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(54) **VISCOUS FLUID DISPENSER**

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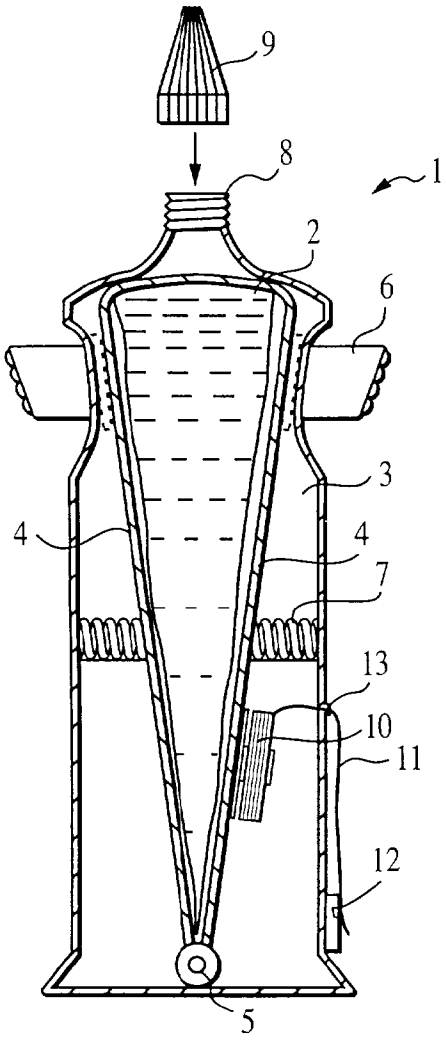
(57) **ABSTRACT**

A readily collapsible enclosure holding viscous fluid is housed within a non-elastic housing with relatively rigid members secured on one end and extending on opposite sides of the collapsible enclosure holding viscous fluid within the non-elastic housing so that pressure applied to the rigid members reduces the volume of the enclosure to discharge the viscous fluid. Various pressure applying points and assists are included with spring pressure balancing applications on said rigid members included. A strand dispensing spool can be housed within the resilient housing.



