

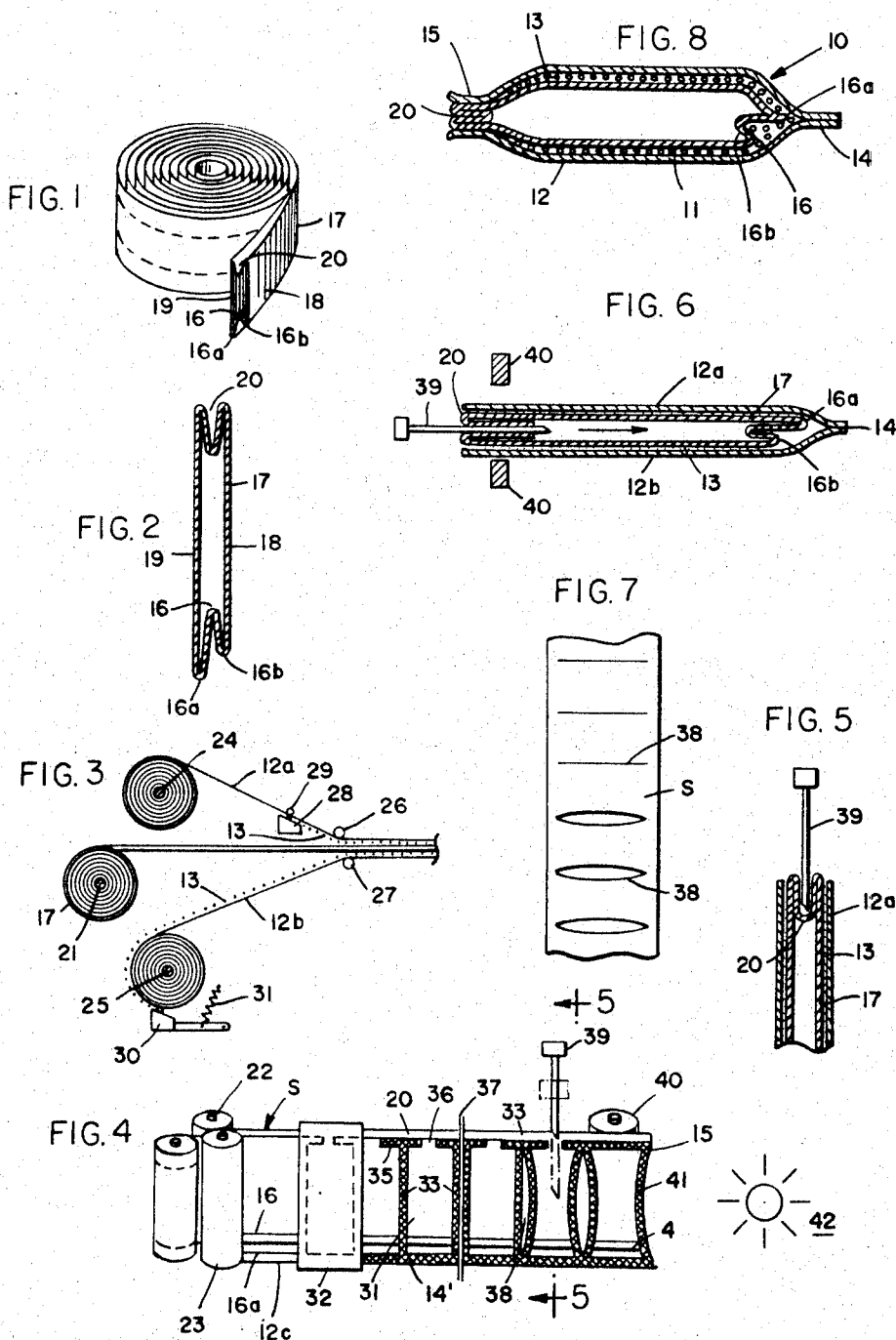
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METHOD OF FORMING FLEXIBLE AMPOULES

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METHOD OF FORMING FLEXIBLE AMPOULES

