March 6, 1956 J. BOLSEY 2,737,329

FILLING APPARATUS FOR PENS AND THE LIKE

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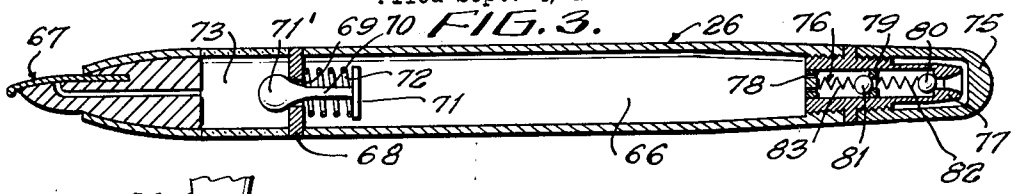



FIG. 3.

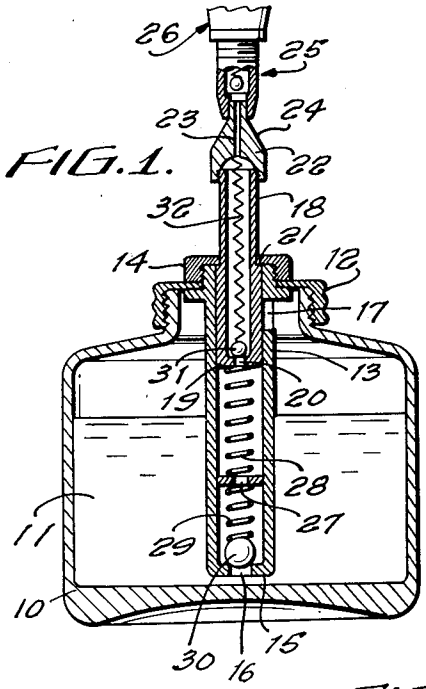



FIG. 1.

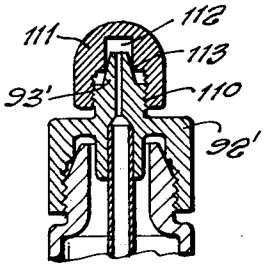



FIG. 6.

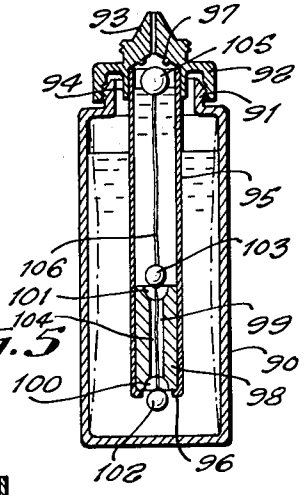



FIG. 5

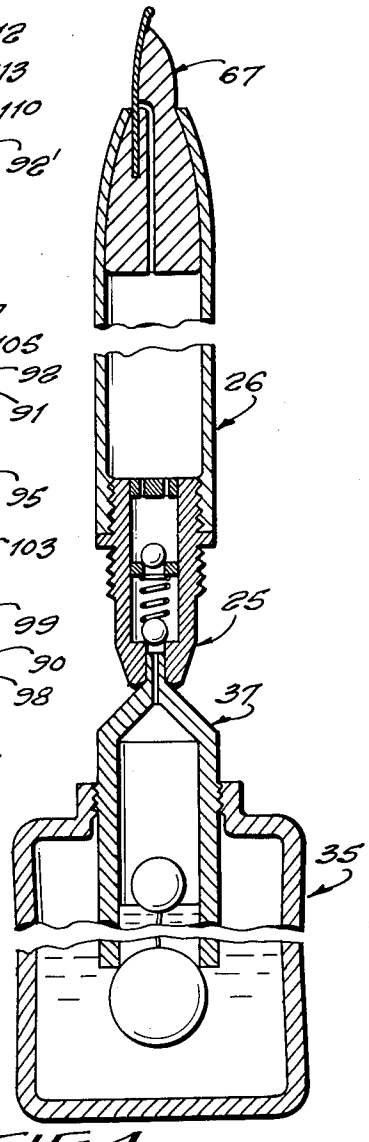



FIG. 4.

