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MATERIAL DISPENSER HAVING ATTACHABLE VALVE CONTROL CAP

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Fig. 1.

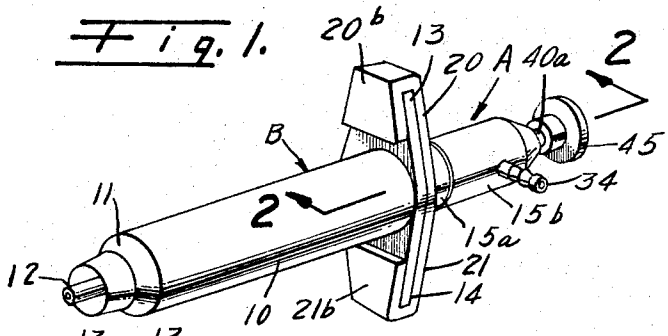
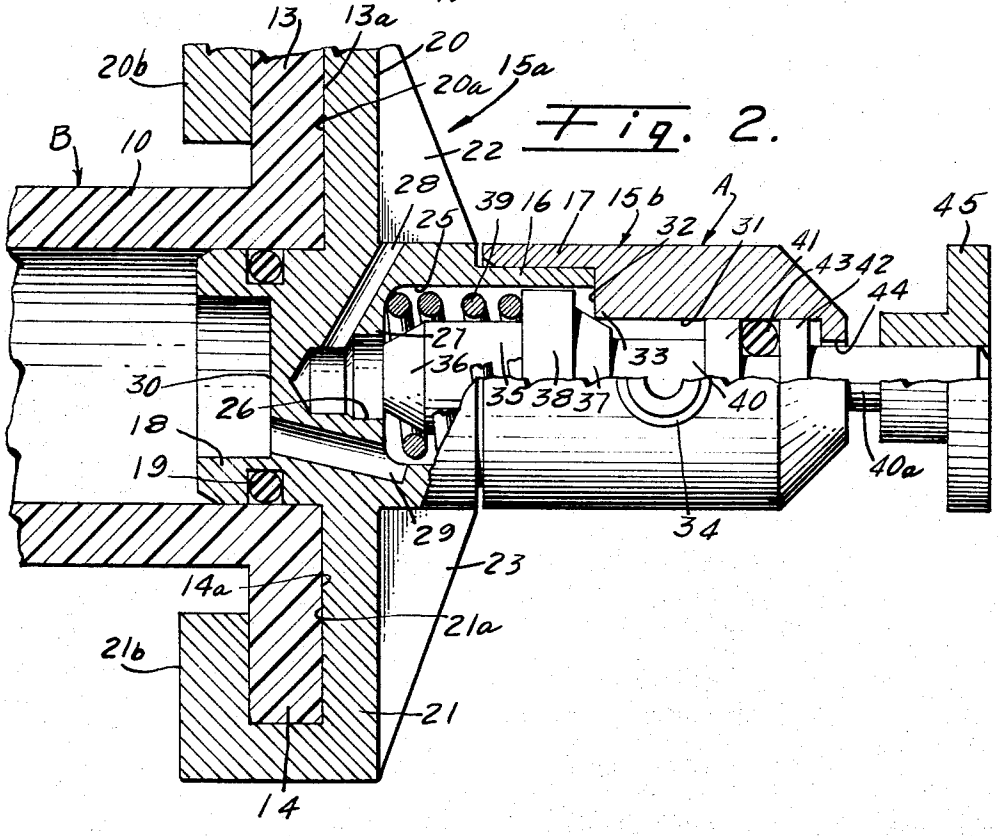


Fig. 2.



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MATERIAL DISPENSER HAVING ATTACHABLE VALVE CONTROL CAP

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The present invention relates generally to dispensing devices for flowable materials, and is more particularly concerned with improvements in dispensers of the character commonly referred to as "syringe" or "needle" type such as utilized for potting or similar operations.

It is one object of the present invention to provide a small hand dispenser for flowable materials which is of simple construction, can be fabricated entirely from plastic, which is light in weight and easily manipulated, and yet incorporates a unique valving control mechanism by means of which a pressurized fluid can be utilized and controlled with such nicety as to permit the deposit of very small amounts of dispensed material when desired.

