

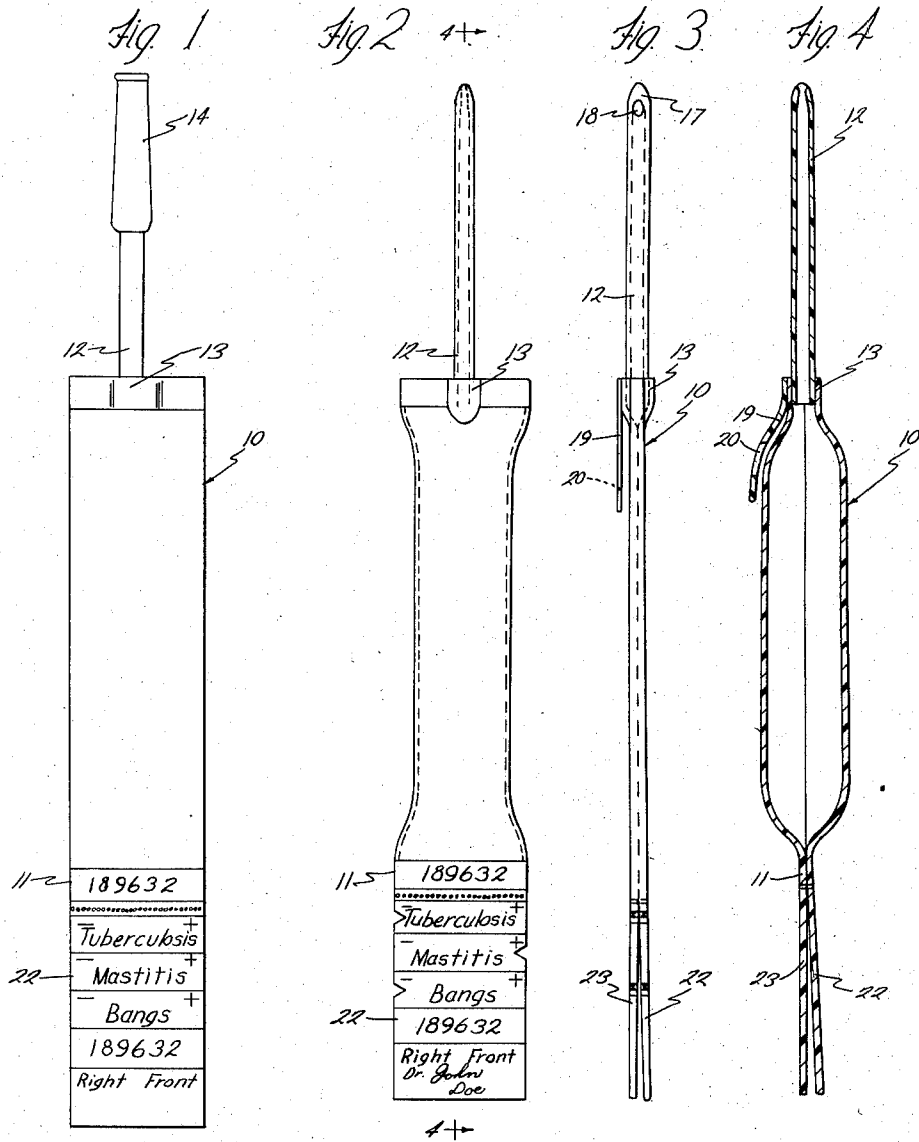
July 21, 1959

E. L. COLE
CONTAINER FOR COLLECTING STORING AND
DISPENSING BIOLOGICAL FLUIDS

2,895,475

Filed Dec. 3, 1956

4 Sheets-Sheet 1



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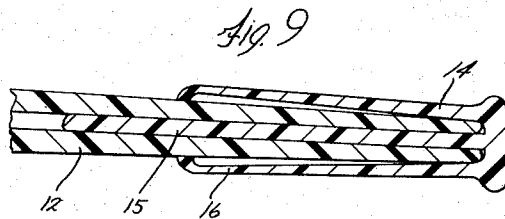
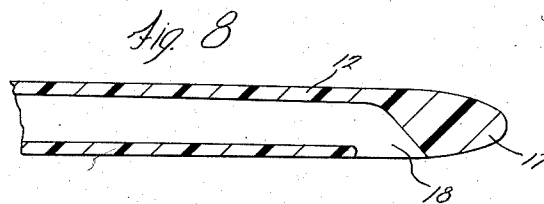
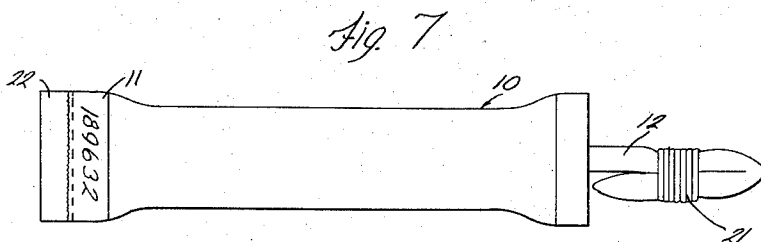
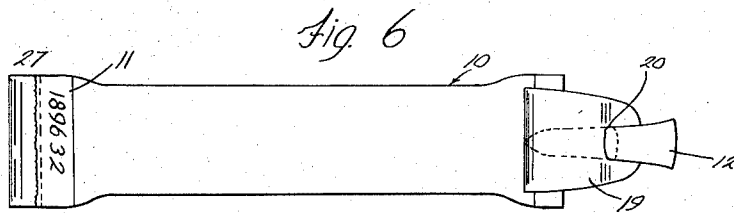
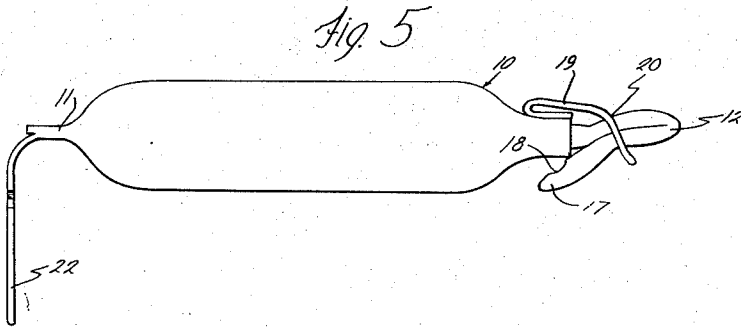