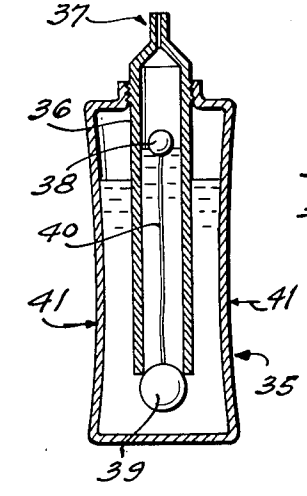



FIG. 2b.

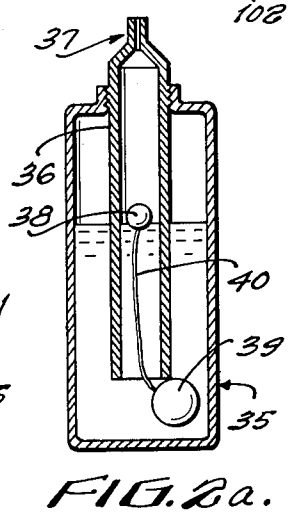



FIG. 2a.

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# FILLING APPARATUS FOR PENS AND THE LIKE

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Application September 4, 1952, Serial No. 307,883

6 Claims. (Cl. 226—63)

The present invention relates to a filling apparatus for pens and the like.

More particularly, this invention relates to containers, for ink and like, which are especially suited to be used for injecting ink and the like directly into the interior of a pen, for example.

At the present time it is customary to fill pens by dipping the pen point ends thereof into the ink in an ink container. This involves a certain amount of inconvenience because the pen point becomes quite wet and usually needs to be dried, and further because conventional pens, due to the space required by the filling device, hold such a small supply of ink that they must be filled at frequent intervals. Moreover, the amount of ink which is supplied to the pen during the filling thereof is unknown, and it sometimes happens that a pen, which the user thinks is full, only contains a small amount of ink due to improper filling unknown to the user.

It is an object of the present invention to overcome inconveniences of the above nature by providing an ink container which is particularly suitable for filling a pen in a positive and efficient way with a considerable supply of ink.

A further object of the present invention is to provide a container which itself holds all of the structure necessary to move ink from the container into the pen so that the latter may be very simply constructed and may hold a larger supply of ink due to the increased ink holding space resulting from the elimination of any filling structure in the pen itself.

Yet another object of the present invention is to provide a container of the above type which is made of relatively few, simple and ruggedly constructed parts and which is capable of completely filling a pen or the like in a quick and easy manner.

An additional object of the present invention is to provide containers of the above type with a means for metering the amount of liquid moved out of the container during an operation thereof so that a predetermined amount of liquid will be supplied to a pen or the like during each filling thereof.

A still further object of the present invention is to provide a container which leaves no ink on the exterior part of a pen when the latter is filled.

Still another object of the present invention is to provide a simple means for efficiently closing containers so that their contents cannot spill.

With the above objects in view, the present invention mainly consists of a filling apparatus, for filling pens and the like, this apparatus including a container, adapted to hold a liquid, and a tubular means at least partially mounted in the container and extending to and communicating with the bottom interior portion thereof, this tubular means having an open top end located over the container. A metering means is associated with the tubular means and fills the same, from the interior of the container, with a predetermined amount of liquid to be moved into a pen or the like during filling thereof. The



container may be flexible so that liquid is moved out of the same by compression of the container, or the container may be rigid and the tubular means associated therewith may be constructed to act as a pump for pumping liquid out of the container. Also, both of these latter features may be combined in one container.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a sectional elevational view of the filling apparatus constructed in accordance with the present invention and shown associated with a pen to be filled, the latter being fragmentarily illustrated in Fig. 1;

Figs. 2*a* and 2*b* show two positions, respectively, of a different embodiment of a filling apparatus constructed in accordance with the present invention;

Fig. 3 is a sectional view of one possible pen construction adapted to be used with the filling apparatus of Figs. 1 and 2;

Fig. 4 shows the apparatus of Figs. 2*a* and 2*b* associated with the pen of Fig. 3;

Fig. 5 shows in section a further embodiment of a container similar to those of Figs. 1, 2*a* and 2*b*; and

Fig. 6 is a fragmentary, sectional view, on an enlarged scale, of a container similar to that of Fig. 5 and a closure therefor.

