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 CONTAINER FOR MIXING TWO FIRE EXTINGUISHING
 FLUIDS DURING DISCHARGE
 Filed April 25, 1962

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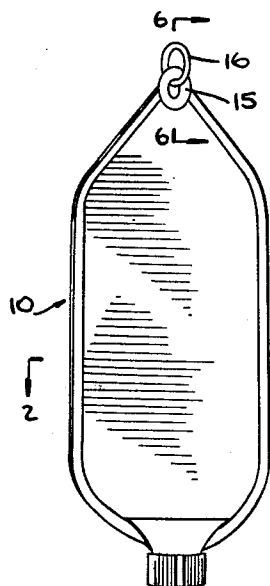


Fig. 3.

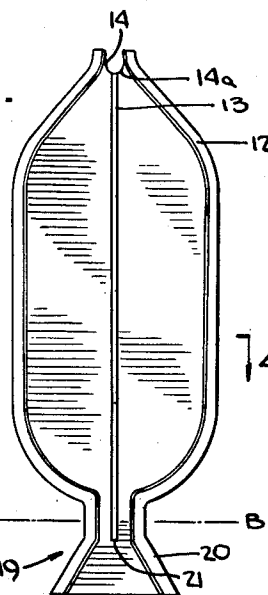
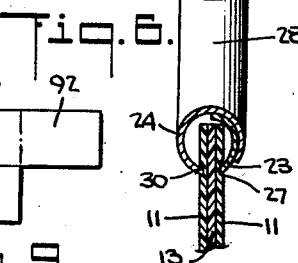
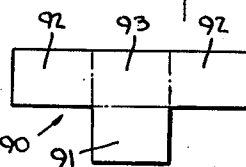
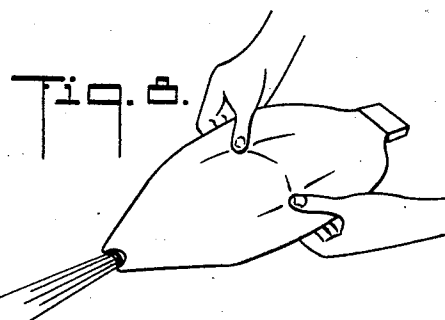
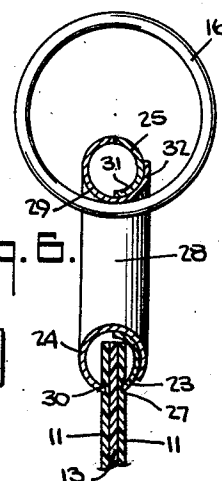
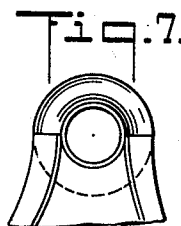
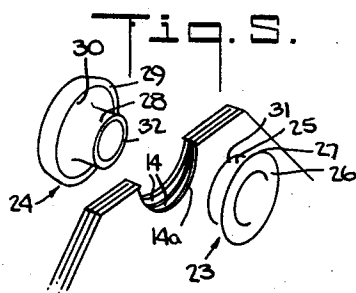
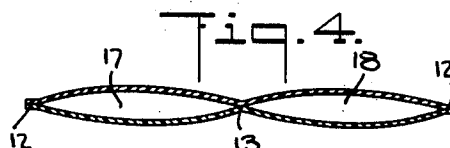
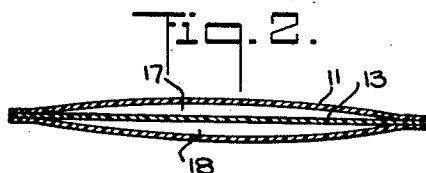


Fig. 1.



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CONTAINER FOR MIXING TWO FIRE EXTINGUISHING FLUIDS DURING DISCHARGE

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4 Claims. (Cl. 169—32)

This invention relates to an improved fluid dispensing package and more particularly to a container and a package for discharging and mixing a number of fluids in the form of a jet under pressure, as for a fire-extinguisher or insecticide.

It is an object of my invention to provide a flexible package for simultaneously discharging and mixing a number of fluids from compartments having adjacent openings.