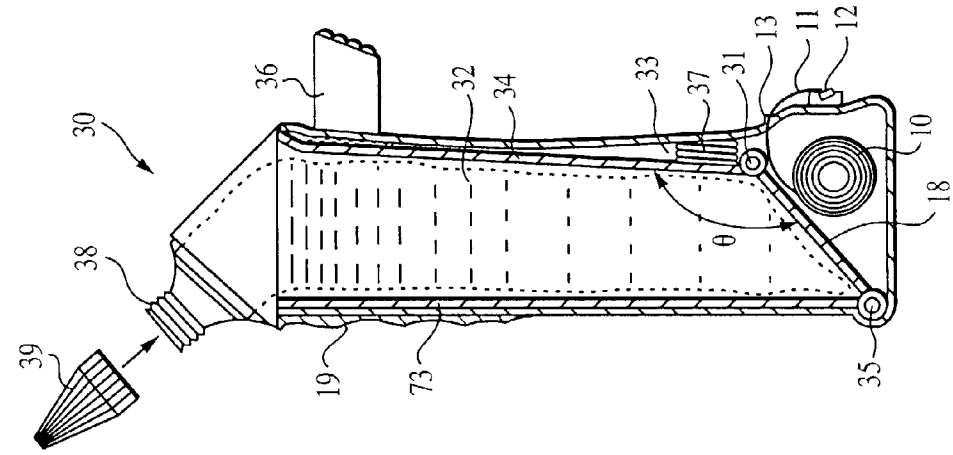


FIG. 3

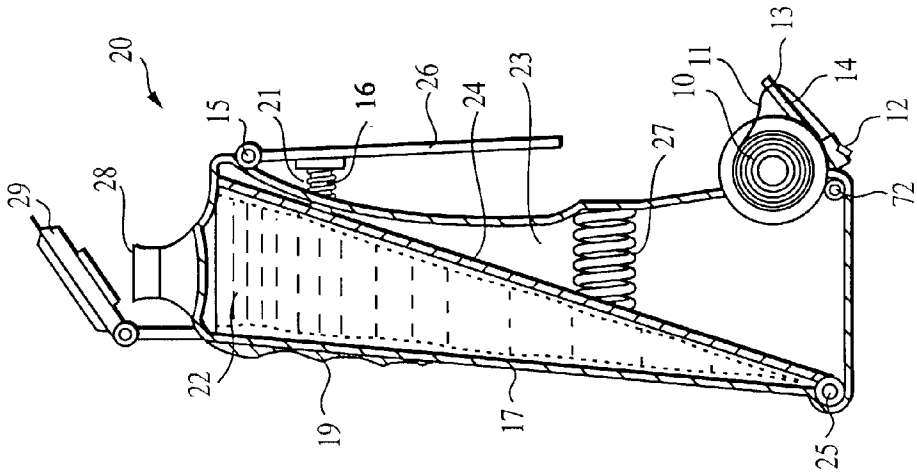


FIG. 2

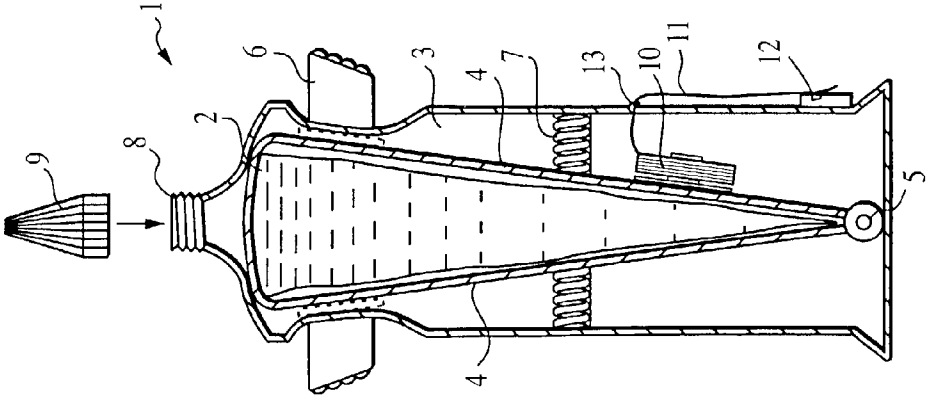


FIG. 1

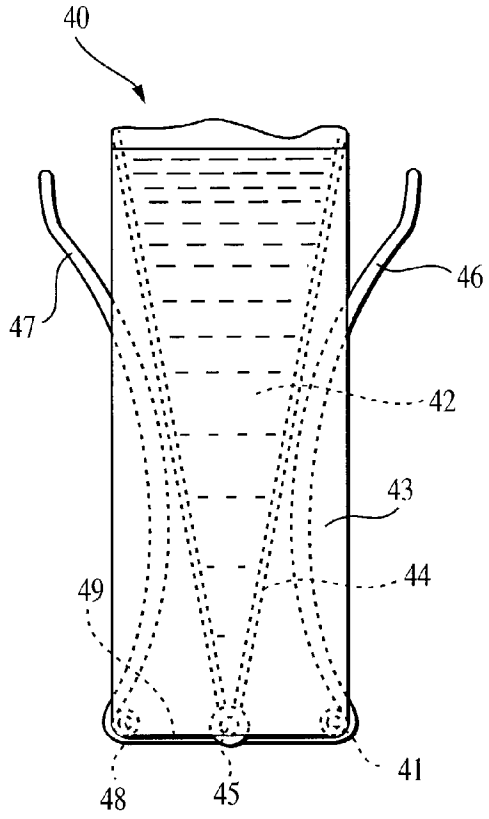


FIG. 4

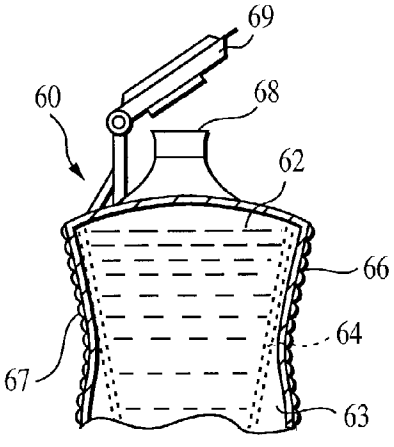


FIG. 5

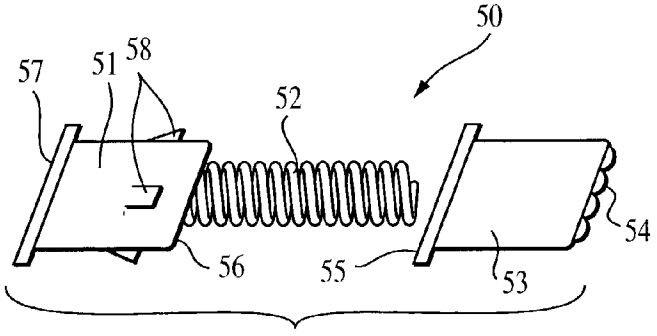


FIG. 6(a)

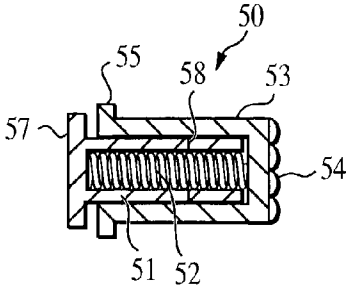


FIG. 6(b)

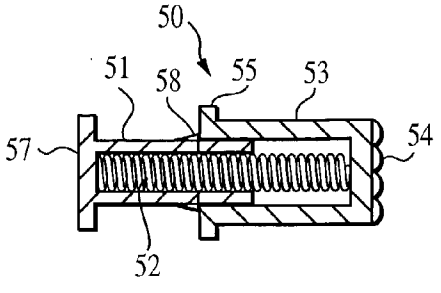


FIG. 6(c)

VISCOUS FLUID DISPENSER

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] Viscous fluid is dispensed by applying force to rigid members on opposite sides of a collapsible confined space within a non-elastic housing.

[0003] 2. Description of Related Art

[0004] The provision of devices that assist dispensing of pastes, lotions, creams, colors, paints, adhesives, etc. from rubber, flexible metal, plastic and other resilient tubes or containers is common in the art. Most of these devices apply force externally of the containers. U.S. Pat. No. 1,563,459, issued Dec. 1, 1925 to H. Volland, and U.S. Pat. No. 3,262,605, issued Jul. 26, 1966 to T. Madden et al, assist dispensing by use of slide members along the length of the container. U.S. Pat. No. 1,320,275, issued Oct. 28, 1919 to E. Roach, and U.S. Pat. No. 1,510,848, issued Oct. 7, 1924 to A. Hubbard, and U.S. Pat. No. 1,773,577, issued Aug. 19, 1930 to O. Eide, and U.S. Pat. No. 3,211,341, issued Oct. 12, 1965 to H. Bailey use pressure applied to rigid members, on either side of resilient collapsible tubes, that are secured together and pivoted about one end. U.S. Pat. No. 2,936,932 teaches making portions of the container more rigid so that applied pressure assists discharge. U.S. Pat. No. 5,529,213, issued Jun. 25, 1996 to R. Mack et al, and U.S. Pat. No. 5,680,966, issued Oct. 28, 1997 to R. Johnson are examples of an outer rigid or resilient housing with an inner collapsible or deformable container for the viscous material to be dispensed by pressure applied to the inner collapsible container.

