Feb. 9, 1965 B. R. BODELL 3,168,887

SHIPPING AND STORAGE CONTAINER FOR AQUATIC LIFE

Filed June 14, 1963

Fig. 1.

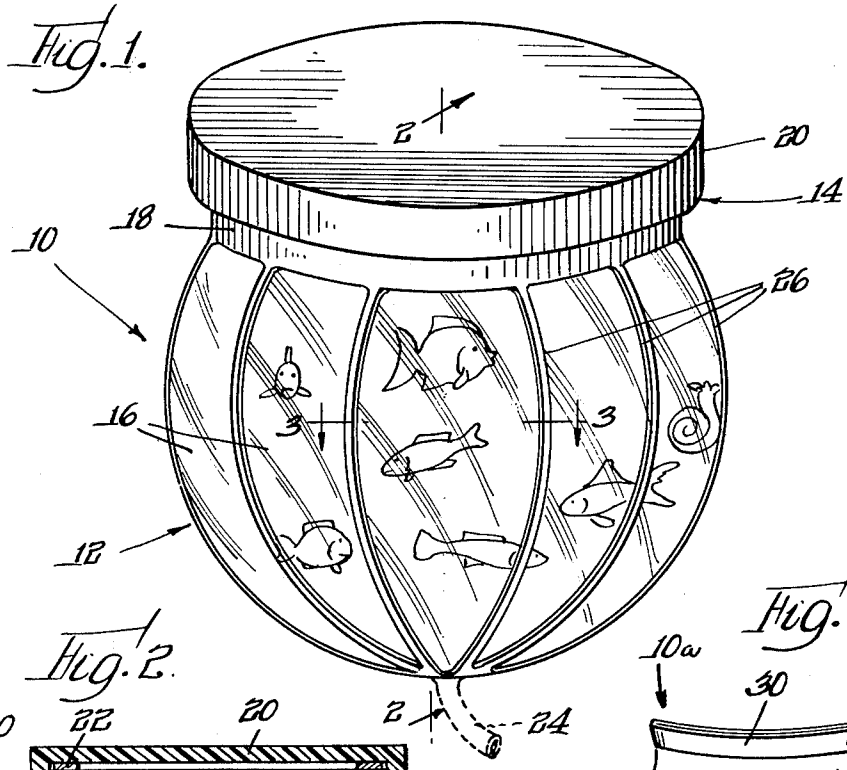


Fig. 2.

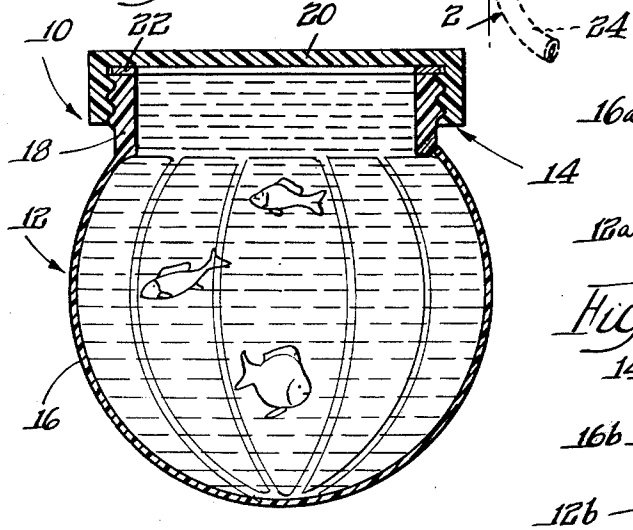


Fig. 4.

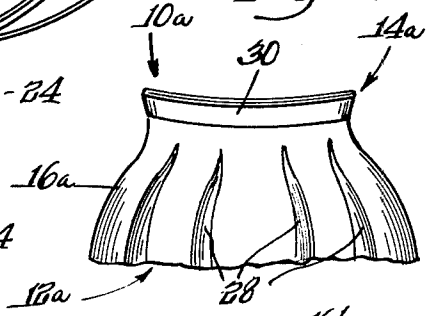


Fig. 5.

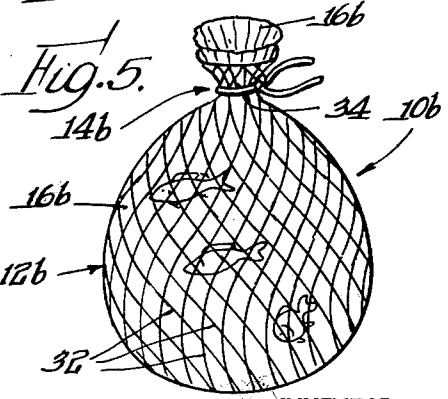
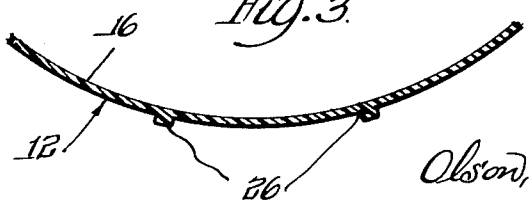


Fig. 3.