It is also an object of my invention to provide a flexible package having a number of compartments with adjacent openings, sealed by a single hermetic seal removable from the openings without impairment thereof but capable of supporting the full weight of a package containing fluids.

It is another object of my invention to provide a flexible package as described above, with a hermetic seal at one end, and capable of being filled and subsequently hermetically sealed at the other end.

A further object of my invention is to provide a flexible package for fluids capable of creating a fire-extinguishing foam when discharged and mixed, and to provide a means for directing foam-creating fluids towards a fire.

Still another object is to provide a simple and inexpensive package, with a hermetical but readily removable seal at one end, containing dry substances in separate compartments and then being capable of being filled with water and then sealed at the other end, whereby the dry substances may be mixed with water and stored separately in the package until it is needed.

Still a further object is to provide a package as above in which dry substances, when dissolved in water, can be discharged from the package as a single mixed fluid jet capable of creating a fire-extinguishing foam.

In the accomplishment of these and other objects of my invention, I provide a flexible bag having a number of compartments whose walls converge towards a common opening which serves as a nozzle for fluids discharged from the various compartments. The common opening is sealed by a grommet or other removable clamp which is capable of supporting the weight of a bag filled with fluids but which can be pulled away without impairing the opening. When the grommet is pulled away from the opening, the bag and all its compartments can be squeezed so as to force fluids contained therein out through the common opening. As fluids are forced out, they will be mixed together, and the shape of the opening is designed so that fluids are discharged as a jet or single stream capable of being aimed in any desired direction.

Where the package of my invention is to be used as a fire-extinguisher, the bag is constructed of a material impervious to fire-extinguishing compounds to be stored therein. One of the compartments is filled with a saturated solution of bicarbonate of soda and water together with some licorice or protein stabilizer and the other compartment is filled with a saturated solution of aluminum sulfate and water. When the two solutions are discharged from their respective compartments and mixed as a jet of fluids, a fire-extinguishing foam is created.

In another embodiment, a flexible bag with a number of compartments is constructed as described above, but with an additional filling opening in each compartment at the ends opposite the openings sealed by a grommet. The compartments can then be filled initially only with dry ingredients of a fire-extinguishing foam compound,

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and the ultimate user can add water through the filling openings. The filling openings can then be hermetically sealed, and the entire package can be stored until needed.

It is a feature of my invention that different fluids can be stored separately in a flexible package until needed, and can then be discharged simultaneously through a single opening and mixed in a single fluid jet by applying pressure to the package. It is another feature that a grommet can be used for suspending and at the same time for hermetically sealing a common opening of fluid filled compartments in a package. It is a feature that the grommet can be pulled away from the common opening without impairing the opening. It is still another feature that the grommet may be used to seal one end of a package while filling openings are left at the other end thereof so that dry substances may be transported or stored in the package, fluids may be added later and the filling openings then sealed.

A further feature of my invention is the use of foam-creating liquids which can be stored separately in a single container and then mixed and discharged simultaneously in a jet which can be aimed at a fire so as to smother it with foam.

These and other objects and features of the invention will best be understood and appreciated from the following description of preferred embodiments thereof, selected for purposes of illustration and shown in the accompanying drawings in which:

FIG. 1 is a perspective view of a fluid dispensing package filled with fluids;

FIG. 2 is a sectional view taken along lines 2—2 of FIG. 1;

FIG. 3 is a plan view of a second embodiment of fluid dispensing package in its unfilled state;

FIG. 4 is a sectional view of the second embodiment of FIG. 3 taken along line 4—4 of FIG. 3;

FIG. 5 is a perspective view of the nozzle end of a fluid dispensing package with an exploded view of a grommet;

FIG. 6 is an exploded vertical sectional view of the nozzle end of a fluid dispensing package sealed by a grommet;

FIG. 7 is a plan sectional view of the nozzle end of a fluid dispensing package sealed by a grommet;

FIG. 8 is a view of a fluid dispensing package in use, discharging fluids; and

FIG. 9 is a plan view of a metal clip.

