

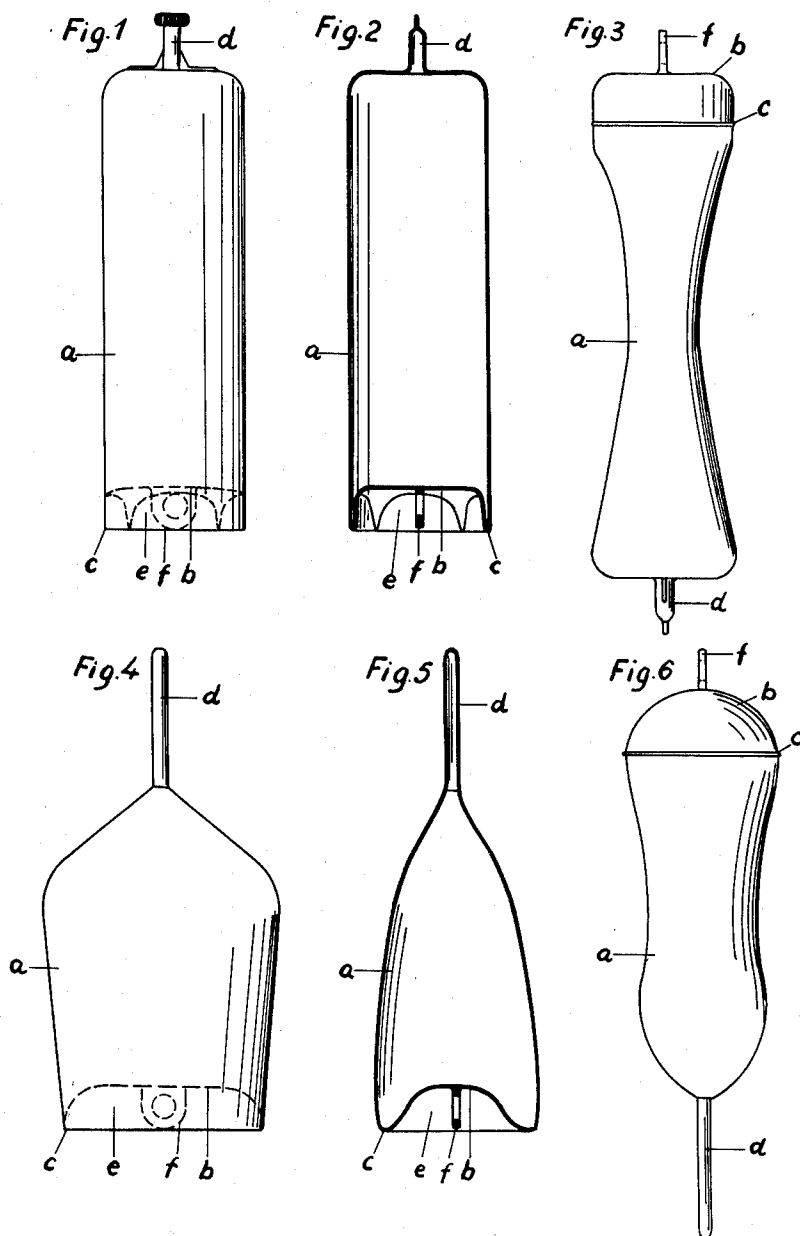
March 12, 1963

S. TAUSCHINSKI ETAL
CONTAINERS FOR MEDICINAL LIQUIDS

3,081,002

Filed Aug. 13, 1958

4 Sheets-Sheet 1



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Fig. 7

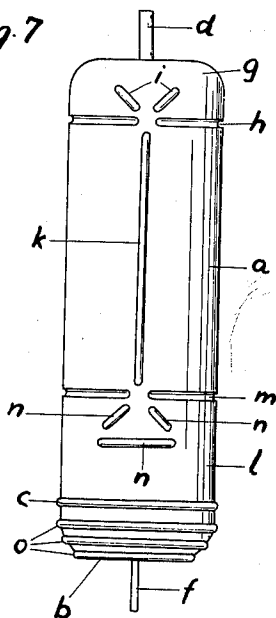


Fig. 8

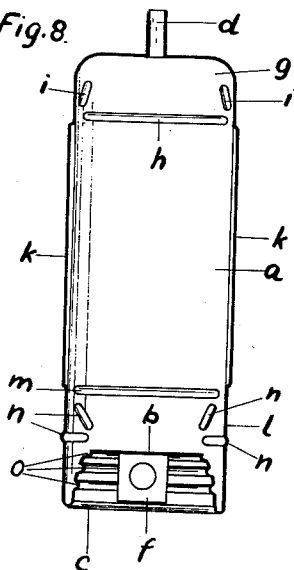
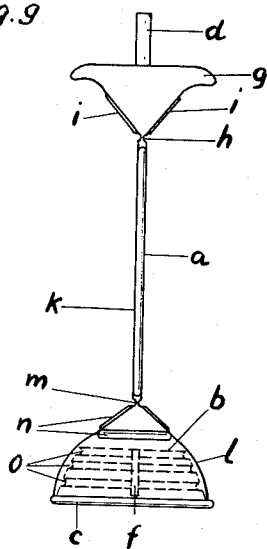


Fig. 9



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Fig. 10

