

PATENT SPECIFICATION (11)

1 327 737

DRAWINGS ATTACHED



1 327 737

- (21) Application No. 8848/72 (22) Filed 25 Feb. 1972 (19)
 (31) Convention Application No. 119 162 (32) Filed 26 Feb. 1971 in
 (33) United States of America (US)
 (44) Complete Specification published 22 Aug. 1973
 (51) International Classification B65D 25/14
 (52) Index at acceptance
 B8D 1A4A 1B1 1C 1F1 7PY
 B2E 219 23Y 278 285 28Y 327 32Y 33X 428 431 432 43X
 44Y 488 498 515 516 52Y 541 575 576 58Y 668
 F4U 52B

(54) COATED CONTAINER AND METHOD OF COATING

(71) We, DART INDUSTRIES INC., a Corporation organised and existing under the Laws of the State of Delaware, United States of America, of 8480 Beverly Boulevard, Los Angeles, State of California, 90054, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates generally to containers and more specifically, it relates to expanded plastics containers.

Expanded plastic bead containers of styrene and other materials may be used in the field of hot drink cups. Expanded plastic bead (e.g., styrene bead) containers have not been generally utilised in packaging diary products such as yogurt, cottage cheese, sour cream and other products such as margarine, potato salad and sauerkraut. One reason for this is that the liquid components of these materials will bleed through the container. Moreover, these containers are pervious to oxygen which tends to promote spoilage if the package is stored for a long time. Certain commercial and economic considerations, however, dictate the desirability of utilising expanded plastic bead containers for packaging of the foregoing products.

The invention provides a coated container comprising

(a) expanded polystyrene side and bottom walls; and

(b) a coating on said container set in direct contact with said expanded polystyrene, said coating comprising a vinylidene chloride polymer, a surfactant comprising a member selected from the group of a material of the homologous series of nonyl phenoxypoly (ethyleneoxy) ethanols, and a microcrystalline wax.

The invention also provides a method of coating an expanded plastics container com-

prising (a) applying a flowable coating comprising a vinylidene chloride polymer, a surfactant comprising a member selected from the group of a material of the homologous series of nonyl phenoxypoly (ethyleneoxy) ethanols, and a microcrystalline wax to the interior of said container, and (b) revolving said container around a central axis thereof to spread evenly said coating.

The method preferably includes the step of drying said coating in a microwave oven following the rotation of said container.

It is preferred that the speed of rotation is in the range of 2000 to 3000 revolutions per minute.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings, in which:—

Figure 1 is a cross-sectional elevation of a container,

Figure 2 is a view similar to Figure 1 showing a container with a lid member installed thereon,

Figure 3 is a cross-sectional view showing three of the containers in nested relationship, and

Figure 4 is a schematic perspective view showing the application of a coating material to a container.

Referring to the drawings, and particularly Figure 1, a package comprises an expanded plastic bead container 1 and a coating 2 on said expanded plastic material comprising a Saran latex material set in direct contact with the material of the expanded plastic bead container. The word 'Saran' is acknowledged to be a Trade Mark. It is preferred that the expanded plastic bead material be of polystyrene of a type which may be used for the production of meat trays, hot drink cups, etc.

The Saran latex material used for the coating preferably comprises a high vinylidene chloride content Saran. The Saran latex material also includes a surfactant

which has been found to promote easy application and complete coverage of the coating; and, an anti-blocking material which has been found to facilitate the stacking and unstacking of containers produced. The surfactant material comprises a member selected from the group of nonyl phenoxypoly (ethyleneoxy) ethanols, of which certain members may be preferable, but all of which are useful. The antiblocking composition is a microcrystalline wax. Extremely good results have been obtainable from the foregoing composition with a Saran present in the amount of about 80 to about 95 percent by weight, a surfactant in the amount of about 5 to about 15 percent by weight and an anti-blocking material in the amount of about 1 to about 10 percent. The presently preferred coating composition consists of a polyvinylidene chloride Saran in the amount of about 85 to about 90 percent by weight, a member selected from the group of homologous series of nonyl phenoxypoly (ethyleneoxy) ethanols, present in the amount of about 6 percent to about 10 percent by weight and microcrystalline wax present in the amount from about 2 percent to about 5 percent. All of the foregoing are based on weight percent of liquids.

One of the advantages of the container of the example is that the coating inhibits blocking as is sometimes occasioned by other coatings. As shown in Figure 3, the cups can be nested together and easily unnested without undue sticking. This antiblocking feature is somewhat unexpected in view of the known static friction qualities of a high vinylidene chloride content material.

An important advantage of the container of the example is the vapour barrier property of the coating material on an expanded plastic bead container. The coating appears to serve as a vapour barrier which retains not only vapours but liquids as well, and restricts the entrance of oxygen and other gases into a sealed container. Also the coating seemingly provides greater thermal insulation capacity to the already good insulation provided by the expanded plastic beads. Thus, when a container as described in this example is formed into a complete package by applying a lid 3 as shown in Figure 2, the package thus assembled is ideal for dairy products and the other previously mentioned products which heretofore have not generally been packaged in expanded plastic bead containers.

Referring once again to Figure 2, the lid 3 is formed with a downwardly directed U-shaped groove having an inner wall 5 and an outer wall 6 which are arranged to fit on an upstanding peripheral edge portion 7 of container 1. A shoulder portion 8 of external wall portion 6 is arranged to snap-fit over external ledge 9 of container 1 to form

a relatively tight seal. An inwardly directed shoulder 10 is also arranged to locate in groove 11 and further serves to seal the container. As can best be seen in Figure 3, a stacking feature is provided by means of stacking ledge 13.

