Oct. 2, 1934. L. R. HOMEWOOD ET AL 1,975,545

COLLAPSIBLE TUBE AND CONTAINER FOR ANALOGOUS PURPOSES

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Fig. 1.

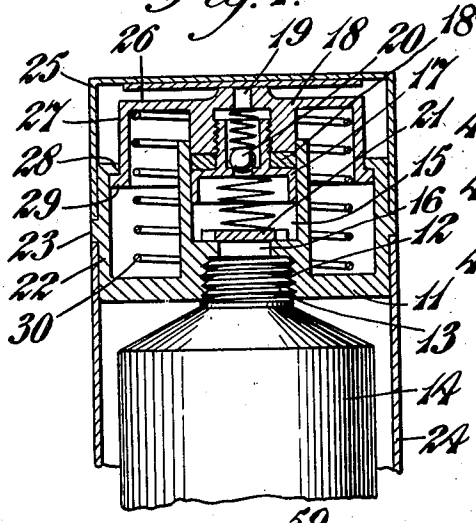



Fig. 2.

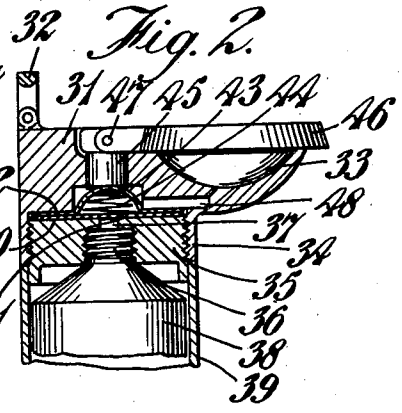



Fig. 3.

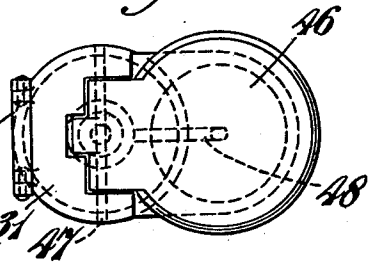
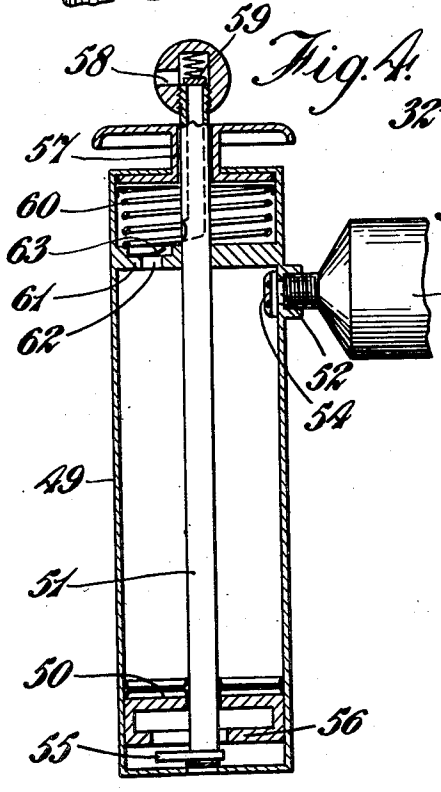



Fig. 4.




INVENTOR
L. R. Homewood.
C. R. Turner.

By Lacey & Lacey.

Attys

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## COLLAPSIBLE TUBE AND CONTAINER FOR ANALOGOUS PURPOSES

Leonard Richard Homewood, Charlton, London, and Charles Robert Turner, Hackbridge, England

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In Great Britain February 10, 1932

4 Claims. (Cl. 221—60)

This invention relates to dispensing devices, and has for an object to provide an improved device of this kind intended for use in dispensing small quantities at a time of paste or semi-liquid material from a container to which the device is applied, or of which it forms a part; a device according to the invention being particularly suitable for use in conjunction with well-known collapsible tubes.

To this end and in accordance with the invention, a compartment for paste or other semi-liquid material is connected with an outlet of a container through the medium of a non-return valve permitting egress of material from the container but preventing ingress thereto, and with an outlet orifice of the device through a further non-return valve, adapted when closed to prevent ingress of air to said compartment, the volume of which latter may be altered as by means of a plunger, the arrangement being such that as the volume of the compartment is increased, material from the container will pass into said compartment, and when the volume of the latter is decreased, such material will be urged from the compartment through the outlet orifice.

It will be observed that the device operates by means of "suction", or, in other words, the material passes from the container into the compartment referred to as a result of the reduction of pressure in the latter. It is necessary, therefore, in cases where the container is other than a collapsible tube, that means should be provided for permitting the ingress of air into the container in such manner that it has no access to the outlet of the container itself.