SUMMARY OF THE INVENTION

[0005] A viscous fluid dispenser has a non-elastic housing around a confined or collapsible viscous material container. Rigid side members that extend along opposite sides of the collapsible container within the non-elastic housing are pressed or pivoted together. By pressing against the rigid side members within the non-elastic housing, viscous fluid is dispensed. Springs placed selectively along the rigid side members balance viscous fluid pressures within the collapsible confined or space container. A twine dispenser can be housed within the resilient housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] **FIG. 1** is a cross-sectional elevation of a dispenser in accordance with a first preferred embodiment of the invention.

[0007] **FIG. 2** is a cross-sectional elevation of a dispenser in accordance with a second preferred embodiment of the invention.

[0008] **FIG. 3** is a cross-sectional elevation of a dispenser in accordance with a third preferred embodiment of the invention.

[0009] **FIG. 4** is a partial vertical elevation of an alternate leverage device for use with the invention.

[0010] **FIG. 5** is a partial elevation of an alternate pressure applying arrangement.

[0011] **FIG. 6**(*a*) is an exploded top view of a spring-loaded pressure applicator.

[0012] **FIG. 6**(*b*) is a sectional side view of the spring loaded pressure applicator of **FIG. 6**(*a*) in its compressed configuration.

[0013] **FIG. 6**(*c*) is a sectional side view of the spring loaded pressure applicator of **FIG. 6**(*a*) in its expanded configuration.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] It is well known to apply pressure onto collapsible tubes using contact members. Such provision typically has separate collapsible tube and pressure means and requires combining the two to dispense the fluid from the collapsible tube. The present invention combines a collapsible confined space or tube and pressure applying means into a single enclosed unit.

[0015] As shown in **FIG. 1, a** dispenser **1** includes a collapsible confined space, lining or tube **2** containing a viscous fluid with a closure aperture shown as a threaded discharge **8** and a closure cap **9**. The collapsible tube is housed within a non-elastic housing **3**. Included within the non-elastic housing are rigid plates **4** hinged **5** together at their first lower end to form jaws for applying pressure against the sides of the collapsible tube. Pressure applicators **6**, in the shape of a push button, are attached adjacent to the rigid plates second upper end, farthest from the hinged end, for forcefully dispensing the fluid. Steady pressure applying springs **7** are provided at about the middle length of the rigid plates. These springs maintain a uniform pressure along the rigid plates and along the collapsible lining or tube **2**. With the components of the dispenser all housed together within one non-elastic housing **3**, the dispenser is readily available for quick use. A spool **10** for twine **11** is also housed within the non-elastic housing **3** and can be dispensed through an opening **13** and threaded through a cutting means **12**. If the viscous fluid is toothpaste, the twine can be dental floss. If the viscous fluid is an adhesive, the twine could be binding cord, etc. The non-elastic housing can be a rigid metal or plastic or a resilient material that is not stretchable to any appreciable degree.

[0016] **FIG. 2** is a modification of the dispenser of **FIG. 1**. Rather than having both rigid plates of the dispenser **20** move about a common hinge, only one first rigid plate **24** is free to move about a hinge **25** while a second relatively stationary rigid side **17** is attached to the hinge. Also, the pressure applicators are in the form of a lever **26** that is hinged **15** at one end to provide leverage on the movable rigid plate **24** through a pressure pin **16** acting against return spring pressure **21**. Finger gripping irregularities **19** can be formed on the housing **23**. The closure aperture **28** from the collapsible lining or tube is shown closed by a pivoted cap **29**. A spring **27** is positioned between the non-elastic housing **23** and rigid plate **24** to maintain a steady pressure on the rigid plate and adjacent side of the collapsible lining or tube **22**. The second relatively rigid stationary side **17** can be either a rigid plate or a rigid housing or rigid housing side. The same spool **10**, twine **11**, opening **13** and cutting means **12** are provided. Rather than having the spool **10** and twine **11** attached to the rigid plate **24**, they are attached to a door **14** that is hinged **72** to the non-elastic housing **23** lower corner.