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SHIPPING AND STORAGE CONTAINER FOR AQUATIC LIFE

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This invention relates generally to the art of packaging and more particularly to containers for aquatic life.

In the past, shipping and storage containers for fish and other aquatic life have been manufactured from resinous plastic film. However, such containers have only been capable of holding fish in a live condition for about three days. Moreover, it has been necessary to provide an air or oxygen bubble of appreciable volume within these prior art containers in order to achieve even this comparatively short period of safe storage.

Therefore, an important object of the present invention is to provide a shipping and storage package for aquatic life which is capable of holding fish and the like in a live condition for prolonged periods.

Another object of the invention is to provide a package which is adapted to be charged with a mixture of water and aquatic life in a complete liquid fill and then sealed for shipping and storage.

A more general object of the invention is to provide a new and improved shipping and storage package for aquatic life.

A further object of the invention is to provide a supported film package for shipping and storing aquatic life.

A still further object of the invention is to provide a film package for aquatic life that is characterized by efficient gas transfer.

These and other objects and features of the invention will become more apparent upon a reading of the following disclosure.

A package in accord with the invention includes a flexible translucent container of silicone rubber film adapted to be charged with a mixture of water and aquatic life in a complete liquid fill and a closure for the container.

In order that the principle of the invention may be readily understood, three embodiments thereof, but to which the application is not to be restricted, are shown in the accompanying drawing wherein:

FIG. 1 is a perspective view of a shipping and storage package constructed in compliance with the invention for containing aquatic life;

FIG. 2 is a central sectional view on a reduced scale taken along the line 2—2 of FIG. 1;

FIG. 3 is a view taken substantially along the section 3—3 of FIG. 1 with the thickness of the film being exaggerated for purposes of illustration;

FIG. 4 is a fragmentary, side elevational view of a modified package constructed according to the invention; and

FIG. 5 is a perspective view of a second modified form of the package of the invention.

Referring now in detail to the drawing, specifically to FIGS. 1–3, a shipping and storage package or receptacle for aquatic life which is indicated generally by the numeral **10** is seen to comprise a water impervious flexible translucent container or envelope **12** and a closure unit **14**. The container **12** is fashioned from a gas transfer membrane or film **16**; and in compliance with the invention, the film **16** is selected to be fabricated from silicone rubber. This material is unusually useful for the purposes of the invention because it readily passes oxygen from the atmosphere into the container to be diffused through the contents thereof for use by the contained aquatic life in their metabolic processes. This material also passes carbon dioxide out of the container whereby

to preserve a level of acidity in the watery contents that is conducive to preserving fish and the like in a living condition.

A silicone rubber film having a thickness of approximately five mils has been found to be eminently suitable for the purposes of the invention while films having thicknesses of from about one to about ten mils have been found to be operative. Films of the specified thickness are sufficiently translucent to satisfy the demands of aquatic life placed in the package **10**. These film thicknesses are indicated for purposes of example and are not intended to be limiting. Walls of these thicknesses serve to retain the liquid and thus inherently exhibit a low moisture vapor transmission rate.

The closure unit **14** includes a relatively stiff, externally threaded collar member **18** which advantageously merges into the film **16**. The closure unit additionally includes a cooperatively threaded screw cap **20** and, if desired, a sealing gasket **22**. The screw cap **20** can be made from various metals and thermoplastic resins, and the collar **18** may be fabricated from a polymeric material which is both compatible with silicone rubber and capable of forming a fusion joint therewith. Alternatively, the film **16** and the collar **18** may be fabricated entirely from silicone rubber.

Because it is unnecessary to capture a large bubble of air or oxygen in the package **10**, it is possible to fill the package through the open top defined by the collar **18**. In such case, fish, snails, aquatic vegetation and other similar aquatic life may be readily poured into the container **12** with a corresponding quantity of water; and as is well shown in FIG. 2, the container **12** may be charged in a substantially complete liquid fill. Thereafter, the screw cap **20** will be assembled to the collar **18** for closing the package **10**. It has been found that, during a period of extended use, a gas bubble will develop in the package **10** even if the package has been completely filled with liquid initially; and the development of this gas bubble occurs because the net gas transfer into the package is positive. The resultant increase in the net contained volume of the package is compensated for by the resiliency of the material of film **16**. However, it is also possible to collapse a portion of the container **12** during filling to accommodate the positive net gas transfer.

If desired, the container **12** may be optionally provided with an integral siphon tube **24** to be used in introducing a slurry of food and water into the package **10** after the same has been filled.

In compliance with another important feature of the invention, the shipping and storage package **10** includes a flexible support arrangement which, in the embodiment of FIGS. 1–3, comprises a number of arcuate ribs **26** which radiate from the collar **18** and which are formed integrally with the film **16** of the container **12**. The unitary relationship of the ribs **26** and the film **16** is well illustrated in FIG. 3. The ribs **26** advantageously comprise thickened sections of the silicone rubber material from which the film **16** is fabricated; and when so made, the ribs **26** define tensilely strong elements disposed on the external surface of the film **16** to restrain the film against excessively local stretching.