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4 Sheets-Sheet 2



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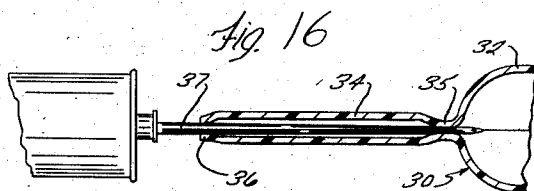
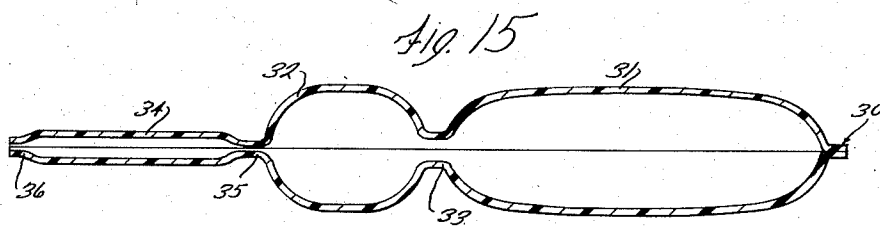
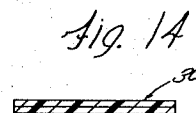
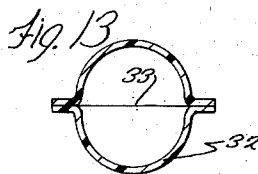
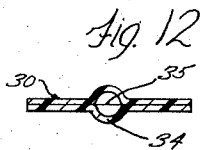
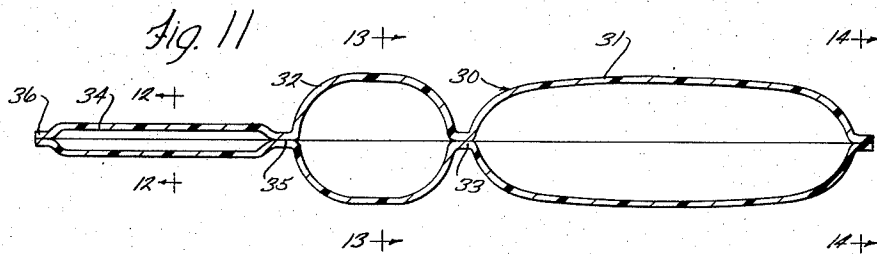
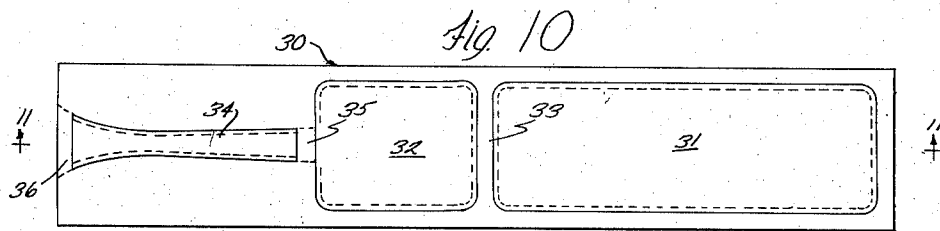
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4 Sheets-Sheet 3