[0017] **FIG. 3** is a further modification of the dispenser of **FIG. 1**. The same general collapsible liner or tube **32**, with viscous fluid, and non-elastic housing **33**, having a first rigid plate **34** and second rigid plate **73**, are used. A third rigid base plate **18** is provided between the first and second rigid plates. The third rigid base plate **18** permits the primary pressure plates **73**, **34** to move toward each other in an essentially parallel manner, rather than arcuately. A second hinge **31** is added to join the rigid base plate **18** to the first rigid plate **34** to permit this movement. The first hinge **35** joins the base plate **18** to the second rigid plate **73**. A single pressure applicator **36**, closure aperture **38**, closure cap **39** with spool **10**, twine **11**, opening **13** and cutting means **12** are also used. The two hinges **31** and **35** on either end of the base plate permit that pressure plate **34** to float somewhat so as to accommodate a collapsible liner or tube **32** that has an essentially uniform cross-section along its length. The base plate does not apply much pressure onto the collapsible tube **32** but serves primarily to provide a support for the spool **10** and as a rigid connection between the second rigid plate **73** and the first rigid plate **34**. The pressure applied by the pressure plate **34** is essentially uniform along its extent due to the pressure applicator **36** location at the top end of the pressure plate and the spring **37** constant force applied at the lower end of the pressure plate. This force balancing and physical arrangement results in the discharge from the collapsible tube being essentially uniform along the collapsible container length rather than primarily from the bottom due to a pivotal movement of the rigid plates secured together at the bottom end. The hinge **31** is of the well known limited rotation type often used with doors where rotation between the hinge sections is due to flats on the hinges abutting sections, in this instance, so as to permit only about a 90 degree relative rotation between the sections. The preferred angle $\ominus$ between the base plate **18** and rigid plate **34** is in the range of 90 to 180 degrees. The plates remain coplanar when the angle $\ominus$ reaches it maximum 180 degree limit.

[0018] **FIG. 4** discloses an alternate system for applying pressure against the rigid plates **44** of the dispenser **40**. In this embodiment, there is no liner or tube used. The viscous fluid **42** is confined between the relative rigid dispenser **40** walls **43** and the rigid plates **44**. The spring and pressure applicator are replaced by a pair of curved levers **46**, **47** on either side of the rigid plates **44** that are hinged **45** together essentially centrally on a rigid lower base plate **49**. The lower end of the levers **46**, **47** are hinged to either end **41**, **48** of the rigid lower base plate **49**. Pressure against the upper ends of the curved levers **46**, **47** presses the central area of the curved levers against the rigid plates **44** to press viscous fluid from the confined space **42**.

[0019] **FIG. 5** discloses another alternate system for applying pressure against the rigid plates **64** of the dispenser **60**. The upper areas of the non-elastic housing **63** are provided with resilient gripping areas **66**, **67** at the upper areas of the rigid plates **64** for pressing the rigid plates against the viscous fluid within the confined space **62** to discharge the viscous fluid out of the closure aperture **68** that can be closed, with a pivot cap **69** shown.

[0020] **FIG. 6**(*a*) discloses a further alternate pressure applicator **50**, preferably made of plastic, for pressing on the rigid plate(s) of the invention. The outer pressure applicator **53** is similar to the push button **6** shown in **FIG. 1**. The outer end is provided with irregular gripping or pressing areas **54**, for non-slip pressure application, and the inner end is provided with a flange **55** around an opening provided for access to the hollow interior for passage of one end of a spring **52** into the empty space within the push button **53**. The flange **55** can be secured to the non-elastic housing inner or outer surface. Inner pressure applicator **51** outer end **56** is open providing for reception of the other end of the spring **52**, in the empty space within the inner pressure member **51**. The inner pressure applicator **51** inner end is provided with a flange **57** for pressing against the rigid plates. The outer pressure applicator **53** serves the same function as the pressure applicator **6** in **FIG. 1**. When pressed on, the flange **55** is forced against the flange **57** to press on the rigid plates. However, when pressure against the gripping outer end area **54** is released, return spring **52** presses the flange **55** outward against the non-elastic housing and the flange **57** inward against the rigid plate. This results in a constant spring pressure being applied against the rigid plates and the collapsible container. The spacing between the rigid plates and resilient housing limit the distance the inner pressure member **51** and outer pressure member **53** can separate. This distance is not enough to expose the spring **52** ends that are retained within the hollow inner and outer pressure members. Pop-out tabs **58** are provided by cutting a "U" shape through the inner applicator **51** and heating and bending the resulting tab to provide a spring action.