Referring now to the drawings, there is shown in Fig. 1 a container **10** holding therein a supply of ink **11** and being provided with a cover **12** screwed on the neck of the container and forming the top wall thereof. This cover **12** is formed with a central opening through which a part of a tube extends, this tube being fixed to the top wall of container **10**, formed by cover **12**, as by having the part extending through the opening of cover **12** outwardly threaded and engaged by a nut **14**, as illustrated in Fig. 1. The tube **13** is provided with a bottom wall **15** located in the bottom interior portion of container **10** and formed with an opening **16**. The tube **13** is also formed with an opening **17**, adjacent its top end, for a purpose described below.

Telescopically mounted within the tube **13** is a second tube **18** having a bottom wall **19** formed with an opening **20** so that the interior of tube **18** communicates with the interior of tube **13**. The tube **18** is formed on its outer surface, intermediate the ends thereof, with a shoulder **21** which engages the nut **14** so that outward movement of the tube **18** is limited. To the top end of tube **18** there is fixed, as by being threadedly connected thereto, an outlet member **22** formed with a central passageway **23** which communicates with the interior of tube **18**. This outlet member **22** is provided with an outer tapered surface **24** which is adapted to extend into and tightly engage, as by being wedged thereto, a valve mechanism **25** located on a pen or the like **26** and further described below.

Within the tube **13** there is located an apertured partition **27** on the top side of which there is located a spring **28** and on the bottom side of which there is located a spring **29**. Spring **28** bears against the tube **18** to urge the same to its top rest position where the shoulder **21** bears against the nut **14**. Spring **29** bears against a ball member **30** located over opening **16** of tube **13** to close this opening and prevent flow of fluid from the interior of tube **13** into the container **10**, this ball member permitting fluid to flow from the latter into the tube **13** so that the ball member **30** and its associated structure form a check valve.

A second check valve structure is provided to regulate the flow of fluid through the opening 20 of tube 18, this second check valve structure taking the form of a ball member 31 located over opening 20 and a spring 32 bearing with one end thereof against the ball member 31 and with its opposite end against the outlet member 22 so as to urge the ball member 30 into the position where it closes opening 20 and prevents fluid from flowing out of tube 18 into tube 13, while permitting fluid to flow from the latter into the tube 18.

The above described structure of Fig. 1 operates as follows:

When the tube 18 is moved downwardly against the action of spring 28, fluid from the interior of tube 13, which fluid may be gaseous at first, flows past ball member 31, against the action of spring 32, into the tube 18. The downward stroke of tube 18 is limited by the partition 27 together with the compressed spring 28 so that the stroke of tube 18 may be regulated by the location of partition 27. When the tube 18 is released to the action of spring 28, the upward movement thereof creates a certain amount of vacuum in the tube 13, and this causes the air pressure on liquid 11 to move the latter against the action of spring 29 past the ball member 30 into the tube 13. It is apparent that after a relatively few strokes of the tube 18, the tube 13 and the tube 18 will become filled with the liquid 11. This movement of liquid 11 into the tubes 13 and 18 to take the place of any gas therein is only required when a fresh container 10 is being used, since after a few strokes of tube 18 the latter always contains a supply of ink therein. Thus, during the normal operation of the apparatus, a single downward stroke of the tube 18 will cause ink in tube 13 to move into the tube 18 and thereby move a predetermined amount of ink out of the latter through the passage 23. The downward movement of the tube 18 is brought about by the downward movement of the pen 26 which has its valve 25 associated with the outlet 22 so that the ink which moves out of tube 18 during the downward stroke thereof moves directly into the pen 26. As was mentioned above, the amount of ink moving into the pen during a single downward stroke of tube 18 is regulated by the location of partition 27 and by the compressed spring 28, as well as by the location of shoulder 21, so that this structure acts as a metering device which causes a predetermined amount of liquid to be moved into the pen with one simple downward stroke of the tube 18.