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Fig. 17

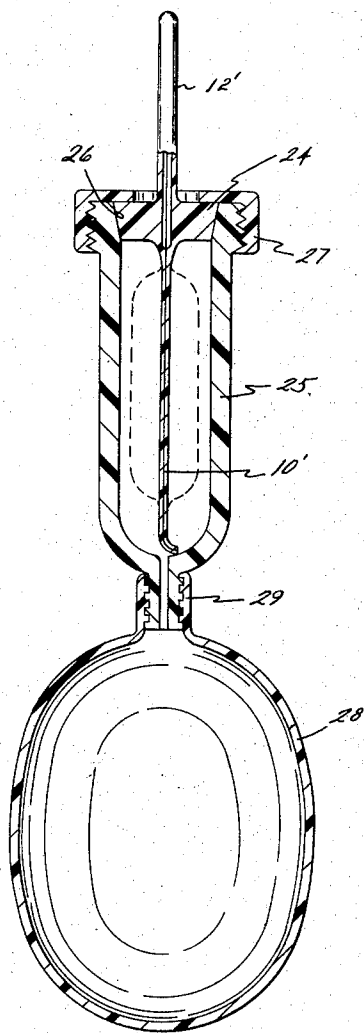
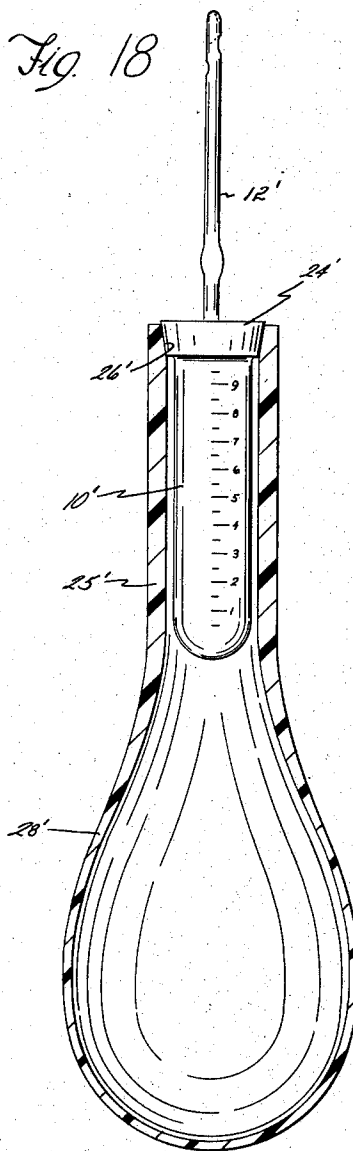


Fig. 18



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2,895,475

CONTAINER FOR COLLECTING, STORING AND DISPENSING BIOLOGICAL FLUIDS

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Application December 3, 1956, Serial No. 625,975

5 Claims. (Cl. 128—272)

My invention relates to improvements in a method and container for collecting, storing and dispensing biological fluids.

