)

My invention relates to that class of receptacles which are employed for holding and for dispensing material of a more or less pasty consistency, as for dental, shaving and similar preparations, and an object of my invention, among others, is the production of a receptacle of this type that shall be extremely convenient to use, that shall be particularly sanitary and that shall be simple in construction.

The objects herein set out, as well as others, may be attained by the construction and use of one form of a tube embodying my invention illustrated in the accompanying drawing in which

Figure 1 is a side view of my improved tube with the tip cut in section to show construction, the valve being open.

Figure 2 is a similar view of the top of said tube showing the valve closed.

Figure 3 is another similar view showing the valve turned to its sealing position.

Figure 4 is a top view with the valve in its open position.

Figure 5 is a top view showing the valve in its closed and sealing position.

Figure 6 is a top view with the valve in its closed but unsealed position.

Figure 7 is a view on enlarged scale with parts broken away in cross section, showing the valve in its open position.

Figure 8 is a similar view showing the valve in its closed but unsealed position.

Figure 9 is a view in section on a plane denoted by the dotted line 9-9 of Figure 8.

Figure 10 is a view similar to Figure 2 but showing a modification of the device.

Figure 11 is a similar view showing another modification and

Figure 12 is still another view showing another modification.

In the accompanying drawing the numeral 12 indicates a receptacle of the collapsible type and provided with a top 13 having an outlet passage 14. This receptacle, and especially the top, is preferably composed of some ductile material, as lead or other metal, whereby it will lend itself readily to pressure and contraction as in tubes of this type in use at the present time. A valve chamber 15 is formed within the tip 16 of the top, the passage 14 opening into said chamber. A slot 17 in the tip extends into the chamber 15, a valve 18, preferably of spherical form, being shaped to fit the chamber 15. This valve has an operating tab 19 of a thickness substantially that of the width of the slot 17 and of a length to be readily accessible for operation of the valve. A

port 20 extends through the valve and is adapted to register with the outlet passage 14 when the valve is in its open position, but to be out of registry with said passage to close the latter when the valve is in its closed position.

The tip 16 and valve 18 are so formed that the surface of the latter, together with the port 20, comprises the mouth of the receptacle so that the material from within the receptacle, when extruded, passes directly out of the valve and not through a second opening in the tip. As a consequence none of the material, when the valve is closed, is exposed to the action of the air, but is completely enclosed, and there is therefore no chance for such material to dry and harden and thereby prevent outflow of material from the tube.

The formation of the tube, and especially with the slot, is such as to provide ready means for manipulation in its construction, as being of ductile material all that is required is a little pressure to enclose the valve and secure it in place with the sides of the slot parallel to nicely fit the tab 19.

In order to closely seal the passage 14 and prevent the accumulation of the contents of the tube between the valve and the wall of the valve chamber 15, I provide in the surface of the valve 18 cam grooves each of which has a straight guide portion 21 or 22 and a curved cam portion 23 or 24 in which bosses 25 formed on the inner surface of the tip 16 are received. These bosses are formed by indenting the metal of said tip, as shown in Figs. 7, 8 and 9 of the drawing, and the grooves 23 and 24 decrease in depth from the guide portions 21 and 22 to their opposite ends.

In operation, the valve being in its open position, as shown in Fig. 7, the bosses 25 are in the guide portions 21 and 22 of the grooves, and as the valve is moved to its closed position by sliding the tab 19 from the position shown in Fig. 1 to the position shown in Fig. 2 the guides 21 and 22 move along the bosses until the latter are located at the intersection of said guides and the cam portions 23 and 24 of said grooves, the tab now being in the position shown in Fig. 2. Said tab being now turned to the position shown in Fig. 3 the cams 23 and 24 pass said bosses 25 into the shallow portions of the grooves comprising said cams, with the result that the valve is thrust closely down against its seat 26 at the mouth of the passage 14, thereby tightly closing said passage and preventing the escape of the contents of the tube into the chamber 15 between the valve and the walls of said chamber.

In order that the valve may be turned into this sealing position an enlarged arcuate opening 27 is formed at the end of the slot 17, as shown in Figs. 4 and 5 of the drawing, with stop shoulders 28 in said openings to receive the sides of the tab 19 and thereby limit its sealing movement. When the valve is moved to its closed position said tab passes directly into the opening 27 from the position shown in Fig. 4, and then being turned to its sealing position its sides will contact with the shoulders 28, as shown in Fig. 5 of the drawing.