When the tube 18 approaches the bottom of its stroke, gas above the liquid 11 in the container flows through the opening 17 into the space between the portion of tube 18 above shoulder 21 thereof and the tube 13. Thus, when the tube 18 is released to the action of spring 28, a certain amount of this gas will be trapped above opening 17 between the nut 14 and shoulder 21, and this gas, which slowly leaks out between the tube 18 and nut 14, provides a cushion which prevents the shoulder 21 from knocking against the nut 14.

It is apparent that the above described structure provides an ink container with a pumping means which is capable of pumping liquid from the container into a pen or the like with one downward stroke of the tube 18 during normal use of the apparatus.

A second embodiment of a filling apparatus constructed in accordance with the present invention is shown in Figs. 2*a* and 2*b* where the ink container 35 is made of a flexible plastic material. The top will of container 35 is formed with an opening through which a tube 36, also made of a flexible plastic material, passes, this tube 36 filling the opening in the top wall of container 35 and being fixed to the latter in any suitable way. For example, the plastic material of tube 36 may be threaded as shown or may be fixed to the plastic material at the top wall of container 35, about the opening thereof, by application of a suitable solvent at this joint.



The tube 36 has an open top end 37 which is tapered on its outer surface, as illustrated, so that it has a shape corresponding to that of outlet member 22, described above. Thus, the apparatus of Fig. 2 is adapted to be associated with a pen in the same way as that illustrated in Fig. 1.

Within the tube 36 there is located a float 38 in the form, for example, of a spherical member, which may be hollow or made of cork or the like and which is of a smaller size than the interior cross section of tube 36 so that member 38 is located with appreciable clearance within tube 36. A valve member 39, which also may be in the shape of a sphere and which cannot float in the ink within container 35, is located within the latter adjacent the bottom open end of the tube 36. The float 38 and valve member 39, the latter being of a larger size than the bottom open end of tube 36, are interconnected by a flexible member 40 which may be a cord, for example. The buoyant force on float 38 is large enough to raise member 39.

The above described apparatus is illustrated in Fig. 2*a* in its rest position and in Fig. 2*b* in a position during operation of the apparatus for filling a pen. When the flexible container 35 is compressed, e. g. by the hand of the user, the ink therein moves from the position shown in Fig. 2*a* upwardly toward the top of the tube 36. The ink rising within the tube 36 causes the float 38 to also rise, and this float 38, through the cord 40 which is shorter than the tube 36, pulls the valve 39 over the bottom open end of tube 36 to close this tube and prevent any more ink from entering into the tube 36, the structure being illustrated in this position in Fig. 2*b*. Upon further compression of the container 36, as indicated by the arrows 41, the fluid about the tube 36 transmits the compression of the container to this tube, which is also made of a flexible plastic material, so that this tube itself becomes compressed and causes ink to move upwardly past the float 38 and through the open top end 37 of tube 36 into a pen or the like connected to this open top end 37 in the same way as was described above in connection with the outlet member 22 of the structure of Fig. 1.

It is thus apparent that the apparatus of Figs. 2*a* and 2*b* provides a very simple structure for filling a pen simply by squeezing the flexible material of the container 35. The members 38—40 act as a metering means, and the length of cord 40 is suitable chosen to permit a predetermined amount of liquid to be moved out of the container during compression thereof.