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8 Claims

ABSTRACT OF THE DISCLOSURE

A method of forming flexible ampoules. A longitudinally folded web equipped with longitudinal gussets along the upper and lower edges thereof is longitudinally advanced toward a filling spout. A pair of films is longitudinally advanced so that the web is interposed between the films. The surface of the films adjacent the web may be coated with an antioxidant or an antiseptic. The films and web are transversely sealed at spaced longitudinal points, and the lower edges of the film are longitudinally sealed below the lower web gusset. The sides of the upper web gusset pass opposite sides of the filling spout, which reciprocates from a first position to a filling position, thereby perforating the web. The spout reciprocates once between adjacent transverse seals. Thereafter, the upper edges of the web and films are longitudinally sealed.

Related application

This application is a continuation-in-part of my prior co-pending application entitled Liquid Container and Method, Ser. No. 405,551, filed Oct. 21, 1964, now abandoned.

Background of the invention

This invention relates to a container, and finds particular utility in medicinal use. It is known that individual doses of medication to be injected are divided into small glass ampoules. However, handling, washing, filling and labeling of the ampoules are considered complicated and expensive operations. There is also a need for a container in which small quantities of medicine in powdered form, such as antibiotics, can be stored, diluted, and withdrawn without exposing the solution to air. Rubber-capped antibiotic flasks now in use have proved to be unsatisfactory for this use.

Summary of the invention

The inventive method provides a container which may be filled with a measured amount of medicament. The thin material of the ampoule is readily pierced by a needle to aspirate the medicament, and the ampoule is provided with a gusset to facilitate insertion of the needle. Before insertion of the needle the medicament is protected by an outer covering which may be coated with an antioxidant or an antiseptic. After the contents of the ampoule are aspirated, the relatively inexpensive ampoule may be disposed of.

Description of the drawing

FIG. 1 is a perspective view of a coil or roll of tubing which is employed in the inventive method;

FIG. 2 is a sectional view of the tubing of FIG. 1;

FIG. 3 is a schematic view showing some of the steps of forming the ampoules;

FIG. 4 is a perspective view, partially in schematic form, showing further steps in forming the ampoules;

FIG. 5 is a fragmentary sectional view taken along the line 5—5 of FIG. 4;

FIG. 6 is a sectional view similar to FIG. 5 showing the filling spout in the filling position;

FIG. 7 is a schematic view of the tubing of FIG. 1 in one step of the inventive method; and

FIG. 8 is a section view of a completed ampoule.

Description of the preferred embodiment

Referring to FIG. 8, the numeral 10 designates generally a flexible ampoule formed according to the inventive method. The ampoule 10 includes an inner liquid-filled packet 11, which is encased in an outer covering 12. An oily protective layer 13 of antioxidant or antiseptic may be dispersed between the packet 11 and the outer covering 12. An antioxidant may be used if it is desired to improve the oxygen and water vapor barrier characteristics of the ampoule, and an antiseptic may be used if it is desired to improve its sterile characteristics. Many oil and grease soluble antioxidants are suitable, such as propylgallate or 5-acenaphthenol. Similarly, many oil and grease soluble antiseptics may be used. Derivatives of the phenol group such as hexilresorcin have been found particularly suitable.

One end of the ampoule is formed by sealing the outer covering 12 as at 14, and the other end of the ampoule is formed by sealing the outer covering and one end of the packet 11 as at 15. The packet 11 is seen to be provided with a gusset or fold as at 16 at one end thereof, and the gusset is advantageously provided by sides of unequal height such as long side 16a and short side 16b.

When it is desired to remove the contents of the ampoule, the nurse or physician tears the sealed edge 14 of the outer covering to expose the gusset 16 of the inner packet. A hypodermic syringe is then inserted into the gusset to perforate the packet 11 so that the contents may be withdrawn. The unequal sides 16a and 16b of the gusset facilitate insertion of the hypodermic syringe into the gusset.