In that form of the device shown in Fig. 10 the valve arrangement is substantially the same as hereinbefore described, with the exception that the tip 29 is separately formed from the body 30 and is screw-threadedly engaged therewith, the chamber 31 opening to the lower end of the tip so that the valve 18, which is the same as that hereinbefore described may be inserted into the chamber from the open end of the tip, and when the latter is secured in place by the inter-engaging screw threads the valve is seated at the mouth of the passage to prevent escape of the contents of the receptacle or to register its port 20 with the passage 32.

That form of the structure shown in Figure 11 is quite similar to that shown in Figure 10 so far as engagement of the tip 33 with the body 30 of the receptacle is concerned. The chamber 34 however does not open to the bottom of the tip, but is formed in a manner similar to that shown in Figs. 1-9.

In the structure as shown in Figure 12 the tip 35 is screw-threadedly engaged with the body, the dividing line between the end of the body and the inner surface of the tip being coincident with a horizontal plane passing diametrically through the valve so that the latter may be readily inserted underneath the tip 35 when assembling the device.

The guide and cam grooves with the bosses underneath therein for the purpose of sealing the valve are present in this device as well as in the device above described, the valve however being in such position that said parts do not show.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative, and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A receptacle including a tip having a valve chamber therein with an outlet passage opening from the receptacle into said chamber and with a slot opening from the outer surface of the tip into said chamber, a valve located in said chamber and having a port to register with said outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and closing movements to the valve in one plane, and means to impart movement to said valve in another plane when in its closed position.

2. A receptacle including a tip having a valve chamber therein with an outlet passage opening from the receptacle into said chamber and with a slot opening from the outer surface of the tip into said chamber, a valve located in said chamber and having a port to register with the outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and

closing movements to the valve in one plane, and an enlarged opening at the end of said slot to permit movement of said valve in another plane when in its closed position.

3. A receptacle including a tip having a valve chamber therein with an outlet passage opening from the receptacle into said chamber and with a slot opening from the outer surface of the tip into said chamber, a valve located in said chamber and having a port to register with the outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and closing movements to the valve in one plane, an enlarged opening at the end of said slot to permit movement of said valve in another plane when in its closed position, and stop shoulders in said opening to limit sealing movement of the valve.

4. A receptacle including a tip having a valve chamber therein with an outlet passage opening from the receptacle into said chamber and with a slot opening from the outer surface of the tip into said chamber, a valve located in said chamber and having a port to register with said outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and closing movements to the valve in one plane, and means for forcing the valve to its seat at the mouth of said passage by a sealing movement in another plane.

5. A receptacle including a tip member having a valve chamber therein with an outlet passage opening from the receptacle into said chamber and with a slot opening from the outer surface of the tip into said chamber, a valve member located in said chamber and having a port to register with said outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and closing movements to the valve in one plane, and a cam groove in one of said members to receive a boss projecting from the other of said members to force the valve against its seat at the mouth of said passage by a sealing movement in another plane.

6. A receptacle including a tip member having a valve chamber therein with an outlet passage opening from the receptacle into said chamber and with a slot opening from the outer surface of the tip into said chamber, a valve member located in said chamber and having a port to register with said outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and closing movements to the valve in one plane, a cam groove in the valve, and a boss projecting from the tip into said cam groove to force the valve against its seat at the mouth of said passage by a sealing movement of the valve in another plane.

7. A receptacle including a tip member having a valve chamber therein with an outlet passage opening from the receptacle into said chamber and with a slot opening from the outer surface of the tip into said chamber, a valve member located in said chamber and having a port to register with said outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and closing movements to said valve in one plane, a cam groove in one of said members to receive a boss projecting from the other of said members to force the valve against its seat at the mouth of said passage by a sealing movement in another plane, and a guide groove leading into said cam groove, said boss projecting into said guide groove.

8. A receptacle including a tip member having a valve chamber therein with an outlet passage

from the receptacle into the chamber and with a slot opening from the outer surface of the tip into said chamber, a valve member located in said chamber and having a port to register with said outlet passage, a valve actuator projecting from the valve through said slot for imparting opening and closing movements to the valve in one plane,

a guide groove in one of said members to receive a boss projecting from the other of said members during opening and closing movements of said valve, and an arcuate cam groove opening from said guide groove at an angle thereto to receive said boss to effect sealing movement of said valve.

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