[0021] **FIG. 6**(*b*) shows the pressure applicator of **FIG. 6**(*a*) in its compressed configuration. The tabs **58** are pressed into the space within the inner pressure member and the inner pressure member **51** is pressed against spring **52** pressure into the empty space within the outer pressure applicator **53** with the inner pressure applicator **51** flange **57** adjacent to the outer pressure applicator **53** flange **55**. In this configuration the flange **57** can be placed against a rigid plate while the flange **55** is placed against the non-elastic housing. While the flange **55** can be affixed to the outside of the non-elastic housing, it is preferred that both flanges **55**,**57** be place between the rigid plate(s) and non-elastic housing.

[0022] **FIG. 6**(*c*) shows the pressure applicator of **FIG. 6**(*a*) in an extended configuration. As the rigid plates are pressed inward to dispense fluid, the distance between the non-elastic housing and rigid plates increases. To accommodate the increased distance, the inner pressure member is moved out from the outer pressure member under spring force. This compensates for increased distance between the non-elastic housing and pressure plates. When the inner pressure member has moved out far enough to uncover the tabs **58**, they spring out and prevent the inner pressure member from entering any further back into the outer pressure member. With the inner pressure member extended, pressure can still be easily applied to the pressure plates with minimum travel of the outer pressure member, the fluid being dispensed using the same pressure originally applied to the outer pressure area **54**. This is possible even though the rigid plate is no longer adjacent to the non-elastic housing.

[0023] It is believed that the construction, operation and advantages of this invention will be apparent to those skilled in the art. It is to be understood that the present disclosure is illustrative only and that changes, variations, substitutions, modifications and equivalents will be readily apparent

to one skilled in the art and that such may be made without departing from the spirit of the invention as defined by the following claims.

1. A viscous fluid dispenser comprising:

a collapsible confined space for viscous fluid having a closure aperture;

a non-elastic housing enclosing said collapsible confined space;

a first rigid plate located adjacent one side of said collapsible confined space and within said non-elastic housing between said collapsible confined space and said non-elastic housing;

means for applying pressure on said first rigid plate within said non-elastic housing to press on said collapsible confined space to discharge viscous fluid from said collapsible confined space through said closure aperture.

2. A viscous fluid dispenser as in claim 1 wherein:

said first rigid plate has a first lower end and a second upper end;

said first rigid plate first lower end is held within said non-elastic housing such that said means for applying pressure pivots said first rigid plate around said first rigid plate first lower end.

3. A viscous fluid dispenser as in claim 1 wherein:

a spring within said resilient housing presses on said rigid plate to maintain a residual pressure on said confined space.

4. A viscous fluid dispenser as in claim 2 wherein:

a second rigid plate has a first lower end and a second upper end within said non-elastic housing with said first rigid plate lower end being hinged to said second rigid plate lower end;

said means for applying pressure on said rigid plates applies pressure to said rigid plates adjacent to said rigid plates second upper ends.

5. A viscous fluid dispenser as in claim 4 wherein:

said means for applying pressure on said rigid plates applies pressure to both of said rigid plates adjacent said rigid plates second upper ends.

6. A viscous fluid dispenser as in claim 4 wherein:

said first and second rigid plates have an inner surface, facing said confined space, and an outer surface, facing away from said confined space;

a spring is placed within said resilient housing for pressing on the outer surface of one of said rigid plates.