A device according to the invention may be made up in the form of a lid or cap for use with an existing container, and in the case where it is intended for use in connection with a collapsible tube, it will in general be provided with a cover within which the tube as a whole may be enclosed. The outlet orifice of the device may be provided with a cover the opening of which automatically brings about a decrease in the volume of the compartment and a resulting discharge of material from said outlet orifice, which latter may be disposed in a recess in the main body of the device for convenience in use.

The invention is illustrated by the accompanying drawing, of which:

Figure 1 is a fragmentary view showing one form of dispensing device as applied to a collapsible tube in sectional elevation;

Figure 2 is a corresponding fragmentary sectional elevation of another form applied to a collapsible tube;

Figure 3 is a plan view corresponding to Figure 2; and,

Figure 4 is a sectional side elevation of a form of the invention having its own container for material to be dispensed.

As shown in Figure 1, a disc 11 is formed centrally with an internally threaded recess, indicated at 12, to take the usual threaded outlet neck, indicated at 13, of a collapsible tube 14. From the recess 12 there extends above the disc 11 a cylinder 15, the lower end of which communicates through an opening 16 with the recess 12. The cylinder 15 constitutes a compartment, the volume of which is alterable to effect the dispensing of paste or semi-liquid material from the tube 14; and in the cylinder 15 is mounted a piston 17 carried by a plunger member 18, formed in turn with a bore 19 constituting an outlet orifice. A gasket 18a is provided on the piston 17 within the cylinder 15 to prevent leakage around the piston. The piston 17 is hollow and is provided with a non-return ball valve 20, permitting the egress of material from the cylinder 15, but preventing the ingress of air thereto; while the opening 16 is normally closed by a non-return disc valve 21, permitting the passage of material through the opening into the cylinder 15, but not in the opposite direction.

The disc 11 is formed with a circumferential flange 22, having in turn a circumferential rim 23, which latter serves as a seating for covers 24 and 25 for protecting, the first the collapsible tube 14, and the second the outlet end of the device. The plunger member 18 also is formed integrally with a disc 26 and circumferential flange 27 somewhat smaller in diameter than the circumferential flange 22 of the disc 11, the free margin of the flange 22 being turned inwardly as shown at 28, and the free margin of the flange 27 being turned outwardly as shown at 29, whilst a coiled compression spring 30 is interposed between the two discs 11 and 26.

It will be seen that the parts will normally assume the positions shown in Figure 1, and that by first removing the cover 25 and then depressing the plunger member 18, the piston 17 will be moved to reduce the effective volume of the cylinder compartment 15, the ball valve 20 opening to permit the egress of material from the cylinder 15 through the outlet orifice 19; subsequent release of the plunger member 18 allowing it and the piston 17 to move under the influence of the spring 30 to enlarge the compartment 15

once again, thus drawing material from the tube 14, past the valve 21 into the cylinder. Thus, each time the plunger member 18 is moved to compress the spring 30, a predetermined quantity of material will be dispensed through the discharge opening 19.

In the form shown in Figure 2 a metal casting or moulding 31 is attached pivotally to an apertured member 32 adapted to be screwed to a wall, and is formed integrally with what may be termed a delivery basin 33, and at its end part with an internally threaded circumferential flange 34, into which is screwed a metal disc 35 formed with an internally threaded recess 36, from which a bore 37 extends completely through the disc 35. A collapsible tube 38 is shown engaged with the threaded recess 36, and a cover 39 for the tube 38 is a close fit over the lower part of the disc 35.

A washer 40 of flexible material, such as leather, extends over the upper face of the disc 35 and is formed with an aperture 41 which is out of alinement with the bore 37, this washer constituting a non-return valve through which material may pass from the tube 38 via the bore 37, but not in the opposite direction. Immediately above the washer 40 is a separate washer 42, a part of which is maintained around the greater part of its periphery in air-tight contact with the washer 40, and the central portion of the washer 42 is domed, as indicated at 43, and is normally spaced from the washer 40 by means of a coiled compression spring 44; there being slidable in the casting or moulding 31 a plunger 45 which rests upon the domed portion of the washer 42. The washer 42 constitutes a valve operating alternately to the lower washer valve 40. In the form shown a cover 46 for the basin 33 is pivotally mounted about an axis 47 so that when it is swung upwardly about said axis it will depress the plunger 45 against the action of the spring 44, with the result that the valve constituted by the washer 40 will close and material will be forced out of the space between the washers 40, 42 for some distance therebetween, and then either through an opening (not shown) in the washer 42 at a point remote from the spring 44, or alternatively, between the periphery of the two washers, into a discharge passage 48, and so to the delivery basin 33.