Under present conditions there are many occasions to isolate small quantities of fluids, such as milk, blood, vaccine, etc. and hold them for indefinite periods of time before carrying out the end use for which the particular fluid was isolated. Some times this involves shipping of the isolated fluid and making analyses thereof at some central laboratory. In other cases the isolation may be at some central point and the end use of the individual quantities isolated may be at widely separated points. My invention contemplates the provision of a novel container for this purpose and a novel method of isolating the fluid in the container so as to facilitate the handling, transporting, storing and end use of the isolated fluid under a variety of conditions. Also in the case of milk, the tube facilitates the taking of sample, particularly as regards sterile technique.

It is the principal purpose of my invention to provide a novel container for such fluids as those mentioned above which is equipped with the necessary means for which it may be used to receive small quantities of fluid with a minimum of susceptibility of contamination from the exterior, the container being of such a nature that its contents may be extracted with the same degree of freedom from exterior contamination. The container embodying my invention is so constructed as to be free of the usual objections that it is fragile and easily broken. It is also so constructed that filling and emptying thereof is readily accomplished by a simple device.

It is also a purpose of my invention to provide in connection with the container of the character above described, a novel method of taking the fluid into the container and expelling it from the container which is particularly adaptable to the sampling of blood and milk from live animals.

The nature and advantage of my invention will appear more fully from the following description and the accompanying drawings which illustrate a preferred embodiment of the invention. It should be understood, however, that the description and drawings are illustrative only and are not intended to limit the invention except insofar as it is limited by the claims.

In the drawings:

Figure 1 is a plan view of a container embodying the invention, showing the container before filling;

Figure 2 is a plan view of the container into which the fluid has been drawn;

Figure 3 is a side view of the container shown in Figure 2, but illustrating the container with a different catheter tip;

Figure 4 is a sectional view through the container on the line 4—4 of Figure 2;

Figure 5 is an exterior view of the container showing how it may be sealed in a simple manner by a tab carried thereon;

Figure 6 is a view looking down at Figure 5;

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Figure 7 is a view like Figure 6, illustrating another way of sealing the container;

Figure 8 is an enlarged sectional view of the catheter tip of Figure 3;

Figure 9 is an enlarged sectional view of the catheter tip of Figures 1 and 2;

Figure 10 is a plan view of a container modified in certain respects to adapt it particularly for isolation of more than one ingredient of a biological fluid;

Figure 11 is a sectional view taken on the line 11—11 of Figure 10;

Figures 12, 13 and 14 are sectional views taken on the lines 12—12, 13—13 and 14—14 of Figure 11;

Figure 15 is a sectional view similar to Figure 11, showing the container as it appears before segregation of one compartment within it from another;

Figure 16 is a fragmentary sectional view illustrating the extraction of the contents of the container with an ordinary hypodermic needle.

Figure 17 is a longitudinal sectional view through a container with a device for filling and emptying it; and

Figure 18 is a view like Figure 17, showing a modification.

As an example of one of the needs for containers for isolating fluids which must be tested, it is the practice now in some states to carry on an elaborate method of testing the milk from cows in order to protect the public against possible transmission of diseases. To carry out this testing, samples of milk may be taken from the four quarters of the cow's udder. These samples are kept separate and properly identified so that upon testing in a fully equipped laboratory, any evidence of disease can be traced to the particular source. Some times this testing is done for the purpose of discovering the presence of such diseases as mastitis. The collection of samples in this fashion and their transportation to the central testing laboratory has involved a tremendous amount of work because the samples have heretofore been collected in individual glass test tubes or bottles (usually bottles) which must be stored and transported and, after emptying them, washed, sterilized, and used over again.

Another example of wide spread need for sample isolation is in the taking of blood tests of animals or human beings and the analyses of the samples of blood collected. In this field as well as in the milk testing field, the practice is to take the individual samples at various places and to carry out the analyses at a central point. Naturally the value of the analyses will depend to a great degree upon the freedom of the samples from exterior contamination or from deterioration between the point of collection and the point of analysis. One of the particular characteristics of my invention is the simplicity by which the exterior contamination is avoided.