For the purpose of developing the ampoule 10, a continuous web or length of tubing such as that designated generally by the number 17 of FIG. 1 is employed. It will be seen that the tubing 17 provides confronting faces 18 and 19 interconnected along the bottom edge by gusset 16 and along the upper edge by gusset 20. Both of the gussets may be provided by folding the tubing along spaced parallel lines. The sides of gusset 16 are seen to be of unequal height—side 16a being slightly longer than side 16b.

The actual sequence of operations in forming and filling the ampoules can be seen by reference to FIGS. 3 and 4. The plastic tubing 17, which is advantageously thermoplastic in nature, such as polyethylene, is unrolled from a suitable unwind stand 21 with gusset 20 disposed uppermost. In other words, the axis of the roll of tubing is disposed vertically. Means for unwinding the roll of tubing 17 and advancing it longitudinally may be provided in the form of draw rolls 22 and 23 (FIG. 4).

A first outer film 12a is unrolled from unwind stand 24, and a second outer film 12b is unrolled from unwind stand 25. Films 12a and 12b are also advanced by draw rolls 22 and 23, and are positioned by idler rollers 26 and 27 adjacent the plastic tubing 17. The films may be made of a transparent, non-elastic material which is relatively impervious to oxygen and moisture, such as ethyl vinyl acetate, polyvinylidene chloride (saran), or the like. It is desirable that at least one of the films be transparent in order to permit visual observation of the contents of the ampoule, but one of the films may be metallic foil or other opaque material which provides better protection for the ampoule contents.

Enroute to the idler rollers the sides of the films 12a and 12b are advantageously coated with a layer 13 of

protective material. The protective material may be either an antioxidant if it is desired to improve the oxygen and water vapor barrier characteristics of the ampoule, or it may be an antiseptic if it is desired to improve the sterile characteristics of the ampoule. The films may be coated by any suitable means, and FIG. 3 illustrates two alternative means. Film 12a is drawn through reservoir 28 under the urging of roller 29, and film 12b is covered by applicator 30, which is urged against the film by spring 31. The layer of protective material is not necessary for all types of medicine, however.

Referring now to FIG. 4, the tubing 17 and the films 12a and 12b form strip S which is drawn through draw rollers 22 and 23 and advanced toward sealing element 32. The width of the films 12a and 12b is such that their bottom edges 12c extend below the bottom of the longer side 16a of gusset 16 of the web, and the top edge of the films terminate at about the top of the web. Sealing element 32 heat seals the lower edges of the films 12a and 12b below the bottom of gusset side 16a to form bottom seal 14'. Sealing element 32 also transversely seals the films 12a and 12b and the plastic tubing at spaced longitudinal points as at 33 to form discrete ampoules or containers 34. Each ampoule 34 is also sealed longitudinally adjacent the top thereof as at 35 by sealing element 32. Longitudinal seals 35 are positioned below the upper edge of the strip S and extend only part way across the mouth of each packet 34 to provide an unsealed portion 36. The transverse seals 33 also terminate below the upper edge of the strip S so that at least a portion of upper gusset 20 of the plastic tubing remains unsealed.

The discrete ampoules 34 are advanced toward transverse cutter 37 which cuts the strip S approximately centrally of each transverse seal 23 between the upper and lower longitudinal seals 35 and 14' to form slits 38 between adjacent ampoules 34. The transverse cutter 37 bisects the transverse seals 33 so as to utilize one half of the seal as the seal for the trailing edge of a first container and the leading edge of a subsequent container.

The strip S is then advanced toward a filling spout 39 which is positioned within gusset 20 of the web. The sides of gusset 20 pass opposite sides of the filling spout 39, and the web is guided thereby. When an opening 36 between adjacent upper longitudinal seals 35 is positioned below the filling spout, the filling spout reciprocates from the guide position shown in solid in FIG. 4 to the filling position shown in dotted outline. As the filling spout is lowered through the gusset it pierces the web and enters the ampoule 34. When the desired amount of medicament has been injected into the ampoule, the filling spout is withdrawn to the guide position, and the opening 36 and the hole made by the filling spout is sealed by a sealing element 40. As each ampoule 34 is filled with medicament, the pressure causes the sides of the packet to assume an arched configuration as at 41. Rather than utilizing a web of plastic tubing that has a closed upper edge provided by gussets 20, the upper edge may be open to pass the filling spout and thereafter sealed by sealing element 40.