In a preferred embodiment of my invention, shown in FIGURES 1 and 2, a flexible bag indicated generally by the numeral 10 is constructed of three sheets of suitable film or plastic material resistant to the action of the liquid contained therein. For use as a fire extinguisher, standard vinyl, either transparent or colored, may be used.

Side walls 11 are hermetically sealed together and with partition 13, as with an electronic heat sealer, so as to form a seam 12 around the periphery of the bag. Thus the sealed sheets form two distinct compartments 17 and 18 separated by partition 13.

The seams converge at one end of the bag 10 to define adjacent narrow openings 14 (as seen in FIG. 5) for the compartments 17 and 18. In FIG. 1 the openings are sealed shut by a grommet 15, through which a ring 16 passes. And see FIG. 6.

A second embodiment of my invention is illustrated in FIGURES 3 and 4 in which bag 10 is constructed of two sheets of film or plastic material. The partition 13 is transverse rather than parallel to side walls 11.

Side walls 11 are hermetically sealed together around their edges to form a seam 12 and the side walls are hermetically sealed together down a center line thereof to form a partition 13, dividing the bag 10 into two separate

compartments. The seams 12 and partition 13 converge at one end of the bag 10 to define adjacent narrow openings 14 of each separate compartment, the edges of the openings 14 define a concave arcuate rim 14a at the end of the bag 10. The openings 14 may be sealed shut by a grommet 15, and a ring 16 may pass through the grommet 15, as shown in FIG. 1 with respect to the first embodiment.

In either embodiment, side walls 11 preferably form a steep curve with partition 13 near openings 14 when the bag 10 is filled or inflated, so as to assure opening of the compartments and union of the fluids when the grommet is removed and pressure is applied, as explained below.

The invention is adaptable to many uses combining chemicals stored in compartments 17 and 18.

Thus, in use, one compartment of the bag 10 may be filled with a substance A and the other compartment can be filled with a separate substance B.

When used as a fire extinguisher, the two substances A and B may consist of any fire extinguishing substance or preferably may be solutions which form a fire extinguishing foam when discharged and mixed. Foam creating solutions are exemplified by a saturated solution A of bicarbonate of soda and water containing a stabilizing agent and another saturated solution B of aluminum sulfate and water.

The stabilizing agent forms a coating on the foam bubbles and maintains the foam for a period adequate to extinguish the fire. Suggested agents may be any matter high in protein content, such as licorice, peanut shells, fish scales or a hydrolysed protein derived from soy beans. In quality, it is suggested that the protein agent be 15-25% by weight of the bicarbonate of soda. Such an agent has been known to maintain a foam for over 24 hours.

For example, in a one-quart plastic foam extinguisher, 2.25 ounces of aluminum sulphate for filling with one pint of water may be placed in one compartment and 1.48 ounces of bicarbonate of soda and .375 ounce of licorice or other stabilizing agent for filling with one pint of water may be placed in the other compartment.

In either embodiment, the seam 12 may continue about the entire periphery of the bag opposite the opening 14. On the other hand, the seam 12 may be interrupted at the end of the bag 10 opposite the openings 14 and a funnel-shaped projection 19 from the bag 10 may be formed by continuations 20 of the seam 12, as may be seen in FIG. 3. A continuation 21 of the center partition 13, whether parallel or transverse to walls 11, extends into the neck of the funnel-shaped projection 19. The projection 19 has a single opening 22 at the end thereof.

FIGS. 5 through 7 show details of the grommet 15 construction. Each grommet 15 comprises two telescoping parts 23 and 24, as seen in FIG. 5. Part 23 has an outer hollow cylindrical stem or pin 25 and a head 26 at one end of said stem 25 in the form of a radial flange or ring dished to define an inwardly turned marginal clamping edge 27. The other grommet part 24 comprises an inner hollow cylindrical stem or pin 28 adapted to fit snugly into the outer stem 25 and a dished head 29 in the form of a radial flange or ring similar to the flange 26 and similarly provided with an inturned marginal clamping edge 30.

