Aug. 12, 1952 D. W. HILL 2,606,586

CONTAINER

Filed June 3, 1949 2 SHEETS—SHEET 1

Fig. 1.

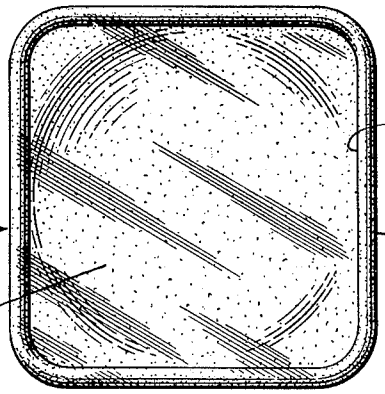

Fig. 2.

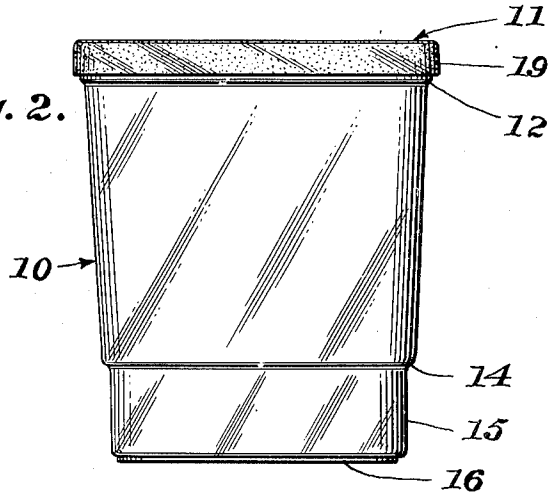

Fig. 3.

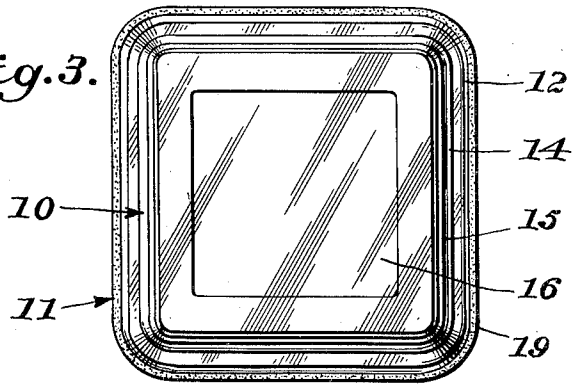

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Fig. 5.

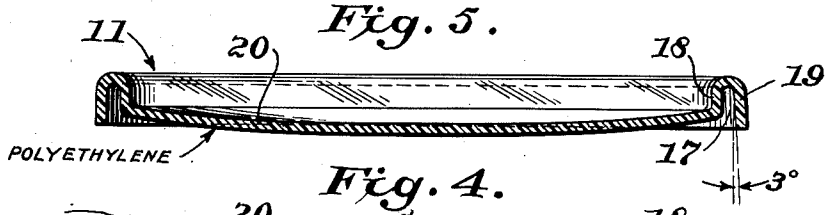


Fig. 4.

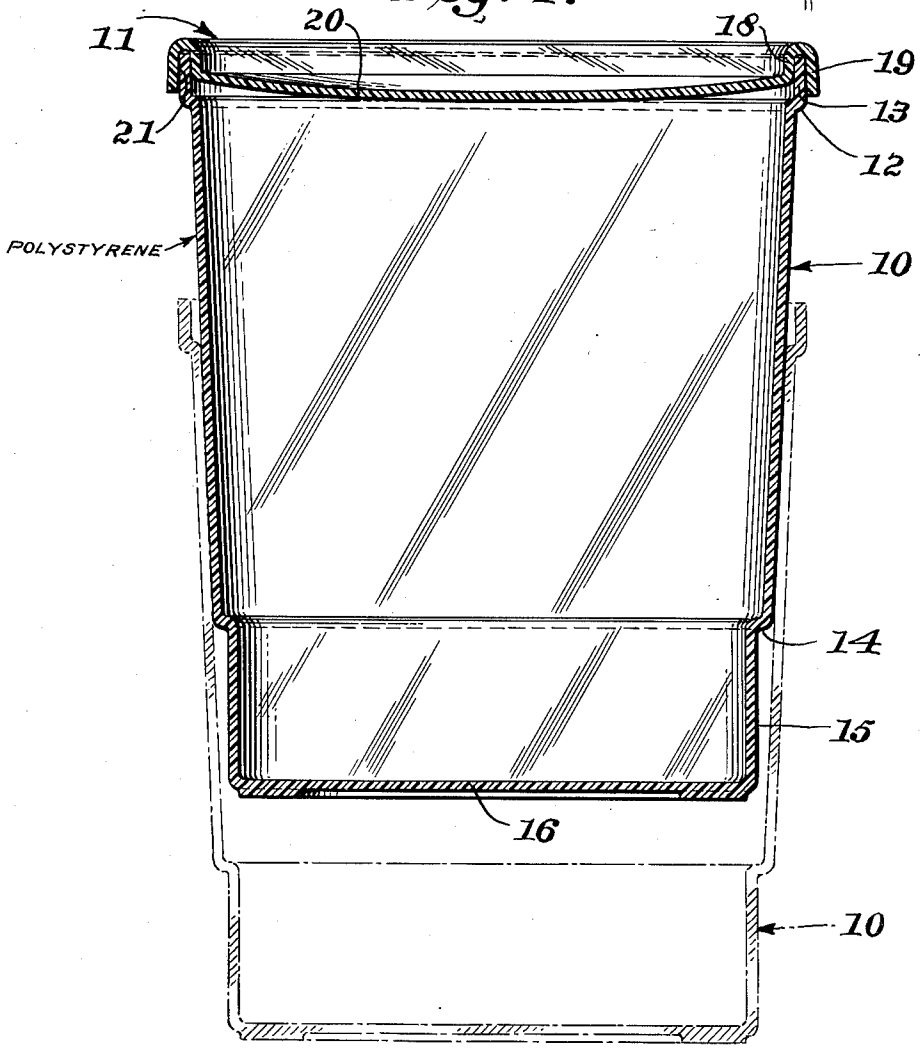
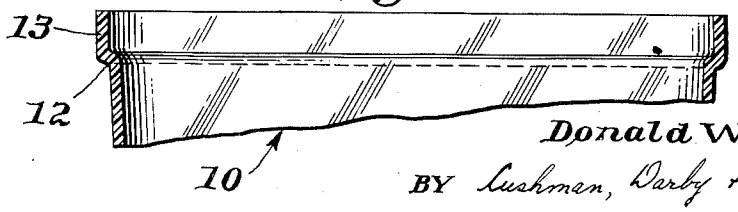