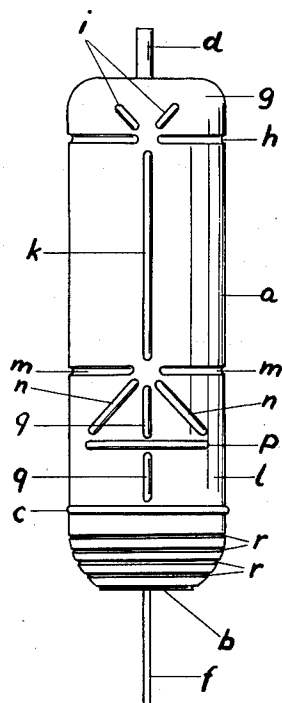
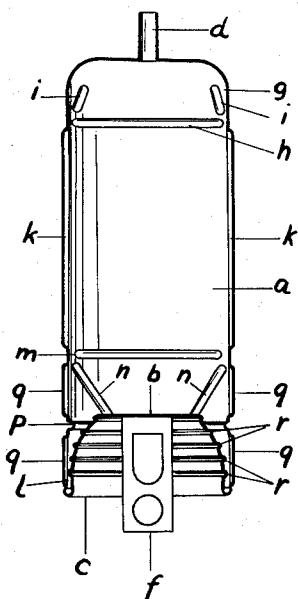


Fig. 11



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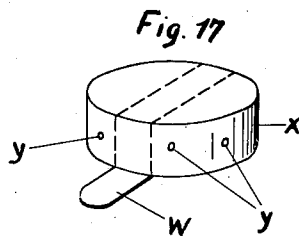
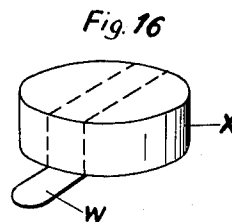
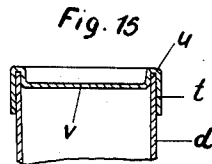
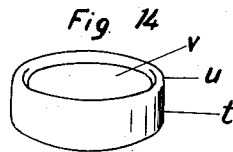
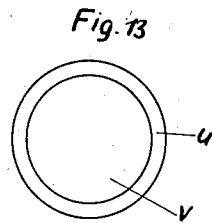
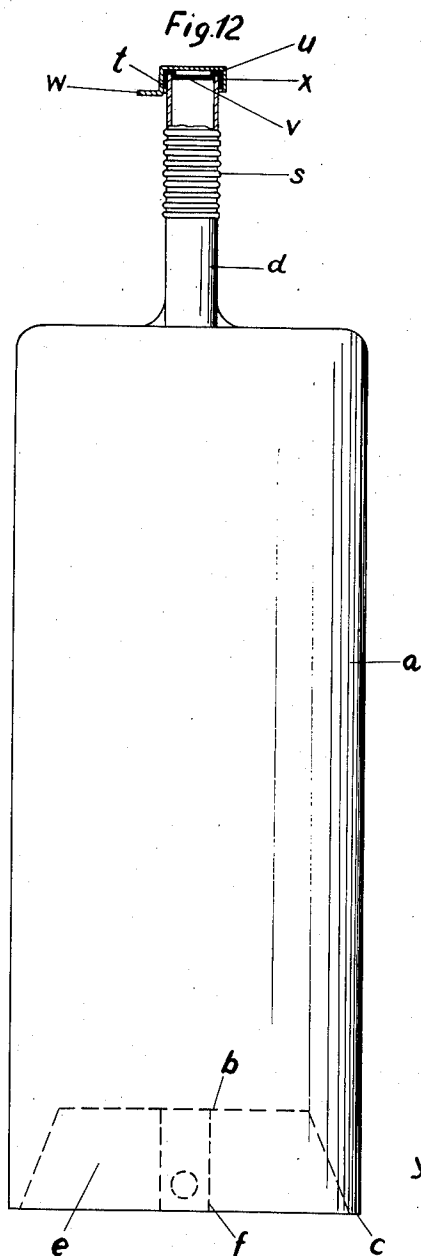
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3,081,002