The coated container according to the example is relatively easy to manufacture. A container 1 can be positioned with its open end downward and held in position by a vacuum pot or chuck 14 as shown in Figure 4. The Saran latex coating material can then be sprayed into the container 1 by nozzle 15, while at the same time the container is rotated. The rotation assures complete coverage of the interior and further, if the rotation is conducted at high speed, it has been found that the coating is evened out and completely impregnated into the plastic material. At high rotation speeds it is possible to drive some of the coating material completely through the plastic material of the container. To accomplish this advantageous result it is desirable to rotate a typical container having a draft angle of between 5° to 7° at a speed in excess of 2000 revolutions per minute and preferably in excess of 3000 revolutions per minute.

A container thus coated is then placed on a drying oven conveyor (not shown) and preferably moved through a microwave oven which quickly dries the coating from the inside out. This form of drying energy is not harmful to the container and serves to give it a hardened film without surface bubbles. If desirable, the container can then be decorated by printing or embossing. It is an advantage of the example shown in and described with reference to the drawings that the containers can be coated before the printing or embossing operation without deleteriously affecting the barrier or insulation qualities of such.

The following specific example illustrates the advantages of the invention: Yogurt was placed in a container as shown in Figure 2 and having a coating consisting of 100 parts by weight of a high vinylidene chloride latex, sold as Dow Latex XD-7151 and available from the Dow Chemical Company, Midland, Michigan; 10 parts by weight of a surfactant solution of nonyl phenoxypoly (ethyleneoxy) ethanols, sold as IGEPAL-CO-630 and available from GAF Corporation, New York, New York; and 5 parts by weight of a microcrystalline wax solution, sold as NOPCO 1055-M and available from NOPCO Chemical Division of Diamond Shamrock Chemical Company, Newark, New Jersey. The yogurt was found to be fresh and edible after storage under refrigeration for a period of about 85 days. Yogurt stored in conventional containers made of impact styrene was found to be spoiled and considered "rotten" after the same period

of storage under substantially identical conditions.

One of the advantages of the illustrated container is that various thicknesses of the coating material 2 can be applied to the container 1. It is currently preferred to have a thickness of coating material in the range of about .0001 to about .0015 on the inside of the container.

WHAT WE CLAIM IS:—

1. A coated container comprising (a) expanded polystyrene side and bottom walls; and (b) a coating on said container set in direct contact with said expanded polystyrene, said coating comprising a vinylidene chloride polymer, a surfactant comprising a member selected from the group of a material of the homologous series of nonyl phenoxypoly (ethyleneoxy) ethanols, and a microcrystalline wax.

2. A method of coating an expanded plastics container comprising (a) applying a flowable coating comprising a vinylidene chloride polymer, a surfactant comprising a member selected from the group of a material of the homologous series of nonyl phenoxypoly (ethyleneoxy) ethanols, and a

microcrystalline wax to the interior of said container, and (b) revolving said container around a central axis thereof to spread evenly said coating.

3. The method as claimed in claim 2 further comprising the step of drying said coating in a microwave oven following the rotation of said container.

4. —The method as claimed in claim 2 or claim 3 wherein the speed of rotation is in the range of 2000 to 3000 revolutions per minute.

5. A method of coating an expanded plastic container substantially as hereinbefore described with reference to the accompanying drawings.

6. An expanded plastics container when coated by the method of any one of claims 2 to 5.

7. A container substantially as hereinbefore described with reference to and as shown in Figure 1 and Figure 2 of the accompanying drawings.

BOULT, WADE & TENNANT,
Chartered Patent Agents,
34 Cursitor Street,
London, EC4A 1PQ.

of storage under substantially identical conditions.

One of the advantages of the illustrated container is that various thicknesses of the coating material 2 can be applied to the container 1. It is currently preferred to have a thickness of coating material in the range of about .0001 to about .0015 on the inside of the container.

WHAT WE CLAIM IS:—

1. A coated container comprising (a) expanded polystyrene side and bottom walls; and (b) a coating on said container set in direct contact with said expanded polystyrene, said coating comprising a vinylidene chloride polymer, a surfactant comprising a member selected from the group of a material of the homologous series of nonyl phenoxypoly (ethyleneoxy) ethanols, and a microcrystalline wax.

2. A method of coating an expanded plastics container comprising (a) applying a flowable coating comprising a vinylidene chloride polymer, a surfactant comprising a member selected from the group of a material of the homologous series of nonyl phenoxypoly (ethyleneoxy) ethanols, and a

microcrystalline wax to the interior of said container, and (b) revolving said container around a central axis thereof to spread evenly said coating.

3. The method as claimed in claim 2 further comprising the step of drying said coating in a microwave oven following the rotation of said container.

4. The method as claimed in claim 2 or claim 3 wherein the speed of rotation is in the range of 2000 to 3000 revolutions per minute.

5. A method of coating an expanded plastic container substantially as hereinbefore described with reference to the accompanying drawings.

6. An expanded plastics container when coated by the method of any one of claims 2 to 5.

7. A container substantially as hereinbefore described with reference to and as shown in Figure 1 and Figure 2 of the accompanying drawings.

BOULT, WADE & TENNANT,
Chartered Patent Agents,
34 Cursitor Street,
London, EC4A 1PQ.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1973.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,
from which copies may be obtained.



* C L M S *