Fig. 6.



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UNITED STATES PATENT OFFICE

2,606,586

CONTAINER

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2 Claims. (Cl. 150—0.5)

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This invention relates to containers particularly useful for foods, medicines and chemicals, and where the same are stored in refrigerators or frozen food lockers.

The primary object of the invention is to provide a receptacle which may be tightly sealed at all times to thereby preserve the contents as well as prevent the escape and diffusion of gases and vapors from the contents into the storage space. In this connection, the container is of such character that a vacuum seal may be obtained as when products which initially give off a vapor are enclosed and the vapors subsequently condensed under low temperature.

A further object of the invention is to provide a container which will have sufficient rigidity and strength that it will not become distorted by pressure changes due to condensation of gases within the container or by reason of the weight and character of the contents. Of equal importance, the body of the container is so constructed that the thickness of its side wall is made substantially uniform circumferentially and preferably also longitudinally whereby the container will support considerable weight without fracture.

An additional object of the invention is to provide a container which will maintain a tight seal at all times regardless of temperature conditions such as may contribute to differences in expansion and contraction of the materials of which the container and its closure are made. That is to say, the body of the container is made preferably of a flexible, transparent, difficultly distortable plastic material such as polystyrene, and the closure of the container is made of an opaque, readily distortable, flexible material such as polyethylene. Notwithstanding that polystyrene is subject to greater and more rapid change in dimensions under temperature variations than polyethylene, a tight seal is always maintained. This is accomplished by providing the closure with a dished central portion or compensating area whereby at no time do the differences in coefficient of expansion and contraction between the polystyrene body and the polyethylene cover strain the sealing relationship or break the seal.

Containers in accordance with this invention may be of any desired shape but preferably are rectangular and adjacent their bottoms the containers are of reduced dimension to enable them to be nested in a manner which will allow them to be economically shipped and stored for use.

In the drawings:

Figure 1 is a top view of the cover in place;

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Figure 2 is a side elevation of the same;

Figure 3 is a bottom view;

Figure 4 is a vertical section through the container with the cover thereon, enlarged, and also showing in dot and dash lines a second container to illustrate nesting;

Figure 5 is a detailed sectional view of the cover member; and

Figure 6 is a fragmental sectional view to illustrate the top portion of the jar or container in detail.

Referring to Figures 2 and 4, the container is provided with a body indicated as a whole at 10 formed of polystyrene which is transparent and relatively stiff, i. e., flexible, but difficultly distortable. The walls of the jar or receptacle 10 possess sufficient strength to resist distortion due to pressure differentials created within the container as by condensation of vapors and gases therein, as well as to resist distortion by reason of the weight and character of the contents. The molecular weight of the polystyrene employed may vary between 1,040 and 104,000, although the products having the higher molecular weights are the more desirable. The plastic is molded in a conventional manner and the polystyrene itself is a well known commercial product available from a number of different manufacturers.

The jar 10 is closed by a cover 11, as illustrated in Figures 1, 4 and 5 which is made of polyethylene. This material is flexible, rubbery and opaque, and I find that when used with polystyrene, tends to adhere to the same and produce a seal in a highly desirable manner, as illustrated in Figure 4. The polyethylene is also a well known commercial plastic, and preferably is of the type which contains at least one thousand CH_2 groups or more to the molecule.