It will be appreciated that a frame (not shown) may be provided for supporting the various means described in connection with the operation pictured in FIGS. 3 and 4. The strip S may either be advanced intermittently to permit the various sealing and filling operations to be performed while the strip is stationary, or the strip may be advanced continuously and the sealing and filling means may move on the frame. If desired, the strip may be equipped with signalling means for activating the various means by way of a photocell as described in my prior application, Ser. No. 405,551, filed Oct. 21, 1964. During the time that the strip is in the apparatus it may advantageously be subjected to ultra violet or gamma rays from source 42.

As the strip S is advanced beyond sealing element 40, the connections between the individual ampoules 34 may

be severed to provide single ampoules, or a plurality of ampoules may be maintained in the joined condition and shipped as a unit. When an individual ampoule is to be used, it may be torn from the strip.

When the contents of the ampoule are desired to be withdrawn, the nurse or physician tears the sealed end 14 (FIG. 8) to expose the gusset 16. A hypodermic syringe may then be inserted into gusset 16 to perforate the inner packet 11. If the protective layer 13 is an antiseptic, the needle is lubricated with the antiseptic when it passes through the gusset, thereby preserving the antiseptic quality of the medicament.

The filling spout 39 may inject either liquid or powdered medicament into the ampoule. A powdered medicament can be diluted in the ampoule by injection of a suitable solvent by a syringe, and when the solution is ready, it may be aspirated by the syringe without the introduction of air.

While in the foregoing specification a detailed description of an embodiment of the invention was set down for the purpose of explanation, many variations of the details herein given may be made by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In a method of forming flexible ampoules, the steps of longitudinally advancing a longitudinally folded web, said web being provided with a longitudinal gusset along the lower edge thereof, advancing a pair of films in covering relationship with the sides of said web, transversely sealing said films and said web at longitudinally spaced points therealong, the transverse seals extending only part way across the width of said web to terminate short of the upper edge of the web, longitudinally sealing the lower edges of said films below the lower edge of said web, advancing said web and said films so that confronting faces of said folded web pass opposite sides of a filling spout, said spout being interposed between said confronting faces, and thereafter longitudinally sealing said films and said web adjacent the upper edge of said web to develop a plurality of liquid-tight containers defined by said web.

2. The method of claim 1 including the step of transversely cutting said web and said film generally centrally of said transverse seals intermediate the upper and lower edges.

3. The method of claim 1 in which said web is provided with a second longitudinal gusset along the upper edge thereof, the sides of said second gusset providing said confronting faces, said spout reciprocating from a guide position above the bottom of the second gusset to a filling position below the second gusset bottom, said web being perforated by said spout in the filling position.

4. The method of claim 1 in which the surfaces of said films adjacent said web are coated with an antioxidant.

5. The method of claim 1 in which the surfaces of said films adjacent said web are coated with an antiseptic.

6. In a method of forming flexible ampoules, the steps of longitudinally advancing a longitudinally folded web, said web being provided with a first longitudinal gusset along the lower edge thereof and a second longitudinal gusset along the upper edge thereof, advancing a pair of films in covering relationship with the sides of said web, transversely sealing said films and said web at longitudinally spaced points therealong, the transverse seals extending only part way across the width of said web to terminate short of the upper edge of the web, longitudinally sealing the lower edges of said films below the lower edge of said web, transversely cutting said web and said films generally centrally of said transverse seals intermediate the web upper and lower edges, advancing said web and said films toward a filling spout, said spout being positioned within said second gusset, moving said spout

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downwardly to perforate said web between said transverse seals, introducing a medicament through said filling spout, withdrawing said spout from web, and thereafter longitudinally sealing said films and said web adjacent the upper edge of said web to develop a plurality of liquid-tight containers defined by said web.

7. The method of claim 6 in which the surfaces of said films adjacent said web are coated with an antioxidant.

8. The method of claim 6 in which the surfaces of said film adjacent said web are coated with an antiseptic.

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