May 24, 1932. E. F. JOHNSON ET AL 1,859,397

METHOD AND DEVICE FOR STOPPING AND REGULATING FLOW FROM COLLAPSIBLE TUBES

Filed Feb. 27, 1931

Fig. 1.

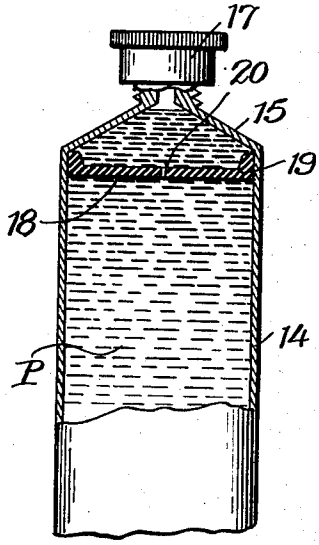


Fig. 2.

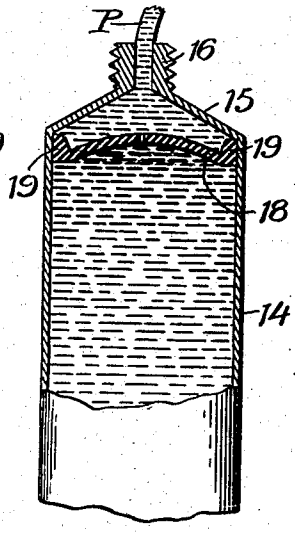


Fig. 6.

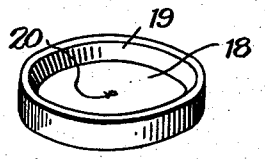


Fig. 7.

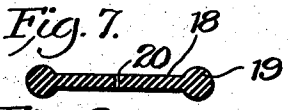


Fig. 8.

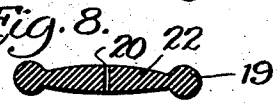


Fig. 3.

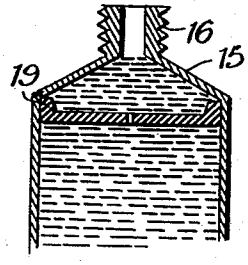


Fig. 4.

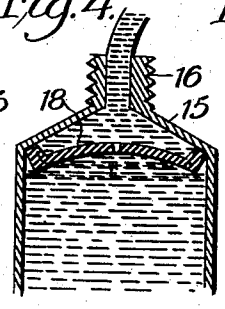
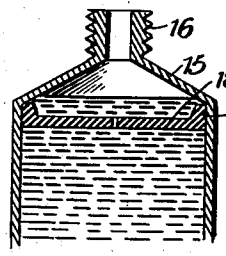


Fig. 5.



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UNITED STATES PATENT OFFICE

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METHOD AND DEVICE FOR STOPPING AND REGULATING FLOW FROM COLLAPSIBLE TUBES

Application filed February 27, 1931. Serial No. 518,872.

The present invention relates to a method of and device for stopping and regulating the flow of plastic or fluent material from dispensing containers and consists in the steps of procedure, and combinations and arrangements of elements of apparatus hereinafter described and particularly set forth in the accompanying claims.

In the present type of containers for dispensing fluent or plastic materials (e. g. toothpaste, soap, vaseline, oils, grease, paints, etc.) the substance is usually contained in collapsible tubes which are compressed for expelling the same, and while this is satisfactory in a general way there is the serious defect that a considerable quantity in each tube is lost through oozing after the desired amount has been expelled from the tube. And a further result of this emission is that it serves to clog or smear the tube opening when the closure cap is applied, or if not applied—which is usually the case—the material solidifies or hardens through exposure. Due to this last condition the tube end thus sealed has greater strength than the material of the tube body with the result that when compressure is applied the tube itself breaks and the entire contents of the article must needs be discarded.