CONTAINERS FOR MEDICINAL LIQUIDS

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Filed Aug. 13, 1958, Ser. No. 754,840

Claims priority, application Germany Sept. 24, 1957

4 Claims. (Cl. 222-105)

The invention relates to containers for receiving and dispensing medicinal liquids, especially infusion and transfusion solutions. The containers are made from pliable material, preferably synthetic substances such as polyethylene.

According to the invention, the end of the container provided with an eye can be pushed in to form a hollow, the extent to which it can be pushed in being limited by a rib (bead) or channel formed on or in the wall of the container. By pushing in the end of the container, an edge is formed on the wall of the container which enables the container to be stood up like a bottle. In addition the invention presents the advantage that by pulling out the pushed in portion of the container, additional volume can be obtained which enables other medicaments to be introduced into the filled container.

It has been found that it is advisable to make the compressible bottom of the container slightly smaller in cross-section than the cross-section of the container itself, and to divide it into several rings by concentrically arranged ribs or channels. This measure facilitates the pushing in of the bottom of the container and results in that the container, even after its bottom has been pushed in, has a circumferential surface free from folds.

According to another feature of the invention, a closing device is provided which enables the container to be connected up with an infusion apparatus without auxiliary means.

Several embodiments of the invention are illustrated diagrammatically by way of example in the accompanying drawings, in which

FIGS. 1 to 6 show two forms of construction of the container according to the invention,

FIG. 1 being an elevation of a cylindrical container,

FIG. 2 a longitudinal section of FIG. 1, and

FIG. 3 an elevation showing the container in compressed state with bulged end in position for use;

FIG. 4 is an elevation of a flat container,

FIG. 5 a longitudinal section of FIG. 4, and

FIG. 6 an elevation showing the flat container in compressed state with bulged end in position for use;

FIGS. 7 to 11 show two further forms of construction of the container according to the invention,

FIG. 7 being an elevation of a container provided with ribs and channels,

FIG. 8 a longitudinal section of FIG. 7, and

FIG. 9 an elevation of the container in collapsed state;

FIG. 10 is an elevation of a container with lengthened lower part, and

FIG. 11 a longitudinal section of FIG. 10 with the bottom pushed in;

FIGS. 12 to 17 show a closing device for the container,

FIG. 12 being an elevation of a container fitted with such a closing device,

FIG. 13 a plan view of a profiled disc forming part of the closing device,

FIG. 14 a perspective view of FIG. 13,

FIG. 15 a sectional view showing the disc in position on the mouth of the tubular connection piece of the container,

FIG. 16 a perspective view of a cap forming part of the closing device, and

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FIG. 17 is a perspective view of a closing cap of modified construction.