The foregoing feature is extremely important in certain potting operations, particularly where a rather heavy epoxy might be utilized. With conventional manually operable plungers in the dispenser, it was most difficult to terminate the feed in view of built up pressures within the device. There was no way to dump this built up pressure, and as a consequence there was a considerable waste of the material. Having such inherent disadvantages of operation in mind, it is an important concept of the present invention to provide a control arrangement wherein the application of fluid actuating pressure may be modulated with respect to an atmospheric vent in such a manner that an exteremly fine control of pressure is obtainable, and wherein the pressurized fluid will be disconnected with respect to the dispensed material and dumped or vented to atmosphere immediately upon closing of the valve at the cessation of a dispensing operation.

Another object of the herein described invention is to provide a unique control attachment, which may be fabricated as an article of manufacture, and which may be selectively attached to standardized containers for dispensable materials for controlling the dispensing operation by means of a pressurized fluid.

Still another object is to provide a device of the character described in which opening of the valve may be accomplished without opposition by an opposing pressure, and wherein the valve will automatically open when applied fluid pressure exceeds a predetermined value, so as to prevent overloading.

Yet another object is to provide a valving arrangement wherein the dispensing fluid pressure is determined and regulated by throttling movement of the valve between fluid supply and venting connections.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

Referring to the accompanying drawings which are for illustrative purposes only:

FIG. 1 is a perspective view of a dispensing device embodying the features of the present invention; and

FIG. 2 is an enlarged fragmentary axial sectional view showing details of the attachable valve control cap of the device.

Referring more specifically to the drawings, for illustrative purposes, the complete dispensing device is disclosed in FIG. 1 as embodying an attachable valve control cap A having releasable connection with a container B for the dispensable material. The connected parts are fabricated entirely from suitable material, and in the present instance a plastic commercially obtainable and known as Delrin has been utilized.

More specifically, the container B for the dispensable material comprises a tubular body **10** which is contracted at its dispensing end and provided with an end wall **11** which connects with a tubular discharge nozzle or needle **12**.

At its other charging end, the tubular body is provided with integral oppositely extending radial arms or projections **13** and **14** which form a part of the releasable attaching means for the valve cap A, as well as to cooperatively provide coplanar abutment end surfaces **13***a* and **14***a*.

The containers B may respectively be charged with the dispensable material, and the attachable valve cap A utilized as a common control unit which may be selectively attached to the different containers B, or a single container B may be utilized with the control cap A, the container being repeatedly charged with the dispensable material as needed. In any event, the valve cap A may be combined with the container B as a complete dispensing device, and at the same time the valve cap A is susceptible of use as a separate attachment which may be fabricated and sold as a separate article of manufacture.

The valve cap A comprises a generally cylindrical body structure which is composed of two sections **15***a* and **15***b* which are separately fabricated and later assembled into a unitary structure with adjacent ends **16** and **17** in telescoped circumferentially overlapped relation, in which position the ends are secured as by bonding or otherwise endwise separation. As will subsequently appear, this arrangement permits the valving parts to be easily assembled within the valve cap and thus operatively secured and retained in an operative position in a simple but effective manner.

As more specifically shown in FIG. 2, the end of the valve cap A, which is to be associated with the container B, is constructed with a cylindrical end portion **18** which is insertable into the open bore end of the container B, a circumferentially extending sealing ring **19** mounted in a circumferential groove serving to seal the connection between the valve cap and the container.

Inwardly spaced of this end, the section **15***a* is provided with oppositely extending radial arms **20** and **21** which may be reenforced by associated ribs **22** and **23** in each case. These arms provide coplanar abutment surfaces **20***a* and **21***a* which are engageable with the abutment surfaces **13***a* and **14***a* respectively to limit the extent of insertion of the cylindrical end portion **18** into the open bore end of the container B. When connecting the valve cap A with the container B, the radial arms of the valve cap are angularly displaced with reference to the radial projections of the container B to permit fully seated engagement of the two parts. The two parts are then relatively rotated to bring the arms and projections into registration, and this movement will operate to engage the endmost portions of the container projecting under hooked end portions **20***b* and **21***b* respectively so as to releasably retain the parts in interconnected relation.

The end **16** of body section **15***a* is counterbored to provide a cylindrical chamber **25** in the bottom of which there is a reduced bore extension **26** which forms an annular valve seat **27** through which communication is established between the chamber **25** and an exhaust vent passageway **28** connecting with atmosphere. A second passageway **29** provides an outlet connection between the chamber **25** and a recessed end face **30** in the cylindrical end portion **18**.