To overcome these disadvantages our invention contemplates the use of a device insertable in the tube at the time of filling which when collapsed acts to create an appreciable vacuum at a point near the discharge opening so that when pressure is stopped the emitting fluent substance is immediately retracted or withdrawn within the tube for a distance sufficient to entirely clear the neck opening. The device further acts to keep the tube opening at all times clean and free from liability of hardening, and obviously there is no needless loss of the substance due to the conditions above stated. This theory has heretofore been proposed but insofar as known is believed not to have succeeded due probably to the defect of insufficient vacuum, or leakage between the diaphragm and the tube opening. And a further probable fault is that attempt was made to alter the tube structure per se which is obviously impracticable both in function and from the cost production standpoint.

The invention as disclosed herein is especially designed for tubes of the collapsible type though it will be understood is equally as well applicable to fluent material containers of the non-collapsible type. Thus, the method and article herein disclosed will serve the same purpose with those containers which are used in force feed lubricating apparatus for automobiles or the like.

The invention is shown by way of illustration in the accompanying drawings, wherein:

Figure 1 indicates a tube of the collapsible type showing the device in section.

Figure 2 shows the same in the act of dispensing.

Figures 3, 4 and 5 illustrate the three (3) phases of functioning of the article, i. e. before dispensing, during dispensing, and after dispensing.

Figure 6 is a transverse sectional view of the device per se, and;

Figures 7 and 8 illustrate modified forms of the device.

Referring to the construction in further detail and wherein like reference characters indicate corresponding parts in the different views shown, 14 designates a collapsible tube with the usual type of reduced end portion 15 having a neck 16 closed by the screw cap 17. Said tube is of the conventional type employed for dispensing toothpaste, shaving soap, vaseline, paints, and other substances and is nowise altered in its construction or changed in function by the application of this invention. That is to say, the device may be applied to tubes of this character generally.

The article per se consists of a disc or diaphragm 18 having an appreciable broad marginal edge 19 that lies in intimate contact with the inner surfaces of the tube 14 at its juncture with the reduced end 15. Said disc or diaphragm has a central orifice 20 preferably concentric with the opening in the neck of the tube and through said orifice the fluent material or paste P is expelled or dispensed after the manner indicated in Figure 2.

The function of the device follows substantially those phases illustrated in Figures 3, 4 and 5, to wit: Figure 3 shows the disc in position with the substance around it and prior to pressure on the tube; Figure 4 shows the position of the parts while the tube is collapsed and the material is being dispensed; and in Figure 5 the pressure has been released allowing the vacuum disc to function and suck or draw in that oozing portion of the paste which otherwise would protrude beyond or lodge in the neck of the tube.

In lieu of the form of disc or diaphragm shown in Figures 1, 2 and 6 the same may have the enlarged edge 19 thereof formed on opposite sides as shown in Figure 7. In Figure 8 the disc is substantially the same as in Figure 7, but in this instance has an enlarged middle or central portion 22.

In each of the constructions disclosed herein the disc member is inserted within the tube at substantially the position shown in the filling process and thereby becomes an integral part of the article during all the time of its use and is discarded when the tube is empty.

It is to be understood the invention as herein disclosed is not limited to the details of construction shown and described, as these may be varied without departing from the spirit of the invention as defined by the claims.

What is claimed as new is:

1. The combination with a tube for a fluent substance having a reduced end portion providing an annular abutment, of a separate and orificed flat diaphragm of soft pliable material having a substantially enlarged edge portion, said enlarged portion of the diaphragm closely fitting against said annular abutment and operable to open and move with the material when the tube is collapsed, and to close and retract the emitting substance when said pressure is released, as and for the purpose set forth.

2. The combination with a tube for a fluent substance having a reduced end portion providing an annular abutment, of a separate and orificed flat diaphragm of rubber material having a substantially enlarged edge portion disposed to opposite sides of the diaphragm and closely fitting against said annular abutment and operable to open and move with the material when the tube is collapsed, and to close and retract the emitting plastic substance when pressure is released, as and for the purpose set forth.

In witness whereof, we have hereunto set our hands at Washington, D. C., this sixth day of February, A. D. nineteen hundred and thirty-one.

EDWARD F. JOHNSON.
GEORGE R. CRUZE.