Referring to Figure 4, I find that it is essential that the thickness of the side wall of the container be substantially uniform circumferentially. When this is done, the container will support tremendous weights superimposed upon it without cracking or fracturing, and notwithstanding changes in temperature conditions or the character of the contents. This is of tremendous importance in food lockers, and enables the receptacle to have a much greater utility. Also, the use of polystyrene is more desirable than glass, because the latter, if it fractures or breaks, will shatter, whereas the polystyrene body of the container of this invention, should this contingency occur, will not shatter.

The thickness of the wall of the container is preferably about .055 inch, plus or minus .003,

and in this connection, it is preferable that the longitudinal thickness of the side wall of the container also be substantially uniform. The thickness of the top edge 13 may vary slightly and be about .065 inch, plus or minus.

At its upper end the wall of the container is offset as of 12, and the offset marginal portion 13 at the top of the container forms the sealing edge for engagement with the closure 11. At its lower end, the side wall is provided with the inwardly directed circumferential shoulder 14 and the area of the container below this shoulder is reduced, as shown at 15 to the bottom 16. The thickness of the wall about the reduced area 15 must also be substantially uniform circumferentially and preferably longitudinally. The thickness of the bottom 16 may vary, although preferably, the thickness of the side walls and bottom of the container will be the same, as indicated above. The purpose of the reduced portion 15 becomes apparent upon reference to Figure 4 where the containers are shown in nested relation, which is highly economical for shipping and stock storing purposes.

The closure 11 has a circumferential sealing groove 17 which receives the upper edge 13 of the container, as shown in Figure 4. The sealing groove is a peripheral flange of U-shaped section and has the inner and outer continuous walls 18 and 19, as shown in Figure 5, and a central dished portion 20 which is of considerable importance. That is to say, the polystyrene or body material expands and contracts much greater and much faster than does the polyethylene of the closure under changes in temperature. Moreover, when products are initially placed in the body 10, they may tend to give off gases, and although the pressure may be slight, if a proper seal were not provided, the cover would be loosened from its sealing relation with the body. Likewise, after a reduced temperature has been reached and the gases evolved are condensed, a vacuum is created, and under such circumstances, the seal might also be destroyed.

I have discovered that these contingencies are overcome by forming the dished portion 20 with an excess area. In other words, the dished portion 20, which is defined at its periphery by the inner wall of the sealing groove 17 of the closure, has an area which, at all times, is great enough to compensate for the differences in expansion and contraction of the plastic materials of the container body and closure without straining the seal. At the same time, this excess material in the central area 20 enables gas pressures in the container to be accommodated in that the dished portion may then bow upwardly, and vacuum conditions created by condensation of gases are also taken care of without breaking the snug sealing contact illustrated in Figure 4, since the dished portion will then bow inwardly, as shown. In fact, when a vacuum is created within the container 10, as by the condensation of gases, and which vacuum may be as much as two inches or more, I have found that it will be retained under actual conditions for an indefinite length of time, for example eight months under practical tests.

It will be noted that the top edge 13 of the container body is received in the sealing groove 17 of the closure 11, and that a tight, snug seal is provided, as shown in Figure 4, which seal is considerably enchanced by the adhesive affinity of the polyethylene for the polystyrene.

As will be observed, the body 10 is made of polystyrene plastic of such character that it will not distort under the various conditions of use whereas the closure 11 is made of polyethylene which is relatively distortable. It would not be possible to make the body of polyethylene because pressure differentials, weight of superposed filled containers or other articles, as well as the weight of the contents, would cause distortion of such a body and would be undesirable. Likewise, it would not be possible to have a polystyrene body and a polystyrene cover since the tight adhesive sealing relation described above would be lost, and in the presence of pressure differentials created either by gas expansion or condensation, the cover would be strained and the seal broken. On the other hand, by making the cover of distortable material, a central compensating area 20 may be advantageously used to take care of both differences in the coefficient of expansion and contraction between the respective plastic materials, and also to assure that the container will be equally satisfactory where gas pressures are created, and where a vacuum is produced by condensation of gases within the container.

The plastic materials are odorless, tasteless, moisture-resistant and inert with respect to most foods, medicines and chemicals, and have a long life.

I claim:

1. A generally box-like container having a body of flexible but difficultly distortable polystyrene plastic, and a closure of flexible and distortable polyethylene plastic, said closure having a depending peripheral flange and intermediate dished portion thereby providing a peripheral sealing groove, the side walls of which snugly and adhesively receive the top edges of the body to form a tight seal, and said intermediate dished portion providing for the maintenance of a tight seal by compensating for differences in the coefficient of expansion and contraction between the respective plastic materials of the body and the closure.

2. A generally box-like container having a body of flexible but difficultly distortable polystyrene plastic, said body having a generally square bottom, walls and opening and having walls outwardly offset at the top edges, and a closure of flexible and distortable polyethylene plastic, said closure having a depending peripheral flange and intermediate dished portion thereby providing a peripheral sealing groove, the side walls of which snugly and adhesively receive said offset edges of said body to form a tight seal.

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