According to my invention I prefer to provide a container 10 which is made up of a thin flexible plastic composition. It is desirable but not necessary that the composition be transparent. The particular nature of the composition may, of course, be varied, because there are many of the synthetic resins which will serve for this purpose. A polyethylene resin has been found satisfactory for the particular type of container used in the milk testing field. The container 10 is preferably a flattened tubular body having one end 11 sealed off. The other end of the container is sealed to a tube 12 at 13 so that the tube 12 forms a catheter. The container 10 may have the catheter 12 molded directly with it or inserted. The catheter is protected by a cap 14. The cap 14 may be provided with a center needle 15 (see Figure 9) to insure that the catheter duct is open. The cap has space 16 for a lubricant. The needle 15 keeps lubricant from entering the duct of the catheter 12 when the cap is withdrawn. In the extraction of milk samples I find I can also

arrange the catheter with a side opening in the manner indicated in Figures 3 and 8 of the drawings, wherein the tip 17 of the catheter is solid and the central passage of the catheter has an end opening 18 at the side of the tip 17 as illustrated. The catheter tube 12 is sufficiently flexible that it may be folded over as indicated in Figures 5, 6 and 7 of the drawings and sealed by a clamping tab 19 that is secured to the container 10 and apertured at 20. The catheter can also be folded and secured by any suitable means such as the rubber band 21, shown in Figure 7. The manner of filling and emptying the container 10 is described below. The normal shape of the container is flat or collapsed as it is shown in Figure 1.

In the taking of milk samples, the tube 10 in its flattened air free condition, is applied to the teat of the particular quarter of the cow's udder to be tested by inserting the catheter 14 into the teat. The tube may normally fill without assistance, but if the milk does not flow into the ampule from the teat, the technician would ordinarily simply squeeze the teat with his hand, as in normal milking, to cause increase in flow. When sufficient milk for the purpose of the test has been obtained, the catheter 14 is then withdrawn and folded over upon itself and secured by passing it through the tab 19. At the testing point it is only necessary to clip off the catheter 14 or the other end of the container 10 to obtain the contents without exterior contamination.

The containers 10, when used for sampling of milk in the manner just described, preferably are put up in sets of four. They can also be furnished singly. It often happens that only one teat is diseased. All four containers of a particular set are stamped with a common identification number or symbol and the individual containers in the set are suitably marked to identify the particular quarter of the udder to which it applies. Preferably each container 10 carries two removable strips 22 and 23 at the end opposite the catheter. These strips each carry the same identification symbol as the container 10. They are also imprinted to show various teats, the particular teat tested, and they carry a place for the tester's name. When the laboratory findings are made these strips are notched to indicate the findings. One strip can be returned to the tester and the other one filed for permanent record, thus avoiding the work and possible mistakes in transferring data to cards. With this arrangement it is also desirable for the tester to keep a book record showing the identification of the particular cow tested and identifying the test by the identification on the containers. The filled containers being flexible, may be readily handled and stored in groups for shipping either with or without refrigeration. They may be washed on the exterior without contamination of the sample content. The present day insulating containers can be packed with these containers and a certain amount of refrigerant so as to keep the samples in proper condition until they reach the central laboratory.

Referring now to Figures 10 to 16 inclusive, this particular modification of the container is adapted especially for the handling of biological fluids and the like where it is particularly desirable to maintain a separation between a plurality of materials which are to be used together. For example, it is now a practice to dehydrate a vaccine on the interior of a container so that when the vaccine is to be used, water or other fluid may be added to reconstitute the vaccine to a liquid suspension or solution for use. The container 30 in Figure 10 is particularly adaptable to this use. This container has the two enlarged portions 31 and 32 separated by a restriction 33. In filling the container 30 the vaccine is placed in the portion 31 thereof and sealed, the seal being made at 33. The container portion 32 can then be filled with water or other fluid in the right amount and sealed off at 35 from the tubular inlet portion 34 which is also sealed at 36. The seal 33 is weak so

that by squeezing the fluid filled portion 32 the seal can be broken.

In use the seal 33 can be broken by applying pressure on the portion 32 so as to mix the fluid and the vaccine in the chamber 31. The vaccine may be withdrawn by means of the needle 37 shown in Figure 16 of the drawings or may be poured out through the restriction 34 as needed.