7. A viscous fluid dispenser as in claim 1 wherein:

said means for applying pressure on said first rigid plate includes a lever for increasing leverage by increasing mechanical advantage.

8. A viscous fluid dispenser as in claim 7 wherein:

said lever is hinged outside said resilient housing and applies pressure to said first rigid plate through a pressure pin.

9. A viscous fluid dispenser as in claim 8 wherein:

said lever is spring loaded so as to apply a residual pressure on said first rigid plate.

10. A viscous fluid dispenser as in claim 7 wherein:

a second rigid plate is adjacent an opposing side of said collapsible confined space;

said first rigid plate and said second rigid plate have lower ends and upper ends;

said means for applying pressure on said rigid plates includes two levers that move toward each other against said first and second rigid plates;

a base plate within said non-elastic housing;

said levers are hinged onto said base plate to fix and space said levers lower ends as said levers upper ends are moved to press said levers against said rigid plates.

11. A viscous fluid dispenser as in claim 10 wherein:

said rigid plates first lower ends are hinged to said base plate between the location at which said levers lower ends are hinged;

said levers are arcuately shaped such that moving said levers upper ends together presses a central arcuate area of said levers against said rigid plates.

12. A viscous fluid dispenser as in claim 2 wherein:

said means for applying pressure on said rigid plate includes a resilient gripping area formed on said non-elastic housing adjacent to said rigid plate second upper end.

13. A viscous fluid dispenser as in claim 1 wherein:

said means for applying pressure on said rigid plate includes an outer pressure applicator push button having an irregular surface on one outer end and an opening to a hollow internal area on the inner other end, for reception of one end of a spring, and an inner pressure applicator, telescopable into said outer pressure applicator push button hollow internal area, having an opening on one outer end facing said outer pressure applicator for reception of the other end of said spring, and a flange on the other inner end of said inner pressure applicator for pressing against said rigid plates.

14. A viscous fluid dispenser as in claim 13 wherein:

said inner pressure applicator has intermediate tabs for limiting reinsertion of said inner pressure applicator into said outer pressure applicator when said inner pressure applicator is telescoped out from said outer pressure applicator.

15. A viscous fluid dispenser as in claim 1 wherein

said means for applying pressure on said first rigid plate is in pressure contact with a collapsible container within said collapsible container space and is hinged to a second rigid plate that is in contact with the other opposing side of said collapsible container and said non-elastic housing;

16. A viscous fluid dispenser as in claim 1 wherein:

said means for applying pressure on said first rigid plate presses said first rigid plate into contact with said collapsible confined space;

a second rigid plate in pressure contact with said collapsible confined space other opposing side provides back pressure;

said first and said second rigid plates each have an upper end and a lower end;

a third rigid base plate joins the first lower end of said first rigid plate and said first lower end of said second rigid plate to permit said first rigid plate and said second rigid plate to approach each other essentially parallel.

17. A viscous fluid dispenser as in claim 16 wherein:

said third rigid base plate pivotably attaches to said first rigid plate lower end and to said second rigid plate lower end.

said first rigid plate and said third rigid base plate have an angle $\ominus$ between them that can vary from 90 degrees to 180 degrees.

18. A viscous fluid dispenser as in claim 17 wherein:

said means for applying pressure on said first rigid plate presses on the upper end of said first rigid plate;

a spring has one end pressing against said resilient housing and the other end pressing against said first rigid plate adjacent its lower first end to equalize pressure on said collapsible container along said first rigid plate length.

19. A viscous fluid dispenser as in claim wherein:

a spool for twine is secured within said resilient housing with an opening in said housing for discharging twine and a cutting means on said resilient housing for severing twine.

20. A viscous fluid dispenser as in claim 19 wherein:

a door and said spool and said cutting means are hinged to said non-elastic housing so that said door can be pivoted out from said non-elastic housing to access said spool and said cutting means.

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