In the embodiments of the invention illustrated in FIGURES 1 to 6 the container *a* pressed in at one end has an inwardly bulged bottom surface or wall *b* forming a hollow cavity, which surface is off-set in relation to the wall of the container by means of a lip (bead) *c*. The container in this state is fully filled. It is provided at its other end with a tubular connection piece *d* made in one piece with the container itself. In the middle of the hollow cavity *e* a projecting member having an eye *f* is fixed on the bottom surface or wall *b* of the container. The container can be stood upright for storage. As previously noted, FIGURES 1, 2 and 3 illustrate a cylindrical container, while FIGURES 4, 5 and 6 show a flat container.

When taking into use, the upright container is opened by cutting off or opening the tubular connection piece *d*. The infusion apparatus is connected with tight fit to the opened connection piece in known manner. The pressed in end of the container is then pulled outwards by gripping the eye *f*. When in use, the container is hung up by means of this eye *f*.

The bulge formed by the previously pressed in end of the container gives the container additional volume which enables other medicaments to be introduced (injected).

In the examples illustrated in FIGS. 7 to 11, the filled container *a* is provided at the top with a tubular connection piece *d* which is located on the upper part *g* of the container. Adjoining the container part *g* a transverse channel *h* is formed in the wall of the container. Ribs *i* are also provided in the part *g* and arranged as shown in FIG. 7. In the middle portion of the container *a* two diametrically opposite longitudinal ribs *k* are formed on the wall of the container. The lower part *l* of the container is off-set by means of a transverse channel *m* in the container wall and provided with ribs *n* arranged as shown in FIG. 7. The bottom *b* of the container can be pressed in or inwardly inverted and carries on its outer side an eye *f* serving as handle.

The cross-section of the bottom *b* is smaller than the cross-section of the container proper. At the lower end of the container part *l* the container wall is divided into rings towards the bottom *b* by concentrically arranged beads *c, o* (FIG. 7). When the bottom *b* is pressed in, the beads *o* are located one above the other in reversed order. The bead *c* forms the edge on which the container can stand (FIG. 8).

The container intended for accommodating infusion solutions, is, as a whole, constructed so that it complies with the requirements laid down for storing such solutions in glass bottles and is suitable both for dispensing the contents and also for receiving additional medicinal solutions. For the latter purpose the bottom of the container, when the container is filled, is inwardly inverted and can be bulged out by exerting pressure on the wall of the container. As a result additional volume is produced which enables other medicaments to be added to the solution already in the container.

The pressing out of the bottom of the container is regulated by the concentric beads *o* in such a manner that the wall is turned inside out in outward direction successively from ring to ring.

The channels *h, m* and ribs *k, i, n* formed in or on the container wall enable the container to collapse almost completely when removing the contents, because the container wall folds up at the places predetermined by the arrangement of the ribs and channels (FIG. 9).

In the form of construction illustrated in side elevation in FIG. 10 and in longitudinal section in FIG. 11, the lower part *l* of the container is somewhat lengthened, the transverse ribs *n* are replaced by grooves *p* and the

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longitudinal ribs *k* are continued in the container part *l* as elements *q*. The channels *r* are inwardly directed (FIG. 10) so that, when the bottom *b* is pressed in, they appear as outer edges (FIG. 11). In this construction the invention of the bottom of the container is facilitated and the container folds up better.

In FIGS. 12 to 17 a closing device for the containers according to the invention is illustrated and also constitutes part of the invention. FIG. 12 shows in side elevation a container equipped with such a closing device.

The container *a* made from polyethylene, polyvinylchloride or some other synthetic substance and can be stood on its pressed-in bottom, has a tubular connection piece *d* which is knurled at *s* to facilitate handling when inserting the infusion apparatus to be used. The closing device is formed by a profiled disc made from the same material as the container and its connection piece, and a metal cap made, for example from aluminium.

The profiled disc *t* has a hollow beaded edge *u* and a lower-lying inner surface *v* which constitutes the pierceable diaphragm of the closing device. This disc is slipped on to the edge of the mouth of the connection piece *d*. Thus the profiled disc fitting tightly, embraces the upper end of the connection piece *d*, the annular groove formed by the beaded edge *u* in the body of the disc receives the edge of the mouth of the connection piece *d* and the surface *v* of the disc enters the mouth of the connection piece *d* (FIG. 15).