Fig. 3 of the drawings illustrates one possible pen construction adapted to be used with the apparatus described above. This pen 26 includes a hollow rigid pen body 66 adapted to directly serve as an ink reservoir and having at one end thereof a pen point means 67 adapted to receive ink from the interior of body 66 to deliver this ink to the pen point. At the top end of the pen body 66 there is located a valve mechanism 25 which is threadedly connected to the top open end of the pen body 66 and which is outwardly threaded to receive a cap 75 for covering the valve mechanism 25 when the pen is not being filled, this cap 75 being removed when the pen is to be filled.

The valve mechanism 25 includes an elongated valve body 76 formed with an elongated hollow passage extending therethrough and being provided with a constricted portion 77 at its inlet end. Within the valve body 76 there is located an apertured plate 78 and an apertured plate 79. A ball member 80 bears against constricted portion 77 to close the passage of valve body 76, and a ball member 81 bears against the central aperture of partition 79 to close this aperture, the ball members 80 and 81 being urged into their positions illustrated in Fig. 3 by a pair of springs 82 and 83, respectively, as illustrated. Thus, when the pen 26 is located in the position shown in Figs. 1 or 4, the outlet 22 or the open top end 37 extend into the passage of the valve body 76 in wedging engage-

ment therewith so that the ink may flow, without spilling, into the pen body **66**, this ink moving the ball member **80** away from constricted portion **77** and the ball member **81** away from the aperture of partition **79** against the action of spring **83** and then flowing through the apertured partition **78** into the reservoir formed by the pen body **66**.

It will be noted that the pen body **66** is provided with a partition **68** formed with an aperture through which an elongated member **70** loosely extends, this member **70** having a spherical mass **71'** on one end thereof urged against the aperture **69** of partition **68** by a spring **72** which bears against a nut **71**, or the like, on the end of member **70** opposite to spherical mass **71'**. This latter structure prevents the ink within reservoir **66** from acting with its full pressure against the pen point means **67**. When the latter becomes dry it is only necessary to give the pen **26** a downward shake which, by inertia, will cause the mass **71'** to move downwardly against the action of spring **72**, thus opening the aperture **69** and permitting ink to flow from the reservoir formed by body **66** to the pen point means **67**. This body **66** may be made of a transparent or translucent material between the partition **68** and pen point means **67** to give an indication of the ink within the pen. The spring **72** is carefully calibrated to urge the mass **71'** toward the top of the pen with a force sufficient to hold the ink within the reservoir **66** on the top side of partition **68**.

In Fig. 5 there is shown a different embodiment of a container adapted to be used in a manner similar to the container of Figs. 2*a* and 2*b* to fill a pen, or the like. The container of Fig. 5 includes an outer, liquid-holding part **90** made of a flexible material, such as a suitable plastic, and having a top open threaded end **91** which receives a cover member **92** provided with a top tapered outlet end **93** adapted to cooperate with a valve construction of the type shown in Fig. 3 and in the same way as was described above in connection with Figs. 1 and 4. The cover member **92** is provided on its interior with a depending tubular portion **94** to which there is fixedly connected, in any suitable way such as by threading, fusing, or the like, a rigid elongated tube **95** having opposite open ends and extending almost to the bottom wall of the part **90**, this tube **95** being formed at its bottom end with an inwardly extending annular flange **96**. The cover **92** is provided on its interior with pin members **97** which are fixed to the cover member **92**, the purpose of these pin members **97** being fully described below. Also, cover member **92** is formed with outer threads as shown.

Within the rigid tube **95** there is slidably mounted a piston member **98** formed with an axial bore **99** which terminates at its opposite ends in spherical seats **100** and **101** adapted to respectively cooperate with the ball valve members **102** and **103**, these ball valve members being interconnected by a flexible cord, or the like, **104** which is of a smaller thickness than the diameter of bore **99** and which is slightly longer than the piston **98**. This cord **104** may be fixed in any suitable way to the valve member **102** and **103**, such as by being wedged into the material of these valve members or being joined thereto by a suitable adhesive material. A float member **105**, which may also be spherical, is located within the tube **95** above the valve member **103** and is connected thereto by a flexible cord, or the like, **106** which may be made of the same material as the cord **104** and which may be fixed to the members **105** and **103** in the same way that cord **104** is fixed to the members **102** and **103**.