While a particular embodiment of the invention has been thus far shown and described, it should be understood, of course, that the invention is not limited thereto since many modifications may be made. Therefore, and in order to enhance the understanding of the invention, modified embodiments are shown in FIGS. 4 and 5; and since these latter embodiments incorporate certain elements which are similar to those found in the embodiments of FIGS. 1–3, like numerals have been used to

designate like parts with the suffix letter "*a*" being employed to distinguish those elements associated with the embodiment of FIG. 4 and with the suffix letter "*b*" being utilized to indicate the elements associated with the embodiment of FIG. 5.

The shipping and storage package which is indicated generally by the numeral **10***a* in FIG. 4 is particularly characterized by the construction of closure unit **14***a* and by the configuration of the silicone rubber film **16***a* into a series of accordion pleats **28**. The closure unit **14***a* specifically comprises a heat-sealed band **30** which is used in effectuating closure of the container **12***a* after it has been filled. The accordion pleats **28**, on the other hand, are incorporated in order to increase the surface area of the container **12***a* for a given enclosed volume whereby to enhance the gas transfer characteristics of the container.

The shipping and storage package **10***b* which is shown in FIG. 5 is also characterized by the type of closure unit **14***b* which is incorporated and by the selection of the support arrangement to comprise a network of tensilely strong, fiber strands **32** which are united into a mesh sack. The fiber strands **32** are juxtaposed externally with the film **16***b* of container **12***b* for mechanically restraining the container against excessive local stretching; and the mesh sack which is made up of the strands **32** is adapted to receive the unfilled container **12***b* whereupon the water and aquatic life may be introduced into the container until it is filled. Then closure may be effected; and in the embodiment of FIG. 5, the closure unit constitutes a simple tie **34** that is defined by a string, strap or other similar element wrapped about the concentric necks of the mesh sack and the film container.

The specific examples herein shown and described are to be considered as being primarily illustrative. Various changes beyond those described will, no doubt, occur to those skilled in the art; and such changes are to be understood as forming a part of this invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A receptacle for containing and shipping live aquatic life comprising a water impervious envelope having a thin, translucent film wall of silicone rubber with a low moisture vapor transmission rate and a relatively high oxygen and carbon dioxide permeability, said envelope being substantially filled with a mixture of water and aquatic life, and means for closing said envelope whereby water will not flow through the wall but oxygen and carbon dioxide will ingress and egress, respectively, to permit the aquatic life to exist without deterioration.

2. A receptacle for containing and shipping live aquatic life comprising a water impervious envelope having a thin, translucent film wall of silcione rubber with a low moisture vapor transmission rate and a relatively high oxygen and carbon dioxide permeability, said envelope having tensilely strong support means along portions

thereof to restrain said envelope against excessive local stretching, said envelope being substantially filled with a mixture of water and aquatic life, and means for closing said envelope whereby water will not flow through the wall but oxygen and carbon dioxide will ingress and egress, respectively, to permit the aquatic life to exist without deterioration.

3. A receptacle in accordance with claim 1 and wherein said wall has a thickness in a range of about 1 to about 10 mils.

4. A receptacle for containing and shipping live aquatic life comprising a water impervious envelope having a thin, translucent film wall of silicone rubber with a low moisture vapor transmission rate and a relatively high oxygen and carbon dioxide permeability, a mesh sack of tensilely strong flexible strands juxtaposed externally in widely distributed supporting engagement about said envelope mechanically to restrain said envelope against excessive local stretching, said envelope being substantially filled with a mixture of water and aquatic life, and means for closing said envelope whereby water will not flow through the wall but oxygen and carbon dioxide will ingress and egress, respectively, to permit the aquatic life to exist without deterioration.

5. A receptacle in accordance with claim 2 wherein said support means includes a plurality of spaced ribs formed integral with said envelope.

6. A receptacle in accordance with claim 2 wherein said envelope includes a sequence of folds whereby to provide a high ratio of surface area to contained volume.

7. A receptacle in accordance with claim 1 wherein said envelope has means providing a siphon tube for introducing a slurry of food and water after the envelope has been filled.

References Cited by the Examiner

UNITED STATES PATENTS

1,607,626	11/26	Hopkinson	150—.5
1,733,571	10/29	Alden	206—45.34
2,199,915	5/40	Howard	150—.5
2,232,783	2/41	Housheer	206—56
2,316,607	4/43	MacDonald	206—46
2,406,679	8/46	Gray	150—.5
2,634,856	4/53	Perkins	206—63.2
2,652,807	9/53	Washburn	206—46
2,949,882	8/60	Thomas	206—46
2,990,948	7/61	Zackheim	206—46
2,994,424	8/61	Selby et al.	206—46

OTHER REFERENCES

Proceedings of the American Society for Horticultural Science, vol. 57, 1951, page 423.

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