The cap *x* made from soft metal (aluminium) and provided with a pull-off tab *w* is placed on the beaded edge *u* of the disc *t* and heated according to a known process.

Under the action of the heat, the profiled disc *t* or rather its beaded edge *u* is, on the one hand, welded to the edge of the mouth of the connection piece *d* and, on the other hand, rigidly connected with the cap without the surface *v* of the disc undergoing any change whatever or being in any way affected. In this manner a bacteria-proof converging of the surface *v* is produced.

After the sealing of the container, sterilization is carried out under heat. Germs can then no longer get into the closing device and particularly not to the surface *v* thereof. When taking the vessel into use, the metal cap *x* is removed with the aid of the pull-off tab *w* and the exposed surface *v* of the disc *t* pierced by the puncturing pin of the infusion apparatus.

In the form of construction of the closing device illustrated in FIG. 17, small holes *y* are provided in the circumferential surface of the cap *x*, through which holes the plastic, becoming soft during the welding of the profiled disc *t* on to the connection piece *d*, can pass so that, on cooling, the metal cap has a particularly firm hold on the profiled disc.

We claim:

1. A container for medicinal liquids formed of plastic material and comprising a tubular wall and two end wall portions integral with said tubular wall, a tubular connection member adapted to serve as an outlet for said container, said connection member projecting outwardly from one of said two end wall portions and including closure means therefor, the other of said two end wall portions including a bottom wall of lesser diameter than said tubular wall having an eye member extending outwardly therefrom, said other of said two end wall portions further including a collapsible portion formed therein joining said tubular wall and said bottom wall, said collapsible portion including means for facilitating the collapse of said portion, said means comprising a series of coaxial circular bead members, said bead members forming therebetween a series of coaxial rings having different diameters, said series being formed by a progressive arrangement of said circular bead members in accordance with

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the size of their diameters axially of said container from said tubular wall to said bottom wall, one of said bead members being disposed at the junction of said tubular wall and said other of said two end wall portions, said collapsible portion having a portion of lesser diameter than the diameter of said tubular wall, said bottom wall and said collapsible portion being so constructed and arranged as to be received within said tubular wall upon the occurrence of pressure exerted upon said bottom wall through said eye members, and said one of said bead members forming a bottom edge for said container on said bottom wall and said collapsible portion are received within said tubular wall, and ribs carried by said tubular wall for determining folding of the container upon emptying thereof.

2. A container for medicinal liquids formed of plastic material and comprising a tubular wall and two end wall portions integral with said tubular wall and formed of the same material as said tubular wall, said tubular wall including means for determining the folding of the container upon the emptying thereof, said means comprising ribs carried by said tubular wall, a tubular connection member adapted to serve as the outlet for said container having a closure means, said tubular member projecting from one of said two end wall portions, the other of said two end wall portions including a bottom wall having thereon a projection, said other of said two end wall portions having formed therein a collapsible portion joining said tubular wall and said bottom wall, said collapsible portion including a portion of lesser diameter than the diameter of said tubular wall and means for facilitating the collapse of said collapsible portion, said means for facilitating the collapse of said portion comprising a series of coaxial circular bead members formed in said other end wall portion, said bead members forming therebetween a series of coaxial rings in said other end wall portion arranged axially of said container between said tubular wall and said bottom wall, said bottom wall being of lesser diameter than the diameter of said tubular wall, said bottom wall and said collapsible portion being received within said tubular wall upon the occurrence of pressure exerted upon said bottom wall through said projection, the edge of said tubular wall formed when the collapsible portion is received within the tubular wall forming a bottom edge for the container when said portion is received within the tubular wall.

3. A container according to claim 2, wherein one of said bead members is disposed at the junction of said tubular wall and said other of said two end wall portions, said one of said bead members forming said bottom edge for said container when said bottom wall and said collapsible portion are received within said tubular wall.

4. A container according to claim 2, wherein said circular bead members are of differing diameters, said series comprising a progressive arrangement of said circular bead members in accordance with the sizes of their diameters arranged axially of said container from the juncture of said tubular wall and said other end wall portion.

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