A grommet 15 is applied by telescoping the two parts 23 and 24 and pressing or stamping them together to cause the marginal flange edges 27 and 30 to be sealably clamped on to the bag 10. During this operation, a rim 31 of the outer stem 25 curls radially outward against the inner face of the flange 29 to permit the two flanges 26 and 29 to approach axially towards clamping position and a rim 32 of the inner stem 28 acting as a rivet, is swaged or upset radially outwardly against the outer face of the flange 26 to hold the two grommet parts 23 and 24 permanently together. This operation of fastening the grommet 15 in position is effected by stamping action through the use of a so-called grommets machine, or will occur when the two parts are pounded together.

In applying a grommet 15 to the discharge end of a bag 10, the telescoped grommet parts 23 and 24 are placed centrally with respect to said discharge end with the stem 25 of the grommet part 23 positioned against the arcuate rim 14a of said bag 10 at said discharge end and the two grommet flanges 26 and 29 located on opposite faces of the bag 10 as shown in FIG. 4 in dotted lines. While in this position, the grommet 15 is fastened by stamping action into the state shown in FIG. 6 and clamped onto the bag 10 as already described, to seal the openings 14. In this clamping position the lower sections of the marginal flange edges 27 and 30 are firmly pressed against the side walls 11 of the bag 10 across the openings 14 along an arc 33 bring said walls 11 compressively together and thereby hermetically sealing said opening. The sealing of the discharge end of the bag 10 is continued along the arc defined by the marginal flange edges 27 and 30 and across the seams 12 and partition 13 at said end. Beyond this arc, the marginal flange edges 27 and 30 have no clamping function.

The grommet 15 is firmly retained in sealable closure position indefinitely notwithstanding rough usage during storage or transportation. The grommet 15 is so retained on the discharge end of the bag 10 solely by friction and can be removed by merely pulling said grommet to open up the bag openings 14 without mutilating the bag.

Because of the hollow structure of the grommet stems 25 and 28, the grommet 15 forms an eyelet through which a ring 16 is inserted. The removal of the grommet 15 is effected by the simple operation of pulling on the ring 16.

In FIG. 8, a package according to my invention is shown in use. In the drawing, a grommet 15 has been removed from a bag 10 containing fluids 17 and 18 such as a saturated solution of bicarbonate of soda and water in one compartment together with the aforementioned stabilizing agent and a saturated solution of aluminum sulfate and water in the other compartment. The bag 10 is held in a person's hands so that the openings 14 point in the direction in which fluids are to be directed. Hand pressure is then applied to squeeze the contents of the bag 10 out through the openings 14. Or, the "nozzle" portion of the bag may be held by one hand, and the contents expelled under pressure of the other hand, as if by a nozzle. The shape of the openings 14 shapes the flow of fluids 17 and 18 through them so that a single jet 35 is ejected from the bag 10. If the fluids 17 and 18 are foam-creating substances as described above, a fire smothering foam will be created at not more than a few feet from the openings 14 by the reaction of the two fluids 17 and 18 when mixed and agitated by the formation of the single jet 35.

As can be seen in FIG. 8, the shape of the rim 14a of the openings 14 and the shape of the openings 14 themselves cooperate to mix the separate fluids 17 and 18 and also to form a single jet 35 of the mixed fluids which can be pointed in any desired direction.

The embodiments of a fluid dispensing package using projection 19 as in FIGS. 1 and 3 have several advantages. If desired, a bag 10 as shown may be manufactured and sealed with a grommet 15 before being filled at all. Then the bag 10 can be filled with any desired fluids through the funnel-shaped projection 19, and a conventional heat sealing device can be applied across the edge of the bag 10 at the point where the projection 19 meets the bag 10. Thus a continuous seam 12 would be formed and projection 19 could be removed.

In order to save the expense of storing and shipping a package filled with relatively heavy fluids, projection 19 may be employed in another way. Instead of putting fluids through the projection 19 of the bag 10, dry substances can be put into the various compartments of the bag 10. The projection 19 can then be releasably sealed in some conventional way, such as by a metal clip or an elastic band.