Referring now to Figure 17, this figure illustrates a simple effective means to effect the emptying or filling of a container. The container 10' is modified to the extent that its catheter equipped end is enlarged to form a plug or stopper 24 slightly larger than the container 10' in cross section. A substantially rigid transparent tubular shell 25, made of a tough transparent plastic composition, is provided with a tapered mouth 26 to receive the stopper 24. It is also threaded on the exterior to receive a cap 27. The other end of the shell 25 has a collapsible resilient syringe bulb 28 secured thereto by a nipple 29. When the bulb 28 wears out it can be replaced readily. When a container 10' is inserted in the shell 25 and sealed by the stopper 24, it can be subjected to sub-atmospheric or super-atmospheric pressure by manipulation of the bulb 28, to aid in filling or expelling the contents of the container 10'.

Figure 18 illustrates a modified shell 25' which embodies a tapered mouth 26' but which is simplified by leaving off the threaded cap and by making the bulb part 28' integral with the main shell 25'. For most purposes this simplified form of shell is fully satisfactory. With either form of shell the container 10' may have a bendable catheter or a rigid one and may have more than one compartment as in Figure 10.

It is believed that the nature and advantages of my invention appear clearly from the foregoing description.

Having thus described my invention, I claim:

1. Means for collecting and storing fluid samples and the like comprising an elongated flexible tube having sealed ends and having a catheter integrally joined to one end of the tube in communication with the interior of said tube for filling or emptying the tube, a tubular shell having an end opening receiving said container, the container having an enlarged plug at the base of the catheter and the end opening of the shell having a seat for said plug, said shell having a collapsible air bulb joined thereto whereby to apply super-atmospheric or sub-atmospheric pressure to the exterior of a container sealed in said shell by the plug and seat.

2. Means for collecting and storing fluid samples and the like comprising an elongated flexible tube having sealed ends and having a catheter integrally joined to one end of the tube in communication with the interior of said tube for filling or emptying the tube, said tube having strips projecting from the end opposite the catheter for recording purposes, a tubular shell having an end opening receiving said container, the container having an enlarged plug at the base of the catheter and the end opening of the shell having a seat for said plug, said shell having a collapsible air bulb joined thereto whereby to apply super-atmospheric or sub-atmospheric pressure to the exterior of a container sealed in said shell by the plug and seat.

3. A container for collecting and storing fluid samples and the like comprising a pair of flexible strips sealed together at their side edges and at one end edge and at a point spaced inwardly from the other end edge to form a container, the portions of the strips between said other end edge and said inwardly spaced seal forming identification strips for recording purposes, and an elongated bendable tubular catheter joined to the end of the container opposite the identification strips, said catheter being in communication with the interior of the container.

4. A container for collecting and storing fluid samples and the like comprising a pair of flexible strips positioned

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one against the other with their edges aligned, at least one of said strips having a transverse score line thereon weakening the strip whereby to permit an end portion to be torn therefrom, said strips being sealed together along their side edges and along one end edge and having a transverse seal extending thereacross between the sealed end edge and said score line whereby to provide a sealed pocket therebetween, the portions of the strips between said last named seal and the ends opposite the sealed ends providing identification tabs for recording purposes, and a bendable tubular catheter joined to the sealed ends of said strips and being in communication with the sealed pocket between the strips.

5. Means for collecting and storing fluid samples and the like comprising an elongated flexible tube having sealed ends and having a catheter integrally jointed to one end of the tube in communication with the interior of said tube for filling or emptying the tube, the catheter having its interior passage terminating at the side of the catheter in juxtaposition to the catheter tip, a tubular

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shell having an end opening receiving said container, the container having an enlarged plug at the base of the catheter and the end opening of the shell having a seat for said plug, said shell having a collapsible air bulb joined thereto whereby to apply super-atmospheric or sub-atmospheric pressure to the exterior of a container sealed in said shell by the plug and seat.

References Cited in the file of this patent

UNITED STATES PATENTS

2,222,267	Schnabel	Nov. 19, 1940
2,529,836	Darlington	Nov. 14, 1950
2,655,152	Turner et al.	Oct. 13, 1953
2,680,440	Fox	June 8, 1954
2,683,456	Pierson	July 13, 1954
2,687,130	Cohen	Aug. 24, 1954
2,693,189	Ryan	Nov. 2, 1954
2,704,076	Larson	Mar. 15, 1955
2,731,053	Lockhardt	Jan. 17, 1956
2,757,669	Gewecke et al.	Aug. 7, 1956