The above described apparatus of Fig. 5 operates in the following manner:

A pen or the like is placed over the tapered outlet end **93** of cover member **92** to receive ink from the container. Then the liquid-holding part **90** is manually squeezed by the operator so as to force ink or the like to flow into the tube **95** through the bore **99**, the force of the ink itself serving to unseat valve member **103** from seat **101**. The cord **104** is long enough to prevent valve **102** from becoming seated on seat **100** when valve member **103** is lifted from seat **101** by ink flowing upwardly through bore **99** as a result of the compression of the flexible container part **90**. The ink rising in the tube **95** causes the float **105** to also rise. As is evident from Fig. 5, the total length of cords **104** and **106** and the diameter of ball valve member **103** is shorter than the length of tube **95**, so that when the liquid in the latter approaches the top of the tube the float **105** will pull the valve **102** onto its seat **100** to prevent further flow of liquid through the piston **98**. The continued compression of the container part **90** will therefore cause liquid to raise the piston **98** and force the liquid above the same within the tube **95** past the float **105** and through the bored outlet end **93** of the cover member **92** into the pen or the like, the pins **97** preventing the float **105** from closing the outlet end **93**. It is evident that this structure allows only a predetermined amount of liquid to be located in the tube **95** above the piston **98** prior to the closing of bore **99** by valve **102**. Thus, this structure operates as a metering device to control the amount of liquid which is forced out of the container during the compression of part **90** thereof.

When the container part **90** is released, the valve **102** will, by gravity, become unseated from seat **100**, and the liquid remaining above the piston **98** together with the air pressure in the tube **95**, which communicates with the atmosphere through the outlet end **93**, will cause the valve **103** to become seated on seat **101**. This air pressure within the tube **95** will be greater than the pressure about the tube **95** within the container part **90** and will therefore force the piston **98** downwardly to the bottom of tube **95**, the annular flange **96** limiting this downward movement. This completes the operation of the apparatus of Fig. 5 for a single filling of the pen. This operation is repeated each time a pen is filled, and it is evident that the piston **98** will always return to the bottom of tube **95** so that a predetermined amount of ink will always be supplied to a pen during each filling operation.

In Fig. 6 there is disclosed a container construction similar to that of Fig. 5 and a closure for the same. As is apparent from Fig. 6, the cover member **92'** is provided with the threads **110** to receive the cap **111**. This cap **111** is formed on its interior with a recess **112** forming an annular shoulder **113** which engages the outer, tapered surface of the outlet end **93'** of cover member **92'**. Thus, when the cap **111** is threaded onto the outer threads **110** of cover member **92'**, the shoulder **113** is tightly pressed about its entire circumference against the tapered outer surface of outlet end **93'** to form a tight seal with the latter so as to prevent any escape of the contents of the container. It is believed to be evident that the cooperation between the shoulder **113** and tapered outer surface of part **93'** provides a very simple and effective means for sealing the container because no great accuracy is required in the formation either of the tapered outer surface of part **93'** or the shoulder **113**.

The present disclosure is similar and related to the disclosure in my co-pending application Serial No. 307,885 filed on September 4, 1952, and entitled "Pens and Devices for Filling the Same."

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of filling apparatus for the pens or the like differing from the types described above.

While the invention has been illustrated and described as embodied in a filling apparatus having a metering means for filling a pen or the like with a predetermined amount of ink, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully

reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Filling apparatus for filling pens comprising, in combination, a flexible container having a top wall formed with an opening passing therethrough; a flexible tube passing through said opening in said top wall of said container and filling the same, said tube being fixed to said top wall of said container, having an open bottom end located within said container adjacent the bottom wall thereof, and having an open top end, of a smaller size than said open bottom end thereof, located over said container; a float of a smaller size than the interior cross section of said tube located within the latter for floating on a liquid located within said tube; a valve member of a larger size than said open bottom end of said tube and located outside of the latter and within said container; and an elongated flexible member shorter than the length of said tube, interconnecting said float and valve member and passing through said open bottom end of said tube so that when liquid rises in the latter said float, through said flexible member, draws said valve member over said bottom open end of said tube to close the latter and limit the quantity of liquid moved into the same by compression of said container.