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For example, the metal clip shown in FIG. 9 may be attached and seal the funnel-shaped projection 19 shown in FIG. 10 by folding projection 19 along line B—B (as may be seen in FIG. 3), and then applying clip 90 by compressing and sealing projection 19 against bag 10 between portions 91 and 93 of clip 90, and finally folding portions 92 about the compressed assembly. The package containing dry substances only can then be shipped and stored until needed. When desired, the sealing device can be removed, and fluids can be directed into the compartments where they will be mixed with the dry substances already present therein. The projection 19 can then be resealed, either by heat-sealing means, or again be mechanical means. The package can then be used as a fluid dispenser.

If a package is to be used as a fire-extinguisher containing the foam-creating substances previously described, it is particularly advantageous to ship and store a package containing only dry licorice and bicarbonate of soda in one compartment and dry aluminum sulfate in another. Sufficient quantities of these substances should be placed in their respective compartments so that saturated solutions will result even when the compartments are filled to their maximum fluid capacity.

When the fire-extinguisher is to be made ready for use, only water need be added to the two compartments, and it would not be necessary to take care that two fluids be kept separate in the filling process. The single opening 22 of the projection 19 is especially adapted for directing a single fluid into a bag 10.

Certain minor variations of these preferred embodiments will be apparent to those skilled in the art. For instance, the package need not be limited to two compartments, and a package may be constructed having any plurality of compartments. Also, the grommet need not take the precise form shown, so long as an hermetic seal is provided which can be removed without impairing the package openings.

This invention, accordingly, is not limited to the precise form hereinabove shown, but includes modifications thereof within the principles hereinabove described and exemplified.

What is claimed is:

1. A container comprising a pair of flexible outer sheets and at least one additional flexible inner sheet disposed therebetween, said outer and inner sheets being connected adjacent the periphery thereof in a sealed relationship to form a plurality of compartments extending substantially parallel to one another, said container having an opening extending through the periphery of said sheets and intersecting the interior of said compartments, said opening forming an orifice in each of said compartments, and means for clamping said outer and inner sheets into sealed relationship to one another adjacent to said opening whereby when said clamping means are released the opening is adapted to discharge the contents of said compartments in a single stream.

2. The container of claim 1 wherein said inner and outer sheets each include a diverging section spaced apart from said opening and diverging outwardly from the remainder thereof, said diverging sections forming a diverging portion of said container, the periphery of the wider region of said diverging portion having an additional opening extending therethrough and intersecting the interior of said compartments, said additional opening form-

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ing an additional orifice in each of said compartments, the diverging section of said inner and outer sheets forming a plurality of funnels within said diverging portion, each of said funnels being in alignment with a different one of said compartments, whereby said funnels are adapted for filling the compartments of said container.

3. A plastic foam fire extinguisher comprising a pair of flexible outer sheets and at least one additional flexible inner sheet disposed therebetween, said outer and inner sheets being connected adjacent the periphery thereof in a sealed relationship to form a plurality of compartments extending substantially parallel to one another, a substantially saturated water solution of bicarbonate of soda containing a stabilizing agent in one of said compartments and a saturated solution of aluminum sulphate in another of said compartments, said container having an opening extending through the periphery of said sheets and intersecting the interior of said compartments, said opening forming an orifice in each of said compartments, and means for clamping the plurality of sheets into sealed relationship to one another adjacent to the opening of said container whereby when said clamping means are released the opening is adapted to discharge the contents of said compartments in a single stream.

4. A package for simultaneously discharging and mixing a plurality of fluids comprising a flexible container, means intersecting the interior surface of said container for dividing the interior of said container into a plurality of separate flexible compartments extending substantially parallel to one another, said container having an aperture disposed in one portion thereof adjacent an intersection of said dividing means with the interior surface of said container, said aperture being in communication with and forming an orifice in each of said compartments, whereby said aperture is adapted to discharge the contents of said compartments in a single stream, said container having a second aperture disposed in another portion of said container spaced apart from said one portion, said other portion being adjacent an intersection of said dividing means with the interior surface of said container, said second aperture being in communication with and forming an orifice in each of said compartments, and structure forming a funnel, the throat portion of said funnel being connected to said second aperture, said funnel having means for dividing the interior thereof into a plurality of separate passages, each of said passages being disposed in alignment with a different one of said compartments, whereby said funnel is adapted for filling the separate compartments of said package with fluids.

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