The body section **15***b* is constructed with an axially extending bore **31** which communicates with a counter-

bore in the end **17** to form a radial wall **32** to provide an annular valve seat **33** through which communication is established between the chamber **25** and a tubular hose connector **34** for connection with a suitable pressurized fluid source.

Housed and reciprocably movable within the chamber **25** is a poppet valve **35** which is formed with a bevelled end **36** for valving cooperation with the valve seat **27**, and at its opposite end with a bevelled end **37** for valving cooperation with the valve seat **33**. Adjacent this end, the valve is formed with a circumferentially extending flange **38** which serves to reciprocably guide the valve within the chamber **25**. A compression spring **39** positioned in the chamber **25** with one end bearing against the flange **38** and its other end bearing against the bottom of the chamber **25** adjacent the seat **27** normally urges the valve to a position in which the bevelled end **37** is in closed relation with respect to the valve seat **33**, and the bevelled end **36** is in opened relation with respect to the valve seat **27**. In this position of the valve, communication is cut off with respect to the pressurized fluid supply through the connector **34**, while communication is established between the interior at the charging end of container B through passage **29**, chamber **25** and exhaust vent passage **28** to atmosphere, thus relieving any residual pressure which might be remaining in the container B after shutting off the pressurized fluid supply.

It will be appreciated that by making the spring **39** of proper resistive force, the valve **35** can be aranged to automatically open at a desired pressurized fluid pressure and thus prevent overloading. For example, the spring can be so graduated as to open at a 60 p.s.i. pressure.

Opening of the valve, however, is normally accomplished manually by means of a reciprocably mounted valve stem **40**, this valve stem being guidingly supported by spaced circumferentially extending flanges **41** and **42** which thus form a groove in which there is mounted a sealing ring **43**. An end extension of the valve stem, as indicated at **40***a*, projects through an end opening **44** and has mounted thereon a button **45**. The innermost end of the valve stem **40** bears against the adjacent end of the poppet valve **35**.

With the arrangement described above, the valve **35** normally closes against the valve seat **33** and in this position allows venting of the charging end of the container B to atmosphere. Upon depressing the button **45**, the valve **35** unseats and admits pressurized fluid to the chamber **25**. As the valve **35** is unseated with respect to the pressurized fluid flow, the valve tends to close with respect to flow through the exhaust vent passage **28**. Thus a regulatory throttling effect is obtained and full fluid pressure is not applied for dispensing the epoxy material until the valve seats with respect to valve seat **27**. A very precise control is thus provided which permits dispensing of very small amounts of the dispensable material and by immediately venting the container to atmosphere the pressurized fluid acting on the dispensable material may be immediately dumped and thus prevent waste.

From the foregoing description, it is believed clearly apparent that the device of this invention is of simple construction and embodies the features for carrying out the stated objects.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of my invention, and, hence, I do not wish to be restricted to the specific form shown or uses mentioned, except to the extent indicated in the appended claim, wherein various portions have been separated for clarity of reading and not for emphasis.

I claim:

A syringe type device for dispensing a material, comprising:

(a) a tubular container for a flowable material, said container having a dispensing end passage formed as a needle, and a charging end;

(b) opposed radial projections at said charging end extending beyond the container periphery;

(c) a body structure having radially outwardly extending arms releasably connectable with said projections by a relative turning movement, said body structure having an elongate interior chamber;

(d) elongate plug means at one end of said body structure for endwise entry into the charging end of said container, said plug means including a peripheral seal for engaging an inner wall surface of said container;

(e) a fluid outlet passage in said plug means connecting said chamber with the interior of said container at its charging end;

(f) an exhaust vent passage including a valve seat at one end of said chamber normally venting said outlet passage to atmosphere;

(g) a fluid inlet passage including a valve seat at the other end of said chamber adapted for connection with a source of pressurized fluid;

(h) valving means in said chamber including a reciprocably mounted valve member cooperably associated with said valve seats, said valve member being normally urged to an unseated position with respect to the valve seat of the vent passage, and a seated position with respect to the valve seat of the inlet passage; and

(i) manually operable means at the opposite end of said body from said plug means for selectively actuating said valving means so as to move said valve member in a closing direction at one of said valve seats while moving it in an opening direction at the other valve seat, whereby flow of fluid under pressure into the charging end of said container and the discharge of material from the dispensing end of the container may be precisely controlled.

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