2. Filling apparatus for pens, comprising, in combination, a flexible container; a cover member joined to said container and being formed with a passageway providing communication between the interior and exterior of the container; a rigid tube located within said container, being fixed at one end to said cover member about said passageway thereof and extending almost to the bottom of said container, said tube being provided adjacent the bottom of the container with an inwardly extending annular flange; a piston slidably mounted within said tube and being formed with an axial bore; a pair of valve members respectively located adjacent opposite ends of said piston for alternately closing said bore thereof, said valve members being interconnected by an elongated first, flexible member passing freely through said piston bore and being slightly longer than said piston; and a float member located within said tube above said piston and being interconnected with the valve member in said tube above said piston by an elongated second, flexible element shorter than the difference between the length of said tube and said first flexible member.

3. Filling apparatus, for filling pens, comprising, in combination, a flexible container having a top wall formed with an opening passing therethrough and a bottom wall opposite said top wall; passage means mounted on said top wall of said container, extending through said opening thereof into the interior of said container, and having top and bottom open ends so that said passage means provides communication between the interior and exterior of said container, said bottom end of said passage means being located adjacent said bottom wall of said container; a float located with clearance in said passage means for floating on a liquid located in said passage means; elongated flexible means shorter than said passage means fixed at one end to said float and extending from the latter toward said bottom wall of said container; and valve means for closing said passage means fixed to the opposite end of said flexible means to be pulled by the latter and said float into a position closing said passage means when said float rises to a predetermined extent in said passage means upon compression of said flexible container to force liquid therein upwardly along the interior of said passage means, whereby a metered predetermined amount of liquid will pass into said passage means for discharge through said open top end thereof to fill a pen or the like.

4. Filling apparatus as defined in claim 3, said passage means being in the form of an elongated tube of a flexible material and said valve means being in the form of a member larger than the diameter of said tube and being located within said container outside of said tube so as to engage the bottom open end thereof for closing said passage means.

5. Filling apparatus as defined in claim 3, said passage means including an elongated rigid tube having an inwardly extending annular flange at its bottom open end and a piston slidably mounted in said tube and being formed with an axial bore, said piston having a bottom end adapted to engage said annular flange to limit downward movement of said piston in said tube, said flexible means extending freely through said bore of said piston and said valve means being in the form of a closure member larger than the diameter of said bore of said piston and engaging the bottom end of said piston to close said passage means.

6. Filling apparatus as defined in claim 2, and wherein a plurality of pins are fixed to an inner surface portion of said cover member directed toward said float member so that said pins engage said float member to prevent the same from closing said passageway in said cover member.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 606,977 | McGlade | July 5, 1898 |
| 617,777 | Schweizer | Jan. 17, 1899 |
| 986,536 | Ashley | Mar. 14, 1911 |
| 1,569,875 | Nixon | Jan. 19, 1926 |
| 1,665,908 | Costello | Apr. 10, 1928 |
| 1,704,573 | Matthews | Mar. 5, 1929 |
| 1,866,773 | Koerner | July 12, 1932 |
| 1,891,826 | McGinnis | Dec. 20, 1932 |
| 1,916,186 | Mevnier | June 27, 1933 |
| 2,088,952 | Goble | Aug. 3, 1937 |
| 2,107,700 | Haas | Feb. 8, 1938 |
| 2,219,604 | Trotter | Oct. 29, 1940 |
| 2,554,489 | Crane | May 29, 1951 |
| 2,554,658 | Bolsey | May 29, 1951 |
| 2,670,885 | Allen | Mar. 2, 1954 |