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C. C. NIELSEN

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CLOSURE FOR COLLAPSIBLE TUBES

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Fig. 1.

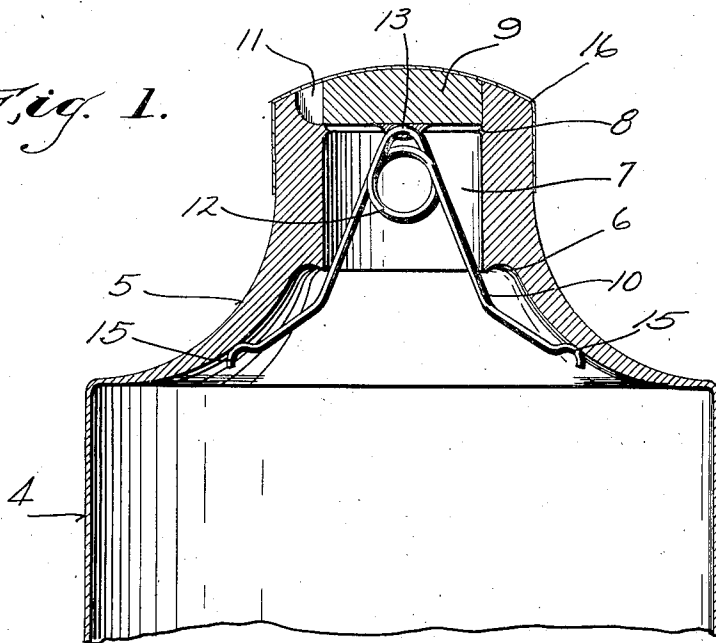


Fig. 2.

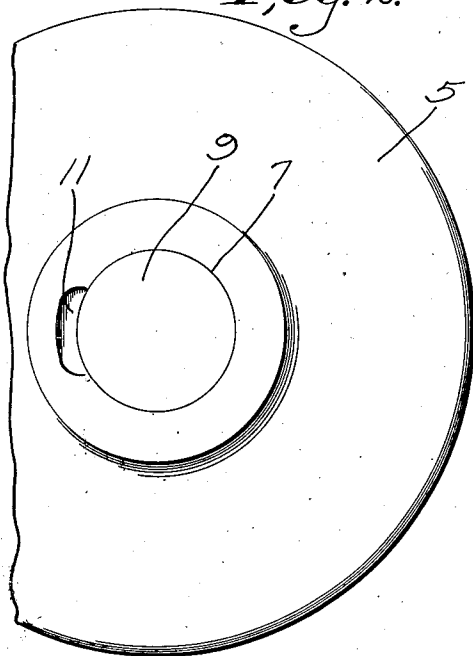
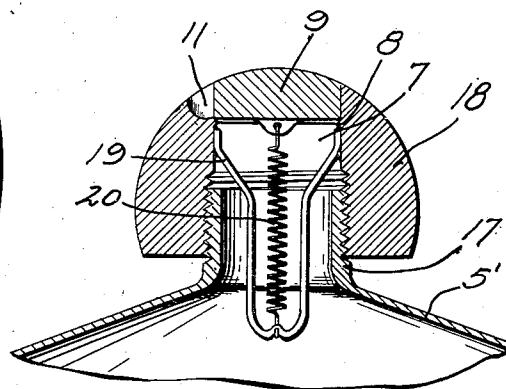


Fig. 3.



INVENTOR
Clarence C. Nielsen
BY
Muller, Muller & Muller
ATTORNEYS

UNITED STATES PATENT OFFICE

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CLOSURE FOR COLLAPSIBLE TUBES

Clarence C. Nielsen, Milwaukee, Wis.

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5 Claims. (Cl. 221-60)

This invention relates to improvements in closures for collapsible tubes.

It is the primary object of the invention to provide a simple inexpensive device for automatically releasing in a ribbon or stream the contents of a collapsible tube discharged therefrom under pressure, and for automatically closing the discharge opening in said tube when the pressure on the contents is relieved.

10 In the drawing:

Figure 1 is an enlarged cross section of the discharge end of a collapsible tube made in accordance with the present invention and sealed for shipment and sale.

15 Figure 2 is a plan view of the device with the sealing coating removed.

Figure 3 shows a modified embodiment of the invention which is wholly incorporated in a cap interchangeable with the conventional caps of existing tubes to adapt the invention advantageously for use in connection with the type of tube currently produced.

Like parts are identified by the same reference characters throughout the several views.

25 In Figure 1 the reference character 4 represents the wall and reference character 5 the discharge head end of a collapsible tube which is conventional except for the form of the discharge end.