It will be observed that the cover 46 may be omitted and the plunger 45 may extend above the top of the moulding or casting 31, and, again, that the delivery basin 33 may be replaced by any convenient kind of discharge orifice or nozzle. In some cases the washer 42 may be of such a resilient nature as will enable the spring 44 to be dispensed with.

In the form shown in Figure 4 of the drawing, the device has its own compartment 49 for material to be dispensed, and in this compartment there is mounted a piston 50 and a rod 51 extending therefrom through the upper end of the device. The compartment 49 is provided at its upper end with a lateral inlet 52 for material to be dispensed, and in the case in question, said inlet takes the form of an internally threaded recess communicating with the interior of the compartment 49 to receive the usual threaded nozzle of a collapsible tube, indicated at 53, the inlet opening 52 being provided with a non-return valve 54 preventing the egress of material therethrough. In the case in question, there is a bayonet or equivalent connection, indicated at 55, 56 between the rod 51 and the piston 50, so that these may be disconnected at will by simply rotating the rod 51 through an appropriate angle. Also, the upper end of the rod 51 extends through a piston device 57 and is itself provided with an outlet 58 controlled by a non-return valve 59. A coiled compression spring 60 serves to maintain the piston 57 at the top of its travel, and a fixed metal disc 61 is formed with a bore 62 controlled by a valve 63 communicating between the cylindrical space above the disc 61 and the interior of the container 49. Thus, every time the dispensing piston 57 is depressed, material will be forced from the said cylindrical space to be discharged through the outlet 58, and every time it is released further material will be drawn through the bore 62 from the compartment 49 to said space, the charging piston 50 moving upwardly each time. In order to re-charge the device all that is necessary is to pull the rod 51 as far as it will go and then to rotate it to connect it with the charging piston 50, finally depressing the piston 50 to the bottom of the stroke by means of the rod 51, thus drawing in a new supply of material via the inlet 52.

In all cases it will be necessary for what may be termed the discharge non-return valve and the dispensing compartment to be substantially air-tight as a whole, except possibly for what may be termed the container non-return valve, which latter need be substantially tight only for the material to be dispensed.

A device according to the invention may be formed as part of a tooth brush or shaving brush, the depression of the plunger or equivalent serving to eject a supply of material on to the "filling" of the brush, and although the device is suitable particularly for use in conjunction with collapsible tubes, it may be used with any other kind of container where provision is, or can be, made for the ingress of air thereto without risk of said air reaching the discharge opening of the container.

We claim:—

1. A dispensing closure comprising a disk having an opening to receive the outlet member of a container, a depending cover carried by the disk and enclosing the container, a body on the disk having a compartment communicating with the opening in the disk and having an outlet orifice leading from the compartment, alternately operating valves controlling the flow through the compartment, and a plunger for actuating said valves whereby to effect a measured discharge from the container.

2. A dispensing closure comprising two rigid members secured one upon the other, the upper member having a compartment and an outlet orifice leading from the compartment and the lower member having an opening in which the discharge element of a container may be secured, alternately operating valves consisting of two flexible washers clamped by and between said members, the lower washer having an opening out of alinement with the opening in the lower rigid member and the upper washer being free to move to and from the lower washer about the opening in the lower washer, and means to effect movement of the upper washer whereby to effect a measured discharge from the container.

3. A dispensing closure comprising two rigid members secured one upon the other, the upper member having a compartment and an outlet orifice leading from the compartment and the lower member having an opening in which the

discharge element of a container may be secured, alternately operating valves consisting of two flexible washers clamped by and between said members, the lower washer having an opening out of alinement with the opening in the lower member and the upper washer being free to move to and from the lower washer about the opening in the lower washer, the upper washer having a raised portion, a spring disposed within the raised portion and tending to draw the upper washer from the lower washer, and a plunger acting on the raised portion of the upper washer in opposition to the spring whereby the actuation of the plunger will effect a measured discharge from the container.

4. A dispensing closure comprising two rigid members secured one upon the other, the upper member having a compartment and an outlet orifice leading from the compartment and the lower member having an opening in which the discharge element of a container may be secured, alternately operating valves consisting of two flexible washers clamped by and between said members, the lower washer having an opening out of alinement with the opening in the lower member and the upper washer being free to move to and from the lower washer about the opening in the lower washer, the upper washer having a raised portion, a spring disposed within the raised portion and tending to draw the upper washer from the lower washer, a plunger acting on the raised portion of the upper washer in opposition to the spring whereby the actuation of the plunger will effect a measured discharge from the container, and a cover pivotally mounted on the upper rigid member and normally extending thereover and having a portion bearing upon the plunger whereby raising of the cover will operate the plunger.

LEONARD RICHARD HOMEWOOD.
CHARLES ROBERT TURNER.