30 In the forming operation in which the terminal end 5 of the tube is shaped, it is preferably provided internally with an annular shoulder at 6 about a discharge bore 7 which is generally cylindrical in form except for a slight restriction at 8 which constitutes a seat against which the valve 9 is normally held by the pressure of spring 10. Opening from the bore 7 above the seat 8 and at one side of the valve 9, is a duct 11 preferably of somewhat elongated form so that material issuing therefrom past the valve 9 will take the form of a ribbon.

The spring 10 comprises a central coil 12 having one turn extended at 13 and anchored in the valve 9. The extreme ends of the spring comprise divergent wires preferably terminating in hooks at 15 engageable in the shoulder 6 to limit the normal outward movement of the valve 9. The outward movement of the valve is resisted by the resiliency of the spring 10 which tends to increase the divergence of the arms, which engage the under surface of the end portion 5 of the tube to subject the valve to a tension which tends to draw it downwardly in bore 7 to the point of engagement with the seat at 8.

55 When the wall 4 of the tube is manually col-

lapsed to subject the contents to pressure, the pressure is sufficient to overcome the light tension of spring 10 and raise the valve 9 which is guided in bore 7 like a piston in its cylinder. The initial movement of the valve from seat 8 exposes the bottom of the port 11 and allows the material to issue from the port in a form determined by the cross sectional contour of the port or duct.

As soon as the pressure on the contents of the tube is relieved, the light spring 10 is able to react against the head 5 of the tube to draw the valve 9 downwardly to seat 8, thereby cutting off the further escape of material from port 11.

In order to protect the tube and its contents during sale, the whole is preferably encased in a light cap or sheath 16 of collodion or cellulose, or any other suitable film of material which may readily be disrupted and removed by the consumer.

The Fig. 3 construction is slightly more expensive but may be used individually and changed from tube to tube as the contents of one tube are used up. The end 5' of the tube shown in Fig. 3 is entirely conventional, terminating in a threaded discharge spout at 17. The invention is embodied in a special cap 18 screw threaded for engagement with the spout 17. A bracket 19 is secured to one side of the cap 18 to support the lower end of the tension spring 20 connected to the valve 9. The valve 9 moves in a bore 7 in the cap, having a seat restriction at 8 and a discharge port or duct at 11, all corresponding to the like parts in Fig. 1. The mode of operation of the Fig. 3 device is identical with that disclosed in Fig. 1.

There are numerous other forms in which the invention may be embodied, and those disclosed are merely exemplifications. In the following claims the word "head" is used generically to designate the tube end 5 of Fig. 1 and the cap 18 of Fig. 3.

I claim:

1. A device of the character described, comprising a discharge head provided with a bore, a valve reciprocable in the bore between advanced and retracted positions, a spring acting on said valve in a direction to draw it toward its retracted position, and an outlet duct between the inner wall of the head and the edge of the valve positioned to communicate with said bore when said valve is advanced, said outlet duct being closed when said valve is in its retracted position and having circumferentially spaced sides only a short distance apart, whereby to confine and give direction to material issuing through said

duct when said valve is in its advanced position.

2. In a device of the character described, the combination with a discharge head provided with a bore and a duct comprising a lateral enlargement of the upper end of the bore opening to the end of said head and angularly restricted to one side of the bore, of a valve reciprocable in the bore and spring biased toward a position in which said duct is closed, and seat means limiting the movement of said valve beyond said position, said valve being yieldable from said seat means to release through said duct a material acting with pressure on the valve.

3. A device of the character described, comprising a head having a discharge bore, diverging sides at one end of said bore, and an axially extending escape duct at the other end of said bore opening laterally of the discharge bore in the inner wall of the outer end of the head, and extending only for a limited extent circumferentially thereof, a piston type valve reciprocable in said bore, and spring means connected with said valve and engaging said sides, said spring means

being adapted yieldably to maintain said valve in a position to close said duct.

4. A device of the character described, comprising the combination with a collapsible tube having a head with a tapered side wall and a central discharge bore, said wall being shouldered adjacent said bore, of a valve means reciprocable in said bore, and a spring connected with said valve and yieldably engaging said wall, said spring having means coacting with said shoulder to permit and also limit relative movement between said spring and wall.

5. In a device of the character described, the combination with a discharge head having a central bore and a wall inclined thereto and shouldered adjacent said bore, of a valve device reciprocable in said bore, a spring having an intermediate coil connected with said valve device, and free ends bearing against the wall of said head and hooked for engagement with said shoulder to limit the movement of said device.

CLARENCE C. NIELSEN.